Regional District of Central Kootenay

CRESTON VALLEY SERVICES COMMITTEE

Open Meeting Agenda

Date: Thursday, May 7, 2026

Time: 9:00 am

Location: Creston and District Community Complex - Erickson Room

312 19 Avenue North, Creston, 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:

   9:00 a.m. PT

   Join by Video:

   https://rdck-bc-ca.zoom.us/j/92632670829?pwd=VkcPYOv0WnMTDNowScaJt12nFYz8zN.1

   Join by Phone:

   +1 778 907 2071 Canada Toll Free

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

   Meeting ID: 926 3267 0829
   Meeting Password: 430277

   In-Person Location: 312 19 Avenue North, Creston, BC

2. **CALL TO ORDER**

   Chair DeBoon called the meeting to order at [Time] a.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

RECOMMENDATION:

The agenda for the May 7, 2026 Creston Valley Services Committee meeting be adopted as circulated.

5. RECEIPT OF MINUTES

5 - 8

The April 2, 2026 Creston Valley Services Committee minutes, have been received.

6. STAFF REPORTS

6.1 CRESTON & DISTRICT COMMUNITY COMPLEX - QUARTERLY PROGRAMMING UPDATE

The Committee Report dated May 7, 2026 from Tia Wayling, Regional Programming Manager, re: Quarterly Programming Update, has been received.

Note: report will be included in addenda.

7. DIRECTOR REPORTS

7.1 CRESTON VALLEY CONSERVATION ACTION FORM SUMMARY REPORT

9 - 54

Director Vandenberghe submitted the attached report for the Committee's information re: Creston Valley Wildlife Management Area.

7.2 FOR INFORMATION: CRESTON VALLEY TOURISM SOCIETY

55 - 61

Director Vandenberghe submitted the attached report for the Committee's information re: Creston Valley Tourism Society.

7.3 GOAT RIVER WATER MONITORING REPORT

62 - 136

Director Vandenberghe submitted the attached report for the Committee's information re: Water Monitoring Goat River Report.

7.4 CRESTON VALLEY PUBLIC LIBRARY - ANNUAL GENERAL MEETING 2026

137 - 152

Director Vandenberghe submitted the attached reports for the Committee's information re: Creston Valley Public Library Annual General Meeting (AGM) 2026.

8. NEW BUSINESS

8.1 DISCUSSION ITEM: CRESTON VALLEY ALTERNATE WATER SUPPLY FEASIBILITY STUDY - UPDATE AND PATH FORWARD

153 - 182

The Committee Report dated November 7, 2024 from Chris Gainham, Utility Services Manager, re: Creston Valley Alternate Water Supply Feasibility Study, has been received for information.

8.2 DISCUSSION ITEM: BLOSSOM FESTIVAL FREE SWIM

Request received to discuss Valley Services Committee sponsored free swim on Sunday of Blossom Festival 2026.

8.3 CRESTON NEW HORIZON'S SENIOR SOCIETY AGREEMENT REPORT

Staff have a report to present to the Committee re: Creston New Horizon's Senior Society use of Rotary Hall.

Note: report will be included in addenda.

8.4 SERVICE S224 - FINANCIAL PLAN AMENDMENT

Staff have a report for the 2025 Columbia Basin Trust project for an accessible trail to the new field washrooms to present to the Committee.

Note: report will be included in addenda.

9. OLD BUSINESS

9.1 GOAT RIVER WATERSHED WATER SUSTAINABILITY PLAN

Reoccurring item added to the agenda

9.2 ACTION ITEM LIST

183

10. PUBLIC TIME

The Chair will call for questions from the public and members of the media at 11:45 a.m.

11. CLOSED

11.1 Meeting Closed to the Public

RECOMMENDATION:

In the opinion of the Committee - and, in accordance with Section 90 of the Community Charter – the public interest so requires that persons other than DIRECTORS, ALTERNTAE DIRECTORS, DELEGATIONS AND STAFF be excluded from the meeting;

AND FURTHER, in accordance with Section 90 of the Community Charter, the meeting is to be closed on the basis(es) identified in the following Subsections:

90. (1) A part of a council meeting may be closed to the public if the subject matter being considered relates to or is one or more of the following:

(e) the acquisition, disposition or expropriation of land or improvements, if the council considers that disclosure could reasonably be expected to harm the interests of the municipality;

11.2 Recess of Open Meeting

RECOMMENDATION:
The Open meeting be recessed at [Time] in order to conduct the Closed meeting.

12. NEXT MEETING

The next Creston Valley Services Committee meeting is scheduled for May 28, 2026 at 9:00 a.m.

13. ADJOURNMENT

RECOMMENDATION:
The Creston Valley Services Committee meeting be adjourned at [Time].

Regional District of Central Kootenay
CRESTON VALLEY SERVICES COMMITTEE
Open Meeting Minutes

Thursday, April 2, 2026
9:00 am PT
Creston and District Complex – Erickson Room
312 19 Avenue North, Creston, BC

COMMITTEE MEMBERS' PRESENT

Director A. DeBoon	Town of Creston
Director G. Jackman	Electoral Area A
Director R. Tierney	Electoral Area B
Director K. Vandenberghe	Electoral Area C

STAFF PRESENT

S. Horn	Chief Administrative Officer
T. Davison	General Manager of Community Services
C. Stanley	Regional Manager – Operations & Asset Management
C. LeBlanc	Community Resilience Coordinator
R. Baril	Meeting Coordinator

GUESTS

Director A. Watson	RDCK Board Chair/Electoral Area D
D. Dumas	Creston Town Counselor

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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:
9:00 a.m. PT

Join by Video:
https://rdck-bc-ca.zoom.us/j/92632670829?pwd=VkcPYOv0WnMTDNowScaJt12nFYz8zN.1

Join by Phone:
+1 778 907 2071 Canada Toll Free

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

Meeting ID: 926 3267 0829
Meeting Password: 430277

In-Person Location: 312 19 Avenue South Creston, BC

2. CALL TO ORDER

Chair DeBoon called the meeting to order at 9:04 a.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 April 2, 2026 Creston Valley Services Committee meeting be adopted as circulated.

Carried

5. RECEIPT OF MINUTES

The March 5, 2026 Creston Valley Services Committee minutes, have been received.

6. DELEGATE

6.1 DELEGATION: 2026 TASTE OF CRESTON

Tanya Wall, Executive Director of Fields Forward Society and Creston Valley Food Action Coalition presented for the Committee the planning for the 2026 Taste of Creston event. The event will take place July 1, 2026 from 4:00 p.m. to 8:00 p.m.

Planning for the event has been well underway, after the overwhelming success of the 2025 event. Taste of Creston for this year will be held at Millenium Park, with an increase in food options available. Pre-ticket sales will be available in June, offering an opportunity for food vendors to prepare in advance of the event.

FREEDOM OF THE FLOOR

Moved and seconded,
And resolved:

That Freedom of the Floor be granted to Councelor Dumas and Director Watson.

Yaqan Nukiy has been invited to participate in the event, providing an opportunity to bridge the trauma of the traditional event celebration and come together over food to celebrate our diverse population and ethnicities.

7. OLD BUSINESS

7.1 GOAT RIVER WATERSHED WATER SUSTAINABILITY PLAN

Staff gave an overview of successes and areas for improvement in relation to connection points with producers over the last month.

Community to Community Process meetings with Yaqan Nukiy council and staff, RDCK Board and staff are being planned for May.

7.2 ACTION ITEM LIST

Item 5 – Staff asked for clarification on what was meant by “beneficiaries”

- The Committee would like a list of all contributions that Service S108 Economic Development – Creston and Areas B and C supports.

8. PUBLIC TIME

The Chair called for questions from the public and members of the media at 9:59 a.m.

A member of the public asked when the community will hear more about the Economic Action Plan “Expression of Interest”.

- Staff responded that they are working on getting this shared with public very soon.

9. CLOSED

9.1 Meeting Closed to the Public

Moved and seconded,
And resolved:

In the opinion of the Committee - and, in accordance with Section 90 of the Community Charter – the public interest so requires that persons other than DIRECTORS, ALTERNTAE DIRECTORS, DELEGATIONS AND STAFF be excluded from the meeting;

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Carried

9.2 Recess of Open Meeting

Moved and seconded,
And resolved:

The Open meeting be recessed at 10:00 a.m. in order to conduct the Closed meeting.

Carried

10. NEXT MEETING

The next Creston Valley Services Committee meeting is scheduled for May 7, 2026 at 9:00 a.m.

11. ADJOURNMENT

Moved and seconded,
And resolved:

The Creston Valley Services Committee meeting be adjourned at 11:07 a.m.

Carried

Digitally approved by

_____

Arnold DeBoon, Chair

Creston Valley Conservation Action Forum Check-In Summary Report

Prepared by:

Kootenay Conservation Program[1]

March 2026

[1] For more information: Juliet Craig, KCP Program Director, juliet@kootenayconservation.ca
https://kootenayconservation.ca/conservation-action-forums/

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BACKGROUND INFORMATION

In February 2026, Creston Valley Wildlife Management Area and Kootenay Conservation Program (KCP) co-hosted a check-in meeting to review the progress on the priority actions identified during the 2020 Creston Valley Conservation Action Forum. The Conservation Action Forum (CAF) was a collaborative event that involved participants with diverse backgrounds and perspectives, including scientists, resource managers, conservationists, First Nations, and other governments. In 2020, CAF participants worked together to identify five priority actions that would contribute to maintaining healthy fish and wildlife populations and ecological functions in the Creston Purcells Conservation Neighbourhood (Figure 1) over the subsequent five years and were encouraged to pursue these actions as they were able[2]. Six years after the 2020 event, it was timely to check-in on these actions and their progress.

The five key actions identified in 2020 (not ranked) were:

1. Develop a Landscape Scale Ecosystem-based Inventory of Biodiversity
2. Enhance Landscape Connectivity and Corridors Through a Climate Change Lens
3. Expand Stewardship Opportunities to Protect High Quality Habitats
4. Restore Floodplain Connectivity of the Kootenay/Kootenai River System
5. Perform Fire Maintained Ecosystem Restoration

The February 2026 Conservation Action Forum Check-in meeting was structured in two parts. The morning provided an opportunity to review progress on the priority actions identified at the 2020 Forum and explore recommendations for next steps. A series of 18 concise presentations were delivered to address priority actions. In the afternoon, participants formed four breakout groups to assess the ongoing relevancy of the priority actions and adjust as needed to better reflect current situations and issues. The breakout groups also identified next steps for moving forward on the key priority actions and discussed potential collaborative efforts to support this work. The meeting concluded with a summary of the day's discussions and closing remarks.

[2] Kootenay Conservation Program. (2020). Creston Valley Conservation Action Forum Summary Report. https://kootenayconservation.ca/wp-content/uploads/2020/05/Creston-Valley-CAF-Summary-Report_FINAL-27Feb2020.pdf

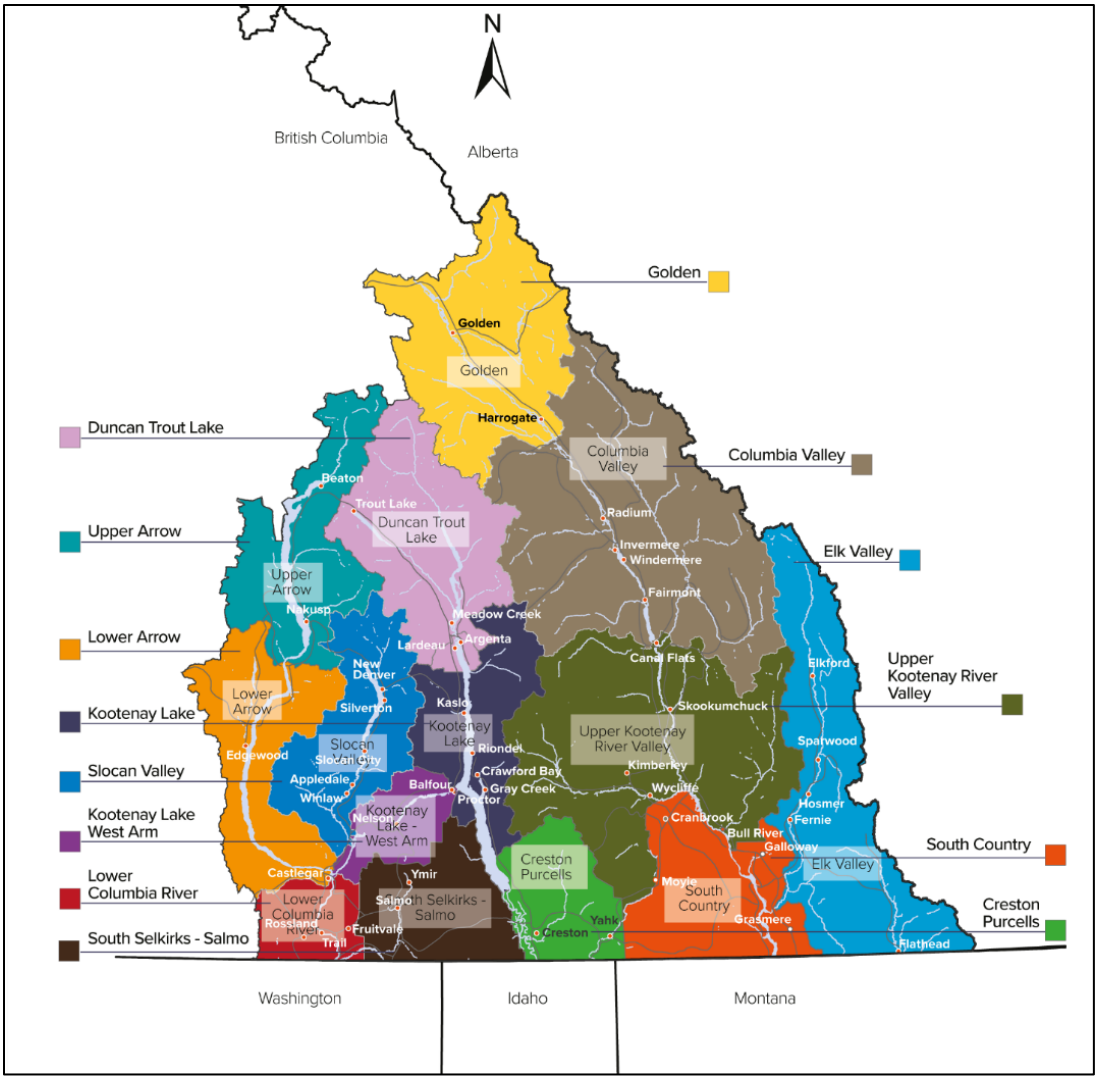


Figure 1: The Creston Purcells Conservation Neighbourhood (shown in light green) is one of 14 Conservation Neighbourhoods identified by Kootenay Conservation Program to frame subregions of the Kootenays based on social, ecological, and conservation-driven communities.

SUMMARY OF PROGRESS ON CRESTON VALLEY CONSERVATION ACTION FORUM PRIORITY ACTIONS

The Creston Purcells Conservation Neighbourhood extends from the south end of Kootenay Lake to the US border, along the western margin of the valley bordering Darkwoods Conservation Property in Regional District of Central Kootenay (RDCK) Electoral Area C, and east to the watershed divide in the Purcell Mountains which includes a small portion of RDCK Electoral Area A encompassing Wynndel/Eastshore of Kootenay Lake and a large portion of RDCK Electoral Area B extending to its boundary with the Regional District of East Kootenay. KCP respectfully acknowledges that these lands are the traditional, ancestral, and unceded territory of the Yaqan Nuʔkiy, one of six Ktunaxa Nation communities, who have stewarded this

land, water and all living things since time immemorial, and whose values and culture continue to inspire and guide stewardship of this region.

The Creston Valley is well-known for its ecological treasures such as diverse wetland and riparian habitats, active floodplains along the Kootenay River, old cottonwood galleries rich with biological diversity and uncommon and at-risk species. Since the 1940s, this region has been recognized as being exceptionally important for wildlife and led to the provincial designation of the Creston Valley Wildlife Management Area (CVWMA) in 1968, which protects over 300 species of birds, close to 60 species of mammals, and 29 species of fish, reptiles, and amphibians[3]. Further international recognition came in 1994, when the CVWMA was designated a Ramsar site wetland of international importance; and again, in 2002, with its designation as a nationally Important Bird Area by BirdLife International because it regularly supports over 100,000 water birds during migration periods[4].

This Conservation Action Forum Check-in meeting created an opportunity for local stewardship groups, First Nations, scientists, governments, agricultural producers, and others to identify concrete actions to conserve and protect the incredibly biodiverse and ecologically rich landscape of this region. The following is a summary of the status of each of the five original priority actions based on a combination of formal presentations given by project leads as well as participant updates.

The day began by setting the stage with 18 presentations delivered by representatives from 14 different organizations. Presentations were themed to report the results of conservation and stewardship projects of each of the five priority actions identified during the 2020 Creston Valley Conservation Action Forum. Presenters shared information on local research and stewardship projects.

PRIORITY ACTION 1: DEVELOP A LANDSCAPE SCALE ECOSYSTEM-BASED INVENTORY OF BIODIVERSITY

Presenters shared updates on this priority action, illustrating how long-term monitoring, geospatial mapping, habitat restoration, species recovery, and invasive species management intersect to protect biodiversity. Presentations emphasized collaboration, data-driven planning, and proactive responses to conservation challenges within the ***Creston Valley Wildlife Management Area*** *and surrounding key habitats.*

Marc-Andre Beaucher's presentation outlined the importance of the **Creston Valley Wildlife Management Area**, a 7,000-hectare Ramsar wetland and key waterfowl staging site in BC's interior that supports numerous species at risk. Monitoring activities implemented since 2020 highlight its value for diverse wetland-dependent birds, reptiles, and other wildlife, and the ecosystem services it provides to the Creston Valley alongside research and education

[3] https://crestonwildlife.ca/wetlands-wildlife/biodiversity/
[4] https://www.crestonwildlife.ca/

opportunities. Looking ahead, staff are updating guiding frameworks for the next 5–10 years to set restoration priorities, refine monitoring efforts to available capacity, identify new funding sources, and strengthen partnerships to support ongoing conservation and monitoring efforts.

Wildsight Creston Valley worked with the Selkirk College GIS department to create the "Green Map" by combining 28 digital layers that identified many features on the landscape, including habitat quality and local knowledge, to identify potential migration corridors. Living Lakes Canada also used LiDAR to map trees in the valley bottom by height and species which allowed an inventory of Cottonwoods along watercourses. Future work will include mapping of elk exclusion fences through drone photography and AI-guided geospatial analysis, with an ultimate goal of mapping the whole valley bottom and establishing wildlife migration corridors.

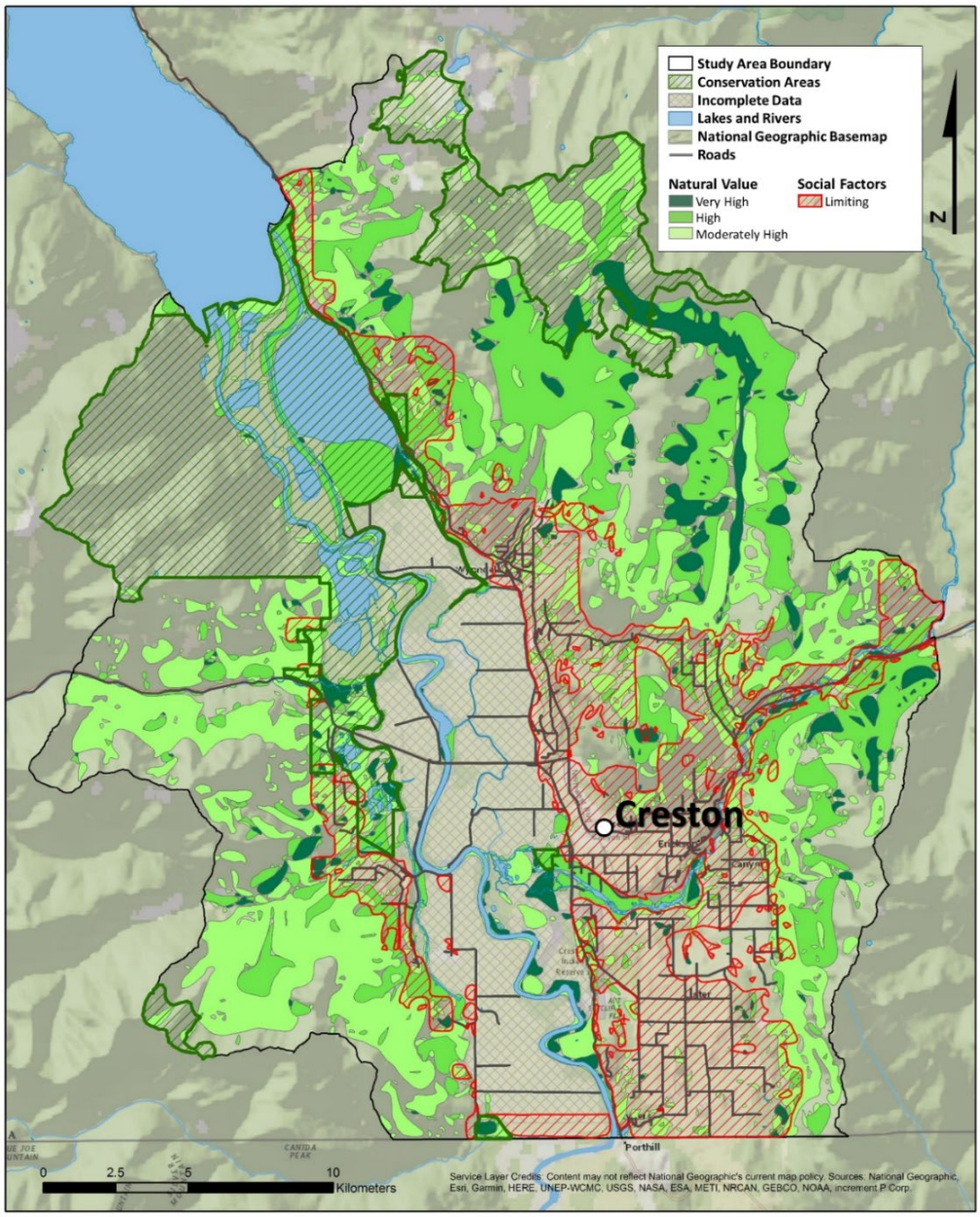


Figure 2: Green Map of Creston Valley identifying natural values. Source: Wildsight Creston Valley.

Heather Gates of **Wildlife Conservation Society Canada** summarized a decade of acoustic bat monitoring in the Creston Valley through the North American Bat Monitoring Program, which has generated baseline data to track trends and prepare for White-Nose Syndrome. Year-round detectors revealed migratory timing and habitat use. To address roost shortages, researchers created artificial tree roosts and pole structures, building 18 installations across key sites including the Creston Valley Wildlife Management Area. Monitoring using guano, acoustics, and microclimate data has detected seven species, including the endangered little brown myotis. Future work will test new locally made BatBark and MiniBark roosts and continue monitoring occupancy and effectiveness.

Devon Moore with the **Ministry of Water, Lands and Resource Stewardship** presented on recovery efforts to maintain and increase the Rocky Mountain northern leopard frog's population at its last known breeding site in the Creston Valley, including reintroductions to their historical range and annual monitoring of egg mass distribution over the years. Also discussed were challenges facing the northern leopard frog, such as habitat loss and the increasing American bullfrog population in the Creston Valley, and a description of the efforts to address these challenges, including prescribed burns, habitat restoration, and the bullfrog control program.

Molly Tilden of the **Central Kootenay Invasive Species Society** (CKISS) highlighted invasive species as a major biodiversity threat in the Creston Valley. CKISS has expanded stewardship initiatives, including the 2025 Poison Hemlock Patrol, which incentivizes landowners to eradicate this toxic plant and will continue in 2026. The confirmation of whirling disease in Kootenay Lake has increased focus on prevention through public education and community monitoring via iNaturalist is being utilized to support the early detection of new threats. CKISS stressed the need for sustained funding, stronger prevention, and rapid response to manage invasive species effectively.

Priority Action 2: Enhance Landscape Connectivity and Corridors Through a Climate Change Lens

Presenters shared updates on the progress being made towards enhancing landscape connectivity through a climate change lens. Presentations focused on the identification of landscape-level wildlife corridors to reconnect fragmented grizzly bear populations, and restoration and other land-based activities to protect wildlife movement and enhance habitats.

Michael Proctor with the **Trans-border Grizzly Bear Project** (TBGBP) described efforts to reconnect grizzly bear populations between the South Selkirk and Purcell mountains. The South Selkirk population to the west of Kootenay Lake was completely isolated – no exchanges of grizzly bears with the Purcells or the Central Selkirks north of the West Arm. Using GPS telemetry, TBGBP identified corridor habitat across the Kootenays including the Creston Valley in the Duck Lake area. This stimulated the implementation of management to increase connectivity of grizzlies across the Creston Valley, and after 15 years of these activities, monitoring revealed that the South Selkirk grizzly population had reconnected with the south Purcells. In recent years, a local community group was then started to organize conflict

reduction efforts, and a wildlife coexistence manager was hired. These conservation successes inspired the TBGBP to initiate an Ecological Corridors project with other Kootenay biologists. This initiative, Kootenay Connect, secured Environment and Climate Change Canada funding for species at risk habitat restoration work in 7 corridors across the Kootenays as the Kootenay Connect Priority Places project. They are also working to get one pilot corridor (around Columbia Lake) officially recognized by the Province of BC.

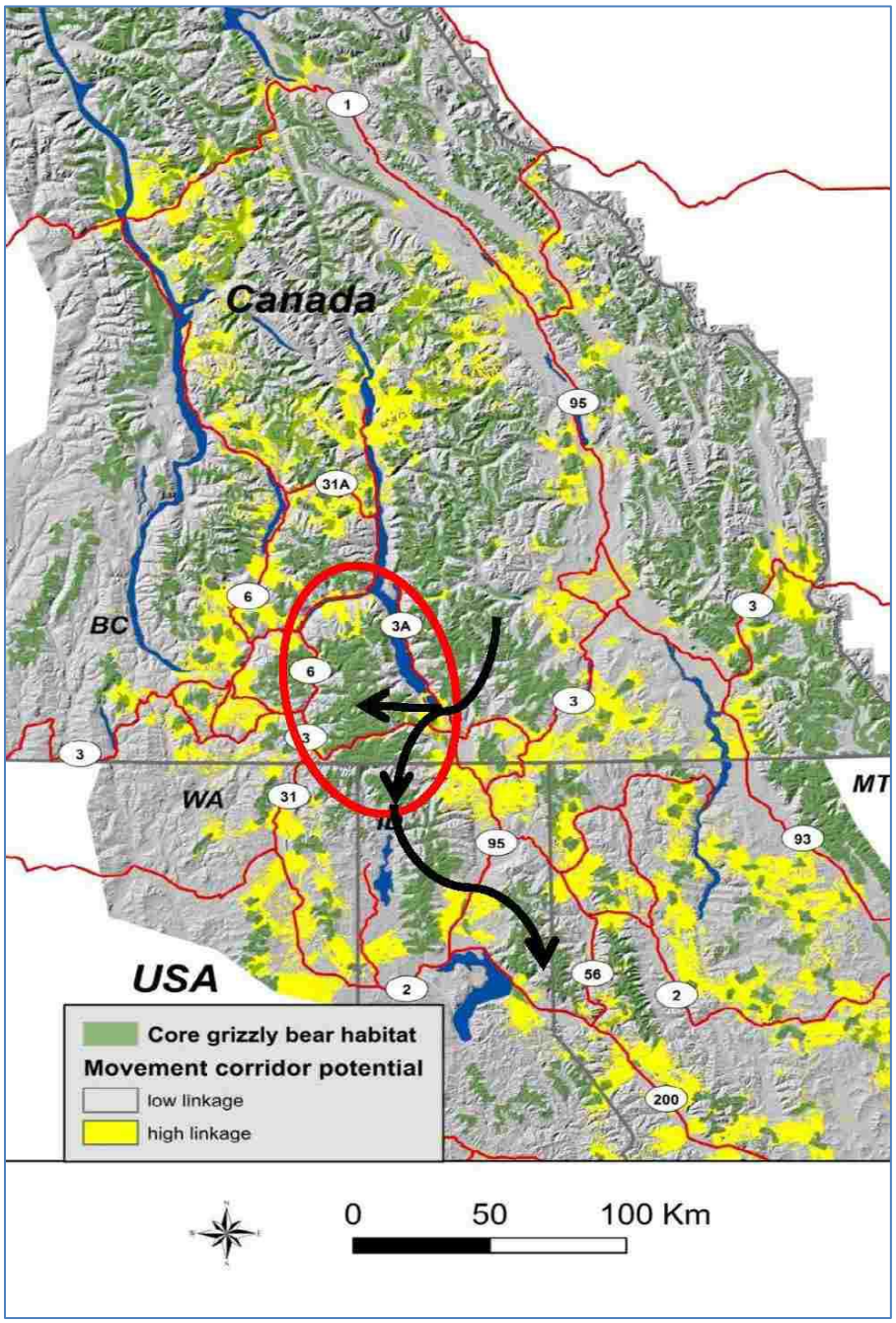


Figure 3: Grizzly movement and connectivity in the Creston Valley. Source: Michael Proctor, Trans-border Grizzly Bear Project.

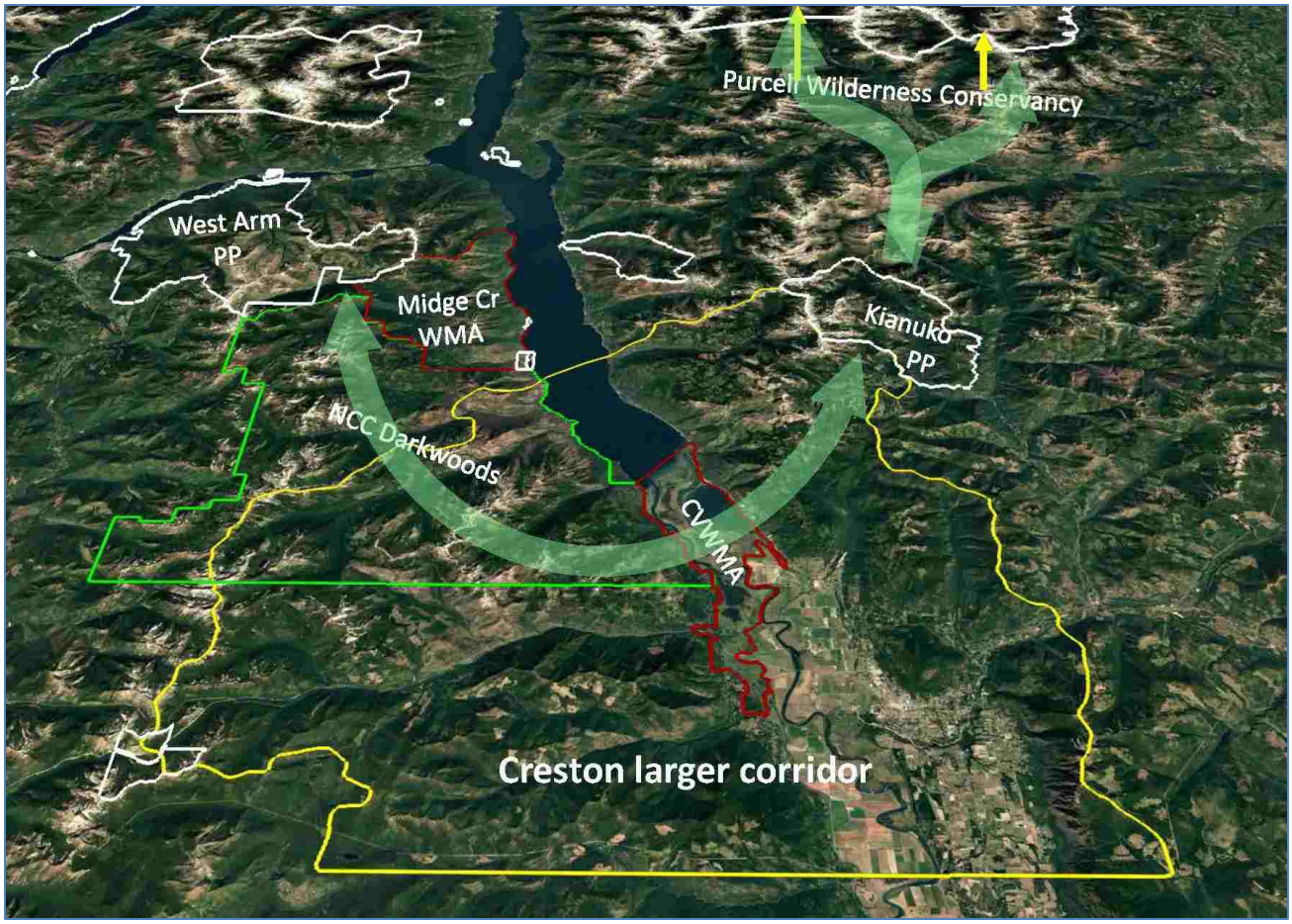


Figure 4: Kootenay Connect corridor in Creston Valley (yellow). Source: Kootenay Connect.

Marc-Andre Beaucher presented on habitat enhancement work that took place from 2019–2025 in the Frog Bear corridor, a key movement pinch-point for east-west grizzly bear movements between the Selkirk and Purcell Mountains. Supported by Kootenay Connect Priority Places, guided by a connectivity master plan, and delivered with partners including the **Nature Conservancy of Canada**, projects created over two hectares of new wetlands, restored 15 hectares of habitat, fenced roughly 23 hectares of sensitive riparian areas, and established 16 hectares of habitat for species-at-risk. Cattle exclusion led to rapid vegetation recovery and improved wildlife habitat, and a new sinuous wetland channel increased breeding and movement opportunities for amphibians and turtles. Future work will focus on monitoring, additional fencing, targeted restoration, and ongoing partnership building.

Figure 5: Frog-Bear Corridor enables safe passage of grizzly bears in the Creston Valley between the Selkirk and Purcell Mountains. Source: Nature Conservancy of Canada.

Rebecca Gidney of **Wildsight Creston Valley** created a video on their Wire Fence Removal to Restore Habitat Connectivity (Wildflow) project, conducted in partnership with the Creston Valley Rod & Gun Club, which aimed to improve habitat connectivity and reduce risks to wildlife by removing old, unsafe fencing along known wildlife movement corridors. Over the course of the project, Wildsight contractors and community volunteers removed approximately 1,830 metres of derelict barbed wire fencing across seven properties in RDCK Electoral Area A, from Wynndel to Riondel. These locations were selected because they overlapped with observed wildlife migration paths and key habitat areas. The project also engaged community members in conservation, increasing awareness of local wildlife needs and encouraging broader adoption of wildlife-friendly practices.

PRIORITY ACTION 3: EXPAND STEWARDSHIP OPPORTUNITIES TO PROTECT HIGH QUALITY HABITATS

Presentations detailed the progress being made towards expanding stewardship opportunities to protect high quality habitat in the Creston Valley. Information shared highlighted agricultural initiatives that support biodiversity and wildlife connectivity, human wildlife coexistence programming that supports electric fencing and proactive management, and promotion of payment for ecosystem services to restore riparian habitat on private land.

Rachael Roussin of the **Kootenay Boundary Farm Advisors** outlined agriculture programs that support biodiversity. The Environmental Farm Plan and Beneficial Management Practices Program provide funding for "planning" and "projects." A plan will look at a specific area of a farm, such as riparian health, biodiversity, grazing, vegetative buffers and water management and provide recommendations that align with farm goals. Farmers can then access funding to implement projects identified in plans.

Dave Zehnder, founder of the **Farmland Advantage** program, provided information on the payment for ecosystems services concept (by email). Two major themes identified at the 2020 Creston CAF as critical to the future health of the Creston Valley's ecology were connectivity of riparian habitats in the Creston flats, and bear and elk movement corridors through the wider Creston Valley. There was also consensus amongst participants that farmland is critical to achieving this connectivity. Corridors that link public lands, First Nations Reserve Lands, conservation properties, and farmland were identified. Since that meeting, they have worked with partners to target farms in the zones deemed critical, and established contracts with them to take the necessary contracts to restore and maintain riparian corridors. What is required now is a scaling up of the concept through a three-step process to achieve the scale required: 1) establish a working group to guide collaboration; 2) secure the necessary funding to continue the process, and 3) implement the model at scale.

Creston Valley Grizzly Coexistence Solutions promotes coexistence between grizzly bears and people through education, collaboration, and the use of practical tools. **Dee Howard** presented on how correctly installed electric fencing can prevent bear conflicts and associated grizzly bear mortalities in low elevation wildlife linkage habitats that overlap with private agricultural land, emphasizing that effective coexistence depends on prevention rather than reaction. Providing safe wildlife passage, while carefully managing agricultural attractants, is a key strategy for reducing conflict and ensuring that both human communities and grizzly bear populations can thrive.

PRIORITY ACTION 4: RESTORE FLOODPLAIN CONNECTIVITY OF THE KOOTENAY/KOOTENAI RIVER SYSTEM

Restoration of floodplain connectivity in the Kootenay/Kootenai River system has focused on the Frog-Bear wetlands. Wetland and riparian restoration efforts have enhanced habitat for wildlife and improved connectivity in the area.

Adrian Leslie from **Nature Conservancy of Canada** (NCC) outlined habitat restoration efforts on NCC properties in the Creston Valley. To help support grizzly bears and northern leopard frogs, NCC restored three wetlands along with almost 2km of riparian habitat in their Frog Bear Conservation Corridor. Wetlands were initially restored in 2021, and revegetation efforts have been ongoing ever since. Despite challenges from excessive herbivory from elk, along with invasive plants and drought conditions over the past several years, the wetlands are being used

by northern leopard frogs, bears, many birds, turtles and pollinators while native vegetation is becoming established throughout.

Figure 6: Wetland enhancement in Frog-Bear Corridor. Source: Nature Conservancy of Canada.

We enhanced this session by playing Norm Allard's **YouTube video** on **Yaqan Nuʔkiy wetland restoration** that he had prepared for World Wetlands Day 2026.

PRIORITY ACTION 5: PERFORM FIRE MAINTAINED ECOSYSTEM RESTORATION

There has been significant progress in collaborating to perform fire-maintained ecosystem restoration with the establishment of the Yaqan Nuʔkiy ɬuku kqaɬin Working Group.

John Cathro and **Carter Kuiper** provided an update on the **Yaqan Nuʔkiy ɬuku kqaɬin Working Group.** The goals of this working group in 2026 are to: establish the ɬuku kqaɬin Prescribed Fire Crew including training, equipment, and contracts; collaboratively plan 2-3 large burns; and conduct spring and fall burns with the ɬuku kqaɬin Prescribed Fire Crew and Working Group members. This group consists of representatives from Yaqan Nuʔkiy, Creston Valley Community Forest, Huscroft Lumber, Canfor, Creston Valley Wildlife Management Area, Nature Conservancy of Canada (Darkwoods), Town of Creston, BC Wildfire Service, RDCK, and First Nations Emergency Services Society.

PRIORITY ACTION 6 (NEW): ADDRESS ELK AND AGRICULTURE CONFLICT

Presenters invited to address growing conflicts between elk and the agricultural community in the Creston Valley introduced topics such as elk conflict management, producer compensation programming, disease prevention, and improved population monitoring. Presentations highlighted integrated tools, such as behavioural deterrents, targeted harvest, new survey technologies, and policy programs, paired with surveillance for chronic wasting disease led by the province, illustrating that a coordinated approach to balance conservation, agriculture, and hunting opportunities is needed.

Colleen Cassady St. Clair from the **University of Alberta** summarized her work with graduate students to address human-elk conflict in contexts of human safety and agriculture over the past 25 years. They used behaviour-based methods of hazing, aversive conditioning, and deterrents. Core conclusions were that (a) human safety can be increased by repeatedly chasing elk with humans and dogs, (b) intensity of grassland use can be reduced by repeated herding on horseback, and (c) stationary deterrents with lights and sound cause elk to flee initially, but with rapid habituation. Variation in boldness among individuals contributes to the capacity of elk to inhabit human-dominated areas. A jurisdictional scan showed greater prevalence of four management tools across elk ranges: harvest of cows and young animals, coordinated and high-intensity hazing, selective fencing, and compensation for damage to crops and equipment.

The **Agriculture Wildlife Program** compensates producers for up to a maximum of 80% of damage caused by designated wildlife (including elk) to standing forage, grain, and silage corn crops. **Taylor Griffin** with the **Ministry of Agriculture and Food** presented on the provincial program, including eligibility requirements, timing, how the compensation component works, while noting budgetary constraints may result in compensation levels or methodology being adjusted.

Cait Nelson of the **Ministry of Water, Land and Resource Stewardship** outlined chronic wasting disease (CWD), a fatal prion disease affecting deer, elk, moose, and caribou that can persist in the environment and spread through bodily fluids and carcasses. Infected animals often appear healthy, making testing essential. After more than 20 years of surveillance, B.C.'s first cases were confirmed in the Kootenay region in 2024, including detections near the U.S. border, with the biggest threat to Creston being recent cases identified in Bonners Ferry only 20 kms from the border. Prevention focuses on carcass handling restrictions, testing harvested and roadkill animals, reporting sick wildlife, public education, and coordinated partnerships to limit spread before the disease becomes established.

Emily Chow with the **Ministry of Water, Land and Resource Stewardship** presented on three key initiatives underway by the provincial government to improve coexistence between elk and agriculture and inform better management decisions: a proposed hunt targeting antlerless elk that remain year-round in agricultural areas (while increasing surveillance for CWD); a drone survey trial to provide safer, more efficient, and more frequent population estimates than traditional helicopter surveys; and a collaring project that will deploy 12 GPS collars to gather

data on elk movements, mortality, habitat use, and disease pathways. These projects aim to address outdated population data, account for local differences in Creston elk, and build the knowledge needed to balance conservation, hunting opportunities, and agricultural sustainability.

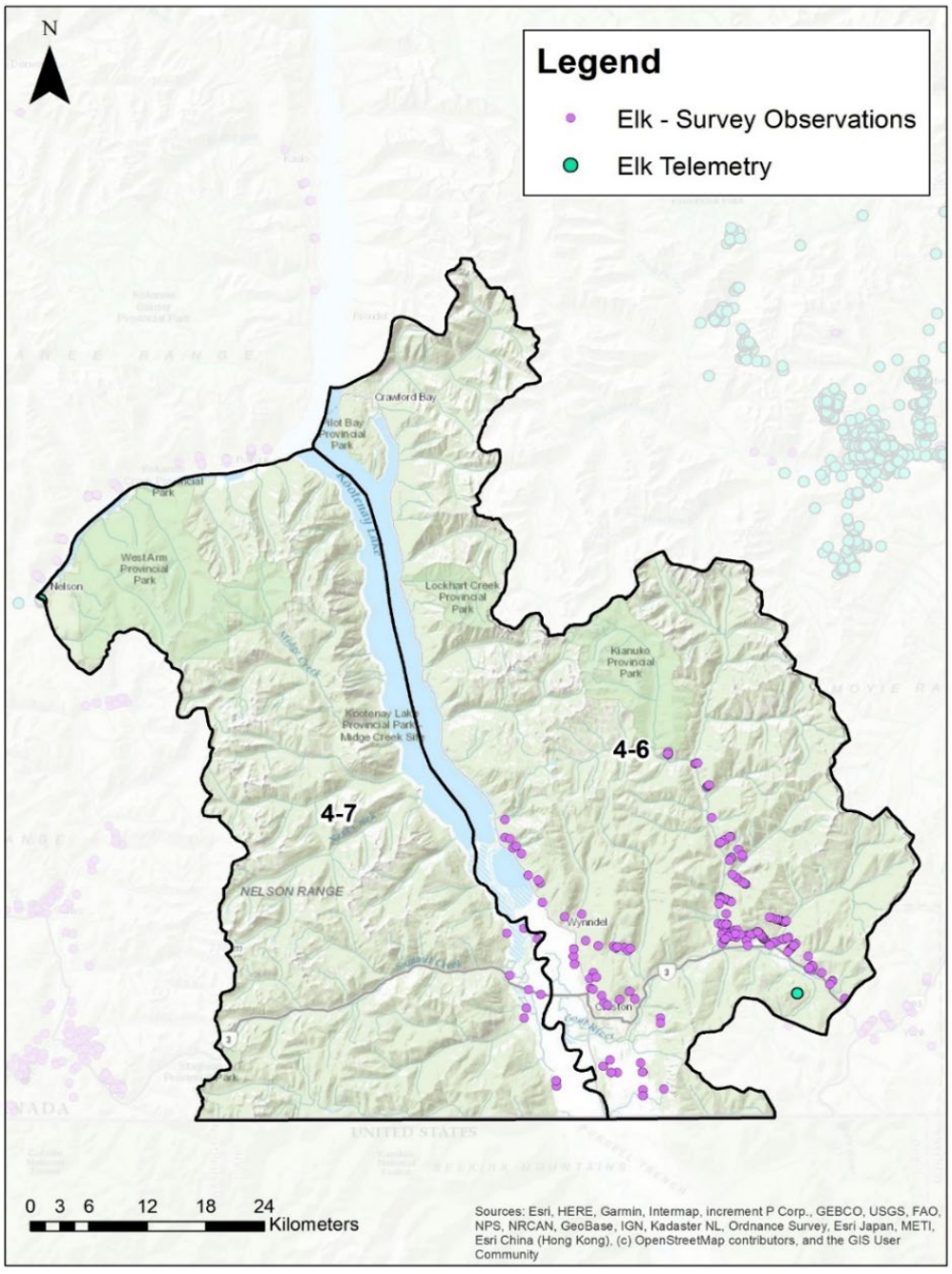


Figure 7: Elk survey observations (purple) and telemetry locations (green). The provincial government has purchased 12 collars for elk in the Creston Valley to increase telemetry data. Source: Provincial government.

Discussion of Next Steps for Priority Conservation Actions and Potential Collaborations

Following presentations, participants moved into four breakout groups to discuss the next steps for key priority conservation actions and to identify potential collaborations.

The four priority actions focused on in breakout groups were:

1. Enhance Landscape Connectivity and Corridors Through a Climate Change Lens
2. Expand Stewardship Opportunities to Protect Habitats and Biodiversity
3. Restore Floodplain Connectivity of the Kootenay/Kootenai River System
4. Address Elk and Agricultural conflict [NEW]

The first step for each group was to determine whether to update the original priority conservation action based on work that has taken place over the last five years, and new available information (Table 1).

Table 1: Priority Actions discussed at the 2026 KCP Creston Valley Conservation Action Forum Check-in.

2020 Priority Action	2026 Priority Action
Develop a Landscape Scale Ecosystem-based Inventory of Biodiversity	*Combined with Action #3*
Enhance Landscape Connectivity and Corridors Through a Climate Change Lens	**Enhance Landscape Connectivity and Corridors Through a Climate Change Lens**
Expand Stewardship Opportunities to Protect High Quality Habitats	**Expand Stewardship Opportunities to Protect Habitats and Biodiversity**
Restore Floodplain Connectivity of the Kootenay/Kootenai River System	**Restore Floodplain Connectivity of the Kootenay/Kootenai River System**
Perform Fire Maintained Ecosystem Restoration	**Perform Fire Maintained Ecosystem Restoration** [***not discussed*** *because being led and coordinated by Yaqan Nuʔkiy ɛuku kqaɛin Working Group*]
	Address Elk and Agricultural conflict [*NEW*]

The following provides a summary of discussion points made during smaller group discussions on priority actions.

PRIORITY ACTION 1: COMBINED WITH ACTION #3

This action was combined with Action #3 and not specifically discussed at the 2026 Forum.

PRIORITY ACTION 2: ENHANCE LANDSCAPE CONNECTIVITY AND CORRIDORS THROUGH A CLIMATE CHANGE LENS

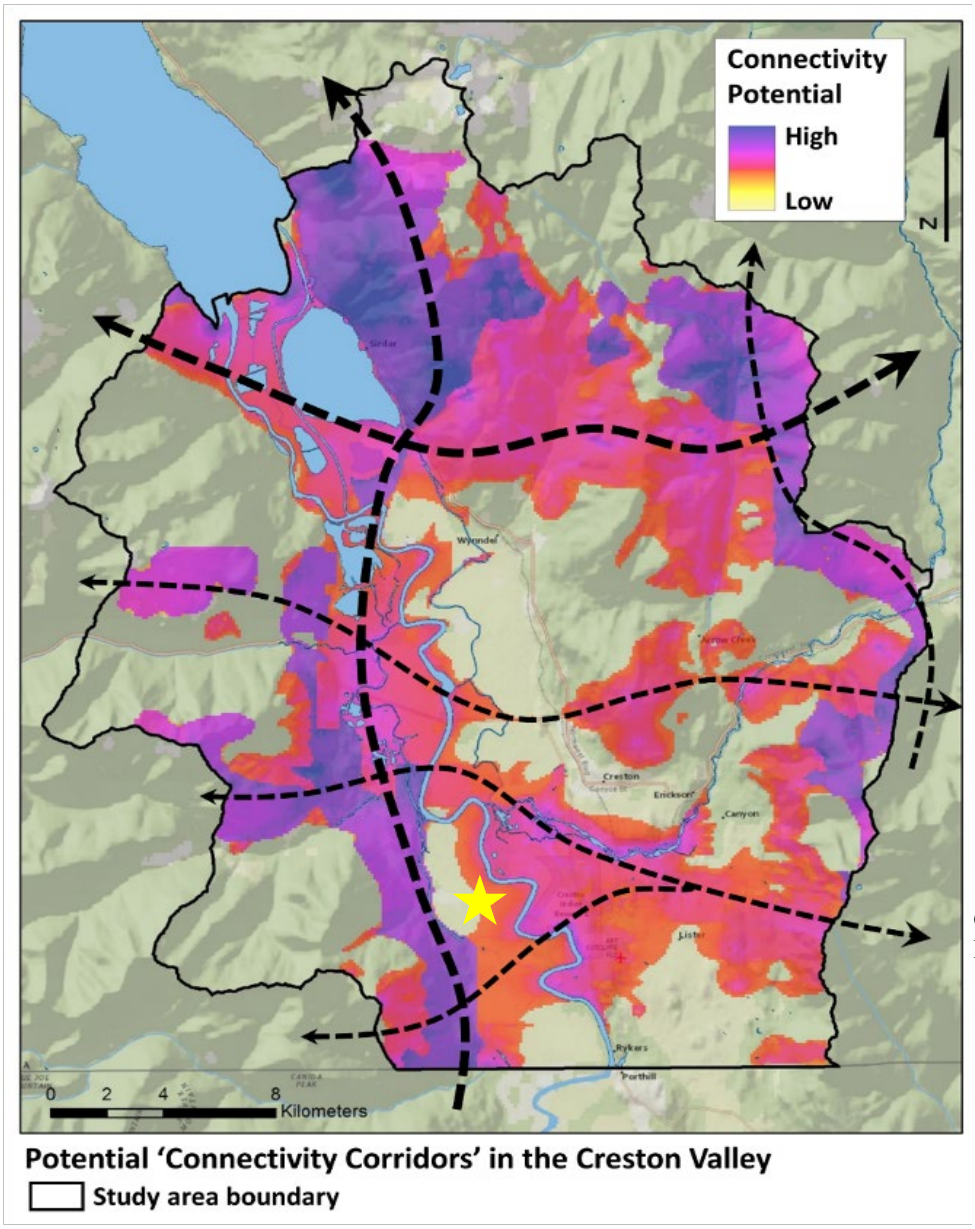
Group members: Morag Turnbull (The Nature Trust of BC), Irene Manley (WLRS/FWCP), Lee-Anne Fournier-Beck (BC Wildfire Service), Rebecca Gidney (Wildsight Creston Valley), Vanessa Lozecznik (College of the Rockies), Caroline Collier (Wildsight Creston Valley), Marcy Mahr (Kootenay Conservation Program), Julie Couse (Nature Conservancy of Canada), Brian Churchill (Wildsight Creston Valley). Lead**:** Wildsight Creston Valley

This group focused on corridors and connectivity south of Hwy 3 using those identified by Wildsight Creston Valley's Green Mapping project as a starting place.

1. **What is being planned already?**

- Creston Valley Green Map (Wildsight Creston Valley):
    - Compiled many data layers to map out the Creston Valley
    - Found that the valley bottom, which is mostly agricultural land, had no government data – this was a large constraint for the Green Mapping project to identify the bigger picture
    - Also had a project using LiDAR to map trees by species and height in the valley bottom; mostly cottonwoods and not a lot of coverage – not sure where to go next with this; included a pilot area with aerial photography east of Creston to assist with mapping
    - What is missing in Green Map:
        - Want to identify the best natural (undeveloped) areas in the valley – currently these are found on most First Nations Reserve lands
        - If anyone has project data on species, biodiversity, etc., anywhere in the valley bottom, it is important to include
- Connectivity Model developed by Wildsight Creston Valley and depicted on map (presented by Gitte Grover at meeting) was based on:
    - "Nodes" and local data
    - Yaqan Nuʔkiy observations of elk migration
    - Michael Proctor data on grizzly movement
- Southern cross-valley corridor connecting Goat Creek to Yaqan Nuʔkiy Reserve Lands to Corn Creek on west side of valley
- WLRS-FWCP has telemetry data for western screech-owl (WESO) along the Goat River which is an important secure riparian corridor in the bottom of the canyon – WESO polygons could be brought into corridor assessment

- South of Hwy 3, Yaqan Nuʔkiy has been restoring wetlands and creating more connectivity between the Creston Valley Wildlife Management Area in north - south / east-west directions (work ongoing)
- Nature Conservancy of Canada and Creston Valley Wildlife Management Area have also been working in Frog Bear Corridor and adjacent properties to enhance habitat and connectivity (via Kootenay Connect Priority Places and other projects)
- There are some additional prescribed fires planned with Yaqan Nuʔkiy and the Nature Conservancy of Canada (further north in the Creston Valley)



Goat Creek – YN Reserve Lands – Corn Creek

Figure 8: Potential 'Connectivity Corridors' in the Creston Valley based on Wildsight Creston Valley's Green Mapping Project. Source: Wildsight Creston Valley.

2. **What are the next steps to advance this action?**

Building connectivity North - South

- The CVWMA and First Nations Reserve Lands create a north - south corridor along the Kootenay River – identify the gaps, create strategies to address
- Are there conservation opportunities to build from Yaqan Nuʔkiy restoration work?
- Discussion is taking place about some public land parcels because the Regional District of Central Kootenay is looking at them to create a regional parks program in Electoral Areas B and C (ongoing discussion)

Building connectivity East - West with Green Mapping and other inputs

- Discussed the area where the Goat River meets the Kootenay River, the CVWMA and where it intersects with Hwy 3, and the mainstem of the Kootenay River, as well as some private ag parcels surrounding this zone (e.g., Ferry landing Rd.)
- Begin to target the southernmost suggested connectivity corridors identified in Wildsight Creston map Goat Creek - Corn Creek
- Cross-valley connectivity is very important to connect wet and dry habitats
- Obtain FWCP's WESO data and fill in habitat mapping gaps in the Goat River canyon this area does not have high agricultural use so maybe there could be some opportunities for conservation that could contribute to connectivity
- Need to do an assessment of key private lands to determine whether they could be priorities for acquisition to create a protected corridor (note: KCP is doing this)
- There are well-known biodiversity hotspots like Fox Tree Hill that should be included in corridor planning – what other high biodiversity areas exist? Where are there sensitive ecosystems? Ryan Durand has done sensitive ecosystem mapping and wetland classification for the Columbia Wetlands and Slocan Valley, he's a good plant ecologist/GIA analyst -- his methods include TEM, LiDAR, drones, field ground-truthing, and applying BC wetlands classification.
- What about opportunities for bat work here too? Encourage another NABat grid cell for south of Hwy 3 along Kootenay River
- Yaqan Nuʔkiy is working on aquatic connectivity (e.g., burbot) – coordinate with them to bring together aquatic and terrestrial connectivity since that interface is so important for species and habitat along the Kootenay River valley bottom
- Further south, down by Dale Marsh and USA / Canada border there could be a corridor that feeds out of Boundary Creek and east to the Kootenay River
    - Have found northern leopard frogs down by Rykerts Lake
    - At the base of Skimmerhorn, there are lots of natural springs and different wetlands that pop up in different places (private land and then further east public, including a wildlife habitat area)
- In addition to looking at opportunities, also identify / map the barriers to movement and pinch points for wildlife

Next steps:

- Identify a few keystone / target species for multi-species corridors

        - E.g., grizzly bear, western screech owl (note: western painted turtles and north leopard frogs have smaller movements of scale yet would be included in the "umbrellas" of more wide-ranging species)
    - Look at sensitive habitats, (Gb) brushland ecosystems (Fox Tree Hill east of Kootenay River), cottonwoods, dryer forests and promoting connectivity between those habitats
    - Coordinate with Yaqan Nuʔkiy to identify gaps and next steps with their wetland / riparian restoration work
    - Consider having Ryan Durand use similar techniques to what was done in the Columbia Wetlands and Slocan River Valley to provide detailed landscape mapping and classification of wetlands communities based on the BC Wetland Classification System
        - Ryan's mapping can help identify areas for enhancing sensitive wetland and Gb ecosystems, rare plants, and habitats for fire treatment to reduce wildfires
    - Assess private land through the lens of conservation opportunities along the Goat River and the main Kootenay River (KCP is doing this)

Key Actions:

- Brian (Wildsight Creston Valley): Share "Goat-Corn" east - west suggested corridor boundary (see map above)
    - Revisit CDC available mapping data and integrate new data into Green Map
    - Add wildfire risk reduction plans to Green Map (fire-maintained ecosystem restoration) - would be great to know where ecosystems exist that require fire maintenance because this ties into mitigating climate change and should be considered across the landscape from Duck Lake to the US Border
    - Brian will make a list based on this group's input and move it forward to continue building out the Green Map
- Irene (MLWRS/FWCP):
    - WESO private lands - share territory maps based on telemetry points look at those habitats to pull them into the Green Map's larger context
    - Map out WESO habitat as identified by Irene's team

3. **What geographic area of the Creston Valley is a high priority for this action? (either describe or draw on map)**

    - South of Hwy 3: North - South corridor of the Kootenay River floodplain
    - East - West corridors according to Wildsight Creston Valley's Geen Map, in particular the lower corridor linking the Goat River Canyon to Yaqan Nuʔkiy Reserve Lands to Kootenay River to Corn Creek

4. **Resources/Collaborators:** Wildsight Creston Valley; Yaqan Nuʔkiy; WLRS-FWCP; CVWMA; Creston Wildlife Co-existence; Farmland Advantage; Kootenay Boundary Farm Advisors; BCWS; NCC; Ryan Durand; Michael Proctor; Thomas Hill (Fox Tree Hill / dry brushland ecosystems); KCP.

5. **Timeframe:** In the next 6-12 months

PRIORITY ACTION 3: EXPAND STEWARDSHIP OPPORTUNITIES TO PROTECT HABITATS AND BIODIVERSITY

Group members: Raine Freeman (Friends of Kootenay Lake Stewardship Society), Molly Tilden (Central Kootenay Invasive Species Society [CKISS]), Laurie Carr (CKISS), Devon Moore (FWCP), Julia Shewan (CVWMA), Asha DeLisle (Town of Creston), Vanessa Lozecznik (College of the Rockies), Jess Holden (Wildsight Creston Valley), Rebecca Gidney (WildsightCreston Valley), Caroline Collier (Wildsight Creston Valley).

Many of the same discussions that arose from the 2020 CAF are similar to actions/activities arising now around stewardship with agriculture.

1. **What is being planned already? (and increased collaboration because of this networking opportunity)**

- Caroline Collier (Wildsight Creston Valley) working on pollinator pathway through town to promote growth of native plants. Town has a newsletter - potential opportunity for Pollinator Pathway to get the word out.

2. **What are the next steps to advance this action?**

- Opportunities that could take place, or already in motion but could use more support, include:
    - Turtle observations to identify crossing areas and mortalities, submit to Ministry of Transportation and Transit (MOTT) to build road crossing structures (Jess, Wildsight Creston Valley)
    - Treating poison hemlock (CKISS); opportunities for more collaboration between CKISS and the town to treat poison hemlock (CKISS and town will have later breakout conversation)
    - Wildlife reports (Julia, CVWMA)
    - Bullfrog hunt (Devon, FWCP)
    - Northern leopard frog observations (Devon, FWCP)
    - Marsh monitoring program, getting volunteers to listen for species (possibly Friends of Kootenay Lake Stewardship Society)
    - Collecting wildflower seeds (Caroline, Wildsight)
    - Planting and growing native plants (Caroline, Wildsight)
    - Bioblitz (Julia, CVWMA)
    - Checking bluebird boxes
    - Bat counts (Jess, in contact with bat program, needs more volunteers)
    - Installing turtle fencing (Wildsight initiative already underway but could use more volunteer effort to walk fences for maintenance)

    - Hold event to teach seniors in the valley how to use iNaturalist
    - Ongoing Creston Valley Bioblitz project
- Establish more working groups that allow for more intentional connection among individuals in the valley (Julia, CVWMA)
- More connection of various group's volunteer lists to enhance folks coming out to multiple events/initiatives
    - Establish a sort of "Creston Conservation Corps group of volunteers"
    - Could include this in the Creston Valley welcome basket to be supplied to newcomers
    - The Harvest Share program has a good volunteer pool that could be utilized
- Attend farmers market to advertise cross-organization volunteer opportunities
    - Better connection between organizations so if one group is tabling at an event, can speak to and advertise for multiple organizations. Would increase representation for all groups
    - Limits to insurance for covering volunteers; folks tend to move away from using volunteer engagement because sometimes the coordination is more costly than finding a summer student to be paid for the work
    - Wildsight recently reviewing insurance policy to better understand what coverage they have – if we did a "co-volunteer group" could Wildsight's insurance cover all applicable activities?
- KCP could help with a tool that can be taken to landowners, like the Stewardship Solutions Toolkit, to aid with identification of stewardship opportunities (except KCP doesn't interface with the public)
- Could we have a shared "conservation themed volunteer calendar"?
    - KCP has an events Google calendar, but it's more partner organizations that utilize it rather than the general public
    - Laurie with CKISS was mentioning they have an excel file that you can enter information into and then it automatically adds it to their website; she will ask their website designer about how this works
    - Chamber of Commerce already has a calendar that adds in any Creston events (they have someone paid to manage that)
        - Reach out to see if we could do volunteer events (Vanessa from College of the Rockies could do this, Rebecca from Wildsight also said she could have this conversation)
        - Still do an intake event and direct them to the Chamber of Commerce calendar
- Could we hold a Volunteer Fair event to promote potential volunteer opportunities?
    - We could hold it at College of the Rockies

- Host regular events (e.g., annual volunteer appreciation event?) to volunteers to create a sense of community (get better engagement when groups of people attend events to socialize); have booths from all organizations to highlight opportunities
    - Something to give back to volunteers (e.g., hats, seeds, plants, etc.)
    - Monthly prize draws?
    - Currently FWCP as well as KCP and other partners host Critter Day in Trail every two years. Perhaps that could be brought to Creston (Juliet will ask Angus at FWCP)

Activity	Resources Needed	Timeframe	Collaborators	Lead
Talk to chamber of commerce about posting volunteer events on their calendar. Side note: Rebecca is wondering if we could tack on volunteer appreciation to the business awards?	None - conversation.	Not discussed.	Rebecca (Wildsight) and Vanessa (College of the Rockies) interested in leading this conversation.	Wildsight Creston and College of the Rockies
If Chamber of Commerce doesn't work, establish a shared volunteer events calendar.	Organization to host the calendar, discussion regarding fee for service to post to it?	Not discussed.	All participants were interested.	Potentially Wildsight Creston Valley
Host Volunteer Fair for conservation in Creston.		Not discussed.		
Discuss bringing Critter Day to Creston.	Could be hosted at community park, volunteers, support from FWCP.	Not discussed.		Juliet (KCP) will discuss with Angus (FWCP).

PRIORITY ACTION 4: RESTORE FLOODPLAIN CONNECTIVITY OF THE KOOTENAY/KOOTENAI RIVER SYSTEM

Group Members: Marc-Andre Beaucher (CVWMA), Alyson Brda (CVWMA), Krista Watts (Columbia Basin Trust), Robyn Usher (Crest Valley Rod & Gun Club), Asa MacLaurin (BC Wildfire Service), Alana Higginson (BC Wildlife Federation), Jim Schaefer (Creston Valley Rod & Gun Club), Adrian Leslie (Nature Conservancy of Canada)

Background regarding considerations on water in the Creston Valley:

- How well is the hydrology mapped in the area?

    - Kootenay Lake is really well understood as it's tracked by the water branch of Canada, power companies, etc.
    - Would be important to map all the tributaries to understand water in the valley, the connections, flows, amounts, etc.
        - RDCK & Yaqan Nu?kiy are currently doing community engagement on this
- Columbia River Treaty between Canada & US is under review (but currently put on hold)
    - This Treaty focuses on flood control and power generation; unsure how outcomes of this could affect waters in the Valley
    - Nothing our groups can do about this treaty, but helpful to understand that it is under review and could impact work regarding water in the Valley

Two potential projects were discussed under this priority action.

PROJECT #1: Pumping water into units surrounding/including the wetlands in the Creston Valley Wildlife Management Area (CVWMA)

1. **What is being planned already?**

- CVWMA just updated some water control structures in Six Mile Slough – getting water into the Wildlife Management Area areas is dependent on the levels of the lake and whether it can be moved into there. The infrastructure is there (gravity system), so it's dependent on the river and lake levels coming up higher than the wetlands
    - In the past 25 years, Six Mile Slough has experienced cycles of flood and drought – all four compartments were "over-full" for a number of years and in the past 5-7 years, drought likely resulting from the changing climate has been dried out the compartments by the end of the summer.

2. **What are the next steps to advance this action?**

- One way to solve would have been to breach natural levees in Six Mile Slough - but challenges were encountered due to the presence of federal species at risk.
- The project could be revisited with Department of Fisheries and Oceans - talk to CVWMA if passionate about this
- Note on water levels in BC: BC Hydro has looked at what an average year looks like - they've only had 1 in the last 15 years. Hard to plan for the future when you don't understand what's happening. Build wetlands 5 years ago and now they have no water, how to build for an ever-changing climate?

PROJECT #2: Return of the Kokanee Salmon Project (Summit Creek Enhancement)

1. **What is being planned already?**

- Creston Valley Rod & Gun Club (CVRGC) was funded to increase kokanee salmon stock in the lake. Going into year 4. Lots of the eggs went into Meadow Creek, but lots of the eggs were also put into Summit Creek and the Goat River in year one.

- Reason for action was a huge drop in kokanee populations in the lake - but what caused this? Was it rearing habitat and that's why we're discussing restoring that?
- Whether the restoration in the floodplain and streams benefits kokanee in the end, it also benefits other species and adds nutrients from the wetlands into the river - so although focused on one species, it's actually a multi-species - ecosystems approach that could provide benefits
- Creston Valley Rod & Gun Club have collected quantitative data on the creek and did habitat assessments following government protocols
    - Started investigating old creek channels and seeing what channels still exist, what ones were carrying nutrients
    - Shade cover, nutrients, gravel materials, etc.
    - Want to improve rearing and spawning habitats
    - Found kokanee spawning much higher up stream than recorded previously - due to not being surveyed that far up before, or if there were barriers that are no longer there? Unsure.
    - Have been in conversations with the provincial fisheries department in Nelson, Yaqan Nuʔkiy, Kootenai Tribe of Idaho (KTOI), CVWMA, and BC Wildlife Federation regarding proposed restoration ideas
- Identified 7 options on what types of restoration could occur on Summit Creek, proposed these to Yaqan Nuʔkiy
    - Options are all on CVWMA lands, still water in *some* of the channels, but lots of them don't have water at any time of year anymore. Summit creek has lowered itself and has started eroding and headcuts have formed creeping upstream - the bottom is now 2-3m below the original channels
    - Stewardship and community education is a strong feature of this project (start with small enhancement projects to include community and increase awareness?)
- Project concerns:
    - Freshet is a lot more violent than it used to be
        - CVWMA has lost part of their dykes in some areas - built temporary one
        - To combat this concern – could dissipate stream channels through wetlands first to slow energy and spread flow, that way any restoration work downstream wouldn’t be at risk of blowing out and being lost
    - Channel is very sterile now, no cover on it and very channelized and straightened. Potential to do some planting and large woody debris (at least at the entrance where the fish are waiting for the right temps for the fish to swim up river)
    - Don’t want to repeat work others are doing or work siloed – need to make sure there’s good communication throughout groups in the Valley and projects are working to benefit each other rather than repeating work
    - Not a full understanding of the geomorphology and hydrology of the area – potential that Kootenai Tribe of Idaho may be interested in helping gain a better understanding of this?

2. **What are the next steps to advance this action?**

- Long-term objective for 2026 - Have a plan ready for the end of December 2026 to start seeking funding
- Seek input on the restoration plan from the Yaqan Nuʔkiy (by end of February) to create a solid plan for going forward and finalize document of restoration options (CVRGC)
- Host a workshop with technical support and come up with a prioritized plan - bring interested parties meaningfully together (targeted audience)
    - Workshop planning
    - Identify any other key partners and the hydrologic work they're doing (RDCK, Yaqan Nuʔkiy, others?)
    - Broaden outcomes to more than just Kokanee - identify and list co-benefits
        - Burbot, wetlands, riparian area, etc.
- Finalize solid plan with interested parties and start searching for funding
    - Lots to flush out first - but potential for ecosystem enhancement project funding (Columbia Basin Trust)

3. **Resources** necessary to implement activities
    - Landowner buy-in - CVWMA
    - Local First Nations - Yaqan Nuʔkiy, Kootenai Tribe of Idaho
    - Other interested parties - CVRGC, BCWF, NCC (for letter of support)
    - Funding for feasibility study
        - Kootenai Tribe of Idaho may be interested in hydrological studies and feasibility
    - Funding for project development
        - Project partners search for funding opportunities
    - Funding for project implementation - this amount will be dependent on what plans are chosen to go forward - could be large amounts of funding depending on the undertaken, or small to start

4. **Timeframe**:
    - Input on plan to build workshop around - end of February
    - Workshop planning & implementation - done by the end of May
        - Kootenai Tribe of Idaho having meeting 5-6 of May – Marc-Andre would like to engage with them prior to this since it's a decision makers meeting
    - Finalize plan to start applying for funding – Dec 2026

5. **Collaborations**:
    - Project lead: Creston Valley Rod and Gun Club
    - Landowner: Creston Valley Wildlife Management Area
    - Local First Nations - Yaqan Nuʔkiy, Kootenai Tribe of Idaho
        - Other interested parties - CVRGC, BCWF
            - BCWS burn reed canary if there's an area to treat?

- Community members wanting to learn more and get engaged in conservation projects
- **Lead:** who will be the lead for the next steps/activities that support the overall priority action: Creston Valley Rod and Gun Club - Robyn Usher (Kokanee Project Manager)

Geographic area of interest:

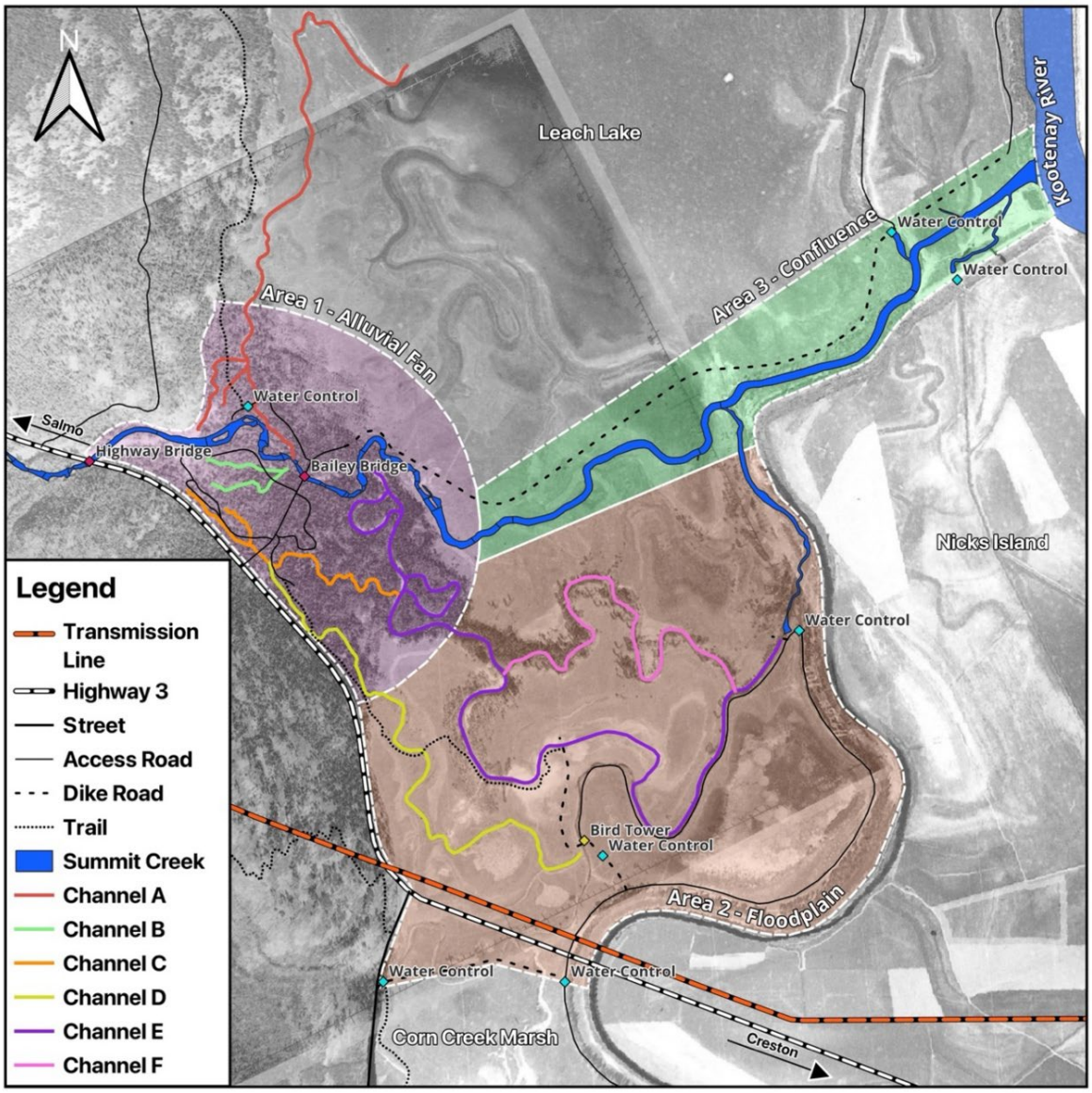


Figure 9. Potential riparian restoration units in the Creston Valley Wildlife Management Area, west side. Source: Creston Valley Rod & Gun Club.

PRIORITY ACTION 5: PERFORM FIRE MAINTAINED ECOSYSTEM RESTORATION

This action was not discussed at the Creston Valley Conservation Action Forum Check-In because it is already being actively pursued and coordinated by the Yaqan Nuʔkiy ɣuku kqaɣin

Working Group. Contact the Yaqan Nuʔkiy ɣuku kqaɣin Working Group for more information and future plans.

PRIORITY ACTION 6: ADDRESS ELK AND AGRICULTURE CONFLICT

Group members: Emily Chow (Ministry of Water, Land and Resource Stewardship), Don Low (Farmer), Robin Louie (Yaqan Nuʔkiy; Friends of Kootenay Lake), Dale Mcnamar (Farmer), Gitte Grover (Wildsight Creston Valley)

Locals suspect the elk population in the area has increased steadily and are now at unsustainable levels for agriculture producers. The increase in conflict seemed to coincide with the end of the winter Limited Entry Hunting (LEH) in the area. First Nations have been helping by harvesting elk, but the community doesn't need as many elk as the farmers would like to see removed. Everyone likes the elk and can tolerate a certain amount, but the current population is too much.

1. **What is being planned already?**

- Projects in progress:
    - Elk inventory in 2026/27
    - Trial drone survey
    - Hunt coordinator and special instructions

2. **What are the next steps to advance this action?**

High level suggestions:

- Improving high elevation habitat will be important
- Important context with predator management and the connection to non-migratory elk
- Conservations with Nature Conservancy of Canada/ Darkwoods to explore hunting
- Hunting towers like in Michigan
- Wildlife act changes: hazing, landowner tags

Actions:

- Government & others: Advocate for a landowner tag
    - This would allow landowners to have tags to give out, allowing some control over who they have on their property. This is common in several other jurisdictions. Currently not an option under the *Wildlife Act*
- Government & others: Review hunting regulations - hunt over the winter
    - This would be reviewed for the next hunting regulation cycle, would allow pressure to be on the elk over winter, when they are causing conflict. This was considered for this cycle but didn't go forward due to concerns with hunting migratory elk

- Government & others: Advocate for a grizzly bear hunt
    - We discussed how increasing predator population may be encouraging elk to stay low year round
- Payment for ecosystem services - is there a different funding source for compensation? Payment for ecosystem service?
    - Compensation through Ministry of Agriculture was reduced from 80% to 51% in 2025. Compensation doesn't solve the problem but is an important part of the picture, would be good to find a different funding source to help with compensation
- Increased communication with the agriculture community – Creston Valley Rod & Gun Club, Creston Valley Beef Growers, Dairy farmers, Orchard (see below)

3. What geographic area of the Creston Valley is a high priority for this action?

- Lower valley agriculture lands

Activity	Resources Needed	Timeframe	Collaborators	Lead
Improve communication - Gov, Beef Growers, Dairies, Orchards, Rod & Gun	None	Start spring/ summer 2026	Reps from: Gov, Beef Growers, Dairies, Orchards, Rod & Gun Club	All

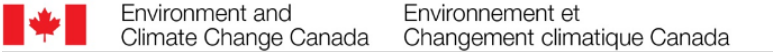
MOVING FORWARD

All Creston Valley Conservation Action Forum Check-in participants, as well as those who were invited but could not attend, will be provided with this summary report and encouraged to connect with one another to continue working on the actions discussed during this meeting, and identify opportunities to collaborate and share information within the conservation community and beyond. Lead organizations will pursue these actions and continue to move them forward, while also seeking additional partners, funding opportunities, and community input where appropriate. Kootenay Conservation Program will provide another check-in opportunity in the coming years to provide an opportunity for the Creston Valley conservation community to reconnect, assess further progress on priority actions, and refine them as needed. In the interim, participants are encouraged to maintain open lines of communication, share updates on emerging initiatives, and support collective efforts that advance conservation goals throughout the Creston Valley.

In a feedback survey completed at the end of the day, participants indicated that attending the meeting was helpful in terms of checking-in on the progress of priority conservation actions identified at the original Creston Valley Conservation Action Forum in 2020 and identifying next steps. They also indicated they would be interested in checking in more regularly (e.g., every two years) to connect and share their work in a more informal setting. Moving forward, KCP will remain engaged at a strategic level in supporting partners and First Nations in their conservation work in the Creston Valley area.

ACKNOWLEDGEMENTS

The Creston Valley Conservation Action Forum Check-in was held in Creston, BC, and relied upon the collaborative efforts of many people. We are extremely grateful to Creston Valley Wildlife Management Area for co-hosting this event, and to the organizing committee: Marc-Andre Beaucher (Creston Valley Wildlife Management Area), Jessica Holden (Wildsight Creston Valley), Adrian Leslie (Nature Conservancy of Canada), Julia Shewan (Creston Valley Wildlife Management Area), and Dave Zehnder (Windermere District Farmers Institute). We appreciate everyone who provided expert input and background information: Marc-Andre Beaucher, Laurie Carr, John Cathro, Emily Chow, Heather Gates, Rebecca Gidney, Taylor Griffin, Dee Howard, Carter Kuiper, Devon Moore, Cait Nelson, Dr. Michael Proctor, Rachael Roussin, Colleen Cassady St. Clair, and Dave Zehnder, as well as the many other meeting participants. We also sincerely appreciate the support of funding agencies that supported this workshop including the Columbia Basin Trust, Fish and Wildlife Compensation Program, Environment and Climate Change Canada, Habitat Conservation Trust Foundation, the Nature Conservancy of Canada, and The Nature Trust of BC.



APPENDIX A: PARTICIPANTS

First Name	Last Name	Affiliation
Adrian	Leslie*	Nature Conservancy of Canada
Alana	Higginson	BC Wildlife Federation
Alyson	Brda	Creston Valley Wildlife Management Area
Asa	MacLaurin	BC Wildfire Service
Asha	DeLisle	Town of Creston
Brian	Churchill*	Wildsight Creston Valley
Caroline	Collier	Wildsight Creston Valley
Carter	Kuiper	Yaqan Nuʔkiy
Dale	Mcnamar*	Farmer
Dean	Skoreyko	Piper Farms
Dee	Howard	Creston Valley Rod & Gun Club, Creston Coexistence
Devon	Moore	Ministry of Water, Land and Resource Stewardship
Don	Low	Farmer
Emily	Chow	Ministry of Water, Land and Resource Stewardship
Gitte	Grover	Wildsight Creston Valley
Heather	Gates	Wildlife Conservation Society Canada
Irene	Manley*	Ministry of Water, Land and Resource Stewardship
Jessica	Holden	Wildsight Creston Valley
Jim	Schaefer	Creston Valley Rod & Gun Club
John	Cathro	Yaqan Nuʔkiy ɛ̓uku kqaɛ̓in Working Group
Julia	Shewan*	Creston Valley Wildlife Management Area
Julie	Couse	Nature Conservancy of Canada
Juliet	Craig*	Kootenay Conservation Program
Kendal	Benesh	Kootenay Conservation Program
Krista	Watts	Columbia Basin Trust
Laurie	Carr	Central Kootenay Invasive Species Society
Lee-Anne	Fournier-Beck	BC Wildfire Service
Marc-Andre	Beaucher*	Creston Valley Wildlife Management Area
Marcy	Mahr*	Kootenay Conservation Program
Molly	Tilden	Central Kootenay Invasive Species Society
Morag	Turnbull	The Nature Trust of BC
Raine	Freeman	Friends of Kootenay Lake Stewardship Society
Rebecca	Gidney	Wildsight Creston Valley
Robin	Louie	Yaqan Nuʔkiy, Friends of Kootenay Lake Stewardship Society
Robyn	Usher	Creston Valley Rod & Gun Club
Tadhg	Howard	Creston Valley Rod & Gun Club, Creston Coexistence
Vanessa	Lozecznik	College of the Rockies

** Attended the 2020 Creston Valley Conservation Action Forum*

APPENDIX B: PRESENTATION ABSTRACTS

Action #1: Develop a Landscape Scale Ecosystem-based Inventory of Biodiversity

Biodiversity and species at risk (turtles, skinks, northern leopard frogs, etc.) (presented by Marc-Andre Beaucher, Creston Valley Wildlife Management Area)

Creston Valley Wildlife Management Area (CVWMA) is a 7,000 hectares Ramsar wetland of international significance, also important locally, regionally, and provincially (protected under the *Creston Valley Wildlife Act*). CVWMA is recognized as the most important staging area for waterfowl in the BC interior and provides suitable habitat and conditions for numerous provincially and federally listed species at risk. Monitoring activities implemented since the last forum in 2020 were summarized. These activities highlight the spatial significance of the CWWMA for a wide range of species such as over 25 waterfowl species, Bobolink, Common Nighthawk, Forster's Tern, Western Grebe, Barn, Bank, and Cliff Swallows, rubber boa, Western skink, and Western painted turtle, just to name a few. Many species/groups are wetland or water-dependant and rely heavily on functional, continuous, and intact habitats for various life stages. While providing suitable habitat for a wide variety of wildlife, plant, and invertebrate species, the CVWMA wetlands offer invaluable ecosystem services to the Creston Valley as well as providing numerous research and educational opportunities. Moving forward, CVWMA staff are working on updating guiding framework documents for the next 5-10 years which will identify new habitat restoration priorities and funding sources, assess value of current programs and activities and adapt to future needs, and tweak monitoring programs to the organization's capacity and resources. Continuing to work with key organizations to supplement and facilitate the delivery of ongoing monitoring programs and future conservation activities will be key to CVWMA. More info on the CVWMA can be found at https://crestonwildlife.ca/.

Landscape level approach to biodiversity and connectivity (presented by Gitte Grover, Wildsight Creston Valley)

Wildsight worked with the Selkirk College GIS department to create the "Green Map" though combining 28 digital layers that identified many features on the landscape especially habitat quality. Additionally, through local knowledge and identification of "nodes" potential migration corridors though the valley were mapped. Adding on, a Living Lakes intern used LiDAR to map trees in the valley bottom by species which allowed an inventory of Cottonwoods along watercourses. A new addition planned is the mapping of elk exclusion fences through drone photography and AI-guided geospatial analysis. A successful pilot study identified fences in a 600 ha study area and was also able to identify Cottonwoods by 2 height classes. If Wildsight can secure funding, the whole valley bottom will be mapped and, working with farmers and orchardists, migration corridors could be established.

Bat conservation and monitoring in the Creston Valley (presented by Heather Gates, Wildlife Conservation Society Canada)

We acoustically monitored bat populations in the Creston Valley, British Columbia, for ten years through the North American Bat Monitoring Program (NABat). Each June, we sampled the Creston NABat grid cell for one week using four stationary detectors and two replicate driving transects. These long-term baseline data allow us to assess population trends and fill critical knowledge gaps ahead of the anticipated arrival of White-Nose Syndrome. To complement these surveys, we deployed solar-powered, long-term acoustic detectors at three strategic locations to document migratory bat activity year-round. These data help us understand seasonal timing, movement patterns, and habitat use by migratory bat species in the region.

To address the shortage of natural roosts, we created artificial tree roosts by converting young trees into snag-like structures. We either wrapped BrandenBark™ around trees to simulate exfoliating bark or used chainsaws to cut cracks and crevices that mimic natural defects. In areas with limited trees and good machine access, we installed BrandenBark™ on large poles to create roosting structures. To date, we have constructed 18 tree or tree-like roosts in the Creston Valley, including 15 within the Creston Valley Wildlife Management Area and three at the Nature Conservancy of Canada's Frog Bear property. We also continue to monitor the Kuskanook bat condo through guano collection, acoustic detectors, and microclimate loggers. Genetic analysis of guano detected seven bat species at the tree-roost mimics, including the federally endangered Little Brown myotis. Yuma myotis continue to use the Kuskanook condo, where genetic analysis confirmed Little Brown myotis for the first time in 2024. Next, we will install locally produced Canadian BatBark and MiniBark roosts at three priority sites and monitor occupancy and microclimate to evaluate their effectiveness compared to nearby BrandenBark™ roosts. We will continue to monitor all previously installed roost structures by way of guano collection.

Updates on Northern Leopard Frogs and American Bullfrogs (presented by Devon Moore, MWLRS)

The Rocky Mountain population of the northern leopard frog is considered endangered in Canada, with the last known breeding population located in the Creston Valley. Ongoing recovery efforts focus on maintaining and increasing the abundance of this population while creating captive assurance populations and undertaking reintroductions to their historical range. This presentation addresses the current status of the northern leopard frog population in the Creston Valley through a discussion of the results of the 2025 field season. It describes egg mass distribution over the years, the recent results of the reintroduction program, and highlights of other work completed to recover this species. Also discussed are challenges facing the northern leopard frog, such as habitat loss and the increasing American bullfrog population in the Creston Valley, and a description of the efforts to address these challenges, including prescribed burns, habitat restoration, and the bullfrog control program. Helpful links include: Northern leopard frog Recovery Strategy; Northern leopard frog COSEWIC Status Appraisal; Northern leopard frog reintroduction program; and the Fish and Wildlife Compensation Program.

Invasive Species Update (presented by Molly Tilden, Central Kootenay Invasive Species Society)

According to the World Conservation Union (IUCN), invasive species are the second most significant threat to biodiversity, surpassed only by habitat loss. As such, effective invasive species management is critical to maintaining the ecological health and functioning of the Creston Valley. Following the 2020 Creston Conservation Action Forum, the Central Kootenay Invasive Species Society (CKISS) has prioritized work under Priority Action #4: *Expand Stewardship Opportunities to Protect High Quality Habitats*. CKISS has advanced this action through a range of initiatives. One example is the Poison Hemlock Patrol program, launched in Creston in 2025 to support the eradication of poison hemlock (*Conium maculatum*), one of the most toxic plants in the world. Poison hemlock poses serious risks to human health, livestock, and wildlife, and the Creston Valley is a hot spot for this species. The program offers cash incentives to landowners and community volunteers to safely treat poison hemlock on private and municipal lands. While volunteer uptake was limited during the pilot season, landowner interest was strong, demonstrating a clear appetite for stewardship support. Based on this response, CKISS is continuing and refining the program in 2026.

Whirling disease, an invasive parasite that can cause high mortality in salmonid populations, is an emerging concern for Creston Valley watersheds. The disease was confirmed in Kootenay Lake in 2024, leading to the Columbia River watershed being designated an infected area. There is currently no treatment for whirling disease once it enters an aquatic system, making prevention and containment the only effective management options. In response, CKISS has focused on public education and awareness, promoting best management practices such as Clean, Drain, Dry, and Decontaminate to reduce the risk of spread between waterbodies. Feedback from 2025 surveys and meetings with First Nations suggests that many water users are still unaware of the risks and how their actions can prevent spread. In 2026, CKISS will expand our targeted education efforts.

CKISS also recognizes the importance of public participation in early detection and monitoring. Community observations submitted through iNaturalist play a critical role in identifying emerging threats. CKISS has developed regional iNaturalist guides to help users identify invasive flora and fauna, and observations of invasive plants made within the CKISS region are automatically linked to CKISS iNaturalist projects. This approach directly supported the detection of Black Henbane, a Provincial Early Detection Rapid Response (EDRR) species, which was identified in Creston last year.

Looking ahead, CKISS emphasizes the need for increased investment in invasive species management across all jurisdictions, sustained funding for community engagement and stewardship initiatives, and a stronger focus on prevention, reporting, and rapid eradication at the earliest stages of invasion.

Action #2: Enhance Landscape Connectivity and Corridors Through a Climate Change Lens

Grizzly bear and landscape-level connectivity in Creston (presented by Michael Proctor, Trans-border Grizzly Bear Project)

The Trans-border Grizzly Bear Project (TBGBP) started working in South Selkirk and Purcell mountains in 2004 and in the Creston Valley in 2012. Using DNA from hair traps they revealed a regional pattern of fragmentation of the grizzly distribution in southeastern BC corresponding to human settled valleys and major highways. The South Selkirk population to the west of Kootenay Lake was completely isolated – no exchanges of grizzly bears with the Purcells or the Central Selkirks north of the West Arm. Using GPS telemetry the TBGBP identified corridor habitat across the Kootenays including the Creston Valley in the Duck Lake area. This stimulated the implementation of management to increase connectivity of grizzlies across the Creston Valley. Activities included a cost-share electric fencing program, strategic land purchases by the Nature Conservancy Canada (NCC), non-lethal conflict response by the TBGBP and the BC Conservation Officer Service, access management in the NCC Darkwoods property within the S Selkirks and more. After 15 years of these activities, monitoring revealed that the S Selkirk grizzly population had reconnected with the south Purcells across the Creston Valley. In recent years, some backsliding has occurred with regards to coexistence with grizzlies in the valley. A local community group was then started to organize conflict reduction efforts, and a coexistence manager was hired. On another front, these conservation successes across the world-class Creston Valley Wildlife Area wetlands inspired the TBGBP to initiative an Ecological Corridors project with other Kootenay biologists. This initiative, Kootenay Connect, secured Environment and Climate Change Canada funding for species at risk habitat restoration work in 7 corridors across the Kootenays as the Kootenay Connect Priority Places project. They are also working to get one pilot corridor (around Columbia Lake) officially recognized by the Province of BC.

Frog Bear Corridor enhancement (presented by Marc-Andre Beaucher, Creston Valley Wildlife Management Area)

Marc-Andre Beaucher, Head of Conservation Programs at CVWMA guided attendees through some of the **Kootenay Connect Frog Bear Habitat Enhancement Projects** implemented from 2019 to 2025. Projects originated from a “connectivity or wildlife corridor” Master Plan developed with the help of a landscape architect intended to enhance connectivity and wildlife movement opportunities, and increase habitat complexity in an area south of Duck Lake. This area is a critical pinch-point in the Creston Valley for east-west grizzly bear movements between the Selkirk and Purcell Mountains. CVWMA and key partners, in particular the Nature Conservancy of Canada (NCC), took the Master Plan to action, creating just over two hectares of new wetlands and watercourses, restoring some 15 hectares of habitat in wetlands and along drainage ditches, protecting roughly 23 hectares of sensitive riparian habitat from the impacts of grazing and other agricultural practices through fencing, and establishing 16 hectares of habitat for species at risk (e.g. Bobolink) where conservation actions and agricultural practices come together and complement one another through seasonal grazing management.

While every activity completed reached various levels of success, the fencing of the riparian and wetland edge habitat adjacent to the core northern leopard frog breeding area and along the east channel of the Kootenay River, to exclude cattle grazing, resulted in the vegetation rebounding rapidly after fencing. Cottonwood shoots over 1.5 meters in height were observed approximately a year after cattle exclusion and ground cover also increased considerably as a result of this activity as well as overall foraging and movement habitat quality for birds, invertebrates, bats, and mammals.

The addition of a sinuous wetland channel (500m in length) on CVWMA's West Meadows Farm's east parcel added significant habitat complexity to a portion of the cleared agricultural land and is now offering better movement, foraging, and breeding opportunities for amphibians, painted turtles, and many more species.

Moving forward, CVWMA staff intend to continue the monitoring of key species in the Frog Bear corridor (e.g., Bobolink, leopard frog, Barn Swallow) and add species if needed (e.g. marsh birds). Completing riparian habitat fencing (e.g., along east channel of Kootenay River) will be on the to-do list and as well as continuing to conduct targeted and/or broad-scale habitat treatments to restore and enhance habitat particularly for northern leopard frog breeding habitat. Finally, CVWMA will continue to partner with key organizations to implement monitoring and stewardship activities along the Frog Bear corridor.

More info on the **Frog-Bear Habitat Enhancement Project** can be found at https://kootenayconservation.ca/creston-frog-bear-corridor-habitat-enhancement/.

Barbed wire fence removal project (presented by Rebecca Gidney, Wildsight Creston Valley)

The Wire Fence Removal to Restore Habitat Connectivity (Wildflow Project) Project, in partnership with the Creston Valley Rod & Gun Club, in the Creston Valley aimed to improve habitat connectivity and reduce risks to wildlife by removing old, unsafe fencing along known wildlife movement corridors. Barbed wire fences can injure animals, block migration routes, and fragment habitats, creating safety hazards for both wildlife and humans. Over the course of the project, Wildsight contractors and community volunteers removed approximately 1,830 metres of derelict barbed wire fencing across seven properties in RDCK Electoral Area A, from Wynndel to Riondel. These locations were selected because they overlapped with observed wildlife migration paths and key habitat areas.

The objectives of the project were to restore safe passage for wildlife, reduce entanglement, injury and mortality, and demonstrate practical, low-cost solutions for landowners to balance property management with ecosystem health. Measurable results include the total length of fencing removed, the number of properties improved, and feedback from landowners confirming safer, more open landscapes for wildlife movement.

Through hands-on participation, the project also engaged community members in conservation, increasing awareness of local wildlife needs and encouraging broader adoption of wildlife-friendly practices. Overall, the project addressed habitat fragmentation and wildlife safety concerns, delivered tangible improvements to seven properties, and supported long-term conservation in the Creston Valley by removing barriers to safe wildlife movement. More information on this project, including a video, can be found here.

Action #3: Expand Stewardship Opportunities to Protect High Quality Habitats

Payment for Ecosystem Services for Farmers (presented by Dave Zehnder, Farmland Advantage)

Dave Zehnder, founder of the Farmland Advantage Program, provided information for the forum. Two major themes identified at the last forum as critical to the future health of Creston valley's ecology were connectivity of riparian habitats in the Creston flats, and bear and elk movement corridors through the wider Creston valley. There was also consensus amongst participants that farmland is critical to achieving this connectivity. Corridors that link crown lands, Indian Reserve Lands, Conservation properties and farmland were identified. Since that meeting in 2020 we have worked with partners to target farms in the zones deemed critical and established contracts with them to restore and maintain riparian corridors. It worked! This approach has proven effective and shows farmers' willingness to be part of the solution, they signed on and have been taking the necessary actions. What is required now is a scaling up of the concept. I propose a three-step process to achieve the scale required: 1) Establish a working group to guide the collaboration; 2) Secure the necessary funding to continue the process; and 3) Implement the model at scale.

Agriculture programs to support biodiversity: Kootenay and Boundary Farm Advisors and Environmental Farm Plan (presented by Rachael Roussin, Kootenay Boundary Farm Advisors)

Two programs were presented to highlight support for the agriculture sector that help farmers access advisors and financial support to enhance on-farm biodiversity. The Environmental Farm Plan and Beneficial Management Practices Program provide funding for "planning" and "projects." A plan will look at a specific area of a farm, such as riparian health, biodiversity, grazing, vegetative buffers and water management and provide recommendations that align with farm goals. Farmers can then access funding to implement projects identified in plans. Funding is also available for equipment and supplies that decrease a farm's impact on the environment.

The Kootenay and Boundary Farm Advisors (KBFA) is a local agriculture extension program producers can call for free advice and direction on navigating local and national programs. KBFA hosts many on-the-ground events for the agriculture sector, providing a good way for farmers to connect about important topics and production practices.

Wildlife Co-existence Solutions (presented by Dee Howard, Creston Coexistence)

Creston Valley Grizzly Coexistence Solutions promotes coexistence between grizzly bears and people through education, collaboration, and use of practical tools. Coexistence is made possible with correctly installed electric fencing to prevent bear conflicts and associated grizzly bear mortalities in low elevation linkage habitats that overlap with private agricultural land. The project provides grizzly bear safety education and bear spray training, has a local outreach coordinator, works with local First Nations, and facilitates a local working group. The presentation emphasizes that effective coexistence depends on prevention rather than reaction. Providing safe wildlife linkage areas, while carefully managing agricultural attractants, is a key strategy for reducing conflict that often results in bear mortality. At the same time, strong support for local food producers is essential to ensure that conservation strategies remain practical and economically sustainable. A balanced approach—one that protects people, livelihoods, and wildlife—creates the conditions necessary for long-term success. Ultimately, coexistence is not simply about minimizing conflict; it is about fostering resilient ecosystems and shared responsibility to ensure that both human communities and grizzly bear populations can thrive.

For more information on workshops, fence cost-sharing and updates, please go to our facebook page: Creston Coexistence Solutions. Another excellent source: www.transbordergrizzlybearproject.ca

Action #4: Restore Floodplain Connectivity of the Kootenay/Kootenai River System

Frog-Bear wetland restoration project (presented by Marc-Andre Beaucher, CVWMA and Adrian Leslie, Nature Conservancy of Canada)

To help support grizzly bears and northern leopard frogs, the Nature Conservancy of Canada restored three wetlands along with almost 2km of riparian habitat in their Frog Bear Conservation Corridor in the Creston Valley. Wetlands were initially restored in 2021, and revegetation efforts have been ongoing ever since. Despite challenges from excessive herbivory from elk, along with invasive plants and drought conditions over the past several years, the wetlands are being used by northern leopard frog, bears, many birds, turtles and pollinators while native vegetation is becoming established throughout.

Action #5: Perform Fire Maintained Ecosystem Restoration

Yaqan Nuʔkiy ɣuku kqaɣin Working Group (presented by John Cathro, Cathro Consulting, and Carter Kuiper, Yaqan Nuʔkiy)

The objectives of the Yaqan Nuʔkiy ɣuku kqaɣin working group are to: Coordinate wildfire resiliency activities in the Creston Valley; Promote alignment between funding agencies and projects; Coordinate messaging on ɣuku kqa·ɣin activities and issues with member organizations; Report out on challenges and opportunities; Share information between members to enhance collaboration; Coordinate information sharing internally with ɣuku kqa·ɣin members to support decision making of members; Develop and implement a methodology for prioritizing areas for the reintroduction of fire; Develop the structure, acquire the equipment and secure the training for a ɣuku kqa·ɣin Prescribed Fire Crew; and Reintroduce fire, based on a collaborative approach between members. The goals of this working group in 2026 are to: Establish the ɣuku kqaɣin Prescribed Fire Crew including training, equipment and contracts; Collaboratively plan 2-3 large burns; Conduct spring and fall burns with the ɣuku kqaɣin Prescribed Fire Crew and Working Group members. Membership consists of representatives from Yaqan Nuʔkiy, Creston Valley Community Forest, Huscroft Lumber, Canfor, Creston Valley Wildlife Management Area, Nature Conservancy of Canada (Darkwoods), Town of Creston, BC Wildfire Service, RDCK, and First Nations Emergency Services Society.

Action #6 (New): Address Elk and Agriculture Conflict

Creston Elk Project (presented by Emily Chow, Ministry of Water, Land and Resource Stewardship)

Elk matter in the Kootenays because they support First Nations and resident hunters, play an essential ecological role, and hold intrinsic value on the landscape, while local agriculture is also vital for regional food security – yet coexistence between elk and farming often creates conflict with consequences either way. To improve coexistence and inform better management decisions, three key initiatives are underway: a proposed hunt targeting antlerless elk that remain year-round in agricultural areas (while also increasing surveillance for Chronic Wasting Disease), a drone survey trial to provide safer, more efficient, and more frequent population estimates than traditional helicopter surveys, and a collaring project that will deploy 12 GPS collars to gather data on elk movements, mortality, habitat use, and disease pathways. Together, these projects aim to address outdated population data, account for local differences in Creston elk, and build the knowledge needed to balance conservation, hunting opportunities, and agricultural sustainability.

Elk Mitigation Measures (presented by Colleen Cassady St. Clair, University of Alberta)

Colleen Cassady St. Clair from the University of Alberta has been working with graduate students to address human-elk conflict in contexts of human safety and agriculture over the past 25 years. They used behaviour-based methods of hazing, aversive conditioning, and deterrents. Core conclusions were that (a) human safety can be increased by repeatedly chasing elk with humans and dogs, (b) intensity of grassland use can be reduced by repeated herding on horseback, and (c) stationary deterrents with lights and sound cause elk to flee initially, but with rapid habituation. Variation in boldness among individuals contributes to the capacity of elk to inhabit human-dominated areas. A jurisdictional scan showed greater prevalence of four management tools across elk ranges; harvest of cows and young animals, coordinated and high-intensity hazing, selective fencing, and compensation for damage to crops and equipment. For more information on elk mitigation measure, please see the Jurisdictional Scan of Strategies for Mitigating Elk-Agriculture Conflict Report.

Elk Compensation package for landowners (presented by Taylor Griffin, Ministry of Agriculture and Food)

The Agriculture Wildlife Program supports producers for damaged by designated wildlife (including elk) to standing forage, grain and silage corn crops. The Creston Valley represents one area in the program which operates on a provincial wide scale. This program requires producers to pre-register to be eligible for compensation with an inspection for loss to be completed prior to harvest. Registration deadlines for irrigated crops is April 30th and June 15th for annual or single cut crops. Producers must notify the regional office to schedule an inspection, a minimum of 7 days prior to harvest. Compensation is strictly limited to lost tonnage by designated wildlife and is restricted to those who engage in on-farm mitigation or prevention activities in accordance with best management practices. Compensation is only provided up to a maximum of 80% of the inspected loss. Budgetary constraints may result in compensation levels or methodology being adjusted. For 2025 the compensation rate for silage corn, grain and forage crops was limited to 51% of value. If producers in the Creston Valley are interested in more information they are encouraged to visit the program website (Agriculture Wildlife Program - Province of British Columbia) or contact our Program Representative in Cranbrook via phone (250-420-6203 or 1-888-332-3352) or email (ProductionInsurance.Cranbrook@gov.bc.ca). Website Link: Agriculture Wildlife Program - Province of British Columbia

Chronic Wasting Disease (presented by Cait Nelson, Wildlife Health Biologist, Ministry of Water, Land and Resource Stewardship)

Cait Nelson (WLRS) shared information on chronic wasting disease (CWD) which is a fatal and infectious neurological disease that is caused by an abnormal protein called a prion. The disease affects deer, elk, moose and caribou and will reduce survival rates and lead to population declines over time. CWD is not known to affect people, but it cannot be ruled out, so public health recommends that infected animals are not eaten. The disease has the potential to contaminate environments which makes it very challenging to manage and contain. Infected animals shed the disease agent through bodily fluids and or carcasses. When these prions enter the environment, they are persistent, virtually indestructible, impossible to clean up and will create an ongoing source of disease. Another challenging aspect about CWD is that most infected animals appear healthy. Infected animals are referred to as "silent carriers of CWD" because most show no sign of disease and animals with symptoms are rarely seen in the wild. Most animals that test positive for CWD are healthy looking hunter harvested animals. There is no way to tell if they are infected just by looking. The only way to know for sure is through testing. CWD surveillance and testing in wildlife has been ongoing for over 20 years in B.C. The first cases of CWD were detected in the Kootenay region in 2024 and there have been 9 cases of CWD confirm in B.C. to date. The cases in the Cranbrook area are of concern to Creston Valley but so are cases that have been identified south of the border in Washington, Idaho and Montana. Most concerning are the recent cases identified in Bonners Ferry only 20 kms from the border with the potential to move up the valley. The best chance to protect deer, elk and moose in these areas is to stay ahead of this disease before it establishes in B.C. populations. We can do this by following carcass handling and transport restrictions to avoid introducing CWD to new areas, by testing harvested and roadkill animals to identify new cases, so we know where CWD is on the landscape, by reporting sick or dead animals to the B.C. Wildlife Health Program and by learning about CWD and how you can get involved. This fight will require a team effort, and we welcome all partners to help guide and deliver this program. If you are interested in championing this effort in your community or through your organization, please get in touch and visit the B.C. CWD website for more resources:
www.gov.bc.ca/chronicwastingdisease

APPENDIX C: POTENTIAL PROJECT LIST FOR CRESTON VALLEY

These project ideas were proposed prior to the Creston Conservation Action Forum Check-In. Although the list is not exhaustive, it provides potential projects ideas for funding such as the Columbia Basin Trust Ecosystem Enhancement Program.

Develop a Landscape Scale Ecosystem-based Inventory of Biodiversity	
CKISS is leading a Community Poison Hemlock Eradication program in the Creston Valley. We will also be delivering a Whirling Disease education and prevention program at water bodies throughout the Columbia River Basin, including the Creston Valley.	*Central Kootenay Invasive Species Society*
Northern leopard frog recovery project and bullfrog control program	*WLRS, FWCP, northern leopard frog recovery and American bullfrog control*
Enhance Landscape Connectivity and Corridors Through a Climate Change Lens	
Creston Nectar Network – Pollinator Pathway	*Wildsight Creston Valley*
Recently wrapped up our Wildflow wildlife friendly fencing project	*Wildsight Creston Valley*
Expand Stewardship Opportunities to Protect High Quality Habitats	
Wildlife coexistence, predominantly Elk & Grizzly bear Agriculture conflict with Creston Valley; Grizzly Bear Coexistence outreach, and our current project is called Creston Valley Grizzly Coexistence Solutions.	*Creston Valley Grizzly Coexistence Solutions: CVRG*
1. Encourage the Creston community to plant native plants - provided this spring. 2. Encourage the planting of showy milkweed in an effort to encourage the western monarch to propagate here in an effort to increase its numbers. 3. Plan to save local areas rich in valued wild native flowers and shrubs.	*Wildsight Creston Valley*
Payment for Ecosystem Services on private agricultural land to restore riparian and other habitats done in a connected corridor.	*Windermere Farmers Institute*

Restore Floodplain Connectivity of the Kootenay/Kootenai River System

The Creston Valley Rod & Gun Club's Return of the Kokanee Salmon Project is moving into its fourth year. Following a detailed assessment of Kokanee salmon spawning and rearing habitat on Summit Creek and assessment of historic channel restoration, we are proposing the following: 1. Reconnection of historic channels to one another and to the historic floodplain on Summit Creek to improve existing Kokanee salmon migratory and rearing habitat.2. Restoration of ecosystem processes on Summit Creek that would reduce erosion, channel incision, and degradation while improving gravel retention, habitat diversity, and stream morphology. We are working with the Creston Valley Wildlife Management Area and the Ministry of Water, Land and Resource Stewardship to finalize a proposal for sharing with interested groups including the RDCK, Yaqan Nuʔkiy, and Wildsight Creston.	*Creston Valley Rod & Gun Club*
Are there solutions to getting water (pumping) from the Kootenay River into compartments 4 and 5 at Six Mile Slough in CVWMA? Working with DFO to figure out a solution is the key. Marc Andre could provide details. Getting water into these compartments would help restore critical habitats for Northern Leopard frog and complement the prescribed burn that just took place.	*Thomas Hill*

Perform Fire Maintained Ecosystem Restoration

The Creston Community Forest has completed wildfire risk reduction projects in the Creston Valley since 2018. These projects have predominantly been on Goat Mountain directly north of Creston. Additional areas include the areas close to Kitchener and in Canyon Lister. As part of the ecosystem restoration work we have been involved in, we have a prescribed burn scheduled in the spring 2026 close to Kitchener (Lower Birch) where we will be collaborating with the BC Wildfire Service.	*Creston Community Forest*
ɛuku kqaɛin provides a framework for collaborative planning, information sharing and re-introduction of fire in the Creston Valley. ɛuku kqaɛin includes multiple agencies and organizations with a shared interest in reintroducing fire in the Creston Valley for the purpose of ecological and cultural restoration as well as community wildfire risk reduction.	*Yaqan Nuʔkiy ɛuku kqaɛin Working Group*
The Kootenay Lake Fire Zone (BC Wildfire) supports prescribed fire implementation which may or may not provide for ecological enhancement or other conservation priorities within the Creston Valley. The clients we support include the Creston Valley Wildlife Management Authority, Nature Conservancy of Canada, Creston Community Forest, BC Parks, Yaqan Nuʔkiy First Nation, Monticola Forest Ltd. We may not have the ability to support all projects, but we are always open to having the conversation to see if opportunities do exist for BC Wildfire Service to support where we can.	*BC Wildfire Service*
I know there is upcoming Wildfire Risk Reduction work near Fox Tree Hill. I think the BC Wildlife Service lens is focused on the more forested areas and fuel management, but incorporating some aspect of ecosystem restoration (ER) in the Gb 03 that is part of this project would be really important. For both ecological and cultural values. Cathro Consulting is aware of this, we discussed it, but it's worth further conversation. Chloe Kuch at Cathro is a good contact for this.	*Thomas Hill*

There are several NDT 4 ecosystems north of Wyndell that could benefit from prescribed burning (Sanca, Martel Creeks etc.). Currently, there is no ER allowed in this area due to aspects of Caribou recovery in the South Purcell's. Although this herd has been extirpated for some time now this is still in place, yet logging continues but no ER. There are important questions about what is actually driving carrying capacity of ungulates in this area. To not allow ER in important biodiverse fire adapted ecosystems yet allowing reverting mature forest ecosystems to early seral stages is definitely a topic for conversation, at quite a high level though. It would be good to see low intensity fire re-introduced on this part of the landscape. I have polygons to share in the future if needed.

Thomas Hill

Address Elk and Agriculture Conflict

Project ideas:

- Elk inventory for next winter
- Trial drone surveys to count elk in agricultural areas
- Hiring a hunt coordinator to help support the elk LEH

BC WLRS

APPENDIX D: FORUM AGENDA

KCP Creston Valley *Conservation Action Forum - Check-In Meeting*

February 18, 2026
9:30 am – 4:00 pm LOCAL TIME (MT)
Creston Senior's Centre, 810 Canyon Street, Creston

BACKGROUND

In 2020, Kootenay Conservation Program and Creston Valley Wildlife Management Area co-hosted the Creston Valley Conservation Action Forum which brought together partners from this conservation neighbourhood to learn about the local landscape and collaboratively develop a set of shared conservation priorities. These forums are an opportunity to share insights from leading scientists and other knowledge keepers on key conservation actions that will make a difference for fish, wildlife, and habitats in the next five years. In 2020, the following five key actions were identified:

1. Develop a Landscape Scale Ecosystem-based Inventory of Biodiversity
2. Enhance Landscape Connectivity and Corridors Through a Climate Change Lens
3. Expand Stewardship Opportunities to Protect High Quality Habitats
4. Restore Floodplain Connectivity of the Kootenay/Kootenai River System
5. Perform Fire Maintained Ecosystem Restoration

The goal of this forum "check-in" is to provide updates on the progress of the key conservation actions identified in 2020, collaboratively identify new shared priorities moving forward, and discuss next steps. Thank you for joining us to contribute your knowledge and expertise, as we work together to advance these conservation priorities. KCP respectfully acknowledges that this event and associated conservation actions are taking place on the traditional, ancestral, and unceded territories of the Yaqan Nuʔkiy, whose values and cultures continue to inspire and guide stewardship of this region.

AGENDA

Purpose: To check in on the progress of the five priority conservation actions identified at the 2020 Creston Valley Conservation Action Forum and to identify next steps and beneficial collaborations moving forward.

9:15 Grab a coffee and get settled

9:30 Welcome

9:45 Introductions: Round Table

- Name, organization, were you at the 2020 forum? What is your connection to the Creston Valley? (< 1-minute each)

10:05 Agenda Review and Overview of 2020 Creston CAF

10:15 'Espresso Shot' updates on the Creston Valley Conservation Actions (3-4 min. each)

Action #1: Develop a Landscape Scale Ecosystem-based Inventory of Biodiversity

- Biodiversity and species at risk (turtles, skinks, northern leopard frogs, etc.) (Marc-Andre Beaucher, Creston Valley Wildlife Management Area)
- Cottonwood floodplains mapping and Green Map (Gitte Grover, Wildsight Creston Valley)
- Bat diversity and conservation in Creston Valley (Heather Gates, Wildlife Conservation Society Canada)
- Updates on Northern Leopard Frogs and American Bullfrogs (Devon Moore, MWLRS)
- Top invasive plants in Creston (Laurie Carr, CKISS)
- Q&A

10:45 Bio Break (15 min)

11:00 'Espresso Shot' Updates on the Creston Valley Conservation Actions cont.

Action #2: Enhance Landscape Connectivity and Corridors Through a Climate Change Lens

- Grizzly bear and landscape-level connectivity in Creston (Michael Proctor, TransBorder Grizzly Project) - **video**
- Frog Bear Corridor enhancement (Marc-Andre Beaucher, CVWMA)
- Barbed wire fence removal project (Rebecca Gidney, Wildsight Creston)
- Q&A

Action #3: Expand Stewardship Opportunities to Protect High Quality Habitats

- Biodiversity options in environmental farm plans (Rachael Roussin, Kootenay Boundary Farm Advisors) - **video**
- Payment for Ecosystem Services for Farmers (Dave Zehnder, Farmland Advantage)
- Wildlife Co-existence Solutions (Dee Howard, Creston Coexistence)
- Q&A

Action #4: Restore Floodplain Connectivity of the Kootenay/Kootenai River System

- Yaqan Nuʔkiy wetland restoration (Norm Allard, Yaqan Nuʔkiy) - **YouTube video**
- Frog-Bear wetland restoration project (Marc-Andre Beaucher, CVWMA and Adrian Leslie, NCC)
- Q&A

Action #5: Perform Fire Maintained Ecosystem Restoration

- Prescribed fire working group for Creston Valley (John Cathro, Cathro Consulting and Carter Kuiper, Yaqan Nuʔkiy)
- Q&A

Action #6 (New): Address Elk and Agriculture Conflict [or after lunch]

- Elk Mitigation Measures (Colleen Cassady St. Clair, University of Alberta) - **video**
- Elk Compensation package for landowners (Taylor Griffin, Ministry of Agriculture and Food) **- video**
- Chronic Wasting Disease (Cait Nelson, WLRS) - **video**
- Creston Elk Project (Emily Chow, MWLRS)
- Q&A

12:00 **LUNCH** (45 minutes)

12:45 Group Photo (outside)

1:00 **Emerging Priority Project Ideas**

- Discussion on what's missing/changed from 2020
- Current project ideas (full brainstorm)
- Current or potential funding opportunities (e.g. Columbia Basin Trust Ecosystem Enhancement Program; Farmland Advantage)

1:30 **Moving Forward: Next Steps For Key Actions and Discussion of Potential Collaborations**

Breakout groups for each Priority Action (or emerging actions).

- What is being planned already?
- What are the next steps to advance this action?

2:45 ish **BioBreak**

3:00 Report Out from Breakout Groups

3:30 Next Steps and Closing Remarks

4:00 Adjourn

Special thanks to KCP Program and Event Supporters

Creston Valley Tourism Society
Staff Report – March 2026

Staff Report by Executive Director, Jesse Willicome, summarizing work done from **Mar. 1–31, 2026.**

March marked a transition from planning into execution as Creston Valley Tourism Society moved into the spring tourism season. Work during the month focused on completing major deliverables, advancing marketing initiatives, progressing key projects, and preparing for the upcoming Annual General Meeting on Thursday, Apr 23.

From an administrative and governance perspective, staff completed monthly financial reporting and year-end administrative requirements, including coordination of Board signatures for the 2025 financial statements and updated accounting agreement. Work also progressed on planning for the AGM, including venue booking & coordination, invitations to stakeholders, agenda development, and initial Board recruitment and succession discussions.

Several major projects reached key milestones. Production of the 2026–27 Explore Creston Valley Visitor Guide, Hiking Map, and Tear-Away Map was completed and sent to print. The ExploreCrestonValley.com website redevelopment also advanced into its final stages, with content and layout nearing completion ahead of an anticipated April launch. Work continued on the Creston EventReady Program, including delivery of the EventReady Focus Group and follow-up planning to integrate the program with CVTS event support initiatives.

In the marketing and communications area, digital campaigns continued through Google Ads and Meta platforms, with strong performance across channels. March website traffic increased to over 14,600 users and 15,500 sessions, representing approximately 45–50% growth over the same period in 2025. Engagement remained strong on key trip-planning pages including trails, events, accommodations, and travel information.

From a financial perspective, March MRDT revenues totalled $6,174.75, slightly below March 2025 levels ($6,594.99), but consistent with seasonal trends. Year-to-date MRDT revenues reached $17,047.96, representing an increase of approximately 33.8% over the same period in 2025. Overall revenues remain strong, with the organization maintaining a positive net income position and stable financial footing.

Overall, March represented a highly productive month, with significant progress made on key projects and marketing initiatives. The organization is well positioned heading into April and the start of the peak tourism season.

2. March Staff Activity

Administration

- **Financial Administration & Bookkeeping:** Completed regular bookkeeping in QuickBooks, including expense entry, reconciliations, cheque and e-transfer processing, and coordination with the bookkeeper and accountant.
- **Advertising Payments & Invoicing:** Managed Visitor Guide and Hiking Map ad payments, resent invoices with GST, deposited cheques, and began setting up Helcim for credit card payments.
- **Financial Reporting & Year-End:** Prepared February staff and financial reports, coordinated Board signatures on 2025 year-end financials and accounting agreement, and circulated the updated 2026 budget.
- **General Administration:** Ongoing email management, scheduling, mail handling, cheque ordering, and coordination with Board members, contractors, and partners.
- **AGM Preparation:** Confirmed Creston Hotel venue booking, sent invitations via March e-newsletter, began agenda and logistics planning, and coordinated initial details with Board leadership.

Project / Planning

- **Destination BC Co-op Program:** Finalized and submitted the revised 2026–27 Co-op Marketing Partnership Program application and budget, while reviewing remaining 2025–26 program reporting and expenditures.
- **Website Redevelopment – Hello Agency:** Continued coordination with Hello Agency on design refinement, content structure, platform access, and initial layout review ahead of target launch of early April.
- **Creston EventReady Program:** Reviewed and approved focus group materials, attended the EventReady Focus Group, and coordinated follow-up planning with Hello Agency.
- **Event Sponsorship / Event Marketing Support Program:** Updated 2026 program guidelines and application form to align with EventReady, and developed a draft funding agreement/contract for participating events. Oversaw initial inquiries and applications from Bird Fest, Blossom Fest & Hop To Vine Hustle.
- **Operational & Contract Planning:** Met with Hello Agency regarding broader 2026 marketing support, including digital campaigns, website, photography, and social media transition planning.

Marketing & Content

- **Visitor Guide Production:** Completed final editorial revisions, amenities directory updates, layout review, cover selection, and Board approvals for the 2026–27 Visitor Guide.
- **Hiking Map & Tear-Away Map:** Finalized edits, reviewed proofs, and coordinated approval and submission for printing.

- **Printing & Distribution Coordination:** Coordinated production timelines and shipment logistics with Elite Lithographers, arranged delivery to Creston and ABC Brochures in Pincher Creek AB, updated GoBrochures.com online ordering system, and implemented new digital inventory tracking & reporting in analytics dashboard.
- **Spring Advertising Campaigns:** Coordinated print ad placements in Spring/Summer editions of *West Kootenay Go & Do*, *Trench*, *Fernie Fix Magzines*; reviewed creative with Hello Agency, and approved Meta campaign materials.
- **Digital & Social Media Coordination:** Worked with Hello Agency on new spring campaign planning and digital advertising, and coordinated April social media planning with Madeline Tribble.
- **Content Development:** Updated blog content, coordinated with Brian Lawrence on final blog deliverable, reviewed photo contest submissions, and engaged photographers regarding 2026 content opportunities.

Stakeholder / Partner Relations

- **Stakeholder Communications:** Drafted and distributed the March Stakeholder E-Newsletter and responded to ongoing business and partner inquiries.
- **Regional & Local Collaboration:** Participated in meetings with the Economic Development Collective, RDCK Valley Services Committee, and local partners on tourism and economic development initiatives.
- **AGM Outreach:** Coordinated with Board members on AGM planning and reached out to Brad Parsell regarding participation as guest speaker.
- **International Selkirk Loop (ISL):** Continued limited support as Board Chair, including meeting coordination, financial oversight, governance follow-up, and discussions regarding future structure and marketing priorities for 2025.
- **Event & Community Liaison:** Responded to inquiries related to Event Sponsorship, EventReady participation, and other stakeholder and community matters.

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3. April Upcoming Activities

Administration

- **Monthly Reporting & Board Communications:** Prepare and circulate the March Staff Report, financial summaries, MRDT update, and marketing analytics for Board review.
- **Financial Administration:** Complete April bookkeeping, reconciliations, payroll, and ongoing tracking of advertising revenues and expenses.
- **AGM Planning & Coordination:** Finalize logistics for the April 23 AGM, including agenda, presentations, catering, materials, and coordination with Board members and guest speaker.
- **Board Recruitment & Membership:** Support Board succession planning by confirming returning members and identifying potential new Board members ahead of the AGM.

Project / Planning

- **Website Redevelopment – Launch:** Complete final content updates, testing, and coordination with Hello Agency in preparation for the public launch of the new ExploreCrestonValley.com website in early April.
- **Destination BC Co-op Program – Transition & Launch:** Finalize reporting for the 2025–2026 Co-op Marketing Campaign and initiate the 2026–2027 program, including confirming tactics, budgets, and campaign timelines.
- **Creston EventReady Program:** Continue development of EventReady resources and supports, and begin integrating the program with the updated Event Sponsorship Funding Program.
- **Operational Planning:** Continue aligning spring and summer project timelines, marketing activities, and program delivery with available capacity and budget.

Marketing & Content

- **Print Collateral Distribution:** Coordinate local distribution of Visitor Guides, Hiking Maps, and Tear-Away Maps to businesses and accommodations, and manage regional distribution through BC Visitor Centres (GoBrochures), ABC Brochures, and other key locations.
- **Spring Digital Marketing Campaign:** Continue coordination with Hello Agency of spring digital campaigns across Google Ads and Meta platforms targeting BC, Alberta, and regional drive markets.
- **Website Content & Launch Support:** Finalize and review website content, imagery, and listings in advance of launch, and support initial promotion of the new website.
- **Social Media Transition Planning:** Continue coordination with Hello Agency to transition social media management responsibilities from Madeline Tribble beginning in May.
- **Content Development:** Continue coordination of new blog content, photography, and seasonal storytelling aligned with spring and early summer travel themes.

Stakeholder / Partner Relations

- **AGM Engagement:** Coordinate AGM communications, invitations, and stakeholder participation, and support engagement with attendees during the event.
- **Regional Tourism Collaboration:** Maintain communication with Destination BC, Kootenay Rockies Tourism, and ETSI-BC regarding marketing programs, funding, and partnerships.
- **Local Economic Development Collaboration:** Continue participation in Economic Development Collective discussions and engagement with RDCK, Town of Creston and local partners.
- **International Selkirk Loop (ISL):** Continue limited involvement in ISL governance, financial oversight, and restructuring discussions as Board Chair.

4. Important Updates & Future Actions

A. ExploreCrestonValley.com Website Redevelopment & Launch

The redevelopment of ExploreCrestonValley.com is now in its final stages, with launch anticipated in April 2026. Work in March focused on final content updates, layout review, and coordination with Hello Agency on site functionality and structure.

The new website will provide improved navigation, mobile usability, and enhanced trip-planning functionality, and is expected to better support conversion of visitors from initial inspiration through to travel planning.

Initial promotion of the new website will begin following launch, supported by digital marketing campaigns and social media.

B. 2026 Print Collateral Production & Distribution

Production of the 2026 Visitor Guide, Hiking Map, and Tear-Away Map has been completed, with materials shipped and beginning to arrive in Creston in early April. April will focus on distribution, including:

- Local distribution to businesses and accommodations
- Regional placement at key tourism locations (e.g., Kootenay Lake Ferry terminals, Cranbrook Airport)
- Distribution through ABC Brochures in Southern Alberta
- Shipment to BC Visitor Centres via the GoBrochures network

A new inventory tracking system has been implemented to better monitor distribution levels and remaining stock throughout the season.

C. Destination BC Co-op Marketing Program (2026–2027)

The 2025–2026 Co-op Marketing Campaign has now concluded, with final reporting underway. The 2026–2027 Co-op Marketing Partnership Program will launch in April.

As previously noted, Destination BC has reduced its funding contribution for the upcoming year to $28,227.27 from almost $34,000.00 in 2025, resulting in a lower overall program budget. A revised campaign plan and budget have been prepared to align with the updated funding levels while maintaining core marketing activities.

CVTS staff will continue to monitor program performance and administrative requirements, particularly given the increasing reporting demands associated with the program.

D. CVTS Annual General Meeting – April 23, 2026

Planning is nearing completion for the CVTS Annual General Meeting scheduled for April 23, 2026 at the Creston Hotel. Kootenay Rockies Tourism CEO Brad Parsell has been

invited to attend as a guest speaker, providing an opportunity for attendees to hear about regional tourism priorities and initiatives.

Hello Agency has also been invited to provide a short presentation at the AGM highlighting the new ExploreCrestonValley.com website and the Creston EventReady Program, offering Board members and stakeholders an opportunity to see these projects and their potential impact.

Importantly, Melhas advised that she will be stepping down as Board Chair following the AGM. At this time, no Board member has formally stepped forward to assume the Chair role. To ensure continuity, it is proposed that members be elected to the Board at the AGM as usual, with Board officer roles (Chair, Vice-Chair, Treasurer, Secretary) to be assigned at a subsequent meeting.

It is also worth noting that the Chair role is not a highly intensive position, generally involving chairing quarterly Board meetings, liasing with staff, providing financial oversight, and signing cheques as required. The majority of operational and administrative responsibilities continue to be carried out by staff.

E. Social Media & Marketing Support Transition

Planning is underway to transition social media management responsibilities from Madeline Tribble to Hello Agency beginning in May during Madeline's maternity leave.

Discussions with Hello Agency in March focused on defining roles, responsibilities, and scope of services, including coordination of social media, digital advertising, and content development.

This transition is intended to ensure continuity of marketing activities during the peak tourism season.

F. International Selkirk Loop (ISL) – Ongoing Involvement

CVTS continues to provide limited support to the International Selkirk Loop organization during its current transition period.

In addition to ongoing governance and administrative support, current discussions include:

- Potential production of a regional tear-away map or reprint of the ISL folding travel map for the 2026 season (targeting May–June)
- Development of a Request for Proposals (RFP) for a new ISL website to be issued later in 2026

Work in March also included Board meeting coordination, financial oversight, annual reporting, and ongoing discussions with regional partners regarding future organizational structure and direction.

As previously directed by the CVTS Board, this involvement remains limited in scope and focused on supporting stability during the transition period.

wildsight
Creston Valley Branch

Water Monitoring on the Goat River

CABIN and Water Quality Monitoring Report for 2022-2024

Thank you to all the wonderful water volunteers, water advisors, and funders that made this project possible!

Prepared by Melissa Flint, Wildsight Creston Valley Branch

Feb 18, 2026

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Project Objectives:

Wildsight Creston Valley Branch (WCVB) is engaged in community-based monitoring on the Goat River. The community-based monitoring includes two components: gathering baseline water quality data, and measuring benthic invertebrates as an indicator for watershed health. These data should reveal if there are effects from agriculture, forestry, climate change and/or urban/rural development in the Creston Valley that have detrimental effects on water quality and river biota. In addition to the scientific data gathered, the program develops community awareness and involvement in watershed health in the Creston Valley.

The objectives of this report are:

1. Summarize baseline water quality data collected on the Goat River from 2022-2024 at two sites.
2. Identify if there are any water quality parameters that are of concern based on provincial freshwater aquatic life guidelines from 2022-2024.
3. Present benthic invertebrate data using CABIN (Canadian Aquatic Biomonitoring Network) protocols and analysis from 2022-2024 at one site on the Goat River. Does the benthic community differ from the Reference Conditions Approach due to stress in the watershed?
4. Relate benthic invertebrate results to water quality data.
5. Provide recommendations for future stream data collection.

Introduction

The Goat River is a major tributary to the Kootenay River in the Creston Valley, drains a watershed area of 1259 km^2, and is a stream order 4. The headwaters originate near White Grouse Mountain, to the NE of Kianuko Provincial Park. Major tributaries to the Goat River include Arrow Creek, and Kid Creek. The Goat River holds cultural values for the Yaqan Nu?kiy and Ktunaxa Nation members. The Goat River has also historically been an important spawning area for Kokanee salmon (*Oncorhynchus nerka*) and Burbot (*Lota lota*). The Goat River and its associated floodplain and riparian areas have significant ecological values for species-at-risk as well as biodiversity, locally and regionally. It also has important recreational/social value as a swimming spot for Creston residents in the hot summer months.

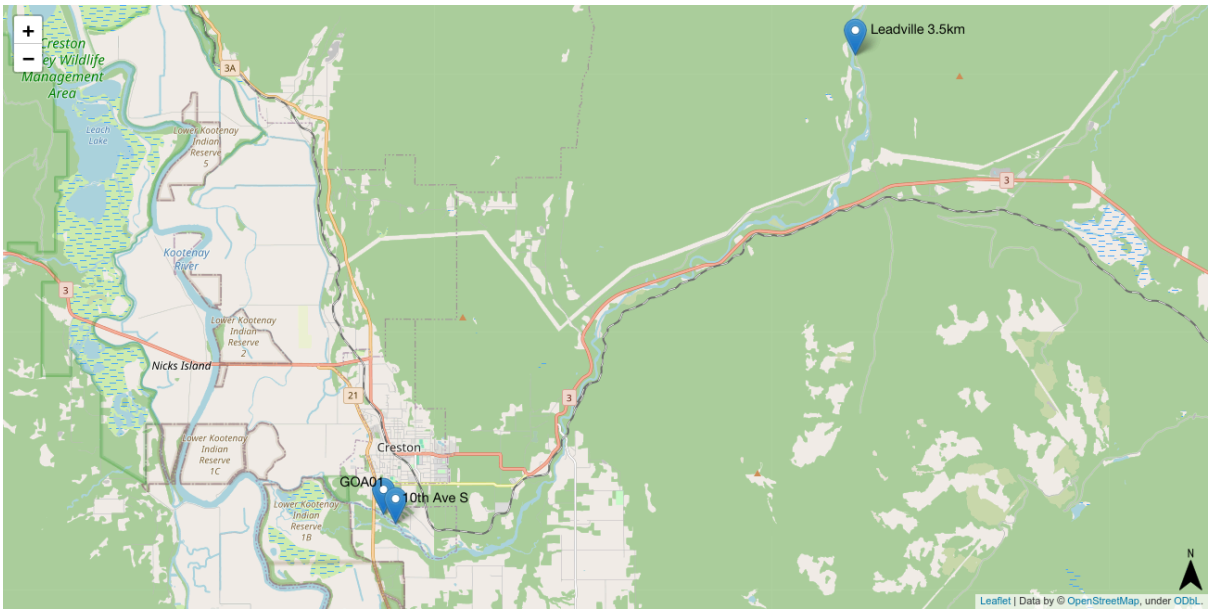
The Goat River has salmonids such as Brook Trout, Kokanee, Mountain Whitefish, Rainbow Trout, Westslope Cutthroat Trout, as well as Burbot (Westslope Fisheries 2001). Fish stocking of Westslope Cutthroat Trout, Eastern Brook Trout and Rainbow Trout goes back to 1916 in the Goat River (HabitatWizard 2024).

The river has been impacted by dyking, gravel removal, a dam, agriculture, forestry, mining, development, and industrial activity. Extensive dyking in the 1930's -1940's rerouted the Goat River to join the Kootenay River upstream of its historic outlet. Climate change effects

such as increased temperature and changes in flows are putting additional stress on the ecological health of the Goat River. Since 2017, Yaqan Nu?kiy (Lower Kootenay Band) has worked to restore the wetlands on the lower reaches of the Goat River. This includes restoring the Goat River South Channel to support the return of the Kokanee, and to restore cultural ties to land and water. Yaqan Nu?kiy is also conducting hydrometric monitoring, and continuous temperature monitoring since 2023 on the Goat River. Living Lakes Canada has been monitoring groundwater in, or adjacent to the Goat River in aquifers 487, 488 and 489 (BC Gov 2025, Living Lakes Canada 2025). Aquifers 488 and 489 have been flagged as 'at risk' due to agricultural demand and risk of drought (Western Water Associates 2025).

Water Quality Monitoring

Figure 1 Map of sampling locations for water monitoring of the Goat River 2022-2024



Methods:

Water Quality

Once a month from May to October, basic water quality measures were taken at two sites on the Goat River during 2022-2024. The '10th Ave S' site was selected near the downstream limit of the river, with cumulative influences such as urbanization, agriculture and forestry. The 'Leadville 3.5km' site was chosen because it is above the agriculture and urbanization influences, although it is still impacted by forestry and mining upstream of this site.

Samples were taken using portable water meters or chemical tests. Water parameter measures were: dissolved oxygen (Hanna multimeter H198194), water temperature (YSI Pro

30), specific conductivity (YSI Pro 30), pH (Oakton pHTestr 5), turbidity (LaMotte 2020i) and air temperature. There were some instances where the Hanna multimeter H198194 was not working so a reading was taken from the CHEMets Dissolved Oxygen kit. Samples were also taken with the Water Rangers sampling kits and uploaded to the Water Rangers data hub.

Figure 2 Description and site locations of May-Oct Monthly water quality sampling 2022-2024

	
10th Ave S 49.0782992, -116.5143657 Goat River at the end of 10th Ave S, downstream view	**Leadville 3.5km** 49.1917843, -116.3443565 Camping area 3.5km up Leadville Forest Service Road, upstream view

Lab Tests

Once a year during the fall in 2022-2024, lab tests were also collected at GOA01 and Leadville 3.5km on the Goat River (Figure 1 and 3). GOA01 is in riffle/run habitat, 200m upstream of the highway 21 bridge. The study site was chosen near the downstream limit of the river, with cumulative influences such as urbanization, agriculture and forestry. It was selected previously as a CABIN test site in 2008 for the BC MOE-Kootenay Region study. Lab tests were taken at GOA01 instead of 10th Ave S to correspond with CABIN testing once a year. GOA01 can be considered equivalent to the 10th Ave S site. Water samples were collected in laboratory-supplied sample bottles, packed on ice and shipped to CARO Analytical Services (2022-2023) and ALS Calgary (2024) to be analyzed.

- Water samples analyzed in a laboratory were: alkalinity, hardness, total metals, nitrogen (Nitrate, Nitrite, Nitrate+Nitrite, Total Nitrogen, Total Kjeldahl Nitrogen(2022-2023), Ammonia (2024), Total phosphorus, Total dissolved phosphorus, Ortho- Phosphate and Total suspended solids.
- Duplicate grab samples were sent during 2022 and 2024 for quality control. For 2022 one field blank was also sent.

Figure 3 Description and site locations for water samples collected for lab analysis

	
GOA01 49.0807, -116.51907 200m upstream of highway 21 bridge, downstream view	**Leadville 3.5km** 49.1917843, -116.3443565 Camping area 3.5km up Leadville Forest Service Road, upstream view

Quality Assurance and Quality Control

Water meters were calibrated and maintained according to manufacturer instructions. A calibration log was kept for all meters. The pH (Oakton pHTestr 5) pH meter was calibrated before every sampling using standard calibrations solutions. The Conductivity meter (YSI Pro 30) was calibrated twice in the season using standard calibration solutions (2022-2023) and before every sampling in 2024. The Hanna multimeter (H198194) was calibrated before each sampling using standard calibration. The turbidity Meter (LaMotte 2020i) was calibrated using standard calibration solutions (0 NTU, 1 NTU) before each use.

In addition to the QA/QC protocols for Caro Analytical and ALS, the following duplicates and field blanks were implemented during the sampling program.

- Duplicate samples were collected by filling two sample bottles right after each other at a monitoring location. The percent difference between the duplicate samples is calculated. The max acceptable percentage difference is 20%, as long as the results are at least 10x the detectable limits for a given parameter.
    - Relative Percent Difference(RPD), where A is larger than B, the RPD =2*(A-B)/(A+B)*100%
- One field blank (laboratory issued de-ionized water) was added to test for contamination from sample collection equipment, handling and conditions during sampling. Field blanks that are 2 times greater than the reportable detection limit are considered an issue.
    - Blank x difference=Field Blank Value/Reportable Detection Limit

Data Analysis:

Lab tests and water quality data were compared to the British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (BC Ministry of Environment and Climate Change Strategy 2024). Some of the aquatic guidelines require data over an extended period such as sampling daily for 30 days, to establish baseline information and acceptable ranges.

Additionally, a two sample, two tailed t-test was done to see if there is a significant difference between water quality measurements taken at 10th Ave S and 3.5km Leadville during 2022-2024.

- H0: u1=u2 Null hypothesis is that there is no difference in water quality measurements between 10th Ave S and 3.5km Leadville.
- H1: u1 ≠ u2 The alternative hypothesis is that there is a difference in water quality measurements between the 10th Ave S and 3.5km Leadville.
- α=0.05 Significance level
- $p \geq \alpha$, If the p of the t test greater or equal to 0.05, then fail to reject the null hypothesis. This means there is not enough evidence to conclude a significant difference between the two group means.

Results

Water Quality Results

Water quality data collected during May-October (2022-2024) for specific conductivity, dissolved oxygen, pH, turbidity and water temperature are summarized in Table 1.

Table 1 Summary of Water Quality parameters on the Goat River 2022-2024

Site	Parameter	Mean	Min	Max	# of Samples	Standard deviation
10th Ave S	specific conductivity µs/cm	68.2	33.9	84.5	17	18.0
3.5 km Leadville	specific conductivity µs/cm	62.0	33.7	75.0	17	14.5
10th Ave S	oxygen mg/L	11.1	8.8	15.2	17	1.7
3.5 km Leadville	oxygen mg/L	11.2	9.0	16.5	17	1.7
10th Ave S	ph	7.4	6.9	7.8	17	0.3
3.5 km Leadville	ph	7.5	7.1	7.9	17	0.2
10th Ave S	turbidity_ntu	0.67	0.05	2.62	17	0.7
3.5 km Leadville	turbidity_ntu	0.56	0.01	1.96	16	0.6
10th Ave S	Water temperature C	12.4	5.2	20.3	17	4.7
3.5 km Leadville	Water temperature C	10.9	3.9	18.8	17	4.5

A two tailed t-test was performed for pH, specific conductivity, water temperature, turbidity and dissolved oxygen to compare readings at the 10th ave S and Leadville 3.5km sites between 2022-2024.

pH: A two-sample t-test, two tailed t test was conducted to compare the pH readings of 10th ave S and Leadville 3.5km between 2022-2024. The results showed no significant difference for pH at 10th ave s (M=7.4 , SD=0.30) from the pH at Leadville 3.5km (M=7.5, SD=0.23), t(32)=1.808, p=0.081, p>0.05.

The rest of the t test results are summarized in Table 2. All had p>0.05, so accept the null hypothesis that there is no significant difference in water quality measurements at 10th Ave S and 3.5km Leadville between 2022-2024.

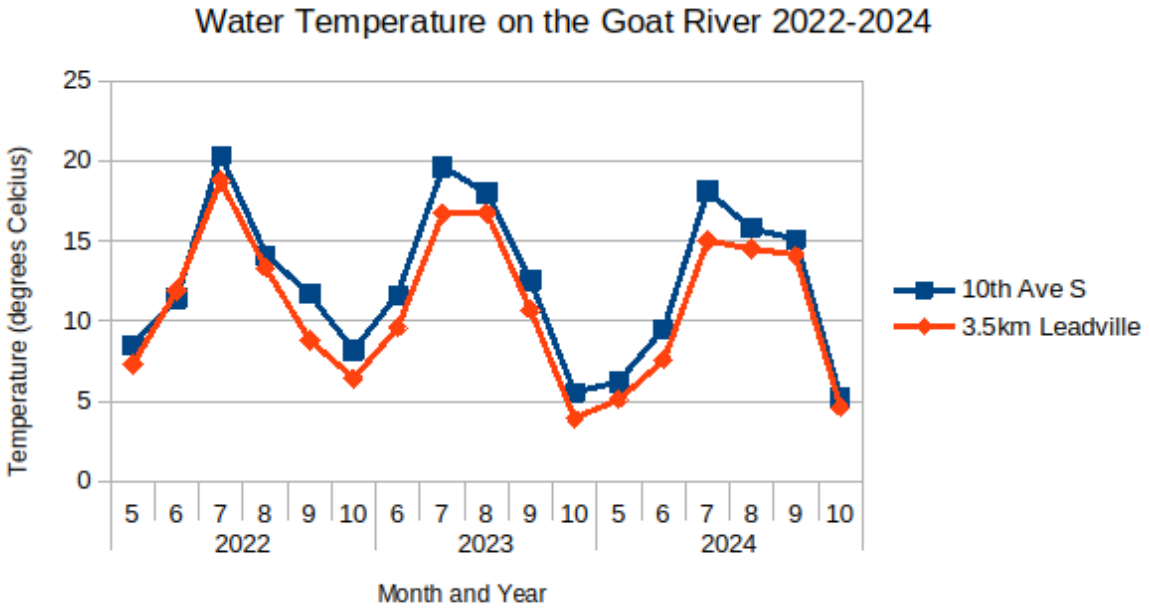
Table 2 Two tailed t-test summary table for water quality measurements of the Goat River 2022-2024

Site	Calculation	ph	specific conductivity (us/cm)	Water temperature C	turbidity_ntu	Dissolved oxygen mg/L
10th ave S	Mean	7.4	68.2	12.4	0.7	11.1
10th ave S	Standard deviation	0.30	18.58	4.88	0.75	1.75
Leadville	Mean	7.5	62.0	10.9	0.6	11.2
Leadville	Standard deviation	0.23	14.98	4.67	0.63	1.78
	degrees of freedom	32	32	32	31	32
	T value	1.808	1.077	0.944	0.446	0.055
	p of t test	0.081	0.290	0.352	0.657	0.957

Water Temperature

Water temperature varied with the seasons (Figure 4). The highest water temperatures were measured during July 2022 (20.3°C) at 10th Ave S and (18.8°C) at 3.5km Leadville.

Figure 4 Water Temperature on the Goat River 2022-2024



There are several guidelines for water temperature regulations.

Drinking water: max of 15C for aesthetics (BC Ministry of Environment and Climate Change Strategy 2020) There are licenses for domestic water use on the Goat River (Kootenay Boundary Water Tool 2025). The 10th Ave S site on Goat River exceeded 15°C during July (2022-2024) and August (2023-2024).

Optimal Spawning for Sockeye: 10.6-12.8 C (Oliver and Fidler 2001) Kokanee is a land-locked sockeye. The temperature measured in September 2024 at 10th Ave S (15.1°C) exceeded this optimal spawning temperature range.

pH

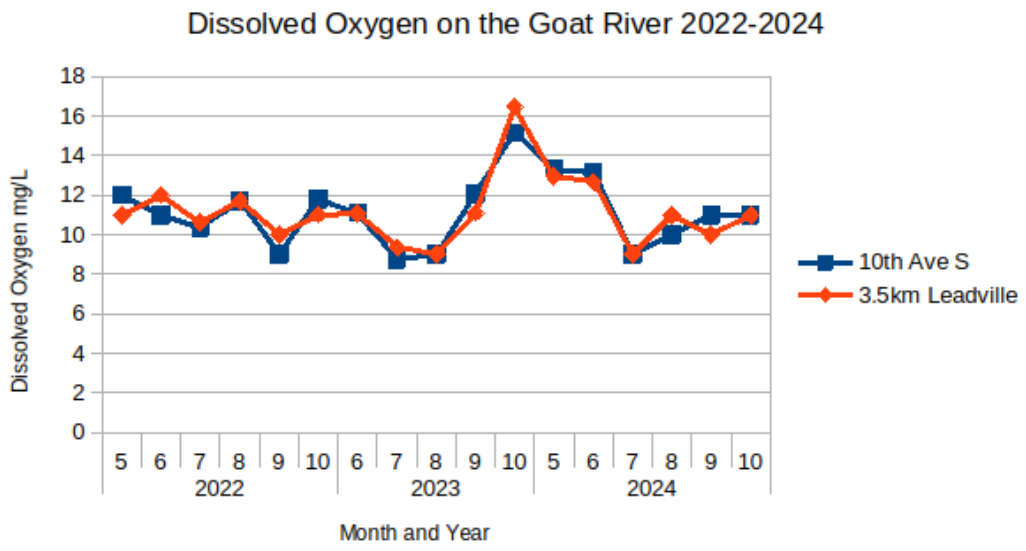
pH values are a measurement of hydrogen-ion concentrations in the water. On the pH scale 7 is neutral, below 7 is acidic, and above is 7 basic. pH can affect the solubility and bioavailability of nutrients and metals. The pH of the Goat River varied between 6.9 and 7.9 during 2022-2024, with a mean pH of 7.5. The BC Aquatic Guidelines allow for unrestricted change permitted within a pH range of 6.5 to 9 (British Columbia Ministry of Environment and Climate Change Strategy. 2024), so all readings were in range.

Dissolved Oxygen

Dissolved oxygen fluctuates with discharge, temperature, photosynthetic activity and presence of organic matter. Dissolved oxygen decreases with increases in temperature, so in the summer months dissolved oxygen is lower. Dissolved oxygen needs to be between at least 5-9 mg/L for aquatic life (life-stage dependent), especially for cold adapted fish species such as salmonids (BC Ministry of Environment 1997). A 30 day mean dissolved oxygen below 8 mg/L, is considered detrimental to cold adapted salmonids (all life stages

other than embryos/allevins) (BC Ministry of Environment 1997). The lowest measurement of dissolved oxygen was 8.75 mg/L (19.6°C) in July 2023 at the 10th Ave S site. All other dissolved oxygen readings were equal or greater than 9 mg/L during 2022-2024 at both sites. Dissolved oxygen readings in Oct 2023 were higher than expected at 15.2 mg/L (5.5°C, 10th Ave S) and 16.5 mg/L (3.9°C, 3.5km Leadville). Water temperatures were cool, and water could have been well aerated, or there could have been a sensor error on that day.

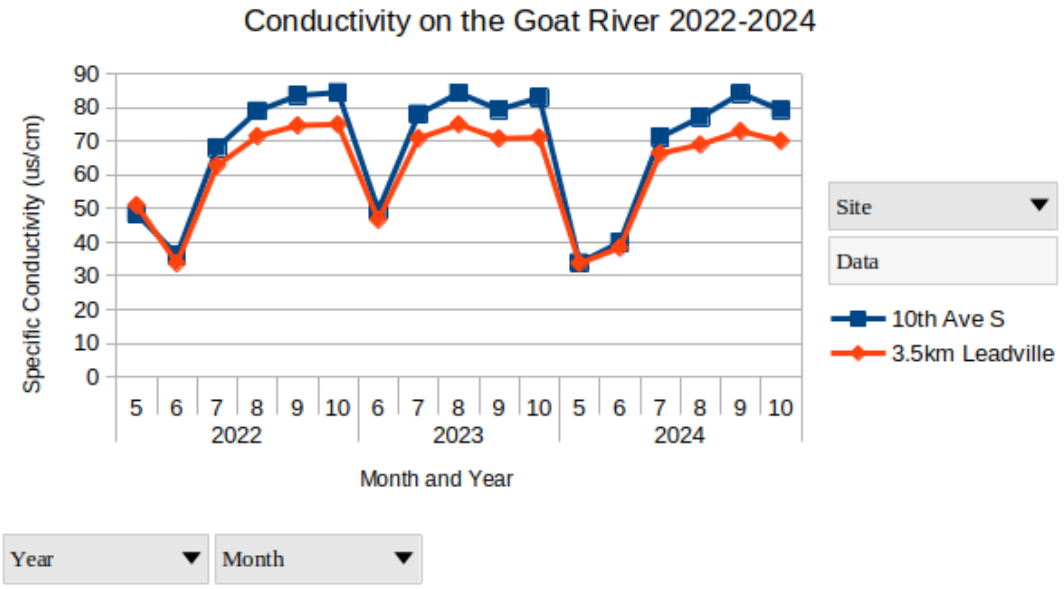
Figure 5 Dissolved Oxygen on the Goat River 2022-2024



Specific Conductivity

Specific conductivity is the measure of water's ability to conduct electricity at a specific temperature (25°C). The salts dissolved in water conduct this electricity and human activity can change the amount of salts in the water through effluent, road salts and mining. There is no BC aquatic life guideline for conductivity. Specific conductivity varied with water flows, with a range between 33.7µs/cm to 84.5 µs/cm. Higher water in the spring resulted in lower conductivity, and as flows got lower in summer months, conductivity increased.

Figure 6 Specific Conductivity on the Goat River 2022-2024



Turbidity

Turbidity is a measure of the clarity of water. Organic and inorganic particles, algae, microorganism, silt, and clay can increase turbidity. Both anthropogenic activity like forestry, road building, erosion, effluent, and natural activity like freshet can affect turbidity. The B.C. Aquatic Life Guidelines are dependent on the turbidity range of the water body, and during particular times of year. Normal ranges and objectives have not been established for the Goat River. Rivers tend to be more turbid during high water/freshet. For the Goat River, the highest turbidity was 2.62 NTU in June 2022 at 10th Ave S, during high flows. The average turbidity from measurements at both sites was 0.62 NTU which is very clear.

Lab Results

Total Suspended Solids

Total suspended solids is a measurement of suspended particles in water. It is related to turbidity measurement. For aquatic life there is a dose relationship where concentration and duration both matter. The BC aquatic life guidelines need to be compared to background TSS levels which have not been established for Goat River. Measurements were below the detection limits in 2022 (<2 mg/L), 2023 (<10 mg/L), and 2024 (<3 mg/L). Fall sampling times would be considered clear flows and the TSS measurements reflect this.

Hardness and Alkalinity

Hardness is the amount of ions in the water, primarily calcium and magnesium. Alkalinity is related to hardness as they both use measurements of calcium carbonate. Hardness is

known as a toxicity modifying factor because depending on the measurement of hardness certain metals may be toxic to aquatic life (BC Ministry of Environment and Climate Change Strategy 2024). There are no B.C. Aquatic Life Guidelines for Hardness. Hardness levels for 2022-2024 during CABIN sampling ranged between 33.3 to 37 mg/L. Metals that are affected by hardness like copper, iron, lead, cadmium, nickel and zinc were below the detection limit in the samples.

Alkalinity is a measure of calcium carbonate and relates to how sensitive a water body is to acid inputs. The BC guidelines only apply to lakes and are not reflective of rivers/streams unless a large number of samples are taken in one season (Swain 1987). Each water body will have its own typical range of alkalinity. During 2022-2024 it ranged from 26.2 to 34.2mg/L.

Nutrients

Nutrients including nitrogen and phosphorus can be limiting productivity factors in biological systems. However, if nutrients are too high due to anthropogenic factors such as fertilizer, sewage or effluent runoff, algae will grow, which can deplete dissolved oxygen levels. In 2022 and 2023, nutrients arrived at the lab after the hold time (24-48h), so the following parameters: Nitrate, Nitrite, Phosphate, calculated Nitrate+Nitrite (as N) and total Nitrogen, are inconclusive.

In 2024, samples were sent to ALS in Calgary since courier service is quicker to this area from Creston. In 2024, GOA01 had total phosphorus levels of 0.0021mg/L, total dissolved phosphorus of 0.0032mg/L, and orthophosphate of 0.0027 mg/L. The Leadville site was all below the detection limit for the phosphorus parameters. There are no river guidelines for total phosphorus, ortho-phosphates or dissolved phosphorus.

Both sites had similar total nitrogen: 0.033 mg/L at GOA01, 0.0331 mg/L Leadville 3.5km. There are no water quality guidelines for total nitrogen. The rest of the nutrients (Ammonia, Nitrite, calculate Nitrate+Nitrate, Nitrate, Total Kjeldahl Nitrogen) were below the detection limit.

The 2024 results show that nutrient levels were very low during fall sampling in the Goat River.

Metals

In 2022-2024, total metals measurements were below the BC aquatic life guidelines, or below detection limit of the lab test. Total metals were similar at both the 3.5km Leadville site and the GOA01 site. Full results can be found in the Lab Results Appendix.

Quality Assurance and Quality Control

Lab Samples

A duplicate alkalinity test was taken at the 3.5km Leadville site in 2022, of 41.6 and 39.5 mg/L. The relative percent difference is 5% and well below the 20% threshold. A duplicate alkalinity test was taken at the GOA01 site in 2024 of 40.6 and 41.1 mg/L. The relative percent difference is 1% and below the 20% threshold.

A field blank was taken at the GOA01 in 2022 using deionized water. This was also tested for alkalinity and came in below the detection limit (<1.0). This means that there was no contamination in the sampling.

CABIN (Canadian Aquatic Biomonitoring Network)

Methods:

CABIN Sampling

One CABIN site was selected in riffle/run habitat on the Goat River (GOA0, Figure 7). The study site was chosen near the downstream limit of the river, with cumulative influences such as urbanization, agriculture and forestry. This site is 200m upstream of the highway 21 bridge. It was selected previously as a CABIN test site in 2008 for the BC MOE-Kootenay Region study. Benthic invertebrates were colllected using CABIN protocol (Environment Canada 2012) in the fall for 3 consecutive years (2022, 2023, 2024). Benthic invertebrate samples were sent to CABIN certified taxonomists: Pina Viola in 2022 and 2023, and Cordillera Consulting in 2024.

CABIN protocol also includes habitat reach assessment, channel data, substrate data and water chemistry (Environment Canada 2012). Water chemistry variables included dissolved oxygen (Hanna multimeter H198194 2022, 2023, Hach Dissolved Oxygen Winkler Method in 2024), water temperature (YSI Pro 30), specific conductivity (YSI Pro 30), pH (Oakton pHTestr 5), turbidity (LaMotte 2020i) and air temperature. Lab tests for metals and nutrients were also taken and are described in the Water Quality section above.

Benthic invertebrate samples were also submitted to STREAM (Sequencing The Rivers for Environmental Assessment and Monitoring) at the University of Guelph for 2022 and 2023. Three sample replicates were collected using STREAM protocols (Maitland et al. 2024). Funding for STREAM sample submission in 2024 was not available.

Figure 7 Sampling Location for the 2022-2024 CABIN Benthic Invertebrate Sampling

GOA01
49.0807, -116.51907
200m upstream of highway 21 bridge, downstream view

Data Analysis:

CABIN Analysis

The GOA1 test site sampled in 2022, 2023, 2024, were compared to reference conditions in the Columbia Basin 2020 model developed by Environment and Climate Change Canada (Strachan 2020). Invertebrate counts and habitat data collected in the field were uploaded to the online CABIN database. Several environmental variables required in the Columbia Basin 2020 model were also calculated by Living Lakes Canada GIS specialist and uploaded to each site visit. Once complete datasets were uploaded, CABIN analytic tools were used to calculate the community composition and variation from the reference model.

CABIN analytic tools completed the BEAST (BEnthic Assessment of SedimenT) analysis, in which the test site (GOA01) was be assigned to the appropriate reference group based on 12 habitat characteristics[1] (Strachan 2020). Then the benthic invertebrate composition of GOA01 was compared to those found in the assigned reference site group in an ordination analysis. The test site benthic communities were plotted with the reference communities on three different vectors (axes) based on taxonomic composition by the CABIN analytic tools. The overall assessment was determined from the vector plot with the most severe rating. Confidence ellipses were drawn around the plotted values to determine how similar the test

[1] The 12 habitat predictors include 4 variables measured on site (longitude, altitude, channel slope and canopy coverage) and 8 landscape GIS calculated variables (Bedrock Geology-Sedimentary%, Climate-Precipitation OCT and Temperature DEC Min; Hydrology- Drainage Area; Landcover-Grassland%, Shrub Low% and Water%; Topography- Max % Slope in the upstream watershed) (Strachan 2020)

site was to reference sites. The further the test site lies from the cloud of reference sites in the ordination group, the higher the environmental stress.

1. A site that falls within the 90% confidence ellipse is designated 'Similar to Reference'.
2. A test site that falls within the 90% and 99% confidence ellipses is designated 'Mildly Divergent'.
3. A test site that falls within the 99% and 99.9% confidence ellipses is designated 'Divergent'.
4. A site that falls outside of the 99.9% confidence ellipses is designated 'Highly Divergent'

CABIN analytic tools were also used to compare the data to:

- River Invertebrate Prediction and Classification System (RIVPACS) Analysis.
    - RIVPACS compares the test sites with benthic communities at reference sites based on habitat characteristics. It uses presence/absence data to compare what taxa were expected (E) to occur at the test site and which taxa were observed (O). These are based on the probability of a greater than 70% occurrence at reference sites.
- Bray-Curtis Dissimilarity analysis
    - Shows the dissimilarity between the test site invertebrate community to the median of the predicted reference sites.
- Metrics calculations:

Metric calculations can help describe the macroinvertebrate community in terms of species abundance, richness and composition.

- % Chironomidae- % of Chironmidae taxa.
- % EPT taxa - Is the percentage of individuals in the Ephemeroptera, Plecoptera and Trichoptera taxa (EPT) divided by the sum of all individuals in the sample.
- EPT taxa (no)- Measure of richness of Ephemeroptera, Plecoptera and Trichoptera taxa (EPT).
- Hilsenhoff Family index- Describes composition in terms of pollution tolerance. It estimates the overall tolerance of the community weighted by relative abundance and pollution/dissolved oxygen sensitivity. Each taxa is assigned a tolerance number from 0-10 for that group's sensitivity to organic pollutants.

- No. EPT individuals/Chironomids+EPT Individuals- Is a ratio of the sensitive EPT taxa to the more tolerant Chironomidae taxa.
- Simpson's Diversity- Diversity index used to measure how many different taxa are present, and how evenly individuals are distributed among those taxa.
- Simpson's Evenness is an index of composition of how even the distribution of individuals is among all the taxa.
- Total abundance- Sum of all individuals.
- Functional Feeding Groups: Functional feeding group proportion changes with the availability of food in the creek and can reflect the health of the riparian vegetation, channel stability and impacts from land development

Results

CABIN Results

BEAST Analysis: Comparison to the Reference Model

The test site GOA01 was classified into a reference group using 12 predictor variables (Strachan 2020). GOA01 was consistently classified into reference group 2 in 2022, 2023 and 2024 with a probability of group membership 53.7-53.9% (Table 3).

Table 3 Probability of Assigning the GOA01 test site to the appropriate group

Site	Group Assignment	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
GOA01 (Sep 05 2022)	**2**	13.4%	**53.7%**	13.3%	12.1%	2.7%	4.8%
GOA01 (Oct 01 2023)	**2**	13.1%	**53.9%**	13.3%	12.2%	2.6%	4.9%
GOA01 (Sep 29 2024)	**2**	12.8%	**53.9%**	13.3%	12.4%	2.6%	4.9%

The benthic invertebrate composition of GOA01 was compared to those found in the reference sites for group 2 in an ordination analysis. Results from 2022-2024 are summarized below in Table 4 and in Figures 9-11. GOA01 was mildly divergent in 2022 and 2023, and highly divergent in 2024.

Table 4 BEAST Results of GOA01 2022-2024

Site	Group	Prob.	Vector 1 vs 2	Vector 1 vs 3	Vector 2 vs 3	Overall
GOA01 (Sep 05 2022)	2	0.537	Reference	Mildly Divergent	Mildly Divergent	**Mildly Divergent**
GOA01 (Oct 01 2023)	2	0.539	Reference	Mildly Divergent	Mildly Divergent	**Mildly Divergent**
GOA01 (Sep 29, 2024	2	0.539	Divergent	Highly Divergent	Divergent	**Highly Divergent**

Figure 9 Ordination Vector Graph for GOA01 Sep 5, 2022

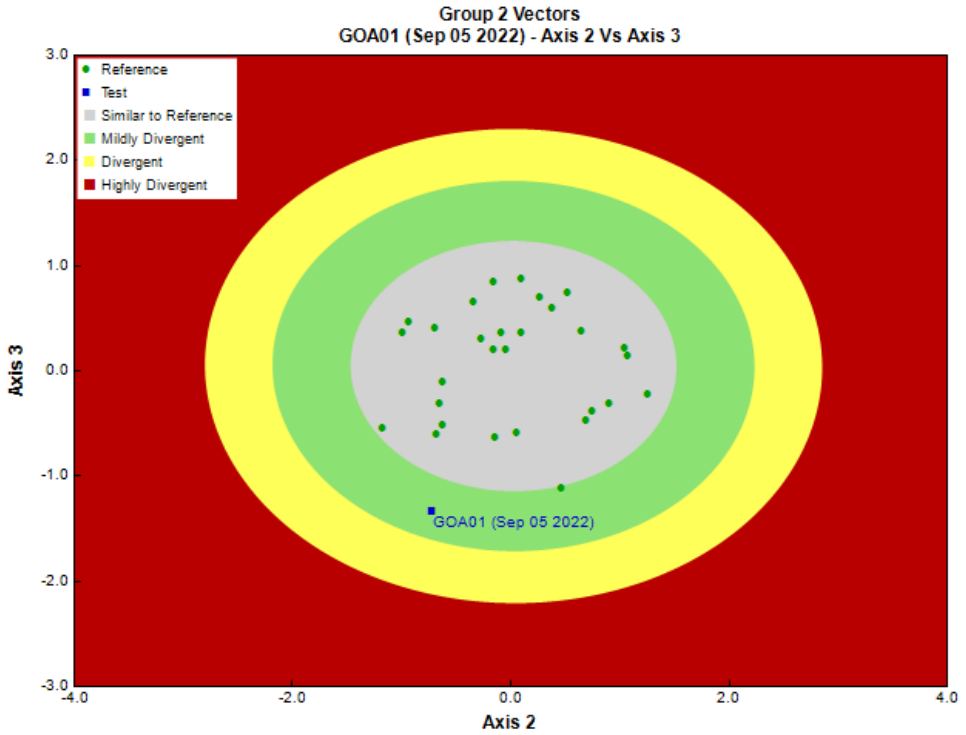


Figure 10 Ordination Vector Graph for GOA01 Oct 1, 2023

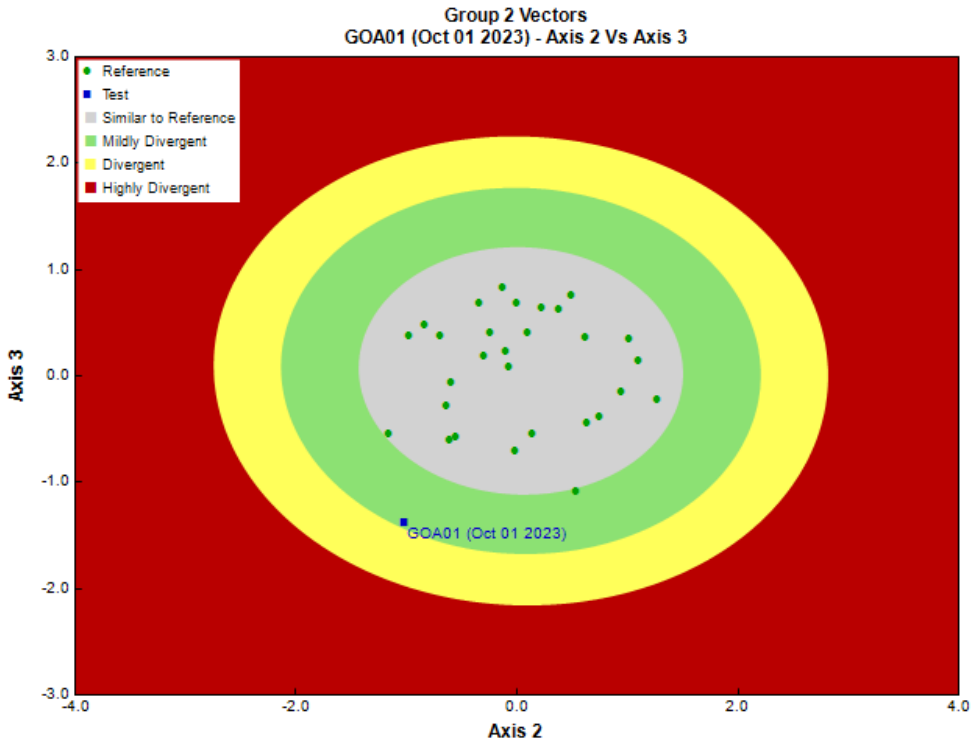
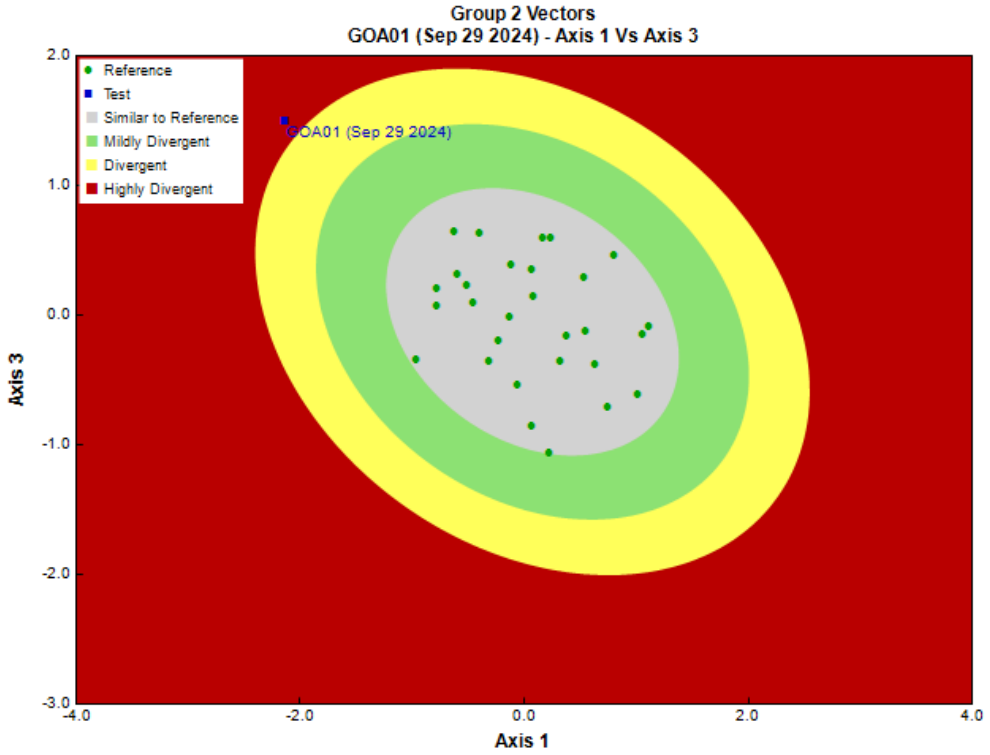


Figure 11 Ordination Vector Graph for GOA01 Sep 29, 2024



RIVPACS

GOA01 had a RIVPACS ratio of 0.7 (2022, 2024) and 0.8 (2023) (Table 5). Samples with a RIVPACS ratio of Observed Taxa:Expected Taxa (O:E) that are less than 1 are considered impaired[2]. The missing families in the GOA01 samples (with a p >0.7) are taxa that are sensitive to resource development disturbances in BC (Strachan 2020).

Table 5 RIVPACS Results Goat River 2022-2024

Date Sampled GOA01	**RIVPACS Observed:Expected Taxa Ratio with p>0.7**	**Missing Taxa with p>0.7**
Sep 05 2022	0.7	Capniidae, Nemouridae, Rhyacophilidae, Taeniopterygidae
Oct 01 2023	0.8	Capniidae, Nemouridae, Rhyacophilidae
Sep 29 2024	0.7	Baetidae, Nemouridae, Rhyacophilidae, Taeniopterygidae

Bray-Curtis Dissimilarly

If the test site and the median reference site share all the same abundance of taxa the results of the Bray-Curtis Dissimilarity will be 0 and if the test sites do not share the same abundance of taxa the result will be 1.The Bray-Curtis dissimilarity distances indicate that GOA01 does not share the same abundance of taxa to the median reference site. There was a trend from intermediate dissimilarity in 2022 (0.62), 2023 (0.74) to high dissimilarity in 2024 (0.91) (Table 6).

Table 6 Bray-Curtis Dissimilarity for Goat River 2022-2024

Site	**Bray-Curtis Distance**
GOA01 (Sep 05 2022)	0.62
GOA01 (Oct 01 2023)	0.74
GOA01 (Sep 29 2024)	0.91

Community Metrics

The community metrics can give us a greater understanding of the macroinvertebrates and how they differ from the reference communities. Community metrics are summarized in Table 7.

[2] O:E ratio =1 are healthy, O:E ratio <1 are impaired, O:E ratio > 1 are biodiversity hotspots/enriched

Table 7 Community Metrics Results for the Goat River 2022-2024

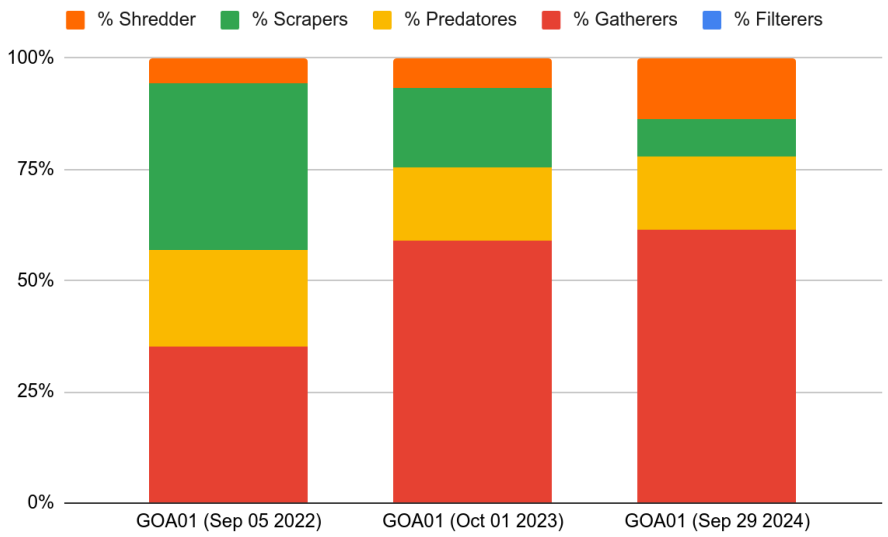
Metric	GOA01 (Sep 05 2022)	GOA01 (Oct 01 2023)	GOA01 (Sep 29 2024)	RefMean	StdDev
% Chironomidae	11.8	15.9	**17.9**	6.0	5.6
% EPT Individuals	72.6	**67.5**	**62.6**	88.1	9.3
EPT taxa (no)	13.0	12.0	11.0	12.4	2.4
Hilsenhoff Family index (North-West)	3.53	3.61	2.89	3.15	0.31
No. EPT individuals/Chironomids+EPT Individuals	0.86	**0.81**	**0.78**	0.94	0.06
Simpson's Diversity	0.83	0.86	0.83	0.79	0.08
Simpson's Evenness	0.29	0.38	0.34	0.30	0.08
Total Abundance	1341.7	2458.3	**5333.3**	1083.1	932.4
Total No. of Taxa	21.0	19.0	18.0	18.2	4.7

*__bolded numbers__ are >2 standard deviations away from the reference mean

- % Chironomidae- From 2022 to 2024 there was an increase in Chironomidae in the Goat River from 12% (2022), 16% (2023) to 18% (2024). Chironomidae taxa are generally more tolerant of habitat degradation.
- % EPT taxa - From 2022 to 2024 there was a decrease in the percentage of EPT individuals from 73% (2022), 68% (2023) to 63% (2024). EPT taxa are generally sensitive to habitat disturbance and therefore a lower percentage of EPT indicates a potential degradation of habitat.
- EPT taxa number- There was a slight decrease in EPT taxa between 2022-2024 from 13 to 11. EPT taxa are generally sensitive to disturbance so decrease in EPT taxa could indicate habitat disturbance.
- Hilsenhoff Family index- A Hilsenhoff values were 3.5 (2022), 3.6 (2023) and 2.9 (2024). The Hilsenhoff Family index varied between Very Good (2022-2023) to Excellent (2024).
- No. EPT individuals/Chironomids+EPT Individuals- The closer to 1 the more EPT individuals you have compared to the Chironomids. This ratio is showing the community decreased in EPT individuals and increased in Chironomids from 0.86 (2022), 0.81 (2023) and 0.78 (2024).
- Simpson's Diversity- Diverse and even communities can indicate good habitat quality. Values go from 0 to 1 with the greater diversity being higher values. Simpson's Diversity index of 0.8 for all years is excellent.

- Simpson's Evenness; The composition is relatively even and has been stable throughout the 2022-2024 seasons.
- Total abundance- Abundance can decrease due to habitat degradation, but can also increase if more nutrients are available. There was a very high abundance in 2024 (5333).
- Functional Feeding Groups: Functional feeding groups varied by year (Figure 12) Gatherers were greater than 2 standard deviations above reference mean (38% ± 14) in 2023 (79%) and 2024 (83%). Gatherers eat fine particulate organic matter in the water and are expected to increase in response to disturbance. Scrapers were greater than 2 standard deviations below reference mean (61% ± 15) in 2023 (24%) and 2024 (12%). Scrapers are specialized to eat algae material and are expected to decrease at a site in response to disturbance

Figure 12 Functional Feeding Groups Goat River 2022-2024



STREAM Results

The STREAM samples consisted of 3 replicates that were DNA sequenced. In 2022, there were 13 Orders, 33 Families, 51 Genera and 62 species of macroinvertebrates sequenced in the samples. STREAM sequences the whole sample whereas CABIN takes a subset of the sample, which is why more taxa are identified in the STREAM sample. Of the invertebrates sampled in 2022, it included 16 species of Ephemeroptera (mayflies), 12 Plecoptera (stoneflies) and 9 Trichoptera (caddisflies). Of the four families that were missing from RIVPACS in 2022 with a probability of 70% (Capniidae, Nemouridae, Rhyacophilidae and Taeniopterygidae), all except one (Rhyacophilidae) were identified in the STREAM sample.

In 2023, there were 18 Orders, 32 Families and 52 genera sequenced in the samples. Of the invertebrates sampled in 2023, it included 11 genera of Ephemeroptera (mayflies), 11

Plecoptera (stoneflies) and 4 Trichoptera (caddisflies). Of the 3 families that were missing from RIVPACS in 2023 (Capniidae, Nemouridae, Rhyacophilidae), all except one (Rhyacophilidae) were identified in the STREAM sample.

Discussion Water Quality and CABIN

The water quality measurements as well as the lab tests from 2022-2024 give some baseline data for the Goat River. The monthly water quality parameters from 2022-2024 showed seasonal water variations during 2022-2024. Temperature exceeded aesthetic drinking water standards during the summers (2022-2024) as well optimal Kokanee spawning temperatures (Sep 2024).

Continuous temperature monitoring on the Goat River is being collected by Yaqan Nu?kiy (since 2023) and should help understand trends in water temperature. The continuous temperature monitoring would allow for a comparison to the maximum temperature limit for salmonids of 18-19°C max weekly average (Oliver and Fidler 2001). If summers become hotter and water recharge less abundant, thermal conditions in the Goat River may become unsuitable for cold-water adapted salmonids, especially for spawning Kokanee (Atlas et al. 2021).

Fall lab results showed no significant findings in nutrients, metals, hardness, alkalinity or total suspended solids. Both the 3.5km Leadville site and the 10th Ave S/GOA01 sites did not differ substantially for lab tests or water quality parameter results.

The benthic invertebrate communities trended from mildly divergent to highly divergent from reference conditions during 2022-2024 on the Goat River. This indicates that the Goat River has impaired habitat conditions. Although the benthic communities still show excellent species diversity and evenness, there was a lower proportion of the EPT taxa, which are sensitive to habitat disturbance, than expected (Environment and Climate Change Canada 2024). There is also a higher proportion of Chironomids, which are generally more tolerant to habitat degradation (Environment and Climate Change Canada 2024). Taken together with the BEAST, RIVPACS and Bray-Dissimilarity, there are signs of habitat disturbance and stress in the Goat River.

The most divergent CABIN result was in 2024. The high total abundance in 2024 could be caused by increased nutrients in the system, and/or other climatic factors. The two most abundant families were Ephemerellidae and Chironomidae in 2024 which are both more tolerant to habitat disturbance (Strachan 2024). Although nutrients levels were low during fall CABIN sampling, there may have been anthropogenic nutrient inputs earlier in the season.

Climatic factors may have also contributed to the ‘highly divergent’ results in 2024. In the West Kootenays, the snowpack was at 72% level as of April 1, 2024 (Gov. BC 2024). Lower snowpacks can lead to lower summer runoff and increased summer stream temperatures.

However, snowpack is not the only variable contributing to summer flows: extraction of water, groundwater influence, land management (forestry, agriculture, etc), summer temperatures and summer precipitation also contribute (Ruzzante and Gleeson 2025, Dekker et al. 2024). Hydrological changes can have varied effects on the benthic community such as increased abundance and changes in community composition (Dunkle et al. 2023). In particular, hydrology models predict that climate change will result in low flows in the Goat River that are detrimental to fish and ecological function in the river (Dekker et al. 2024).

The benthic community results from 2022-2024 indicates that the Goat River has been trending towards increasingly impaired habitat conditions. With ongoing threats in the form of development, increased water demand and climate change, continued monitoring of flow, temperature, and biomonitoring is recommended. In addition, activities to protect riparian habitat along the Goat River and to improve land management practices in this watershed would both improve the resiliency of this watershed and help restore ecological health and fish populations in this river.

Recommendations

- Lab tests for GOA01 could be continued in the fall with CABIN sampling to help interpret CABIN results. Lab tests in the fall for Leadville 3.5km could be discontinued.
- If resources permit, lab tests for nutrients would be recommended at GOA01 site in May/June after a rain event to capture the presence/absence of runoff from surrounding farms when there is more fertilizer application.
- With increasing anthropogenic pressures on the Goat River as well as impacts on flow and temperatures due to climate change, CABIN sampling on the Goat River should continue to capture variation of the benthic community.

References

Atlas, W.I, Seitz, K.M, Jorgenson, J. W.N., Millard-Martin, B., Housty, W.G., Ramos-Espinoza, D, Burnett, N.J., Reid, M. and J. W. Moore. 2021. Thermal sensitivity and flow-mediated migratory delays drive climate risk for coastal sockeye salmon. FACETS. **6**: 71-89. https://doi.org/10.1139/facets-2020-0027

British Columbia Ministry of Environment. 1997. Water Quality: Ambient Water Quality Guidelines for Dissolved Oxygen. Technical Report. Available online at: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/dissolvedoxygen-tech.pdf

British Columbia Ministry of Environment and Climate Change Strategy. 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C. Available online at: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/drinking-water-and-recreation/source_drinking_water_quality_guidelines_bcenv.pdf

British Columbia Ministry of Environment and Climate Change Strategy. 2024. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary. Water Quality Guideline Series, WQG-20. Prov.B.C., Victoria B.C Available online at: http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines

Dekker, Isaac, Kristian L. Dubrawski, Pearce Jones, and Ryan MacDonald. 2024. Estimating Non-Stationary Extreme-Value Probability Distribution Shifts and Their Parameters Under Climate Change Using L-Moments and L-Moment Ratio Diagrams: A Case Study of Hydrologic Drought in the Goat River Near Creston, British Columbia *Hydrology* 11, no. 9: 154. https://doi.org/10.3390/hydrology11090154

Dunkle, M.R., Bellmore, J.R., Fellman, J.B. and Caudill, C.C. 2024. Glaciers, snow, and rain: Water source influences invertebrate community structure and secondary production across a hydrologically diverse subarctic landscape. Limnol Oceanogr, 69: 232-245. https://doi.org/10.1002/lno.12451

Environment Canada. 2012. Canadian Aquatic Biomonitoring Network field manual - wadeable streams Cat. No.: En84-87/2012E-PDF

Environmental and Climate Change Canada. 2024. Benthic macroinvertebrate metric reference guide. Available online at: https://www.canada.ca/en/environment-climate-change/services/canadian-aquatic-biomonitoring-network/resources/benthic-macroinvertebrate-metric-reference-guide.html

HabitatWizard database. Accessed Dec 2024. Ministry of Environment. Available online at: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/temperature-tech.pdf

Kootenay Boundary Water Tool. Accessed February 2025. BC Ministry of Forests. Available online at: https://kwt.bcwatertool.ca/watershed

Government of British Columbia. (2024). *2024 snow survey and water supply bulletins*. Available online at: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/drought-flooding-dikes-dams/river-forecast-centre/snow-survey-water-supply-bulletin

Government of British Columbia. 2025. Aquifers 487, 488. 489. Digital dataset. Available online at: https://apps.nrs.gov.bc.ca/gwells/aquifers

Living Lakes Canada Upper Columbia Basin Groundwater Monitoring Program. 2025 [Data set]. Columbia Basin Water Hub. https://data.cbwaterhub.ca/organization/living-lakes-groundwater-monitoring-program

Maitland, Carley, Wright, Michael, Hajibabaei, Mehrdad 2024. STREAM Benthic Metabarcoding Lab Protocol.protocols.io https://dx.doi.org/10.17504/protocols.io.5jyl8ppb6g2w/v2 Version created by Michael Wright

Oliver, G.G. and L.E. Fidler. 2001. Towards a Water Quality Guidelines for Temperature in the Province of British Columbia. Prepared for the Ministry of Environment, Lands and Parks Water Management Branch. Available at: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/temperature-tech.pdf

Ruzzante, S. W., & Gleeson, T. 2025. Rising temperatures drive lower summer minimum flows across hydrologically diverse catchments in British Columbia. *Water Resources Research*, 61, e2024WR038057. https://doi.org/10.1029/2024WR038057

Strachan, Stephanie. 2020. Reference Model Supporting Documentation for CABIN Analytical Tools: Columbia Basin 2020. Environment and Climate Change Canada. Available at: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/monitoring-water-quality/biomonitoring/cabin_columbia_basin_model_documentation_2020.pdf

Swain, L.G. 1987. Water Quality: Second Report on Chemical Sensitivity of BC Lakes to Acidic Inputs. Water Management Branch of British Columbia. Available at: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/monitoring-water-quality/second_report_on_chemical_sensitivity_of_bc_lakes_to_acidic_inputs.pdf

Western Water Associates Ltd. 2025. Assessing Aquifers for Monitoring in the Columbia Basin (Revised Final). Prepared for LIving Lakes Canada. Available at: https://livinglakescanada.ca/wp-content/uploads/2025/09/asessing-aquifers-for-monitoring-in-the-columbia-basin_western-water-associates-ltd.pdf

Westslope Fisheries. 2001. Fish and Fish Habitat Assessment for the Lower Goat River, Creston, BC. Prepared for Columbia-Kootenay fisheries Renewal Partnership.

https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual

Appendices

Some of the data listed in the appendices are also available online:

- CABIN specific data available at https://www.canada.ca/en/environment-climate-change/services/canadian-aquatic-biomonitoring-network/database.html
- Water quality and lab data are available on the Columbia Basin Water hub: https://data.cbwaterhub.ca/dataset/goat-river-cabin-water-quality

CABIN Appendix

2022 CABIN Report (5 pages)

2023 CABIN Report (5 pages)

2024 CABIN Report (5 pages)

Site Description

Study Name	BC NGO-Goat River Ecological Monitoring
Site	GOA01
Sampling Date	Sep 05 2022
Know Your Watershed Basin	Lower Kootenay
Province / Territory	British Columbia
Terrestrial Ecological Classification	Montane Cordillera EcoZone Columbia Mountains and Highlands EcoRegion
Coordinates (decimal degrees)	49.08070 N, 116.51907 W
Altitude	545
Local Basin Name	Goat River
	Kootenay River
Stream Order	5

Up Stream

Cabin Assessment Results

Reference Model Summary	
Model	Columbia Basin 2020
Analysis Date	October 22, 2024
Taxonomic Level	Family
Predictive Model Variables	Altitude Drainage-Area Longitude Natl-Grassland Natl-ShrubLow Natl-Water Precip10_Oct Reach-%CanopyCoverage Sedimentary Slope SlopeMax Temp12_DECmin

Reference Groups	**1**	**2**	**3**	**4**	**5**	**6**
Number of Reference Sites	13	24	28	35	32	15
Group Error Rate	53.8%	55.2%	34.1%	52.2%	23.1%	29.4%
Overall Model Error Rate	39.4%					
Probability of Group Membership	13.4%	53.7%	13.3%	12.1%	2.7%	4.8%
CABIN Assessment of GOA01 on Sep 05, 2022	Mildly Divergent					

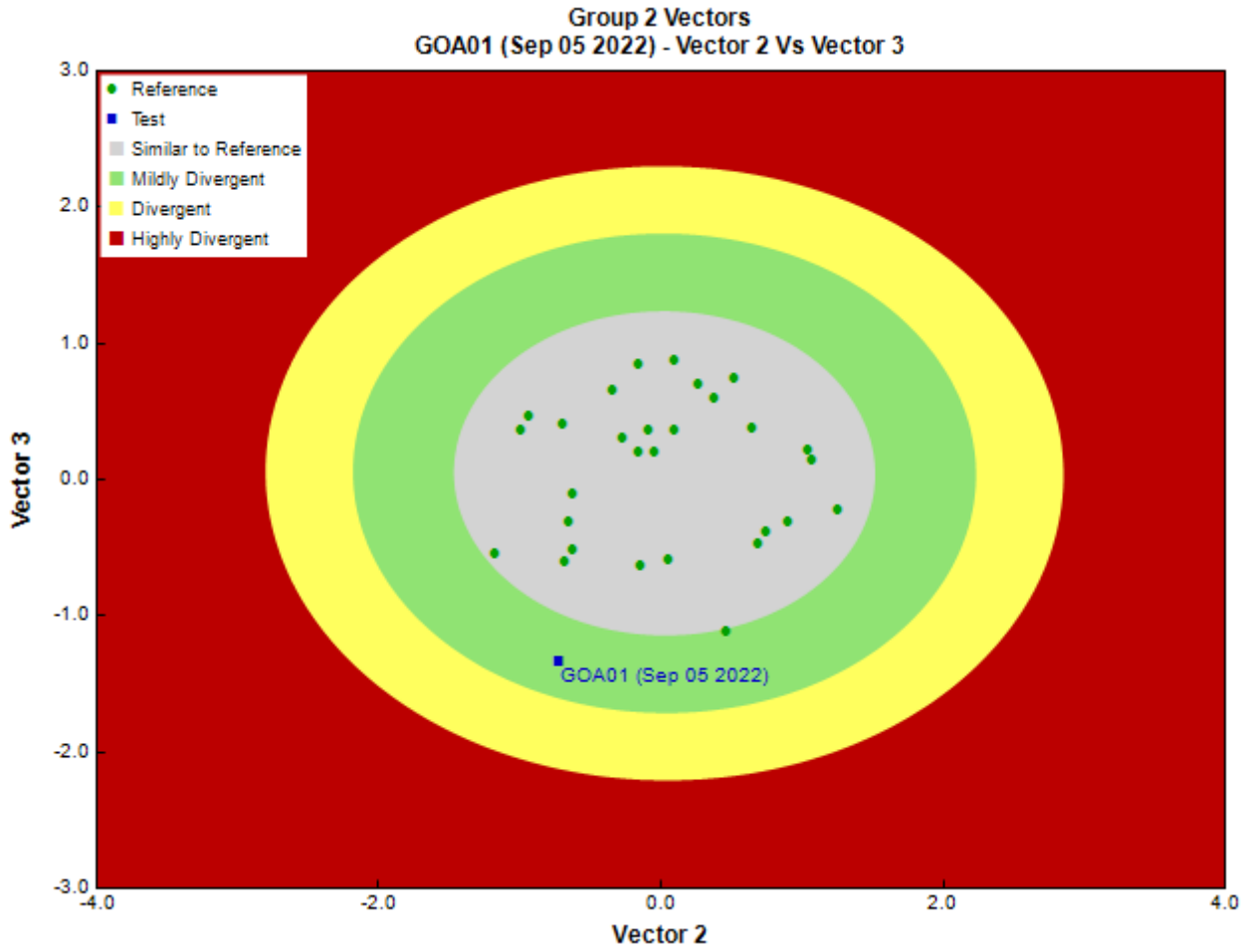


Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

Sample Information

Sampling Device	Kick Net
Mesh Size	400
Sampling Time	3
Taxonomist	Pina Viola, Consultant
	Marchant Box
Sub-Sample Proportion	24/100

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
Arthropoda	Arachnida	Trombidiformes		1	4.2
			Hygrobatidae	1	4.2
			Lebertiidae	8	33.3
			Sperchontidae	2	8.3
			Torrenticolidae	26	108.3
	Insecta	Coleoptera	Dytiscidae	1	4.2
			Elmidae	7	29.2
		Diptera	Chironomidae	38	158.3
			Tipulidae	5	20.9
		Ephemeroptera	Ameletidae	2	8.3
			Baetidae	38	158.3
			Ephemerellidae	70	291.7
			Heptageniidae	91	379.3
			Leptohyphidae	1	4.2
			Leptophlebiidae	4	16.7
		Plecoptera	Chloroperlidae	3	12.5

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
			Perlidae	2	8.3
			Perlodidae	2	8.3
		Trichoptera	Apataniidae	1	4.2
			Hydropsychidae	6	25.0
			Hydroptilidae	4	16.7
			Lepidostomatidae	9	37.5
			Total	322	1,341.9

Metrics

Name	GOA01	Predicted Group Reference Mean ±SD
Bray-Curtis Distance	0.62	0.3 ± 0.1
Biotic Indices		
Hilsenhoff Family index (North-West)	3.5	3.2 ± 0.3
Number Of Individuals		
% Chironomidae	11.8	6.0 ± 5.6
% EPT Individuals	72.6	88.1 ± 9.3
% of 2 dominant taxa	50.2	54.4 ± 11.4
No. EPT individuals/Chironomids+EPT Individuals	0.9	0.9 ± 0.1
Total Abundance	1341.7	1083.1 ± 932.3
Richness		
EPT taxa (no)	13.0	12.4 ± 2.4
Simpson's Diversity	0.8	0.8 ± 0.1
Simpson's Evenness	0.3	0.3 ± 0.1
Total No. of Taxa	21.0	18.2 ± 4.7

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites						Probability Of Occurrence at GOA01
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	
Baetidae	100%	100%	100%	100%	100%	100%	1.00
Capniidae	77%	79%	63%	74%	63%	76%	0.76
Chironomidae	100%	100%	100%	93%	100%	88%	0.99
Chloroperlidae	77%	93%	88%	93%	96%	82%	0.90
Ephemerellidae	85%	97%	98%	98%	98%	82%	0.95
Heptageniidae	92%	100%	100%	100%	100%	100%	0.99
Hydropsychidae	46%	72%	71%	91%	79%	53%	0.70
Nemouridae	85%	100%	98%	98%	98%	100%	0.97
Perlodidae	77%	97%	85%	83%	90%	82%	0.90
Rhyacophilidae	69%	100%	83%	91%	98%	82%	0.92
Taeniopterygidae	69%	97%	88%	100%	100%	88%	0.92

RIVPACS Ratios

RIVPACS : Expected taxa P>0.50	12.33
RIVPACS : Observed taxa P>0.50	10.00
RIVPACS : O:E (p > 0.5)	0.81
RIVPACS : Expected taxa P>0.70	9.99
RIVPACS : Observed taxa P>0.70	7.00
RIVPACS : O:E (p > 0.7)	0.70

Habitat Description

Variable	GOA01	Predicted Group Reference Mean ±SD
Bedrock Geology		
Sedimentary (%)	90.91000	91.25558 ± 24.81348
Channel		
Depth-Avg (cm)	20.0	31.4 ± 15.4
Depth-BankfullMinusWetted (cm)	185.00	54.15 ± 36.59
Depth-Max (cm)	37.5	46.8 ± 23.7

Habitat Description

Variable	GOA01	Predicted Group Reference Mean ±SD
Macrophyte (PercentRange)	0	0 ± 0
Reach-%CanopyCoverage (PercentRange)	0.00	1.00 ± 0.96
Reach-DomStreamsideVeg (Category(1-4))	3	3 ± 1
Reach-Pools (Binary)	0	1 ± 1
Reach-Rapids (Binary)	0	0 ± 0
Reach-Riffles (Binary)	1	1 ± 0
Reach-StraightRun (Binary)	1	1 ± 1
Slope (m/m)	0.0070000	0.0435622 ± 0.0544263
Veg-Coniferous (Binary)	1	1 ± 0
Veg-Deciduous (Binary)	1	1 ± 0
Veg-GrassesFerns (Binary)	1	1 ± 0
Veg-Shrubs (Binary)	1	1 ± 0
Velocity-Avg (m/s)	0.44	0.63 ± 0.23
Velocity-Max (m/s)	0.71	0.95 ± 0.33
Width-Bankfull (m)	98.0	23.6 ± 18.9
Width-Wetted (m)	24.5	14.0 ± 9.6
XSEC-VelInstrumentDirect (Category(1-3))	3	2 ± 0
XSEC-VelMethod (Category(1-3))	3	2 ± 1
Climate		
Precip10_OCT (mm)	65.43328	93.78954 ± 37.73803
Temp12_DECmin (Degrees Celsius)	-10.60250	-12.77499 ± 1.90440
Hydrology		
Drainage-Area (km^2)	1256.53600	267.49128 ± 347.95771
Perimeter (Km)	193.03860	107.09622 ± 85.97364
Landcover		
Natl-Grassland (%)	5.43000	4.84000 ± 3.39798
Natl-ShrubLow (%)	0.07000	4.94988 ± 4.53147
Natl-Water (%)	0.29000	0.22026 ± 0.32058
Substrate Data		
%Bedrock (%)	0	0 ± 1
%Boulder (%)	0	6 ± 7
%Cobble (%)	34	51 ± 23
%Gravel (%)	0	4 ± 6
%Pebble (%)	66	39 ± 23
%Sand (%)	0	0 ± 0
%Silt+Clay (%)	0	0 ± 0
D50 (cm)	5.60	8.79 ± 6.32
Dg (cm)	5.2	7.7 ± 3.1
Dominant-1st (Category(0-9))	5	6 ± 1
Dominant-2nd (Category(0-9))	6	6 ± 1
Embeddedness (Category(1-5))	4	4 ± 1
PeriphytonCoverage (Category(1-5))	3	2 ± 1
SurroundingMaterial (Category(0-9))	3	3 ± 1
Topography		
SlopeMax (%)	923.50000	475.68167 ± 413.51912
Water Chemistry		
Ag (mg/L)	0.0000250	0.0000038 ± 0.0000018
Al (mg/L)	0.0096000	0.0064450 ± 0.0021850
As (mg/L)	0.0025000	0.0002615 ± 0.0000120
B (mg/L)	0.0250000	0.0262500 ± 0.0335876
Ba (mg/L)	0.0127000	0.0683500 ± 0.0002121
Be (mg/L)	0.0000500	0.0000075 ± 0.0000035
Bi (mg/L)	0.0000500	0.0000038 ± 0.0000018
Ca (mg/L)	9.4400000	24.6363636 ± 20.0629852
Cd (mg/L)	0.0000050	0.0000038 ± 0.0000018
Co (mg/L)	0.0000500	0.0000114 ± 0.0000019
Cr (mg/L)	0.0002500	0.0000750 ± 0.0000354
Cu (mg/L)	0.0002000	0.0001155 ± 0.0000219
Fe (mg/L)	0.0270000	0.0105500 ± 0.0036062
General-Alkalinity (mg/L)	46.2000000	74.2125000 ± 53.9915558
General-Conductivity (µS/cm)	82.8000000	121.7600000 ± 104.0053005
General-DO (mg/L)	9.9300000	11.0129630 ± 0.8955266

Habitat Description

Variable	GOA01	Predicted Group Reference Mean ±SD
General-Hardness (mg/L)	35.7000000	95.8956522 ± 77.3576081
General-pH (pH)	6.7	7.7 ± 0.8
General-SolidsTSS (mg/L)	1.0000000	5.9463636 ± 8.6422279
General-SpCond (µS/cm)	81.2000000	165.1777778 ± 128.4575336
General-TempAir (Degrees Celsius)	26.0	11.5 ± 5.9
General-TempWater (Degrees Celsius)	17.2000000	6.4451852 ± 2.2997548
General-Turbidity (NTU)	0.1700000	5.7154545 ± 6.9690564
K (mg/L)	0.4700000	0.4604091 ± 0.2737828
Li (mg/L)	0.0004500	0.0011000 ± 0.0000000
Mg (mg/L)	2.9400000	8.6045455 ± 7.5439965
Mn (mg/L)	0.0023300	0.0007470 ± 0.0001937
Mo (mg/L)	0.0004400	0.0006780 ± 0.0000170
Na (mg/L)	1.9000000	1.0881818 ± 0.7163042
Ni (mg/L)	0.0002000	0.0001625 ± 0.0001945
Nitrogen-NO2 (mg/L)	0.0050000	0.0034091 ± 0.0048394
Nitrogen-NO2+NO3 (mg/L)	0.0050000	0.0789333 ± 0.0140433
Nitrogen-NO3 (mg/L)	0.0050000	0.0719000 ± 0.0408583
Nitrogen-TKN (mg/L)	0.0250000	0.0200000
Nitrogen-TN (mg/L)	0.0250000	0.0929091 ± 0.0373336
Pb (mg/L)	0.0001000	0.0000337 ± 0.0000259
Phosphorus-OrthoP (mg/L)	0.0050000	0.0005167 ± 0.0006974
Phosphorus-TDP (mg/L)	0.0025000	0.0010200 ± 0.0007879
Phosphorus-TP (mg/L)	0.0250000	0.0049864 ± 0.0043795
S (mg/L)	1.5000000	5.0000000
Sb (mg/L)	0.0002000	0.0000635 ± 0.0000092
Se (mg/L)	0.0002500	0.0001105 ± 0.0000134
Si (mg/L)	4.3000000	2.5681818 ± 1.4562562
Sn (mg/L)	0.0001000	0.0000075 ± 0.0000035
Sr (mg/L)	0.0340000	0.0445000 ± 0.0002828
Te (mg/L)	0.0002500	0.0000000 ± 0.0000000
Th (mg/L)	0.0000500	0.0000000 ± 0.0000000
Ti (mg/L)	0.0025000	0.0005000
Tl (mg/L)	0.0000100	0.0000015 ± 0.0000007
U (mg/L)	0.0003750	0.0012050 ± 0.0000495
V (mg/L)	0.0025000	0.0001500 ± 0.0000707
Zn (mg/L)	0.0020000	0.0006400 ± 0.0005091
Zr (mg/L)	0.0000500	0.0000000 ± 0.0000000

Site Description

Study Name	BC NGO-Goat River Ecological Monitoring
Site	GOA01
Sampling Date	Oct 01 2023
Know Your Watershed Basin	Lower Kootenay
Province / Territory	British Columbia
Terrestrial Ecological Classification	Montane Cordillera EcoZone Columbia Mountains and Highlands EcoRegion
Coordinates (decimal degrees)	49.08070 N, 116.51980 W
Altitude	541
Local Basin Name	Goat River
	Kootenay River
Stream Order	5

Up Stream

Cabin Assessment Results

Reference Model Summary	
Model	Columbia Basin 2020
Analysis Date	October 22, 2024
Taxonomic Level	Family
Predictive Model Variables	Altitude Drainage-Area Longitude Natl-Grassland Natl-ShrubLow Natl-Water Precip10_Oct Reach-%CanopyCoverage Sedimentary Slope SlopeMax Temp12_DECmin

Reference Groups	**1**	**2**	**3**	**4**	**5**	**6**
Number of Reference Sites	13	24	28	35	32	15
Group Error Rate	53.8%	55.2%	34.1%	52.2%	23.1%	29.4%
Overall Model Error Rate	39.4%					
Probability of Group Membership	13.1%	53.9%	13.3%	12.2%	2.6%	4.9%
CABIN Assessment of GOA01 on Oct 01, 2023	Mildly Divergent					

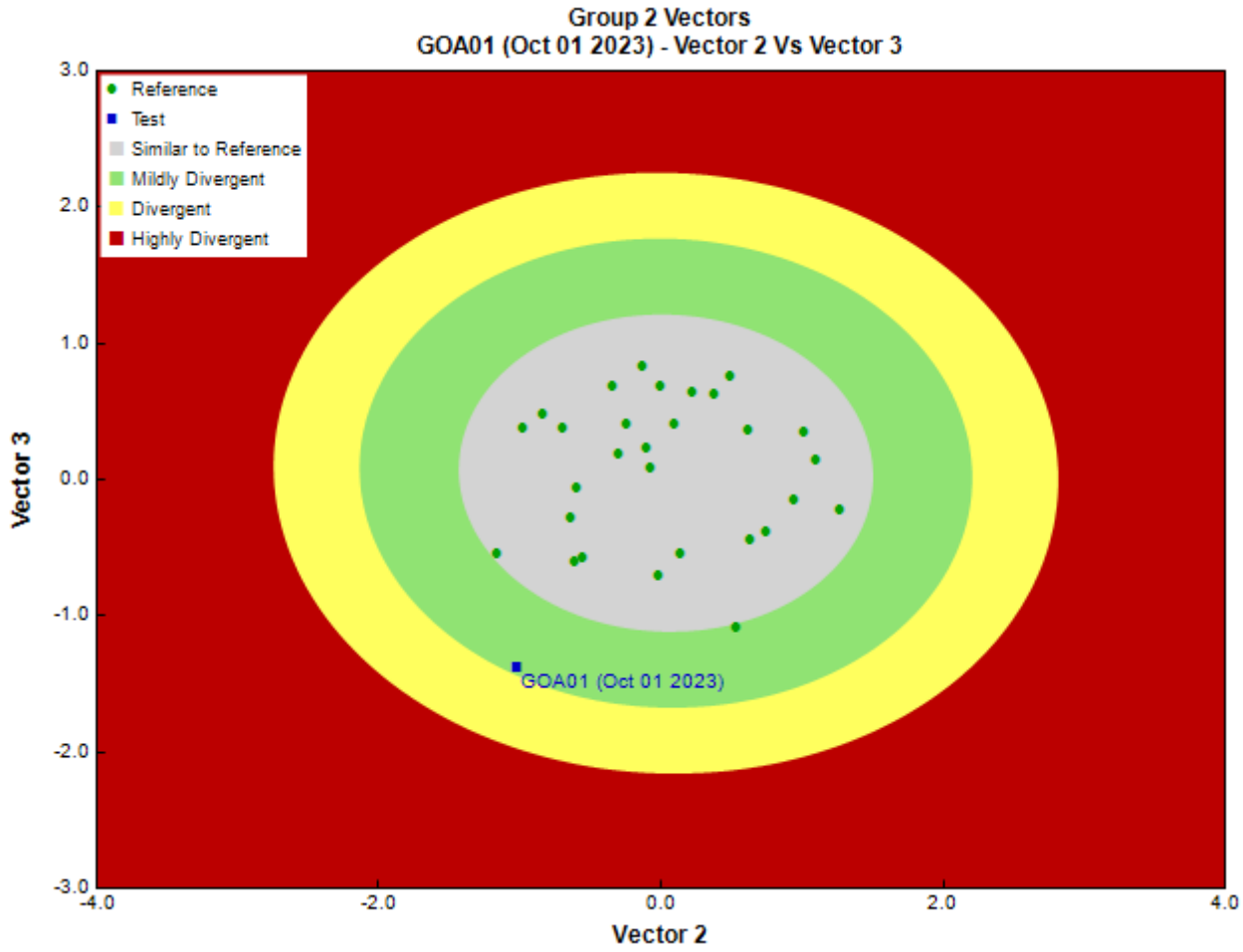


Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

Sample Information

Sampling Device	Kick Net
Mesh Size	400
Sampling Time	3
Taxonomist	Pina Viola, Consultant
	Marchant Box
Sub-Sample Proportion	12/100

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
Annelida	Clitellata	Tubificida	Naididae	21	175.0
Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	6	50.0
			Torrenticolidae	3	25.0
	Insecta	Coleoptera	Elmidae	3	25.0
		Diptera	Chironomidae	47	391.7
			Empididae	1	8.3
			Tipulidae	15	125.0
		Ephemeroptera	Ameletidae	5	41.7
			Baetidae	11	91.6
			Ephemerellidae	54	450.0
			Heptageniidae	49	408.2
			Leptophlebiidae	60	500.0
		Plecoptera	Chloroperlidae	2	16.7
			Leuctridae	1	8.3
			Perlidae	3	25.0
			Perlodidae	5	41.7

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
			Taeniopterygidae	6	50.0
		Trichoptera	Hydropsychidae	1	8.3
			Lepidostomatidae	2	16.7
			Total	295	2,458.2

Metrics

Name	GOA01	Predicted Group Reference Mean ±SD
Bray-Curtis Distance	0.74	0.3 ± 0.1
Biotic Indices		
Hilsenhoff Family index (North-West)	3.6	3.2 ± 0.3
Number Of Individuals		
% Chironomidae	15.9	6.0 ± 5.6
% EPT Individuals	67.5	88.1 ± 9.3
% of 2 dominant taxa	38.6	54.4 ± 11.4
No. EPT individuals/Chironomids+EPT Individuals	0.8	0.9 ± 0.1
Total Abundance	2458.3	1083.1 ± 932.3
Richness		
EPT taxa (no)	12.0	12.4 ± 2.4
Simpson's Diversity	0.9	0.8 ± 0.1
Simpson's Evenness	0.4	0.3 ± 0.1
Total No. of Taxa	19.0	18.2 ± 4.7

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites						Probability Of Occurrence at GOA01
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	
Baetidae	100%	100%	100%	100%	100%	100%	1.00
Capniidae	77%	79%	63%	74%	63%	76%	0.76
Chironomidae	100%	100%	100%	93%	100%	88%	0.99
Chloroperlidae	77%	93%	88%	93%	96%	82%	0.90
Ephemerellidae	85%	97%	98%	98%	98%	82%	0.95
Heptageniidae	92%	100%	100%	100%	100%	100%	0.99
Hydropsychidae	46%	72%	71%	91%	79%	53%	0.70
Nemouridae	85%	100%	98%	98%	98%	100%	0.97
Perlodidae	77%	97%	85%	83%	90%	82%	0.90
Rhyacophilidae	69%	100%	83%	91%	98%	82%	0.92
Taeniopterygidae	69%	97%	88%	100%	100%	88%	0.92

RIVPACS Ratios

RIVPACS : Expected taxa P>0.50	12.34
RIVPACS : Observed taxa P>0.50	11.00
RIVPACS : O:E (p > 0.5)	0.89
RIVPACS : Expected taxa P>0.70	9.99
RIVPACS : Observed taxa P>0.70	8.00
RIVPACS : O:E (p > 0.7)	0.80

Habitat Description

Variable	GOA01	Predicted Group Reference Mean ±SD
Bedrock Geology		
Sedimentary (%)	90.91000	91.25558 ± 24.81348
Channel		
Depth-Avg (cm)	30.3	31.4 ± 15.4
Depth-BankfullMinusWetted (cm)	130.00	54.15 ± 36.59
Depth-Max (cm)	37.0	46.8 ± 23.7
Macrophyte (PercentRange)	1	0 ± 0
Reach-%CanopyCoverage (PercentRange)	0.00	1.00 ± 0.96
Reach-DomStreamsideVeg (Category(1-4))	3	3 ± 1

Habitat Description

Variable	GOA01	Predicted Group Reference Mean ±SD
Reach-Pools (Binary)	0	1 ± 1
Reach-Rapids (Binary)	0	0 ± 0
Reach-Riffles (Binary)	1	1 ± 0
Reach-StraightRun (Binary)	0	1 ± 1
Slope (m/m)	0.0060000	0.0435622 ± 0.0544263
Veg-Coniferous (Binary)	0	1 ± 0
Veg-Deciduous (Binary)	1	1 ± 0
Veg-GrassesFerns (Binary)	1	1 ± 0
Veg-Shrubs (Binary)	1	1 ± 0
Velocity-Avg (m/s)	0.28	0.63 ± 0.23
Velocity-Max (m/s)	0.31	0.95 ± 0.33
Width-Bankfull (m)	98.0	23.6 ± 18.9
Width-Wetted (m)	46.3	14.0 ± 9.6
XSEC-VelInstrumentDirect (Category(1-3))	3	2 ± 0
XSEC-VelMethod (Category(1-3))	3	2 ± 1
Climate		
Precip10_OCT (mm)	65.43328	93.78954 ± 37.73803
Temp12_DECmin (Degrees Celsius)	-10.60250	-12.77499 ± 1.90440
Hydrology		
Drainage-Area (km^2)	1256.53600	267.49128 ± 347.95771
Perimeter (Km)	193.03860	107.09622 ± 85.97364
Landcover		
Natl-Grassland (%)	5.43000	4.84000 ± 3.39798
Natl-ShrubLow (%)	0.07000	4.94988 ± 4.53147
Natl-Water (%)	0.29000	0.22026 ± 0.32058
Substrate Data		
%Bedrock (%)	0	0 ± 1
%Boulder (%)	0	6 ± 7
%Cobble (%)	57	51 ± 23
%Gravel (%)	0	4 ± 6
%Pebble (%)	43	39 ± 23
%Sand (%)	0	0 ± 0
%Silt+Clay (%)	0	0 ± 0
D50 (cm)	7.30	8.79 ± 6.32
Dg (cm)	6.6	7.7 ± 3.1
Dominant-1st (Category(0-9))	6	6 ± 1
Dominant-2nd (Category(0-9))	5	6 ± 1
Embeddedness (Category(1-5))	4	4 ± 1
PeriphytonCoverage (Category(1-5))	2	2 ± 1
SurroundingMaterial (Category(0-9))	3	3 ± 1
Topography		
SlopeMax (%)	923.50000	475.68167 ± 413.51912
Water Chemistry		
Ag (mg/L)	0.0000250	0.0000038 ± 0.0000018
Al (mg/L)	0.0025000	0.0064450 ± 0.0021850
As (mg/L)	0.0002500	0.0002615 ± 0.0000120
B (mg/L)	0.0250000	0.0262500 ± 0.0335876
Ba (mg/L)	0.0118000	0.0683500 ± 0.0002121
Be (mg/L)	0.0000500	0.0000075 ± 0.0000035
Bi (mg/L)	0.0000500	0.0000038 ± 0.0000018
Ca (mg/L)	9.6600000	24.6363636 ± 20.0629852
Cd (mg/L)	0.0000050	0.0000038 ± 0.0000018
Co (mg/L)	0.0000500	0.0000114 ± 0.0000019
Cr (mg/L)	0.0002500	0.0000750 ± 0.0000354
Cu (mg/L)	0.0002000	0.0001155 ± 0.0000219
Fe (mg/L)	0.0210000	0.0105500 ± 0.0036062
General-Alkalinity (mg/L)	36.5000000	74.2125000 ± 53.9915558
General-Conductivity (µS/cm)	59.2000000	121.7600000 ± 104.0053005
General-DO (mg/L)	11.3000000	11.0129630 ± 0.8955266
General-Hardness (mg/L)	36.6000000	95.8956522 ± 77.3576081
General-pH (pH)	7.8	7.7 ± 0.8
General-SolidsTSS (mg/L)	1.0000000	5.9463636 ± 8.6422279

Habitat Description

Variable	GOA01	Predicted Group Reference Mean ±SD
General-SpCond (µS/cm)	80.7000000	165.1777778 ± 128.4575336
General-TempAir (Degrees Celsius)	17.0	11.5 ± 5.9
General-TempWater (Degrees Celsius)	11.7000000	6.4451852 ± 2.2997548
General-Turbidity (NTU)	0.2500000	5.7154545 ± 6.9690564
K (mg/L)	0.4600000	0.4604091 ± 0.2737828
Li (mg/L)	0.0003700	0.0011000 ± 0.0000000
Mg (mg/L)	3.0200000	8.6045455 ± 7.5439965
Mn (mg/L)	0.0015100	0.0007470 ± 0.0001937
Mo (mg/L)	0.0004700	0.0006780 ± 0.0000170
Na (mg/L)	2.0800000	1.0881818 ± 0.7163042
Ni (mg/L)	0.0002000	0.0001625 ± 0.0001945
Nitrogen-NO2 (mg/L)	0.0050000	0.0034091 ± 0.0048394
Nitrogen-NO2+NO3 (mg/L)	0.0050000	0.0789333 ± 0.0140433
Nitrogen-NO3 (mg/L)	0.0050000	0.0719000 ± 0.0408583
Nitrogen-TKN (mg/L)	0.0250000	0.0200000
Nitrogen-TN (mg/L)	0.0250000	0.0929091 ± 0.0373336
Pb (mg/L)	0.0001000	0.0000337 ± 0.0000259
Phosphorus-OrthoP (mg/L)	0.0085000	0.0005167 ± 0.0006974
Phosphorus-TDP (mg/L)	0.0025000	0.0010200 ± 0.0007879
Phosphorus-TP (mg/L)	0.0250000	0.0049864 ± 0.0043795
S (mg/L)	1.5000000	5.0000000
Sb (mg/L)	0.0001000	0.0000635 ± 0.0000092
Se (mg/L)	0.0002500	0.0001105 ± 0.0000134
Si (mg/L)	3.9000000	2.5681818 ± 1.4562562
Sn (mg/L)	0.0001000	0.0000075 ± 0.0000035
Sr (mg/L)	0.0356000	0.0445000 ± 0.0002828
Te (mg/L)	0.0002500	0.0000000 ± 0.0000000
Th (mg/L)	0.0000500	0.0000000 ± 0.0000000
Ti (mg/L)	0.0025000	0.0005000
Tl (mg/L)	0.0000100	0.0000015 ± 0.0000007
U (mg/L)	0.0004100	0.0012050 ± 0.0000495
V (mg/L)	0.0025000	0.0001500 ± 0.0000707
Zn (mg/L)	0.0020000	0.0006400 ± 0.0005091
Zr (mg/L)	0.0000500	0.0000000 ± 0.0000000

Site Description

Study Name	BC NGO-Goat River Ecological Monitoring
Site	GOA01
Sampling Date	Sep 29 2024
Know Your Watershed Basin	Lower Kootenay
Province / Territory	British Columbia
Terrestrial Ecological Classification	Montane Cordillera EcoZone Columbia Mountains and Highlands EcoRegion
Coordinates (decimal degrees)	49.08073 N, 116.51954 W
Altitude	539
Local Basin Name	Goat River
	Kootenay River
Stream Order	5

Down Stream

Cabin Assessment Results

Reference Model Summary	
Model	Columbia Basin 2020
Analysis Date	December 17, 2024
Taxonomic Level	Family
Predictive Model Variables	Altitude Drainage-Area Longitude Natl-Grassland Natl-ShrubLow Natl-Water Precip10_Oct Reach-%CanopyCoverage Sedimentary Slope SlopeMax Temp12_DECmin

Reference Groups	**1**	**2**	**3**	**4**	**5**	**6**
Number of Reference Sites	13	24	28	35	32	15
Group Error Rate	53.8%	55.2%	34.1%	52.2%	23.1%	29.4%
Overall Model Error Rate	39.4%					
Probability of Group Membership	12.8%	53.9%	13.3%	12.4%	2.6%	4.9%
CABIN Assessment of GOA01 on Sep 29, 2024	Highly Divergent					

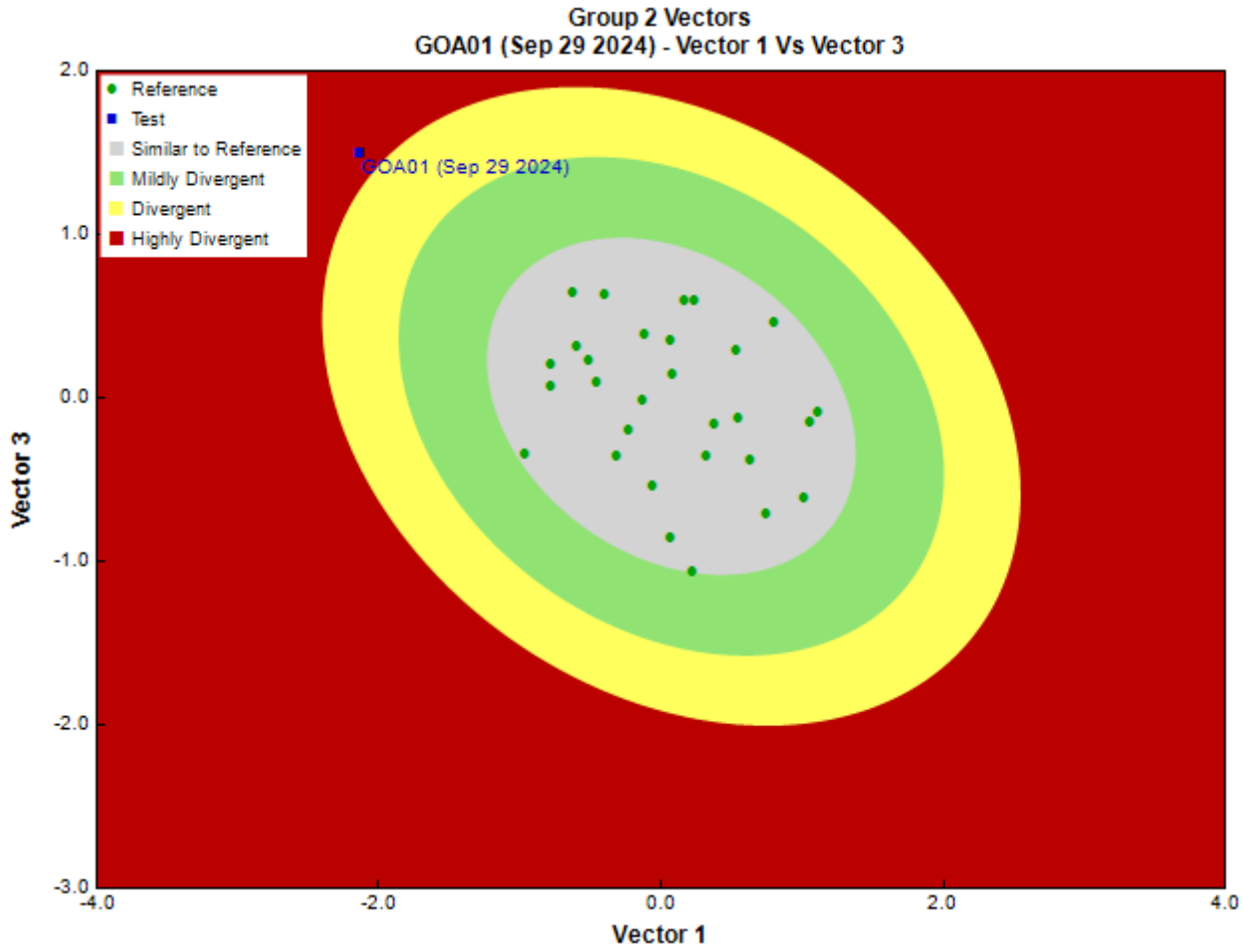


Figure 3. CABIN ordination assessment of the test site with the predicted group of reference sites. Each axis represents the relative abundance of the entire benthic invertebrate community with different organisms weighted differently on each axis.

Sample Information

Sampling Device	Kick Net
Mesh Size	400
Sampling Time	3
Taxonomist	-
	-
Sub-Sample Proportion	6/100

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
Annelida	Clitellata	Tubificida	Naididae	3	50.0
Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	1	16.7
			Sperchontidae	1	16.7
			Torrenticolidae	7	116.7
	Insecta	Coleoptera	Elmidae	2	33.4
		Diptera	Chironomidae	57	950.1
			Tipulidae	48	800.0
		Ephemeroptera	Ameletidae	14	233.3
			Ephemerellidae	83	1,383.3
			Heptageniidae	33	550.0
			Leptophlebiidae	54	900.0
		Plecoptera		2	33.3
			Capniidae	1	16.7
			Chloroperlidae	1	16.7
			Leuctridae	1	16.7
			Perlodidae	3	50.0

Community Structure

Phylum	Class	Order	Family	Raw Count	Total Count
		Trichoptera	Hydropsychidae	1	16.7
			Hydroptilidae	1	16.7
			Lepidostomatidae	7	116.7
			Total	320	5,333.7

Metrics

Name	GOA01	Predicted Group Reference Mean ±SD
Bray-Curtis Distance	0.91	0.3 ± 0.1
Biotic Indices		
Hilsenhoff Family index (North-West)	2.9	3.2 ± 0.3
Number Of Individuals		
% Chironomidae	17.9	6.0 ± 5.6
% EPT Individuals	62.6	88.1 ± 9.3
% of 2 dominant taxa	44.0	54.4 ± 11.4
No. EPT individuals/Chironomids+EPT Individuals	0.8	0.9 ± 0.1
Total Abundance	5333.3	1083.1 ± 932.3
Richness		
EPT taxa (no)	11.0	12.4 ± 2.4
Simpson's Diversity	0.8	0.8 ± 0.1
Simpson's Evenness	0.3	0.3 ± 0.1
Total No. of Taxa	18.0	18.2 ± 4.7

Frequency and Probability of Taxa Occurrence

Reference Model Taxa	Frequency of Occurrence in Reference Sites						Probability Of Occurrence at GOA01
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	
Ameletidae	69%	59%	68%	57%	58%	65%	0.61
Baetidae	100%	100%	100%	100%	100%	100%	1.00
Capniidae	77%	79%	63%	74%	63%	76%	0.76
Chironomidae	100%	100%	100%	93%	100%	88%	0.99
Chloroperlidae	77%	93%	88%	93%	96%	82%	0.90
Empididae	54%	62%	71%	50%	62%	65%	0.61
Ephemerellidae	85%	97%	98%	98%	98%	82%	0.95
Heptageniidae	92%	100%	100%	100%	100%	100%	0.99
Hydropsychidae	46%	72%	71%	91%	79%	53%	0.70
Nemouridae	85%	100%	98%	98%	98%	100%	0.97
Perlodidae	77%	97%	85%	83%	90%	82%	0.90
Rhyacophilidae	69%	100%	83%	91%	98%	82%	0.92
Sperchontidae	23%	76%	46%	43%	44%	59%	0.59
Taeniopterygidae	69%	97%	88%	100%	100%	88%	0.92
Tipulidae	69%	48%	49%	65%	40%	53%	0.53

RIVPACS Ratios

RIVPACS : Expected taxa P>0.50	12.34
RIVPACS : Observed taxa P>0.50	10.00
RIVPACS : O:E (p > 0.5)	0.81
RIVPACS : Expected taxa P>0.70	9.99
RIVPACS : Observed taxa P>0.70	7.00
RIVPACS : O:E (p > 0.7)	0.70

Habitat Description

Variable	GOA01	Predicted Group Reference Mean ±SD
Bedrock Geology		
Sedimentary (%)	90.91000	91.25558 ± 24.81348
Channel		
Depth-Avg (cm)	19.5	31.4 ± 15.4
Depth-BankfullMinusWetted (cm)	115.00	54.15 ± 36.59

Habitat Description

Variable	GOA01	Predicted Group Reference Mean ±SD
Depth-Max (cm)	27.0	46.8 ± 23.7
Macrophyte (PercentRange)	0	0 ± 0
Reach-%CanopyCoverage (PercentRange)	0.00	1.00 ± 0.96
Reach-DomStreamsideVeg (Category(1-4))	3	3 ± 1
Reach-Pools (Binary)	0	1 ± 1
Reach-Rapids (Binary)	0	0 ± 0
Reach-Riffles (Binary)	1	1 ± 0
Reach-StraightRun (Binary)	1	1 ± 1
Slope (m/m)	0.0050000	0.0435622 ± 0.0544263
Veg-Coniferous (Binary)	1	1 ± 0
Veg-Deciduous (Binary)	1	1 ± 0
Veg-GrassesFerns (Binary)	1	1 ± 0
Veg-Shrubs (Binary)	1	1 ± 0
Velocity-Avg (m/s)	0.25	0.63 ± 0.23
Velocity-Max (m/s)	0.36	0.95 ± 0.33
Width-Bankfull (m)	98.2	23.6 ± 18.9
Width-Wetted (m)	52.9	14.0 ± 9.6
XSEC-VelInstrumentDirect (Category(1-3))	3	2 ± 0
XSEC-VelMethod (Category(1-3))	3	2 ± 1
Climate		
Precip10_OCT (mm)	65.43328	93.78954 ± 37.73803
Temp12_DECmin (Degrees Celsius)	-10.60250	-12.77499 ± 1.90440
Hydrology		
Drainage-Area (km^2)	1256.53600	267.49128 ± 347.95771
Perimeter (Km)	193.03860	107.09622 ± 85.97364
Landcover		
Natl-Grassland (%)	5.43000	4.84000 ± 3.39798
Natl-ShrubLow (%)	0.07000	4.94988 ± 4.53147
Natl-Water (%)	0.29000	0.22026 ± 0.32058
Substrate Data		
%Bedrock (%)	0	0 ± 1
%Boulder (%)	1	6 ± 7
%Cobble (%)	48	51 ± 23
%Gravel (%)	0	4 ± 6
%Pebble (%)	51	39 ± 23
%Sand (%)	0	0 ± 0
%Silt+Clay (%)	0	0 ± 0
D50 (cm)	6.05	8.79 ± 6.32
Dg (cm)	6.3	7.7 ± 3.1
Dominant-1st (Category(0-9))	6	6 ± 1
Dominant-2nd (Category(0-9))	5	6 ± 1
Embeddedness (Category(1-5))	4	4 ± 1
PeriphytonCoverage (Category(1-5))	3	2 ± 1
SurroundingMaterial (Category(0-9))	3	3 ± 1
Topography		
SlopeMax (%)	923.50000	475.68167 ± 413.51912
Water Chemistry		
Ag (mg/L)	0.0000050	0.0000038 ± 0.0000018
Al (mg/L)	0.0055000	0.0064450 ± 0.0021850
As (mg/L)	0.0003500	0.0002615 ± 0.0000120
B (mg/L)	0.0050000	0.0262500 ± 0.0335876
Ba (mg/L)	0.0139000	0.0683500 ± 0.0002121
Be (mg/L)	0.0000100	0.0000075 ± 0.0000035
Bi (mg/L)	0.0000250	0.0000038 ± 0.0000018
Ca (mg/L)	9.3000000	24.6363636 ± 20.0629852
Cd (mg/L)	0.0000025	0.0000038 ± 0.0000018
Co (mg/L)	0.0000500	0.0000114 ± 0.0000019
Cr (mg/L)	0.0002500	0.0000750 ± 0.0000354
Cu (mg/L)	0.0002500	0.0001155 ± 0.0000219
Fe (mg/L)	0.0310000	0.0105500 ± 0.0036062
General-Alkalinity (mg/L)	40.6000000	74.2125000 ± 53.9915558
General-Conductivity (µS/cm)	67.9000000	121.7600000 ± 104.0053005

Habitat Description

Variable	GOA01	Predicted Group Reference Mean ±SD
General-DO (mg/L)	10.0000000	11.0129630 ± 0.8955266
General-Hardness (mg/L)	37.0000000	95.8956522 ± 77.3576081
General-pH (pH)	7.7	7.7 ± 0.8
General-SolidsTSS (mg/L)	1.5000000	5.9463636 ± 8.6422279
General-SpCond (µS/cm)	84.5000000	165.1777778 ± 128.4575336
General-TempAir (Degrees Celsius)	21.0	11.5 ± 5.9
General-TempWater (Degrees Celsius)	14.7000000	6.4451852 ± 2.2997548
General-Turbidity (NTU)	0.5300000	5.7154545 ± 6.9690564
K (mg/L)	0.4990000	0.4604091 ± 0.2737828
Li (mg/L)	0.0005000	0.0011000 ± 0.0000000
Mg (mg/L)	3.3400000	8.6045455 ± 7.5439965
Mn (mg/L)	0.0010300	0.0007470 ± 0.0001937
Mo (mg/L)	0.0004150	0.0006780 ± 0.0000170
Na (mg/L)	2.2400000	1.0881818 ± 0.7163042
Ni (mg/L)	0.0002500	0.0001625 ± 0.0001945
Nitrogen-NH3 (mg/L)	0.0025000	0.0014722 ± 0.0022127
Nitrogen-NO2 (mg/L)	0.0005000	0.0034091 ± 0.0048394
Nitrogen-NO2+NO3 (mg/L)	0.0025500	0.0789333 ± 0.0140433
Nitrogen-NO3 (mg/L)	0.0025000	0.0719000 ± 0.0408583
Nitrogen-TN (mg/L)	0.0330000	0.0929091 ± 0.0373336
Pb (mg/L)	0.0000250	0.0000337 ± 0.0000259
Phosphorus-OrthoP (mg/L)	0.0027000	0.0005167 ± 0.0006974
Phosphorus-TDP (mg/L)	0.0032000	0.0010200 ± 0.0007879
Phosphorus-TP (mg/L)	0.0021000	0.0049864 ± 0.0043795
S (mg/L)	1.1800000	5.0000000
Sb (mg/L)	0.0000500	0.0000635 ± 0.0000092
Se (mg/L)	0.0000250	0.0001105 ± 0.0000134
Si (mg/L)	4.1100000	2.5681818 ± 1.4562562
Sn (mg/L)	0.0000500	0.0000075 ± 0.0000035
Sr (mg/L)	0.0390000	0.0445000 ± 0.0002828
Te (mg/L)	0.0001000	0.0000000 ± 0.0000000
Th (mg/L)	0.0000500	0.0000000 ± 0.0000000
Ti (mg/L)	0.0001500	0.0005000
Tl (mg/L)	0.0000050	0.0000015 ± 0.0000007
U (mg/L)	0.0003600	0.0012050 ± 0.0000495
V (mg/L)	0.0002500	0.0001500 ± 0.0000707
Zn (mg/L)	0.0015000	0.0006400 ± 0.0005091
Zr (mg/L)	0.0001000	0.0000000 ± 0.0000000

Stream Data Appendix

STREAM Data 2022 (1 page)

STREAM Data 2023 (1 page)

STREAM DATA: Sep 5, 2022						GOA01 3 replicates		
Phylum	**Class**	**Order**	**Family**	**Genus**	**Species**	**GOA_1_A**	**GOA_1_B**	**GOA_1_C**
Annelida	Clitellata	Haplotaxida	Naididae	Nais	*Nais variabilis*	P	P	
Arthropoda	Insecta	Coleoptera	Chrysomelidae	Donacia	*Donacia clavipes*			P
Arthropoda	Insecta	Diptera	Chironomidae	Conchapelopia	*Conchapelopia pallens*	P		P
Arthropoda	Insecta	Diptera	Chironomidae	Cricotopus	*Cricotopus bicinctus*		P	
Arthropoda	Insecta	Diptera	Chironomidae	Nilotanypus	*Nilotanypus fimbriatus*	P		
Arthropoda	Insecta	Diptera	Chironomidae	Orthocladius	*Orthocladius carlatus*		P	
Arthropoda	Insecta	Diptera	Chironomidae	Orthocladius	*Orthocladius fuscimanus*		P	
Arthropoda	Insecta	Diptera	Chironomidae	Orthocladius	*Orthocladius glabripennis*	P		
Arthropoda	Insecta	Diptera	Chironomidae	Pagastia	*Pagastia orthogonia*			P
Arthropoda	Insecta	Diptera	Chironomidae	Paralauterborniella	*Paralauterborniella nigrohalteralis*	P		
Arthropoda	Insecta	Diptera	Chironomidae	Potthastia	*Potthastia gaedii*		P	
Arthropoda	Insecta	Diptera	Chironomidae	Synorthocladius	*Synorthocladius semivirens*		P	
Arthropoda	Insecta	Diptera	Chloropidae	Thaumatomyia	*Thaumatomyia bistriata*			P
Arthropoda	Insecta	Diptera	Dolichopodidae	Peloropeodes	*Peloropeodes cornutus*	P		
Arthropoda	Insecta	Diptera	Empididae	Neoplasta	*Neoplasta megorchis*			P
Arthropoda	Insecta	Diptera	Simuliidae	Simulium	*Simulium defoliarti*	P		
Arthropoda	Insecta	Diptera	Simuliidae	Simulium	*Simulium negativum*	P		
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus	*Ameletus subnotatus*	P	P	P
Arthropoda	Insecta	Ephemeroptera	Baetidae	Acentrella	*Acentrella insignificans*	P	P	P
Arthropoda	Insecta	Ephemeroptera	Baetidae	Acentrella	*Acentrella turbida*	P	P	P
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	*Baetis phoebus*	P	P	P
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	*Baetis tricaudatus*	P		
Arthropoda	Insecta	Ephemeroptera	Baetidae	Diphetor	*Diphetor hageni*	P	P	
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	*Attenella margarita*	P		P
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	*Drunella doddsii*	P	P	P
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	*Drunella grandis*	P	P	P
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	*Ephemerella tibialis*	P	P	P
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Ecdyonurus	*Ecdyonurus simplicioides*	P	P	P
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus	*Epeorus albertae*	P	P	P
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	*Tricorythodes mosegus*	P		P
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia	*Paraleptophlebia heteronea*	P	P	
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia	*Paraleptophlebia memorialis*	P	P	P
Arthropoda	Insecta	Ephemeroptera	Siphlonuridae	Siphlonurus	*Siphlonurus occidentalis*			P
Arthropoda	Insecta	Megaloptera	Corydalidae	Nigronia	*Nigronia serricornis*		P	
Arthropoda	Insecta	Plecoptera_Insecta	Capniidae	Eucapnopsis	*Eucapnopsis brevicauda*		P	
Arthropoda	Insecta	Plecoptera_Insecta	Chloroperlidae	Alloperla	*Alloperla severa*	P	P	
Arthropoda	Insecta	Plecoptera_Insecta	Chloroperlidae	Sweltsa	*Sweltsa coloradensis*	P	P	P
Arthropoda	Insecta	Plecoptera_Insecta	Nemouridae	Zapada	*Zapada cinctipes*	P	P	
Arthropoda	Insecta	Plecoptera_Insecta	Nemouridae	Zapada	*Zapada columbiana*		P	
Arthropoda	Insecta	Plecoptera_Insecta	Perlidae	Hesperoperla	*Hesperoperla pacifica*	P	P	
Arthropoda	Insecta	Plecoptera_Insecta	Perlodidae	Isoperla	*Isoperla fulva*	P	P	P
Arthropoda	Insecta	Plecoptera_Insecta	Perlodidae	Kogotus	*Kogotus modestus*	P		
Arthropoda	Insecta	Plecoptera_Insecta	Perlodidae	Megarcys	*Megarcys watertoni*	P		
Arthropoda	Insecta	Plecoptera_Insecta	Pteronarcyidae	Pteronarcys	*Pteronarcys princeps*			P
Arthropoda	Insecta	Plecoptera_Insecta	Taeniopterygidae	Doddsia	*Doddsia occidentalis*	P		
Arthropoda	Insecta	Plecoptera_Insecta	Taeniopterygidae	Taenionema	*Taenionema pacificum*	P	P	P
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	*Brachycentrus americanus*	P		
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	*Brachycentrus occidentalis*	P	P	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	*Arctopsyche grandis*	P		
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Ceratopsyche	*Ceratopsyche cockerelli*	P	P	P
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Ceratopsyche	*Ceratopsyche oslari*	P	P	P
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	*Hydropsyche oslari*	P		
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma	*Lepidostoma pluviale*		P	P
Arthropoda	Insecta	Trichoptera	Leptoceridae	Ceraclea	*Ceraclea nepha*	P		
Arthropoda	Insecta	Trichoptera	Limnephilidae	Dicosmoecus	*Dicosmoecus gilvipes*	P	P	
Gastrotricha	undef_Gastrotricha	Chaetonotida	Chaetonotidae	Chaetonotus	*Chaetonotus gelidus*		P	
Gastrotricha	undef_Gastrotricha	Chaetonotida	Chaetonotidae	Chaetonotus	*Chaetonotus persimilis*		P	
Nematoda	Chromadorea	Plectida	Plectidae	Plectus	*Plectus aquatilis*	P		P
Nematomorpha	Gordioida	Gordea	Gordiidae	Paragordius	*Paragordius varius*	P	P	P
Rotifera	Bdelloidea	Adinetida	Adinetidae	Adineta	*Adineta vaga*			P
Rotifera	Bdelloidea	Philodinida	Philodinidae	Philodina	*Philodina flaviceps*		P	
Rotifera	Bdelloidea	undef_Bdelloidea	undef_undef_Bdelloidea	Rotaria	*Rotaria rotatoria*			P

STREAM DATA: Oct 1, 2023					GOA01 3 replicates		
Phylum	**Class**	**Order**	**Family**	**Genus**	**XGOA_00**	**XGOA_00**	**XGOA_0001_C_2023**
Annelida	Clitellata	Crassiclitellata	Lumbricidae	Eiseniella		P	
Annelida	Clitellata	Lumbriculida	Lumbriculidae	Stylodrilus	P		
Annelida	Clitellata	Tubificida	Naididae	Nais		P	P
Arthropoda	Arachnida	Trombidiformes	Hygrobatidae	Atractides	P	P	P
Arthropoda	Collembola	Entomobryomorpha	Tomoceridae	Tomocerus		P	
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	P	P	P
Arthropoda	Insecta	Coleoptera	Elmidae	Ordobrevia	P	P	P
Arthropoda	Insecta	Diptera	Athericidae	Atherix		P	
Arthropoda	Insecta	Diptera	Chironomidae	Cladotanytarsus	P		
Arthropoda	Insecta	Diptera	Chironomidae	Cricotopus		P	P
Arthropoda	Insecta	Diptera	Chironomidae	Demicryptochironomus		P	
Arthropoda	Insecta	Diptera	Chironomidae	Microtendipes		P	
Arthropoda	Insecta	Diptera	Chironomidae	Sublettea	P	P	P
Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsus	P	P	P
Arthropoda	Insecta	Diptera	Chironomidae	Thienemanniella	P		
Arthropoda	Insecta	Diptera	Limoniidae	Hexatoma		P	
Arthropoda	Insecta	Diptera	Tipulidae	Tipula_genus	P	P	
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus	P	P	P
Arthropoda	Insecta	Ephemeroptera	Baetidae	Acentrella		P	P
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis		P	
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella			P
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	P	P	
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	P	P	P
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Cinygmula		P	
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus		P	P
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena	P	P	P
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Neoleptophlebia	P	P	P
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia	P	P	P
Arthropoda	Insecta	Plecoptera_stoneflies	Capniidae	Capnia	P	P	
Arthropoda	Insecta	Plecoptera_stoneflies	Capniidae	Eucapnopsis	P	P	P
Arthropoda	Insecta	Plecoptera_stoneflies	Chloroperlidae	Alloperla		P	P
Arthropoda	Insecta	Plecoptera_stoneflies	Chloroperlidae	Sweltsa	P	P	P
Arthropoda	Insecta	Plecoptera_stoneflies	Nemouridae	Zapada	P	P	
Arthropoda	Insecta	Plecoptera_stoneflies	Perlidae	Hesperoperla		P	
Arthropoda	Insecta	Plecoptera_stoneflies	Perlodidae	Isoperla	P	P	P
Arthropoda	Insecta	Plecoptera_stoneflies	Perlodidae	Kogotus		P	
Arthropoda	Insecta	Plecoptera_stoneflies	Perlodidae	Skwala	P	P	P
Arthropoda	Insecta	Plecoptera_stoneflies	Pteronarcyidae	Pteronarcys	P	P	
Arthropoda	Insecta	Plecoptera_stoneflies	Taeniopterygidae	Taenionema	P	P	P
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche		P	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Ceratopsyche	P	P	P
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	P	P	
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma	P	P	
Gastrotricha	undef_Gastrotricha	Chaetonotida	Chaetonotidae	Chaetonotus		P	
Gastrotricha	undef_Gastrotricha	Macrodasyida	Thaumastodermatidae	Chimaeradasys		P	
Mollusca	Bivalvia	Venerida	Sphaeriidae	Pisidium	P		
Rotifera	Eurotatoria	Adinetida	Adinetidae	Adineta		P	
Rotifera	Eurotatoria	Philodinida	Philodinidae	Dissotrocha		P	
Rotifera	Eurotatoria	Philodinida	Philodinidae	Philodina	P	P	
Rotifera	Eurotatoria	Ploima	Brachionidae	Brachionus		P	
Rotifera	Eurotatoria	undef_Eurotatoria	undef_undef_Eurotatoria	Rotaria	P		
Tardigrada	Eutardigrada	Parachela_tardigrades	Murrayidae	Dactylobiotus		P	

Monthly Water Quality Appendix

Summary of Monthly Water Sampling 2022-2024 (1 page)

Goat River Water Quality Data May 2022-Oct 2024												
date_time	site_id	latitude	longitude	pH- pH units	conductivity- µS/cm	specific_conductivity- µS/cm	water_temperature- °C	turbidity- NTU	dissolved_oxygen- %	dissolved_oxygen- mg/L	air_temperature- °C	notes
2022-05-01 13:00	Goat River (10th Ave S)	49.0782992	-116.5143657	7.3	33	48.4	8.5	0.26		12	22	DO from CHEMETS Dissolved Oxygen, water temperature via thermometer
2022-06-25 13:30	Goat River (10th Ave S)	49.0782992	-116.5143657	6.92	26.4	36.3	11.4	2.62		11	25	DO from CHEMETS Dissolved Oxygen, water temperature via thermometer
2022-07-30 13:00	Goat River (10th Ave S)	49.0782992	-116.5143657	7.26	61.3	68.1	20.3	0.22	118	10.35	32	Water temperature taken by via thermometer
2022-08-29 09:15	Goat River (10th Ave S)	49.0782992	-116.5143657	7.03	63	79	14.1	0.05	111.9	11.7	19	Water temperature taken by via thermometer
2022-09-27 09:05	Goat River (10th Ave S)	49.0782992	-116.5143657	6.9	61.6	83.6	11.7	0.16		9	15	DO from CHEMETS Dissolved Oxygen, water temperature via thermometer
2022-10-29 13:00	Goat River (10th Ave S)	49.0782992	-116.5143657	7.1	55.7	84.5	8.2	0.34	96	11.78	15	Water temperature taken by via thermometer
2022-05-01 14:00	Goat River 3.5km	49.1917843	-116.3443565	7.5	34	51	7.3	0.42		11	18	DO from CHEMETS Dissolved Oxygen, water temperature via thermometer
2022-06-25 14:30	Goat River 3.5km	49.1917843	-116.3443565	7.06	24.9	33.8	11.9	1.27		12	24	DO from CHEMETS Dissolved Oxygen, water temperature via thermometer
2022-07-30 14:05	Goat River 3.5km	49.1917843	-116.3443565	7.3	55.9	62.8	18.8	0.14		10.61	34	Water temperature taken by via thermometer
2022-08-29 11:20	Goat River 3.5km	49.1917843	-116.3443565	7.5	53.6	71.5	13.3	0.03	109.1	11.71	23	Water temperature taken by via thermometer
2022-09-27 10:07	Goat River 3.5km	49.1917843	-116.3443565	7.29	51.5	74.7	8.8	0.39		10	15.5	DO from CHEMETS Dissolved Oxygen
2022-10-29 14:10	Goat River 3.5km	49.1917843	-116.3443565	7.3	48.4	75	6.4	0.05	90.1	11.02	15	
2022-09-05 11:30	Goat River GOA01	49.0807	-116.51907	6.66	82.82	81.2	17.2	0.17	101	9.93	26	
2023-10-01 13:32	Goat River GOA01	49.0807	-116.51907	7.84		80.7	11.7	0.25		11.28	17	
2023-06-26 09:05	Goat River (10th Ave S)	49.0782992	-116.5143657	7.7	36.8	49.5	11.6	0.18	101.6	11.12	19.5	
2023-07-29 13:00	Goat River (10th Ave S)	49.0782992	-116.5143657	7.83	70	78.1	19.6	0.31	94.1	8.75	28	
2023-08-26 13:00	Goat River (10th Ave S)	49.0782992	-116.5143657	7.7	73	84.3	18	0.16		9	28.5	Hanna multimeter no batteries- DO from CHEMets Dissolved Oxygen kit
2023-09-29 14:30	Goat River (10th Ave S)	49.0782992	-116.5143657	7.76	60.2	79.4	12.5	0.24	110.2	12.08	19	
2023-10-25 12:00	Goat River (10th Ave S)	49.0782992	-116.5143657	7.4	51	83	5.5	0.74	117.7	15.16	8	Water temperature taken by via thermometer
2023-06-26 10:05	Goat River 3.5km	49.1917843	-116.3443565	7.7	32.9	46.7	9.6	0.08	97.9	11.08	21	
2023-07-29 14:00:00	Goat River 3.5km	49.1917843	-116.3443565	7.75	59.7	70.9	16.7		96.3	9.35	32	
2023-08-26 14:00:00	Goat River 3.5km	49.1917843	-116.3443565	7.7	63.3	75	16.7	0.28		9	30	Hanna multimeter no batteries- DO from CHEMets Dissolved Oxygen kit
2023-09-29 15:20	Goat River 3.5km	49.1917843	-116.3443565	7.9	51.5	70.8	10.7	0.13	102.9	11.1	21	
2023-10-25 12:50	Goat River 3.5km	49.1917843	-116.3443565	7.6	42.5	71.1	3.9	0.01	128.3	16.48	5	
2024-09-29 14:05	Goat River GOA01	49.0807	-116.51907	7.7	67.9	84.5	14.7	0.53		10	21	DO was taken with Hach Dissolve Oxygen Winkler Method
2024/05/24 09:00	Goat River (10th Ave S)	49.0782992	-116.5143657	7.2	21.7	33.9	6.2	2.25	108	13.34	15	high water
2024/06/22 09:05	Goat River (10th Ave S)	49.0782992	-116.5143657	7.3	28.2	40	9.5	1.02	114.7	13.13	21	
2024/07/31 13:00	Goat River (10th Ave S)	49.0782992	-116.5143657	7.59	61.8	71.2	18.1	0.79		9	31	DO from CHEMets Dissolved Oxygen kit
2024/08/30 13:05	Goat River (10th Ave S)	49.0782992	-116.5143657	7.53	63.7	77.1	15.8	0.36		10	25	DO from CHEMets Dissolved Oxygen kit
2024/09/26 13:00	Goat River (10th Ave S)	49.0782992	-116.5143657	7.68	68.3	84.2	15.1	1.28		11	22	DO from CHEMets Dissolved Oxygen kit
2024/10/25 13:10	Goat River (10th Ave S)	49.0782992	-116.5143657	7.21	49.3	79.3	5.2	0.37		11	14	DO from CHEMets Dissolved Oxygen kit
2024-05-24 09:50	Goat River 3.5km	49.1917843	-116.3443565	7.31	20.9	33.7	5.1	1.96	104.3	12.96	14.5	high water
2024-06-22 10:05	Goat River 3.5km	49.1917843	-116.3443565	7.6	25.6	38.4	7.6	1.84	107.6	12.66	19	
2024-07-31 14:00	Goat River 3.5km	49.1917843	-116.3443565	7.61	53.6	66.4	15	0.27		9	26	DO from CHEMets Dissolved Oxygen kit
2024-08-30 13:45	Goat River 3.5km	49.1917843	-116.3443565	7.75	55.1	69	14.5	0.95		11	26	DO from CHEMets Dissolved Oxygen kit
2024-09-26 14:00	Goat River 3.5km	49.1917843	-116.3443565	7.81	57.8	73	14.1	0.72		10	22.5	DO from CHEMets Dissolved Oxygen kit
2024-10-25 14:10	Goat River 3.5km	49.1917843	-116.3443565	7.53	42.8	70.1	4.6	0.42		11	13	DO from CHEMets Dissolved Oxygen kit

Lab Results Appendix

CARO lab results 2022 (11 pages)

CARO lab results 2023 (9 pages)

ALS lab results 2024 (3 pages)

CERTIFICATE OF ANALYSIS

REPORTED TO	Wildsight (Creston) PO Box 1001 Creston, BC V0B 1G0		
ATTENTION	Melissa Flint	**WORK ORDER**	22I1097
PO NUMBER		**RECEIVED / TEMP**	2022-09-07 14:30 / 5.8°C
PROJECT	WCVB Goat River	**REPORTED**	2022-10-13 08:41
PROJECT INFO		**COC NUMBER**	B122634

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

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If you have any questions or concerns, please contact me at TeamCaro@caro.ca

Authorized By:

Team CARO
Client Service Representative

TEST RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	22I1097
PROJECT	WCVB Goat River	**REPORTED**	2022-10-13 08:41

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
GOA01 (22I1097-01) | Matrix: Water | Sampled: 2022-09-05 11:30						
Anions						
Nitrate (as N)	< 0.010	3	0.010	mg/L	2022-09-13	HT1
Nitrite (as N)	< 0.010	0.02	0.010	mg/L	2022-09-13	HT1
Phosphate (as P)	< 0.0100	N/A	0.0050	mg/L	2022-09-13	HT1
Calculated Parameters						
Hardness, Total (as CaCO3)	**35.7**	N/A	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	**46.2**	10	1.0	mg/L	2022-09-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Bicarbonate (as CaCO3)	**46.2**	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2022-09-13	
Phosphorus, Total (as P)	< 0.0050	0.005	0.0050	mg/L	2022-09-12	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2022-09-12	
Solids, Total Suspended	< 2.0	N/A	2.0	mg/L	2022-09-13	HT1
Total Metals						
Aluminum, total	**0.0096**	N/A	0.0050	mg/L	2022-09-11	
Antimony, total	< 0.00020	0.009	0.00020	mg/L	2022-09-11	
Arsenic, total	< 0.00050	0.005	0.00050	mg/L	2022-09-11	
Barium, total	**0.0127**	1	0.0050	mg/L	2022-09-11	
Beryllium, total	< 0.00010	0.00013	0.00010	mg/L	2022-09-11	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2022-09-11	
Boron, total	< 0.0500	1.2	0.0500	mg/L	2022-09-11	
Cadmium, total	< 0.000010	N/A	0.000010	mg/L	2022-09-11	
Calcium, total	**9.44**	N/A	0.20	mg/L	2022-09-11	
Chromium, total	< 0.00050	N/A	0.00050	mg/L	2022-09-11	
Cobalt, total	< 0.00010	0.004	0.00010	mg/L	2022-09-11	
Copper, total	< 0.00040	0.002	0.00040	mg/L	2022-09-11	
Iron, total	**0.027**	1	0.010	mg/L	2022-09-11	
Lead, total	< 0.00020	0.003	0.00020	mg/L	2022-09-11	
Lithium, total	**0.00045**	N/A	0.00010	mg/L	2022-09-11	
Magnesium, total	**2.94**	N/A	0.010	mg/L	2022-09-11	
Manganese, total	**0.00233**	0.61	0.00020	mg/L	2022-09-11	
Molybdenum, total	**0.00044**	1	0.00010	mg/L	2022-09-11	
Nickel, total	< 0.00040	0.025	0.00040	mg/L	2022-09-11	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2022-09-11	
Potassium, total	**0.47**	N/A	0.10	mg/L	2022-09-11	
Selenium, total	< 0.00050	0.001	0.00050	mg/L	2022-09-11	
Silicon, total	**4.3**	N/A	1.0	mg/L	2022-09-11	

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	22I1097
PROJECT	WCVB Goat River	**REPORTED**	2022-10-13 08:41

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
GOA01 (22I1097-01) | Matrix: Water | Sampled: 2022-09-05 11:30, Continued						
Total Metals, Continued						
Silver, total	< 0.000050	0.00005	0.000050	mg/L	2022-09-11	
Sodium, total	**1.90**	N/A	0.10	mg/L	2022-09-11	
Strontium, total	**0.0340**	N/A	0.0010	mg/L	2022-09-11	
Sulfur, total	< 3.0	N/A	3.0	mg/L	2022-09-11	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2022-09-11	
Thallium, total	< 0.000020	0.008	0.000020	mg/L	2022-09-11	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2022-09-11	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2022-09-11	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2022-09-11	
Tungsten, total	< 0.0002	N/A	0.0002	mg/L	2022-09-11	
Uranium, total	**0.000375**	0.0085	0.000020	mg/L	2022-09-11	
Vanadium, total	< 0.0050	N/A	0.0050	mg/L	2022-09-11	
Zinc, total	< 0.0040	0.0075	0.0040	mg/L	2022-09-11	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2022-09-11	
GOA01 A (22I1097-02) | Matrix: Water | Sampled: 2022-09-05 11:30						
General Parameters						
Alkalinity, Total (as CaCO3)	< 1.0	10	1.0	mg/L	2022-09-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
GOA02 (22I1097-03) | Matrix: Water | Sampled: 2022-09-05 14:30						
Anions						
Nitrate (as N)	< 0.010	3	0.010	mg/L	2022-09-13	HT1
Nitrite (as N)	< 0.010	0.02	0.010	mg/L	2022-09-13	HT1
Phosphate (as P)	< 0.0100	N/A	0.0050	mg/L	2022-09-13	HT1
Calculated Parameters						
Hardness, Total (as CaCO3)	**33.3**	N/A	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	**41.6**	10	1.0	mg/L	2022-09-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Bicarbonate (as CaCO3)	**41.6**	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2022-09-13	

TEST RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	22I1097
PROJECT	WCVB Goat River	**REPORTED**	2022-10-13 08:41

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
GOA02 (22I1097-03) | Matrix: Water | Sampled: 2022-09-05 14:30, Continued						
General Parameters, Continued						
Phosphorus, Total (as P)	< 0.0050	0.005	0.0050	mg/L	2022-09-12	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2022-09-12	
Solids, Total Suspended	< 2.0	N/A	2.0	mg/L	2022-09-13	HT1
Total Metals						
Aluminum, total	**0.0100**	N/A	0.0050	mg/L	2022-09-11	
Antimony, total	< 0.00020	0.009	0.00020	mg/L	2022-09-11	
Arsenic, total	< 0.00050	0.005	0.00050	mg/L	2022-09-11	
Barium, total	**0.0136**	1	0.0050	mg/L	2022-09-11	
Beryllium, total	< 0.00010	0.00013	0.00010	mg/L	2022-09-11	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2022-09-11	
Boron, total	< 0.0500	1.2	0.0500	mg/L	2022-09-11	
Cadmium, total	< 0.000010	N/A	0.000010	mg/L	2022-09-11	
Calcium, total	**8.61**	N/A	0.20	mg/L	2022-09-11	
Chromium, total	< 0.00050	N/A	0.00050	mg/L	2022-09-11	
Cobalt, total	< 0.00010	0.004	0.00010	mg/L	2022-09-11	
Copper, total	< 0.00040	0.002	0.00040	mg/L	2022-09-11	
Iron, total	< 0.010	1	0.010	mg/L	2022-09-11	
Lead, total	< 0.00020	0.003	0.00020	mg/L	2022-09-11	
Lithium, total	**0.00049**	N/A	0.00010	mg/L	2022-09-11	
Magnesium, total	**2.86**	N/A	0.010	mg/L	2022-09-11	
Manganese, total	**0.00054**	0.61	0.00020	mg/L	2022-09-11	
Molybdenum, total	**0.00055**	1	0.00010	mg/L	2022-09-11	
Nickel, total	< 0.00040	0.025	0.00040	mg/L	2022-09-11	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2022-09-11	
Potassium, total	**0.37**	N/A	0.10	mg/L	2022-09-11	
Selenium, total	< 0.00050	0.001	0.00050	mg/L	2022-09-11	
Silicon, total	**3.9**	N/A	1.0	mg/L	2022-09-11	
Silver, total	< 0.000050	0.00005	0.000050	mg/L	2022-09-11	
Sodium, total	**1.31**	N/A	0.10	mg/L	2022-09-11	
Strontium, total	**0.0318**	N/A	0.0010	mg/L	2022-09-11	
Sulfur, total	< 3.0	N/A	3.0	mg/L	2022-09-11	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2022-09-11	
Thallium, total	< 0.000020	0.008	0.000020	mg/L	2022-09-11	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2022-09-11	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2022-09-11	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2022-09-11	
Tungsten, total	< 0.0002	N/A	0.0002	mg/L	2022-09-11	
Uranium, total	**0.000375**	0.0085	0.000020	mg/L	2022-09-11	
Vanadium, total	< 0.0050	N/A	0.0050	mg/L	2022-09-11	
Zinc, total	< 0.0040	0.0075	0.0040	mg/L	2022-09-11	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2022-09-11	

TEST RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	22I1097
PROJECT	WCVB Goat River	**REPORTED**	2022-10-13 08:41

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
GOA02 A (22I1097-04) | Matrix: Water | Sampled: 2022-09-05 14:30						
General Parameters						
Alkalinity, Total (as CaCO3)	39.5	10	1.0	mg/L	2022-09-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Bicarbonate (as CaCO3)	**39.5**	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2022-09-11	

Sample Qualifiers:

HT1 The sample was prepared and/or analyzed past the recommended holding time.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	22I1097
PROJECT	WCVB Goat River	**REPORTED**	2022-10-13 08:41

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H2SO4	✓	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	✓	Kelowna
Hardness in Water	SM 2340 B* (2017)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	✓	N/A
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2017)	Block Digestion and Flow Injection Analysis	✓	Kelowna
Phosphorus, Total Dissolved in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2017)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2017)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Solids, Total Suspended in Water	Solids in Water, Filtered / SM 2540 D* (2017)	Solids in Water, Filtered / Gravimetry (Dried at 103-105C)	✓	Kelowna
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
Long-term Average	
mg/L	Milligrams per litre
Short-term Maximum	
Working Guideline	
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

Guidelines Referenced in this Report:

BC Water Quality Guidelines - Freshwater Aquatic Life

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	22I1097
PROJECT	WCVB Goat River	**REPORTED**	2022-10-13 08:41

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued or once samples expire, whichever comes first. Longer hold is possible if agreed to in writing.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:TeamCaro@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline (s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	22I1097
PROJECT	WCVB Goat River	**REPORTED**	2022-10-13 08:41

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B2I1027										
Blank (B2I1027-BLK1)				Prepared: 2022-09-13, Analyzed: 2022-09-13						
Nitrate (as N)	< 0.005	0.005	mg/L							
Nitrite (as N)	< 0.005	0.005	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Blank (B2I1027-BLK2)				Prepared: 2022-09-13, Analyzed: 2022-09-13						
Nitrate (as N)	< 0.005	0.005	mg/L							
Nitrite (as N)	< 0.005	0.005	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Blank (B2I1027-BLK3)				Prepared: 2022-09-13, Analyzed: 2022-09-13						
Nitrate (as N)	< 0.005	0.005	mg/L							
Nitrite (as N)	< 0.005	0.005	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Blank (B2I1027-BLK4)				Prepared: 2022-09-14, Analyzed: 2022-09-14						
Nitrate (as N)	< 0.005	0.005	mg/L							
Nitrite (as N)	< 0.005	0.005	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Blank (B2I1027-BLK5)				Prepared: 2022-09-14, Analyzed: 2022-09-14						
Nitrate (as N)	< 0.005	0.005	mg/L							
Nitrite (as N)	< 0.005	0.005	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
LCS (B2I1027-BS1)				Prepared: 2022-09-13, Analyzed: 2022-09-13						
Nitrate (as N)	3.79	0.005	mg/L	4.00		95	90-110			
Nitrite (as N)	2.08	0.005	mg/L	2.00		104	85-115			
Phosphate (as P)	0.848	0.0050	mg/L	1.00		85	80-120			
LCS (B2I1027-BS2)				Prepared: 2022-09-13, Analyzed: 2022-09-13						
Nitrate (as N)	3.99	0.005	mg/L	4.00		100	90-110			
Nitrite (as N)	2.19	0.005	mg/L	2.00		110	85-115			
Phosphate (as P)	0.852	0.0050	mg/L	1.00		85	80-120			
LCS (B2I1027-BS3)				Prepared: 2022-09-13, Analyzed: 2022-09-13						
Nitrate (as N)	3.79	0.005	mg/L	4.00		95	90-110			
Nitrite (as N)	1.94	0.005	mg/L	2.00		97	85-115			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO Wildsight (Creston)
PROJECT WCVB Goat River

WORK ORDER 22I1097
REPORTED 2022-10-13 08:41

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B2I1027, Continued										
LCS (B2I1027-BS3), Continued				Prepared: 2022-09-13, Analyzed: 2022-09-13						
Phosphate (as P)	0.944	0.0050	mg/L	1.00		94	80-120			
LCS (B2I1027-BS4)				Prepared: 2022-09-14, Analyzed: 2022-09-14						
Nitrate (as N)	3.98	0.005	mg/L	4.00		100	90-110			
Nitrite (as N)	2.03	0.005	mg/L	2.00		102	85-115			
Phosphate (as P)	0.968	0.0050	mg/L	1.00		97	80-120			
LCS (B2I1027-BS5)				Prepared: 2022-09-14, Analyzed: 2022-09-14						
Nitrate (as N)	3.88	0.005	mg/L	4.00		97	90-110			
Nitrite (as N)	1.83	0.005	mg/L	2.00		91	85-115			
Phosphate (as P)	0.914	0.0050	mg/L	1.00		91	80-120			
General Parameters, Batch B2I1082										
Blank (B2I1082-BLK1)				Prepared: 2022-09-11, Analyzed: 2022-09-11						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Blank (B2I1082-BLK2)				Prepared: 2022-09-11, Analyzed: 2022-09-11						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
LCS (B2I1082-BS1)				Prepared: 2022-09-11, Analyzed: 2022-09-11						
Alkalinity, Total (as CaCO3)	112	1.0	mg/L	100		112	80-120			
LCS (B2I1082-BS2)				Prepared: 2022-09-11, Analyzed: 2022-09-11						
Alkalinity, Total (as CaCO3)	107	1.0	mg/L	100		107	80-120			
General Parameters, Batch B2I1094										
Blank (B2I1094-BLK1)				Prepared: 2022-09-11, Analyzed: 2022-09-13						
Nitrogen, Total Kjeldahl	< 0.050	0.050	mg/L							
Blank (B2I1094-BLK2)				Prepared: 2022-09-11, Analyzed: 2022-09-13						
Nitrogen, Total Kjeldahl	< 0.050	0.050	mg/L							
LCS (B2I1094-BS1)				Prepared: 2022-09-11, Analyzed: 2022-09-13						
Nitrogen, Total Kjeldahl	1.02	0.050	mg/L	1.00		102	85-115			
LCS (B2I1094-BS2)				Prepared: 2022-09-11, Analyzed: 2022-09-13						
Nitrogen, Total Kjeldahl	1.02	0.050	mg/L	1.00		102	85-115			
General Parameters, Batch B2I1136										
Blank (B2I1136-BLK1)				Prepared: 2022-09-12, Analyzed: 2022-09-12						
Phosphorus, Total Dissolved	< 0.0050	0.0050	mg/L							
Blank (B2I1136-BLK2)				Prepared: 2022-09-12, Analyzed: 2022-09-12						
Phosphorus, Total (as P)	< 0.0050	0.0050	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	22I1097
PROJECT	WCVB Goat River	**REPORTED**	2022-10-13 08:41

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B2I1136, Continued										
Blank (B2I1136-BLK3)				Prepared: 2022-09-12, Analyzed: 2022-09-12						
Phosphorus, Total (as P)	< 0.0050	0.0050	mg/L							
Phosphorus, Total Dissolved	< 0.0050	0.0050	mg/L							
LCS (B2I1136-BS1)				Prepared: 2022-09-12, Analyzed: 2022-09-12						
Phosphorus, Total Dissolved	0.108	0.0050	mg/L	0.100		108	85-115			
LCS (B2I1136-BS2)				Prepared: 2022-09-12, Analyzed: 2022-09-12						
Phosphorus, Total (as P)	0.110	0.0050	mg/L	0.100		110	85-115			
LCS (B2I1136-BS3)				Prepared: 2022-09-12, Analyzed: 2022-09-12						
Phosphorus, Total (as P)	0.110	0.0050	mg/L	0.100		110	85-115			
Phosphorus, Total Dissolved	0.110	0.0050	mg/L	0.100		110	85-115			
Duplicate (B2I1136-DUP3)		Source: 22I1097-01		Prepared: 2022-09-12, Analyzed: 2022-09-12						
Phosphorus, Total (as P)	< 0.0050	0.0050	mg/L		< 0.0050				15	
Phosphorus, Total Dissolved	< 0.0050	0.0050	mg/L		< 0.0050				15	
Matrix Spike (B2I1136-MS3)		Source: 22I1097-01		Prepared: 2022-09-12, Analyzed: 2022-09-12						
Phosphorus, Total (as P)	0.107	0.0050	mg/L	0.102	< 0.0050	100	70-125			
Phosphorus, Total Dissolved	0.111	0.0050	mg/L	0.102	< 0.0050	105	70-125			
General Parameters, Batch B2I1296										
Blank (B2I1296-BLK1)				Prepared: 2022-09-13, Analyzed: 2022-09-13						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B2I1296-BS1)				Prepared: 2022-09-13, Analyzed: 2022-09-13						
Solids, Total Suspended	90.0	10.0	mg/L	100		90	85-115			
Total Metals, Batch B2I1085										
Blank (B2I1085-BLK1)				Prepared: 2022-09-11, Analyzed: 2022-09-11						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0500	0.0500	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	22I1097
PROJECT	WCVB Goat River	**REPORTED**	2022-10-13 08:41

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B2I1085, Continued										
Blank (B2I1085-BLK1), Continued				Prepared: 2022-09-11, Analyzed: 2022-09-11						
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0002	0.0002	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0050	0.0050	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
LCS (B2I1085-BS1)				Prepared: 2022-09-11, Analyzed: 2022-09-11						
Aluminum, total	4.07	0.0050	mg/L	4.00		102	80-120			
Antimony, total	0.0386	0.00020	mg/L	0.0400		97	80-120			
Arsenic, total	0.0401	0.00050	mg/L	0.0400		100	80-120			
Barium, total	0.0382	0.0050	mg/L	0.0400		95	80-120			
Beryllium, total	0.0406	0.00010	mg/L	0.0400		102	80-120			
Bismuth, total	0.0389	0.00010	mg/L	0.0400		97	80-120			
Boron, total	< 0.0500	0.0500	mg/L	0.0400		104	80-120			
Cadmium, total	0.0392	0.000010	mg/L	0.0400		98	80-120			
Calcium, total	3.93	0.20	mg/L	4.00		98	80-120			
Chromium, total	0.0408	0.00050	mg/L	0.0400		102	80-120			
Cobalt, total	0.0403	0.00010	mg/L	0.0400		101	80-120			
Copper, total	0.0404	0.00040	mg/L	0.0400		101	80-120			
Iron, total	4.01	0.010	mg/L	4.00		100	80-120			
Lead, total	0.0391	0.00020	mg/L	0.0400		98	80-120			
Lithium, total	0.0408	0.00010	mg/L	0.0400		102	80-120			
Magnesium, total	4.12	0.010	mg/L	4.00		103	80-120			
Manganese, total	0.0404	0.00020	mg/L	0.0400		101	80-120			
Molybdenum, total	0.0392	0.00010	mg/L	0.0400		98	80-120			
Nickel, total	0.0395	0.00040	mg/L	0.0400		99	80-120			
Phosphorus, total	4.00	0.050	mg/L	4.00		100	80-120			
Potassium, total	3.95	0.10	mg/L	4.00		99	80-120			
Selenium, total	0.0396	0.00050	mg/L	0.0400		99	80-120			
Silicon, total	4.3	1.0	mg/L	4.00		107	80-120			
Silver, total	0.0400	0.000050	mg/L	0.0400		100	80-120			
Sodium, total	4.12	0.10	mg/L	4.00		103	80-120			
Strontium, total	0.0396	0.0010	mg/L	0.0400		99	80-120			
Sulfur, total	41.5	3.0	mg/L	40.0		104	80-120			
Tellurium, total	0.0385	0.00050	mg/L	0.0400		96	80-120			
Thallium, total	0.0382	0.000020	mg/L	0.0400		95	80-120			
Thorium, total	0.0387	0.00010	mg/L	0.0400		97	80-120			
Tin, total	0.0395	0.00020	mg/L	0.0400		99	80-120			
Titanium, total	0.0409	0.0050	mg/L	0.0400		102	80-120			
Tungsten, total	0.0400	0.0002	mg/L	0.0400		100	80-120			
Uranium, total	0.0386	0.000020	mg/L	0.0400		97	80-120			
Vanadium, total	0.0397	0.0050	mg/L	0.0400		99	80-120			
Zinc, total	0.0379	0.0040	mg/L	0.0400		95	80-120			
Zirconium, total	0.0393	0.00010	mg/L	0.0400		98	80-120			

CERTIFICATE OF ANALYSIS

REPORTED TO	Wildsight (Creston) PO Box 1001 Creston, BC V0B 1G0		
ATTENTION	Melissa Flint	**WORK ORDER**	23J0845
PO NUMBER		**RECEIVED / TEMP**	2023-10-06 16:00 / 16.4°C
PROJECT	WCVB Goat River	**REPORTED**	2023-10-16 10:44
PROJECT INFO		**COC NUMBER**	B134819

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: https://www.caro.ca/terms-conditions

If you have any questions or concerns, please contact me at TeamCaro@caro.ca

Authorized By:

Team CARO
Client Service Representative

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	23J0845
PROJECT	WCVB Goat River	**REPORTED**	2023-10-16 10:44

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
GOA01 (23J0845-01) | Matrix: Water | Sampled: 2023-10-02 14:15						
Anions						
Nitrate (as N)	< 0.010	3	0.010	mg/L	2023-10-09	HT1
Nitrite (as N)	< 0.010	0.02	0.010	mg/L	2023-10-09	HT1
Phosphate (as P)	**0.0085**	N/A	0.0050	mg/L	2023-10-09	HT1
Calculated Parameters						
Hardness, Total (as CaCO3)	**36.6**	N/A	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	**36.5**	10	1.0	mg/L	2023-10-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-10-11	
Alkalinity, Bicarbonate (as CaCO3)	**36.5**	N/A	1.0	mg/L	2023-10-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-10-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-10-11	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2023-10-14	
Phosphorus, Total (as P)	< 0.0050	0.005	0.0050	mg/L	2023-10-12	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2023-10-12	
Solids, Total Suspended	< 10.0	N/A	2.0	mg/L	2023-10-14	HT1, RS2
Total Metals						
Aluminum, total	< 0.0050	N/A	0.0050	mg/L	2023-10-12	
Antimony, total	< 0.00020	0.009	0.00020	mg/L	2023-10-12	
Arsenic, total	< 0.00050	0.005	0.00050	mg/L	2023-10-12	
Barium, total	**0.0118**	1	0.0050	mg/L	2023-10-12	
Beryllium, total	< 0.00010	0.00013	0.00010	mg/L	2023-10-12	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2023-10-12	
Boron, total	< 0.0500	1.2	0.0500	mg/L	2023-10-12	
Cadmium, total	< 0.000010	N/A	0.000010	mg/L	2023-10-12	
Calcium, total	**9.66**	N/A	0.20	mg/L	2023-10-12	
Chromium, total	< 0.00050	N/A	0.00050	mg/L	2023-10-12	
Cobalt, total	< 0.00010	0.004	0.00010	mg/L	2023-10-12	
Copper, total	< 0.00040	0.002	0.00040	mg/L	2023-10-12	
Iron, total	**0.021**	1	0.010	mg/L	2023-10-12	
Lead, total	< 0.00020	0.003	0.00020	mg/L	2023-10-12	
Lithium, total	**0.00037**	N/A	0.00010	mg/L	2023-10-12	
Magnesium, total	**3.02**	N/A	0.010	mg/L	2023-10-12	
Manganese, total	**0.00151**	0.61	0.00020	mg/L	2023-10-12	
Molybdenum, total	**0.00047**	1	0.00010	mg/L	2023-10-12	
Nickel, total	< 0.00040	0.025	0.00040	mg/L	2023-10-12	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2023-10-12	
Potassium, total	**0.46**	N/A	0.10	mg/L	2023-10-12	
Selenium, total	< 0.00050	0.001	0.00050	mg/L	2023-10-12	
Silicon, total	**3.9**	N/A	1.0	mg/L	2023-10-12	

TEST RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	23J0845
PROJECT	WCVB Goat River	**REPORTED**	2023-10-16 10:44

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
GOA01 (23J0845-01) | Matrix: Water | Sampled: 2023-10-02 14:15, Continued						
Total Metals, Continued						
Silver, total	< 0.000050	0.00005	0.000050	mg/L	2023-10-12	
Sodium, total	**2.08**	N/A	0.10	mg/L	2023-10-12	
Strontium, total	**0.0356**	N/A	0.0010	mg/L	2023-10-12	
Sulfur, total	< 3.0	N/A	3.0	mg/L	2023-10-12	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2023-10-12	
Thallium, total	< 0.000020	0.008	0.000020	mg/L	2023-10-12	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2023-10-12	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2023-10-12	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2023-10-12	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2023-10-12	
Uranium, total	**0.000410**	0.0085	0.000020	mg/L	2023-10-12	
Vanadium, total	< 0.0050	N/A	0.0050	mg/L	2023-10-12	
Zinc, total	< 0.0040	0.0075	0.0040	mg/L	2023-10-12	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2023-10-12	
GOA02 (23J0845-02) | Matrix: Water | Sampled: 2023-10-02 15:00						
Anions						
Nitrate (as N)	< 0.010	3	0.010	mg/L	2023-10-09	HT1
Nitrite (as N)	< 0.010	0.02	0.010	mg/L	2023-10-09	HT1
Phosphate (as P)	**0.0055**	N/A	0.0050	mg/L	2023-10-09	HT1
Calculated Parameters						
Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	**39.5**	10	1.0	mg/L	2023-10-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-10-11	
Alkalinity, Bicarbonate (as CaCO3)	**39.5**	N/A	1.0	mg/L	2023-10-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-10-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-10-11	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2023-10-14	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2023-10-12	
Solids, Total Suspended	< 10.0	N/A	2.0	mg/L	2023-10-14	HT1, RS2

Sample Qualifiers:

HT1	The sample was prepared and/or analyzed past the recommended holding time.
RS2	The Reporting Limits for this sample have been raised due to limited sample volume.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	23J0845
PROJECT	WCVB Goat River	**REPORTED**	2023-10-16 10:44

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Hardness in Water	SM 2340 B* (2021)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	✓	N/A
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
Phosphorus, Total Dissolved in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2021)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2021)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Solids, Total Suspended in Water	Solids in Water, Filtered / SM 2540 D* (2020)	Solids in Water, Filtered / Gravimetry (Dried at 103-105C)	✓	Kelowna
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
Long-term Average	
mg/L	Milligrams per litre
Short-term Maximum	
Working Guideline	
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

Guidelines Referenced in this Report:

BC Water Quality Guidelines - Freshwater Aquatic Life

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	23J0845
PROJECT	WCVB Goat River	**REPORTED**	2023-10-16 10:44

General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: TeamCaro@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	23J0845
PROJECT	WCVB Goat River	**REPORTED**	2023-10-16 10:44

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B3J0723										
Blank (B3J0723-BLK1)				Prepared: 2023-10-09, Analyzed: 2023-10-09						
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Blank (B3J0723-BLK2)				Prepared: 2023-10-10, Analyzed: 2023-10-10						
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Blank (B3J0723-BLK3)				Prepared: 2023-10-10, Analyzed: 2023-10-10						
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
LCS (B3J0723-BS1)				Prepared: 2023-10-09, Analyzed: 2023-10-09						
Nitrate (as N)	4.00	0.010	mg/L	4.00		100	90-110			
Nitrite (as N)	1.96	0.010	mg/L	2.00		98	85-115			
Phosphate (as P)	0.846	0.0050	mg/L	1.00		85	80-120			
LCS (B3J0723-BS2)				Prepared: 2023-10-10, Analyzed: 2023-10-10						
Nitrate (as N)	3.96	0.010	mg/L	4.00		99	90-110			
Nitrite (as N)	1.96	0.010	mg/L	2.00		98	85-115			
Phosphate (as P)	0.919	0.0050	mg/L	1.00		92	80-120			
LCS (B3J0723-BS3)				Prepared: 2023-10-10, Analyzed: 2023-10-10						
Nitrate (as N)	4.09	0.010	mg/L	4.00		102	90-110			
Nitrite (as N)	1.96	0.010	mg/L	2.00		98	85-115			
Phosphate (as P)	1.07	0.0050	mg/L	1.00		107	80-120			
General Parameters, Batch B3J0967										
Blank (B3J0967-BLK1)				Prepared: 2023-10-11, Analyzed: 2023-10-11						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	23J0845
PROJECT	WCVB Goat River	**REPORTED**	2023-10-16 10:44

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B3J0967, Continued										
Blank (B3J0967-BLK1), Continued				Prepared: 2023-10-11, Analyzed: 2023-10-11						
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Blank (B3J0967-BLK2)				Prepared: 2023-10-11, Analyzed: 2023-10-11						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Blank (B3J0967-BLK3)				Prepared: 2023-10-11, Analyzed: 2023-10-11						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
LCS (B3J0967-BS1)				Prepared: 2023-10-11, Analyzed: 2023-10-11						
Alkalinity, Total (as CaCO3)	109	1.0	mg/L	100		109	80-120			
Alkalinity, Phenolphthalein (as CaCO3)	50.5	1.0	mg/L	50.0		101	0-200			
LCS (B3J0967-BS2)				Prepared: 2023-10-11, Analyzed: 2023-10-11						
Alkalinity, Total (as CaCO3)	110	1.0	mg/L	100		110	80-120			
Alkalinity, Phenolphthalein (as CaCO3)	42.6	1.0	mg/L	50.0		85	0-200			
LCS (B3J0967-BS3)				Prepared: 2023-10-11, Analyzed: 2023-10-11						
Alkalinity, Total (as CaCO3)	109	1.0	mg/L	100		109	80-120			
Alkalinity, Phenolphthalein (as CaCO3)	37.7	1.0	mg/L	50.0		75	0-200			
General Parameters, Batch B3J0991										
Blank (B3J0991-BLK1)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Phosphorus, Total (as P)	< 0.0050	0.0050	mg/L							
Blank (B3J0991-BLK2)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Phosphorus, Total (as P)	< 0.0050	0.0050	mg/L							
Blank (B3J0991-BLK3)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Phosphorus, Total (as P)	< 0.0050	0.0050	mg/L							
Blank (B3J0991-BLK4)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Phosphorus, Total (as P)	< 0.0050	0.0050	mg/L							
Phosphorus, Total Dissolved	< 0.0050	0.0050	mg/L							
Blank (B3J0991-BLK5)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Phosphorus, Total (as P)	< 0.0050	0.0050	mg/L							
Phosphorus, Total Dissolved	< 0.0050	0.0050	mg/L							
LCS (B3J0991-BS1)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Phosphorus, Total (as P)	0.101	0.0050	mg/L	0.100		101	85-115			
LCS (B3J0991-BS2)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Phosphorus, Total (as P)	0.101	0.0050	mg/L	0.100		101	85-115			
LCS (B3J0991-BS3)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Phosphorus, Total (as P)	0.103	0.0050	mg/L	0.100		103	85-115			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	23J0845
PROJECT	WCVB Goat River	**REPORTED**	2023-10-16 10:44

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B3J0991, Continued										
LCS (B3J0991-BS4)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Phosphorus, Total (as P)	0.102	0.0050	mg/L	0.100		102	85-115			
Phosphorus, Total Dissolved	0.102	0.0050	mg/L	0.100		102	85-115			
LCS (B3J0991-BS5)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Phosphorus, Total (as P)	0.104	0.0050	mg/L	0.100		104	85-115			
Phosphorus, Total Dissolved	0.103	0.0050	mg/L	0.100		103	85-115			
General Parameters, Batch B3J1200										
Blank (B3J1200-BLK2)				Prepared: 2023-10-13, Analyzed: 2023-10-14						
Nitrogen, Total Kjeldahl	< 0.050	0.050	mg/L							
LCS (B3J1200-BS2)				Prepared: 2023-10-13, Analyzed: 2023-10-14						
Nitrogen, Total Kjeldahl	0.986	0.050	mg/L	1.00		99	85-115			
General Parameters, Batch B3J1287										
Blank (B3J1287-BLK1)				Prepared: 2023-10-14, Analyzed: 2023-10-14						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B3J1287-BS1)				Prepared: 2023-10-14, Analyzed: 2023-10-14						
Solids, Total Suspended	115	10.0	mg/L	100		115	85-115			
Total Metals, Batch B3J0950										
Blank (B3J0950-BLK1)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0500	0.0500	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Wildsight (Creston)	**WORK ORDER**	23J0845
PROJECT	WCVB Goat River	**REPORTED**	2023-10-16 10:44

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B3J0950, Continued										
Blank (B3J0950-BLK1), Continued				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0050	0.0050	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
LCS (B3J0950-BS1)				Prepared: 2023-10-11, Analyzed: 2023-10-12						
Aluminum, total	3.94	0.0050	mg/L	4.00		98	80-120			
Antimony, total	0.0392	0.00020	mg/L	0.0400		98	80-120			
Arsenic, total	0.400	0.00050	mg/L	0.400		100	80-120			
Barium, total	0.0391	0.0050	mg/L	0.0400		98	80-120			
Beryllium, total	0.0379	0.00010	mg/L	0.0400		95	80-120			
Bismuth, total	0.0387	0.00010	mg/L	0.0400		97	80-120			
Boron, total	0.390	0.0500	mg/L	0.400		97	80-120			
Cadmium, total	0.0391	0.000010	mg/L	0.0400		98	80-120			
Calcium, total	3.91	0.20	mg/L	4.00		98	80-120			
Chromium, total	0.0410	0.00050	mg/L	0.0400		102	80-120			
Cobalt, total	0.0406	0.00010	mg/L	0.0400		102	80-120			
Copper, total	0.0410	0.00040	mg/L	0.0400		102	80-120			
Iron, total	4.08	0.010	mg/L	4.00		102	80-120			
Lead, total	0.0389	0.00020	mg/L	0.0400		97	80-120			
Lithium, total	0.0370	0.00010	mg/L	0.0400		93	80-120			
Magnesium, total	3.91	0.010	mg/L	4.00		98	80-120			
Manganese, total	0.0406	0.00020	mg/L	0.0400		102	80-120			
Molybdenum, total	0.0384	0.00010	mg/L	0.0400		96	80-120			
Nickel, total	0.0413	0.00040	mg/L	0.0400		103	80-120			
Phosphorus, total	3.92	0.050	mg/L	4.00		98	80-120			
Potassium, total	3.89	0.10	mg/L	4.00		97	80-120			
Selenium, total	0.398	0.00050	mg/L	0.400		99	80-120			
Silicon, total	4.0	1.0	mg/L	4.00		101	80-120			
Silver, total	0.0388	0.000050	mg/L	0.0400		97	80-120			
Sodium, total	4.03	0.10	mg/L	4.00		101	80-120			
Strontium, total	0.0397	0.0010	mg/L	0.0400		99	80-120			
Sulfur, total	38.7	3.0	mg/L	40.0		97	80-120			
Tellurium, total	0.0363	0.00050	mg/L	0.0400		91	80-120			
Thallium, total	0.0395	0.000020	mg/L	0.0400		99	80-120			
Thorium, total	0.0399	0.00010	mg/L	0.0400		100	80-120			
Tin, total	0.0393	0.00020	mg/L	0.0400		98	80-120			
Titanium, total	0.0404	0.0050	mg/L	0.0400		101	80-120			
Tungsten, total	0.0403	0.0010	mg/L	0.0400		101	80-120			
Uranium, total	0.0396	0.000020	mg/L	0.0400		99	80-120			
Vanadium, total	0.0404	0.0050	mg/L	0.0400		101	80-120			
Zinc, total	0.398	0.0040	mg/L	0.400		99	80-120			
Zirconium, total	0.0403	0.00010	mg/L	0.0400		101	80-120			

CERTIFICATE OF ANALYSIS

Work Order	: **CG2414382**		
Amendment	: **1**		
Client	: **Cash Clients Canada**	Laboratory	: ALS Environmental - Calgary
Contact	: Melissa Flint	Account Manager	: Gulraj Dhanaua
Address	: 2559 29 Street NE Calgary Alberta Canada T1Y 7B5	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: ----	Telephone	: +1 403 407 1800
Project	: ----	Date Samples Received	: 02-Oct-2024 09:40
PO	: ----	Date Analysis Commenced	: 03-Oct-2024
C-O-C number	: ----	Issue Date	: 03-Dec-2024 09:40
Sampler	: MELISSA FLINT		
Site	: Wildsight Creston Valley Branch Surface Water Monitoring		
Quote number	: VA24-CASH100-048		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Harpreet Chawla	Team Leader - Inorganics	Metals, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Leon Yang	Analyst	Inorganics, Burnaby, British Columbia
Logan Carroll	Laboratory Analyst	Inorganics, Edmonton, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/L	milligrams per litre

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: Surface Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	GOA01 (49.0807, -116.051907)	GOA02 (49.1917, -116.3443565)	SUM01 (49.143608, -116.66195)	----	----
Client sample ID									
Client sampling date / time					01-Oct-2024 08:15	01-Oct-2024 07:35	01-Oct-2024 08:45	----	----
					CG2414382-001	CG2414382-002	CG2414382-003	----	----
					Result	Result	Result	----	----
Physical Tests									
Alkalinity, total (as CaCO3)	----	E290/CG	1.0	mg/L	40.6	34.2	50.5	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/CG	0.50	mg/L	37.0	34.7	50.6	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	<3.0	----	----
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	0.0072	----	----
Chloride	16887-00-6	E235.Cl/CG	0.50	mg/L	----	----	1.28	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	0.033	0.031	0.040	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	0.0027	<0.0010	<0.0010	----	----
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	0.0021	<0.0020	<0.0020	----	----
Phosphorus, total dissolved	7723-14-0	E375-U/EO	0.0010	mg/L	0.0032	----	<0.0010	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/CG	0.0050	mg/L	<0.0051	<0.0051	<0.0051	----	----
Total Metals									
Aluminum, total	7429-90-5	E420/CG	0.0030	mg/L	0.0055	0.0042	0.0106	----	----
Antimony, total	7440-36-0	E420/CG	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
Arsenic, total	7440-38-2	E420/CG	0.00010	mg/L	0.00035	0.00018	<0.00010	----	----
Barium, total	7440-39-3	E420/CG	0.00010	mg/L	0.0139	0.0140	0.0300	----	----
Beryllium, total	7440-41-7	E420/CG	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----
Bismuth, total	7440-69-9	E420/CG	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
Boron, total	7440-42-8	E420/CG	0.010	mg/L	<0.010	<0.010	<0.010	----	----

Analytical Results

Sub-Matrix: Surface Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	GOA01 (49.0807, -116.051907)	GOA02 (49.1917, -116.3443565)	SUM01 (49.143608, -116.66195)	----	----
					Client sampling date / time	01-Oct-2024 08:15	01-Oct-2024 07:35	01-Oct-2024 08:45	----	----
						CG2414382-001	CG2414382-002	CG2414382-003	----	----
						Result	Result	Result	----	----
Total Metals										
Cadmium, total	7440-43-9	E420/CG	0.0000050	mg/L		<0.0000050	<0.0000050	0.0000056	----	----
Calcium, total	7440-70-2	E420/CG	0.050	mg/L		9.30	8.49	13.8	----	----
Cesium, total	7440-46-2	E420/CG	0.000010	mg/L		<0.000010	0.000019	0.000038	----	----
Chromium, total	7440-47-3	E420/CG	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Cobalt, total	7440-48-4	E420/CG	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Copper, total	7440-50-8	E420/CG	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Iron, total	7439-89-6	E420/CG	0.010	mg/L		0.031	<0.010	<0.010	----	----
Lead, total	7439-92-1	E420/CG	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Lithium, total	7439-93-2	E420/CG	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
Magnesium, total	7439-95-4	E420/CG	0.0050	mg/L		3.34	3.28	3.93	----	----
Manganese, total	7439-96-5	E420/CG	0.00010	mg/L		0.00103	0.00040	0.00050	----	----
Molybdenum, total	7439-98-7	E420/CG	0.000050	mg/L		0.000415	0.000528	0.000268	----	----
Nickel, total	7440-02-0	E420/CG	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Phosphorus, total	7723-14-0	E420/CG	0.050	mg/L		<0.050	<0.050	<0.050	----	----
Potassium, total	7440-09-7	E420/CG	0.050	mg/L		0.499	0.380	1.20	----	----
Rubidium, total	7440-17-7	E420/CG	0.00020	mg/L		0.00068	0.00062	0.00158	----	----
Selenium, total	7782-49-2	E420/CG	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Silicon, total	7440-21-3	E420/CG	0.10	mg/L		4.11	3.96	4.59	----	----
Silver, total	7440-22-4	E420/CG	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Sodium, total	7440-23-5	E420/CG	0.050	mg/L		2.24	1.49	2.42	----	----
Strontium, total	7440-24-6	E420/CG	0.00020	mg/L		0.0390	0.0357	0.0568	----	----

Analytical Results

Sub-Matrix: Surface Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	GOA01 (49.0807, -116.051907)	GOA02 (49.1917, -116.3443565)	SUM01 (49.143608, -116.66195)	----	----
					Client sampling date / time	01-Oct-2024 08:15	01-Oct-2024 07:35	01-Oct-2024 08:45	----	----
						CG2414382-001	CG2414382-002	CG2414382-003	----	----
						Result	Result	Result	----	----
Total Metals										
Sulfur, total	7704-34-9	E420/CG	0.50	mg/L		1.18	0.94	2.13	----	----
Tellurium, total	13494-80-9	E420/CG	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----
Thallium, total	7440-28-0	E420/CG	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Thorium, total	7440-29-1	E420/CG	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Tin, total	7440-31-5	E420/CG	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Titanium, total	7440-32-6	E420/CG	0.00030	mg/L		<0.00030	<0.00030	<0.00030	----	----
Tungsten, total	7440-33-7	E420/CG	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Uranium, total	7440-61-1	E420/CG	0.000010	mg/L		0.000360	0.000326	0.000300	----	----
Vanadium, total	7440-62-2	E420/CG	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Zinc, total	7440-66-6	E420/CG	0.0030	mg/L		<0.0030	<0.0030	<0.0030	----	----
Zirconium, total	7440-67-7	E420/CG	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

CRESTON VALLEY
PUBLIC LIBRARY

Creston Public Library Association Annual General Meeting

Tuesday, April 21, 2026, 7pm
@ Creston Valley Public Library
Large Library Meeting Room

Agenda:

1. Call to Order
2. Welcome and Introductions
3. Adoption of Agenda
4. Adoption of Minutes of 2025 AGM
5. Chairperson's Report
6. Financial Report
7. New Business
    i. Nominations report
    ii. Election of Board Directors 2026-2028

All members of Creston Valley Public Library are invited to attend.
Email info@crestonlibrary.com to RSVP.

CRESTON VALLEY PUBLIC LIBRARY

Minutes of the Annual General Meeting of the Board of the Creston Valley Public Library

Date: April 15, 2025

Present:, Kathy Durnin (Chair), Alison Szpak (Treasurer),Tealia Decker, Maria Aryan, Peter Jacoby, Monique Ares (Town Rep)
Guests: Erin Carr, Megan Stager (nominee)
Staff: Pat Tomasic
Regrets: Joan Hedstrom, Osa Matthew Grey, Jordan Lysenko
Secretary: Saara Itkonen (Library Director)

Call to order: 7:08pm

Approval of Agenda

Motion to accept agenda. M/S Maria/Alison. Carried

Approval of Minutes of 2024 AGM

Motion to accept previous meeting minutes. M/S Peter/Maria. Carried

Reports

Annual Financial Report

- Erin presented the library's official financial report for 2024.
  Motion to accept the reports. M/S Alison/Tealia. Carried.

Erin left the meeting after her report.

Chairperson's Report

- In 2024 the library board added 1 new trustee, Osa.
- The board started the process of board and library policy review
- Adopted new policies including Library Trustee Code of Conduct, Collections Policy, and Library Code of Conduct
- Negotiated a 5 year collective agreement with staff
- Invested a private donation and reserve with Edward Jones, which has seen significant dividends in return.
- Thank you to the Friends who shared close to $15,000 in funds for the library in 2024!
- Said goodbye and thank you to Joan Hedstrom who served 8 years as a trustee. She served as Board Chair for 7 years, hiring our current Library Director, guiding us through COVID, and standardizing our file sharing and documentation processes. She was a constant source of support for our Library Director. Thank you for your invaluable service, Joan! The board has purchased a gift and card for Joan to thank her for her service. Saara will deliver it to Joan.

CRESTON VALLEY PUBLIC LIBRARY

Nominations Report

- Alison shared the Nominations committee report, supporting the nomination of Megan Stager. Megan spoke to the board about her background in public & social service research.

Election of Board of Directors

- Kathy presented this year's nominee, Megan Stager, to the board. Motion to approve Megan Stager as a trustee of the board. M/S. Kathy/Alison. Carried.

Trustee Term renewals

- Tealia Decker, Maria Aryan, and Peter Jacoby renewed as trustees for 2 more years. Jordan Lysenko has not renewed and has left the board.
  Motion to approve term renewals for 3 trustees. M/S. Alison/Megan. Carried.
- Vice Chair position is now vacant.

Adjourn: 7:43 pm Next meetings @ 7pm: May 20, June 17

Creston Public Library Association
Budget Expenditure Report
March 2026

Revenue	**Received to Date**	**Budget**
RDCK	$ -	$ 570,537
Province	$ -	$ 62,975
Donations	$ 1,165	$ 14,000
Library generated revenue	$ 6,870	$ 4,000
Other grants and revenues	$ 72	$ 15,000
Transfer from reserve	$ -	$ 58,961
Total	$ 8,107	$ 725,473

Expenditures	**Expense to Date**	**Budget**	**Amount Available**	**Percent Available**	**Spent in 2025**
Advertising and promotion	$ 601	$ 3,000	$ 2,399	80%	0
Books and magazines	$ 9,725	$ 59,935	$ 50,210	84%	7,093
Book supplies	$ 2,716	$ 6,500.00	$ 3,784	58%	87
Board operations	$ -	$ 300	$ 300	100%	0
Computer costs	$ 1,627	$ 20,439.00	$ 18,812	92%	2,136
Copier	$ 630	$ 3,000.00	$ 2,370	79%	672
Digital/Other collections	$ 11,722	$ 11,000.00	-$ 722	-7%	5,073
Finance expenses (accounting, etc)	$ 4,794	$ 14,040	$ 9,246	66%	2,309
Furniture and Equipment	$ 155	$ 1,000	$ 845	85%	13
Insurance	$ 3,574	$ 10,558	$ 6,984	66%	3,543
Internet	$ 385	$ 1,550	$ 1,165	75%	385
Janitor	$ 3,381	$ 15,000	$ 11,619	77%	3,305
Membership dues	$ 1,105	$ 1,200	$ 95	8%	1,281
Office supplies and shipping	$ 2,716	$ 10,740	$ 8,024	75%	87
Operations & Miscellaneous	$ -	$ 500	$ 500	100%	0
Programming supplies	$ 609	$ 4,773	$ 4,164	87%	352
Repairs and maintenance	$ 1,993	$ 13,300	$ 11,307	85%	4,916
Telephone and utilities	$ 7,525	$ 22,000	$ 14,475	66%	7,560
Travel & Training	$ 439	$ 3,300	$ 2,861	87%	83
Wages and benefits	$ 161,672	$ 523,338	$ 361,666	69%	135,238
Main Budget Total	$ 215,369	$ 725,473	$ 510,104	70%	174,133

Bank Accounts, per Trial Balance	**$ -**
Reserve/Investment Funds	**$ 217,312**

***Capital Plan Improvements**	**Est. Cost**	**Spent**
Total		

Expenditures Report Detail

			BUDGET			ACTUAL
Budget Line	**Code**	**Code Description**	**Detail**	**Line**	**Total**	
Finance Expenses					**14040**	**4794**
	5004	Payroll Expense			838	
	5005	Accountant			0	
	5006	Bookkeeper			3735	
	5020	Bank Charges & Interest & Exchange			221	
Advertising and promotion						
	5010	Advertising			**182**	**601**
Books, periodicals					**58760**	**9725**
	5045	Magazines			1745	
	5050	Books			7085	
	5051	Processing charges			855	
	5145	ILL Loss & Fines			40	
	5046	Collections - Other			0	
Board operations						
	5070	Board Operations			**200**	**0**
Book supplies						
	5060	Book Supplies			**4108**	**2716**
Computer costs					**10000**	**1627**
	2000	Computers & Equipment				
	5102	Computer Software - Public		0	763	
	5103	Computer Software - Staff			864	
	5104	Computer Hardware - Public			0	
	5105	Computer Hardware - Staff			0	
	5182	Sitka Contract			0	

Consulting fees				**0**	**0**
	5115	Consulting Fees			
Copier				**2220**	**630**
	5120	Copier Costs			
Digital Collections					**11722**
	5044	Databases/e-books		**11722**	
Insurance				**10019**	**3,574.00**
	5150	Insurance			
Internet				**3344**	**385**
	5160	Internet Costs			
Janitor				**12740**	**3381**
	5170	Janitorial Service		3152	
		White and Clean			
		Carpet cleaning			
		Rugs - Valley Wash Inn			
		Recycling (Clear Blue)			
	5171	Janitorial Equipment and Supplies		229	
	5187	COVID expense		0	
Membership dues				**1440**	**1105**
	5190	Membership Dues			
		BCLA			
		Chamber of Commerce			
		ABCPLD	500		
		BCTLA			
Equipment and furniture				**4820**	**155**
	2001	Furniture			
	5202	Library Equipment & Furniture		155	
		Replacement furniture			

	5203	Outdoor Equip & Furniture			0	
		Miscellaneous				
	2002	Fixtures				
Operations & Miscellaneous					**858**	**83**
	5185	Miscellaneous Expenses			83	
	5180	Library Operations			0	
Office supplies					**10530**	**1811**
	5055	Shipping			141	
	5201	Office Supplies			270	
	5210	Postage			0	
	5215	ILL Postage			1384	
	5200	Hygiene & First Aid			16	
Program Supplies					**4680**	**609**
	5225	Program Supplies - Adults			378	
	5227	Program Supplies - Childrens			184	
	5228	Program Supplies - Teen			47	
	5229	Program Supplies - Summer Reading			0	
Repairs and maintenance					**8944**	**1993**
	5240	Repairs & Maintenance		1000	15	
		Fire extinguishers/safety	175			
		Miscellaneous	825			
	5241	Garden & Grounds Maintenance		1600	0	
		Yardcare	1200			
		Discretionary garden funds	400			
	5242	Snow Clearing		2750	1498	
		Parking lot	2000			
		Sidewalks	750			
	5245	Security		440	480	
		Monitoring	240			
		Technician	200			
Strategic Plan Improvements					**80000**	**960.00**

		5080	Capital Plan Impovements			
			Flooring	40000		
			Teen Space	40000		0.00
Telephone and utilities					**21528**	**7525**
		5205	Phone Line/Fax		908	
		5300	Utilities-Gas		710	
		5301	Utilities-Hydro		4820	
		5302	Utilities-Water		1087	
		4155	RDCK Utility Recovery (subtract)	371.25	0	
Travel & Training					**2517**	**439**
		5290	Travel		0	
		5280	Training		439	
Wages and benefits					**440894**	**161672**
	4900	5130	Employee Benefits		10844	
		5250	Salaries		130457	
		5251	EI Expense		2977	
		5252	CPP Expense		6482	
		5255	Pension Expense		9769	
		5260	WCB Expense		1144	1,143.68

Total: 216650

Revenue Report Detail

			BUDGET			ACTUAL TO DATE	
Budget Line	**Code**	**Code Description**	**Detail**	**Line**	**Total**		**Notes**
RDCK (includes rent)					**4235939**		**0**
	4015	RDCK Grant		4235939		0	
	4155	RDCK Utility Recovery					
Province (includes Resource Sharing)					**153826**		**0**
	4021	Prov. per Capita Operating Grant				0	
	4022	Prov. Resource Sharing Grant				0	
	4023	Prov. One Card Grant				0	
	4024	Prov Literacy & Equity Grant				0	
	4025	Prov Enhancement Grant				0	
	4031	BC Cost of Living Rebate				0	
Donations					**15000**		**1165.16**
	4090	Donations - General				365.16	
	4091	Donations - Collection Development				0	
	4092	Donations - Programming				800.00	
	4093	Donations - Friends of the Library				0	
		SRC grant repayment					
		Computers					
Library Generated Revenue					**10000**		**6869.64**
	4060	Photocopier				787.45	
	4070	Fines				0	
	4075	Fundraising miscellaneous				5,880.47	
	4130	Book Replacements				201.72	
Other Grants and Revenues					**3060**		**72.38**
	4052	Miscellaneous Grants				0	
		Law Matters (expected)					
		StudentWorks	0				
	4150	Interest Earned				72.38	
	4152	E. Jones Interest & Dividends				0.00	
							8107.18

Budget Line	Code	Code Description	Amount	Total	Notes
Bank Accounts, per Trial Balance					
	1021	Cash On Hand	$ 465.00		
	1050	Credit Union - Chequing	$ -		
	1055	Credit Union - Shares	30		
		Total		**$495.00**	
(Less Reserve Funds – Donations,etc.)	1062	Investments	217312	**$217,312.25**	

CRESTON PUBLIC LIBRARY ASSOCIATION
Trial Balance March 2026

Account Description	Debits	Credits
1021 · Cash on Hand	465.00	
1050 · Creston & District Credit Union		13,021.42
1052 – CDCU Savings	180,143.08	
1055 · Credit Union - Shares	30.00	
1060 · Credit Union - Term Deposits	0.00	
1061 - Edward Jones Cash Accounts	4,943.45	
1062 - Edward Jones Investments	217,312.25	
1065 - Credit Union – Friday Fundraising	5,947.52	
1066 – Edward Jones – High Int Savings	2,177.06	
1070 · Accounts Receivable	0.00	
1080 · GST Receivable	0.00	
1090 · Prepaid Expenses & Deposits	0.00	
1095 · Accrued Interest	3,798.77	
2000 – Computers	18,220.44	
2001 - Furniture	20,086.70	
2002 - Fixtures	888.10	
2003 – Equipment	10,484.89	
2004 – Leasehold Improvements	51,495.58	
2006 – Accum Amor – Fixtures		248.67
2007 – Accum Amor – Furniture		2,374.23
2008 – Accum Amor – Equipment		2,470.76
2009 – Accum Amor – Computers		4,509.52
2011 – Accum Amoritization – Leasehold		5,149.56
2050 · Accounts Payable	200.09	
2073 – CDCU Collabria VISA	0.00	
2010 · Clearing Account	0.00	
	0.00	371.25
2051 · CPP Payable	0.00	
2052 · EI Payable	0.00	
2053 · Income Tax Payable	0.00	
2054 · Vacation Pay Payable	0.00	
2056 · WCB Payable	0.00	
2057 · Pension Payable		3,958.83
2060 · Accrued Liabilites	0.00	
2065 - Deferred Revenue		147.14
2070 · GST/HST Payable	1,645.13	
2071 · GST/QST Payable	0	
2072 · PST Payable (BC)	0	
3030 · Capital Reserve	0.00	
3060 – Equity in Tangible Capit Asse		83,816.19
3520 · Retained Earnings		556,485.27
3525 - Transfer of Reserve	0.00	
4015 · RDCK Grant	0.00	
4021 · Prov per Capita Operating Grant	0.00	
4022 · Prov Resource Sharing Grant	0.00	
4023 · Prov One Card Grant	0.00	
4024 · Prov Literacy & Equity Grant	0.00	
4025 - Prov Public Library Enhancement	0.00	

4030 - COVID 19 Relief Grant	0.00	
4031 - BC Cost of Living Rebate	0.00	
4050 – Columbia Basin Trust Grants		53,000.00
4052 · Miscellaneous Grants	0.00	
4060 · Photocopy, Scan & Fax		787.45
4070 · Fines		0.00
4075 · Fundraising Miscellaneous		5,880.47
4090 · Donations - General		365.16
4091 · Donations - Collection Develop		0.00
4092 · Donations - Programming		800.00
4093 · Donations - Friends of the Lib		0.00
4130 · Book Replacement		201.72
4150 · Interest Earned		72.38
4152 - E. Jones Interest & Dividends		0.00
4155 · RDCK Utility Recovery	0.00	
4163 · Rebate Programs		4.38
5004 - Payroll Expense	838.07	
5005 · Accountant	0.00	
5006 · Bookkeeper	3,735.00	
5010 · Advertising	600.75	
5020 · Bank Chgs, Interest, Exchange	220.88	
5043 - Provincial Grant Expense	0.00	
5044 · Electronic Resource Data/EBooks	11,721.87	
5045 · Magazines	1,744.54	
5046 - Collections - Other	0.00	
5050 · Books, Audio, Video	7,085.43	
5051 · Processing Charges	855.16	
5055 · Shipping	141.05	
5060 · Book Supplies	2,716.48	
5070 · Board Operations	0.00	
5080 · Capital Improvements	960.00	
5100 · Computer Costs	0.00	
5102 - Computer Software - Public	763.33	
5103 - Computer Software - Staff	863.84	
5104 - Computer Hardware - Public	0.00	
5103 - Computer Hardware - Staff	0.00	
5115 · Consulting Fees	0.00	
5120 · Copier Costs	629.84	
5130 · Employee Benefits	10,844.15	
5145 · Ill Loss & Fines & Books	40.00	
5150 · Insurance	3,574.00	
5160 · Internet Costs	385.20	
5170 · Janitorial Services	3,152.00	
5171 · Janitorial Supplies	228.88	
5180 · Library Operations		2.72
5182 · SITKA Contract	0.00	
5185 · Miscellaneous Expenses	82.80	
5187 - COVID expense	0.00	
5190 · Membership Dues	1,104.85	
5200 - Hygiene & First Aid	16.00	
5201 · Office Supplies	270.38	
5202 · Library Equipment & Furniture	154.84	
5203 · Outdoor Equip & Improvements	0.00	

5205 · Telephone/Fax	908.38	
5210 · Postage	0.00	
5215 · Ill Postage	1,383.75	
5220 · Professional Fees	282.70	
5225 · Program Expenses - Adults	377.53	
5227 · Program Expenses - Children	183.92	
5228 · Program Expenses - Teens	47.29	
5229 · Program Expenses - Summer Prgrm	0.00	
5240 · Repairs & Maintenance	14.97	
5241 · Garden & Grounds Maintenance	0.00	
5242 · Snow Clearing	1,497.62	
5245 · Security	480.00	
5250 · Salaries	130,456.82	
5251 · EI Expense	2,977.03	
5252 · CPP Expense	6,481.73	
5255 · Pension Expense	9,768.99	
5260 · WCB Expense	1,143.68	
5280 · Training	439.00	
5290 · Travel	0.00	
5300 · Utilities - Gas	709.87	
5301 · Utilities - Power	4,819.69	
5302 · Utilities - Water	1,086.75	
	0	
	733,627.12	733,667.12
	733,627.12	733667.12

CRESTON VALLEY
PUBLIC LIBRARY

Vision: *Empowering access to a world of ideas*

Mission: *A welcoming space for the creation and sharing of information, ideas and culture.*

Values: *Community collaboration, Environmental stewardship, Financial sustainability, Lifelong learning, Literacy, Patron-centred services, Reconciliation, Respect and inclusivity, Understanding and empathy, Universal access, Volunteerism, Well-trained and professional staff*

MONTHLY OPERATIONS REPORT

Reported by:	Saara Itkonen Library Director
Report Date	January – March 2026

Recent developments

Event/Program	Participants	Value(s)
Lauriane has been facilitating a kids' Art Club throughout February, March, and now into April. It's a drop-in program for kids to be creative and meet with other kids. Attendance keeps climbing!	96	Lifelong Learning Literacy Respect and inclusivity
Lisa has been visiting with Swan Valley and TAPS every month to read aloud and bring patrons items for borrowing when they can't make it to the library. Her visits are very popular	156	Lifelong learning Literacy Patron-centred services Respect and inclusivity Universal access
In February, Lisa hosted a couple of "Seedy Saturday" events in collaboration with the local seed society. Many patrons contributed seeds or left the library with new seeds to plant. The library will also be storing the Seed Society's seed bank that carries all the seeds needed to replant the valley after a potential disaster. The library is honoured to be a part of this important work.	65	Community collaboration Environmental stewardship

Event/Program	Participants	Value(s)

Long-Term Projects

Ongoing events/programs	Participants	Value(s)
The library received a grant for almost $60,000 to spend on accessibility upgrades to the building. Improvements have already included a new counter for the service desk that has room for piles of books and for a walker or wheelchair to roll underneath as well as a ramp for the back garden.	n/a	Respect and inclusivity Universal access Patron-centred services
Artists are lined up through most of the rest of this year to show their art in our meeting room. Kudos to Lisa for establishing relationships with so many artists in our community! Patrons and staff enjoy the art refresh in the meeting room every month. So patrons even just visit the library to check out the new art.	n/a	Community collaboration Lifelong learning
Many volunteers have connected with the library about volunteering in the garden. We may actually have more than enough this year!	6	Community collaboration Universal access Volunteerism

Words from our patrons

Upcoming

KLF meetings in Castlegar - April 30 – May 2

SOFI and Annual Survey due – May 15

Presentation to RDCK board – June 18

Glossary

ABCPLD – Association of BC Public Library Directors

BCLA – British Columbia Library Association

BCLTA – British Columbia Library Trustees Association

KLF – Kootenay Library Federation

CBT – Columbia Basin Trust

CELA – Centre for Equitable Library Access

2026 Library Usage Statistics

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Hours Open	136	120	136									
Library Visits	3464	3451	4418									
Meeting Room Bookings	85	85	102									
New Library Cards	32	39	33									
Circulation	11654	10306	10810									
Physical Materials	8354	7364	7628									
Electronic Materials	3300	2942	3182									
Interlibrary Loans	791	744	719									
Public Wifi Sessions	153	130	166									
Website Visits	1690	1505	1885									
Internet Sessions	327	285	411									
Tech Help Sessions	31	37	43									
Adult Programs	5	2	7									
Program Attendance	88	37	159									
Teen Programs	0	0	0									
Program Attendance	0	0	0									
Intergenerational Prog	1	1	1									
Program Attendance	21	17	8									
Children's Programs	3	10	12									
Program Attendance	58	149	194									
Passive Programs	2	2	19									
Program Participation	28	1	28									
Community Visits	3	1	3									
Volunteer Hours	27	21	33									

Increase over 2025
Decrease over 2025
Same as 2025/no data comparison

Creston Valley Alternate Water Supply Feasibility Study

Stakeholder Engagement Meeting

Presented by: Chris Gainham – Utility Services Manager RDCK
Matt Lozie P.Eng – Associated Engineering
Melanie Piorecky P.Ag. – Associated Environmental
Lynne Betts – Facilitator
Date: November 7th, 2024

Outline/Meeting Agenda

1	Introduction and Territorial Acknowledgement
2	Project Purpose, Background, Scope and Drivers
3	Project Team
4	Technical Presentation – Agricultural Water Demand, Supply and Concerns
5	Infrastructure Design Concept
6	Questions

Traditional Territory

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

Creston Valley is located on the unceded traditional territory of the Lower Kootenay Band, locally known as Yaqan Nuʔkiy “where the rock stands”.

- Lower Kootenay Band is part of the Ktunaxa Nations.

Alternate Supply
Pros • More supply potentially all year

Purpose of the Project

- **The purpose of the project is to review and assess the feasibility of an alternative long-term water supply for the Creston Valley.**
- **The intent is to support agricultural water needs and to secure additional water supply for resilience against drought and water scarcity.**
- **The intent of the Stakeholder Meeting is to present the project and gather input form Agricultural Producers in the Valley.**

- *Funding for this project was received through the Agricultural Water Infrastructure Program, which is funded by the Government of BC through the Ministry of Agriculture and Food and delivered by the Investment in Agriculture Foundation of BC.*
- *Additional grant funding is provided by the Community Works Grant funds.*

Some Background

At the June 21, 2023 Erickson Water Service Public Meeting we discussed Issues and Challenges related to Water Supply & Drought

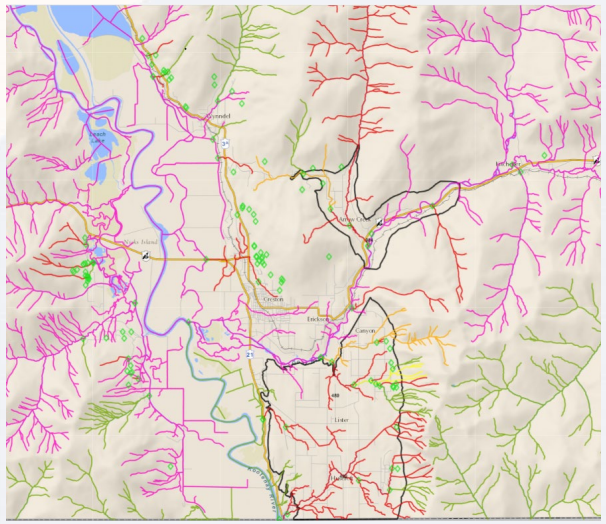
- Treatment plant has limited capacity and water licenses
- Arrow Creek flow can be low during hot dry weather
- Potential Economic and Environmental losses

Option	Pros	Cons	Actions
Increase Supply from Arrow Creek	- More supply most of the year	-Arrow Creek has "Fully Recorded" notation by the Province – likelihood of further significant allocation approval from Arrow or the Goat is unlikely -Very expensive treatment plant and pumping upgrades - Creek flows may not keep up with warm weather demands - Environmental Flow Needs: Low creek base flow impacting the proper functioning of the aquatic ecosystem	Current engineering study is addressing heating and energy efficiency upgrades.
Alternate Supply	- More supply potentially all year	- Very expensive treatment plant, pumping, and distribution upgrades - Groundwater supply is a concern in the area - Supply from Goat River or tributaries would be harmful to flow levels	2019 Erickson Agricultural Water Demand Study ★ This Study
Water Demand Management	- Possibly the least expensive option	- Potentially limited demand reduction - Likely requires universal metering	Erickson Water Metering Project

Project Drivers

- Water scarcity concerns in the Goat River watershed – Including Arrow Creek
  - Environmental Flow Needs
  - Drought and climate resilience
  - Provincial approval for future significant allocation from Goat or tributaries is unlikely

- Drinking Water Conservation
  - Currently treated drinking water from the Arrow Creek WTP is used to irrigate crops



Provincial Water Allocation Notations

Project Team and Stakeholders

Uli Wolf – GM Environmental Services
Chris Gainham – Manager of Utility Services (Project Sponsor)
Eileen Senyk – Water Services Liaison (Project Manager)
Alex Divlakovski – Manager of Water Operations

Lynne Betts - Facilitator
Engagement
and Communications

Matt Lozie P.Eng – Project Manager
Melanie Piorecky P.Ag. - Agrologist

Internal Stakeholders
Area Directors for Electoral Areas A, B and C
RDCK Staff – Development Services and Sustainability

Government Partners
Lower Kootenay Band (Yaqan Nukiy), the Ministry of Agriculture, Ministry of Water, Lands & Resource Stewardship and the Town of Creston

External Stakeholders
Water User Groups in the Creston Valley Improvement and Diking Districts
Agricultural Sector

What's In-Scope and Out of Scope

In-Scope

- Define water supply areas that are currently at risk and may require a new water supply in the near future.
- Identify the interested parties, water purveyors, and First Nations governments with interests and rights in each area of interest.
- Summarize current agricultural land uses and how agriculture in the areas of interest could change in response to climate change, market forces, and food trends, based on available information.
- Establish and define future condition scenarios to form the basis of predictive water demand.
- Explore options to centralize water supply on the Kootenay River that would reduce pressure from over-allocated waterbodies and at-risk supply areas.
- Identify potential intake and water conveyance options for the proposed Kootenay River water supply system

Out of Scope

- This project is a desktop screening level study of options for irrigation water supply for agriculture in the Creston Valley.
- Detailed study of any water sources is out of scope. Identification of water sources for uses other than agriculture is also out of scope.

Associated Environmental

CANADA BEST MANAGED COMPANIES Platinum member



Creston Valley Alternative Water Supply

High-level Feasibility Study

Melanie Piorecky, P. Ag.
Matt Lozie, P.Eng.

November 7, 2024

REGIONAL DISTRICT CENTRAL KOOTENAY

Background

- Water demand > than water supply
- Climate change = drought, unpredictable, reduced snowpack, longer growing season
- Intermingling supply

Look at a centralized water supply to reduce pressure from over-allocated and at-risk supply areas

Steps Taken

What is current agricultural water use?

Crops types + soils + climate + total areas

= Irrigation demand

What is supply?

Sources, allocation, issues

Information Sources

Agricultural land use inventory – crop types

Agricultural Water Demand Model – by crop type

Water purveyor data, past reports

Yaqan Nuʔkiy

In the works

Creston Valley Drought Assessment - BC WLRS

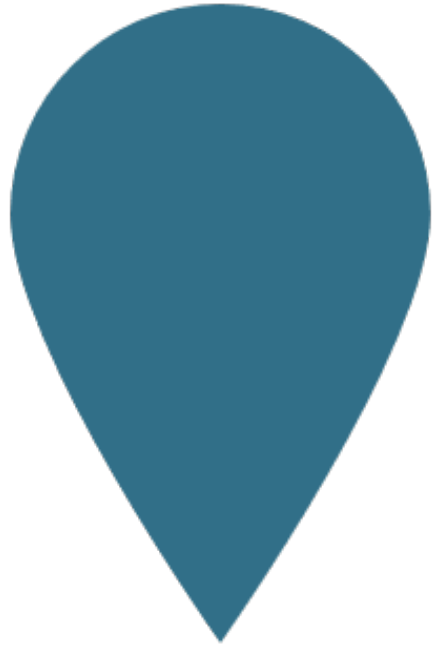
Creston Valley Aquifer Vulnerability Assessment – Living Lakes

Agricultural Water Use in the Region

- Fruit trees, grapes, berries
- Forage
- Cereal and oil crops
- Grass/turf
- Vegetables
- “Cultivated”

Variation in Agricultural Crop Demands

- Turf
- Hay/Forage
- Fruit trees
- Vegetables
- Berry
- Corn, cereal and oil crops
- Grapes



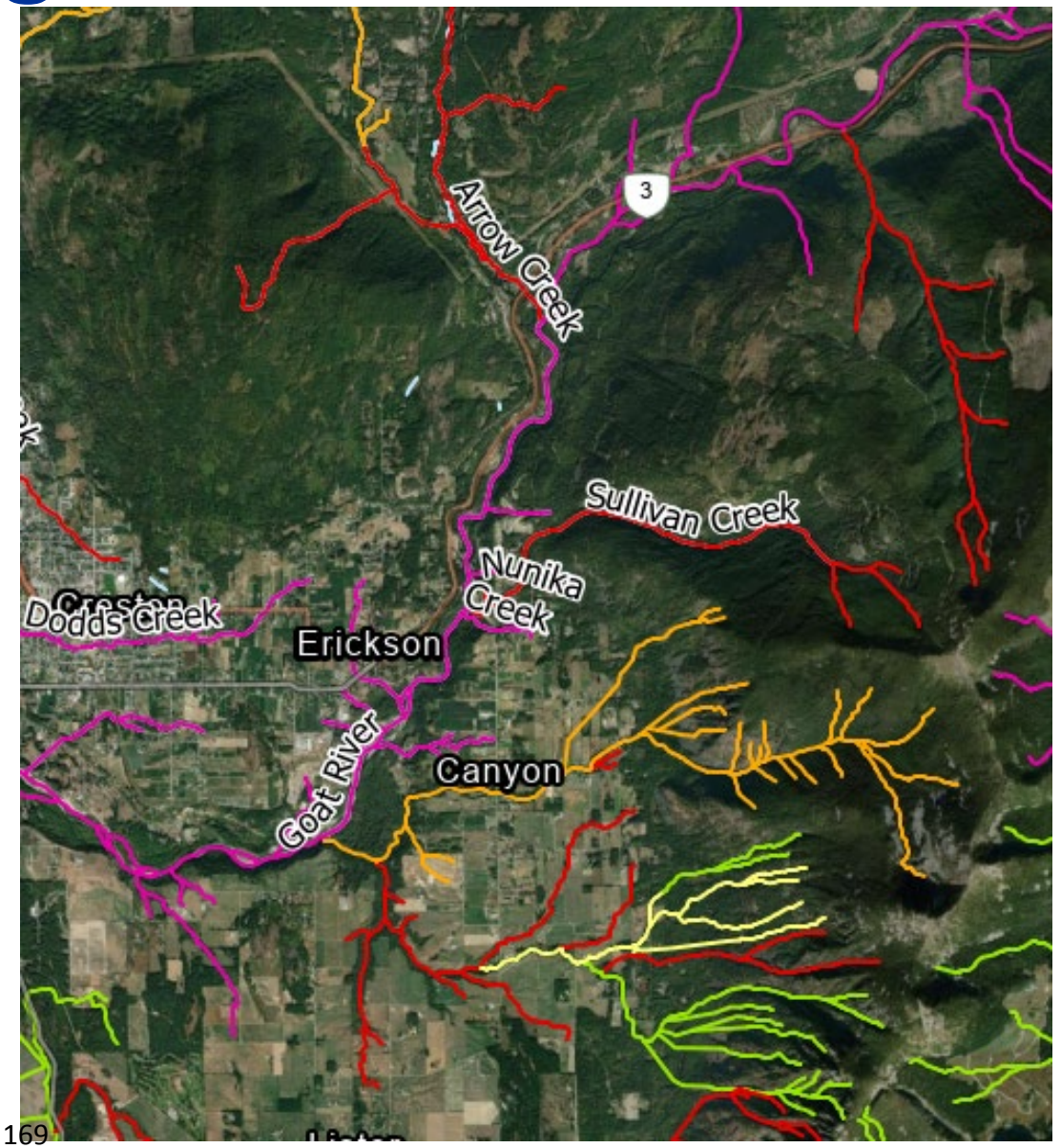
Variation in Agricultural Crop Demands

Agriculture	Average mm
Alfalfa	694
Apple	717
Berry	651
Cherry	759
Corn	468
Forage	892
Fruit	822
Grape	427
Nursery	859
Turf Farm	966
Vegetable	706

How can you be more efficient with water use?

Water Supply in the Region

- Arrow Creek*
- Duck Creek
- Floyd Creek
- Orde Creek
- South Rykerts Creek
- Groundwater Wells
- Goat River Watershed



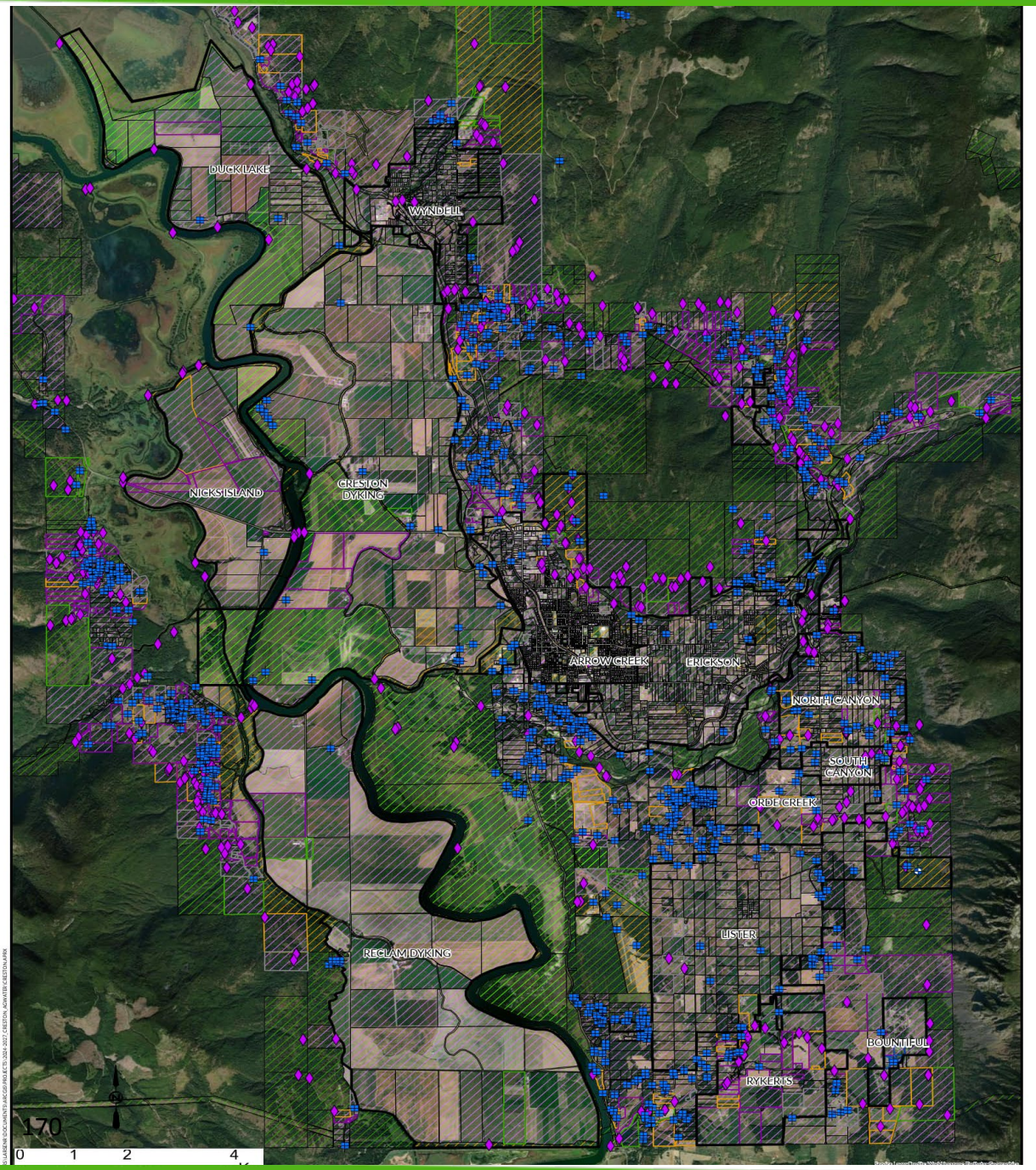
Water Supply in the Region

Licensed

Unlicensed

Well Diversion

Surface water diversion



Water Supply Concerns

- South Canyon Imp. Dist. (Floyd Creek) – concerns wells pulling from surface flows
- North Canyon Imp. Dist. (groundwater) – flow management plan in place
- Lister Water System (groundwater) – aging infrastructure
- Arrow Creek Water Treatment – major capacity concerns
- Goat River Watershed – groundwater connectivity, stress to tributaries, not meeting environmental flow needs

Questions?

Agricultural Water Demand

- Based on 4.5 USGPM/Acre from BC Irrigation Management Guide Table 3.3

Table 3.3 Estimated Peak Irrigation Flow Rate Requirements for B.C. Locations[1,2]

Location	Flow Rate [US gpm/acre][3]	Location	Flow Rate [US gpm/acre][3]	Location	Flow Rate [US gpm/acre][3]
Cloverdale	4.0	Langley	4.0	Sumas	4.5
Comox	5.0	Lillooet	7.5	Summerland	6.5
Creston	4.5	Lister	5.0	Terrace	5.5
Dawson Creek	4.0	Lumby	5.5	Vancouver	4.5

Agricultural Water Demand

- Future Agricultural Water Demand under full build out scenario
  - Within existing system boundaries
  - Excluded “Low or No” Irrigation land
  - Summer peak day flow (Maximum Day Demand)
    - ~ 2400 L/s (38000 USGPM) allocated demand
    - ~ 1800 L/s (28500 USGPM) actual demand

Kootenay River Source

- Summer flows typically above 100 cms
- Required agricultural demand below 2 cms
- Transborder river subject to flow requirements
- Locate intake upstream of the Goat River confluence
- Water quality is typically good. Low suspended solids / turbidity.

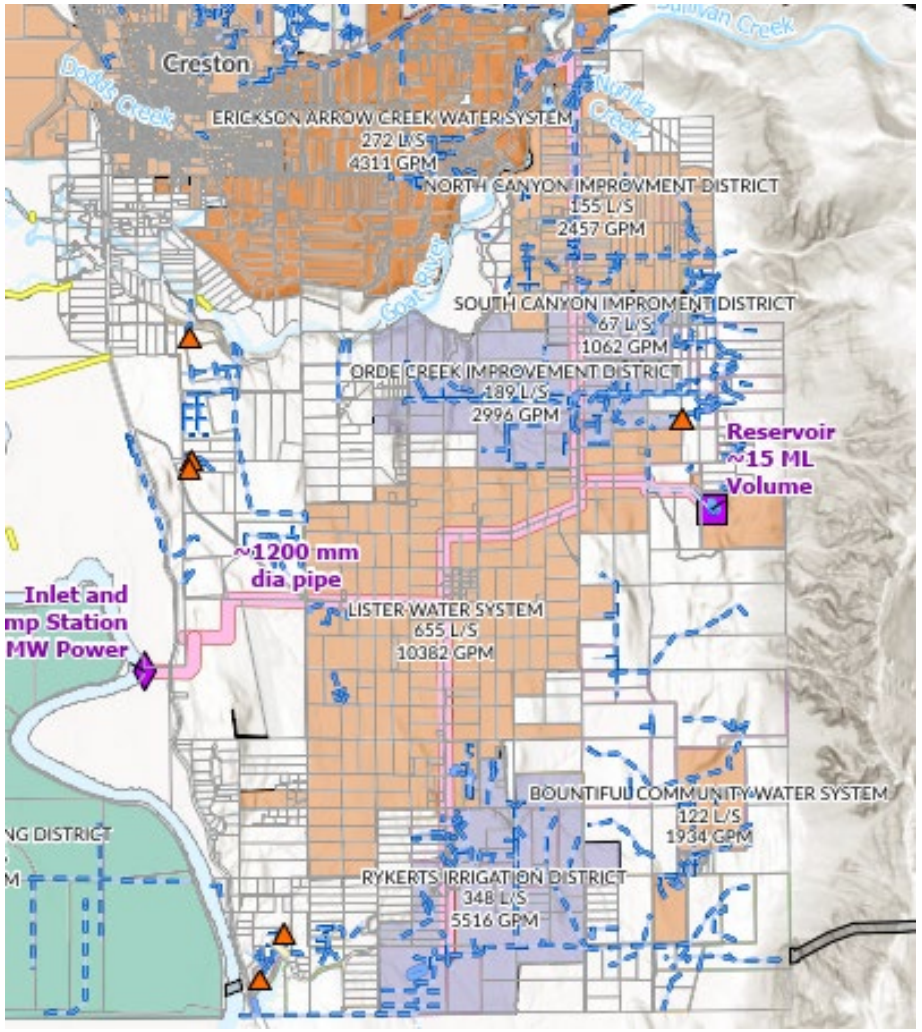
Questions?

Kootenay River Pump Station

- Pump station located on Kootenay River bank
- Pump from 535m up to reservoir at 720m elevation
- Reservoir for balancing daily water use fluctuations
- Could be phased

Agricultural Transmission System

- Large diameter transmission main to convey water
- Most direct route chosen
- New piping required for irrigation water
- Maintain existing piping for potable drinking water
- Phased approach



Treatment

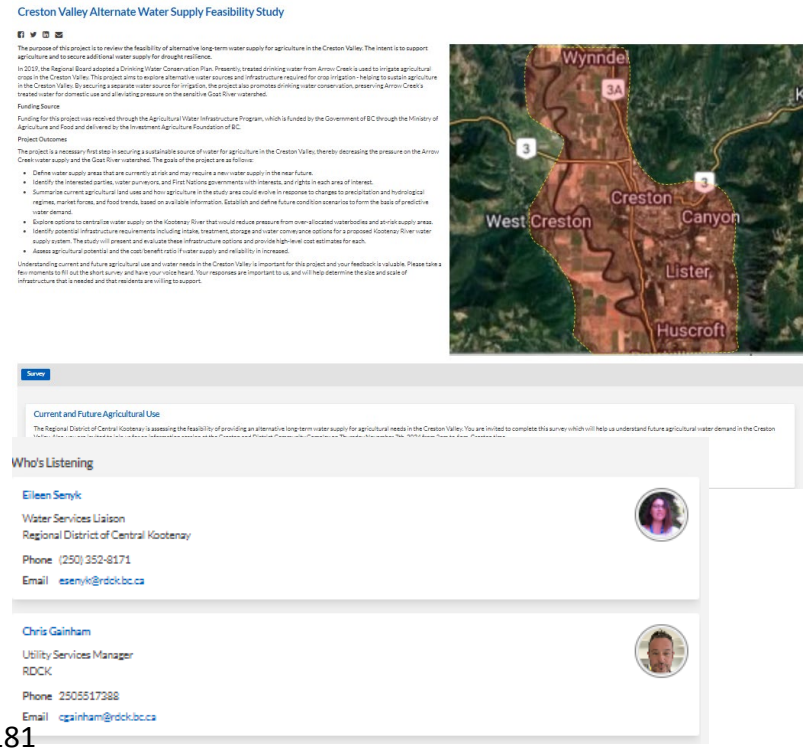
- BC Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture
- Not a potable system, so not IHA jurisdiction
- Small amount of disinfection to limit bacteriological regrowth in pipelines
- Some river intakes use sedimentation ponds

Treatment

- BC Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture
- Not a potable system, so not IHA jurisdiction
- Small amount of disinfection to limit bacteriological regrowth in pipelines
- Some river intakes use sedimentation ponds

Nest Steps

- Final Engineering Report Submission – December 31, 2024
- Stay Engaged – Visit **engage.rdck.ca** and navigate to the study page:
  - Project Survey
  - Staff Contacts



Questions?

CVSC ACTION ITEMS LIST – 2026-04-02

#	ACTION ITEM	MEETING ORIGIN	STATUS
1.	**STAFF DIRECTION:** That the Board direct staff to prepare a draft policy for Board review that requires recipients of financial grant in aid funds to engage with local area Directors and/or provide documentation during the budget process, to be eligible for funding via taxation in a given year.	05-Jan-2023	This has fallen back in the priority list based on other work. Staff has received direction to schedule a meeting with the Cemetery groups.
2.	**STAFF DIRECTION:** Dangerous Dog Bylaw to be written to enable Staff to work sub-regionally in conjunction with RCMP to act on dangerous dogs including provisions for safe and approved housing and care of animals until their future is determined.	02-Mar-2023 03-Oct-2024 01-May-2025 Dec-4-2025 March 16, 2026	AAP process approved for A, B, C by resolution 141/26 for Dangerous and Aggressive Dog control service Establishment Bylaw No. 3067,2026
3.	**STAFF DIRECTION**: Staff to create a contribution agreement with Kootenay River Secondary School where RDCK lists what the funding is for and what the expectations are for the funding. To formalize the agreement, Staff to include in the agreement what the rates are that RDCK is going to charge to receive that funding. CVSC would review the contribution agreement with Kootenay River Secondary School every year.	01-Jun-2023	Ongoing. Staff will include funding for the auditorium in conversations with SD8 regarding facility use discussion. SD8 is in a consultation process to determine public use policies. Conversation should be with SD8 administration.
4.	**STAFF DIRECTION:** That staff request a workshop/session (in conjunction with a site visit for the Creston Valley Services Committee) with the Traditional Use Study (TUS) authors, the Ktunaxa Nation and Yaqan Nukiy, to educate the Committee to better understand the TUS.	09-Sept-2023	Ongoing. Staff meeting with Ktunaxa and LKB staff October 30, 2024. Staff and Directors participated in the TUS Workshop with Ktunaxa in April 2025. Staff is arranging a workshop on Regional Parks in Creston, A,B,C.
5.	**STAFF DIRECTION:** That staff investigate how would a stabilization reserve could be adopted for Service S108 Economic Development – Creston and Areas B and C; and itemizing all the beneficiaries that are recipients of Service S108.	05- Mar-2026	Staff will prepare a report for the June CVSC meeting. The priority for economic development at this time is the EOI for service delivery.