

DECEMBER 2022
PERFORMANCE MEASURE INFORMATION SHEET
KOOTENAY LAKE: RECREATION/TOURISM

SUMMARY

Goal: Maximize the community benefits from the quality and diversity of recreation and tourism.

Recommended Performance Measure:

Objective/Location	Performance Measure	Description
Recreation and tourism/ Kootenay Lake	Preferred recreation days	Total number of days/year between 1743.4ft (531.4m) and 1748ft (532.8m) at Queens Bay during the recreation season – May 1 to September 30. More is better.

Sub-measures representing preferred elevation ranges for specific recreational activities or sites will inform detailed scenario evaluation.

INTRODUCTION

A wide variety of spring and summer recreational activities occur on or around Kootenay Lake, including boating, sailing, water-skiing, swimming, fishing (fly, shore, trolling), canoeing/kayaking, and beach use for multiple activities; these were identified in a [Columbia Basin Trust study \(2004\)](#). In that study, a broad range of preferred lake levels, 1740ft (530.4m) to 1752ft (534m) measured at Queen’s Bay, was identified across a broad range of interests.

An important factor influencing recreation and lake levels on Kootenay Lake is the 1938 International Joint Commission Kootenay Lake Order which applies to Corra Linn dam, the first dam downstream of Kootenay Lake. This order specifies lake elevations that must be met at Nelson, except in conditions of very high inflow. Section 2 (5) of the order states:

“after the high water of the spring and early summer flood and when the lake level at Nelson on its falling stage recedes to elevation 1743.32,... the gates of the dam may be so operated as to retain it at said level until August 31st, and after said date the level of the main lake may be raised to elevation 1745.32, which shall be the maximum storage level until January 7, and thereafter it shall be lowered that shall not exceed elevation 1744 on February 1, elevation 1742.4 on March 1, and elevation 1739.32... on or about April 1, except under extraordinary natural high inflow conditions, when sufficient gates shall be opened and remain open throughout such period of excess so as to lower the level of the main body of Kootenay Lake to the storage level at that time obtaining as above defined.”

Other important factors influencing Kootenay Lake levels include regulated flows from Libby and Duncan Dams, which collectively account for approximately 60% of total annual inflow to the lake. The remaining inflow is from unregulated tributaries.

PAST PERFORMANCE MEASURES

In the [CRT Review Technical Studies](#) (2013) BC Hydro created performance measures for Kootenay Lake. The process of creating these performance measures is described in [Appendix H](#) of the Technical Studies Report and [Appendix G](#) contains the performance measures that were used in these studies. For these studies, BC Hydro noted that a narrower range of preferred lake levels, compared to the 2004 study, is more consistent with recent stakeholder feedback; hence, 1744ft (531.6m) to 1750ft (533.4m) was selected for these studies as shown below (Table 1).

Table 1: Recreation performance measure from CRT Review Technical Studies Report

Objective/ Location	Performance Measure	Units	Description
Recreation and tourism/ Kootenay Lake	Preferred recreation days	# of days	Days between 1744ft (531.6m) and 1750ft (533.4m) at Queens Bay during the recreation season – May 24 to September 8. Higher is better.

NEW INFORMATION

As part of the Socio-Economic Performance Measures project, Columbia Basin Regional Advisory Committee and Columbia River Treaty Local Governments Committee members have commented on Kootenay Lake recreation and tourism, providing new information that can be used to refine the performance measure:

- One CBRAC member noted that lakeside cabin owners prefer higher levels while others want it lower to access beaches.
- Levels above 1749ft - 1750ft (533.1m - 533.4m) introduce debris to the lake which can become a navigational hazard for boats.
- No concerns were raised regarding the preferred lower elevation.
- One member identified a preferred upper elevation of 1748ft (532.8m) to provide beach access and avoid flooding impacts, from May 24 to September 8.
- Another recommended an upper elevation of 1750ft (533.4m) as many lake-based activities, including boating, sailing, water skiing, swimming, troll fishing, canoeing and kayaking do not require beach access and the 2020 Kootenay Lake Flood Impact Analysis does not identify flooding at 1750ft (Note: this report did not evaluate flooding at this lake level). This person suggested the season be extended to the end of September and possibly start May 1. The research team reviewed this input with the Regional District of Central Kootenay General Manager of Development & Community Sustainability Services. As flooding impacts have been identified at 1749ft (533.4m), she recommended the upper elevation range for recreation and tourism should be 1748ft (532.8 m); however, since some beaches are not exposed at that level, a lower elevation of 1744ft (531.6m) would be beneficial. The extended season was supported based on the timing of current recreation activities.
- A LGC member asked that an angling performance measure be explored. This has been discussed with Will Warnock, Aquatic Specialist with the BC Ministry of Forests, Lands and Natural Resource Operations and Rural Development. With the exception of the spawning success of shore-spawning kokanee, there is no evidence of lake levels impacting sport fishing populations or boating, and thus angling success, so a

performance measure cannot be developed. Another research team focused on ecosystem function is exploring a performance measure for shore-spawning kokanee.

In a consultation webinar when a draft performance measure was shared with CBRAC and LGC members, the following comments were received:

- One member shared that shoreline property owners are sometimes unable to use their docks in the late summer when water levels approach the level mandated by the International Joint Commission order (1743.3ft/ 531m). This eliminates boat access during the prime recreation season. When this member followed up with community residents to confirm this finding and request input on preferred levels, no alternative levels were suggested.
- Boat access (including via marinas) can also be a challenge in the early season because of the IJC requirement that lake levels must drop to 1739.3ft (530m) on April 1.
- Navigation by boats can become hazardous when lake levels exceed 1749ft or 1750ft (533m – 533.4m), as this tends to introduce high levels of debris into the lake.
- Multiple members expressed positive opinions about the diversity of recreational experiences that are made possible by the range in elevations seen throughout the year. These members thought that a comprehensive recreation PM should not be solely tied to the needs of boaters.

A study commissioned by the Friends of Kootenay Lake Stewardship Society regarding community values about the future of Kootenay Lake revealed some important insights about recreation (Compass Resource Management, 2017):

- Beaches and trails are very important to Kootenay Lake residents, with 50% and 63% of respondents, respectively, saying that more are is needed.
- Boating infrastructure is less important, with 32% of respondents saying there isn't enough, and 11% saying there is too much.
- Overall, recreation is a significant community value, with 82% of respondents saying it is either important or very important.

Known recreation access needs and preferences, by activity, are summarized below (Table 2) with acknowledgement that this list is based on best available information and is an incomplete snapshot of recreation activity access needs and preferences on the lake.

Table 2: Known access restrictions and preferred elevations for various recreational activities

Activity	Access Restrictions	Preferred Elevations
WATER-BASED		
Motorized boating	Above approximately 1744ft (531.6m) (CRT LGC and CBRAC, pers. comm.; CBT, 2004)	Below 1749ft (533.1m) (CRT LGC and CBRAC, pers. comm.)
Boat-based angling	No Information	No Information
Non-motorized boating (canoeing/kayaking/paddle boarding, etc.)	No Information	No Information

Sailing	No Information	No Information
Swimming	No Information	No Information
SHORELINE-BASED		
Beach activities	Beaches disappear at levels above 1754ft (534.6m) (CBT, 2004)	1744ft – 1754ft (531.6m – 534.6m) (CBT, 2004)
Shore-based angling	No Information	No Information
Camping	No Information	No Information
Non-motorized travel (hiking, biking, horseback riding, cross country skiing, etc.)	No Information	No Information
Motorized travel (quadding, snowmobiling, etc.)	No Information	No Information
Nature study/wildlife viewing	No Information	No Information
Hunting/foraging	No Information	No Information

RECOMMENDED PERFORMANCE MEASURE

Based on the information above, the research team recommends the following modifications to the performance measure used during the CRT Review Technical Studies process:

- Preferred elevation - Align the lower elevation with the IJC order (1743.3ft/ 531.4m at Nelson until Aug 31), which prescribes the maximum lake elevation for the portion of the prime recreation season that follows freshet. This level is close to the minimum elevation used in the CRT Review Technical Studies PM (1744ft/ 531.6m). The research team reviewed records from the Water Survey of Canada gauge at Queens Bay and confirmed that elevations at that location are representative of IJC-influenced operations, as they do not exceed 1743.3ft (531.4m) between the end of freshet and Aug 31.
- Reduce the upper elevation from 1750ft (533.4m) to 1748ft (532.8m) to increase the area of beaches and stay below the initial levels for flooding of low-lying areas.
- Extend the recreation season from May 24 to September 8 from the CRT Review Technical Studies to May 1 to September 30 based on current recreation uses.

Table 3: Recommended performance measure

Objective/Location	Performance Measure	Description
Recreation and tourism/ Kootenay Lake	Preferred recreation days	Total number of days per year between 1743.4ft (531.4m) and 1748ft (532.8m) at Queens Bay during the recreation season – May 1 to September 30. More is better.

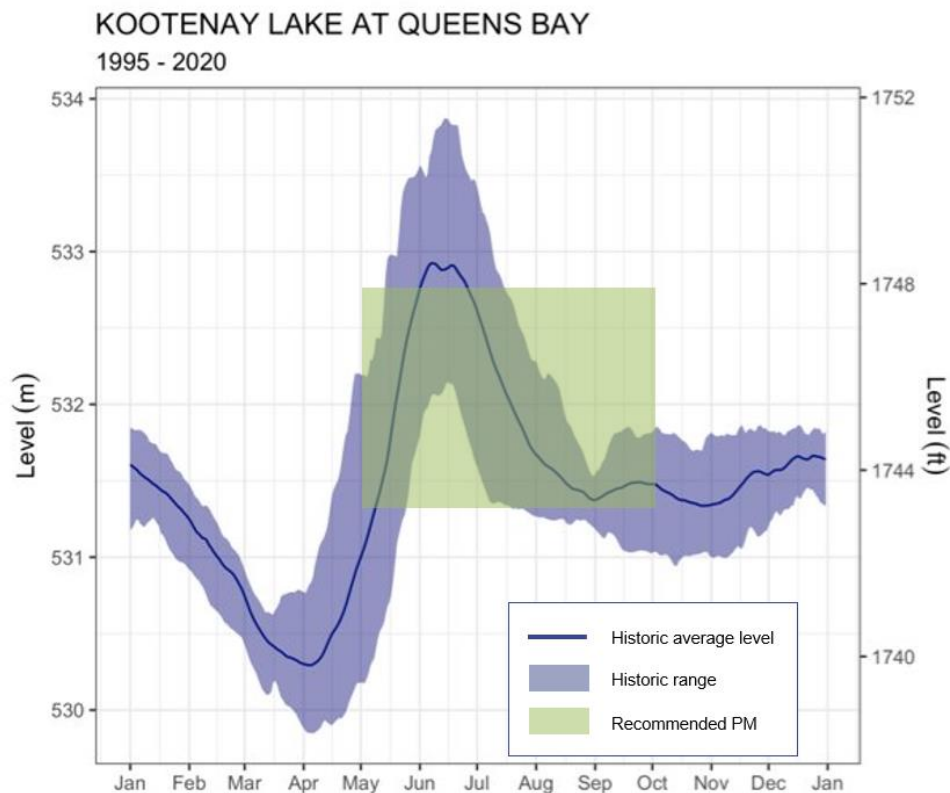
The team also recommends creating a series of “sub measures” that reflect interests for which the research team has documented a known elevation range. Results for these sub-measures would be available during scenario evaluation and reported to the public for preferred scenarios. The recommended sub-measures are summarized in Table 4.

Table 4: Recommended sub-measures for analysis during the modeling process

Sub-Measure Objective	Season	Elevation Range
Motorized boating access	May 1 – Sep 30	1744ft (531.6m) and above
Motorized boating experience preference	May 1 – Sep 30	1744ft – 1749 ft (531.6m – 533.1m)
Beach access	May 1 – Sep 30	1754ft (534.6m) and below
Beach experience preference	May 1 – Sep 30	1744ft – 1754ft (531.6m – 534.6m)

COMPARISON OF PROPOSED PERFORMANCE MEASURE WITH HISTORICAL OPERATIONS

Achieving the minimum elevation by May 1 is likely given the range of historical operations. It is also likely that the maximum elevation will be exceeded in most years when the lake fills in June as a result of freshet. Achievement of preferred elevations becomes less likely in the later part of the season, as according to the International Joint Commission order, the Cora Linn dam must be operated in such a way that lake levels decline to 1743.4ft (531.4m) measured at Nelson, following freshet. However, this is similar to the natural lake level fluctuations prior the construction of any of the dams that impact Kootenay Lake water levels, so users are familiar with this range of fluctuations.



CALCULATIONS

For each alternative:

1. Assemble the simulated results for daily reservoir elevations.
2. Count the number of days over each year that the reservoir water levels are between the critical elevation range during the recreation period.
3. Summarize all statistics.

KEY ASSUMPTIONS AND UNCERTAINTIES

- Each alternative is simulated using the same set of system constraints, input assumptions (e.g., load forecasts) and historic basin inflows.
- Assumes that there is reduced recreational use outside the defined recreation season.
- Assumes that the preferred season and elevations are accurate.

REFERENCES

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.](#)

Compass Resource Management (2017). The Future of Kootenay Lake: Community Values Survey Results. http://www.friendsofkootenaylake.ca/wp-content/uploads/2017/03/CompassRM_FOKLSS_CVSReport_FINAL_2017.pdf

BGC Engineering (2020) Kootenay Lake Flood Impact Analysis.