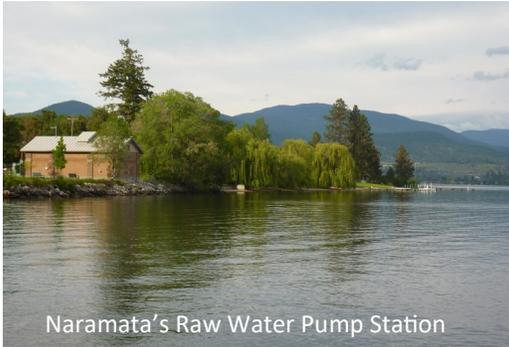


Regional District of Okanagan - Similkameen Public Works

Source Water Assessment and Protection Plan



In 2020, Larratt Aquatic Ltd. (West Kelowna) conducted a study to assess the intake in Okanagan Lake that supplies the Naramata water system in order to produce a *Source Water Protection Plan (SWPP)*. Some of the components of this comprehensive study included; the review of historical data (water quality, GIS, LiDAR, land use), field monitoring and sampling, in situ monitoring (temperature, water currents and sediment measurements), and drone surveys.

Historically, surface water sources such as Okanagan Lake have encountered a multitude of factors within their watersheds that have the

potential to negatively impact the source water quality. Some examples are logging, agricultural practices, cattle grazing, storm run off, septic systems and treated wastewater discharges to name a few. Other factors that are becoming more prevalent in recent years are extreme weather events, wildfires and recreational activities.

The Province of BC has produced a *Comprehensive Source-To-Tap Assessment* tool to assist water purveyors in identifying the hazards and vulnerabilities that may threaten the safety and sustainability of a water supply. Completion of the *Assessment Phase* is the first step, followed by the creation of a *Source Water Protection Plan (SWPP)*. A *SWPP* is a living document that quantifies the source water quality, identifies hazards (natural and man-induced) and makes recommendations on protecting the source water quality and prescribes mitigations to help reduce any risks identified. Completion of these documents is part of Provincial regulations and is a requirement of the *Permit-to-Operate* issued for the Naramata water system by the Interior Health Authority (IHA). It should be noted that RDOS does not have jurisdiction over all activities within the watershed therefore mitigation and control of some factors may require the support of Provincial Ministries and/or other municipalities and stakeholders.

Water systems that utilize ultraviolet (UV) treatment and chlorination without filtration are required to apply for a *Filtration Exclusion* from the Interior Health Authority, as is the case with Naramata.

With the *SWPP* now complete, the next step is to have IHA review and provide comments on the *SWPP*. From there it will go to the RDOS Board for further comments and adoption followed by the RDOS developing a *Filtration Deferral Plan*. The *Filtration Deferral Plan* will look at the infrastructure required to mitigate the risks identified in the *SWPP*. Upon completion of *Filtration Deferral Plan* the RDOS will apply to IHA for a *Filtration Exclusion* for the Naramata system.



Coliform Counts

Total Coliforms and *E.coli* are indicator organisms used to assess bacteriological quality of the water (i.e. the effectiveness of the treatment and safety of the water within the distribution system).



Free Chlorine

Free chlorine residuals in the distribution system add a level of protection to the treated water as it moves through the distribution network. Free chlorine residuals are required to be maintained between 0.2 mg/L and 2.0 mg/L free chlorine. Residents closer to the Treatment Plant will notice a higher level of chlorine than those further away as chlorine is consumed and dissipates over time.

What are THMs?

Trihalomethanes (THMs) are by-products of disinfection created when chlorine combines with organic matter in water. THMs are considered to be a possible carcinogen in humans. The use of chlorine to eliminate waterborne diseases far outweighs the health risk from disinfection by-products. (Guidelines for Canadian Drinking Water Quality, Trihalomethanes, 2006). The MAC for Total Trihalomethanes in drinking water is 0.100 mg/L based on a locational running annual average of a minimum of quarterly samples. Without filtration to remove organics matter, the only control of THM production is an adjustment of chlorine, if permissible.

Water Quality Monitoring in the Distribution System

In 2020 a total of **263** treated water samples were drawn from dedicated sample locations throughout the distribution system on a weekly basis and analyzed by an accredited laboratory for Total Coliforms and *Escherichia coli* bacteria. Of the samples drawn in 2020 there were no detections for Total Coliforms or *E.coli*.



In addition to the weekly bacteriological samples, field tests are conducted for free chlorine residuals, temperature, pH, conductivity and turbidity.

Sampling Location	Unit	Avg	Min	Max	Number of Results
End of Mill Rd	mg/L	0.41	0.01	0.95	29
Flagstone Rise	mg/L	0.41	0.01	1.1	26
Hayman Road	mg/L	0.91	0.41	1.34	26
McPhee Road	mg/L	1.2	0.94	1.44	21
Mill Rd	mg/L	0.97	0.52	1.32	7
Noyes and Mariposa Rd	mg/L	0.6	0.15	1.02	28
NW Office	mg/L	0.95	0.6	1.32	27
Smethurst PRV	mg/L	0.71	0.19	1.36	26
South End	mg/L	0.65	0.17	1.08	27
Upper Debeck	mg/L	0.7	0.21	1.15	26
Workman PI Ph 1	mg/L	0.53	0.04	1.37	26

2020—Distribution System Free Chlorine Residuals

Disinfection By-product Monitoring

Quarterly, treated distribution water samples are submitted to an accredited laboratory for total trihalomethane analysis. In 2020, the annual running averages for all three of the monitored distribution locations were below the Maximum Allowable Concentration (MAC) of 0.100 mg/L.

Sampling Location	Unit	Locational Running Annual Average	Number of Results
End of Mill Rd	mg/L	0.0875	4
Noyes and Mariposa Rd	mg/L	0.0722	4
South End	mg/L	0.0809	4

2020—Total Trihalomethane Results

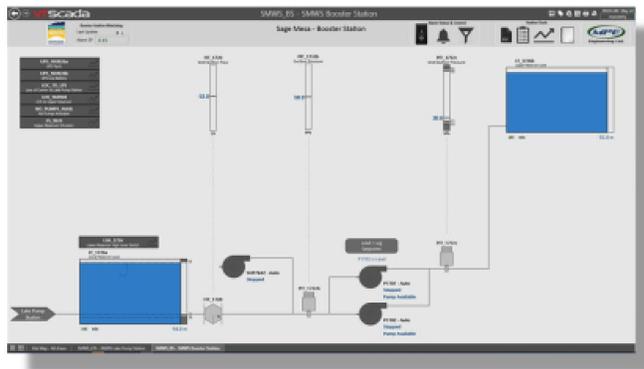
Water System Notices

- No *Water Quality Advisories* or *Boil Water Notices* were issued in 2020 for the Naramata water system.
- A *Information Notice* was issued in February 2020 in advance of the cleaning and inspection of two water storage reservoirs.



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.

Plans for 2021

- Continue work based on the completed *Source Water Assessment* and *Source Water Protection Plan for the Naramata water system* (see front page for more detail). This included the development of a *Filtration Deferral Plan*.
- Upgrades to the Supervisory Control and Data Acquisition (SCADA) system. This will include replacement of key programmable controllers, network upgrades and new software.



IHA's Role

The Interior Health Authority's team of drinking water officers are responsible for providing oversight to ensure compliance and drinking water safety. The IHA is responsible for issuing Permits to Operate to drinking water systems. IHA has four levels of water notifications.

WATER QUALITY ADVISORY (WQA)

-There is some level of risk associated with consuming the water, but a boil water notice is not needed.

- The risk is elevated for people with weakened immune systems.

BOIL WATER NOTICE (BWN)

- There are organisms in the water that can make you sick.

- To safely consume the water, you must bring it to a rolling boil for at least 60 seconds, or use a safe alternate source of water.

DO NOT CONSUME (DNC)

-There are harmful chemicals or other bad things in the water that can make you sick if you consume (swallow) it.

-You cannot make the water safe by boiling it.

-You can bath, shower, and water plants and gardens with the water.

DO NOT USE WATER (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.

	WATER QUALITY ADVISORY (WQA)
	BOIL WATER NOTICE (BWN)
	DO NOT CONSUME (DNC)
	DO NOT USE (DNU)

Standards for Potable Water

The *British Columbia Drinking Water Protection Act (DWPA)* and supporting Regulation along with the *Federal Guidelines for Canadian Drinking Water Quality (GCDWQ)* define parameters for potable water in BC. These include Aesthetic Objectives (AO) and Maximum Allowable Concentrations (MAC) for numerous water quality parameters.



Certified Water Operators

The British Columbia *Environmental Operators Certification Program (BC EOCP)* is responsible for the classification of water systems in BC. The EOCP is also responsible for certification of all water system Operators.

All RDOS Operators are certified through the *BC EOCP*. Operators may hold certification in the disciplines of Water Distribution and/or Water Treatment with 4 levels of certification achievable within each discipline.

Annually, RDOS Operators attend courses and seminars and complete online training required to maintain and augment their levels of certification.

Water Treatment

All of the water pumped from Okanagan Lake is treated through the Ultraviolet (UV) Water Treatment Plant. Raw water from Okanagan Lake is passed through UV light, the primary form of disinfection, which inactivates harmful viruses and organisms (some of which are resistant to chlorine such as *Cryptosporidium*). The water then undergoes a second level of disinfection with the addition of sodium hypochlorite (chlorine). This addition of chlorine also provides protection for the treated water as it moves through the distribution system.

UV Treatment Reactors



Potable Water – Okanagan Lake Source

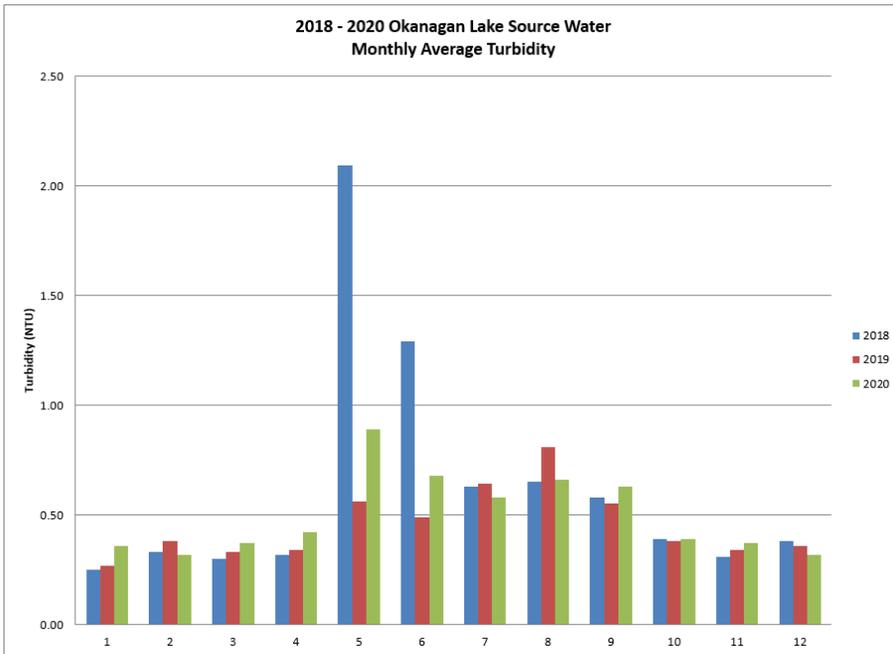
A variety of tests are carried out in the water system on a daily, weekly, monthly and annual basis. Annually the RDOS submits samples to an accredited lab for full comprehensive potable water testing. One sample is collected of the raw water from Okanagan Lake and one sample is taken of the treated water in the distribution system. These comprehensive tests include physical parameters (e.g. color, turbidity, temperature, ultraviolet transmittance), chemical parameters (e.g. total metals and nutrients) and bacteriological quality. Changes in these parameters may result in challenges with the current treatment process, the need for water notifications for customers (i.e. *Boil Water Notice* or *Water Quality Advisory*) or the requirement for additional treatment processes to be implemented. In 2020, all of the tested parameters met the applicable potable water standards. These parameters are also trended annually and in 2020 there were no significant changes in any parameters.



Additional Source Monitoring

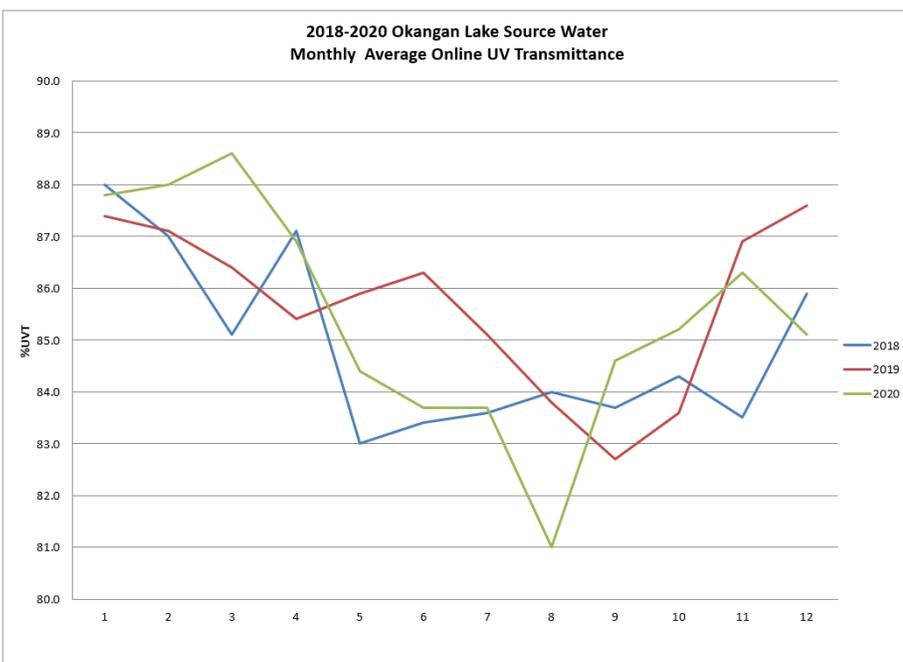
In addition to the annual comprehensive testing, some parameters in relation to the UV treatment process, are monitored more closely. This ranges from online analytical equipment to more frequent testing conducted by an accredited laboratory. Two closely monitored source water parameters are turbidity and UV transmittance.

The average monthly turbidity for 2020 ranged from 0.32 NTU (February and December) to 0.89 NTU (May).



Comparison of 2018 to 2020 Monthly Average Turbidity Levels

The average monthly UV Transmittance for 2020 ranged from 81.0% (August) to 88.6% (March).



Comparison of 2018 to 2020 Monthly Average % UVT Levels

What is Turbidity?

Turbidity is the measurement of the “cloudiness” of water resulting from the suspension of particles such as clay, silt, organics, etc. and is measured in Nephelometric Turbidity Units (NTU). Bacteria, viruses, and parasites such as *Giardia* and *Cryptosporidium* can attach themselves to the suspended particles in turbid water. These particles then interfere with disinfection by shielding contaminants from the disinfectant (UV or chlorine). Interior Health’s Turbidity Index determines the turbidity levels which trigger *Water Quality Advisories* (greater than 1NTU and less than 5NTU) and *Boil Water Notices* (greater than 5NTU) when levels are exceeded. The RDOS has online continuous monitoring of turbidity for surface water sourced systems.

What is UV Transmittance?

Ultraviolet transmittance is defined as the amount of ultraviolet light @ 254 nm wavelength that is transmitted through a 1cm² sample and is indicated as a percentage (%UVT). UV disinfection systems are designed based on the UV transmittance of the source water.

The amount of UV light required to achieve the required UV dose for disinfection is dependent on the flow rate and % UVT of the source water.

Provincial Drought Levels

It can be confusing when Provincial Drought Levels are circulated in the media and appear to contradict local Water Restriction Stages. They are two different rating systems.

Drought levels are based on 'environmental flow needs' in creeks and rivers. BC River's Forecast Centre monitors volumes of water and water levels in order to insure water volumes are adequate to support fish as they move through their life cycle. Fish are indicators of the overall health of the creek ecosystem, especially in times of increasing water scarcity during a drought.

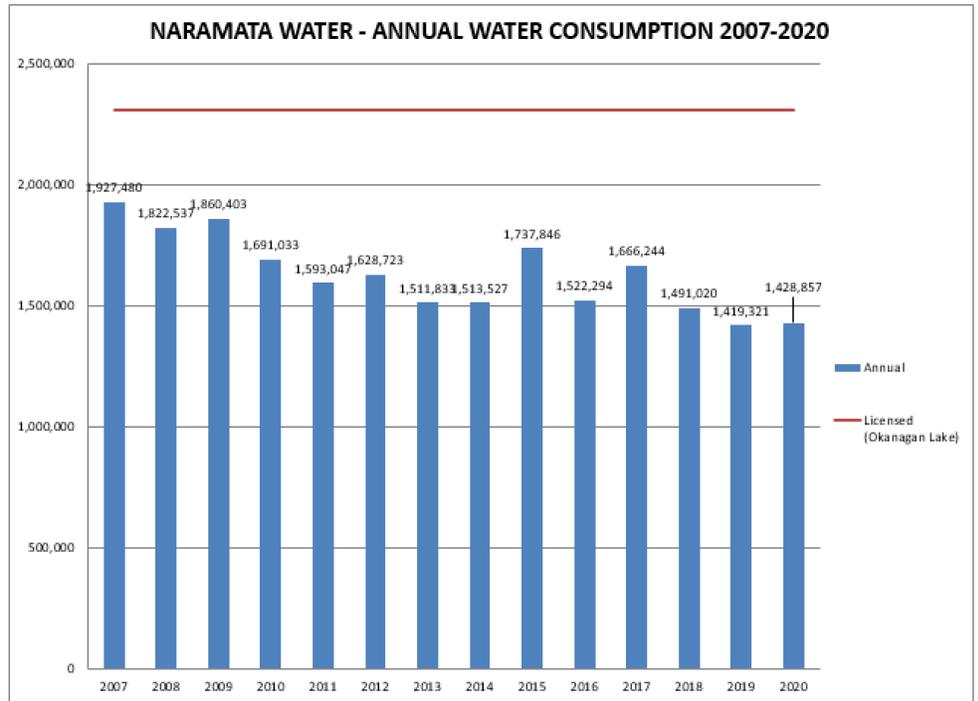
Flow volumes and levels directly correlate to the temperature of water, as shallow or slow moving water heats up more quickly. Hot water holds less oxygen. Without significant cooling shade from healthy riparian habitat, fish can easily start to suffocate and die of heat stress in hot shallow water.



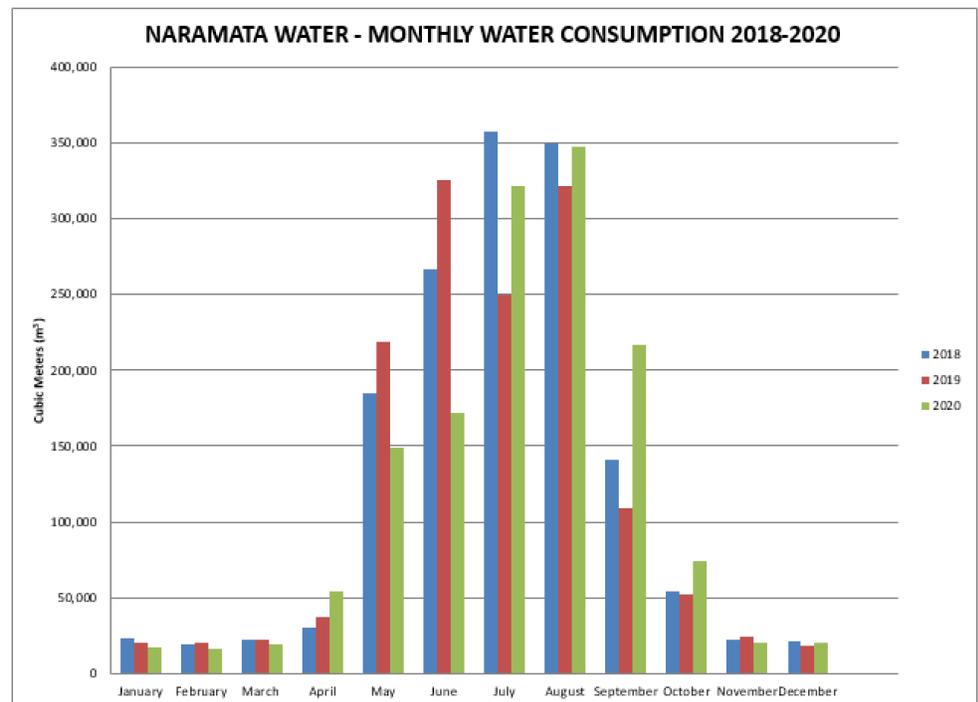
The Province developed a system to rate Drought Levels, and the response actions required at each incremental stage. These recommendations are advertised through media outlets as Drought Levels change.

Water Consumption

Water for domestic, agricultural and commercial uses within the Naramata water system is sourced entirely from Okanagan Lake. The total consumption record for 2020 was up slightly from 2019, with a total of 1,428,857 cubic meters pumped from Okanagan Lake.



Annual Water Consumption 2007-2020



Monthly Water Consumption 2018-2020



Water Conservation

New for 2021

4 x 6 Magnet

These handy little reminders were provided to all property owners in RDOS owned or operated water systems. The hanger can be attached to exterior hose bibs, and the magnets to any metal surface like fridges, filing cabinets, or metal garage doors. If your property is a rental, please insure they are delivered to tenants, and all outdoor irrigation is set to align with regulations.

MAKE WATER WORK FOR YOU

2 x 3 outdoor faucet (hose bib) hanger



For the complete Water Use Restriction Stages visit: [Water Restrictions](https://www.rdos.bc.ca/restrictions)

For more water wise tips visit : www.makewaterwork.ca

Regional Water Restrictions Balance the Demand for Water

The RDOS owns or operates nine water systems. Each system is unique, and has its own Water Use Bylaws tailored to the system and user base.

Water or Sprinkling Restrictions relate to the capacity of each water system to provide potable water to all users. Restrictions are required in times of heavy use or water scarcity and may not be at the same stage in all systems.

Water Restriction Stages relate to the ability to provide the volume of water requested by property owners (balancing demand) and reducing stress on the infrastructure. In Naramata, raw water is extracted from Lake Okanagan at the Lake station pump house, where it is monitored for turbidity and anomalies as it moves up the system to the McKay Rd. treatment facility. Treatment levels are determined by the results of the raw water quality monitoring.

Where demand becomes an issue in any water system, is when more water is being requested by users than the system can comfortably accommodate.

This means there needs to be sufficient time to extract water, pump it to a treatment plant, apply UV treatment and/or chlorination then pump into a reservoir where a mandatory chlorine 'resting time' is required before finally being pumped to the distribution system.

Water Quality Complaints

If you have a water quality complaint or concern or would like to request further information regarding any of the RDOS water systems please contact the following:

Public Works Department
RDOS Environmental Technologist
Toll Free: 1-877-610-3737
Phone: 250-490-4106
Email: info@rdos.bc.ca

Water Connections

During regular business hours water related emergencies, questions regarding applications for water service and water service turn on/off requests can be directed to the following:

Public Works Department
Administrative Assistant
Toll Free: 1-877-610-3737
Phone: 250-490-4135
Email: info@rdos.bc.ca

AFTER-HOURS WATER EMERGENCIES

For all after-hours water related emergencies please call:
Regional Dispatch
250-490-4141



Additional Resources

RDOS Water System Home Page
[Water Systems | RDOS](#)

Interior Health Authority Drinking Water Homepage
[Home \(interiorhealth.ca\)](#)

Federal Guidelines for Drinking Water Quality
[Water Quality - Reports and Publications - Canada.ca](#)

Be Safe—Be Informed—Be Involved In Your Community

SIGN UP TO RECEIVE IMPORTANT RDOS WATER SYSTEM NOTIFICATIONS



To ensure the residents and property owners of the Regional District of Okanagan-Similkameen are safe, informed and up-to-date with community activities, the RDOS has implemented a mass communication service called *CivicReady*. This system allows the RDOS to communicate out routine and emergency messages through email, text and/or phone call.

To sign up and or learn more about CivicReady go to: www.rdos.bc.ca & look for the alarm button or sign up link on the right-hand side



Routine Notifications:

- Community Events
- Water & Sewer System Alerts
- Curbside Pick Up & Landfill Hours
- Regional Recreation
- Land Use Changes
- And More....

Emergency Notifications:

- EOC Updates
- Sandbag Pick-Up Locations
- ESS Locations
- Wildfire Updates
- Dangerous Animals in the Area

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