

DECEMBER 2022

PERFORMANCE MEASURE INFORMATION SHEET

KINBASKET RESERVOIR: RECREATION & TOURISM

SUMMARY

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

Recommended Performance Measure:

Objective / Location	Performance Measure	Description
Recreation & Tourism/Kinbasket Reservoir	Recreation Access and Experience Days	Total number of days/year reservoir elevation is between 2434ft and 2473ft (742m and 753.8m), May 1 – Oct 30. More is better.

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

INTRODUCTION

Kinbasket Reservoir is considered to have high wilderness and scenic values and supports a number of key sportfish species (bull trout, rainbow trout, kokanee). Fishing is the main recreational activity on the reservoir, with the majority of fishing activity occurring within about 15 km of launch points due, in part, to navigational concerns on the reservoir. Other activities include wildlife viewing, camping, picnicking, outfitting, cottage use, hiking and nature study. Although winter use of the reservoir is light, snowmobiling, ice fishing and ice sailing activity is increasing.

Recreation access and associated benefits are important in the Kinbasket Reservoir. A number of key factors that affect recreational quality and use include:

- Diversity and abundance of fish and wildlife, since many recreational activities are focused on enjoyment of these natural resources;
- Ability to safely access the water or shorelines for water-based and shore-based activities;
- Visual quality of views (appearance of the reservoir related to avoidance of exposed mudflats/dust and exposed standing debris);
- Ability for recreational interests to develop along the shoreline, which has been limited in the southern portion of the reservoir due to reservoir-influenced geotechnical instability and the resulting risk of landslide and an associated ‘tsunami’; and
- Avoidance of navigational hazards, including floating debris and deadhead stumps.

PAST PERFORMANCE MEASURES

During the [Columbia Water Use Plan](#) process in 2000-2005, it was agreed that boat access and shoreline access would capture most recreational interests. For boat access, the Recreation

Technical Subcommittee identified preferred elevations over the recreation season that would provide "good opportunity" for a broad range of interests, including access via boat ramps, usability of boat ramps and quality of boating within that range of elevations. The boat access measure was not tied directly to physical structures (i.e., boat ramps). The shoreline access measure was defined around a range of elevations that constituted "good opportunity" for shore-based activities, with activities decreasing in frequency when the water is above or below this elevational zone. Again, this measure was not tied to site-specific elevation issues. The elevation zones were developed based on critical water levels for watershed quality, shore-based activities and water-based activities, as summarized in RL&L (2001). Elevations and timelines used for the recreation performance measure during the Columbia Water Use Plan Consultative Committee Process are in Table 1.

Table 1: Kinbasket recreation performance measures from the Columbia WUP

Boat Access Days	# of days each year with elevations between 2395ft and 2475ft (730m – 754.4m), May 24 – Sep 8.
Shoreline Access days	# of days each year with elevations between 2444.2ft and 2473.4ft (745m - 753.9m), May 1 – Sep 30.

During the [Non-Treaty Storage Agreement](#) (NTSA) process in 2010, preferences for reservoir water levels and seasons of use for recreational activities were modified based on input from Kinbasket community members. The definitions for the performance measures were changed to better reflect the nature of key recreational activities in the Canoe (north) and Columbia (south) reaches, which is driven largely by the natural topography of the north and south ends of Kinbasket Reservoir. At the time of the NTSA process, local residents provided the following key points of information which helped redefine the performance measures as shown in Table 2 (BC Hydro, 2010):

- Canoe Reach:
 - o The shoreline of the Canoe Reach is largely steep sided except in the more northern end, which local residents confirmed limits the amount of shore-based recreation (K. Mortensen, pers. comm.).
 - o Shore-based activities focus primarily on hiking, camping and picnicking, and opportunities appear to be constrained more by availability of suitable flat terrain than reservoir water levels (K. Mortensen, pers. comm.).
 - o Recreational pursuits in this reach focus primarily on water-based activities, which can occur as early as April and as late as end of October depending on weather conditions in any given year. The preferred elevation range is driven largely by what’s “good” for boating quality, fishing, watershed quality and boat access to the reservoir.

- Columbia Reach
 - o Low reservoir water levels can cause much of the reach to be essentially dry for at least three months of the year, primarily during the spring and early summer.
 - o At higher water levels, the area offers a broad range of both water-based and shore-based recreational opportunities. Boat-based activities can extend from

early May (bear hunting) through to snow fall (burbot fishing) (R. Priest, pers. comm.).

Table 2: Non-Treaty Storage Agreement performance measures for recreation on Kinbasket:

Canoe Reach	Water-based recreational activity	# of days each year with elevations between 2404ft – 2475ft (732.7m - 754.4m), Apr 1 to Oct 31
Columbia Reach	Water-based recreational activity	# of days each year with elevations between 2375ft – 2475ft (723.9m - 754.4m), May 1 – Oct 31
	Shore-based recreational activity	# days each year with elevations between 2444ft – 2473ft (744.9m - 753.8m), May 1 – Sep 30

The same performance measures were used in the Columbia River Treaty Technical Studies process in 2013 (BC Hydro, 2013).

NEW INFORMATION

Since the Columbia River Treaty Technical Studies process, additional information about recreation has been shared by local residents, members of the Columbia River Treaty Local Governments Committee, and members of the Columbia Basin Regional Advisory Committee. Notable comments include:

- Canoe Reach
 - The only public boat launch in the Canoe Reach is provided by the Valemount Marina Association and is located 26km south of Valemount on the east side of the reservoir. The end of the lower ramp, which is used early in the recreation season, is at 2387ft (727.6m). The ramp, which was extended in 2013, has mud below, so a reservoir elevation of at least 2390ft (728.6m) is required to float boats off the end of the lower ramp (Lees + Associates, 2021). Despite being operable at this elevation, the optimal range for the Valemount boat ramp is 2434ft (742m) and above, when is it possible to back straight into the water, avoiding the 90 degree turn that exists at lower elevations (R. Maxwell, pers. Comm.). Larger boats are using the marina more every year, requiring higher reservoir elevations for boat access.
 - Camping in the Canoe Reach drawdown zone is common but goes largely untracked because few formal recreation sites exist there. The level of camping activity warrants consideration of shore-based activity in the Canoe Reach.
 - The recreation season in the Canoe Reach does not ramp up until mid-May, when snow drifts have melted at campgrounds and the Valemount Marina.
 - The hot springs located south of Valemount on the west side of the reservoir are inundated most of the year and become accessible when the reservoir is below 2358ft (719m). It is highly unlikely that planning scenarios will reach this low elevation throughout the year. Historically this elevation has occurred during March and even through mid-May in some years.
- Columbia Reach
 - A new boat ramp at Bush Harbour (42km from the exit to Donald, north of Golden) was constructed by BC Hydro in 2011-2013 as an outcome of the Columbia Water Use Plan. The toe elevation of this boat ramp is 2378ft (725.3m). It is operational at 2381ft

(725.6m) (Lees + Associates, 2020). Another ramp at Sprague Bay was also constructed by BC Hydro and is now maintained by the Ministry of Forests. This ramp is operational down to at least 2377ft (724.7m) (M. Sadler, pers. comm., 2022). There are also boat ramps at Caribou Creek (only functional at high water (Government of BC, n.d.)), Nixon Creek, Sullivan Bay, and Beavermouth, as well as a private ramp and dock at the Kinbasket Lake Resort but the operational ranges for these assets are not known. Further, access to some of these ramps can be limited by road conditions (i.e., flooding) (R. Priest, pers. comm.).

- Entire reservoir:
 - There is a preference for reservoir water levels to remain below full pool to minimize re-floating of the extensive debris that is stranded at higher elevations (2470ft and above (M. Chappelle pers. comm.)). This would provide for more desirable areas for shore activities (R. Priest, pers. comm.) and also minimize boating hazards. Debris can also be stranded below this elevation in years when the reservoir does not refill to 2470ft—this is referred to as a “bathtub ring”. The following year, when the reservoir level rises above the elevation of the previous year, this stranded debris is refloated and can become a boating hazard, though this has not been the case in recent events (M. Chappelle pers.comm.). The debris is partially from the original flooding of the reservoir, and from the continual addition of debris carried by tributaries during storm events, and erosion when the reservoir reaches full pool or is surcharged.
 - The large drawdown zone is visually unsightly and makes it difficult to promote tourism in the early part of the recreation season.

Summary of known elevations required/preferred for recreation/tourism

Known access and preferred elevations are provided below (Table 3) with acknowledgement that this list is an incomplete snapshot of recreation/tourism activities and preferences on the reservoir.

Table 3: Known access restrictions and preferred elevations for various recreational activities

Activity	Access Restrictions	Preferred Elevations
WATER-BASED		
Motorized boating	Known minimum operable elevations for public boat ramps: <ul style="list-style-type: none"> - Valemount marina: 2390ft/728.3m (Lees + Associates, 2020) - Nixon Creek: Unknown - Bush Harbour: 2381ft (725.7m) (Lees + Associates, 2020) - Esplanade Bay: Unknown 	Known preferred elevations for public boat ramps on the Canoe Reach: <ul style="list-style-type: none"> - Valemount Marina: 2434ft/742m (R. Maxwell, pers. comm.) “Good opportunity” for boating in the Columbia Reach: 2375ft – 2475ft

	<ul style="list-style-type: none"> - Caribou Creek: unknown - high water only, though very high water causes debris presence which makes use of the ramp challenging - Sullivan Bay- unknown - Beavermouth- unknown - Sprague Bay: unknown, but operable down to at least 2377ft/724.5m (M. Sadler, pers. comm.) 	<p>(723.9m - 754.4m) (BC Hydro, 2010)</p> <p>Known level when floating debris becomes problematic:</p> <p>2470ft/752.9m and above (M. Chappelle, pers. comm.)</p>
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		
General shore-based recreation		<p>For Columbia Reach: 2444ft-2473ft/744.9m-754.8m (BC Hydro, 2010)</p> <p>For Canoe Reach: No information</p>
Beach activities	No information	No information
Shore-based angling	No information	No information
Camping	No information	No information
Non-motorized travel (hiking, biking, horseback riding, cross country skiing, etc.) (full recreation season)	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
Valemount hot springs	2358ft/718.7m and below	

RECOMMENDED PERFORMANCE MEASURES

Based on the information above, the research team recommends:

- Amalgamating previous recreation-focused performance measures into a single combined performance measure for all recreational/tourism activities across the entire reservoir. This measure would be used for initial scenario evaluation; and
- Creating a series of “sub measures” that reflect interests for which the research team has documented a known elevation range. The sub measures will help ensure results for the combined recreation performance measure do not obscure negative results for individual recreational interests that the team has information about. Results for these sub-measures would be available during scenario evaluation and reported to the public for preferred scenarios.

Combined PM

The recommended combined performance measure, detailed below in Table 4, reflects the following:

- Boat access and shoreline access PMs are consolidated to reflect the substantial overlap between elevations preferred for both activities;
- PMs for the Canoe and Columbia Reaches are consolidated, recognizing that the reservoir is operated as a single entity, and that there is substantial overlap in preferred elevations for both reaches;
- The minimum elevation for this consolidated measure is set at 2434.4ft (742m), which reflects the preferred elevation for launching boats at the only boat launch in the Canoe Reach (Valemount Marina), is close to the preferred elevation for shoreline use in the Columbia Reach, and eliminates some of the unsightly visuals when the reservoir is drawn down;
- The maximum elevation for this consolidated measure is set at 2473ft (753.8m)—two feet below full pool—which reduces the impact of floating debris on boater safety while also allowing some room for shoreline use;
- The start date for the season for this consolidated measure is set at May 1, reflecting the start date used in past performance measures for the Columbia Reach, and new information that the recreation season in the Canoe Reach starts in May.
- The end date for the season for this consolidated measure is set at Oct 31, reflecting the end date for water-based recreation used across the reservoir in past performance measures.

Table 4: Recommended recreation and tourism performance measures for Kinbasket

Area	Measure	Dates	Critical Elevation Zone
Entire Reservoir	Recreation Access and Experience Days	May 1 – Oct 31	Total number of days/year with elevations between 2434ft and

			2473ft (742m and 753.8m). More is better.
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Sub-Measures

The recommended sub-measures are summarized in Table 5.

Table 5: Recommended sub-measures for analysis during the modeling process - number of days within the defined season and elevation range

Sub-Measure Objective	Season	Elevation Range
High water debris	May 1 – Oct 31	Above 2473ft/753.8m, in the years the elevation is above this level
General shoreline preference (Columbia Reach)	May 1 – Oct 31	2444ft-2473ft (744.9m-753.8m)
Motorized boating preference (Canoe Reach)	May 1 – Oct 31	2434ft-2470ft (742m-752.9m)
Motorized boating access (Canoe Reach)	May 1 – Oct 31	2390ft (728.5m) and above ///
Motorized boating access (Columbia Reach)	May 1 – Oct 31	2381ft (725.8m) and above
Motorized boating preference (Columbia Reach)	May 1 – Oct 31	2375ft – 2470ft (723.9m-752.9m)
Valemount hot springs access	Mar 1 – Apr 30	2358ft (719m) and below.

COMPARISON OF PROPOSED PERFORMANCE MEASURE WITH HISTORICAL OPERATIONS

Achieving the minimum elevation by May 1 is unlikely as the reservoir is drawn down at this time of the year to create storage space for the upcoming freshet and high inflows, to avoid downstream flooding. The maximum elevation will be exceeded when needed to prevent downstream flooding (Figure 1).

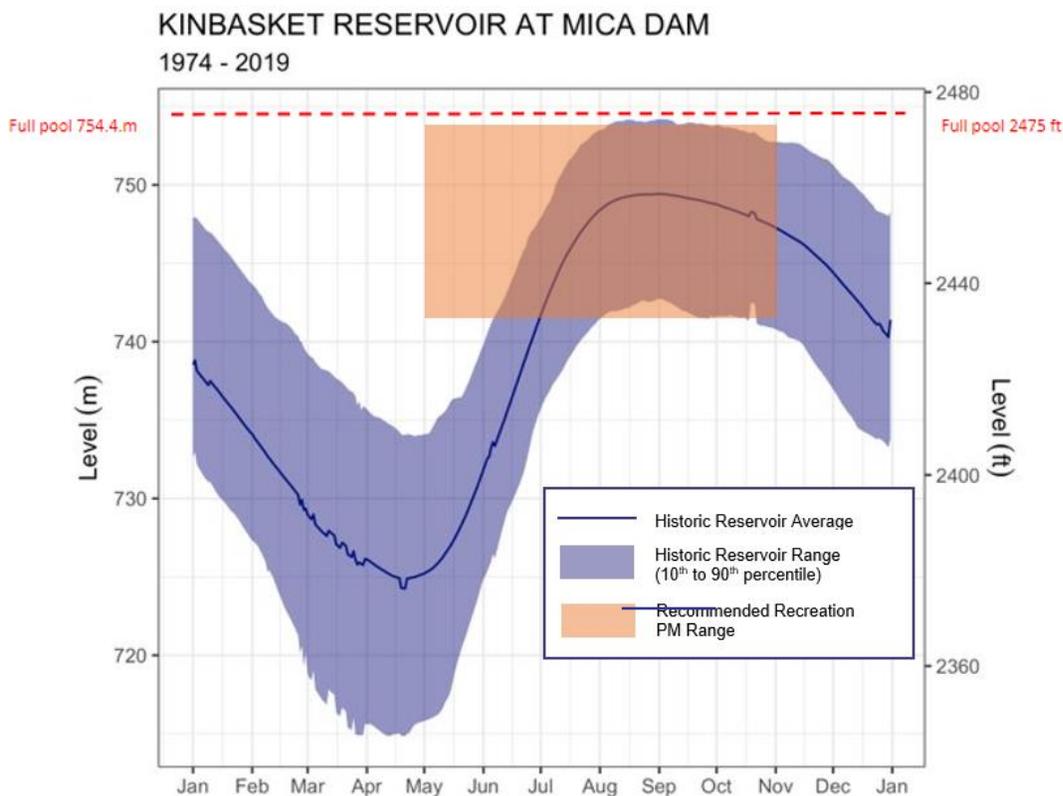


Figure 1: Range of recommended performance measure in comparison to historic reservoir elevations

CALCULATIONS

For each scenario:

1. Assemble the daily simulated results for the recommended elevation range.
2. Count the number of days between the upper and lower thresholds for each season.
3. Summarize all statistics.

KEY ASSUMPTIONS AND UNCERTAINTIES

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

REFERENCES

BC Hydro (2010). Non-treaty Storage Agreement Options Assessment – Performance Measure Information Sheet # 2 (Kinbasket Reservoir Recreation).

<https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/community/ntsa/pm-info-sheet-kin-recreation.pdf>

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