Columbia River Treaty Review Scenarios – Columbia System

Presented at Fall 2012 Public Sessions

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FOR GENERATIONS

OVERVIEW

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Strategic Decision in 2013

- Overview of three Scenarios
- Alternative Operations under the three Scenarios
- How three scenarios impact interests
  - Columbia main stem
  - Kootenay system
- How climate change impacts decision

Discussion - Breakout Groups

- Table discussions on tradeoffs

Strategic Decision in 2013

- Should BC recommend termination at earliest possible date?
- Should BC pursue Coordinated Flood Risk Management?
- What Elements should be included in Treaty Plus?

Strategic Decision Scenarios

Terminate

- Called Upon Flood Control: 2 opposing views (requires effective use of U.S. storage)
- Minimal coordination

Treaty Continue

- Coordinated Flood Risk Management (with assured power draft)
- Called Upon
- Coordination (same as existing)

Treaty Plus

- Coordinated Flood Risk Management (with assured power draft)
- Coordination Plus (enhance for ecosystem and other interests)

Strategic Decision Scenarios

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Treaty Plus

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Detailed Operating Alternatives

- Developed in future WUP reviews (~2020)
- Consider multiple objectives in Canada

Detailed Operating Alternatives

- Consistent with WUP
- Develop CFRM with US Entity as process continues

Detailed Operating Alternatives

- Consistent with WUP
- Develop CFRM with US Entity as process continues
- Opportunities for enhancing other interests

Strategic Decision Scenarios - Columbia

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Terminate	Treaty Continue	Treaty Plus

Possible Operating Alternatives

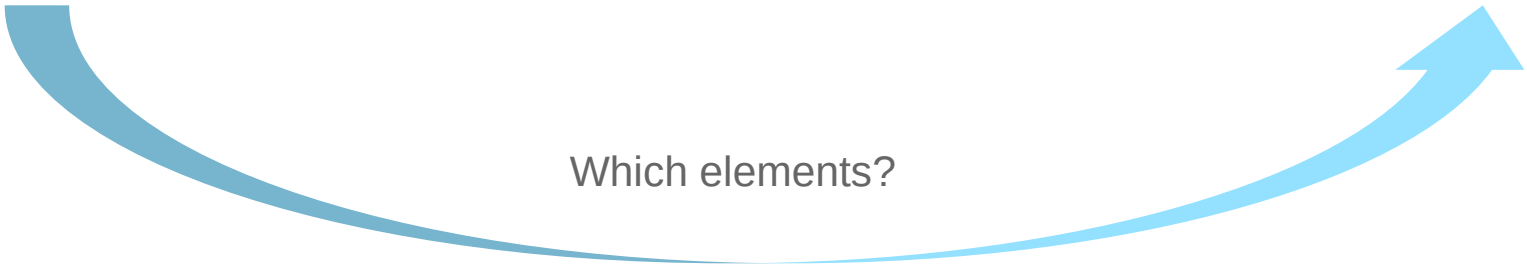
- Power
- Power + current fish operations (includes Arrow recreation)
- Arrow wildlife & vegetation
- Mica environmental/recreation
- Fisheries #1– below Arrow
- Fisheries #2– sturgeon
- Ecosystem Function

Possible Operating Alternatives

- Power
- Power + current fish operations
- Arrow wildlife & vegetation
- Mica environmental/recreation

Possible Operating Alternatives

- Opportunities for enhancing other interests
- ???



Location	Kinbasket Reservoir
Objective	Recreation
Sub-Objective	Shoreline Access
Performance Measure	Access Days in season
Calculation Summary	# days reservoir is between 2444' and 2473', May 1 - Sept 30.
Directionality	higher is better
Source	Columbia Water Use Plan

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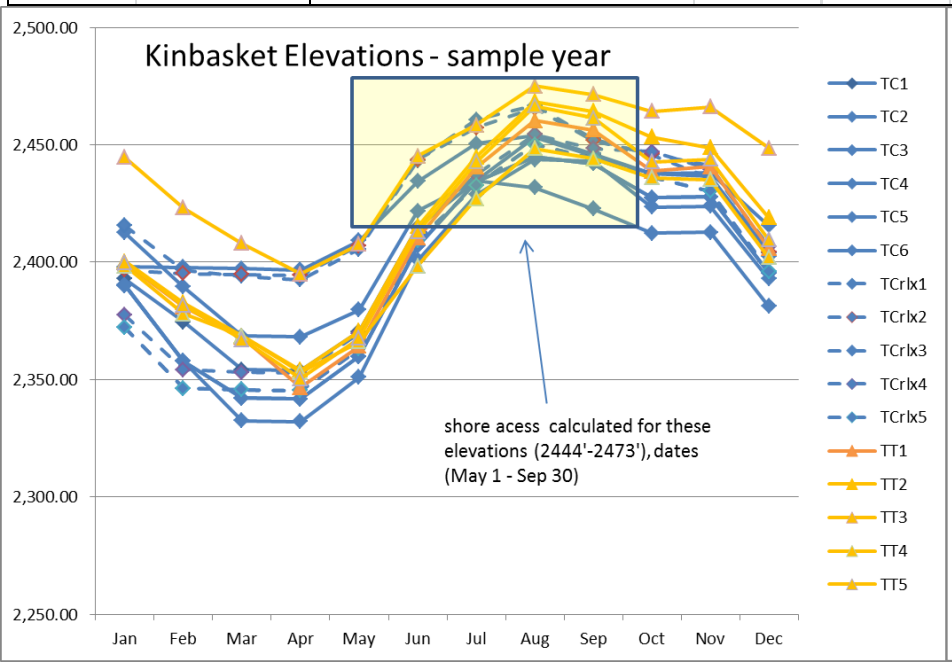
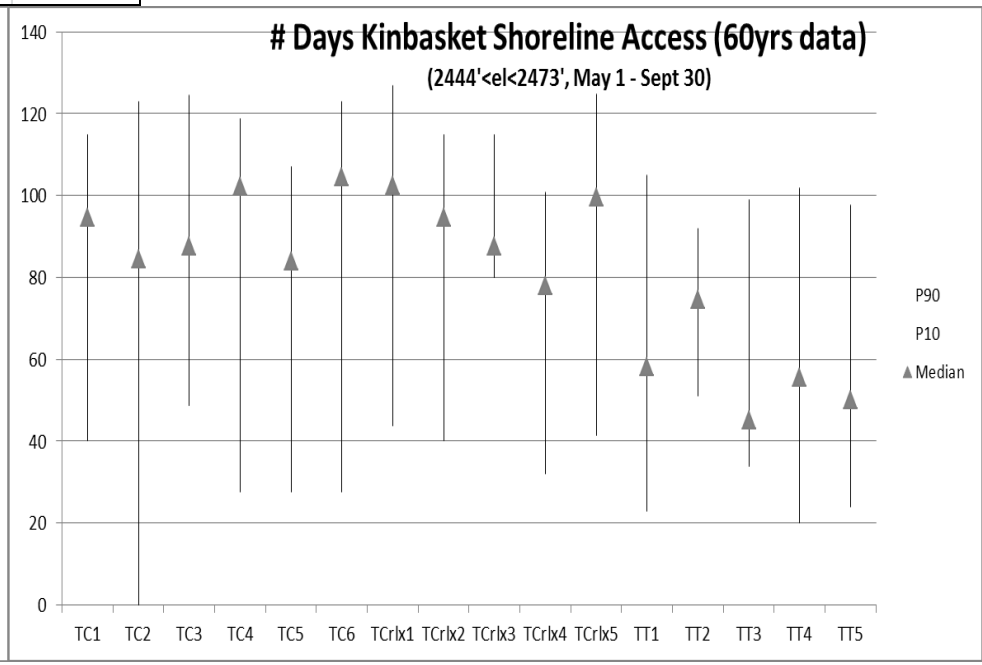
Data from modeling, performance measures from WUPs





Objective	stat	elev.	dates	pm	TC1	TC2	TC3	TC4	TC5	TC6	TCrlx1	TCrlx2	TCrlx3	TCrlx4	TCrlx5	TT1	TT2	TT3	TT4	TT5
shoreline access	ave	2444-2473	May1-Sep30	# days in prefered range	83	67	89	87	76	90	95	91	86	68	89	62	75	53	58	60
shoreline access	P10	2444-2473	May1-Sep30	# days in prefered range	40	0	49	28	28	28	44	80	36	32	41	23	51	34	20	24

Messages: a) a lot of inter-year variability, b) some ability to increase access, c) largest change in dry years from a change in Arrow (TC2), d) Terminate reduces shoreline access

Kinbasket Reservoir

- Recreation, navigation, and fisheries interests favour higher water levels in general

Continue with Treaty	Terminate Treaty
Some gains possible within treaty: • add 3 weeks onto 5 months of boat access on average • May increase food production for kokanee • Lower Arrow elevation that may increase Arrow vegetation but have negative impact on recreation • Loss of $32m per year + 1100 GWh of firm energy	Similar gains possible without treaty: • add 5 weeks onto 5 months of boat access on average • May increase food production for kokanee • Loss of $28m + 1100GWh of firm energy • Loss of CE of $100 - $300m / yr

Arrow Reservoir and Mid-Columbia

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Wildlife and shore recreation interests

- Favour lower spring/summer water levels to maintain vegetation, provide bird nesting habitat, increase large river habitat and river based recreation

Continue with Treaty	Terminate Treaty

• Some ability to reduce reservoir elevations to promote vegetation growth
 	
• But a loss of reservoir recreation (preferred range reduced by 1 month on a 3 month season)
• Loss of ability to maintain fish flows in Lower Columbia
• Loss of $20m per year power
	• Increased ability to reduce reservoir elevations to promote vegetation growth
	• Can maintain in lower (1425-1434ft) portion of recreation range
	
	• Able to maintain fish flows in Lower Columbia
	
	• Net financial loss:
	  • Loss of $6m per year power
	  • Loss of CE $100m - $300m/yr

Arrow Reservoir

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Recreation and power interests

- Favour higher water levels in general
- Particularly in the summer for boat recreation

Continue with Treaty	Terminate Treaty
Ability to maintain high reservoir levels limited by Treaty draft requirements	Ability to maintain high reservoir levels year round But: Impacts on vegetation, wildlife and fisheries Net financial loss: Loss of CE $100m - $300m / yr

Lower Columbia River – Keenleyside Dam to Border

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Fish Interests – different hypothesis: i) return to more "natural" hydrograph with high flow events in spring ii) stabilize flows throughout the year to provide maximum habitat

Flood interests – stable, low flows

Continue with Treaty	Terminate Treaty

• Ability to provide current rainbow trout and whitefish flows (January – June)
 	
But
• Limited ability to provide different flow regimes for fish in the Lower Columbia
	• Ability to provide current rainbow trout and whitefish flows (January – June)
	• Ability to provide different flow regimes in Lower Columbia high flow events in spring but unknown fisheries benefit
	
	But
	• Negative impact on Arrow reservoir (recreation, wildlife)
	• Flood risk in Lower Columbia
	• Net financial loss:
	  • Loss of $10m - $20m
	  • Loss of CE $100m - $300m

Climate Change - Trends

Studies available on climate change impacts to basin in both Canada & US

Trends and projections:

- Warming trend continues for entire region
- BC expected to get modestly wetter
- Precipitation increase is within the range of historical variability
- Seasonal shift in runoff → higher flows in winter/spring/fall with lower flows in summer
- Glacier retreat exacerbates the lower summer flows
- Columbia/Kootenay very likely to remain snowmelt-dominated basins
- US tributaries likely transition from snowmelt to hybrid or rainfall basins
- Canadian river basins not impacted to the same degree as US basins

Climate Change

Implications for Strategic Decision

- Reservoir storage helps operators adapt to climate change.
- Impacts in Canada will likely be less than in the U.S.
- U.S. may require more coordination with Canada in future
- As both an upstream and a downstream party on the Kootenay River system, coordination is important to BC
- Mechanisms to adapt and adjust over time are important to both countries

Information on BC Hydro's Climate studies can be found at: www.bchydro.com/about/sustainability/climate_action/greenhouse_gases.html#climate

Questions / Feedback

1. Feedback on alternatives modeled?

2. Feedback on characterization of impacts?