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## Northwest Power and Conservation Council

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August 6, 2024

### MEMORANDUM

**TO:** Council Members

**FROM:** Jennifer Light, Director of Power Planning  
Patty O'Toole, Director of Fish and Wildlife  
John Shurts, General Counsel

**SUBJECT:** (1) Update on Columbia River Treaty Negotiations  
(2) Staff discussion of Columbia River Treaty Agreement in Principle

On July 11, 2024, US President Biden and Canadian Prime Minister Trudeau released statements announcing that negotiators for the two nations had reached an agreement in principle on "modernizing" the Columbia River Treaty. Staff provided information to the Council at that time on the agreement in principle, and the agreement also received substantial coverage in the press.

On the agenda for the August Council meeting is a presentation by federal officials titled at their request an Update on Columbia River Treaty Negotiations. We assume the presentation will focus mostly on the agreement in principle and what might come next.

The presenters will include Jill Smail from the State Department. Jill Smail has been the lead negotiator for the US. Presenters will also include Pete Dickerson from the Corps of Engineers, Ryan Couch from NOAA Fisheries, Roland Springer from the Bureau of Reclamation, and Hub Adams from Bonneville. The federal officials have said this is to be a presentation only, and they will not be taking questions.

The federal officials provided the following three documents from the State Department's website from July 11 for the packet for the presentation:

[Statement from President Joe Biden on Reaching an Agreement in Principle on Modernization of the Columbia River Treaty Regime | The White House](#)

[Statement by the Prime Minister on an agreement-in-principle reached between Canada and the United States on the Columbia River Treaty | Prime Minister of Canada \(pm.gc.ca\)](#)

[Summary of the Agreement in Principle to Modernize the Columbia River Treaty Regime - United States Department of State](#)

And this document on the State Department's website from July 26, with more of the details on the agreement:

[Details About the Key Elements Agreed Between the United States and Canada Regarding Modernization of the Columbia River Treaty Regime](#)

We have included copies of the summary of the agreement and the details in the packet following this memorandum. The federal officials also made a public presentation on the agreement in principle on Monday, August 5, at which we learned a few additional details.

Also on the Council agenda, and following the Treaty presentation, is a brief discussion from staff about the implications of some of the changes in operations represented by the agreement in principle for the Council's power planning work and fish and wildlife program planning. The discussion will be led by Jenn Light, Power Planning Division Director, and Patty O'Toole, Fish and Wildlife Division Director.

To assist the members in understanding the information from both agenda items, attached to this memorandum is a brief background piece prepared by staff. It is organized into four parts:

- Treaty basics
- Flood control (now called Flood Risk Management)
- Coordinated power operations/Canadian Entitlement
- Flows for salmon migration and similar matters

Each section briefly summarizes the provisions of the existing Treaty. And then includes the summary of the agreement in principle as to how it would change the Treaty.

Staff will supplement this information with brief comments on the implications for the power planning and fish and wildlife work of the Council. And most of that will emphasize what is still uncertain and what information the Council is going to need from the federal agencies to do our work. This includes, for the most obvious example, information on how the new flood risk management operation is expected to affect cross-border flows and storage reservoir operations in the United States, important information for both fish and wildlife and power system planning purposes.

# Columbia River Treaty background

## Treaty basics

The US and Canada agreed to the Columbia River Treaty in 1961; came into force in 1964. Among other things, ratification required an agreement between Canada and British Columbia in which Canada transferred its rights and obligations under the Treaty to British Columbia.

Each nation named “entities” to implement the Treaty. The U.S Entity is shared by the Division Commander for the Corps of Engineers and the Bonneville Power Administrator. For “Canada” – meaning, in a practical sense, British Columbia – the Entity is BC Hydro, a provincial corporation that generates and sells electricity in the province.

The Entities in turn have named an operating committee and dedicated staff to implement the Treaty. The Treaty also directed the two nations to name members to a Permanent Engineering Board, to collect information on and review the manner in which the two nations are implementing the Treaty.

The name Columbia River Treaty can be misleading, implying something broader than the reality. More precise would be to call it the Treaty governing the development and coordinated operation of 15.5 million acre feet (maf) of storage in the Canadian portion of the Columbia River Basin for flood control and power optimization benefits downstream.

By its terms the Treaty required Canada to build three storage projects in the Columbia – what became Mica Dam and Keenleyside Dam on the Arrow Lakes in the mainstem Columbia, and Duncan Dam on an arm of Kootenay Lake – totaling 15 million acre feet of storage. All of that storage is subject to coordinated power operations; roughly 8.5 maf of that storage has been dedicated to flood control, an assured operation that comes to an end at the end of Sept 2024. More on those items below.

Under the Treaty, the Entities develop each year an Assured Operating Plan (AOP) for the “sixth succeeding operating year,” meaning five years ahead. (For example, the Entities approved the AOP for Operating Year 2021-22 in January 2016 <https://usace.contentdm.oclc.org/utis/getfile/collection/p266001coll1/id/7984>). The Entities also determine at that time what the downstream power benefits will be for that year (discussed later), a determination that later controls and is not affected by later planning or actual operations. The Entities then also agree to a Detailed Operating Plan (or DOP) each year just in advance of that operating year. And then work together on actual operations within year. [Note: Because of the uncertainty about flood control operations post-2024 (also discussed later), the Entities have been stymied the last few years in their attempts to agree to AOP for the operating years beginning in 2025 – this has been one of the drivers for the recent agreement in principle.]

[Note: One point to remember is that the impact of the Treaty is neither insignificant nor dominant on the river. By that I mean that the Treaty captures 15.5 maf of storage, in a river with an annual average runoff of roughly 135 maf at The Dalles and 198 maf at the mouth, and system storage of roughly 60 maf total. Think of the Treaty projects and operations as adding a roughly 10% increment of value in shifting flows and it is easier to understand the impacts.]

The Treaty also authorized the US to build Libby Dam on the Kootenai River, as it backs water up into Canada. (The Libby authorization is permanent, in that it remains even if the Treaty is terminated.) Libby is not operated as a Treaty dam, but its operations have to be and are coordinated with Treaty project operations. A Libby coordination agreement ends in Sept 2024 as well. The Treaty projects, especially Mica/Kinbasket, also contain approximately 5 maf of additional storage, called Non-Treaty Storage, which can be used only in coordination with and subordinate to Treaty operations and which is subject to a commercial agreement between Bonneville and BC Hydro.

The Treaty has no end date. Either nation can now terminate the Treaty, with 10 years' notice to the other nation. And of course, the two nations together can always mutually agree to get rid of or modify the Treaty, as they are doing now. Even if the Treaty has no end date, September 2024 is an important date under the original Treaty, as the date at which the flood control regime changes. More on that below.

**Agreement in principle:** The summary of the new Agreement in Principle says the agreement is to run for the next 20 years, and it is to be implemented through amendments to the Treaty. What is not clear yet is when we will see the new Treaty language to implement the agreement, how long it will take to develop and then ratify or put into force the modified Treaty, and whether all or some of the underlying terms of the original Treaty will still exist and come back into force after 20 years or will be replaced.

## **Flood control (now called Flood Risk Management)**

Under the terms of the Treaty itself, roughly 8.5 maf of storage has been dedicated to an assured coordinated flood control operation. Most of that (7.1 maf) was to be in Arrow, but the US and Canadian entities have agreed to move up to 3.5 maf from Arrow to Kinbasket (the reservoir behind Mica). **[Note:** Because the amount of storage in the system is substantially short of annual runoff, and does not really allow for “control” of floods, the Corps of Engineers and others some time ago switched to calling this flood risk management.]

The US paid Canada \$65 million in the 1960s for 60 years of that amount of dedicated flood control storage, an arrangement coming to an end at the end of September 2024.

Under the Treaty, flood control does not go away at that point. Instead, it shifts to something labelled “called-upon” flood control. Which as it sounds, means that under

certain circumstances, the US can still “call upon” BC to provide flood control storage in any particular year. The US has to be able to show that even with effective use of its own storage reservoirs, the US cannot manage flood risk to an acceptable level. The US also would have to pay the operating costs and economic losses for this flood control operation. Needless to say, this would be a highly unusual and awkward way to operate, and that is even before acknowledging that the two nations have very different opinions on what is required for the US to be able to trigger the called-upon operation.

**Agreement in principle: *Pre-planned flood risk management storage space.***

Canada will provide 3.6 maf in pre-planned storage for flood risk management. A point not in the summary of the agreement or the “details” document, but which is in the news accounts and was mentioned by the Corps’ representative in the public presentation on August 5, is that this means that in 70% of the water years *at a minimum*, there will be no or minimal impact to US reservoirs. In the 30% of higher water years, U.S. reservoirs will have to draft to lower levels to make enough flood risk space available. In the public presentation, the Corps’ representative also emphasized that the modeling and analysis is not complete, but in concept the impacts to Grand Coulee operations will be much less than was the concern with no agreement. (Note: We definitely need to know more about these details of possible impacts, to be able to understand and model system operations for both power and fish and wildlife considerations.)

[Note also: The agreement in principle does not indicate where Canada will provide the 3.6 maf of flood risk management. The assumption here – which seemed to be confirmed by the Corps’ representative - is that it will be in Arrow. Under the Treaty’s original flood control provisions Arrow was to provide 7.1 maf of flood control storage. The US and BC later agreed to an annual swap of 3.5 maf of that to Mica/Kinbasket. That left 3.6 maf of flood storage in Arrow as a general rule – it looks like what the agreement in principle has done is reestablish that 3.6 maf as the pre-planned flood management space.]

This portion of the agreement in principle is to be implemented this coming year if possible, in 2025, presumably well before the agreement in principle can be transformed into Treaty language and ratified. So, the parties will need to figure out how to implement this change under existing provisions and authorities to make it work. The Corps’ representative admitted this aspect was still unsettled and not yet agreed to.

*Flood risk management storage payments.* The US agreed to pay Canada \$37.6 million annually for this 3.6 maf of flood risk management space, starting in 2025. (And the flood space will not be made available if the payment is not available.) Once the agreement is in force, the US agrees to make available another \$16.6 million annually, for a total of \$54.2 million annually.

*Called-upon operation for additional space.* If the US needs additional space in Canadian reservoirs above 3.6 maf in any particular water year, the “called upon” provisions of the Treaty are still available. The US will have to pay more for that, and satisfy the various conditions for “called upon” storage.

At this point is unclear what will happen by default at the end of the 20-year agreement. That depends on the language drafted and integrated into the Treaty.

## **Coordinated power operations/Canadian Entitlement**

The Treaty calls for all 15.5 maf of Treaty to be dedicated to a coordinated power operation intended to optimize the use of that storage for downstream power benefits – the increment or increase in the value of the water used for power generation by being able to store water and shape releases to times of greater value.

The downstream power benefits are then “shared” – almost all of the benefits are realized as generation at the US projects, and then Canada is entitled to half of those downstream power benefits, known as the Canadian Entitlement. In the current year, the size of the Entitlement is 1141 MW capacity and 454 aMW energy. Bonneville is to deliver that to Canada. What it means in practice is that Powerex, BC Hydro’s power marketing arm, markets the Entitlement, realizing revenue for BC. [Note: BC sold the rights to the Entitlement for the first 30 years of the Treaty to a utility consortium in the NW, who in turn sold it to California utilities. BC reaped \$254 million from the sale – which is largely used to build the projects. Also, the north-south Intertie we benefit from today is an incidental if necessary result of that sale. The Entitlement “returned” to Canada in the 1990s.]

The Entitlement has been a source of controversy in recent years, especially in the US, especially among Bonneville’s customers and the Mid-C utilities (who contribute about 25% of the Entitlement). Without getting deep into the details, the size of the Entitlement, as noted above, is a calculated hypothetical based on a number of principles that are not all that relevant to current operations and power system values.

**Agreement in principle: Coordinated power operations/Canadian Entitlement reduction.** The agreement assumes continuation of the coordinated power operations. But, the size of the Entitlement will reduce to 660 MW capacity and 305 aMW beginning August 1 of this year (a roughly 60% reduction) and then trend down every year to stabilize in 2034 at 550 MW capacity and 225 aMW energy (50% of current).

[Note: This is one of the areas the parties want to implement right away – and has been implemented effective August 1 - even before the agreement is in force. Exactly how to make that happen will be interesting to watch.]

**Canadian flexibility.** An interesting add-on in the agreement is a concept called “Canadian flexibility.” As noted above, the Treaty requires coordinated power operations on the full 15.5 million acre feet of Canadian Treaty storage. Under the new agreement in principle, Canada will have the right to elect to reduce the coordinated amount of power operations storage down to 11.5 maf to 2039 and 10.5 maf after 2039. For every 1 maf reduction, the Canadian Entitlement will be reduced 6.5 percent. Presumably BC would make that election based on its sense of greater value to itself (whether power or something else) from removing that storage from coordinated operations. How this will

work, whether and when BC will make such an election, and what the impacts will be on storage releases and flows will all need to be tracked.

*Transmission.* The current Treaty says nothing about transmission except that it is a US obligation to provide for transmission to deliver the Entitlement. The agreement in principle includes a couple of brief commitments about transmission. One involves the existing transmission to deliver the Entitlement, allowing Powerex to assume the transmission capacity. Bonneville expects to save significant money by this. The most important is a carrot for BC (presumably important in the getting agreement on the reduction in the Entitlement), in which Bonneville and Powerex together “will conduct a study on expansion of new transmission as envisioned in the Infrastructure Investment and Jobs Act (P.L. 117-58), and on the basis of that study, BPA will determine whether to proceed on necessary domestic processes to implement the expansion as authorized in the IIJA.” The reference is to provisions in the Infrastructure Act specific to Bonneville, authorizing Bonneville to use some appropriated funds to study and expand transmission capability in part “to increase bilateral transfers of renewable electric generation between the western United States and Canada.”

## **Flows for salmon migration and similar matters**

The Treaty recognizes no purposes for coordinated operations other than for flood control and to optimize power generation. But, the Entities understand the Treaty to allow them to agree in any particular operating year to mutually beneficial arrangements to store above or draft below the storage project levels than would otherwise result from strict adherence to the Assured and Detailed Operating Plans, and that this may be done for both power and nonpower objectives. This is the source of what have been called the supplemental operating agreements.

The annual supplemental agreement of most importance has been the annual nonpower use agreement, allowing for (among other things) 1 to 1.5 maf of storage to be released to assist juvenile salmon migration in the U.S. portion of the system.

**Agreement in principle.** There is nothing in the agreement in principle about adding a third purpose to the treaty in general. But there are a number of related provisions:

*Salmon flows.* First, Canada will make available 1 maf in every year, and an additional 0.5 maf in dry years “to support salmon survival and migration.” This will turn what has been an annual supplemental agreement into a baked-in commitment. The amount is not more than already provided every year.

*Salmon reintroduction.* Second, the Agreement in Principle simply recognizes that “both countries and the Tribes and Indigenous Nations” on each side of the border are conducting salmon reintroduction studies and will coordinate on the studies.

*Ecosystem advisory board.* The US and Canada agree to form a “Tribal and Indigenous-led body that will provide recommendations on how Treaty operations can better support ecosystem needs and tribal and indigenous cultural values.” For the

August 5 public presentation, we learned that while many details still remain to work out, this body will be known as JEB for Joint Ecosystem Board, and it will operate to review operations for ecosystem effects, recommend future adaptations, develop adaptive management plans, and work to coordinate the work on reintroduction on both sides of the border.

An official website of the United States Government [Here's how you know](#)



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# Summary of the Agreement in Principle to Modernize the Columbia River Treaty Regime

## FACT SHEET

### OFFICE OF THE SPOKESPERSON

JULY 11, 2024

The Columbia River and its tributaries are the life spring and economic engine of the Pacific Northwest. For millennia, Tribes and Indigenous Nations have relied on it to sustain their culture. Additionally, the Columbia River and its tributaries account for 40 percent of U.S. hydropower, irrigate \$8 billion in agriculture products, and move 42 million tons of commercial cargo (\$20 billion in value) annually. Modernization of the Columbia River Treaty regime has been President Biden's top priority in the U.S. partnership with Canada, as he and Prime Minister Trudeau expressed in March 2023 when they committed to intensify efforts to reach agreement.

Today, we are happy to announce that the United States has reached agreement in principle with Canada on the key elements for a modernized Treaty regime. This negotiating milestone will build on our successful partnership in managing this precious shared resource and grow that partnership to meet future challenges including from climate change. The modernized Columbia River Treaty regime will benefit both countries through commitments on Indigenous inclusion, the ecosystem, power coordination, and flood risk management.

**Hydropower and transmission grid connectivity:** The United States and Canada have a shared goal of transitioning to renewable energy sources to meet growing demand on both sides of the border, which includes maintaining and enhancing our abundant existing clean energy sources like hydropower.

Power grid connectivity across the western United States and Canada is essential to avoid blackouts and mitigate extreme weather impacts to our energy systems. Modernization provides the opportunity

to enhance cooperation between the States' Bonneville Power Administration and Canadian utilities and will set the stage for potential additional grid connectivity to facilitate transfers of renewable energy between the countries. It also will continue power coordination for better optimization of the river system, helping keep the lights on.

In addition, modernization will result in an immediate 37 percent reduction in hydropower that the United States delivers to Canada under the current agreement, and a reduction of 50 percent by 2033. This will retain more clean energy in the United States to support a thriving modern economy without a diminishment of Canada's current clean energy mix.

Power transfers to Canada will reduce further if Canada decides to use more water storage at Canadian Treaty dams in British Columbia to meet domestic needs. As Canada exercises more reservoir flexibility, the size of the Canadian Entitlement will drop in proportion.

**Flood risk management to protect the United States downstream:** The United States will have access to pre-planned storage space behind Canadian Treaty dams for flood risk management. This means that in most years, U.S. reservoirs in the Columbia Basin will operate similar to today.

Pre-planned flood risk management in Canada protects the United States by helping to manage high flows originating in Canada, thus maintaining predictable flows in the Columbia Basin, which enables stable shipping operations, supports irrigation and agriculture, supports recreation, and protects ongoing efforts to support regional salmon populations. Recognizing this, the United States will compensate Canada for helping enable these additional benefits.

**Indigenous inclusion and ecosystem health:** To further cement and expand Tribal and Indigenous inclusion in a modernized Treaty regime, the United States and Canada will establish a Tribal and Indigenous-led body that will provide recommendations on how Treaty operations can better support ecosystem needs and tribal and indigenous cultural values. This body will provide an essential voice for U.S. Tribes and Canadian Indigenous Nations concerning possible adaptations of future operations to support a healthy ecosystem, improve salmon survival, and address cultural values of those who have been stewards of this resource since time immemorial.

**Supporting a healthy salmon population:** A modernized Treaty regime will include a long-term agreement to continue water flows (flow augmentation) from Canadian reservoirs to support salmon migration throughout the basin, including a strategy to bolster flows during dry years. Furthermore, both countries are committing to coordinate on studies on salmon reintroduction, which are led by U.S. Tribes and Canadian Indigenous Nations.

Reaching an agreement in principle on these key elements is an important milestone in the modernization of the Columbia River Treaty regime, and both countries are committed to proceed as quickly as possible to

finalize the text of the modernized agreement and bring it into force. Until both countries complete domestic processes for entry into force, the United States and Canada are preparing appropriate interim measures to transition implementation of Treaty operations to a modernized future that benefits the people and environment on both sides of the border.

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## TAGS

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# Details About the Key Elements Agreed Between the United States and Canada Regarding Modernization of the Columbia River Treaty Regime

JULY 26, 2024

This web page provides supplemental details regarding the “Summary of the Agreement in Principle to Modernize the Columbia River Treaty Regime,” available at

<https://www.state.gov/summary-of-the-agreement-in-principle-to-modernize-the-columbia-river-treaty-regime/>

*\*The term “agreement in principle” refers to a milestone in negotiations. Elements of an agreement in principle do not have the force of law. It means the United States and Canada have reached a meeting of the minds on core issues and have a roadmap for drafting text of a treaty amendment and related arrangements.*

**Preplanned Flood Control:** Following entry into force, Canada will provide the United States with 3.6 MAF of preplanned flood risk management (FRM) storage at Arrow Lakes. The United States and Canada are working to identify arrangements to implement the preplanned FRM for the upcoming flood season (spring of 2025).

**Compensation to Canada for Flood Control:** Annual payments will be made to Canada

- 1) Preplanned FRM payments are anticipated to be \$37.6 million and indexed to inflation, using the consumer price index (CPI), through 2044. This compensation will be owed the first year Canada provides the preplanned FRM.
- 2) The United States also recognizes that we receive additional benefits from preplanned FRM in Canadian reservoirs and will provide an additional \$16.6

million to Canada annually once the modernized agreement enters into force, indexed to inflation using the CPI, through 2044.

**Canadian Entitlement:** The Canadian Entitlement (CE) for the current (2023-2024) operating year was 1141 Megawatts (MW) in hydropower generation capacity and 454 average MW of energy. The following box is the scheduled glidepath of the CE, which reduces the CE at the beginning of the 2024-2025 operating year (beginning 8/1/24), stabilizing in 2033-2034 at 550 MW of capacity and 225 aMW of energy, and ending in 2044.

Operating Year	Agreement in Principle	
	Capacity	Energy
2025	660	305
2026	660	305
2027	660	305
2028	660	305
2029	660	305
2030	590	278
2031	573	225
2032	565	225
2033	558	225
2034	550	225
2035	550	225
2036	550	225
2037	550	225
2038	550	225
2039	550	225
2040	550	225
2041	550	225
2042	550	225
2043	550	225
2044	550	225

The CE may be further reduced, depending on how much flexibility Canada elects to use, as detailed in the following section.

**Canadian Flexibility:** The Treaty requires Canada and the United States to annually coordinate 15.5 million acre-feet (MAF) of reservoir storage space behind Canadian Treaty dams to optimize hydropower generation in both countries.

Canada can elect to reduce the coordinated storage to a minimum of 11.5 MAF in each year through 2039, and 10.5 MAF from 2039-2044 for their own domestic purposes.

For every MAF coordinated storage is reduced, the CE that the United States is required to deliver to Canada will be reduced by 6.5 percent.

**Transmission:** The Bonneville Power Administration (BPA) and Powerex (BC Hydro's energy marketing and trading arm) will enter into an agreement to allow Powerex to assume (in a manner consistent with BPA's transmission tariff that applies to other BPA contract-holders) and pay for existing transmission capacity, currently held by BPA to deliver the Canadian Entitlement.

**New Transmission:** BPA and Powerex will conduct a study on expansion of new transmission as envisioned in the Infrastructure Investment and Jobs Act (IIJA) (P.L. 117-58), and on the basis of that study, BPA will determine whether to proceed on necessary domestic processes to implement the expansion as authorized in the IIJA.

**Tribal and Indigenous Advisory Body:** The United States and Canada will form an indigenous-led body that will provide recommendations on how Treaty operations can better support ecosystem needs.

**Flows for Salmon:** Canada will provide 1 MAF of water flows in all years and an additional 0.5 MAF in dry years to support salmon survival and migration.

**Salmon Reintroduction:** The United States and Canada acknowledge that the Tribes and Indigenous Nations on each side of the border are conducting salmon reintroduction studies and will coordinate on these studies. The goal is to prevent duplication of effort and to facilitate information sharing.

**Kootenai/y Transboundary Collaborative Workgroup (KTCW):** The KTCW will gather the governments in the Kootenai/y Basin to explore adaptive management in the region for the benefit of the ecosystem and other priorities. The KTCW will coordinate with the Joint Ecosystem and Tribal and Indigenous Cultural Values Body and other forums to integrate Kootenai/y issues with the broader Columbia River Basin.

TAGS

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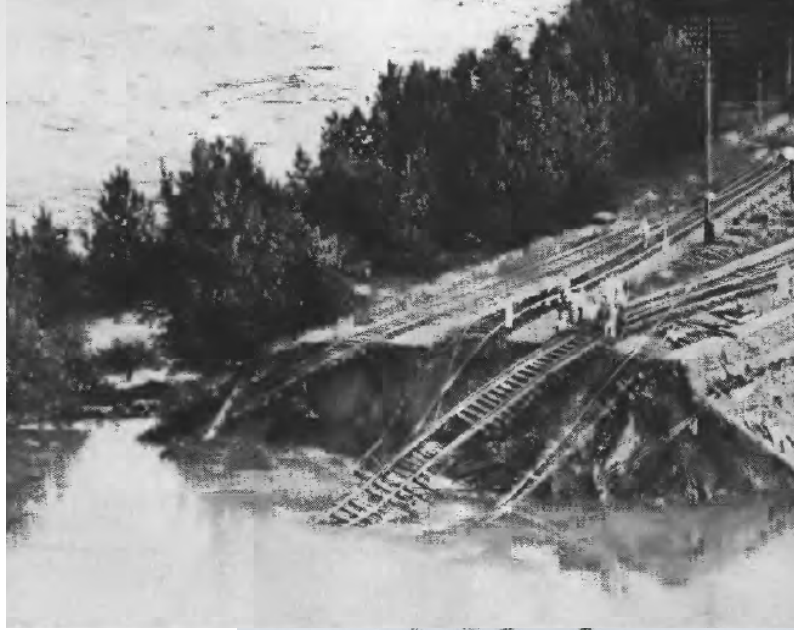
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# 1948 COLUMBIA RIVER FLOOD (VANPORT FLOOD)





# TREATY FLOOD RISK MANAGEMENT TIMELINE



1948 Columbia River Flood (Vanport Flood)

Treaty signed 1961

Treaty entered into force (Sept 1964)

60-year pre-paid, assured flood risk management from Canada

1950

1960

1970

1980

1990

2000

2010

2020

Sep  
2024

Duncan

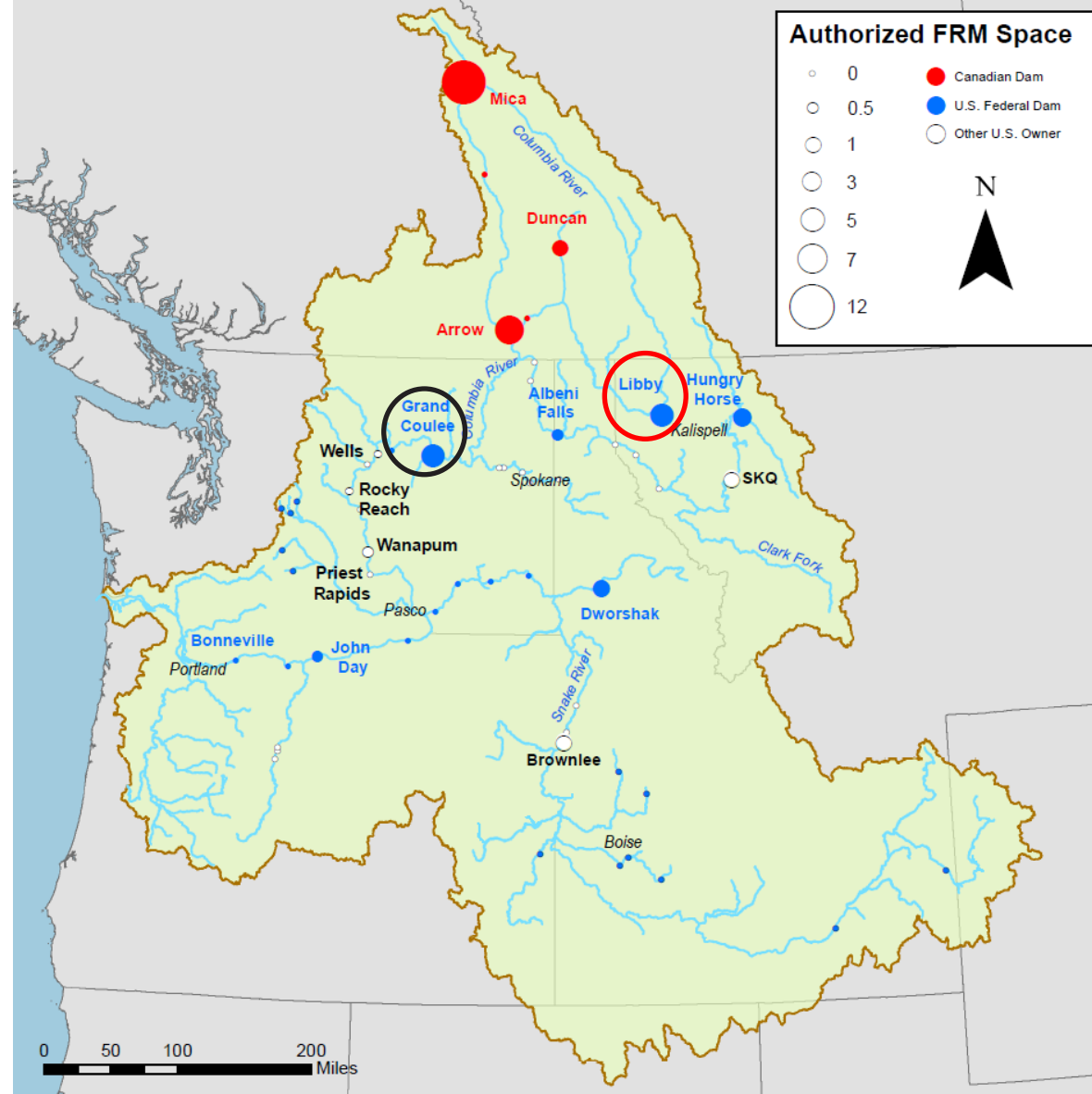
Arrow

Mica

Real-Time or planned flood  
risk management operations,  
depending on degree of  
coordination with Canada



# COLUMBIA RIVER BASIN DAMS





# COLUMBIA RIVER SYSTEM OPERATIONS



4



These federal dams are operated as part of a coordinated, multiple-purpose reservoir system.

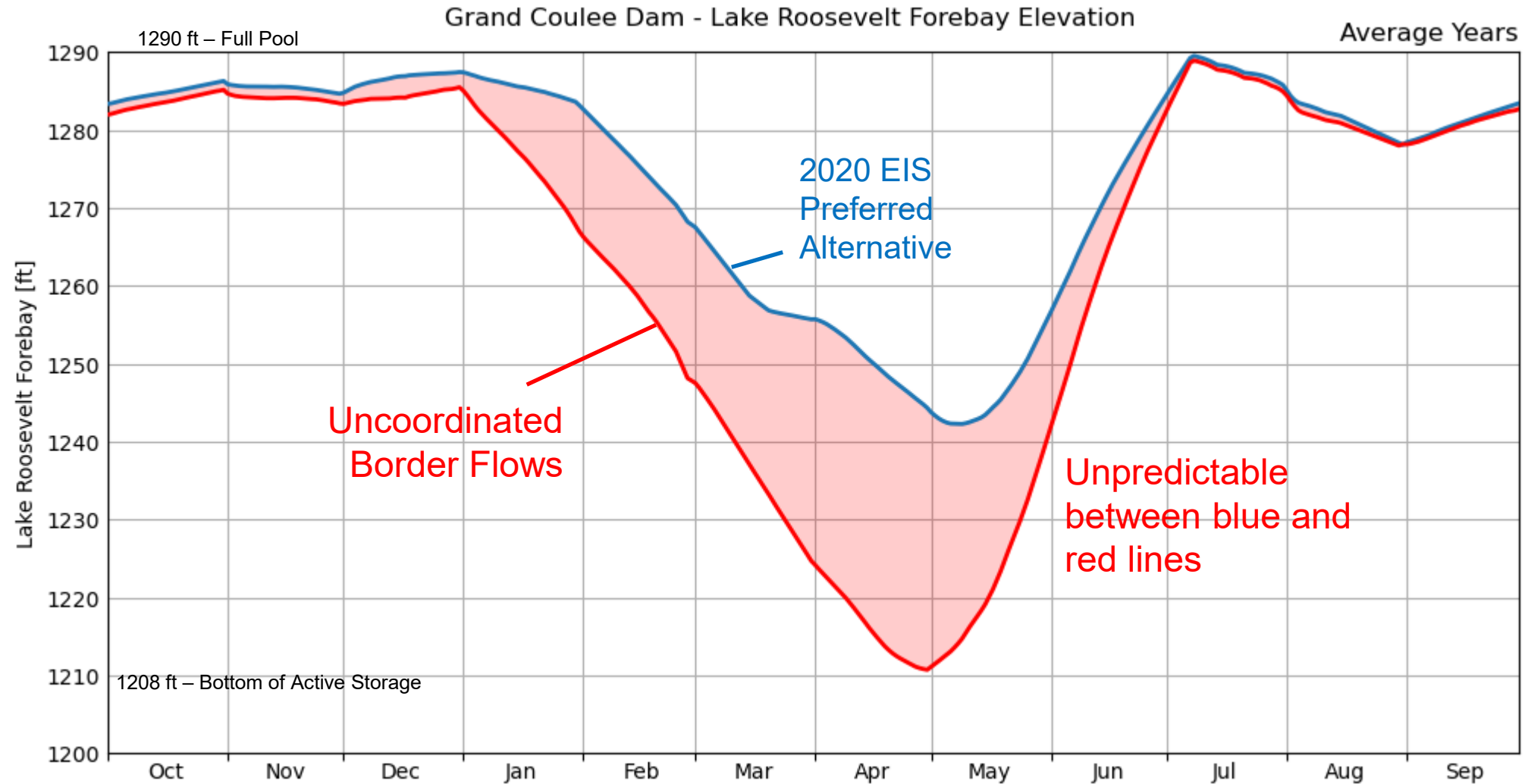
USACE and Reclamation work with our regional partners to operate the dams to serve Congressionally authorized purposes, which can vary by project:

- Flood Risk Management
- Hydropower Generation
- Navigation
- Irrigation
- Fish and Wildlife
- Recreation

Coordinated water management seeks to balance these purposes within the available water supply and project capabilities.



# AVERAGE YEARS: POTENTIAL IMPLICATIONS TO LAKE ROOSEVELT





# IMPLICATIONS TO LAKE ROOSEVELT AVERAGE YEARS

