

# Columbia River Treaty

## Summary of Canadian Dam and Reservoir Issues

March 2014

Jointly prepared by:



## CONTENTS

<b>Introduction .....</b>	<b>3</b>
<b>Columbia Basin Trust Region Map .....</b>	<b>4</b>
<b>Basin-Wide .....</b>	<b>5</b>
<b>Common to Most Sub-Regions.....</b>	<b>6</b>
<b>Kootenay River System .....</b>	<b>9</b>
Kooanusua Reservoir Upstream of Libby Dam .....	9
Libby Dam Downstream to Kootenay Lake .....	10
Duncan Reservoir .....	10
Kootenay Lake.....	11
Brilliant Headpond.....	12
<b>Columbia River System .....</b>	<b>12</b>
Hugh Keenleyside Dam Downstream to U.S. Border .....	12
Arrow Lakes Reservoir .....	13
Shelter Bay to Revelstoke Dam.....	14
Revelstoke Reservoir .....	15
Kinbasket Reservoir .....	15

**Please note:**

This is not a comprehensive list of issues. This document continues to be updated as needed. The content represents resident and advisory input, and has not been fully vetted for technical accuracy. The order of this list does not reflect any prioritization.

This summary has been prepared by the Columbia River Treaty Local Governments’ Committee (LG Committee) and Columbia Basin Trust (the Trust).

For more information or to provide comments on this document, please contact: Cindy Pearce, Executive Director for the LG Committee (1.250.837.3966 [cindypearce@telus.net](mailto:cindypearce@telus.net)) or Kindy Gosal, Columbia Basin Trust Director, Special Initiatives (1.800.505.8998 [kgosal@cbt.org](mailto:kgosal@cbt.org)).

Elected officials from across the Columbia Basin are working together through the LG Committee to help Basin residents and local governments engage in decisions around the future of the Columbia River Treaty (Treaty).

The Columbia River Treaty LG Committee formed in 2011 to work with the Trust to help ensure Basin residents and elected officials alike increase their knowledge on the Treaty. The LG Committee has been working collaboratively on this important issue with regional MLAs and provincial staff, as well as regional MPs.

The LG Committee encourages residents to learn about the Treaty by exploring [www.cbt.org/crt](http://www.cbt.org/crt), taking a tutorial at [www.cbt.org/tutorial](http://www.cbt.org/tutorial), as well as visiting the Province of BC’s website at [www.gov.bc.ca/columbiarivertreaty](http://www.gov.bc.ca/columbiarivertreaty).

## INTRODUCTION

This document is a summary of the issues raised most frequently by Basin residents at 38 community-level Columbia River Treaty (Treaty) Information Sessions—hosted by Columbia Basin Trust (the Trust), the Columbia River Treaty Local Governments' Committee (LG Committee) and the Provincial Columbia River Treaty Review Team, between fall 2011 and fall 2013—involving more than 2,700 residents from across the Basin. Issues raised by the LG Committee are also summarized here.

**These issues are broken into two broad types:**

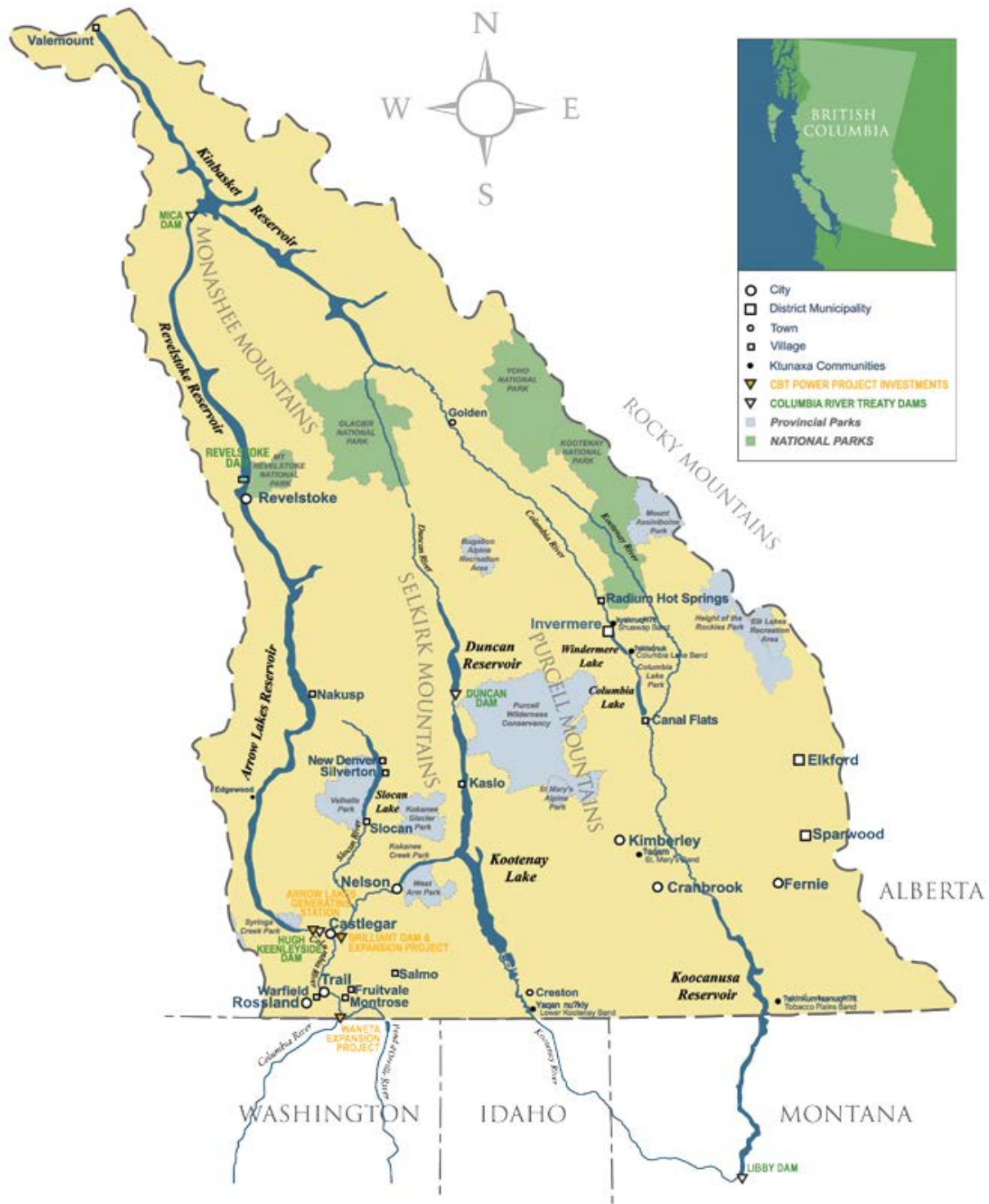
**1. Historical/footprint issues:**

These are issues related to the original construction of the Treaty-related dams and creation of the reservoirs. Many of these issues have not been within the scope of dam/reservoir management planning processes (e.g. Water Use Plans, Non-Treaty Storage Agreement, Assured Operating Plans, and Annual Plans) that have occurred to-date.

**2. Current operations issues:**

These are issues related to the ongoing operations of Treaty-related dams. These may be considered in scope of either the current Treaty Review process, or existing operational or planning processes.

## COLUMBIA BASIN TRUST REGION



SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>BASIN-WIDE</b>		
Current Operations	Incorporate ecosystems as an equal priority in dam/reservoir operations	Flood control and power generation are the primary focus of the current Treaty. Many residents believe that decisions about dam and reservoir operations should include ecosystem functions as an equal priority to flood control and power generation.
	Flood control/management	During high water years and particularly during extreme high water years, reservoir levels need to be drawn down before snowmelt/heavy rains to hold inflows. This requires close cooperation between all operators, including U.S. dam operators, to minimize flooding and damage. These operations can conflict with water management for other values. Improved consultation and communications with local governments and residents with local knowledge of the Columbia system should be part of this process.
	Power generation	Continued production of reliable hydropower from Treaty-related facilities in the Basin is generally supported, including expansion of generating capacity in some locations. Some residents are concerned that future Treaty decisions might reduce power generation and, therefore, revenues from Trust-owned facilities, which could reduce revenue available to fund the Trust's programs and initiatives.
	Hydroelectricity rates	Many residents have the perspective that local power rates should be lower in the Basin than elsewhere in BC because Basin residents live with the impacts of the Treaty dam operations.
	Climate change impacts	The projected local impacts of climate change include earlier freshets, increased extreme precipitation events, more rain at low elevations, more snow at high elevations, warmer water temperatures, longer periods of low flows and more frequent droughts, with resulting impacts on ecosystems, communities and the economy. Increased frequency of flooding can be expected. These changes need to be incorporated into reservoir operations and any changes in operations need to be communicated to local governments and residents.
	Involvement of local residents in reservoir management and dam operation decisions	There are limited mechanisms for knowledgeable local residents to provide input to reservoir management and dam operations.
	Basin residents' understanding of BC Hydro operations and processes	Basin residents do not understand, and are thus unsupportive of BC Hydro operations, in part because of inadequate communications about annual operating decisions and ongoing processes such as Water Use Planning (WUP), including implementation and study results.

**BASIN-WIDE (CONTINUED)**

Current Operations (Continued)	Accounting for benefits and impacts	A better understanding of all the benefits and negative impacts from the Treaty in both BC and the U.S. is needed. Full-cost accounting should be considered, including assigning monetary amounts for values such as ecosystems, and fish and wildlife habitats.
	Transboundary river dialogue and governance	There are limited mechanisms for broader stakeholder involvement in transboundary river governance in the Columbia Basin. This includes discussion on key areas of interest such as managing ecosystems, and associated fish and wildlife in a comprehensive manner across the border. There is a need for more transboundary dialogue about how the system is managed and what can be done to improve its management for shared benefits to both nations.

**COMMON TO MOST SUB-REGIONS**

Historical/ Footprint	Loss of First Nations' archeology and culture	Archeological and important cultural sites, as well as traditional use areas have been inundated by the reservoirs.
	Ecosystem impacts	Inundation and loss of lakes, waterways, wetlands, floodplains and upland ecosystems lead to loss of habitats, particularly riparian and riverine habitats. This loss has had negative impacts on fish, wildlife and important ecosystem functions such as biodiversity, productivity and connectivity. Some Basin residents believe that the reservoirs have warmed the local climate at lower elevations, which has also changed how ecosystems function.
	Loss of nutrients due to dams	Sediments settle behind dams and are not transported downstream as would happen in a natural system, resulting in downstream nutrient loss and impacts on ecosystem productivity.
	Incorporate local knowledge into mitigation and compensation processes	Local knowledge about historical/footprint impacts from when the dams and reservoirs were created should be incorporated in decisions about mitigation and compensation through the Fish and Wildlife Compensation Program–Columbia, East Kootenay-Koocanusa Fish and Wildlife Program and the Columbia River and Duncan Dam Water Use Plans on an ongoing basis.
	Salmon restoration	Many Basin residents support exploring the feasibility of re-establishing salmon into their historical range in Canada, provided U.S. impediments to salmon migration into the Canadian portion of the Basin are addressed first. Creating fish passage for salmon would also benefit other species, however, re-establishing salmon is expected to impact existing resident fish species.

SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>COMMON TO MOST SUB-REGIONS (CONTINUED)</b>		
Historical/ Footprint (Continued)	Economic and social impacts	Economic opportunities were lost, and recreation and social impacts occurred through the inundation of fertile, productive valley bottom land, and community displacements. Residents noted that these losses have not been adequately acknowledged through any form of financial compensation. Local governments noted loss of potential tax revenue from properties that were inundated. Residents observe that recreational and other developments along the reservoirs have not been adequately supported and that these developments could enhance the economies of affected communities.
	Impacts to forest industry	Loss of fertile valley bottom forested areas reduces the productive capacity of the forestry sector. Reservoirs with high cost and complex transportation systems increase forestry costs, reducing the competitiveness of the forestry sector.
	Impacts to agriculture	Loss of productive agricultural land has left a small number of farming operations without the critical mass to sustain a local agriculture industry; expensive transportation is a further challenge and farmers noted lack of adequate financial compensation the losses that occurred. Growing concerns about food security are heightening the importance of these agricultural impacts.
	Impacts to transportation infrastructure	Inundation of valley bottom lands left limited transportation connections within the Basin and to the Okanagan (e.g. due to ferries rather than a bridge on the Arrow Lakes Reservoir). The existing transportation infrastructure is more expensive to up-keep, and inefficient, resulting in lost economic opportunities.
	Adequacy of grants and taxation on existing BC Hydro infrastructure and reservoirs	The method of calculating grants or payments in lieu of taxes and the distribution of these funds to local governments does not match the impacts on affected areas. Lack of taxation mechanisms for reservoir areas and transmission lines is also a concern.
	Need for economic development support	Several communities along the Columbia River attribute their struggles to create sustainable economies in large part to the long-standing impacts of the dams and reservoir operations—for example, the lack of adequate boat ramps and debris management limits tourism development. They identify the need for economic development support to overcome these impacts.
	Current Operations	Benefit-sharing

SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>COMMON TO MOST SUB-REGIONS (CONTINUED)</b>		
Current Operations (Continued)	Damage/loss of First Nations' archeology	Fluctuating water levels expose these sites to wind and wave erosion and create opportunities for people to collect artifacts, further damaging these sites.
	Impacts on First Nations' traditional and current uses	Fluctuating water levels and erosion negatively impact hunting, fishing and gathering of plants and plant products.
	Impacts to ecosystems, fish and wildlife	Reservoir and river level fluctuations impact a wide range of environmental values in the system including fish and other aquatic resources, wildlife, and vegetation. Wetland protection/enhancement and fish access to spawning areas during low water levels are particular concerns.
	Declining recreational fisheries	Basin residents observe that the size and number of recreational fish, kokanee in particular, have been declining, reducing the recreational fishing experience.
	Boat access and recreation infrastructure	Basin residents observe that the Province and BC Hydro have not adequately met their obligations to provide this important infrastructure.
	Impacts to recreation/tourism and access due to fluctuating reservoir levels	Reservoir and river level fluctuations negatively impact a wide range of recreation/tourism values in the system (e.g. boating and boating access on reservoirs, motorized use of drawdown areas and access to beaches). ATV recreation on drawdown areas is unmanaged and local support is mixed.
	Debris management	Floating debris, particularly after high water levels, creates navigational hazards, limits log transport and causes damage to property, water pipes and water sewage infrastructure.
	Invasive aquatic species	It is uncertain whether there is a link between reservoir operations and invasive aquatic species.
	Dust storms/revegetation	At low reservoir/river levels, exposed areas are prone to wind scarification creating small particulate dust storms, which impact the health and quality of life of nearby residents, and impacts tourism. The current revegetation programs are reducing the dust issue, but more needs to be done.
Dam safety	There are concerns that as the dams age, the risk of a failure increases, putting downstream communities at risk. The ability of the dams to withstand increased heavy stream flows, as projected with climate change, is also a concern, as well as potential impacts of ongoing siltation, which reduces reservoir capacity. Basin residents want access to information related to these issues.	



SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>KOOTENAY RIVER SYSTEM</b>		
Current Operations	Lack of Basin input or influence in Libby Dam operations	Libby Dam operations are based on U.S. processes/decisions, with some coordination with BC Hydro. This limited coordination does not adequately address the full range of impacts of Libby Dam operations in Canada, both upstream and downstream of Libby Dam.
	Responsibility for avoidable flood damage due to Libby Dam operations	If future Libby Dam operations cause flooding in Canada that could have been averted, either BC or U.S. agencies should be responsible for compensating for these avoidable damages.
	Lack of a Water Use Plan-like process on the Kootenay River system, including the Koochanusa Reservoir	A process—with Canadian and U.S. participation—that looks at operational impacts on a range of values and considers all dams/reservoirs on the Kootenay River system (i.e. Koochanusa Reservoir to Columbia confluence) is needed.
<b>KOOCANUSA RESERVOIR UPSTREAM OF LIBBY DAM</b>		
Footprint	Debris removal	A long-term commitment to an adequate, annual debris removal program is required.
	Fish and wildlife conservation and restoration	There is no water licence issued by the Province of BC for Koochanusa Reservoir because Libby Dam is in the U.S. Consequently, until 2013 there was no Fish and Wildlife Compensation Program for this area similar to other reservoirs in the Basin. Basin residents want to know how to get involved in the new East Kootenay-Koochanusa Fish and Wildlife Program established in April 2013 by the Trust, the Province and BC Hydro. Currently, there is limited monitoring of fish and wildlife in the area, so it is difficult to know the status of ecosystems, wildlife, fisheries, etc. There is some interest in exploring the feasibility of a nutrient restoration program for Koochanusa Reservoir.
	Limited road access	Limited road access on the south east portion of Koochanusa Reservoir (in BC) constrains economic development opportunities, but protects against ecological damage.
Current Operations	Fluctuating reservoir levels impact agriculture, recreation and tourism	Agriculture and property are impacted by erosion and flooding at high water levels. Access for water-based recreation and tourism opportunities is impacted at low levels. Ecosystems are impacted as water levels fluctuate. As a result, some residents call for reduced fluctuations. There are concerns about increased fluctuations under a Called Upon flood control regime, which would be in place after 2024 unless a new flood risk management agreement is negotiated.

SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>KOOTENAY RIVER SYSTEM (CONTINUED)</b>		
Current Operations (Continued)	Motorized recreation at low water levels	The extensive mudflats that exist when Koocanusa Reservoir is drawdown are accessed by ATV users, creating dust that impacts the health and quality of life of nearby residents. This type of motorized use also leads to conflicts in areas adjacent to the reservoir. A motorized use agreement is suggested to manage this conflict.
<b>LIBBY DAM DOWNSTREAM TO KOOTENAY LAKE</b>		
Current Operations	Impacts on diking infrastructure due to river level fluctuations	Some residents have identified that rapid stream flow fluctuations in the Kootenay River, as a result of Libby Dam operations, have weakened dikes in the Creston area. This situation, coupled with a lack of funding for dike maintenance, is resulting in dike erosion, creating a flood risk to agricultural lands in the Creston Valley.
	Management of Columbia Valley Wildlife Management areas (CVWMA) and existing/potential wetland areas outside the CVWMA	Rapid stream flow fluctuations in the Kootenay River, as a result of Libby Dam operations, have weakened dikes in the Creston area. This situation, coupled with a lack of funding for dike maintenance, is resulting in erosion of dikes that protect the Creston Valley Wildlife Management Area (CVWMA) wetlands, and wetlands adjacent to Kootenay River. Some of these dikes were funded by the provincial and federal governments to create wetlands to compensate for the inundation of wetlands by the Duncan Dam. The provincial and federal responsibility to continue to provide funds to support this compensation is unclear.
	Accretions* and development in historical floodplain areas increase flood risk	Development in the historical floodplain, approved by the Province and regional districts, after construction of Libby Dam has increased the flood risk to infrastructure. However, the flood risk has been greatly reduced in frequency and scale compared to the historical flood risk before Libby Dam.
<b>DUNCAN RESERVOIR</b>		
Historical/ Footprint	No buy-back opportunities for expropriated lands	Unlike what occurred around Arrow Lakes Reservoir, property owners were not provided an opportunity to buy-back properties that weren't inundated.
Current Operations	Accretions* and development in historical floodplain areas increase flood risk	Development in the historical floodplain, approved by the Province and regional districts, after construction of Libby Dam has increased the flood risk to infrastructure. However, the flood risk has been greatly reduced in frequency and scale compared to the historical flood risk before Libby Dam.

\* An increase of land along the shores of a body of water—in this case due to approved development into historical floodplain areas.

SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>KOOTENAY RIVER SYSTEM (CONTINUED)</b>		
DUNCAN RESERVOIR (CONTINUED)		
Current Operations (Continued)	Mosquito control	Some residents have identified that post-dam operations have resulted in increased mosquito cycles, impacting local quality of life, heightening the risk of West Nile virus infections, and requiring more frequent and costly control by the regional district.
	Flooding of lands with agriculture potential	Frequent flooding of lands with high agriculture potential reduces the ability of the local area to realize agriculture opportunities.
	Addition of generating facilities at Duncan Dam	Adding generating facilities at Duncan Dam would increase the payments in lieu of taxes that local governments receive, which could be used to better address impacts from Duncan Dam.
	Environmental values	Duncan operations have significant impacts on fish habitat and fish populations, as well as wetland and riparian-dependent wildlife. There is concern about how discharges impact Kokanee and Gerrard Rainbow Trout spawning.
	Erosion between Duncan Dam and Kootenay Lake	Some residents have identified erosion of private land below Duncan Dam as an issue. It is not clear when and what flows create erosion.
KOOTENAY LAKE		
Current Operations	Accretions and development in historical floodplain areas increase flood risk	Development in the historical floodplain, approved by the Province and regional districts, after construction of Libby Dam has increased the flood risk to infrastructure. However, the flood risk has been greatly reduced in frequency and scale compared to the historical flood risk before Libby Dam.
	Grohman Narrows limits outflow rates	Sand deposition at Grohman Narrows and in other areas on the West Arm limits how fast water can move out of Kootenay Lake, which can result in higher lake levels than would occur if the Narrows, in particular, was deepened. The possibility of dredging Grohman Narrows is being explored by BC Hydro.
	1938 International Joint Commission (IJC) Order	The 1938 International Joint Commission (IJC) Order addresses water flow management on the Kootenay River through Corra Linn Dam, south of Nelson. It does not address the managed inflows from Duncan and Libby dams. Some residents are asking if the current IJC Order is relevant to today's hydro operations given that the Duncan and Libby dams were built after the IJC Order.
	Debris management	In very high water years, floating debris damages lakefront properties and creates boating risks, although less so than compared to before the Treaty.

SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>KOOTENAY RIVER SYSTEM (CONTINUED)</b>		
KOOTENAY LAKE (CONTINUED)		
Current Operations (Continued)	Ferry navigation on Kootenay Lake	At very low lake levels, the provincial ferry has grounded when entering the West Arm. Dredging (i.e. 25–35 years ago) minimized this in the past. At very high lake levels, the ferry has difficulties docking.
	Aquatic ecosystems	Concerns about reduced recreational fisheries, smaller fish and declining kokanee numbers.
<b>BRILLIANT HEADPOND</b>		
Current Operations	Fluctuating water levels	Rapid, daily fluctuations in water levels impact riparian areas, safe use of and access to this waterway, property values, recreational opportunities, and causes erosion. Residents suggest the following are needed: a WUP-like process, an erosion control/management plan, an invasive aquatic plant management plan, safe public boat and road access, and water navigation markers and policies.
<b>COLUMBIA RIVER SYSTEM</b>		
Historical/ Footprint	Fish and Wildlife Compensation Program - Columbia (FWCP)	Many feel the current funding is inadequate and there are some concerns about whether the funds are fairly allocated. The new FWCP delivery model has created further concerns about the lack of resident biology expertise, and uncertainty about how decisions are made. Some residents are not aware of, or knowledgeable about the program. Some view the program as unsuccessful, particularly the reservoir fertilization/nutrient restoration programs.
	Full implementation of Water Use Plans	There are concerns about implementation of the Duncan Dam and Columbia River Water Use Plan (WUPs), including delays in implementation, difficulty accessing information about implementation, and lack of ongoing involvement in WUP implementation and associated decisions.
<b>HUGH KEENLEYSIDE DAM DOWNSTREAM TO U.S. BORDER</b>		
Current Operations	Large fluctuations in river levels	Fluctuations caused by a combination of Kootenay and Columbia River system operations. Daily water level fluctuations on the Kootenay River are the most significant. This impact of BC Hydro operations is not understood by the public.
	Gyro beach erosion	River level fluctuations and high water erode sands, requiring beach replacement about every two years.

SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>COLUMBIA RIVER SYSTEM (CONTINUED)</b>		
<b>HUGH KEENLEYSIDE DAM DOWNSTREAM TO U.S. BORDER (CONTINUED)</b>		
Current Operations (Continued)	Flood impacts on community infrastructure	In high water years, community infrastructure can be flooded, including waste water and sewage trunk lines, access roads and facilities in areas such as Castlegar, Waldie Island and Trail. The flooding is reduced in frequency and scale compared to pre-Treaty.
	Accretions and development in historical floodplain areas increase flood risk	Development in the historical floodplain, approved by the Province and regional districts, after construction of Treaty dams has increased the flood risk to infrastructure. However, the flood risk has been greatly reduced in frequency and scale compared to the historical flood risk before the Treaty dams.
<b>ARROW LAKES RESERVOIR</b>		
Footprint	Ferries/fixd links	Fixed links (i.e. bridges) promised when the Hugh Keenleyside Dam was constructed have not been built and the ferries are considered inadequate in heavy traffic and limit economic opportunities
Current Operations	Fluctuating reservoir levels	At low water levels: shore and boat recreation/tourism and log booming are limited; water supply pipes can be damaged; dust storms can occur, causing health issues; and ecosystems are impacted, particularly fish access to spawning areas.. Marina infrastructure, private property and ecosystem areas are impacted at high water levels. Some residents are interested in more stable water levels year-round.
	Boat ramps/breakwaters	Properly designed ramps/breakwaters are needed to provide water access over a range of water levels; no safe overnight moorage at low water levels; Water Use Plans have not been fully implemented.
	Fisheries	Flows and high water levels impact white sturgeon. Access to fall spawning habitats for kokanee and bull trout can be limited by low water levels. Productivity may be limited by low reservoir levels in spring; partially compensated by the nutrient restoration program delivered by the Fish and Wildlife Compensation Program, though there are questions about whether the program is effective. Residents note declining kokanee populations and fewer, smaller fish generally.
	Accretions and development in historical floodplain areas increase flood risk	Development in the historical floodplain, approved by the Province and regional districts, after construction of Hugh Keenleyside Dam has increased the flood risk to infrastructure. However, the flood risk has been greatly reduced in frequency and scale compared to the historical flood risk before the Treaty dams.

SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>COLUMBIA RIVER SYSTEM (CONTINUED)</b>		
ARROW LAKES RESERVOIR (CONTINUED)		
Current Operations (Continued)	Wildlife	In spring, rising reservoir levels displace nesting waterfowl and shorebirds; fall levels impact bird habitat availability; fish populations can impact eagles and ospreys.
	Erosion of property and infrastructure	Erosion along the reservoir by fluctuating water levels.
	Navigation safety	Accidents (e.g. Arrow Park) due to changing water levels and boating hazards exposed at lower reservoir levels.
	Highway infrastructure damage	Roads are sinking and eroding away following very high reservoir levels. Concerns are most frequently expressed about the road between Burton and Fauquier.
	Sedimentation	More information on potential sedimentation issues on Arrow Lakes Reservoir is needed. There are concerns that ongoing sedimentation from tributaries may reduce the capacity of Arrow Lakes Reservoir to store water and that this has not been factored into hydro operations. There are also concerns that sediment deposition may change the accessibility of the reservoir for boating and log booming at low water levels.
SHELTER BAY TO REVELSTOKE DAM		
Current Operations	Fluctuating reservoir levels impact ecosystems and recreation	Lower reservoir levels are preferred to allow use of the drawdown zone for recreation and to reduce impacts on ecosystems and habitats. This conflicts with the preferences of residents downstream along Arrow Lakes Reservoir who want higher water levels for water-based recreation.
	Wetland management and BCH land management	Arrow Lakes Reservoir and Columbia River water level fluctuations impact wetland conditions; extensive BC Hydro lands should be actively managed for environmental values.
	Access conflicts on wetlands	Motorized and non-motorized recreation use conflicts.
	Boat ramps/breakwaters	Water Use Plans have not been fully implemented.
	River navigation safety	Markers are needed for safe navigation; dike/weir suggested to increase water depths for boating; unsafe boat launch at Shelter Bay.
	Fisheries	Minimum flows required for rainbow trout, bull trout, sculpins, dace and possibly sturgeon.

SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>COLUMBIA RIVER SYSTEM (CONTINUED)</b>		
SHELTER BAY TO REVELSTOKE DAM (CONTINUED)		
Current Operations (Continued)	Mosquito control	Increased costs to regional district in recent years when Arrow Lakes Reservoir levels remain high for longer periods in the summer.
	Municipal infrastructure damage	Roads sinking and sluffing following very high reservoir levels, at locations where the potential for damage was previously identified.
REVELSTOKE RESERVOIR		
	No issues have been raised	
KINBASKET RESERVOIR		
Footprint	Fish and wildlife	Lack of adequate funding and information on fish and wildlife values results in lack of allocation of Fish and Wildlife Compensation Program funds to the Kinbasket region. There are concerns that revegetation and bird nesting restoration activities through the Columbia River Water Use Plan have not been pursued sufficiently.
	Reduced road infrastructure	The resource road between Golden and Revelstoke was flooded and has not been fully replaced. The current access routes to Kinbasket Reservoir from Golden and Revelstoke are inadequate.
	Impacts to forest industry	Forestry impacts in Golden were especially high due to lack of transportation infrastructure, loss of productive timber lands and high cost of maintaining the existing transportation network.
Current Operations	Road maintenance	The lack of a maintenance budget and the poor road network make roads impassable in some seasons.
	Fisheries	The habitats for Kokanee, Bull Trout and Burbot are impacted. There are concerns that the number and size of recreational fish species has declined.
	Fluctuating water levels limit recreation/tourism potential	Extensive drawdown zone with unsightly mudflats limits recreation and tourism development potential.
	Weir	Some residents have suggested building weirs in the north and south of Kinbasket Reservoir to create areas with stable water levels for fisheries and recreation, as well as a mechanism to deal with dust storms.

SUMMARY OF CANADIAN DAM AND RESERVOIR ISSUES

Type of Issue	Issue	Description
<b>COLUMBIA RIVER SYSTEM (CONTINUED)</b>		
KINBASKET RESERVOIR (CONTINUED)		
Current Operations (Continued)	Boat ramps/breakwaters	Properly designed ramps/breakwaters are needed to provide boat access in a range of water levels, particularly at Bush Harbour. There are concerns about the status of Columbia River Water Use Plan implementation to provide this infrastructure.
	Inadequate campgrounds	No provincial campground; recreation sites are not maintained.
	Geotechnical concerns limit shoreline recreation/tourism development	Geotechnical studies completed before 1995 indicate there is a potential risk of a catastrophic landslide occurring and causing a tsunami-like wave that could inundate some shoreline areas. The Province will not approve shoreline development because of these studies and is forcing existing recreation users to abandon their shoreline cabins.
	No connection to the electrical grid	Connection to the electrical grid is not available around parts of Kinbasket Reservoir. This is seen as a limit to economic development.
Financial	Non-Treaty Storage Agreement (NTSA)	There are concerns about how water stored behind Mica Dam in excess of Treaty commitments (i.e. non-Treaty storage) is managed. For example, if this water is not used to manage water levels in Kinbasket Reservoir to meet a range of Basin values, some Basin residents believe that a portion of the revenues from the Non-Treaty Storage Agreement should be allocated to the Basin to address the resulting impacts. .
	Payment in lieu of taxes	BC Hydro makes a payment to the Columbia Shuswap Regional District in lieu of taxes; these funds are allocated to regional district areas that are not impacted by Mica Dam.
	Taxation of water stored in Kinbasket Reservoir	Water in Kinbasket Reservoir could be viewed as an asset that generates revenue for the Province. Taxation of this asset is seen as a way to generate revenues that could be used to offset the impacts of this reservoir. This issue may apply to other reservoirs as well.