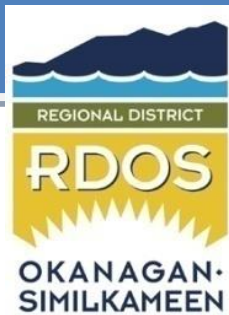


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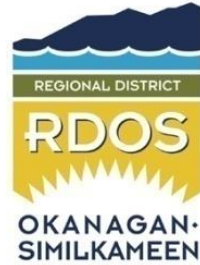
ANNUAL WATER QUALITY MONITORING REPORT SUN VALLEY WATER SYSTEM



Sun Valley Pump Station and Reservoir

Regional District of Okanagan-Similkameen

November, 2022



**2021 ANNUAL WATER QUALITY MONITORING REPORT
SUN VALLEY WATER SYSTEM
SUN VALLEY, B.C.**

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1. Introduction

As the owner and operator of the Sun Valley water system, the Regional District Okanagan-Similkameen is responsible for the following Annual Report summarizing the results from the 2021 *Water Quality Monitoring Program*. The report is a conditional requirement of the *Permit to Operate* issued by the Interior Health Authority (IHA) and the *BC Drinking Water Protection Act and Regulation*.

2. System Description

The Sun Valley water system is located within Electoral Area D southeast of Okanagan Falls. The Sun Valley water system consists of a deep groundwater well, a reservoir, distribution pumps and a distribution system. They system supplies water to approximately 28 services which include domestic, irrigation and commercial uses. The system also supports fire protection in the community of Sun Valley.

3. System Classification and Operator Certifications

3.1. System Classification

The *British Columbia Environmental Operators Certification Program (BC EOCP)* is responsible for the classification of potable water systems in BC. The Sun Valley water system remained classified as a *Small Water System (SWS)* in 2021.

3.2. Operator Certification

The *British Columbia Environmental Operators Certification Program (BC EOCP)* is also responsible for certification of all water system operators. Operators may hold certification(s) in the disciplines of Water Distribution and/or Water Treatment with four (4) levels of certification achievable within each discipline. RDOS Operators annually attend courses, seminars and complete online training required to maintain their levels of certification. In addition, all operators annually continue to work on augmenting and furthering their levels of certification. All RDOS Operators are certified through the BC EOCP as indicated in the Table 1 below.

| OPERATOR EOCP CERTIFICATION No. | WATER DISTRIBUTION CERTIFICATION LEVELS | | | | WATER TREATMENT CERTIFICATION LEVELS | | | |
|--|--|-----|----|---|---|-----|----|---|
| | IV | III | II | I | IV | III | II | I |
| 1162 | X | | | | | | X | |
| 4194 | | | X | | | | | |
| 4840 | | | X | | | | X | |
| 4839 | | X | | | | | | X |
| 6926 | | | X | | | | | X |
| 8761 | | | X | | | | | X |
| 9322 | | X | | | | | | X |

Table 1: RDOS Operator Certifications 2021

4. Annual Water Usage

The RDOS started trending the monthly and annual pumping volumes extracted from the Sun Valley well in 2019 with the installation of a flow meter. In 2021, a total of 172,420 m³ of water was pumped from the Sun Valley well up from 132,491 m³ in 2020.

4.1. Consumption Records

| | Cubic Meters (m ³) | US Gallons | Date |
|---------------------------|--------------------------------|------------|------------------|
| Annual Total Usage | 172,420 | 45,548,545 | |
| Minimum Daily Flow | 6 | 1,585 | December 8, 2021 |
| Maximum Daily Flow | 1,560 | 412,108 | June 27, 2021 |

Table 2: Annual Water Consumption 2021

Both annual and monthly water consumption has been trended as shown in the following two graphs.

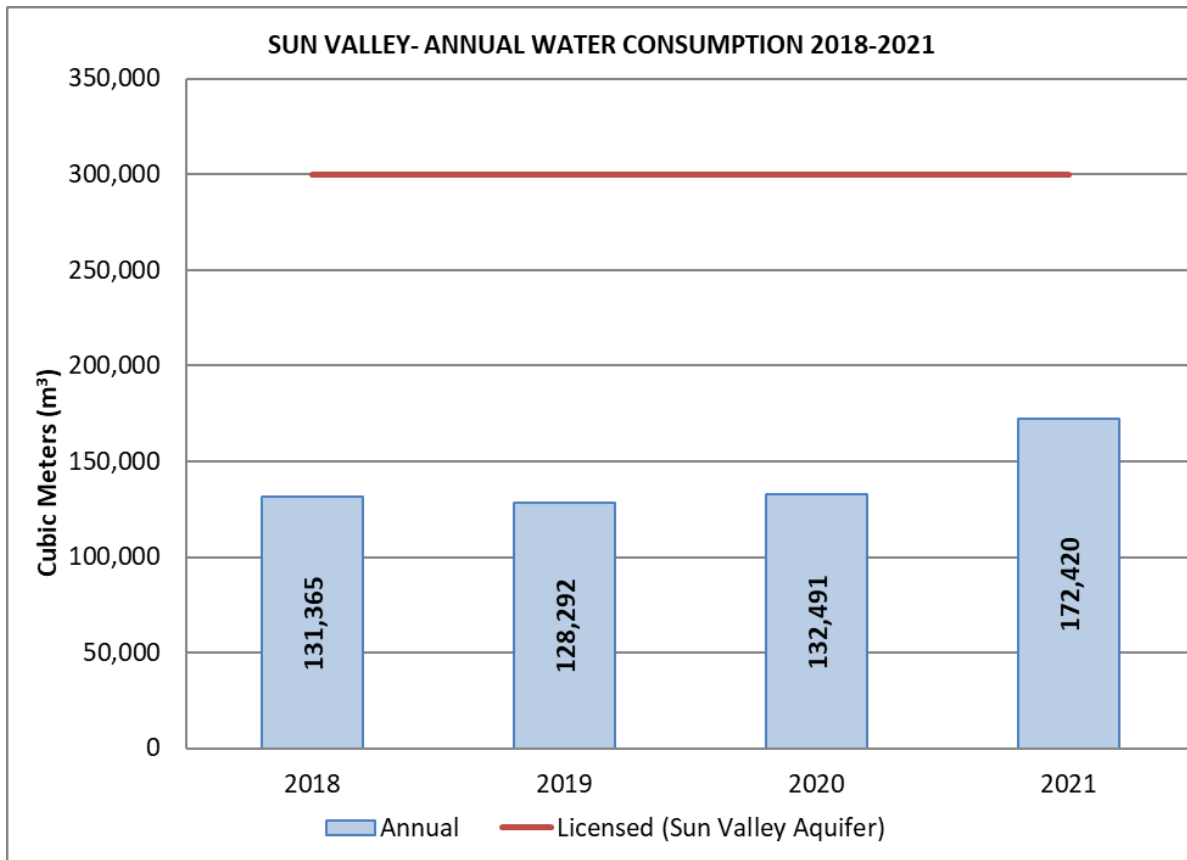


Figure 1: Annual Water Consumption 2018 to 2021

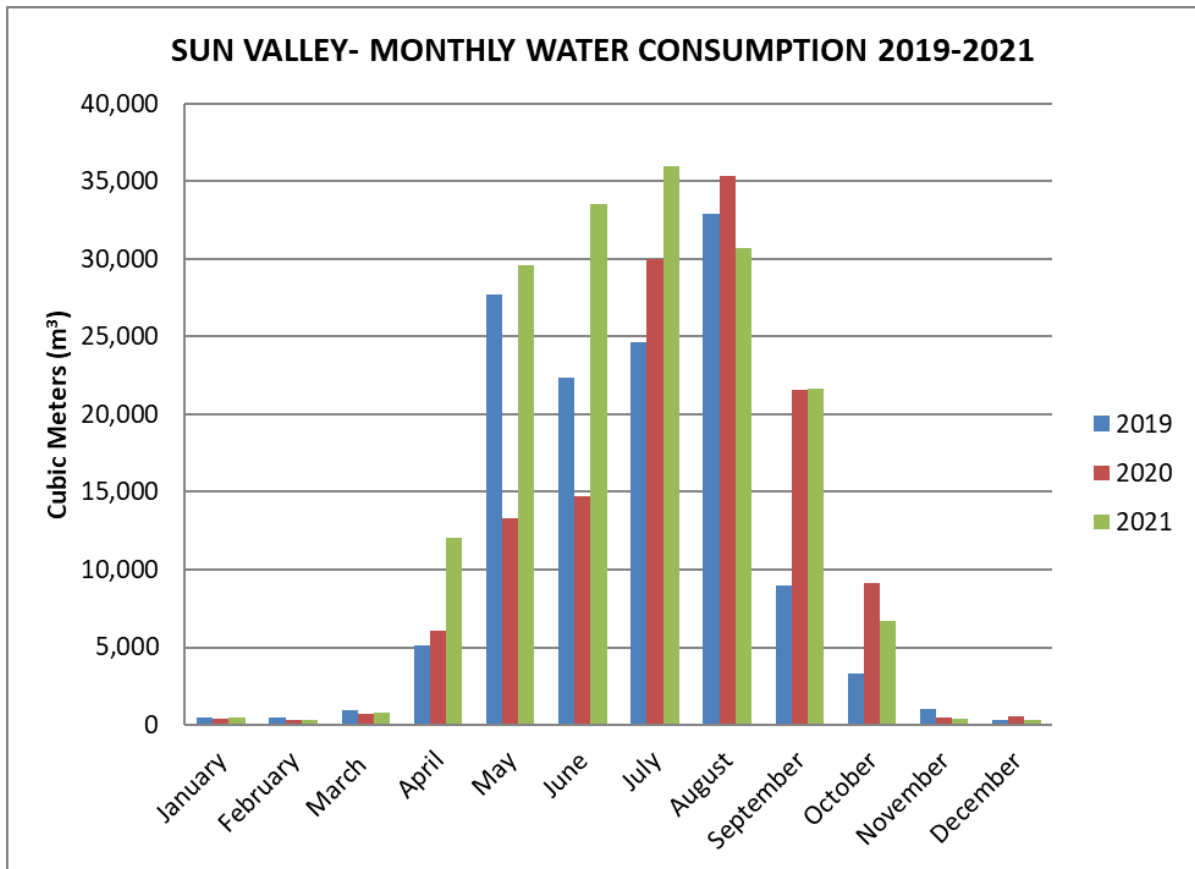


Figure 2: Monthly Water Consumption 2019 to 2021

4.2. Water Conservation

The Sun Valley water system started under Stage “Normal” water restrictions in 2021. The 2021 Heat Dome was present over the Okanagan from late June to mid-July. Additional messaging was utilized during these times encouraging residence to be cognisant of their water usage and to conserve wherever possible. With the continued heat, by the end of July the decision was made to move all RDOS water systems to Stage 1, which limited watering to two days per week.

5. Aquifer Monitoring

The RDOS monitors the aquifer level using the Sun Valley well. Unfortunately, due to a technical issue with the well level monitoring equipment the data for 2021 was not accurate and will not be reported. Below is the well static level trend for 2019 to 2020.

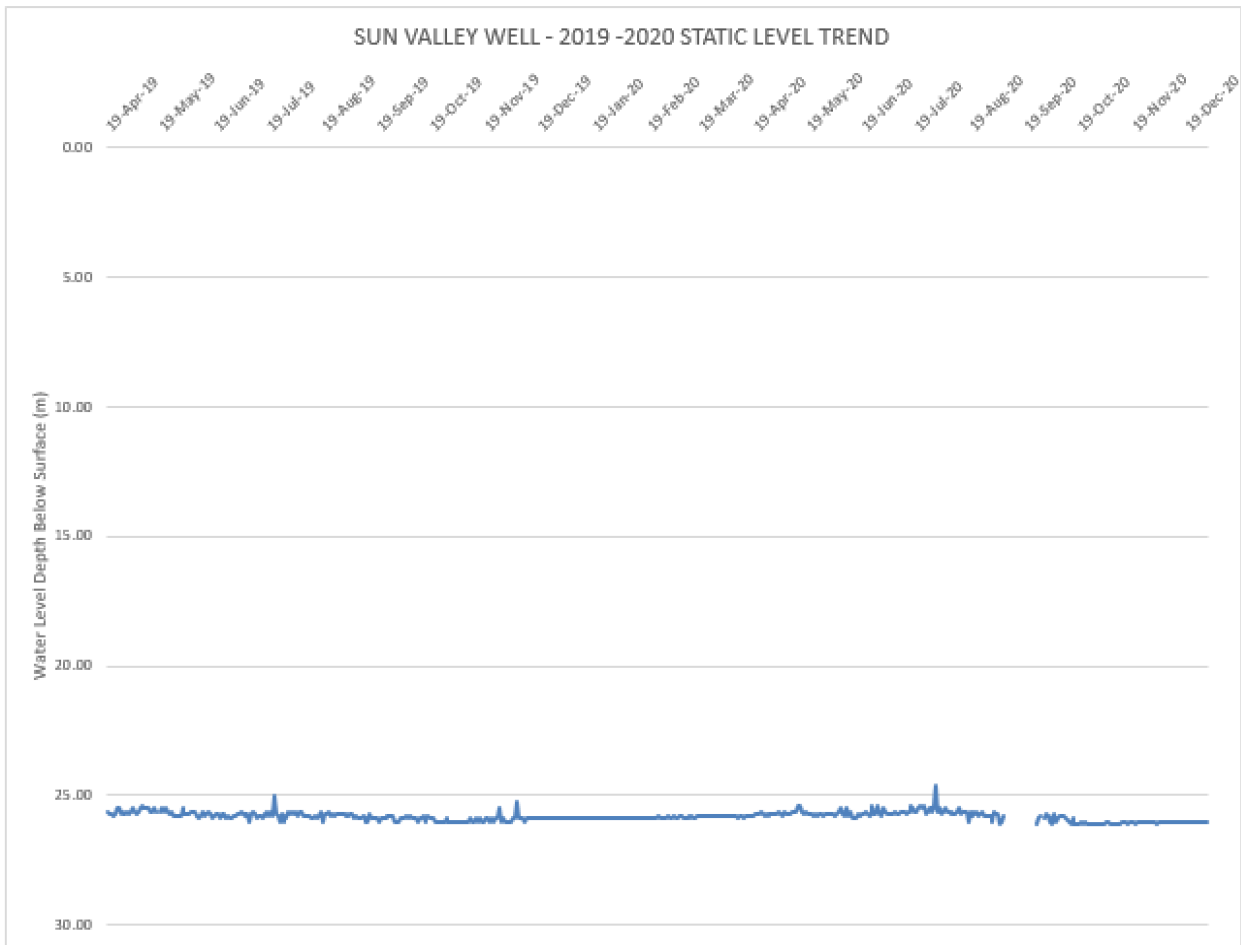


Figure 3: Sun Valley Aquifer Level 2019 to 2020

6. Source Water Quality

All untreated source water quality parameters are compared to the applicable criteria set out in the *British Columbia Drinking Water Protection Act and Regulation (DWPA)*, the *Guidelines for Canadian Drinking Water Quality (GCDWQ)*, Interior Health Authority programs and Operational Guidelines (OG). The *DWPA* and *GCDWQ* define these parameters and set Aesthetic Objectives (AO) and Maximum Allowable Concentrations (MAC).

Iron and manganese are present in the Sun Valley well water with concentrations that currently meet the criteria set in *The Guidelines for Canadian Drinking Water Quality*. However, iron and manganese continue to create problems within the Sun Valley distribution system.

It is believed that when the iron and manganese in the well water comes in contact with oxygen in the storage reservoir, oxidation of these metals occurs. This results in precipitates of iron and manganese forming reddish/brown sediments. The precipitates settle out in the distribution system

pipings and form a layer which becomes a medium where bacterial growth can occur. It is suspected that the Total Coliform bacteria that has been reported in a number of samples over the past years are a result of regrowth of bacteria in these sediments. In addition, discolored water and clogging of home filtration systems occurs when these sediments are disturbed and become suspended in the water.

The RDOS continues to closely monitoring the bacteriological quality of the water in the distribution system and responds accordingly with flushing of the system with high velocity water to scour the pipe walls to remove the buildup of iron and manganese precipitates.

In 2020 the RDOS started to investigate options for sequestering the iron and manganese in a small bench scale test. Sequestering is achieved by the use of a chemical additive to keep the iron and manganese in solution and prevent it from precipitating. The bench scale testing conducted to-date has not provided conclusive results and the RDOS will continue its investigation. Public consultation will occur before moving forward with any implementation plan for treatment.

All accredited laboratory tests in 2021 were performed by Caro Analytical Services (Kelowna, B.C.)

6.1. Source Water Bi-Weekly Monitoring

Bi-weekly monitoring of the Sun Valley well includes bacteriological grab samples and field measured parameters using field kits. Samples from the well were analyzed for Total Coliforms and *Escherichia coli* (*E.coli*). The table below summaries the bacteriological laboratory results and the field measured parameters from the Sun Valley groundwater well.

| Analyte | Unit | Average | Minimum | Maximum | Number of Results | Number of Results with Exceedances |
|-------------------------------------|------------|---------|---------|---------|-------------------|------------------------------------|
| Field Results | | | | | | |
| Conductivity | µS/cm | 490 | 477 | 511 | 16 | 0 |
| pH | | 7.80 | 7.26 | 7.98 | 17 | 0 |
| Total dissolved solids | mg/L | 348 | 338 | 363 | 16 | 0 |
| Temperature | °C | 10.8 | 8.7 | 13.0 | 17 | 0 |
| Turbidity | NTU | 0.17 | 0.06 | 0.45 | 26 | 0 |
| Lab Results: Microbiological | | | | | | |
| Background bacteria | CFU/100 mL | <1 | <1 | 1 | 26 | 0 |
| E. coli (counts) | CFU/100 mL | <1 | <1 | <1 | 29 | 0 |
| Total coliforms (counts) | CFU/100 mL | <1 | <1 | 7 | 29 | 0 |

Table 3: Sun Valley Well Bi-Weekly Testing 2021 Summary

6.2. Source Water Comprehensive Potable Water Results

Annually, the RDOS submits a sample of the untreated well water to an accredited lab for comprehensive potable water testing. The results of these test are compared against the *Guidelines for Canadian Drinking Water Quality*. The *GCDWQ* establishes Maximum Allowable Concentration (MAC), Interim Maximum Allowable Concentrations (IMAC) and Aesthetic Objectives (AO) for parameters if applicable. In 2021, there were no exceedances of the guidelines in the Sun Valley groundwater well annual sample.

This comprehensive test includes physical parameters (e.g. color, turbidity, temperature, ultraviolet transmittance), chemical parameters (e.g. hardness, total metals and nutrients). Changes in these parameters may result in the need for water notifications for customers (i.e. Boil Water Notice or Water Quality Advisory) or the requirement for treatment processes to be implemented. The following tables display the results for the respective comprehensive potable water tests along with summaries of the previous three (3) years of data for comparison.

6.2.1. Source Water General Potability Parameters 2021

| Analyte | Unit | Guideline | | Sun Valley Well Sept 13, 2021 Sample |
|--|-------|--------------------|---------------------------|--|
| | | GCDWQ MAC | GCDWQ AO | |
| Lab Results: General | | | | |
| Alkalinity (total, as CaCO ₃) | mg/L | NG | NG | 224 |
| Total organic carbon | mg/L | NG | NG | 0.74 |
| Chloride | mg/L | NG | 250 | 6.06 |
| Colour | CU | NG | 15 | <5.0 |
| Conductivity | µS/cm | NG | NG | 471 |
| Total cyanide | mg/L | 0.2 ^{1.1} | NG | <0.0020 |
| Fluoride | mg/L | 1.5 | NG | 0.33 |
| Hardness (as CaCO ₃), from total Ca/Mg | mg/L | NG | NG | 226 |
| Langelier Index | | NG | NG | 1.0 |
| pH | | NG | 7.0 - 10.5 ^{2.1} | 8.20 |
| Total dissolved solids (computed) | mg/L | NG | 500 | 285 |
| Sulphate | mg/L | NG | 500 ^{2.2} | 46.5 |
| Sulphide (total, as S) | mg/L | NG | 0.047 ^{2.3} | <0.020 |
| Turbidity | NTU | N ^{1.2} | NG | 1.26 |
| UV transmittance at 254 nm - filtered | % | NG | NG | 98.6 |
| Nutrients | | | | |
| Ammonia (total, as N) | mg/L | NG | NG | <0.050 |
| Nitrate (as N) | mg/L | 10 | NG | <0.010 |
| Nitrite (as N) | mg/L | 1 | NG | <0.010 |

See Guideline Notes in Section 6.2.3.

Table 4: Sun Valley Well General Potability Parameters 2021

6.2.2. Source Water General Potability Parameters Summary 2018 to 2020

| Analyte | Unit | Average | Minimum | Maximum | Number of Results | Number of Results with Exceedances |
|--|-------|---------|---------|---------|-------------------|------------------------------------|
| Lab Results: General | | | | | | |
| Alkalinity (total, as CaCO ₃) | mg/L | 185 | 158 | 199 | 3 | 0 |
| Total organic carbon | mg/L | 0.82 | 0.74 | 0.95 | 3 | 0 |
| Chloride | mg/L | 6.43 | 6.02 | 7.03 | 3 | 0 |
| Colour | CU | <5.0 | <5.0 | <5.0 | 3 | 0 |
| Conductivity | µS/cm | 470 | 468 | 471 | 3 | 0 |
| Total cyanide | mg/L | <0.0020 | <0.0020 | <0.0020 | 3 | 0 |
| Fluoride | mg/L | 0.32 | 0.27 | 0.40 | 3 | 0 |
| Hardness (as CaCO ₃), from total Ca/Mg | mg/L | 227 | 205 | 239 | 3 | 0 |
| Langelier Index | | 0.6 | 0.5 | 0.7 | 3 | 0 |
| pH | | 7.99 | 7.82 | 8.09 | 3 | 0 |
| Total dissolved solids (computed) | mg/L | 262 | 248 | 271 | 3 | 0 |
| Sulphate | mg/L | 47.8 | 45.2 | 52.6 | 3 | 0 |
| Sulphide (total, as S) | mg/L | <0.020 | <0.020 | <0.020 | 3 | 0 |
| Turbidity | NTU | 0.92 | <0.10 | 1.53 | 7 | 0 |
| UV transmittance at 254 nm - filtered | % | 98.6 | 98.3 | 99.0 | 3 | 0 |
| UV transmittance at 254 nm - unfiltered | % | 96.3 | 96.3 | 96.3 | 1 | 0 |
| Nutrients | | | | | | |
| Ammonia (total, as N) | mg/L | 0.045 | <0.020 | 0.088 | 3 | 0 |
| Nitrate (as N) | mg/L | <0.010 | <0.010 | <0.010 | 3 | 0 |
| Nitrite (as N) | mg/L | <0.010 | <0.010 | <0.010 | 3 | 0 |

See Guideline Notes in Section 6.2.3.

Table 5: Sun Valley Well General Potability Parameters 2018 to 2020 Summary

6.2.3. Guideline Notes for General Potability Parameters Summary 2018 to 2020

1. Notes for Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations (GCDWQ MAC)

Note 1.1 for Total cyanide:

The MAC for free cyanide is 0.2 mg/L. A maximum of 0.2 mg/L was used, in this report, to identify exceedances for total cyanide as a means for determining the potential for exceeding the free cyanide guideline.

Note 1.2 for Turbidity:

"Waterworks systems that use a surface water source or a groundwater source under the direct influence of surface water should filter the source water to meet health-based turbidity limits, as defined for specific treatment technologies. Where possible, filtration systems should be designed and operated to reduce turbidity levels as low as possible, with a treated water turbidity target of less than 0.1 NTU at all times. Where this is not achievable, the treated water turbidity levels from individual filters should meet the requirements described in GCDWQ.

For systems that use groundwater that is not under the direct influence of surface water, which are considered less vulnerable to faecal contamination, turbidity should generally be below 1.0 NTU.

For effective operation of the distribution system, it is good practice to ensure that water entering the distribution system has turbidity levels below 1.0 NTU."

2. Notes for Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO)

Note 2.1 for pH:

The operational guideline for pH is a range of 7.0 to 10.5 in finished drinking water.

Note 2.2 for Sulphate:

There may be a laxative effect in some individuals when sulphate levels exceed 500 mg/L. Health authorities should be notified of drinking water sources containing above 500 mg/L.

Note 2.3 for Sulphide (total, as S):

The aesthetic objective for sulphide (as H₂S) is 0.05 mg/L. This is equivalent to 0.047 mg/L sulphide (as S).

6.2.4. Source Water Total Metals 2021

| Analyte | Unit | Guideline | | Sun Valley Well Sept 13, 2021 Sample |
|----------------------------------|------|----------------------|----------------------|---|
| | | GCDWQ MAC | GCDWQ AO | |
| Lab Results: Total Metals | | | | |
| Aluminum (total) | mg/L | 2.9 ^{1.1} | 0.100 ^{2.1} | 0.0067 |
| Antimony (total) | mg/L | 0.006 | NG | <0.00020 |
| Arsenic (total) | mg/L | 0.010 ^{1.2} | NG | 0.00111 |
| Barium (total) | mg/L | 2.0 ^{1.3} | NG | 0.105 |
| Boron (total) | mg/L | 5 | NG | <0.0500 |
| Cadmium (total) | mg/L | 0.007 ^{1.4} | NG | <0.000010 |
| Calcium (total) | mg/L | NG | NG | 69.6 |
| Chromium (total) | mg/L | 0.05 | NG | 0.00066 |
| Cobalt (total) | mg/L | NG | NG | <0.00010 |
| Copper (total) | mg/L | 2 ^{1.5} | 1 | 0.00079 |
| Iron (total) | mg/L | NG | 0.3 | 0.207 |
| Lead (total) | mg/L | 0.005 ^{1.6} | NG | 0.00025 |
| Magnesium (total) | mg/L | NG | NG | 12.6 |
| Manganese (total) | mg/L | 0.12 ^{1.7} | 0.02 ^{2.2} | 0.0589 |
| Mercury (total) | mg/L | 0.001 | NG | <0.000010 |
| Molybdenum (total) | mg/L | NG | NG | 0.00232 |
| Nickel (total) | mg/L | NG | NG | 0.00074 |
| Potassium (total) | mg/L | NG | NG | 3.24 |
| Selenium (total) | mg/L | 0.05 | NG | <0.00050 |
| Sodium (total) | mg/L | NG | 200 | 10.1 |
| Strontium (total) | mg/L | 7.0 ^{1.8} | NG | 0.528 |
| Uranium (total) | mg/L | 0.02 | NG | 0.00362 |
| Zinc (total) | mg/L | NG | 5.0 | 0.0299 |

See Guideline Notes in Section 6.2.6.

Table 6: Sun Valley Well Total Metals Potability Parameters 2021

6.2.5. Source Water Total Metals Summary 2018 to 2020

| Analyte | Unit | Average | Minimum | Maximum | Number of Results | Number of Results with Exceedances |
|----------------------------------|------|-----------|-----------|-----------|-------------------|------------------------------------|
| Lab Results: Total Metals | | | | | | |
| Aluminum (total) | mg/L | <0.0050 | <0.0050 | <0.0050 | 3 | 0 |
| Antimony (total) | mg/L | <0.00020 | <0.00020 | <0.00020 | 3 | 0 |
| Arsenic (total) | mg/L | 0.00118 | 0.00115 | 0.00119 | 3 | 0 |
| Barium (total) | mg/L | 0.106 | 0.101 | 0.109 | 3 | 0 |
| Boron (total) | mg/L | 0.0168 | 0.0065 | 0.0188 | 3 | 0 |
| Cadmium (total) | mg/L | 0.000014 | <0.000010 | 0.000023 | 3 | 0 |
| Calcium (total) | mg/L | 70.4 | 63.2 | 74.0 | 3 | 0 |
| Chromium (total) | mg/L | <0.00050 | <0.00050 | <0.00050 | 3 | 0 |
| Cobalt (total) | mg/L | <0.00010 | <0.00010 | <0.00010 | 3 | 0 |
| Copper (total) | mg/L | 0.00141 | <0.00040 | 0.00208 | 3 | 0 |
| Iron (total) | mg/L | 0.202 | 0.181 | 0.227 | 3 | 0 |
| Lead (total) | mg/L | 0.00035 | 0.00023 | 0.00054 | 3 | 0 |
| Magnesium (total) | mg/L | 12.4 | 11.5 | 13.1 | 3 | 0 |
| Manganese (total) | mg/L | 0.0578 | 0.0559 | 0.0603 | 3 | 0 |
| Mercury (total) | mg/L | <0.000010 | <0.000010 | <0.000010 | 3 | 0 |
| Molybdenum (total) | mg/L | 0.00227 | 0.00217 | 0.00240 | 3 | 0 |
| Nickel (total) | mg/L | 0.00028 | <0.00040 | 0.00045 | 3 | 0 |
| Potassium (total) | mg/L | 3.13 | 2.97 | 3.34 | 3 | 0 |
| Selenium (total) | mg/L | <0.00050 | <0.00050 | <0.00050 | 3 | 0 |
| Sodium (total) | mg/L | 9.53 | 8.82 | 10.1 | 3 | 0 |
| Strontium (total) | mg/L | 0.565 | 0.551 | 0.588 | 3 | 0 |
| Uranium (total) | mg/L | 0.00386 | 0.00359 | 0.00409 | 3 | 0 |
| Zinc (total) | mg/L | 0.0309 | 0.0219 | 0.0386 | 3 | 0 |

See Guideline Notes in Section 6.2.6.

Table 7: Sun Valley Well Total Metals Potability Parameters 2018 to 2020 Summary

6.2.6. Guideline Notes for Total Metals Potability Summary 2018 to 2020

1. Notes for Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations (GCDWQ MAC)

Note 1.1 for Aluminum (total): The maximum acceptable concentration (MAC) for total aluminum in drinking water is 2.9 mg/L (2 900 µg/L) based on a locational running annual average of a minimum of quarterly samples taken in the distribution system. (Update March 5, 2021)

Note 1.2 for Arsenic (total): Every effort should be made to maintain arsenic levels in drinking water as low as reasonably achievable.

Note 1.3 for Barium (total): Update January 24, 2020. The MAC was revised from 1.0 mg/L to 2.0 mg/L.

Note 1.4 for Cadmium (total): A maximum acceptable concentration (MAC) of 0.007 mg/L (7 µg/L) is established for total cadmium in drinking water, based on a sample of water taken at the tap. (Update July 14, 2020)

Note 1.5 for Copper (total): A maximum acceptable concentration (MAC) of 2 mg/L is established for total copper in drinking water, based on a sample of water taken at the tap. Guidelines for Canadian Drinking Water Quality - Guideline Technical Document on Copper, June 2019.

Note 1.6 for Lead (total): The maximum acceptable concentration (MAC) for total lead in drinking water is 0.005 mg/L (5 µg/L), based on a sample of water taken at the tap and using the appropriate protocol for the type of building being sampled. Every effort should be made to maintain lead levels in drinking water as low as reasonably achievable (or ALARA). (GCDWQ: Guideline Technical Document; March, 2019)

Note 1.7 for Manganese (total): Guidelines for Canadian Drinking Water Quality - Guideline Technical Document on manganese, May 2019.

Note 1.8 for Strontium (total): Guidelines for Canadian Drinking Water Quality - Guideline Technical Document on strontium, May 2019.

2. **Notes for Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO)**

Note 2.1 for Aluminum (total): The operational guidance (OG) value for total aluminum in drinking water is 0.100 mg/L (100 µg/L) to optimize water treatment and distribution system operations. This value is based on a locational running annual average. The sampling frequency required to calculate the locational running annual average will vary based on the type of treatment facility and the sampling location. (Update March 5, 2021)

Note 2.2 for Manganese (total): Guidelines for Canadian Drinking Water Quality - Guideline Technical Document on manganese, May 2019.

7. Distribution System Water Quality

All treated distribution system water quality parameters are compared to the *British Columbia Drinking Water Protection Act and Regulation (DWPA)* and the *Guidelines for Canadian Drinking Water Quality (GCDWQ)* unless otherwise noted, which could be indicated as an operational guideline (OG). The *DWPA* and *GCDWQ* define these parameters and set Aesthetic Objectives (AO) and Maximum Allowable Concentrations (MAC).

All accredited laboratory tests in 2021 were performed by Caro Analytical Services (Kelowna, B.C.)

7.1. Distribution System Bacteriological Results

The Sun Valley distribution system has two dedicated sample stations that are alternated between bi-weekly. Samples from the distribution system were analyzed for Total Coliforms and *Escherichia coli* (*E.coli*).

Schedule A

Water Quality Standards for Potable Water

(sections 2 and 9)

| Parameter: | Standard: |
|---|---|
| Fecal coliform bacteria | No detectable fecal coliform bacteria per 100 ml |
| <i>Escherichia coli</i> | No detectable <i>Escherichia coli</i> per 100 ml |
| Total coliform bacteria | |
| (a) 1 sample in a 30 day period | No detectable total coliform bacteria per 100 ml |
| (b) more than 1 sample in a 30 day period | At least 90% of samples have no detectable total coliform bacteria per 100 ml and no sample has more than 10 total coliform bacteria per 100 ml |

As discussed above under source water, oxidized iron and manganese are forming reddish/brown sediments within the distribution system. The precipitates settle out in the distribution system piping and forms a layer which becomes a medium where bacterial growth can occur. It is suspected that the Total Coliform bacteria that has been reported in a number of samples over the past years are a result of regrowth of bacteria in these sediments. In addition, discolored water and clogging of home filtration systems occurs when these sediments are disturbed and become suspended in the water.

The RDOS continues to closely monitoring the bacteriological quality of the water in the distribution system and responds accordingly with flushing of the system with high velocity water to scour the pipe walls to remove the buildup of iron and manganese precipitates.

In 2021, both distribution sampling locations had one report each for Total Coliforms. All distribution sample had no detections for *E.coli*. The following is a summary of the bacteriological laboratory results and field turbidity results from the distribution system.

| Analyte | Sampling Location | Unit | Average | Min | Max | Number of Results | Number of Results with Exceedances |
|-------------------------------------|-------------------|------------|---------|-----|-----|-------------------|------------------------------------|
| Lab Results: Microbiological | | | | | | | |
| Background bacteria | Pinewinds Pl. | CFU/100 mL | <1 | <1 | 1 | 19 | 0 |
| | Sun Valley Way | CFU/100 mL | 1 | <1 | 14 | 21 | 0 |
| E. coli (counts) | Pinewinds Pl. | CFU/100 mL | <1 | <1 | <1 | 21 | 0 |
| | Sun Valley Way | CFU/100 mL | <1 | <1 | <1 | 23 | 0 |
| Total coliforms (counts) | Pinewinds Pl. | CFU/100 mL | <1 | <1 | 3 | 21 | 1 |
| | Sun Valley Way | CFU/100 mL | <1 | <1 | 4 | 23 | 1 |

Table 8 Distribution Water Bacteriological 2021 Summary

7.2. Distribution Water Quality Field Parameters

The following is a summary of the field parameters that are measured routinely in the distribution system.

| Analyte | Sampling Location | Unit | Average | Min | Max | Number of Results | Number of Results with Exceedances |
|------------------------|-------------------|-------|---------|------|------|-------------------|------------------------------------|
| Field Results | | | | | | | |
| Conductivity | Pinewinds Pl. | µS/cm | 486 | 466 | 500 | 9 | 0 |
| | Sun Valley Way | µS/cm | 485 | 472 | 499 | 12 | 0 |
| pH | Pinewinds Pl. | | 7.84 | 7.62 | 8.06 | 9 | 0 |
| | Sun Valley Way | | 7.88 | 7.7 | 8.17 | 12 | 0 |
| Total dissolved solids | Pinewinds Pl. | mg/L | 345 | 331 | 354 | 9 | 0 |
| | Sun Valley Way | mg/L | 345 | 336 | 354 | 12 | 0 |
| Temperature | Pinewinds Pl. | °C | 13.1 | 5.8 | 18.1 | 9 | 0 |
| | Sun Valley Way | °C | 11.4 | 4.9 | 15.8 | 13 | 0 |
| Turbidity | Pinewinds Pl. | NTU | 1.68 | 0.2 | 8.42 | 18 | 0 |
| | Sun Valley Way | NTU | 1.73 | 0.42 | 5.77 | 21 | 0 |

Table 9: Distribution Field Measured Parameters 2021 Summary

7.3. Reservoir Supply Bi-Weekly Monitoring

Bi-weekly monitoring of the Sun Valley Reservoir includes bacteriological grab samples and field measured parameters using field kits. Samples from the Reservoir were analyzed for Total Coliforms and *Escherichia coli* (*E.coli*). The table below summarizes the bacteriological laboratory results and the field measured parameters from the Sun Valley Reservoir.

| Analyte | Unit | Average | Minimum | Maximum | Number of Results | Number of Results with Exceedances |
|-------------------------------------|------------|---------|---------|---------|-------------------|------------------------------------|
| Field Results | | | | | | |
| Conductivity | µS/cm | 487 | 465 | 499 | 15 | 0 |
| pH | | 7.9 | 7.73 | 8.15 | 15 | 0 |
| Total dissolved solids | mg/L | 345 | 330 | 354 | 15 | 0 |
| Temperature | °C | 10.8 | 7.9 | 12.7 | 15 | 0 |
| Turbidity | NTU | 1.48 | 0.82 | 2.63 | 24 | 0 |
| Lab Results: Microbiological | | | | | | |
| Background bacteria | CFU/100 mL | <1 | <1 | 3 | 24 | 0 |
| E. coli (counts) | CFU/100 mL | <1 | <1 | <1 | 25 | 0 |
| Total coliforms (counts) | CFU/100 mL | <1 | <1 | <1 | 25 | 0 |

Table 10: Sun Valley Reservoir Supply Bi-Weekly Testing 2021 Summary

7.4. Water Quality Complaints

One water quality complaint was received in 2021 regarding odour and low flow at 2090 Pinewinds Pl. See Section 9.6.

8. Water System Notifications

The Interior Health Authority’s team of drinking water officers are responsible for providing the oversight to ensure compliance and drinking water safety. The IHA is responsible for issuing *Permits to Operate* to drinking water systems. The Interior Health Authority has four types of water notifications to inform users of negative impacts to water quality.

8.1. Water Quality Advisory (WQA)

There is some level of risk associated with consuming the drinking water but a Boil Water Notice is not needed. The risk is elevated for people with weakened immune systems, the elderly and infants and young children.

No WQAs issued for 2021.

8.2. Boil Water Notice (BWN)

There are organisms in the water that can make you sick. To safely consume (swallow) the water, you must bring it to a rolling boil for at least 60 seconds, or use a safe alternate source of water.

In 2021 there were four BWNs issued for power outages that resulted in portions of the water system losing water pressure. The Boil Water Notices were in effect between 6 and 16 days. The dates the BWN were issued and rescinded have been tabulated below.

| Date BWN Issued | Date BWN Rescinded |
|-------------------|--------------------|
| May 9, 2021 | May 14, 2021 |
| July 31, 2021 | August 6, 2021 |
| September 9, 2021 | September 24, 2021 |
| October 5, 2021 | October 12, 2021 |

Table 11 Sun Valley Water System Boil Water Notices 2021 Dates

8.3. Do Not Consume (DNC)

There are harmful chemicals or other bad things in the water that can make you sick. You cannot make the water safe by boiling. The water can make you sick if you consume (swallow) it. You cannot use the water for drinking, brushing teeth, washing/preparing/cooking food or pet’s drinking water. You can bath, shower and water plants and gardens with the water.

No DNCs issued in 2021.

8.4. Do Not Use (DNU)

There are known microbial, chemical or radiological contaminants in the water and that any contact with the water with the skin, lungs or eyes can be dangerous. Do not turn on your tap for any reason and do not use your water. You CANNOT make the water safe by boiling it.

No DNUs issued in 2021.

9. Program Updates and Status

9.1. Cross Connection Control Program

The RDOS continued work in 2021 towards implementing an official Cross Connection Control program and bylaw. On January 21, 2021 the RDOS adopted Bylaw No 2851, 2020 Cross Connection Control. Bylaw 2851 is a Regional bylaw that will be applicable to all RDOS owned and operated water systems.

9.2. Capital Works / System Additions

No items of note in 2021.

9.3. Emergency Response Plan

The *Emergency Response Plan* is scheduled to be updated in 2022.

9.4. Future Systems Upgrades

The RDOS will continue to investigate potential options for treatment of the iron and manganese in the Sun Valley water system.

9.5. Supervisory Control and Data Acquisition (SCADA) System

A SCADA system is an integral part of a modern water system. It is comprised of sensors, programmable controllers, communications and network devices installed at pump stations and treatment facilities. The SCADA system controls equipment such as pumps and monitors system operations while storing important data such as intake turbidity levels, pumping flow rates, and storage reservoir levels. The system also provides for efficiencies in operation and the response to system failures. This is achieved by the ability to monitor and view the system remotely through a software package along with the generation of alarms that will notify the system Operators when there is a problem or failure within a system.

In 2020 the RDOS had a consultant develop a SCADA Master Plan. This plan will assist with upgrades to the existing SCADA network along with providing a detailed plan on how to move forward into the future in an efficient manner.

In 2021 the RDOS implemented a new SCADA software package. This include new graphics that conformed to the specifications outlined in the Master Plan along with enhanced security for remote access and improved data trending capabilities.

9.6. System Maintenance/Upgrades

After receiving positive test results for Total Coliforms in the latter part of January the Reservoir and distribution system were dosed with 12% sodium hypochlorite and the distribution system flushed.

In anticipation of a planned shutdown on Pinewinds Place at the end of March, the Reservoir was dosed with 12% sodium hypochlorite. An investigation was conducted at 2090 Pinewinds Place regarding reported low water flow from the owner. Adequate flow and pressure was confirmed on the RDOS's side of the service connection. The service valve was renewed and a water meter vault installed.

9.7. Water Quality Monitoring Program

The *Water Quality Monitoring Program* is scheduled to be updated in 2022.

10. Summary

All tested source water parameters from the Sun Valley groundwater well met the applicable criteria in 2021. All tested tread distribution water parameters with the exception of turbidity met the applicable criteria in 2021. The operation of the Sun Valley system by a team of RDOS *EOCP* certified Operators resulted in the supply of the highest quality water possible to the community of Sun Valley. The RDOS continues to work on reviewing and upgrading the various programs that support facilitating the highest quality of water possible.