Ghost
Watershed Alliance Society

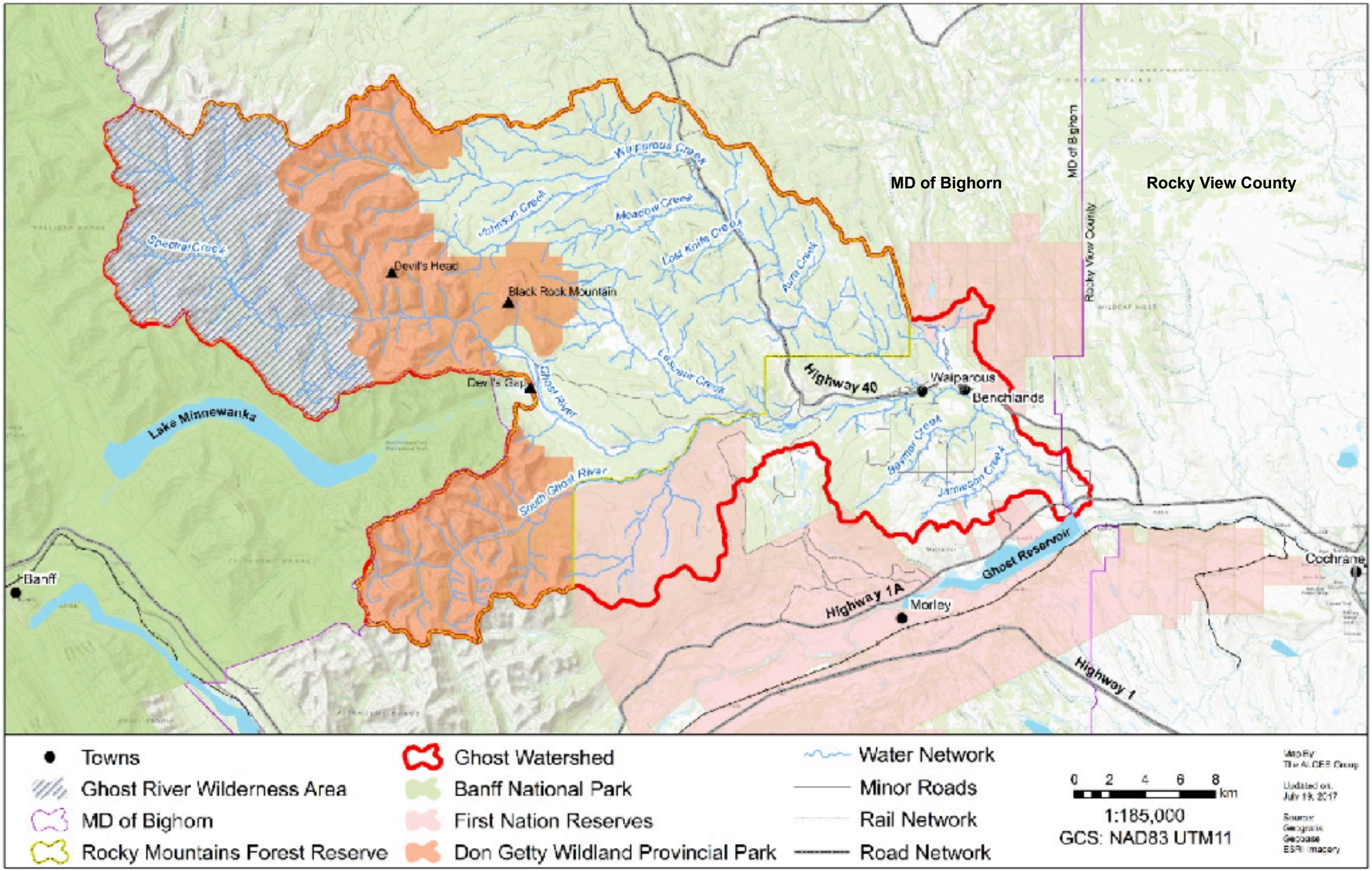
Report on GWAS' Work in 2024

Presented by:
Marina Krainer
Executive Director

GWAS AGM
The Crossing at Ghost River
November 23, 2024

Photo credit: M. Krainer

The Ghost Watershed



Who is GWAS?

- Watershed Stewardship Group (WSG)
- Established 2002
- Largely volunteer driven
- 2 part-time staff

Photo credit: C. Hill

What does GWAS do?

- Gather and share knowledge
- Raise awareness
- Work collaboratively to improve watershed health

Photo credit: K. Hull

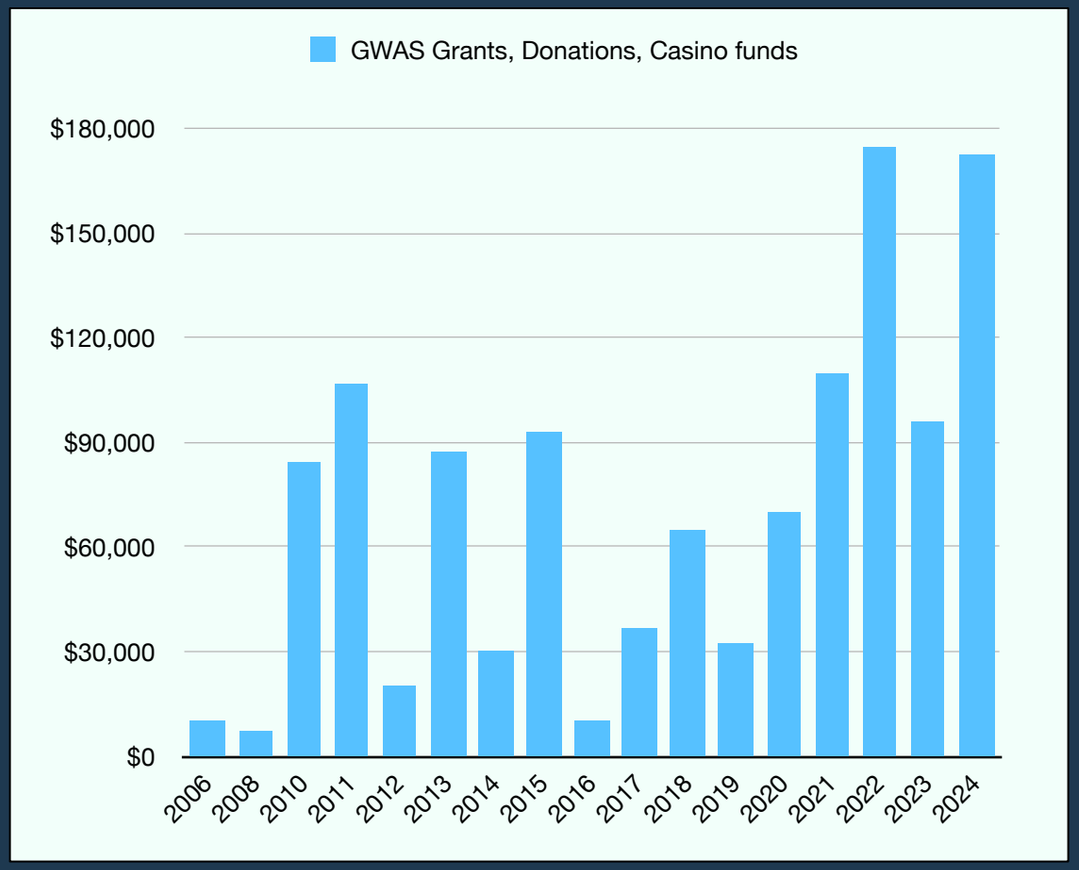
Recognizing GWAS's History

- Started by local residents concerned about watershed health
- Built many important relationships and partnerships since then.

Photo credit: D. Pichette

Recognizing GWAS's History

- Since 2006, GWAS raised over $1.2 Million in grants, donations and Casino funds
- Taking on more projects and expanding programs every year



GWAS Major Milestones

2002 — GWAS founded

2004 — Review of Detailed Forest Management Plan

2006 — Expanded outreach activities

2008 — • First data scoping and mapping project.
• Outreach project: Walks, Website, Display

2009 — • Executive Director hired
• Eco-system-based forestry project started

2010 — • Ghost Cumulative Effects Study - Phase I
• C&F Riparian Health Inventory Phase I
• Ecosystem-based forestry

2011 — • Ghost Cumulative Effects Study - Phase II
• Cows & Fish Riparian Health Inventory Phase II

2012 — • Signage Project
• Review of forestry plans with Herb Hammond
• 10-year anniversary of GWAS

2013 — • 1st Bioengineering Project
• Flood, Diversion inoperable

2014 — • State of the Watershed Report Project started
• Bio-engineering - Silvester Creek

GWAS Major Milestones

2015
- State of the Watershed Report Project underway

2016
- Bioengineering with BTFR - Meadow Creek

2017
- 1st Bioengineering workshop with Dave Polster - Johnson Creek
- State of the Watershed Report published
- Bio-engineering workshop with Dave Polster

2018
- Bioengineering with Dave Polster - Four Mile Creek
- CABiN Training
- Education Coordinator hired
- State of the Watershed implementation work
- Year 1 of CABiN sampling

2019

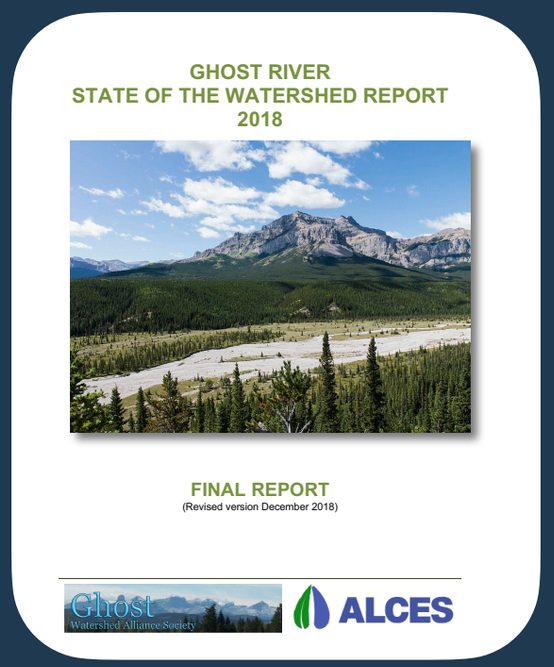
2020

2021
- Year 2 CABiN sampling
- Bio-engineering workshop with Dave Polster
- Bio-engineering Video
- 20 Year anniversary
- Year 3 CABiN sampling
- GWAS has sampled the largest number of CABiN sites in Alberta!

2022
- Year 4 CABiN sampling
- 2 Bio-engineering workshops
- 3 Bio-engineering workshops
- Year 5 CABiN sampling

2023

2024


GHOST RIVER
STATE OF THE WATERSHED REPORT
2018

FINAL REPORT
(Revised version December 2018)

Ghost Watershed Alliance Society

ALCES

Common Issues in The Ghost Watershed

- Excessive erosion
- Loss of riparian vegetation
- Soil compaction
- Sedimentation of streams
- Barriers to fish movement

Photo credits: H. Unger & M. Krainer

GWAS Operations Plan - Strategic Objectives

- Science, research, monitoring & knowledge
- Outreach, awareness, education
- Advice and recommendations
- Ecosystem repair and enhancement

Photo credit: M. Krainer

GWAS Water Monitoring Plan

- ✦ Started in 2020
- ✦ Three focus areas; Ghost River, Waiparous Creek, tributaries
- ✦ CABiN and STREAM, temperature loggers and lead testing

Photo credit: C. Hill

What is CABiN?

- CABiN - Canadian Aquatic Biomonitoring Network
- National biomonitoring program developed by Environment and Climate Change Canada
- Provides standardized sampling protocols & training

Photo credit: C. Hill

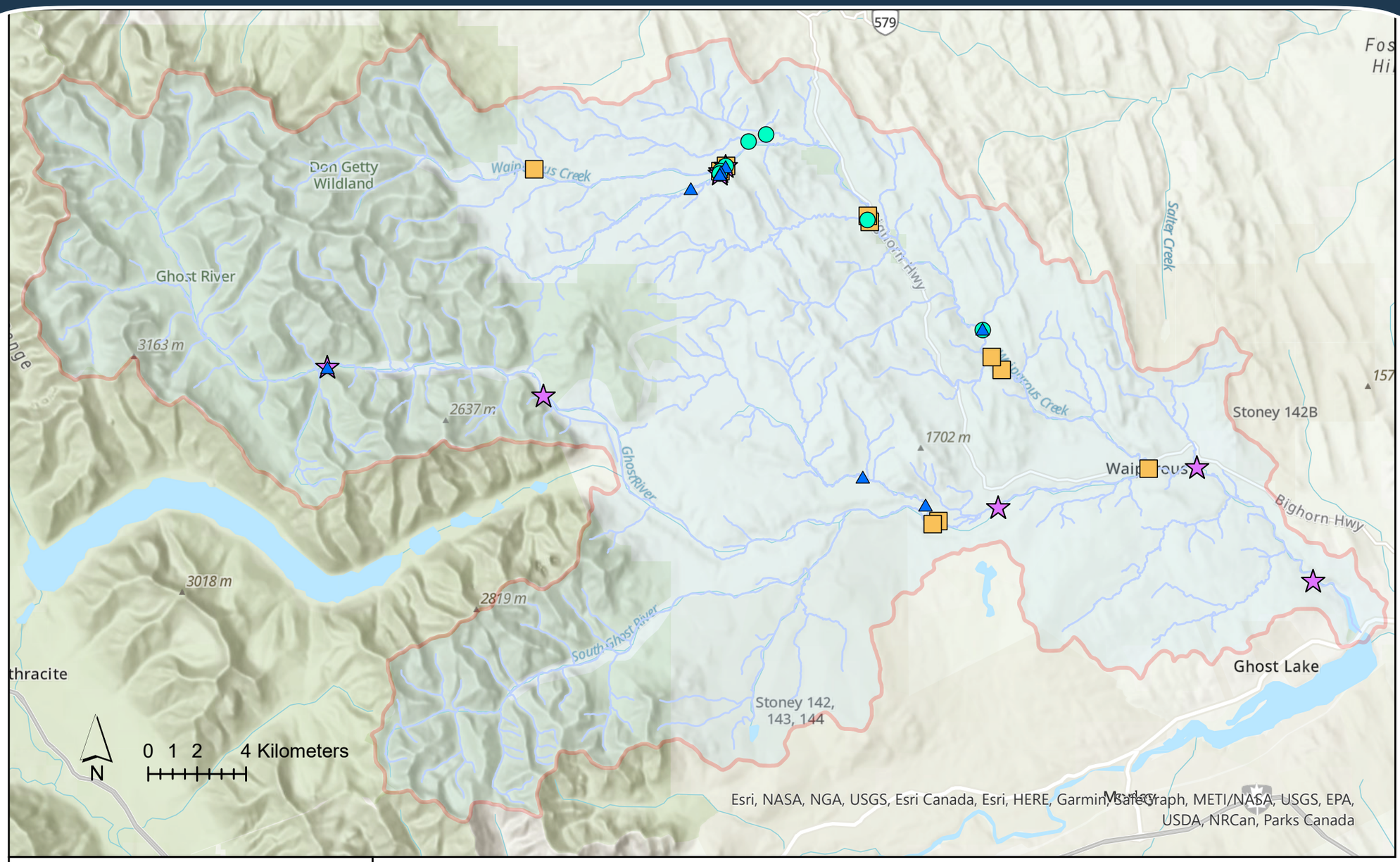
Benthic Macroinvertebrates as Indicators

- ✦ Long-lived (1-3 years)
- ✦ Diverse, responding to a wide range of stressors
- ✦ Ubiquitous and generally abundant
- ✦ Key part of the food web

Stonefly
Photo credit: C. Hill

Ghost Watershed Sampling Sites 2020 - 2024

- 10 sites in 2020
- 8 sites in 2021
- 7 sites in 2022
- 8 sites in 2023
- 10 sites in 2024



2023
2022
2021
2020
Streams
Ghost_Basin_Project

Author: GWAS
Date Published: November 22, 2023
Scale: 1:225,000
Data Sources: GWAS, MacHydro, Esri Basemap
Coordinate System: NAD83 10TM AEP Forest

GWAS Aquatic Bio-monitoring in 2024

- Sampled 8 sites in 2024:
  - Tributaries: Aura Creek, Lesueur Creek (2 sites), Johnson Creek (2 sites), Lost Knife Creek
  - Waiparous Creek: 2 sites

Photo credit: B. MacAlpine

CABiN 2023 Sampling Results

- Resampled key sites and added a few new sites
- EPT ratio indicated high water quality at most sites
- Only exceptions were Lesueur Creek near mouth and Johnson Creek, yet these sites had very high species diversity
- All sites were “good” or “very good” (Hilsenhoff Biotic Index)

Photo credit: C. Hill

CABiN - Collaboration

- Eastern Slopes Collaborative:
  - Organizations engaged in CABiN sampling all along Alberta's Eastern Slopes
  - Exchange information, share expertise, support each other
- Working together to develop CABiN Reference Condition Model

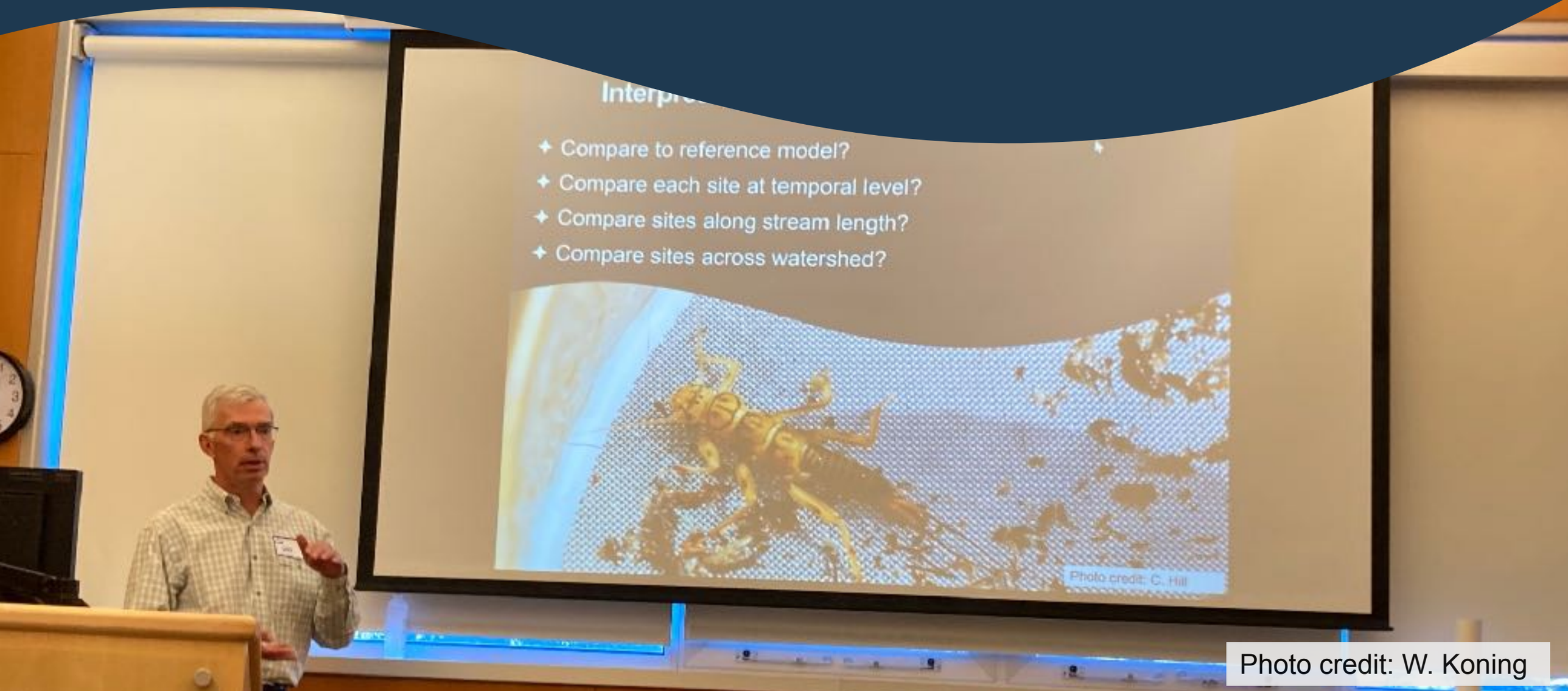


Photo credit: W. Koning

CABiN - Reference Condition Model

- Greatly improves ability to analyze data collected
  - Compares test sites to sites in reference condition
  - Much more detailed statistical analysis compared to no RCM
- Undertook detailed review of potential reference watershed units
- Sampled 3 potential reference sites this year

Photo credit: M. Krainer

GWAS Water Monitoring Plan

- Collected stream temperature loggers since 2021
- 8 stream temperature loggers in 2024
- Data shared with GoA Fisheries Biologists and fRI Research
- GWAS is working on analyzing data internally

Photo credit: K. Allan

Stream Temperature Loggers

- ✦ Thank you to our volunteers!
- ✦ Always looking for more volunteers!

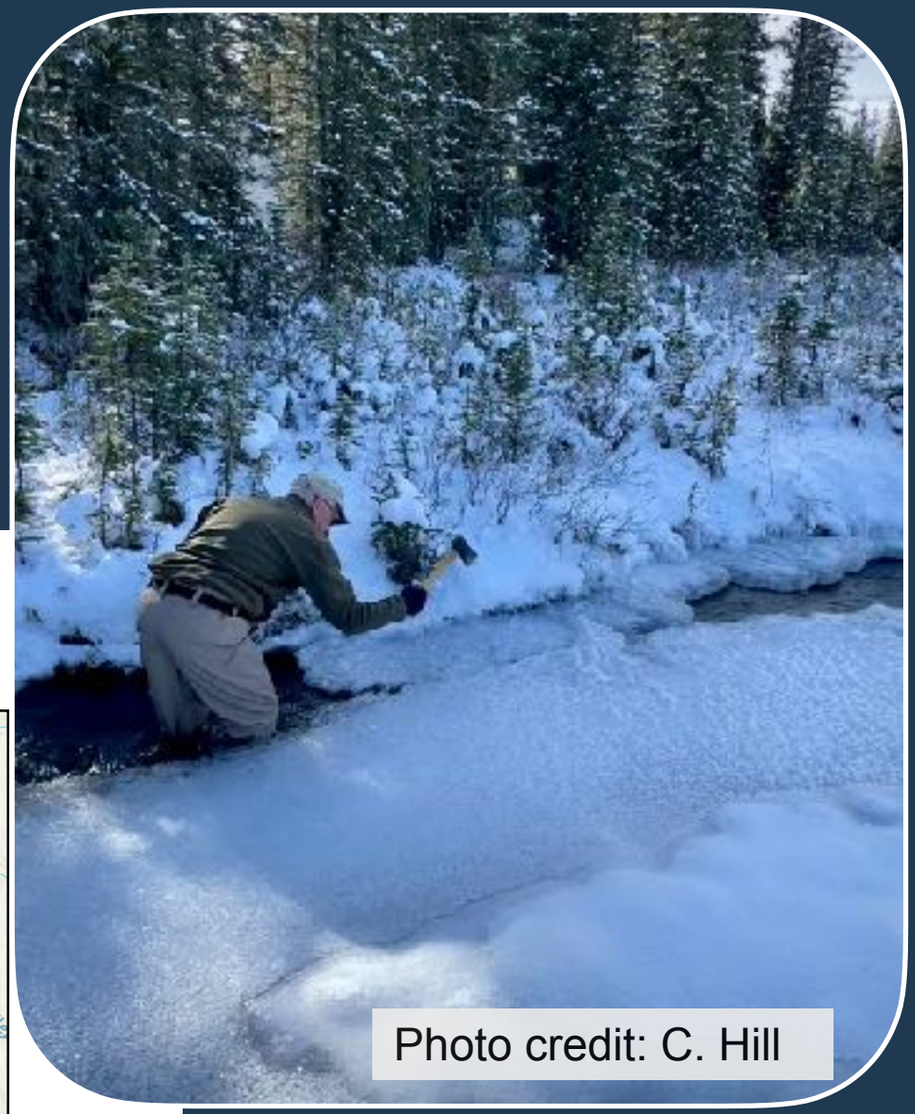
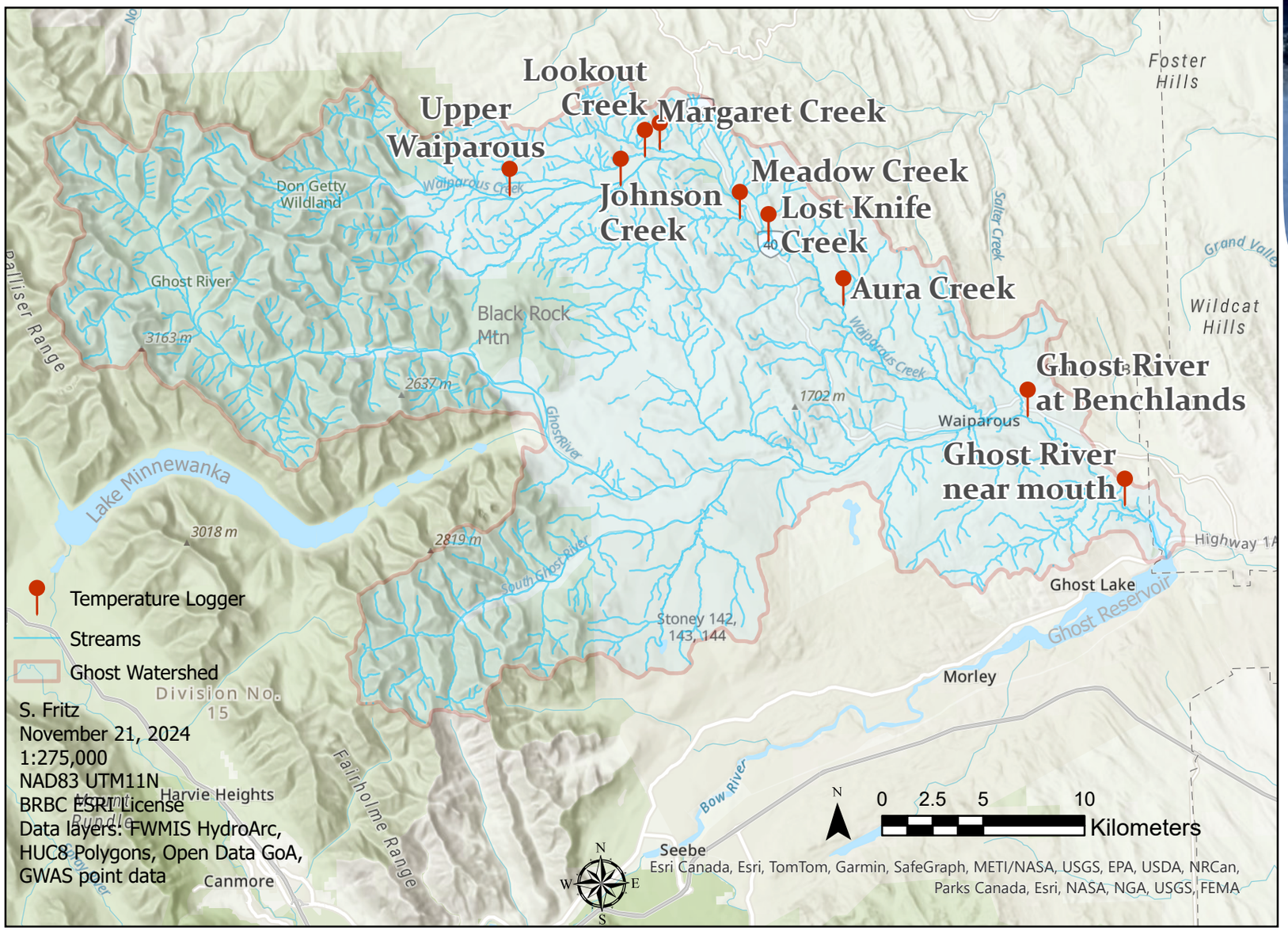


Photo credit: C. Hill

2024 Temperature Logger Locations in the Ghost River Watershed



Working Together on Native Trout Recovery

- ✦ Collaboratively work on awareness, closing data gaps and restoration
- ✦ Cows and Fish Native Trout workshops
- ✦ GWAS held 4 virtual workshops and 3 bio-engineering field days this year!

Photo credit: M. Krainer

Why do we undertake bioengineering?

- Prevent channeling of run-off
- Prevent excessive amounts of sediment from ending up in streams
- Re-establish riparian vegetation

Bio-engineering = Erosion control

Photo credit: C. Hill

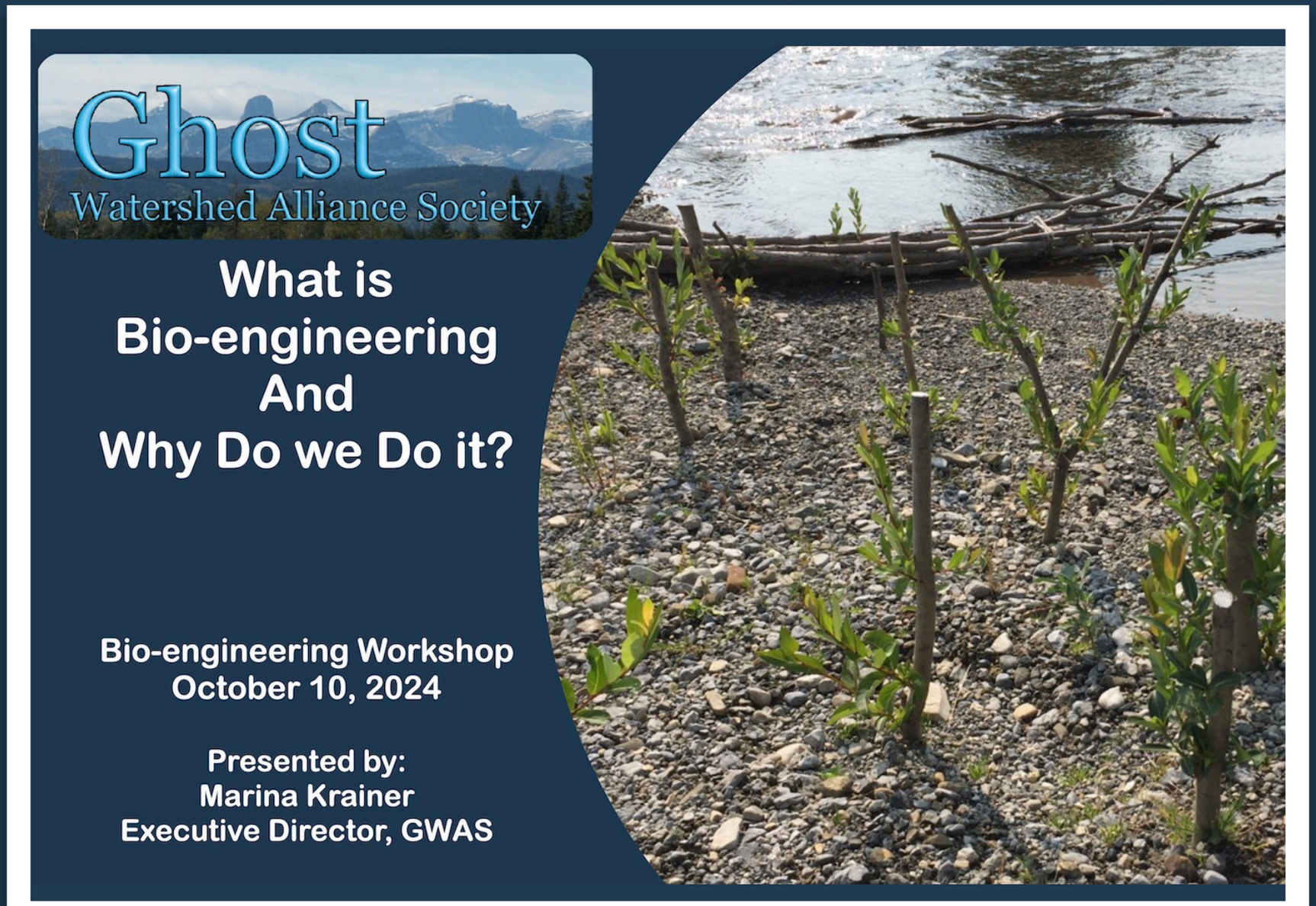
Benefits of Rough and Loose Technique

- ✦ Prevents overland flow
- ✦ Promotes infiltration
- ✦ Prevents erosion
- ✦ Provides diverse habitat

Photo credit: E. Lindsay

Bio-engineering Workshops

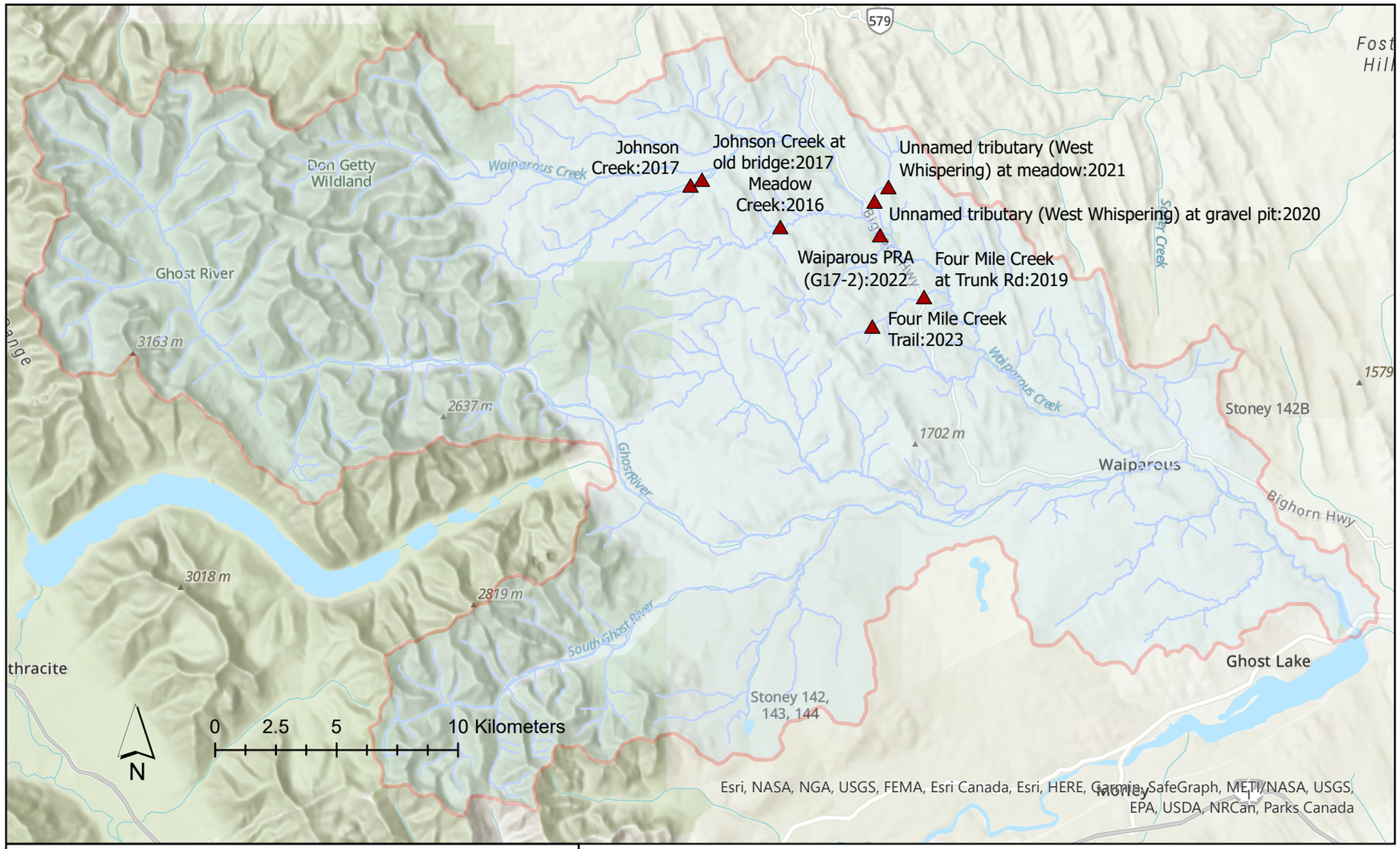
- Held virtually on June 12, Sept 12, Oct 10, Oct 17
- Presentations by Angela Ten (TUC), Dan Kruse (CARA) bio-engineering specialist Jon Berlie and GWAS ED
- 34 attendees (2 regrets, provided recording)



Bioengineering Sites

- ✦ Undertaken in partnership with many organizations.
- ✦ BHA, BTFR, CARA, T4T, TUC, C&F, AEPA

GWAS Restoration Sites 2016 to 2023



Features

▲ Restoration_Sites — Streams — Ghost_Basin

Author: GWAS
Date Published: November 22, 2023
Scale: 1:225,000
Data Sources: GWAS, MacHydro, ESRI Basemap
Coordinate System: NAD83 10TM AEP Forest

Bio-engineering March Field Day

- March 16: Willow and poplar stake harvesting
- 13 volunteers
- Over 1,700 stakes harvested!

Photo credits: M. Krainer

Bio-engineering Spring Field Day

- June 14: Field day at two sites:
  - Waiparous bridge (2022) restoration site
  - Whispering Pines West, 2020 site near beaver dam analogues

Photo credits: J. Berlie & M. Krainer

Bio-engineering Spring Field Day

- 8 volunteers
- All 1,700 stakes harvested in March planted!

Photo credits: M. Krainer

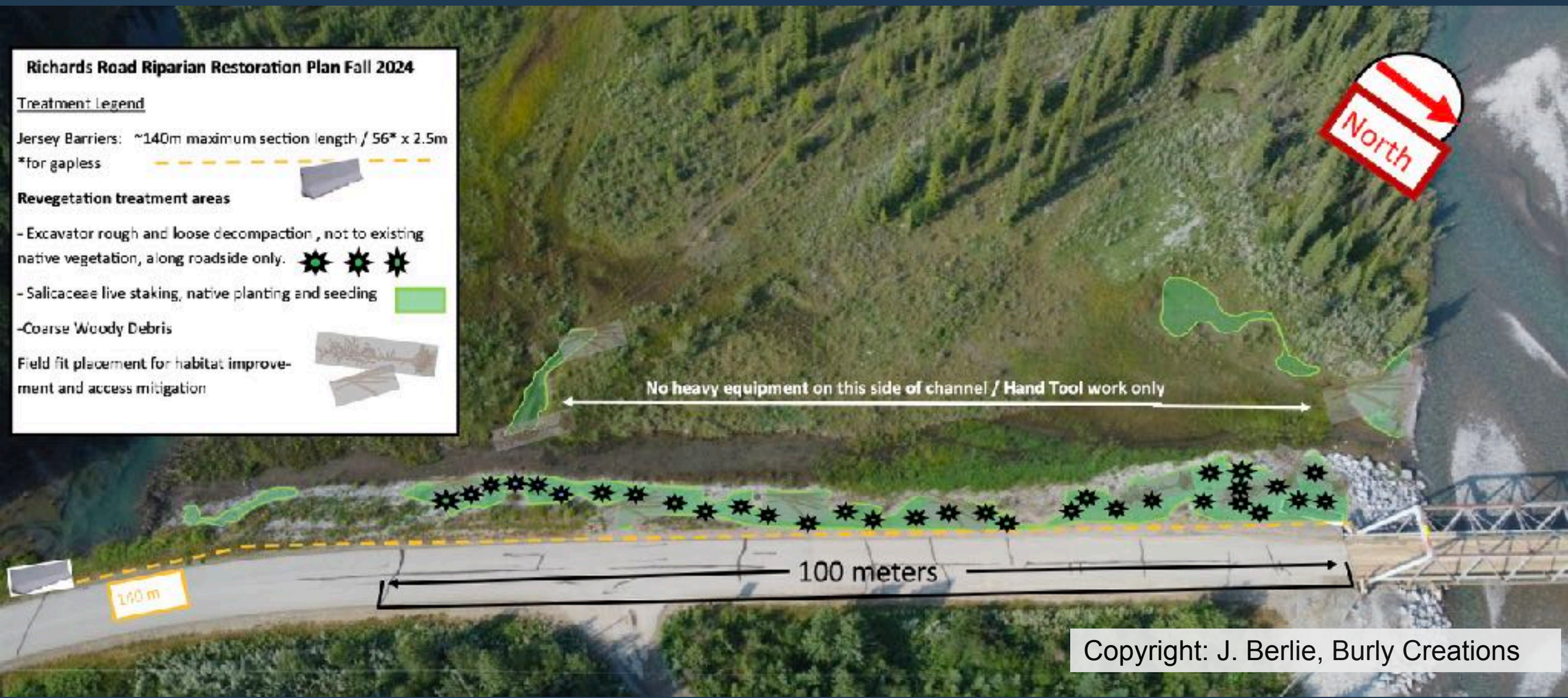
Richard Road Bio-engineering Site

- Reported illegal trail next to Ghost River at Richard Road in 2023 (tracks through wetland with western toad and tadpoles present)
- Contacted MD of Bighorn in 2023 to propose bio-engineering project. Well received by MD. Agreed to partner.

Photo credit: M. Krainer

Richard Road Bio-engineering Site

- Applied for grant from ACA for the project.
- Burly Creations developed restoration plan.
- Applied for permits.



Richards Road Bio-engineering Project

- Protect side channel of Ghost River
- Native trout & western toad habitat

Generously funded by:

Alberta Conservation Association

Photo credits: M. Krainer

Richards Road Bio-engineering Project

- 9 volunteers on Sept. 14, 2024
- Willows, poplars, native seeds
- MD of Bighorn installed roadside fence

Photo credits: M. Krainer

Waiparous PRA - East Culvert site

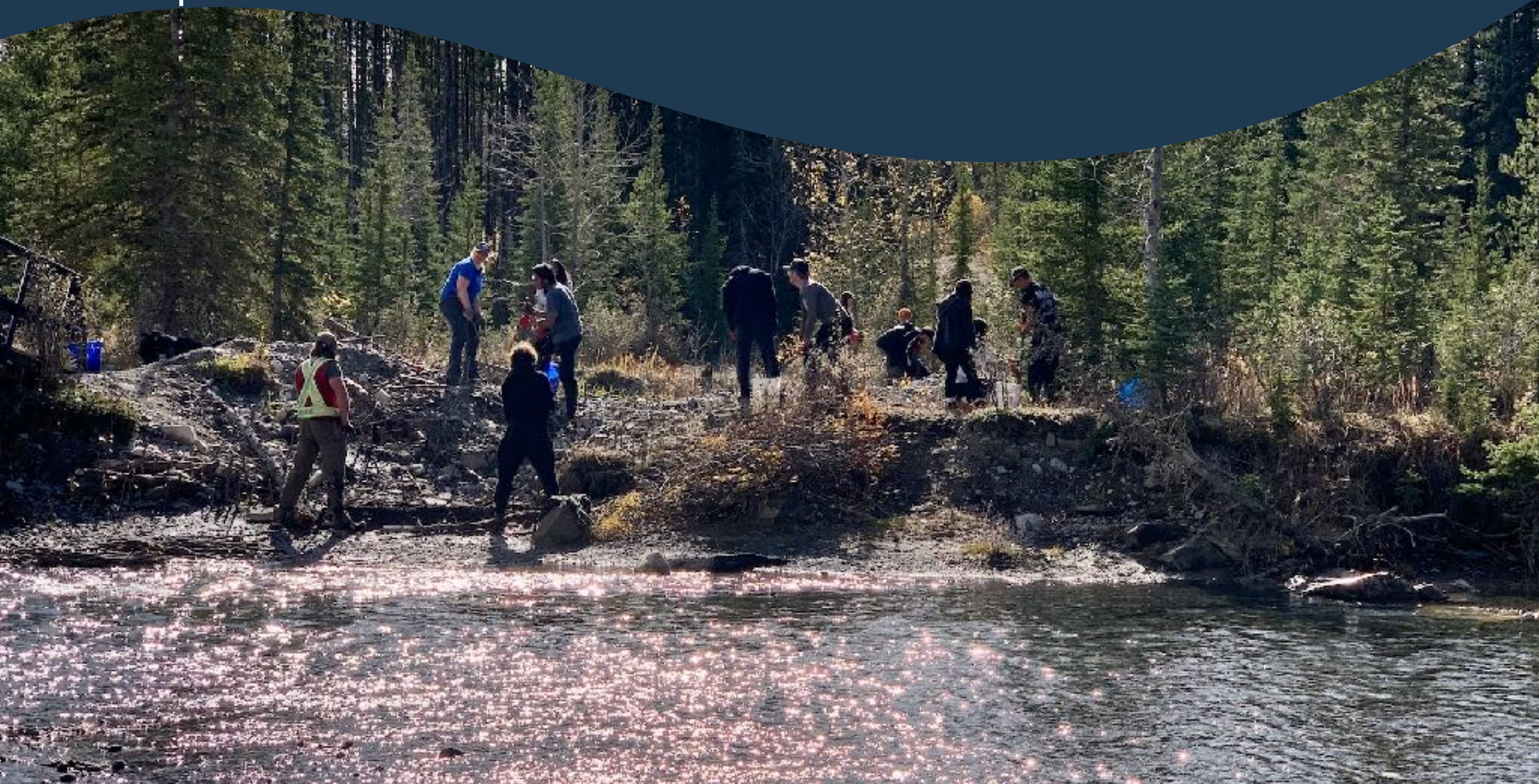
- Freshwater Conservation Canada replaced hanging culverts with arched crossing in 2023
- Critical habitat stream for native trout
- Oct 19, 2024 bio-engineering field day

Waiparous PRA - TUC East Culvert site

- Field day with 8 volunteers
- Applied live staking and live silt fence bio-engineering techniques

Bio-engineering workshops

- ✦ Promote collaboration
- ✦ Team-building
- ✦ Opportunity to share knowledge and perspectives
- ✦ Improve watershed health and fish habitat



Thank you to our Bio-engineering Specialist!

- Jon Berlie - Burly Creations
- Diploma in restoration of natural systems, University of Victoria
- Certified ecological restoration practitioner with the Society for Ecological Restoration
- Certified ISA Arborist

Photo credit: M. Krainer

Assessment and Monitoring

- ✦ Comparison over time
- ✦ CABiN sampling
- ✦ Riparian Health Inventories
- ✦ Undertake site revisits

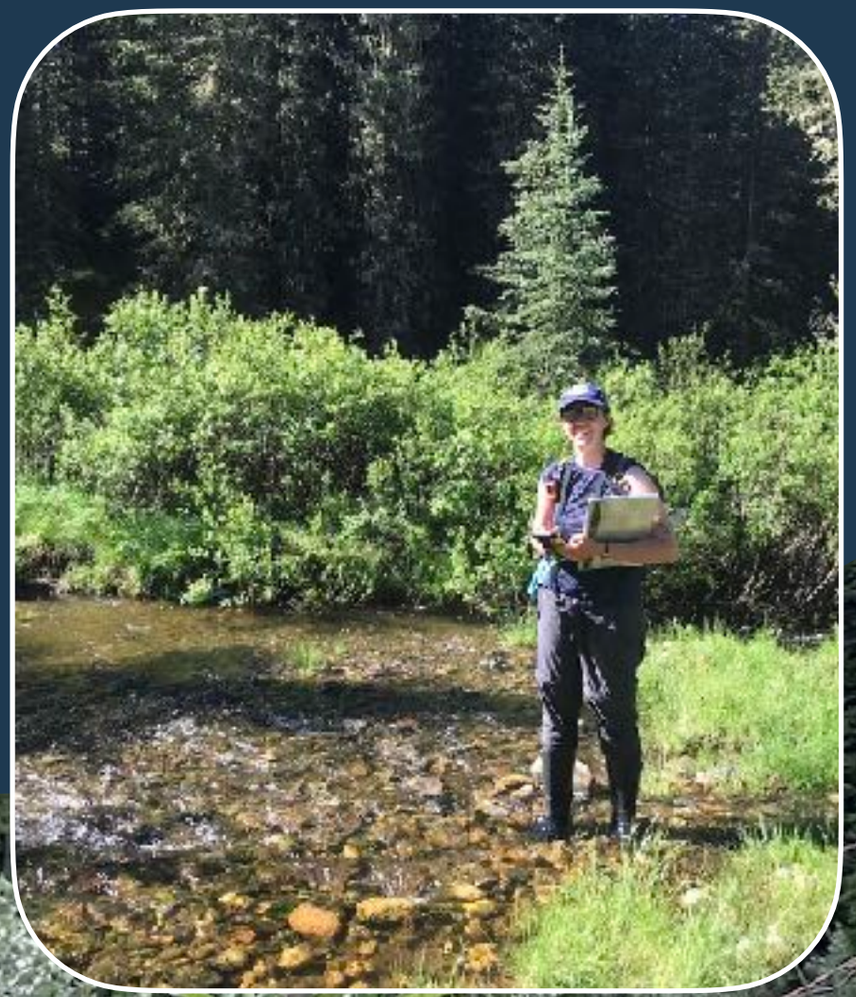


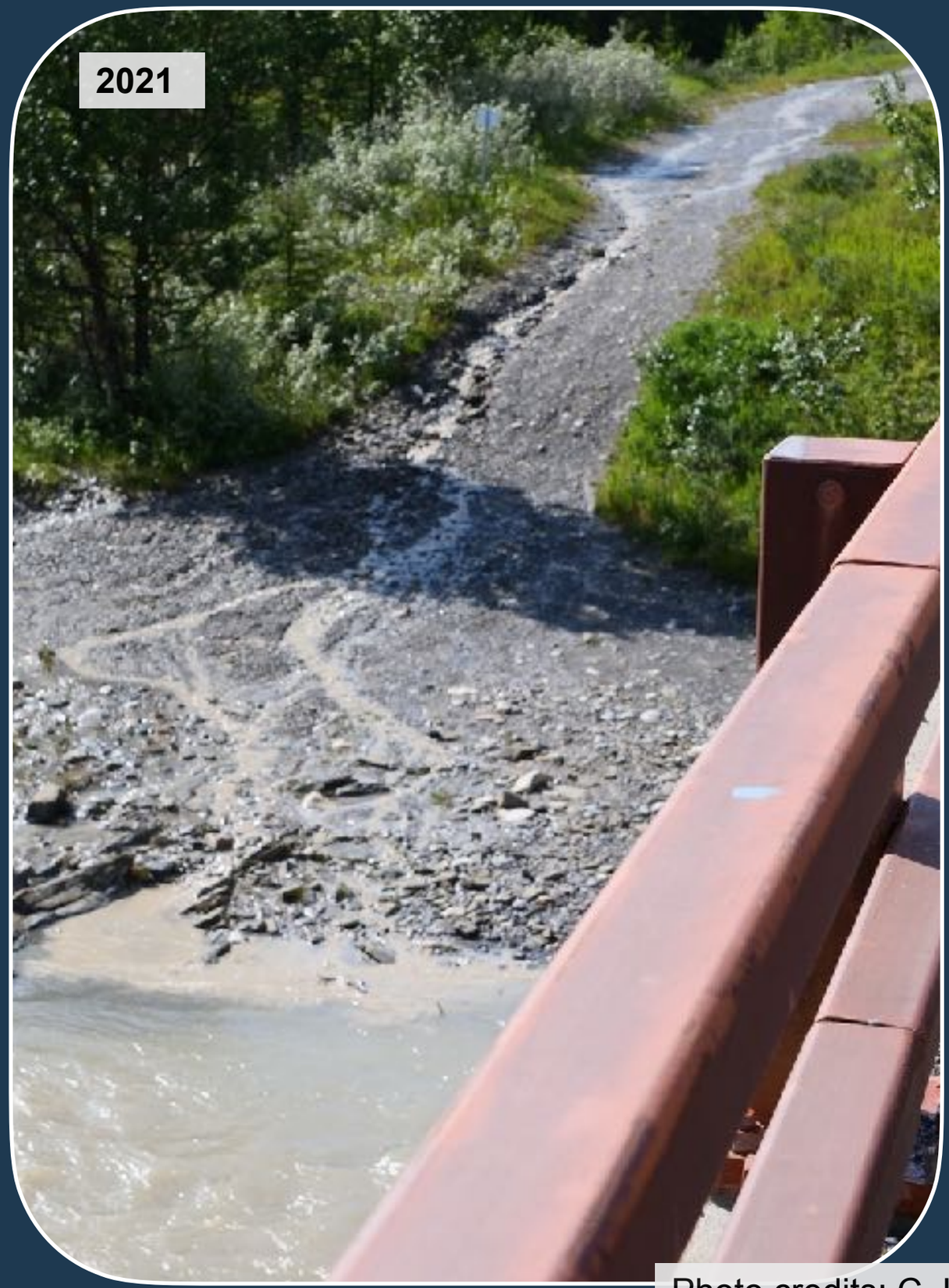
Photo credit: M. Krainer and K. Hull

Waiparous Creek Bio-engineering Site Monitoring

- Significant survival and growth despite another very dry fall and early spring!
- Rough and loose captured lots of sediment

Photo credit: M. Krainer

Waiparous Creek Bio-engineering Site Monitoring



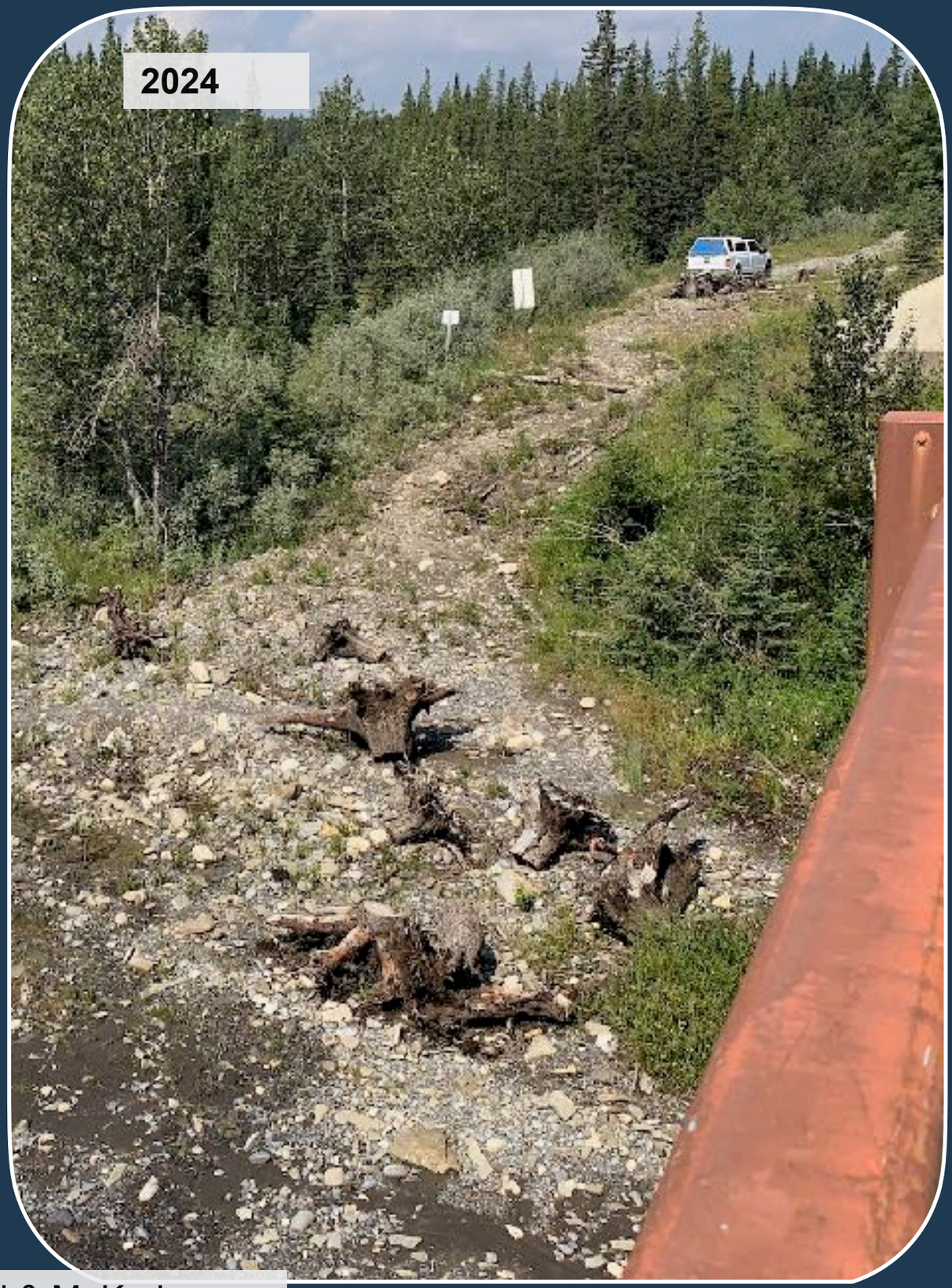


Photo credits: C. Hill & M. Krainer

Waiparous Creek Bio-engineering Site Monitoring

Photo credits: J. Berlie & M. Krainer

Waiparous Creek Bio-engineering Site Monitoring

Photo credits: J. Berlie & M. Krainer

Collaboration

- Margaret Lake Project
- Collaboration between CARA, T4T & Freshwater Conservation Canada
- Restore lakeshore and encourage people to walk to the lake

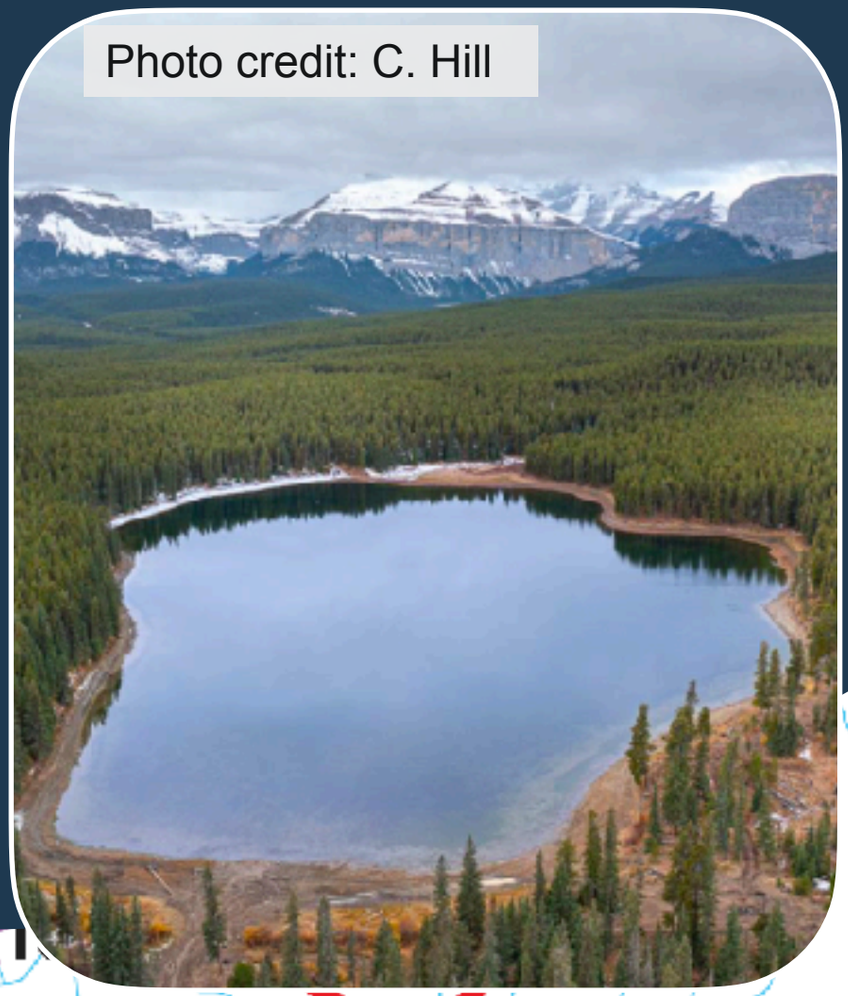
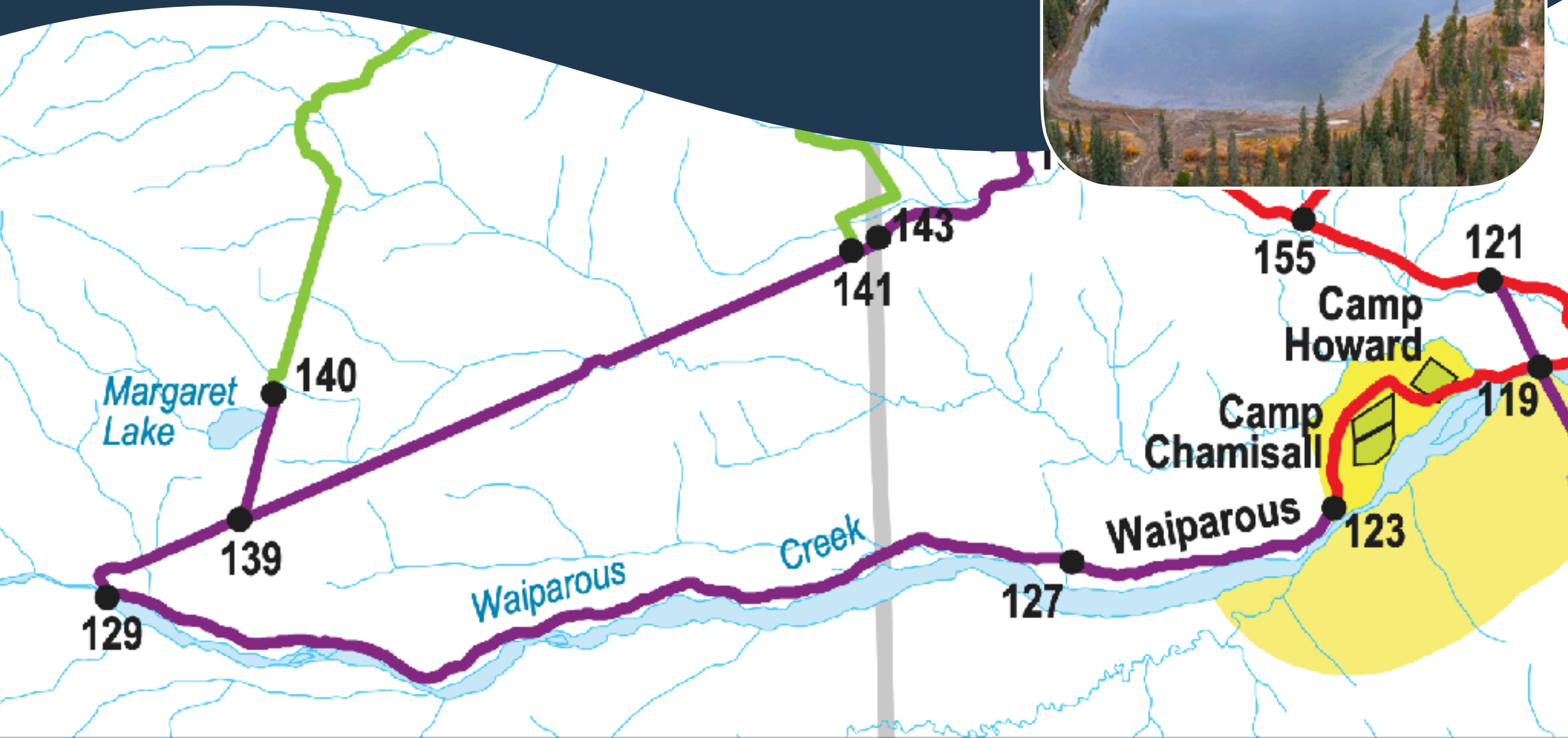


Photo credit: C. Hill



Collaboration

- CARA & T4T replace fence around lake this fall. Many thanks for their hard work!
- Next year: bio-engineering around lakeshore

Photo credits: T4T

Collaboration with Recreational User Groups

- Joined clean-up event organized by CARA
- Booth at Starlight Ride 4 Smiles event

Photo credit: M. Krainer, N. Johnson, N. Edy (CochraneNow)

Collaboration

- Landscape Management Planning: SSRP prescribed planning for Ghost Region
- Diverse group of individuals who either live, recreate and/or work in the Ghost Region
- Common thread: passionate about the area, want to see it effectively managed
- Held workshop with diverse group of stakeholders and GoA Planners

Photo credit: M. Krainer

Collaborative Work

- Bow River Basin Council (BRBC) Online State of the Basin
- In-depth review of new GIS layers and wording for the Ghost River sub-basin section
- Could not have done this work without in-house GIS expertise!

Bow River Basin Council

Bow Basin Sub-Watersheds: Executive Summaries

Back to Report

Introduction | Ghost River | Elbow River | Fish Creek | Pine Creek | Jumpingpound Creek | Nose Creek | Bighill Creek | Sheep and Highwood River | Upper Bow Banff | Upper Bow Kananaskis | Middle Bow

The Ghost River Watershed

Overview

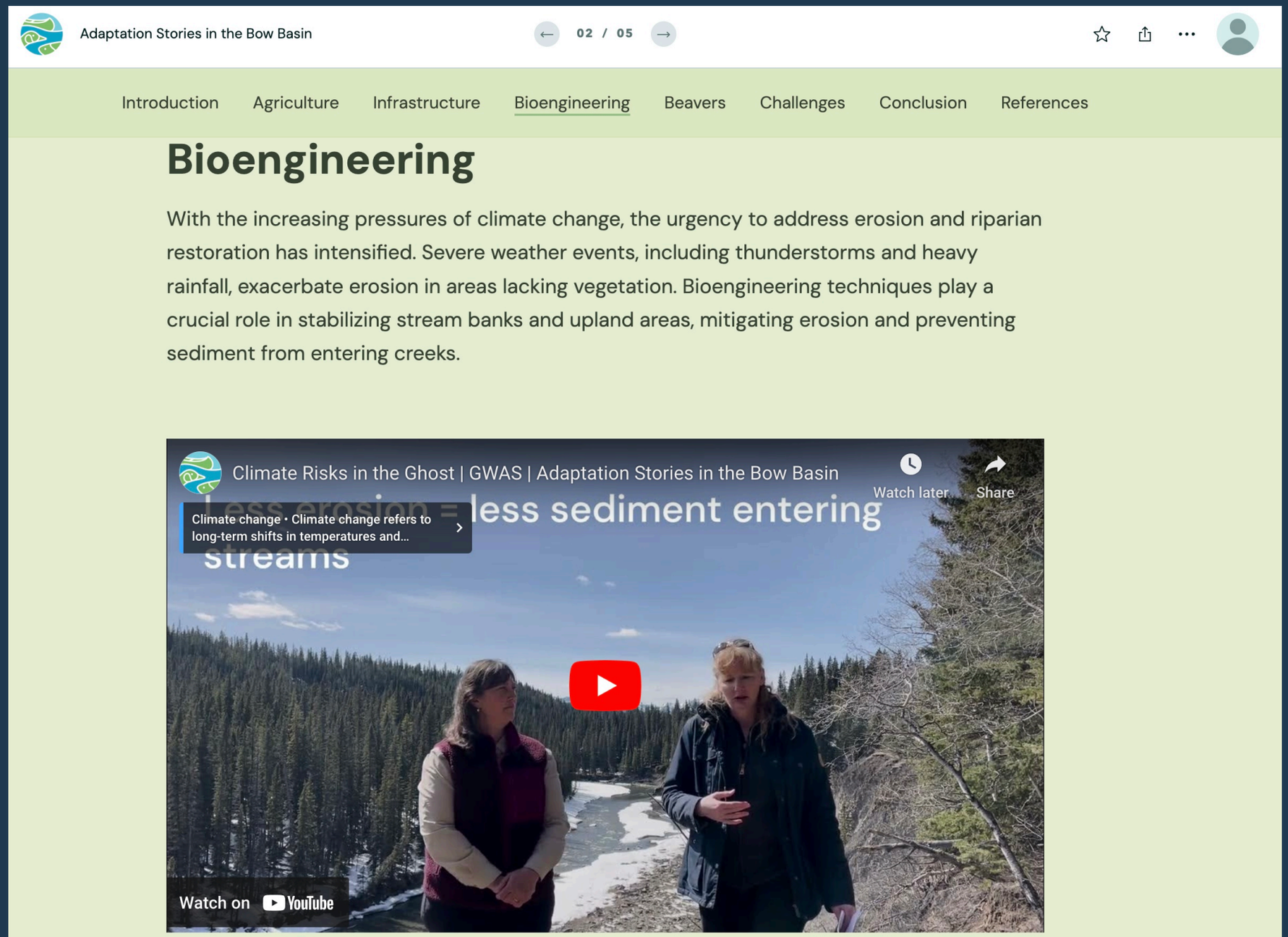
The Ghost Watershed is situated west of the City of Calgary and just east of Banff National Park. It is the northernmost of five sub-basins of the Bow River Basin upstream of major population and economic centres in southern Alberta.

Situated along the Eastern Slopes of the Rocky Mountains, the Ghost River and its tributaries flow through a diverse landscape, eventually discharging into the north arm of the Ghost Reservoir where it flows into the Bow River at the site of the Ghost dam. The gradual eastward decrease in elevation and slope defines this watershed, corresponding with changes in geology, soils, climate, vegetation and human use, all of which change along this west to east gradient.

The Ghost Watershed is 944 km2 in size and contains one of the most scenic landscapes in Alberta, making it a very popular area for recreation. Generally, the biodiversity of the watershed is quite rich with a variety of wildlife, fish and plant populations. However, the watershed is vulnerable to impacts from humans and therefore proper watershed management is necessary to keep these impacts at bay in order to maintain the ecological integrity of the entire Ghost Watershed, from its headwaters to the confluence with the Bow River.

Collaborative Work

- ✦ Bow River Basin Council (BRBC) Climate Adaptation StoryMap
- ✦ Bio-engineering as a tool to make the watershed more resilient
- ✦ Spent a day in the watershed giving interviews to BRBC Intern



Climate Risks in the Ghost | GWAS | Adaptation Stories in the Bow Basin

Collaborative Work

- BRBC Watershed Stewardship Coordinating Committee
- City of Calgary Source Water Protection Plan
- BRBC Forums and other workshops

Photo credit: BRBC

BRBC Groundwater Monitoring Program

- Monitoring of domestic groundwater wells started
- Assessing water levels on a monthly basis
- Equipment provided by BRBC

Photo credit: M. Krainer

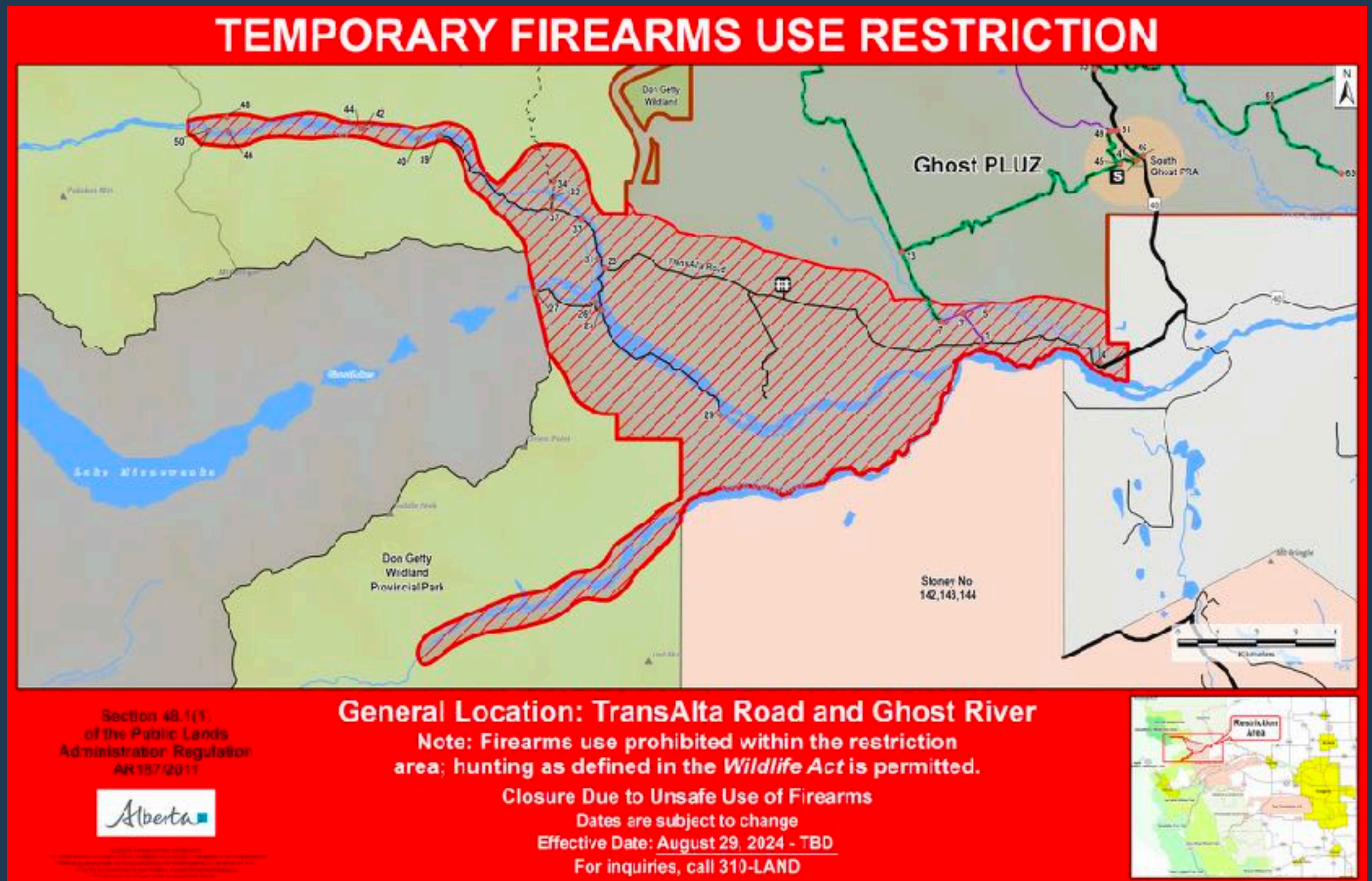
Being a Voice for the Watershed

- ✦ SLS forest harvest plans for Ghost Watershed
- ✦ On-going communication with GoA lands department on recreation issues (target shooting, random camping and trails)

Photo credits: K. Hull & M. Krainer

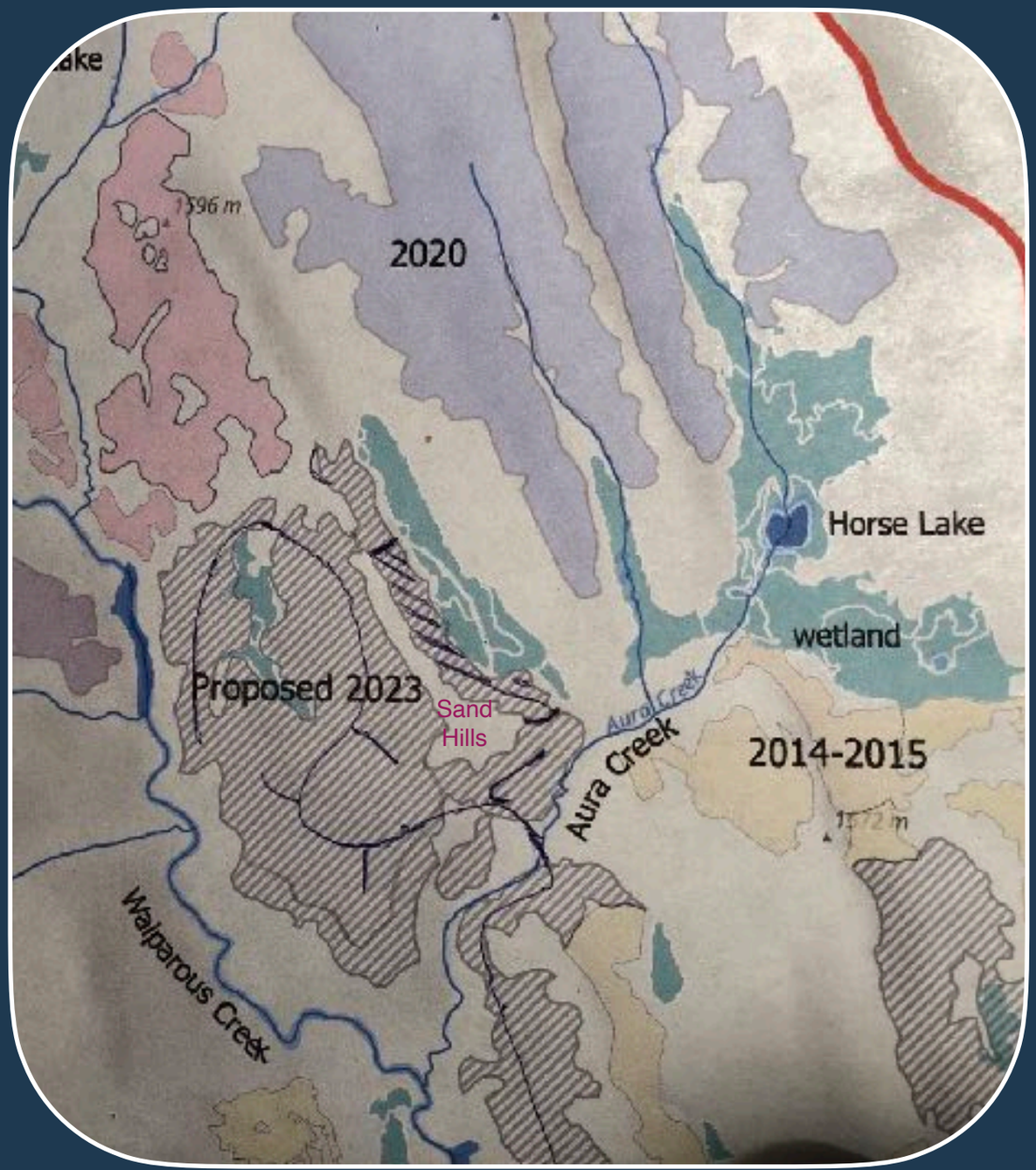
Being a Voice for the Watershed

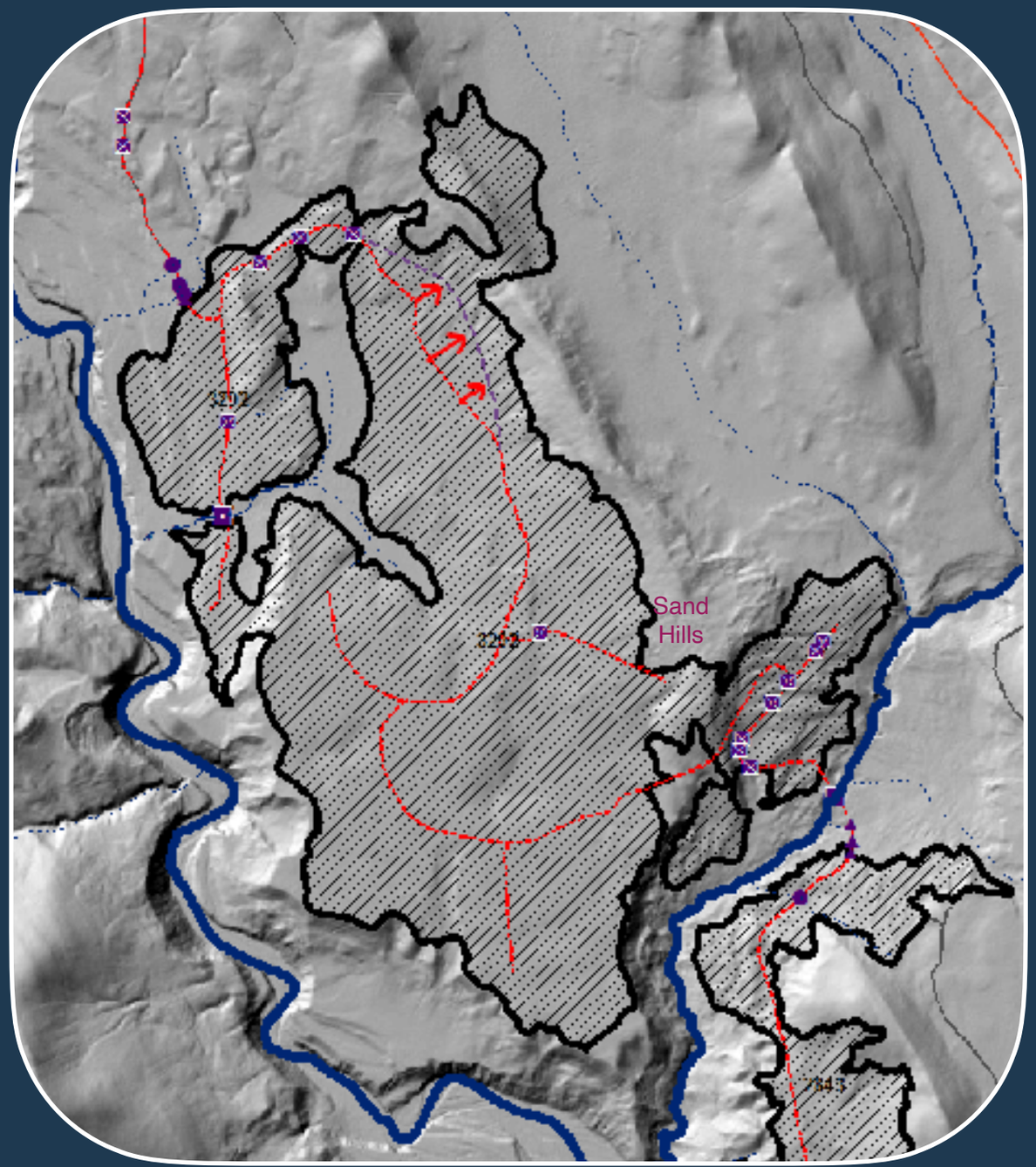
- ✦ AFP implemented a target shooting restriction on Aug 29, 2024
- ✦ GWAS sent a letter to Minister Loewen in support of the target shooting restriction and offering to help with finding solutions



Forestry - Changes to Logging Plans

- In 2023, SLS agreed to reroute haul road away from areas with highly erodible soils at The Cache and the Sand Hills.
- Portion of block to the NE of Sand Hills removed from harvest plan.
- SLS did not build the bridge across Aura Creek.





Forestry

- GWAS continues to communicate with West Fraser / SLS on logging operations
- Met with West Fraser / SLS in March and in the field in April 2024
- Area to NE of Cow Lake was harvested this fall
- Additional blocks further north and near the Cadet Camp to be harvested in 2025

Photo credit: M. Krainer

Forestry

- Discussed options to prevent sediment from entering native trout critical habitat stream with West Fraser / SLS operations staff
- Bio-engineering techniques are an effective tool to prevent run-off from roads to reach streams
- More work to do for GWAS and partners to visualize bio-engineering techniques

Photo credit: M. Krainer

Ghost River Diversion

- Old diversion structure has been inoperable since 2013 flood
- TransAlta is still proposing to rebuild the diversion with a new design
- Water Act application was planned for 2024, but has not gone ahead to date
- North Ghost River is home to a population of bull trout

Photo credit: H. Unger

Plans for 2025

- ✦ Continue Water Monitoring Program
- ✦ Collaboration on landscape planning
- ✦ On-going collaboration with partners on projects and outreach
- ✦ Bio-engineering

Photo credit: M. Krainer

Plans for 2025 (continued)

- ✦ Continue Education & Outreach work
- ✦ Work on further analysis of the data collected
- ✦ Maintain and share our knowledge, improve outreach resources
- ✦ Continue to be a voice for the watershed

Photo credit: C. Hill

How can you help?

- ✦ Being a member of GWAS
- ✦ Raising awareness with family and friends
- ✦ Volunteering for field work (WQ sampling, bio-engineering, etc.)
- ✦ Helping with educational events
- ✦ Taking photos in the Ghost Watershed

Photo credit: M. Krainer

Thank You to our Volunteers!

- ✦ A dedicated, skilled and enthusiastic Board of Directors
- ✦ Passionate volunteers

Photo credit: C. Hill

Thanks to our Partners

BRBC

CALGARY ATV RIDERS ASSOCIATION

COWS & FISH RIPARIAN MANAGEMENT SOCIETY

erwp

Freshwater Conservation Canada

TRAILS 4 TOMORROW

Photo credit: M. Krainer

Thank you to our funders!

Alberta Conservation Association

Alberta Ecotrust

BP Volunteers

City of Calgary

Forest Resource Improvement Association of Alberta
(FRIP grant sponsored by West Fraser / SLS and BRBC)

Land Stewardship Centre

MD of Bighorn

TD Friends of the Environment

Fisheries and Oceans Canada - Habitat Stewardship Program

&

our members and all the generous individual donors!