

# Wilderness Mountain Water System

2022 Annual Report

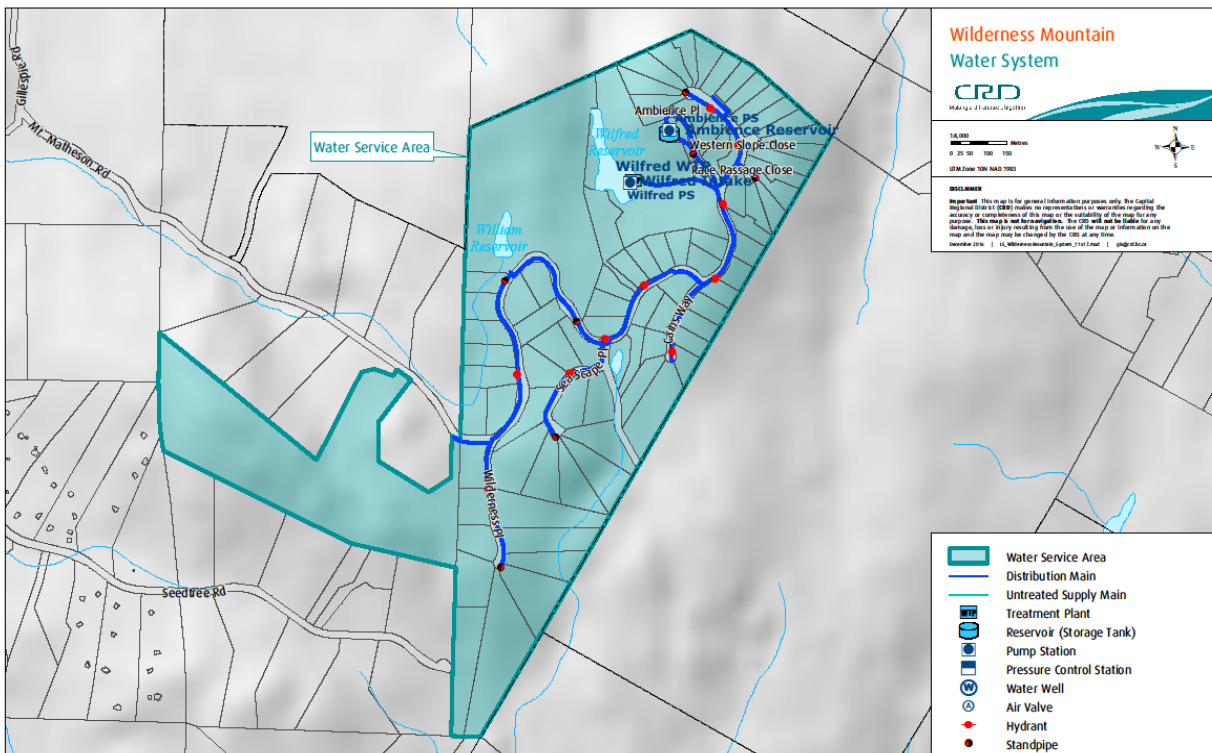
**CRD** | Drinking Water

## Introduction

This report provides a summary of the Wilderness Mountain Water Service for 2022 and includes a description of the service, summary of the water supply, demand and production, drinking water quality, operations highlights, capital project updates and financial report.

## Service Description

The community of Wilderness Mountain is a rural residential development located on Mount Matheson in the Juan de Fuca Electoral Area. The area was originally serviced by a private water utility from about 1983, and in 2008 the service converted to the Capital Regional District (CRD). The Wilderness Mountain water service is made up of 82 parcels encompassing a total area of approximately 124 hectares. Of the 82 parcels, 74 were customers to the water system in 2022.



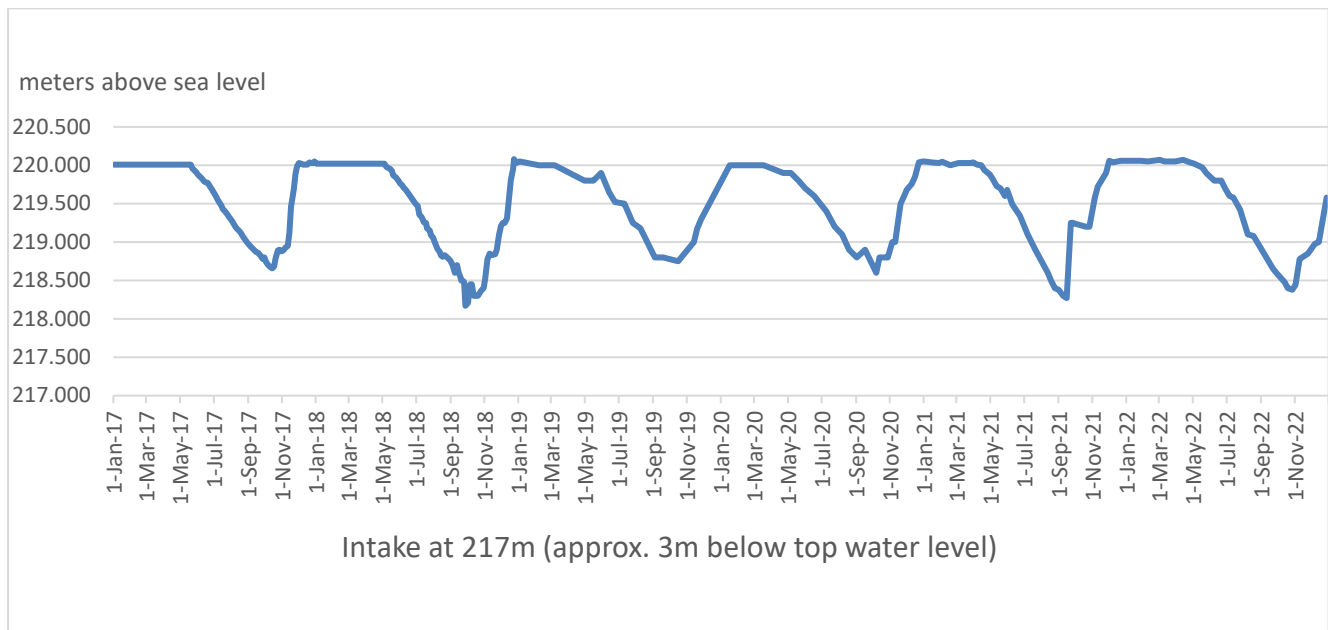
**Figure 1: Map of the Wilderness Mountain Water Service Area**

The Wilderness Mountain water system is primarily comprised of:

- Raw water obtained from Wilfred Reservoir, a small surface water body which lies within a protected watershed and was created by the construction of two dams.
- Water from Wilfred Reservoir is pumped to the treatment plant which consists of coarse cartridge filtration, ultraviolet disinfection and chloramine disinfection.
- The chloraminated water is then pumped to two distribution system storage tanks (combined capacity of 250 cubic metres or 66,000 US gallons) and the distribution system.
- Distribution system. 3,750 meter network of 150 millimeter (6 inch) and 100 mm (4 inch) polyvinyl chloride (PVC) water mains.
- Other water system assets: 74 service connections, 10 hydrants, six standpipes, 21 gate valves and a Supervisory Control and Data Acquisition (SCADA) system.
- Although the water system also includes the William Brook Dam and related water reservoir, this reservoir is no longer utilized for water supply.

## Water Supply

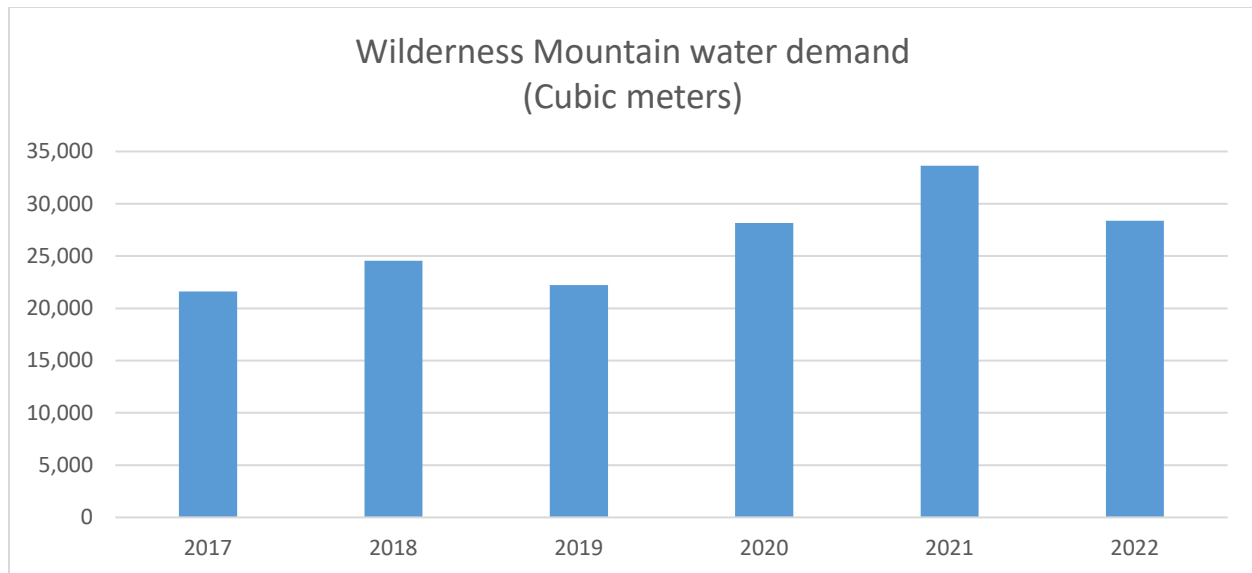
The raw water supply level in Wilfred Reservoir is shown in Figure 2. The lake level was at its lowest point in October. The reservoir reached full volume in January 2022.



**Figure 2: Wilfred Reservoir Water Level 2017-2022**

## Water Usage

The volume used by the community, or the water demand, is illustrated in Figure 3. The demand in 2022 was 16% lower than in 2021 and within 1% the five year average.



**Figure 3: Wilderness Mountain Water Demand (cubic meters) 2016-2022**

### Drinking Water Quality

The Wilderness Mountain Water System was on a boil water advisory (BWA) for 78 days in 2022 due to elevated turbidity in the treated water. High algal activity and the inability of the existing filtration system to filter out very small algae species in bloom were the main factors for this long BWA for this system. Ongoing discussions with the Commission, Island Health, and CRD staff are taking place to plan upgrades in the near future to mitigate this situation.

Wilfred Reservoir raw water exhibited elevated iron and manganese concentrations throughout the entire year, but especially during the fall and winter. Lake turnover and rain-driven runoff events are the main causes. Without designated treatment in place to remove these metals from the raw water, the aesthetic objective for manganese, as per Guidelines for Canadian Drinking Water Quality (GCDWQ), was regularly exceeded in the treated water. Iron concentrations exceeded the aesthetic objective during the wet season. In samples from November 16, the manganese concentrations in the treated water even exceeded the maximum acceptable concentration (MAC), the health-related limit stipulated by the GCDWQ. Concentrations beyond the aesthetic limit can lead to water discolourations, while exceedances of the MAC can become a health issue with chronic exposure. Because the disinfection process in the Wilderness Mountain Water System utilizes chloramination, the effects on customers in terms of discoloured water may have been reduced. Additional treatment is required to mitigate this ongoing issue.

The data below provides a summary of the water quality characteristics in 2022:

#### Raw Water:

- In September, the raw water exhibited a higher spike of total coliform bacteria concentrations. Aside from that, total coliform concentrations were low throughout the year.
- *E. coli* bacteria concentrations were mostly low with higher concentrations in the fall following the first post-summer rainfall and runoff event.
- *Cryptosporidium* and *Giardia* parasites were tested twice in 2022 and neither were detected.

- The raw water was tested for metals in February, May, September and November. The results indicate that both iron and manganese concentrations are particularly high during the wet season in fall and winter. Cause for this is likely a combination of the lake turnover in October/November and runoff from rainfall events.
- The median annual raw water turbidity was 0.8 Nephelometric Turbidity Unit (NTU) and therefore lower than in 2021. The maximum turbidity was 1.6 NTU (July and August). Most raw water turbidity spikes coincided with algal and/or zooplankton blooms in Wilfred Reservoir.
- The raw water was soft (median hardness 14.15 mg/L CaCO<sub>3</sub>).
- The pH was slightly acidic (median pH 6.84), slightly lower than in previous years.
- The median total organic carbon (TOC) concentration was moderately high at 3.85 mg/L, which is in line with results pre-2021.

#### Treated Water:

- The treated water was bacteriologically safe to drink outside the 78 day BWA from July 20 to October 5. No *E. coli* bacteria were found in the treated water and only one of 90 bacteriological samples tested positive for total coliform bacteria throughout the year (July 20: 1 CFU/100mL in the North Cell of the distribution reservoir).
- The treated water turbidity was periodically above the GCDWQ turbidity limit of 1.0 NTU in particular during summer and fall. This led to the aforementioned prolonged BWA.
- Manganese concentrations exceeded the aesthetic objective in the treated water during most parts of the year. One treated water sample from November was above the MAC in the GCDWQ. Iron concentrations were elevated throughout the year and in November and February in exceedance of the aesthetic objective. Despite the exceedances, no significant water discolouration was reported by customers.
- The disinfection by-products Trihalomethanes (TTHM) and Haloacetic Acids (HAA) were well below the GCDWQ limits.
- The annual median total chlorine residual in the system was 2.48 mg/L.

Table 1 and 2 below provide a summary of the 2022 raw and treated water test results.

Water quality data collected from this drinking water system can be reviewed on the CRD website:

<https://www.crd.bc.ca/about/data/drinking-water-quality-reports>

### Operational Highlights

The following is a summary of the operational issues that were addressed by CRD Integrated Water Services staff:

- Cleaning and inspection of concrete tanks
- Flushing of distribution system
- Maintenance of all 10 fire hydrants
- Replacement of intake pump at Wilfred Reservoir
- Replacement of UV sensors at Treatment Plant
- Monthly dam inspections and dam maintenance

## Capital Project Updates – 2022

- Source Water Protection Plan Report – Complete
- Water Treatment Plant Conceptual Design Report – Complete

## Financial Report

Please refer to the attached 2022 Statement of Operations and Reserve Balances.

Revenue includes parcel taxes (Transfers from Government), fixed user fees (User Charges), water sales and interest on savings (Interest earnings), and miscellaneous revenue such as late payment charges (Other revenue).

Expenses include all costs of providing the service. General Government Services include budget preparation, financial management, utility billing and risk management services. CRD Labour and Operating Costs include CRD staff time as well as the costs of equipment, tools and vehicles. Debt servicing costs are interest and principal payments on long term debt. Other Expenses include all other costs to administer and operate the water system, including insurance, supplies, water testing and electricity.

The difference between Revenue and Expenses is reported as Net revenue (expenses). Any transfers to or from capital or reserve funds for the service (Transfers to Own Funds) are deducted from this amount and added to any surplus or deficit carry forward from the prior year, yielding an Accumulated Surplus (or deficit) that is carried forward to the following year.

2023 service budget with no increase recommended by the Commission resulted in removal of funding for cyclical maintenance and planned Water Treatment upgrades, which is not sustainable for future years. The service is experiencing ongoing drinking water quality issues, which requires system cyclical maintenance and capital upgrades to provide additional treatment in order to mitigate the ongoing water quality issues and potential risk of not meeting health regulatory requirements. The Commission will be engaged for ongoing discussions regarding sustainable service delivery, regulatory compliance requirement and prudent financial planning for future years.

|               |   |
|---------------|---|
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Attachment: 2022 Statement of Operations and Reserve Balances

For questions related to this Annual Report please email [IWSAdministration@crd.bc.ca](mailto:IWSAdministration@crd.bc.ca)

**Table 1**

| Table 1: 2022 Summary of Raw Water Test Results, Wilderness Mountain Water System         |                          |                         |                  |                       |          |                           |                                |                  |                       |          |
|---|--------------------------|-------------------------|------------------|-----------------------|----------|---------------------------|--------------------------------|------------------|-----------------------|----------|
| PARAMETER   |                          | 2022 ANALYTICAL RESULTS |                  |                       |          | CANADIAN GUIDELINES       | 2012 - 2021 ANALYTICAL RESULTS |                  |                       |          |
| Parameter Name  | Units of Measure         | Annual Median           | Samples Analyzed | Range Minimum Maximum |          | ≤ = Less than or equal to | Median                         | Samples Analyzed | Range Minimum Maximum |          |
| mg/L = parts per million ug/L = parts per billion   |                          |                         |                  |                       |          |                           |                                |                  |                       |          |
| <b>Physical Parameters</b> (ND means Not Detected by analytical method used)              |                          |                         |                  |                       |          |                           |                                |                  |                       |          |
| Alkalinity, Total   | mg/L                     | Not tested in 2022      |                  |                       |          |                           | 8.78                           | 26               | 7.28                  | 13.3     |
| Carbon, Dissolved Organic   | mg/L as C                | 3.3                     | 2                | 2.5                   | 4        |                           | 3.8                            | 25               | 1.91                  | 5.4      |
| Carbon, Total Organic   | mg/L as C                | 3.85                    | 4                | 3.1                   | 4.4      | Guideline Archived        | 4                              | 28               | 2.96                  | 8.8      |
| Colour, True  | TCU                      | 19                      | 6                | 14                    | 25       | ≤15 AO                    | 14.5                           | 71               | 7                     | 26       |
| Conductivity @ 25 C   | uS/cm                    | Not tested in 2022      |                  |                       |          |                           | 75.5                           | 30               | 67.7                  | 92.7     |
| Hardness as CaCO <sub>3</sub>   | mg/L                     | 14.15                   | 4                | 13.4                  | 15.8     | No Guideline Required     | 16.3                           | 32               | 11.1                  | 20.6     |
| pH  | pH units                 | 6.84                    | 14               | 6.4                   | 7.14     | 7.0 - 10.5 AO             | 6.91                           | 59               | 6.14                  | 8.1      |
| Total Suspended Solids  | mg/L                     | 5.2                     | 1                | 5.2                   | 5.2      |                           | 1.4                            | 19               | 0.2                   | 7.2      |
| Total Solids  | mg/L                     | 42                      | 1                | 42                    | 40       |                           | 50                             | 19               | 42                    | 88       |
| Turbidity, lab tests  | NTU                      | 0.8                     | 33               | 0.35                  | 1.6      |                           | 0.95                           | 398              | 0.4                   | 5.8      |
| Ultraviolet Absorption, 5 cm  | Abs.@254 nm              | Last tested in 2015     |                  |                       |          |                           | 0.415                          | 17               | 0.345                 | 0.659    |
| Ultraviolet Transmittance   | %                        | 72.2                    | 5                | 69.9                  | 78.3     |                           | 76.8                           | 17               | 72.7                  | 82.1     |
| Water Temperature   | degrees C                | 13.3                    | 21               | 4.4                   | 20.2     | ≤15 AO                    | 11                             | 384              | 3.5                   | 21.2     |
| <b>Non-Metallic Inorganic Chemicals</b> (ND means Not Detected by analytical method used) |                          |                         |                  |                       |          |                           |                                |                  |                       |          |
| Ammonia, Total  | ug/L as N                | 20                      | 2                | < 15                  | 25       |                           | < 15                           | 20               | < 15                  | 71       |
| Bromide   | ug/L as Br               | 0.042                   | 1                | 0.042                 | 0.042    |                           | 19.35                          | 17               | < 0.03                | 50       |
| Chloride  | mg/L as Cl               | 10                      | 1                | 10                    | 10       | ≤ 250 AO                  | 11                             | 9                | 11                    | 14       |
| Cyanide   | mg/L as Cn               | < 0.0005                | 1                | < 0.0005              | < 0.0005 | 0.2 MAC                   | 0.00065                        | 9                | < 0.0005              | 0.0164   |
| Fluoride  | mg/L as F                | < 0.05                  | 1                | < 0.05                | < 0.05   | 1.5 MAC                   | < 0.05                         | 9                | < 0.05                | < 0.05   |
| Nitrogen, Nitrate   | ug/L as N                | 28                      | 2                | 26                    | 30       |                           | < 20                           | 19               | < 0.45                | 37       |
| Nitrogen, Nitrite   | ug/L as N                | < 5                     | 2                | < 5                   | < 5      |                           | < 5                            | 18               | < 0.3                 | < 5      |
| Nitrogen, Total   | ug/L as N                | 236                     | 2                | 205                   | 267      |                           | 193.08                         | 20               | 84                    | 263      |
| Phosphate, Total  | ug/L as P                | 4.45                    | 2                | 3.1                   | < 0.0005 |                           | 6.12                           | 20               | < 1                   | 71       |
| Silica  | mg/L as SiO <sub>2</sub> | 4.55                    | 2                | 3.6                   | 5.5      |                           | 4.9                            | 17               | < 0.5                 | 5.28     |
| Silicon   | mg/L as Si               | 1980                    | 4                | 1400                  | 2920     |                           | 1715                           | 24               | 380                   | 2610     |
| Sulphate  | mg/L as SO <sub>4</sub>  | 4.5                     | 3                | 4                     | 6.6      | ≤ 500 AO                  | 6.615                          | 20               | 4.9                   | 19       |
| Sulphide  | mg/L as H <sub>2</sub> S | 0.0037                  | 1                | 0.0037                | 0.0037   | ≤ 0.05 AO                 | < 0.0018                       | 1                | < 0.0018              | < 0.0018 |
| Sulphur   | mg/L as S                | < 3                     | 4                | < 3                   | < 3      |                           | < 3                            | 25               | < 3                   | 5.94     |
| <b>Metals</b> (ND means Not Detected by analytical method used)                           |                          |                         |                  |                       |          |                           |                                |                  |                       |          |
| Aluminum  | ug/L as Al               | 25.5                    | 4                | 9.8                   | 64.9     | 2900 MAC / 100 OG         | 26.2                           | 24               | 7.8                   | 81.5     |
| Antimony  | ug/L as Sb               | < 0.5                   | 4                | < 0.5                 | < 0.5    | 6 MAC                     | < 0.5                          | 24               | < 0.5                 | < 0.5    |
| Arsenic   | ug/L as As               | 0.11                    | 4                | < 0.1                 | 0.13     | 10 MAC                    | < 0.1                          | 24               | < 0.1                 | 0.15     |
| Barium  | ug/L as Ba               | 2                       | 4                | 1.5                   | 2.7      | 1000 MAC                  | 1.9                            | 24               | < 1                   | 2.7      |
| Beryllium   | ug/L as Be               | < 0.1                   | 4                | < 0.1                 | 2.7      |                           | < 0.1                          | 24               | < 0.1                 | < 0.1    |
| Bismuth   | ug/L as Bi               | < 1                     | 4                | < 1                   | < 1      |                           | < 1                            | 24               | < 1                   | < 1      |
| Boron   | ug/L as B                | < 50                    | 4                | < 50                  | < 50     | 5000 MAC                  | < 50                           | 24               | < 50                  | < 50     |
| Cadmium   | ug/L as Cd               | < 0.01                  | 4                | < 0.01                | < 0.01   | 5 MAC                     | < 0.01                         | 24               | < 0.01                | 0.117    |
| Calcium   | mg/L as Ca               | 3.095                   | 4                | 2.9                   | 3.53     | No Guideline Required     | 3.425                          | 24               | 2.91                  | 4.56     |
| Chromium  | ug/L as Cr               | < 1                     | 4                | < 1                   | < 1      | 50 MAC                    | < 1                            | 24               | < 1                   | < 1      |
| Cobalt  | ug/L as Co               | 0.225                   | 4                | < 0.2                 | 0.28     |                           | < 0.2                          | 24               | < 0.2                 | < 0.5    |
| Copper  | ug/L as Cu               | 3.165                   | 4                | 2.53                  | 4.47     | 2000 MAC / ≤ 1000 AO      | 3.135                          | 24               | 1.95                  | 14.6     |
| Iron  | ug/L as Fe               | 281.5                   | 4                | 166                   | 754      | ≤ 300 AO                  | 165                            | 24               | 111                   | 643      |
| Lead  | ug/L as Pb               | 0.235                   | 4                | < 0.2                 | 0.24     | 5 MAC                     | 0.55                           | 24               | < 0.2                 | 1.01     |
| Lithium   | ug/L as Li               | < 2                     | 4                | < 2                   | < 2      |                           | < 2                            | 15               | < 2                   | 5        |
| Magnesium   | mg/L as Mg               | 1.545                   | 4                | 1.48                  | 1.69     | No Guideline Required     | 1.775                          | 24               | 1.56                  | 2.24     |
| Manganese   | ug/L as Mn               | 64.65                   | 4                | 36.4                  | 240      | 120 MAC / ≤ 20 AO         | 53.35                          | 24               | 23.7                  | 167      |
| Mercury   | ug/L as Hg               | < 0.0019                | 4                | < 0.0019              | < 0.0019 |                           | < 0.002                        | 21               | < 0.0019              | < 0.05   |
| Molybdenum  | ug/L as Mo               | < 1                     | 4                | < 1                   | < 1      |                           | < 1                            | 24               | < 1                   | < 1      |
| Nickel  | ug/L as Ni               | < 1                     | 4                | < 1                   | < 1      |                           | < 1                            | 24               | < 1                   | 5.2      |
| Potassium   | mg/L as K                | 0.313                   | 4                | 0.274                 | 0.379    |                           | 0.32                           | 24               | 0.249                 | 0.381    |
| Selenium  | ug/L as Se               | < 0.1                   | 4                | < 0.1                 | < 0.1    | 50 MAC                    | < 0.1                          | 24               | < 0.1                 | 0.12     |
| Silver  | ug/L as Ag               | < 0.02                  | 4                | < 0.02                | < 0.02   | No Guideline Required     | < 0.02                         | 24               | < 0.02                | < 0.02   |
| Sodium  | mg/L as Na               | 6.54                    | 4                | 6.18                  | 6.74     | ≤ 200 AO                  | 6.945                          | 24               | 6.25                  | 10.9     |
| Strontium   | ug/L as Sr               | 13.1                    | 4                | 12.2                  | 14.1     | 7000 MAC                  | 14.45                          | 24               | 12.8                  | 16.1     |
| Thallium  | ug/L as Tl               | < 0.01                  | 4                | < 0.01                | < 0.01   |                           | < 0.01                         | 24               | < 0.01                | < 0.05   |
| Tin   | ug/L as Sn               | < 5                     | 4                | < 5                   | < 5      |                           | < 5                            | 24               | < 5                   | < 5      |
| Titanium  | ug/L as Ti               | < 5                     | 4                | < 5                   | < 5      |                           | < 5                            | 24               | < 5                   | < 5      |
| Uranium   | ug/L as U                | < 0.1                   | 4                | < 0.1                 | < 0.1    | 20 MAC                    | < 0.1                          | 24               | < 0.1                 | < 0.1    |
| Vanadium  | ug/L as V                | < 5                     | 4                | < 5                   | < 5      |                           | < 5                            | 24               | < 5                   | < 5      |
| Zinc  | ug/L as Zn               | 6.55                    | 4                | < 5                   | 7.8      | ≤ 5000 AO                 | < 5                            | 24               | < 5                   | 18.6     |
| Zirconium   | ug/L as Zr               | < 0.1                   | 4                | < 0.1                 | 0.11     |                           | < 0.1                          | 24               | < 0.1                 | < 0.5    |
| <b>Microbial Parameters</b>   |                          |                         |                  |                       |          |                           |                                |                  |                       |          |
| <b>Indicator Bacteria</b>   |                          |                         |                  |                       |          |                           |                                |                  |                       |          |
| Coliform, Total   | Coliforms/100 mL         | 26.5                    | 14               | 4                     | 280      |                           | 109.5                          | 230              | < 1                   | 4300     |
| <i>E. coli</i>  | <i>E.coli</i> /100 mL    | < 1                     | 18               | < 1                   | 12       |                           | < 2                            | 233              | < 1                   | 40       |
| Hetero. Plate Count, 28C (7 day)  | CFU/1 mL                 | Last analyzed in 2014   |                  |                       |          | No Guideline Required     | 920                            | 54               | 40                    | 5800     |
| <b>Chlorophyll</b>  |                          |                         |                  |                       |          |                           |                                |                  |                       |          |
| Chlorophyll, Total  | ug/L                     | 2.865                   | 16               | < 0.26                | 8.22     |                           | 5.08                           | 25               | 0.728                 | 14.6     |
| <b>Parasites</b>  |                          |                         |                  |                       |          | No MAC Established        |                                |                  |                       |          |
| <i>Cryptosporidium</i> , Total oocysts  | oocysts/100 L            | < 0.1                   | 2                | < 0.1                 | < 0.1    | Zero detection desirable  | < 1                            | 21               | < 1                   | < 1      |
| <i>Giardia</i> , Total cysts  | cysts/100 L              | < 0.1                   | 2                | < 0.1                 | < 0.1    | Zero detection desirable  | < 1                            | 21               | < 1                   | < 1      |

**Table 2**

| Table 2: 2022 Summary of Treated Water Test Results, Wilderness Mountain Water System |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
|---|-------------------------|-------------------------|------------------|--------------------------|----------|---------------------------|------------------------------|------------------|--------------------------|--------|
| PARAMETER   |                         | 2022 ANALYTICAL RESULTS |                  |                          |          | CANADIAN GUIDELINES       | 2012-2021 ANALYTICAL RESULTS |                  |                          |        |
| Parameter Name  | Units of Measure        | Annual Median           | Samples Analyzed | Range<br>Minimum Maximum |          | ≤ = Less than or equal to | Median                       | Samples Analyzed | Range<br>Minimum Maximum |        |
| mg/L = parts per million ug/L = parts per billion                                     |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
| <b>Physical Parameters</b>  |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
| Colour, True  | TCU                     | 13                      | 5                | 10                       | 19       | ≤ 15 AO                   | 13                           | 67               | 3                        | 18     |
| Conductivity @ 25 C   | uS/cm                   | Not tested in 2022      |                  |                          |          |                           | 92.1                         | 28               | 84.2                     | 100.3  |
| Hardness as CaCO3   | mg/L                    | 13.9                    | 4                | 13.6                     | 16.4     |                           | 16.05                        | 14               | 13.9                     | 18.1   |
| pH  | pH units                | 6.97                    | 12               | 6.79                     | 7.8      | 7.0 - 10.5 AO             | 7.07                         | 62               | 6.44                     | 9.1    |
| Total Organic Carbon  | mg/L                    | 3.75                    | 4                | 3.2                      | 4.3      |                           | 3.85                         | 8                | 2.5                      | 8.7    |
| Turbidity, lab tests  | NTU                     | 0.75                    | 26               | 0.35                     | 1.5      | 1 MAC and ≤ 5 AO          | 0.7                          | 419              | 0.17                     | 3.6    |
| Water Temperature   | degrees C               | 8.8                     | 119              | 4                        | 20.1     | ≤ 15 AO                   | 11.05                        | 1922             | 1.8                      | 21.1   |
| <b>Microbial Parameters</b>   |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
| <b>Indicator Bacteria</b>   |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
| Coliform, Total   | CFU/100 mL              | < 1                     | 90               | < 1                      | 1        | 0 MAC                     | < 1                          | 196              | < 1                      | 16     |
| <i>E. coli</i>  | CFU/100 mL              | < 1                     | 90               | < 1                      | < 1      | 0 MAC                     | < 1                          | 868              | < 1                      | < 1    |
| Hetero. Plate Count, 28C (7 day)  | CFU/1 mL                | 22000                   | 1                | 22000                    | 22000    | No Guideline Required     | 870                          | 112              | <10                      | 20000  |
| <b>Disinfectants</b>  |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
| <b>Disinfectants</b>  |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
| Chlorine, Total Residual  | mg/L as Cl <sub>2</sub> | 2.48                    | 21               | 0.28                     | 3.76     | No Guideline Required     | 2.15                         | 95               | 0.03                     | 3.35   |
| Monochloramine, Field - 1 Station   | mg/L                    | 2.43                    | 16               | 1.24                     | 3.29     |                           | 2.13                         | 54               | 0.17                     | 2.98   |
| <b>Disinfection By-Products (ND means Not Detected by analytical method used)</b>     |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
| <b>Trihalomethanes (THMs)</b>   |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
| Bromodichloromethane (BDCM)   | ug/L                    | < 1                     | 4                | < 1                      | < 1      |                           | < 1                          | 57               | < 1                      | 26     |
| Bromoform (BRFM)  | ug/L                    | < 1                     | 4                | < 1                      | < 1      |                           | < 1                          | 57               | < 0.1                    | < 2    |
| Chloroform (CHLF)   | ug/L                    | 1.85                    | 4                | 1.1                      | 2.7      |                           | 1.5                          | 57               | <0.1                     | 3.1    |
| Chlorodibromomethane (DBCM)   | ug/L                    | < 1                     | 4                | < 1                      | < 1      |                           | < 1                          | 57               | <0.1                     | 3.1    |
| Total Trihalomethanes (TTHM)  | ug/L                    | 1.85                    | 4                | 1.1                      | 2.7      | 100 MAC                   | 3.6                          | 57               | < 1                      | 160    |
| <b>Haloacetic Acids (HAAs)</b>  |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
| Haloacetic Acids (*5 Total, HAA5)   | ug/L                    | 10.8                    | 4                | 5.2                      | 17       | 80 MAC                    | 10                           | 51               | 0.75                     | 88     |
| <b>Metals (ND means Not Detected by analytical method used)</b>                       |                         |                         |                  |                          |          |                           |                              |                  |                          |        |
| Aluminum  | ug/L as Al              | 20.75                   | 4                | 7.1                      | 59.4     | 2900 MAC / 100 OG         | 28.9                         | 14               | 4.5                      | 62.1   |
| Antimony  | ug/L as Sb              | < 0.5                   | 4                | < 0.5                    | < 0.5    | 6 MAC                     | < 0.5                        | 14               | < 0.5                    | < 0.5  |
| Arsenic   | ug/L as As              | 0.115                   | 4                | < 0.1                    | 0.14     | 10 MAC                    | < 0.1                        | 14               | < 0.1                    | 0.14   |
| Barium  | ug/L as Ba              | 1.95                    | 4                | 1.3                      | 2.6      | 1000 MAC                  | 1.6                          | 14               | < 1                      | 2.6    |
| Beryllium   | ug/L as Be              | < 0.1                   | 4                | < 0.1                    | < 0.1    |                           | < 0.1                        | 14               | < 0.1                    | < 0.1  |
| Bismuth   | ug/L as Bi              | < 1                     | 4                | < 1                      | < 1      |                           | < 1                          | 14               | < 1                      | < 1    |
| Boron   | ug/L as B               | < 50                    | 4                | < 50                     | < 50     | 5000 MAC                  | < 50                         | 14               | < 50                     | < 50   |
| Cadmium   | ug/L as Cd              | < 0.01                  | 4                | < 0.01                   | < 0.01   | 5 MAC                     | < 0.01                       | 14               | < 0.01                   | < 0.01 |
| Calcium   | mg/L as Ca              | 3.045                   | 4                | 2.93                     | 3.8      | No Guideline Required     | 3.44                         | 14               | 2.93                     | 3.89   |
| Chromium  | ug/L as Cr              | < 1                     | 4                | < 1                      | < 1      | 50 MAC                    | < 1                          | 14               | < 1                      | < 1    |
| Cobalt  | ug/L as Co              | < 0.2                   | 4                | < 0.2                    | 0.22     |                           | < 0.2                        | 14               | < 0.2                    | 0.5    |
| Copper  | ug/L as Cu              | 12.61                   | 4                | 8.08                     | 22.3     | 2000 MAC / ≤ 1000 AO      | 10.65                        | 14               | 3.57                     | 92.7   |
| Iron  | ug/L as Fe              | 267.5                   | 4                | 91.7                     | 518      | ≤ 300 AO                  | 109.5                        | 14               | 52                       | 902    |
| Lead  | ug/L as Pb              | 0.365                   | 4                | 0.27                     | 0.47     | 5 MAC                     | 0.4                          | 14               | 0.2                      | 0.99   |
| Lithium   | ug/L as Li              | < 2                     | 4                | < 2                      | < 2      |                           | < 2                          | 10               | < 2                      | < 5    |
| Magnesium   | mg/L as Mg              | 1.535                   | 4                | 1.52                     | 1.68     | No Guideline Required     | 1.79                         | 14               | 1.6                      | 2.07   |
| Manganese   | ug/L as Mn              | 49.7                    | 4                | 8.8                      | 208      | 120 MAC / ≤ 20 AO         | 29.3                         | 14               | 11.9                     | 364    |
| Mercury   | ug/L as Hg              | < 0.0019                | 4                | < 0.0019                 | < 0.0019 |                           | < 0.0019                     | 11               | < 0.0019                 | 0.0032 |
| Molybdenum  | ug/L as Mo              | < 1                     | 4                | < 1                      | < 1      |                           | < 1                          | 14               | < 1                      | < 1    |
| Nickel  | ug/L as Ni              | < 1                     | 4                | < 1                      | < 1      |                           | < 1                          | 14               | < 1                      | < 1    |
| Potassium   | mg/L as K               | 0.316                   | 4                | 0.272                    | 0.362    |                           | 0.341                        | 14               | 0.241                    | 0.423  |
| Selenium  | ug/L as Se              | < 0.1                   | 4                | < 0.1                    | < 0.1    | 50 MAC                    | < 0.1                        | 14               | < 0.1                    | < 0.1  |
| Silicon   | mg/L as Si              | 1935                    | 4                | 1320                     | 2860     |                           | 2015                         | 14               | 408                      | 2640   |
| Silver  | ug/L as Ag              | < 0.02                  | 4                | < 0.02                   | < 0.02   | No Guideline Required     | < 0.02                       | 14               | < 0.02                   | < 0.02 |
| Sodium  | mg/L as Na              | 9.3                     | 4                | 8.73                     | 9.55     | ≤ 200 AO                  | 9.59                         | 14               | 8.3                      | 11.4   |
| Strontium   | ug/L as Sr              | 12.85                   | 4                | 12.3                     | 14.9     | 7000 MAC                  | 14.3                         | 14               | 13                       | 17.2   |
| Sulfur  | mg/L as S               | < 3                     | 4                | < 3                      | < 3      |                           | < 3                          | 14               | < 3                      | 4.6    |
| Thallium  | ug/L as Tl              | < 0.01                  | 4                | < 0.01                   | < 0.01   |                           | < 0.01                       | 14               | < 0.01                   | < 0.05 |
| Tin   | ug/L as Sn              | < 5                     | 4                | < 5                      | < 5      |                           | < 5                          | 14               | < 5                      | < 5    |
| Titanium  | ug/L as Ti              | < 5                     | 4                | < 5                      | < 5      |                           | < 5                          | 14               | < 5                      | < 5    |
| Uranium   | ug/L as U               | < 0.1                   | 4                | < 0.1                    | < 0.1    | 20 MAC                    | < 0.1                        | 14               | < 0.1                    | < 0.1  |
| Vanadium  | ug/L as V               | < 5                     | 4                | < 5                      | < 5      |                           | < 5                          | 14               | < 5                      | < 5    |
| Zinc  | ug/L as Zn              | < 5                     | 4                | < 5                      | 5.7      | ≤ 5000 AO                 | < 5                          | 14               | < 5                      | 21.3   |
| Zirconium   | ug/L as Zr              | < 0.1                   | 4                | < 0.1                    | < 0.1    |                           | < 0.1                        | 14               | < 0.1                    | < 0.5  |