EXPLORING THE FEASIBILITY OF BUILDING A PROPOSED WEIR/DAM ON KOOCANUSA RESERVOIR

SUMMARY OF A PRELIMINARY ASSESSMENT AND PUBLIC FEEDBACK

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1.0 Introduction

On January 8, 2021, the B.C. government released an independent report by BGC Engineering Inc. (BGC) outlining preliminary costs, benefits and impacts related to the feasibility of building a weir across Koocanusa Reservoir. The report was commissioned by the Province in response to calls from some local residents in recent years to construct a weir across Koocanusa Reservoir, which spans the B.C.-Montana border south of Jaffray. The suggestion came as a result of ongoing concerns about summer changes to Koocanusa water levels and their impact on recreation and tourism on the Canadian side of the reservoir. Water levels rise and fall as a result of the U.S. Army Corps of Engineers' operations at Libby Dam on the U.S. side of the border. It was determined that a dam, not a weir, would be necessary to achieve a stable reservoir elevation. For the purpose of this summary report, the proposed water control structure is referred to as a "weir/dam".[1] All reservoir elevation measurements in this report are displayed in feet above sea level, as is commonly used throughout the Koocanusa region.

The Province presented an outline of the BGC report to the Regional District of East Kootenay at their board meeting on January 8, 2021 and hosted a Virtual Town Hall via Zoom on January 12, 2021 to share the report and seek feedback from the public. It was emphasized in both sessions that this is a preliminary assessment meant to broaden the conversation, involve more people, and receive input.

The Province accepted additional feedback on the BGC report by email and mail up to February 12, 2021, five weeks from the date of publication.

This summary provides key details of the BGC report, a description of the public engagement sessions, a summary of questions and feedback received, the Province's assessment of that feedback and its decision on next steps.

[1] A **weir** is a steel or concrete barrier constructed across a river that raises the water level on the upstream side and is constantly overflowing. A **dam** is a structure constructed across a valley to adjust the flow and control the level of water held within a catchment area or reservoir.

2.0 Summary of the Koocanusa Weir/Dam Feasibility Preliminary Assessment

BGC was commissioned by the Province to conduct a preliminary assessment (BGC study) of the feasibility of building a weir/dam on Koocanusa Reservoir. BGC provided the results of their work to the Province in a report titled *Lake Koocanusa: High Level Assessment of a Proposed Dam*, which reviewed potential impacts of a proposed water control structure on recreation, navigation, hydroelectric power, flood-risk management and ecosystems, as well as costs.

See the full report on the Province's Columbia River Treaty website.

The BGC study was guided by the goal of achieving a stable water elevation on Koocanusa Reservoir of 2,440 feet above sea level[2], the minimum level suggested by some local residents, primarily the Build a Weir Committee. The study found that if a weir/dam was to be built at this elevation, it would likely be submerged for four to six months each year.

The BGC study focused on two scenarios:

- **Scenario A:** maintaining the reservoir at or above 2,440' level throughout the year; and
- **Scenario B:** maintaining a level of 2,440' from mid-May to the end of September, during the prime recreation period.

The study found that the proposed weir/dam would have positive impacts for recreation and tourism, shoreline aesthetics and ecosystems on the Canadian side of the reservoir; however, the opposite would be true on the American side, where reservoir levels would have to fluctuate more to compensate for the loss of storage in B.C. A weir/dam would also hinder the ability of fish and other aquatic life to move throughout the reservoir between Canada and the U.S.

The study found that the proposed weir/dam may create negative impacts on the downstream portion of the Kootenay River, including in B.C., as the U.S. would need to modify its flows out of Libby Dam.

It is anticipated that a weir/dam would negatively affect hydroelectric power generation and flood-risk management in B.C. if the reservoir level was maintained at a minimum elevation of 2,440' year-round (Scenario A). These negative impacts largely disappear if this reservoir level

[2] All reservoir elevation measurements in this summary report are displayed in feet above sea level, as is commonly used throughout the Koocanusa region.

is only maintained during the prime recreation season of late May through September (Scenario B).

The report includes a high-level cost estimate for the weir/dam, which would likely be more than $400 million and could potentially exceed $1 billion, once aspects such as fish passage, site geology constraints, construction accessibility, specialized submerged spillway and dam engineering construction, and in-depth consultation with Indigenous Nations and local residents are accounted for. The study also determined that yearly operating and maintenance costs would range from $560,000 to $1.4 million.

The report concludes that, if a decision were made to continue investigating the possibility of a weir/dam, further work would need to be done to determine a more accurate cost estimate, who would fund, build and operate the water control structure, potential legal and regulatory hurdles, and an approach to engaging with the U.S. on this issue.

3.0 Description of Public Engagement Activities

The BGC report was posted on the B.C. Columbia River Treaty website, shared via Facebook and Twitter, and circulated through the Regional District of East Kootenay communication channels. The Columbia River Treaty Local Governments' Committee and the Columbia Basin Regional Advisory Committee were kept informed of the report's purpose, publication date and options for submitting feedback.

The Province invited feedback on the BGC report from January 8 to February 12, 2021, a period of five weeks from publication. Local residents and interested parties were encouraged to submit their feedback to the Province's Columbia River Treaty Team in writing, by email or mail.

To share results of the study and seek additional feedback from local elected officials and the public, the Province presented results of the study to the Regional District of East Kootenay Board at its meeting on January 8, 2021, and hosted a public Virtual Town Hall via Zoom on January 12, 2021.

At both sessions, details of the study were presented by Hamish Weatherly of BGC. Kathy Eichenberger, Executive Director of the Province's Columbia River Treaty Team, provided further context and answered questions. The Virtual Town Hall was moderated by Brooke McMurchy, also with the Province's Columbia River Treaty Team.

3.1 Regional District of East Kootenay Board Meeting – January 8, 2021

This meeting was attended by Regional District of East Kootenay Board members and was open to the public and media. Questions and comments by Board members centered around the challenge of negotiating a change in water flows with the U.S.; acknowledging that a weir/dam on Koocanusa Reservoir would affect flows downstream along the Kootenay River in the U.S. and back up into B.C.; recognizing the potential economic benefits to recreation, tourism and property development; questioning the value of a weir/dam given the significant cost; and suggesting that the seasonal elevation should be 2,450' instead of 2,440'.

The Board decided to reserve comments until after the public session on January 12.

3.2 Public Virtual Town Hall – January 12, 2021

The Public Virtual Town Hall was attended by 145 people, mostly from the Koocanusa region, including some participants from the U.S. Questions sent to the Province in advance of the meeting were addressed during the session, as were questions raised during the session. Topics included preferred reservoir elevation levels, the need for broad consultation before further consideration is given to the weir/dam, the costs involved, the location of the weir/dam, and more. A list of questions raised during this Town Hall along with corresponding answers can be found in Appendix A.

The Town Hall was scheduled from 7 p.m. – 8:30 p.m. Mountain Time; however, presenters stayed 30 – 45 minutes longer to answer as many questions as possible. More than 80 participants remained online until the session was complete.

4.0 Summary of Feedback

This section summarizes all feedback the Province received on the BGC report. The Province accepted input by email, mail and through two virtual presentations between January 8 and February 12, 2021.

Feedback was received from residents, business owners, scientists, and academics, most of whom live near Koocanusa Reservoir. Many asked questions to further clarify the proposal of a weir/dam, while others expressed their support for or against a new water control structure.

In addition to this feedback, substantive input was submitted by the Upper Columbia Basin Environmental Collective, and Stewart Rood, with the Water Institute for Sustainable

Environments (WISE), University of Lethbridge (AB); and Chinook Environmental Resources (Fernie, B.C.). These submissions are described in Sections 4.2 and 4.3. The full submissions are in Appendix B and C.

4.1 Summary of Key Issues

The following topics, not in order of priority, were communicated as feedback on the BGC report.

Benefits to recreation and tourism: Those in favour of building a weir/dam felt that the resulting stable water levels would enable Lake Koocanusa to become a year-round recreation and tourism destination, similar to Sandpoint, Idaho, as well as create sustained economic growth in the region and increase property development potential.

Benefits to agriculture: It was expressed that a reservoir level of 2,459' (full pool) would offer benefits to the East Kootenay agriculture industry, in particular by allowing an irrigation system from the reservoir that could support the production of forage products, benefitting both livestock and wildlife herds.

Preferred elevation for Koocanusa Reservoir: Many people said that the reservoir elevation level of 2,440' assessed in the BGC study is too low (2,440' is the seasonal elevation that the Built a Weir Committee asked the Province to assess). It was suggested that an elevation of 2,450' would be an acceptable level for most users of the reservoir. Others suggested keeping the reservoir at full pool, which is 2,459'. In 2004, a stakeholders report prepared by Columbia Basin Trust on preferred and potential negative reservoir levels identified a preferred range of 2,445' – 2,455' with the most detrimental elevation being below 2,420'.[3]

It was mentioned that avoiding steep elevation fluctuations on either side of a stable level is also important. Significant water level fluctuations make it difficult for private landowners and businesses along the reservoir to build proper infrastructure. One resident stated that, in some areas of the lake, 20 feet of elevation fluctuation can equate to 60 – 100 feet distance from a property line.

To support a stable elevation above 2,440', people explained that there are many hazards on Koocanusa Reservoir that are dangerous to boaters, such as sandbars and rocks, and that these hazards are exposed and more prevalent when water levels are at 2,440'.

[3] Columbia Basin Trust (2004) A Stakeholders Summary of Preferred and Potential Negative Reservoir Levels and River Stages on the Kootenay River System in Canada - Interest Group Response Summary to proposed VarQ Alternative Flood Control Operation.

Timing of a stable elevation: People questioned the seasonal recreation period of mid-May to the end of September that was considered in the BGC study, stating that recreation in May and June is often limited due to the cooler weather and water temperature.

Broad community input: People expressed the need to seek input on building the proposed weir/dam from a wide range of people in the region representing a variety of interests beyond recreation and tourism. They said all property and business owners along the reservoir should be consulted directly, and in forums without representatives from the U.S. present (the January 12, 2021 Virtual Town Hall was open to the public, and therefore representatives from the U.S. were able to join).

Cost of the proposed weir/dam: Concerns were raised about the cost of building a weir/dam, estimated in the BGC study at well over $400 million, and people asked whether the significant funds required would be better spent, in a post-COVID world, to support interests other than tourism and recreation. Other residents felt that the long-term economic benefits, including employment, taxes generated by the project, extra revenue through property development and land taxes, would outweigh the costs.

Location of a proposed weir/dam: Questions were raised about where the proposed weir/dam would be built and how it could impact water levels at different communities along the reservoir, especially those properties which may have to be expropriated near the structure. Concerns were also expressed about the lack of proper geology on the Canadian side of Koocanusa Reservoir to support a water control structure, referencing the sandy soil and lack of rocky cliffs. One person asked whether building a weir/dam south of the border in collaboration with the U.S. had been considered, surmising that costs could be lower, and a more suitable location could be selected.

Option to add power generation: It was suggested to add power generating capabilities to a proposed weir/dam to maximize benefits from the structure.

Benefits of recreation on mental health: A resident described how they have witnessed the benefit that recreation can have on the mental health of those in the region, and expressed support for creating a weir/dam so B.C. could manage its water levels and enable recreation through more predictable, stable and higher water levels in the summer.

Potential debris: It was advised that if a weir/dam was built, there would need to be mechanisms in place to prevent or manage dirt and debris that get trapped behind the structure.

Hazards for boating: Some people questioned whether the proposed weir/dam would, itself, be a danger for boaters and wondered if boaters would be able to travel overtop of it when it is submerged.

Shoreline erosion: One person wondered whether extending the boating season by creating a stable reservoir elevation in the summer would cause more erosion along the shoreline from large wakes.

Environmental considerations: A number of people raised concerns about the environmental impacts of constructing and operating a weir/dam. They were curious how it would impact fish and other aquatic life that travel throughout the reservoir. People expressed desire for fish passage to be explored if the proposed weir/dam should go forward.

One resident was curious how the weir/dam would affect water tables north of the reservoir.

Another resident expressed concern about ice wells that are created under current operations. When the reservoir levels drop after the lake freezes, wildlife are known to fall into the ice wells and become trapped.

The Upper Columbia Basin Environmental Collaborative (UCBEC) and Stewart Rood both explained in greater detail, their concerns about the ecological impacts that would be caused by a weir/dam. See Appendices B and C. UCBEC stressed in their submission that if a water control structure was to be further considered, it would need to go through local, regional and system-wide assessments to fully understand the impacts and trade-offs of changing water flows on Koocanusa Reservoir.

Impacts to the Kootenay River system: It was acknowledged that the proposed weir/dam would remove water storage in the Koocanusa Reservoir currently depended on by U.S. Army Corps of Engineers when operating Libby Dam, and would lead to a change in Libby Dam operations to compensate. This would affect the flow regime along the Kootenay River, downstream of Libby Dam, into B.C., with consequences for Canadian fish habitat, power production and flood-risk management, especially from the Kootenay Lake area through Castlegar and Trail, during high snowmelt years.

Consultation with the U.S.: A number of people acknowledged that constructing the proposed weir/dam would require consultation with or permission from the U.S. They wondered if seeking a seasonal stable elevation could be done through the current Canada-U.S. Columbia River Treaty negotiations instead of going through the long, expensive, and challenging process of constructing a weir/dam. Counter to these points, some people strongly advocated for further exploring a weir/dam on the Canadian side of the reservoir, to ensure B.C. has control over water levels without depending on the Columbia River Treaty.

4.2 Submission from Stewart Rood: Lake Koocanusa: Management for Recreation on a Popular International Reservoir

Stewart Rood is with the Water Institute for Sustainable Environments (WISE), University of Lethbridge (AB); and Chinook Environmental Resources (Fernie, B.C.). Mr. Rood has been investigating environmental impacts from Libby Dam for two decades and is part of the team tracking responses to the ecological flow regime.

Mr. Rood submitted a detailed assessment of the BGC study (Appendix B) that includes alternatives to seeking a stable reservoir elevation; refined estimated cost of a proposed weir/dam; and descriptions of the impacts and benefits a new water control structure would have.

In his assessment, Mr. Rood asserted that a large dam, not a weir, would need to be built to achieve a stable elevation in the summer months, and that the actual cost of the dam would substantially exceed $1 billion, due to its size (60m tall x 1500m wide) and unique design challenges to accommodate varying water levels upstream and downstream, and seasonal submergence.

Mr. Rood's assessment also showed that such a dam would interrupt navigation, fragment the lake ecosystem and impede fish passage, including kokanee salmon and bull trout that are designated as threatened in Montana. Maintenance of a full pool year-round would substantially reduce flood control as well as hydroelectric power generation at Libby Dam and downstream through hydropower facilities along the lower Kootenay River and the Columbia River in the U.S.

The study suggested alternative measures to support recreation on Koocanusa Reservoir, including enhanced woody debris management, and coordinating water levels with Libby Dam operations, especially in years with low flood risk. The study encouraged considering environmental impacts around the reservoir and downstream, and the broader consequences for the Columbia River Treaty system of rivers, dams, and reservoirs.

4.3 Submission from the Upper Columbia Basin Environmental Collaborative

The Upper Columbia Basin Environmental Collaborative (UCBEC) is a partnership composed of a cross-section of environmental stakeholders from the Upper Columbia Basin, representing provincial, regional, and local environmental organizations, supported by select scientific, technical and policy experts.

UCBEC's submission (Appendix C) outlines a number of concerns related to ecological impacts resulting flow regime changes along the Kootenay River, including the B.C. portion; and the need for this proposed weir/dam to be assessed as part of system-wide changes required to address environmental damages that have resulted from dams and reservoirs, particularly those authorised under the Columbia River Treaty. UCBEC emphasized that, if the proposal for a weir/dam moved forward, assessment would be required locally, regionally and system-wide to identify environmental consequences that it would create, and to better understand the linkages and competing interests that would need to be considered.

5.0 Conclusion

The Koocanusa area is one of the most beautiful and scenic areas in the province. The territory has deep and meaningful cultural and spiritual value to the Ktunaxa people. East Kootenay residents appreciate having exceptional recreational opportunities in their own back yard. Newcomers are putting down stakes and forming new communities to return to year after year. Visitors come from near and far to enjoy all that Koocanusa Reservoir has to offer in prime summer season and by doing so contribute to the tourism economy of the region. To many, it is, simply, home.

The Province recognizes that water levels on Koocanusa Reservoir are a serious concern for many residents, farmers, business owners and local government officials. This is why the B.C. Columbia River Treaty Team listened to those voices when they asked the Province to explore the possibility of building a water control structure to maintain reservoir levels to sustain, and expand on, the social and economic potential that the Koocanusa Reservoir offers. BGC Engineering Inc. was retained to undertake a high-level preliminary look at what could be done and what the implications might be, positive and negative. BGC's report on their assessment showed that benefits to recreation and tourism were clear, and these would increase at higher weir/dam design elevations. The report also described how maintaining year-long high-water levels would cause much greater flooding and power generation losses in both countries, as opposed to seasonally managed recreation levels. Of concern were suspected negative effects on ecosystems and, in particular, fish.

This review was meant to be a starting point for an initial dialogue with the broader community. Following BGC's preliminary report, local government feedback and public responses, a virtual town hall presentation and discussion was held to hear from as many people as possible. This summary report presents the range of views and perspectives, all of them valid. Many people championed the great possibilities that a water control structure

could bring. Others raised questions around the environmental, engineering, legal and economic feasibility of such a project. There was also discussion about the role of the Canada-U.S. Columbia River Treaty negotiations in establishing preferred seasonal reservoir levels. Of note is that the Ktunaxa Nation had not as yet been engaged in this discussion.

The Province has reviewed all feedback received and, after careful consideration, determined that, at this time, the first priority to most efficiently address concerns about Koocanusa Reservoir water levels is to advocate for increased co-ordination of Libby Dam operations during Canada-U.S. negotiations on the Columbia River Treaty. The ability to achieve some of the year-long, and to a lesser extent, seasonal objectives of a weir/dam may be hampered by the implications on downstream flood risk management and the survival and enhancement of kokanee, sturgeon and bull trout populations. The significant cost to design, consult on, construct, and operate a weir/dam is a key factor in this decision, as is the absence of a clear funding or operating agency for such a project.

Should negotiations with the U.S. not produce a favourable outcome, other options could be explored.

The Province's Columbia River Treaty Team wishes to sincerely thank all the people who provided input and feedback and participated in the community dialogue to date. We are grateful for your commitment to improving the conditions of Koocanusa Reservoir, which we share. We look forward to continuing to work with the Ktunaxa Nation, local government officials, interested parties, and every member of the public, to achieve what we are all striving for.

Appendices

Appendix A: Questions and Answers from the January 12, 2021 Virtual Town Hall

The following summarizes the questions asked during the January 12 virtual meeting, including those submitted in advance. The answers given in this summary may be more detailed than those given during the presentation.

Q: Why is this an issue? Is it just about water levels for boating and recreation?

A: Low reservoir elevations have had a negative effect on commercial tourism, as well as impacting resident and visitor recreation opportunities. That is why the Build a Weir Committee, with the support of some other residents and businesses, asked us to look into the concept. The report also looked at the implications of a weir/dam for other uses.

Q: Was this drive for the weir/dam to be built started by people who are local or people from out of province?

A: This effort was started by the Build a Weir Committee and businesses and residents around the reservoir. These are local people who were concerned about the low water levels they saw in the summer of 2019, which is what brought this issue to the forefront. They are people who are trying to make sure that what happened in 2019 isn't repeated, but also are looking at a longer-term vision for the area as a place that would attract recreation and tourism from around B.C., Alberta and the United States. Part of the reason we are having this conversation is to look at the cost versus the benefit.

Q: Is this just an opinion of a few individuals? Shouldn't all owners and businesses along the lake be given an opportunity to provide their feedback on this issue?

A: This is exactly why we are having this discussion – both at the virtual meeting and throughout the following feedback period, to hear a broad range of views and input.

Q: If the sole argument is facilitating recreation, then in our COVID-19 and post-COVID-19 world, couldn't the money be put to better use?

A: It is true that, according to estimates by the independent consultant, the cost of building a weir/dam would be very significant, as would the annual operating costs.

Q: Why was a water elevation level of 2,440 feet used for this report?

A: Koocanusa Reservoir's "full pool" level is 2,459'. The Build a Weir Committee suggested the 2,440-foot depth as being deep enough to address community concerns. Therefore, this figure was used as a conceptual starting point for a conversation with the community. In considering

the benefits and impacts of the 2,440' weir/dam proposal, it could be inferred that a weir/dam 10 feet higher would have similar trends, impacts and benefits, just more so in some cases. For example, greater flood risk, but only if the reservoir was kept at this level all year round, and higher recreation value. Several public comments suggested a higher seasonal reservoir elevation ranging from 2450' to full pool at 2459'.

Q: You said that the 2019 water levels were alarming to residents. So why did you use those same numbers in the report? Also, I recommend that, for this summer, when the Lake reaches 2,440', go boat the entire Lake you will see gravel bars coming up, etc. You will see rocks and other hazards poking out.

A: In 2019, part of this issue was that 2,440' wasn't even reached until mid July, so a significant portion of the recreation and tourism season was affected. 2,440' is a number suggested by the Build a Weir Committee and we have used that as a starting point. Several public comments suggested a higher seasonal reservoir elevation ranging from 2450' to full pool at 2459'.

Q: Was consideration given to constructing a weir/dam immediately upstream of the Koocanusa Reservoir's highest water point?

A: If the question is whether a Canadian weir/dam would be constructed to full pool elevation, similar to the Libby Dam, then no, that has not been considered at this time. The costs for such a structure would be greatly increased. The elevation of 2,440' used to consider the concept was suggested by the Build a Weir Committee.

Q: Will this potential weir/dam allow the northern end of the reservoir to achieve these higher lake levels as well or will it be limited to a pre-set maximum lake elevation overall?

A: In the report, the impacts of the proposed weir/dam were evaluated for two scenarios. The weir/dam could be operated to maintain the reservoir at or above an elevation of 2,440' either:

(A) throughout the year, so 2,440' would be the minimum elevation, or
(B) only during the prime recreation season of late May through September to allow for lower reservoir levels during the spring snow melt to capture flood waters. During that period the reservoir would be below 2,440'.

After the threat for flooding has passed, Libby Dam is typically operated to refill the reservoir to full pool at 2,459'.

This would also apply to the northern end of the reservoir. The northern end would experience the same levels as it currently does when the reservoir elevation fluctuates.

Q: How far upstream would the 2,440' elevation weir/dam impact the water levels? Would Wardner see any increase in duration of water levels high enough to support recreational use at our location?

A: Wardner would not see any change from what is happening now when the reservoir elevation is at 2,440', typically early to mid-July rising to end September.

Q: Would the water on the Canadian side continue to be as clean as it is now, if a certain amount is not let out each year and is trapped behind a weir/dam?

A: This is just a very preliminary report on the concept that was commissioned in order to initiate a dialogue and hear from communities about the idea of building a weir/dam. This question is one of many that would need to be addressed in the event that a decision was made to proceed further. If such a decision were made, there would also follow a significant period of consultation. That being said, Kootenay River flows are clean, and sediments and impurities could be flushed out on an annual basis if the preferred elevation is maintained seasonally and not year-round.

Q: Will the Canadian side trap a lot of dirt and debris?

A: This is just a preliminary report on the concept of a weir/dam, so this type of detail was not assessed. It would also depend on whether the weir/dam would operate at a constant elevation all year round or just seasonally.

Q: Will there be a danger to boaters who get too close to the weir/dam?

A: While this is only a high-level evaluation, it stands to reason that the weir/dam could pose a navigation hazard if boaters came too close, and the appropriate safety measures would need to be put in place.

Q: Can you clarify the exact proposed location of the weir/dam and explain what impacts we should be aware of during construction and after completion for residents/boaters downstream of the weir/dam? Will boaters be able to pass over the submersible weir/dam or will this restrict boats from using full Canadian portion of lake? If this submersible weir/dam is located upstream from the Canadian/U.S. border; how would that impact the owners/members at Madera Ranch?

A: The exact siting of the weir/dam has not been determined. Although what we've heard so far is a preference for a location just upstream of the border, all of these considerations would have to be addressed. There would be times when boaters could pass over the weir/dam at higher elevations, as long as navigation safety aids and protocols, such as minimum drafts, are

in place. There would be other times when boaters could not travel over the weir/dam, when for example water elevations on the downstream side would be lower. The impact to existing properties would have to be assessed and addressed. Regardless of the exact location of the weir/dam, there would certainly be disruptions during construction, affecting water levels, which could last several years.

Q: Would the increased amount of boating resulting from higher lake levels degrade the current beaches and shoreline by extending the season with large wakes from surf boats?

A: This is just a preliminary report, intended to initiate a dialogue and hear from the community about the idea of building a weir/dam. This question is one of many that would need to be looked into in the event that a decision was made to consider the proposal further. However, a good indication would be observations on beach and shoreline erosion from current boating activities from mid-July to mid-September when reservoir levels are regularly above 2,440'.

Q: Is the water warm enough early in the season to make the added recreation time a weir/dam would offer worth it?

A: Whether or not people would choose to recreate on the reservoir in May and June is a matter of personal preference. This is why we are asking for people's feedback and input.

Q: If a weir/dam is going to be built, why not make it a dam and generate some power, so the project has a purpose other than just allowing for higher water levels?

A: This report didn't include an assessment of the potential to generate hydropower. However, the feasibility of adding generation is highly questionable, given that the weir/dam would be submerged almost half of the year.

Q: Will this weir/dam affect the water tables to the north? Since this valley is a drainage basin already affected by Libby Dam levels, will it change things further up the valley?

A: This preliminary report on the concept of a weir/dam did not investigate implications for groundwater. Further studies on this question and many other aspects of the proposal would need to be undertaken if a decision were made to consider this proposal further.

Q: Would this weir/dam compromise the Army Corps of Engineers' ability to produce profitable power? Can a loss of power be quantified and shared with the public?

A: The conceptual study did not go into such detail, but less available storage means less available flow for power generation, especially during winter, through the turbines at Libby Dam, and also downstream in B.C. through BC Hydro, Fortis and the Columbia Power Corporation's hydro projects on the Kootenay River.

Q: Would a weir/dam affect the Army Corps of Engineers' flood control responsibilities?

A: Under the Treaty, the U.S. Army Corps of Engineers does not have flood control responsibilities for the Kootenay River system per se, however they would presumably still operate Libby Dam to minimize (to the best of its ability) damaging floods downstream, which would include Bonners Ferry Idaho, the Kootenay Lake area and further into the Lower Columbia.

Q: Would a weir/dam create more draw-down conditions on the U.S. side of the Koocanusa reservoir?

A: It likely would, in order to generate power during the winter, maximize flood storage during the snow melt period, and release court-mandated flows for Endangered Species Act fish.

Q: What would happen to fish and other water creatures that travel up and down the reservoir if a weir/dam were built? Would there be a sharp temperature contrast between upstream and downstream of the weir/dam that could affect wildlife?

A: In the report, potential impacts of the proposed weir/dam on the ecosystem of Lake Koocanusa and the Kootenay River have only been assessed at a high level. On that basis, the report determined that, while a more stable reservoir level may improve some ecosystem conditions on the Canadian side of the weir/dam, the opposite would be true on the American side, where reservoir levels would need to fluctuate more to compensate for the loss of storage flexibility.

With a weir/dam in place, the ability of fish and other aquatic life to move throughout the Koocanusa Reservoir between Canada and the U.S. would also be hindered. Therefore, fish passage would need to be included in the weir/dam design, although residual impacts to fish habitat would likely remain.

No assessment has been made on water quality and temperature. All this would require a much more in-depth investigation.

Q: Does the United States have any jurisdiction or power to prevent us from building a weir/dam?

A: Any changes proposed to the water flow of Koocanusa Reservoir would require extensive engagement with the United States in terms of the Columbia River Treaty. Should the CRT be terminated, there still could be new constraints under the Boundary Waters Treaty of 1909. There are legal issues to be considered, as well as consulting those who may be affected in the U.S. Also, it should be noted that there has not yet been any government-to-government engagement with the Ktunaxa Nation on this proposed project. That would have to come first.

Q: If this proposal is just about fixing a minimum water level for boating, wouldn't it be cheaper to just refine the agreement that is in place with the U.S. Army Corps of Engineers on the Libby Dam and use the existing infrastructure? Couldn't the U.S. Army Corps of Engineers maintain the level at 2,440' or higher, and still be able to generate power?

A: There is discussion at the Canada-U.S. Columbia River Treaty negotiating table about Libby Dam co-ordination. While the details of these negotiations are confidential for the time being, it's safe to say that these interests are reflected in those discussions. If the U.S. Army Corps of Engineers were to maintain the level at 2,440' or higher, the elevation would be increased, but the amount of flow going through would reduce. It's important to note that Libby is not operated just for flood control or power generation, but also to meet legal requirements such as the Endangered Species Act.

Q: Is there even a geologically feasible spot to put a weir/dam on the Canadian side?

A: This is just a preliminary report that was commissioned in order to initiate a dialogue and hear from communities about the idea of building a weir/dam. This question is one of many that would need to be addressed in the event that a decision was made to consider the proposal further. That being said, just from a visual reconnaissance of the area, there does not appear to be a natural anchor for the weir/dam, and the foundation soils, which we know can be problematic, have not been assessed.

Q: Has any consideration been given to use of the Whooshh system or fish ladders for fish passage, if this project were to be built?

A: This is a preliminary study, so the question of options for fish passage hasn't been looked into at this point. Should a weir/dam be built, we would be looking closely at all options for fish passage.

Q: Would Scenario A (maintaining the reservoir at or above an elevation of 2,440' throughout the year) adversely affect the Kootenay and Columbia systems south of the proposed weir/dam to the U.S. border?

A: There would be a trickle-down effect, including loss of storage flexibility, and Libby Dam operations would be altered. In high-water years, there would definitely be an increased flood risk from the Canadian border through Creston, Kootenay Lake, Nelson, Castlegar and Trail.

Q: If a weir/dam were built, wouldn't Canada/B.C. then control water levels on this side, meaning we would have the water-level fluctuations we have now?

A: It would depend whether the weir/dam were operated year-round or just during the recreation season. If year-round, there would be no operation on the Canadian side – it would always be at the same level and spilling over into the U.S. If seasonal, the water levels would go

down in winter, with seasonal operation of the weir/dam controlled by Canada and B.C., to minimize negative impacts to flood risk management and power generation in B.C.

Q: If gates of the weir/dam are at 2,450', why would water flow over the weir/dam?

A: The water would flow above the Canadian weir/dam from the U.S. side. When the U.S. Army Corps of Engineers refills the reservoir to 2,460', the water would back up over the Canadian weir/dam.

Q: Would this weir/dam affect the early bull trout fishing in the area?

A: We don't know if it would affect the early bull trout in the area. There would have to be a more detailed investigation of the impacts on fisheries.

Q: If this project were to proceed, what kind of time frame would you be looking at to start and complete it?

A: The project design would likely take three years or more, after which there would be the need to consult, conduct federal and provincial environmental assessments and then secure the appropriate permits. Consultation and engagement with the Ktunaxa Nation would be required throughout the entire process. So even after a decision were made, it might take anywhere from five to 10 years before construction could start. If it got to the point where all the authorizations are in place, the construction itself would likely take three years or more. If the decision were made to proceed with this project, it could take as long as 13 years for it to be complete and operational.

Q: In order to realize any economic gain from development around the lake, government would have to release a lot of Crown land. Has this been investigated?

A: When the reservoir level is at full pool, it floods Crown land and Ktunaxa territory, so the footprint would not increase.

Q: What impact would a weir/dam have on Kootenay riverbank erosion downstream, in particular the Creston Dikes?

A: Most of the bank erosion on the Kootenay River in the past was due to how it was ramped up and down quickly. Silty soils are affected by sudden change in pressure, which results in a lot of the bank erosion. If reservoir fluctuations on the U.S. side of Koocanusa led to rapid increases and decreases in flows, further erosion could occur. More hydraulic assessment would be needed to assess the level of impact.

Q: If there are endangered species, why not grow them in a fish hatchery and stock the waters?

A: Efforts are being made to do this; but even hatchery fish need appropriate water flows and spawning beds, to be able to spawn and to survive. Sturgeon populations are experiencing huge challenges right now, with all efforts needed to maintain a viable population.

Q: We lose about 1 million acre-feet of water each year due to the recently adopted water-release program to foster sturgeon breeding below Libby Dam. Can this sturgeon program be reduced, as this would make up most of the difference in the water level being discussed?

A: Tribes in the U.S. and Indigenous Nations in Canada have been engaged in dialogue about what is required for the sturgeon program. There are U.S. court orders that stipulate conditions to try to recover and enhance the sturgeon population. Biologists on both sides of the border are working very hard on this problem.

Q: What are the next steps and timelines to keep this idea moving forward?

A: We are asking people to comment further and give feedback and input until February 12. Then the B.C. Columbia River Treaty Team will provide a summary of what we heard during the meeting and after. Next steps will be decided at that point.

Other Comments

During the January 12, 2021 Virtual Town Hall, a number of other comments were made regarding the weir/dam proposal:

- Factoring in employment, taxes generated by the project, extra revenue through development and land taxes, $400 million is probably a small price to pay for the long-term gains from the weir.
- Constant influx of wood is a safety hazard, which would be mitigated by having the level be 2452'.
- At 2440', there are many water hazards on the lake.
- Don't forget the fish – higher lake levels would better support Kokanee.
- Madera Ranch is a possible option for the weir location.
- We have to be mindful of properties on the Canadian side being cut off from rest of reservoir.
- The lake is busy enough as it is; more water would bring more development.
- I hope elected officials see this proposal. The cost benefit doesn't seem to make sense right now.
- A submerged weir might make an interesting tourist feature.
- 2,440' wouldn't reach Wardner.

- Fish passage for this proposed weir would have unique challenges, including the need to pass large numbers of Kokanee in both directions. Kokanee, particularly juveniles, are not strong swimmers.
- The flats near Wardner are at approximately 746 metres. The new weir wouldn't bring water up to the flats.
- The flats where the old steamboat landing was are at 752 metres, so the new weir at 2440' won't impact those flats at all.
- The flats at Wardner are used for agriculture to a large degree, so flooding them always is not a good idea. Also, if it is flooded, it becomes very smelly.
- The Army Corps of Engineers changed the operation of Libby in 2000 due to a court order. And yet we can't look at our own interests in Canada.
- Please make U.S. authorities calculate in dollars what agricultural benefits are derived from irrigation on the Columbia River. A percentage of those benefits should be allotted to British Columbia citizens. The CRT was originally made for flood control and power generation. For several decades a great increase in agricultural production in Washington has been enabled by cheap irrigation from the Columbia River dams. The Army Corps of Engineers service agricultural interests to a large extent. Canadians should be awarded some benefits because irrigation operations affect water levels in Canada.

Appendix B: Lake Koocanusa: Management for Recreation on a Popular International Reservoir, Stewart Rood, February 12, 2021

See attachment

Appendix C: Koocanusa Dam Proposal Upper Columbia Environmental Collaborative Comments, February 12, 2021

See attachment