Modeling Results: Iteration One

COLUMBIA RIVER TREATY 2014/2024 REVIEW

Washington AWRA Chapter Conference

September 12, 2012

Overview of Today's Presentation

- Basics of Treaty Review
- Key Terms and Definitions
- Iteration 1 Alternatives
- Iteration 1 Modeling Results
- Next Steps for Treaty Review

Columbia River Treaty 2014 / 2024 Review

- **Description**
  - Studies jointly conducted by USACE and BPA on behalf of the U.S. Entity.
  - Collaboration with regional sovereigns and stakeholders.
  - Evaluates benefits and costs of alternative Treaty futures.
- **Purpose**
  - Enable the U.S. Entity to make an informed recommendation, regionally-support recommendation to the U.S. Department of State
  - Is it in the best interest of the U.S. to continue, terminate or seek to amend the Treaty?
- **Authorization**
  - Existing Treaty authorizes U.S. Entity to conduct these studies.

Columbia River Treaty Organization

BPA Administrator and Corps of Engineers' Northwestern Division Engineer are the U.S. Entity that implements the Treaty for the U.S. The Canadian Entity is B.C. Hydro, a province owned electric utility.

*Established by TREATY **Established by ENTITIES *** Established by PEB

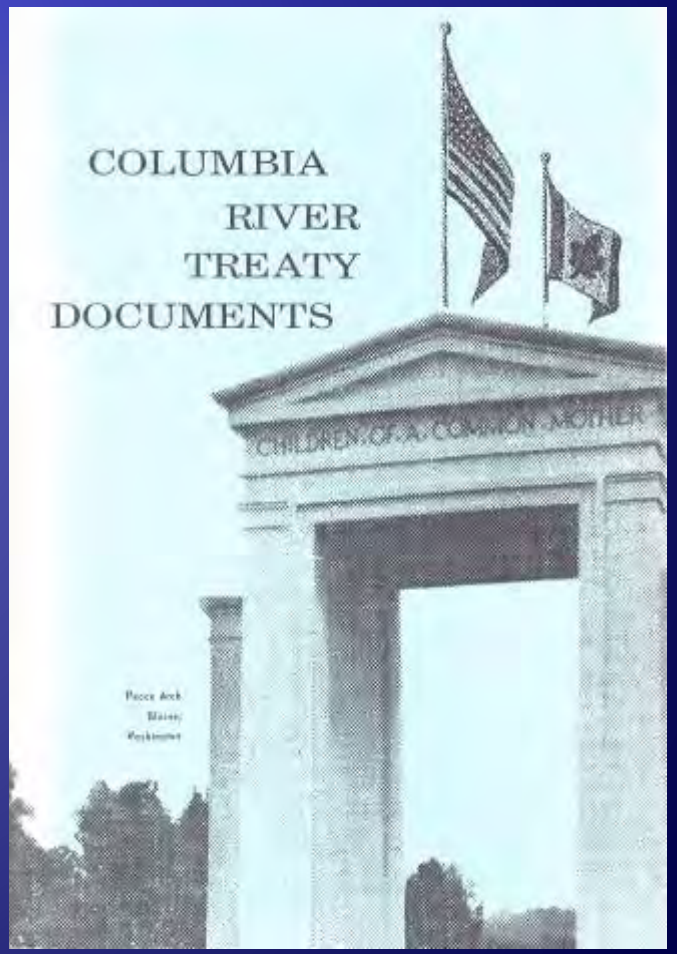
Why a Treaty 2014/2024 Review?

Treaty has no specified end date…

but either nation can terminate as early as Sept. 2024 with 10 years' written notice.

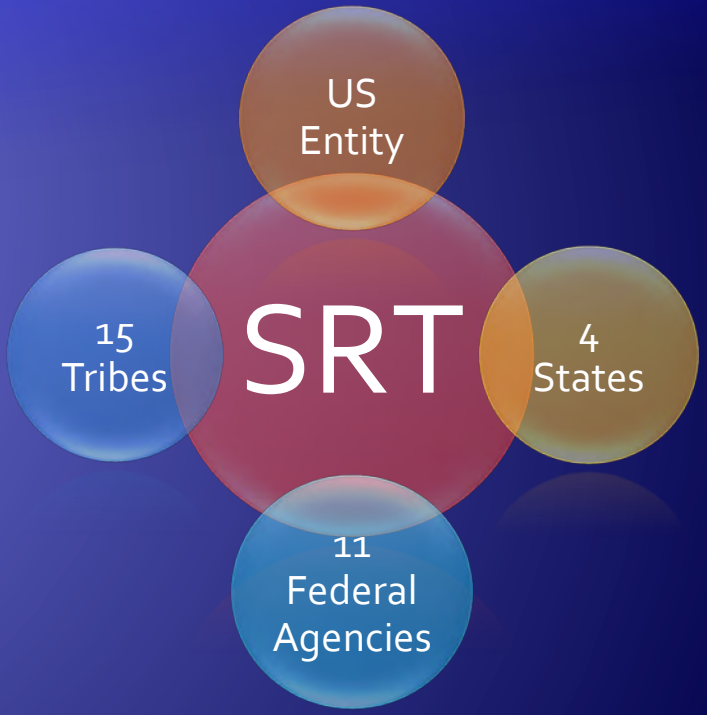
Current assured annual flood control operating procedures will end in 2024…

whether or not there is a Treaty.



Collaboration with Regional Sovereigns

- Sovereign Review Team (SRT)
  - 4 States
  - 15 Tribes (5 representatives)
  - 11 Federal Agencies
- Sovereign Technical Team
  - Technical leads and staff representing SRT members
- Each team has been meeting at least monthly since Fall 2010.



Coordination with Regional Stakeholders

- **2012 Listening Sessions: Share Iteration 1 Results and Formulate Iteration 2 Alternatives**
  - June 27: Portland, OR
  - July 9: Spokane, WA
  - July 12: Boise, ID
  - July 18: Kalispell, MT
- **2011 Listening Sessions: Scoping**
- **2011 -12 SRT Panel Sessions**
  - June: Hydropower
  - August: Ecosystem Function and Flood Risk Management
  - February 2012: Water Supply
- **2011-2012 Presentations**
  - 40 Presentations and Discussion Sessions

What we are hearing from regional stakeholders

- Desire for transparency and clarity
- Interest participating in:
  - scoping, formulation of alternatives and evaluation of impacts, and;
  - developing and regionally vetting the recommendation.
- A robust study of Flood Risk, Hydropower, and Ecosystem Function Concerns
- Fully assess impacts of future Treaty alternatives on other parts of the system, including water supply, irrigation, navigation, recreation, water quality, and cultural resources
- Consider possible implications of climate change on the Treaty decision.
- Provide an understanding of Canadian perspectives
- Reconsideration of the present governance of the CRT

Basics of Treaty Review

1. Understand
   - Start by understanding regional needs and priorities.
2. Determine
   - Can the current Treaty meet those needs?
   - Does the Treaty need to be changed?
   - Are the changes so significant that we have to start over with a new Treaty?
3. Arrive at that determination by:
   - Collecting information
   - Evaluating the results
   - Assessing impacts on various river interests

Basics, cont.

1. Evaluation takes place over three "iterations."
2. Each iteration tests a number of scenarios or "alternatives."
3. Information from each iteration used to refine approach and build alternatives for the next iteration.

Basics, cont.

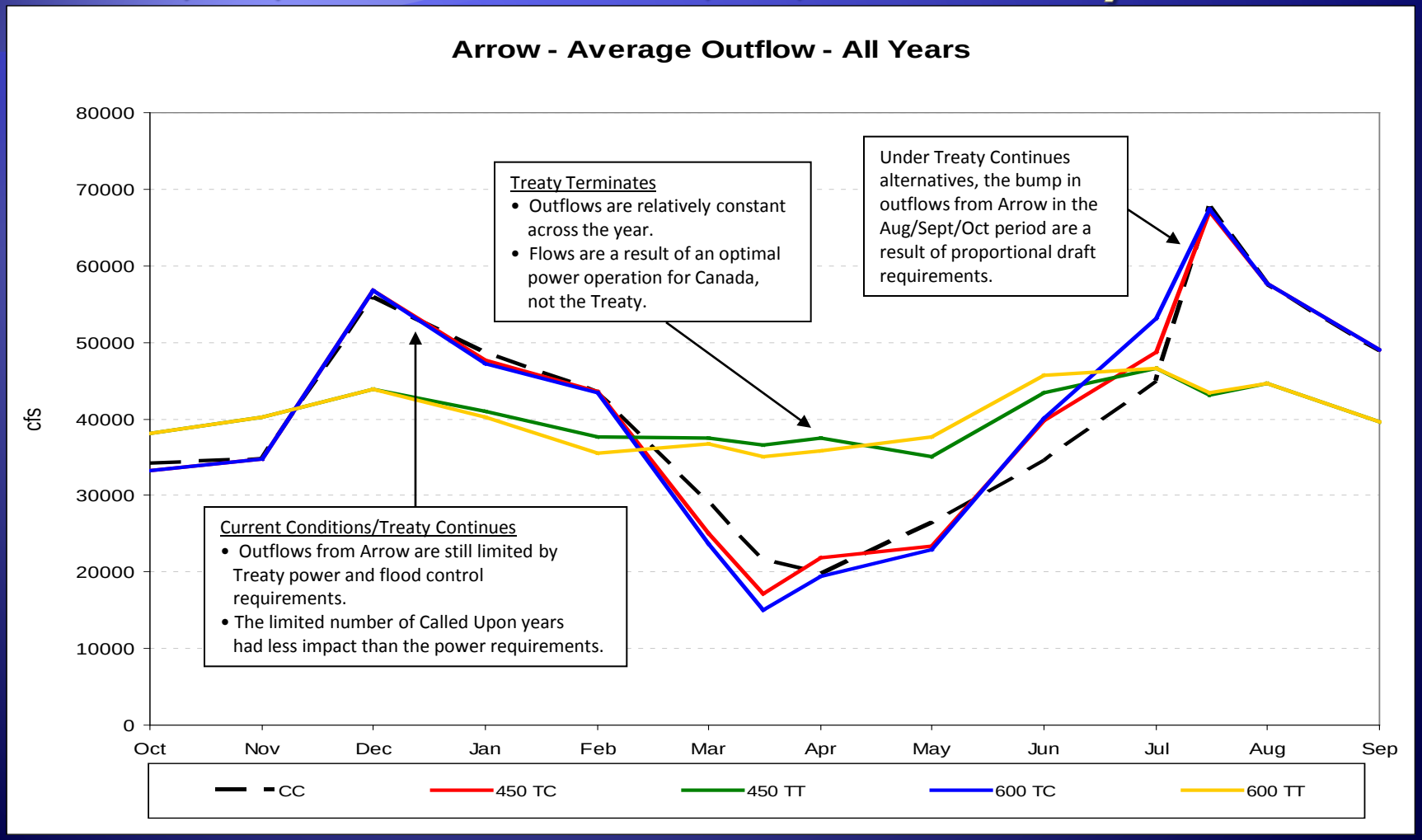
- Iteration One has just been completed.
  - Current Condition (only for comparison)
  - Alternatives post 2024:
    - 450 kcfs – Treaty Continues and Treaty Terminates
      - Uses current storage reservation diagrams
    - 600 kcfs – Treaty Continues and Treaty Terminates
      - Uses relaxed storage reservation diagrams

Key Assumptions in Iteration 1

- Assumptions about Canadian Operations Post-2024 without the Treaty.
- Flood Risk Management: Effective Use and Called Upon
- Both assumptions affected outcomes across all scenarios.

Canadian Operations:

With (TC) and without (TT) the Treaty



Iteration 1 Results
Flood Risk Management

Effective Use
Called Upon
Peak Flows

Flood Risk Management Effective Use at 450kcfs…

Treaty Continues

- Effective use in 18 out of 70 Years

Treaty Terminates

- Effective use in 23 out of 70 Years

Why is this important?

Under effective use most U.S. reservoirs are drawn down to lower water levels more frequently. This could:

- Limit a reservoir's ability to refill.
- Hinder the ability to meet needs such as irrigation, summer fish flows, recreation and protection of cultural resources.

Flood Risk Management Effective Use at 600 kcfs…

Effective use 1 time in 70 Years, Treaty Continues or Terminates

Increases fish flows during the spring and keeps some U.S. reservoirs fuller.

May increase flood risk. Increases peak river flows

Average: 17-21 kcfs higher
In 10 wettest years: 28-49 kcfs higher
(more analysis in iteration 2)

Flood Risk Management How often do we "Call Upon" Canada for more storage?

At 450 kcfs…

- Treaty Continues – 4 times in 70 Years
- Treaty Terminates – 6 times in 70 Years

At 600 kcfs…

- 0 times in 70 Years

Why is this important?

Called Upon has financial impacts to U.S. – $4-$34 million per request (based on power cost to Canada).

For Iteration 2…
Analysis of the annual average payment required for Called Upon.

Iteration 1 Results Ecosystem-Based Function

- Reservoir Levels
- River Flows

Ecosystem-Based Function

Reservoir Elevations

- Effective use resulted in deeper draw downs and less frequent refill for some reservoirs. Could have an impact on resident fish, cultural resources, recreation, and irrigation.
- In several tributary sub-basins, Treaty operations had little or no effect on reservoir elevations and outflows.

Ecosystem-Based Function

River Flows

- In the Lower Columbia Basin, Treaty Terminates alternatives resulted in:
  - Lower winter flows
  - Higher spring flows
  - Lower late summer flows

- 600 kcfs alternatives increased peak river flows in the spring –Treaty or no Treaty.

Why is this important?

- Lower summer flows could affect ability to meet summer fish flow objectives.
- Reduction in winter flows could affect salmon protection flow objectives.
- Higher spring flows could benefit juvenile salmon migration.

For Iteration 2…
We will continue to examine these preliminary results.

Iteration 1 Results Hydropower

Canadian Entitlement

Hydropower Generation

Canadian Entitlement

If the Treaty continues, U. S. payment of Canadian Entitlement also continues:

- Energy -- 442aMW Capacity -- 1331 MW

Estimated value of Canadian Entitlement in 2024:

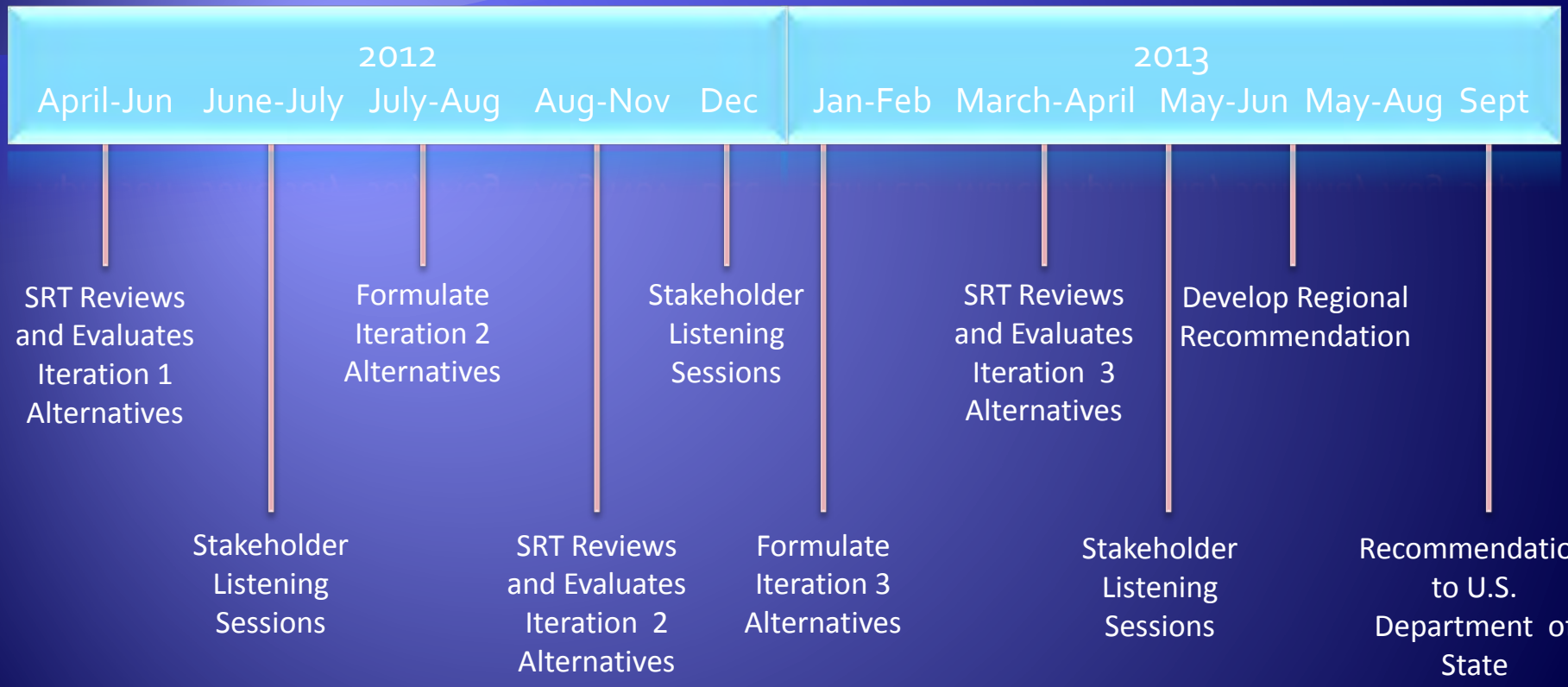
- Energy -- $113-$219 million
- Capacity -- $115 million
- Combined -- $229-$335 million per year

Hydropower Generation

Net effect of terminating the Treaty on total power and power costs (including the entitlement) for each country:

	Average Annual Hydropower Generation (aaMW)
Canada	410 loss (-$220 to -$320 million)
United States	325 – 350 gain (+$180 to $280 million)

Where Do We Go From Here?



For more information:

Matt Rea
Program Manager
U.S. Army Corps of Engineers
503-808-4750
matt.t.rea@usace.army.mil

Nancy Stephan
Program Manager
Bonneville Power Administration
503-230-5296
nlstephan@bpa.gov

Website: http://www.crt2014-2024review.gov