



Columbia River Treaty

A Canadian Perspective

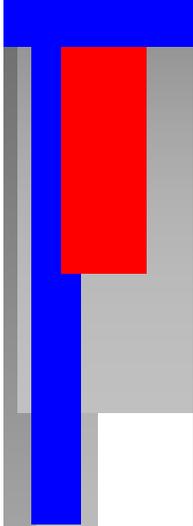
*Doug Robinson
Secretary to the Canadian Entity*

*Portland, Oregon
30 April 2008*





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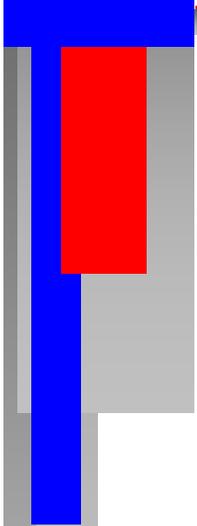


Canada Stats



- 2nd largest country in total area after Russia ~ 10 million sq km. Excluding water area, drops to 4th, after China and U.S.
- Population ~33 million (11% of U.S.); 75% within 150 km of U.S.
- Longest coastline in the world; U.S. – Canada border is the longest undefended border in the world.
- Gained independence from Great Britain in 1 July 1867 (91 years after the U.S... on 4 July 1776).
- Government = Parliamentary Democracy (British model)
- Also a Constitutional Monarchy, with Queen Elizabeth II as the official head of state.
- 10 Provinces and 3 Territories (the latter are sparsely populated and rely more on the federal government).
- National capital is Ottawa, on Ontario / Quebec border.
- For more info see: <http://en.wikipedia.org/wiki/Canada>

Relief Map of B.C.



Border with Alberta runs along the Columbia River watershed boundary.

Note that the river basins generally run North / South... more connections with the U.S. than with Alberta.



British Columbia Stats



- Population of B.C. is 4.4 million (13% of Canada).
- Third most populated province after Ontario (12.7 million, 39% of Canada) and Quebec (7.7 million, 23%).
- 6th province to join the Canadian Confederation (in 1871).
- With an area of 944,700 square kilometers, BC is the about the same size as France, Germany and the Netherlands combined.
- In terms of U.S. states, B.C. is slightly larger than Washington + Oregon + California.
- Capital city is Victoria on Vancouver Island;
- Largest city is Vancouver, the 3rd largest city in Canada (after Toronto and Montreal).
- Primary industries are: Forestry, Tourism, Mining, Agriculture, Energy and Transportation.



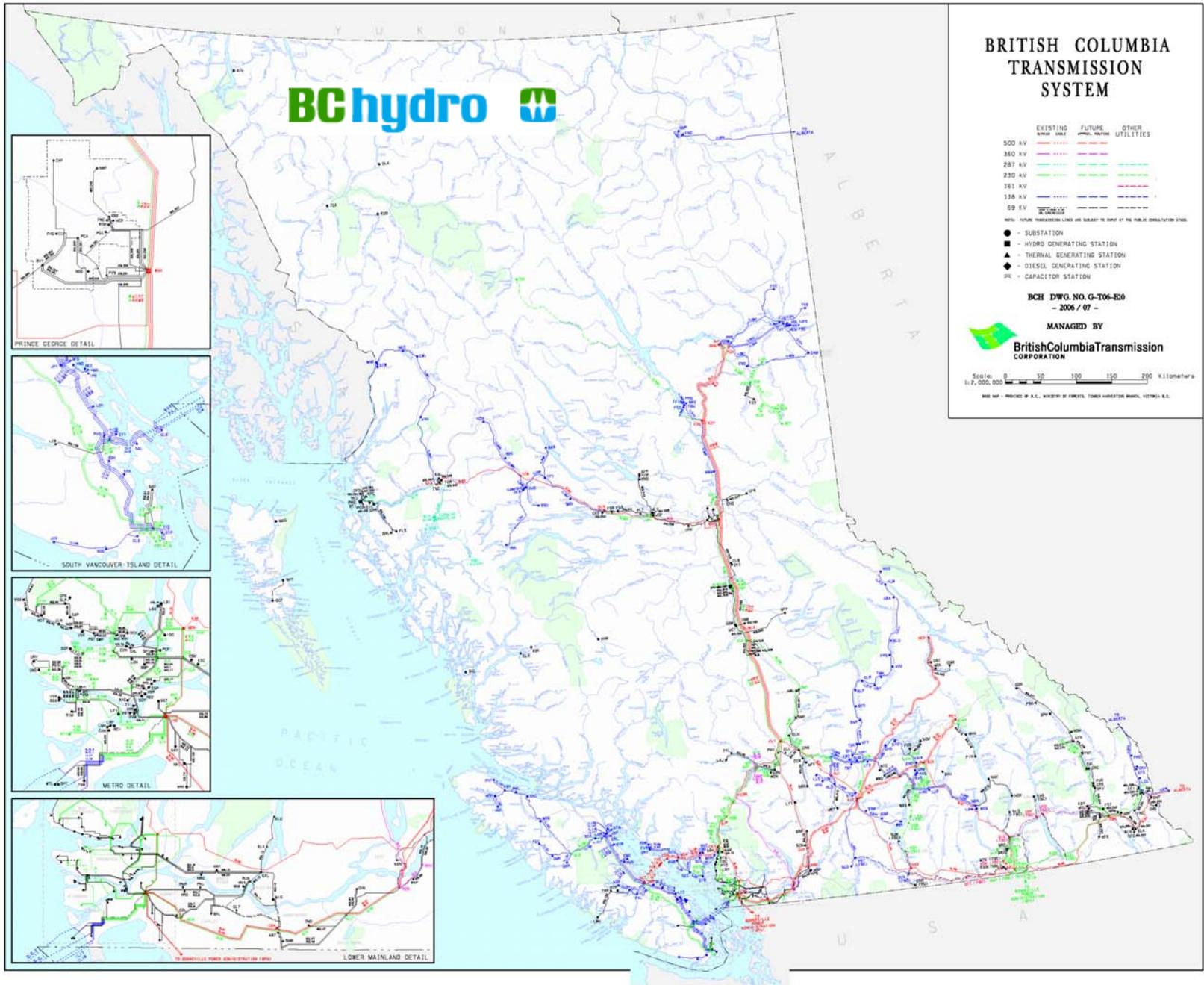
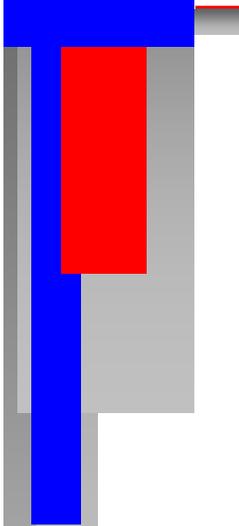
BC Hydro Stats



- BC Hydro is a crown corporation owned by the Province of British Columbia (BC).
- BC Hydro serves ~90% of the provincial load, which includes 1.7 million customers.
- Installed capacity = 10,200 MW Hydro + 1,040 MW Thermal ~ 11,300 MW Total
- Annual Generation = 43,000 to 54,000 GWh, depending on water conditions.
- Interconnected System: 18,336 km of “T” voltage; 55,705 km of distribution voltage lines.
- Annual Revenue ~ C\$4.2 billion; Employees ~4,500
- By a 1964 exchange of Notes, BC Hydro was designated to be the Canadian Entity responsible for implementing the Columbia River Treaty.



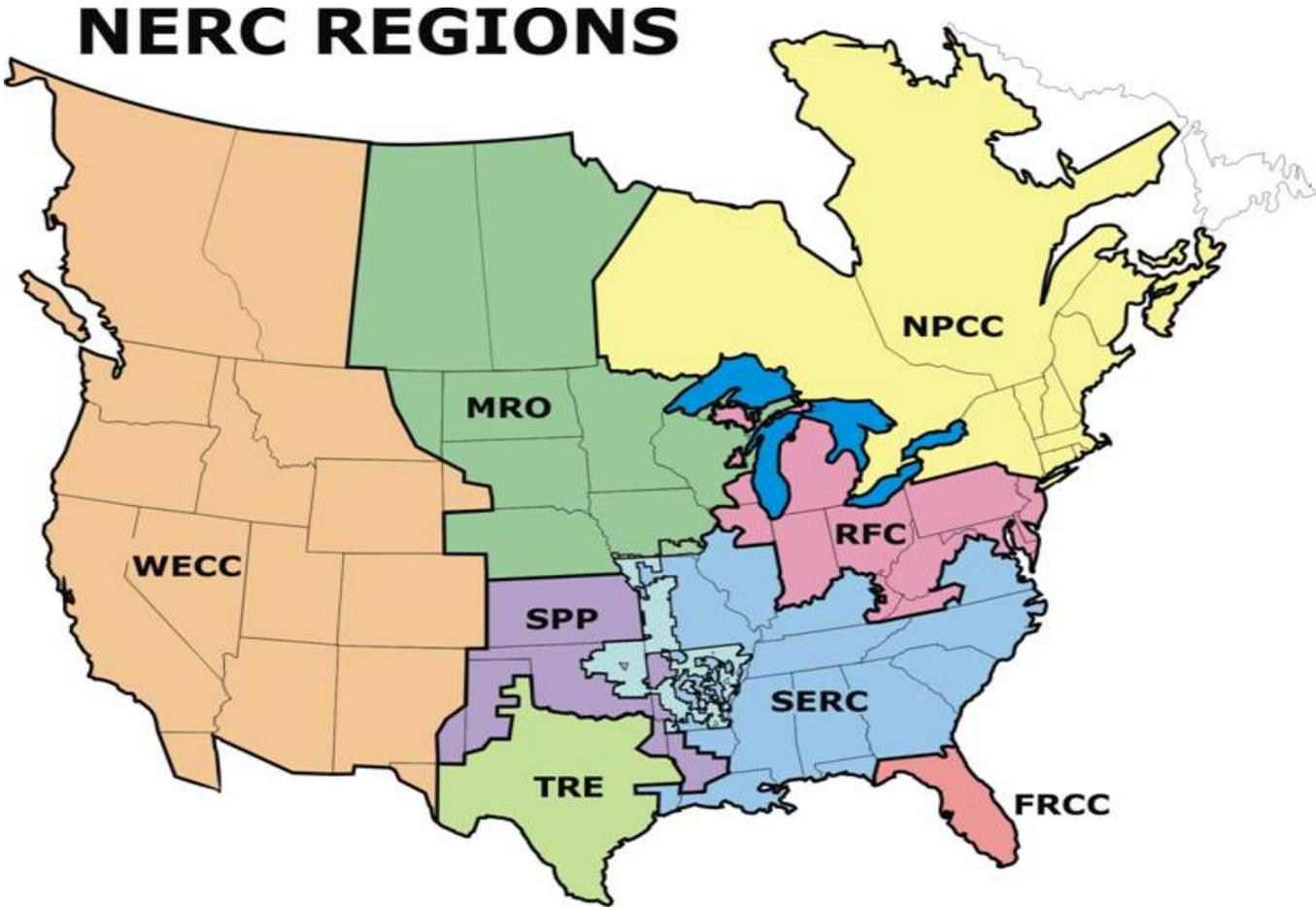
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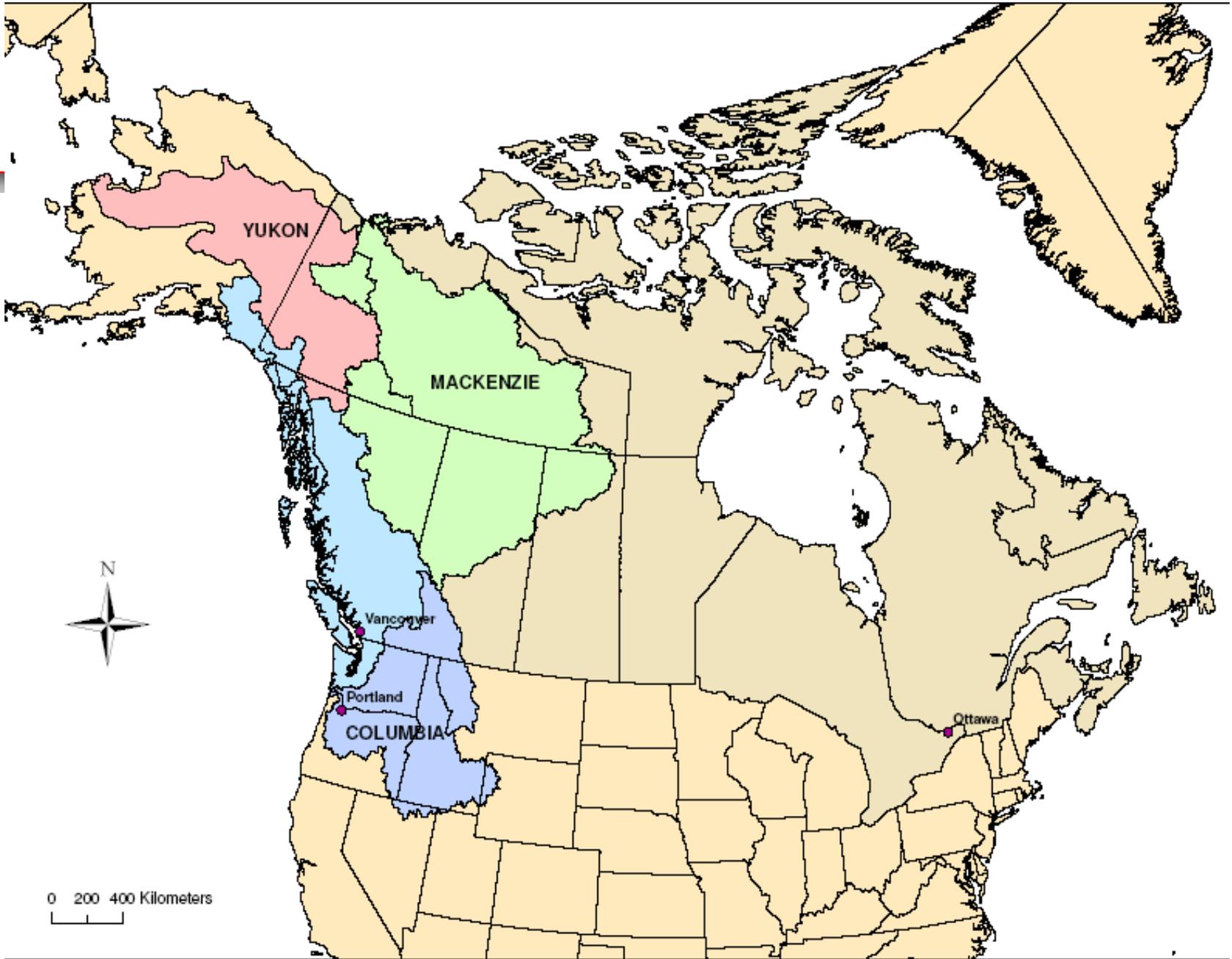
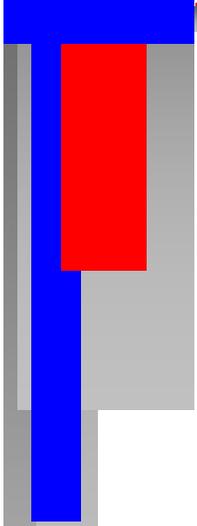


Canada and the U.S. Share Electrical Networks





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Columbia River Treaty

Columbia River Flows South from B.C.

Columbia River Basin



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Kootenay Tributary Crosses the Border (Twice!)

Columbia River Basin



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Agreed Design of Canadian Treaty Storage

- By 1960, 13.0 million acre-feet (MAF) of storage was in place in the US. A further 15.5 MAF was needed to limit the flow at The Dalles to a tolerable limit of 600 kcfs. This established the volume requested by the US.
- A multitude of potential project configurations were proposed: all included Duncan as built; high Arrow and low Arrow (Murphy) options were considered; and various Mica and East Kootenay options were considered.
- The eventual design included 7.0 MAF at Mica, 1.4 MAF at Duncan and 7.1 MAF at Arrow (the high Arrow option).
- The latter would raise the level of the Arrow Lakes by 40 feet above the natural high water line for a total rise and fall of 66 feet. It would flood 20,000 acres of arable land, inundate 50 miles of beaches and displace 2,000 residents.



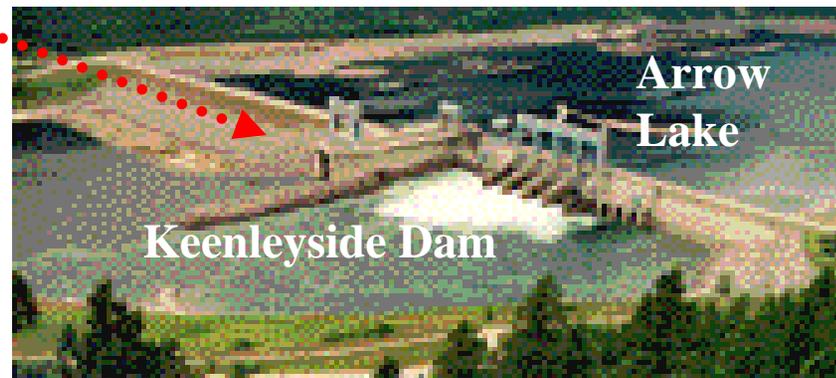
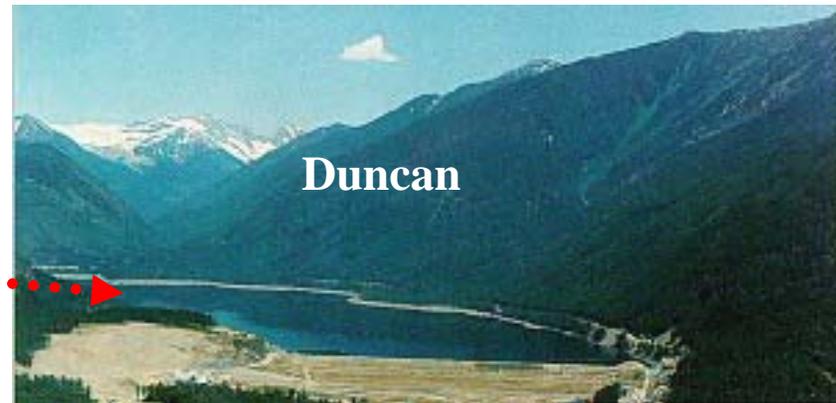
Insufficient Regional Input

- To avoid displacing residents, the region proposed an alternate plan that would only flood up to the existing high water levels. This was considered inadequate because it resulted in only 12.5 MAF of Canadian storage... not the requested 15.5.
- No public hearings were held on the Treaty between the start of negotiations in 1960 and the final agreement on 22 Jan 1964.
- Hearings were held on the Water Storage Licence, but interveners were prevented from discussing the Treaty itself.
- In Spring 1964 a hearing on the Treaty was held, but the location was Ottawa... and only government witnesses would have their expenses paid. The Standing Committee was instructed to either accept or reject the Treaty and Protocol as developed... no changes or revisions were to be permitted.
- After 50 sessions the Standing Committee on External Affairs accepted the Draft Treaty and Protocol without changes, and it was ratified by the House of Commons shortly thereafter.



Duncan and Arrow

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

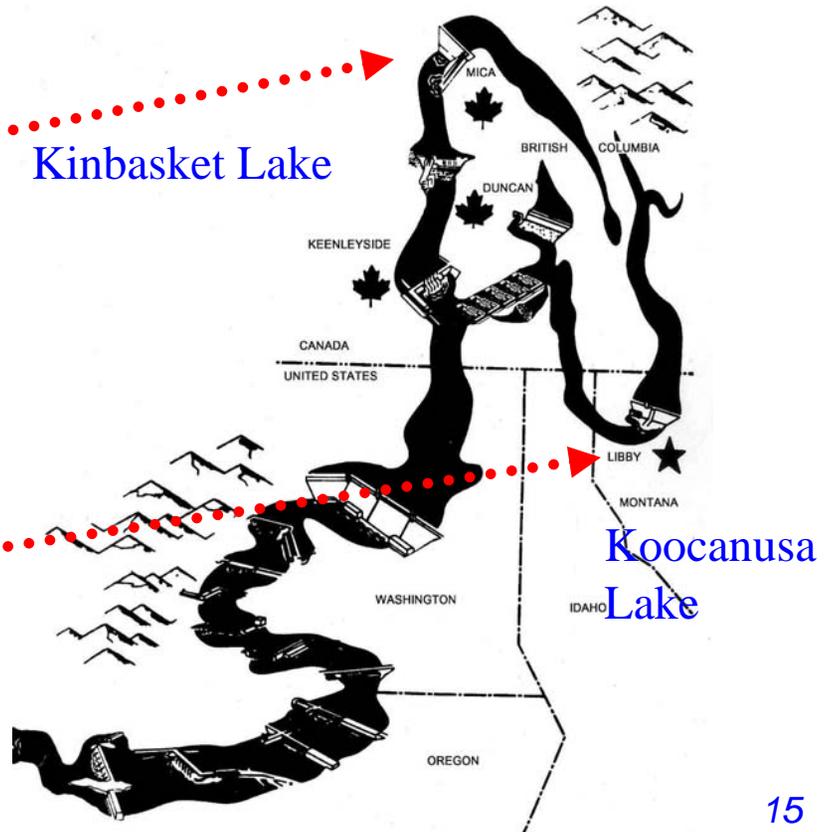
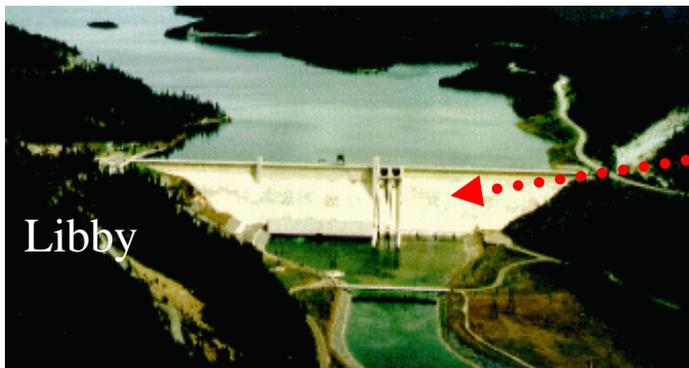


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Mica and Libby

	<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.



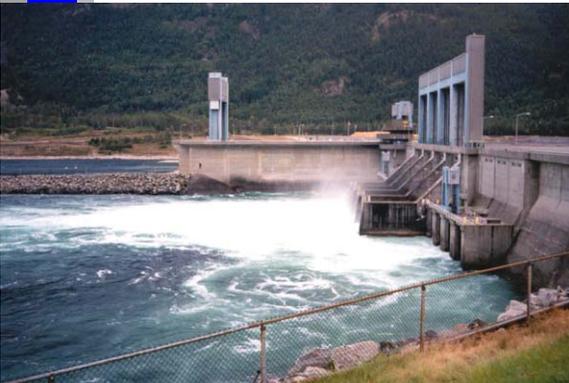
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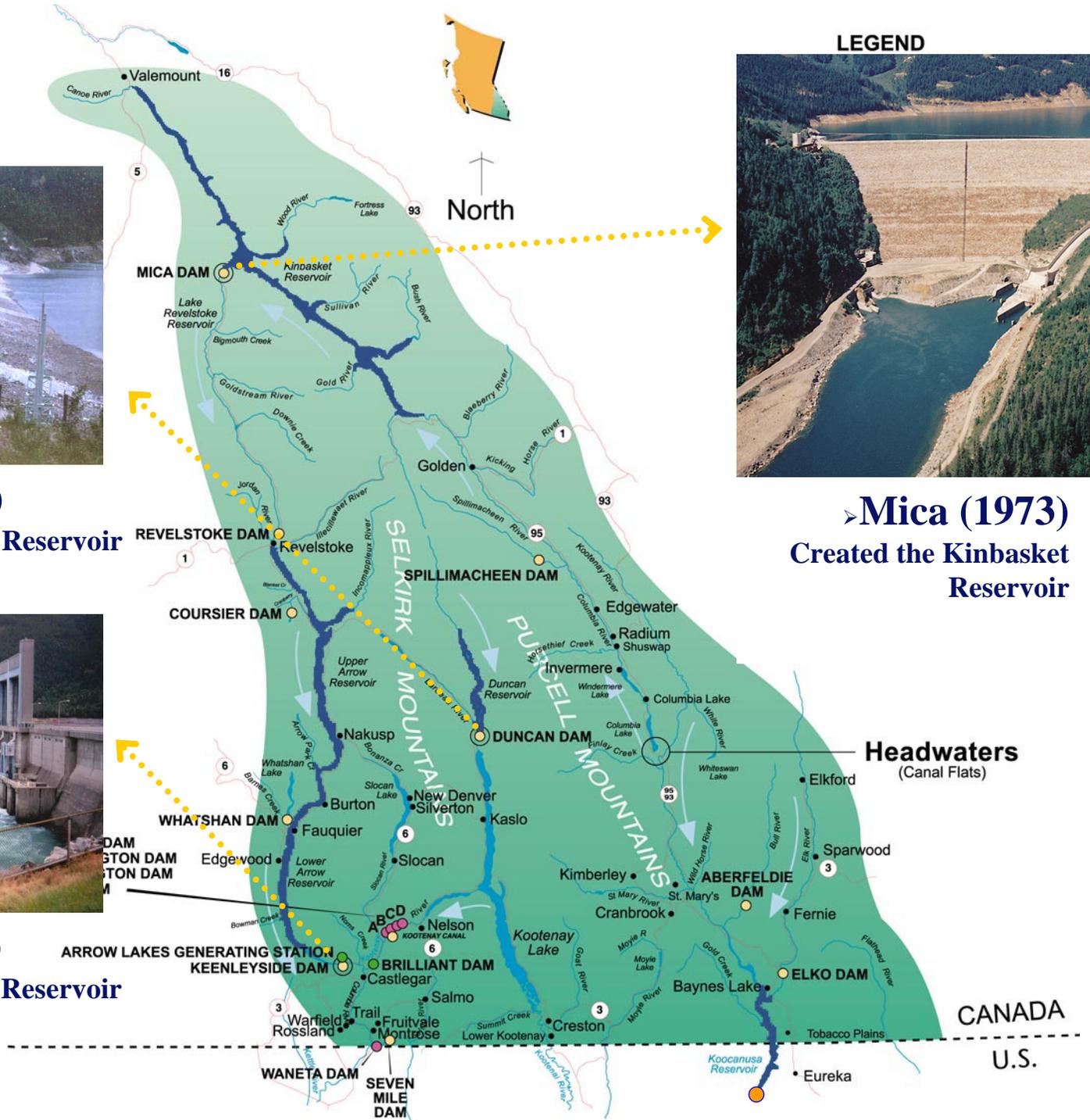
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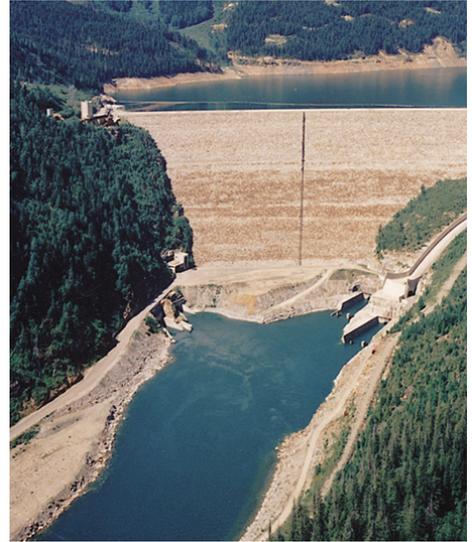
Duncan (1968)
Created the Duncan Reservoir



Keenleyside (1969)
Created the Lower Arrow Reservoir



LEGEND



Mica (1973)
Created the Kinbasket Reservoir

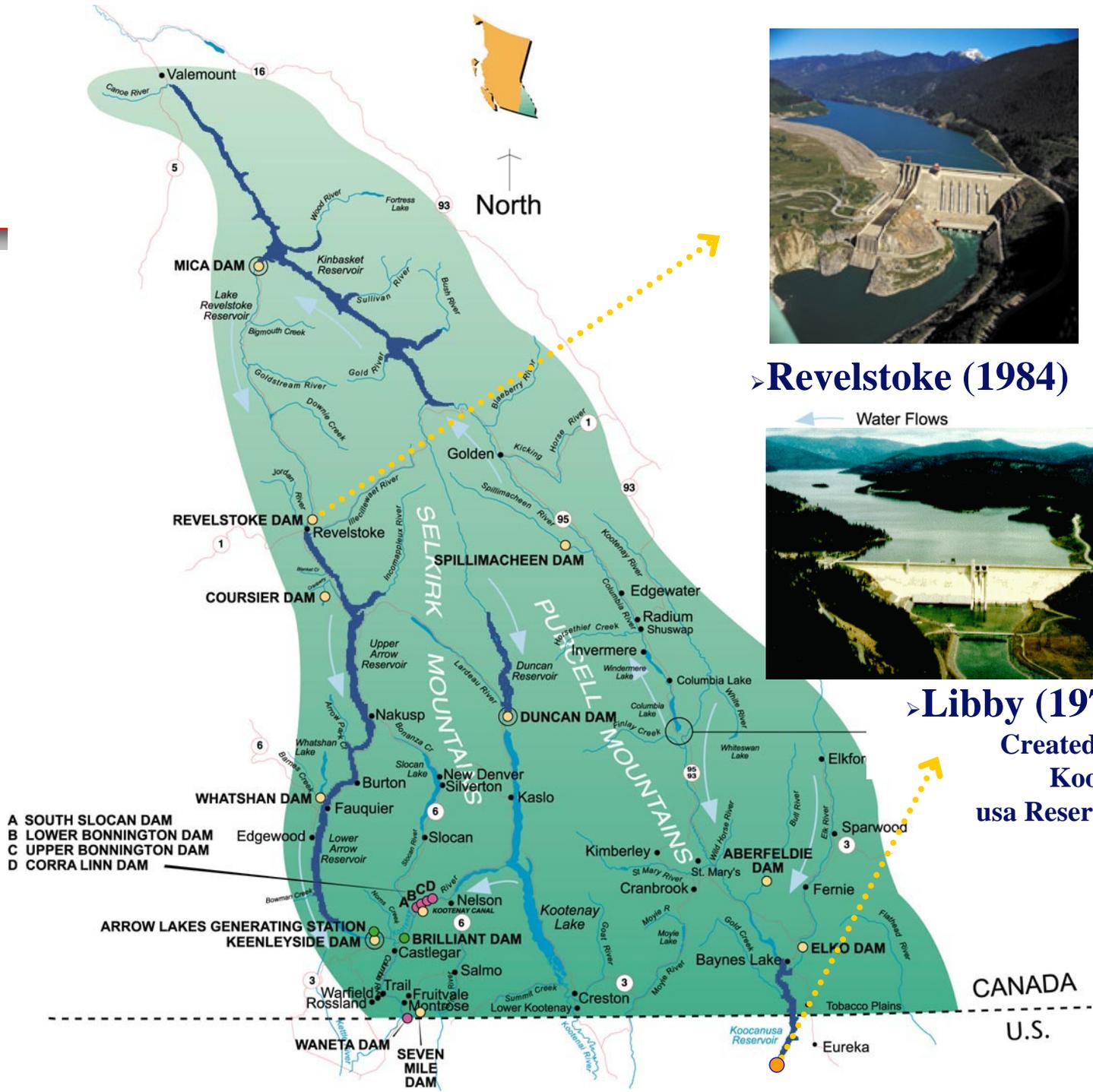
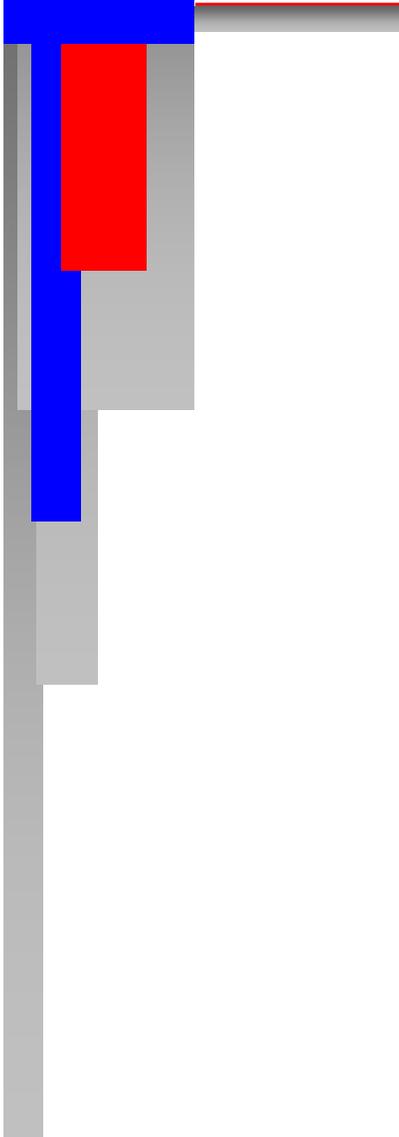
Headwaters
(Canal Flats)

CANADA

U.S.



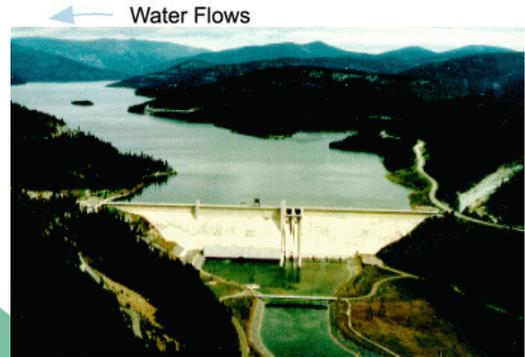
Columbia River Treaty



- A SOUTH SLOCAN DAM
- B LOWER BONNINGTON DAM
- C UPPER BONNINGTON DAM
- D CORRA LINN DAM



➤ **Revelstoke (1984)**



➤ **Libby (1973)**
Created the Kootenai Reservoir



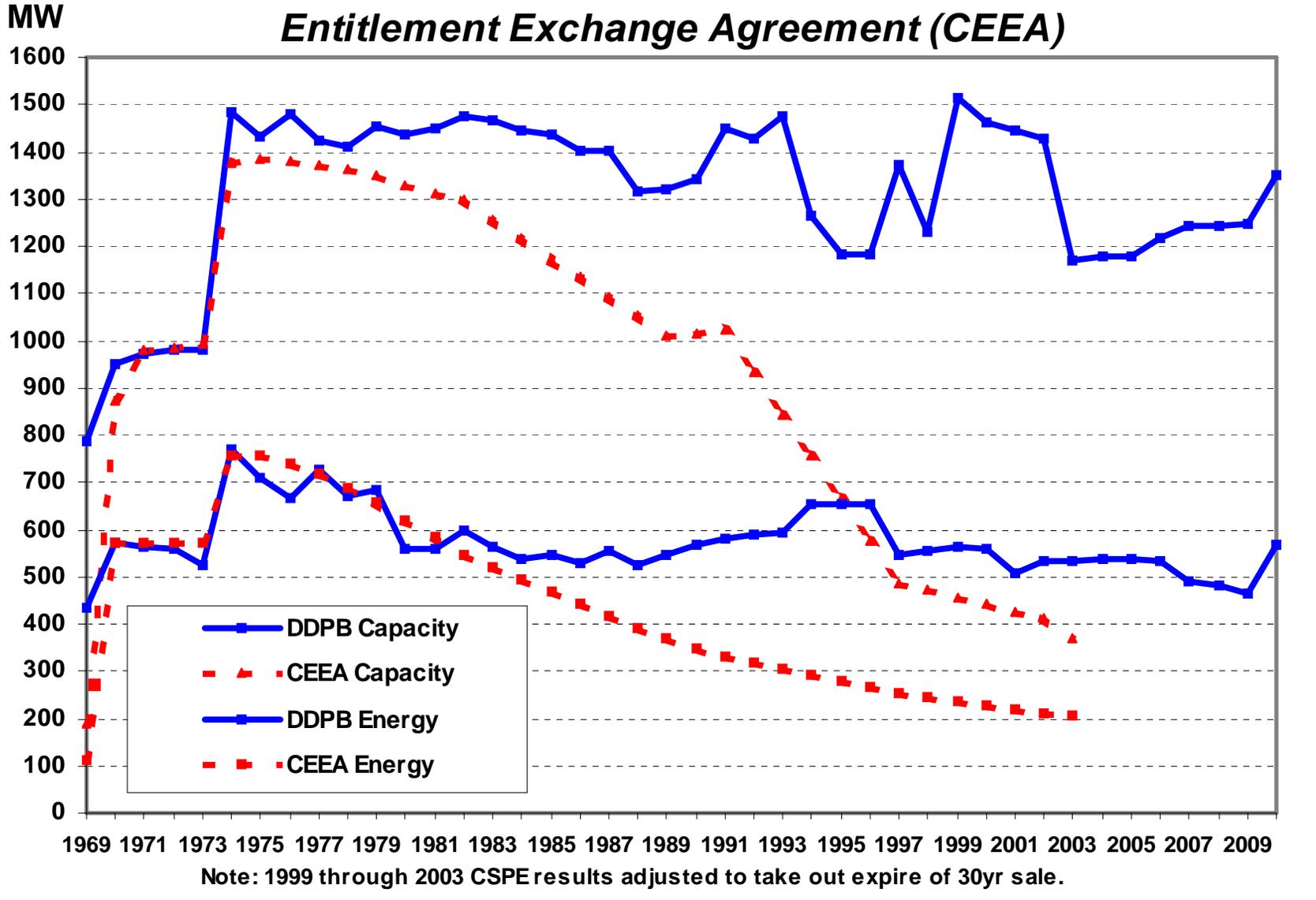
Treaty Benefits to Canada

- Payment of US\$64.4 million (1968 - 1973\$) for ½ of U.S. Flood Control Benefits (avoided damages) for 60 years.
- 50% of U.S. downstream power benefits (as agreed to 5 years in advance) = CAN Entitlement.
- 30-year sale of CAN Entitlement for \$254.4 million (1964\$) funded the majority of the Treaty projects.
- Additional payments for early completion of projects (~\$7M).
- Flood control protection in Canada / B.C.
- Stream flow regulation and developed head at Mica provided low cost sources of electric power.
- Libby regulation increased electricity generation on the Kootenay River.
- MacLean's Magazine (Canadian version of "Time") named the Columbia River Treaty 1 of the 25 greatest events to shape Canada in its first 100 years (i.e. to 1967).



Columbia
River
Treaty

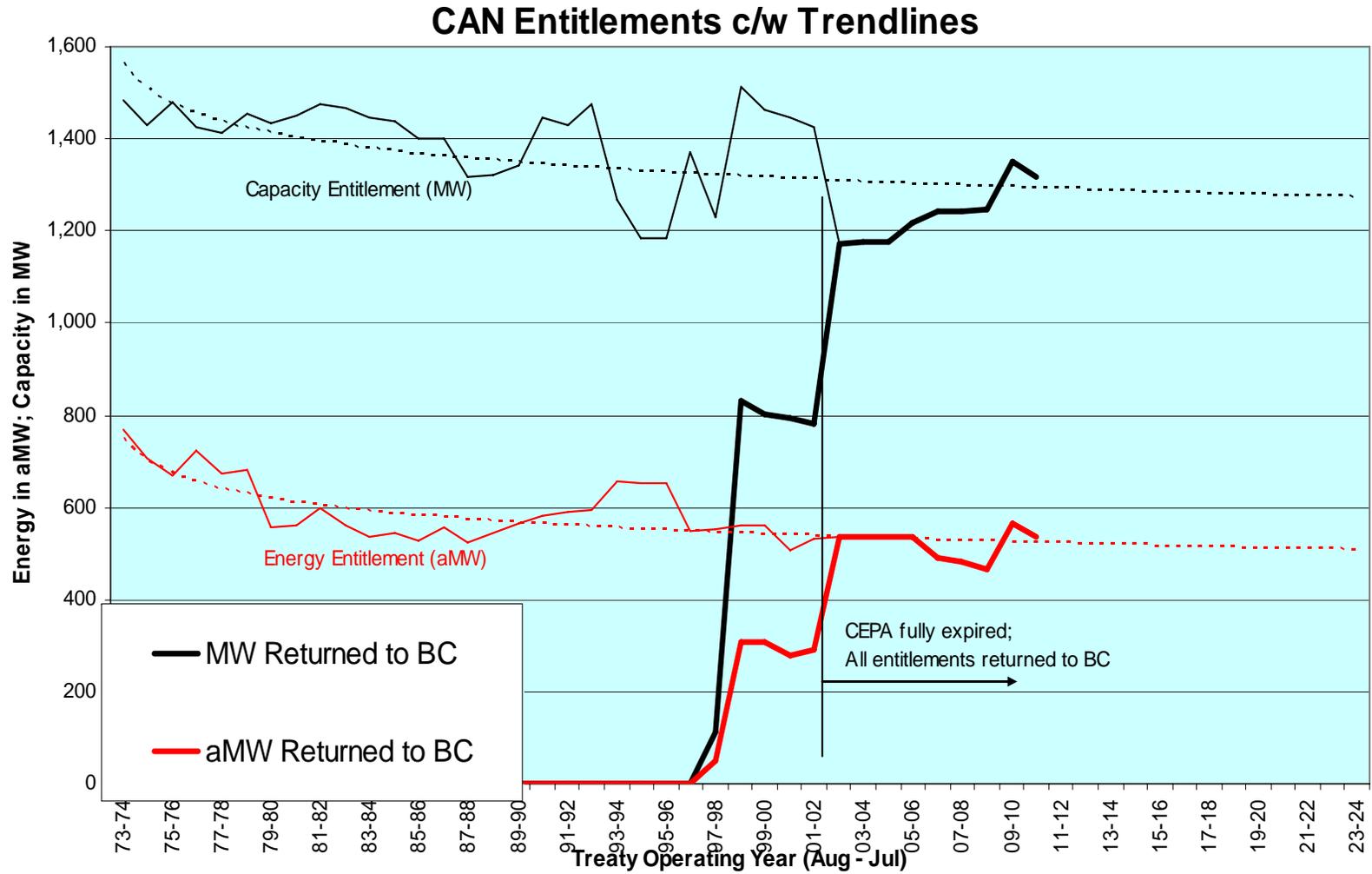
Canadian Entitlement from Annual Determination of Downstream Power Benefits (DDPB) vs. 1964 Canadian Entitlement Exchange Agreement (CEEA)



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Canadian Power Benefits



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Canadian Control / Flexibility

- The Treaty does not turn over control of Canadian reservoirs and rivers to the U.S... instead, it agrees to specific operations under specific conditions.
- Article 1 of the Protocol clarified that the on-going flood control obligations for Canadian projects after 2024 are subject to specific limits, and are only to be used after U.S. flood control abilities have been fully utilized.
- Article 7 of the Protocol clarified that the Treaty requirement was effectively for a flow at the border, not a specific operation at each Treaty project (subject to maintaining Flood Control abilities at each project).
- Flood Control plans are developed to minimize flooding in both countries; Power plans are developed to optimize generation in both countries.
- The Mica project was built 5 MAF larger than required under the Treaty. This increased the ability to “flex” water within Canada to address domestic power, social and environmental needs.



Treaty Costs to Canada

- 2300 people along the Arrow Lakes, Koocanusa, Duncan and Kinbasket reservoirs were displaced (with market-based compensation).
- 600 square kilometres of high value valley bottom land was flooded beneath 412 km of new reservoirs.
- Numerous First Nations archeological and burial sites were submerged and/or degraded by erosion.
- Federal – Provincial relations were seriously strained by Treaty negotiations (now fully corrected).
- On-going impacts from changing water levels, include:
 - Reduced recreation opportunities.
 - Loss of key wildlife habitat.
 - Loss of fish habitat; Trapping of nutrients behind dams.
 - Increased dust storms around reservoirs.
 - Increased transportation problems.
 - Reduced farming and forestry activities.
- Political Tensions: Residents in the region felt they carried the bulk of the Treaty costs, but did not fairly share in the Treaty benefits.



Role of the Columbia Basin Trust



- The 1995 Columbia Basin Accord established the CBT to invest the Region's allocation of the CAN Entitlement (~5%): \$295M, plus \$32M operating, plus 50% of generation project expansion rights in the region (\$26M).
- Mission: *"The CBT supports efforts by the people of the Basin to create a legacy of social, economic and environmental well-being and to achieve greater self-sufficiency for present and future generations."*
- Mandate: *"To manage the Columbia Basin Trust's assets for the ongoing economic, environmental and social benefit of the region, without relieving governments of any obligations in the region."*
- CBT is developing a number of generation projects in the basin (Arrow Lakes Hydro, Brilliant Dam, Brilliant Expansion, Waneta Expansion) through joint ventures with Columbia Power Corporation (a Provincial Crown Corporation).
- CBT Website: www.cbt.org/
- CPC Website: www.columbiapower.org/



CBT Water Initiatives: Strategic Goals



“The CBT recognizes that one of the most significant water issues in the Columbia Basin is the opportunity to renew, terminate, or re-negotiate the CRT. The CBT is committed to ensuring Basin residents’ values and view are a key part of the process from start to finish.”

Goal 1: “Work with Basin residents to build an understanding of, and capacity to deal with water-related issues in the Basin.”

Goal 2: “Support the development of a network of organizations working on water initiatives in the Basin.”

Goal 3: “Strengthen the participation and influence of Basin residents in water-related processes in the Basin.”



BC Water Use Plans

- Provincial legislation developed in November 1996 gave rise to the Water Use Planning process.
- Objective was to review water licences, in light of changing public values and environmental needs... i.e. improve management of B.C.'s water resources through a collaborative review, with representation by all interests.
- Process was initiated for both the Columbia and Duncan basins in 2001. In 2007, the B.C. Water Comptroller ordered the implementation of the proposed plans for both.
- These included several discharge and reservoir level constraints for Duncan; no hard constraints for Mica/Arrow.
- Numerous monitoring studies and other capital works are now being implemented, in addition to these operational changes.
- Plans will be reviewed in 5 – 13 years (varies with component).



Reasons for Treaty Success



- Natural Synergies / Geography: The U.S. system included large generating projects, but relatively poor or expensive storage projects. The Canadian part of the basin presented a number of very attractive storage sites in the narrow and deep valleys. Win – win arrangements were therefore available.
- Technical Input: Engineers were brought into the issue very early on. Technical principles agreed to by IJC engineers helped to drive the political process (not the other way around).
- Mandated Agencies: Organizations were in place on both sides of the border that cut through political divisions: BC Province on the Canadian side; Corps (for basin-wide FC) and BPA (for basin-wide power) on the U.S. side; the IJC on both sides.
- Historical Relationship: The U.S. and Canada have a long history of addressing issues in a peaceful and constructive manner.



Future of the Treaty



- Either the U.S. or Canada has the option of terminating many aspects of the Treaty as early as Sep 2024, with a minimum of 10 years notice. Called Upon FC continues for life of projects.
- Many societal values have changed since the Treaty was finalized in 1964:
 - Fisheries interests and legal support is greatly increased.
 - Certain fish stocks have dropped dramatically since 1960's.
 - First Nations / Aboriginal issues are much more visible.
 - Many more people live on or near the Columbia River.
 - Environmental issues are much more prominent.
- Power and Flood Control remain very important to modern society, however, and the Treaty has successfully delivered these while also addressing other issues.
- Personal belief that the coordinated win-win approach will continue over the long term.



Conclusions



- In aggregate, the Columbia River Treaty has provided significant economic benefits to the Province of B.C., and Canada.
- The historical timelines available to develop and implement the Treaty were very tight, however, and consultation with the basin residents in 1960 – 1964 was not adequate.
- The Treaty operation of the reservoirs continue to impact residents of the region, First Nations and the environment.
- The B.C. government is working to address these impacts in two ways:
 - Funding (~5% of the CAN Entitlement) and political support has been provided to develop the Columbia Basin Trust.
 - Water Use Plans have been developed for the Columbia River main stem and the Duncan River, to ensure water is managed in a balanced and appropriate manner.
- The Entities also work very hard to develop mutually beneficial operations that meet power, flood control and other requirements.
- The option to terminate the Treaty as early as 2024 will present many challenges to the Parties... it also, however, presents the opportunity to further improve this very important and historic agreement.



Additional Reading List

- Report of the Committee on Economic Studies of the Columbia River Development, A.G.L. McNaughton (1958).
- The Canada – U.S. Controversy over the Columbia River; Ralph W. Johnson (1966).
- The Columbia River Treaty: The Economics of an International River Basin Development; John Krutilla (1967).
- The Continental Waterboy, Donald Waterfield (1970).
- Where Water Falls, Clarence C. Dill (1970).
- People in the Way, James W. Wilson (1973).
- Conflict over the Columbia: The Canadian Background to an Historic Treaty; Neil A. Swainson (1980).
- W.A.C. Bennett and the Rise of British Columbia, David J. Mitchell (1983).