

**Summary Report**  
**Columbia River Treaty Review Technical Conference**

**March 22, 2013**

**Sandman Inn, Castlegar, BC**

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## Introduction

The Columbia River Treaty Review Technical Conference (Conference) was held at the Sandman Inn in Castlegar on March 22, 2013. Approximately 120 people attended.

The Conference's intended objectives and outcomes were to:

- Satisfy stakeholders interested in more-in depth information on modelling and operational alternatives of future Columbia River Treaty (Treaty) scenarios;
- Convey opportunities and drawbacks of various Treaty options so that participants have a shared understanding of the modelling, rationale and other issues in the Columbia River Treaty Technical Discussion Paper;
- Identify Columbia Basin residents' views on the various Treaty options;
- Provide an opportunity for cross Basin dialogue on the future of the Columbia River Treaty;
- Provide information on the United States' Treaty review process; and,
- Provide a venue for Columbia Basin stakeholders to discuss topics of interest to them that may or may not fall within the scope of the Treaty.

Recorders documented questions and the essence of discussions that occurred during each session but did not identify the commenter. Conference PowerPoint presentations can be found on the Province's Columbia River Treaty Review website. [link: <http://blog.gov.bc.ca/columbiarivertreaty/community-sessions/>].

## Background

The Province initiated a Columbia River Treaty Review (Treaty Review) to evaluate future decision options, including possible continuation, amendment or termination of the Treaty. The Ministry of Energy and Mines is the lead agency for the Treaty Review and has established a Columbia River Treaty Review team.

The Treaty Review provides an opportunity for the Province to engage with the Columbia Basin residents. The Province wants to ensure the implications of Treaty options are communicated to, and well understood by, Basin residents, and that those residents have full opportunity to provide input to help inform Provincial recommendations on the future of the Treaty.

The Treaty Review also provides an opportunity for the Province to engage with the Columbia River Basin First Nations, and a separate First Nations consultation process is underway.

The Columbia River Treaty Review team consulted with the Columbia River Treaty Local Governments' Committee and Columbia Basin Trust on the public consultation process. Basin residents also provided feedback on how they wanted to be consulted. In addition to community consultation sessions and getting input from a group of knowledgeable and committed local experts, Basin residents wanted the Province to host a conference that would allow interested residents to review the results of Treaty Review technical studies and receive more-in depth information on the modelling and operational alternatives.

Two Columbia River Treaty Review technical conferences were planned for March 2013. A conference was scheduled for Golden on March 20 and Castlegar on March 22. The Castlegar conference was also available to those who wanted to participate via LiveStream. The conference in Golden was cancelled due to low registration, and those people who had registered were offered travel cost assistance to attend the Castlegar conference. Several Golden residents also took advantage of the LiveStream option for the Castlegar conference. A bus was provided to assist residents from Edgewood, Fauquier, Burton, Arrow Park, and Nakusp to attend the conference in Castlegar.

# Columbia River Treaty 2014 Review Technical Studies Paper

## Technical Studies Presentation

BC Hydro presented an overview of the technical studies and the rationale and modelling done to examine the Treaty Terminate versus Treaty Continue scenarios germane to the fall 2013 strategic decision. The presentation briefly touched on a Treaty Plus scenario, however, as this scenario follows from a decision to continue the Treaty, it was not modelled at this time. For the Columbia River system, the analysis of the scenarios in the presentation built on the modelling undertaken during previous water use planning processes, highlighting operating alternatives that were not possible in the past due to the Treaty constraints. An analysis of the Kootenay River system was also conducted and performance measures were developed in absence of a Kootenay water use plan.

Conference attendees were informed that the purpose of the technical studies is to provide Basin residents and decision makers with an understanding of the range of physically possible operations under the two key scenarios. Therefore, the technical analysis focused on the “bookend” alternatives and not the many possible alternatives in-between.

## Technical Studies Breakout Sessions

Following the BC Hydro presentation, attendees could participate in two rounds of breakout sessions where the technical studies results were discussed by sub-region in more detail. Attendees could choose from the following breakout sessions:

- Kinbasket and Arrow Lakes Reservoirs
- Lower Columbia
- Kootenay System

### Breakout Session: Kinbasket and Arrow Lakes Reservoirs

The session began with a review of the information in the Columbia River Treaty Review Technical Studies Paper presentation focussing on the Kinbasket and Arrow Lakes Reservoirs. The interests that drove the development of alternatives in the water use planning processes around the Kinbasket/Arrow were also used in the Treaty Review modelling.

### Questions and Discussion

A key area for discussion was the elevation of the Arrow Lakes Reservoir used in modelling “lower” levels. Several participants wanted to know why even lower levels were not modelled (for instance 1,420 feet), noting that inundation at 1,423 feet affected vegetation restoration and nesting. Some argued that holding Arrow Lakes Reservoir levels low for multiple years would let vegetation and growth get established, improve recreation quality and reduce dust. One participant recommended dust

performance measures (e.g. “dust potential days”) for the area of the Columbia River between Mica Dam and the Arrow Lakes Reservoir (mid-Columbia).

Participants wanted to know if levels above 435 meters (1,427 feet) favoured power production and what was the minimum level to generate power. A participant questioned whether having the Treaty Terminates reference case at 1,420 - 1,430 feet would result in more power generation than the Treaty Continues reference case.

Some participants also stated that if water levels were lower, the reservoir would act like a river, and that, in the past when levels were lower, the river had both muddy banks and a current that was too strong for safe swimming. Even if it were deemed safe, it was suggested that the muddy shores created a barrier to both good swimming and boating. It was noted that while low water allowed for some boat access, this was only the case for smaller boats and not larger ones; and that the paddle wheelers of the past would have required higher water levels.

One participant wanted to know if a natural hydrograph alternative had been modeled.

Some participants noted lower water levels resulted in more dust storms and increased dust collection in homes. While the region did enjoy the recreational benefits of sandy beaches, they were only available from June to August.

A number of participants stated that dam operations should focus on finding a balance between high levels in Arrow Lakes Reservoir for recreation and fish, and low levels for vegetation, birds and wildlife. It was argued that good conditions for a small number of boat users were being traded for poor conditions for large numbers of fish and wildlife, and their supporting ecosystems.

Other participants noted that lower water levels would be a barrier to kokanee accessing tributaries for spawning. It was said that that the relatively low cost for stream restoration could provide kokanee access to the tributaries at lower water levels, and that there needs to be a greater commitment to kokanee access in the future. One participant noted that “... for one million years kokanee have managed to get up the tributaries at low water levels.” At the other end of the water-level spectrum, it was stated that estuaries are lost at full pool.

Similar to the concerns regarding kokanee, participants stated that the return of salmon to the Canadian portion of the Columbia River should be considered, and included in any future Treaty discussions. There were questions about the effectiveness of sturgeon pulse flushing, and how often it occurs.

The impact that changes to Arrow Lakes Reservoir would have on the operations of Kinbasket Reservoir were discussed (e.g. changes to Arrow that minimize fluctuations in levels, or in order to operate at full pool, means Kinbasket has to work harder to make up the difference, so that border flows still fall within the range prescribed. Changes in Arrow releases need to be coordinated with releases from Libby and Duncan dams). A participant noted that the amount of recreational use on Arrow Lakes Reservoir far exceeded that on Kinbasket Reservoir.

A few participants wanted to know the analysis behind the statement made by the U.S. Entity that the Canadian Entitlement should be reduced to \$30-50 million. Since this range was lower than expected by

some participants, they also wanted to know how it might affect the results of the technical studies completed for the Treaty Review.

Some participants were concerned about the trade-off chart used in the presentation, and how it might be changed to better convey information on the benefits of multiple values and reduce value overlap.

### **Breakout Session: Kootenay River System**

The session began with a review of the information in the Columbia River Treaty Review Technical Studies Paper presentation focussing on the Kootenay River system. Although there was an earlier Water Use Planning process for Duncan Reservoir, there has not been a similar process for the Kootenay River system. As part of the modelling work, the Columbia River Treaty Fish and Wildlife Technical Committee worked with BC Hydro to develop some Kootenay River system performance measures that could be used in the Treaty Review modelling studies.

### **Questions and Discussion**

There were a number of questions regarding the performance measures developed for the Kootenay River system. Several participants felt there should be a Kootenay Water Use Planning process for the whole of the Kootenay, including the Duncan Reservoir, with formally developed performance measures. One participant felt that a vegetation performance measure should be included while another participant wanted a measure of ecosystem function, suggesting a performance measure on nutrients in the South Arm of Kootenay Lake. One participant felt there should be a performance measure for Kootenay Lake flooding that in some way measured economic damages and not just water levels. A participant wanted to see more performance measures for downstream of Corra Linn dam.

Participants were interested in knowing whether the modelling studies had examined different operation options for Duncan dam and whether a power generation option could be considered.

The flooding that occurred in 2012 generated a lot of questions regarding possible future flooding, and measures that could be taken to reduce it. Participants wanted to know if the \$3-5 million damage estimate included environmental damage and changes in real estate values. A participant noted that this level of damage had a huge impact on the Regional District of Central Kootenay and that there was a need to look at the trade-offs, and whether provincial assistance might be appropriate when choices are made regarding flooding. Participants wanted to know what obligations Canada had regarding US flood control under both the Treaty Continue and Treaty Terminate scenarios, and whether there was an option to continue Assured Flood Control post 2024.

Other topics for discussion included:

- How the release of water at Libby might impact salmon downstream
- Whether power at Libby was traded-off for salmon flows on the Snake River system
- U.S. tribal interest in pushing for more normative flows so that system acts more like a river
- Okanagan Nation Alliance and the Colville Tribe trans-boundary salmon program
- How far salmon can reach upstream of the Columbia River

- The flood control situation at Koocanusa
- Whether high flows from Libby (pulses) help turn water columns (and nutrients) over in Kootenay Lake. One commented that nutrients are low on Kootenay Lake, so unsure whether turn-over flows would help.
- What the US Army Corps of Engineers will want for the future of the Treaty
- What happens to the Libby Coordination Agreement if the Treaty is continued or terminated
- What Canada's obligations were for flooding in U.S., whether the Treaty is continued or terminated
- The possibility of Grohman Narrows being dredged
- How far upstream the Kootenay Canal Agreement extended
- Whether there was an option to continue Assured Flood Control past 2024

### Breakout Session 3: Lower Columbia River

The session began with a review of the information in the Columbia River Treaty Review Technical Studies Paper presentation focussing on the lower Columbia River. There was extensive discussion of the high water levels, and subsequent flooding, during 2012. It was recommended that there needs to be even greater cooperation between BC Hydro and local government for situations like that which occurred in 2012. It was noted that, while there is a link between river flows and the height of the reservoir, it does not necessarily mean that quickly rising reservoirs result in faster outflows. Much of impact of the high water levels during 2012 was experienced in the reservoirs, to protect against downstream river impacts.

The species that the Treaty Review team heard most about were sturgeon, whitefish and trout. There are currently high flows being released at certain times to help sturgeon but it still might not be enough; while some spawning is occurring there remains recruitment failure with the sturgeon population in the Columbia River (i.e. there is virtually no sturgeon eggs, laid in the river, surviving through to the juvenile stage).

With respect to rainbow trout and whitefish, and other species, there were five basic hypotheses put forward that may help these populations, even though there is not conclusive fisheries data at this point. These were: the protection of eggs through the management of water flows; create more stable water flows; in winter reduce flows (pre-dams there were lower flows in winter but now for power production winter flows are higher and fish expend a lot more energy); increase habitat availability; and managing adult and juvenile growth rates which are driven by food supply out of Arrow Lakes Reservoir.

It was re-emphasized that the dams do provide barriers and therefore not only alter the habitat but disrupt the connectivity between habitats.

While there was general agreement in the group that there has been significant damage to the environment as a result of the dams, one participant voiced a concern that "all biologists wanted were more and more fish," and that too much spending was going on trying to achieve this goal.

The subject of dam removal was also aired as an alternative remedy to spending more dollars trying to fix the problem. While there is a 'nothing-is-off-the-table' approach to the community consultation and



feedback sessions, the participants were reminded that there would have to be very sound reasons for removing one, or more, dams in the future.

There were a number of questions on how the Treaty affects the ecosystem; whether there is a clear trade-off in Canadian Entitlement against ecosystem gains; and whether the U.S. would likely want higher spring flows.

Participants were informed that decisions involve both sides, since the Treaty is about mutual benefits, and that the United States cannot unilaterally demand certain flows, or timing of those flows, from Canada.

A recurring theme during the session focussed on the rate of change of water levels rather than the actual change itself. It was thought by some that the water levels fluctuate too quickly. Some participants felt that the rate of change could be spread over four days rather than two it would be much better for the environment and the affected communities.

Following a question regarding the possibility of more flood damage if the Treaty was terminated, it was stated that the Treaty dams have certainly reduced flooding (and 2012 was a prime example of that), and that the more storage there is then the less likelihood of flood damage.

The issue of safety and security regarding dam infrastructure was raised. The BC Hydro representative outlined the high level of capital projects that are ongoing, and the extensive monitoring that takes place on a regular basis of the dams, the gates and the spillways. Given the high priority this has within the organization, there was no need for concerns about failing infrastructure, and the main challenge remains how to best manage the water flows.

With respect to the possibility of dredging at Grohman Narrows, BC Hydro will provide more details to communities in meetings to be held in future. Whatever changes to the system take place, there will not be an increased risk of flooding downstream at Trail.

There was a concern voiced that the performance measures table in the report “do not add up,” and that there seems to be no significant difference between the various scenarios.

## **U.S. Treaty Review Process**

An update on the work that is occurring in the U.S. on the Columbia River Treaty was presented by Jim Barton, U.S. co-chair of the Columbia River Treaty Operating Committee (CROTC) with the U.S. Army Corp of Engineers, and fellow co-chair Rick Pendergrass, with Bonneville Power Administration.

The presentation covered such topics as the scope of the CROTC, the regional engagement efforts underway through the Sovereign Review Team (SRT), an overview of “Iteration 2” components and alternatives, U.S. flood risk management and impact analysis, where the U.S. reservoir storage is located, and estimated future value of Canadian Entitlement.

## Questions and Discussion

The questions and topics for discussion arising from the presentation included:

- How does the U.S. view called upon? The U.S. team responded by saying that the U.S. Congress authorizes the utilization of some dams for flood risk management, and that these would be used for flood control before the U.S. called upon Canada. (their White Paper on the subject can be accessed online [link: <http://blog.gov.bc.ca/columbiarivertreaty/files/2012/07/Columbia-River-Post-2024-Flood-Risk-Management-Procedure-White-Paper-Sept-2011.pdf>]).
- In the 1960s the benefits with and without dams were examined, but now values with dams already in place form the basis of the analysis.
- While downstream benefits were expected to decline, have downstream benefits been forecasted for 2030 and 2040 for example? Also has carbon pricing been examined? The U.S. team confirmed that downstream benefits are declining, and that carbon pricing has not been examined. As for forecasting downstream benefits, the Canadian Entitlement is estimated at between \$220 and \$360 million.
- Has the U.S. team looked at the Canadian portion of the Basin when looking at ecosystem trade-offs, and if so, was there any coordination with the Province? The U.S. team responded that it is not considering the ecosystem in the Canadian portion of the Basin, as it is not aware of all the issues involved.
- The US team was asked what the United States' position will be on whether to recommend modifying, terminating or continuing the Treaty? The response was that while no position has been confirmed, it is looking at the value of coordination, and sharing the benefits with Canada.
- Asked if there are mechanisms in place to deal with the disagreements among the various U.S. stakeholder groups, the response was that efforts are underway to work together and develop a set of principles.
- The US team noted that the recommendations to the State department would reflect regional recommendations from the Sovereign Review Team and that there was going to be an option for a minority report to accompany the recommendations.
- Whether the U.S. had factored Libby into the future, together with role for flood control if called upon by Canada for Canadian needs?
- The message that transboundary discussions are valuable both for ecosystems, and people.
- Why does the U.S. believe the downstream benefits should be \$50-60 million (in power) when their forecasts show Canadian Entitlement (by 2025) as being between \$250-300 million if the Treaty continues under the existing methodology? The U.S. team explained the value of how it expects to operate post 2024, and the \$50-60 million value is for power only. There still needs to be an ecosystem and flood control component value factored in.
- Are agricultural needs factored in? Thirteen million acre feet are diverted for irrigation in the U.S. Domestic water use is excluded under the Treaty, so each country can manage water for its own domestic needs. This use can affect the ecosystem.
- How is water storage for irrigation handled, whether under the Treaty or Non-Treaty Storage Agreement? The response was that in Washington there is a conflict between ecosystem, fish

and irrigation interests. Currently, from April to August, there can be no new water withdrawals, unless there is new water. There could be a release of additional water from Canadian storage. The value of this additional water release is not currently captured.

## Panel Discussion of Treaty Scenarios

During the early afternoon a panel discussion was presented on the benefits and drawbacks of the three key Treaty Scenarios (Treaty Terminate, Treaty Continue, and Treaty Plus) with respect to three key Basin interest areas: the environment, power generation and the community. The three respective panel members were: Gerry Nellestijn (Salmo River Watershed Streamkeepers Society), Llewellyn Matthews (Columbia Power Corporation) and Deb Kozak (Columbia River Treaty Local Governments' Committee). The audience was reminded that each of the panel members were not there to represent the sector or interest groups as a whole, but purely to provide their own perceptions and ideas, or to pass on what they have heard from others.

Kozak asked two Local Governments Committee representatives to speak from the floor to relay what they are personally hearing from their communities with respect to the Treaty. Comments included the feeling of sorrow regarding the impact that the Treaty dams had on some community members and how important water discharges are throughout the Lower Columbia region.

All three panel presenters were clear in stating that for each of them it was too early in the process to make a decision and advise the Treaty Review team as to whether the Treaty should be continued, amended or terminated.

Comments from the audience included the observation that there are many individuals and stakeholder groups (e.g. rod and gun clubs, streamkeepers, utility users etc.) with in-depth knowledge about the land and potential restoration activities. It was recommended that this knowledge-base be used as best as possible by the Treaty Review team.

There was a query as to what was actually needed in Canada to protect species at risk such as white sturgeon, with the response being that there are currently studies being done in Canada, to be released soon, that will attempt to address this.

Other questions to the panel included whether the income for Columbia Basin Trust was tied to the Treaty (i.e. does the Trust's revenue decrease if the Canadian Entitlement decreases?); whether the Province will continue with the consultation process once the decision on Treaty Continue, or Treaty Terminate is made; and what efforts are being made to consult with Sinixt and First Nations, especially with respect to cultural artifacts in Arrow Lakes Reservoir. Responses were that Columbia Basin Trust is independent of the Treaty and would not be affected by any Treaty decision, the province would continue to engage Basin residents if changes to the Treaty were contemplated in future, with the reminder that Water Use Plans will be reviewed in 2020; and that there is a separate consultation process with First Nations.

One audience member observed that currently there were a group of stakeholders facing complex issues concerning the Great Lakes, and that it may be worthwhile to look at their citizen model, especially since there are so many of Basin groups outside of government that have an interest in a healthy ecosystem and other interests.

Another audience member noted that extensive work has been undertaken in the U.S. concerning the return of salmon to the upper Columbia River. It was recommended that the Treaty Review Team include – as a goal - restoring the ecosystem, and getting salmon back to the Canadian portion of the Basin. “Much destruction has been done, now it is time to rebuild,” they commented.

One person was concerned that within a year the Columbia Power Corporation would not exist and that the Waneta Expansion would be transferred to the Columbia Basin Trust. Matthews reassured the audience that there were no plans to close the Corporation. He also reminded the audience that there are environmental benefits from the dams in terms of generating renewable energy, and benefits to the Basin from the profits produced. The Corporation is also looking at other projects to produce electricity and welcomes input from the community in this matter.

For the closing remarks of the panel discussion, Nellestijn recommended that the Treaty Review Team talk to the environment groups and that there should be a new process or category in the Treaty that is “Environmental Entitlement.” In Nellestijn’s opinion, this is becoming an issue of greater importance and is the “third leg of the stool in the USA and drifting towards being the whole show.”

Kozak reminded the audience that the Local Governments’ Committee want people to be consulted and would like to present the information to the public and stakeholders when the decision on the recommendation from the CRT Team is made in the fall. In the future, she concluded, representatives of the Local Governments’ Committee would like to be present as observers when negotiations are being conducted.

Matthews closed the session by stating that the Columbia Power Corporation is looking for maximum flexibility in its operations and that flood management will continue to be an important issue and a 200 year flood study for Kootenay Lake is required.

## Community Interest Workshops

The afternoon workshops focused on topics, linked to the Treaty Review, suggested by Basin residents. Conference attendees were asked to choose two break-out sessions out of the following four options: archaeology performance measures for power system planning; salmon in the Columbia Basin; climate change; and flood management operations and bylaws.

## Breakout Session: Archaeology performance measures for power system planning

The session was facilitated by Dan Ohlson of Compass Resource Management. The purpose of the session was to examine the assumptions and rationales underpinning archeology performance measures. These would help inform water modelling processes and better understanding of implications for archeological values. The session examined the history behind the development of the performance measures; reviewed inundation parameters and exposure parameters; and reviewed field observations from work in the reservoirs.

Six panel members were part of the presentation and discussion: Sunny Lebourdais – Sexqeltkemoc te Secwepemc; Ian Tamasi, Tipi Mountain; Ian Cameron, Ursus Heritage; Wayne Choquette, archaeologist; Peter Vigneault, BC Hydro; and Nicole Nichols of Golder Associates.

The following is a thematic summary of the concerns expressed during the session by First Nations, the public, and contract archeologists, organized into three interrelated categories.

Performance Measures - Conference participants questioned the assumptions behind both the inundation and exposure parameters. Technical aspects, including the assumption that being protected by one metre of water inundation was favourable and that different soil characteristics are not considered, were questioned. There was a desire for further dialogue to test the assumption that inundation was indeed favourable and whether there was a way to assess the impact of illegal pot hunting.

It was also felt that the performance measures were limited in their design and not comprehensive enough to fully understand the implications of decision scenarios on cultural heritage. It was asserted that these measures were currently better suited to the narrower category of archeology and that more context was needed for the broader issue of cultural heritage (i.e. archeology + traditional use studies + vegetation).

Other concerns involved the weighting of archeological sites (that all sites are considered equal) and a desire for up-to-date inventories that are more descriptive about the nature of the site.

Archeology Inventories – Conference participants pointed out that in order for the performance measures to be relevant and accurately assess the implications of hydrologic modelling scenarios, they must be applied to up-to-date and accurate inventories.

Concerns were expressed about the pace of inventory work undertaken through BC Hydro's Reservoir Archeology Program. It was felt that increased resources were required to ensure that more sites are identified and considered. This would additionally help expedite the development of management plans to protect exposed sites.

Concerns were also raised about the lack of information in the Kooacanusa area and some areas in the Kootenay system.

General Approach to Cultural Heritage Designation and Management – Conference participants expressed concerns about how cultural heritage assets are designated and managed at a site or object

basis under the *Heritage Conservation Act* rather than on a landscape level. Some First Nations and contract archeologists felt that the site specific approach did not capture the complex nature of cultural heritage. It was proposed that a landscape approach to designation and management would capture the full context and importance of a significant area.

Some contract archeologists indicated that they may not be in agreement with the current approach and how BC Hydro scopes out its program and associated project proposals, but sought these contract opportunities as it was felt better to be involved than not. They were however looking for enhanced opportunities in developing the scope of work under the Reservoir Archeology Program.

First Nations have also expressed some concerns over how the contracts are equitably distributed throughout the Columbia River basin.

More specifically, the session included the following discussion topics and/or comments:

- How sites are compared to the larger context
- What the recommendations are from Water Use Plan consultation committees compared to current archaeological programs (Water Licence Requirements and Riparian Areas Regulation)
- What the relationship is between archaeological sites, Traditional Use Studies and vegetation
- Enhanced collaboration on project scoping
- The complex nature of Cultural Heritage
- Wave cut lines in the Arrow Lakes Reservoir
- What the rationale is behind the one metre assumption (regarding inundation) in the Kinbasket Reservoir
- Weighting and issues concerning inventory reliability.
- Whether all archaeological sites are equal
- How different soil characteristics are considered
- How the impact of increased pot hunting, or potential thereof, can be measured
- How good the performance measures are with incomplete inventories
- Increased resources and staff allocation
- Relative importance of sites and land forms
- Collaborative process that is required
- Increased re-vegetation with greater exposure
- The requirement of more funding resources and data
- Columbia Basin Trust's involvement with archaeological sites
- The question whether inundation is protective for these sites or, rather, result in negative impacts
- The issue of bad science
- First Nations perspective of archaeological sites
- That the Kooecanusa Reservoir area has significant data gaps
- Sites of all kinds, not just defined by statutory mechanisms
- The fact that more discussion is required on the subject
- The impact of surcharges on the foreshore

## Breakout Session: Salmon in the Columbia Basin

Bill Green of the Canadian Columbia River Intertribal Fisheries Commission (CCRIFC) presented information on the research undertaken to date regarding the possibility of getting ocean-going salmon back into the Canadian portion of the Columbia River.

Green outlined the various methods which could be undertaken for migrating salmon to navigate certain dam structures, from fish ladders to a “trap and truck” approach – trapping the adult salmon downstream of a dam and either trucking them to the reservoir or, more likely, further upstream to faster flowing water around one or more reservoirs. A large truck would be able to carry tens of thousands of adult salmon. This trap and truck method does not necessarily mean that it would have to be a short term measure only; it could be repeated for many years if it is the most viable method.

Another alternative is relocating fry and releasing them upstream so that the river can be ‘imprinted’ upon them. The latter would be problematic as it would be difficult to determine if successful and there would likely be low survival: the fry would face a major hurdle – if they did ever emerge from the gravel – in getting back out to the ocean. While turbines could be screened to reduce mortality, it may be challenging and expensive, but technology has come a long way in recent times.

### Questions and Discussion

Green stated the skill set to put such a complex project together would likely come from consultants and academics, as the ecological risk of bringing the salmon back, though culturally of great value to First Nations especially, would have to be carefully examined.

Part of the risk analysis would include looking at the net change of the nutrients in the system being consumed by the salmon and the nutrients being left from the salmon after spawning; the impact that returning salmon may have on kokanee populations; and any potential movement of pathogens. All fish moved would have to be screened against viruses that attack salmon such as IHN (infectious hematopoietic necrosis) - a deadly viral infection that affects certain types of fish, including sockeye, chinook and chum salmon, but not pink salmon.

When asked how much such an endeavour would cost, Green estimated that step one, to undertake the research to determine feasibility that would involve a marked-recapture study, would take about three years and cost about \$100,000. Step two, of actually implementing and monitoring the work would cost significantly more, perhaps in the range of \$10 million. While the costs seem high, it has been a huge economic and cultural impact to the region to exclude the salmon for all this time.

There were other questions and concerns from the session participants. Since the salmon have not been in the upper Columbia River for decades, the ecosystem has changed significantly, including introduced or invasive species. Whether salmon could cope in the new environment would have to be seen.

One participant asked about the success in getting ocean-going salmon back to the Okanagan region and why they were now back in this portion of the Columbia River basin. The answer, explained Green, is

that the Okanagan watershed drains into the Columbia River below Chief Joseph Dam in Oregon. This dam, 877km upstream from the mouth of the Columbia River and completed in 1955, has no fish ladders and therefore blocks all fish passage. While salmon are back in the Okanagan, the next step for that watershed is to get the salmon past the weir in Penticton.

There were concerns voiced that there are barely enough nutrients (even with the Fish and Wildlife Compensation Program's nutrient addition project) in Arrow Lakes Reservoir to support a healthy kokanee population, so re-introducing salmon may not be a wise exercise. Green reiterated that habitat assessment and restoration would be a priority and the initial target for reintroducing salmon would be in the stretch of the Columbia River between Grand Coulee Dam and Hugh Keenleyside Dam, but not into Arrow Lakes Reservoir.

There were other concerns that could impact the re-introduction of salmon, such as climate change and changing water temperatures although Green said that this would all be examined during the three year feasibility study. There was also a concern about sturgeon being able to co-exist with the salmon if reintroduced. They had co-existed historically in these waters, explained Green, so there is no reason why this should not still be the case.

Green stated that, outside of the issue of trying to return salmon this portion of the Columbia River system, more attention was needed to ecosystems and better management (for ecological values) of the reservoirs. Riparian areas also needed special attention.

Green confirmed that if such a salmon project went ahead there would be close consultation with US Fisheries and he has already had talks with many of the tribes south of the border. He concluded that it would have to be a cross-nation initiative as it could not be done without US involvement and support. Even if the project is feasible, its success may in the end also come down to money.

The initial report looking into the prospect of getting salmon back to the Canadian portion of the river is available to interested individuals by contacting Bill Green at [bgreen@ccrirc.org](mailto:bgreen@ccrirc.org).

## **Breakout Session: Climate Change and the Columbia River**

In her presentation Stephanie Smith, manager of Hydrology and Technical Services for BC Hydro, drew on the recently released BC Hydro report on the potential impacts on climate change on water resource management. The report can be found at [link: [http://www.bchydro.com/content/dam/hydro/medialib/internet/documents/about/climate\\_change\\_report\\_2012.pdf](http://www.bchydro.com/content/dam/hydro/medialib/internet/documents/about/climate_change_report_2012.pdf)]. The presentation included a brief overview of climate change studies in the basin, followed by a discussion of potential vulnerabilities and risks. Looking ahead, Smith shared what resources were available to learn more, and facilitated a discussion of what participants' see as the top issues with respect to climate change and the Columbia River Treaty.



In summary, in the future the basin can expect warmer temperatures; wetter falls, winters and springs, but drier summers; diminished snow packs except at high elevations; loss of glaciers; slightly higher annual runoff, altered timing of that runoff; and less predictable runoff.

## Questions and Discussion

Some of the discussion points that arose during the presentation included:

- Climate change projections should be included in the flood management session.
- Climate change needs to be factored in discussions with the International Joint Commission (Kootenay Lake).
- There is a need to educate people about climate change.
- Climate change and the impact on summer flows is a concern.
- There will be about the same or more water available, particularly in the Canadian portion of the basin, but timing of run off is changing which may have impacts on flood control, but lesser impacts on power generation.
- There will be more rain instead of snow melt in the future; although there will still be snow in the upper elevations, there will be more rain than snow at lower levels.
- The value of Canadian storage will only grow, so it is important, one participant stated, that it is not given away too cheaply.
- Whether a model has been made to predict the evaporation off of snow packs.
- An opinion that climate change should not be a concern. US will want water for salmon anyway.
- A concern that there is a difference of opinion between the U.S. and Canada regarding “Called Upon”; the U.S., it was reported, does not think refill will be a problem for reservoirs drawn down for effective use.
- Climate change will affect feeder creeks. As a result hydrological protection is needed to reduce the threat of wildfires to communities.
- The requirement of water quantity and quality modelling (Burton and Kaslo are currently doing stream monitoring.)
- There will be an increase in ecosystem productivity following an increase in temperature. It is currently relatively low due to glacier turbidity.
- The impact on the Columbia River given the fact that the Columbia Ice Field will be gone by the end of the century
- The impact on kokanee populations because of other glaciers receding
- Whether the outcome of ice packs melting particularly fast in the U.S. would result in shortage of flows and water in the near or intermediate future
- Whether a regulated stream flow could be modified to compensate for the impact to ecosystems
- Whether levees needed to be planned
- Estimates of what percentage of water at the Dalles, in 2045, will derive from Canada, and what percent from the U.S
- The cost to the U.S. to replace the storage from Canada
- Whether warmer air will result in warmer water

## Breakout Session: Flood management operations and bylaws

There were two separate presentations on flood control; one focusing on the Columbia-Kootenay region by Kelvin Ketchum, manager of system optimization for BC Hydro; and the second by Mark Crowe of the Regional District of Central Kootenay focusing on flood plain regulation. Dwain Boyer of the Ministry of Forests, Lands and Natural Resource Operations provided an historic perspective.

The presentations covered a range of topics including: the general principles of primary flood control; floodplain regulation and bylaws; setbacks; natural boundaries; the recent high water event of 2012; a summary of operations of the various water bodies; Treaty “on call” flood control storage; and Treaty flood control measures after 2024.

### Questions and Discussion

Some of the key points of the discussion included:

- The requirement of emergency dike repairs in the Creston Valley Wildlife Management Area following the high water of 2012.
- The effect of drawing down Kootenay Lake on boating in the area between Grohman Narrows and Corra Linn Dam, especially downstream of the Narrows.
- The perception that vegetation has degraded, and there is need for more provincial involvement at Kootenay Lake.
- Increased attention directed towards the operation of the dikes around Creston.
- Increased local government involvement in provincial changes in legislation concerning opening-up property around Kootenay Lake.
- The need to have subdivision officers at the table to better understand flooding issues
- The possibility of changing operations (such as the draw-down of reservoirs) in years when there is a very high snowpack such as 2012
- The possibility of a canal connecting Kootenay River and Arrow
- The point reservoirs can go above full pool before they break the dams
- Development and whether there were elevations below which it should not occur
- The affect on property tenure of movements of the natural boundary
- The definition of “50%” natural for Kootenay Lake and the definition of “flood” in this context
- The impact on sturgeon populations of unnatural flows
- The flood damages in 2012
- Safety concerns regarding the Libby surcharge
- Plans to dredge Grohman Narrows and whether it would be deeper than in the 1930s
- Climate change and in the impact on site specific exemptions and setback requirements
- Residents living in flood hazard zones getting notified of an impending flood and how

## End of Day Plenary

Wrapping up the day’s presentations and discussions, participants were asked what they would like the Province to consider going forward and what would they like to see more of.

The priorities identified by conference attendees included:

- Getting more youth engaged in the subject.
- Recognition and appreciation that this session allowed participants to ask technical questions – especially in the flood management and climate change sessions.
- The Treaty Review Team in the future needs to deliver more projections concerning climate change.
- The need to continue to engage the public. When negotiations with the U.S. do occur, the public should not be left out of the process this time.
- More cross-basin discussions like this are required; and the ability to talk about what we want as a whole.
- Once both sides have made their recommendations to their respective State Department or Federal government there needs to be a joint conference and have a discussion together.
- Encourage the idea of cross-border conference that would also include discussion with First Nations to solicit input.
- While this discussion has been very useful and interesting, one participant did not have a great deal of hope that their wishes will be respected, and that the decision will be made by others. It was suggested that a structure be created where ideas can flow freely, and be documented to ensure that ideas and proposals are accounted for and not lost.
- It is “unlikely that we will get what we want - it is a negotiation after all - but our own decision making should be answerable to ideas that come from us.
- The Treaty Review Team lead reiterated that a draft public consultation report will be posted online for comment, and welcomed further feedback.