

Acknowledgements

The Beaver River watershed is within the traditional lands of the Dene, Cree, and Métis. This recognition represents respect and gratitude to share in the land and honours our responsibility to truth and reconciliation as members of Treaty 6, 8, and 10 territories and the Métis Homeland.

LICA's IWMP Committee would like to thank everyone who participated in the Beaver River Integrated Watershed Management Plan Engagement Session 1. Your comments and feedback are important to help shape a plan that is locally relevant and implementable in the long-term. We would also like to thank the Government of Alberta for providing funding to support this initiative.

Note: Front cover image is a compilation of watershed values identified in the Engagement Session I survey.

Suggested Citation: Palliser Environmental Services Ltd. 2021. Beaver River Integrated Watershed Management Plan Engagement Session I: Watershed Issues, What We Heard Summary Document. Prepared for Lakeland Industry Community Association, Bonnyville, AB. 20 pp.

Executive Summary

The Beaver River Integrated Watershed Management Plan (IWMP) Engagement Session I was held April through May 2021. Six virtual engagement sessions were hosted for different stakeholder and Indigenous groups with a total of 64 participants. A supporting online survey to evaluate engagement session quality had thirteen participants. An additional online survey aimed at determining the level of support for the watershed issues outlined in the Beaver River Watershed IWMP draft Terms of Reference (TOR) received 46 participants.

Considering the discussion held during the engagement sessions and the survey results, the following represents a general summary of feedback related to each main watershed issue identified in the IWMP draft TOR:

Water Quantity: Water quantity was the second highest priority issue identified by survey participants.

The quantity of surface water and groundwater is less of a concern compared to the fluctuation in water levels that are experienced in the watershed. There is concern about the lack of understanding of processes that influence these dynamics, and the degree to which fluctuating water levels are a concern.

Water Quality: Water quality was the highest priority issue identified by survey participants.

Additional considerations for water quality should address surface water contamination from livestock, recreational users, lake dwellers, and enforcement of policies that can maintain water quality.

Riparian Areas and Wetlands: There is general concern for loss and degradation of riparian areas and wetlands with interest in management and enforcement tools to maintain these areas.

Biodiversity: There is a general concern for biodiversity with most concern related to landscape functions that support quality habitat.

Land Management: There is a general concern for cumulative effects from land use activities. The Beaver River IWMP should align with the Cold Lake Subregional Plan to minimize conflicting recommendations.

Climate Change: Comments suggested that there is a lack of understanding and consensus regarding how climate change will impact the region. There was a wide range of level of concern regarding the impacts of climate change from very limited to the most significant threat to the watershed.

Knowledge and Understanding: Knowledge and understanding were the third highest priority issue identified by survey participants.

Gaps in knowledge and understanding for natural conditions and anthropogenic (human caused) impacts on watershed function as a concern was largely supported by survey participants. There

was less understanding from survey participants on whether limited public understanding or use of First Nations and Métis Rights, Indigenous Knowledge and Practices in the development and implementation of plans and policies was a concern.

Suggestions were made to improve understanding in the following areas: cumulative impacts; connections between human, animal and ecosystem health; Métis and First Nation Rights; and impacts of development and military activities on watershed health.

Overall, there was strong agreement with many of the watershed issues outlined in the draft IWMP TOR, with general agreement for all issue statements. The IWMP Committee can feel confident moving forward with the issues presented considering the added context provided by stakeholders during discussion and in the online survey. The highest priorities identified by survey participants are water quality, water quantity and knowledge and understanding respectively. A summary of how feedback was considered in the final IWMP will be prepared at the end of the planning process.

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1.0 Introduction

An Integrated Watershed Management Plan (IWMP) is a guidance document and planning tool for resource managers, including governments, planners, Indigenous communities, other stakeholders, and landowners who manage water and land resources. The IWMP will identify goals for improving and/or maintaining watershed health, and will make recommendations on how to reach those goals. As a designated Watershed Planning and Advisory Council, LICA is facilitating IWMP development for the Beaver River Watershed with the vision of “A healthy Beaver River watershed for the future”.

LICA and LICA’s IWMP Committee are committed to engaging with stakeholders, First Nations, and Métis at key points in the planning process to achieve planning success. To facilitate engagement, virtual meetings were scheduled to present background information on the planning process and seek input into stakeholder, First Nations, and Métis concerns related to watershed management and land and water resources. In addition, an online survey was distributed to provide additional opportunity for input, confirm watershed issues that were previously identified by stakeholders (2013-2016), and to better understand current stakeholder, First Nations and Métis concerns regarding land and water resources in the Beaver River watershed.

This document provides a summary of feedback provided during Engagement Session 1, which will be considered in IWMP development. Information on the Beaver River Watershed IWMP and supporting documents including the full draft Beaver River IWMP Terms of Reference (TOR), TOR Summary Document and Beaver River State of the Watershed Report (2013) can be found at www.lica.ca/watershed/iwmp.

2.0 Methods

2.1 Engagement Sessions

Six 2.5 hour virtual engagement workshops were held in April and May 2021 focused on the following groups:

- First Nations and Métis
- General Public
- Industry
- Municipal Governments
- Provincial and Regional Associations, Non-Government Organizations, and Academia
- Provincial and Regional Governments

The engagement sessions included a presentation of background information on the IWMP process and current knowledge of the state of the watershed by Palliser Environmental Services Ltd (PESL). Discussion was facilitated by PESL throughout the presentation with time allocated to discuss the issues of water quantity, water quality, riparian areas and wetlands, biodiversity, land management, climate change, and knowledge and understanding. During each workshop, links were provided to the LICA IWMP website, that housed background information, the Engagement Session I survey directed toward watershed issues and priorities, and the Engagement Session evaluation. Notes were taken by LICA staff during each session and compiled by PESL. Key comments were drawn from the discussion notes and summarized into main feedback points in this document. Detailed session notes may be requested from LICA.

2.2 Surveys

2.2.1 Engagement Session Evaluation

The survey included questions on the quality of the engagement session and areas for improvement. The survey was distributed to all engagement session participants at the end and/or following completion of each session. Survey Monkey was used to create the session evaluation. This software automatically generates a summary of the results describing the data in simple bar graphs depicting frequency distribution, pie charts, and text displays of participant responses. Results were compiled based on responses to questions using the Likert scale (strongly agreed, agreed, neutral, disagreed, strongly disagreed) (Likert 1932). Key comments were extracted from written answers and summarized in Section 3.1.2. Detailed session evaluation responses may be requested from LICA.

2.2.2 Beaver River Integrated Watershed Management Plan: Identifying Watershed Issues

The survey was created using Google Forms and included a brief introduction to the IWMP, and questions regarding the watershed issues identified in the draft IWMP TOR, watershed issue priorities, and survey quality. Generally, participants were asked to rate their level of agreement with each watershed issue using a Likert scale (Likert, 1932), and to provide additional comments if they disagreed with any issue. The survey was made available on the LICA IWMP website for six weeks, and was sent to all engagement session participants and individuals on the IWMP contact list.

Survey data was analyzed using descriptive statistics. Data were described using frequency distributions, which displays the number of times each value on the Likert scale was selected). The mode (or most frequent response) was used to determine the general level of agreement associated with each issue (Sullivan and Artino 2013). Key comments were extracted from written answers, particularly those comments that were made by more than one participant, and were summarized in Section 3.2.2. Complete written responses to the online survey may be requested from LICA.

Survey respondents were also asked to indicate their top three watershed management priorities. Options provided reflected the watershed issues and included: water quantity, water quality, riparian areas and wetlands, biodiversity, land management, climate change, and knowledge and understanding. Values were assigned to each response in order to rank the feedback from participants. The highest priority (indicated by a 1 in the survey) was assigned 5 pts, the second priority (indicated by a 2 in the survey) was assigned 3 pts, and the third priority (indicated by a 3 in the survey) was assigned 1 pt). From the rankings, the top scoring options were identified as highest priority.

3.0 Results

3.1 Engagement Sessions

Overall, 64 people participated in the IWMP Engagement Session 1 (Table 1). The General Public and Municipal Government sessions had the highest number of participants (15) and the Federal and Provincial government session had the fewest participants (4).

Table 1. Summary of participation in IWMP Engagement Session 1, April-May 2021.

Date (2021)	Session	Participants
April 20	Provincial and Regional Associations, Non-Government, Academia	9
April 26	First Nations and Métis	9
May 3	Federal and Provincial Government (Follow-up email sent May 4 seeking input)	4
May 6	Municipal Governments	15
May 12	Industry	12
May 18	General Public	15
	Total Participation	64

3.1.1 Summary of Key Feedback and Discussion

Provincial and Regional Associations, Non-Government, Academia

- Specific lakes of importance were identified as: Crane, Long, Marie, Skeleton, Kehewin (now water source for Kehewin FN)
- Interest in grazing lease land management (near Muriel Lake)
- Desire for alignment of IWMP with the Cold-Lake Subregional Plan
- Climate change - identify bio-indicators to assess climate change long-term
- Opportunity: ABMI has relevant data sets they are willing to share to support the development of the IWMP (e.g., Hydro Temporal Variability segment which looks at fluctuating water levels through time; wetlands)
- Opportunity: Academics interested in developing student led programs to help fill in knowledge gaps (e.g., water quality/quantity monitoring)

First Nations and Métis

- Ice and snow melt important to include in discussion
- Fishing Lake involved in climate change leadership and may have data to share, such as water monitoring data
- Fishing Lake and Frog Lake have low dissolved oxygen concerns
- Biodiversity: impacts of beavers on water levels and quality, and fishing by pelicans and cormorants are concerns
- Recommendation: Priority for industry lease remediation should be for pad sites that are close to the lakes and berm breaches

Federal and Provincial Government

- Interested in wetland loss through time (e.g., since the 1970s to today)
- Interested in understanding and measuring biodiversity and climate change. How parts are connected within the system.
- Possibilities to look at direct and indirect impacts on watershed values (forestry).
- IWMP recommendations should focus on aspects more within industry's control, such as timber harvesting levels versus forest fires.

Municipal Government

- Lac La Biche County uses a riparian setback matrix that considers slope metrics and may be useful for other jurisdictions
- Concerns from residents about damages to loon/crane habitat on lakes
- Provincial government has been promoting Intermunicipal Collaboration Frameworks with municipalities; these Frameworks may be considered in the IWMP
- Municipalities develop master plans for stormwater management

Industry

- Offered to support project with available data
- May be beneficial to sample Beaver River further upstream from current provincial sites
- Biodiversity: Provincial Fish and Wildlife (local office) studied water birds and Lakeland College completed amphibian surveys. These reports may be useful references for IWMP development.

General Public

- Concern for water quality expressed
- Significant concerns regarding water quantity at Muriel Lake and many issues regarding quality at Moose Lake
- Previous plans focused on oil and gas, would like to see more focus on agriculture
- Need bigger buy in of entire community, not just lake front owners
- More education is needed on how communities impact lakes
- Sylvan lake has a great public information program for removing structures/debris from the lake after winter ice fishing, which may be a helpful resource for other jurisdictions
- A better understanding is needed of impacts of increased lake levels on flooded trees and associated impacts on water quality and oxygen levels in the lakes. Specific lakes mentioned were Mann Lakes and Vincent Lake in the St. Paul – Ashmont areas
- This plan should include/highlight the economic benefits to following the IWMP
- Looking for opportunities for fur trappers to get involved. A trapper representative felt that they were the most misunderstood group
- Better understand the mobilization of contaminants to surface water during spring snowmelt. Is this a knowledge gap or a priority for the IWMP?
- Need a balance. It is important to look at everything, not just human caused concerns.
- MD of Bonnyville has a program where they provide trees in the spring. Maybe we can reach out to help encourage utilization of native tree species, provide education, riparian tress, etc.
- Work with local gardening centers to help promote species that support biodiversity

3.1.2 Session Evaluations

Thirteen of 64 (20%) engagement session participants completed the session evaluation. Overall, the sessions were well received. Most people who completed the survey either agreed or strongly agreed that:

- The workshop was useful
- The workshop met or exceeded expectations
- There were many opportunities to bring ideas forward
- The presentation was informative and valuable
- The planned discussion periods throughout the presentation were valuable
- The facilitation was appropriate and effective

- Participants understand what the IWMP will look like
- The right people were in attendance for the stakeholder sector session

Many participants commented that they found the background information useful, along with the time allocated to discussion. A few people commented that they would like to see the presentation more refined to individual interests.

3.2 Online Survey

The following is a summary of online survey results.

3.2.1 About the Participants

Forty-six people completed the online survey titled “Beaver River Integrated Watershed Management Plan: Identifying Watershed Issues”. Sixteen of the 46 people were members of the IWMP Committee, and 30 people represented a variety of stakeholders and Indigenous peoples (Table 2). The survey respondents ranged in age from 15 to over 65 (Figure 1). Nearly 40% (18) of survey respondents resided in the MD of Bonnyville, and almost 11% (5) of respondents resided in The City of Cold Lake (Figure 2). Seven respondents represented First Nations, and four people represented Métis Settlements.

Table 2. Summary of participation in the online survey.

Participants	Completed Surveys
IWMP Committee	16
Engagement Session I Attendees	30
Total	46

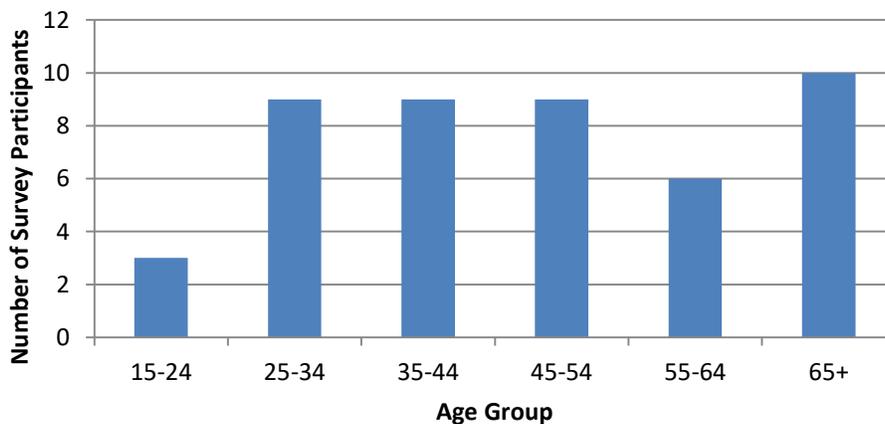


Figure 1. Age range of survey respondents.

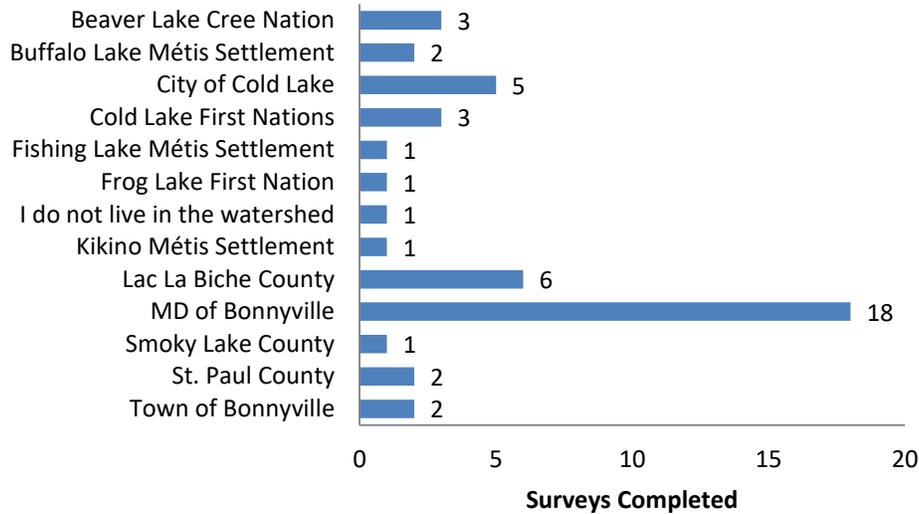


Figure 2. Communities represented by survey respondents.

Figure 3 summarizes the agency, group or sector that the survey respondents represented. The highest proportion of surveys were completed by the general public (approximately 20%), followed by First Nations (17%) and agriculture and municipal governments (15% each) (Figure 3).

About 80% of respondents had read the Terms of Reference for the Beaver River IWMP prior to filling out the survey (Figure 4). Fifty-six percent of respondents had attended a stakeholder engagement session prior to completing the survey, while an additional 35% planned to attend (Figure 5).

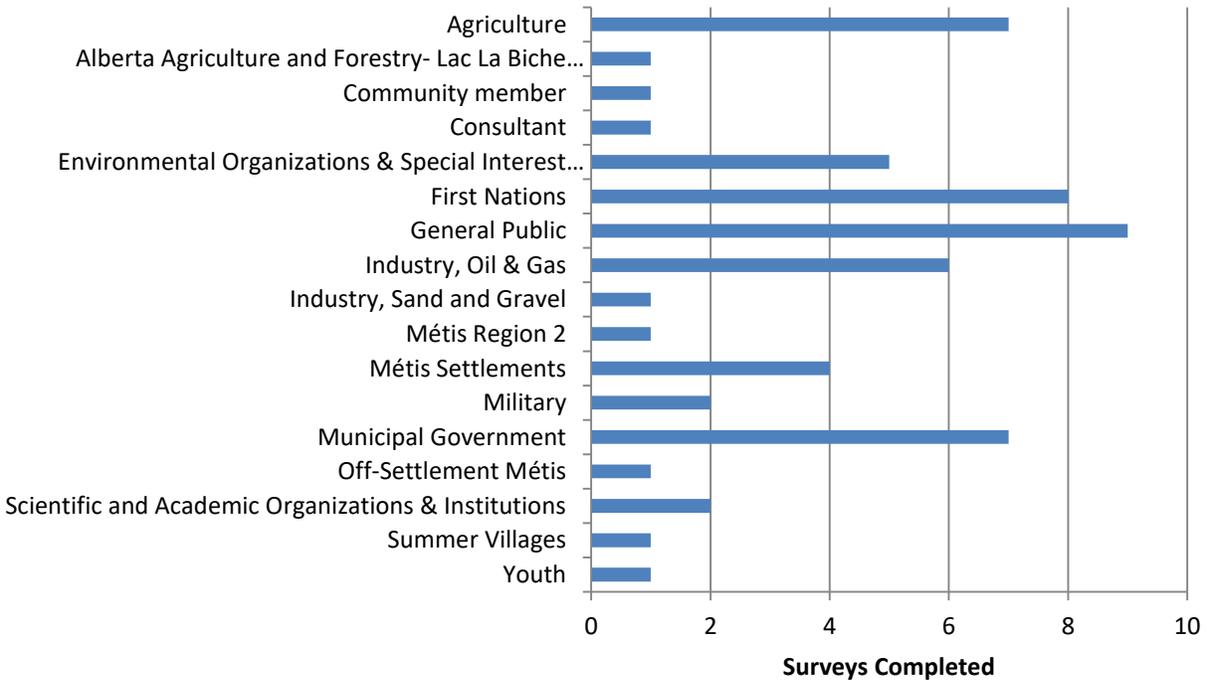


Figure 3. Affiliations (e.g., agency, group or sector) of survey respondents. Note that some survey participants identified more than one sector that they represented.

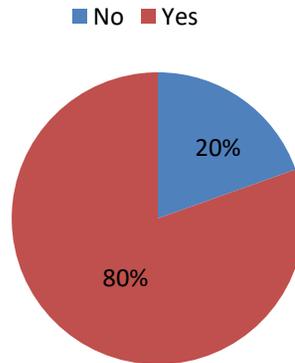


Figure 4. Response to the question “Have you read the draft Terms of Reference (TOR) and/or Summary Document developed to guide the Beaver River Integrated Watershed Management Plan (IWMP) process?”.

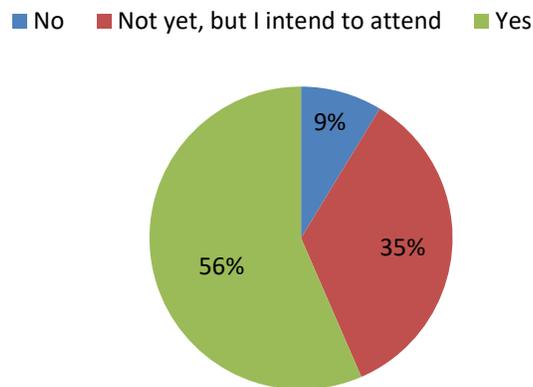


Figure 5. Response to the question “Have you attended a stakeholder engagement session hosted by LICA to discuss watershed issues that should be considered in the Beaver River IWMP?”.

3.2.2 Response to Issue Statements

1. Water Quantity (Surface Water and Groundwater)

Overall, 83% of participants either agreed or strongly agreed with issue 1.1 and 84% with issue 1.3. There was lower agreement with issue 1.2 (63%), issue 1.4 (68%) and 78% with issue 1.5 (Table 6). There was a higher disagreement with issues 1.2 and 1.4 related to surface water and groundwater withdrawals, 24% of participants and 17% of participants disagreed, respectively (Table 6).

Table 6. Level of agreement expressed by survey participants for issues related to water quantity. The most frequent response (the mode) is shaded in grey.

Issue Statement	Percentage of Respondents				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Issue 1.1: Fluctuating water levels (lakes and wetlands) and streamflows caused by climate change and variability (e.g., temperature, evaporation, and precipitation) are a concern because they can: 1) Impact water availability for municipal water supplies, agricultural uses, and First Nations and	37	46	9	7	2

Issue Statement	Percentage of Respondents				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Métis 2) Increase risk of flooding, and impacts associated with drought, 3) Impact recreation activity, 4) Alter aquatic, riparian and upland habitat, 5) Alter land use (e.g., cultivation, development) around wetlands and ephemeral streams (watercourses that flow briefly in direct response to rainfall or snowmelt).					
Issue 1.2: The volume of surface water withdrawals are a concern.	26	37	13	15	9
Issue 1.3: Altered drainage patterns and/or discharges of treated effluent, and stormwater are a concern.	43	41	13	2	0
Issue 1.4: There is concern regarding the uncertainty of groundwater quantity resulting from climate change and variability, and withdrawals for human and industrial use.	22	46	15	15	2
Issue 1.5: There is a concern regarding limited understanding of the impact that groundwater withdrawals have on aquifer dynamics (e.g., shallow/deep aquifer interactions) and on lake water levels and streamflows (i.e., groundwater-surface water interactions).	37	41	15	4	2

Participants explain disagreement with Water Quantity issue statements:

- Surface water withdrawals are not a large contributing factor to overall water supply and quality, although there is some uncertainty on use by sector and annual variability
- Groundwater shows a rising trend in water levels, and conditions are monitored continuously and reported annually [in some areas]
- Uncertainty expressed on the role of climate change on water supply versus natural variability

Participants provide additional concerns and comments for Water Quantity:

- Residential and agricultural run-off and discharge are a significant concern
- Improve broad understanding of factors driving variability in water quantity (e.g. describe conditions of drought, normal and excess water quantity in the region)
- Better understand whether water allocations by sector are considered appropriate
- Data gap in understanding regional groundwater resources, particularly data related to aquifers
- Insufficient monitoring to detect trends in time for a management response
- The growth of algae and impact on watershed (to consider in water quality)
- Altered drainage is a concern, but not stormwater discharge
- Preservation and restoration of wetlands

2. Water Quality (Surface Water and Groundwater)

Overall, participants either agreed or strongly agreed with issue 2.1 (82% agreement), issue 2.2 (86%), and issue 2.4 (80%). There was less agreement expressed for issue 2.3 (72%) (Table 7). Nine percent of respondents indicated a neutral response to issues 2.1 and 2.2, and about 14% of respondents indicated a neutral response to issues 2.3 and 2.4. There was a higher disagreement with issue 2.3 (14%) compared to issue 2.1 (9%), issue 2.2 (4%) and issue 2.4 (6%).

Table 7. Level of agreement expressed by survey participants for issues related to water quality. The most frequent response (the mode) is shaded in grey.

Issue Statements	Percentage of Respondents				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Issue 2.1: There is a concern that water quality in lakes and streams does not meet desired or required end uses (e.g., drinking water, contact recreation, agriculture, Indigenous traditional practices, and/or wildlife and aquatic species needs) in some areas due to soil type and geology, climate change and variability, and/or influx of point and non-point source pollution from adjacent lands (e.g., nutrients, sediment, bacteria).	53	29	9	9	0
Issue 2.2: The influx of nutrients originating from external sources and the internal natural cycling of nutrients contribute to eutrophication (enrichment) in many waterbodies in the watershed is a concern.	44	42	9	4	0
Issue 2.3: Groundwater: There is concern for human health due to naturally occurring and/or thermally mobilized trace metals (i.e., arsenic and uranium) in concentrations above drinking water guidelines.	27	45	14	9	5
Issue 2.4: Groundwater: There is concern for groundwater quality degradation due to land use, including potential contamination from improperly abandoned water wells, landfills, agricultural activity, septic fields and, oil and gas activity (casing failures).	38	42	13	2	4

Participants explain their disagreement with Water Quality issue statements:

- Agreement with the question, but take issue with assumptions about recommendations the IWMP may provide in response to the concern
- Belief that the question is too ‘all encompassing’ where the respondent may agree with some aspects, but not the entire question.

Participants provide additional concerns and comments for Water Quality:

- Concerns regarding impacts of recreational use (i.e. off-highway vehicles), livestock, land use practices, and shoreline development
- Need for more education, enforcement, and potentially additional regulations
- Uncertainty around the impacts of agriculture and whether the sector receives a disproportionate level of blame
- Impact of air quality on water quality
- Uncertainty about sources of fecal matter contamination (i.e. human or wildlife)
- Concerns about impacts to other species and the food chain
- Shoreline development

3. Riparian Areas and Wetlands

Overall, 87% of participants either agreed or strongly agreed with issue 3.1, 9% of respondents were neutral, and 4% of respondents either disagreed or strongly disagreed with Issue 3.1 (Table 8).

Table 8. Level of agreement expressed by survey participants for issues related to riparian areas and wetlands. The most frequent response (the mode) is shaded in grey.

Issue Statements	Percentage of Respondents				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Issue 3.1: There is concern for the loss of wetlands and riparian areas and their respective functions: Water storage (absorptive capacity, flood control) and water balance in lakes and streams; Groundwater recharge; Water quality (retention of nutrients, suspended sediment, soil and associated contaminants); Biodiversity; Ecological services (recreation, carbon sequestration, stormwater treatment).	46	41	9	2	2

Participants explain their disagreement with the Riparian Areas and Wetlands issue statement:

- The rate of wetland loss and riparian area modification is limited in the basin due to availability of more suitable developable land. However, connectivity and impacts from linear disturbances and how they influence wetland complexes should be the primary consideration.
- Wetlands are largely protected by existing regulations - except for agriculture.

Participants provide additional concerns for Riparian Areas and Wetlands:

- Peat harvesting may have a detrimental impact to wetlands
- Agricultural impacts including drainage of ponds and wetlands in cultivated fields and associated impacts; lack of buffers along fence lines and road and other linear features that provide upland bird habitat
- Shoreline development and lack of Environmental Reserve (ER) bylaws that may be detrimental to water quality
- The number of subdivisions permitted around Moose Lake, the monitoring of garbage left on the lake during winter use, the amount material (old boat lifts, etc.) left in the lake year after year.
- No serious effort to reclaim wetlands or repair riparian areas
- Lack of enforcement (Federal/Provincial/Municipal) and clarity of enforcement responsibilities

4. Biodiversity

Overall, 80% of participants either agreed or strongly agreed with issue statements 4.1 and 4.4 (Table 9). Seventy-eight percent of participants either agreed or strongly agreed with issue statements 4.2 and 4.3. For issues 4.1 to 4.3, 17-20% responded neutral to the issue statement (Table 9). Seven percent of participants strongly disagreed with issue statement 4.4.

Table 9. Level of agreement expressed by survey participants for issues related to biodiversity. The most frequent response (the mode) is shaded in grey.

Issue Statements	Percentage of Respondents				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Issue 4.1: There is a concern for fragmented and poor-quality habitat, due to increased road density, access, recreational activity, industrial activity (e.g., pipelines, well-sites, mining [sand and gravel]), and other developments.	28	52	17	2	0
Issue 4.2: There is a concern for decreasing abundance	43	35	20	2	0

Issue Statements	Percentage of Respondents				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
and/or size of certain fish and wildlife species in the watershed.					
Issue 4.3: There is concern regarding the potential threat of terrestrial and aquatic invasive species (e.g., quagga mussel, Himalayan Balsam) in and adjacent to waterbodies in the watershed.	48	30	17	2	2
Issue 4.4: Maintaining berries, plants and animals that are safe to eat is a concern.	43	37	9	4	7

Participants explain their disagreement with Biodiversity issue statements:

- Loss in aquatic biodiversity is likely more affected by eutrophication, climate impacts and overfishing rather than habitat fragmentation.
- It is important to maintain healthy populations for consumption, but participant is not aware of scientific evidence to suggest it is an issue in the region
- Some aspects of issue 4.1 should be separated into individual concerns and forest cover should be added to the list

Participants provide additional concerns and comments for Biodiversity:

- Concerns regarding fisheries management, and nesting habitats on or near lakes
- Impact of forest management and climate change on population health and dynamics
- Concerns regarding weed and invasive species management by industry (agriculture and oil and gas), and landscaping with invasive plants on residential properties
- Agricultural land can provide habitat for wildlife (e.g., grain left in fields after harvest can provide winter feed for ungulates)
- Potential threat of increased number of new species or wildlife diseases (e.g., chronic wasting disease, white nose syndrome, whirling disease)
- Consider One Health: interconnected human, animal and ecosystem health. Health of one species cannot be examined in isolation
- Impacts of water quality contamination on (e.g., fish, runoff quality)

5. Land Management

Overall, 85% of participants either agreed or strongly agreed with issue 5.1 (Table 10). Eleven percent of participants were neutral, and 4% disagreed with the land management issue statement (Table 10).

Table 10. Level of agreement expressed by survey participants for issues related to land management.

Issue Statement	Percentage of Respondents				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Issue 5.1: There is a concern for the cumulative impact of development and industry on water resources, ecosystem and landscape function (including riparian areas and wetlands), biodiversity, and First Nations and Métis traditional land use.	46	39	11	4	0

Participants explain their disagreement with the Land Management issue statement:

- The region may have peaked on development as none of the urban areas are growing, agricultural lands are static and industry is growing at a measured pace.

Participants provide additional concerns and comments for Land Management:

- Land management concerns have significant overlap with the Cold Lake Sub Regional Plan
- Concerns regarding zoning and the permitting process for development (e.g., improved planning of shops and acreages to minimize habitat fragmentation and impact to watercourses)
- Concerns regarding the ability to maintain sustainable Indigenous traditional ways of life
- Encourage examination of cumulative impacts

6. Climate Change

Overall, 73% of participants either agreed or strongly agreed with issue 6.1 (Table 11). Seventeen percent of participants were neutral, and 9% either disagreed or strongly disagreed with the issue (Table 11).

Table 11. Level of agreement expressed by survey participants for issues related to climate change.

Issue Statement	Percentage of respondents				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Issue 6.1: The impacts of climate change is a concern as it relates to water availability and quality, increased risk of drought, fire and floods, pest management (e.g., forest insects and diseases), altered landscapes and habitat conditions, and risks to plants and animals is a concern.	30	43	17	7	2

Participants explain their disagreement with the Climate Change issue statement:

- Uncertainty about the expected climate-related impacts in the region (e.g. increases or decreases in water quantity)
- Suggestion to differentiate between anthropogenic (human-caused) climate change and natural variation in climate

Participants provide additional concerns and comments for Climate Change:

- Concern that the list of climate-related concerns in the question is not complete
- A suggestion to stress climate change throughout the IWMP, since the respondent felt that climate change is potentially the most significant and threatening issue in the watershed
- Concerns about the amount and quality of initiatives to mitigate climate change
- Concerns about the underestimation of the risks of climate change by residents of the region

7. Knowledge and Understanding

Overall, 87% of participants either agreed or strongly agreed with issue 7.1 and 65% of participants either agreed or strongly agreed with issue 7.2 (Table 12). For issue 7.2, 24% of participants responded neutral and 11% either disagreed or strongly disagreed (Table 12).

Table 12. Level of agreement expressed by survey participants for issues related to knowledge and understanding.

Issue Statement	Percentage of Respondents				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Issue 7.1: Gaps in knowledge and understanding of natural conditions and anthropogenic (human caused) impacts on watershed function is a concern.	39	48	9	4	0
Issue 7.2: Limited public understanding or use of First Nations and Métis Rights, Indigenous Knowledge and Practices in the development and implementation of plans and policies is a concern.	41	24	24	7	4

Participants explain their disagreement with Knowledge and Understanding issue statements:

- Uncertainty about the application of Indigenous Traditional Knowledge related to understanding the state of the watershed

Participants provide additional concerns and comments for Knowledge and Understanding:

- Areas where there is a lack of knowledge and understanding include:
 - Cumulative impacts
 - Interconnected human, animal and ecosystem health
 - Impacts of racism and social justice on watershed health
 - Impacts of development and military activities on watershed health and concerns about transparency of environmental monitoring results

3.2.3 Priorities

Survey participants were asked to indicate their top three watershed management priorities by assigning a “1” to the highest priority, a “2” to second priority and a “3” to third priority (Figure 6). A ranking system outlined in Section 2.2.2 was then applied to the results. The results of the priority ranking are presented in Table 13. Overall, issues associated with water quality ranked highest priority, water quantity ranked second, and knowledge and understanding ranked third.

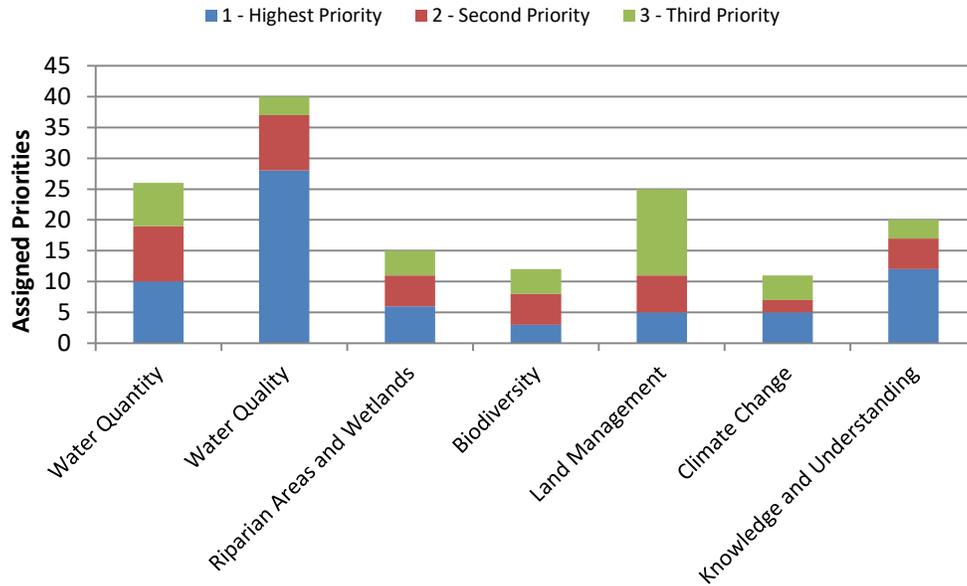


Figure 6. Top three (3) watershed management priorities indicated by survey respondents. Checking the number one indicated this is the highest priority, checking number 3 indicated this is the lowest priority for respondents.

Table 13. Priority scores assigned to each of the main watershed themes discussed.

Rating	Water Quantity	Water Quality	Riparian Areas and Wetlands	Biodiversity	Land Management	Climate Change	Knowledge and Understanding
Highest Priority	50	140	30	15	25	25	60
Second Priority	27	27	15	15	18	6	15
Third Priority	7	3	4	4	14	4	3
Total	84	170	49	34	57	35	78

3.2.4 Additional Comments for IWMP Committee to Consider

The following is a summary of additional comments provided by participants:

- Commitment to manage watershed resources for future generations
- A balance in expectations is needed to allow industry, environment and residents to co-exist
- Lack of policy, enforcement and public education are concerns related to all issues
- Concerns related to safe access to lands, particularly for Indigenous peoples
- Concerns relating to the influence of money and power over decision making (ex. decisions regarding economic development)
- Inadequate preventative planning, for example, building resilient communities (to fires, floods, economic down-turns, drought, pandemics, etc.)
- Lack of community building. Weaker communities are more likely to make individual-based decisions instead of those best for the community

- A concern that the agricultural community was not provided adequate opportunity to engage, particularly since the timing of engagement coincided with heavy workload in the agricultural community
- Concern that the design of the survey was not appropriately designed to meet the desired outcome
- A need for more public understanding and knowledge
- A need for full knowledge and understanding of Treaty Rights of Indigenous peoples

3.2.5 Survey Evaluation

Survey participants were asked to respond to the statement “The survey was an effective way to provide input regarding watershed issues to consider in the Beaver River IWMP.”

Sixty-eight percent of participants either agreed or strongly agreed that the survey was effective to gather input, 27% were neutral and 5% either disagreed or strongly disagreed (Table 14).

Table 14. Effectiveness of the survey.

Survey Evaluation	Percentage of respondents				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The survey was an effective way to provide input regarding watershed issues to consider in the Beaver River IWMP	27	41	27	0	5

To improve the quality of the survey, participants recommended the following:

- Add a written question to each section for details on the participant’s response to multiple choice questions.
- Use more plain language
- Reconsider question design to ensure they are not leading or bias

4.0 Discussion

Frequency distribution (highest frequency of responses expressing agreement) and mode (most frequent response) were used to determine overall level of agreement for each issue. For issue statements related to water quantity, there was an overall general agreement with concerns related to fluctuating water levels, altered drainage patterns and stormwater inputs. There was less concern for issues related to water supply availability, particularly surface water and groundwater withdrawals and use (~66%), and higher agreement (~78%) for concern related to understanding surface water and groundwater interactions.

For issue statements related to water quality, there was generally strong agreement ($\geq 80\%$) with water quality concerns except issue 2.3: “There is concern for human health due to naturally occurring and/or thermally mobilized trace metals (i.e., arsenic and uranium) in concentrations above drinking water guidelines.” This issue statement had the lowest level of agreement (72%) and the highest level of disagreement (14%) of all the water quality statements.

There was strong agreement for the issue statement related to riparian areas and wetlands (80%), land management (85%) and agreement ranging from 78-80% for biodiversity issue statements. For

biodiversity issue 4.3, the level of disagreement was the highest (11%) for the three issues related to biodiversity. Comments related to issue 4.3 “Maintaining berries, plants and animals that are safe to eat is a concern” suggested that the concern was more related to the quality of habitat versus the quality of the food source itself (e.g., water quality contamination that impacted fish health).

The level of agreement for climate change issue statement was 73%, and the level of disagreement was 9%. The lower level of agreement suggests that there is uncertainty about the expected climate-related impacts in the region (e.g. increases or decreases in water quantity).

All comments received during Engagement Session I will be considered further as work to complete the IWMP advances. A summary of how stakeholder comments informed the final Beaver River IWMP will be prepared.

5.0 Conclusion

Engagement Session I, hosted in support of the Beaver River watershed IWMP had 64 participants in the virtual engagement sessions; 13 participants completed the engagement session evaluation survey, and 46 participants completed the online survey developed to determine the level of support for the watershed issues detailed in the draft IWMP Terms of Reference. Results of the discussions held during the engagement sessions, along with the survey feedback, indicated that the watershed issues presented in the draft Beaver River IWMP TOR are strongly supported. Stakeholders provided valuable input and added context to the issues that will be considered in the Beaver River IWMP.

6.0 References

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