



# 2014/2024 Review

## Columbia River Treaty

### Briefing for WDOE – Policy Advisory Group

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# The Columbia River Basin

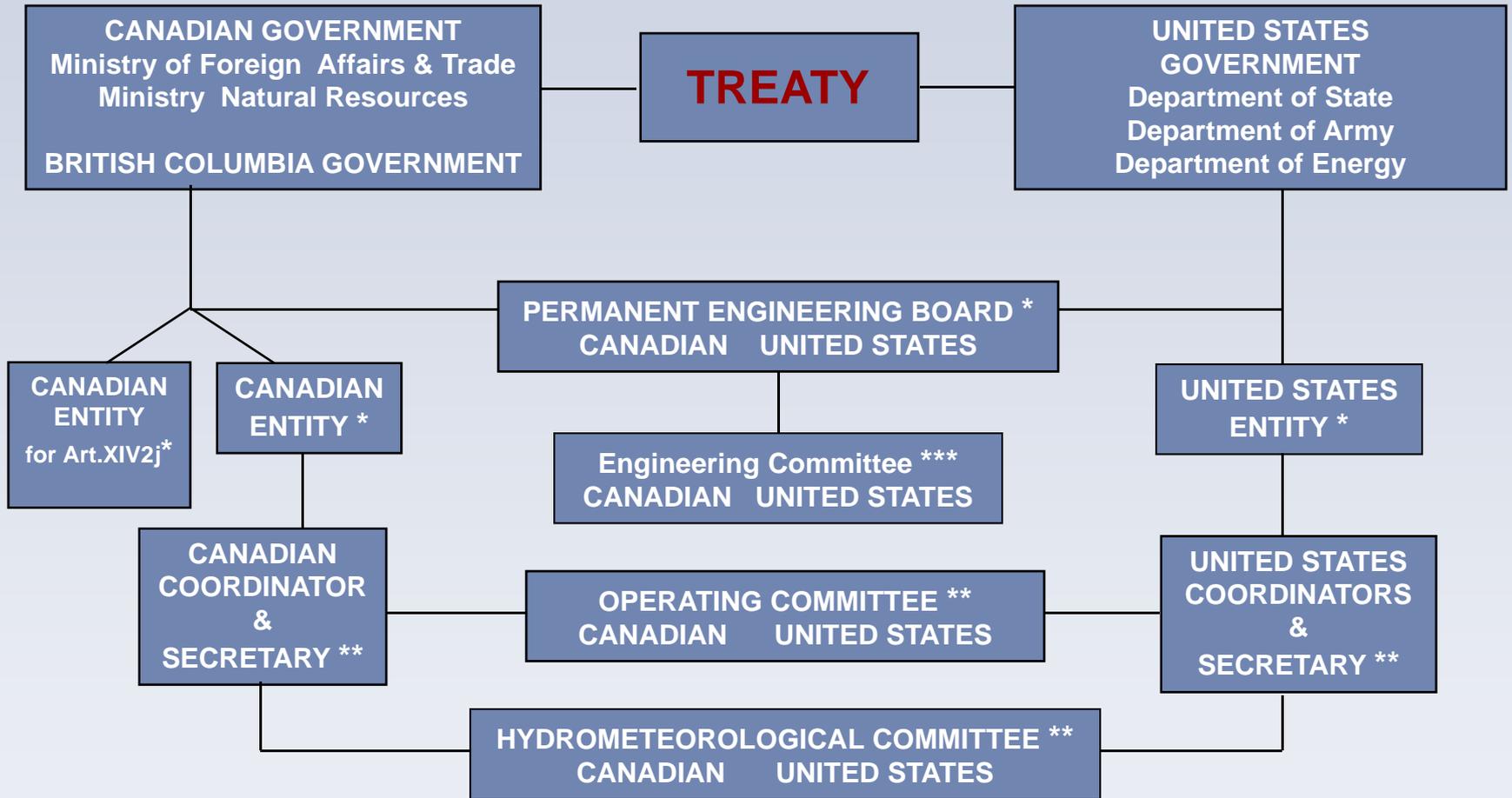


- Canada has 15% of the basin area, but 30% of 134 million acre feet (Maf) average annual flow at The Dalles.
- 50% of worst Columbia flood flows (1894) at The Dalles came from Canada.
- Flow at Canadian border varies from 14,000 to 555,000 cubic feet per second (cfs), much wider variation (1:40) than Mississippi or St. Lawrence.
- Unregulated flow at The Dalles varies from 36,000 to 1,240,000 cfs a 1:34 ratio, compared to the St. Lawrence 1:2 and Mississippi 1:25 ratios.

## Columbia River Treaty by Key Dates

- **1933-42** – Grand Coulee Dam built
- **1943-44** – Corps of Engineers, International Joint Commission (IJC) begin Columbia River studies
- **1948** – Columbia River flood caused deaths, much property damage in both countries
- **1948-59** – Treaty analyses conducted, Treaty project site evaluations
- **1950** – Flood Control Act of 1950 (HD 531) authorization of the Federal Columbia River Flood Control System within the United States with appropriate interfaces for those parts of the basin within Canada.
- **1961-64** – Columbia River Treaty signed and ratified, plus sale of first 30 years' of Canadian Entitlement to the U.S.; Southern Intertie planning begun; Pacific Northwest Coordination Agreement signed
- **1967-73** – Duncan, Keenleyside, Mica, and Libby dams completed
- **2003** – all Treaty Entitlement energy deliveries made to Canada (end of 30-year sale) now at the U.S.-Canada border
- **2014** – latest at least 10-year notice for termination of Columbia River Treaty in 2024 may be given by either Canada or U.S. if termination by 2024 is desired (may be later if a later termination date is desired).
- **2024** – earliest possible termination date for Columbia River Treaty (September 16, 2024)

# Columbia River Treaty Organizations



\* Established by TREATY

\*\* Established by ENTITIES

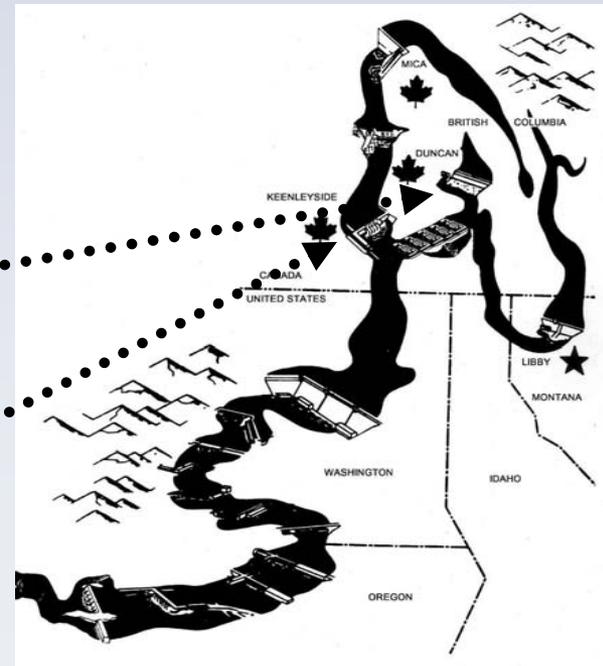
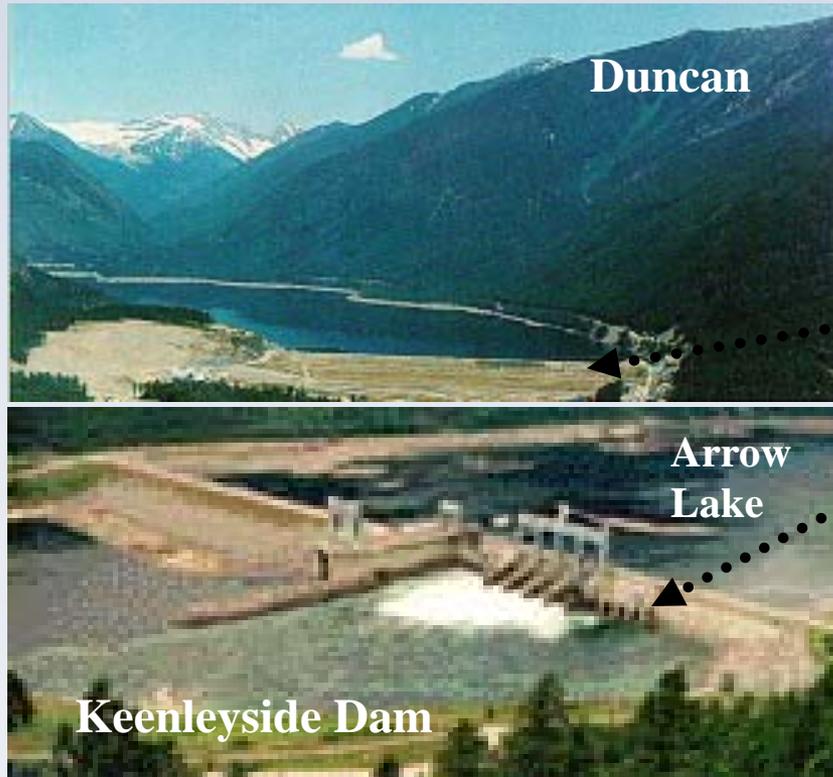
\*\* Established by PEB

# General Treaty Provisions

- The Treaty required Canada to construct and operate three large dams (Mica, Arrow, and Duncan) with 15.5 million acre-feet (Maf) of storage in the upper Columbia River basin in Canada for optimum power generation and flood control downstream in Canada and the U.S.
- The Treaty allowed the U.S. to construct and operate Libby dam with 5 Maf of storage on the Kootenai River in Montana for flood control and other purposes. Libby creates power and flood control benefits downstream in Canada and the U.S., and these benefits have no payment requirements.
- U.S. and Canada are to share equally the downstream power benefits (DSB's) produced in the U.S from the operation of Canadian Treaty storage.

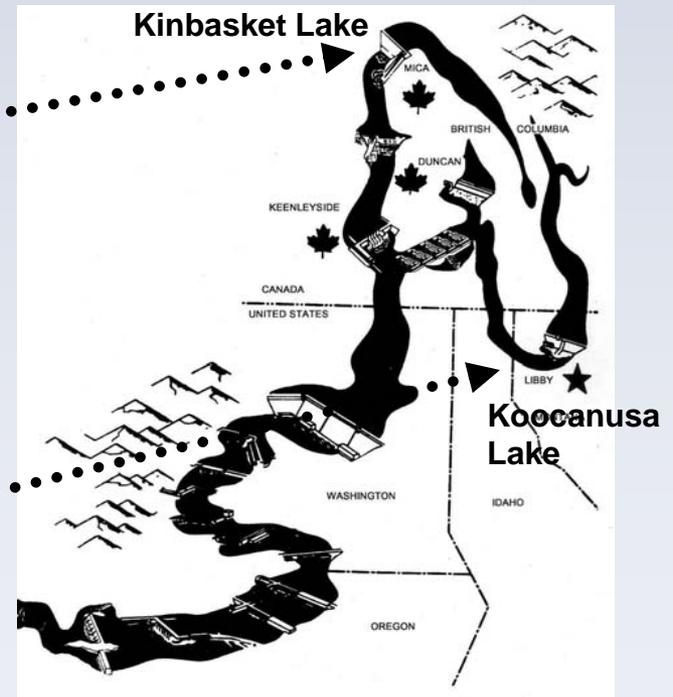
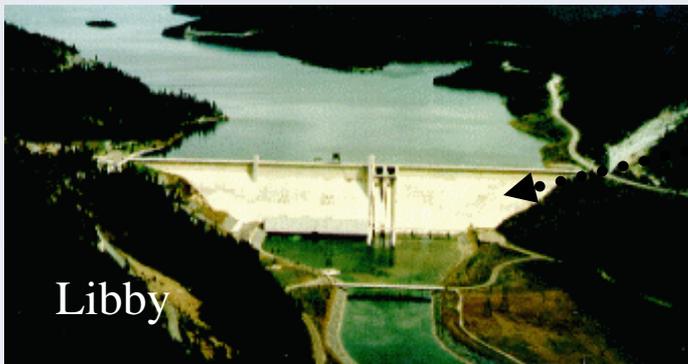
# Duncan and Arrow

	<u>Completed</u>	<u>Treaty Storage</u>	<u>Non-Treaty Storage</u>	<u>Generator Capacity</u>	<u>Dam Height</u>
<b>DUNCAN</b>	1967	1.4 Maf	None	None	130 ft.
<b>ARROW</b>	1968	7.1 Maf	.25 Maf	185 MW	170 ft.



# Mica and Libby

	<u>Completed</u>	<u>Treaty Storage</u>	<u>Non-Treaty Storage</u>	<u>Installed Capacity</u>	<u>Hydraulic Capacity</u>	<u>Dam Height</u>
MICA	1973	7.0 Maf	5.0 Maf	1740 MW	40 KCFS	650 ft.
LIBBY	1973	5.0 Maf	None	604 MW	25 KCFS	370 ft.



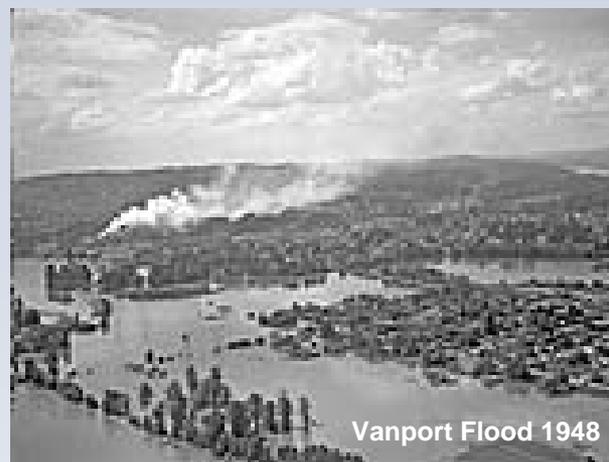
# Treaty Power Provisions

- Canada must operate 15.5 Maf of their Treaty storage for optimum power generation downstream in Canada AND the United States. Canadian storage increases generation at U.S. projects by reducing spill, increasing head, shifting flows to higher value time periods, and augmenting low inflows.
- U.S. must deliver electric power to Canada equal to one-half the estimated U.S. power benefits (Canadian Entitlement) from the operation of Canadian Treaty storage, currently worth about \$250-\$350 million annually.
- Province of B.C. owns Canadian Entitlement, and BPA (on behalf of the U.S. Entity) delivers the power based on daily schedules set by B.C.
- Owners of five Mid-Columbia non-federal hydro projects deliver 27.5% of Canadian Entitlement to BPA for delivery to B.C.



# Treaty Flood Control Provisions

- Canada is obligated to operate 8.45 Maf of storage (recently increased to 8.95 Maf due to Arrow – Mica re-allocation) under a flood control operating plan which specifies assured reservoir drafts.
- Plus all additional storage on an on-call basis (as requested and paid for)... this has never been used to date.
- As the dams were completed, the U.S. paid Canada \$64.4 million for one-half the present worth of the expected future U.S. flood damages prevented from 1968 through 2024.
- The unconditional guarantee by Canada of 8.95 Maf of flood control was purchased only until 2024, when it changes independent of Treaty termination.



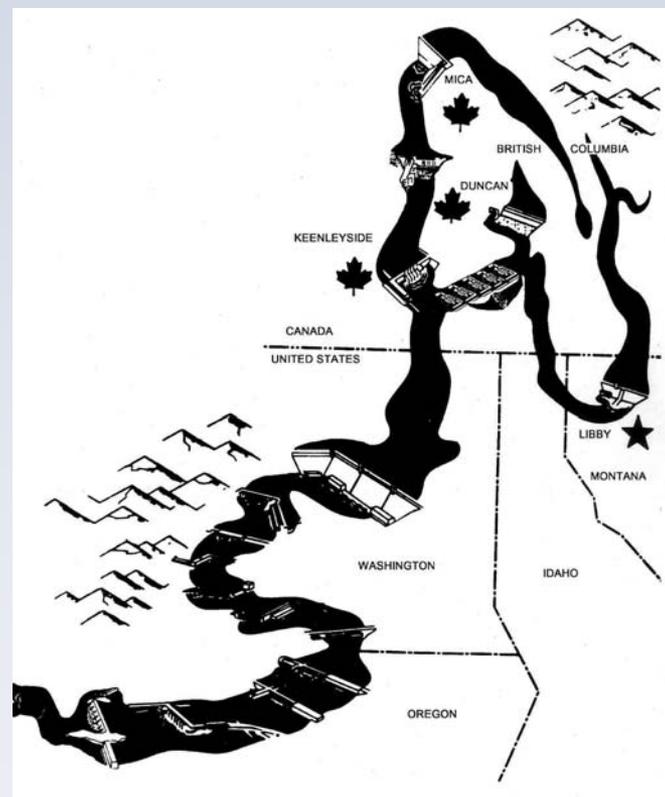
Vanport Flood 1948



Portland Flood 1996

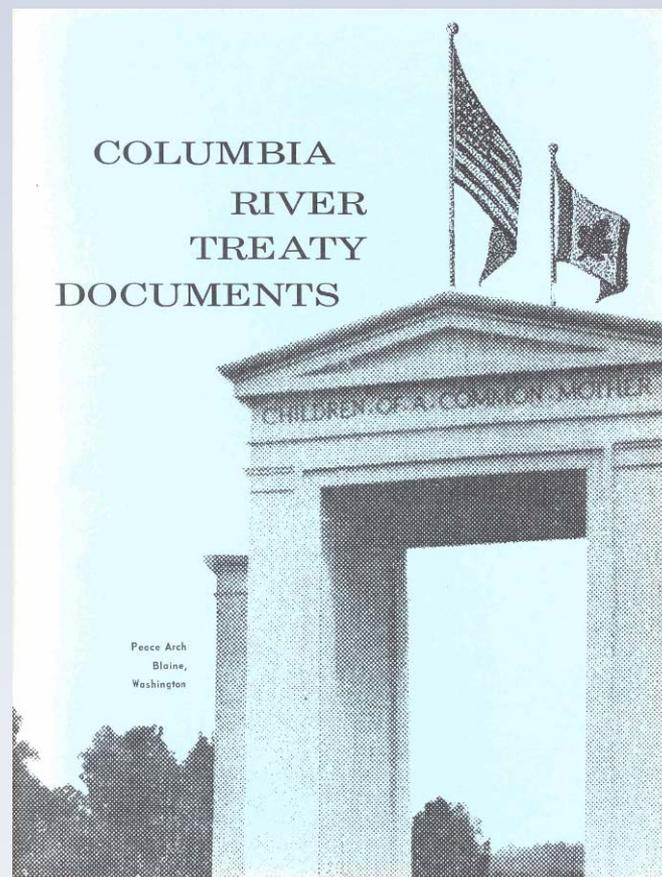
# Columbia River Treaty Benefits

- Canadian Treaty storage reduces flood flows, reduces spill, and shifts energy from low value time periods to high value time periods.
- The Treaty coordination between Canada and US on power and flood control provides \$100's million dollars of annual mutual benefits across the Columbia River Basin.
- The Treaty motivated infrastructure and governance development such as the electrical intertie to California, regional power preference legislation, added generators at most Columbia dams, and several regional power coordination agreements.



## Why a 2014/2024 Review?

- 1) The Treaty has no specified end date; however, it does have a provision allowing either nation to terminate most of the provisions of the Treaty in or after 2024, with a minimum 10 years' written advance notice, hence the name "2014/2024 Review".
- 2) Current flood control operating procedures will end in 2024, independent of Treaty decision.



# Understanding the Implications: Where to begin?

# Phase 1 – Initial Joint Studies

*Phase 1 is only a starting point toward understanding the future of the Treaty, it is not the answer*

## Goals and Objectives

- Conduct fundamental studies to look at potential flood control operations, power operations, and Canadian Entitlement under scenarios with and without the Treaty.
- Gather and establish baseline information to inform future analysis and decisions on how to proceed.
- Prepare to answer basic questions expected from governments, stakeholders, and the public.

## Coordination

- Studies have been undertaken jointly by the Entities.

## If the Treaty is Terminated

- B.C. will operate Mica, Arrow, and Duncan for the benefit of Canada (subject to Boundary Waters Treaty), except for called upon flood control operations. The U.S. will continue to coordinate with Canada on the operation of Libby.
- Canadian Entitlement will cease to exist, and the U.S. will retain all incremental power at downstream U.S. projects from the operation of Canadian storage.
- Without Treaty planning and coordination in place, Canadian storage operations (except for flood control) could be potentially uncertain and un-coordinated.
- Flood control provided by Canadian projects transitions mainly to a “Called Upon” operation after 2024 for the life of the projects.



## If the Treaty is not terminated

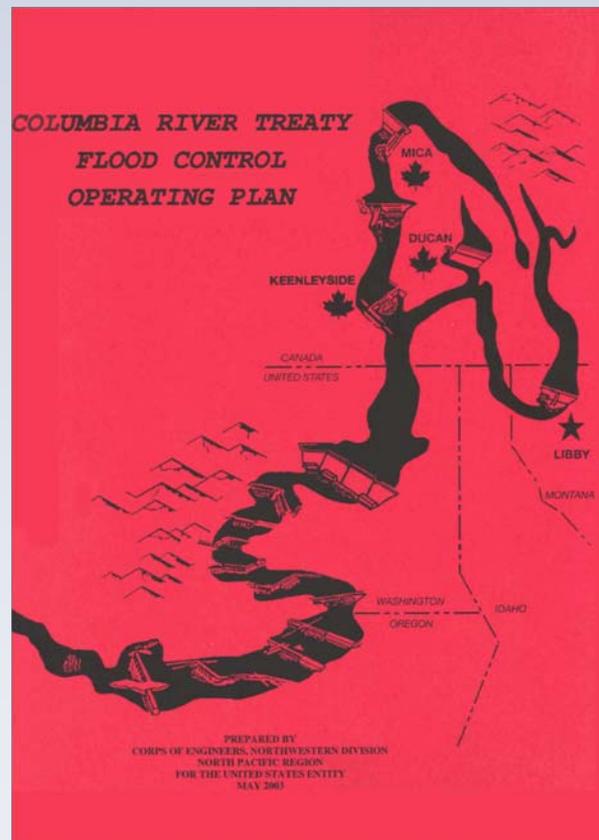
- B.C. will continue to operate their Treaty storage for optimum power generation downstream in Canada AND the United States.
- Canadian Entitlement will continue.
- Certainty in Canadian storage operations through Treaty planning and coordination.
- Flood control provided by Canadian projects transitions mainly to a “Called Upon” operation after 2024 for the life of the projects



# Post-2024 Flood Control

Flood control provided by Canadian projects transitions mainly to a “Called Upon” operation after 2024 for the life of the projects:

- U.S. requests for “called upon” limited to potential floods that could not be adequately controlled by all related (effective) U.S. storage
- “called upon” to provide no greater degree of flood control after 2024 than prior to 2024
- U.S. must pay for operating costs and any economic losses in Canada due to the “called upon” operation
- Implementation details to be addressed in further studies



# Phase 1 – Joint Technical Studies

<p><u><i>Study I*</i></u> <i>Cont. of Existing Procedures</i></p>	<p><u><i>Study II</i></u> <i>Minimum Action</i></p>	<p><u><i>Study III</i></u> <i>Treaty Terminated</i></p>
<ul style="list-style-type: none"><li>- Columbia River Treaty <i>continues</i></li><li>- <i>Current Flood Control Operating Plan continues</i></li><li>- <i>Entitlement return continues</i></li></ul>	<ul style="list-style-type: none"><li>- <i>Columbia River Treaty continues</i></li><li>- <i>Called Upon flood control (based on a target flow at The Dalles)</i></li><li>- <i>Entitlement return continues</i></li></ul>	<ul style="list-style-type: none"><li>- <i>No coordination, except on Libby</i></li><li>- <i>Called Upon flood control</i></li><li>- <i>Various possible Canadian operations</i></li><li>- <i>No Entitlement return</i></li></ul>

←----- 2024-25 Loads and Resources -----→

\*2044-45 Loads and Resources also modeled

# Expected Key Outcomes

- Benefits/limitations/impacts of “called upon” flood control
- 2025 & 2045 Canadian Entitlement
- 2025 U.S. Power estimates
- Range of potential flows and end-of-period reservoir elevations and contents
- Joint Entity Phase 1 Report (available early 2010)

# There is more than one possibility for the future of the Treaty...

- Treaty Remains in Place, continue with current level of annual supplemental operating agreements that achieve some additional power and fishery benefits.
- Treaty Remains in Place – achieve additional benefits through relatively minor adjustments done through Entity implementation agreements.
- Substantive Modification/ Amendment to Treaty
- Treaty termination (by either or both parties); may or may not be replaced with a new treaty.



# Concurrent Studies and Activities

- **CORPS' Flood Risk Management Studies**
  - First Phase: Flood Risk Assessment
    - Objective: Collect and manage data and develop tools and processes necessary to produce quantifiable estimates of flood risk management benefits and costs
    - Complete by January 2011
  
- **RMJOC Climate and Hydrology Data Set Project**
  - Participants
    - Lead: River Management Joint Operating Committee (Reclamation, BPA, Corps)
    - UW Climate Impacts Group
    - Regional reviewers and collaborators
  - Products and Deliverables
    - Modeled climate change streamflow and weather data sets
    - Corresponding seasonal runoff volume forecasts
    - Corresponding reservoir operating rules for flood control and hydropower

# Moving Forward

- This fall, begin one-on-one outreach discussions with sovereign entities and key stakeholders to understand their interests and concerns with respect to the Columbia River Treaty.
- Conduct additional joint Entity or independent technical studies and analyses that will be needed to inform each country's decision makers.
- BPA and the Corps will continue close coordination and communication with the State Department throughout the Review and decision process.