



Annual Water System Report

REGIONAL DISTRICT OF EAST KOOTENAY
2013



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1. RDEK Water Systems Overview

The RDEK strives to provide a safe and reliable water supply to all of its customers. As required by the Drinking Water Protection Act, this annual public report is intended to inform the public of the water systems owned and operated by the RDEK and provide details on water quality, system maintenance and improvements, water conservation tactics, and more. The RDEK's seven certified operators ensure proper operation of the systems that comply with regulations set out by the BC Interior Health Authority.

RDEK Operated Water Systems:

Water Systems	EOCP #	# of Connections
Windermere	1098	575
Timber Ridge	1099	345
Holland Creek	N/A	369
Edgewater	649	456
Rushmere	1854	34
Moyie	N/A	72
Elko	N/A	58

2. Water Treatment Objectives

The Canadian Drinking Water Guidelines, developed by Health Canada, are designed to protect the health of the most vulnerable members of the community, such as children and the elderly. Basic parameters are set out that every water system should strive to achieve in order to provide the cleanest, safest and most reliable drinking water possible.

A Maximum Acceptable Concentration (MAC) level has been established by Health Canada for microbiological criteria. Each MAC has been designed to safeguard health, assuming a lifelong consumption of drinking water containing the substances at the maximum concentration level.

Aesthetic Objectives (AO) apply to characteristics of drinking water that can affect its acceptance by consumers. These would include items such as taste, odour and appearance. Some AO's, such as turbidity, could pose a health risk to some at risk consumers if the MAC levels are exceeded.

In the East Kootenay, the Interior Health Authority (IHA) acts as the water quality regulator by issuing operating permits and conditions on permit including those found in the BC Drinking Water Protection Act and the Canadian Drinking Water Guidelines.

IHA uses the following model to ensure waterborne illnesses are not jeopardizing the public's health:

The 4-3-2-1-0 treatment objective:

- is based on Canadian Drinking Water Quality Guidelines
- 4 log (99.99%) inactivation of viruses
- 3 log (99.9%) inactivation of or removal of Giardia and Cryptosporidium
- 2 treatment processes for surface water (typically this includes filtration and disinfection)
- 1 for <1 NTU of turbidity (with a target of 0.1 Nephelometric Turbidity Units)
- 0 fecal coliform and E. Coli

3. Water Quality Monitoring

Monitoring programs are established as required by regulations, operating permit and the Drinking Water Officer. Bacterial testing is a major requirement and is performed weekly in every RDEK water system. Samples are submitted to an approved lab where they are tested for Total Coliform and E. Coli Bacteria.

Coliforms:

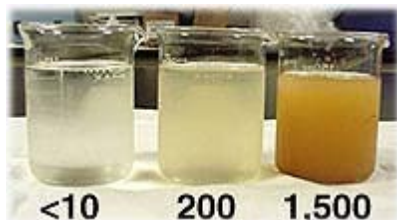
The presence of total coliforms in the water system is an indicator that the system is experiencing regrowth, that infiltration has occurred, or that it has not been properly treated at source. It is an indication that potential exists for bacteria causing adverse health effects. The MAC for total coliform in all RDEK operated water systems is 0 per 100 mL. If a sample comes back positive for coliform, a re-sample is conducted, if that result is positive than the main is flushed, monitored, and tested again. If the third result is positive, the main is taken out of service, chlorinated, flushed and remains out of service until acceptable results are obtained.

E. coli:

Escherichia coli is one species in the fecal coliform group and is a definite indicator of the presence of feces in the distribution system. The MAC for E.coli is 0 per 100 ml. An unacceptable MAC test for E.coli triggers an immediate boil water order by the Medical Health Officer which remains in effect until the problem is isolated, identified, resolved, and acceptable test results are obtained.

Turbidity:

Turbidity is a measure of water clarity. Turbid water can look cloudy or opaque and can also affect the color of the water. Turbidity is measured in Nephelometric Turbidity Units (NTU). The instrument used for measuring is called nephelometer or turbidimeter, which measures the intensity of light scattered at 90 degrees as a beam of light passes through a water sample.



The RDEK monitors turbidity with continuous monitoring instrumentation and verifies values with daily grab samples in all of its surface source water systems using this as a basis for general water quality. Water Quality Advisories are issued when turbidity levels reach 1 NTU. Boil Water Notices are issued at or above 5 NTU. Depending on the treatment system, Health Canada recommends different turbidity level objectives; however, it should never be above 1.0 NTU.

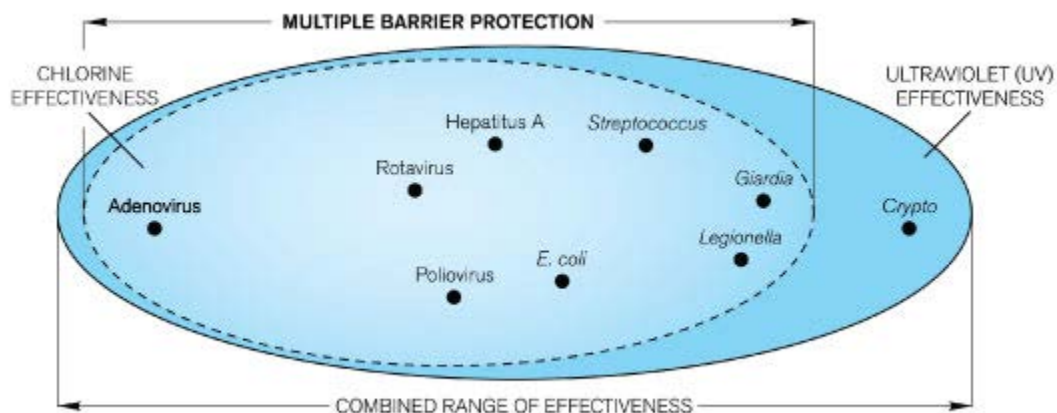
Chlorine Disinfection:

Most RDEK water systems are currently using chlorine to disinfect the water prior to sending it in the distribution system or to maintain free chlorine in the distribution system. Maintaining free chlorine residual in all parts of the system is important in keeping the water safe from bacteriological growth and other disease causing organisms.

To ensure adequate chlorine levels exist, the RDEK has a number of online chlorine analyzers that monitor residuals and will alarm and alert an operator should it fall below a desired point.

Ultraviolet Light Disinfection:

Ultraviolet light (UV) destroys harmful organisms by causing a molecular change in their DNA makeup that prevents them from multiplying and destroys the ability to spread disease. When germs cannot multiply, they are considered dead. It is often used in conjunction with chlorination for added protection and to combat organisms such as cryptosporidium which is a chlorine resistant protozoan that can easily be inactivated by UV. Another advantage of UV disinfection is that it does not produce any disinfection by-products. Edgewater Water System UV disinfection implementation is currently in process with anticipated introduction by the end of 2014.



Disinfection By-products:

Disinfection by-products are formed when disinfectants used in water treatment plants react with bromide and/or natural organic matter (i.e., decaying vegetation) present in the source water. Different disinfectants produce different types or amounts of disinfection byproducts. Disinfection byproducts, for which MAC's have been established, have been identified in drinking water, including trihalomethanes and haloacetic acids.

- Trihalomethanes (THM) are a group of four chemicals that are formed along with other disinfection byproducts when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water. The THM's are chloroform, bromodichloromethane, dibromochloromethane, and bromoform. The Canadian Drinking Water Guidelines have established a MAC to regulate total THM's (TTHM) at a maximum allowable annual average level of 0.1 mg/L.
- Haloacetic Acids (HAA) are a group of chemicals that are formed along with other disinfection byproducts when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water. The Canadian Drinking Water Guidelines do not have a MAC in place for HAA's at this point in time; however, the United States Environmental Protection Agency (EPA) has set regulations for HAA at 60 parts per billion annual average or 0.06 mg/L.

The RDEK samples for both THM's and HAA's on a quarterly basis. There were no results exceeding Canada's MAC's or the U.S. EPA guidelines in 2013.

For more information on specific water quality parameters please contact the RDEK or visit the *Province of BC's Ministry of Healthy Living and Sport* website to find the *Drinking Water Protection Act and Regulation* http://www.health.gov.bc.ca/protect/dw_index.html or the Health Canada website to find the *Guidelines for Canadian Drinking Water Quality*. http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/index-eng.php#tech_doc

4. RDEK Water Quality Performance

Parameters	Quality Standards	Frequency	Water Systems	Performance	
Total Coliform, E.Coli	Less than one E.Coli and total coliform bacteria detectable per 100ml samples	Weekly	Windermere	100%	
		Weekly	Edgewater	100%	
		Weekly	Holland Creek	100%	
		Weekly	Timber Ridge	100%	
		Weekly	Rushmere	98%	
		Monthly	Moyie	100%	
		Monthly	Elko	100%	
Free Chlorine Residual	Free chlorine residual minimum of 0.5mg/l entering the system after no less than 20 mins contact time. Minimum of 0.2mg/l at any/all end points of the distribution system	Five days/week	Windermere	99.2% ≥ 0.5 mg/L	
		Five days/week	Edgewater	100% ≥ 0.5 mg/L	
		One day/week	Holland Creek Distribution	100% ≥ 0.2 mg/L	
		Five days/week	Timber Ridge Distribution	99.6% ≥ 0.2 mg/L	
		Five days/week	Rushmere	78.6% ≥ 0.5 mg/L	
Turbidity	Disinfected water shall not be higher than 1 NTU*. Between 1 NTU and under 5 NTU a water quality advisory must be issued. Above 5 NTU a boil water notice is issued. Turbidity of water treated by membrane filtration shall not exceed 0.1 NTU in at least 95% of the samples in any month.	Five days/week	Windermere	29% ≤ 1.0 NTU 95% ≤ 5.0 NTU	
		Five days/week	Edgewater	100% ≤ 1.0 NTU 94% ≤ 0.3 NTU	
		Five days/week	Holland Creek	100% ≤ 1.0 NTU 62% ≤ 0.3 NTU	
		Five days/week	Timber Ridge	99.5 % ≤ 1.0 NTU	
		Five days/week	Rushmere	0% ≤ 0.1 NTU 97.5% ≤ 0.3 NTU 100% ≤ 1.0 NTU	
Total Trihalomethanes	Maximum Allowable Annual Average of 0.1 mg/l	Quarterly	Windermere	100%	
		Quarterly	Edgewater	100%	
		Quarterly	Timber Ridge	100%	
		Quarterly	Rushmere	100%	
Haloacetic Acids	Under Review by Health Canada (no MAC) at this time	Quarterly	Windermere	N/A	
		Quarterly	Edgewater	N/A	
		Quarterly	Holland Creek	N/A	
		Quarterly	Timber Ridge	N/A	
		Quarterly	Rushmere	N/A	

*NTU: Nephelometric Turbidity Unit

*MAC: Maximum Acceptable Concentration

*MPN: Most Probable Number

5. RDEK System at a Glance

RDEK Water System	Source Water	Supply Method	Disinfection/ Treatment Process	Pressure Reducing Stations	Reservoir & Capacity	Fire Protection
Windermere	Lake Windermere	Pumped/ Gravity	Chlorine disinfection	2	Concrete 1250m ³	yes
Edgewater	Lake Baptiste	Gravity	Chlorine disinfection	2	Steel 800m ³ & 400m ³	yes
Holland Creek	Groundwater Wells	Pumped/ Gravity	Chlorine disinfection	1	Supplied by Kinbasket Water and Sewer	yes
Timber Ridge	Lake Windermere	Pumped/ Gravity	Conventional treatment, Chlorine and UV disinfection (By Parr Utilities)	No RDEK owned PRV	Supplied by Parr Utilities	yes
Rushmere	Lake Windermere	Pumped	Ultra Filtration and chlorine disinfection	0	Polyurethane 17 m ³	no
Moyie	Groundwater well	Pumped/ Gravity	No treatment or disinfection	0	Concrete 71m ³	no
Elko	Groundwater well	Pumped	No treatment or disinfection	0	No storage	no

6. Water Systems in Detail

6.1 Windermere Water System:

Windermere's water is drawn from Lake Windermere and pumped from one low-level pump house to another high-level pump house located beside the Windermere Public Beach. During this transfer, it is dosed with chlorine gas and pumped again across highway 93/95 to a 1250m³ concrete reservoir. The water is then sent back into the distribution system and ultimately to the residential services. This process is monitored using instrumentation and alarm dialers to notify the operators when a problem occurs. These sites are regularly frequented 5 days per week and processes are verified and recorded.

6.1.1 - 2013 Events and System Improvements

- Rebuilt one of three high-lift turbine pumps and motor
- Replaced faulty check valves in high-lift pump station
- Emptied, cleaned and inspected high-lift chlorine contact chamber and reservoir
- Upgraded South Pressure Reducing Valve Station to stainless steel pilot tubing and stainless steel valve seats

- Re-graded main pump house road access
- Purchased and installed new chlorine gas cylinder regulator
- Sent away low-lift turbine pump and motor for repair/replacement
- Complete teardown of all fire hydrants – cleaned up, inspected, repaired, lubricated as required
- Cleaned main reservoir using dive crew and suction equipment
- Replaced 8” valve on high-lift pumphouse effluent line
- Contracted Kerr Wood Leidel for Engineering Cost Assessment on water improvement options

6.1.2 - 2013 Major Events

- A Boil Water Notice (BWN) was issued on June 26th and wasn't rescinded until July 24th. The cause for the BWN was due to high turbidity levels which exceeded 5 NTU. Signs were installed at town entrances, door to door notification occurred, as well as email notification to those on the RDEK's email list.

6.2 Edgewater Water System:

The source water intake for Edgewater is located in Baptiste Lake, approximately two kilometers SE of town adjacent to the Elk Park Ranches. The water flows from Baptiste to consumer taps using force of gravity. It is chlorinated and stored at the Hewitt Rd reservoirs which provide 1200m³ of treated storage. The RDEK monitors turbidity and chlorine levels among other points of interest and automatic alarm dialers provide assurance that operators can respond when problems arise.

6.2.1 – 2013 Events and System Improvements

- Repaired Baptiste Lake intake valves
- Replaced inoperable valves and deteriorating pipe in reservoir valve chamber
- Hewitt Road Pressure Reducing Valve maintenance on piloting system
- Night flow analysis and reservoir step testing components of water distribution leak detection program
- Replaced and repaired air release valves on Baptiste Lake siphon line
- Replaced faulty hydrant across from Post Office
- Hydrant inspection and maintenance program
- Design work on UV building slated for 2014
- Inserted five new main valves on feeder lines to town
- Started Columbia Road Pressure Reducing Valve Station renewal project

6.2.2 – 2014 Plans

- Construction of UV disinfection building
- Columbia Road Pressure Reducing Valve station renewal completion
- Leak detection

6.3 Holland Creek Water System:

The community is supplied with potable water by Kinbasket Water and Sewer Corporation (KWSC). Well source water is chlorinated to protect against contamination within the distribution system should it become compromised. Water is metered by KWSC before entering Holland Creek. The system contains one PRV station which is located just prior to the first connection.

There were no significant system improvements in 2013 nor are there any scheduled for 2014.

6.4 Timber Ridge Water System:

Timber Ridge has a dedicated bulk water connection from Parr Utilities Water Treatment Plant where raw water from Lake Windermere is brought to IHA standards that conform to 4-3-2-1-0 treatment objectives. Because Timber Ridge Phase 3 requires a pump station to deliver sufficient pressures, the RDEK operates a reservoir and pump house within Timber Ridge to accommodate this. It also provides a point for the RDEK to monitor water quality such as chlorine and turbidity levels. Automatic alarm dialers are also set up here to alert staff of any problems with the system.

6.4.1 – 2013 Events and System Improvements

- The decommissioned Timber Ridge community pump houses and reservoirs were excavated and removed
- Two major water main breaks were repaired on the pump house influent and effluent lines
- Water disruption to all of Timber Ridge on June 29th due to operational issues at Windermere Water and Sewer plant
- Timber Ridge Phase 3 fire pump mechanical problems were addressed
- Replaced Phase 3 pump house reservoir effluent piping with stainless steel
- Installed new pump to provide redundancy to Phase 3 supply and allow for more flow

6.4.2 – 2014 Plans

- Install two variable frequency drives from decommissioned Timber Ridge pump house to Phase 3 pump house
- Provide a backup power supply for phase 3 pump house and remove aging gasoline fire pump

6.5 Rushmere Water System

The community of Rushmere is supplied with treated water from Lake Windermere through a small membrane filtration treatment plant. Treated water is stored within the plant and pumped to the community using two variable frequency distribution pumps. Rushmere water system is solely dedicated to domestic use and not used for fire protection. The plant is highly automated and operators have remote monitoring and control capability (SCADA). The plant is attended at a minimum of 3 times per week and can alert staff when problems occur. The RDEK also has a video surveillance system within the plant.

6.5.1 – 2013 Events and System Improvements

- Operators dealt with low flow through raw water intake during low lake conditions
- Installed buoy marker on lake intake
- Total Coliform result came back positive from lab. Subsequent re-sampling took place which came back negative. Positive result attributed to sampling error and not representative of the water quality in the system.
- Regular membrane filter chemical cleaning performed using NSF approved citric acid and NSF approved tetrasodium pyrophosphate

6.5.2 – 2014 Plans

- Relocation of chlorination system closer to injection point

6.6 Moyie Water System

The Moyie Water System receives its ground water from a well 57 meters deep. Water is pumped from the well using a 15 horsepower well pump up to a 320 m³ reservoir which maintains the pressure in the distribution system. The Water is unchlorinated. RDEK operators are on site 2-3 times per week to ensure proper operation and perform bacteriological sampling. The pump house is also outfitted with automatic alarm dialers to alert staff when regular functions are compromised.

6.6.1 - 2013 Events and System Improvements

- Three water connections were removed due to a consolidation of land which no longer required separate connections

6.6.2 – 2014 Plans

- Replace 50 meters of water main between Hwy 3 and Tavistock Street, reconnecting 3 service connections on that stretch and installing a flush out
- New roof on storage shed

6.7 Elko Water System

The community of Elko receives raw water from a single well located near the pump house. The well is located in a confined aquifer and does not require further treatment. Water is fed directly to the distribution system using a 30 horsepower submersible well pump. Because there is no storage reservoir in Elko, the water system relies solely on the continuous operation of the 67 meter well to keep up with demand. RDEK operators are on site 2 to 3 times per week to ensure proper operation and perform bacteriological sampling monthly as required. The pump house is also outfitted with automatic alarm dialers to alert staff when regular functions are compromised.

6.7.1 – 2013 Events and System Improvements

- Replaced 1 of 2 water pressure tanks in pump house
- Power disruptions caused electrical pump switch failure which had to be replaced
- Pressure switch failed causing brief disruption to service
- Service leak repaired
- Planning for well pump replacement and variable pump drive installation

6.7.2 – 2014 Plans

- Replace well pump and motor
- Install variable frequency drive to reduce hard starts, reduce electrical consumption, and prolong pump and motor replacement

7. Operator Certification

EOCP Certifications		
Employee	Certification #	Level
Joel Bilodeau	7394	WT-III, WD-II MWWT-II, WWC-II
Ginger Palmer	6821	WT-I, WD-II, MWWT-I, WWC-I, CH
Paul Oaks	6500	WT-I, WD-I, MWWT-I, WWC-I, CH
Krista Neufeld	7969	WD-I, MWWT-OIT, WT-OIT, WWC-OIT, CH
Jim Maletta	5425	SWS, WD-I
Pat Botterill	3861	SWS, WD-I
Dave Berger	7040	SWS

*WT: Water Treatment

*WD: Water Distribution

*MWWT: Wastewater Treatment

*WWC: Wastewater Collection

*CH: Chlorine Handling

*SWS: Small Water Systems

*OIT: Operator in Training

8. Water Conservation

Water is essential to life on earth. We need water to grow food, keep clean, provide power, control fire, and last but not least, we need it to stay alive!

If water is constantly being cleaned and recycled through the earth's water cycle, why do we need to conserve it? The answer is that people use up our planet's fresh water faster than it can naturally be replenished.




To provide enough clean fresh water for people, water is cleaned at drinking water treatment plants before it is used. And after water is used, it is cleaned again at wastewater treatment plants or by a septic system before being put back into the environment.

Saving water is good for the earth, your family, and your community.


- When you use water wisely, you **help the environment**, save water for fish and animals, help preserve drinking water supplies, and ease the burden on wastewater treatment plants. The less water you send down the drain, the less work these plants have to do to make water clean again.
- When you use water wisely, you save the energy that your water supplier uses to treat and move water to you and the energy your family uses to heat your water.
- When you use water wisely, you **save money**. Your family pays for the water you use. If you use less water, you'll have more money left to spend on other things.

In an effort to conserve water, the RDEK has adopted a watering hours schedule for all its operated water systems. See information below.



Regional District of East Kootenay

Watering Hours



The RDEK has watering hours on all of its water systems. Having set watering hours conserves water, creates a balance in the system demand and controls costs. Please abide by these watering hours. They are in place for the benefit of your community.

<u>Elko Water System</u> Watering Times: Morning 6:00am - 10:00am Evening 7:00pm - 11:00pm	<u>Moyie Water System</u> Watering Times: Morning 6:00am - 10:00am Evening 7:00pm - 11:00pm
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Residents west of Main Street water on **EVEN** numbered days, and residents east of Main Street water on **ODD** numbered days.

Residents living west of Tavistock can water on **EVEN** numbered days and residents east of Tavistock can water on **ODD** numbered days.

Windermere, Timber Ridge, Holland Creek, Edgewater Water Systems


Please note: All Water Systems are on the same Watering Restrictions - which includes "No Watering Fridays" allowing time for the reservoirs to replenish.

Manual Watering Times:
Morning 6:00am - 10:00am
Evening 7:00pm - 11:00pm

Automatic Irrigation System Watering Times:
3:00am - 8:00am

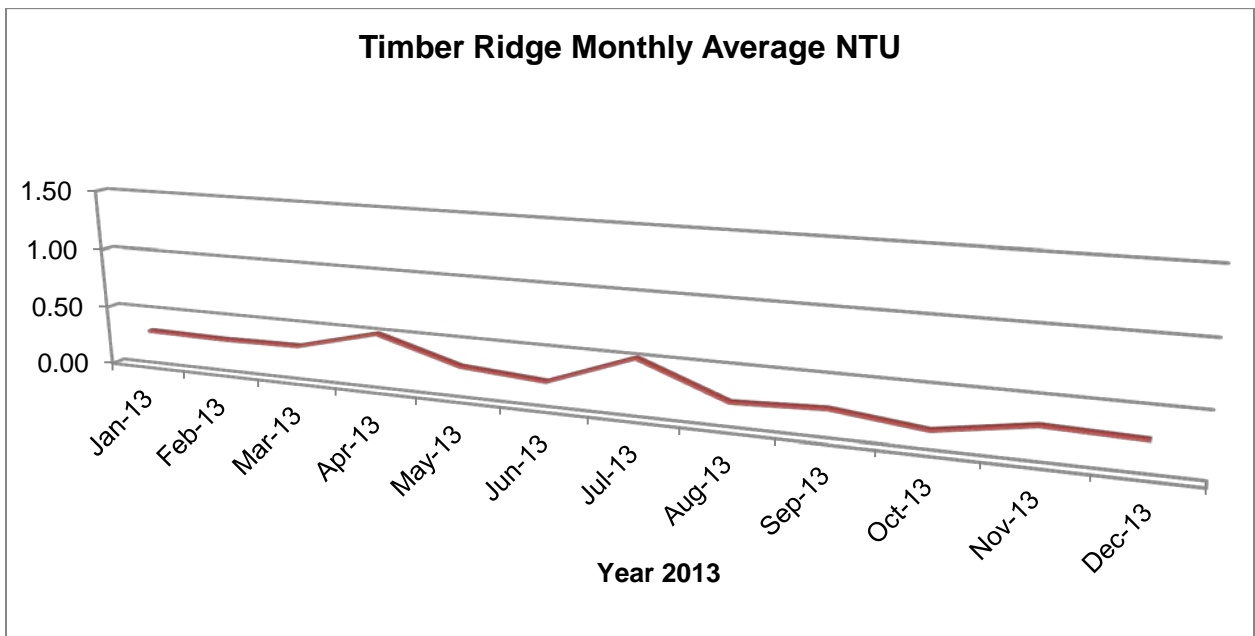
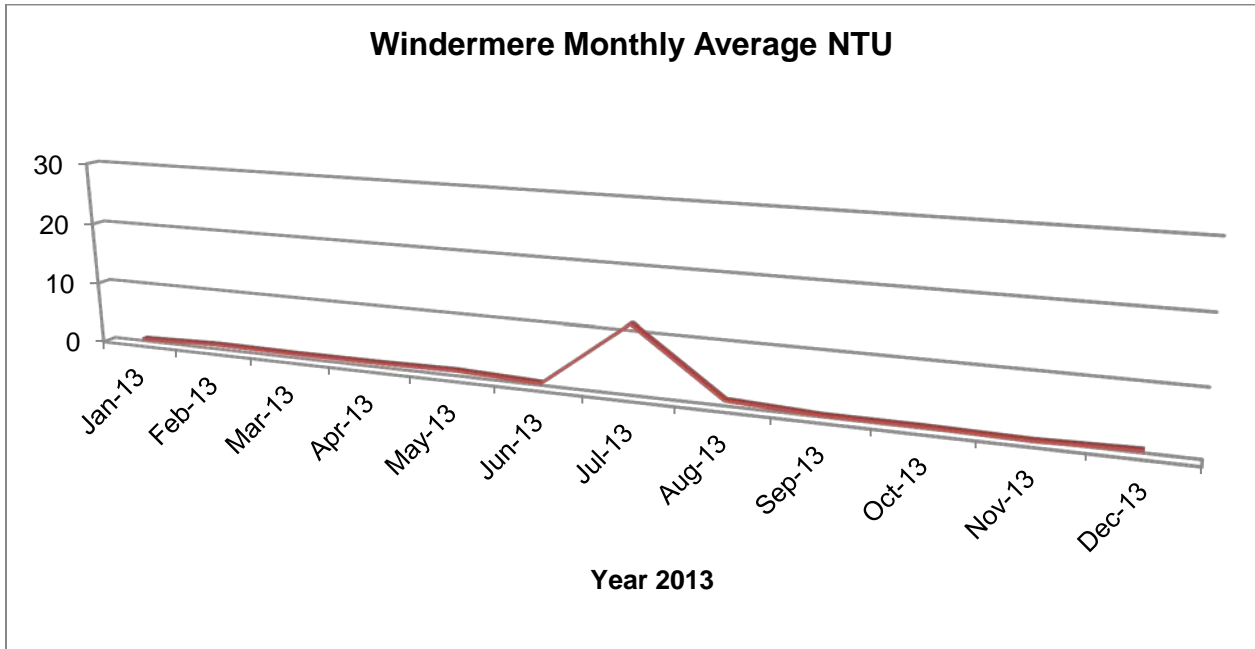
EVEN numbered houses may water on Tuesdays, Thursdays and Sundays
ODD numbered houses may water on Mondays, Wednesdays and Saturdays

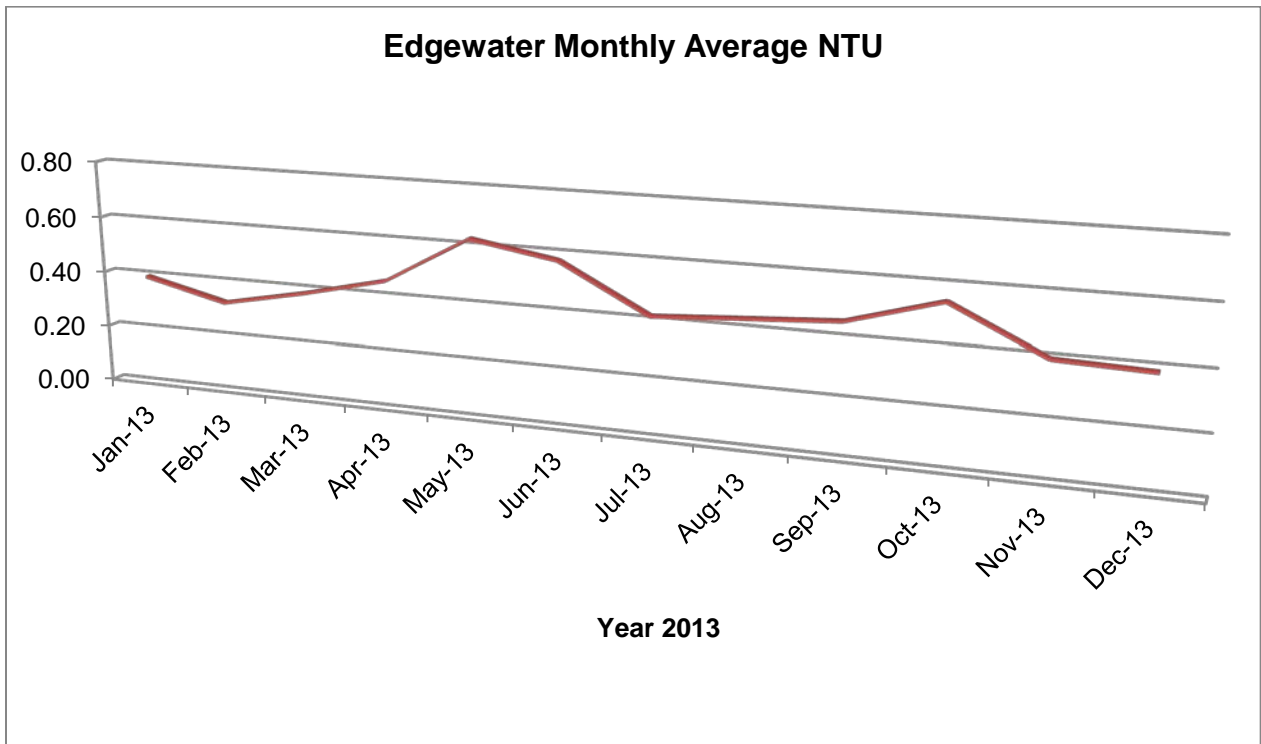
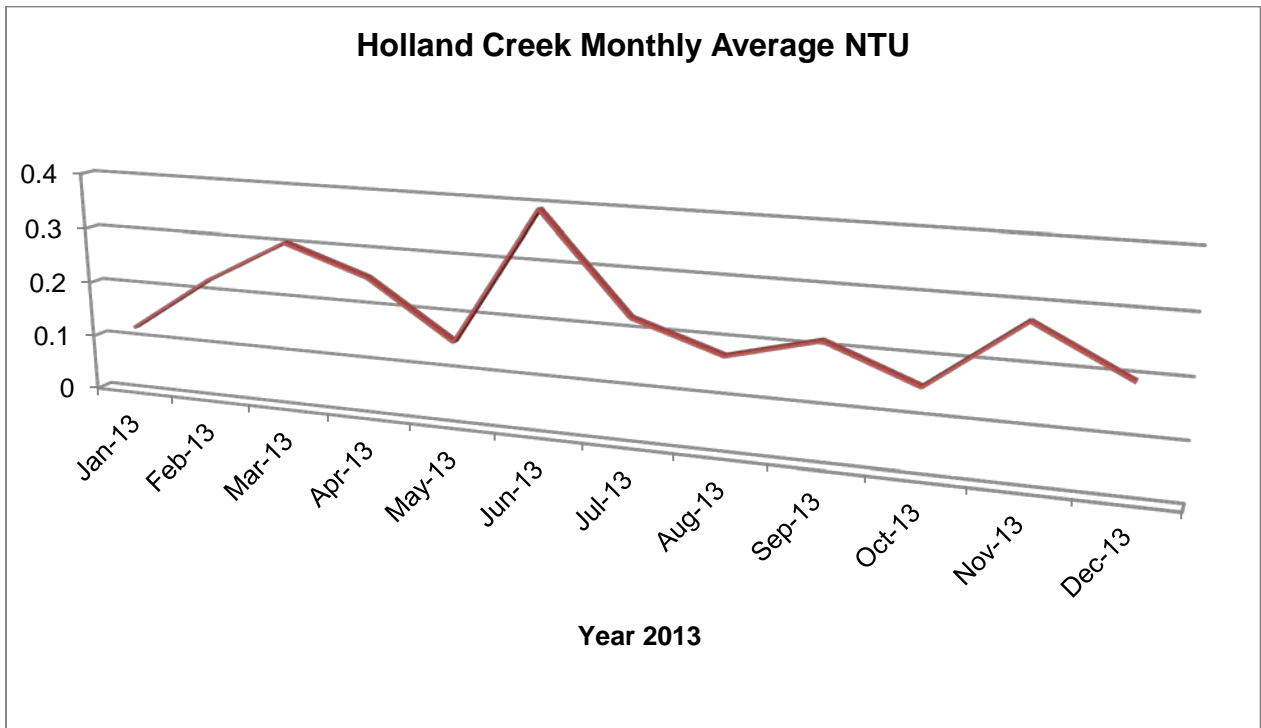
For more information, contact the RDEK Engineering Services Department at 1-888-478-7335 or visit www.rdek.bc.ca

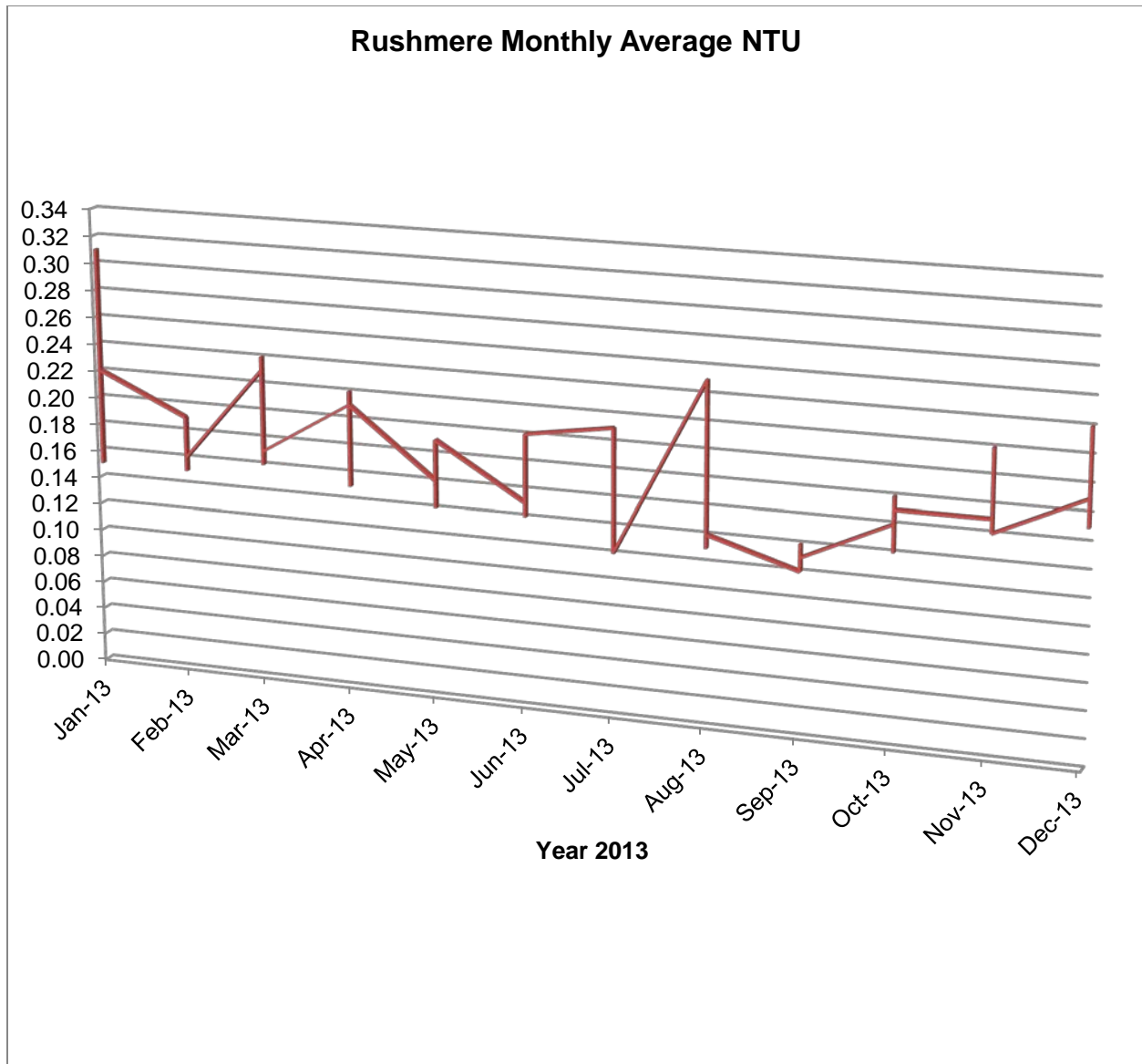


The RDEK has also developed a Water Conservation Plan in 2009.

9. Water System Data







Summary

The RDEK is committed to providing safe potable water in efficient a manner as possible. Working with the IHA to plan for future improvements while facing obstacles as they are presented, is a major part of what we do. This report represents a way of communicating facts and keeping the public apprised of what's happening now as well as things to come in the future. We hope it has helped shed some light on current operation processes of our water services in the East Kootenays.