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

**Established by TREATY**

**Established by ENTITIES**

***Established by PEB***

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.
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

- **Current Conditions/Treaty Continues**
  - Outflows from Arrow are still limited by Treaty power and flood control requirements.
  - The limited number of Called Upon years had less impact than the power requirements.

- **Treaty Terminates**
  - Outflows are relatively constant across the year.
  - Flows are a result of an optimal power operation for Canada, not the Treaty.

- **Under Treaty Continues alternatives**, the bump in outflows from Arrow in the Aug/Sept/Oct period are a result of proportional draft requirements.

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**Arrow - Average Outflow - All Years**

- **cc**
- **450 TC**
- **450 TT**
- **600 TC**
- **600 TT**
Iteration 1 Results
Flood Risk Management

Effective Use
Called Upon
Peak Flows
Flood Risk Management Effective Use at 450 kcfs...

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:

<table>
<thead>
<tr>
<th>Country</th>
<th>Average Annual Hydropower Generation (aaMW)</th>
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<tbody>
<tr>
<td>Canada</td>
<td>410 loss (-$220 to -$320 million)</td>
</tr>
<tr>
<td>United States</td>
<td>325 – 350 gain (+$180 to $280 million)</td>
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</tbody>
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Where Do We Go From Here?

**2012**
- April-Jun: SRT Reviews and Evaluates Iteration 1 Alternatives
- June-July: Stakeholder Listening Sessions
- July-Aug: Formulate Iteration 2 Alternatives
- Aug-Nov: SRT Reviews and Evaluates Iteration 2 Alternatives
- Dec: Stakeholder Listening Sessions

**2013**
- Jan-Feb: SRT Reviews and Evaluates Iteration 3 Alternatives
- March-April: Formulate Iteration 3 Alternatives
- May-Jun: Stakeholder Listening Sessions
- May-Aug: Develop Regional Recommendation
- Sept: Recommendation to U.S. Department of State
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