

**RESEAU**  
centre for mobilizing innovation

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# **Pilot Evaluation of Alternative Drinking Water Treatment Options for GBID**

Friday, September 18<sup>th</sup>

# GBID's Project Mission & Vision

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## Mission

Our mission is to enhance the quality of life for our people by creating a healthy and self-sufficient community through:

- Pilot evaluation of alternative drinking water treatment options for GBID
- Being fiscally responsible and increasing our own source revenue
- Building community capacity
- Developing business opportunities that are built on traditional knowledge, community strengths and are based on the realities of the market

## Vision

### Sustainable Resource Management

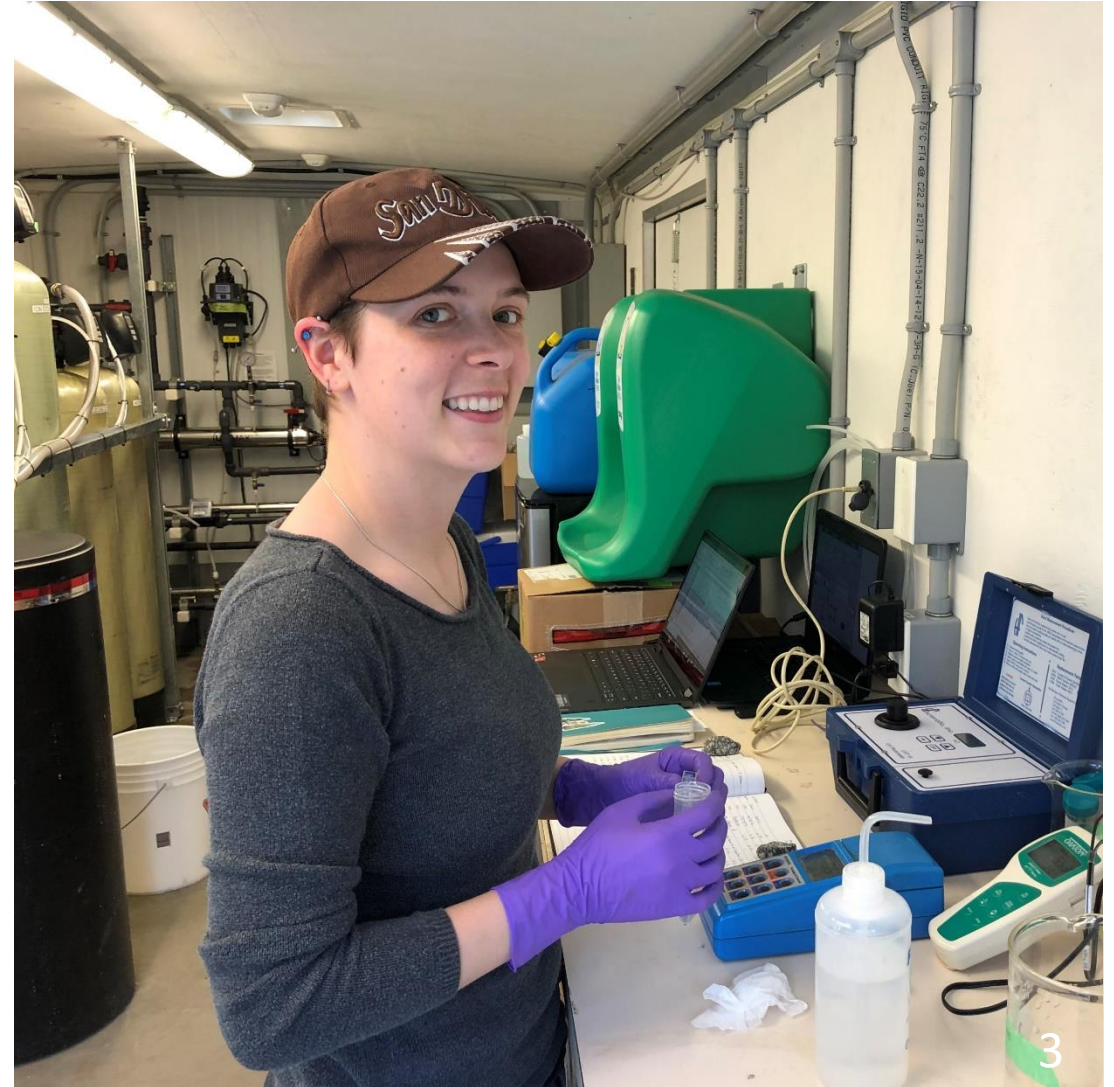
- Healthy People
- Strong Culture
- Healthy Environment
- Successful Economy
- Strong Governance System



# Project History

Jaycee Wright is a Master's student at UBC, working with RESEAU CMI

She joined this project in 2018 as an undergraduate student and is excited to continue working with the community of Gillies Bay!



# Existing System - Insufficient

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## British Columbia Drinking Water Quality Objectives:

- 4-log (99.99%) inactivation of viruses
- 3-log (99.9%) inactivation of Giardia Lamblia and Cryptosporidium
- 2 treatment processes
- < 1 NTU turbidity, target of 0.1 NTU
- 0 total and fecal coliforms

## Existing System:

- One treatment process:  
Chlorination
- Johnson screen at intake

# Treatment Solution Options

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GAC: Porous carbon that adsorbs DOC

BAC: Biological activity on GAC performs DOC removal

IEX: Chemical exchange resins remove DOC

BIEX: Biological activity on IEX resins is suspected to perform DOC removal



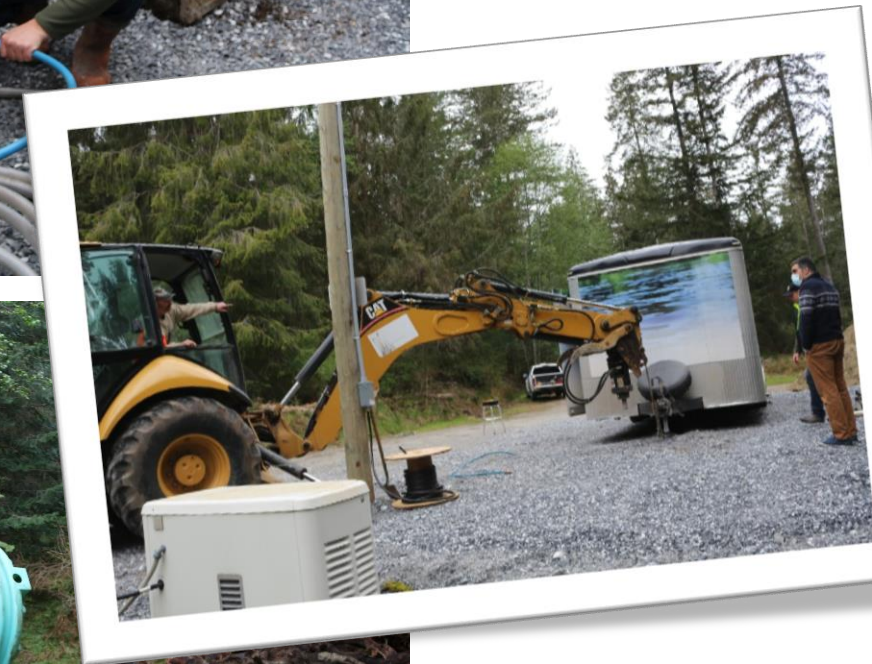
# Pilot Project Phases





# Phase One

- Delivery of mobile treatment laboratory to site
- Water and electrical connection
- Wastewater tank installation and connection





# Phase Two

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- Startup and troubleshooting of system
- Startup of GAC and IEX
- On- and off-site water analysis





# Phase Three (Current Phase)

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- Transition to long-term, continuous operation
- GAC and IEX transition to BAC and BLEX
  - On- and off-site water analysis
- Site visits to provide maintenance and support



# Piloting Objectives

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## Process options:

- Granular activated carbon (GAC)
- Biological activated carbon (BAC)
- Ion exchange (IEX)
- Biological ion exchange (BIEX)

Assess performance of technologies

Optimize system for water conditions





# Cranby Lake Surface Water Characteristics

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- High organics content: 7.5 – 11.3 mg/L total organic carbon (TOC)
- Low chloride content: ~4.7 mg/L
- Low sulphate content: ~2.7 mg/L
- No fluoride, bromide, nitrite, nitrate, or phosphate



# Natural Organic Matter (NOM)

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- Measured as total organic carbon (TOC)
- React with chlorine to create toxic disinfection by-products (DBPs)
- NOM removal:
  - Consumes coagulant, food for microorganisms create biofilms
- GBID needs specialized technologies
  - Robust
  - Reduced chemicals
  - Low maintenance



# Treatment Performance Assessment



# Treatment Performance Assessment

## IEX TOC removal:

78% down to 30% after 700 hours

## BIEX TOC removal:

30% to 50% after 800 hours

## GAC TOC removal:

78% down to 19% after 300 hours

## BAC TOC removal:

19%

Parameter (Avg)	Raw Water	Treatment Option Effluent Values			
		IEX	BIEX	GAC	BAC
TOC (mg/L)	9.20	3.43	4.42	5.55	7.34
UVT (%)	66.5	92.1	88.7	83.3	71.4
Turbidity (NTU)	0.80	0.37	0.30	0.37	0.29



# System Pressure Monitoring

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- Indicates frequency of filter changes
- Currently changing cartridge filters every 10 days
- Examining increasing filter sizes to extend filter life and reduce consumables





# Future Steps

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- Continued analysis of treatment technology effectiveness
- Continued monitoring as water quality changes over the next 8 months
- Continued support
- Schedule regular meetings





# Thank you for your support!

- RESEAU CMI
- Gillies Bay Board of Trustees
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- Jaycee Wright
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- Candace Cook

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Thank You!