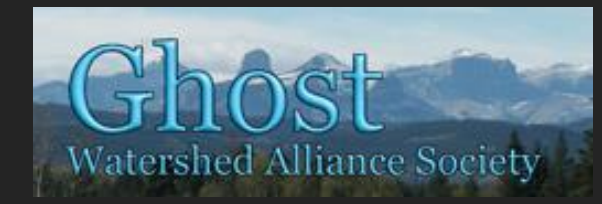
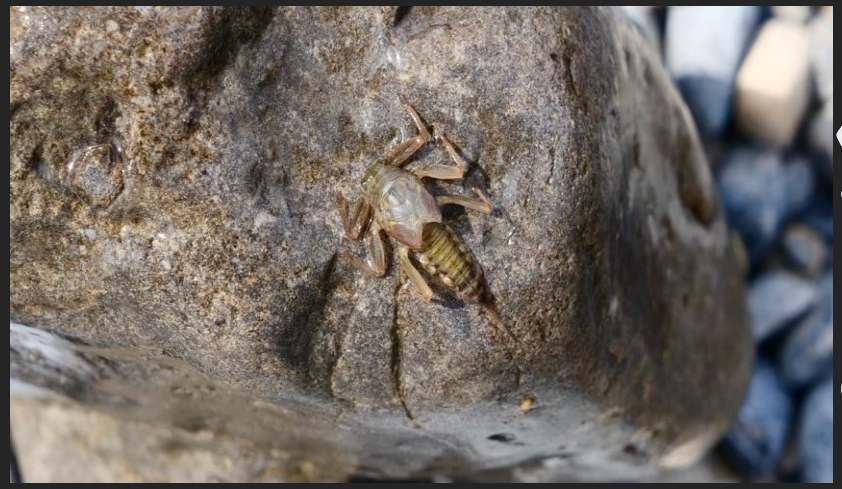




GHOST WATERSHED WATER MONITORING PROGRAM

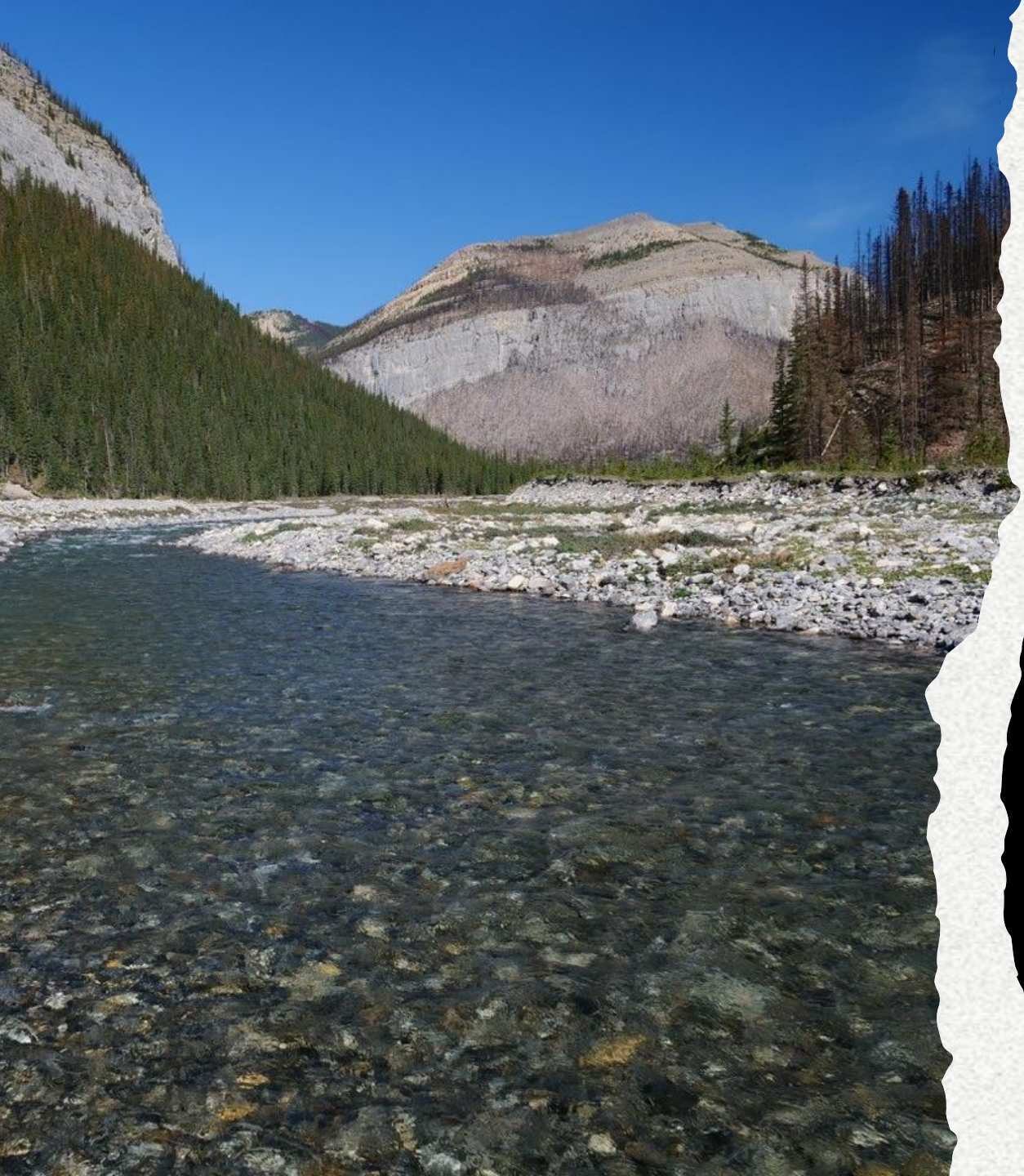
Year 2

Presentation to the

Ghost Watershed Alliance Society

Annual General Meeting

27 November 2021



Water Monitoring Program Components

- CABiN/STREAM
- Lead sampling
- Temperature logging
- CreekWatch
- Turbidity monitoring

STREAM/CABiN Refresher
What are they?

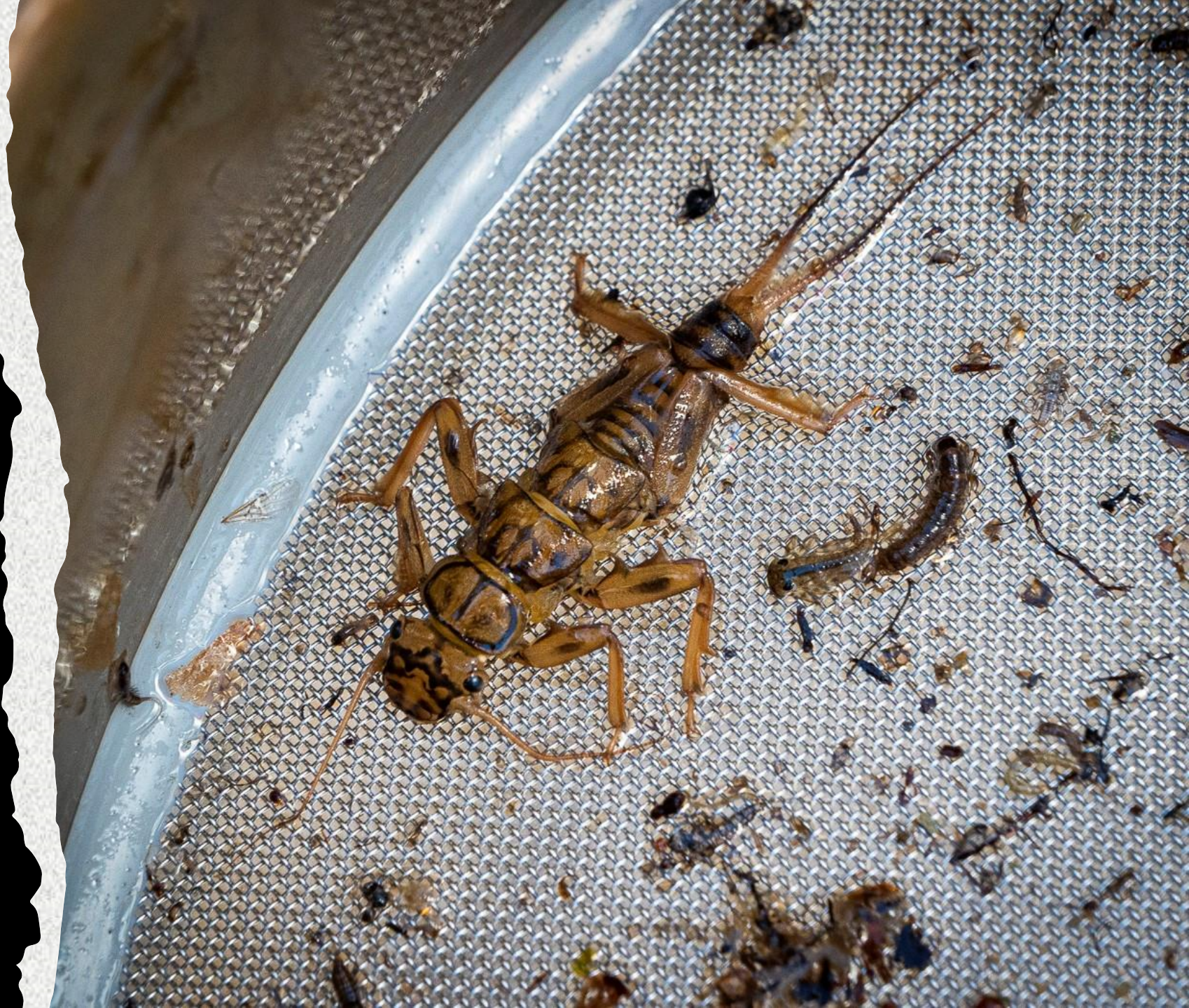
- *STREAM* - Uses DNA analysis to identify freshwater benthic macroinvertebrates and assess aquatic ecosystem health in Canada

- *CABiN* - National biomonitoring program developed by Environment Canada to provide standardized sampling protocols

STREAM/CABiN Components

Biological
- Macro invertebrates

Chemical
- pH
- Dissolved oxygen (DO)
- Specific conductance
- Total suspended solids (TSS)
- Turbidity
- Nitrogen
- Phosphorous
- Major ions



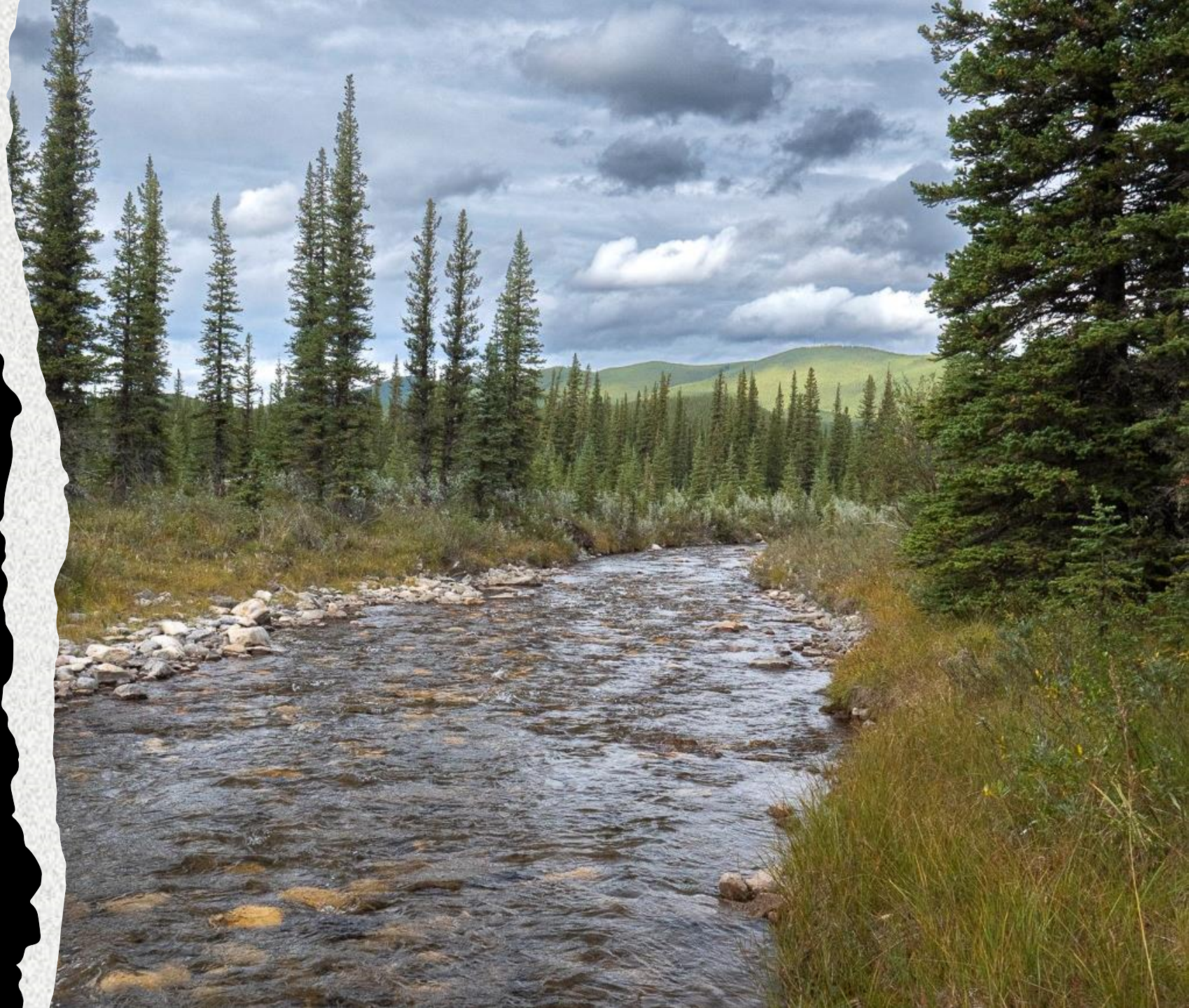
STREAM/CABiN Components

Physical

- Water temperature
- Stream width, depth
- Stream velocity
- Stream slope
- Substrate characteristics
- Degree of embeddedness

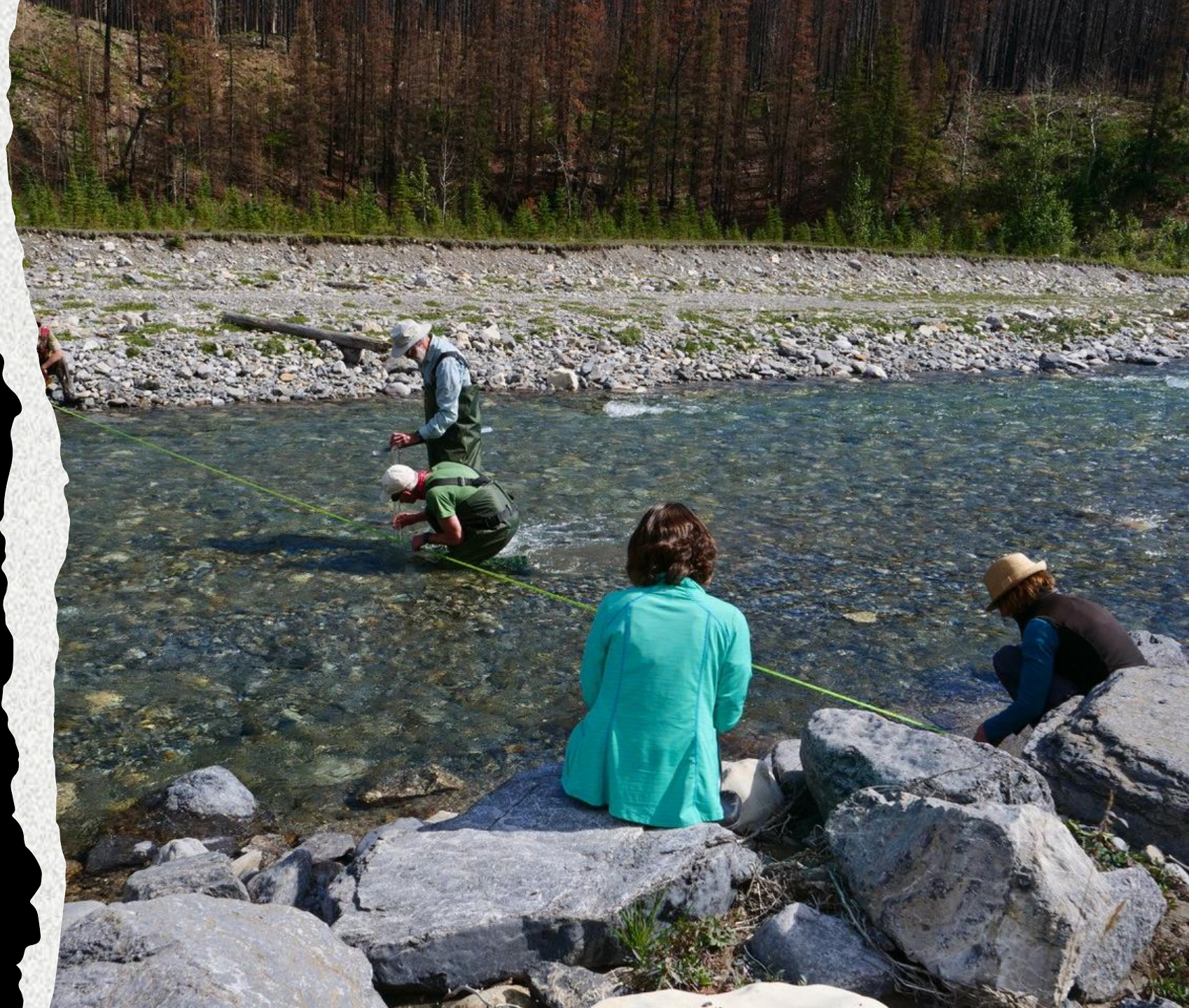
Geographic

- Ecoregion in which the site occurs
- Streamside vegetation
- Surrounding land use
- Stream characteristics
  - Riffle, rapid, run, pool
  - Canopy cover
  - Presence of macrophytes
  - Periphyton coverage



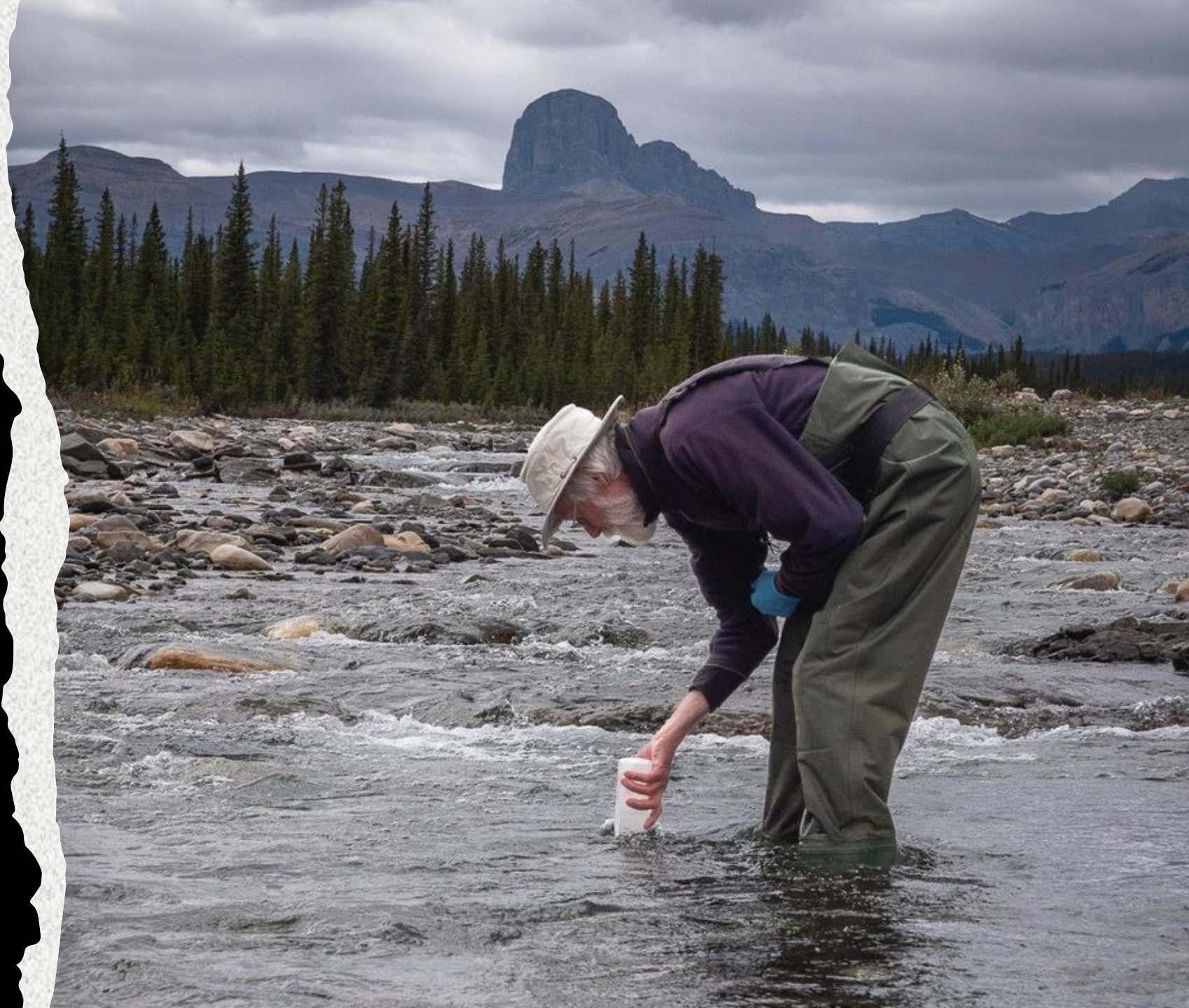
STREAM/CABiN
Objective to;

- Understand impacts of land use and human activity on aquatic ecosystems
- Use a credible sampling method to gather data



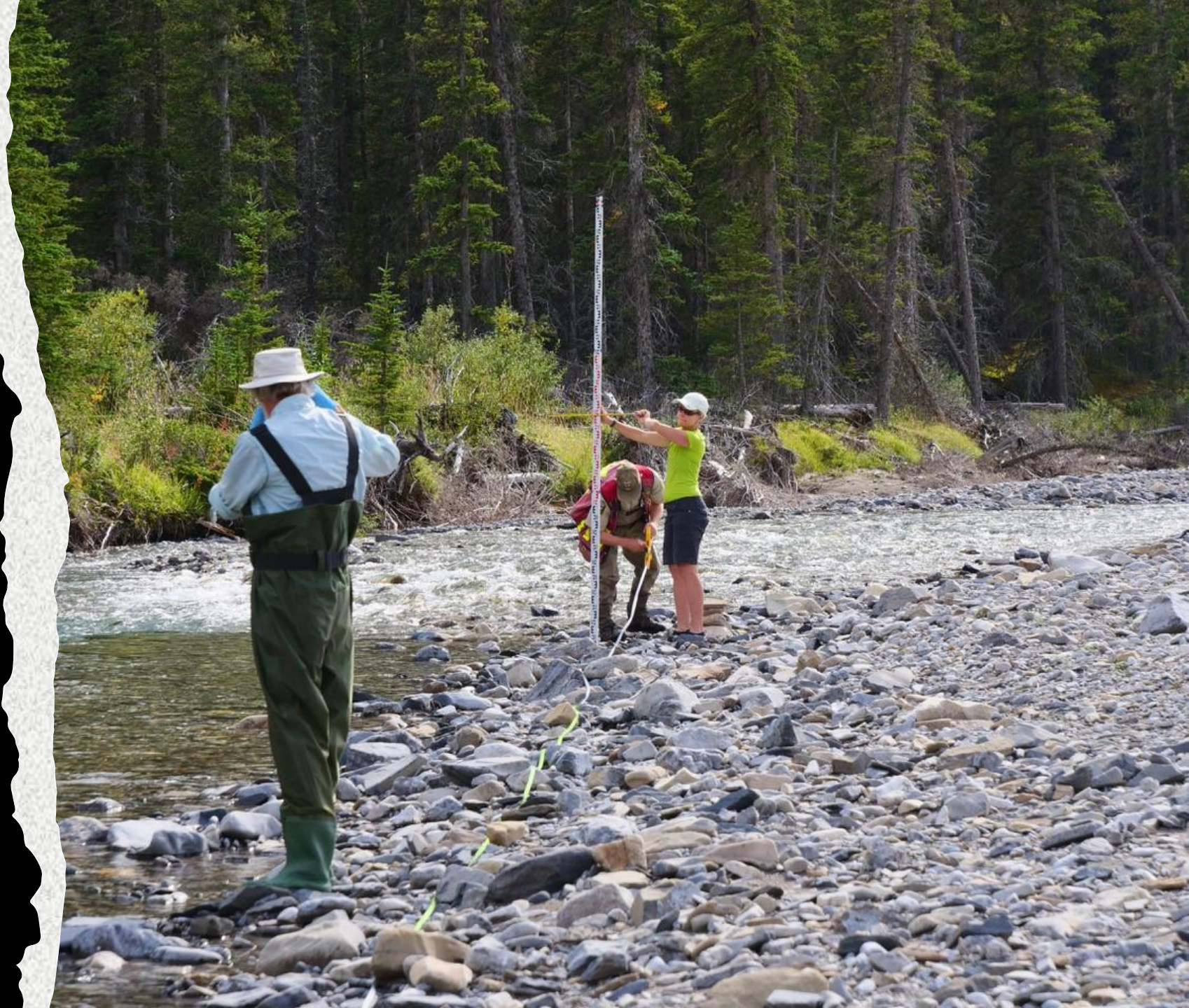
STREAM/CABiN Objective to;

- Provide a baseline of water quality for the watershed
- Be part of a nation-wide method and network that contributes knowledge on the health of Canada’s rivers and streams!



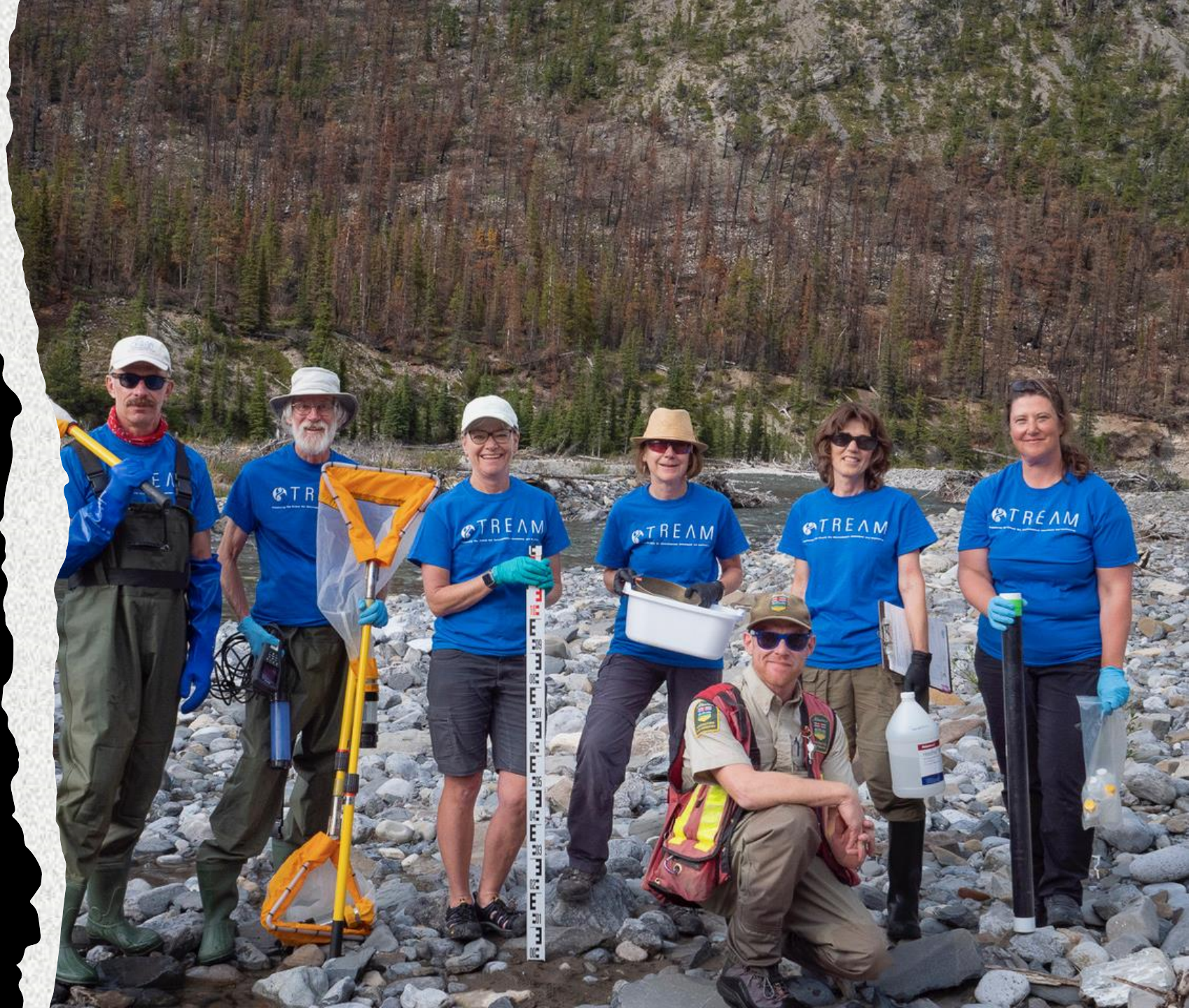
STREAM/CABiN What we did in 2021

- Sampled 8 sites in Aug./Sept. 2021
  - 5 on the Ghost River
  - 2 on Waiparous Creek
  - 1 on Johnson Creek
  - 3 STREAM samples and 1 CABiN sample taken at each



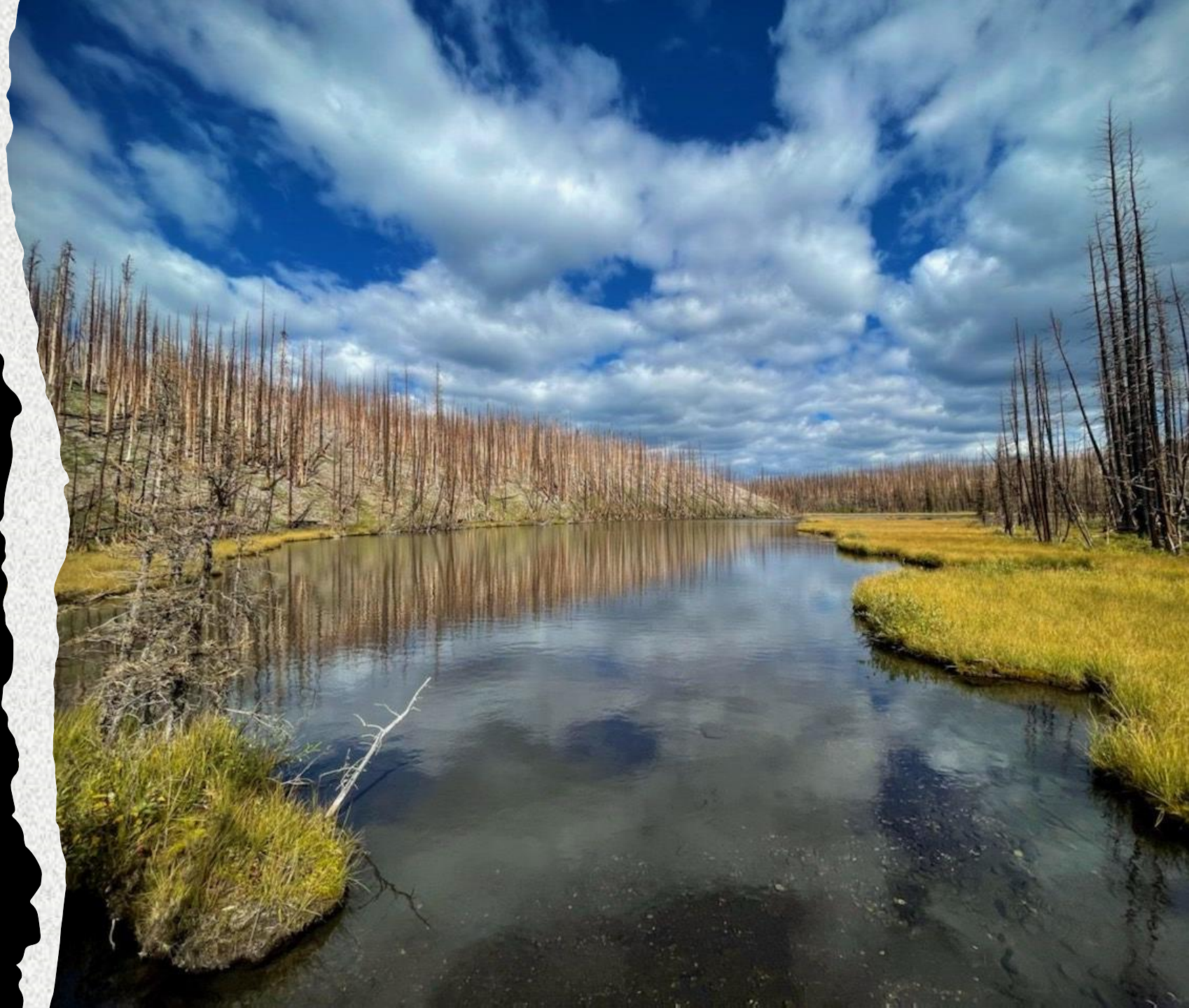
2020 Devil's Head Fire Impact

- Sampled in the Ghost Wilderness Area upstream of the fire
- Sampled at the Trans Alta Diversion dam site near the downstream end of the fire
- Impacts from the fire detected?



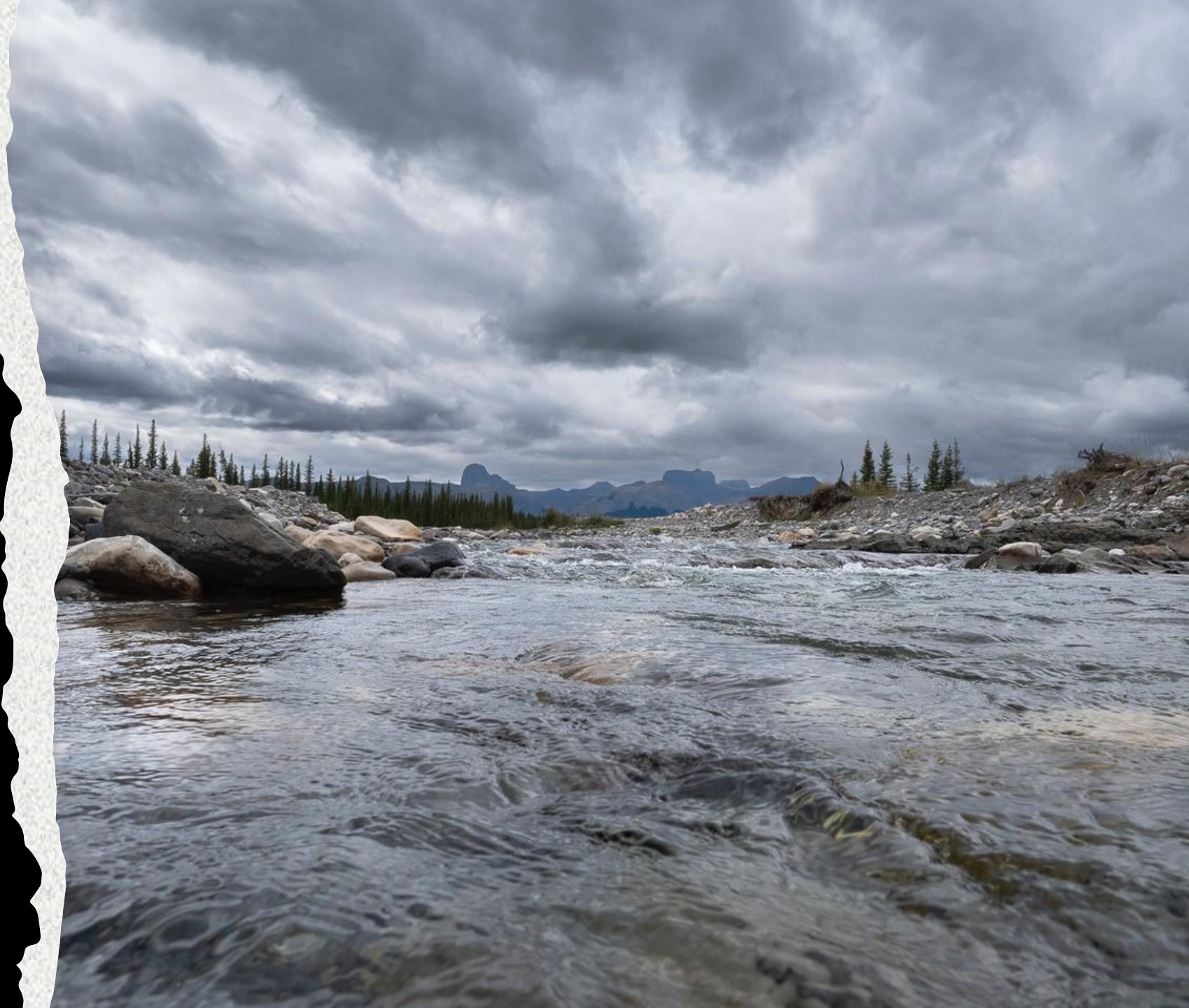
2020 Devil's Head Fire Impact

- Johnson Creek sampled
- Waiparous above and below confluence with Johnson Creek sampled
- SW headwaters at Johnson Lake burned



Results from 2020

- Water chemistry indicates high water quality in Waiparous Creek
- Excellent populations of EPT (pollution intolerant macro invertebrates - stoneflies, mayflies, and caddisflies)
- Minor reduction in EPT/total downstream near confluence with Ghost River
- Full report available



Acknowledgements

Supportive Organizations

- *Canadian Aquatic BioMonitoring Network* (*CABiN*), Environment and Climate Change Canada
- Hajibabaei Lab, Centre for Biodiversity Genomics, University of Guelph
- *Living Lakes Canada*
- World Wildlife Fund (Canada)
- Alberta Agriculture and Forestry
- Trout Unlimited
- Bow River Basin Council (BRBC)

Canada

WWF

Trout Unlimited
Canada

UNIVERSITY of GUELPH

Acknowledgements

Funding Agencies

- Department of Fisheries and Oceans – Habitat Stewardship Program
- Alberta Ecotrust
- Land Stewardship Centre
- Forest Resource Improvement Association of Alberta (FRIP grant) - sponsored by Spray Lake Sawmills and Bow River Basin Council

Supportive Suppliers

- Bureau Veritas Laboratories
- Cordillera Consulting
- Halltech Aquatic Research
- Oak Environmental Inc.
- Alberta Environment and Parks

Fisheries and Oceans Canada

Pêches et Océans Canada

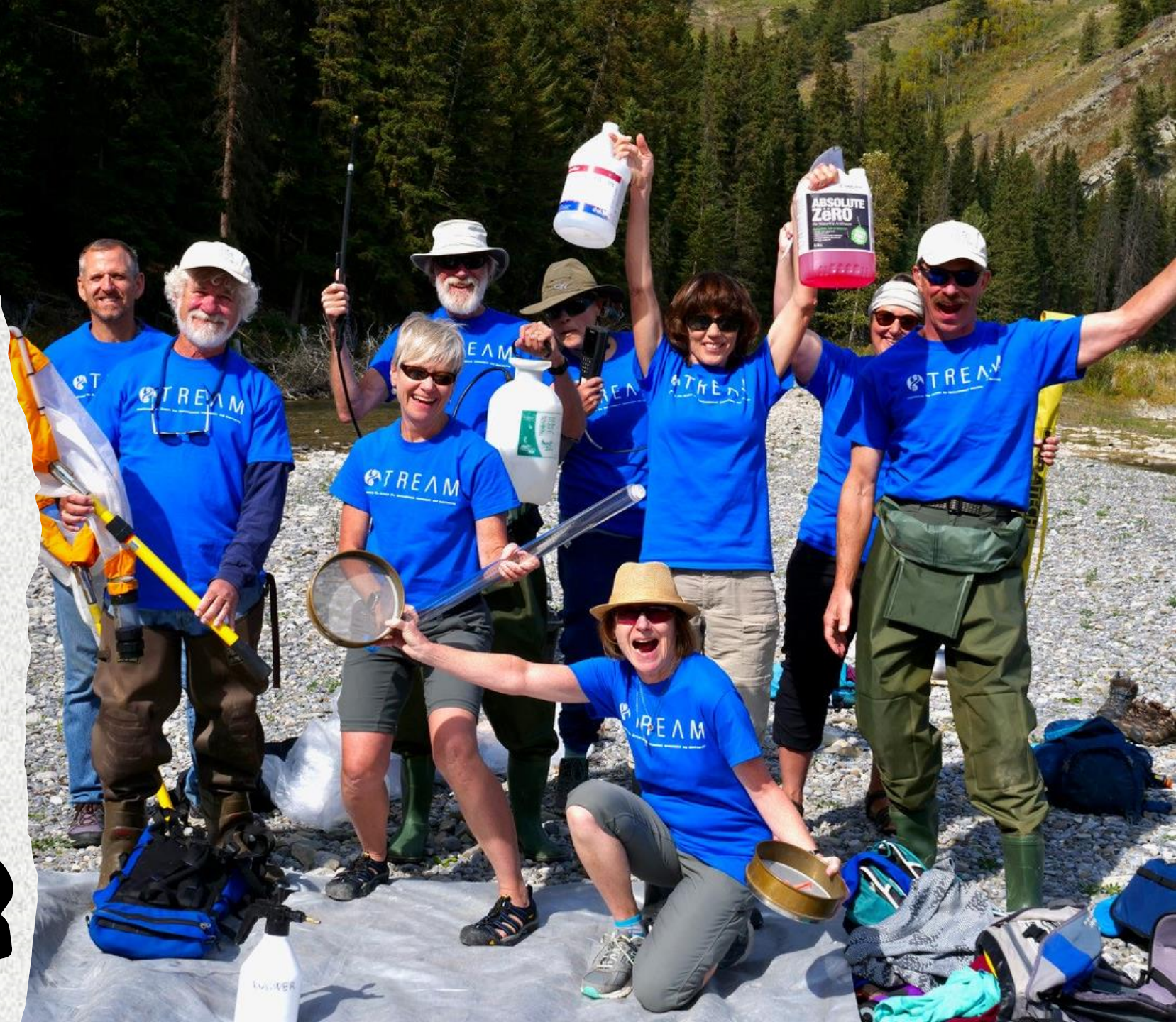
ALBERTA ecotrust

Land Stewardship Centre

Ghost
Watershed Alliance Society

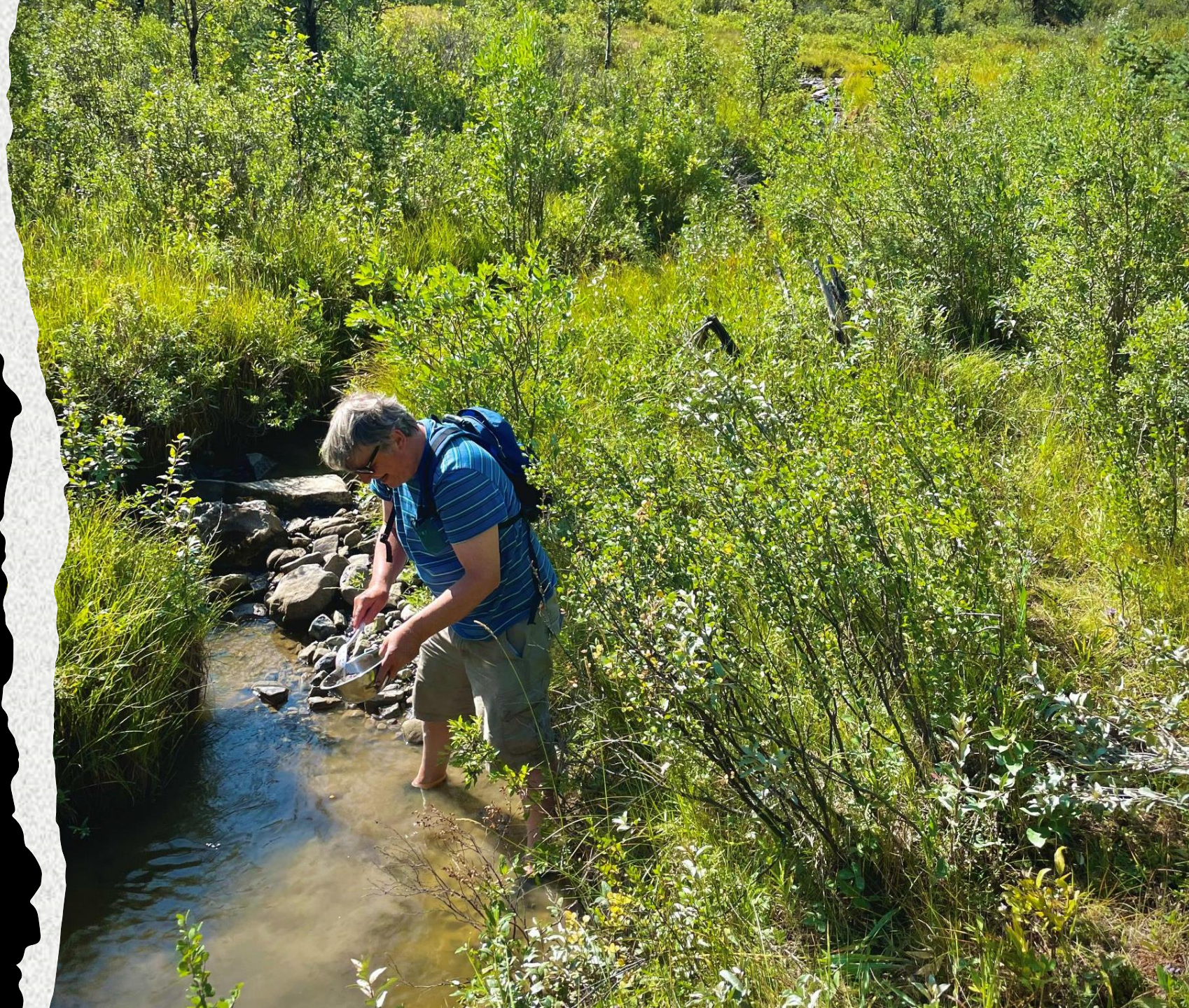
Acknowledgments

GWAS Volunteers!

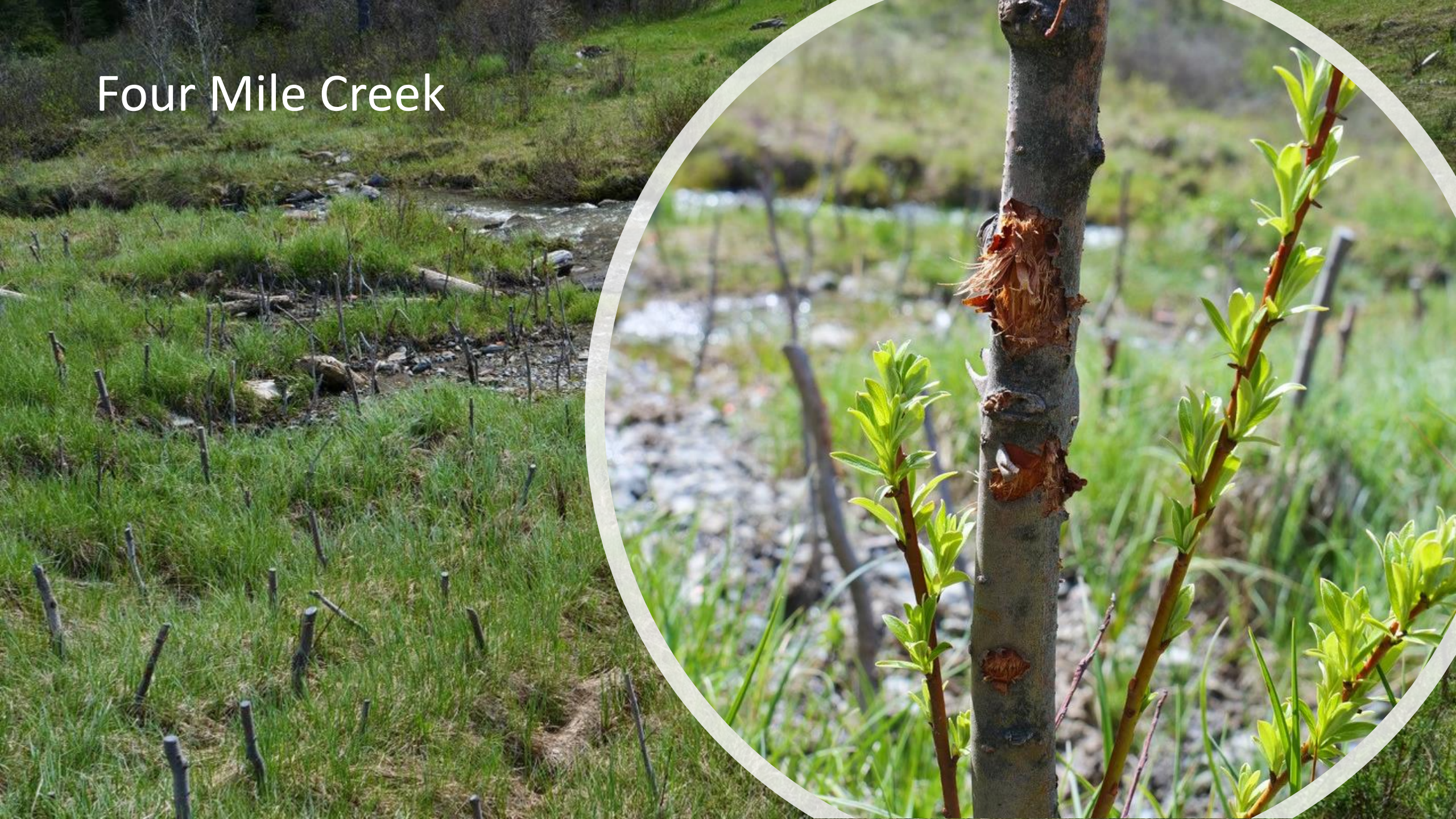


Lead in stream sediment sampling

- Objective – see if target shooting at Four Mile Creek has impacted sediments
- 5 sites sampled along creek, 3 samples / site
- Results – all samples have elevated lead compared to upstream control site
- Next steps – discuss findings with Gov and partner organizations

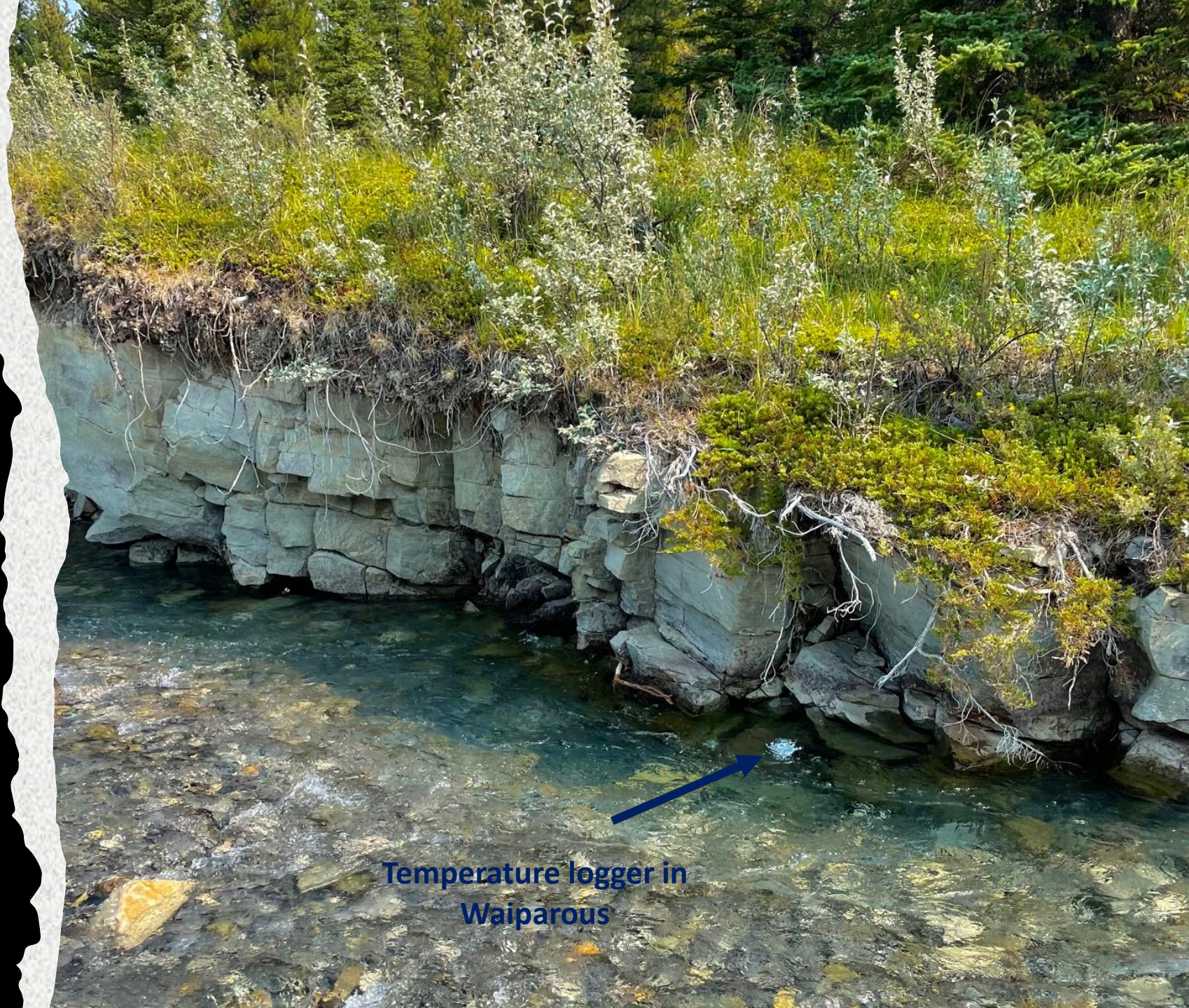


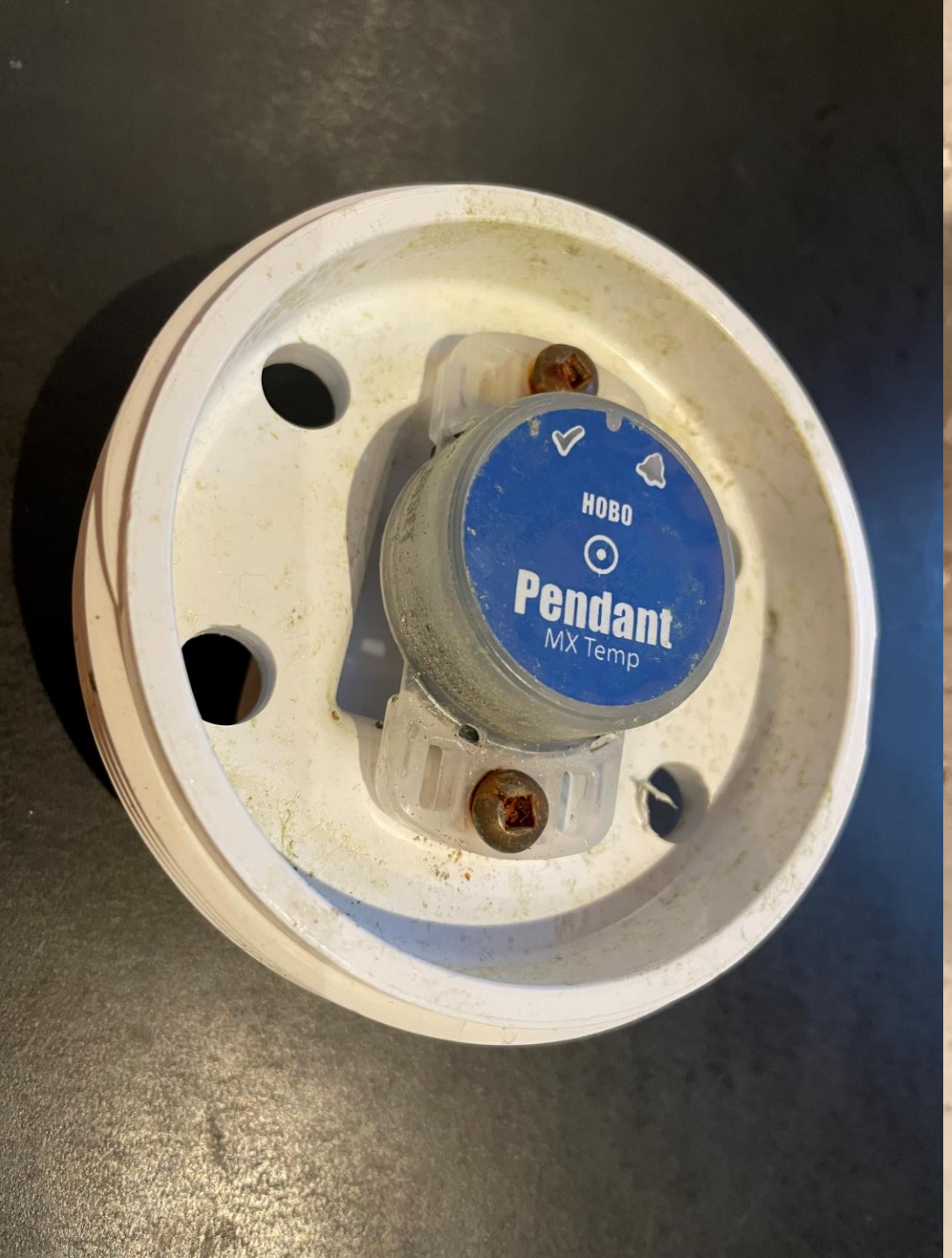
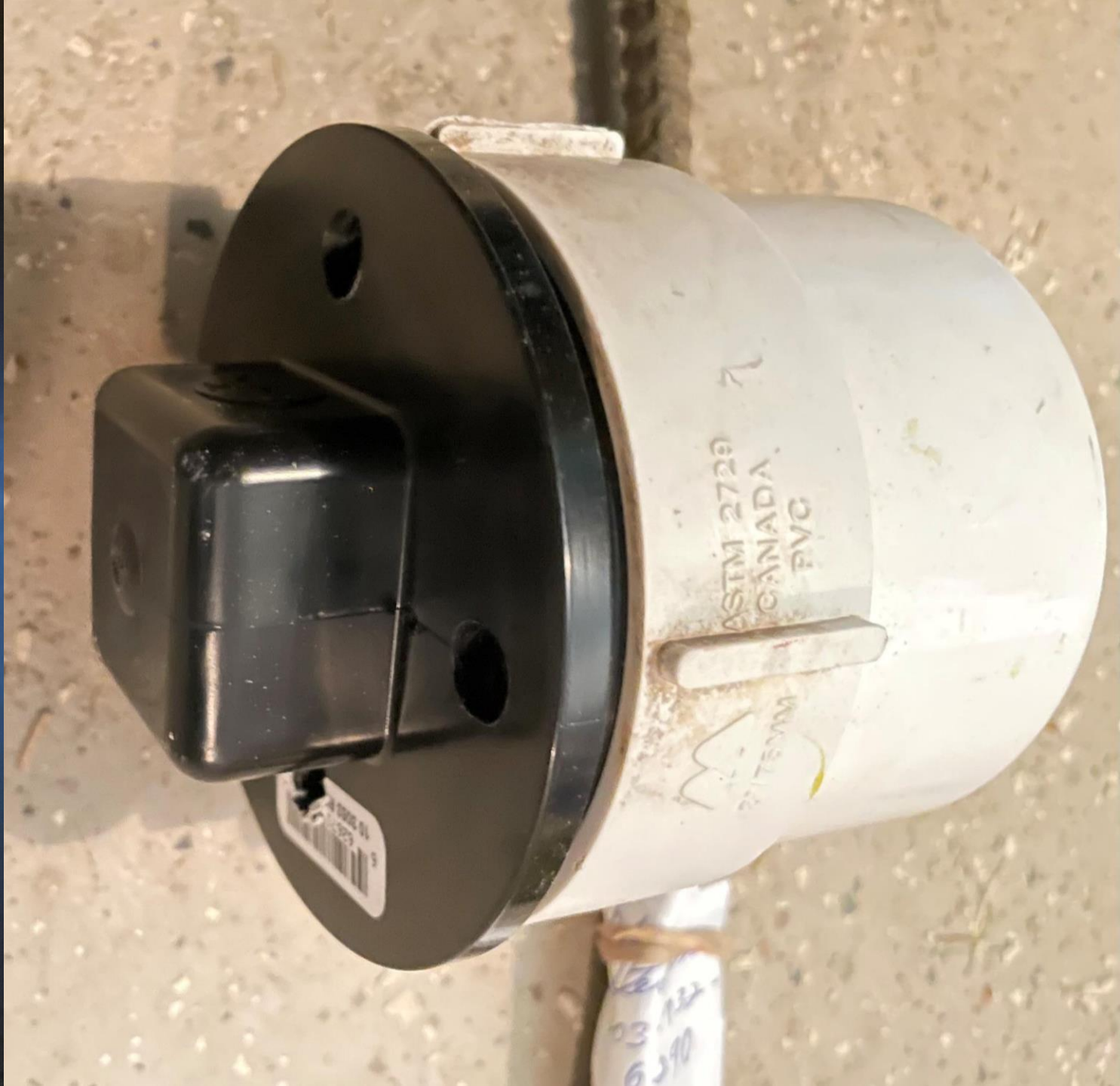
Four Mile Creek



Water Temperature Logging

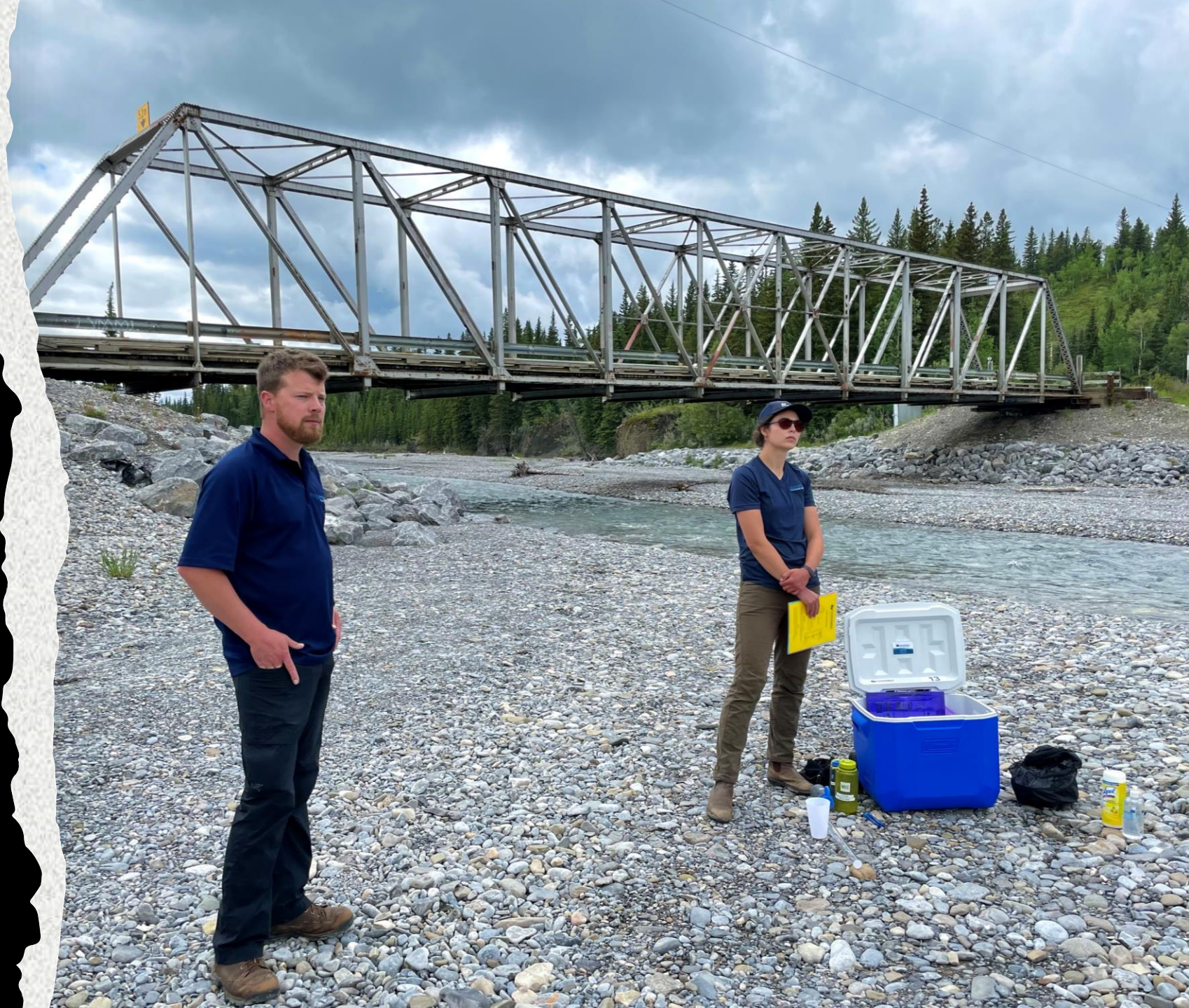
- Objective – understand water temperature dynamics
- Reason – temperature a key indicator of stream health
- Locations – 3 in Ghost, 2 in Waiparous




HOBO
Pendant
MX Temp

ASTM 2729
CANADA
PVC

CreekWatch

- Community - based citizen science
- Water sampled weekly through summer
- Specific parameters include
  - Water temperature
  - Air temperature
  - Turbidity
  - pH
  - Dissolve oxygen
  - Ammonium nitrogen
  - Phosphorous
  - Chloride



Thanks!

Questions?