Regional District of Central Kootenay

COMMUNITY SUSTAINABLE LIVING ADVISORY COMMITTEE

Open Meeting Agenda

Date: Tuesday, June 16, 2026

Time: 1:00 pm

Location: RDCK Board Room, 202 Lakeside Dr., Nelson, BC

Directors will have the opportunity to participate in the meeting electronically. Proceedings are open to the public.

Pages

1. **ZOOM REMOTE MEETING INFO**

   To promote openness, transparency and provide accessibility to the public we provide the ability to attend all RDCK meetings in-person or remote (hybrid model).

   Meeting Time:

   1:00 PST

   Join by Video:

   https://rdck-bc-ca.zoom.us/j/95242278422?pwd=OHZm4pXvEbFsFR7JRBYvfMFiHMjlRy.1

   Join by Phone:

   855 703 8985 Canada Toll-free

   *6 to unmute or mute
   *9 to raise or lower your hand

   Meeting ID: 952 4227 8422
   Meeting Password: 203526

   In-Person Location:
   RDCK Boardroom
   202 Lakeside Dr, Nelson, BC

2. **ELECTION OF CHAIR**

CALL FOR NOMINATION (3 times)

Director _____ nominated Director _____.
Director _____ nominated Director _____.
Director _____ nominated Director _____.

OPPORTUNITY FOR CANDIDATES TO ADDRESS THE COMMITTEE
Each Committee member gives a two-minute address.

VOTE BY SECRET BALLOT
Acting General Manager Wilson distributes the secret ballots to the Directors.

DECLARATION OF ELECTED OR ACCLAIMED CHAIR
Director _____ was declared the Community Sustainable Living Advisory Committee Chair for 2026.

DESTROY BALLOTS

RECOMMENDATION:
That the ballots used in the election of the Community Sustainable Living Advisory Committee Chair be destroyed.

3. CALL TO ORDER

Chair ____ called the meeting to order at ____ p.m.

4. TRADITIONAL LANDS ACKNOWLEDGEMENT STATEMENT

We acknowledge and respect the Indigenous peoples within whose traditional lands we are meeting today.

5. ADOPTION OF AGENDA

RECOMMENDATION:
The Agenda for the June 16, 2026 Community Sustainable Living Advisory Committee meeting be adopted as circulated.

6. RECEIPT OF MINUTES

5 - 9

The December 9, 2025 Community Sustainable Living Advisory Committee minutes, have been received.

7. STAFF REPORTS

7.1 FOR INFOMATION: UPDATES ON SUSTAINABILITY SERVICE PROJECTS AND AREAS OF ACTIVITY

10 - 24

The Staff Report dated June 16, 2026 from Paris Marshall Smith, Sustainability & Resilience Supervisor, was received.

8. OLD BUSINESS

8.1 FOR DISCUSSION: QUARTZ CREEK COMMUNITY WATERSHED: NATURAL ASSET MANAGEMENT PLAN AND LONG-TERM PROTECTION STRATEGY

25 - 148

The Committee Report dated June 16, 2026 from Paris Marshall Smith, Sustainability & Resilience Supervisor, has been received.

RECOMMENDATION:

That the RDCK Board receive the Quartz Creek Community Watershed Natural Asset Management Plan (August 2025) for information;

AND FURTHER, that staff be directed to develop a watershed protection and acquisition strategy for the Quartz Creek Community Watershed, in collaboration with the Ymir Community Watershed Society, the Province of BC (Ministry of Water, Land and Resource Stewardship), Interior Health Authority, and relevant First Nations, and that this strategy be brought back to the Board for consideration;

AND FURTHER, that staff be directed to investigate additional staff capacity or contracted services as needed to support implementation of this direction

8.2 FOR INFORMATION: 2026 KOOTENAY LAKE PARTNERSHIP ACTIVITIES

149 - 150

The Committee Report dated June 16, 2026 from Paris Marshall Smith, Sustainability & Resilience Supervisor, has been received.

8.3 FOR DISCUSSION: COMMUNITY SUSTAINABLE LIVING ADVISORY COMMITTEE FUTURE GOVERNANCE AND FUNDING MODEL

151 - 166

The Committee Report dated June 16, 2026 from Paris Marshall Smith, Sustainability & Resilience Supervisor, has been received.

RECOMMENDATION:

THAT the Board direct staff to prepare a proposal to transition the Community Sustainable Living Advisory Committee (CSLAC) from a committee governing Service S105 to a standing committee of the Board, with sustainability work funded through General Administration Service S100 and Service S105 requisition discontinued no later than the 2028 Financial Plan;

AND FURTHER, that staff be directed to prepare draft Terms of Reference for a reconstituted CSLAC as a standing Board committee for the Committee's consideration.

9. PUBLIC TIME

The Chair will call for questions from the public and members of the media at _____ p.m.

10. NEXT MEETING

The next Community Sustainable Living Advisory Committee meeting is scheduled for October 20, 2026 at 1:00 p.m.

11. ADJOURNMENT

RECOMMENDATION:

The Community Sustainable Living Advisory Committee meeting be adjourned at ____ p.m.

Regional District of Central Kootenay
COMMUNITY SUSTAINABLE LIVING ADVISORY COMMITTEE
Open Meeting Minutes

Tuesday, December 9, 2025 at 1:00
RDCK Hybrid Meeting

COMMITTEE MEMBERS PRESENT

Chair K. Vandenberghe	Electoral Area C	In-Person
Director G. Jackman	Electoral Area A	In-Person
Director R. Tierney	Electoral Area B	In-Person
Director A. Watson	Electoral Area D	In-Person
Director C. Graham	Electoral Area E	
Director W. Popoff	Electoral Area H	
Director A. Davidoff	Electoral Area I	
Director H. Hanegraaf	Electoral Area J	
Director L. Main	Village of Silverton	In-Person
Director S. Hewat	Village of Kaslo	In-Person

GUEST

Director K. Page	City of Nelson
Director T. Weatherhead	Electoral Area K

STAFF PRESENT

Y. Malloff	General Manager of Finance, IT & Economic Development
S. Sudan	General Manager of Development and Community Sustainability Services
P. Marshall Smith	Sustainability & Resilience Supervisor
A. Leffelaar	Climate Action Intern
R. Baril	Meeting Coordinator

1. ZOOM REMOTE MEETING INFO

To promote openness, transparency and provide accessibility to the public we provide the ability to attend all RDCK meetings in-person or remote (hybrid model).

Meeting Time:
1:00 PST

Join by Video:
https://rdck-bc-ca.zoom.us/j/95242278422?pwd=OHZm4pXvEbFsFR7JRBYvfMFiHMjlRy.1

Join by Phone:
855 703 8985 Canada Toll-free

*6 to unmute or mute
*9 to raise or lower your hand

Meeting ID: 952 4227 8422
Meeting Password: 203526

In-Person Location:
RDCK Boardroom
202 Lakeside Drive, Nelson, BC

2. CALL TO ORDER

Chair Vandenberghe called the meeting to order at 1:00 p.m.

3. TRADITIONAL LANDS ACKNOWLEDGEMENT STATEMENT

We acknowledge and respect the Indigenous peoples within whose traditional lands we are meeting today.

4. ADOPTION OF AGENDA

Moved and seconded,
And resolved:

The Agenda for the December 9, 2025 Community Sustainable Living Advisory Committee meeting be adopted as circulated.

Carried

5. RECEIPT OF MINUTES

The October 14, 2025 Community Sustainable Living Advisory Committee minutes, have been received.

6. STAFF REPORTS

6.1 FOR INFORMATION: UPDATES ON SUSTAINABILITY SERVICE PROJECTS AND AREAS OF ACTIVITY

The Staff Update dated December 2025 from Paris Marshall Smith, Sustainability & Resilience Supervisor, was received.

7. OLD BUSINESS

7.1 FOR INFORMATION: FINANCIAL PROJECTIONS AND SCENARIO CONSIDERATION

The Community Sustainable Living Advisory Committee Financial Projections and Scenario Consideration dated December 9, 2025 from Paris Marshall Smith was received.

7.2 FOR DISCUSSION: COMMUNITY SUSTAINABLE LIVING ADVISORY COMMITTEE 2026 BUDGET REVIEW

The Community Sustainable Living Advisory Committee 2026 Budget Presentation dated December 9, 2025 from Paris Marshall Smith, Sustainability & Resilience Supervisor, has been received.

The Committee would like to review this item in February 2026.

Staff Direction: analyze recommendations for staff time delegation and explore all options.

Moved and seconded,
And resolved that it be recommended to the Board:

That it be recommended to the Board that the $25,000 in grants for Community Sustainable Living Advisory Committee S105 be removed from the draft 2026 Financial Plan.

Carried

RECESS/ RECONVENE The meeting recessed at 2:22 p.m. and reconvened at 2:30 p.m.

7.3 FOR INFORMATION: RURAL MOBILITY COMMUNITY ADVISORY COMMITTEE UPDATE

The Committee Report dated December 9, 2025 from Alex Leffelaar, Climate Action Assistant, has been received.

FREEDOM OF THE FLOOR

Moved and seconded,
And resolved

That Freedom of the Floor be granted to Director Page

Carried

8. NEW BUSINESS

8.1 FOR DISCUSSION: VOLUNTEER DRIVER REGIONAL SERVICES COLLABORATIVE - LGCAP FUNDING

The Committee Report dated December 9, 2025 from Alex Leffelaar, Climate Action Assistant, has been received.

Moved and seconded,
And resolved that it be recommended to the Board:

That the Board authorize staff to allocate to a maximum of $20,000 from the Local Government Climate Action Program grant Rural Mobility Community Advisory Committee Phase 2 Project: Regional Volunteer Driver Network;
AND FURTHER, that the grant funding be allocated to Development Services A108 – account 43020;
AND FURTHER, that this item is included for Board's review.

Carried

8.2 FOR DISCUSSION: KOOTENAY RIDESHARE USER INTERFACE IMPROVEMENTS - LGCAP FUNDING

The Committee Report dated December 9, 2025 from Alex Leffelaar, Climate Action Assistant, has been received.

Moved and seconded,
And resolved that it be recommended to the Board:

That the Board authorize staff to allocate to a maximum of $10,000 from the Local Government Climate Action Program grant for the Rural Mobility Community Advisory Committee Phase 2 Project – Kootenay Rideshare User Interface Improvements;
AND FURTHER, that the grant funding be allocated to Development Services A108 – Grants 43020;
AND FURTHER, that this item is included for Board's review.

Carried

8.3 FOR DISCUSSION: SLOCAN LAKE AND RIVER PARTNERSHIP TERMS OF REFERENCE - FOR APPROVAL

The Committee Report dated December 9, 2025 from Paris Marshall Smith, Sustainability & Resilience Supervisor, has been received.

Moved and seconded,
And resolved that it be recommended to the Board:

That the Board is authorized to sign as a signatory of the Slocan Lake and River Partnership Terms of Reference;
AND FURTHER, that this item is included for Board's review.

Carried

8.4 FOR DISCUSSION: CONFIRM 2026 CSLAC MEETING DATES

The Committee to confirm the following meeting dates for 2026:

- February 17, 2026
- June 16, 2026
- October 20, 2026
- December 15, 2026

9. PUBLIC TIME

The Chair called for questions from the public and members of the media at 3:45 p.m.

10. NEXT MEETING

The next Community Sustainable Living Advisory Committee meeting is scheduled for February 17, 2026 at 1:00 p.m.

11. ADJOURNMENT

Moved and seconded,
And resolved:

The Community Sustainable Living Advisory Committee meeting be adjourned at 3:46 p.m.

Carried

Digitally approved by

_____
Kelly Vandenberghe, Chair

Community Sustainable Living Advisory Committee

Staff Update – June 2026

Prepared by: Paris Marshall Smith, Sustainability & Resilience Supervisor

Date: June 18, 2026

This update provides a summary of current activity within the RDCK Community Sustainable Living Advisory Committee (CSLAC) portfolio, highlighting recent accomplishments, active projects, and upcoming milestones. It aims to support Committee members in tracking progress, understanding resource commitments, and preparing for upcoming decisions or opportunities.

JUNE HIGHLIGHTS

1. Future of RDCK sustainability/CSLAC for discussion
2. Kootenay Lake Partnership finances and minutes from last meeting
3. Slocan Lake and River Partnership (SLRP) first Steering Committee meeting minutes
4. Receipt of Quartz Creek Natural Asset Management Plan

LOOKING AHEAD

- Summer 2026: Continues to be heavily focused on Goat Watershed Water Sustainability Planning, administration of Rural Mobility projects – volunteer driver program, rideshare update and discussion of next steps for Quartz Creek Natural Asset Management Plan

CONTENT

1. Dashboard of Key Activities

Project	Status	What's New	Next Milestone	CSLAC Role
Goat River Watershed	Active	Phase 3b engagement launching, Collective Conversations Working Group with yaqan nukiy + province underway	Review engagement, contribute to working group process	None at this time – has moved to Board & Creston Valley Services Committee
Slocan Lake and River Partnership	Active	Steering Committee Meeting on CW May 26 Funding application submitted	TAC meeting on June 29th, launch the foreshore inventory mapping	Provide administrative support
Kootenay Lake Partnership	Active	Update report on agenda, several projects underway	Reporting out in fall on projects	Administration of funds and sit on technical and executive committees
Ymir Watershed Natural Asset Management Plan	Report for consideration	Project complete, report for receipt	Determine next steps	Review & identify next steps for Board consideration
Climate Action Strategy	Active	Businesses cases in progress	Board review each case as brought forward	Support review & implementation
Regional Invasive Species Working Group	Active	Funding approved for 2026-2027	Ongoing reporting	Monitor & support
Rural Mobility Community Advisory Committee	Active	Funding approved, projects underway	Reporting on projects in fall 2026	Continue to support investigations

2. Thematic Project Updates

WATER (WATERSHED GOVERNANCE & NATURAL ASSETS)

- Watershed Governance Initiative –
  - Goat Watershed Water Sustainability Planning: What We Heard Report on Board June Agenda for receipt. Collective Conversations Working Group with Province and yaqan nukiy launched. Community engagement continuing.
  - Slocan Lake & River Partnership: Seeking funding to complete Foreshore Inventory Mapping (FIM) and Shoreline Guidance Documents
  - Kootenay Lake Partnership: Several active projects – website redevelopment, video production, mussel survey, partnership development.
  - Ymir Watershed Natural Asset Management: CSLAC to determine next steps

CLIMATE ACTION & RESILIENCE

- Climate Action Strategy: LGCAP and SOCA reporting for 2025 underway
- Invasive Species Plan: Regional Invasive Species Working Group funding received for 2026-2027
- Grid Resilience (Lardeau Valley Pilot): Consider how to advance this in other vulnerable areas in the RDCK

FOOD & AGRICULTURE

- Central Kootenay Food Policy Council: Core funding for 2026 approved

TRANSPORTATION & ENERGY

- Regional Mobility Strategy: Funding for community investigations approved, projects now underway
- General Energy & GIS Projects: Ongoing collaboration on mapping tools

COMMUNICATIONS & ADMIN

- Website & Print Materials: Ongoing updates in progress to align with new RDCK site
- General Administration: CSLAC coordination and project support

3. Staff Time and Commitments Summary

The following table outlines the staff time related to sustainability in the RDCK (2.8 FTE overall – Climate Action Assistant (CAA: 0.3FTE - S100 and grant funding), Community Resilience Coordinator (CRC: 0.5 FTE - grant funding), Senior Energy Specialist (SES: 1.0 FTE - grant funding and held in S100 –*leave from February to August 2026*), and Sustainability & Resilience Supervisor (SRS: 0.75 - S105 & 0.25 - S100 – *leave January to April 2026*) distribution between January to June 2026.

	Area of Work	Staff Allocation	Staff Responsible	Key Update
Water	Watershed Governance Initiative	5%	SRS	On-going coordination
	Goat River Watershed Water Sustainability Planning	60%	CRC & SRS	Engagement underway with residents, Improvement Districts, electeds, Province, stakeholders
	Kootenay Lake Partnership	10%	SRS & GMDS	Support delivery of projects and administration of funds
	Slocan Lake and River Partnership	20%	SRS	Funding applications, meeting coordination
	Ymir Watershed Natural Asset Management	0%	SRS	Project complete – determine next steps
Energy	Demand Side Management	0%	SES	On hold
Transportation	Rural Mobility Working Group	40%	CAA & SRS	Project administration
	Low Carbon Transportation	0%	SES	On hold
	Admin (S105)	15%	SRS & CAA	Reporting & project admin
Food Systems	Food Systems – CKFPC	5%	SRS	Project Administration
Climate Action	Climate Action Strategy	20%	SRS & CRC	Staff are working on implementing Climate Action Ideas
	Invasive Species Plan	5%	SRS	Project Administration
Ge ner	Supporting practice of energy efficiency and	20%	ALL	Externally and internally

environmental sustainability			
Reporting	10%	ALL	LGCAP & SOCA
Admin (S100)	15%	SRS & SES	Ongoing Board reporting

4. Annual CSLAC Planning Timeline – *note project applications and evaluations not active for 2026*

Month	Key Activities
December	Budget approval
February	Visioning, annual planning, budget discussion
April	Call for applications (if funds available), project reporting
June	Evaluate applications
July	Launch approved projects
August–December	Project implementation and reporting

5. Appendix – Board Resolutions Guiding CSLAC Activities

FOOD & AGRICULTURE	
CENTRAL KOOTENAY FOOD POLICY COUNCIL	1. 718/17 That the Board direct staff to include a $10,000 per year funding for the Central Kootenay Food Policy Council within the 2018-2022 draft financial plan for Service S105. 2. 741/18 That the Board grant the balance of $22,083.62.00 to the Central Kootenay Food Policy Council (CKFPC) contingent on all grant reporting and society action reporting deliverables be presented and approved by the Board; AND FURTHER, that staff obtain documentation form CKFPC that indicates they are in compliance with the British Columbia Societies Act. 3. 757/18 That the Board appoint the following Directors to the Central Kootenay Food Policy Council for a term to end December 31, 2020 Director Faust and the second appointment BE REFERRED to December 13, 2018 Board meeting. 4. 03/19 That the Board appoint the following Director to the Central Kootenay Food Policy Council for a term to end December 31, 2020 as per resolution 757/18: Director Peterson Director Main (Alternate) 5. 48/19 That the Board agrees that the Central Kootenay Food Policy Council has satisfied the Board's requirements and has demonstrated that it is in compliance with funders and the BC Societies Act; AS SUCH, the RDCK Board grants the balance of the $29,347.87 to the Central Kootenay Food Policy Council from Community Sustainability Service S105. 6. 284/20 That the Board approve the $25,000 in the 2020 Financial Plan from Community Sustainable Living Service S105 be held for a Food Security Coordinator position within the Emergency Operations Centre as leveraging funds. 7. 285/20 That the Board direct staff to report on options to establish a Food Security Coordinator position to be fully funded through Community Sustainable Living Service S105 with a budget up to $25,000 8. 377/20 That the Board send a letter of support for the Columbia Basin Food Security Plan; AND FURTHER, that the Board allocate funds to the first phase of the "Central Kootenay Interim Food Security Action Plan" from Community Sustainability Service S105 in the amount of $22,145.00 to the Central Kootenay Food Policy Council. 9. 115/21 That the Board approve the Central Kootenay Food Policy Council's request for increase in core funding for a total amount of $15,000 to be included in the 2021 Financial Plan from the Service 105

	Community Sustainable Advisory. 10. 286/21 That the Board and staff review the draft Central Kootenay Interim Food Security Action Plan and provide their recommendations by May 11, 2021. 11. 288/21 That Board direct staff to complete an internal assessment, prior to requesting a Service Case Analysis, to understand if a Contribution Service for food and agriculture is possible. 12. 855/21 That the Board direct staff to work with Central Kootenay Food Policy Council to proceed with the proposed actions of the Regional Food Security Action Plan: Recommendation 3.3 - Support annual Farm & Food Directory via paid advertisements and Recommendation 3.7 - Develop full inventory of food assets in the Central Kootenay with costs of no more than $3,575 to be paid from Service 105 – Community Sustainable Living Service. 13. 431/24 That the Board authorize staff to enter into a agreement with the Central Kootenay Food Policy Council or the Grow & Connect Interior project for a total of $20,000 + GST, to be paid from the Local Government Climate Action Funds in S100 – General Administration and that the Chair and Corporate Officer be authorized to sign the necessary documents; AND FURTHER, that the 2024 financial plan for S100 General Administration be amended to increase Contribution from Reserve by $20,000 and Grants expense by $20,000. 14. 695/24 That the Board approve the RDCK enter into an agreement with Central Kootenay Food Policy Council for $30,000 to be paid from General Administration Service S100 for one year (2025) for core funding; AND FURTHER, that the amount be included in the draft 2025-2029 Financial Plan. 15. 04/26 That the Board approve the RDCK extending the Service Agreement with the Kootenay Food Council for the delivery of regional food systems coordination, communication, and network development to a maximum value of $30,000 for the period April 2026 to March 2027. AND FURTHER, that this amount be included in the 2026-2030 Draft Financial Plan for Service 100 – General Administration. 16. 32/26 That the Board direct staff to enter into agreement with Kootenay Food Council for the Kootenay Food Procurement Network project for a total of $20,000 for the period April 2026 to March 2027; AND FURTHER, that this amount be include in the 2026-2030 Draft Financial Plan for S100 - General Administration.
WATER	
WATERSHED GOVERNANCE INITIATIVE	1. 416/16 That the RDCK write a letter to the POLIS Project on Ecological Governance and invite the organization to the West Kootenay to hold a watershed workshop. 2. 592/16 That the RDCK invite The POLIS Project on Ecological Governance to attend the January 2017 Board meeting to give a presentation on watersheds and water sustainability. 3. 88/18 That the Board direct staff to invite the Polis Project to host a workshop with the RDCK staff and Directors on watershed governance; AND FURTHER expenses and stipend be paid by General Administration S100. 4. 256/18 The Watershed Governance workshop with the POLIS Project be booked for May 18th, 2018 and the Watershed Governance Workshop Discussion report be made available to all Board Directors. 5. 487/18 That the Board direct staff to develop a Regional Watershed Governance Initiative project plan and identify an allocation for General Manager of Development Service and Sustainability Coordinator's time to implement the project plan for consideration in the draft 2019 five year financial plan within General Administration Service (S100). 6. 892/18 That the RDCK Board directs staff to seek funding to launch and coordinate a scoping study to better understand the potential watershed governance roles and responsibilities of the RDCK; with areas for the study to be determine by the Community Sustainable Living Advisory Committee at the January committee meeting; And further, the Board allocates staff time of the Sustainability & Resilience Supervisor (0.3 FTE), General Manager of Development Services (0.1 FTE) and Water Services Liaison (0.1 FTE) to support the procurement process for services. 7. 13/19 That the Board direct staff to develop a Regional Watershed Governance Initiative project plan, and

identify an allocation for General Manager of Development Service and Sustainability Coordinator's time to implement the project plan for consideration in the draft 2019 five year financial plan within General Administration Service (S100).

8. 121/19 That the RDCK Board approve funds in the amount of $26,250 from S105 Community Sustainable Living Advisory Service for the Watershed Governance Initiative scoping study, to complement the work being done in Area H and I's ground water studies, for the following watersheds:
    - Bourke, Sitkum & Duhamel Community Watershed (Area F);
    - Arrow Creek Community Watershed (Area B);
    - Ymir Community Watershed (Area G);
    - Argenta Watershed (Area D);
    - Harrop (Area E);
    - and Deer Creek (Area J)
9. 409/10 That the RDCK Board award the Regional Watershed Governance Initiative Scoping Study to Christina Metherall and Elucidate Consulting, and that the Chair and Corporate Officer be authorized to sign the necessary documents to a maximum value of $26,880 (includes GST).
10. 282/20 That the Board direct staff to prepare a workplan to determine the organizational capacity of the Community Sustainability Services and Water Services staff to pursue the recommendations of the RDCK Regional Watershed Governance Initiative report dated January 2020.
11. 389/20 That the Board endorse the Watershed Governance Initiative Project Plan (May 2020) and direct staff to pursue the Project Plan as a collaboration between Community Sustainability and Water Services staff
12. 610/20 The Board direct staff to bring forward a project plan with budget that will seek to collate and map existing watershed information held by the RDCK and other sources at a regional scale to inform our next steps and as a support to communities and conducting a gap analysis; AND FURTHER bring this back to the Community Sustainable Living Advisory Committee to inform the RDCK's next steps on watershed governance.
13. 828/20 That the Board approve transfer of funds to Community Sustainability Service S105 for a student position to support the Watershed Governance Initiative Data Collation and Mapping project in the amount of $14,500 from the Climate Action Revenue Incentive Program (CARIP) Service S100 and include in the 2021 Financial Plan; That the Board approve transfer of $9,000 in funds for the Watershed Governance Initiative Data Collation and Mapping project from Climate Action Revenue Incentive Program (CARIP) Service S100 to Community Sustainability Service S105.
14. 112/21 That the Board send a letter of support to Living Lakes Canada for the Columbia Basin Water Monitoring Collaborative and Water Hub.
15. 113/21 That the Board direct staff to report back to Community Sustainable Living Advisory Committee on how the workplan for the Watershed Governance Initiative is modified and budgeted based on a collaboration with Living Lakes Canada.
16. 584/21 That the Board approve the recommended next steps of Phase 3 of the Watershed Governance Initiative (WGI) with a focus on relationship building and planning, mapping and monitoring as outlined below and presented to the Community Sustainable Living Advisory Committee August 17, 2021:
    1. Supporting continued relationship building with Yaqan Nukiy and Ktunaxa Nation Council, Syilx Okanagan Nation Alliance, Secwepemc and Sinixt
    2. Provide technical support for community led watershed mapping and communication tools such as story mapping
    3. Supporting management of RDCK water systems - pilot natural asset management
    4. Supporting regional monitoring – investigate how the RDCK could support local level monitoring
    5. Supporting community led mapping – investigate Nature Based Planning
17. 585/21 That the RDCK Board direct staff to develop a work plan for continued work on the Watershed Governance Initiative (WGI) including seeking external partners; AND FURTHER, to prepare for discussion on how Community Sustainable Living Advisory Committee (CSLAC) can encompass the entire Board.
18. 658/21 That the Board direct the Chair of the Board and Chair of Community Sustainable Living Advisory Committee to reach out to MLA Brittny Anderson to discuss opportunities for engagement around the

	Regional Watershed Governance Initiative as it moves into Phase 3 focused on relationship building, monitoring and mapping. 19. 852/21 That the Board direct staff, Community Sustainable Living Advisory Committee Chair and Board Chair to work with MLA Anderson to develop a relationship with Forest Lands Natural Resource Operations and Rural Development and host community forums focused on watershed governance and stewardship in 2022. 20. 853/21 That Resolution 847/20, being the transfer of $9,000 in funds for the Watershed Governance Initiative Data Collation and Mapping project from Climate Action Revenue Incentive Program (CARIP) Service S100 to Community Sustainability Service S105 and include in the 2021 Financial Plan BE RESCINDED because funds were not needed as anticipated. 21. 86/22 That the RDCK Board approve funding up to $25,000 for the 2022 Watershed Governance Initiative budget from S105 Community Sustainable Living Service and include this in the 2022 Financial Plan; AND FURTHER, the Board allocates staff time of the Sustainability & Resilience Supervisor and Water Services Liaison to support the 2022 Watershed Governance Initiative. 22. 128/22 That the Board direct staff to submit a response on behalf of the RDCK to the Province on the Watershed Security Strategy and Fund; AND FURTHER, invite Board members and staff to comment on the draft responses by Monday, February 28, 2022. 23. 258/22 That the RDCK Board direct staff to send a request to Yaqan Nukiy Chief and Council for their participation on developing a Water Sustainability Plan for the Creston Valley; AND FURTHER, request that the Province order a Water Sustainability Plan be developed in the Creston Valley in partnership with RDCK and Yaqan Nukiy SUBJECT TO agreement from Yaqan Nukiy. 24. 433/22 That the Board direct staff to prepare a service case analysis and report back to the Board on the implications of establishing the requisition of a Drinking Water & Watershed Protection Service bylaw for protection of watersheds and drinking water in the Regional District of Central Kootenay to be added to the workplan in 2023. 25. 515/22 That the Board direct staff to work with the Wynndel community residents to create a story map, request an investigation under the Drinking Water Protection Act (Section 29) and request that the Ministry of Forests confirm the VRI (vegetation regeneration index) for the Duck Creek Watershed; AND FURTHER, that the Community Sustainable Living Service (S105) contribute up to a total of $25,000 of funds over 2022 and 2023 budget years to conduct a cumulative impact study of proposed logging in the Duck Creek Watershed. 26. 224/23 The Board is asked to provide comments related to watershed ecosystem services and health; climate resiliency; watershed governance and the help needed; economic opportunities within watersheds; reconciliation with Indigenous Peoples as it relates to water; and, advancing the UN Declaration of the Rights of Indigenous Peoples. 27. 304/23 That the Board approve the RDCK enter into a Collaborative Research Agreement with Selkirk College to provide research support for a service case analysis on a Drinking Water and Watershed Protection Service Case Analysis for the period of May 1, 2023 to September 30, 2023; AND FURTHER, that the Agreement be signed by the Chair and Corporate Officer. 28. 305/23 That the Board direct staff to conduct Step 1 of Community Sustainable Living Advisory Committee project evaluation of completing a Natural Asset Management Plan for Ymir Water System - Quartz Creek Watershed. 29. 377/23 That the Board direct staff to complete Step 2 of Community Sustainable Living Advisory Committee project evaluation to create a natural asset management plan for the Quartz Creek Watershed prepare a workplan and budget. 30. 304/23 That the Board approve the RDCK enter into a Collaborative Research Agreement with Selkirk College to provide research support for a service case analysis on a Drinking Water and Watershed Protection Service Case Analysis for the period of May 1, 2023 to September 30, 2023; AND FURTHER, that the Agreement be signed by the Chair and Corporate Officer. 31. 305/23 That the Board direct staff to conduct Step 1 of Community Sustainable Living Advisory Committee project evaluation of completing a Natural Asset Management Plan for Ymir Water System - Quartz Creek Watershed.

	32. 377/23 That the Board direct staff to complete Step 2 of Community Sustainable Living Advisory Committee project evaluation to create a natural asset management plan for the Quartz Creek Watershed prepare a workplan and budget. 33. That the Board direct staff to include the annual grant allocation of $20,000 in Community Sustainable Living Service S105, in the 2024 budget for the following projects: • Columbia Basin Groundwater Monitoring Program - Living Lakes: $10,000 • Regenerative Educational Community Food Garden - Elk Root Conservation: $10,000 34. 385/24 That the Community Works Fund application submitted by Regional District Central Kootenay for the project titled 'Ymir Watershed Natural Asset Management Plan' in the amount of $60,000 be approved and that funds be disbursed from Community Works Funds allocated to Electoral Area G and allocated to S105 Community Sustainable Living Service; AND FURTHER that the 2024 Financial Plan for S105 Community Sustainable Living Service be amended to increase Community Works Grants by $60,000 and increase Contracted Services Expense by $60,000. 35. 386/24 That the Board direct staff to submit a joint application to the Watershed Security Fund for water sustainability project within the yaqan nuʔkiy ʔamakʔis - Creston Valley in the amount of $150,000 and that if successful, grant funds be allocated to S105 Community Sustainable Living Service; AND FURTHER, briefing notes are provided to elected officials and elected officials are engaged when Chief and Council are engaged. 36. 612/24 That the Board approve the RDCK entering into a Funding Agreement with Real Estate Foundation of British Columbia for water sustainability for yaqan nuʔkiy ʔamakʔis - Creston Valley, and that the Chair and Corporate Officer be authorized to sign the necessary documents. 37. 67/25 That it be recommended to the Board that the RDCK enter into a Contribution Agreement with yaqan nuʔkiy for building our partnership of working together on water sustainability for yaqan nuʔkiy ʔamakʔis - Creston Valley, and that the Chair and Corporate Officer be authorized to sign the necessary documents; AND FURTHER, that the costs be paid from S105 – Community Sustainability. 38. 218/25 That the Board approve the Goat Watershed Engagement Strategy as outlined in the April 15, 2025 Engagement Strategy for the Water Sustainability Plan – Goat Watershed Committee Report prepared by Paris Marshall Smith, and that staff bring back a refined engagement strategy to the May 15, 2025 Board Meeting; AND FURTHER, that a report be submitted to the Board following the completion of the engagement. 39. 264/25 That Board direct staff to move the Goat Watershed Water Sustainability Plan to Creston Valley Services Committee for further discussion around implementation. 40. 430/25 That the Board approve submission of a Community to Community (C2C) funding application to UBCM for the Building Our Relationship for Working Together on Water Sustainability with yaqan nuʔkiy; 41. AND FURTHER, directs staff to provide overall grant management for the project, with the Chair and Corporate Officer authorized to execute the application and any related agreements, subject to a successful application. 42. 434/25 That the Board direct staff to apply to the Investment Agriculture Foundation of BC's Agriculture Water Infrastructure Program, Stream 3 (project type #8) to support direct producer engagement in the Goat River Watershed (Creston Valley), and that the Chair and Corporate Office be authorized to sign the necessary agreements subject to a successful application. 43. 526/25 That the Board authorize staff to apply for the Stream 2 grant from Watershed Security Fund to undertake Foreshore Inventory Mapping (FIM) of the Slocan River for up to $150,000; AND FURTHER, that if successful the grant funding and related expenses be included in the Community Sustainable Living Service S105 budget and that the Chair and Corporate Officer be authorized to sign the necessary documents. 44. CVSC- That the Board authorize staff to apply for the Real Estate Foundation of BC (REFBC) grant in support of funding portions of Phases 3 & 4 of the Goat River Watershed Water Sustainability Planning; AND FURTHER, that if successful the grant funding be allocated to Community Sustainable Living Service S105; AND FURTHER, that if successful, the Chair and Corporate Officer be authorized to sign all necessary documents.
KOOTENAY	1. 91/18 That the RDCK Board approve funding of $10,000 under S105 Community Sustainable Living Service to

<table>
<tr><td>LAKE PARTNERSHIP</td><td>support the contracted service of the Kootenay Lake Partnership Coordinator position within the 2018 budget.
2. 414/19 That the RDCK Board extends its support for Living Lakes Canada's Foreshore Inventory and Mapping for Aquatic Species at Risk proposal to the Canada Nature Fund with in-kind contributions of mapping data and staff hours for a total contribution of $175,000.00 over the four (4) year term of the project, which is:
<table><tr><th>PROJECT</th><th>IN-KIND CONTRIBUTIONS</th></tr><tr><td>Regional Flood and Hazard Risk Assessment LIDAR Acquisition and Processing</td><td>Completed in 2018 $40,000.00 Completed in 2018 $40,000.00</td></tr><tr><td>Floodplain Mapping Kootenay Lake Inundation Study</td><td>In Process $60,000.00
In Process $10,000.00</td></tr><tr><td>Planning staff time for review and outreach</td><td>Pending $25,000.00</td></tr></table>
3. 390/20 That the Board direct staff to transfer the remaining grant funding from the Real Estate Foundation (REF) in Community Sustainability Service S105, administered by RDCK on behalf of the Kootenay Lake Partnership, to Living Lakes Canada to support the Program Coordinator Position upon receiving confirmation from REF to do the transfer; AND FURTHER, that final report comes back to RDCK for information
4. 89/22 That the Board approve an allocation of $10,000 annually from 2022-2024 to fund the Kootenay Lake Partnership Coordinator from the Community Sustainable Living Service S105 and this amount be added to the 2022-2026 Financial Plan; AND FURTHER, the Board approve that amount be paid to the Ktunaxa Nation Land and Resource Division annually, to support the Kootenay Lake Partnership through contract administration of the Coordinator position SUBJECT TO a contribution agreement with the Ktunaxa Nation Council being prepared and brought back to the Board.
5. 129/23 That the Board approve an allocation of $10,000 annually from 2022-2024 to fund the Kootenay Lake Partnership Coordinator from the Community Sustainable Living Service S105 and this amount be added to the 2022-2026 Financial Plan Community Sustainable Living Service S105. (see minutes for full resolution)
6. 326/23 That the Regional District of Central Kootenay manage and administer the Ktunaxa Nation Council's successful grant applications for the Kootenay Lake Partnership initiatives and be compensated for that work through the administration fee included in the grant award; AND FURTHER, that the Chair and Corporate officer be authorized to sign the necessary agreements.
7. 716/23 That the Board direct staff to submit a funding application to UBCM Community to Community (C2C) for Kootenay Lake Partnership 2024 strategic planning.
8. 04/24 That the Board ratify the funding application to the UBCM Community to Community (C2C) Program for the Kootenay Lake Partnership 2024 strategic planning; AND FURTHER, the RDCK is willing to provide overall grant management and supports all proposed activities within the C2C grant application for Kootenay Lake Partnership 2024 strategic planning with less than 10 hours of staff time to come from Planning and Land Use Service S104.</td></tr>
<tr><td colspan="2">ENERGY</td></tr>
<tr><td>REGIONAL BIOENERGY & FULL FIBER UTILIZATION PLANNING</td><td>1. 119/19 That the Board direct staff to explore partnerships possibilities with Columbia Shuswap Regional District, Regional District East Kootenay and Regional District Kootenay Boundary on the Timber Deadstock Biofuel scoping study; AND FURTHER, that staff explore funding opportunities for the study
2. 232/19 That the Board approve the RDCK entering into a Contribution Agreement with Columbia Basin Trust to support the research and development of a business plan for timber deadstock biofuel in the Regional District of Central Kootenay, and that the Chair and Corporate Officer be authorized to sign the necessary documents;
AND FURTHER, the required matching funds of up to $25,000 come from Service S105 - Community Sustainable Living Advisory;</td></tr>
</table>

	AND FURTHER, that the grant funds be received and administered through S105. 3. 500/20 That the Board direct staff to further develop the business case potential of the Wood Pellet Boiler Network, District Energy in Castlegar and Village District Energy Systems as part of the Timber Deadstock Bioenergy Feasibility Study in coordination with municipal staff. 4. 845/20 That the Community Sustainable Living Advisory Committee Chair, RDCK Board Chair and senior staff approach the new Minister of Forests, Lands, Natural Resource Operations & Rural Development to ask what emerging direction may be coming which would assist the RDCK in further investigating bioenergy projects which would align with provincial objectives of maximizing fiber utilization and reducing forest fuel loading; AND FURTHER to make a similar outreach to Forest Enhancement Society BC. 5. 285/21 That the Community Sustainable Living Advisory Committee take no further action at this time on the following recommendation: 845/20 That the Community Sustainable Living Advisory Committee Chair, RDCK Board Chair and senior staff approach the new Minister of Forests, Lands, Natural Resource Operations & Rural Development to ask what emerging direction may be coming which would assist the RDCK in further investigating bioenergy projects which would align with provincial objectives of maximizing fiber utilization and reducing forest fuel loading; AND FURTHER to make a similar outreach to Forest Enhancement Society BC.
COMMUNITY GEOTHERMAL - GIS PROJECT	1. 451/21 That the Board approve funding $10,000 for the South Kootenay Lake Community Services Society`s Community Geothermal - GIS Project Set-up and Data Integration from S105 Community Sustainable Living Service and include this in the 2021 Financial Plan.
RURAL GRID RESILIENCE INVESTIGATION	1. 516/22 That the Board direct staff to work with Community Energy Association to understand the potential and limitations of energy storage, micro generation or bi-directional charging and prepare a workplan and budget for 2-3 community pilots in 2023, with the report to come back to the Community Sustainable Living Advisory Committee for review. 2. 303/23 That the Board approve $6,500 in funding to support a Lardeau Valley Opportunity LINKS Society pilot of residential power back up/renewable home assessment & rebates, to be paid from the Community Sustainable Living Service (S105).
REGIONAL ACTIVE & LOW CARBON TRANSPORTATION STRATEGY	1. That the Board direct staff to prepare a detailed project budget to investigate regional active transportation solutions as outlined in the report from Community Sustainable Living Advisory Committee (CSLAC) staff dated September 10, 2022 and report back to CSLAC for approval. 2. 384/24 That the RDCK Board direct staff to establish a collaborative working group on regional transportation and partner with regional industry, local governments, and community organizations; AND FURTHER, that up to $15,000 be used from S100- General Administration – Local Government Climate Action Program reserve to fund the initiative; AND FURTHER, that the working group Terms of Reference come back to the Community Sustainable Living Advisory Committee for review. 3. 458/24 That the Board direct staff to submit an application to the 2024 Age-friendly Communities Grants for the Regional Mobility Working Group in the amount of $25,000; AND FURTHER, if successful, grant funds be allocated to the A108 Development Services and the previously allocated $15,000 Local Government Climate Action Program funding (res 384/24) be returned to S100 reserve; AND FURTHER, that staff be authorized to enter into a contribution agreement with BC Healthy Communities should the RDCK be awarded funding. 4. 525/25 That the Board authorize staff to apply for $10,000 from the Community Climate transitions Innovation Fund from the Tamarack Institute to support the Rural Mobility Community Advisory Committee Project: Shared Mobility Programs – Healthcare Transportation; AND FURTHER, that if successful the grant income be allocated to Grant Specified account and expenses to Consulting Fees account, both in A108 Development Services: Rural Mobility Community Advisory Committee. 5. 620/25 That the Board authorize staff to allocate to a maximum of $20,000 subject to final budget approval from the Local Government Climate Action Program grant Rural Mobility Community Advisory Committee Phase 2 Project: Regional Volunteer Driver Network; AND FURTHER, that the grant funding be allocated to Development Services A108 draft 2026 -2030 Financial Plan.

	6. 621/25 That the Board authorize staff to allocate to a maximum of $10,000 subject to final budget approval from the Local Government Climate Action Program grant for the Rural Mobility Community Advisory Committee Phase 2 Project – Kootenay Rideshare User Interface Improvements; AND FURTHER, that the grant funding be allocated to Development Services A108 draft 2026-2030 Financial Plan. 7. 119/26 That the Board direct staff to submit an application to the Climate Ready Infrastructure Service (CRIS) fund for up to $20,000 in consultant support to undertake the Rural Transit Operating Model Feasibility Assessment. 8. 131/26 That the Rural Mobility Community Advisory Committee Amendment Bylaw 3074, 2026 be ADOPTED and the Chair and Corporate Officer be authorized to sign the same. 9. 132/26That Board appoint the following individuals to the Rural Mobility Advisory Committee for a term to end April 17, 2027: 1. Sarah Breen 2. Trish Dehnel 3. Miranda Hughes 4. Maxence Jaillet 5. Kelly McCafferty 6. Keith Wiley 7. Andrew Murray 8. David Gregory 9. Jacqueline Willard 10. Michelle Postnikoff 11. Cassie Norman 12. Reidun Rosi
CLIMATE ACTION	
CLIMATE ACTION STRATEGY	1. 124/19 That the Board direct staff to prepare a resolution that responds to ramping up RDCK's climate action in response to the climate emergency by April, 2019. 2. 272/19 - WHEREAS Climate change is recognized to be an urgent reality requiring rapid decarbonisation of energy across all sectors; Climate change is recognized to be an urgent reality where risks are compounded by increased climate change weather related events (more precipitation in the winter, dryer hotter summers) and increased levels of uncertainty. Preparing for increased resilience and adaptability is critical; THEREFORE BE IT RESOLVED That the Regional District of Central Kootenay Board recognizes that the world is in a global state of climate crisis. This reality creates an imperative for ALL ORDERS OF GOVERNMENT to undertake “rapid and far reaching” changes to building construction, energy systems, land use and transportation. 3. 701/19 That the Board direct staff to update the RDCK Policy Framework to incorporate a climate action lens; AND that, the 3-phased Climate Action Lens Policy strategy will seek input from the Senior Management Team to ensure smooth integration with operations and will bring recommendations to the Board for approval. 4. 861/19 That the Board direct staff to distribute the 2019 RDCK State of Climate Action full report and summary handout to the public. 5. 848/20 That the Board approve transfer of funds to Community Sustainability Service S105 for a student position to support climate action work in the amount of $14,500 from the Climate Action Revenue Incentive Program (CARIP) Service S100 and include in the 2021 Financial Plan; AND FURTHER, to offset the costs of the student position, the Board direct staff to apply to the Pacific Institute for Climate Solutions (PICS) for $12,000. 6. 604/21 That the RDCK Board endorse updating the RDCK State of Climate Action (SoCA) reporting framework to include a combination of reporting efforts such as – a dashboard, an annual scorecard, and reports (less

	frequent than current annual reports) with expenses to be paid from General Administration Service S100. 7. 44/22 That the Board adopt Policy 200-01-17 Better Corporate Building Policy and accompanying Procedures effective January 20, 2022 8. That the RDCK Board adopt science based carbon pollution (greenhouse gas emissions) reduction targets of 50% below 2018 levels by 2030, and 100% by 2050; AND FURTHER that the Board directs staff in 2022 to prepare 4-year climate action plans as a pathway to 2030 climate action targets and bring a report back to the Board. 9. 259/22 That the RDCK Board approve the budget of up to $80,000 for the development of the 2023 -26 Climate Action Plan and associated four (4) year Communication and Engagement Strategy, and that these funds be drawn from the Climate Action Revenue Incentive Program (CARIP) reserve in General Administration Service S100. 10. 514/22 That the Board appoint the following Directors to an advisory group to support the completion of the Regional District of Central Kootenay Climate Action Plan – Aimee Watson, Garry Jackman, Janice Morrison, Suzan Hewat 11. 268/23 That the Board refer adoption of RDCK Climate Actions to the August 17, 2023 Board meeting to allow for continued engagement through to July 26; AND FURTHER, that Staff are directed to conduct public in-person meetings at the request of Directors (all requests be submitted no later than Friday May 5). 12. 391/23 That the Board approve up to the amount of $121,700 to support communication and engagement related to RDCK Climate Actions from the Local Government Climate Action Program funding in Service 100 – General Administration; AND FURTHER, that the Board utilize the Community Sustainable Living Committee, as an advisory committee, to inform communication and engagement related to building the RDCK Climate Plan. 13. 89/24 That the Board direct staff to solicit additional individual feedback from RDCK Board Directors via survey; AND FURTHER, that staff use engagement feedback to identify different possible Climate Action Plan versions; AND FURTHER, that staff provide these versions to the Board for direction on which to develop. 14. 90/24That the Board approve stipend and expenses for the Climate Action Plan workshop to be paid from General Administration Service S100. 15. 231/24 That the Board direct staff to explore new climate action items impacting RDCK residents and make recommendations to the Board based on the RDCK Ideas for Climate Action document presented at the April 18, 2024 Board meeting; AND FURTHER, that those items that were identified as high priorities in our consultation process, are practicable, and fiscally feasible are presented to the Board with a business case prior to proceeding, with funding ideally being provided by polluter super-funds. 16. 490/24 (IC58/24) That the Board direct staff to extend the Community Resilience Coordinator term position to December 2026 at an annual cost of $70,981 and that the position be funded from the Local Government Climate Action Program funds; AND FURTHER, that the 2024-2028 financial plan for Service 100 – General Administration be amended to increase contribution from the dedicated Local Government Climate Action Program reserve by $23,630 and to transfer to other service -A108 (Development and Community Sustainability Services) by $23,630 for 2024 and increase contribution from the dedicated Local Government Climate Action Program reserve by $70,891 and to transfer to other service -A108 (Development and Community Sustainability Services) by $70,891 for 2025 and 2026.456/24 That the Board direct staff to draft a Community Sustainable Living Advisory Committee Bylaw to replace the Terms of Reference. 17. 432/25 That the Board direct staff to apply to FCM's Green Municipal Fund for Climate Ready Plans & Processes funding up to the maximum eligible amount, and to collaborate with RDCK member municipalities, Regional District of East Kootenay and Kootenay Boundary and First Nations governments where applicable; (see minutes for full resolution) 18. 503/25 That the Board direct staff to prepare a report for the Board that presents the historical and current project work undertaken to meet the program goals of the BC Climate Action Charter and the Partners for Climate Protection Program, including but not limited to the funding sources for each project, scope of work undertaken, staff and external resources required, milestones met, reporting completed and community and organizational benefits realized.
RURAL	1. 233/19 That the Board partner with the Rural Development Institute's Regional Approach to Rural Climate

DEVELOPMENT INSTITUTE (RDI) – CLIMATE ADAPTATION PROJECT	Adaptation Project Partnership and direct staff to finalize the agreement; AND FURTHER, allocate $12,500 of in-kind staff time from Service S105 for 2019-2020 (2 years) to support the Partnership. 2. 595/19 That the Board approve the RDCK entering into a Collaborative Research agreement with Selkirk College for the Regional Approach to Rural Climate Adaptation Project Partnership for the period from May 1, 2019 to March 1, 2021, and that the Chair and Corporate Officer be authorized to sign the necessary documents.
100% RENEWABLE ENERGY BY 2050	1. 257/18 That the Board commit to the development of strategies and implementation of projects to achieve the long-term goal of deriving 100% of its net energy from renewable sources by 2050 and commit to demonstrate strong political leadership and significantly contribute to the reduction of greenhouse gases in the region. 2. 222/19 That the Board appoint the following individual(s) to work with the West Kootenay EcoSociety towards the 100% Renewable Energy by 2050 from the Community Sustainable Living Advisory Committee; AND FURTHER, stipend and expenses to come from S105: Director Faust & Lockwood 3. 412/19 That the Board Chair and Corporate Officer sign the Memorandum of Understanding with West Kootenay 100% Renewable Energy Plan. 4. 139/21 That the Board receive the West Kootenay 100% Renewable Energy Plan dated December 2020 as presented in the January 6, 2021 West Kootenay 100% Renewable Energy Plan Board Report; AND FURTHER, that the adoption of the plan be considered after the workshop has taken place.
REGIONAL INVASIVE SPECIES PLAN	1. 483/21 That the Board direct Development and Community Sustainability Services staff to coordinate with staff from Geographic Information Services, Resource Recovery, Water Services, Recreation Facilities and Parks to create a proposal for an implementation plan of the draft Regional Invasive Species Strategy. 2. 50/22 That the Board direct staff to negotiate and enter into a sole-source agreement with the Central Kootenay Invasive Species Society for an invasive plant inventory on RDCK-owned or leased properties and development of a detailed implementation plan of the Regional Invasive Species Strategy for an amount not to exceed $44,472 exclusive of GST; AND FURTHER, that the costs for the inventory be paid from the services responsible for the lands and buildings sites identified and the costs of $8,500 for the Regional Invasive Species Implementation Plan be paid from General Administration Service S100. 3. 780/22 That the Board direct staff to enter into a sole-source agreement with the Central Kootenay Invasive Species Society for invasive plant management on RDCK-owned-leased properties, as outlined in the 2022 RDCK Invasive Plant Management Plan up to a maximum amount of $48,230 plus GST; AND FURTHER, that the costs for the invasive plant management be added to the 2023-2027 Financial Plan for the departments responsible for the lands and building sites identified. 4. 172/23 That the Board direct staff to enter into a Contribution Agreement with Central Kootenay Invasive Species Society for the implementation of PROGRAM Option 1 of the Regional Invasive Species Strategy for a total not to exceed $15,000 + GST. 5. 646/23 That the Board appoint the following two (2) Directors to the Regional Invasive Species Working Group for a term to end September 2024 – Kelly Vandenberghe and Suzan Hewat. 6. 379/24 That the Board direct staff to extend the agreement with Central Kootenay Invasive Species Society to continue improving regional capacity for a total not to exceed $15,000 + GST from July 2024 to July 2025; AND FURTHER, that the 2024 financial plan for General Administration Service S100 be amended to increase contribution from reserve by $15,000 and increase grants expense by $15,000. 7. 696/24 That the Board direct staff to extend the agreement with Central Kootenay Invasive Species Society to continue improving regional capacity for a total not to exceed $15,000 + GST from July 2025 to July 2026; AND FURTHER, that this amount be included in the 2025 draft Financial Plan for General Administration Service S100. 8. 03/26 That the Board approve the RDCK extending the agreement with Central Kootenay Invasive Species Society (CKISS) to continue implementing the Regional Invasive Species Strategy to a maximum value of $15,000 for the period of April 2026 to March 2027; AND FURTHER, that this amount be included in the 2026 Draft Financial Plan for Service 100 – General Administration. 9. 100/26 WHEREAS, protecting natural assets is crucial to supporting Canada's Housing Plan. Natural assets such as water infrastructure and healthy ecosystems provide essential services to housing

	communities. Essential services include drinking water, clean air and recreation opportunities. Maintaining existing natural infrastructure is more cost efficient than building new infrastructure to compensate for ecosystem function loss, including that caused by invasive species ; and WHEREAS climate change and persistent drought underscore the vulnerability of local water systems and the need for greater coordination and investment in watershed security to reduce risks to drinking water, wildfire response, flood control, waste water treatment services, and community well-being. Invasive species can exacerbate the impacts of climate change, drought and degrade watershed function; and WHEREAS invasive plants are also implicated in altering fire regimes, and impacting species at risk and natural climate solutions. Management and damage costs are increasing rapidly over time and proactive management substantially reduces future costs. It is estimated that each $1 of immediate invasive species management reduces damages by $53; and WHEREAS invasive species spread and impacts are a national issue and due to a concentration of human activity, municipalities act as epicenters of invasive species establishment and spread. As a result, municipalities are directly involved in limiting the spread of invasive species; and WHEREAS the provinces and territories and municipalities lack adequate resources to prevent the spread of invasive species, leaving local governments unprotected. A funding mechanism to enact FCM standing policies on providing federal support for municipalities in the development and delivery of invasive species programs is also lacking; Therefore be it RESOLVED, That FCM lobby the federal government to fund a Local Governments for Invasive Species Prevention Program to support municipalities in preventing and managing invasive species.
COMMUNITY AMBASSADORS – partnership with Youth Climate Corps/Wildsight	1. 125/23 That the Board support the development and delivery of the Climate Action Ambassadors program in partnership with Youth Climate Corps-Wildsight; AND FURTHER, the Board provide a letter of support to partner with Youth Climate Corps through Wildsight for the application to the Rural Economic Diversification & Infrastructure Program (REDIP) contributing in-kind support ($58,000) and cash contribution ($40,000 previously approved in reso 259/22) to be funded from the Local Government Climate Action Plan for training in each of the departments and oversight of development and delivery of the program. 2. 651/23 That the Board provide a letter of support to the Rural Economic Diversification & Infrastructure Program (REDIP) for the Fire to Food Youth Climate Corps-Wildsight project with in-kind support up to $19,200 for training in each of the departments and oversight of development and delivery of the program.
CSLAC ADMINISTRATIVE & COMMUNICATION SUPPORT	
WEBSITE UPDATE & PRINT MATERIAL	1. 601/18 That the Board direct staff to highlight the work of the Sustainability Service (105) through the RDCK website and announce with a media release. 2. 578/19 That the Board directs staff to procure services from Little H Design Works for $2,500 for the work of designing the summary report for the RDCK's Climate Action Indicator Project with funds to come from Service 105; AND FURTHER, staff be directed to seek quotes to produce a graphic illustration of this report for distribution on line.
ADMIN	1. 382/18 That the RDCK Board support the allocation of S105 funds 'Grants' leveraging and linking additional funds from external agencies for sustainability initiatives, as described in the Community Sustainable Living Advisory Committee Terms of Reference. 2. 123/19 That the Board approve the 2019 Community Sustainable Living Advisory Committee draft budget; AND FURTHER, that the directors stipend and expenses be reduced to $5,000 for the years 2020-23 inclusive. 3. 207/24 That the Board direct staff to review the current Community Sustainable Living Advisory Committee Terms of Reference and bring forward a report for the June 18, 2024 CSLAC meeting. 4. 457/24 That the Board direct staff to prepare a Community Sustainable Living Advisory Committee Project Fund policy. 5. 619/25 That the $25,000 in grants for Community Sustainable Living Advisory Committee S105 be removed from the draft 2026 Financial Plan.

Committee Report

June 16, 2026

Quartz Creek Community Watershed: Natural Asset Management Plan and Long-Term Protection Strategy

Author: Paris Marshall Smith, Sustainability & Resilience Supervisor
File Reference: 5200-20-NAMP
Electoral Area/Municipality: G
Services Impacted Community Sustainable Living Service 105

1.0 STAFF RECOMMENDATION

That the RDCK Board receive the Quartz Creek Community Watershed Natural Asset Management Plan (August 2025) for information;

AND FURTHER, that staff be directed to develop a watershed protection and acquisition strategy for the Quartz Creek Community Watershed, in collaboration with the Ymir Community Watershed Society, the Province of BC (Ministry of Water, Land and Resource Stewardship), Interior Health Authority, and relevant First Nations, and that this strategy be brought back to the Board for consideration.

AND FURTHER, that staff be directed to investigate additional staff capacity or contracted services as needed to support implementation of this direction;

2.0 BACKGROUND/HISTORY

The Quartz Creek Community Watershed is a 588-hectare sub-basin located in the Selkirk Mountains of southeastern British Columbia. It is the sole source of drinking water for the community of Ymir, serving approximately 400 residents. The Ymir Water System has been an RDCK service since 1979 and has no viable alternative water source. Earlier studies confirmed that other potential water sources in the area are untreatable due to sulphide mineral contamination associated with historical mining activity.

The watershed is designated as a Community Watershed under the Forest and Range Practices Act (FRPA), which provides some additional constraints on forestry operations but does not prohibit timber harvesting. Forest tenure in and around the watershed has been held by BC Timber Sales (BCTS) and, since 2021, by ATCO Wood Products Ltd. (a Fruitvale-based private company), which holds the current Forest Stewardship Plan (FSP) for the area through 2029.

Community and organizational concern regarding logging in the watershed dates to 2017, when BCTS proposed road-building and cut-block development within the watershed boundary. In response, the Ymir Watershed Action Team formed and subsequently became the registered non-profit Ymir Community Watershed Society

(YCWS) in 2018. The RDCK has expressed unanimous concern about any forestry activity that could compromise water quality or quantity in the watershed. In 2019, RDCK staff engaged Interior Health (IHA) under the Drinking Water Protection Act, however IHA did not intervene at that time.

The RDCK commissioned the development of a Natural Asset Management Plan (NAMP) for the Quartz Creek Community Watershed to formally assess the condition, value, and risk profile of this natural infrastructure asset. The final NAMP report was completed in August 2025 by Green Analytics.

3.0 PROBLEM OR OPPORTUNITY DESCRIPTION

The Quartz Creek Community Watershed provides critical public infrastructure services to the community of Ymir for which there is no engineered or alternative substitute. Despite this irreplaceable role, the watershed remains vulnerable to commercial forestry, wildfire, and climate change.

The completion of the NAMP now provides the RDCK with a detailed financial, ecological, and risk-based foundation to justify and pursue formal watershed protection measures. Staff explored a range of provincial legislative tools during the preparation of this report. Several avenues were found to be inapplicable in this context (see Section 6.0), which sharpens the case for pursuing the protection pathways that are available: engagement through the FRPA Forest Stewardship Plan process, potential timber rights acquisition, and multi-government partnership development.

3.1 Alignment to Board Strategic Plan

Protecting the Quartz Creek watershed aligns directly with the RDCK's commitment to protecting watersheds, sustainable service delivery, infrastructure resilience, and community health. The Ymir Water System is an RDCK-administered service, and safeguarding its source is a core responsibility. The NAMP approach also advances the RDCK's work on natural asset management, consistent with evolving national standards from the Canadian Standards Association (CSA, 2023) and provincial directions on climate adaptation and infrastructure planning.

3.2 Legislative Considerations

A range of provincial and federal legislative frameworks are relevant to watershed protection at Quartz Creek:

- Forest and Range Practices Act (FRPA): The Community Watershed designation imposes additional constraints under ATCO's Forest Stewardship Plan and provides an avenue for RDCK to formally comment during FSP referral periods. While RDCK holds no decision-making authority, consistent and well-documented engagement can influence operational planning and create a record that supports stronger provincial intervention.
- Water Sustainability Act (WSA): Offers the most robust framework for integrating water and land management through Water Sustainability Plans, which can create binding land use rules tailored to a specific watershed. This requires significant coordination with the Province and First Nations and political will at the provincial level.
- Institutional License of Occupation (ILO): The Province may issue an ILO to public bodies such as the RDCK for purposes including watershed management and conservation. This does not transfer land ownership but provides site-level management authority for monitoring, access, and stewardship activities. This tool has been used elsewhere in the RDCK (e.g., Rosebud Lake).

- Local Government Act (LGA), Sections 329-341: Authorizes RDCK to acquire land or tenure for regional parks purposes, including borrowing authority. This enables long-term financing and stewardship partnerships even before title is secured.
- Timber Rights Acquisition: Negotiating a purchase or covenant arrangement with ATCO Wood Products -- potentially with NGO or grant co-financing -- would directly remove the logging threat. The Puntledge River precedent (Comox Valley, 2023-2024) demonstrates the viability of this approach for small community watersheds.

3.3 What Are the Risks

The risks of inaction are significant:

- Commercial forestry in the watershed could degrade canopy cover, increase sedimentation and evaporation, and alter flow dynamics. The watershed's small size (588 ha) and lack of redundancy make it highly sensitive to even limited disturbance.
- Wildfire is identified in the NAMP as the highest-consequence risk. Loss of forest canopy could render Ymir's water supply unusable for an extended period.
- Climate change is projected to alter snowpack and precipitation patterns, increasing drought risk -- effects compounded by any loss of forest cover.
- Acid rock drainage from exposed sulphide minerals, triggered by road-building or logging, could permanently contaminate Quartz Creek. No water treatment system capable of remediating acid contamination is in place.
- ATCO's current FSP runs through 2029. The upcoming referral window represents a limited and time-sensitive opportunity for formal engagement.

4.0 PROPOSED SOLUTION

Staff recommend a two-track protection strategy that leverages the NAMP findings to engage senior governments through available channels and pursue long-term tenure-based protection.

Track 1: FSP Engagement and Provincial Partnership

- Formally engage the Ministry of Water, Land and Resource Stewardship (WLRS) and Ministry of Forests regarding the Quartz Creek watershed, presenting the NAMP findings as the basis for provincial action on harvest deferrals or alternative planning approaches within the current FSP.
- Engage ATCO Wood Products directly to open discussions on watershed-sensitive operational planning, deferrals, or a longer-term covenant arrangement.
- Seek First Nations engagement to explore co-stewardship, co-governance, or Indigenous conservation area designations that could provide additional protection leverage.
- Work with Interior Health Authority to reassess the potential for action under the Drinking Water Protection Act, supported by the quantified risk evidence in the NAMP.

Track 2: Tenure and Funding Strategy

- Commission a timber value analysis to establish the cost of acquiring ATCO's timber rights as the most direct long-term protection pathway.
- Identify and pursue funding through: the BC Watershed Security Fund, Natural Infrastructure Fund, Disaster Mitigation and Adaptation Fund (DMAF), BC Parks Foundation, and conservation donor partners.
- Pursue an Institutional License of Occupation (ILO) to establish RDCK site-level management authority within the watershed for monitoring, access, and conservation activities.

- Explore Regional Parks authority under the LGA as a framework for long-term stewardship financing and governance, including potential partnership with YCWS.

4.1 Financial Considerations of the Proposed Solution

The NAMP establishes a compelling financial case for protection investment:

Ecosystem Service / Risk	Quantified Value or Cost Exposure
Drinking water supply (bulk water replacement)	$303,000 to $601,000 per year
Built storage replacement (partial)	$8.6 million capital + $600,000/year operating
Built storage replacement (full capacity)	Over $34 million capital
Filtration and sediment control	Avoided cost of water treatment plant (not monetized)
Wildfire risk	High consequence; no redundancy or backup source

The cost of maintaining intact watershed function is orders of magnitude lower than any engineered alternative. Initial steps of provincial engagement, FSP referral participation, ILO application, and strategy development, can be advanced with existing staff capacity (though not at this time). Timber rights acquisition, if pursued, will require external financing. Provincial and federal funding programs, together with conservation donor partnerships, offer viable co-financing pathways.

Staff responsible for this project are currently at capacity. To pursue this project would require additional staff support and/or contracted services. Staff could investigate funding opportunities and return with options for consideration.

4.2 Risks with the Proposed Solution

- Provincial engagement on harvest deferrals or FSP amendments is not guaranteed and depends on Ministerial direction and political will.
- Timber rights acquisition costs are unknown and will depend on market conditions and ATCO's willingness to negotiate.
- Multi-track engagement across Province, First Nations, IHA, and ATCO requires sustained staff capacity over an extended period.
- The FSP referral window under the current plan (through 2029) is time-limited. Delay in initiating engagement reduces available leverage.

4.3 Resource Allocation and Workplan Impact

Initial strategy development and provincial engagement can be led by Sustainability & Resilience Supervisor (though not at this time – staff are currently at capacity) in collaboration with the Area G Director and YCWS. External legal or planning support may be required for timber rights negotiations or ILO applications. A preliminary workplan and resource estimate will be included in the protection strategy report brought back to the Board.

4.4 Public Benefit and Stakeholder Engagement of Proposed Solution

Quartz Creek is the sole drinking water source for approximately 400 Ymir residents. Community engagement on this issue has been extensive and sustained since 2017, with broad public support for protection. The Ymir Community Watershed Society is an established and active partner. Key stakeholders for the protection strategy include:

- Ymir Community Watershed Society (YCWS)
- Ktunaxa Nation Council
- Sinixt Confederacy
- Interior Health Authority
- BC Ministry of Water, Land and Resource Stewardship (WLRS)
- BC Ministry of Forests
- ATCO Wood Products Ltd.
- BC Parks Foundation and conservation partners

4.5 Measuring Success

Success milestones to be tracked and reported to the Board:

- Formal submission of NAMP findings to provincial ministries and IHA
- Initiation of engagement with ATCO Wood Products
- Completion of timber rights valuation
- Identification and application to relevant funding programs
- ILO application submitted
- Development of a long-term protection framework with recommendation to Board

5.0 ALTERNATIVE SOLUTION(S)

The primary alternative is to receive the NAMP for information only and continue monitoring without initiating a formal protection strategy. This approach preserves staff capacity for other priorities but does not address the identified risks and foregoes the strategic opportunity created by the NAMP findings. Given the irreplaceability of the watershed and the absence of any backup water source, staff do not recommend this option.

6.0 OPTIONS CONSIDERED BUT NOT PRESENTED

During the preparation of this report, staff explored the potential use of BC Land Act Sections 16 and 17, tools that allow the Province to withdraw Crown land from disposition or establish a Land Use Investigation Reserve.

Following consultation with the Province, staff confirmed that these tools are not applicable in this context for two reasons: local governments are not eligible to hold Land Act Reserves, and logging activities are not tenured under the Land Act and therefore cannot be restricted through this mechanism. These tools have been removed from consideration. This gap reinforces the importance of the FRPA FSP engagement pathway and timber rights acquisition as the primary available levers.

A Water Sustainability Plan under the WSA was also considered but assessed as unlikely to succeed in the near term given the level of provincial coordination required and the volume of competing WSA processes underway across BC.

Doing nothing is not considered a feasible option given the RDCK's role as water system operator and the documented risk profile of the watershed.

7.0 OPTIONS SUMMARY

Option 1:
That the RDCK Board receive the Quartz Creek Community Watershed Natural Asset Management Plan (August 2025) for information;

AND FURTHER, that staff be directed to develop a watershed protection and acquisition strategy for the Quartz Creek Community Watershed, in collaboration with the Ymir Community Watershed Society, the Province of BC (Ministry of Water, Land and Resource Stewardship and Ministry of Forests), Interior Health Authority, and relevant First Nations, and that this strategy be brought back to the Board;

AND FURTHER, that staff be directed to investigate additional staff capacity or contracted services as needed to support implementation of this direction

Option 2:
That the RDCK Board receive the Quartz Creek Community Watershed Natural Asset Management Plan (August 2025) for information only, with no further direction to staff at this time.

8.0 RECOMMENDATION

That the RDCK Board receive the Quartz Creek Community Watershed Natural Asset Management Plan (August 2025) for information;

AND FURTHER, that staff be directed to develop a watershed protection and acquisition strategy for the Quartz Creek Community Watershed, in collaboration with the Ymir Community Watershed Society, the Province of BC (Ministry of Water, Land and Resource Stewardship), Interior Health Authority, and relevant First Nations, and that this strategy be brought back to the Board for consideration;

AND FURTHER, that staff be directed to investigate additional staff capacity or contracted services as needed to support implementation of this direction

Respectfully submitted,
Paris Marshall Smith, Sustainability & resilience Supervisor

CONCURRENCE

Chief Administrative Officer – Stuart Horn
General Manager of Development and Community Sustainability Services – Amy Wilson

ATTACHMENTS:
Attachment A -- Quartz Creek Community Watershed Natural Asset Management Plan, August 2025

2025

Ymir Watershed / Quartz Creek Natural Asset Management Plan

Consolidated Report

August 2025

Executive Summary

Context and Purpose

The Quartz Creek Community Watershed is a 588-hectare sub-basin located in the Selkirk Mountains of southeastern British Columbia. It provides the sole source of drinking water to the community of Ymir, a small unincorporated community within the Regional District of Central Kootenay (RDCK). This source is critical to public health, community resilience, and cost-effective infrastructure service delivery. Recognizing the vital role played by the watershed's natural assets—particularly its intact forests and high-elevation hydrology—the RDCK commissioned the development of a Natural Asset Management Plan (NAMP) to assess the condition of these assets, evaluate their replacement cost, identify associated risks, and recommend strategic management actions.

The NAMP adopts a structured approach modeled on conventional asset management frameworks used for built infrastructure. By treating the watershed as a service-providing asset, the plan enables the RDCK decision-makers to assess current performance, quantify financial exposure, and support long-term planning aligned with ecological integrity and infrastructure reliability.

Natural Asset Inventory Summary

The foundation of the Quartz Creek Natural Asset Management Plan is a spatially explicit natural asset inventory developed using provincial, regional, and the RDCK geospatial datasets. The inventory aligns with the national standards and specifications outlined by the Canadian Standards Association (CSA, 2023) for natural asset inventories.

The inventory treats the entire Quartz Creek Community Watershed as the primary natural asset, reflecting the fact that drinking water provision is an emergent service derived from the interaction of multiple interdependent natural processes. Rather than focusing solely on isolated features (e.g., riparian buffers, forest stands), the plan recognizes that the watershed functions as a complex, integrated system of upland forests, soils, stream networks, and microclimatic regulators.

Key features of the inventory include:

- **Watershed Size and Cover**: The watershed spans approximately 588 hectares and is dominated by forested land cover, with 99.2% categorized as coniferous forest.
- **Forest Attributes**: The forest is predominantly mature and old-growth, with limited disturbance in the past 20 years. Vegetation Resource Inventory (VRI) data was used to delineate dominant tree species and age classes.
- **Disturbance Layers**: The inventory integrates 20 years of data on wildfire history, pest outbreaks, cutblock activity, and other cumulative disturbance measures from the BC Cumulative Effects Framework. As of 2023, no significant disturbance has occurred within the watershed boundary.
- **Access Infrastructure**: Only a limited segment (~0.8 km) of forest road enters the northeast portion of the watershed. There are no major access corridors, limiting anthropogenic pressure and preserving ecological integrity.

- **Asset Attributes**: Additional inventory attributes include water licenses, road networks, and forest tenure designations. These attributes support the condition assessment and inform risk and management planning.

The spatial structure of the inventory allows for condition assessments and risk scores to be assigned at both the watershed and sub-watershed (fundamental watershed) levels. This enables both systems-level planning and finer-scale prioritization of management actions. Importantly, the inventory is designed to be updated over time, allowing the RDCK and partners to track changes in asset extent, quality, and stress exposure as part of ongoing natural asset monitoring.

Asset Condition Assessment

The Quartz Creek Community Watershed is currently in excellent ecological health. A desktop condition assessment evaluated a series of spatial indicators including forest cover, habitat connectivity, hydrologic integrity, and anthropogenic disturbance. The results show that 100% of the watershed falls within either "good" or "very good" condition classes. Specifically, over 56% of the watershed is rated "very good," reflecting contiguous mature and old forest cover with minimal road density or structural fragmentation. These findings confirm that the watershed continues to function effectively as a natural water storage and filtration system—sustaining water quality and quantity without the need for built treatment infrastructure.

The condition results support not only clean drinking water, but also key ecological functions that stabilize flow, mitigate fire and erosion risk, and buffer climate variability. The continued delivery of these services depends on maintaining the current landscape configuration and ecological processes.

Replacement Cost Assessment

The plan includes a detailed replacement cost analysis to quantify the economic value of drinking water services provided by the intact watershed. Results show that engineered substitutes for the drinking water and storage functions provided by Quartz Creek would be prohibitively expensive, especially for a small community like Ymir.

- **Water supply replacement** (via bulk-water hauling) would cost an estimated $303,000 to $601,000 per year.
- **Built storage replacement** (to replicate forest-mediated water retention) would exceed $8.6 million for partial replacement and over $34 million for full capacity, with annualized operating costs in excess of $600,000.

These figures exclude environmental permitting, system integration, and do not replicate ancillary benefits such as sediment control, water quality regulation, or wildfire buffering. The analysis demonstrates that maintaining the existing watershed function is orders of magnitude more cost-effective than engineered alternatives.

Risk Assessment

While the current ecological condition is strong, the watershed is exposed to several high-consequence risks. These include:

- **Wildfire**: The highest-rated risk due to potential catastrophic impacts on forest cover, water quality, and flow regulation.
- **Climate change**: Altered snowpack, precipitation timing, and seasonal flow dynamics threaten long-term water availability.
- **Commercial logging and road development**: These could degrade canopy cover, increase sedimentation, and fragment the watershed.
- **Drought**: Increasingly likely under future climate scenarios, with implications for flow reliability.
- **Acid rock drainage and mining**: Though currently unlikely, the consequences of even minor contamination would be severe due to the absence of water treatment capacity.

A precautionary lens was applied to risk scoring given the watershed's irreplaceability and the absence of viable backup sources. Overall, the risk profile underscores the importance of prevention and preparedness as the foundation of long-term service delivery.

Strategic Recommendations

To ensure the continued delivery of drinking water and safeguard the watershed's ecological and financial value, the following management priorities and actions are recommended:

1. **Protect and Maintain Watershed Integrity**: Maintaining the forested watershed in its current condition is essential. This includes limiting disturbance, prohibiting new road development, and prioritizing forest retention in critical areas.
2. **Reduce Wildfire Risk**: Implement fuel management activities aligned with the *Ymir Community Wildfire Protection Plan*. This may include fuel breaks, canopy thinning in targeted locations, and collaborative planning with tenure holders and emergency services.
3. **Prevent Impacts of Commercial Forestry**: Proactively engage with the forest tenure holder (ATCO Wood Products) and the province of BC to explore deferrals, buyouts, or alternative harvest areas outside the watershed. Formal agreements should reflect the watershed's utility value and the public interest in its preservation.
4. **Develop an Emergency Backup Water Supply**: Advance exploratory studies of Aquifer #0493 beneath the Ymir townsite as a potential partial redundancy. Though not a full substitute, a groundwater source could provide resilience in the event of temporary disruption.
5. **Coordinate Watershed Monitoring**: Establish a formal monitoring program that includes both ecological indicators and water quality parameters. Engage community members and community groups in data collection, and ensure results are shared transparently to build public trust.
6. **Foster Collaborative Governance and Stewardship**: Strengthen partnerships among the RDCK, tenure holders, provincial ministries, First Nations, and the local community.

Collaborative governance is essential given the split between service delivery and land-use authority.

Conclusion

The Quartz Creek Community Watershed is not merely a landscape—it is a core component of Ymir's public infrastructure. It provides clean, reliable, and effectively free drinking water to the community. Its replacement is not economically viable, and its degradation would impose significant risks to public health and financial stability. This NAMP demonstrates that proactive stewardship of the watershed offers a fiscally prudent, environmentally sound, and socially responsible pathway for securing Ymir's long-term water future. Investing in the protection of natural assets today is a strategic infrastructure decision that will pay dividends for generations to come.

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1. Introduction

Natural assets (e.g., wetlands, forests, grasslands, meadows, watercourses) provide a cost-effective, resilient, alternative or complement to some built infrastructure. Indeed, when managed properly, natural assets provide several valuable services, including, for example, the provision of clean drinking water, improved air quality, carbon storage and sequestration and flood control. Recognizing natural assets and the range of services they provide, ensures they are effectively managed and avoids the deterioration of the assets and associated services. Similar to built assets, ensuring a sustainable long-term supply of ecosystem services is the reason for having a natural asset management plan (NAMP).

A NAMP is a plan for managing assets to deliver an agreed standard of service. Such plans make explicit the costs and benefits associated with service delivery and help to manage costs appropriately, while also addressing relevant risks. Asset management plans have been employed to inform the management of built assets for decades. More recently, the idea of incorporating natural assets into a similar type of management framework has been recognized because like built assets, natural assets represent a critical part of a community's infrastructure and need to be accounted for and managed proactively. If natural assets are not managed properly, their value can depreciate and their ability to provide services diminishes.

In the case of the Quartz Creek Community Watershed – the focus of the current study - mismanaging this asset would have grave consequences for the residents of Ymir who rely on the watershed for their drinking water. To inform the management of the Quartz Creek Community Watershed for the continued provision of drinking water to the community of Ymir, the Regional District of Central Kootenay (RDCK) – the district in which the watershed is based and the entity that owns the built infrastructure that captures and distributes drinking water to Ymir residents – commissioned the development of a NAMP for the Quartz Creek Community Watershed.

Figure 1-1 depicts steps in natural asset management that were undertaken to develop a NAMP for the Quartz Creek Community Watershed. The process draws from the approach typically applied to built assets. It begins with obtaining spatial data layers that depict the location, extent and type of the various assets (Step 1). This information is structured into a registry that is a tabular representation of the assets where each asset is a row in the registry and a series of columns contain asset attributes, such as land ownership and watershed (Step 2). Using GIS, the amalgamated data is used to delineate and quantify the type, location and extent of assets (Step 3). The resulting inventory forms the basis of all subsequent asset management steps. The assets in the inventory are assessed for condition and rated on a scale from very poor to very good to align with such scales used for built assets (Step 4). The condition is assessed through a series of indicators that proxy the ecological health of the assets on the assumption that assets in good ecological health are able to deliver good ecological services. Paralleling the asset management approach applied to built assets, replacement costs are assigned to the assets in the inventory (Step 5). The risks that might impair the ability of assets to deliver priority services are then identified and assessed (Step 6). Next, the focus is on identifying and assessing management actions (Step 7); which in the case of the Quartz Creek Community Watershed are intended to ensure or aid in the continued provision of drinking water to the community of Ymir. The results of the steps are presented in an asset management plan (Step 8).

Figure 11-1. Overview of steps associated with natural asset management for Quartz Creek Community Watershed.

The purpose of the current report is to present the results of the asset management approach for the Quartz Creek Community Watershed. The report is organized as follows:

- Section 2 contains information on community watersheds in BC generally as well as the Quartz Creek Community Watershed more specifically.
- Section 3 provides an overview of the approach and results of the natural asset inventory.
- Section 4 summarizes the approach and results of the condition assessment.
- Section 5 presents replacement costs for the drinking water provision from Quartz Creek.
- Section 6 contains the results of the risk assessment.
- Section 7 identifies and analyzes management actions intended to support continued drinking water provision from the watershed.
- Section 8 concludes the NAMP.
- Appendices provide details on water quality and quantity data, the condition assessment, the risk assessment and the interested parties engagement session .
- References are provided in Section 12.

2. Quartz Creek Community Watershed

This section provides contextual information for the NAMP; an overview of the significance and implications of the community watershed designation is provided along with details on the Quartz Creek Community Watershed.

2.1 Managing Community Watersheds

Water supply systems in BC are regulated under the *Drinking Water Protection Act (DWPA)* and overseen by Interior Health. A water supply system consists of the physical infrastructure and management of the collection, treatment, storage and distribution of drinking water from the source(s) to the consumers. The physical components of a water supply system include source waters and their catchment areas (Ministry of Healthy Living and Sport 2010).

A community watershed, as defined under the Forest and Range Practices Act (FRPA), is all or part of the drainage area that is upslope of the lowest point from which water is diverted for human consumption by a licensed water purveyor. With 467 community watersheds designated in B.C., the areas require special management to conserve the quality, quantity and timing of flow and to prevent cumulative negative hydrological effects having material adverse effects on source water (Government of British Columbia 2025). The governance of community watersheds includes FRPA, which oversees forest harvesting and ranching operations on the Crown land portion of a watershed, but no entity is responsible for the management of the cumulative impacts of all activities in community watersheds (Forest Practices Board 2025). Many community watersheds encompass Crown land that may have tenures for recreation (e.g., shooting ranges, off road vehicles), forest harvesting, livestock grazing, and lease lots. In addition to these permitted activities, it is common for unsanctioned activities such as camping in nondesignated areas, squatting, or dumping of unwanted items (e.g., garbage, vehicles, campers, etc.) to also take place within community watersheds. Both sanctioned and unsanctioned activities can have negative impacts on source water quality and quantity.

In 2015, it was determined that the Province of BC was not effectively managing for cumulative effects in community watersheds, and a Supreme Court of BC ruling in 2021 found that the government lacked the authority under FRPA to link the results of cumulative effects assessments to their decision-making. The province is now exploring sustainability plans and water objectives to address cumulative effects on water, but these solutions have yet to be rolled out province-wide (Forest Practices Board 2022).

In an attempt to improve drinking water supplies, Interior Health commissioned a study to enhance communications between all stakeholders in the provision of clean drinking water and to develop an effective long-10e communication strategy that will better position stakeholders to positively contribute to the safe and effective provision of drinking water (Be the Change Group Inc. 2017). Similarly, the multiple barrier approach to safe drinking water, is also a collaborative process of not only treatment using physical and chemical barriers, but it also recognizes the need to maintain and improve the quality of water from source to tap (Interior Health Authority 2017).

More recently, natural asset management has been explored to more effectively manage and protect watersheds. A Common Asset Trust model is currently under pilot in the Grindstone Creek

watershed in Ontario (Natural Assets Initiative & Dark Matter Labs 2024). This, and other aforementioned strategies, may lead to more effective management of community watersheds in the future.

2.2 Quartz Creek Community Watershed

The Quartz Creek Community Watershed is located within the RDCK. The watershed provides drinking water to the 400 residents of Ymir, British Columbia (BC) and is designated as a community watershed under the FRPA (Figure 2-1). The watershed is located between the communities of Salmo and Nelson, within the RDCK Electoral Area G in southeastern BC. Elevations of the watershed range from 780 m at the mouth of Quartz Creek to 1,694 m on the western boundary of the watershed (Emerman 2020b). The watershed occurs within the greater Salmo Watershed and Quartz Creek is a tributary to the Salmo River. The historic Fresno mine is located in the watershed near Quartz Creek, above the water intake (Emerman 2020b).

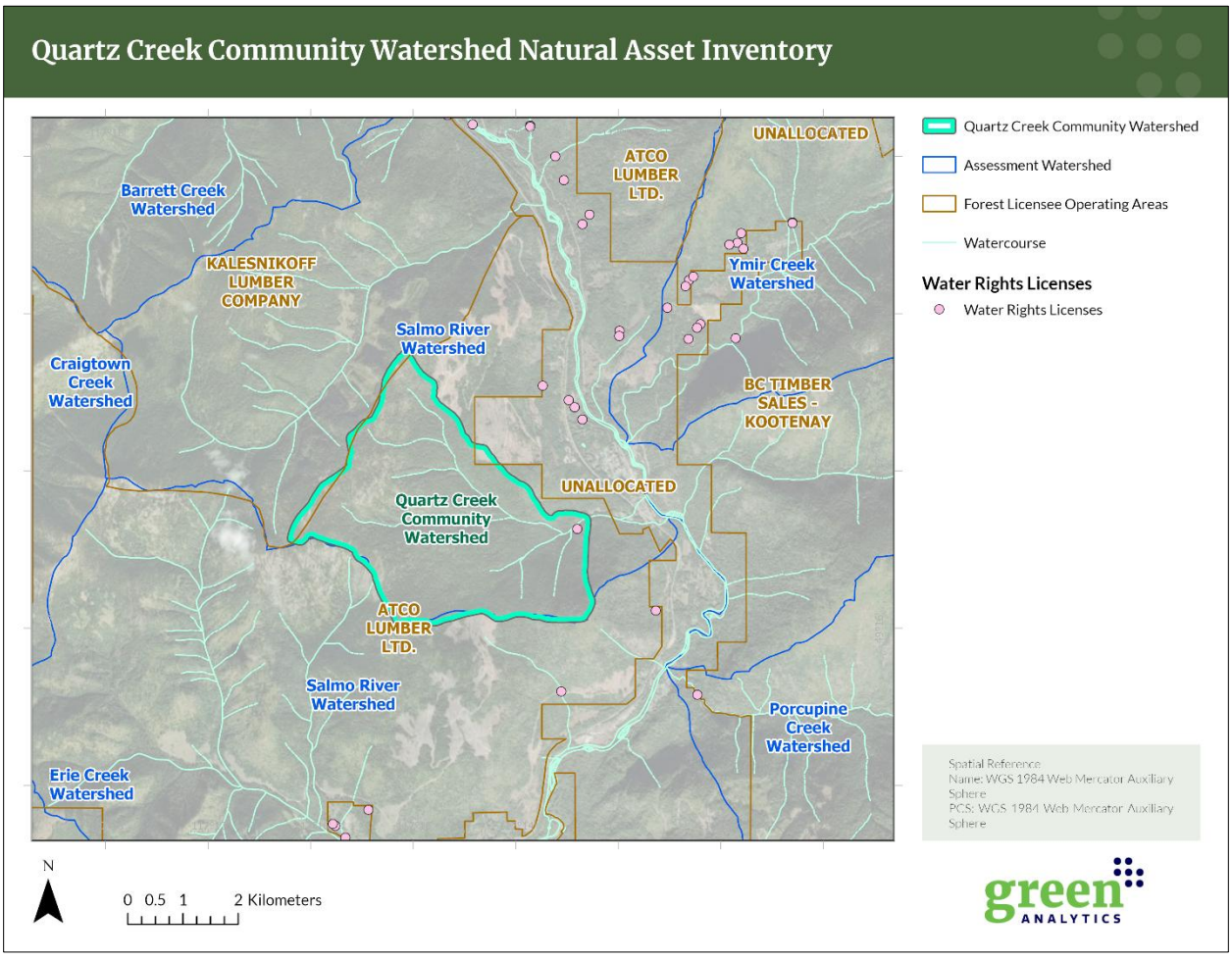

Figure 22-1. Quartz Creek Community Watershed located.

Ymir has a population of approximately 400 people and has 108 active water connections (RDCK 2024). The watershed is small, only about 600 hectares, and it relies on rain and snow as source water, as there are no aquifers or large storage reservoirs. The watershed is relatively intact with only

a single service road, mountain biking trails, a historic mine site, and a water intake with a recently replaced 617 m^3 storage tank, located on Quartz Creek. In addition to providing drinking water, the system has the capacity to service 16 fire hydrants in case of a localized fire or wildfire (RDCK 2024). While the RDCK owns the system that provides drinking water to local residents, neither the district or the community have control over the activities that take place within the watershed.

The watershed is located within the Timber Operating Area W (Ymir) held by ATCO Wood Products Ltd. Currently, there is no proposed harvesting, but it was previously considered, when held by BC Timber Sales. The planned logging was met with wide-ranging concerns from Ymir residents. First and foremost, that the loss of forest cover could result in a reduction in water supply for domestic use and fire suppression in the late summer and early fall, when water levels are already notoriously low, as well as contamination concerns potentially resulting from acid rock drainage and metal leaching that may occur during forest road construction (pers. comm., Jason Leus, February 18, 2025). The following photo and caption are from a Nelson Star article published on August 24, 2017, that highlighted the opposition of the Lower Kootenay Band and Ymir residents to the proposed harvesting.

Lower Kootenay Band councillor Jared Basil drove out to Ymir on Tuesday to pledge his support for the area's opposition to BCTS plans to log in their watershed. He's seen here with community spokesperson Jason Leus and approximately a quarter of the population of the small rural town. Photo: Will Johnson

Table 2-1 provides an overview of significant events related to the Quartz Creek Community Watershed in chronological order.

Table 2-1. Notable events related to the Quartz Creek Community Watershed in chronological order.

Time	Event
1890s	A mining boom in the late 1800's resulted in a Quartz Creek Settlement that grew rapidly (now the unincorporated community of Ymir). Water system first constructed to supply water to an expanding mine community.
1896	Gold mining occurred between 1896 and 1904 before it shifted south towards the Village of Salmo.
1979	The water system became a regional district service in 1979 after a cold winter that froze the entire system and left the community without water for approximately 6 weeks.
2000	Alternate groundwater sources were investigated by the RDCK in the early 2000s but were unsuccessful due to high levels of contamination thought to be originating from historic mining (Emerman 2020). There is no alternative water source for the Ymir community.
2009	A new treatment plant was installed that consists of sand filters and nominal cartridge filters for turbidity reduction, absolute cartridge filters for oocyst removal, ultraviolet light for disinfection/inactivation of microbiological components; and, chlorination for disinfection of bacteria/viruses. A SCADA system allows for remote monitoring of plant processes.
2017	BC Timber Sales commissioned a watershed assessment for proposed harvesting in the Quartz Creek watershed (Bates 2017).
2018	A Clean Water & Wastewater Fund grant provided funding to replace the reservoir with a larger 617 m^3 tank providing improved emergency and fire water storage.
2018	In response to Ymir resident concerns, BC Timber Sales commissioned a Phase 2 Watershed Assessment of the impact of the initial phase of planned logging in the watershed. It used streamflow data from Anderson Creek as a proxy for Quartz Creek, because streamflow data was not available for Quartz Creek.
2018	BC Timber Sales commissioned SNC-Lavalin to investigate the potential for acid rock drainage and metal leaching. Rock high in sulphide minerals is known as acid rock. When the rock is exposed to water and air, it creates sulphuric acid that can damage the natural environment. The study concluded that there was a need for mitigation and monitoring of adverse impacts of acid rock drainage and metal leaching (SNC-Lavalin 2020).
2019	Continuous flow monitoring on the mainstem of Quartz Creek above the weir and on two headwater catchments took place between September 2019 – July 2022. In addition, air temperature and snow distribution (snow water equivalent) were investigated at multiple sites across the watershed in the winter/spring of 2020. Monitoring was initiated by BC Timber Sales and continued by ATCO Wood Products Ltd.
2019	Installation of a gauging station by the RDCK on Quartz Creek to monitor streamflow.
2019	Ymir Community Watershed Society, representing local residents, commissioned a critique of the Phase 2 Watershed Assessment (Emerman 2019).
2019	A Section 29 – Investigation of threats to drinking water was requested by the RDCK in support of Quartz Creek. On April 18, 2019, the RDCK received a response from Interior Health Authority (IHA) indicating no pursuit and on July 11, 2019, there was follow up confirming no further action by IHA.
2020	Logging license and related studies were transferred from BC Timber Sales to ATCO Wood Products Ltd. Proposed logging was deferred to allow for 3-5 years of baseline

Time	Event
	streamflow and water quality data collection (Pers. Comm., Craig Stemmler, Woodlands Manager, ATCO Wood Products Ltd.).
2023	Issuance of Forest Stewardship Plan #921: Forest Licence: A20193 and A20218, Term 2024 to 2029 by ATCO Wood Products (ATCO 2023). The RDCK and Ymir Community Watershed Society included on referral list and will be notified of proposed development activities as the stand level developments are proposed.
2025	The RDCK commissions the Natural Asset Management Plan.
Future	Planned upgrades include reservoir effluent meter installation, water system control upgrades and UV disinfection replacement.

Appendix A provides some additional details and context associated with the Quartz Creek Community Watershed. The appendix summarizes existing flow and water quality monitoring information as well as anticipated regional impacts associated with climate change.

3. Natural Asset Inventory

As noted above, creating an asset inventory is foundational to all subsequent tasks in a NAMP. The approach employed to create the inventory for Quartz Creek Community Watershed aligns with Canada-wide standards and specifications for natural asset inventories (CSA 2023). The inventory is created in GIS, amalgamating relevant data to compile a complete picture of the type, location, and extent of assets within the watershed boundary. The first task in creating the inventory is to obtain and review all possible data sources. This is followed by structuring the asset inventory and then delineating the assets by type, location and extent. This section of the report provides the approach and results of these tasks.

3.1 Obtain and Review Data

A number of data sets were obtained and reviewed for the purpose of creating the natural asset inventory for the Quartz Creek Community Watershed. Data sources ultimately employed in the inventory are identified in Table 3-1.

Table 33-1. Data sources obtained and employed in the Quartz Creek Community Watershed asset inventory.

Dataset	Source
Assessment Watersheds	Province of British Columbia
Fundamental Watersheds	Province of British Columbia
Quartz Creek Community Watershed	Province of British Columbia
Vegetation Resource Inventory (VRI)	Province of British Columbia
Freshwater Atlas – Wetlands	Province of British Columbia
Freshwater Atlas – Water Bodies	Province of British Columbia
Digital Road Atlas	Province of British Columbia
Forest Tenure Roads	Province of British Columbia
Forest Licensee Operating Areas	Province of British Columbia
Drinking Water Sources	Province of British Columbia
Water Rights Licenses	Province of British Columbia
Harvest – Consolidated Cutblocks	Province of British Columbia
Pest Infestation	Province of British Columbia
Historical Fire	Province of British Columbia
Cumulative Effects: Human Disturbance 2023	Province of British Columbia
Wetlands	RDCK
Lakes	RDCK
Roads	RDCK
Streams	RDCK
Building Footprints	RDCK

3.2 Structure the Asset Registry

For the purposes of this NAMP, the focus is on the natural features (e.g. forests) within the Quartz Creek Community Watershed. While the watershed provides numerous services, including stormwater management, carbon storage, and air quality improvements, a key service of the watershed is the provision of drinking water to the community of Ymir. This NAMP is above all concerned with the management of the watershed for the continued provision of drinking water

considering the risks to the watershed. For this reason, the entire community watershed, rather than the specific natural features within it, is considered the primary asset and is the focus of the NAMP.

Treating the entire watershed as the primary natural asset in the management plan recognizes that drinking water provision is an emergent property of complex, interlinked physical, biological, and hydrological processes. Individual components, such as upland forests, riparian corridors, and stream channels, do not function in isolation. Collectively, the natural features within the watershed serve numerous functions:

- Forests regulate infiltration and evapotranspiration
- Forest soils mediate sediment and nutrient flux
- Riparian buffers stabilize banks and attenuate peak flows
- Intact stream channels support self-purification processes

By regarding the watershed as an integrated unit, the plan preserves these critical interdependencies, ensuring that actions taken in one sub-area (for example, fuel - treatment or selective harvesting) do not inadvertently degrade water quality or hydrological regulation downstream. This system-based perspective also aligns with best practice guidance in natural asset management, which emphasizes service continuity, resilience to disturbance, and cumulative - effects mitigation over parcel-by-parcel approaches.

Moreover, the watershed serving the community of Ymir, BC, functions as both the source and conveyance system for drinking water, meaning that any disruption, whether from wildfire, pest outbreak, or land-use change, propagates through the entire hydrological network and directly impacts water security. Framing the watershed as the primary asset allows for unified risk assessment, monitoring, and investment prioritization, creating a coherent strategy to maintain service levels under current and future stressors (such as climate variability and increased demand).

Within this context, Figure 3-1 demonstrates the asset hierarchy employed in the Quartz Creek Community Watershed natural asset inventory. Structuring the natural asset hierarchy in this way allows for the results (condition and risk assessments) to be measured at the fundamental watershed level, then aggregated to an overall score for the whole watershed capturing a systems level perspective. At the same time, the data structure maintains more detailed information on asset types and sub-types, which is the foundational information needed to measure and assess condition at the watershed level. Importantly, the inventory is designed to be updated over time, allowing the RDCK and partners to track changes in asset extent, quality, and stress exposure as part of ongoing natural asset monitoring.

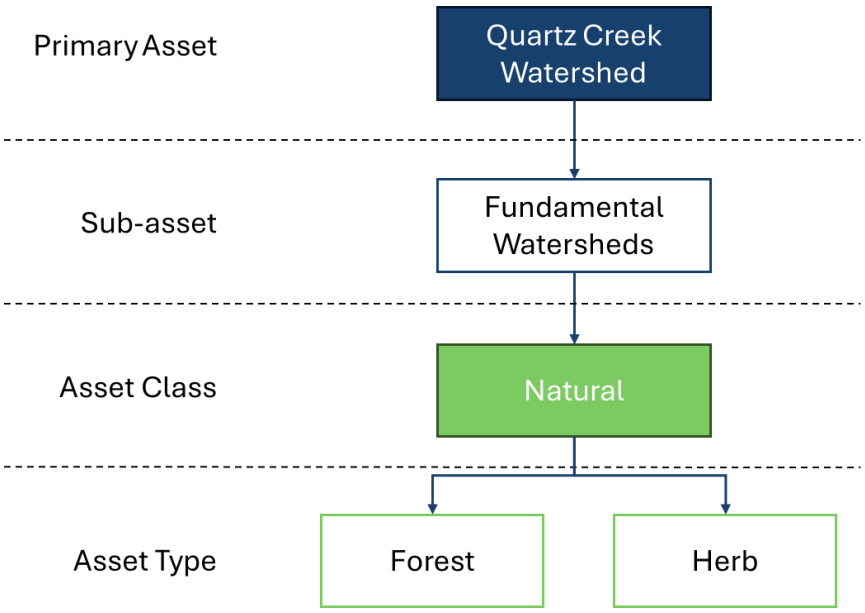

Figure 3-1. Asset inventory hierarchy for Quartz Creek Community Watershed.

3.3 Asset Attributes

To provide a robust picture of the primary asset and its associated sub-assets and asset types, numerous asset attributes were incorporated into the asset inventory. These attributes describe the asset and the context in which it is situated. Attributes are represented by spatial data layers. Table 3-2 summarizes the various attribute data linked to the natural asset inventory.

Table 33-2. Assets attributes and description.

Attribute	Description
Fundamental Watershed	The finer scale watershed unit defined in the BC Freshwater Atlas Hierarchical Watershed Framework.
Assessment Watershed	A broader-scale watershed unit composed of multiple fundamental watersheds.
Water Rights & POD Licenses	Spatial data identifying authorized surface and groundwater withdrawals.
Drinking Water Source	Identifies status of assets intersecting drinking water sources.
Forest Tree Species	Derived from the vegetation resources inventory data. Indicates the dominant tree species.
Forest Age	The estimated age of forest stands.
CEM Human Disturbance 2023	Information on human-induced disturbances and insights into landscape fragmentation and cumulative land-use pressure.
Roads & Forest Roads	Includes all linear transportation features like roads.
Forest Licensee Operating Area	Illustrates the designated areas where forest companies have legal rights to manage and harvest timber.
Old Growth	Identifies assets within areas of old growth forest
Cutblocks (Past 20 years)	Areas harvested for timber over the past two decades.
Fire (Past 20 years)	Historical wildfire areas over the past 20 years, indicating areas affected by natural or human-caused events.

3.4 Inventory Outputs

This section provides a range of inventory outputs that define and summarize the Quartz Creek Community Watershed asset.

3.4.1 Asset Delineation

Figure 3-2 and Table 3-3 provide a summary of the Quartz Creek Community Watershed natural asset. Figure 3-2 shows the community watershed and fundamental watersheds on top of the sub-type asset classification. The primary asset is dominantly defined by coniferous forest cover. Based on the dominant species mapping from the BC VRI, 99% of Quartz Creek Community Watershed asset is comprised of coniferous forest (Table 3-3).

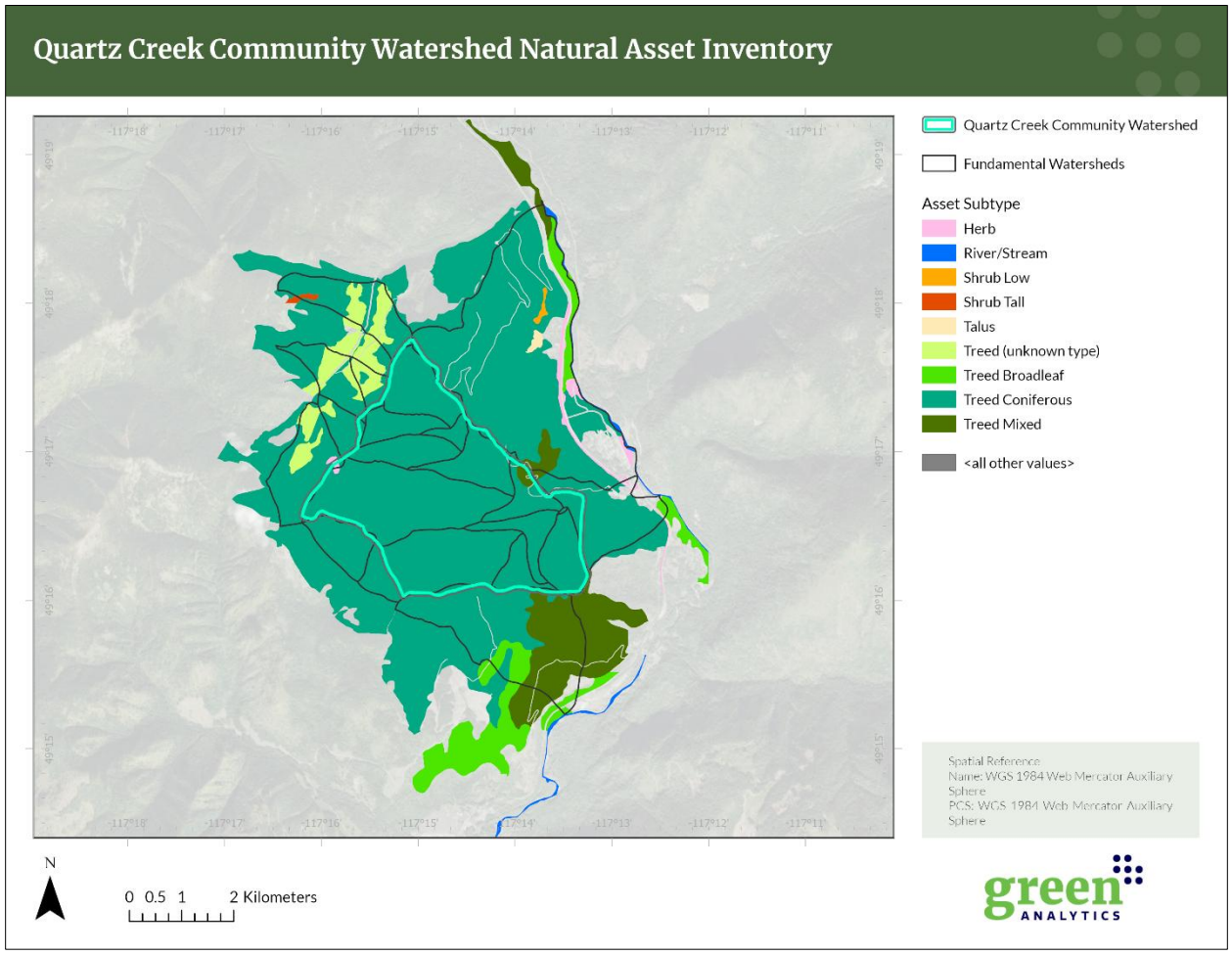

Figure 3-2. Map of the Quartz Creek Community watershed asset and the asset sub-types in and around the asset.

Table 33-3. Area of asset by class, type and sub-type within the Quartz Creek Community Watershed.

Asset Class	Asset Type	Asset Subtype	Area (ha)	Percent of total area
Natural	Forest	Treed Coniferous	583.82	99.19%
		Treed Mixed	3.85	0.65%
	Herb	Herb	0.92	0.16%
		Total	**588.60**	**100%**

3.4.2 Inventory Attributes

This section highlights the attributes incorporated into the asset inventory. These speak to the current state of the Quartz Creek Community Watershed as well as important context surrounding the watershed boundary. Figure 3-3 shows the primary forest species within the watershed.

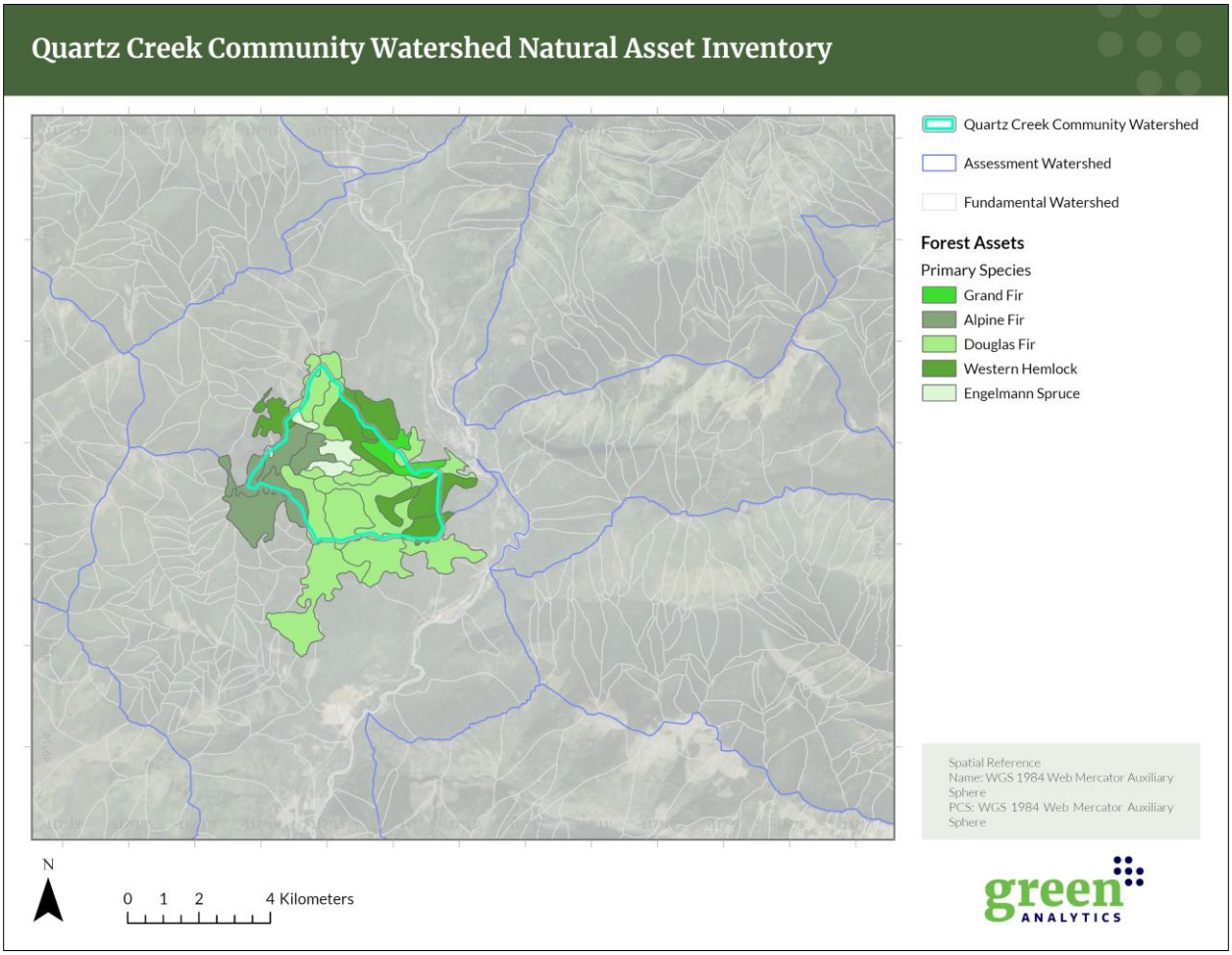

Figure 3-3. Location and distribution of primary forest species within the Quartz Creek Community Watershed.

Figure 3-4 demonstrates the forest age distribution within the watershed. The forest is primarily mature and old with small portions of younger age classes.

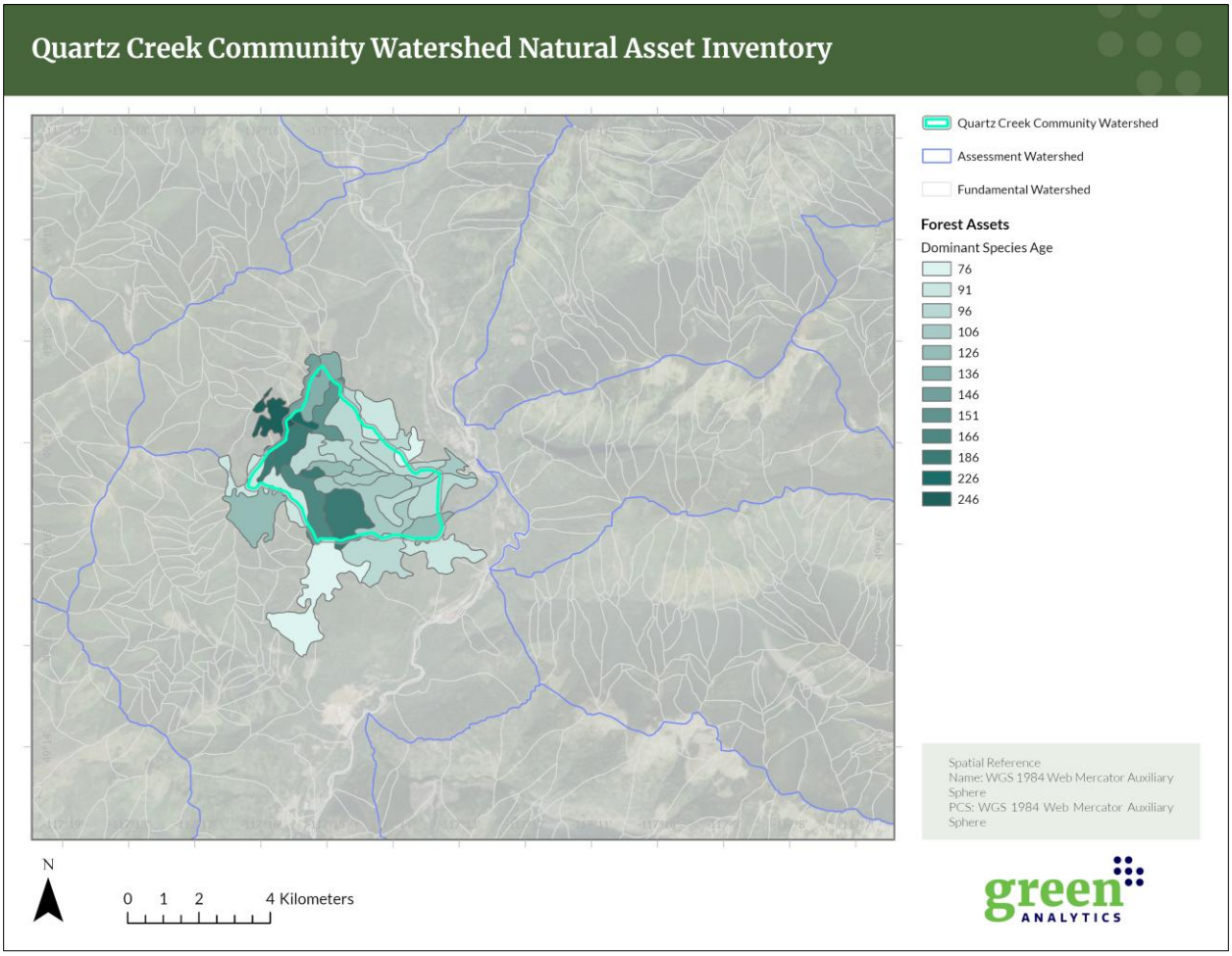

Figure 3-4. Forest age distribution within the Quartz Creek Community Watershed.

The British Columbia Cumulative Effects Framework (BC CEF)[1] is a provincial approach for assessing and managing the cumulative effects of natural resource activities on environmental, economic, social and cultural values. It evaluates the condition and trends of specific resources (i.e., fish habitat, water) across landscapes over time to inform land-use decisions. BC CEF data is available for the Quartz Creek Community Watershed. As is evident in Figure 3-5, as of 2023 the watershed had not been impacted by the disturbances captured within the BC CEF.

[1] Government of British Columbia. N.d. Cumulative Effects Framework. Accessed at https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/cumulative-effects-framework/overview

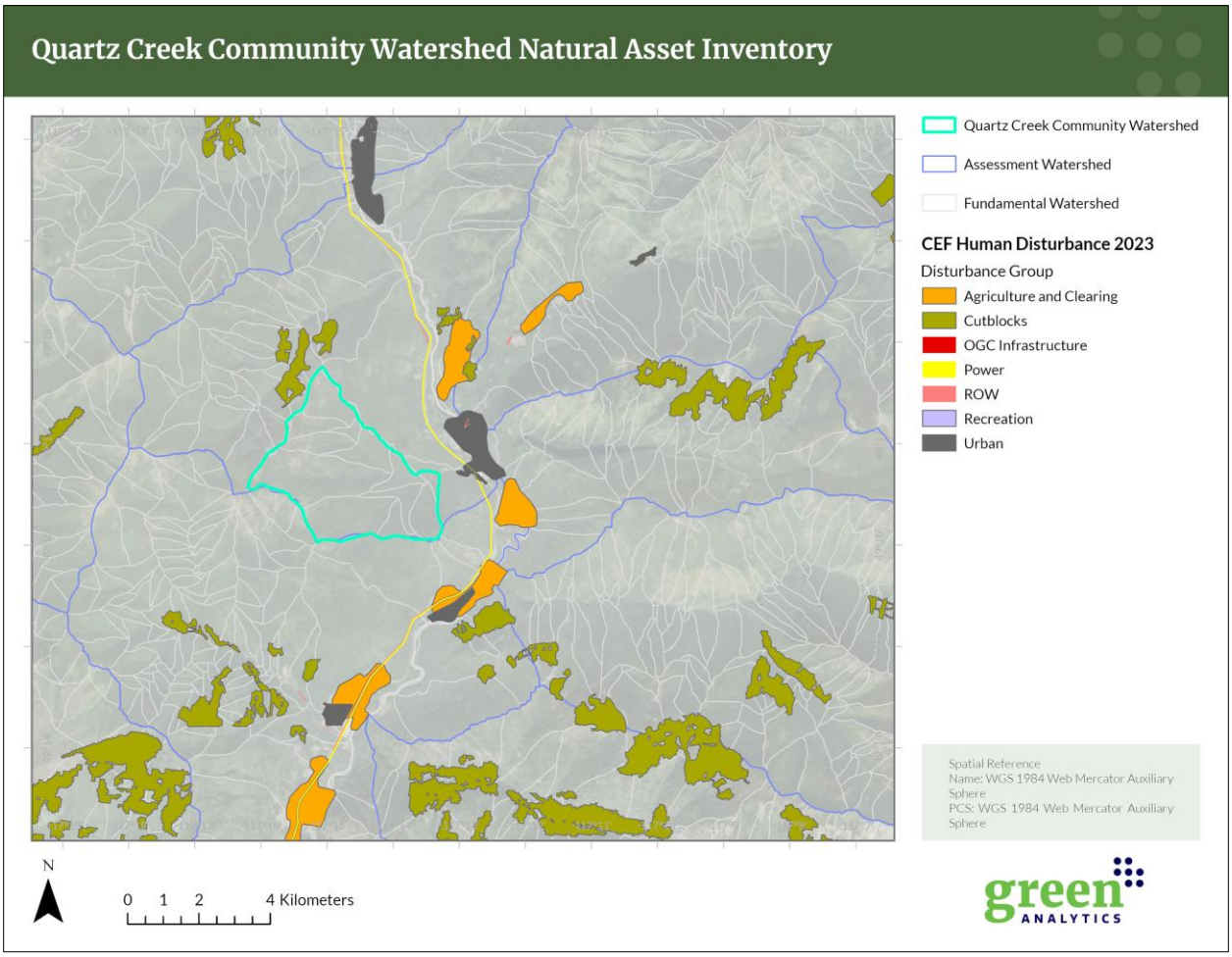

Figure 3-5. BC Cumulative Effects Framework disturbance measures in the area around the Quartz Creek Community Watershed.

Roads in and around the Quartz Creek Community Watershed were also considered when layering relevant asset attributes into the asset inventory. Figure 3-6 demonstrates the distribution of roads and forestry roads within the asset boundary. As can be seen, there is a section of forestry road that enters into the watershed on the north-east side of the watershed boundary. Based on the available data, there are approximately 0.8 kilometres of forest road within the formal boundary of the Quartz Creek Community Watershed.

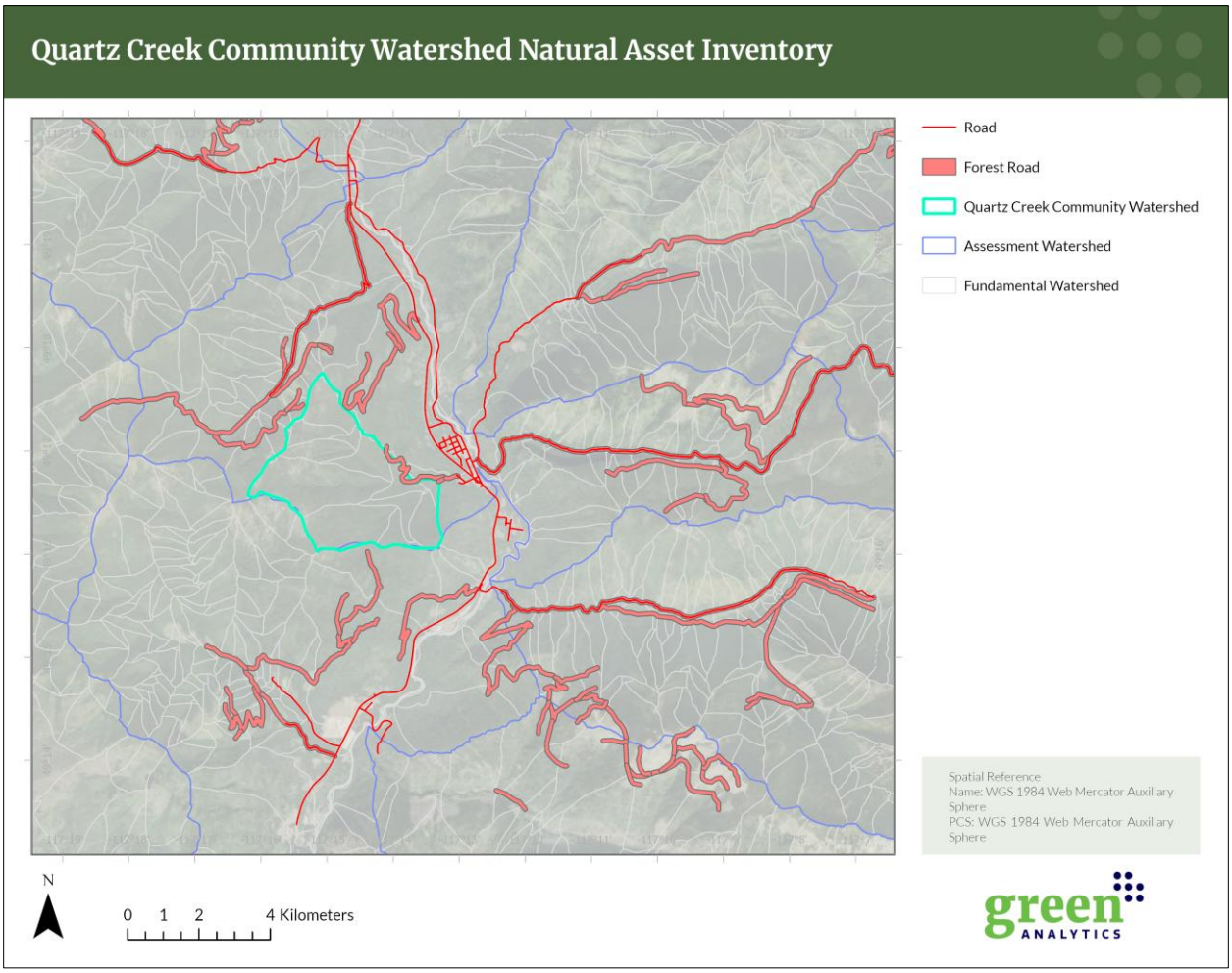

Figure 3-6. Roads and forestry roads in and around the Quartz Creek Community Watershed boundary.

As will be examined further in the risk assessment, there is a possibility of timber harvest taking place within the Quartz Creek Community Watershed. Figure 3-7 demonstrates the distribution and extent of forest licensee operating areas in and around the watershed. ATCO Lumber Limited is the exclusive licensee within the watershed boundary.

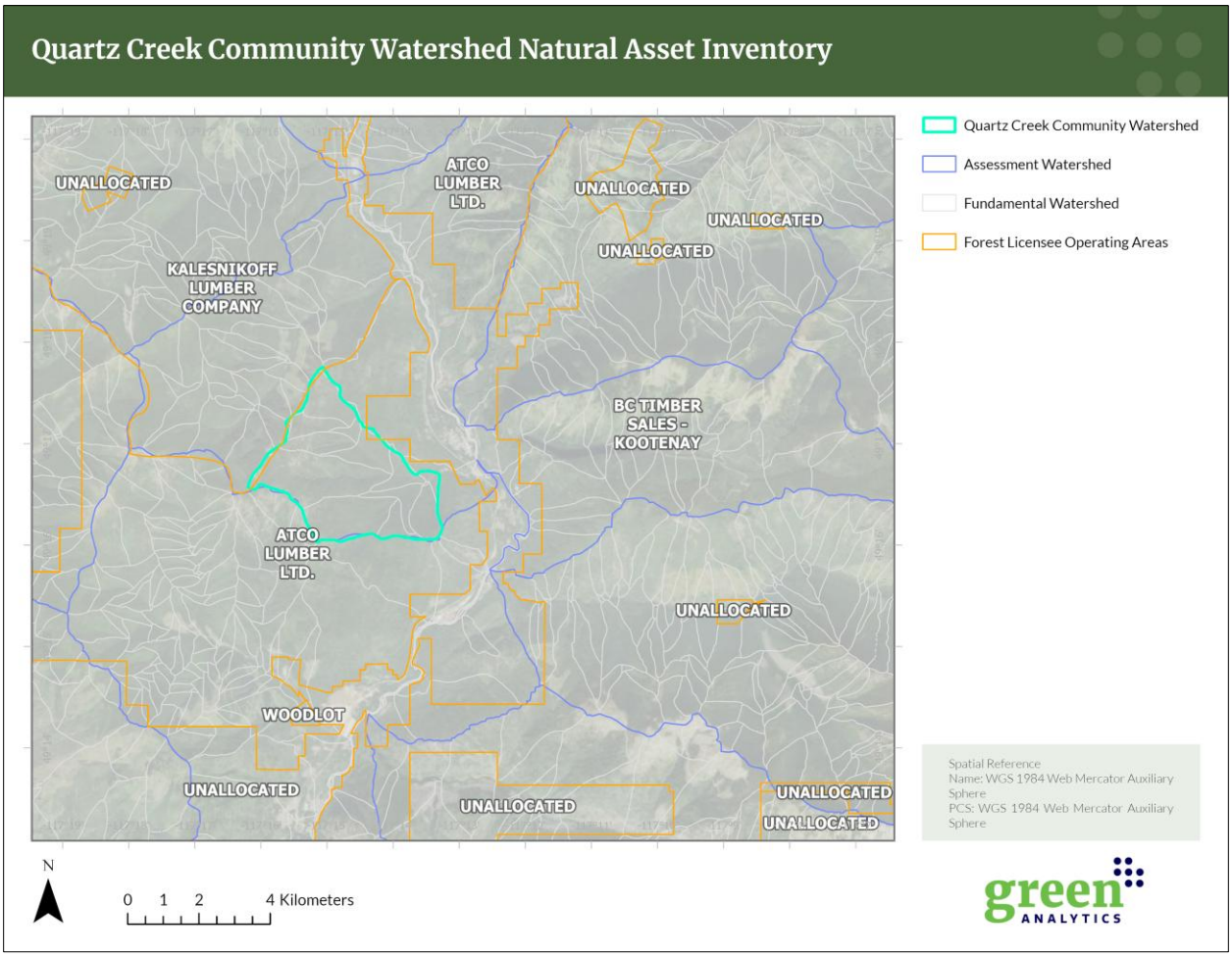

Figure 3-7. Forest licensee operating areas in and around the Quartz Creek Community Watershed.

Related to the image above, Figure 3-8 demonstrates timber harvest cut-blocks surrounding the Quartz Creek Community Watershed in the last 20 years. It is evident that ATCO has undertaken harvesting within their licensee operating area to the edge of the south boundary of the watershed. Harvesting has also taken place in close proximity to the north (by ATCO) and west (by Kalesnikoff) boundaries of the watershed.

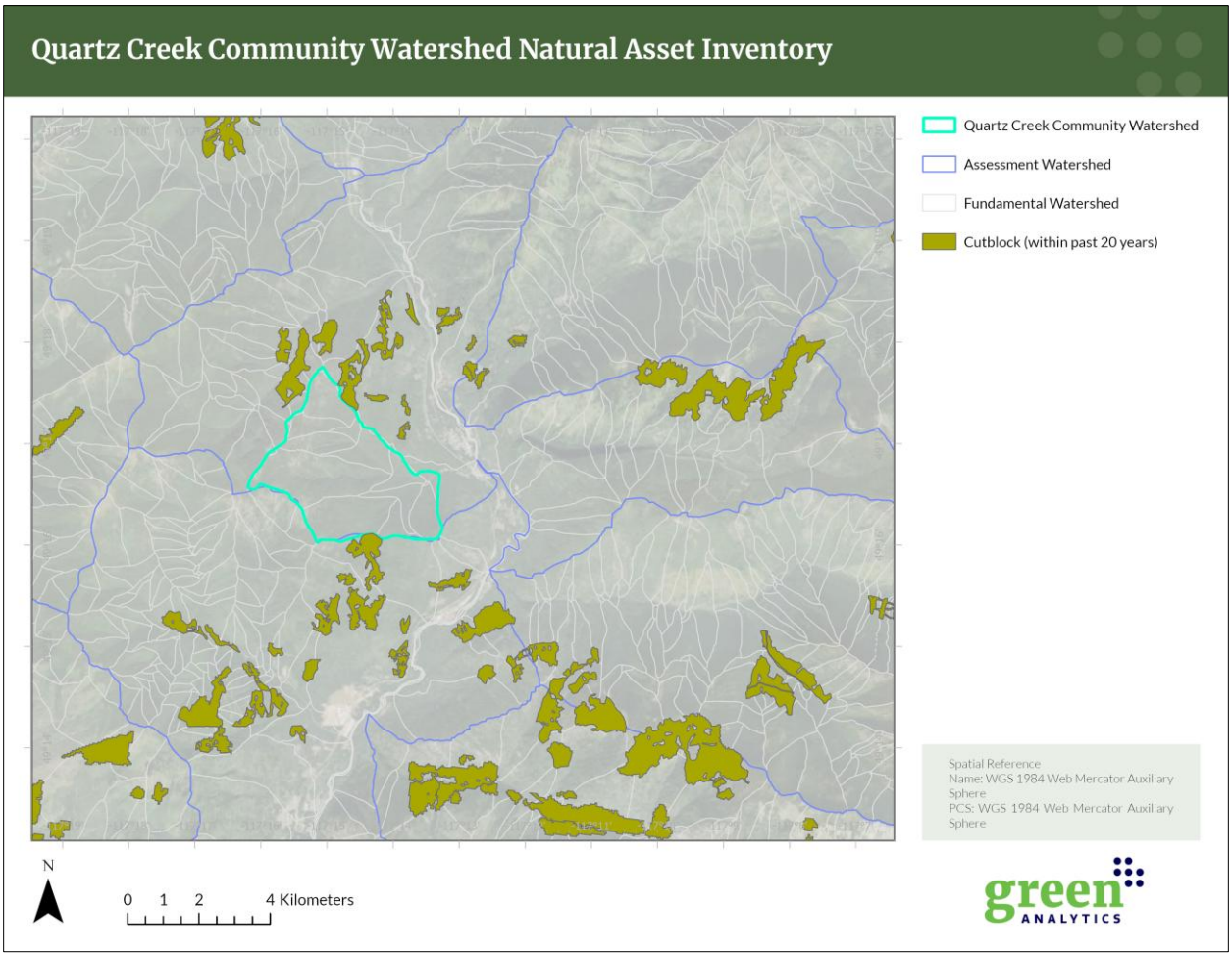

Figure 3-8. Cutblocks taking place within the last 20 years in proximity to the Quartz Creek Community Watershed.

Figure 3-9 demonstrates the location and extent of fires that have taken place in the area surrounding the Quartz Creek Community Watershed in the last 20 years. The risk of fire was revisited through the risk assessment approach (Section 6).

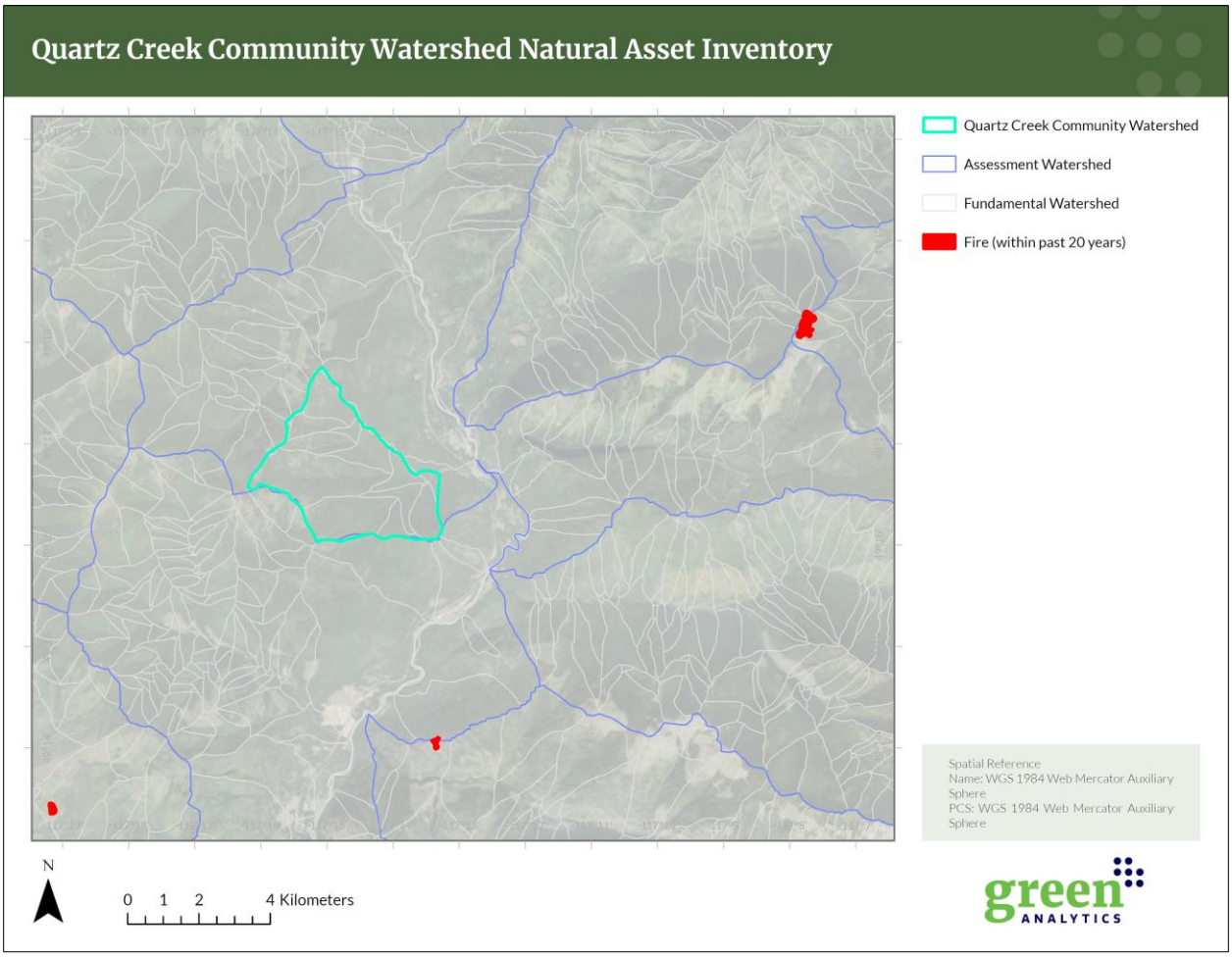

Figure 3-9. Location and extent of fires that have taken place in the last 20 years in the area surrounding the Quartz Creek Community Watershed.

The final attribute that was incorporated into the natural asset inventory for Quartz Creek Community Watershed is the location and extent of pests and disease impacts. Figure 3-10 demonstrates such impacts for the most prevalent pests and disease in the area over the last 20 years. Like fires, the risk of pests and diseases was further considered in the risk assessment for the watershed (Section 6).

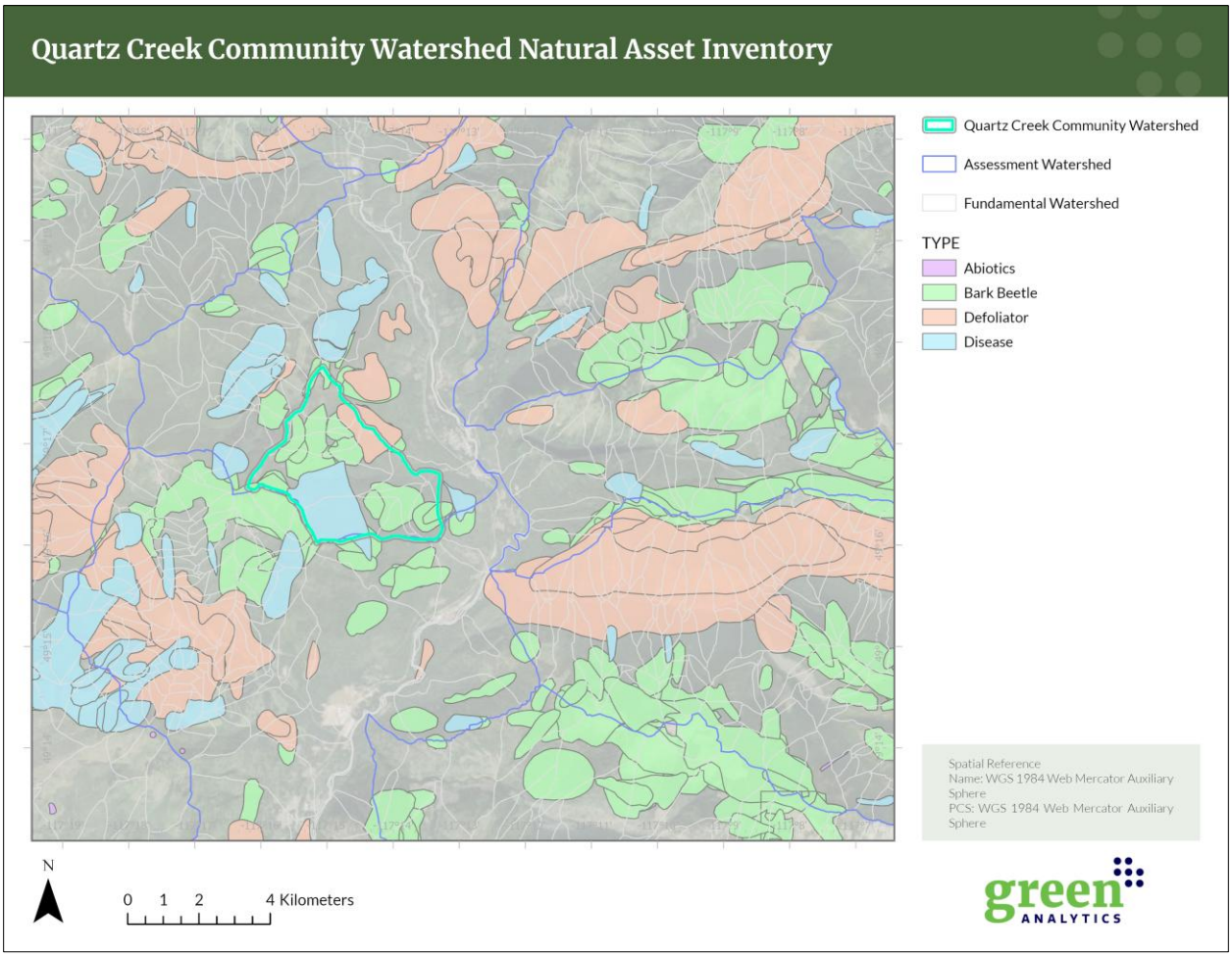

Figure 3-10. Location and extent of pests and disease impacts in and around the Quartz Creek Community Watershed within the last 20 years.

4. Condition Assessment

This section provides an overview of the condition assessment approach and results (with additional details contained in Appendix B).

4.1 Approach Overview

A natural asset condition assessment aims to evaluate a natural asset's ability to provide services at a high level. This approach uses the cascade model outlined in CSA (2023), which links biophysical processes, function, ecosystem services, and human benefits (Figure 4-1). For instance, a wetland's biophysical processes enable water storage, which reduces flood risks and provides human benefits by minimizing flood damages. Condition indicators capture ecological condition and connect it to ecosystem services and community value. The assessment assumes that a natural asset in "good" ecological condition is more likely to deliver a "good" level of ecological services, which, in turn, benefit the community. In the context of the Quartz Creek Community Watershed, the focus is the provision of drinking water to the community of Ymir.

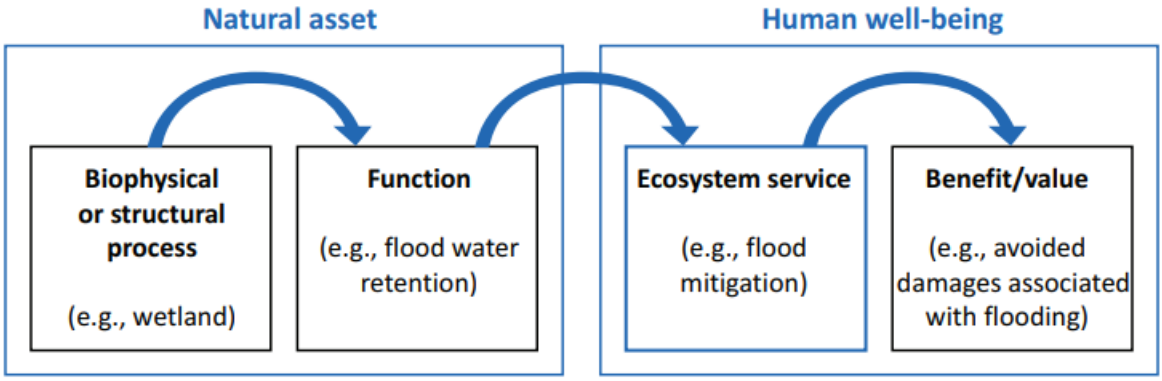

Figure 4-1. Cascade model upon which the condition assessment is based (CSA 2023).

The process used for the condition assessment aligns with that outlined in the Canada-wide standards and specifications for natural asset inventories (Figure 4-2) (CSA 2023). The standard provides guidance on condition assessment criteria, indicators and scoring in the context of natural assets. The standard identifies three criteria - landscape context, physical context and ecological condition – to guide the selection of indicators. For each of the indicators, a scoring system is established to allow the results of the assessment to be positioned within a standardized 5 point ranking system ranging from very good to very poor.

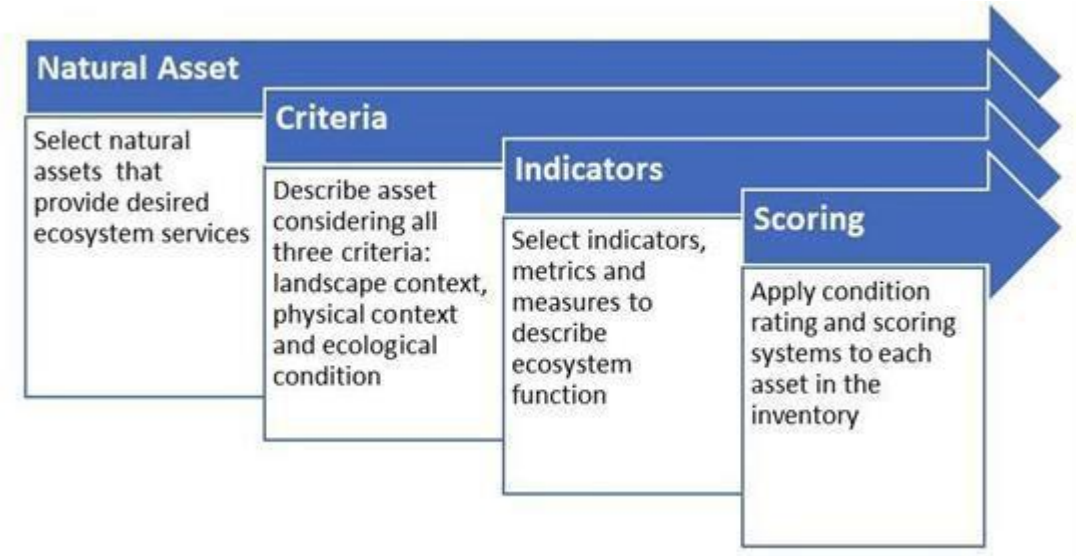

Figure 4-2. The natural asset condition assessment process (Source: CSA 2023).

While a specific scoring system is needed for each individual indicator (see Appendix B for details on the scoring system applied to each indicator employed in Quartz Creek Community Watershed condition assessment), the scores generally align with the condition descriptions presented in Table 4-1.

Table 44-1. Sample condition rating scale definitions (CSA 2023).

Rating	Explanation
Very Good	Well maintained, good condition, no signs of deterioration in ecological conditions. Natural asset service provision is high.
Good	Ecological conditions appear to be sufficient; some minor localized (or isolated) impacts noticeable, which might be a warning sign of possible decline. Natural asset service provision is acceptable.
Fair	Clear signs of deterioration in ecological function and service-influencing factors. Natural asset service provision, while still functional, is at risk of failing.
Poor	Condition is below standard with large portion(s) of the system exhibiting significant deterioration in ecological function. Natural asset service provision is impacted, and some services might be non-functioning.
Very Poor	Widespread signs of advanced deterioration; unlikely that the natural asset is providing any functional service.

The first step in the condition assessment for Quartz Creek was to identify a set of relevant condition indicators. Based on past project experience, Green Analytics identified a preliminary set of potential indicators. These were vetted with local environmental consultants – Ecoscape – and the RDCK and revised considering feedback received. The final set of condition indicators are organized into four categories that reflect the watershed's hydrological, ecological, and land-use conditions, with an emphasis on water quality, quantity, and resilience. The indicators focus on land cover and ecosystem health to establish a foundation for assessing watershed condition. The condition indicators chosen will be useful for measuring changes in water quality and hydrology in the future. The assumption behind the indicators is that a healthy resilient watershed is essential to maintaining

water quality and quantity. While the focus of this assessment is on the condition of the primary asset, namely the community watershed, it is important to also consider the condition of the source water derived from that asset. This was further explored in the context of the risks to the community watershed (Section 6). Table 4-2 summarizes and describes the condition indicators used for the Quartz Creek Community Watershed condition assessment.

Table 44-2. Condition categories, indicators, and description.

Category	CSA Criteria	Indicator	Description
Forest Cover and Composition	Ecological / Landscape	- Percent (%) forest cover	Evaluates ecosystem complexity, biodiversity potential, and overall resilience. A high percent cover and mature forest imply greater watershed condition.
Forest Health and Disturbance	Ecological	- Equivalent clearcut area	Detect stressors that may increase erosion, alter water yield, or degrade habitat. Less disturbance, good regeneration, and low pest impact imply greater watershed conditions.
Riparian and Canopy Integrity	Ecological / Landscape	- Riparian forest integrity - Overall canopy closure*	Assesses stream shading, erosion protection, and microclimate buffering. Higher riparian continuity and intact canopy implies better stream protection and microclimate conditions that support water supply.
Roads and Fragmentation	Physical / Ecological	- Road density - Interior forest habitat - Watercourse crossings	Roads and fragmentation increase erosion risk, reduce core habitat and watershed resilience that could ultimately impact water supply quantity and quality.

* Overall canopy closure was not able to be measured with available data and is recommended to be added as a measure of condition once LIDAR data for the area becomes available. Canopy closure is important for maintaining the necessary microclimate that helps slow the snowpack melt and maintain a steady water supply into the summer months.

The select condition indicators were applied to the natural assets within the Quartz Creek Community Watershed boundary through a desktop exercise relying on GIS. Details on the approach employed for each indicator is provided in Appendix A. While the desktop condition assessment is grounded in landscape ecology metrics, it is recommended that field-based verification of the condition of the natural assets be completed over time to support and improve natural asset condition monitoring. Field-based condition assessments provide details and information on the condition of assets as well as the factors contributing to the condition results. Observations of habitat structure and complexities, risks (e.g. invasive species) and factors contributing to service delivery (e.g. pests and disease) can be obtained through field-based assessments.

4.2 Summary of Condition Results

The results of the condition assessment are summarized in this section while results for individual indicators are presented in Appendix B. Each indicator is ranked on a scale from very good to very poor and a corresponding numerical score is assigned to each fundamental watershed: (5) very good, (4) good, (3) fair, (2) poor, and (1) very poor. These are averaged and rounded to the nearest

integer to establish overall condition results, which are presented in Figure 4-3 and detailed in Table 4-3.

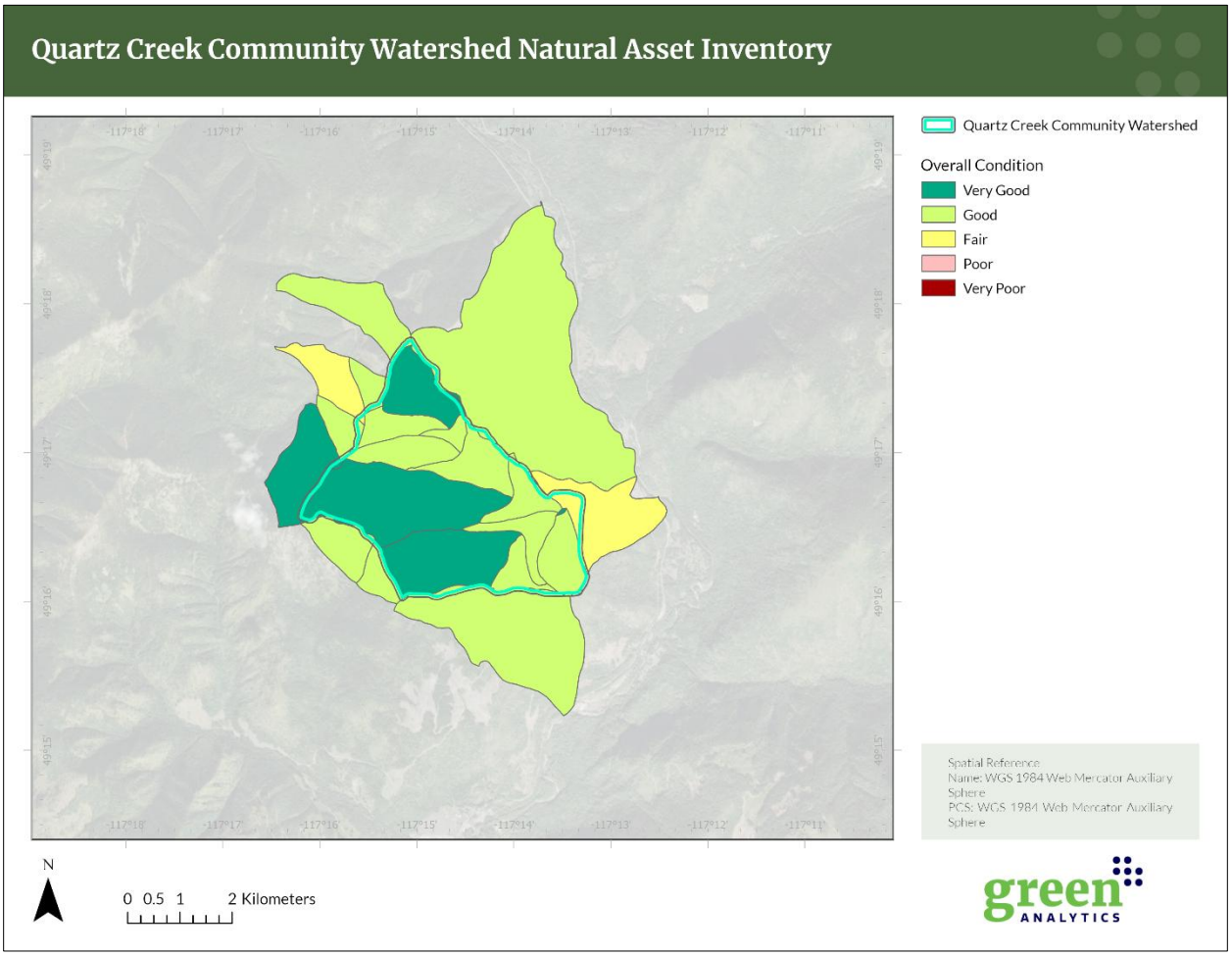

Figure 4-3. Overall condition ranking by fundamental watershed.

Table 4-3 shows the overall condition results for all mapped fundamental watersheds. These capture any watershed that intersects with the community watershed boundary. This broader area has some watershed area ranked as fair (8.6% of the total area). However, these areas are largely outside the main Quartz Creek catchment area. Focusing on the fundamental watersheds that are mainly within the Quartz Creek Community Watershed, the condition ranking ranges between good and very good. This is not surprising as the watershed has been largely undisturbed and is comprised of mostly intact mature and old forest cover. Given that the watershed is a key drinking water source, it will be important to maintain this overall condition to ensure a sustainable supply of clean water for the community of Ymir.

Table 44-3. Overall summary of condition results.

Condition Ranking	All Mapped Fundamental Watersheds*		Quartz Creek Community Watershed**	
	Area (ha)	Percent of Total Area	Area (ha)	Percent of Total Area
Very Good	400.28	24.43%	326.45	56.45%
Good	1097.36	66.97%	251.82	43.55%
Fair	141.03	8.61%	0	0%
Poor	0	0%	0	0%
Very Poor	0	0%	0	0%

* All fundamental watershed that intersect with the Quartz Creek Community watershed boundary.

** A subset of the fundamental watershed that have the majority of their area within the Quartz Creek Community watershed.

Drawing on the condition results by fundamental watershed, an overall condition score was determined for the Quartz Creek Community Watershed by taking an area weighted average of the individual fundamental watershed scores. This overall area weighted average is 4.48, which corresponds to a good condition score (4 is good and 5 is very good).

5. Replacement Cost

In traditional asset management, replacement costs represent the estimated expense of restoring an asset's function if it fails. These estimates support capital planning, depreciation accounting, and risk management by making the financial implications of asset failure explicit. For built infrastructure—such as Ymir's 617 m^3 steel storage tank, valued at $800,946 (2024 CAD)—this calculation is straightforward and forms the basis for lifecycle costing and service planning.

In contrast, natural assets like the Quartz Creek Community Watershed cannot be rebuilt in the same way. If the watershed is damaged—such as by a major wildfire—it may no longer provide critical service flows, including water supply and storage. While restoration and reforestation can help recover natural functions over time, service provision may be significantly disrupted for several years or even decades.

Given this context, the replacement cost for Quartz Creek must be estimated by identifying engineered systems that could replicate the key services it provides. In other words, this analysis estimates the cost of replacing the *services* provided by the Quartz Creek watershed, not the physical replacement of the natural assets themselves. This distinction is critical given the unique role the watershed plays as living infrastructure. Cost estimates represent the most feasible engineered analogues to replicate service provision (e.g. bulk water delivery, built storage), not ecological restoration. Specifically, this section focuses on the engineered alternatives for two essential hydrologic services currently provided by the watershed: (1) the delivery of drinking water and (2) the storage and regulation of water by forest cover. For each, realistic substitutes are identified — bulk-water trucking and engineered storage tanks — and the costs of delivering comparable service levels using built infrastructure are estimated.[2]

5.1 Replacement of Drinking-Water Supply via Bulk-Water Trucking

Quartz Creek provides approximately 26,625 m^3 per year of treated drinking water — an average of 73 m^3 per day — to 108 residential connections in the community of Ymir. According to the *Emergency Preparedness and Response Plan for the Quartz Creek Community Watershed*, no readily available alternate water source currently exists. In the event of a watershed failure that disrupts water quality or quantity (e.g., from wildfire or slope destabilization), emergency water would need to be transported into the community via bottled water, portable tanks, or bulk-water tankers until the original source is restored. Under these conditions, the only feasible near-term replacement is the delivery of bulk potable water by truck.

Replacing the watershed's supply function would require establishing a reliable bulk-water hauling system supported by certified infrastructure. This includes:

- A dedicated potable-water fill station, ideally located in Salmo or Nelson, with pumping, storage, and certification by Interior Health.

[2] The costs presented in this section represent conservative (lower-bound) estimates and do not reflect contingency, emergency surge premiums, or future inflation. Actual costs during drought or wildfire emergencies may be significantly higher.

- Access to a commercial fleet of potable-water trucks and certified operators, with minimum capacity to complete at least four 20 m^3 round trips per day to meet daily demand.
- An operational plan ensuring water quality standards, regulatory compliance, and emergency logistics capacity during peak season or wildfire events.

While the trucking approach is technically feasible, it presents significant logistical, financial, and strategic challenges. Nearby fill stations in Salmo and Nelson offer the most accessible options, but certified commercial haulers are located in distant communities such as Cranbrook, Vernon, and Golden. Moreover, regional capacity for bulk potable-water hauling is limited, particularly during drought or wildfire emergencies when multiple communities may be drawing on the same services (Janzen et al. 2022).

Bulk water could potentially be sourced from nearby systems such as Nelson or Salmo and transported by truck to Ymir. This approach assumes that these systems have surplus capacity; however, Salmo's system is already constrained, and Nelson's supply depends on seasonal sources, meaning water availability during drought or wildfire events is uncertain. Other potential source communities are located farther away, which would increase trucking distances and costs. For this reason, the estimates presented here should be considered lower-bound cost scenarios.

Bulk-water rates vary across BC. Table 55-1 summarizes published rates from municipal fill stations as of May 2024. The mean fill-station water price is approximately $3.50 per m^3, which has been used in this assessment.

Table 55-1. Bulk Potable Water Rates from Fill Stations in Select British Columbian Communities (2024 CAD).

Community	Price ($/$m^3$)	Use	Source (Accessed May 2024)
West Kelowna	$1.57	General	Bulk Water Station - City of West Kelowna
Maple Ridge	$1.70	General	Bulk Fill Water Stations | Maple Ridge, BC
Golden	$3.56	General	Bulk Water | Town of Golden
Houston	$8.00	Commercial & industrial	Bulk Water and Wastewater Station
Houston	$2.00	Residential	Bulk Water and Wastewater Station
Dawson Creek	$4.54	Domestic	Water Sales - City of Dawson Creek
Kamloops	$3.12	General	Bulk Water Supply | City of Kamloops
Mean	**$3.50**		

Table 5-2 summarizes the replacement cost of Quartz Creek's supply function using bulk-water hauling under 2024 cost assumptions, including trucking costs (per m^3), bulk-water purchase fees, and amortized fill-station costs.

Table 55-2. Annual Cost of Bulk-Water Trucking to Replace Drinking-Water Supply (*based on 26,625 m^3 annual demand; all values in 2024 CAD)*.

Source Location	Bulk Water Fee ($/$m^3$)	Trucking Cost ($/$m^3$)	Annual Delivery Cost	Fill Station (Amortized)	Total Annual Cost	Annual Cost per Connection
Salmo	$3.50	$7.44	$291,150	$12,000	$303,150	$2,808
Nelson	$3.50	$18.60	$588,750	$12,000	$600,750	$5,559

- Bulk-water fee reflects the average bulk water fill rates for municipal potable water from a selection of BC communities (see Table 5-2).
- Trucking costs are based on a cost model developed by Janzen et al. (2022), escalated to 2024 CAD using BCPI and diesel fuel index adjustments.
- Fill station costs assume a capital investment of $230,000–$350,000, amortized at $7,000 per year over a 50-year life, with $5,000 annual operations and maintenance. The cost to build a new filling station in Salmo or Nelson is informed by recent experience in the Capital Regional District (CRD 2024).

While the Salmo route offers a more cost-effective option, both scenarios result in annual system-wide costs exceeding $300,000 to $600,000, or $2,800 to $5,600 per connection. These costs do not include contingencies or environmental risk premiums.

Summary and Implications

- Bulk-water trucking is technically feasible but logistically complex, regionally constrained, and cost-prohibitive as a sustained water supply strategy.
- The high cost per connection and lack of delivery redundancy make this option suitable only as a short-term emergency measure, not a permanent replacement.
- This reinforces the economic and strategic value of maintaining the integrity of the Quartz Creek Community Watershed, which provides continuous, gravity-fed, and treatment-compatible water without the need for hauling, emissions, or third-party supply dependencies.

5.2 Replacement of Water Storage via Engineered Tanks

In addition to supplying potable water, the intact forest cover of the Quartz Creek Community Watershed provides a vital natural water storage function. Through canopy interception, forest soils, and sub-surface flow regulation, the watershed retains and gradually releases water, ensuring more stable base flows throughout the year.

Forest-mediated storage is not a static volume like a reservoir. Rather, it acts as a distributed, seasonal sponge, holding back and slowly releasing snowmelt and precipitation over time. The actual annual storage service capacity of the watershed is unknown. However, in the absence of this

natural buffering function, Ymir could require up to 26,625 m^3 of built storage (the equivalent of its annual water demand) as a theoretical maximum to maintain consistent year-round supply.

If forest cover were substantially lost or degraded, due to wildfire, disease, or clearcutting, this storage function could be significantly impaired, leading to increased flow variability, sedimentation, and potential shortages during low-flow periods. In this case, the only feasible engineered replacement would be to construct sufficient above-ground storage tanks to compensate for the loss of natural retention and flow regulation.

Ymir's current 617 m^3 storage tank, installed in 2018, serves as a useful cost benchmark (RDCK 2023). It was valued at $800,946 in 2024 CAD from the Ymir system's asset management plan. This implies a capital cost of $1,298 per m^3 of capacity. Assuming a conservative 55-year lifespan, the amortized replacement cost is $23.60 per m^3 per year.

This unit cost can be used to estimate the financial implications of constructing engineered tanks to replace different fractions of the watershed's storage function; up to a maximum of 26,625 m^3, equivalent to Ymir's annual demand (Table 5-3).

Table 55-3. Estimated Replacement Cost of Forest-Mediated Water Storage (*all values in 2024 CAD)*.

Storage Replacement Scenario	Volume Replaced (m^3)	Capital Cost	Annualized Cost	Cost per Connection (Annual)
Full replacement	26,625	$34,569,750	$610,373	$5,651
25% replacement	6,656	$8,642,437	$157,084	$1,454
5% replacement	1,331	$1,728,487	$31,730	$294

These estimates assume immediate construction of tanks to offset lost storage function. They do not include additional costs such as land acquisition, permitting, geotechnical site preparation, or operations and maintenance. Nor do they account for the co-benefits of natural forest storage, including filtration, habitat connectivity, and fire-risk mitigation, which cannot be replicated by built infrastructure.

Summary and Implications

- The forested watershed provides a distributed, passive storage system that requires no external energy, maintenance, or infrastructure investment.
- Replacing even a small fraction of this natural storage capacity with engineered tanks would result in substantial capital and annual costs, ranging from $6,000 to over $600,000 per year, depending on the scale of function loss.
- Theoretical storage needs could reach 26,625 m^3 (equivalent to Ymir's annual demand) if forest-mediated regulation were completely lost.

- These findings underscore the high economic value of forest integrity in the watershed and the importance of investing in forest protection, monitoring, and post-disturbance recovery strategies.

5.3 Consideration of Other Alternatives

In the event of a major service disruption in the Quartz Creek Community Watershed, alternative water sources beyond bulk-water trucking were also considered. These options are constrained by geography, infrastructure requirements, regulatory complexity, and system limitations. While some may serve as medium- to long-term solutions with significant investment, none currently offer a reliable or cost-effective substitute for the watershed's existing function. Options include:

1. **Connection to Salmo's water system**. Salmo is the nearest community with an established municipal water supply. However, its system has known capacity constraints and no confirmed surplus to support emergency exports to Ymir. It is not realistic to think that Salmo will have sufficient supply to support the community of Ymir. In addition, a connection would require construction of a pressurized main across very difficult terrain, along with costly upgrades to Salmo's treatment and storage infrastructure. The regulatory feasibility of this alternative is uncertain if not insurmountable. Given these substantial barriers, this option is not economically viable or technically feasible.
2. **Connection to other regional systems**. Beyond Salmo, the most prominent regional system is Nelson's. However, Nelson is approximately 30 km away and located at a significantly higher elevation. Interconnection would require new long-distance transmission infrastructure, pump stations, and storage facilities. Nelson's supply is also reliant on high-elevation, snow-fed creeks and may not have surplus capacity during low-flow periods. No formal agreements or infrastructure plans currently support such a connection.

3. **Development of a new surface water source**. Several alternative watersheds (Porcupine, Stewart, Oscar, and Ymir Creeks) were noted as potential alternative surface water sources for Ymir. However, none of these systems currently supply drinking water and would require full source development from the ground up. This includes hydrologic studies, a watershed assessment, and the design and construction of new intakes, treatment facilities, and storage infrastructure. Given the mountainous terrain, land ownership, and environmental permitting requirements, this approach would be expensive, slow, and technically complex.

4. **Development of a new groundwater source**. The most feasible long-term alternative is the development of a groundwater supply, specifically from Aquifer #0493 – the Salmo River Bedrock Aquifer. This aquifer lies beneath the Salmo River valley and extends beneath the Ymir townsite, making it geographically accessible and potentially suitable for community-scale use. Preliminary mapping identifies it as a bedrock aquifer with moderate productivity. However, to confirm viability, the community would require detailed hydrogeological studies, pump testing, and long-term monitoring to assess sustainable yields. If flow volumes prove adequate, this option offers key advantages: lower exposure to surface contamination, greater source protection potential, and proximity to existing distribution infrastructure. Despite its promise, uncertainty around flow volumes remains a critical limitation. Infrastructure investment would be required to construct wellheads, treatment systems, and

system connections. More realistically, this option could serve as a partial redundancy to offset risk and supplement Quartz Creek during times of disturbance. This potential role is noted as a future management consideration in Section 7.

All alternatives described above would require major capital investment, extended permitting timelines, and long-term infrastructure development. None are immediately deployable, and none guarantee adequate supply during periods of peak demand or climate-driven stress. In contrast, bulk-water trucking, while costly and logistically challenging, is the only immediately accessible solution. This reinforces the importance of maintaining the integrity and resilience of the existing watershed.

5.4 Replacement Cost Summary

This replacement cost assessment highlights the substantial financial value of the hydrologic services provided by the intact Quartz Creek Community Watershed. If these services were lost or impaired, whether by wildfire, land-use change, or other disturbance, the only viable substitutes would be costly, engineered interventions. These include bulk-water hauling to replace the drinking-water supply and above-ground tanks to replicate forest-mediated storage.

The findings are clear:

1. **The natural watershed is the least-cost, most reliable service provider.** Replacing Quartz Creek's drinking-water supply through bulk hauling would cost between **$303,000 and $601,000 annually**, or **$2,800–$5,600 per connection**. These figures are conservative and exclude costs associated with delivery failures or long-term inflation risks.

2. **Built storage is prohibitively expensive at scale.** Replacing even 25% of forest-mediated storage would require more than $8.6 million in tank infrastructure, with annualized costs exceeding $157,000. A full replacement of up to 26,625 m^3 (the theoretical maximum equivalent to Ymir's annual demand) would cost **over $34.5 million** to build, with more than **$610,000 in annualized costs**.

3. **Engineered replacements are not like-for-like.** Tanks and trucks replicate only volume, not the full ecological, hydrologic, or quality-regulating benefits of an intact watershed. Natural storage also provides fire-risk mitigation, sediment control, and long-term flow stabilization; services that built infrastructure cannot easily match.

4. **Investing in watershed health is fiscally prudent.** Proactive protection, forest stewardship, and post-disturbance recovery offer a far more cost-effective and resilient strategy. These actions safeguard long-term service delivery and reduce the financial risks of emergency replacements or service disruption.

By framing natural functions in terms of replacement cost, this analysis equips decision-makers with a tangible, infrastructure-based comparison. It underscores the critical insight that natural assets are service assets and that maintaining their integrity is a financially sound, risk-informed, and operationally reliable approach to long-term water management.

6. Risk Assessment

This chapter presents the risk assessment for the Quartz Creek Community Watershed, a 588-hectare, predominantly forested sub-basin that provides the sole source of drinking water to the nearby community of Ymir. As demonstrated in Section 4, the watershed is currently in a near-pristine state and functions as a living infrastructure system, providing essential ecosystem services including water storage, filtration, flow regulation, and quality protection. These natural services are essential to Ymir's high-quality and reliable water delivery.

The risk assessment is designed to evaluate two interrelated dimensions:

1. **Risks to the natural assets** that comprise the source watershed, particularly the forest, soils, and hydrologic features.
2. **Risks to the provision of drinking water** at the point of intake, with a specific focus on hazards that originate from or directly affect the watershed's condition and function.

This dual lens recognizes that damage or degradation of natural assets can directly reduce the quality, quantity, or reliability of drinking water. However, some risks may affect drinking water availability or quality without directly harming the natural asset base (e.g., shifts in snowmelt timing due to climate change). Importantly, this risk assessment excludes risks associated with built infrastructure (e.g., treatment facilities, pipes) and focuses strictly on the watershed and its functions up to the intake point.

A critical contextual factor underpinning this assessment is the absence of feasible alternative water sources (see Section 5). Given this reality, the integrity and functionality of these natural assets are paramount to ensuring reliable, safe drinking water provision. Any degradation or disruption to the watershed's natural systems directly translates to potential impacts on water security for the entire community.

Table 6-1 summarizes the identified hazards to the watershed and drinking water service, including their descriptions and relevance.

Table 66-1. Overview of identified hazards to the Quartz Creek Community Watershed.

Hazard	Description	Compounding Factors	Primary Relevance
Wildfire	Catastrophic loss of forest cover leading to reduced water storage capacity, increased erosion, creation of hydrophobic soils, and potential water quality degradation from ash and debris	Compounded by drought conditions, climate change patterns, and inappropriate forest management practices	Natural Assets
Drought	Extended periods of reduced precipitation resulting in diminished water storage, reduced groundwater recharge, and potential ecosystem stress	Compounded by climate change, increased consumption, and seasonal variations; may increase wildfire risk	Drinking Water Provision
Erosion	Surface soil loss and sediment delivery from disturbed slopes or bare soils	Vegetation loss, spring snowmelt, unmanaged runoff	Both
Landslides	Mass wasting events that alter channels, increase sediment load, and block or redirect flow	Significantly compounded by loss of forest cover (particularly from wildfire), steep terrain, and extreme precipitation events	Both
Forest Pest Outbreaks	Large-scale insect infestations (e.g., mountain pine beetle) causing widespread tree mortality and altering forest composition and hydrological function	Compounded by climate change creating favorable conditions for pest survival and reproduction, and by forest monocultures	Natural Assets
Commercial Logging	Commercial logging activities resulting in immediate loss of forest cover and disruption to natural hydrological processes	May compound wildfire and erosion risks by removing protective vegetation and altering local microclimates	Natural Assets
Forest Logging Roads	Construction and maintenance of logging access roads leading to habitat fragmentation, altered drainage patterns, and potential contamination sources	May compound erosion risks and provide vectors for inappropriate use and contamination	Natural Assets
Acid Rock Drainage	Presence of geological formations that may leach minerals or metals (e.g., acid rock drainage) into the water supply	May be compounded by changes in groundwater flow patterns, increased residence time during drought, or disturbance from development activities	Drinking Water Provision
Mining	Exploration or development could disturb sulfide-bearing rock or expose water to toxic materials	Lack of treatment infrastructure, sensitive intake location	Both
Climate Change - Precipitation Patterns	Altered timing, intensity, and distribution of rainfall affecting watershed recharge and seasonal water availability	Compounds drought, wildfire, and pest outbreak risks while potentially intensifying extreme weather events	Both

Hazard	Description	Compounding Factors	Primary Relevance
Climate Change - Snowpack Dynamics	Changes in snowmelt timing and rates affecting seasonal water storage and release patterns	Compounded by temperature increases and altered precipitation patterns, potentially leading to earlier spring peaks and summer water shortages	Drinking Water Provision
Seasonal Water Volume Variations	Natural fluctuations in water availability throughout the year creating periods of potential shortage or excess	Compounded by climate change, increased consumption, and altered snowpack dynamics	Drinking Water Provision
Recreation and Non-Sanction Uses	Sanctioned and non-sanctioned uses such as dumping, camping, and trail use could introduce contaminants and disturb ecosystems.	May be compounded by increased access from road development and lack of enforcement or monitoring	Both

6.1 Risk Approach

This natural asset risk assessment focuses on how the hazards may affect the health of the watershed and, by extension, the community's ability to rely on it for a consistent supply of clean drinking water. For each hazard, a risk score was developed using two considerations:

1. **Likelihood** — the expected probability of the hazard occurring within a relevant planning horizon.
2. **Consequence** — the severity of impact of the hazard on the watershed's ecological function or its capacity to provide clean drinking water if the hazard occurs.

To establish scores, a structured and transparent approach was employed that integrates:

- Local knowledge of watershed conditions and management history
- Empirical evidence from peer-reviewed literature and regional studies
- Historical precedents, where applicable
- Judgment of potential consequences based on expert review and precautionary principles

The scores were applied considering the Quartz Creek system's unique sensitivity as a small, snowmelt-dominated, high-elevation catchment with no feasible alternate drinking water sources, and no infrastructure for treating chemical or heavy metal contamination.

6.1.1 Framework Alignment

The framework used in this assessment is aligned with the Source Water Protection risk assessment approach outlined in the *Source to Tap Assessment Guide* (STTAG) (BC Ministry of Health et al., 2016). It also reflects principles from the BC Ministry of Environment's environmental risk characterization guidance and Interior Health's Drinking Water Source Assessment protocols.

The tables and terminology used in this report have been adapted to:

1. Reflect the broader ecosystem services context of natural asset management
2. Strengthen the emphasis on long-term service reliability
3. Improve accessibility for integration into land use, watershed, and climate planning processes

6.1.2 Risk Rating Definitions

Likelihood reflects how probable it is that the hazard will occur over the planning horizon. Table 6-2 contains likelihood rating and definitions.

Table 66-2. Likelihood scoring definitions.

Rating	Definition	Indicators
Rare	Highly unlikely; may occur in extreme or unprecedented conditions.	No recent occurrences; low climate projection alignment.
Unlikely	Possible but not expected within planning horizon.	Isolated cases in similar watersheds.
Moderate	Occurs occasionally; could plausibly happen in the next 10–20 years.	Past examples, moderate trend indicators.
Likely	Expected to occur intermittently or in certain conditions.	Recurring regional events; supported by projections.
High	Very likely to occur within planning horizon.	Strong historical precedent or consistent upward trend.

Consequence reflects the level of disruption or harm that would occur if the hazard materialized. Table 6-3 contains definitions and ratings for consequences.

Table 66-3. Consequence scoring definitions.

Rating	Definition	Indicators
Minor	Low or negligible impact on service or ecosystem. No disruption.	Temporary or small-scale ecological disturbance.
Moderate	Noticeable but manageable disruption. Temporary loss of service or decline in asset condition.	Short-term degradation, but recoverable.
High	Serious damage to natural asset or long-term disruption to service.	Requires intervention; significant user impacts.
Very High	Irreversible or systemic damage. Prolonged or complete loss of function.	Threat to water supply security, ecological collapse.

Table 6-4 demonstrates how likelihood and consequence ratings are combined to establish an overall risk score. No weighting is assigned to the likelihood or consequence scores implying equal weighting for both when the scores are combined into an overall risk score.

Table 66-4. Risk scores associated with combined likelihood and consequence ratings.

Likelihood ↓ / Consequence →	Minor	Moderate	High	Very High
Rare	Low	Low	Med	High
Unlikely	Low	Med	Med	High
Moderate	Low	Med	High	Very High
Likely	Med	High	High	Very High
High	Med	High	Very High	Very High

Table 6-5 provides information on how to interpret the risk scores by summarizing the typical response associated with each risk rating.

Table 66-5. Response guidance by risk score.

Score	Response Guidance
Low	Monitor, minimal action required unless conditions change.
Medium	Incorporate into ongoing planning and preparedness efforts.
High	Prioritize for proactive management and mitigation planning.
Very High / Extreme	Immediate planning action required. May warrant emergency preparedness or long-term adaptation measures.

6.1.3 Precautionary Lens

This risk assessment applies a precautionary lens due to the critical importance of the watershed as the sole source for drinking water for the community of Ymir. Where uncertainty exists, particularly for emerging or poorly quantified hazards, risk ratings prioritize consequence over probability, recognizing that the community has limited capacity to mitigate large-scale failures or secure alternate supply in the event of system failure (e.g. contamination or loss of flow).

6.2 Risk Assessment Results

6.2.1 Wildfire

Wildfire poses a severe risk to the ecological and hydrological integrity of the watershed. High-severity wildfires can remove the forest canopy, combust organic soil layers, and leave behind hydrophobic soils that repel water, resulting in increased surface runoff, peak flows, and sediment transport (Moody & Martin, 2001). These changes degrade the forest's ability to store and slowly release water, reducing the watershed's natural regulation of water quantity and timing.

The Ymir *Fire Protection Area Community Wildfire Protection Plan* (B.A. Blackwell & Associates Ltd. 2008) identifies the general area as having "high to extreme probability" and "moderate to high consequence" for wildfire, especially in and near developed areas. The plan noted over 270 fire events between 1950 and 2005, with 64% caused by lightning, confirming that ignition risk is not solely anthropogenic and will likely persist or increase under climate change. Although most past fires have been small (<4 ha), the trend toward larger, more severe events is well documented

provincially and nationally. Figure 6-1 demonstrates the fire history for the area in and around the Quartz Creek Community Watershed.

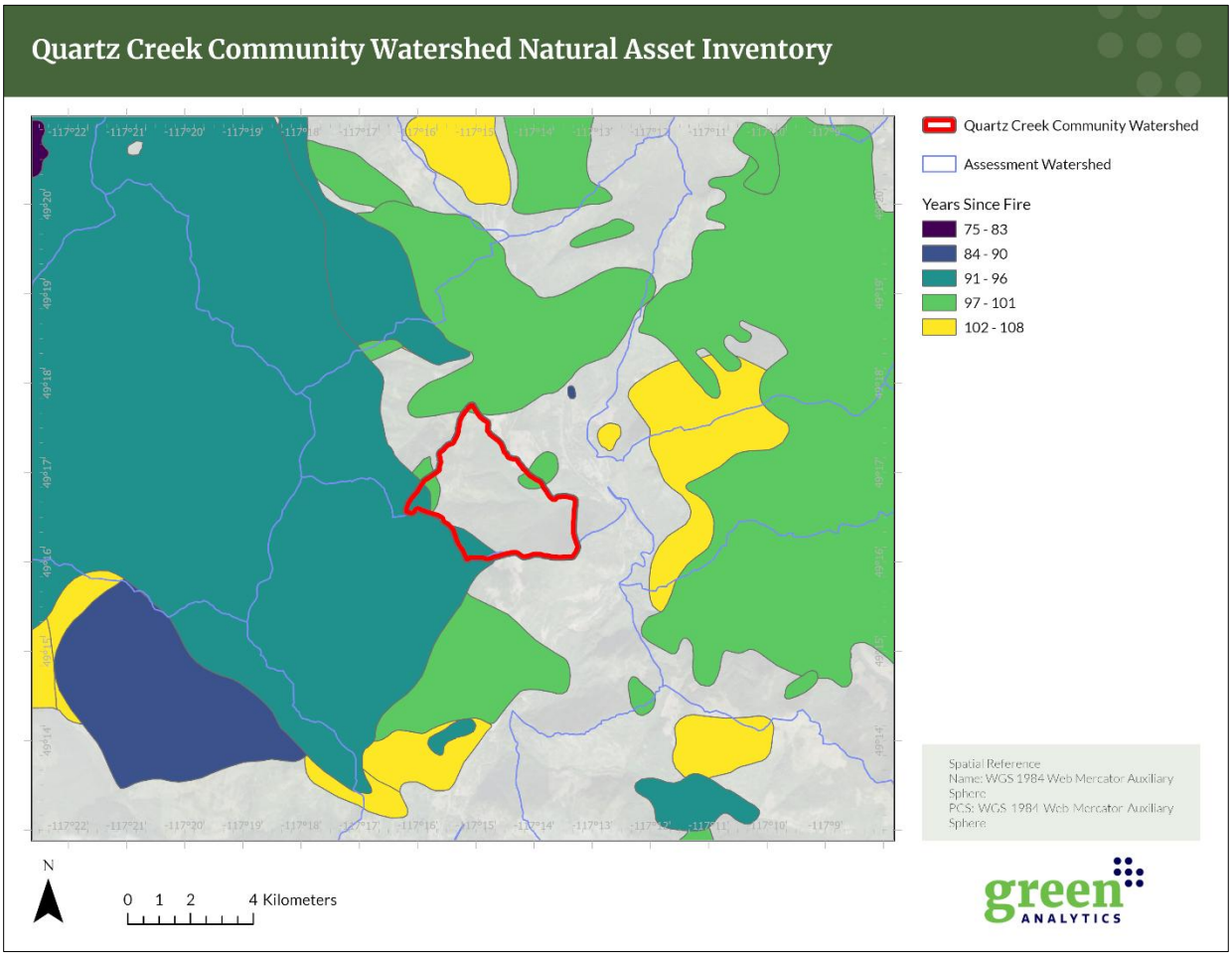

Figure 66-1. Fire history in and around the Quartz Creek Community Watershed.

The *Community Wildfire Protection Plan* explicitly states that Ymir's water supply is vulnerable to watershed disturbance, and that a large fire could cause severe infrastructure damage and contamination of water sources, especially if slope stability is compromised.

Post-fire conditions often result in long-term declines in water quality, including elevated turbidity, ash, nutrients, and heavy metals, with water treatment systems frequently overwhelmed by sediment and contaminant pulses (Silins et al., 2009; Emelko et al., 2011). In burned watersheds, revegetation may take decades, and in severe cases, ecosystem recovery may be incomplete or lead to permanent shifts in vegetation and hydrologic function.

Likelihood Rating: High

The likelihood of a significant wildfire affecting the watershed is high, based on local fire history, high-risk fuel types, and increasing climatic volatility.

Justification:

- The *Community Wildfire Protection Plan* maps Ymir as high to extreme in fire probability.
- Provincial wildfire data and recent trend analyzes indicate an increase in fire frequency and severity over the past two decades in the southern interior of BC (e.g., Jordan et al., 2015; Silins et al., 2009).
- Lightning-caused ignitions are common and beyond human control.
- Regional climate trends suggest longer, drier fire seasons.
- Lack of large-scale recent burns suggests fuel accumulation is significant.
- C2/C3/C4 fuels dominate the landscape surrounding Ymir and are priority targets for treatment.

Consequence Rating: Very High

The consequence of wildfire to the watershed's natural assets and their ability to support drinking water services is very high, due to both ecological degradation and service disruption.

Justification:

- Ymir's *Community Wildfire Protection Plan* confirms the water supply is highly vulnerable to wildfire disturbance.
- Post-fire effects (e.g., erosion, turbidity, water contamination) would significantly impair water quality.
- Given no alternative water source, even temporary impairment is critical.
- Recovery from high-severity wildfire can take decades or longer and may not fully restore original function.

Risk Score: Very High (High Likelihood × Very High Consequence)

6.2.2 Drought

Drought is a significant and growing threat to the reliability of drinking water services in small, forested, snowmelt-dependent watersheds like the one serving Ymir. The absence of an alternative water source elevates the importance of drought resilience.

In BC, droughts have become more frequent and severe, particularly in the southern Interior. According to the BC Drought Information Portal (BC Ministry of Water, Land, and Resource Stewardship 2025), much of the West Kootenay region has faced Level 3 or higher drought conditions in recent summers, including Level 4 and 5 (extreme drought) declarations affecting water licensing, agricultural activity, and fish habitat. These trends are projected to intensify with climate change, as spring snowmelt occurs earlier and summer precipitation declines.

For small communities relying on natural watersheds, drought can lead to:

- Critically low summer base flows, particularly in late July through September.

- Higher concentration of contaminants (e.g., naturally occurring metals) due to reduced dilution.
- Increased stress on vegetation and forest health, which in turn raises fire and pest risks.

Climate models for the Columbia Basin project reduced summer flows, earlier peak runoff, and increased year-to-year variability in streamflow (PCIC 2020). Quartz Creek, while relatively intact, is likely vulnerable to these trends due to its small size (588 ha) and dependency on snowpack for sustained flows. Section 9.2 of Appendix A further documents climate related impacts for the region.

While the 2008 Community Wildfire Protection Plan for the Ymir Fire Protection Area does not specifically address drought, its emphasis on climate-exacerbated wildfire risk and the vulnerability of the water supply highlights the compounding impact of hot, dry summers.

Likelihood Rating: Likely

The likelihood of experiencing seasonal or multi-year drought conditions is likely and increasing.

Justification:

- Historical drought levels in the region have reached Levels 4–5 under the BC Drought Response Plan.
- Climate projections show earlier snowmelt, reduced summer rainfall, and higher evapotranspiration rates.
- Small watersheds can be more sensitive to precipitation anomalies.

Consequence Rating: High

Consequences to drinking water provision are high, particularly because the watershed is the sole source of water for the community.

Justification:

- Sustained low flows could compromise water quantity and pressure, especially during peak demand.
- Reduced dilution during low flows could increase the risk of naturally occurring contaminant concentrations (e.g., acid rock drainage).
- Water treatment capacity may be affected if intake levels drop or turbidity increases due to drought-induced erosion.

Risk Score: High (Likely Likelihood × High Consequence)

6.2.3 Erosion

Erosion is a persistent hazard in steep forested watersheds, particularly where vegetation is disturbed or removed. In the Quartz Creek Community Watershed, surface erosion could increase sediment delivery to streams, raise turbidity at the intake, and degrade the watershed's filtration and

flow regulation functions. These effects are most acute during spring snowmelt and storm events, when peak flows can mobilize soil and debris.

The location of Ymir's water treatment infrastructure adds sensitivity to this hazard. The intake sits on an alluvial fan classified with a 'G' rating under the RDCK Floodplain Management bylaw, indicating that it has been mapped by air photo but lacks surveyed limits (E. Senyk, RDCK, pers. comm., 2025). This fan is geomorphically active and prone to sudden sediment deposition during runoff events, increasing the intake's vulnerability to surface erosion. This designation reflects both geomorphic activity and data uncertainty. In practice, this means that the erosion risk may be higher than currently quantified.

Forest cover plays a critical role in erosion control by stabilizing soils and intercepting rainfall. Logging, wildfire, pest outbreaks, or road construction can remove this protection and expose mineral soils, especially on steep slopes. These disturbances increase the risk of chronic surface erosion, rill and gully formation, and sediment-laden overland flow.

Given the limited treatment capacity of Ymir's system and uncertainty around its ability to effectively filter fine sediments or turbidity, even moderate erosion events could impair drinking water services temporarily or require intake shutdown.

Likelihood Rating: Moderate

The likelihood of damaging erosion affecting the intake area is currently rated as moderate but could rise significantly if forest cover is lost or altered.

Justification:

- The watershed is currently intact, with stable soils and no active disturbance.
- The 'G' classification of the alluvial fan suggests a geomorphically active area, but without defined recurrence interval.
- Forest loss due to wildfire or logging could sharply increase sediment yield and debris flow risk.
- Post-fire erosion is well documented in comparable BC watersheds.

Consequence Rating: Moderate

Consequences to drinking water provision are moderate, especially given the intake's location on an alluvial fan, the limited capacity of the existing filtration infrastructure, and the absence of backup supply.

Justification:

- Fine sediment can clog intakes and exceed turbidity thresholds for safe drinking water.
- Intake shutdowns would disrupt service to the entire community.
- Geotechnical or hydrological remediation of an active fan is complex and costly.

Risk Score: Medium (Moderate Likelihood × Moderate Consequence)

6.2.4 Landslide

Landslides pose a distinct and serious hazard in steep, forested headwater catchments like Quartz Creek. These events can occur suddenly and with high energy, transporting large volumes of soil, rock, and organic debris downslope. When they intersect watercourses or intakes, landslides can significantly disrupt both watershed function and drinking water services.

In southern interior BC, landslides have damaged both ecological systems and drinking water infrastructure, with turbidity and sediment loading among the most common impacts. In extreme cases, landslides can physically damage or block intakes, contaminate water supplies with fine sediments and nutrients, and alter hydrologic pathways permanently (Jakob & Weatherly, 2003; Jordan & Martin, 2004).

The *Ymir Fire Protection Area Community Wildfire Protection Plan* (B.A. Blackwell & Associates Ltd. 2008) notes that wildfire in this area would likely trigger slope instability, especially where steep slopes intersect high fuel load areas. The Community Wildfire Protection Plan also emphasizes that post-fire erosion risk must be considered in rehabilitation planning, especially for watershed protection. In this region, large storms and rain-on-snow events can rapidly mobilize material—especially where forest removal has exposed mineral soils or hydrophobic layers.

The consequences of a mass wasting event in this watershed could include:

- Complete or partial blockage of the intake.
- Long-term elevation in turbidity, nutrients, or metal concentrations.
- Physical redirection of channels or destruction of riparian zones.
- Emergency water service interruptions and expensive mitigation or restoration efforts.

Likelihood Rating: Unlikely

Landslides are not frequent in the current undisturbed state of the watershed, but the potential increases significantly with fire, vegetation loss, or road development.

Justification:

- The terrain is steep and known to be susceptible to slope failures.
- Climate models project more intense precipitation and rapid melt events.
- Post-fire landslides are well documented in similar BC watersheds.

Consequence Rating: High

The consequences are high for both natural assets and drinking water, particularly due to the lack of redundancy in supply and the potential for long-term ecological degradation.

Justification:

- Intakes could be blocked or buried, causing service outages.
- Channel structure and flow patterns may be permanently altered.

- Cleanup and restoration are technically complex and expensive.

Risk Score: High (Unlikely Likelihood × High Consequence)

6.2.5 Forest Pest and Disease Outbreaks

Forest pest outbreaks pose a chronic and escalating risk to the natural integrity of the Quartz Creek Community Watershed. Insect infestations can cause widespread canopy loss, tree mortality, and fuel accumulation, reducing forest ecosystem functions related to water retention, snow interception, transpiration, and slope stability.

In southern interior BC, mountain pine beetle (MPB) has affected millions of hectares over the past two decades, and while the most extreme outbreaks peaked in the early 2000s, localized infestations remain a concern. Existing data shows the historical pattern of forest pest outbreaks across the Quartz Creek Community Watershed (Figure 6-2).

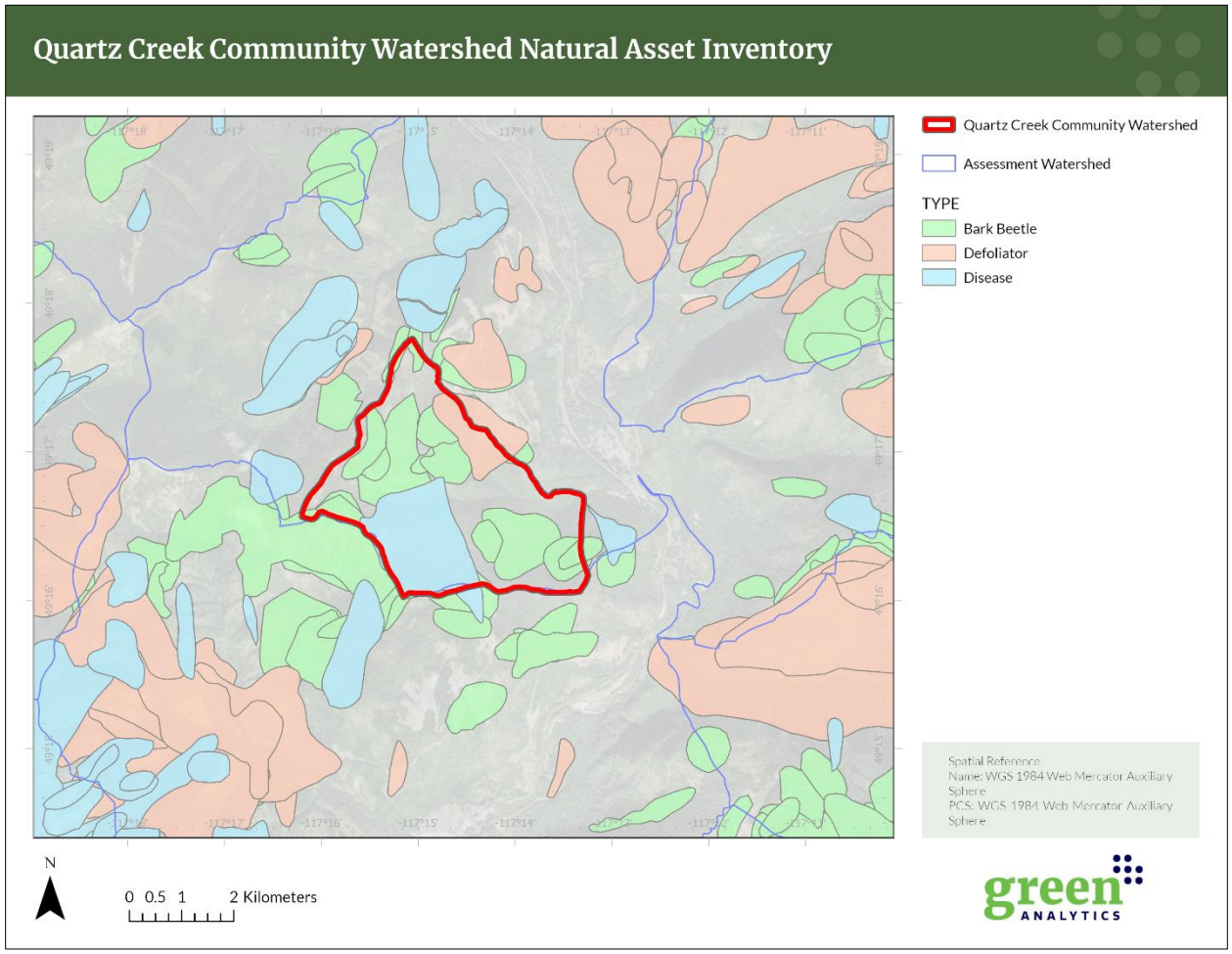

Figure 66-2. Location and extent of pests and disease impacts in and around the Quartz Creek Community Watershed within the last 20 years.

Kurz et al. (2008) show that climate change can facilitate pest expansion by:

- Shortening overwinter mortality periods.

- Increasing outbreak frequency.
- Enabling range expansion into higher elevations.

When pest outbreaks reach a threshold of stand-level mortality, key ecosystem service impacts include:

- Increased peak flows from snowmelt due to loss of canopy interception.
- Higher soil moisture and runoff in the short term, followed by reduced infiltration capacity.
- Elevated erosion and sediment risks as dead root systems decay and destabilize slopes.
- Increased wildfire risk, particularly when dead trees are left standing for years.

Studies from BC have shown that MPB-affected watersheds exhibit altered hydrology for up to 15 years post-outbreak (e.g., Winkler et al., 2010), including earlier snowmelt and increased water yield. While these changes may seem beneficial from a quantity perspective, they increase the risk of flood pulses, reduce late-summer baseflow, and elevate the risk of slope failure and sediment delivery.

The *Ymir Fire Protection Area Community Wildfire Protection Plan* (B.A. Blackwell & Associates Ltd. 2008) identifies pest-susceptible stands and recommends selective removal of beetle-prone species as part of wildfire mitigation, confirming that forest pests are a concern in this watershed's fire and fuel dynamics. Although pest outbreaks may not immediately impair water quality, they can significantly weaken the natural resilience of the forest to other risks (fire, erosion, drought) and reduce its long-term water regulation functions.

Likelihood Rating: Moderate

The risk of localized pest outbreaks is moderate given current climate trends and forest composition.

Justification:

- Regional data shows recurring pest cycles in southern interior BC forests (BC Ministry of Forests, Lands and Natural Resource Operations 2012).
- Climate projections suggest that warming winters will continue to support beetle persistence.

Consequence Rating: Moderate to High

Consequences to natural assets are moderate to high, depending on scale and duration of the outbreak, and should be interpreted in the context of cumulative risk pathways. This rating reflects both the direct impacts of pest outbreaks and their role in amplifying other hazards. Widespread tree mortality weakens the forest's ability to buffer snowmelt, reduce runoff, and stabilize soils—functions that are critical in a small, single-source watershed like Quartz Creek. Pest-killed stands also increase vulnerability to wildfire, erosion, and slope failure, intensifying cumulative risks to water quality and watershed health.

Justification:

- Significant loss of forest canopy and evapotranspiration function can alter watershed hydrology.
- Pest-killed trees lead to increased fuel loads, erosion susceptibility, and fire risk.
- Long-term ecological consequences (e.g., shift in species composition, habitat degradation) are possible.
- Impacts to drinking water are indirect but could be significant due to cumulative effects.

Risk Score: Moderate to High (Moderate Likelihood × Moderate to High Consequence)

6.2.6 Commercial Logging

Commercial logging — particularly clear-cutting in snowmelt-dominated headwater catchments like the Quartz Creek Community Watershed — has well-documented impacts on both water quantity and quality, though effects vary based on harvest extent, location, and mitigation practices. Figure 6-3 shows all known historical logging in the area surrounding Quartz Creek Community Watershed.

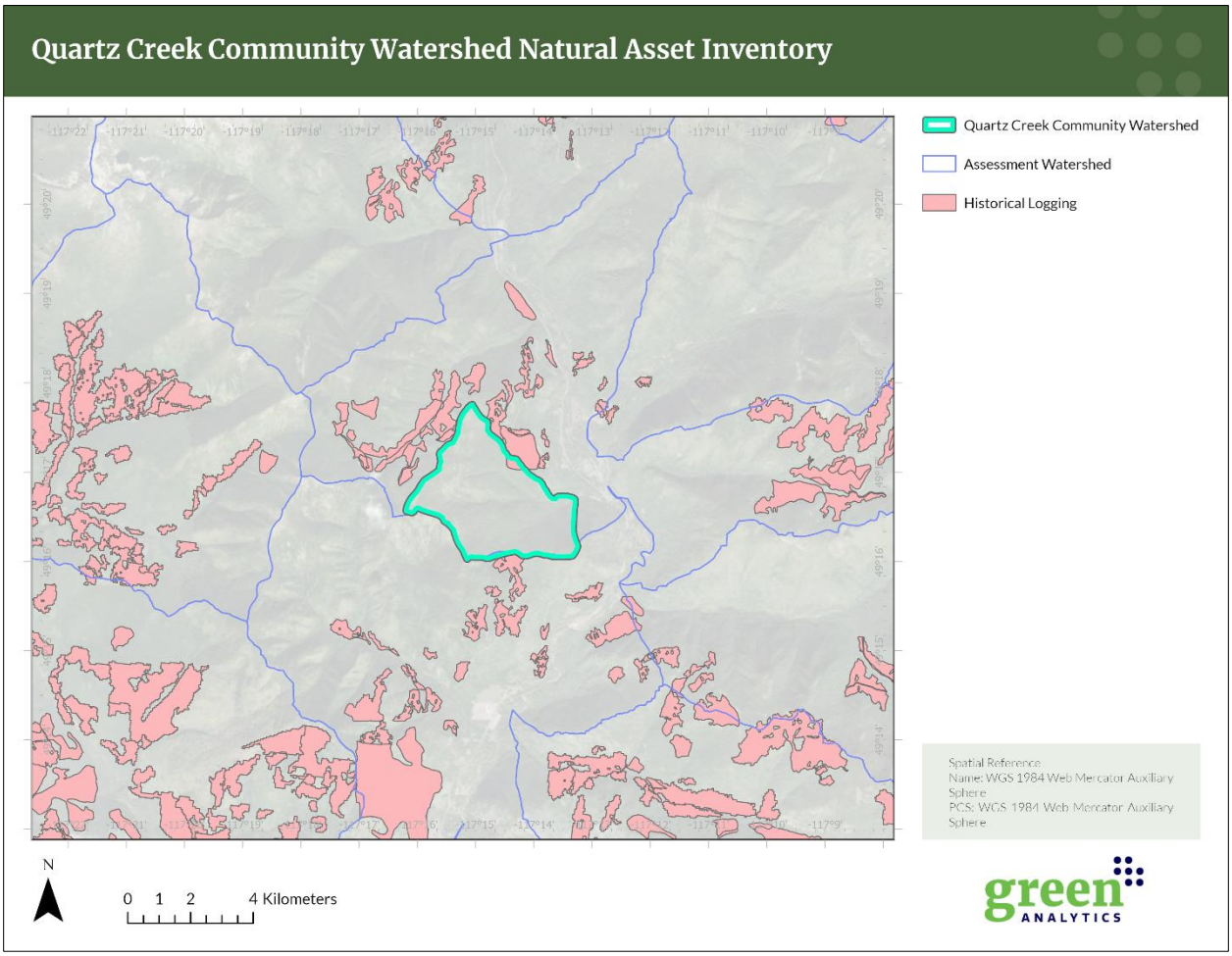

Figure 66-3. Logging areas around Quartz Creek Community Watershed in last 20 years.

Water Quantity Impacts

Clearcutting has been shown to reduce canopy interception and transpiration, which increases snow accumulation and accelerates melt, leading to (Winkler et al., 2021; Whitaker et al., 2002; Gronsdahl et al., 2019):

- Advanced timing of spring peak flows.
- Increased peak flow magnitude.
- Reduced late-summer low flows, especially when harvest exceeds 50% of the watershed area.

Simulations in Redfish Creek and studies at Upper Penticton Creek (watersheds similar in size and elevation to Quartz Creek) show peak flow increases of up to 22% with only 22% of the basin harvested (Whitaker et al., 2002). With 50% clearcutting, 100-year floods became 5–6.7 times more frequent and significantly advanced the timing of snowmelt-generated high flows and decreased late-summer low flows (Winkler et al., 2021). Similarly, Gronsdahl et al. (2019) show that as extent of logging increased to approximately 50% of the catchment area, reductions in daily summertime low flows became more significant, and seasonal low-flow yields were significantly lower.

The magnitude of change in streamflow depends on factors such as the annual precipitation, precipitation in years following cutting, the rate of revegetation, the percentage of the watershed harvested, the location and elevation of the cut blocks within the watershed, and the time since harvest (Laird & Cumming, 2001; Whitaker et al. 2002; Winkler et al. 2021).

Water Quality Impacts

Water quality impacts associated with clearcutting include:

- Suspended sediment and turbidity consistently increase post-harvest, particularly when soils are disturbed (Winkler et al., 2021).
- Colour (True Colour Units) increased from 17 TCU (control) to over 50 TCU in logged watersheds (Winkler et al. 2021). High colour values can be problematic for downstream water treatment plants.
- DOC (dissolved organic carbon) storm responses are larger and faster in clear-cut areas, stressing water treatment (Mistick & Johnson, 2020).
- Inorganic nitrogen (e.g., nitrate) can increase after harvest but typically remains below health thresholds (Hope, 2009).
- Temperature has been shown to increase up to 13°C post-harvest without riparian buffers (Gomi & Dhakal, 2006).

These effects are most severe when riparian zones are logged, harvest occurs in upper-elevation snow zones, or logging occurs on north-facing slopes, which normally function as key seasonal water storage areas.

Critical Considerations for Quartz Creek

- The dense, north-facing forest canopy in this watershed likely functions as a natural water storage and regulation system. Logging in these zones could reduce resilience to climate-driven low-flow conditions.
- Many of the common water quality issues noted above could be minimized with common mitigation strategies (e.g. maintaining sufficient riparian buffers). However, there are two key risks from commercial logging that are less easily mitigated:
    1. Increased risk of acid rock drainage, especially where roads expose mineralized geology. This is addressed separately in Section 6.2.8.
    2. Altered seasonal flow timing, which could jeopardize the community's water security during the dry season.

Likelihood Rating: Moderate

While no logging is presently occurring and the timber licence holder has expressed they have no current plans in place to harvest within the watershed, the potential for future commercial activity remains.

Justification:

- Logging is a permitted land use in many community watersheds in BC unless otherwise protected.
- The watershed's forest cover may be viewed as economically attractive.
- Without formal restrictions, logging remains a plausible scenario.

Consequence Rating: High

Consequences to natural asset function are high, particularly if harvesting exceeds 30–50% of watershed area or occurs on critical slope positions.

Justification:

- Proven hydrologic and water quality effects across multiple BC case studies.
- Even with mitigation (e.g., buffers), streamflow timing and peak magnitudes are altered.
- In a single-source drinking water system, even temporary increases in turbidity or low-flow conditions carry service-level risks.

Risk Score: High (Moderate Likelihood × High Consequence)

6.2.7 Forest Logging Roads

Forest logging roads are one of the most persistent and damaging forms of linear disturbance in headwater catchments. Even when temporary, poorly planned or maintained roads can significantly alter hydrologic connectivity, destabilize slopes, and mobilize sediment during rainfall or snowmelt events (Jordan & Martin, 2004).

In snowmelt-dominated regions like southern interior BC, road surfaces concentrate and accelerate surface runoff, while culverts or ditches can redirect flows in ways that exceed natural infiltration capacity, triggering erosion or shallow landslides. This is particularly hazardous on steep, dissected terrain (such as that surrounding Ymir) where a small road failure can result in long runout debris flows that overwhelm streams and water intakes.

The BC Ministry of Forests' (2019) provides detailed guidance for forest road planning, construction, and deactivation, including best practices for drainage design, slope stabilization, buffer zones, and erosion control. These measures are especially critical in sensitive areas such as community watersheds. The inclusion of this guidance in official provincial engineering standards reflects the recognized severity of the risks that forest roads pose to water quality, slope stability, and overall watershed function—particularly in unprotected or unmanaged catchments.

Empirical studies from BC have shown:

- Forest roads are often the largest contributors of fine sediment to streams following logging (Reid & Dunne, 1984; Jordan & Martin, 2004).
- Chronic sediment loading can degrade aquatic habitat and exceed turbidity thresholds for drinking water treatment, especially where intakes are unfiltered or close to road alignments (Reid & Dunne, 1984; Jordan & Martin, 2004).
- Legacy roads or decommissioned routes can continue to erode and contribute sediment decades after initial use (Jakob & Weatherly, 2003).

The *Ymir Fire Protection Area Community Wildfire Protection Plan* (B.A. Blackwell & Associates Ltd. 2008) also flags road networks as ignition vectors and notes that roads in steep areas with high fuel loads may serve as conduits for both wildfire spread and slope destabilization.

Roads also enable human access; raising the risk of fire, unauthorized dumping, camping, or off-road vehicle use, which can further degrade water quality or disturb wildlife habitat. Figure 6-4 demonstrates the location and extent of roads in the area surrounding Quartz Creek Community Watershed, including active and pending fire roads.

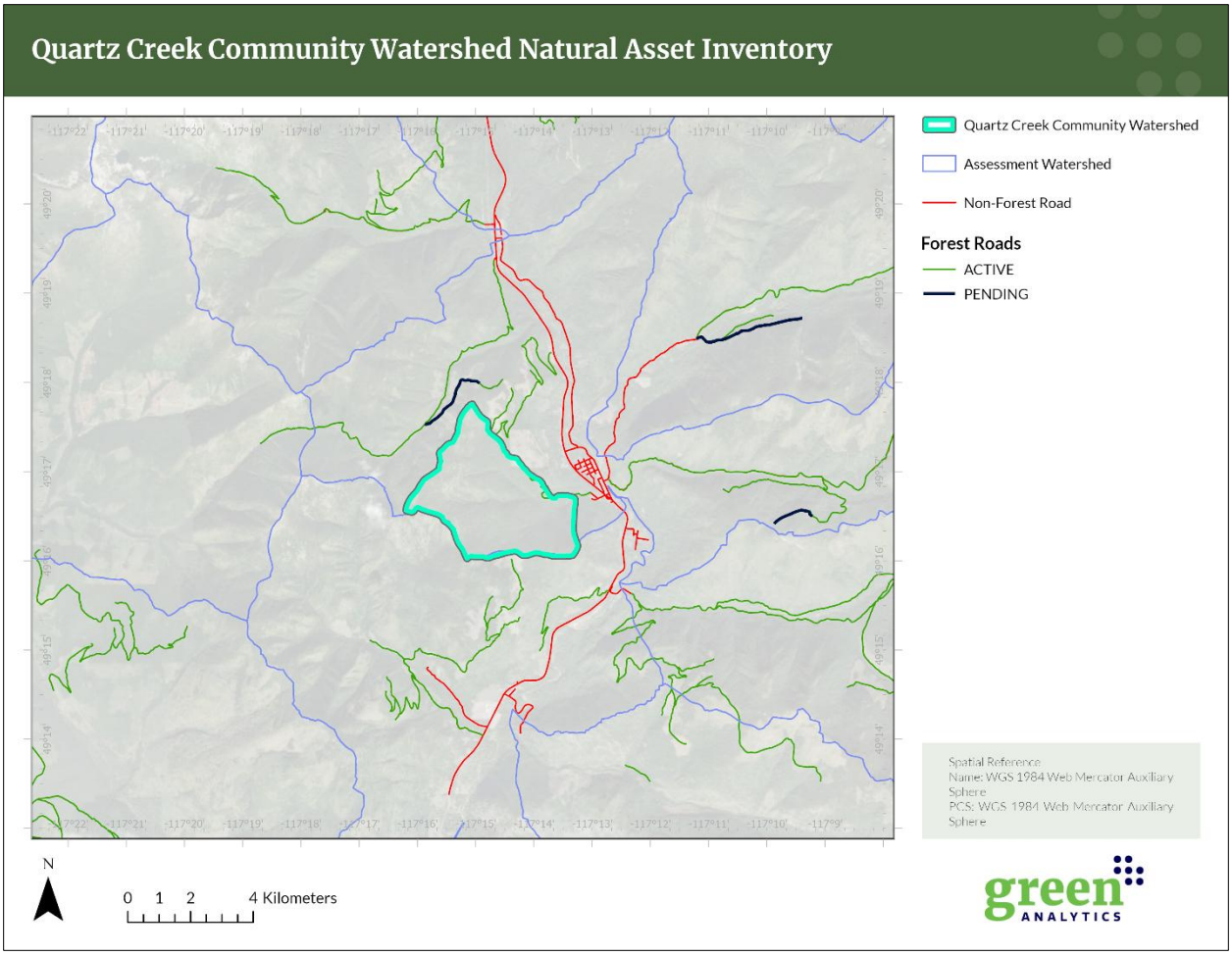

Figure 66-4. Roads in the area surrounding Quartz Creek Community Watershed, including active and pending fire roads.

Likelihood Rating: Moderate

No new road development is currently occurring, and the watershed remains largely intact. However, the potential for road construction exists if commercial logging resumes or expands.

Justification:

- Forest roads are required for timber access in steep terrain.
- The watershed may contain legacy roads or informal access routes, which present ongoing risks if not properly managed.

Consequence Rating: High

Consequences to the watershed's natural functions are high, especially if roads intersect riparian zones or destabilize slopes.

Justification:

- While some of the risks can be mitigated using provincial best management practices, in the absence of enforcement or oversight, their application cannot be guaranteed.

- Historical precedent in BC shows that even small-scale road construction can lead to persistent sedimentation and hydrologic disruption if poorly managed.
- Road-related sediment is well documented in the literature and is difficult to control once mobilized.
- Sediment mobilization can persist for years or decades.
- Road failures can initiate landslides or divert stream channels.
- Access roads increase non-natural disturbance risk (e.g., fires, dumping, invasive species).
- Drinking water systems relying on single-source surface intakes are especially vulnerable to suspended sediment and turbidity pulses.

Risk Score: High (Moderate Likelihood × High Consequence)

6.2.8 Acid Rock Drainage

Acid rock drainage occurs when sulfide minerals—particularly pyrite (iron sulfide)—are exposed to oxygen and water, leading to the production of sulfuric acid. This acidic runoff dissolves toxic metals such as copper, lead, mercury, and zinc, which can then enter surrounding water bodies. Acid rock drainage can be triggered by natural erosion, but is commonly associated with mining, road construction, or other forms of ground disturbance that expose sulfide-bearing rock.

In the Quartz Creek Community Watershed, the potential for acid rock drainage has been explicitly documented. A 2020 report by SNC-Lavalin, commissioned by BC Timber Sales, identified multiple potentially acid-generating rock types along planned forest road alignments. This was independently reviewed and substantiated by Dr. Steven Emerman, who concluded that the risk to the community water source was credible and under-assessed.

Their static and leachate tests on 16 rock samples confirmed that dacite, latite, and tonalite in the area are potentially acid-generating. Leach tests found runoff concentrations exceeding BC drinking water and aquatic life standards for pH, sulfate, and up to 10 metals, including aluminum, cadmium, copper, iron, mercury, nickel, and zinc.

Emerman (2020a), in a technical review, concluded that the SNC-Lavalin study likely underestimated the actual risk:

- It assessed only a portion of the watershed, limited to the proposed Phase 1 road alignment
- It lacked kinetic (long-term) tests, which are necessary to understand sustained leaching potential. Kinetic testing involves extended-duration experiments that simulate real-world geochemical conditions to evaluate the long-term release rates of acidity and metals from disturbed rock or soil. These tests are critical in identifying whether acid-generating reactions will persist, escalate, or taper off over time.
- The mitigation measures were generic and nonspecific, and the proposed monitoring plan lacked defined response actions.
- The assumption that runoff would not reach surface waters was not supported by evidence

- Soils in the area were also identified as potentially acid-generating, raising concerns about cumulative loading.

As Maest et al. (2002) note, predicting the long-term water quality impacts of acid-generating rock disturbance requires site-specific kinetic testing and careful modelling, both of which were lacking in the SNC-Lavalin assessment, as was highlighted by Emerman (2020a).

This potential risk is also compounded by the fact that the Quartz Creek Community Watershed has been identified as having moderate to high terrain sensitivity and shallow soils in several locations (Uunila, 2018), increasing the likelihood that exposed acid-generating rock could generate surface runoff with minimal buffering capacity.

Currently, no new road construction is planned, and the watershed remains in excellent condition, which supports a moderate likelihood rating. However, given the documented presence of potentially acid-generating materials and the lack of treatment infrastructure, any future disturbance to forest cover or terrain—particularly road construction—could rapidly elevate this to a high-impact event.

This latent risk is especially serious given the absence of redundancy in Ymir's drinking water system. If acid rock drainage is triggered near the water intake, it could cause sustained contamination, threaten human health, and require major infrastructure investment to address—potentially beyond the means of the community.

Likelihood Rating: Moderate

Acid rock drainage potential is confirmed in local geology, and the risk would increase significantly with additional road construction.

Justification:

- The watershed is currently undisturbed, and no roads are planned.
- However, potential acid rock drainage sources are known to exist, and even limited disturbance (e.g., test pits, access roads) could trigger exposure:
    - Static and leach tests show clear acid-generating potential of exposed rock and soils.
    - Road construction or slope disturbance could rapidly expose these materials to runoff.
    - The community has no water treatment system capable of removing heavy metals or neutralizing acid.
    - Past and proposed forestry activities increase the likelihood of disturbing potentially acid-generating rock.
    - Runoff modeling suggests exceedances of BC water quality standards even under conservative assumptions.
- Any new land use (e.g., commercial logging) would increase the likelihood dramatically.

Consequence Rating: High

Consequence is high due to the potential for water supply contamination in a system without mitigation infrastructure.

Justification:

- Drinking water standards would be exceeded for aluminum, fluoride, and mercury under modeled conditions.
- Acidic water can harm aquatic life, corrode infrastructure, and mobilize additional metals from sediment.
- If acid rock drainage occurs near or above the intake, it could render the entire supply unsafe, with no redundancy or alternate source.
- Remediation costs (e.g., water treatment facilities, containment) would be significant and unaffordable for a small community.
- Current assessments do not provide sufficient confidence that mitigation can fully prevent or manage the risk.

Risk Score: High (Moderate Likelihood × High Consequence)

6.2.9 Climate Change – Precipitation Patterns

Precipitation patterns in southern interior BC are becoming less predictable and more extreme, a trend expected to continue or intensify under future climate scenarios. In snowmelt-dominated watersheds like the one serving Ymir, the seasonal shift from snow to rain has profound implications for both the functioning of natural assets and the provision of drinking water. Section 9.2 of Appendix A further documents climate related impacts for the region.

The Pacific Climate Impacts Consortium (PCIC) projects the following for this region over the coming decades:

- More winter precipitation falling as rain rather than snow
- Shorter snow-covered season, with earlier and faster melt
- Increased frequency of high-intensity rainfall events, especially in fall and spring
- Longer summer dry periods, contributing to drought risk

These trends could interact with the watershed in multiple ways:

- Earlier spring runoff can lead to increased spring flooding and reduced water availability later in the year
- More frequent heavy rainfall events increase the risk of landslides and erosion, particularly if areas of the watershed are disturbed and steep
- The combination of greater peak flows and reduced late-season base flows reduces the watershed's natural regulation capacity

- Water quality may decline during intense storms due to sediment mobilization, turbidity spikes, and contaminant flushing

In forested watersheds, intact vegetation helps buffer extreme precipitation, but this capacity is diminished by logging, fire, or pests. The watershed's ability to maintain stable flow and filtration services will therefore be increasingly reliant on maintaining canopy cover, soil structure, and slope stability.

For the community of Ymir, these changes raise serious concerns given the absence of alternate water sources and the high dependence on natural flow regulation to sustain drinking water supply through the summer and fall.

Likelihood Rating: Likely

Based on regional climate model projections and observed trends in BC, significant changes in precipitation timing and intensity are likely over the next 10–30 years.

Justification:

- PCIC (2020) and Columbia Basin Trust (2021) both project greater hydrologic volatility, including increased rainfall intensity and reduced snowpack.
- Recent years have already shown more frequent rain-on-snow events, dry summers, and early melt in nearby areas.
- These changes are consistent across multiple emissions scenarios (RCP 4.5 and 8.5).

Consequence Rating: High

Consequences to watershed function and drinking water provision are high, especially given the lack of engineered storage or backup supplies.

Justification:

- Increased precipitation variability will lead to less predictable water supply and greater turbidity risks.
- Without natural or engineered buffering capacity, both flood and drought risks will increase.
- Watershed integrity may degrade if compounded by other stressors (e.g., fire, logging, pests), reducing resilience to precipitation extremes.
- Drinking water intakes may be exposed to seasonal water shortages or quality degradation.

Risk Score: High (Likely Likelihood × High Consequence)

6.2.10 Climate Change – Snowpack Dynamics

The Quartz Creek Community Watershed supplying Ymir is in a snowmelt-dominated hydroclimatic region, where seasonal snow accumulation and gradual spring melt are key to maintaining summer and fall base flows. However, climate change is rapidly altering snowpack dynamics across southern

interior British Columbia. Section 9.2 of Appendix A further documents climate related impacts for the region.

Key regional projections from the Pacific Climate Impacts Consortium (PCIC) and other studies show:

- Significant reductions in April 1 snow water equivalent (SWE) across most elevations.
- Earlier onset of snowmelt, with peak streamflows shifting weeks earlier in the spring.
- Faster melt rates, particularly during warm, high-radiation spring periods.
- Increased rain-on-snow events, which contribute to flashier hydrographs and slope instability.

These changes affect watershed function and water supply in several critical ways (Hamlet & Lettenmaier, 1999; Whitaker et al., 2002; Stewart, 2009):

- Spring runoff may be more concentrated, increasing early-season flood risk and reducing water availability later in the year.
- Late summer low flows may be lower and longer, increasing vulnerability during droughts
- The watershed's natural water storage function is diminished, especially if forest cover is compromised.
- Stream temperature and water quality may deteriorate, particularly in shallow, low-flow conditions.

The implications for drinking water provision are serious:

- The intake system may experience longer dry-season stress, with declining reliability during peak demand.
- Without artificial storage, the community may face shortages, restrictions, or degraded water quality.
- The risk is magnified by the fact that Ymir has no alternative water source.

Likelihood Rating: Likely

Changes in snowpack dynamics are already being observed and are projected to intensify under all future climate scenarios.

Justification:

- PCIC (2020) and other provincial studies show consistent trends of declining snowpack and earlier melt.
- These trends are likely to continue and worsen in the next 10–30 years.

Consequence Rating: High

Consequences to drinking water provision are high, especially during the summer and fall when demand is high and flows are lowest.

Justification:

- Earlier melt and reduced storage lead to longer late-season low flow periods.
- Without supplemental infrastructure, drought resilience depends entirely on snowpack timing.
- Small headwater systems like Quartz Creek are especially sensitive to interannual snowpack variability.
- Changes in snowpack also interact with other hazards (e.g., wildfire, pest outbreaks) that further impair watershed health.

Risk Score: High (Likely Likelihood × High Consequence)

6.2.11 Seasonal Water Volume

Watersheds in south-central BC commonly experience strong seasonal streamflow variability, driven by snow accumulation in winter and melt in spring. Peak flows typically occur in April to June, while low flows persist through late summer into early fall. This pattern is well document in the existing monitoring data summarized in Section 9.1.1 of Appendix A. In small catchments like Quartz Creek (~600 ha), the limited storage capacity of soils and subsurface systems means there is little buffering once snowmelt ends.

This seasonal pattern creates a well-documented risk to communities that rely on unregulated surface sources, particularly:

- Water shortages in August–September, when base flows are lowest and demand may be highest.
- Turbidity or water quality issues during spring runoff, especially if high flows mobilize sediment or debris.

The absence of supplemental storage or alternate sources makes the Ymir community highly vulnerable to intra-annual variability, particularly in dry years or after years with low snowpack. The BC Drought Information Portal (BC Ministry of Water, Land, and Resource Stewardship 2025) has documented increasing frequency of late-summer Level 3–5 drought conditions in this region, reducing streamflow and prompting water use restrictions in similar communities. Anticipated changes in climate could further amplify this hazard (see Section 9.2 of Appendix A).

Research in Upper Penticton Creek and Redfish Creek (Winkler et al., 2021; Whitaker et al., 2002) demonstrates that in small, snowmelt-dominated headwater catchments:

- Low flows can become critically low during dry years, even without disturbance.
- Clearcutting or other forms of canopy loss could further alter seasonal flow timing, often increasing spring runoff at the expense of summer baseflow.

- Hydrologic recovery can take decades, particularly in high-elevation, slow-growing forests.

Thus, while seasonal variability is a natural feature of the hydrologic cycle, its interaction with climate trends and land use changes elevates it to a service-level risk in single-source systems.

Likelihood Rating: Likely

Seasonal water volume variability is a perennial feature of the watershed and is becoming more pronounced due to climate change.

Justification:

- All snowmelt-dominated catchments in southern BC exhibit predictable seasonal highs and lows.
- Earlier snowmelt and longer dry periods are already being observed (PCIC, 2020).
- Summer low flows are getting lower, increasing the likelihood of stress in late-season months[3].

Consequence Rating: High

Consequences to water service are high, particularly during prolonged low-flow periods.

Justification:

- Without sufficient late-season flows, intake volumes could fall below operational thresholds.
- Low flows reduce dilution capacity, potentially increasing concentrations of naturally occurring contaminants (e.g., metals).
- Dry-season shortages may require rationing, emergency water sourcing, or infrastructure adaptation.
- Ecosystem health may also be affected, compounding long-term resilience.

Risk Score: High (Likely Likelihood × High Consequence)

6.2.12 Mining

Mining is not currently occurring within the Quartz Creek Community Watershed, but the region is considered geologically prospective, and mineral exploration interest has persisted intermittently over the past several decades. While no active claims overlap the watershed boundary as of 2025, nearby areas have experienced historical mining activity, and Quartz Creek remains within a zone of potential future interest for precious metals.

Mining activities—particularly exploration drilling, bulk sampling, or mine development—can expose acid-generating rock, disturb hydrologically sensitive terrain, and introduce contaminants or

[3] Timing & Volume of River Flow - Environmental Reporting BC

sediment into watercourses. In unfiltered, single-source drinking water systems like Ymir's, even low-level disturbance can pose a service-critical risk.

Potential pathways of impact include:

- Exposure of acid-generating rock and subsequent metal leaching.
- Construction of access roads that fragment slopes and increase erosion.
- Spills or discharges from exploration or development equipment.
- Legacy site reactivation or incidental disturbance of contaminated zones.

The community's vulnerability is heightened by its lack of engineered treatment capacity for heavy metals or acidic water, as well as the absence of alternate supply sources. In such settings, even early-stage exploration activities may require precautionary evaluation.

Likelihood Rating: Unlikely

No mining activity is currently occurring, and no active tenure overlaps the watershed. However, regional geological interest and historical precedent indicate that proposals may emerge in the future.

Justification:

- The area is known to be mineralized and is within a broader zone of exploration interest.
- Mineral tenure can be acquired without community consultation under current provincial legislation.

Consequence Rating: High

Consequences to drinking water provision are high due to the potential for long-term contamination and the lack of adaptive capacity.

Justification:

- Even minor disturbance in mineralized terrain could introduce toxic metals into the water supply.
- The community has no treatment infrastructure for heavy metals or pH adjustment.
- Any contamination near the intake would require extensive remediation or complete water source replacement.

Risk Score: Medium (Unlikely Likelihood × High Consequence)

6.2.13 Recreation and Non-Sanctioned Uses

Both sanctioned and non-sanctioned recreational uses present a growing source of pressure on sensitive drinking water source areas across British Columbia. While the Quartz Creek Community Watershed currently lacks formal road access and has no sanctioned trail infrastructure within its boundary, several sanctioned trails—including the "Quartz Climb" and "Descent" mountain biking

trails—are located adjacent to the watershed. These routes signal growing recreational interest in the area and could drive increased human presence in or near the community's drinking water source.

Non-sanctioned uses—including illegal dumping, unauthorized camping, and off-road vehicle activity—can introduce a range of contaminants and disturbances. These include:

- Leachate from dumped waste (e.g., oil containers, garbage).
- Pathogens or nutrients from human waste.
- Soil compaction, riparian disturbance, and sedimentation from off-road traffic.
- Unauthorized fires, which can elevate wildfire risk and leave chemical residues.

Even sanctioned trail networks can contribute to cumulative risk if use increases significantly or if off-trail activity and fire starts become more frequent. The *Ymir Fire Protection Area Community Wildfire Protection Plan* (B.A. Blackwell & Associates Ltd. 2008) specifically flags unmanaged public access as a wildfire ignition risk and recommends limiting access to sensitive areas. These concerns extend to watershed protection given the close link between fire, erosion, and drinking water quality.

Likelihood Rating: Unlikely

While current access is limited, sanctioned trails nearby and regional recreation trends suggest the likelihood of increased pressure in future years.

Justification:

- Limited public access exists within the watershed.
- Existing trails in adjacent areas attract users and increase landscape exposure.
- Human-caused ignitions and waste accumulation are increasing regionally in rural areas.
- New access routes (e.g., for logging) would likely raise the likelihood to moderate.

Consequence Rating: Minor

Impacts are expected to be localized or low-intensity under current use levels but could escalate with greater visitation or unmanaged access.

Justification:

- Small contamination inputs can have outsized effects in a single-source drinking water system.
- Inappropriate fires and off-trail erosion could cause temporary water quality degradation.
- Trail networks may act as disturbance corridors if unmanaged.

Risk Score: Low (Unlikely Likelihood × Minor Consequence)

6.3 Risk Assessment Summary

This risk assessment identifies and evaluates hazards that could impact the health of the Quartz Creek Community Watershed and the continued provision of drinking water to the community of Ymir. Table 6-6 organizes the hazards by overall risk rating and identifies considerations for potential response actions.

Table 6-6. Risk score by hazard with potential response considerations.

Hazard	Primary Relevance	Likelihood Score	Consequence Score	Risk Score	Potential Response Considerations
Wildfire	Natural Assets	High	Very High	Very High	Maintain mature canopy; develop fuel breaks; coordinate with Community Wildfire Protection Plan recommendations.
Drought	Drinking Water Provision	Likely	High	High	Promote water conservation; monitor flow thresholds; explore contingency planning.
Climate Change – Precipitation Patterns	Both	Likely	High	High	Use climate-informed forest practices; maintain slope stability; manage flood pathways.
Climate Change – Snowpack Dynamics	Drinking Water Provision	Likely	High	High	Protect high-elevation canopy; monitor snowmelt timing; assess dry-season flow risks.
Seasonal Water Volume Variations	Drinking Water Provision	Likely	High	High	Plan for seasonal flow gaps; quantify minimum flow thresholds; develop storage options or supplemental groundwater supply source.
Commercial Logging	Natural Assets	Moderate	High	High	Restrict logging; retain canopy in key areas; assess cumulative watershed impacts.
Forest Logging Roads	Natural Assets	Moderate	High	High	Prohibit new roads unless critical; follow BMPs rigorously; deactivate legacy roads.
Acid Rock Drainage	Drinking Water Provision	Moderate	High	High	Prohibit excavation in potentially acid-generating areas; conduct kinetic testing; monitor drainage chemistry.
Landslides	Both	Unlikely	High	High	Avoid slope disturbance; prioritize forest retention; monitor post-disturbance areas.
Forest Pest Outbreaks	Natural Assets	Moderate	Moderate to High	Medium to High	Maintain species diversity; monitor pest conditions; promote structural heterogeneity.
Erosion	Drinking Water Provision	Moderate	Moderate	Medium	Maintain canopy cover, avoid ground disturbance, stabilize high-risk slopes
Mining	Both	Unlikely	High	Medium	Monitor for mining interest in the area and initiate consultation with any potential mining organization as soon as possible.
Recreation and Non-Sanctioned Uses	Both	Unlikely	Minor	Low	Limit access; implement public education and signage; monitor known entry points.

A large proportion of the risks identified in this assessment are rated high, particularly in relation to consequence. This reflects a deliberate application of the precautionary principle given the unique characteristics of this watershed:

- Quartz Creek is the sole drinking water source for the community of Ymir.
- The watershed is small, snowmelt-dominated, and highly sensitive to hydrologic and ecological disruption.
- Degradation of water quality or flow could result in service disruption, public health risks, or long-term ecological damage.

Hazards were assessed based on their relevance either to the natural assets of the watershed (e.g., forest health, slope stability) or to the provision of drinking water (e.g., flow reliability, contamination risk). In some cases, risks affect both domains simultaneously, particularly where natural processes and human wellbeing are tightly coupled (e.g., wildfire, road construction, climate change impacts).

While the likelihood of certain hazards remains low or moderate in the current pristine state of the watershed (e.g., Acid Rock Drainage, Landslides), the potential consequences of exposure are high, warranting proactive prevention strategies. This is particularly true in scenarios where land use change or climate-driven variability could amplify underlying vulnerabilities.

The risk ratings presented here are grounded in:

- Peer-reviewed and jurisdictional studies (e.g., Winkler et al., 2021; PCIC, 2020),
- Local assessments (e.g., SNC-Lavalin 2020; B.A. Blackwell & Associates Ltd. 2008), and
- Watershed-specific geological and hydrological data.

Together, this analysis highlights the need for active watershed stewardship, protection, and scrutiny of future land use proposals that could compromise the long-term health and resilience of the source water system.

7. Management Implications and Recommendations

The Quartz Creek Community Watershed is a vital natural asset that provides the community of Ymir with clean, reliable drinking water—an essential service with no viable alternative. Its intact forest ecosystem performs critical hydrological and filtration functions, sustaining water quality and quantity at no operational cost. These ecological services are effectively irreplaceable; engineered solutions such as treatment infrastructure or alternate water sources would be prohibitively expensive, technically challenging, and likely less reliable. However, the watershed lies on Crown land outside the jurisdiction of the RDCK, which owns the water system but lacks authority over the land itself. Forest tenure in the watershed is held by a private licensee (ATCO Wood Products), creating a governance gap between the entity responsible for water delivery and the entity with rights to alter the land that supplies it.

Compounding this governance challenge is a high wildfire risk profile. The *Community Wildfire Protection Plan* for the Ymir Fire Protection Area identifies high to extreme wildfire probability in areas surrounding the community—including Quartz Creek. Wildfire or logging-induced disturbance could rapidly degrade water quality through sedimentation, altered flow regimes, or loss of forest cover. Given the RDCK's limited ability to directly control land-based threats, safeguarding drinking water services depends on proactive collaboration with the tenure holder, targeted mitigation efforts, and sustained recognition of the watershed as a critical public utility. This section outlines the management priorities and strategic options needed to protect the long-term integrity of the Quartz Creek Community Watershed and the essential drinking water service it provides.

7.1 Management Priorities

Safeguarding the long-term provision of clean drinking water to the community of Ymir requires clear and defensible management priorities for the Quartz Creek Community Watershed. These priorities must recognize both the ecological dynamics of the watershed and the institutional limitations of the RDCK, which operates the water system but has no jurisdiction over the land base that sustains it. In this context, strategic focus is essential: limited capacity must be aligned with high-leverage interventions. The priorities outlined below reflect this approach, linking the most critical risks to the most actionable points of influence.

Protect and Maintain Watershed Integrity

- The overarching management priority should be to protect and maintain the ecological integrity and functional resilience of the Quartz Creek Community Watershed. This priority underpins all others.
- The forested catchment acts as a natural filtration system and flow regulator, sustaining high-quality water at virtually no cost to the community.
- Its continued health is essential not only for water quality, but also for reducing the watershed's vulnerability to fire, erosion, and runoff events.
- All other management actions—whether focused on risk mitigation or adaptive planning—derive their effectiveness from the preservation of this foundational integrity.

Acknowledge and Plan for Unmanageable Risks

- Some risks to the watershed cannot be prevented or controlled through local action.
- Lightning-caused wildfires, climate-induced hydrologic shifts, landslides, and invasive species may all affect the watershed despite the best efforts of planners and stewards.
- Management must acknowledge these limitations and incorporate resilience strategies such as redundancy (e.g., emergency water supply), ecological buffering (e.g., maintaining mature forest cover), and emergency response planning, to ensure that service provision can continue even in the face of acute disturbance.

Foster Collaborative Governance and Stewardship

- Maintaining the condition and managing the risks associated with the Quartz Creek Community Watershed demands a strong commitment to partnership among all relevant stakeholders.
- The RDCK, as the water system operator, relies heavily on productive relationships with key parties such as ATCO and the Government of BC, which oversees the Vegetation Resource Inventory and regulates land use.
- Meaningful engagement with local community members, watershed users, First Nations, and non-governmental organizations like the Ymir Community Watershed Society can enrich monitoring efforts, ensure diverse perspectives are considered, and build shared responsibility for land and water stewardship.
- Open communication, joint planning, and transparent data sharing should form the backbone of a resilient, adaptive governance structure that can effectively address evolving challenges within the watershed.
- The engagement process of interested parties completed as part of this project and NAMP has provided an initial touch point from which the RDCK can continue to develop and foster collaborative stewardship. See Appendix D for more information on the engagement process and Appendix E for additional guidance on collaborative watershed governance.

7.2 Possible Management Actions

The management priorities outlined in Section 7.1 establish the protection and long-term sustainability of the Quartz Creek watershed as the central objective of this Natural Asset Management Plan. Ensuring the continued provision of clean, reliable drinking water to the community of Ymir depends on maintaining the watershed's ecological integrity and minimizing exposure to high-consequence risks. This section identifies four specific, implementable actions that align with these priorities and address the most pressing threats to watershed function.

7.2.1 Reduce Wildfire Risk

Description

Efforts to reduce wildfire risk in the watershed include implementing targeted fuel treatments and establishing defensible corridors around vulnerable areas. These actions should be guided by the *Community Wildfire Protection Plan*, which identified much of the landscape surrounding Quartz Creek as being at high or extreme risk for wildfire. By prioritizing these areas and regularly refining

readiness plans, management can protect not only the watershed's water quality but also the safety and resilience of the broader community. Ongoing collaboration among local stakeholders will be needed to ensure the approach remains adaptive and effective in addressing this pressing threat.

Current Status

Targeted fuel treatments, the creation of defensible corridors, and readiness coordination is already underway but must be continuously refined and spatially aligned with drinking water values at risk.

Valuation

Treating forests to reduce wildfire risk comes with substantial costs that vary depending on the chosen method and whether timber harvesting is involved. According to data from the Forest Enhancement Society of BC reported by LM Forest Resource Solutions Ltd (2020), manual thinning and debris disposal without timber harvesting averages about $3,839 per hectare (2020 CAD), increasing to roughly $4,556 in 2024 dollars. Mechanical thinning in the absence of harvesting is somewhat less expensive, averaging $1,853 per hectare (2020 CAD), or approximately $2,199 in 2024 dollars. When forest fuel treatments are combined with timber harvesting, average costs can decrease by 30 to 60 percent.

Relevant Parties

Reducing wildfire risk in the Quartz Creek community watershed requires the involvement of multiple stakeholders. These stakeholders need not be directly involved in the watershed's management since wildfire may spread from beyond its boundaries if it is ignited nearby.

- As the landowner, the Government of BC, has a direct role to play in mitigating wildfires in or near the watershed. The government also regulates forest harvest operations, and their ministries or agencies coordinate and respond to wildfires. Further, the Forest Enhancement Society of BC is a Crown agency involved in mitigating wildfire risk by funding actions to reduce fuel loads in the province's forests.
- The RDCK has engaged in fuel management in the region, for example in Selous Creek near the City of Nelson (Kalesnikoff 2021). The RDCK has also developed a *Community Wildfire Protection Plan* for Area G, which includes Ymir (Cathro Consulting Ltd and B.A. Blackwell & Associates Ltd 2017).
- Forest licensees, such as ATCO, play a key role in wildfire risk reduction by conducting timber harvesting operations that can strategically reshape forest structure and lower fuel loads, thereby aiding fire management in and around Quartz Creek Community Watershed (LM Forest Resource Solutions Ltd 2020). As noted above, the RDCK partnered with Kalesnikoff Lumber Co. Ltd to manage fuel loads in Selous Creek near the City of Nelson. Licensees also have a role to play by taking actions to reduce the risk of wildfire stemming from their forest harvest operations in the area and reporting wildfire ignition as early as possible.
- The local community, including residents, community groups such as the Ymir Community Watershed Society, and those engaging in recreation in the watershed can reduce the likelihood of wildfire through their actions, such as reducing fuel loads on private property, or raising awareness about how to mitigate the risk of wildfire. They have a stake in ensuring the watershed remains undisturbed given that it is the source of their drinking water. Local

community members can also report signs of wildlife in the region ensuring fire suppression activities start as early as possible.

- First Nations in the region are key partners and should be consulted during the assessment and development of fuel treatments and before any fuel reduction treatments proceed (Cathro Consulting Ltd and B.A. Blackwell & Associates Ltd 2017).

7.2.2 Prevent Degradation from Commercial Forestry

Description

Preventing the degradation of the Quartz Creek Community Watershed from commercial forestry requires proactive collaboration with forest tenure holders and a commitment to safeguarding the region's vital water resources. While the RDCK lacks direct jurisdiction over the land, engaging with licensees such as ATCO Wood Products is essential to promote practices that protect water quality and maintain forest ecosystem integrity. Preserving no-harvest buffer zones around drinking water supply areas remains the preferred strategy, but other mechanisms—such as negotiating harvest deferrals or exploring the purchase of timber rights—can also be effective tools. By aligning forestry activities with watershed protection priorities, it is possible to minimize the risks of sedimentation, slope destabilization, and water contamination that can arise from logging and related operations. Two specific actions for consideration are descried below:

1. **Leverage the Forest Landscape Planning (FLP) process.** The FLP process is a modernized approach to forest governance in BC, replacing traditional forest stewardship plans.[4] FLPs operate at a tactical scale, bridging the gap between broad, strategic land use priorities and on-the-ground operational planning, such as road and cutblock placement.[5] Developed in partnership with Indigenous groups and in collaboration with license holders, FLPs are designed to engage local governments and stakeholders more effectively. By evaluating and mitigating environmental impacts, applying scenario modelling, and considering cumulative effects, FLPs respond to changing conditions like climate change and wildfire threats. Although they cover larger areas than individual watersheds such as Quartz Creek and may take several years to develop, FLPs may provide a long-term opportunity to secure Ymir's drinking water supply by enabling agreements that balance timber access with the protection of community watersheds. For instance, given the larger spatial scale, the FLP process could offset any reduction in ATCO's timber supply resulting from prioritizing the Quartz Creek Community Watershed's drinking water use by allowing access to timber from other Crown lands with lower non-timber values.
2. **Purchase of Timber Rights.** Acquiring timber rights can serve to safeguard community watersheds and the drinking water they supply. By purchasing or leasing these rights, local governments, regional districts, or community organizations are able to directly manage the forested lands allowing them to prioritize water quality and environmental stewardship. For example, the Capital Regional District's fee simple purchase of its drinking watershed lands protects its water supply (Haddock 1999). Fee simple land ownership may not always be possible due to Crown land status. In these cases it may be possible to secure timber rights

[4] Forest landscape plans - Province of British Columbia

[5] https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/forest-landscape-plans/flnrord_forest_landscape_planning_bulletin.pdf

as with Metro Vancouver's 999-year lease for the three watersheds supplying its drinking water. Smaller communities have also secured these leases including Enderby, Fernie, and Vernon (Haddock 1999). Another related option is Community Forest Agreements (CFAs) which are forest licenses granted to local communities or First Nations allowing them to manage nearby Crown lands. These communities may prioritize several management objectives, including water supply. For example, the Creston Community Forest's tenure overlaps with multiple community and domestic watersheds and a primary management objective is to maintain drinking water supply.[6]

Current Status

Forest harvest operations are currently not occurring in the watershed and the licensee, ATCO Wood Products, has no firm plans for timber harvest. However, the potential for commercial logging remains. Harvesting within the Quartz Creek Community Watershed is permitted provided operations adhere to regulations designed to protect local drinking water supplies. Governed by legislation such as the FRPA and its related regulations, timber harvest activities must demonstrate that they do not adversely impact water quality, quantity, or flow timing for licensed community water systems. A strict 100-metre no-harvest buffer is enforced upslope of water intakes, except in cases where it can be shown that sediment delivery will not increase. Within this buffer, tree removal is highly restricted and allowed only for essential access or maintenance. All harvesting plans require thorough risk assessments, including hydrological or terrain stability analyzes, to mitigate any threats to water resources, and licensees must submit and comply with approved Forest Stewardship Plans that detail the measures taken to safeguard water values during operations.

Valuation

The value of timber can be assessed as the net revenue—calculated by subtracting harvesting costs from the revenue generated by selling the timber. This figure reflects the profit a licensee would forgo if harvesting does not occur, providing a useful indication of the potential cost involved in purchasing timber rights. Since ATCO Wood Products has no current harvest plans, detailed information about cutblock locations or specific forest operations is unavailable. Therefore, the estimated net revenue is calculated for the licensee's entire portion of the watershed, though, in practice, harvesting would not encompass the whole area. Any negotiations to defer harvesting or acquire timber rights would require further analysis. These estimates are based on species-specific timber volumes (m^3), prices (per m^3), and harvest costs (per m^3).

Timber volumes by species for Quartz Creek were estimated from the Vegetation Resource Inventory (VRI) using data on volumes per hectare for live trees at a 17.5 cm utilization threshold.[7, 8] These fields represent the net live volume per hectare since they subtract decay, waste, and breakage from the gross volume. As part of estimating revenue a weighted average price was calculated using data from

[6] https://www.crestoncommunityforest.com/

[7] Volume fields included 'live_vol_per_ha_spp1_175', 'live_vol_per_ha_spp2_175', 'live_vol_per_ha_spp3_175', 'live_vol_per_ha_spp4_175', 'live_vol_per_ha_spp5_175', and 'live_vol_per_ha_spp6_175'.

[8] The VRI data also contained volumes for 12.5 cm and 22.5 cm utilization thresholds. A 12.5 cm utilization threshold yields similar results and the fields for a 22.5 cm threshold were all zero.

the Interior Log Market Values Reports covering June 2024 to May 2025.[9] Prices and volumes from transactions in BC's Interior are reported in $/m^3 based on the intended use of the harvested wood (e.g., sawlogs, peelers, or pulpwood). The weighted average prices were estimated for spruce-pine-fir (SPF), Douglas-fir/larch, hemlock-balsam fir (hem-bal), cedar, and other species across all product types by weighting by volume of intended use. As such prices represent the distribution of intended product types for the whole Interior Region (sawlogs account for 79% of volume, peelers account for 5%, and pulpwood 16%). Due to data limitations, no prices were assigned to deciduous species. The cost of harvesting a m^3 of coniferous or deciduous wood in the Southern Interior region was taken from Xu et al. (2018). These costs include expenses related to tree-to-truck operations, hauling, stumpage fees, forest planning and administration, road development and maintenance, and silviculture activities.

The VRI data indicates the presence of eleven species with Interior Douglas fir, Engelmann spruce, Western hemlock, and alpine fir account for 83% of live net volume (Table 77-1). Given assumed prices, the estimated total revenue amounts to $23 million, total costs near $13.5 million, and net revenue $9.6 million. Considering the size of ATCO's lease area in the watershed, this works out to a net revenue of over $16,500 per hectare.

Table 77-1: Volume, Revenue, Costs, and Net Revenue of Timber Harvests in Quartz Creek (2024 CAD).

Species Name (Code)	Volume (m^3)	Revenue[a]		Cost		Net Revenue (Total)
		$/m^3	Total	$/m^3	Total	
Alpine fir (BL)	24,118	$107.07	$2,582,167	$66.76	$1,610,037	$972,131
Western hemlock (HW)	33,393	$96.92	$3,236,356	$66.76	$2,229,262	$1,007,094
Interior Douglas fir (FDI)	68,464	$124.15	$8,500,040	$66.76	$4,570,498	$3,929,542
Engelmann spruce (SE)	41,003	$107.07	$4,389,962	$66.76	$2,737,236	$1,652,727
Grand fir (BG)	11,282	$107.07	$1,207,907	$66.76	$753,156	$454,751
Aspen (AT)	331	No data	-	-	-	-
Common paper birch (EP)	13	No data	-	-	-	-
Interior lodgepole pine (PLI)	5,083	$107.07	$544,243	$66.76	$339,347	$204,896
Western red cedar (CW)	5,085	$187.02	$950,912	$66.76	$339,435	$611,477
Western larch (LW)	10,706	$124.15	$1,329,210	$66.76	$714,720	$614,490
Western white pine (PW)	2,823	$107.07	$302,227	$66.76	$188,445	$113,782
Total	**202,300**		**$23,043,024**		**$13,482,135**	**$9,560,889**
Per Hectare	**352**		**$40,112**		**$23,469**	**$16,643**

[a] Prices were assigned to each species as follows: SPF (BL, SE, BG, PLI, and PW), Douglas fir / Larch (FDI and LW), Hem-Bal (HW), and cedar (CW).

While this analysis provides a rough snapshot of the current timber value on the land base, it does not account for longer-term revenue streams from future harvests. A more thorough analysis of harvest volumes would be based on a proper timber supply model. The cost estimates are based on data from Xu et al. (2018), which may not fully reflect present-day operational expenses, especially given the requirements for maintaining water quality and environmental standards in a community watershed would likely increase harvest costs. Furthermore, the pricing data reflects intended product uses for the entire Interior Forest region over the past year, which may differ from the actual distribution intended uses for wood harvested in the Quartz Creek Community Watershed. ATCO's

[9] Interior Log Market Values - Province of British Columbia

manufacturing operations are focused on veneer production using peelers as inputs but they also market logs and manufacture other wood products.[10] The absence of detailed cutblock location data means the analysis represents the overall license area overlapping with Quartz Creek rather than the areas likely to be harvested.

Relevant Parties

Preventing the degradation of the Quartz Creek Community Watershed's forest due to timber harvest involves several stakeholders.

- As the main licensee of the watershed's area ATCO Wood Products holds the rights to nearly all the timber. As such, they are a key player in avoiding impacts on the watershed from timber harvests. Licensees may forgo harvest altogether which eliminates any risk to the water supply although doing so likely impacts their finances. If harvest operations proceed, the licensee, along with any contractors they engage, have direct roles to play by taking actions to mitigate the harvest's impact on drinking water quality.
- The Government of BC has a direct role as the landowner and licensor of timber harvest rights. In doing so they collect fees related to forest tenure agreements as well as stumpage from timber harvested. Importantly, the Province also governs forestry via legislation, planning, or other avenues with legislation requiring actions to minimize harvest operation impacts in community watersheds. Finally, the government may also have a role to play in funding any timber rights buyout, deferrals, or allowing access to timber elsewhere to offset forgone harvest in Quartz Creek.
- As the water utility operator, the RDCK also has a role to play in avoiding negative impacts on drinking water stemming from harvest operations, monitoring for any impacts on raw water, and dealing with any negative outcomes. They may also be involved in negotiations required for timber licensee buyouts.
- The local community, including residents and community groups, is also directly involved as they must deal with any real or perceived negative impacts on drinking water quality stemming from forest operations. They can also play a role in monitoring for these negative impacts. Water utility ratepayers would also be directly impacted by any outcome of negotiations involving a license buyout—they may need to cover at least part of these costs.
- As partners in forest management, First Nations are also relevant to avoiding impacts of forest operations on drinking water quality in Quartz Creek. For instance, the new FLP process involves First Nations as a partner in forest management in British Columbia.
- Assuming the licensee forgoes timber harvests in Quartz Creek, they still require timber to supply their downstream operations (e.g., ATCO's veneer mill). In this case, timber harvests may be increased elsewhere to compensate for the reduction in timber from Quartz Creek. This introduces a new set of parties and stakeholders in the area from which this timber is harvested.

[10] ATCO Wood Products

7.2.3 Develop Emergency Backup Water Supply

Description

In response to the pressing need for a reliable backup to the primary water source at Quartz Creek, the community should prioritize the development of an emergency water supply system. Recognizing that wildfires or other disturbances could temporarily render the creek unsuitable for use, local leaders should focus on establishing a groundwater-based solution. This system could be designed not to replace Quartz Creek entirely, but to provide a dependable source of safe drinking water during periods of disruption. By investing in this backup infrastructure, the community could enhance its resilience, enabling more flexible emergency response planning, and reducing its vulnerability to unexpected environmental events.

Current Status

The community does not have an established backup water supply although groundwater has been recognized as a viable long-term solution. A test well was drilled in Ymir in 2003, however, it was neither properly completed nor tested for water yield (Golder Associates 2003). Theoretical water yields suggest that there is enough water to supply Ymir's daily needs. This groundwork highlights both the need and the potential for developing a dependable emergency water source to ensure resilience against disruptions to the main supply from Quartz Creek.

Valuation

The projected costs for establishing a backup groundwater supply system in Ymir include several critical components. Drilling costs are based on the assumption that wells will be constructed in aquifer #0493 (Salmo Bedrock Aquifer): the less vulnerable and higher quality source (Lengyel et al. 2024). Given yield data per well from existing registered wells, at least two new wells would need to be drilled to meet Ymir's daily water demand.[10] Cost estimates are based on pricing from other RDCK projects and staff experience and assume a 40 m depth per well. Shared costs (two wells) include mobilization/demobilization ($6,000), site clearing and access ($10,000), hydrology ($18,000) and engineering ($12,000), surveying and permitting ($3,500) for a subtotal shared cost of $49,500. Per-well costs (x2) include bedrock drilling and completion, testing, pad, bollards, signage and casing ($36,222); wellhead, isolation valving, pump, electrical and SCADA ($32,000) for a subtotal of $136,444 for 2 wells and a grand total of $185,944. This estimate does not include land acquisition costs, ongoing operations and maintenance costs, which depend on usage, nor does it cover the expenses associated with connecting the wells to the existing water supply system.

Relevant Parties

Developing a groundwater-based emergency backup water source involves several stakeholders.

- The Government of BC is directly involved in governing aquifers and licensing access via wells including issuing permits. Further, if a well is drilled on Crown land, then the Province is required to grant access. Their agencies, such as Interior Health, are also involved in permitting regulating new drinking water sources.[11]

[11] https://www.interiorhealth.ca/information-for/businesses/drinking-water-providers-and-operators#emergency-response-plans

- The RDCK operates Ymir's water utility and as such has a direct role to play in developing and operating any new backup water system.
- Members of the local community, notably water utility ratepayers, are also impacted by any new emergency backup water source as they may need to cover related costs. Water users, both drinking and fire suppression, will also be affected as the backup source ensures the availability of water if the supply from Quartz Creek is compromised.
- Yields from existing wells drilled nearby into aquifer #0493 may be influenced by any new backup well system which may influence water availability to certain private well users. For instance, the new wells may reduce supply to existing users and as such, assessments should be made to ensure that drawing additional water from this aquifer does not negatively impact existing users.

7.2.4 Implement Coordinated Watershed Monitoring

Description

Implementing watershed monitoring involves a collaborative approach, drawing on the efforts already underway by multiple stakeholders, including the RDCK, government agencies, and local resource licensees. To ensure comprehensive and reliable data collection, agreements should be established with all parties involved to facilitate regular sharing and review of monitoring information, such as turbidity, flow rates, temperature, and land use changes. Coordination among tenure holders and agencies helps to minimize duplication of effort while promoting shared stewardship of data. By prioritizing these key parameters and fostering cooperative data management, the monitoring program should aim to provide a clear and consistent picture of watershed health, equipping the community to respond adaptively to changing conditions based on robust evidence.

Current Status

A variety of organizations are actively engaged in data collection efforts within the Quartz Creek Community Watershed to safeguard water quality and monitor environmental changes. The RDCK regularly gathers water quantity and quality data at their intake weir, focusing on indicators such as raw water pH, turbidity, bacteriology, and volume. Much of this information is reported the RDCK's annual year end flow and water quality reporting, which is currently being funded by BC Timber Sales and Ymir Water Service.[12] ATCO, and previously BC Timber Sales, have enlisted Saso Consulting to monitor water flows in Quartz Creek, maintaining a current measuring station approximately 200 metres upstream from the RDCK intake. The Government of BC tracks land use changes in the region through its Vegetation Resources Inventories, employing satellite imagery, aerial surveys, and GPS data to monitor shifts in the landscape.[13]

[12] https://www.rdck.ca/environmental-service/environmental-services/water/rdck-water-systems/ymir-water-system/

[13] https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-inventory

Valuation

Monetary estimates for establishing agreements with the different groups and coordinating its use and review are largely unknown. Based on conversations with ATCO and the RDCK, water quality monitoring efforts are estimated to cost roughly $7,000 per year.

Relevant Parties

Implementing coordinated watershed monitoring involves several stakeholders, including those involved in existing monitoring activities.

- Groups currently collecting data include the RDCK since they monitor the water system, ATCO Wood Products who engage Saso Consulting to monitor water quality, as well as the Government of BC who monitors land use change.
- The forest license holder, in this case ATCO, has a role to play in any initiative that coordinates data collection and sharing beyond their current work with Saso Consulting focusing on water supply such as changes in land cover.
- Community members, such as Ymir residents or those using the watershed for recreation, and the Ymir Community Watershed Society could contribute to monitoring changes in land use, water quality, or water supply.
- A lead agency or organization could lead the coordination of watershed monitoring. This may be a government agency, the RDCK, or a local NGO such as the Ymir Community Watershed Society.

7.3 Prioritized Recommendations

This section presents a phased roadmap for safeguarding the drinking water services of the Quartz Creek watershed. Recommendations are structured to address priority risks—wildfire, drought, and logging—within the context of governance and operational constraints. In addition to phased timing, each action is prioritized according to its urgency and potential impact on drinking water services.

Actions are prioritized according to the following definitions:

- **Top Priority:** Essential for protecting the watershed's most at-risk services.
- **High Priority:** Significant importance that follows or depends on top-priority work.
- **Supporting Priority:** Valuable but less time-sensitive or contingent on earlier outcomes.

7.3.1 Short-Term (Years 1–2) Planning, Scoping, Engagement

In the short-term, focus should be on building the knowledge base, fostering relationships, and developing feasible plans before implementation.

Top Priority Actions:

- **Collaborative Wildfire Risk Planning**
    - Engage BC Wildfire Service, ATCO Wood Products, and local experts on explicitly building the Quartz Creek community watershed into existing wildfire management plans.

    - Scope appropriate treatment areas, methods, and objectives.
    - Assess wildfire risk reduction benefits and potential timber value implications.
- **Backup Groundwater Supply Feasibility**
    - Commission a hydro-geological review of Aquifer #0493.
    - Identify potential drill sites, permitting needs, and technical constraints.
    - Develop preliminary feasibility and costing report.

High Priority Actions:

- **Stakeholder Dialogue on Timber Rights**
    - Initiate structured discussions with ATCO, the Province, and local First Nations.
    - Explore options including voluntary deferrals, conditional harvests, and partial buyouts.

Supporting Priority Actions:

- **Coordinated Watershed Monitoring Framework**
    - Align water quality, hydrology, and forest health monitoring across stakeholders.
    - Establish data sharing and joint reporting protocols.

7.3.2 Medium-Term (Years 3–5) Targeted Field Implementation and Testing

In the medium term, focus should be on initiating physical works based on completed planning and engagement (i.e. outcomes of the short-term actions).

Top Priority Actions:

- **Priority Wildfire Fuel Treatments**
    - Implement collaboratively agreed treatments in high-risk zones.
    - Balance water protection with timber considerations.
- **Backup Groundwater Test Wells and Design**
    - Drill and test production wells to confirm capacity and quality.
    - Develop construction and integration plan for connection to Ymir system.

High Priority Actions:

- **Conditional Timber Valuation Study**
    - Commission detailed valuation of timber resources within Quartz Creek Community Watershed to support negotiations (if deemed necessary from initial dialogue).

7.3.3 Long-Term (Years 6–10) Adaptive Management

In the long-term focus should be on maintaining gains, securing long-term control, and adapting to changing conditions.

Top Priority Actions:

- **Maintain Fuel Breaks**
    - Scheduled maintenance cycles for agreed upon wildfire management controls.
- **Backup Water Supply Integration**
    - Construct and connect backup groundwater system.
    - Ensure operational readiness for drought or emergencies.

High Priority Actions:

- **Advance Governance and Tenure Security Plans**
    - Execute easements, tenure adjustments, or acquisition plans for long-term watershed protection (See Appendix E for a description of collaborate watershed governance).

Supporting Priority Actions:

- **Adaptive Management and Climate Readiness**
    - Use monitoring data to adjust practices as necessary
    - Respond to evolving wildfire, hydrologic, and climate risks.

9. Conclusion

The Quartz Creek Community Watershed represents a critical component of Ymir's public infrastructure, providing high-quality drinking water to the community through naturally regulated hydrological and ecological processes. This NAMP has involved a comprehensive assessment of the watershed's condition, service provision, replacement cost, and associated risks to support long-term service reliability and informed decision-making. This information is contained within an inventory that is designed to be updated over time, allowing the RDCK and partners to track changes in asset extent, quality, and stress exposure as part of ongoing natural asset monitoring.

The condition assessment confirms that the watershed is currently in excellent ecological health. Indicators such as forest cover, riparian integrity, and habitat continuity reflect a largely undisturbed system with strong capacity to support water quality and quantity regulation. The intact forest landscape and low levels of fragmentation contribute to a high degree of natural resilience.

Despite its current condition, the risk assessment identified several high-consequence hazards to both the natural assets and the drinking water service they provide. These include wildfire, drought, climate-induced shifts in snowpack and precipitation patterns, and potential future commercial logging or road development. Many of these hazards are likely to increase in frequency or intensity under projected climate conditions. Given that the watershed is the sole source of drinking water for Ymir and that no feasible alternative supply currently exists, any degradation of its condition would pose immediate and significant service-level risks.

The replacement cost analysis illustrates the substantial financial value of the ecosystem services provided by the watershed. Replicating the water supply and natural storage functions through engineered infrastructure—such as bulk-water delivery or above-ground reservoirs—would result in prohibitively high capital and operational costs, while offering only partial functionality. Moreover, engineered alternatives do not provide the ancillary benefits of the intact forested watershed, such as sediment control, fire-risk mitigation, and long-term flow regulation.

In light of these findings, the principal conclusion of the NAMP is that maintaining the ecological integrity of the Quartz Creek Community Watershed is the most reliable and cost-effective strategy to ensure the continued provision of drinking water to the Ymir community. This conclusion underscores the importance of proactive management, including wildfire risk reduction, forest health monitoring, and engagement with land tenure holders and regulatory agencies to prevent land-use activities that could compromise watershed function.

Finally, this plan positions the watershed as a vital service-providing asset, aligning its management with best practices in infrastructure planning and risk mitigation. Ensuring service continuity will require sustained collaboration among the RDCK, tenure holders, provincial regulators, First Nations, and local residents. The outcomes of this NAMP provide the technical foundation and strategic direction necessary to support that ongoing stewardship.

10. Appendix A: Existing Flow, Water Quality and Climate Change Data for Quartz Creek

This appendix provides supporting data on hydrological and water quality monitoring within the Quartz Creek Community Watershed. Its purpose is to establish a baseline understanding of current watershed function, particularly in relation to flow variability, water quality parameters, and early climate-related changes that may influence service delivery. This data contributes essential context for interpreting the risk assessment presented in Section 6 and strengthens the overall condition assessment of the watershed.

Monitoring data has been compiled to capture flow volumes, turbidity, and temperature over multiple years. These datasets inform the plan's evaluation of service reliability, potential climate stressors, and the likelihood of future disruptions in water availability or quality.

Appendix A is intended to provide transparency around the current empirical record and highlight emerging trends that may affect the long-term provision of drinking water to Ymir. It also supports future monitoring design and provides a baseline for evaluating management effectiveness and adaptive responses to climate change or land-use pressures.

10.1 Quartz Creek Flow and Water Quality Monitoring

Land use activities, such as forest harvesting, can alter the vegetative cover and modify hydrologic and vegetative processes, especially in watersheds with snow-melt-dominated peak flows. Those changes may be amplified by the effects of climate change (Smith et al. 2024), so the maintenance of a properly functioning watershed can increase resilience to those effects (Forest Practices Board 2022). Risks to watershed values of relevance to the Quartz Creek Community Watershed arise from changes in timing, magnitude, and frequency of stream flows and increases or decreases in fine and coarse sediment in streams (Joint Professional Practice Guidelines 2020). Recent flow volumes and consumption patterns are summarized herein to establish a baseline characterization of the current state of the watershed for comparison to possible future climate scenarios.

10.1.1 Flow Volume

In 2019, a flow monitoring weir was installed on Quartz Creek at the intake of the Ymir water system with funding from BC Timber Sales. Funding for monitoring and reporting from January 2021 to present was provided by ATCO Wood Products Ltd. Since installation, the RDCK has issued five annual reports that summarize Quartz Creek flow and water quality monitoring (RDCK 2021 - 2025). Data throughout the monitoring period was intermittent and/or inaccurate due to a failed transmitter, level sensor malfunctions, icing that interfered with water level readings, and an overflow calculation error. Data types include daily average weir flow level (mm), creek flows (L/s), 15-min turbidity (NTU) readings, weekly testing of treated water bacteriological, bi-weekly raw water bacteriological, quarterly chemical and biological parameters based on Guidelines for Canadian Drinking Water Quality, quarterly treated water trihalomethanes (THMs) and haloacetic acids (HAAs) and pH when a technician was on site.

Secondary flow monitoring was undertaken by Saso Consulting above the Ymir water system intake by calculating flows through a natural creek section. This secondary monitoring, along with visual

level readings taken weekly, allowed for flow monitoring comparisons. Control upgrades took place in February 2024 substantially improving data reliability (RDCK 2024).

Flow measurements were provided by Eileen Senyk <esenyk@rdck.bc.ca> via email on April 7th and April 17th. Observation dates in that dataset span from January 2022 to January 2025. Flow observations in that dataset are sourced from both a logger instrument (primarily in 2022) and from visual level readings. Flow measurements ranged from near zero L/s to a maximum of around 690 L/s. See Table 9-1 for minimum / maximum flow measurements and the dates upon which those measurements were observed. Maximum flow volumes recorded for 2022-2024 were substantially lower than maximum flow volume recorded in 2020, in which a maximum flow of 1,699 L/s was recorded, or in 2021, in which a maximum flow of 1,057 L/s was recorded (Regional District of Central Kootenay 2021, 2022).

Table 10-1. Minimum and maximum flow values in Quartz Creek from 2022-2024.

Sample Year	Minimum Flow		Maximum Flow	
	Date	Flow (L/s)	Date	Flow (L/s)
2022	Sep 26, 2022	10.46[1]	May 6, 2022	1,758.34[2]
2023	Sep 19, 2023, Nov 13, 2023	5.00	May 16, 2023	526.49
2024	Sep 9, 2024, Sep 16, 2024, Sep 23, 2024	7.56	Apr 30, 2024	418.02

[1]Lower flow levels were recorded visually when the intake pond was frozen on November 21 and November 29 2022. Those values are not considered accurate (RDCK 2023).

[2]Peak flow level was automatically recorded when Quartz Creek was above overflow weir height- it is not considered accurate (RDCK 2023).

Flow volumes in 2022-2024 peaked on May 6th[st] in 2022, May 16th in 2023, and April 30th in 2024. These peak flow dates are in line with those in earlier reports; maximum flows occurred on May 22[nd] in 2020 and on April 30th in 2021 (Regional District of Central Kootenay 2021, 2022). In 2022-2024, flow volumes decreased from the peak to below 100 L/s in July (see Figure 9-1). This also appears to be consistent with the pattern of flow volumes in 2020 and 2021, although there is a gap in flow data from June to August in 2020 (Regional District of Central Kootenay, 2021).

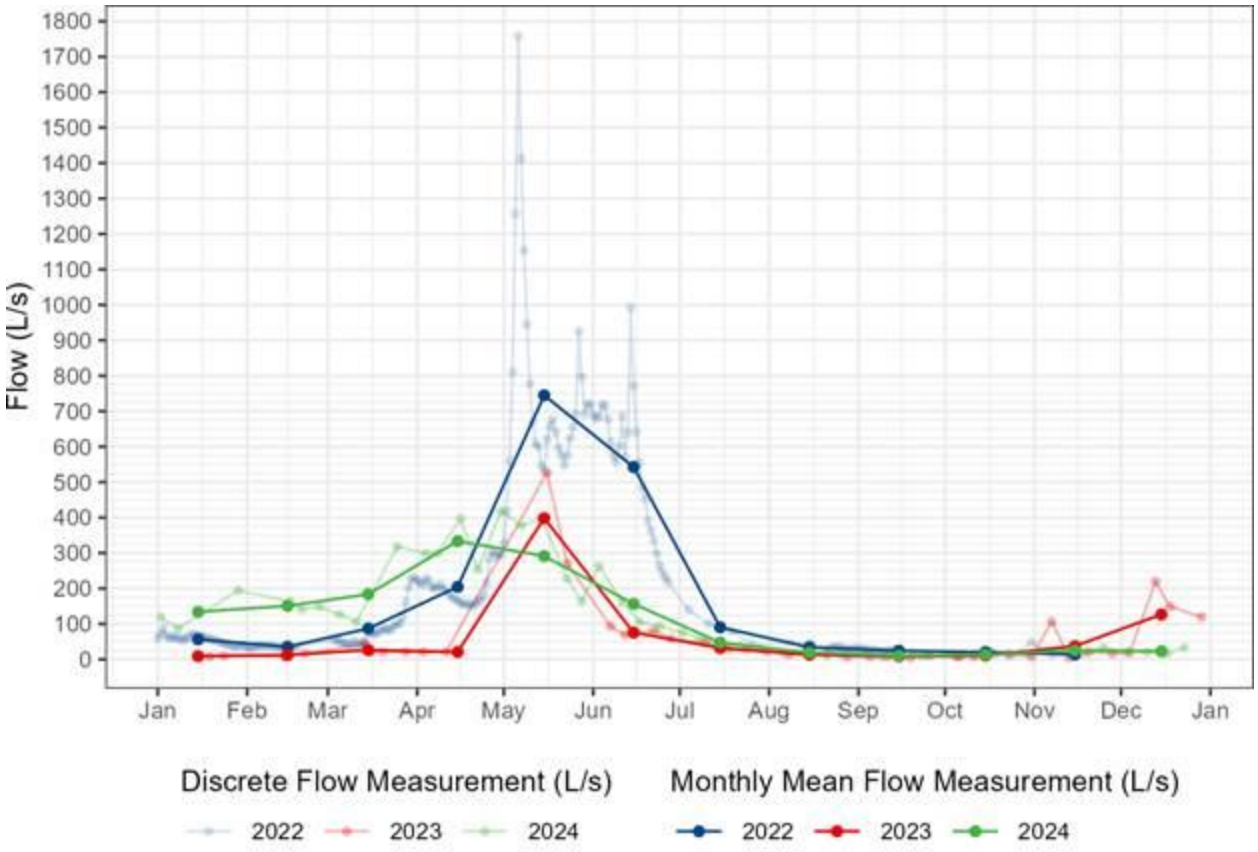

Figure 10-1. Flows in 2022-2024 in Quartz Creek, based on a combination of logger instrument records and visual level readings. Translucent lines and points indicate individual flow measurements and opaque lines and points indicate monthly average flow. Measurement from when the intake pond was frozen in 2022 (February 19th to March 2nd, November 21st, November 29th) are omitted.

10.1.2 Water Consumption

Water consumption values were provided by Eileen Senyk <esenyk@rdck.bc.ca> via email on February 7, 2025. These consumption values detail m^3 of treated water recorded weekly, from December 23rd 2019 to January 6th 2025. To determine the daily and monthly consumption volumes, the average consumption per day from a given weekly measurement was backfilled to each preceding date between weekly recordings and these consumption values were summed for each month. See Table 9-2 for a summary of consumption metrics. Total yearly consumption was highest in 2021 and decreased to be consistently around 26,000 m^3 per year in 2022, 2023, and 2024. Monthly consumption volumes were lowest in the fall and winter months, with the highest consumption totals in July, August, and September (Figure 9-2).

Table 10-2. Minimum and maximum consumption values in Quartz Creek from 2022-2024.

Metric	Year				
	2020	2021	2022	2023	2024
Days in Year	366	365	365	365	366
Total Consumption (m^3)	34934	42610	26052	26133	25729
Maximum Daily Demand (m^3)	332	210	146	118	114
Average Daily Demand (m^3)	95	117	71	72	70
Consumption per Connection (m^3)	323	395	241	242	238
Consumption per Connection per Day (L)	884	1081	661	663	651

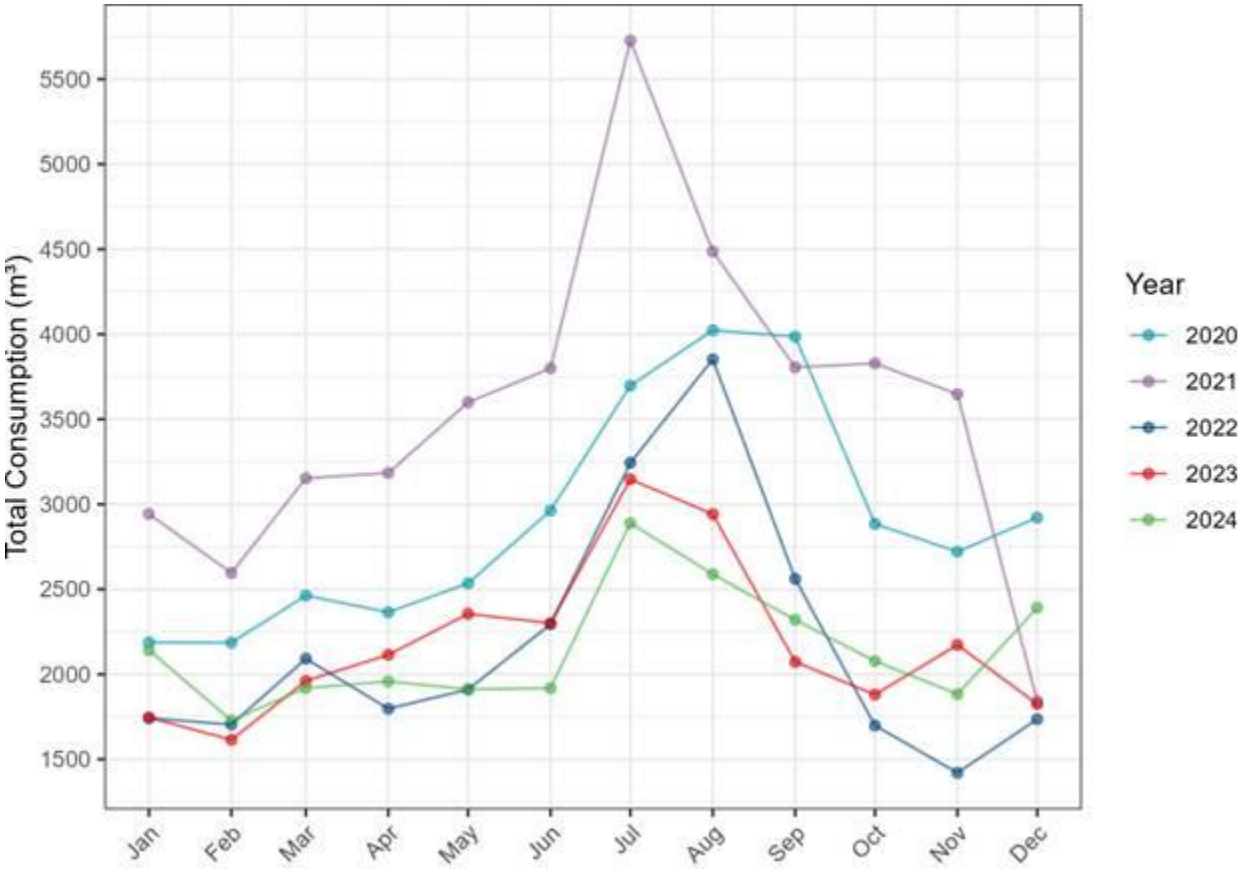

Figure 10-2. Total consumption volume by month from 2020 to 2024.

10.1.3 Available Water Volume and Water Consumption

To explore the relationship between available water volume flowing through Quartz Creek and water consumption, the average flow (as volume per second) was used to estimate the total volume of water that flowed through Quartz Creek for each month in 2022 to 2024 (see Equation 1).

$$Total\ Monthly\ Volume = Average\ Flow\ Measured\ in\ Month \times 60 \times 60 \times 24 \times Count\ of\ Days\ in\ Month \quad 1$$

These total volumes were compared to the corresponding volume of water consumed in that month to determine the ratio of volume available to volume consumed (see Table 9-3). In general, volume available as flow greatly exceeded the volume consumed; flow volumes ranged from one to three orders of magnitude higher than corresponding consumption volumes. In the spring and early summer, monthly volumes available were typically many times higher than the relevant volume consumed. In fall months, those ratios decreased; for example, in September of 2023 and 2024, roughly one tenth of the water flowing through Quartz Creek was extracted from the creek through the community water license. Generally, peak consumption months in 2022 through 2024 appear to coincide with the end of the falling limb of freshet (see Figure 9-3).

Table 10-3. Total flow volume ("Flow Vol. (m^3)") compared to volume consumed ("Vol. Consumed (m^3)") from 2022-2024. "Flow / Consumed" indicates the ratio between flow volume and volume consumed.

Month	2022			2023			2024		
	Flow Vol. (m^3)	Vol. Consumed (m^3)	Flow / Consumed	Flow Vol. (m^3)	Vol. Consumed (m^3)	Flow / Consumed	Flow Vol. (m^3)	Vol. Consumed (m^3)	Flow / Consumed
January	151,197	1,742	87	24,127	1,746	14	358,619	2,142	167
February	85,906	1,704	50	29,844	1,615	18	378,056	1,729	219
March	233,213	2,092	111	70,437	1,961	36	492,191	1,919	256
April	530,515	1,797	295	53,988	2,115	26	864,739	1,958	442
May	1,995,172	1,910	1,044	1,066,707	2,355	453	780,510	1,912	408
June	1,406,543	2,294	613	195,574	2,301	85	405,577	1,918	211
July	242,561	3,244	75	85,685	3,147	27	127,498	2,889	44
August	91,124	3,852	24	34,799	2,942	12	50,811	2,589	20
September	62,827	2,561	25	21,880	2,073	11	25,786	2,320	11
October	54,782	1,698	32	28,890	1,880	15	36,556	2,078	18
November	35,377	1,420	25	96,720	2,173	45	65,387	1,883	35
December	30,342	1,736	17	339,187	1,825	186	61,677	2,391	26

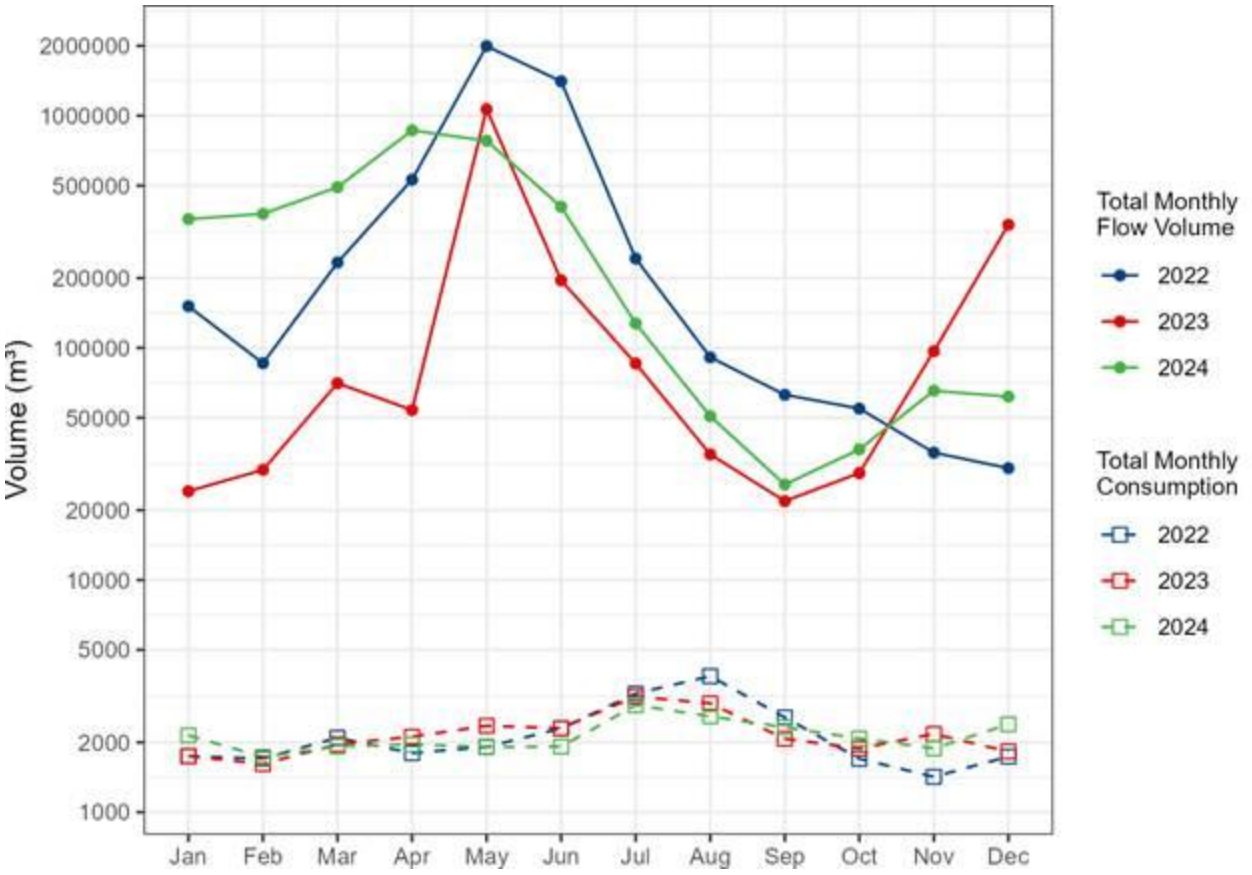

Figure 10-3. Comparison of total flow volume by month (based on average monthly flow / second) and total monthly consumption. Y axis (volume in m^3) is log-transformed to enable comparison between flow volume values and consumption volume values.

10.2 Regional Impacts of Climate Change

A Climate Projection Report was developed for the Kootenay Region to align with goals set out by the British Columbia Climate Action Charter and includes climate projections for both 2050 and 2080. The Kootenay Region is expected to experience significantly warmer summers with a potential decrease in precipitation. Other seasons may see increased precipitation in the form of rain rather than snow due to warmer temperatures. These changes are likely to result in an increased frequency and severity of wildfires, a shift in the growing season and changing crop suitability, and the potential for spring flooding risk (PCIC 2012).

10.2.1 Predicted Changes in Climate Variables

To explore the potential effects of climate change on water availability in the Quartz Creek Community Watershed, locally downscaled climate variables were obtained for the watershed using ClimateBC (Wang et al. 2016). Variables based on historical climate normals from 1991 to 2020 were compared to variables predicted for four future time spans: 2021-2040, 2041-2060, 2061-2080, and 2081-2100 (Mahony et al. 2022). Four different Shared Socioeconomic Pathways (SSPs) based on different greenhouse gas emission scenarios were included for comparison: SSP1-2.6 (low), SSP2-4.5 (intermediate), SSP3-7.0 (high), and SSP5-8.5 (very high) (IPCC 2023). These different SSPs

encompass a range of possible future climate scenarios. For each of these SSPs, ClimateBC's eight Global Circulation Model (8GCM) ensemble was used to predict future climate variables (Mahoney et al. 2022). All predicted values sampled from the historical climate normal or from the SSPs are representative of a typical year in each scenario; predicted values do not represent abnormal or extreme individual years from neither the historical dataset nor any future predicted years.

Consistent with general global climate change models, mean yearly temperature in the Quartz Creek Community Watershed is predicted to increase under all four included SSPs (Figure 9-4-A), although mean yearly temperature under SSP1-2.6 is predicted to level off and decrease in 2061-2080 to 2081-2100. At the same yearly scale, precipitation is also generally predicted to increase, with a deviation from that trend in SSP3-7.0 in 2061-2080 (Figure 9-4-B). Although precipitation overall is expected to increase, precipitation as snow is predicted to decrease (Figure 9-4-C), which is in line with the expected increase in overall temperature in the watershed.

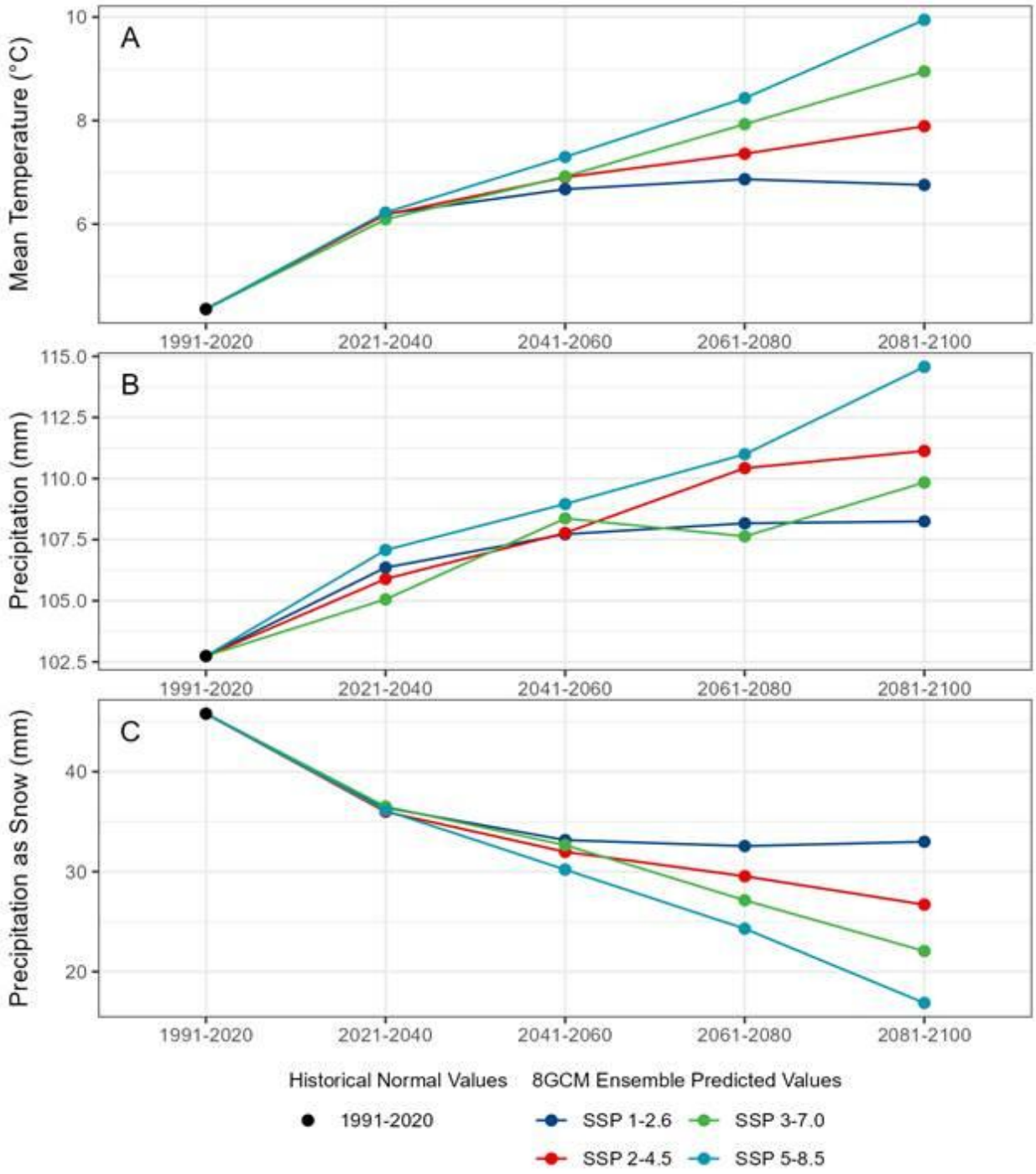

Figure 10-4. Historical and predicted yearly mean temperature, yearly mean precipitation, and yearly mean precipitation as snow based on locally downscaled climate variables in the Quartz Creek Community Watershed.

Hydrology in Quartz Creek is subject to seasonal effects; yearly averages are useful for the establishment of overall trends, but annual aggregation can obscure within-year variation. Monthly predictions of climate variables can provide additional insight into the likely effect of climate change on flow volumes and water availability.

Total precipitation is predicted to increase across all four SSPs (Figure 9-4-B), but the timing of that precipitation will likely affect flow volumes throughout the year. Across all four SSPs, increased precipitation is predicted to occur primarily in the winter, spring, and fall months (Figure 9-5), which may increase flow volumes in those months or affect the timing of peak flow. However, precipitation is predicted to decrease in the summer months (July and August). Since those months are typically when flows in Quartz Creek are low (Figure 9-1, Regional District of Central Kootenay 2021, 2022, 2023, 2024), the reduced precipitation in those months may further decrease the flow in Quartz Creek.

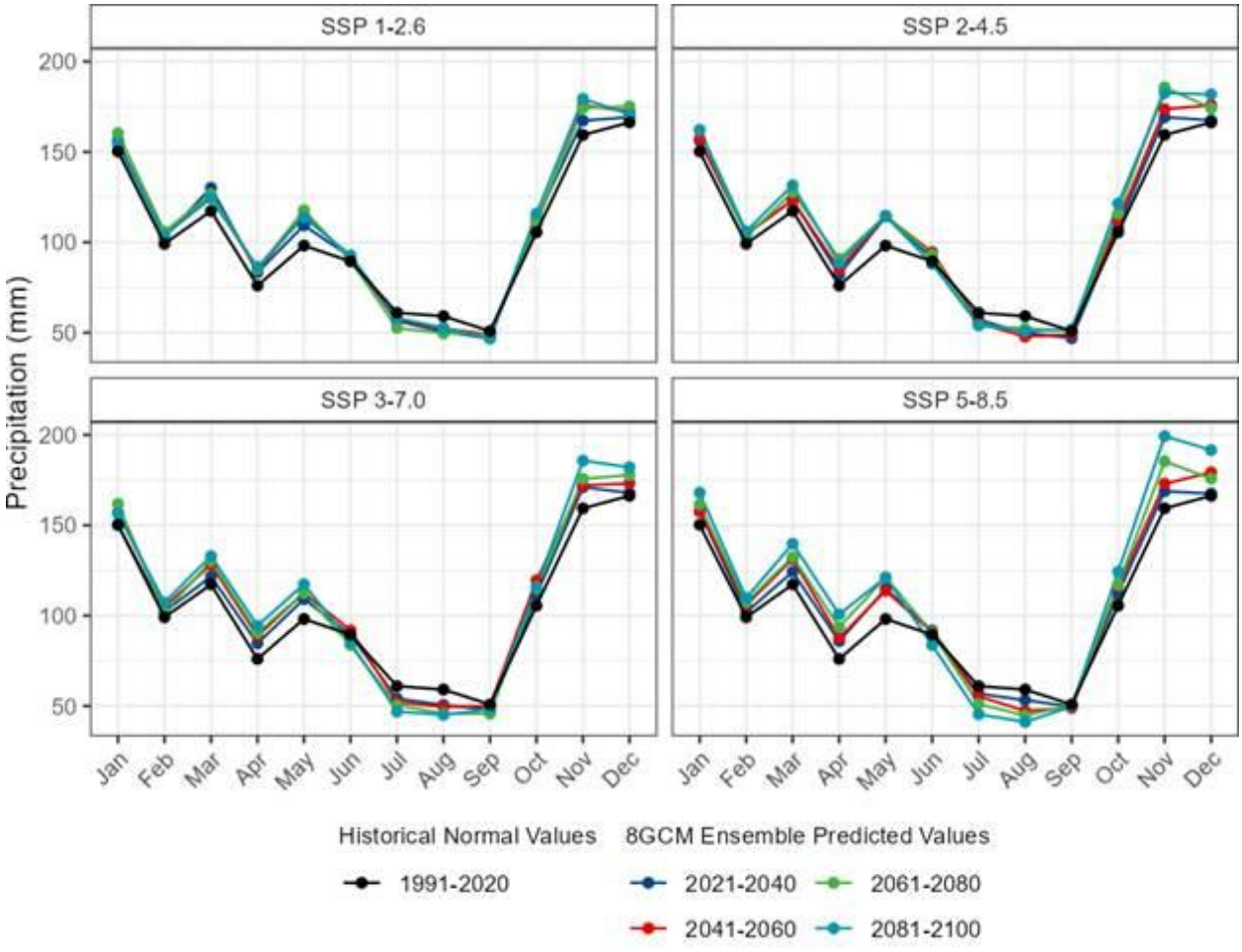

Figure 10-5. Historical and predicted monthly precipitation based on locally downscaled climate variables.

Although precipitation by month is predicted to increase in some cases and decrease in others, both precipitation as snow and average monthly temperatures are predicted to shift in the same direction across all months. Precipitation as snow predicted under all four SSPs is expected to decrease; the key difference between scenarios is the magnitude of the decrease (Figure 9-6). This predicted change would lead to a reduced overall snowpack.

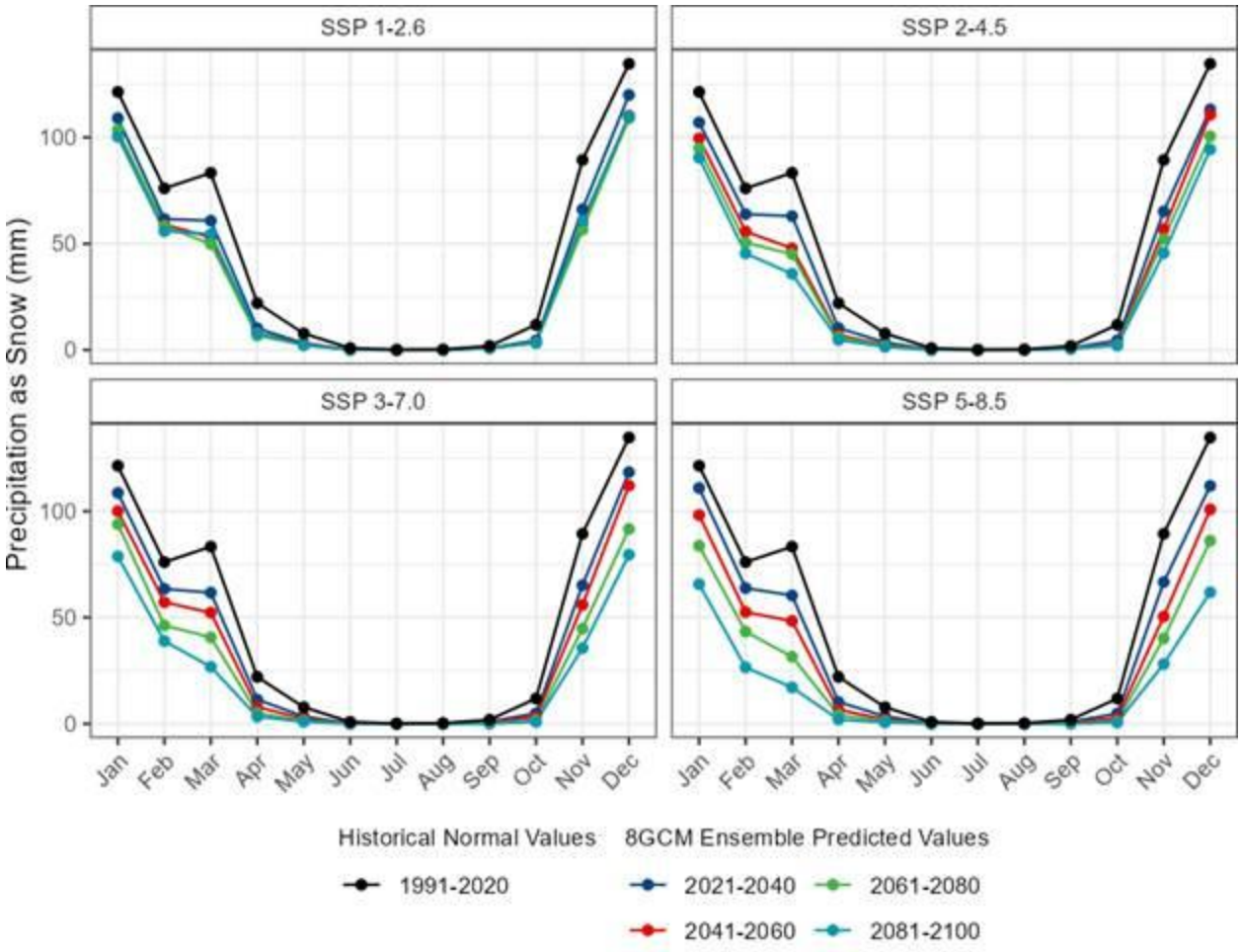

Figure 10-6. *Historical and predicted precipitation as snow based on locally downscaled climate variables.*

As with precipitation as snow, temperatures across all four SSPs are predicted to increase across all months (Figure 9-7). In the least extreme climate scenario evaluated (SSP 1-2.6), temperatures are expected to increase by a few degrees for the first twenty-year period (2021-2040), but then change little beyond that in the following three time spans. In the three other SSPs evaluated, the average monthly temperature is expected to increase incrementally at each timestep. With each more extreme SSP, the number of months with an average temperature below zero degrees decreases over time. For example, SSP 5-8.5 predicts that in the time span of 2081-2100, only December and January will have average monthly temperatures below zero degrees.

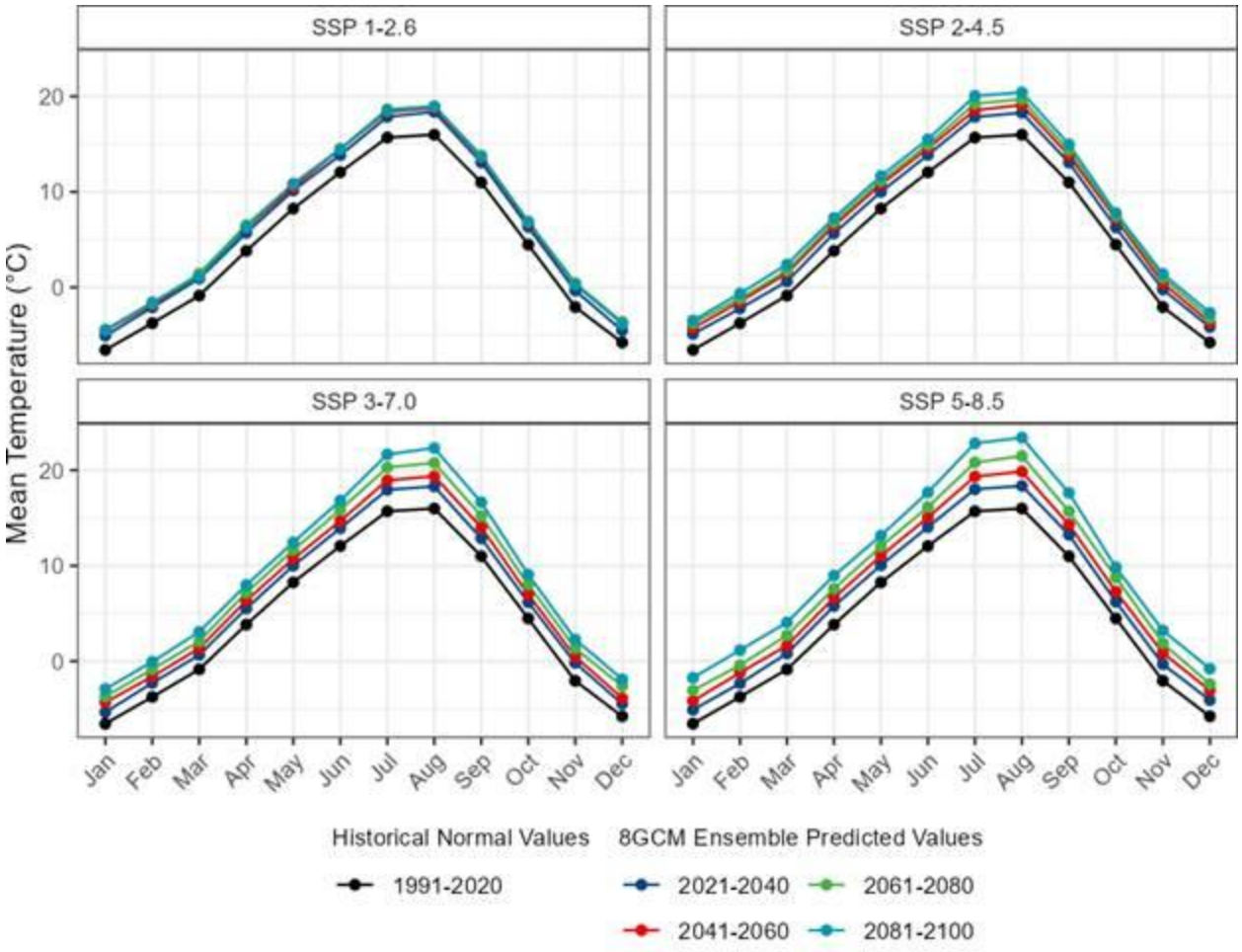

Figure 10-7. Historical and predicted average monthly temperature based on locally downscaled climate variables.

In the Quartz Creek Community Watershed, average monthly temperatures are predicted to increase, and precipitation as snow is predicted to decrease. The degree of impact from these changes will depend on the actual climate scenario that occurs, but in all cases evaluated herein it appears that climate change may cause a reduction in snow accumulation over winter in future years, which would decrease the total volume of water released in the spring melt. In addition, future snowpack may be subject to earlier melting which would lead to a corresponding change to the timing and duration of peak flow. As the snowpack influence on hydrological processes decreases, the predicted increase in precipitation as rain (Figure 9-5) would mean a shift towards higher importance of rainfall runoff on the flow patterns in the watershed.

These predicted changes are in line with findings from a model of a similar montane catchment, which showed that flow regime, including changes to the timing of peak flow, will be impacted (Smith et al. 2024) by climate change. However, there are interactions between climate change and stand-replacing disturbance such as forest fire or harvest that further complicate predictions of flow; Smith et al. (2024) found some cases where stand replacing disturbance effects offset the effects of climate change. If it is necessary to quantify the interactions between climate change and potential disturbance for Quartz Creek Community Watershed, it may be worth exploring a similar

comprehensive hydrological modelling approach to simulate different climate scenarios and / or different levels of stand-replacing disturbance.

10.2.2 Historical Snowpack

To contextualize the predicted decrease in precipitation as snow (see Figure 9-2, Figure 9-6) relative to the historical snowpack, data from the nearest Provincial Snow Survey Program stations were extracted from the BC Ministry of Environment Real-time water data tool (Ministry of Environment and Climate Change Strategy 2025). These two stations are Nelson (930 m elevation, 13.6 km from Quartz Creek Community Watershed) and Char Creek (1310 m elevation, 20.0 km from Quartz Creek Community Watershed). These sites are not directly adjacent to Quartz Creek Community Watershed, but their proximity is reasonable, each is in a Biogeoclimatic Ecosystem Zone also found in the community watershed (Nelson: Interior Cedar – Hemlock, Char Creek: Englemann Spruce – Subalpine Fir), and their elevations fall within the lower and upper elevation limits (780 m to 1694 m) of the community watershed (See Section 9.1). Snow water equivalent (SWE) values (the amount of water stored as snow, White et al. 2016) for each month were extracted and grouped into time spans of a maximum of ten years for comparison (see Figure 9-3). A qualitative assessment of those groupings suggests a general trend of decreasing SWE in the winter months. The predicted trend of decreasing precipitation as snow may represent a continuation of the apparent decreasing trend in SWE at both the Char Creek and Nelson survey stations.

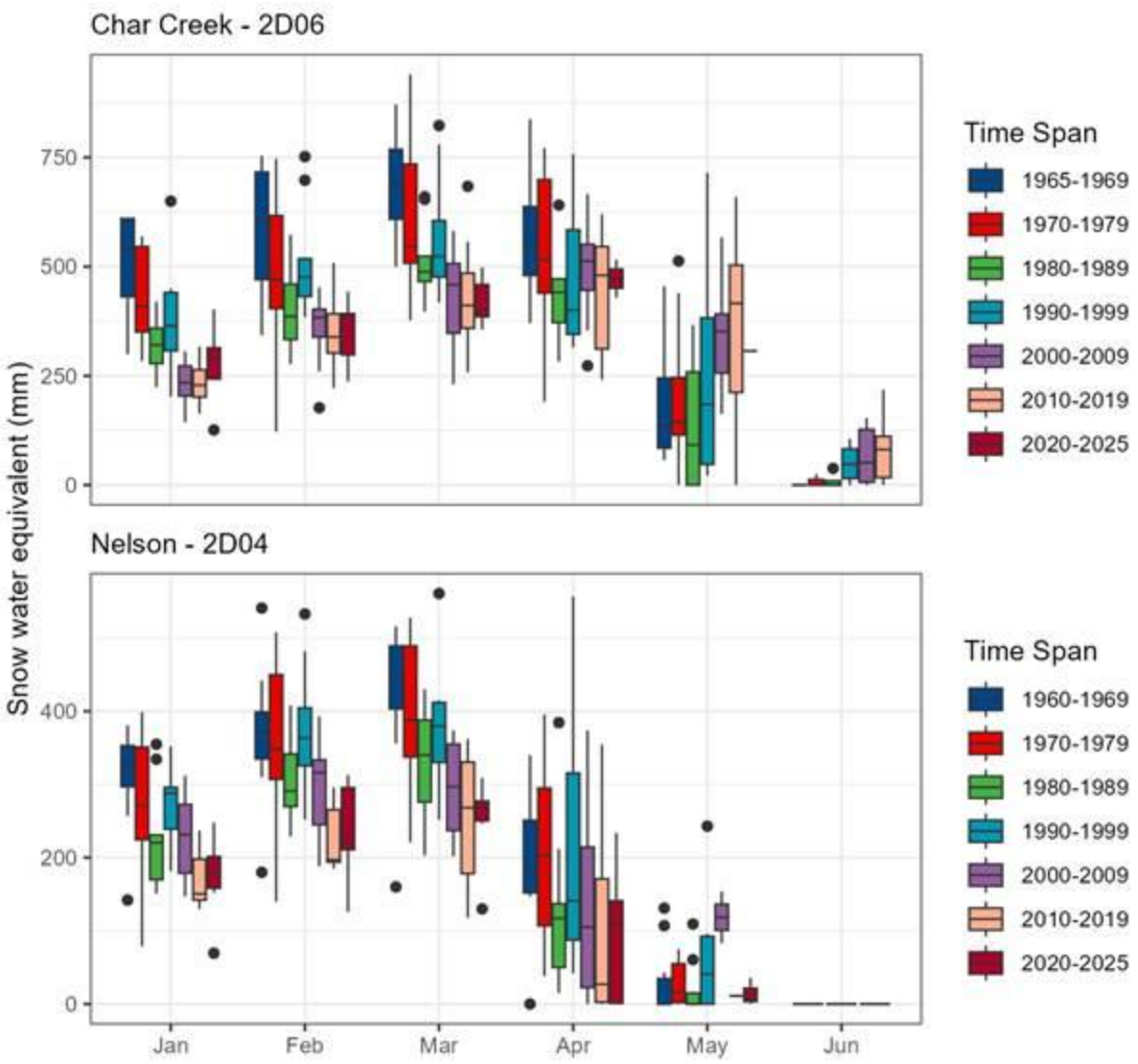

Figure 10-8. *Snow water equivalent (SWE) based on snow depth observations at Char Creek and Nelson snow monitoring stations. Colour-filled boxplots summarize the SWE by decade. Solid points indicate outlier values for a given decade. Note that the earliest data available from Char Creek are from 1965.*

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11. Appendix B: Condition Assessment Approach and Detailed Results

This appendix summarizes the specific rational, approach, and results for each condition indicator measured for the Quartz Creek Community watershed.

Table 1011-1. Category and descriptions for condition indicator.

Category	Indicator	Description
Forest Cover and Composition	- Percent (%) forest cover	Evaluates ecosystem complexity, biodiversity potential, and overall resilience. A high percent cover and mature forest imply greater watershed condition.
Forest Health and Disturbance	- Equivalent clearcut area	Detect stressors that may increase erosion, alter water yield, or degrade habitat. Less disturbance, good regeneration, and low pest impact imply greater watershed conditions.
Riparian and Canopy Integrity	- Continuity of riparian forest - Overall canopy closure*	Assesses stream shading, erosion protection, and microclimate buffering. Higher riparian continuity and intact canopy implies better stream protection and microclimate conditions that support water supply.
Roads and Fragmentation	- Road density - Interior forest habitat - Watercourse crossings	Roads and fragmentation increase erosion risk, reduce core habitat and watershed resilience that could ultimately impact water supply quantity and quality.

* Overall canopy closure was not able to be measured with available data and is recommended to be added as a measure of condition once LIDAR data for the area becomes available. Canopy closure is important for maintaining the necessary microclimate that helps slow the snowpack melt and maintain a steady water supply into the summer months.

11.1 Forest Cover and Composition

Forests regulate water yield, stabilize soil, and filter pollutants. Disturbances (e.g., logging, wildfire) can alter water flows and increase sedimentation. The type and extent of forest cover influence evapotranspiration, canopy interception, and soil infiltration, all of which affect streamflow regulation. Diverse, continuous forest cover also supports long-term watershed stability and resilience.

11.1.1 Percent of Forest Cover within Watersheds

INDICATOR: Percentage of watersheds covered by forest with higher forest cover ranking more favorably.

RATIONALE: According to Environment Canada (2013) research, it is recommended that between 30-50% of watersheds be forested. The greater the percent of forest cover, the greater the conservation and habitat quality of the watershed. From a management perspective, any forest asset within a watershed with a high degree of forest cover will generally require less management intervention.

APPROACH: Watershed boundaries were overlayed on the natural asset inventory. The total area of all forest assets was estimated and compared against the total watershed area to establish the percent of forest cover within the watershed. All individual forest assets within the watershed were allocated the same condition rating based on the scoring thresholds noted below.

RANKING: The area of forest assets within each watershed area was estimated as a percent of the watershed's area. Watersheds, and by extension the forest assets within them, were rated as follows:

- Very Good: watersheds with > 50% forest cover
- Good: watersheds with 41 to 50% forest cover
- Fair: watersheds with 31 to 40% forest cover
- Poor: watersheds with 16 to 30% forest cover
- Very poor: watersheds with <16% forest cover

RESULTS:

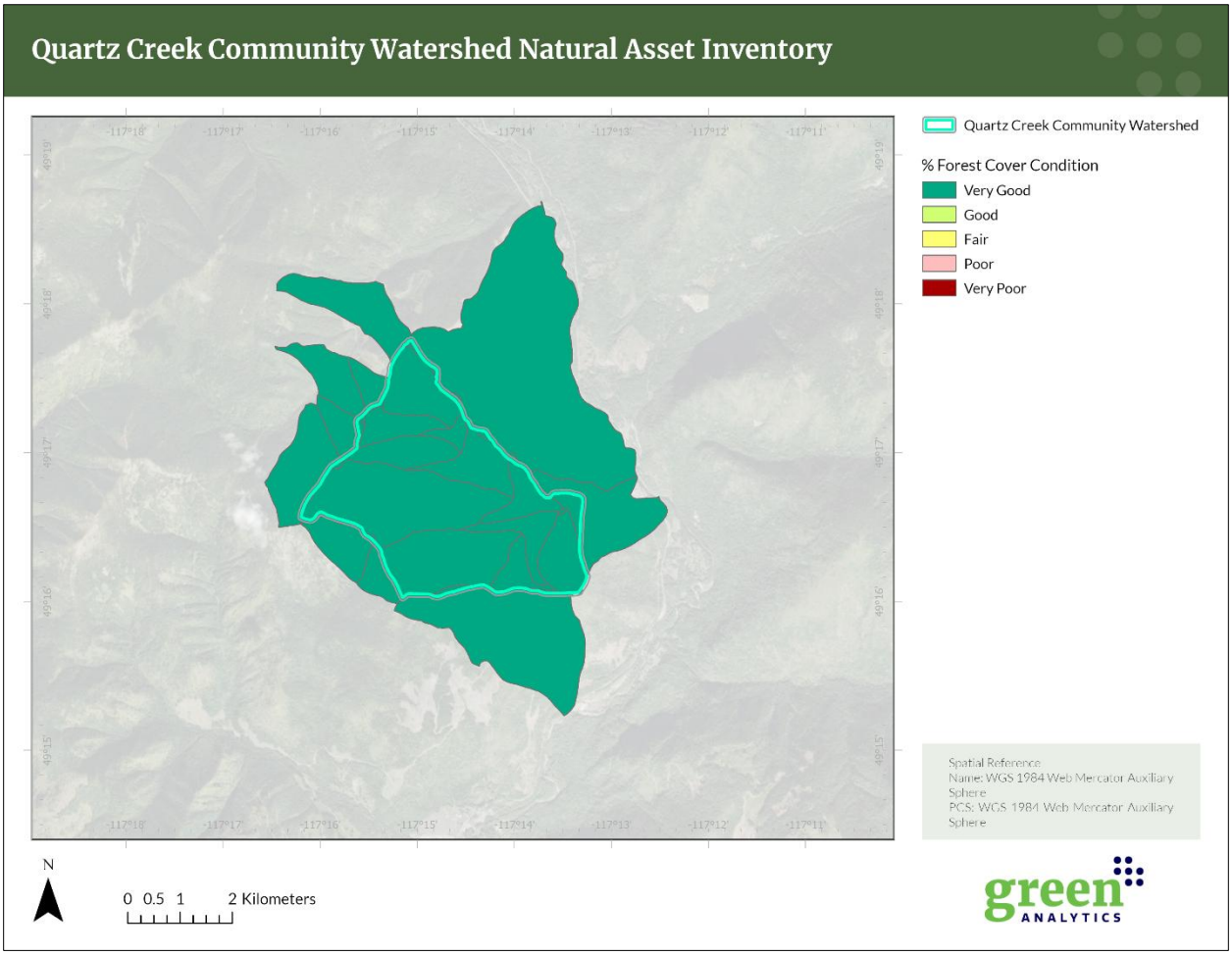

Figure 1011-1. Quartz Creek Community Watershed Forest Cover Condition.

Table 1011-2. Summary table of Quartz Creek Community Watershed forest cover condition.

Condition Ranking	All Mapped Fundamental Watersheds*		Quartz Creek Community Watershed**	
	Area (ha)	Percent of Total Area	Area (ha)	Percent of Total Area
Very Good	1638.67	100%	577.80	100%
Good	0	0%	0	0%
Fair	0	0%	0	0%
Poor	0	0%	0	0%
Very Poor	0	0%	0	0%

* All fundamental watershed that intersect with the Quartz Creek Community watershed boundary.

** A subset of the fundamental watershed that have the majority of their area within the Quartz Creek Community watershed.

11.2 Forest Health and Disturbance

Healthy forests filter precipitation, retain soil, and moderate runoff. Disturbances such as insect outbreaks, fire, or logging can increase erosion, nutrient loading, and sedimentation, leading to degraded water quality and altered flow regimes.

11.2.1 Equivalent Clearcut Area (ECA)

INDICATOR: Equivalent clearcut area (percent of area) within a watershed unit.

RATIONALE: Watersheds are highly sensitive to disturbances such as clear-cutting, fire scars, logging and pest outbreaks. Ecological and hydrological impacts can increase non-linearly with the amount of land disturbed. To assess the impact and the risk of forest disturbance, the concept of Equivalent Clearcut Area, or ECA, is a commonly used indicator. ECA is defined as the "area that has been clearcut, with a reduction factor to account for the hydrological recovery due to forest regeneration and subsequent growth" (BC Forest Practice Board n.d). According to Zhang and Wei (2012), ECA measures can be used to represent the forest disturbance, factoring in hydrological recovery after different types of disturbance (such as wildlife, logging and Mountain Pine Beetle infestations), accumulated across both space and time within the watershed. By measuring disturbances across time and space, ECA provides an indication of how cumulative land disturbances impact water, land, and overall ecological health.

APPROACH: ECA% was measured by first calculating the ECA and then dividing the ECA by the area of disturbance. Davidson et al. (2018) used the ECA metric to assess BC aquatic ecosystem cumulative effects, and calculated ECA using the following equation:

ECA =Area * (1 – Hydrological Recovery Rate)

For example, an area of 100 ha that was disturbed 66 years ago would be assigned a 90% hydrological recovery. ECA in this case would be equal to 10 ha, calculated as 100*(1-0.9) = 10 ha. The following table, adapted from Davidson et al. (2018), provides an easy reference of hydrological recovery rate based on the year since disturbance. It indicates that, as more time passes after a forest disturbance, hydrological recovery improves reflecting greater forest regeneration and growth, and results in a lower ECA estimate.

Table 1011-3. Hydrological recovery rate based on year since disturbance.

Time since disturbance	ECA Hydrologic Recovery
24	0%
39	25%
48	50%
60	75%
66	90%

After the ECA was calculated, the ECA% was calculated by dividing the ECA values by the area of disturbance, to yield the ECA%.

RANKING: Adapted from Davidson et al. (2018), the following 5-point scale was applied:

- Very good: ECA% < 10%
- Good: ECA% between 10 – 25%
- Fair: ECA% between 25 – 45%
- Poor: ECA% between 45 – 65%
- Ver poor: ECA% >65%

RESULTS:

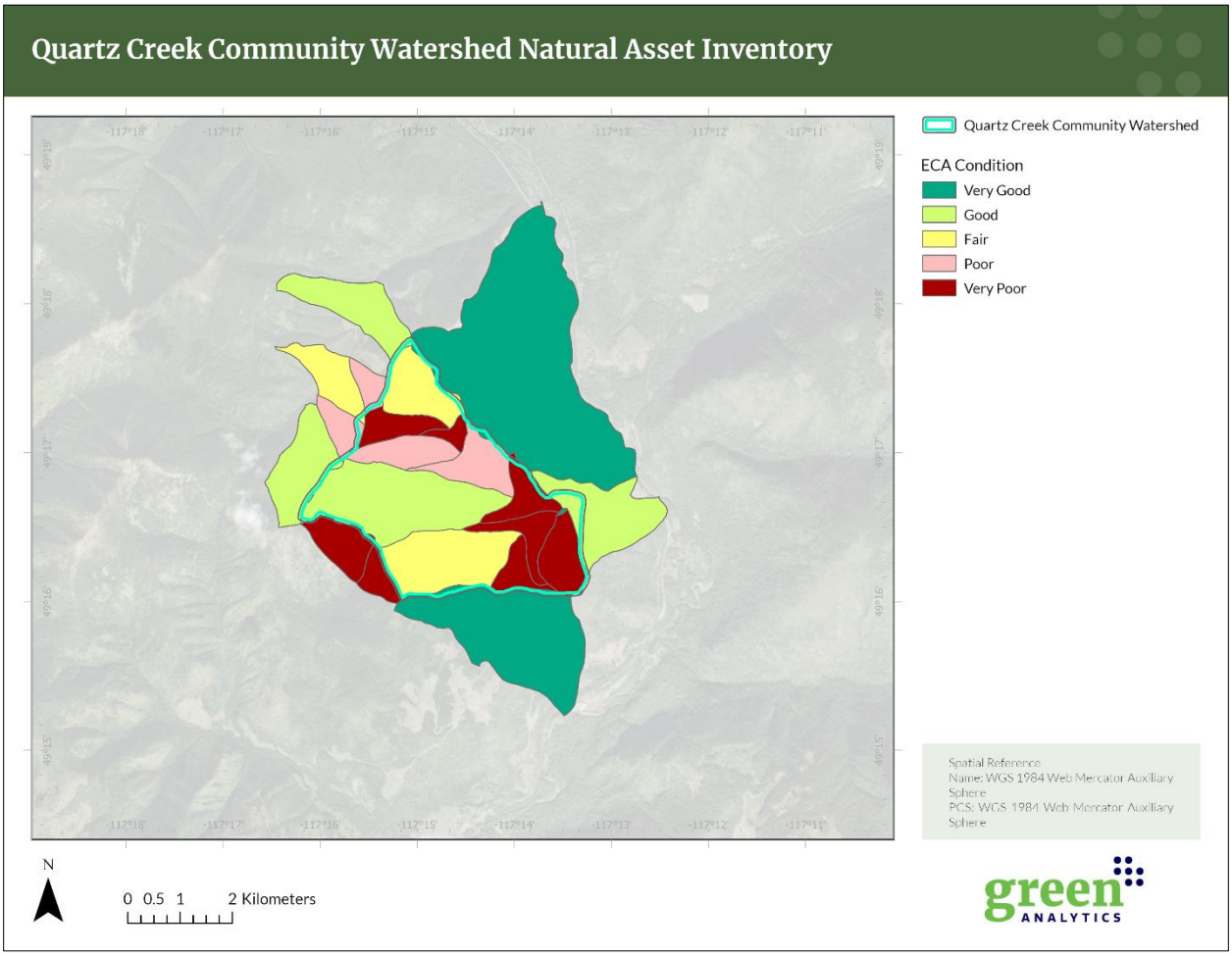

Figure 1011-2. Quartz Creek Community Watershed ECA condition.

Table 1011-4. Summary table of Quartz Creek Community Watershed ECA condition.

Condition Ranking	All Mapped Fundamental Watersheds*		Quartz Creek Community Watershed**	
	Area (ha)	Percent of Total Area	Area (ha)	Percent of Total Area
Very Good	669.93	40.88%	0	0%
Good	408.92	24.95%	164.83	28.53%
Fair	205.39	12.53%	161.14	27.89%
Poor	128.84	7.86%	86.91	15.04%
Very Poor	225.58	13.77%	164.91	28.54%

* All fundamental watershed that intersect with the Quartz Creek Community watershed boundary.

** A subset of the fundamental watershed that have the majority of their area within the Quartz Creek Community watershed.

11.3 Riparian and Canopy Integrity

Forested riparian zones buffer streams from upland impacts by stabilizing banks, filtering pollutants, and providing critical shade to regulate water temperature. Maintaining riparian integrity is essential for protecting aquatic habitat and maintaining drinking water quality. Overall canopy closure through the watershed is also important for maintaining the necessary microclimate that helps slow the snowpack melt and maintain a steady water supply into the summer months. This was not able to be measured with available data and is recommended to be added as a measure of condition once LIDAR data for the area becomes available.

11.3.1 Riparian Forest Integrity

INDICATOR: Percent Riparian Forest Cover

RATIONALE: Riparian zones are the transitional areas between terrestrial and aquatic ecosystems and are ecologically vital. Forested riparian areas filter sediments and nutrients, moderate stream temperatures through shading, stabilize streambanks, and provide habitat connectivity for both aquatic and terrestrial species. These functions are especially critical in watersheds that supply drinking water, such as the Ymir watershed, where maintaining water quality and hydrological stability is a high priority.

Percent riparian forest cover is a practical and effective indicator of riparian integrity. High forest cover within the riparian buffer suggests intact ecological function, while low cover indicates potential degradation due to logging, roads, or other disturbances.

APPROACH: This indicator measures the percent of riparian area that is currently forested. To estimate this, the following steps were taken:

- Generate a 100 m buffer on each side of all mapped streams within the relevant fundamental watersheds (200 m total width).
- Overlay forest cover data onto the buffer and calculate the proportion of the riparian buffer area that is classified as forested.

RANKING: The scoring thresholds are based on ecological research showing that most riparian functions — such as temperature regulation, sediment retention, and habitat connectivity — require at least 70–80% continuous forest cover within the buffer (Rex et al. 2012; Sweeny and Newbold 2014). The top score reflects near-natural conditions, while the lower scores correspond to increasing risk of water quality degradation, loss of biodiversity, and reduced system resilience.

- Very good: Percent (%) of riparian area forest > 90%
- Good: Percent (%) of riparian area forest 80 to 90%
- Fair: Percent (%) of riparian area forest 65 to 79%
- Poor: Percent (%) of riparian area forest 50 to 64%
- Ver poor: Percent (%) of riparian area forest < 50%

RESULTS:

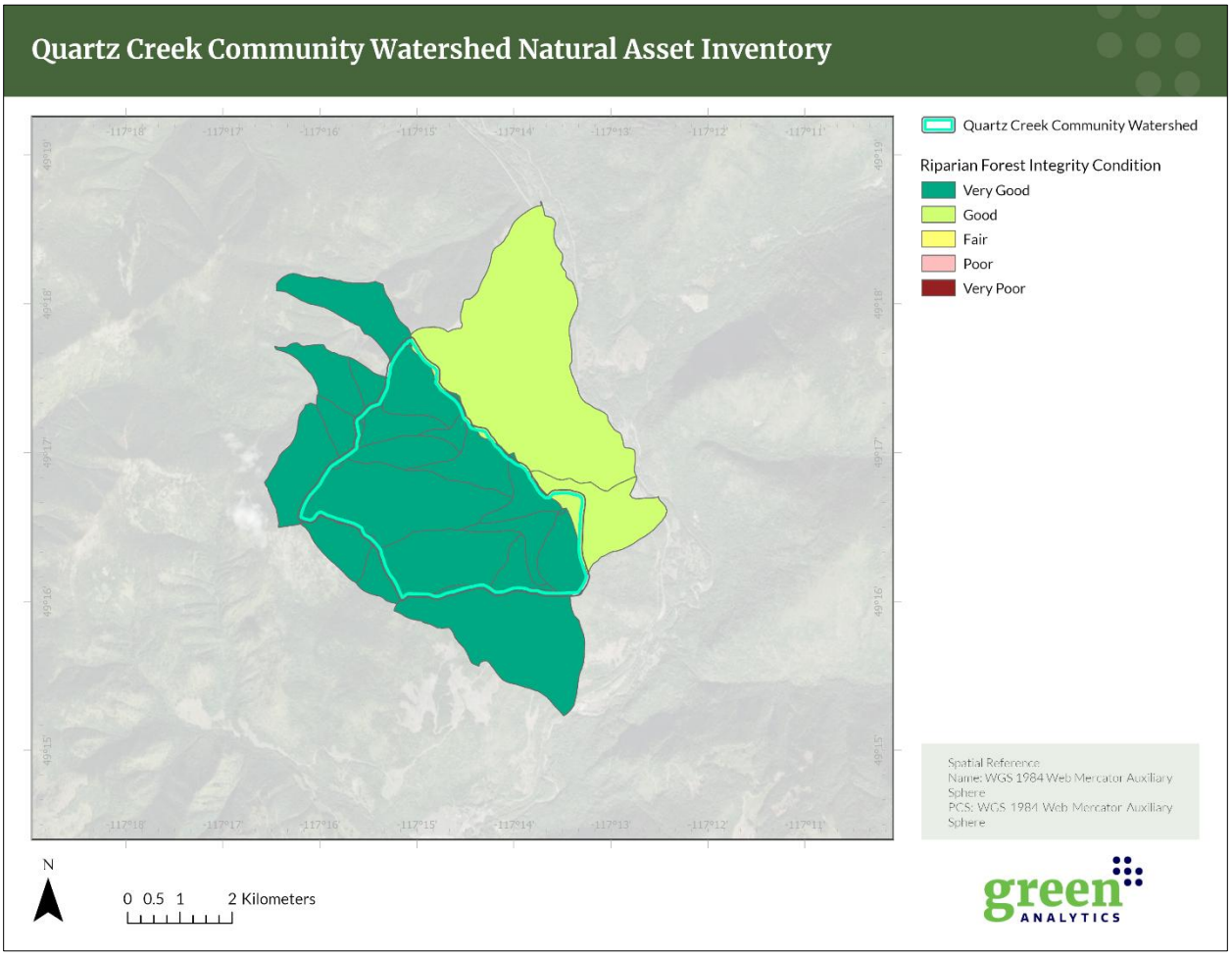

Figure 1011-3. Quartz Creek Community Watershed riparian forest Integrity condition.

Table 1011-5. Summary table of Quartz Creek Community Watershed riparian integrity condition.

Condition Ranking	All Mapped Fundamental Watersheds*		Quartz Creek Community Watershed**	
	Area (ha)	Percent of Total Area	Area (ha)	Percent of Total Area
Very Good	1078.61	66%	577.80	100%
Good	560.06	34%	0	0%
Fair	0	0%	0	0%
Poor	0	0%	0	0%
Very Poor	0	0%	0	0%

* All fundamental watershed that intersect with the Quartz Creek Community watershed boundary.

** A subset of the fundamental watershed that have the majority of their area within the Quartz Creek Community watershed.

11.4 Roads and Fragmentation

Road networks fragment landscapes and disrupt natural hydrology by increasing surface runoff, altering drainage patterns, and contributing to sediment and contaminant loading. Minimizing fragmentation helps preserve infiltration capacity and watershed connectivity.

11.4.1 Interior Forest Habitat

INDICATOR: The percent of interior forest habitat within each fundamental watershed.

RATIONALE: Interior forest habitat refers to areas of contiguous forest located far enough from human-induced or natural edges (such as roads, clearcuts, or openings) to maintain ecological conditions that are relatively undisturbed. These areas provide essential habitat for forest interior-dependent species, promote microclimate stability, and support processes such as nutrient cycling, hydrological buffering, and resistance to invasive species.

In the context of a drinking water supply watershed, interior forests also play a protective role by:

- Minimizing temperature fluctuations in soil and streams.
- Reducing sedimentation and erosion risk by maintaining canopy and ground cover continuity.
- Sustaining long-term forest health and resilience in the face of pests, disease, and climate stressors.

Measuring **percent interior forest** is a simple, spatially explicit way to assess fragmentation and habitat quality. It allows comparison over time and between watersheds.

APPROACH: The percent of interior forest habitat within each fundamental watershed was determined using the following steps:

- Identify all edge-generating features (roads, cutblocks, openings).
- All edge-generating features were buffered by 100 metres to define edge-affected zones.
- Edge buffers were subtracted from total forested area to delineate interior forest area.
- For each fundamental watershed the proportion of the watershed's forested area that qualifies as interior forest was calculated.
    - Percent Interior Forest = (Interior Forest Area / Total Forest Area) × 100

RANKING: Recognizing the landscape ecology principle, large "blocks" of habitat generally provide a greater range of better- quality habitats and imply less fragmentation, a scoring system was applied as follows:

- Very Good: Watersheds with > 80% interior forest
- Good: Watersheds with 65 to 80% interior forest
- Fair: Watersheds with 45 to 64% interior forest
- Poor: Watersheds with 25 to 44% interior forest
- Very Poor: Watersheds with <25% interior forest

RESULTS:

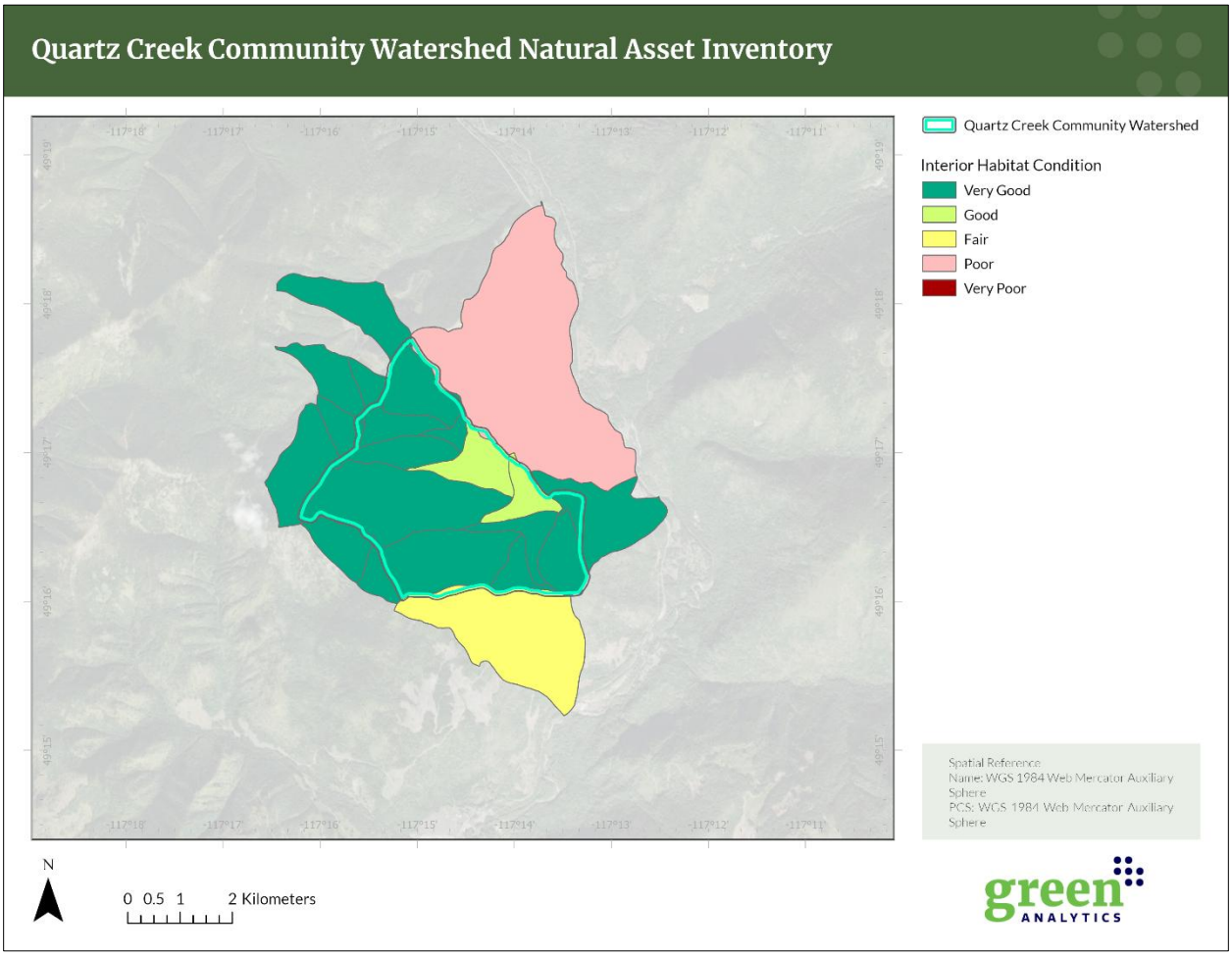

Figure 1011-4. Quartz Creek Community Watershed interior habitat condition.

Table 1011-6. Summary table of Quartz Creek Community Watershed interior habitat condition.

Condition Ranking	All Mapped Fundamental Watersheds*		Quartz Creek Community Watershed**	
	Area (ha)	Percent of Total Area	Area (ha)	Percent of Total Area
Very Good	890.60	54.35%	499.19	86.39%
Good	78.61	4.80%	78.61	13.61%
Fair	206.18	12.58%	0	0%
Poor	463.28	28.27%	0	0%
Very Poor	0	0%	0	0%

* All fundamental watershed that intersect with the Quartz Creek Community watershed boundary.

** A subset of the fundamental watershed that have the majority of their area within the Quartz Creek Community watershed.

11.4.2 Watercourse Crossings

INDICATOR: Density of watercourse crossing (crossings per km^2) within a watershed management unit.

RATIONALE: The density of water crossings within a watershed can be a useful measure of watershed condition as it provides insight into human impacts to the watershed's hydrology, ecology, and overall health. For instance, water crossings such as roads, bridges, and culverts can disrupt the natural flow of water within a watershed. A higher density of crossings can indicate increased alteration of stream networks, potentially leading to changes in stream hydrology. This can affect the timing and magnitude of water flow, contributing to increased erosion, sedimentation, and flooding downstream. Healthy watersheds rely on the connectivity of their ecosystems, and water crossings can fragment aquatic habitats by creating barriers that hinder the movement of aquatic life, such as fish and amphibians. Culverts and other crossings that are improperly designed or maintained may block species migration, reducing genetic diversity. Roads and crossings can contribute to sediment runoff and introduce pollutants into waterways, including oils, heavy metals, and road salts.

By analyzing the density of water crossings, areas can be prioritized for restoration. For instance, areas with high crossing densities but significant ecological value may be targeted for rehabilitation projects, such as improving or replacing problematic culverts, reestablishing natural flow regimes, or restoring connectivity for aquatic species.

APPROACH: Density of watercourse crossings (crossings per km^2) was estimated by intersecting relevant linear features (e.g. roads and pipelines) housed in the geospatial database with the linear features representing the watercourses. Density of crossings per unit area of the watershed was measured as follows:

Crossing Density = count of crossings / watershed areas (km^2)

RANKING: Thresholds are based on scoring used by the BC Cumulative Effects Framework (BC CEF) (British Columbia 2020a) as outlined in Table 10-7.

Table 1011-7: Metrics used to rank watercourse crossing density.

Impact Ranking	Threshold Criteria
Low	Crossing density < 0.24 crossings/km^2
Moderate	Crossing density between 0.24 and 0.6 crossings/km^2
High	Crossing density > 0.6 crossings/km^2

Drawing on the threshold scoring used by the BC CEF, the scoring for watercourse crossing was adapted to establish a consistent five-point ranking scale (Table 10-8).

Table 1011-8: Watercourse crossing density ranking.

Impact Ranking	Condition Ranking	Threshold Criteria
Very Low	Very Good	Crossing density = 0
Low	Good	Crossing density < 0.24 crossings/km^2
Moderate	Moderate	Crossing density between 0.24 and 0.6 crossings/km^2
High	Poor	Crossing density between 0.6 and 1 crossings/km^2
Very High	Very Poor	Crossing density > 1 crossings/km^2

* All fundamental watershed that intersect with the Quartz Creek Community watershed boundary.

** A subset of the fundamental watershed that have the majority of their area within the Quartz Creek Community watershed.

RESULTS:

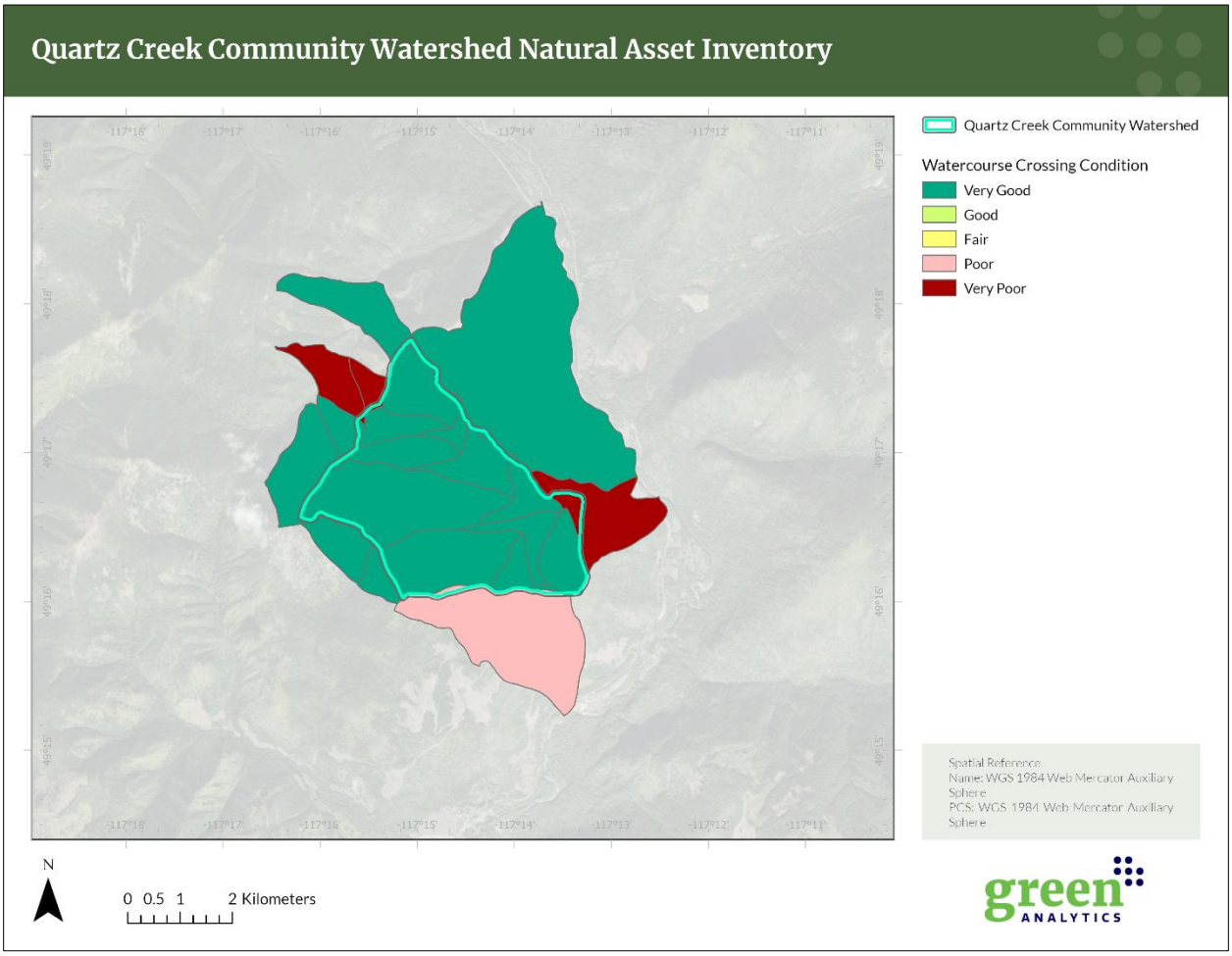

Figure 1011-5. Quartz Creek Community Watershed watercourse crossing condition.

Table 1011-9. Summary table of Quartz Creek Community Watershed watercourse crossing condition.

Condition Ranking	All Mapped Fundamental Watersheds*		Quartz Creek Community Watershed**	
	Area (ha)	Percent of Total Area	Area (ha)	Percent of Total Area
Very Good	1273.75	77.73%	577.80	100%
Good	0	0%	0	0%
Fair	0	0%	0	0%
Poor	206.18	12.58%	0	0%
Very Poor	158.75	9.69%	0	0%

* All fundamental watershed that intersect with the Quartz Creek Community watershed boundary.

** A subset of the fundamental watershed that have the majority of their area within the Quartz Creek Community watershed.

11.4.3 Road Density

INDICATOR: Road density (km/km^2) within each fundamental watershed management unit.

RATIONALE: Road density is a useful metric for assessing watershed condition since roads have significant environmental impacts and provide an indication of human disturbance in a watershed. Roads, especially unpaved ones, increase soil erosion, which can degrade water quality, harm aquatic habitats, and fill in stream beds. Roads can alter the natural flow of water in a watershed changing drainage patterns, increasing runoff, and reducing groundwater recharge. High road density can fragment natural habitats, limit or modify wildlife movement or behaviours and increase the likelihood of wildlife-vehicle collisions. Higher road density often correlates with more intensive land use, which can lead to further degradation of watershed health.[14]

APPROACH: Road density by fundamental watershed management unit was calculated by combining the length of all roads within the watershed and dividing by the watershed area.

RANKING: The BC CEF provides scoring criteria options which vary depending on the context in which they are applied. For instance, separate criteria are used when applied as a water quality (Table 10-10 and Table 10-11) metric versus a metric for grizzly bears (Table 10-12).

Table 10-10 describes the thresholds based on water quality metric applied to sensitive watershed as defined by BC CEF (British Columbia 2020a).

Table 1011-10: Metrics used to rank water quality for sensitive watersheds.

Impact Ranking	Threshold Criteria
Low	Road density < 0.6 km/km^2
Moderate	Road density between 0.6 and 1.2 km/km^2
High	Road density > 1.2 km/km^2

[14] While road density and stream crossing densities are highly correlated, the BC CEF uses both.

Table 10-11 describes an alternative (or secondary) water quality metric used by the BC CEF that is aligned with Watershed Assessment Procedure (WAP) benchmarks and was applied to all non-sensitive watersheds (British Columbia 2020a).

Table 1011-11: Metrics used to rank water quality for non-sensitive watersheds.

Impact Ranking	Threshold Criteria
Low	Road density < 1.5 km/km^2
Moderate	Road density between 1.5 and 2.1 km/km^2
High	Road density > 2.1 km/km^2

Table 10-12 defines the threshold criteria based on biodiversity metric used for Grizzly Bears by BC CEF (British Columbia 2020b).

Table 1011-12: Metrics used to rank impacts to grizzly bear biodiversity.

Impact Ranking	Threshold Criteria
Low	Road density >0 – 0.3 km/km^2
Moderate	Road density between 0.31 and 0.6 km/km^2
High	Road density between 0.61 – 0.75 km/km^2
Very High	Road density > 0.75 km/km^2

Given the highly sensitive nature of the watershed, the chosen road density criteria was a combination of the biodiversity metric used for Grizzly Bears by BC CEF (British Columbia 2020b) and the water quality rates for sensitive watersheds (British Columbia 2020a). The specific thresholds applied to the fundamental watersheds are defined below and were adapted to establish a consistent five-point ranking scale across all indicators.

Table 1011-13: Road density ranking criteria.

Impact Ranking	Condition Ranking	Threshold Criteria
Very Low	Very Good	Road density = 0
Low	Good	Road density >0 – 0.3 km/km2
Moderate	Moderate	Road density between 0.31 and 0.6 km/km2
High	Poor	Road density between 0.61 – 1.2 km/km2
Very High	Very Poor	Road density > 1.2 km/km2

RESULTS:

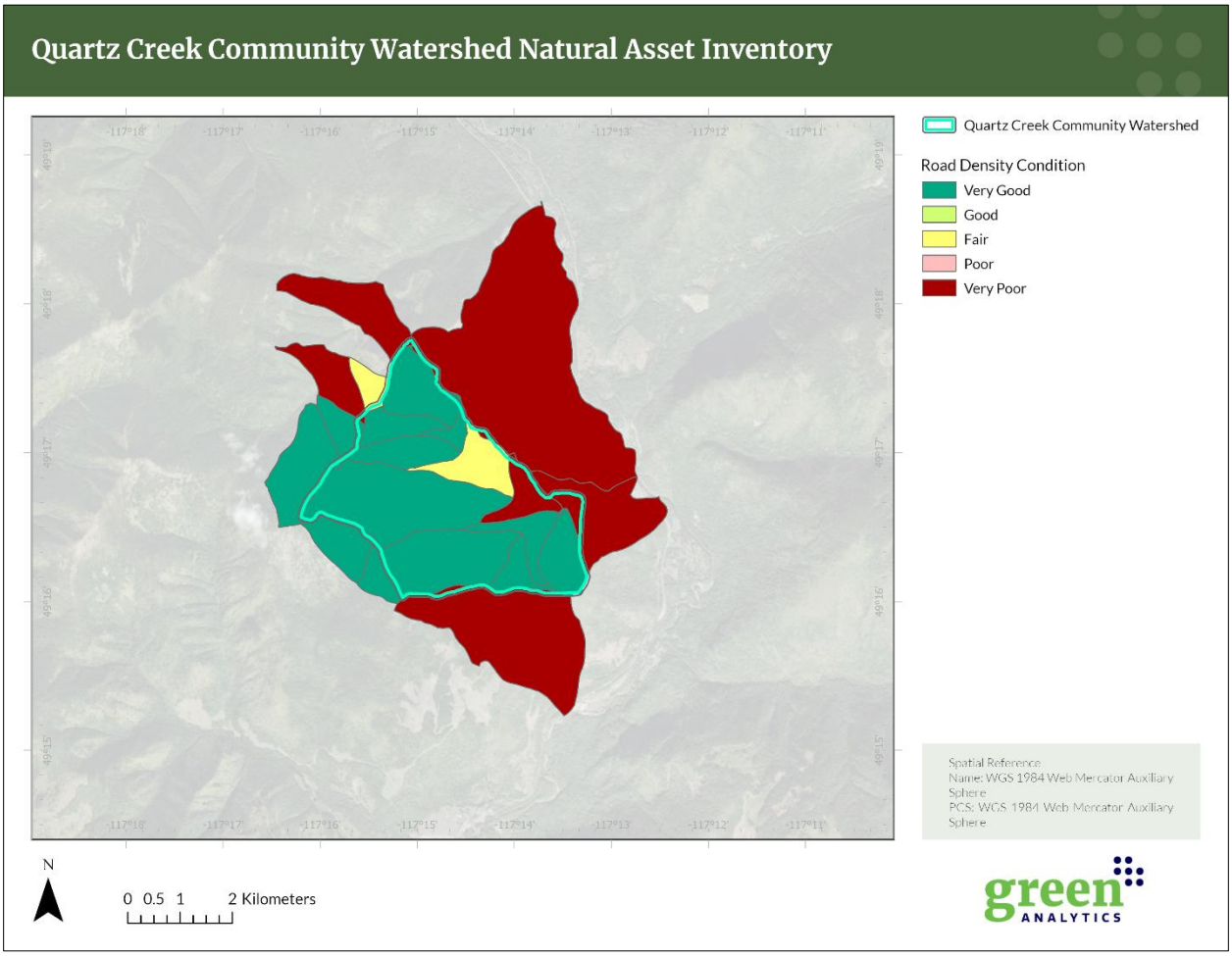

Figure 1011-6. Quartz Creek Community Watershed road density condition.

Table 1011-14. Summary table of Quartz Creek Community Watershed road density condition.

Condition Ranking	All Mapped Fundamental Watersheds*		Quartz Creek Community Watershed**	
	Area (ha)	Percent of Total Area	Area (ha)	Percent of Total Area
Very Good	658.38	40.18%	499.19	86.39%
Good	0	0%	0	0%
Fair	65.10	3.97%	47.39	8.20%
Poor	0	0%	0	0%
Very Poor	915.19	55.85%	31.22	5.40%

* All fundamental watershed that intersect with the Quartz Creek Community watershed boundary.

** A subset of the fundamental watershed that have the majority of their area within the Quartz Creek Community watershed.

12. Appendix D: Interested Parties Engagement

Engagement Process

As part of the Natural Asset Management Plan process, the consulting team assembled a list of interested parties including First Nations, government agencies (provincial, regional, municipal) and watershed users and interests. An email was sent on March 4, 2025, that introduced the project and goals of the Natural Asset Management Plan. The email also included a watershed information request, with particular interest in watershed activities (historic, current and proposed), existing data and/or reports and any available mapping layers (digital or hard copies).

Responses and information were received from Apex Geoscience Consultants Ltd., ATCO Wood Products Ltd., Interior Health, Malach Consulting, Ministry of Forests, Ministry of Water, Land and Resource Stewardship, Okanagan Nation Alliance, Regional District of Central Kootenay, Salmo Valley Trails Society, Saso Consulting, and the Ymir Watershed Action Team.

Engagement with Individual Parties

Following the request for information, multiple on-line meetings and phone calls were scheduled with individual organizations to gather additional information and to further understand watershed concerns. Individual meetings occurred between March and June 2025 with the following organizations: ATCO Wood Products Ltd., Ministry of Forests, Ministry of Water, Land and Resource Stewardship, Okanagan Nation Alliance, Regional District of Central Kootenay, Salmo Valley Trails Society, Saso Consulting and the Ymir Watershed Action Team.

Interested Parties Meeting

When the Natural Asset Management Plan was in draft, an on-line Teams meeting was held on June 13, 2025 from 9-10:30 am, to provide a summary of the report and to garner feedback and discussion with Interested Parties. Twenty-four attendees representing thirteen organizations participated in the meeting. The presentation of the draft Natural Asset Management Plan included a summary of the watershed content, risk assessment and asset replacement options. Discussion centered around watershed jurisdiction, the history of proposed harvesting, recreation as a potential hazard, a changing climate with enhanced wildfire potential and reduced snowpack, pine beetle and pest management, and the future of harvesting and potential alternatives. Participating Organizations included:

ATCO Wood Products
City of Nelson
Interior Health Authority
Ktunaxa/Yaqan Nukiy
Ministry of Forests
Ministry of Water, Land and Resource Stewardship
Ecoscape Environmental Consultants Ltd.
Okanagan Nation Alliance
Regional District of Central Kootenay
Salmo Trails Society
Sinixt Confederacy
Ymir Watershed Action Team (YWAT)
Green Analytics

13. Appendix E: Collaborative Watershed Governance

Collaborative Watershed Governance refers to a cooperative approach to managing and protecting watersheds that involves multiple stakeholders such as governments, Indigenous communities, local residents, environmental organizations, industry, and scientists, working together to make decisions and implement actions. Successful watershed governance typically incudes:

- **Shared Decision-making** – Collaborative governance encourages inclusive participation to develop goals, policies and strategies for watershed management.
- **Trust and Relationship Building** – Effective collaboration is built upon transparency, trust-building and development of long-term relationships.
- **Integration of Knowledge Systems** -Including scientific, local and Indigenous knowledge, recognizing that each offers unique insights into watershed health.
- **Science-based Monitoring and Adaptive Management** – Decisions should be regularly revisited and revised based on monitoring results and changing conditions.
- **A Focus on Ecosystem Health** – The goal is to maintain and/or restore the ecological integrity of the watershed, including water quality, biodiversity and natural hydrological processes.
- **Education and Community Engagement** - Public education on the importance of source drinking water and watershed health is a key component to watershed protection and management.
- **Legal and Institutional Support** - Truly effective collaborative governance often requires supportive polices, legislation and provincial staff and resource support.

To ensure a successful collaborative watershed governance for the Quartz Creek Watershed, prioritized recommendations outlined in this report (Section 7.3) should be pursued within the following framework:

- **Identify and Engage All Interested Organizations/Parties** – As part of the Natural Asset Management Plan process, interested organizations/parties have already been identified (see Appendix D). Contact information of engaged individuals will be provided to RDCK separately.
- **Meet Regularly** - Schedule regular meetings (ideally in-person) to develop relationships and trust, to discuss watershed concerns, to determine watershed priorities and to identify and secure funding to implement priorities. Annual or bi-annual meetings are recommended, with a walking tour of the watershed to facilitate connection of participants to each other and to the land.
- **Develop a Watershed Collaborative Governance Terms of Reference** - To specify conduct and application of rules/ procedures and to outline the purpose, scope, defined responsibilities, composition of participants, meeting expectations and reporting requirements.
- **Establish Working Committees** – To focus on individual priorities and funding securement. Committee progress should be reported at the larger annual or bi-annual meeting.
- **Encourage Communications Between Watershed Partners** – If there are no privacy concerns, consider sharing contact information of the watershed partners with each other, and/or establishing an effective communications strategy (i.e., list serve, Teams chat, etc.).

Additional information and strategies for effective watershed protection and governance can be accessed within the Source Water Protection Toolkit and through pre-recorded webinars at https://sourcewaterprotectiontoolkit.ca/.

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CSLAC Report – For Information

June 16, 2026

2026 Kootenay Lake Partnership Activities

Author:	Sangita Sudan
File Reference:	10-5200-20-KLP
Electoral Area/Municipality:	A, D, E, F, Kaslo & Nelson
Services Impacted	Community Sustainable Living Service/S105

1.0 PURPOSE OF REPORT

The purpose of this report is to provide an update on activities by the Kootenay Lake Partnership utilizing the funding received from various sources including the Real Estate Foundation of BC to support Ktunaxa Nation Council on initiatives to address Protecting Indigenous Cultural Values and Fish and Wildlife Habitat on Kootenay Lake.

2.0 BACKGROUND AND UDPATE

The Kootenay Lake Partnership received funding from various sources to support Ktunaxa Nation Council and Yaqan Nukiy efforts to Protect Indigenous Cultural Values and Fish and Wildlife Habitat on Kootenay Lake in 2023.

These funders include:

Real Estate Foundation of BC	$54,023
Columbia Power Corporation	$10,000
Brilliant Power Corporation	$10,000
FortisBC	$10,000
TECK Resources Ltd	$43,400
RDCK Local Conservation Fund	$10,000
Province of BC	$5000

In 2023 the Ktunaxa Nation Council sent a letter to the RDCK requesting their support as fiscal agent to manage the funding for an administrative fee of 8% of the grants received. The following resolution was passed by the Board:

326/23 That the Regional District of Central Kootenay manage and administer the Ktunaxa Nation Council's successful grant applications for the Kootenay Lake Partnership initiatives and be compensated for that work through the administration fee included in the grant award; AND FURTHER, that the Chair and Corporate officer be authorized to sign the necessary agreements.

There was a scope change following the KLP strategic planning meeting at Ainsworth in 2024 after reviewing the results and a request was made to the Real-Estate Foundation of BC to broaden the scope and flexibility to align with the initial intent of the funding "Protecting Indigenous Cultural Values and Fish and Wildlife Habitat on Kootenay Lake".

The funding from REF for $54,023 will be distributed to support the following initiatives, initiated in 2026:

- KLP Website update in the amount of $1500
    - to reflect the current purpose and strategic focus of the KLP
- Yaqan Nukiy short video and shoreline homeowner guide mailout in the amount of $25,880
    - Highlight the connection the Yaqan Nukiy have to Kootenay Lake and to distribute a mailout on best management practices for shoreline homeowners on how to protect shoreline habitat.
- Mussel Survey to identify native freshwater mussel within Kootenay Lake and associated shoreline and tributary areas in the amount of $25,000.
    - A mussel survey with the Province of BC and Fisheries and Oceans Canada to identify and establish reserves over the mussel beds for protection.

This funding along with the other sources of grants also supports the KLP coordinator position and quarterly meetings. The last KLP meeting was held on May 7th in Creston. Meeting notes are included in attachment B. The coordinator also facilitates a KLP compliance and enforcement working group attended by Natural Resource Officers, Fisheries Guardian, Provincial staff and RDCK planning and building staff on matters that related to violation of federal, provincial and RDCK land use regulations including environmental development permit areas. The KLP coordinator role supports the RDCK in contract management with the 3 listed above.

The contract manager for these initiatives the Sustainability & Resilience Supervisor and the Acting General Manager of Development and Community Sustainability will continue to oversee the work of the KLP Coordinator and attend KLP quarterly meetings.

3.0 NEXT STEPS AND TIMELINE

Once the work on the 3 short term contracts is complete the results will be brought back to the CSLAC, likely fall 2026. Other initiatives will be considered with the remaining funds in alignment with the "working together" document which was an outcome of the KLP strategic planning session. This document once approved will be brought forward to CSLAC.

Respectfully submitted,
Sangita Sudan

CONCURRENCE

Chief Administrative Officer – Stuart Horn
General Manager Development and Community Sustainability – Amy Wilson

Committee Report

June 16 2026

Community Sustainable Living Advisory Committee Future Governance and Funding Model

Author:	Paris Marshall Smith, Sustainability & Resilience Supervisor
File Reference:	01-0515-20-CSL
Electoral Area/Municipality:	A, B, C, D, E, F, G, H, I, J, Kaslo and Silverton
Services Impacted	S105 Community Sustainability and S100 General Administration

1.0 STAFF RECOMMENDATION

THAT the Board direct staff to prepare a proposal to transition the Community Sustainable Living Advisory Committee (CSLAC) from a committee governing Service S105 to a standing committee of the Board, with sustainability work funded through General Administration Service S100 and Service S105 requisition discontinued no later than the 2028 Financial Plan;

AND FURTHER, that staff be directed to prepare draft Terms of Reference for a reconstituted CSLAC as a standing Board committee for the Board's consideration;

2.0 BACKGROUND/HISTORY

Member Withdrawals from Service S105

Service S105, the Community Sustainable Living Service, is an opt-in requisition service funding CSLAC's work and staff time. Three member areas have withdrawn or signaled intent to withdraw:

- Area K has already withdrawn, effective 2026, representing 6% of the S105 requisition.
- Areas E and J are expected to withdraw in 2027, representing 14% and 9% respectively.
- Combined, these three areas represent 29% of the current S105 tax base, reducing it significantly.
- Silverton has indicated it will withdraw and Kaslo is considering

December 2025 Report Summary

In December 2025, staff presented four scenarios for CSLAC's future in response to member withdrawals from Service S105, attached as reference. The December report outlined options ranging from disbanding CSLAC entirely, to scaling back the work plan, to absorbing sustainability into General Administration (S100). All interview participants agreed the core questions were not about whether to do sustainability work, but about how to fund it, govern it, and where it lives organizationally.

December CSLAC Discussion

At the December meeting, Committee members raised the following overarching question, which frames this report:

“What does sustainability look like at the RDCK in 2026 and beyond? who does the work? how is it funded? and under what governance?”

Three areas of question emerged from that discussion:

- How is the work of evaluating, responding to and developing ideas and projects funded?
- What governance model actually supports the work? (Do we need a committee to manage the service?)
- How do we do the work going forward? (What can be absorbed into existing services vs. what needs dedicated space?)

CSLAC’s Role and History

CSLAC was established to provide a regional forum for sustainability and resilience work outside of traditional core services. Over more than a decade, it has guided sub-regional and regional work across watershed governance, food security, climate adaptation, rural mobility, energy resilience, and invasive species management. Staff time is split approximately 75% S105 and 25% S100. The committee has also been a key vehicle for attracting and managing external grants, which have consistently returned investment well above the annual S105 requisition.

Staff are accountable for this transition planning. The Sustainability and Resilience Supervisor (Paris Marshall Smith) is the author of this report, reporting to the General Manager of Development and Community Sustainability Services.

3.0 PROBLEM OR OPPORTUNITY DESCRIPTION

The opt-in service model for S105 is structurally fragile: any member area can withdraw, subject to the consent of the participants, reducing the tax base and increasing costs for those who remain. With 29% of the requisition base departing by 2027, the remaining members would face disproportionate cost increases to maintain current service levels.

At the same time, the issues CSLAC addresses - watershed protection, food security, climate adaptation, rural mobility are regional in nature and impact all members regardless of whether they choose to opt in to S105.

The opportunity is to reframe the question: rather than asking “how do we sustain this service?” the question is “where does this work belong?”

CSLAC has provided a function of responding to emerging issues, evaluating ideas for projects and programs on water, food, energy, climate adaptation, and rural transportation.

Reconstituting CSLAC as a standing committee of the Board, funded through General Administration (S100), would:

- Remove the opt-out dynamic that has destabilized the service
- Distribute sustainability costs across the full regional base through General Administration, where they logically belong
- Retain the dedicated committee structure and staff expertise

3.1 Alignment to Board Strategic Plan

The Board's strategic plan identifies environmental protection, watershed governance, regional economic sustainability, and collaborative governance as core priorities.

CSLAC directly supports all four and provides a structured space to anticipate emerging risks (drought, wildfire, food insecurity, rural transportation gaps), evaluate evidence-based responses before they require reactive investment, and coordinate across service areas and partner governments.

Without a dedicated sustainability function that can evaluate questions and ideas, the Board risks losing the institutional foresight that allows proactive rather than reactive governance.

Transitioning CSLAC to a standing committee formalizes sustainability as a permanent Board governance priority.

3.2 Legislative Considerations

Under the Local Government Act, the RDCK Board has broad authority to establish standing committees to carry out advisory functions on behalf of the Board.

A standing committee does not require a service bylaw or requisition, it is a governance instrument created and dissolved by Board resolution or bylaw.

This report proposes to reconstitute CSLAC as a standing Board committee rather than a service committee.

Winding down Service S105 requires appropriate notice to member areas and amendments to the Financial Plan. Staff will advise on the required timeline and process as part of the transition proposal, with a target of no later than the 2028 Financial Plan.

3.3 What Are the Risks

The primary risk of inaction is accelerating fragmentation. As areas withdraw and the S105 budget shrinks, the service becomes less viable, staff capacity diminishes, grant opportunities are lost, and the regional sustainability function erodes incrementally.

Peer regional districts in BC that have lost integrated sustainability functions have found them difficult and expensive to rebuild.

A comparative analysis by Director Davidoff (Attachment B) confirms that RDCK currently sits in the top tier of BC regional districts for sustainability programming. Losing the coordinating function would likely drop RDCK to a mid-tier, fragmented model over time.

4.0 PROPOSED SOLUTION

Staff propose that Service S105 be wound down as a standalone requisition service, and that CSLAC be reconstituted as a standing committee of the Board, funded through General Administration Service S100. This is not a disbanding of the function rather it is a rehousing of it.

A standing committee of the Board does not require a service bylaw or opt-in requisition. It is established by Board resolution or bylaw, reports directly to the Board, and is funded through General Administration. Its costs (staff support, Director stipends, mileage) are part of the cost of governance, not a separate taxed service. The committee's mandate would be to evaluate emerging sustainability and resilience issues, scope potential new project and program areas, review evidence and partner proposals, and bring recommendations forward to the Board. Final decisions on funding and implementation remain with the Board.

Directors would be appointed by the Board and retain sufficient representation across the region.

4.1 Financial Considerations of the Proposed Solution

To date, CSLAC and S105 have operated within their approved annual budgets. No extraordinary expenditures are being requested as part of this transition.

What CSLAC is being asked to consider at this time:

- Direction to staff to prepare a transition proposal, including a draft S100 budget for the standing committee function, for consideration as part of the 2027 Financial Plan.
- Direction to staff to prepare draft Terms of Reference for the reconstituted committee.

Ongoing cost implications:

- Sustainability staff time (currently 0.75 FTE for SRS, admin and management time) would transfer to S100. The proportion allocated to the standing committee function versus other services will be clarified through the workplan process.
- Director stipends and mileage funded through S100.
- External grants, which have historically covered significant project costs, remain available and will continue to be sought. The standing committee structure preserves the staff capacity needed to attract them.
- Services impacted: S105 (wound down), S100 (increased to absorb sustainability function).

4.2 Risks with the Proposed Solution

- Moving sustainability work into S100 requires Board approval that this is a core regional governance function. This is a deliberate policy position that should be explicitly affirmed.
- The transition period, while S105 is wound down and the new structure is established, requires careful management of active project commitments (Watershed Governance Initiative, Slocan Lake and River Partnership, Kootenay Lake Partnership, Rural Mobility Working Group). These will continue under existing agreements.

4.3 Resource Allocation and Workplan Impact

The Sustainability and Resilience Supervisor will lead the transition planning, supported by the General Manager of Development and Community Sustainability Services.

The transition proposal and draft Terms of Reference can be completed within existing staff capacity, with a target of bringing a formal proposal to the Board before the 2027 budget process begins.
Active projects will not be disrupted. Existing funding agreements and commitments continue under their current authorities through the transition period.

4.4 Public Benefit and Stakeholder Engagement of Proposed Solution

There is no legislated obligation requiring a specific governance structure for sustainability work. The transition is a Board governance decision.

Key stakeholders include: member area Directors and municipal representatives (Kaslo and Silverton); existing CSLAC partner organizations (Kootenay Food Council, Central Kootenay Invasive Species Society, Living Lakes Canada etc.); and grant funders including Columbia Basin Trust and the Local Government Climate Action Program.

Staff have engaged CSLAC Directors through June 2025 interviews and the December 2025 meeting. Further engagement with partner organizations will occur as part of the transition planning process.

4.5 Leveraging Technology

The transition to a standing committee model does not directly implicate new technology investments. However, consolidating sustainability reporting under S100 and the Board provides an opportunity to streamline how sustainability data, project tracking, and grant management are integrated into RDCK's existing administrative systems.

4.5 Measuring Success

- A transition proposal and draft Terms of Reference for summer 2026
- Board adoption of a reconstituted CSLAC as a standing committee with approved Terms of Reference and budget allocation in the 2027 Financial Plan.
- No disruption to active projects during the transition period.
- Sustained or improved grant revenues in the first two years under the new structure.

Staff will report back to the Board at each milestone.

Failure looks like: loss of partner relationships, and regional sustainability intelligence if the transition is not completed in a timely and deliberate way.

5.0 ALTERNATIVE SOLUTION(S)

The alternative solution is to retain Service S105 with a reduced workplan and budget, scaled to reflect the smaller funding base following member withdrawals. This would mean fewer meetings, reduced staff time allocation, and elimination of pilot project funds.

5.1 Financial Considerations of the Alternative Solution(s)

Reducing the S105 budget to reflect the 71% remaining requisition base would require scaling back staff time, meeting frequency, and project grant capacity. Remaining member areas would not face increased requisition, but would receive substantially less service. This model becomes progressively less viable if further withdrawals occur, namely Silverton and Kaslo.

5.2 Risks with the Alternative Solution(s)

A reduced-scope S105 remains vulnerable to further withdrawals and does not resolve the structural issue. It is likely a transitional measure rather than a sustainable long-term model. The comparative analysis indicates that peer regional districts that rely on opt-in service models for sustainability work consistently underperform those that fund it through general administration.

6.0 OPTIONS CONSIDERED BUT NOT PRESENTED

Cancellation of CSLAC and Service S105 entirely was considered but is not presented as a recommended option. While it would eliminate S105 taxation, it would also eliminate the RDCK's capacity to coordinate regional sustainability work, attract sustainability-focused grants, and maintain relationships with key partners. The risk of long-term institutional and financial loss outweighs the short-term tax savings.

Transferring reporting to the Rural Affairs Committee (RAC) only was considered but is not recommended, as RAC does not include municipal members (Kaslo and Silverton), who have historically participated in CSLAC and whose communities are served by its work.

7.0 OPTIONS SUMMARY

Option 1 (Staff Recommendation) – Transition to Board Standing Committee:
Recommendation:
THAT the Board direct staff to prepare a proposal to transition the Community Sustainable Living Advisory Committee (CSLAC) from a committee governing Service S105 to a standing committee of the Board, with sustainability work funded through General Administration Service S100 and Service S105 requisition discontinued no later than the 2028 Financial Plan;

AND FURTHER, that staff be directed to prepare draft Terms of Reference for a reconstituted CSLAC as a standing Board committee for the Committee's consideration;

Option 2 – Retain S105 with Reduced Workplan:
Recommendation:
THAT the Board direct staff to prepare a reduced-scope workplan and budget for CSLAC under Service S105, reflecting the reduction in the funding base following member withdrawals from Areas K, E, and J, and report back to the Committee with a revised 2027 Financial Plan for Service S105.

8.0 RECOMMENDATION

THAT the Board direct staff to prepare a proposal to transition the Community Sustainable Living Advisory Committee (CSLAC) from a committee governing Service S105 to a standing committee of the Board, with sustainability work funded through General Administration Service S100 and Service S105 requisition discontinued no later than the 2028 Financial Plan;

AND FURTHER, that staff be directed to prepare draft Terms of Reference for a reconstituted CSLAC as a standing Board committee for the Committee's consideration;

Respectfully submitted,
Paris Marshall Smith – Sustainability & Resilience Supervisor

CONCURRENCE

Chief Administrator Officer – Stuart Horn
General Manager of Development and Community Sustainability Services – Amy Wilson

ATTACHMENTS:
Attachment A – CSLAC Financial Projections and Scenario Consideration
Attachment B – Comparative Analysis: RDCK vs. Other BC Regional Districts on Sustainability Services

Committee Report – For Information

December 9, 2025

CSLAC Financial Projections and Scenario Consideration

Author:	Paris Marshall Smith, Sustainability & Resilience Supervisor
File Reference:	01-0515-20-CSL
Electoral Area/Municipality:	A,B,C,D,E,F,G,H,I,J, Kaslo and Silverton
Services Impacted	S105

1.0 PURPOSE OF REPORT

Following the interviews conducted by staff of CSLAC members in June 2025, this report outlines the financial impacts of Areas E, J, and K withdrawing from Service 105 and presents four scenarios for the Committee's consideration.

2.0 BACKGROUND AND UDPATE

BACKGROUND

The Community Sustainable Living Advisory Committee (CSLAC) and the RDCK's Community Sustainable Living Service (S105) were created to provide a regional forum for sustainability and resilience issues outside of traditional core services. Areas of focus include watershed governance, food security, rural mobility, and energy resilience.

In June, interviews with Directors and staff provided a range of perspectives on the future of CSLAC and Service 105. Following Committee direction - *That staff be directed to provide options on the continuation of the Community Sustainable Living Service (CSLS 105) and current projects in consideration that three electoral areas have requested to withdraw from the service,* the following provides information for consideration.

FINANCIAL CONTEXT

Currently, Areas E, J, and K contribute 29% of the Service 105 requisition. Area K has already withdrawn – representing a decrease in taxation of 6% for 2026, and Areas E and J (14% and 9% respectively) are expected to follow in 2027. This represents a significant reduction in the funding base. The withdrawals raise questions about the sustainability of the current CSLAC model and whether the work could continue in another form.

1. **Taxation** – whether to increase, maintain, or reduce the requisition of remaining members.
2. **Committee Structure** – whether to continue CSLAC as a committee, or shift reporting to the Board or the Rural Affairs Committee (RAC).

1. **Taxation Options**
    a) Maintain current service level and increase requisition of remaining members
    b) Maintain existing requisition but reduce the scope of work to align with reduced funding in the Service
    c) Move the Service 105 Budget to either Rural Administration S101 or General Administration S100
    d) Decrease the requisition to $0 by cancelling all work under Service 105 (with some exceptions that are already committed)

2. **Committee Options**
    a) Continue with CSLAC as a committee
    b) Disband CSLAC and transfer reporting to the Board or RAC

SCENARIOS FOR CONSIDERATION

Option 1: Disband CSLAC
End CSLAC as a formal committee but continue staff-led sustainability work under S105 with reporting to the Board.

- *Benefits*: Reduced administrative costs (director stipends, mileage, staff support).
- *Risks*: Loss of formal governance/oversight; possible perception of reduced transparency.

Option 2: Retain CSLAC with Reduced Work Plan
Scale operations to reflect reduced contributions (approximately one-third). This could include fewer meetings, reduced staff time allocation and elimination of pilot project funds.

- *Benefits*: Retains committee function and regional dialogue; aligns resources with contributions.
- *Risks*: Reduced staff capacity; diminished ability to support community pilot projects or leverage grants.

Option 3: Absorb into General Administration
Maintain current requisition but shift reporting to Board.

- *Benefits*: Work continues without requiring a standalone committee because decisions are now governed by the Board; streamlined governance.
- *Risks*: RAC does not include municipal members – Kaslo and Silverton. Sustainability priorities may receive less dedicated focus; increased competition for staff time and taxation in General Admin S100.

Option 4: Cancel All Work
Terminate CSLAC and Service 105.

- *Benefits*: Reduces S105 taxation.
- *Risks*: regional forum for sustainability and resilience is no longer available.

KEY CONSIDERATIONS WITH MEMBER WITHDRAWAL

- Equity: Remaining participants may carry disproportionate costs.
- Capacity: Reduced staff time threatens delivery of sustainability initiatives.

- Momentum: Risk of losing regional dialogue and foresight on emerging issues.
- Funding: Lower staff capacity to attract and manage external grants.
- Public interest: Staff heard that there is strong interest from residents in having sustainability as a function of the RD's work.

PUBLIC BENEFIT & STAKEHOLDER PERSPECTIVES

Interviews with Directors and staff underscored:

- CSLAC's value in piloting projects and securing external funding.
- The need for more focused, efficient meeting structures.
- Concerns about fairness in requisition payments with member withdrawals.
- Recognition that without CSLAC or a similar forum, the RDCK risks losing foresight and adaptability on cross-cutting issues.

3.0 NEXT STEPS AND TIMELINE

All interview participants agreed that the big questions still need consideration, and that for many it is format rather than the content. Questions include:

- How do we plan for food, energy, and water resilience?
- How do we respond to community concerns that fall outside core services?
- How do we stay ahead of change, instead of always reacting?

As one participant put it: "If we want to be stagnant, we'll stop asking these questions. But if we want to adapt, we need to keep having the conversation."

QUESTIONS FOR CONSIDERATION

- How does the Board want to handle sustainability and resilience work going forward?
- Should the Board retain a focused CSLAC function to scope and evaluate emerging issues?
- Are existing core services equipped to absorb this work, or does the Board risk losing momentum?
- What approach ensures both fairness to residents, regional preparedness and adaptation?

Respectfully submitted,
Paris Marshall Smith, Sustainability & Resilience Supervisor

CONCURRENCE

Chief Administrative Officer – Stuart Horn
General Manager of Development and Community Sustainability Services – Sangita Sudan

Comparative Analysis: RDCK vs. Other BC Regional Districts on Sustainability Services

(Prepared as a high-level policy and service comparison across BC's 27 Regional Districts)

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1. Executive Summary

The Regional District of Central Kootenay (RDCK) is one of the **strongest and most comprehensive sustainability-service providers** among BC's 27 regional districts.
Based on breadth of service, depth of programming, and integration with planning, RDCK falls within the **top tier**, alongside:

- **Capital Regional District (CRD)**
- **Regional District of Nanaimo (RDN)**
- **Regional District of Central Okanagan (RDCO)**
- **Regional District of Okanagan-Similkameen (RDOS)**
- **Cowichan Valley Regional District (CVRD)**
- **Comox Valley Regional District (CVRD)**
- **Regional District of Kootenay Boundary (RDKB)**

RDCK's approach is notable for integrating **multiple sustainability domains**—climate, water, food systems, ecosystems, transportation, waste, emergency resilience, energy efficiency—under a single strategic service.

Many peer districts (especially rural and northern districts) have only **fragmented** or **minimal** sustainability functions, often limited to waste, water, and statutory land-use duties.

RDCK stands out for **scope, integration, and long-term sustainability vision**.

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2. Analytical Framework

To compare regional districts fairly, four criteria are used:

(1) Breadth of Sustainability Services

How many distinct domains are included (climate, water, energy, waste, food, land use, resilience, etc.)?

(2) Integration & Strategic Planning

Does the RD maintain a cohesive sustainability strategy, or are programs siloed?

(3) Capacity & Resourcing

Is there dedicated staff, a formal service, and stable funding?

(4) Support to Member Municipalities & Electoral Areas

Does the RD help small communities with climate action, adaptation planning, and grants?

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3. RDCK's Position Relative to Peer Regional Districts

3.1 Top Tier (RDCK's Comparative Peer Group)

These RDs are RDCK's closest comparisons in terms of sophistication:

RD	Comparison to RDCK
CRD	Slightly higher capacity (larger population & budget); similar scope; more urban climate challenges; has Climate Action & Adaptation Service (CAAS).
RDN	Comparable mid-size RD; strong sustainability & climate division; RDCK is broader in food systems & rural wildfire resilience.
RDCO	Strong environmental function; heavy focus on watershed + lakeshore protection; RDCK stronger on food/energy transitions.
RDOS	Strong on climate-action plans for municipalities; RDCK more integrated (food, water, land-use).
CVRD (Cowichan)	Similar depth in watershed/climate; RDCK broader in sustainability vision.
CVRD (Comox Valley)	Focuses heavily on watershed and climate adaptation; RDCK has more program diversity.
RDKB	Strong climate work; smaller scale; RDCK more multidisciplinary.

Finding:
RDCK sits comfortably within the **top cluster** but stands out for its **multi-sector integration**—especially in food systems, rural energy efficiency, watershed protection, and community resilience.

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4. Middle Tier (Most BC Regional Districts)

Most RDs fall here. Examples: FVRD, TNRD, RDEK, Columbia-Shuswap, North Okanagan, qathet, etc.

Characteristics typical of Middle Tier:

- Have *some* environmental programming (air quality, water, invasive species, waste).
- Climate work is episodic or grant-based rather than foundational.
- No dedicated sustainability service.
- Programs operate in silos (e.g., environment separate from planning).
- Limited staff (often 1–2 individuals covering environment + engineering + emergency).

How RDCK compares:
RDCK's model is **far more integrated, proactive, and well-resourced**—especially in terms of:

1. **Dedicated sustainability staff**
2. **Cross-sector strategy**
3. **Consistency across municipalities & rural areas**
4. **Public communication and community-based planning**
5. **Depth of climate and resilience initiatives**

RDCK outperforms the entire middle tier on **scope**, **coordination**, and **long-term planning**.

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5. Lower Tier (Limited / Not Evident Sustainability Programming)

Examples: Central Coast, North Coast, Mount Waddington, Skeena–Queen Charlotte, Kitimat–Stikine.

Characteristics typical of Lower Tier:

- Very small or remote—limited resources
- Barebones websites/documentation
- Primary focus on mandated services (waste, water, emergency)
- Seldom have sustainability/climate staff
- Often depend on provincial agencies for resilience planning

How RDCK compares:
RDCK is **dramatically ahead** of these districts in capacity, sustainability delivery, and long-term planning. RDCK's model would be difficult for the smallest districts to replicate without provincial or federal support.

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6. RDCK's Distinctive Strengths

RDCK excels in several sustainability domains where most RDs have minimal programming:

6.1 Integrated Food Systems & Agriculture Sustainability

Few RDs have food/agricultural sustainability built directly into their service portfolio.
RDCK is a provincial leader here.

6.2 Rural Community Resilience (Wildfire, Drought, Climate Impacts)

RDCK's wildfire and emergency-preparedness focus is more extensive than most peer districts.

6.3 Water & Watershed Protection

Strong watershed planning and lake/river monitoring programs.
(Comparable to CVRD Cowichan and RDCO.)

6.4 Broad Scope of Sustainability Domains

RDCK uniquely links:

- Energy
- Water
- Food
- Land use
- Waste/resource recovery
- Climate action
- Transportation
- Resilience & emergency prep

This multi-domain integration is unusual and puts RDCK in the **top 3** in BC for comprehensiveness.

6.5 Support for Smaller Municipalities and Rural Areas

Many RD rural areas lack the capacity for standalone climate or energy planning.
RDCK provides a **shared regional service**, giving small communities access to expertise similar to larger RDs.

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7. RDCK's Key Challenges Compared to Peers

Even top-tier districts face structural challenges:

7.1 Funding Model

Sustainability services are voluntary and depend on:

- taxation approval
- municipal consent
- political buy-in

RDCK's broad scope creates cost-pressure.
CRD and RDCO have larger tax bases and therefore more stable funding.

7.2 Rural Spread & Infrastructure Gaps

RDCK has:

- dispersed communities
- older housing stock

- rural wildfire risk
- limited transportation alternatives

This makes implementation harder compared to urbanized regions (CRD, Metro Vancouver).

7.3 Capacity Limitations Relative to Scope

RDCK has high program diversity but smaller staff numbers relative to larger districts.
This creates a **breadth-vs-depth** tension.

8. Overall Comparative Ranking (High-Level)

Top Tier: Strong / Comprehensive

1. **CRD**
2. **RDCK**
3. **RDN**
4. **RDCO**
5. **RDOS**
6. **Cowichan Valley CVRD**
7. **Comox Valley CVRD**
8. **RDKB**

Middle Tier: Moderate / Fragmented

9–22. Most regional districts
(FVRD, RDEK, TNRD, qathet, North Okanagan, Columbia-Shuswap, Fraser-Fort George, etc.)

Lower Tier: Minimal / Not Evident

23–27. Small/remote districts
(Central Coast, North Coast, Mount Waddington, Kitimat-Stikine, Skeena-Queen Charlotte)

RDCK sits clearly in the top tier, typically within the **top 2–3 most comprehensive** sustainability service models in BC.

9. Conclusion

RDCK is one of the province's leading regional districts in terms of:

- integrated sustainability planning
- rural resilience
- climate adaptation
- watershed protection
- food systems and agricultural sustainability
- strategic vision

Its model resembles those of larger or more urban districts despite having a smaller population and more rural geography.

RDCK is therefore well-positioned to:

- secure grants
- lead inter-regional partnerships
- pilot rural sustainability programs
- mentor smaller districts