



# 2011 Drinking Water Quality Annual Report

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## EXECUTIVE SUMMARY

This report summarizes the District of West Vancouver's water quality program for 2012. Sampling has been carried out in accordance with the protocol developed with Metro Vancouver (formerly Greater Vancouver Regional District) and member municipalities; where objectives exist, monitoring results are compared to the *Guidelines for Canadian Drinking Water Quality*.

The District operates a system that treats and distributes potable water supplied from two local sources, namely Eagle Lake and Montizambert Creek and from purchased, bulk, treated water from Metro Vancouver (Capilano or Seymour sources). Detailed information regarding the Metro Vancouver supply can be found through direct contact with the regional district.

Raw water from both Eagle Lake and Montizambert Creek sources is analyzed for bacteriological, physical and chemical parameters. Bacteriological testing in 2012 revealed source waters to have very low presence of *Escherichia coli* (*E. coli*), giardia, and cryptosporidium.

Water distributed throughout the system was tested for bacteriological, physical and chemical parameters. Samples for total coliforms and *E. coli* were all negative. Tests showed turbidities of greater than 5 NTU in only 3 distribution samples for the year. Tests showed turbidity less than 1 NTU in 96.6 % of all distribution system samples. In locations where samples were above the guideline, water mains were flushed until turbidity dropped to an acceptable level. Chlorine residual tests for all samples tested above the recommended minimum level of 0.2 ppm. Testing for the disinfection by-products, trihalomethanes and haloacetic acids, indicated levels were above Canadian guidelines for trihalomethanes at one site for the first two quarters and at several sites for haloacetic acids from both the Eagle Lake and Montizambert distribution systems. Levels were within guideline limits for Metro Vancouver sites.

The cooperation and support of the staff of the Vancouver Coastal Health Authority is acknowledged in maintaining high quality drinking water in the municipality.

## **1.0 INTRODUCTION**

This report summarizes the District of West Vancouver's water quality program for 2012. The purpose is to detail the municipality's efforts in maintaining high quality, drinking water and to provide residents with the results of the sampling and analysis program.

Water suppliers in British Columbia are regulated by the Drinking Water Protection Act and the Drinking Water Protection Regulation. This *Drinking Water Quality Annual Report* is a requirement of the Vancouver Coastal Health Authority (VCHA) in order to receive annual operating permits and is reviewed by the Medical Health Officer (MHO) for the North Shore. As requested by the MHO, this report shall be made public by a prominent web site posting at <http://www.westvancouver.ca>.

The District's water quality program has been carried out in accordance with the document entitled, *Water Quality Monitoring and Reporting Plan for the GVRD and Member Municipalities, May 2000*, which was developed under the authority and direction of the Regional MHOs

## **2.0 GENERAL DESCRIPTION**

The District of West Vancouver operates a water supply and distribution system consisting of a network of intakes, chlorination stations, reservoirs, pressure reducing valve (PRV) stations, pumps and pipes. The system is required to adequately receive, store, and transport potable water to all users in West Vancouver. Key facilities are connected by a telemetry system (SCADA) to a central computer, which monitors the system, identifies faults and sends alarms to key personnel 24 hours a day.

## **3.0 SOURCE WATER WATERSHEDS**

### **3.1 General**

The municipality obtains water from three sources:

- Eagle Lake;
- Montizambert Creek; and
- Bulk, treated water purchased from Metro Vancouver.

From Horseshoe Bay to the eastern municipal boundary, residents are serviced by a water distribution system that is fed by both Eagle Lake and Metro source waters. While the distribution area for each source varies seasonally, in general, Eagle Lake water is received below the Upper Levels Highway (ULH), west of the McKechnie Reservoir and above the ULH, east to the Chartwell neighbourhood. The municipality continues to expand the use of the Eagle Lake source whenever supplies permit in order to reduce the purchase of bulk water from Metro Vancouver. North of Horseshoe Bay at the northern municipal boundary, the Sunset

Highlands neighbourhood is serviced by the Montizambert Creek source, with the exception of the “Seascapes” multi-family development, which utilizes private wells.

### **3.2 Eagle Lake Treatment Plant**

Located above Cypress Falls Park, Eagle Lake source waters flow through intake screens (with an opening size of 0.54 mm) before entering the treatment plant by gravity. When the lake level is below the elevation of the intake screens, floating pumps are required to pump water from the lower lake levels to the treatment plant. This occurs occasionally, typically during the late summer months.

#### **3.2.1 Operation**

According to Sec 9 (1) of the Drinking Water Protection Act (DWPA), subject to regulations, a person must not operate, maintain or repair a prescribed water supply system unless:

- (a) the person is qualified in accordance with the regulations to do this, or
- (b) is doing this under the supervision of a person who is qualified in accordance with the regulations

Eagle Lake Treatment Plant is classified as a Level 3 facility in accordance with the Environmental Operators Certification Program (EOCP) and is currently operated by a certified level 3 operator. In 2012, one current distribution operator achieved Water Treatment EOCP Level 1 certification and will continue to work towards Level 3 certification. Due to the time required to gather sufficient experience, this will likely require an additional 3 years to achieve.

In January 2013, the District will be hiring a Level 2 certified operator to assist in the plant operations.

#### **3.2.2 Eagle Lake Water Treatment Plant Bypass and Optimization**

In the event of a plant failure, a written bypass procedure is in place. All EOCP certified staff are familiar with the details of the procedure. The details of these procedures have been provided separately in the Eagle Lake Water Treatment Plant Emergency Response and Contingency plan to VCHA. Should the plant be placed in bypass mode for any reason, disinfection rates and minimum allowable chlorine contact time will be maintained.

The Eagle Lake Treatment Plant was not bypassed during 2012.

With the completion of the infrastructure required to optimize the use of the Eagle Lake supply system in June, 2010, the District has increased the supply of Eagle Lake water to the distribution system during non peak periods. The District SCADA system is used to automatically monitor and prompt any required changes to the system based on plant conditions such as clear well level and system demand.

During extended periods when the plant operator is expected to be unavailable (i.e.: vacation), a procedure is in place to allow the plant to function under a reduced demand scenario with some areas which are typically supplied by Eagle Lake transferred to the Metro supply. Should the plant experience any operating difficulties which affect production, the SCADA system will automatically take over and the Metro supply will be introduced to the Eagle Lake distribution system.

Standby personnel monitor the Eagle Lake Water Treatment Plant operation 24/7 and VCH will be notified immediately should there be any changes to operational procedures.

### **3.3 Montizambert Treatment Plant**

With the completion of the Montizambert Treatment Plant in September 2011, residents North of Horseshoe Bay is now supplied with filtered water similar to the quality currently delivered from the West Vancouver Eagle Lake Membrane Filtration Facility.

This water treatment plant employs state-of-the-art Pall Membrane filtration technology, which removes fine particles and micro organisms and is compliant with the 4-3-2-1 multi-barrier approach as specified in the Guidelines for Canadian Drinking Water Quality to ensure safe drinking water as mandated by the Health Authorities of British Columbia.

Since filtered water maintain chlorine residual much longer than conventionally treated water, the introduction of the treatment plant has also resulted in a reduction of maintenance hours previously required to flush the mains in order to maintain a minimum chlorine residual of 0.2ppm within the distribution system.

Since the Montizambert Treatment Plant is also classified as an EOCP Level 3 facility, a similar procedure has been established in the event of a plant failure, and during extended periods when the plant operator is expected to be unavailable. The treatment Plant operation is also monitored 24/7 and VCH will be notified immediately should there be any changes to the operational procedures.

### **3.4 Metro Vancouver**

Bulk treated water purchased by the District from Metro Vancouver for servicing is supplied from the Seymour and Capilano sources. This water enters the municipality's distribution system at five locations:

- Marine Drive and Capilano Road;
- Capilano Road and Welch Street;
- Glenmore Reservoir;
- Capilano Road and Upper Levels Highway; and
- 3105 Capilano Road.

### **3.5 Challenges**

Challenges to the quality and quantity of the source water include:

- maintaining a balance between public access for recreation (e.g., portion of the Baden Powell Trail above Eagle Lake) and security of the watershed for protection of drinking water quality;
- physical disturbances in watersheds such as soil erosion into creeks, which lead to turbidity spikes;
- vulnerability of open water sources to contamination from animal and human activity;
- maintaining creek flow supplementation for fish habitat during the summer, when Eagle Lake level is low; and
- low flow conditions in Montizambert Creek during drier summer months.

### **4.0 REGULATIONS AND STANDARDS FOR SOURCE WATER AND THE DISTRIBUTION SYSTEM**

Both source waters and water within the distribution system are tested for microbiological, chemical and physical parameters. For the purposes of the municipality's own water quality sampling program, locations monitoring Metro water are treated as "distribution," not "source" sites; however, some Metro sample points have been located close to the entry points to the municipal distribution system.

The Drinking Water Protection Regulation (DWPR) requires 1 sample / 1000 residents on a monthly basis for cities with a population between 5000 and 90,000 residents. During 2012 the District of West Vancouver had approximately 45,000 residents, which equates to 540 samples required annually. The total number of samples collected for the District during 2012 was 596. Therefore, the current number of stations and samples provide the number of tests as required by the DWPR.

Further to the information outlined below, full details outlining the health based guidelines for water quality in Canada, established on behalf of the Federal-Provincial-Territorial Committee on Drinking Water, can be found on Health Canada's website.

#### **4.1 Microbiological Parameters**

Under the Guidelines for Canadian Drinking Water Quality (GCDWQ) the most vital guidelines are those dealing with microbiological contaminants. The District of West Vancouver follows the guidelines by taking the required samples at the regulated times.

Samples are taken monthly at the source for *Cryptosporidium* and *Giardia*. The treatment goal for these two parameters is a minimum of 3 log removal or inactivation. By taking a monthly source sample for *Cryptosporidium* and *Giardia* the treatment requirements of the water



treatment plant can be regularly assessed and adjusted. Escherichia coli (E. coli) is sampled bi-weekly at the source and weekly throughout the distribution system. E. coli is an indicator of microbiological safety, the GCDWQ maximum allowable concentration is none detectable per 100 mL sample. Heterotrophic Plate Count (HPC) is tested bi-weekly at the source as well as weekly throughout the distribution system. Although it is naturally occurring and has no limits under the guideline, it is a good monitoring tool for general bacteriological water quality. Total Coliform is sampled bi-weekly at the source and weekly throughout the distribution system. Total coliform is not an indicator of bacteria at the source; therefore, there is no limit for the parameter. When sampled in the distribution system the GCDWQ states that no consecutive samples taken contain total coliform and that no more than 10% of samples taken contain total coliform. Total coliform detected in the distribution system could be an indication of regrowth of bacteria in distribution biofilms or intrusion of untreated water.

The analysis for Giardia and Cryptosporidium was conducted by IG MicroMed Environmental Inc. Analysis for Total Coliform, E. coli and HPC were conducted by Metro Vancouver.

## **4.2 Physical Parameters**

### **4.2.1 Turbidity**

Turbidity describes the amount of suspended solids in water. It is measured in nephelometric turbidity units (NTU). The presence of turbidity can have significant effects on both the microbiological quality of water and the detection of the bacteria and viruses. The target turbidity for treated water from the Eagle Lake and Montizambert Water Treatment Plants is less than 0.1 NTU with the intent not to exceed 0.3 NTU at any time. The Guidelines for Canadian Drinking Water Quality supporting documentation states that the turbidity should not exceed 5.0 NTU within the distribution system especially at the point of consumption for aesthetics.

### **4.2.2 Temperature**

The aesthetic guideline for temperature is 15°C. Typically, the temperature of drinking water for both the source water and the distribution system rises during summer months. District staff appreciate that higher temperatures in the distribution system can affect chlorine residuals and can contribute to bacterial re-growth. Tests completed on a regular basis throughout the distribution system are used to ensure acceptable water quality.

### **4.2.3 Colour and Residue**

Physical parameters of colour and residue are tested together with chemical parameters for Eagle Lake and Montizambert source water. With respect to colour, the GCDWQ specifies an aesthetic objective of 15 true colour units (TCU).

## **4.3 Chemical Parameters**

Testing of source waters for chemical parameters, including bromate, bromide, chlorate, chloride and sodium is conducted semi-annually at both Eagle Lake and Montizambert Creek.

In the distribution system, chemical parameters tested include chlorine residual, trihalomethanes (THM), haloacetic acids (HAA), and pH. Chlorine residual is measured at all sampling sites when bacteriological samples are collected; additionally, there are several online chlorine analyzers for continuous monitoring.

#### 4.3.1 Disinfection By-Products

THMs and HAAs are disinfection by-products resulting from the chlorination process. THMs are included in the GCDWQ with an interim maximum acceptable concentration (IMAC) of 100 parts per billion (ppb). HAAs are not regulated in Canada; however, consultation concluded in late 2010 suggesting a potential maximum level of 80 ppb.

#### 4.3.2 pH

Acidity of water is measured by pH, and the aesthetic objective is a reading of 6.5 to 8.5. Both Eagle Lake and Montizambert sources tend toward the lower bound of 6.5. It is recognized that acidic water will accelerate the corrosion of metal pipes, often causing blue-green staining in household fixtures. To address possible leaching of lead and copper, residents have been advised to run taps for at least one minute each morning or any time water has been left standing in pipes for a long period of time. Both the Metro and District water treatment plants have included pH adjustment and corrosion control in their treatment processes.

#### 4.3.3 Metals

The District’s water quality sampling and monitoring program includes semi-annual testing at four locations within the distribution system for a variety of metals.

### 5.0 TESTING, SAMPLE ANALYSIS AND RESULTS

Microbiological testing was conducted at a total of 36 sampling sites, not including Eagle Lake and Montizambert Creek source locations, but including sites near the entry point of Metro Vancouver water into the municipal distribution system. The monitoring protocol dictates that 12-13 sites per week are sampled according to a breakdown as follows: 10% source water, 10% low flow/dead end locations, 40% medium flow locations, and 40% high flow locations. Table 1 outlines the District’s water sampling and testing calendar.

**Table 1 Water and Sampling and Testing Calendar**

Water Type	Parameter	Frequency
Sources	Microbiological, Turbidity, Temperature	Bi-weekly

Eagle Lake Montizambert Creek	Giardia, Cryptosporidium	Monthly
	Chemical, physical list	Semi-annually
Distribution System	Microbiological, Turbidity, Temperature	Weekly (not at every site)
	HAA's, THM's, pH	Quarterly
	Metals	Semi-annually

### 5.1 Sample Analysis Results – Source Water

At Eagle Lake, 25 bi-weekly source water samples were tested. A very low presence of E.coli was detected; 18 samples showed a most probable number (MPN) of less than 1 per 100 mL and 2 samples indicated 1 MPN, 5 samples showed presence of E. coli ranging from 2 to 200 MPN/100mls. Testing for coliforms showed results ranging from  $\leq 1$  – 1200 MPN-/100mls in the raw, untreated source water.

At Montizambert Creek, the 27 bi-weekly samples tested for E.coli with 25 samples yielding results of less than 1 MPN and the remaining 2 samples showing 27 and 3 MPN/100mls- Coliform testing results ranged from less than 5 – 670 MPN/100mls prior to treatment.

Giardia and Cryptosporidium testing was conducted monthly for both source waters. For both Eagle Lake and Montizambert Creek source waters all samples tested for Giardia and Cryptosporidium had negative results with less than 1 species per 100 L with the exception of two samples at Montizambert Creek which were recorded at 2 and 3 species.

Source water chemistry testing was conducted at Eagle Lake and Montizambert on two occasions during 2012, source water chemistry testing results are shown in Appendix B along with a full range of other chemicals parameters which are not included in the guidelines but are still monitored by the District.

### 5.2 Sample Analysis Results – Distribution System

A map of the District's water system and list of District sample sites for the distribution system with locations can be found in Appendix A. While the naming convention includes a reference to the predominant water source, in fact for some locations depending on the hydraulic conditions, the site can be fed by either Eagle Lake or Metro Vancouver water.

Distribution system samples for E.coli were all negative and in no instance were total coliforms detected. In the event of detection of total coliforms in a sample, the municipality's water quality personnel and the MHO would be notified via the Metro Labs; procedures would be followed as outlined in section 8.1 of this report.

In a few instances sites from all three distribution sources had HPC counts exceeding 500 CFU/100 mL; in no instance did a HPC exceedance correspond to the presence of E.coli. The high results are attributable to contamination of taps and/or hose bibs.

All samples within the Eagle Lake, Montizambert and Metro Vancouver testing results met the guideline of greater than 0.2 ppm chlorine residual. Turbidity results for the distribution system indicated 99.5% of all samples tested met the GCDWQ aesthetic objective of 5 NTU. In only three instances were a turbidity level of greater than 5 NTU was detected; one from Metro, one from Eagle Lake and one from Montizambert. The District responded by alerting VCHA and the corresponding sections of main were flushed until a satisfactory result was obtained. Testing results in their entirety can be found in Appendix C of this report.

**Table 2 Distribution System Microbiological and Physical Parameters (WVR Sites)**

Location ID		Chlorine Residual (ppm)			Turbidity (NTU)			Temperature (°C)			HPC (CFU/ml)			Ecoli MPN/100mLs	Total Coliform MF/100mLs
GCDWQ Guideline		Not less than 0.2			Not more than 5			Not more than 15			No limit			None	None
Eagle Lake	No. Samples	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.		
WVR-710	10	0.32	0.57	0.82	0.08	0.60	2.90	6.0	12.4	17.0	6	47.80	180.0	None	None
WVR-716	26	0.11	0.37	0.56	0.06	0.18	0.48	6.0	11.5	22.0	<2	11.15	42.0	None	None
WVR-711	13	0.28	0.57	1.00	0.10	0.26	0.65	5	10.4	16	<2	8.46	32	None	None
WVR-712	13	0.21	0.31	0.46	0.08	0.23	0.38	6	10.4	15	<2	1252.00	>11000	None	None
WVR-718	12	0.42	0.58	0.85	0.09	0.27	0.84	7	11.4	16	<2	129.00	790	None	None
WVR-761	13	0.21	0.27	0.53	0.23	1.00	4.60	5	10.2	17	<2	2932.67	>11000	None	None
WVR-764	13	0.51	0.76	1.20	0.10	0.33	0.72	5	8.5	14	<2	2.00	<2	None	None
WVR-790	26	0.42	0.62	1.10	0.11	0.33	0.82	5	9.3	14	<2	2.64	10	None	None
WVR-791	13	0.46	0.79	1.20	0.09	0.27	0.81	5	9.4	14	<2	10.92	70	None	None
WVR-792	26	0.23	0.38	0.64	0.11	0.25	0.69	5	10.0	15	<2	1008.64	>11000	None	None
WVR-793	13	0.21	0.42	0.82	0.08	0.28	1.30	5	10.5	16	<2	4.92	22	None	None
WVR-794	13	0.27	0.45	0.78	0.11	0.26	0.50	5	10.4	16	<2	12.46	58	None	None
WVR-795	13	0.28	0.53	1.00	0.13	0.27	0.52	6	10.4	16	<2	20.46	170	None	None
WVR-796	26	0.54	0.82	1.20	0.09	0.27	0.72	5	10.2	16	<2	8.40	46	None	None
WVR-797	13	0.20	0.61	0.95	0.10	1.87	20.00	5	9.6	15	<2	5.45	34	None	None

**Table 3 Distribution System Microbiological and Physical Parameters (WEAG and WMZ Sites)**

Location ID	Chlorine Residual (ppm)			Turbidity (NTU)			Temperature (°C)			HPC (CFU/ml)			Ecoli MPN/100mLs	Total Coliform MF/100mLs	
GCDWQ Guideline	Not less than 0.2			Not more than 5			Not more than 15			No limit			None	None	
	No. Samples	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.		
WEAG-719	26	0.27	0.60	1.00	0.06	0.12	0.31	5	10.5	17	<2	2.32	6.0	None	None
WEAG-765	14	0.21	0.48	0.85	0.08	0.13	0.33	6	11.4	22	<2	14.00	94.0	None	None
WEAG-768	13	0.28	0.56	1.10	0.07	0.17	0.42	5	10.5	17	<2	2.50	4.0	None	None
WEAG-769	12	0.30	0.57	0.89	0.10	0.17	0.55	6	11.7	17	<2	11.67	50.0	None	None
WEAG-770	26	0.33	0.71	1.20	0.08	0.17	0.36	5	11.0	23	<2	16.08	270.0	None	None
WEAG-771	26	0.19	0.53	0.87	0.06	0.19	0.50	6	11.5	18	<2	24.38	180.0	None	None
WEAG-772	26	0.43	0.73	1.00	0.09	0.31	2.00	5	10.8	20	<2	2.72	14.0	None	None
WEAG-774	26	0.47	0.72	1.10	0.06	0.14	0.38	5	11.2	21	<2	5.00	14.0	None	None
WEAG-776	12	0.08	0.46	0.79	0.07	0.27	1.10	6	11.6	18	<2	17.83	84.0	None	None
WEAG-778	26	0.40	0.79	1.10	0.09	0.17	0.54	5	10.8	20	<2	2.38	8.0	None	None
WEAG-779	13	0.22	0.56	1.10	0.07	0.18	0.48	6	10.7	17	<2	4.15	16.0	None	None
WEAG-780	14	0.40	0.59	0.82	0.07	0.14	0.25	6	11.0	23	<2	4.43	22	None	None
WEAG-783	12	0.37	0.63	0.82	0.06	0.13	0.28	5	10.5	18	<2	16.33	40	None	None
WEAG-784	14	0.29	0.53	0.94	0.09	0.18	0.38	5	11.1	22	<2	6.57	44	None	None
WEAG-785	14	0.20	0.48	0.64	0.08	0.95	7.00	6	10.8	21	<2	824.86	>11000	None	None
WEAG-786	13	0.30	0.73	1.10	0.14	0.37	1.20	5	9.5	14	<2	8.83	34	None	None
WEAG-787	13	0.32	0.71	1.20	0.11	0.47	1.20	5	9.9	15	<2	15.00	48	None	None
WEAG-788	13	0.30	0.84	2.20	0.09	0.20	0.37	5	9.8	14	<2	2.50	8	None	None
WEAG-880	14	0.25	0.44	0.97	0.10	0.23	0.49	6	11.2	22	<2	50.57	640	None	None
WMZ-781	12	0.04	0.44	0.86	0.08	0.14	0.20	5	10.6	18	<2	130.00	1000	None	None
WMZ-782	14	0.23	0.45	0.75	0.16	1.02	6.00	6	10.7	17	<2	1099.00	>11000	None	None

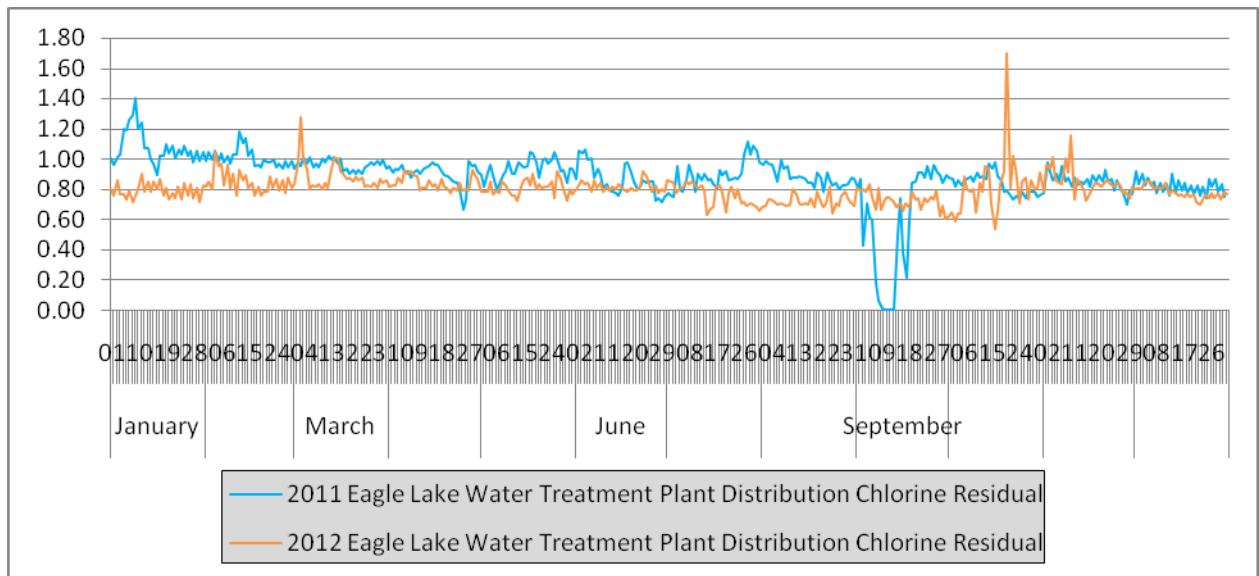
Testing for metals within the distribution system are summarized in Appendix C, all metals within the metals scan were well within GCDWQ limits.

Disinfection by-products are monitored on a quarterly basis at a total of 10 sites covering service areas receiving Eagle Lake, Montizambert Creek and Metro Vancouver water. As both THMs and HAAs represent groups of compounds, the test result is a quarterly average of the

total THMs or HAAs. Quarterly averages for THMs only exceeded the guideline level for one location (Whytcliff Park) for the first two quarters; all subsequent samples for that location were below the guideline. All other THM samples taken throughout West Vancouver were below the guideline. HAA's were slightly over the IMAC at various locations for both Montizambert and Eagle Lake in the first two quarters, all subsequent samples were below the guideline throughout the rest of West Vancouver's distribution system. Quarterly averages were met for both parameters at sites within the Metro Vancouver source water distribution systems.

Disinfection by-products levels are directly related to chlorine dosage levels. Lowering chlorine dosage levels will result in a decrease in disinfection by-product levels. With the implementation of the filtration systems at Eagle Lake and Montizambert Treatment plants, the amount of chlorine required to establish the required 0.2 PPM chlorine residual in the distribution system has decrease as compared to non-filtered water.

The District continued to lower chlorine dosage where and when possible. Data compiled and trended shows that as a direct result of lowering the chlorine dosage, an average decrease in chlorine residuals by approximately 10% within the distribution system as illustrated by the chart below.



We need a sentence regarding measures which will be taken to address CDWV DBP levels. The tables presented in ?? show the % Testing results for the Disinfection Byproducts are fully detailed in Appendix C.

**6.0 PUBLIC NOTIFICATION**

## **6.1 Drinking Water Advisory/Boil Water Advisory**

2012 was relatively free of significant turbidity events, with the exception of some minor elevated levels of turbidity from Metro Vancouver sources. As a result of these events Metro Vancouver took its Capilano source off line on several occasions, leaving the Seymour source in operation. The regional health officers did not issue any boil water advisories.

## **6.2 General Drinking Water Quality Advisory**

No General Drinking Water Advisories were issued in 2012.

## **7.0 OPERATOR QUALIFICATIONS AND TRAINING**

Further to the *Drinking Water Protection Act*, the Drinking Water Protection Regulation (DWPR) came into effect May 16, 2003. The regulation includes classification of distribution and treatment systems and qualification standards for persons operating these systems through the Environmental Operators Certification Program (EOCP).

The Districts water distribution system is classified as Level 4. However, the legislation is silent on the target deadline for minimum certification requirements for District staff operating, maintaining, or repairing the water system. Nevertheless, the District has been working in cooperation with the Health Authority and EOCP towards having operators certified to Level 4. Treatment plants are assessed separately, as mentioned in sections 3.2.1 and 3.3, both the Eagle Lake and Montizambert Treatment Plants are classified as Level 3 facilities.

### **7.1 Operator Qualifications**

The municipality has a staff of four waterworks distribution operators and one supervisor. There are three classification levels for utility workers: basic, semi-skilled, and skilled. The District's EOCP Level 4 distribution system classification requirements have been incorporated into the Utility Worker job classification specifications. The District has EOCP Level 1 and 3 water treatment plant operators who manage the Eagle Lake and Montizambert Treatment Plants.

All staff are encouraged to take courses, which will enable them to advance to higher EOCP class levels.

In 2012, the District staff maintained the following certification levels:

#### **Water distribution:**

- Level 4 – one
- Level 3 – two
- Level 2 – two

## **Water treatment:**

- Level 3 - one
- Level 1 - one

## **8.0 EMERGENCY RESPONSE PLANS**

### **8.1 E. coli Positive Response**

If a sample analyzed by Metro Labs is tested positive for E. coli, the following response plan will occur.

1. The municipality's water quality personnel and the MHO will be notified via the Metro laboratory.
2. Results of interim samples, if any, from the site will be examined. (Interim samples are any samples that may have been taken from the site in the period between when the E. coli positive sample was taken and when it was determined to be E. coli positive.)
3. Arrangements will be made for the immediate collection of a repeat sample (including, where possible, samples from upstream and downstream of the E. coli positive sample location).
4. Water treatment personnel will be contacted to determine if an interruption of source water disinfection had occurred in the period before the E. coli positive sample was taken.
5. The chlorine residual for the sample noted on the sampler's Water Sample Data Sheet will be reviewed to determine if a localized loss of disinfectant residual has occurred.
6. All water utility personnel will be contacted to determine if there has been any loss of pressure or other unusual events that may have led to contaminants entering the water system.
7. The need for a boil water advisory will be evaluated and if deemed necessary, the municipality will carry out various means to inform the public. Metro and the MHO will be informed of this public advisory.
8. At the same time, an effort will be made to contact the MHO to coordinate the need for and extent of the boil water advisory.
9. Metro Labs will initiate procedures necessary for the identification of E. coli with standard biochemical tests.
10. The MHO will be contacted by the municipality with the repeat sample results and the results of the species identification on the E. coli positive sample when these tests are complete.

### **8.2 Chemical or Biological Contamination Response**



In the event of chemical or biological contamination, in either the source waters (Eagle Lake, Montizambert Creek) or the distribution system, the MHO will be immediately notified. The chemical will be identified and any public health risk factors associated with the chemical presence in the potable water will be determined. Steps will be taken to isolate the contaminated zone area and the level of contamination will be determined through water testing and sampling. Through consultation with the MHO, a public advisory will be communicated. All steps to ensure public health and safety including, if necessary, banning of water usage will be undertaken.

### **8.3 Turbidity Response**

In general, turbidity has not been known to be a persistent problem in the District's water supply (see Section 4.2.1), although on occasion, elevated levels can be experienced. Water quality has improved greatly with the introduction of the Eagle Lake and Montizambert Membrane Filtration Facilities, which produce treated water with turbidity of less than 0.1 NTU.

During periods of elevated turbidity, representatives from Metro Vancouver, the Health Authorities, and local municipalities will review communications protocols. Meanwhile, the District continues to follow an existing turbidity response plan, which was developed in cooperation with the VCHA. Given access to municipal sources, the protocol takes into consideration the District's responsibility for due diligence without unreasonably constraining the water utility's ability to operate the system during an elevated turbidity event. The approach also seeks to balance the need to maintain chlorine dosage while minimizing disinfection by-products.

The following actions will be taken regarding turbidity in source waters.

1. The District will conduct regular sampling of Eagle Lake and Montizambert sources to monitor turbidity.
2. The District will take into consideration the effectiveness of increased chlorine dosage, the chlorine contact time, the source of turbidity, and the quality of the Metro Vancouver supply in its response to minimizing the amount of turbidity entering the water system.
3. A turbidity level of >1 NTU will be the trigger for municipal operational actions.
4. During turbidity events >1 NTU, the level of primary chlorination at Eagle Lake and Montizambert sources and at any secondary chlorination points will be increased accordingly.
5. During turbidity events of >5 NTU, a rigorous sampling program for microbiological activity throughout the distribution system will be conducted.
6. During turbidity events of >5 NTU, a public communication may be issued in consultation with the Health Authority.

7. During turbidity events >2 NTU and <3 NTU, the District will consider switching to the Metro Vancouver supply, depending on the turbidity of that supply.
8. During turbidity events >3 NTU, the District will switch to the Metro Vancouver supply, if possible, should the turbidity of that supply be <1 NTU.
9. Two consecutive days of turbidity <1 NTU shall pass before lowering chlorine dosage to pre-event levels.
10. During turbidity events of >5 NTU and while the Eagle Lake treatment plant is in bypass mode, the District may issue a boil water advisory in conjunction with the MHO to residents receiving such water.
11. After a turbidity event of >5 NTU, two consecutive days of turbidity <1 NTU shall pass before rescinding the water quality advisory.

#### **8.4 Response to Interruption of Secondary Disinfection**

The District's SCADA system constantly monitors the secondary chlorination stations. This system automatically alerts utility personnel of any disinfection failures, all of which are reported to the MHO. Utility personnel immediately carry out repairs to equipment and if necessary, manual disinfection is established. Chlorine residual samples are to be taken at various points in the distribution system to ensure adequate free chlorine residual is present. In cases where chlorine residual is less than 0.2 ppm or not present, municipal crews will flush the affected area until an acceptable level is achieved.

Upon notification by Metro Vancouver Operations that an interruption in disinfection has occurred, the municipality will immediately commence monitoring of chlorine residual at strategic locations in the Metro Vancouver supply area. The monitoring will continue until disinfection is resumed and adequate levels have been reached in the distribution system.

#### **9.0 CONCLUSIONS**

Overall, the residents of West Vancouver enjoy very high quality drinking water. Given the protected nature of the Eagle Lake and Montizambert Creek watersheds, very low levels of E. coli, giardia, and cryptosporidium exist in the raw source waters.

District staff continues to take a balanced approach and employ best management practices in the operation and maintenance of the water system to maintain high water quality.

In 2012 the District's distribution system and source water supply met the requirements as outlined in the GCDWQ with the following exceptions:

1. THM quarterly averages exceeded the guideline levels for one site's first two quarterly samples taken within Eagle Lake.

2. HAA quarterly averages exceeded the guideline level for samples taken at sites within the Eagle Lake and Montizambert Creek source water distribution systems.

In closing, it is noted that the District appreciates the good working relationship with public health staff and acknowledges the Health Authority as a partner in maintaining high quality drinking water in the municipality.

## **APPENDIX A**

1. Map of water system sampling locations (I: Engineering pdf)
2. Location addresses for water sampling (doc #546707)

## **APPENDIX B**

1. Source Water Quality – Eagle Lake (doc #545228)
2. Source Water Quality – Montizambert Creek (doc #545228)
3. Source Water Chemistry (doc #545230)

## **APPENDIX C**

1. By-station Municipal Drinking Water Summary Report – 2012
  - doc #545232 – WEAG data;
  - doc #545232 WVR data;
  - doc #545232MZT data;
2. Semi Annual Metals Monitoring Results – 2012 (doc #545230)
3. Disinfection byproducts Quarterly Averages – 2012 (doc #545232)

