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Agenda Item #9  
REPORT #RWSC 2009 - 14

**REPORT TO THE REGIONAL WATER SUPPLY COMMISSION  
MEETING OF WEDNESDAY, 20 MAY 2009**

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**SUBJECT**      2008 ANNUAL BACTERIOLOGICAL SUMMARY OF GREATER VICTORIA'S DRINKING WATER

**PURPOSE**

To provide detailed bacteriological data on the distribution systems for the seven Water Suppliers in the Greater Victoria Drinking Water System in 2008 as required by regulation.

**BACKGROUND**

The *2008 Annual Bacteriological Summary of Greater Victoria's Drinking Water* is the second report in the Water Quality Division's 2008 annual water quality report series. It extends the bacteriological information provided in the *2008 Annual Overview of Greater Victoria's Drinking Water Quality* and details the bacteriological results for the source water, first customer, transmission system, distribution system reservoirs and the distribution systems of individual Water Suppliers who are part of the Greater Victoria Drinking Water System.

Water Quality Division staff post the annual reports and water quality data tables at the following CRD website locations:

- <http://www.crd.bc.ca/water/waterquality/annualreports.htm>
- <http://www.crd.bc.ca/water/waterquality/datatables.htm>

Please find the executive summary and selected charts from the *2008 Annual Bacteriological Summary of Greater Victoria's Drinking Water* attached. The full report is posted on the CRD website listed above.

**RECOMMENDATION**

That the Regional Water Supply Commission receive the staff report for information.

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Concurrence

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# **2008 Annual Bacteriological Summary of Greater Victoria's Drinking Water**

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April 21, 2009

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## *Executive Summary*

The *2008 Annual Bacteriological Summary of Greater Victoria's Drinking Water* is the second report in the Water Quality Division's 2008 annual report series. It extends the bacteriological information given in the *2008 Annual Overview of Greater Victoria's Drinking Water Quality* and details the bacteriological results for the source water, first customer, transmission system, distribution system reservoirs and the distribution systems of individual municipal Water Suppliers who are part of the Greater Victoria Drinking Water System. When completed, these annual reports are posted on the CRD website at <http://www.crd.bc.ca/water/waterquality/annualreports.htm>

The primary observations and conclusions contained in this report are listed below:

1. **Overall Summary.** In general, the overall bacteriological quality of the drinking water in Greater Victoria in 2008 continued to be very good and easily met the Provincial and Federal limits for safe, potable drinking water.
2. **Sample Collection.** In 2008, the Water Quality Division collected and analysed 4,384 bacteriological samples from 150 sampling locations in the Greater Victoria Drinking Water System. This included samples collected from the raw source (untreated water), first customer, transmission mains, distribution system reservoirs and distribution systems. A similar number of samples were collected in 2004 through 2007.
3. **Source Water.** In 2008 the level of total coliform bacteria in the raw source water entering the treatment plants were elevated during mid-September through early October (**Figure 1B**). The 2008 bacterial levels were similar to those observed in 2004 through 2007. As in previous years, the quality of the raw water entering the plant easily met the fecal coliform limit of no more than 10% of the samples having 20 colony forming units per 100 mL in the USEPA Surface Water Treatment Rule and therefore continued to qualify to remain an unfiltered surface water supply under this portion of their regulations (**Figure 1C**).
4. **First Customer.** In 2008, there was only one occurrence of total coliform bacteria at the first customer sampling location below the Japan Gulch Treatment Plant (**Figure 3**). The annual total coliform positive sample rate of 0.4% was comparable to the last several years (**Figure 4**). No *E. coli* bacteria were found in any of the samples collected at this sampling location. These findings provide further assurance of the bacterial safety of Greater Victoria's drinking water.
5. **Transmission Mains.** None of the samples collected from the transmission mains feeding the municipalities contained total coliforms (**Figure 5**). This result was similar to previous years and indicates that generally very few total coliform bacteria were being delivered to the municipal distribution systems (**Figure 5A**).
6. **Distribution System Reservoirs.** Samples collected from the distribution system reservoirs showed that the bacteriological levels in these reservoirs continued to be problematic (**Figure 6**). This was primarily due to the bacteriological regrowth associated with low chlorine residuals and poor water circulation through the reservoirs (**Figure 6A**). When the distribution system reservoirs are considered as a group, the total coliform Guideline level of 10% positive samples was not exceeded in any month of 2008. However, on an individual basis, one of the distribution system reservoirs had an annual percentage positive that exceeded the 10% limit (**Figure 6A**). The number of total coliform occurrences in the reservoirs was similar to 2000 through 2004 and 2007.
7. **Greater Victoria Distribution System.** When the results of all the individual distribution systems are considered as a whole, the Greater Victoria Distribution System complied with both the Provincial Regulation and the Federal Guidelines for bacteriological water quality during all months of the year. Total coliforms were found during eight months in 2008, similar to 2007 (**Figure 7**). The total coliform

positive rate of 0.7% was slightly lower than that of 2005 and 2006 and similar to 2007 and to 2002 to 2004 with a trend of declining total coliform positive samples in the Greater Victoria Distribution System (**Figure 7A**).

8. **Individual Municipal Distribution Systems.** In 2008, none of the municipal distribution systems exceeded the monthly total coliform limit of 10%. In general, the bacteriological water quality of all of the municipal distribution systems has improved over time (since 1992). This includes

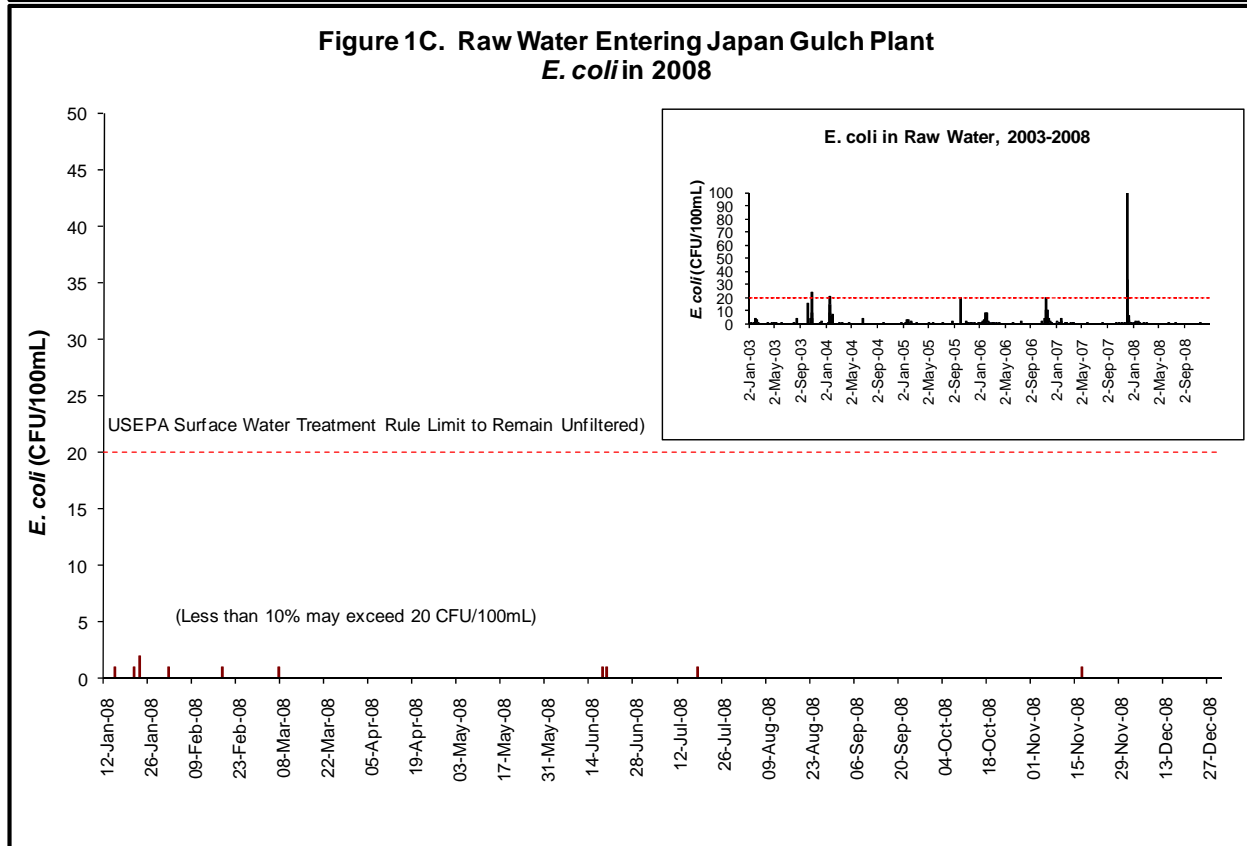
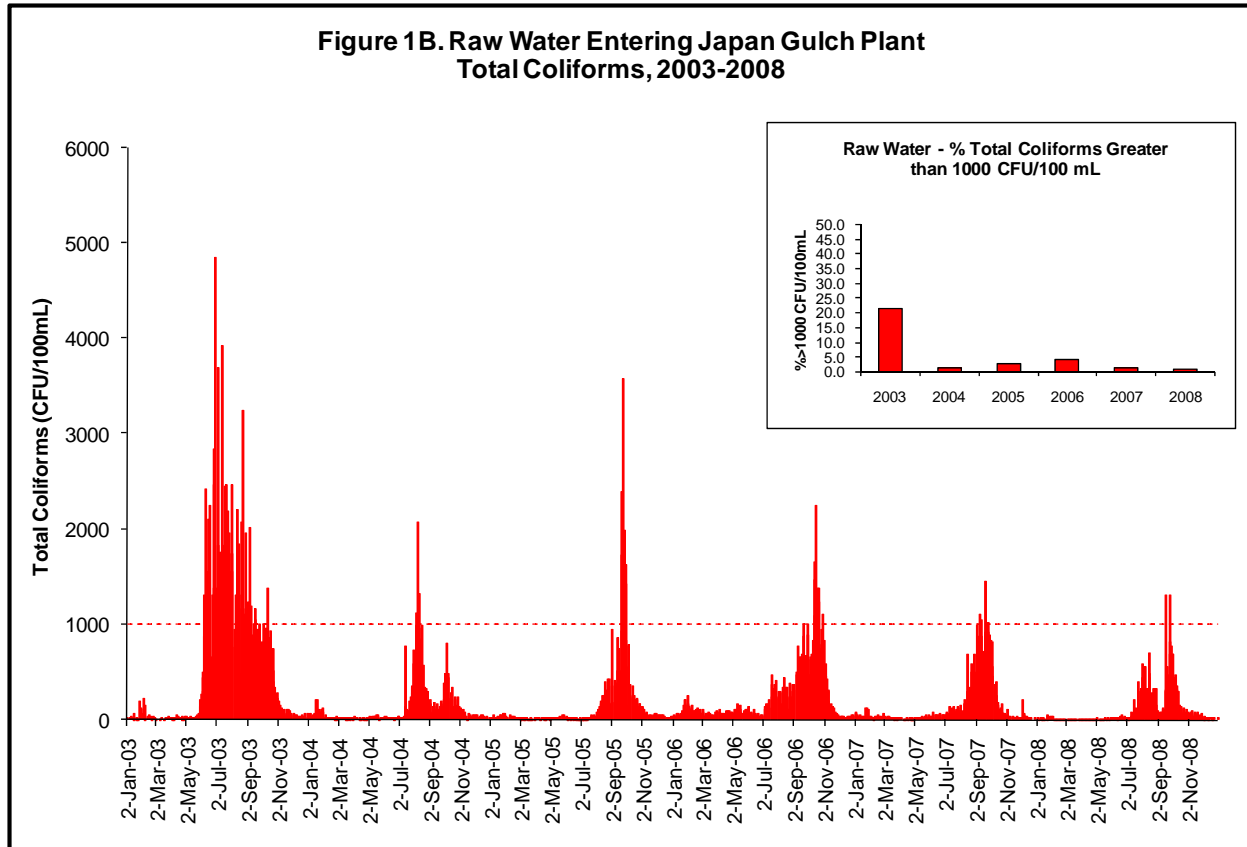
- Central Saanich (Figure 8)
- North Saanich (Figure 9)
- Oak Bay (Figure 10)
- Saanich (Figure 11)
- Sidney (Figure 12)
- Victoria/Esquimalt (Figure 13)
- Juan de Fuca Distribution System (Figure 14)

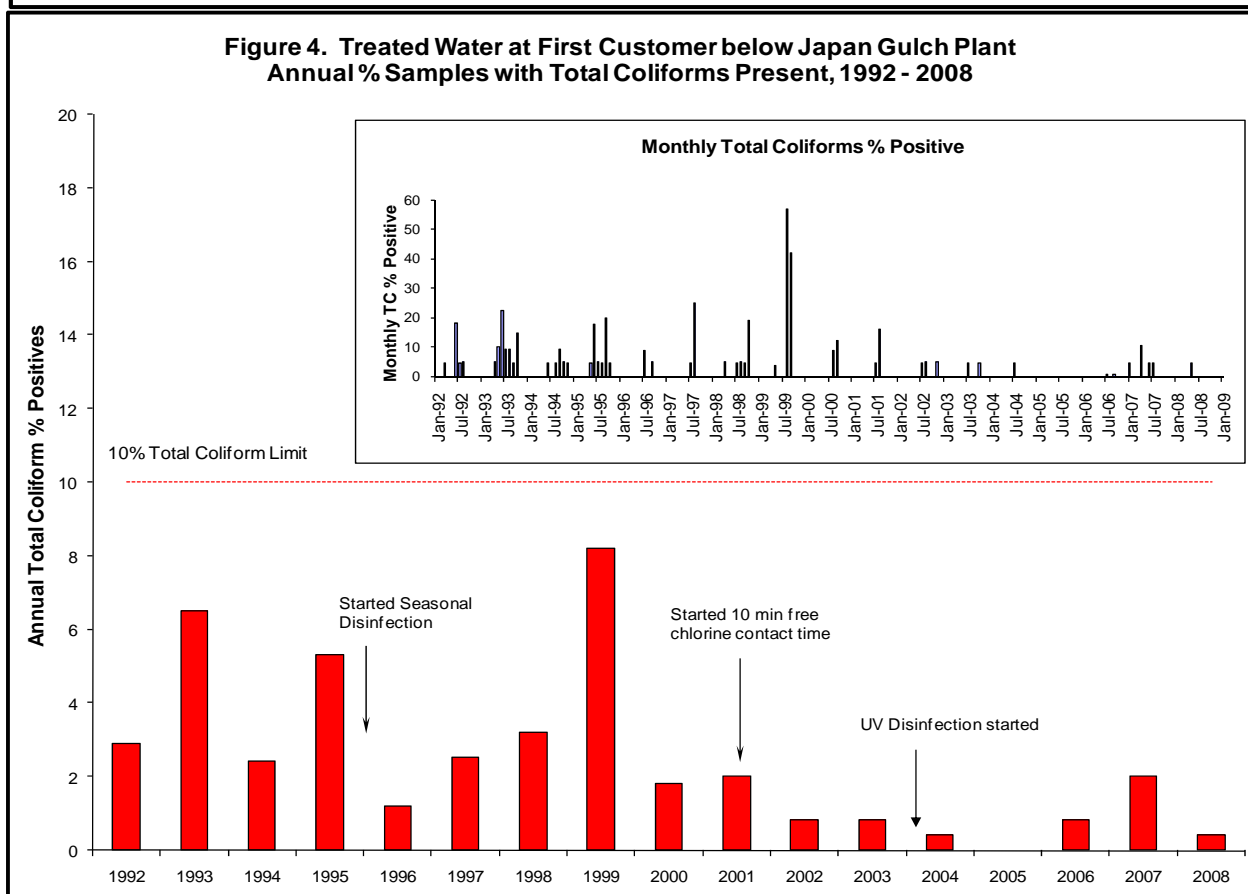
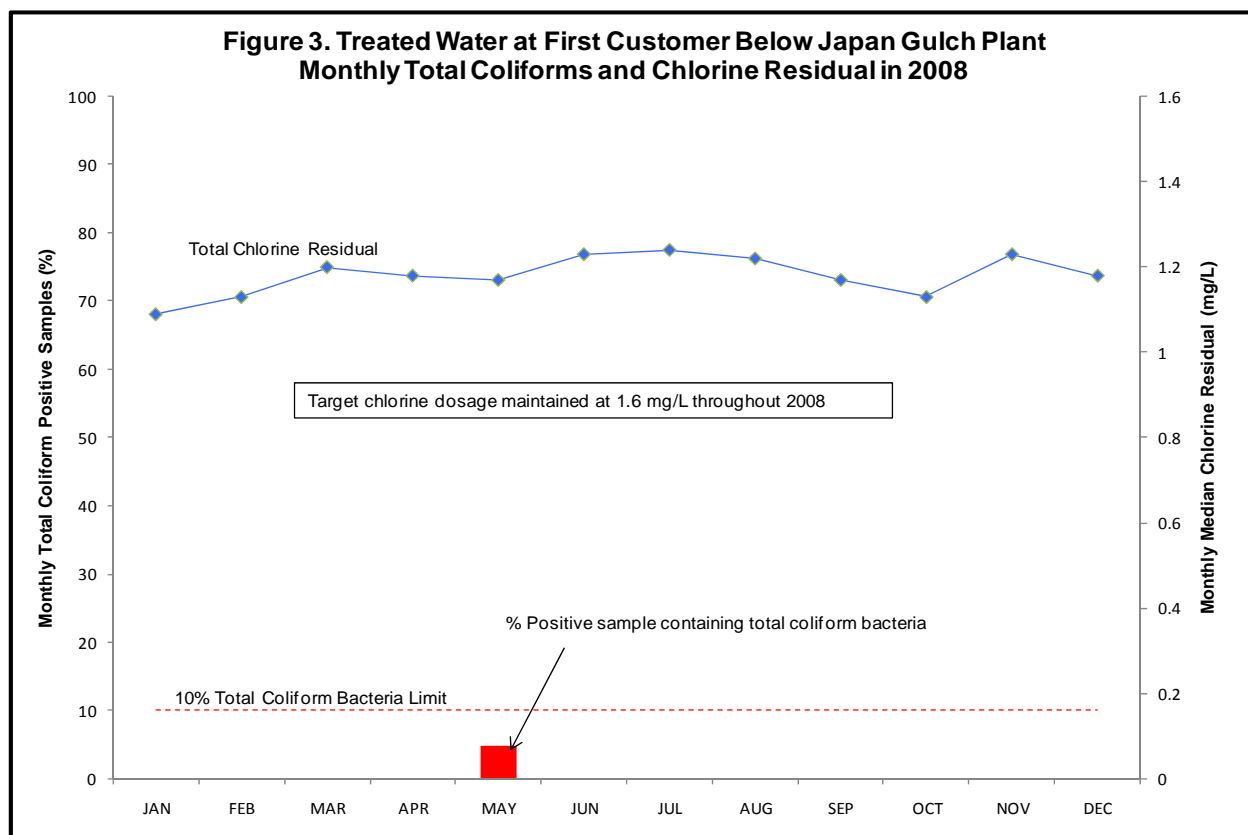
9. **Chlorine Residual.** The median annual chlorine residual at the first customer sampling location below the Japan Gulch Plant was 1.18 mg/L (similar to 2004 to 2007). Overall, within the distribution system, the median annual chlorine residual was 0.64 mg/L, slightly higher than that found in 2005 and 2003 (0.63 mg/L) and identical to 2004, 2006, and 2007 (0.65 mg/L). Within the municipal distribution systems, the median annual chlorine residual varied from a low of 0.43 mg/L for Sidney to a high of 0.89 mg/L for Sooke.

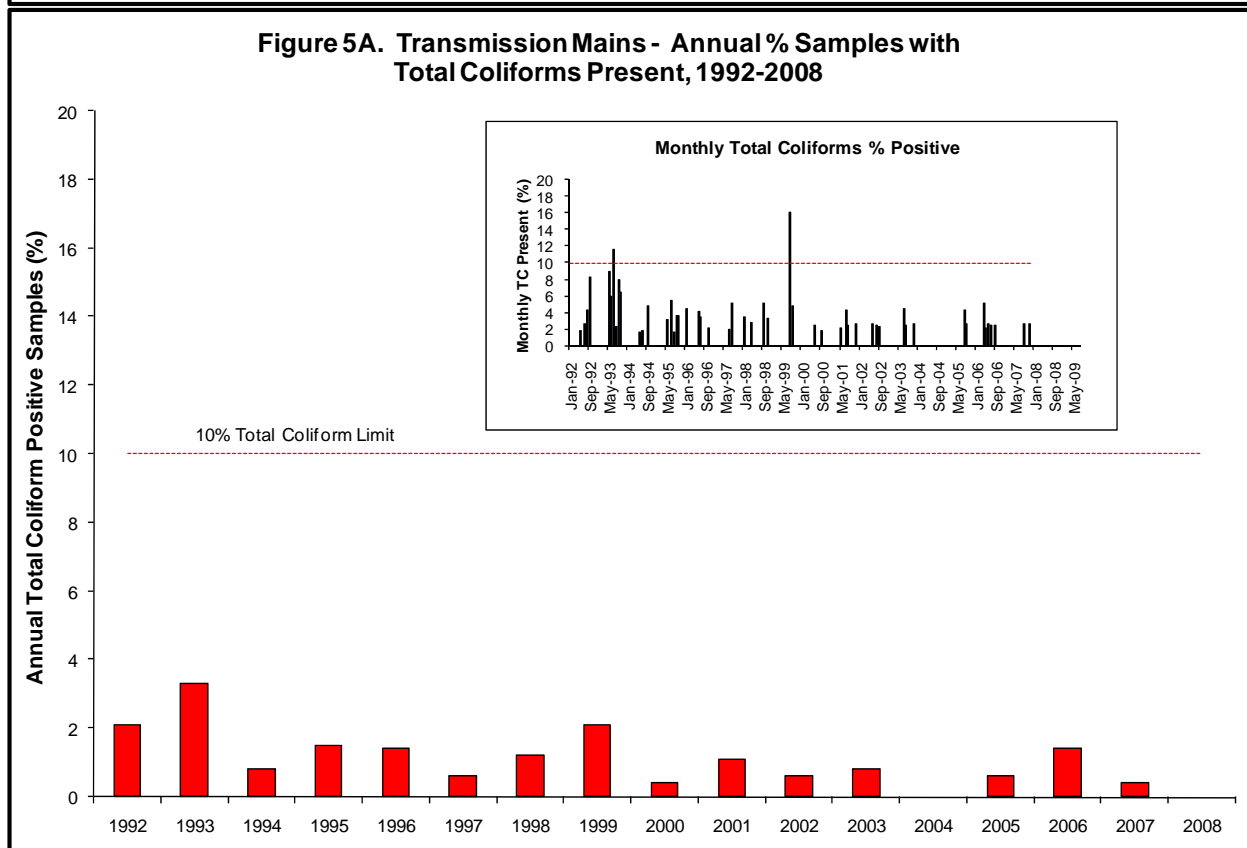
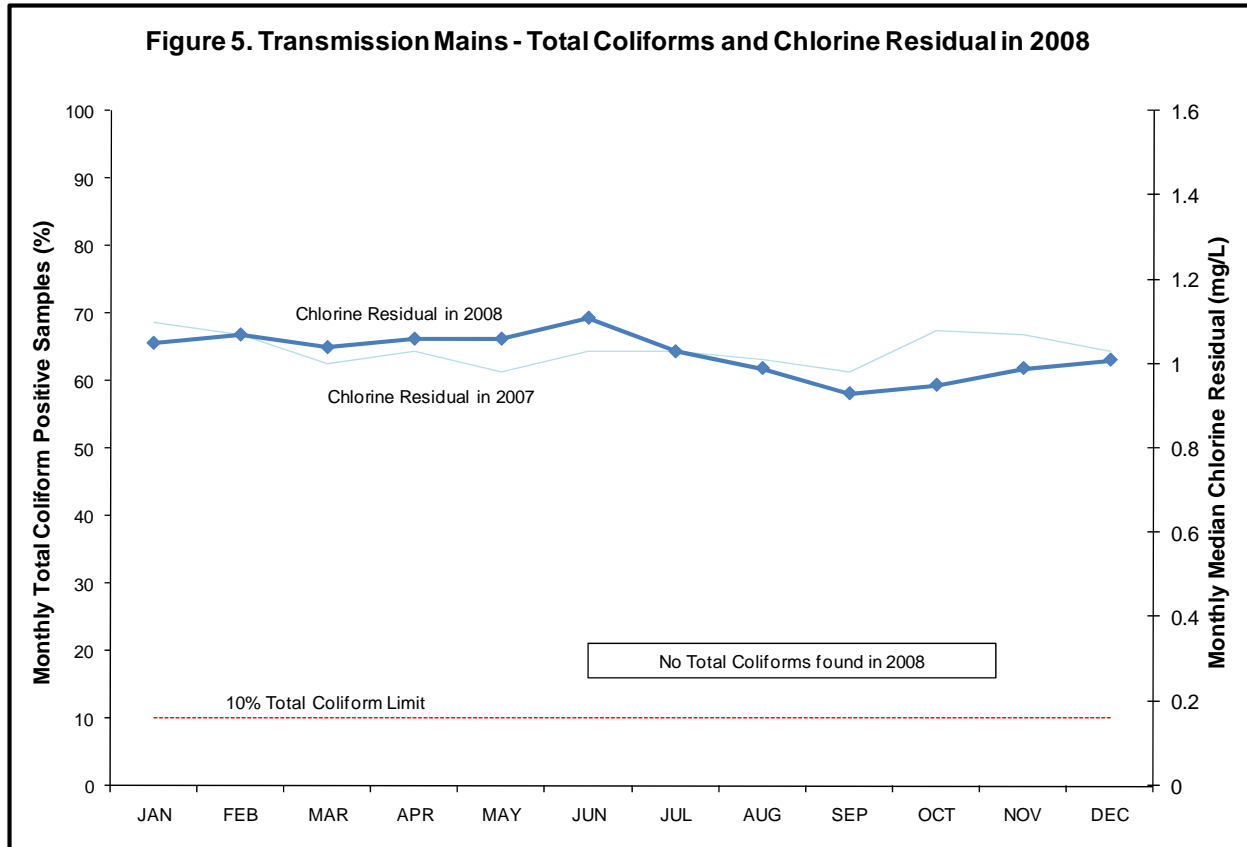
10. **Water Temperature.** At the Japan Gulch Plant, the coldest daily water temperature recorded was 4.0°C in January while the warmest was 17.8°C in September 2008 (three degrees cooler than in 2004). Similarly, the water at the first customer location was cooler than in past years. The Guideline limit of 15°C was exceeded from August 22 to October 3, 2008 which was better than in previous years. Compared to other Canadian cities, the summer temperature of the drinking water in Greater Victoria is quite warm. The lower water temperature in 2005 through 2008 was primarily due to the raising of the water level in Sooke Reservoir.

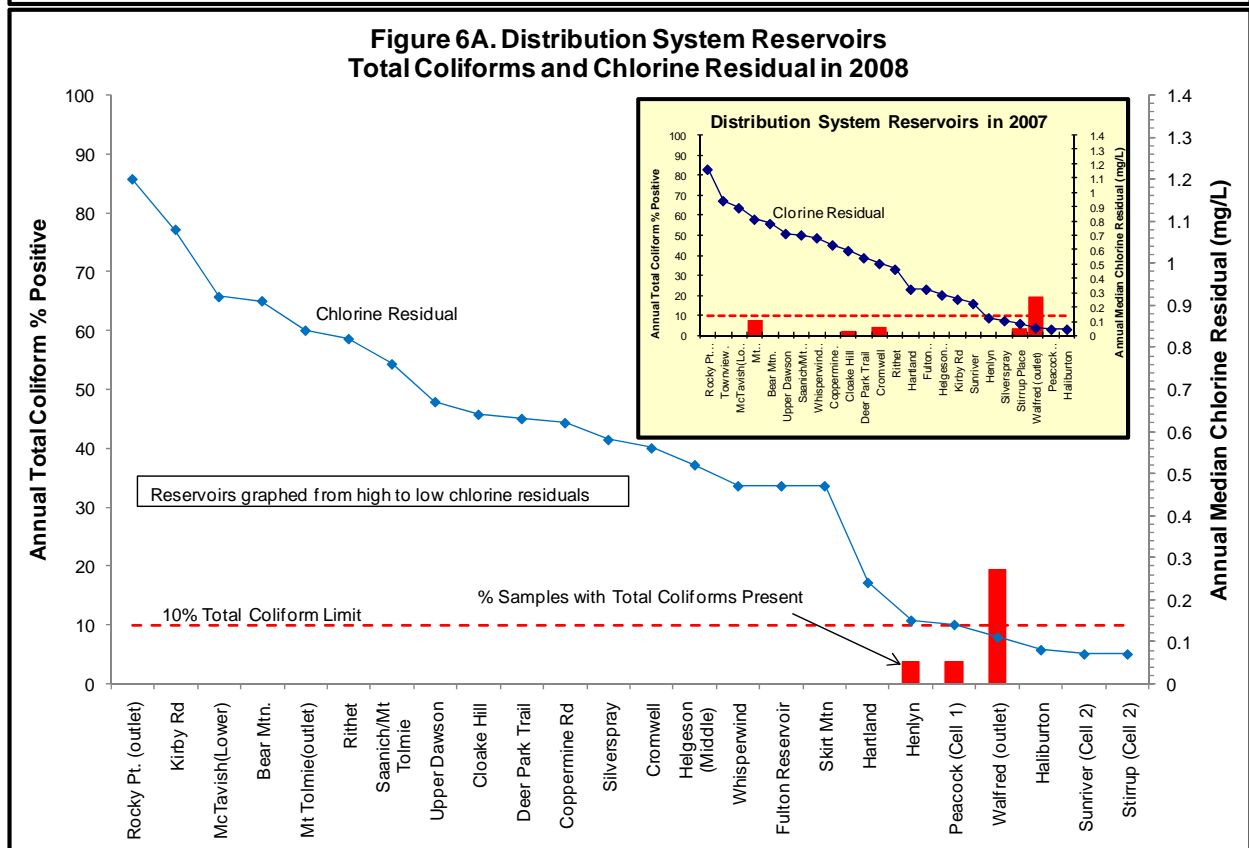
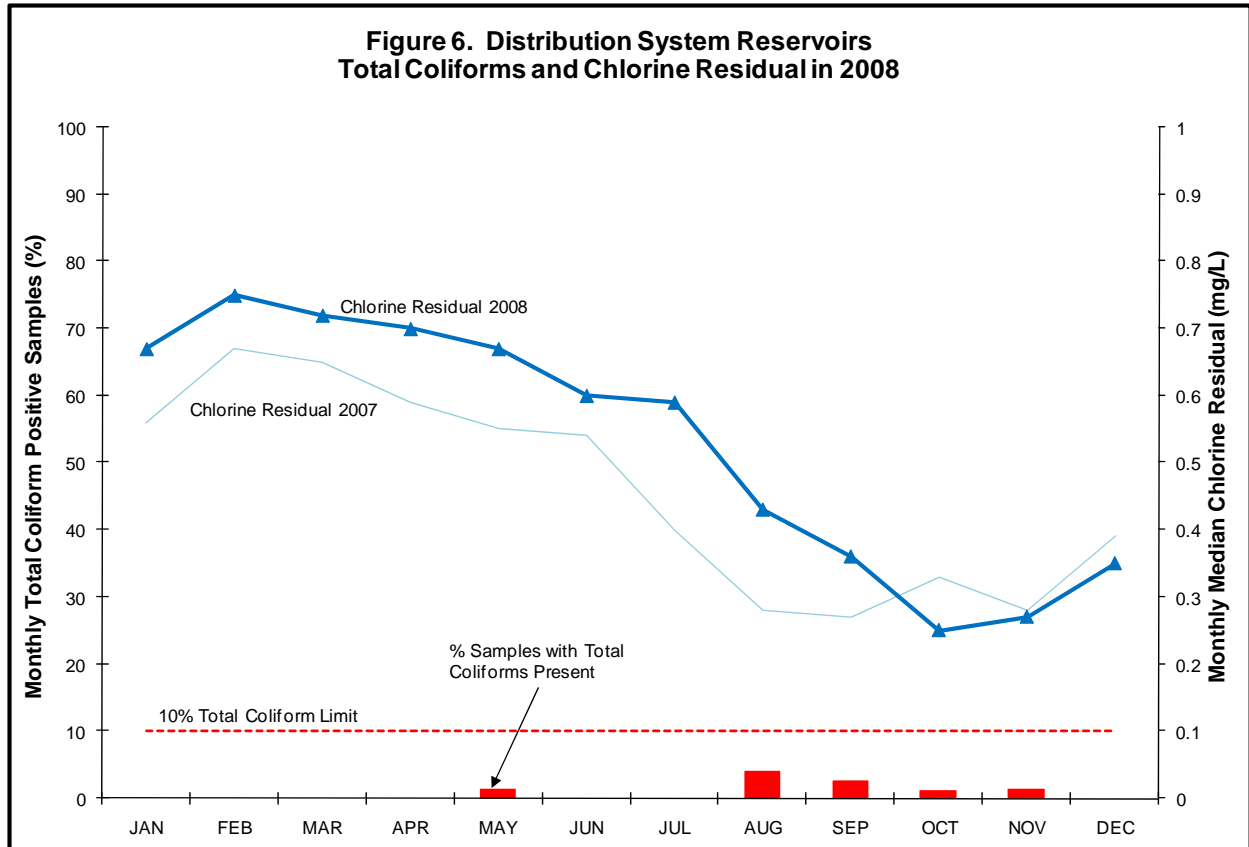
## RECOMMENDATIONS

1. **Improve Distribution Reservoir Circulation.** It is recommended that the program of improving the circulation of the water in the distribution reservoirs be expanded to include those reservoirs that exceeded the total coliform limits in 2008.

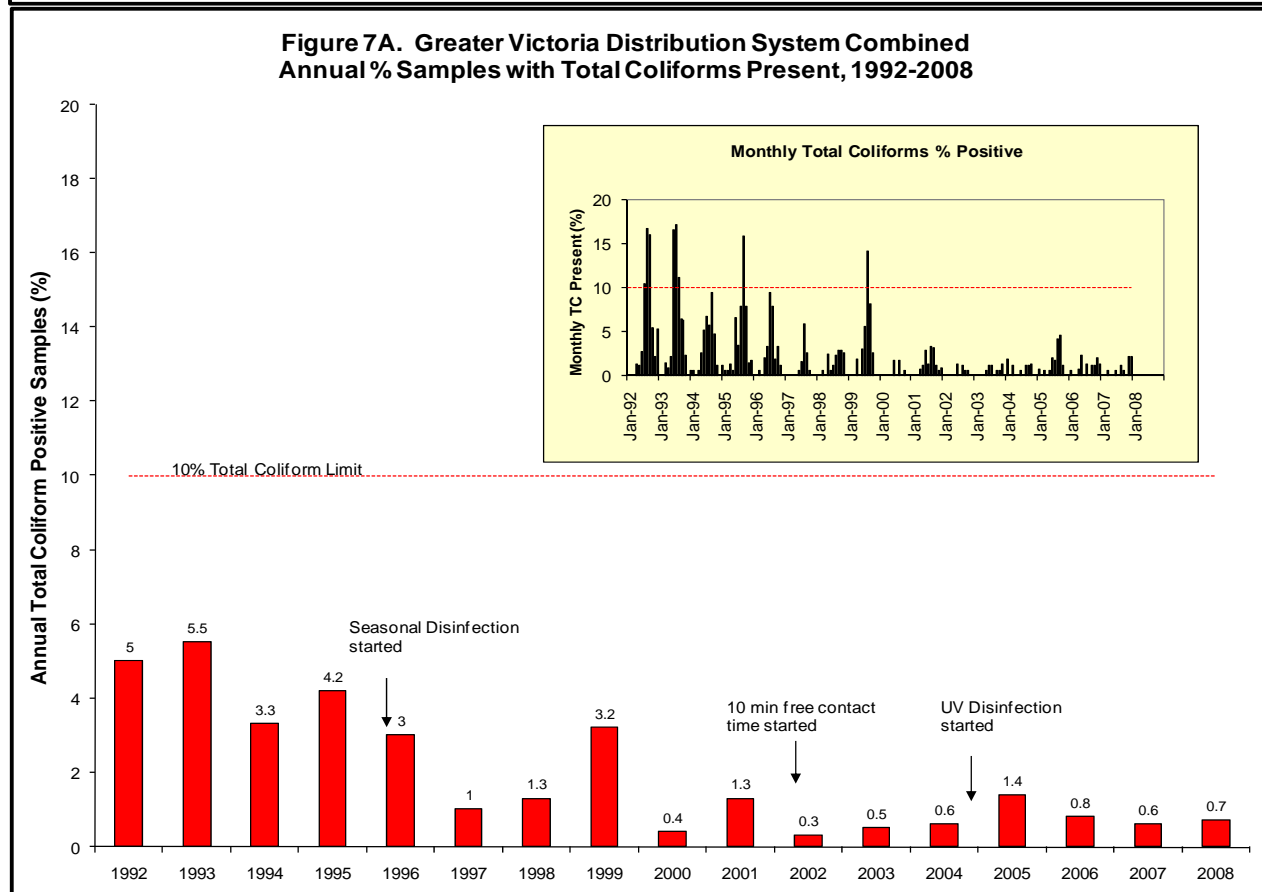
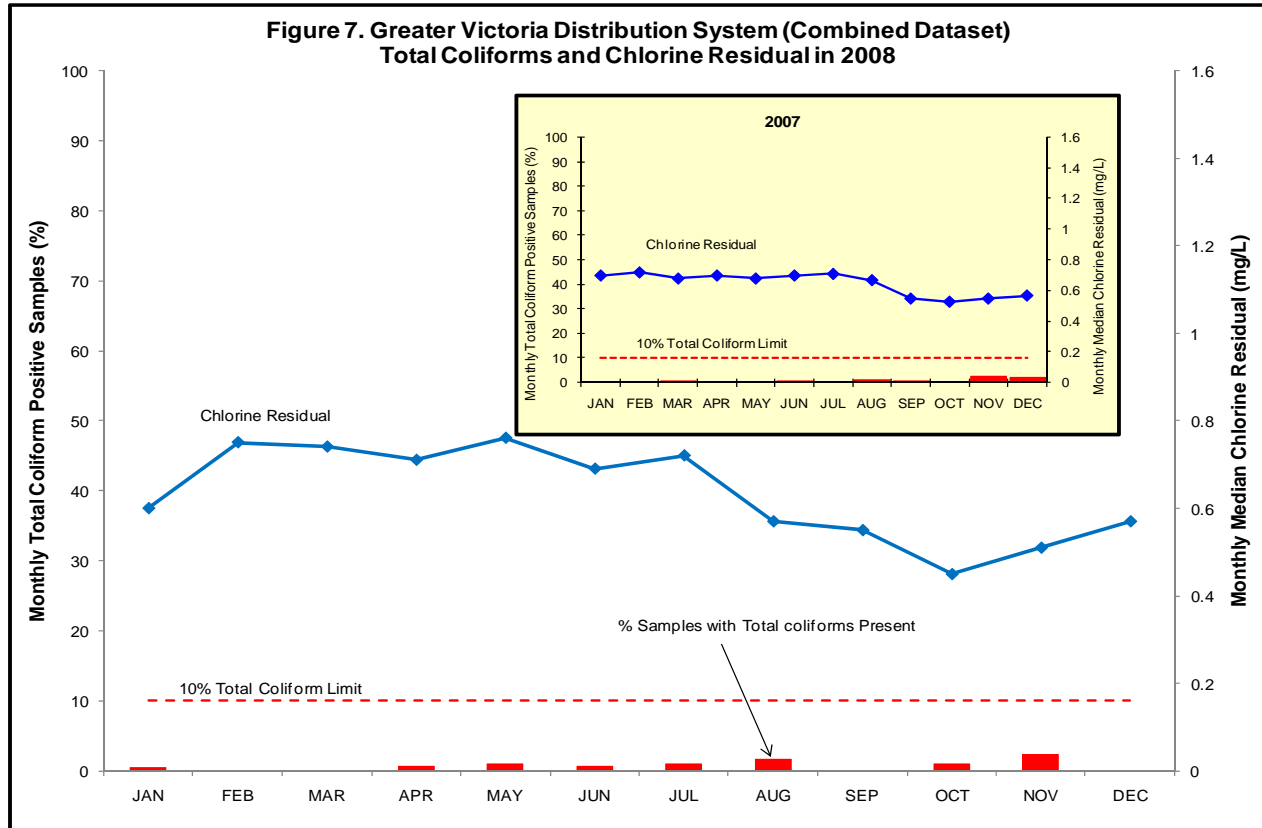




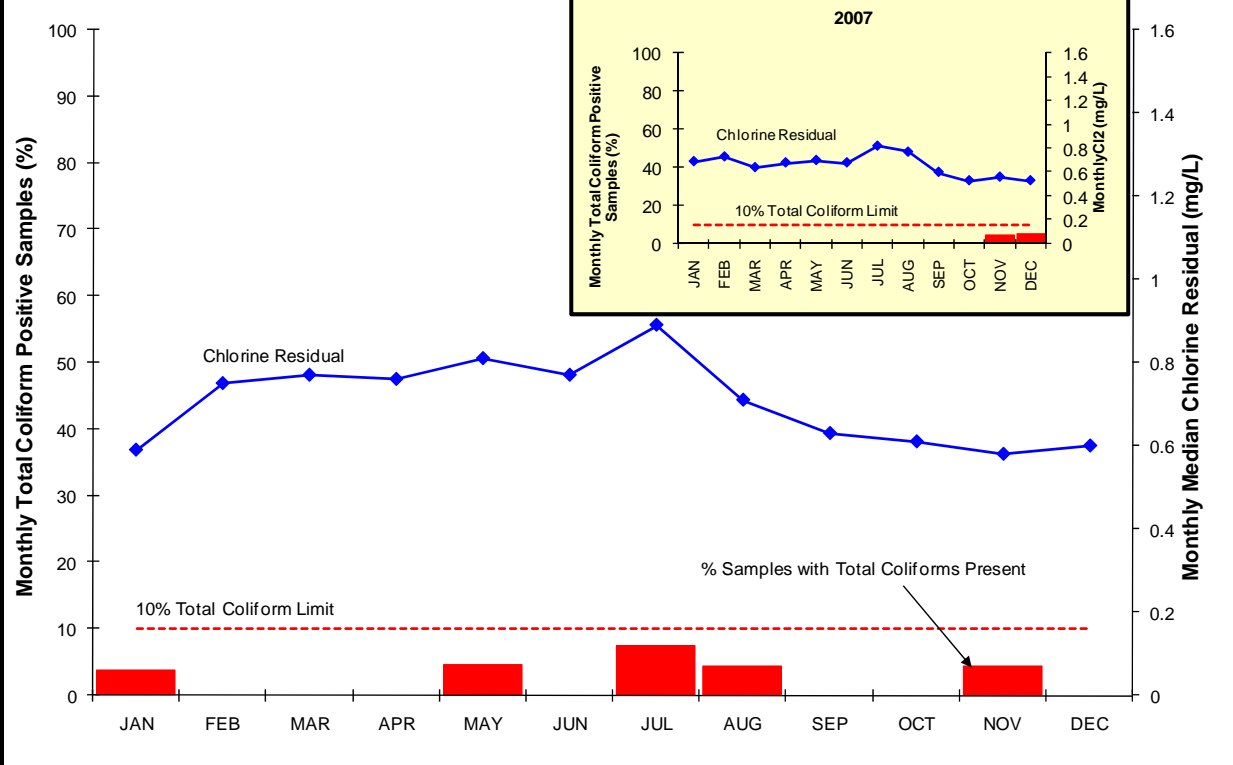




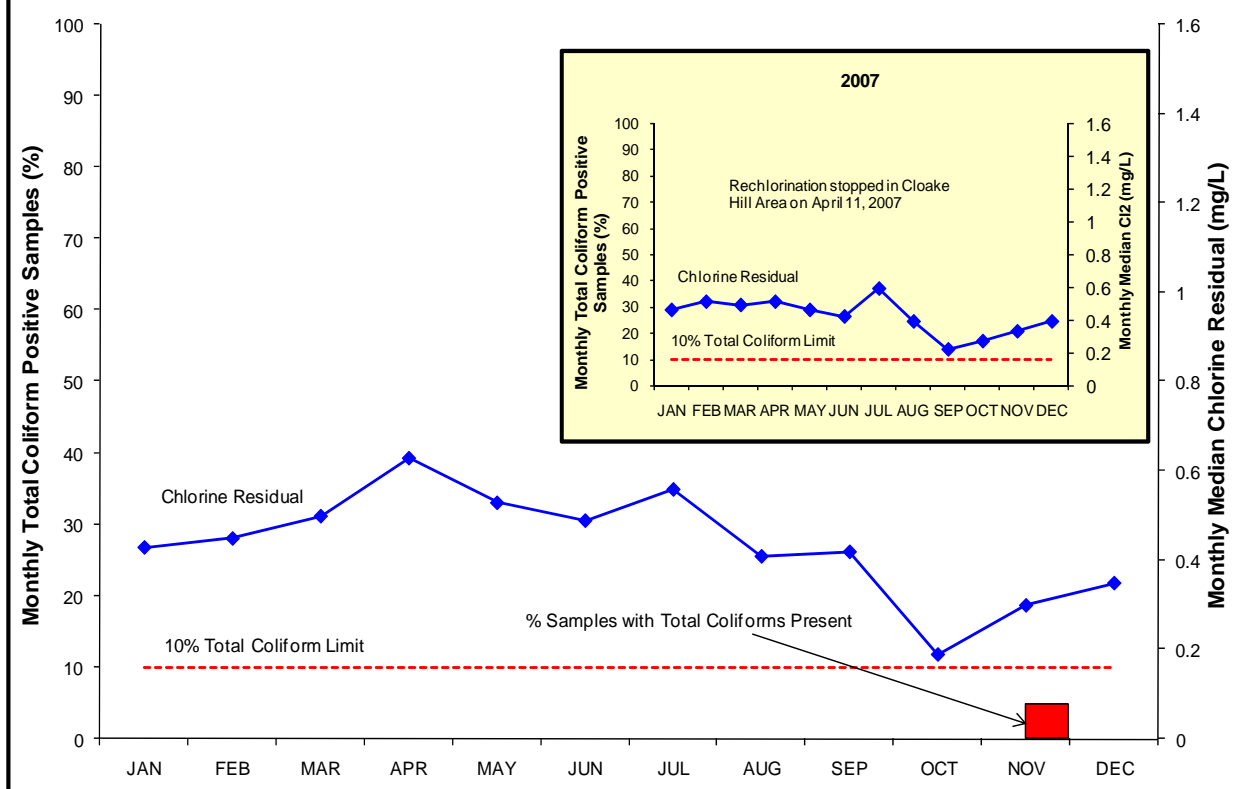


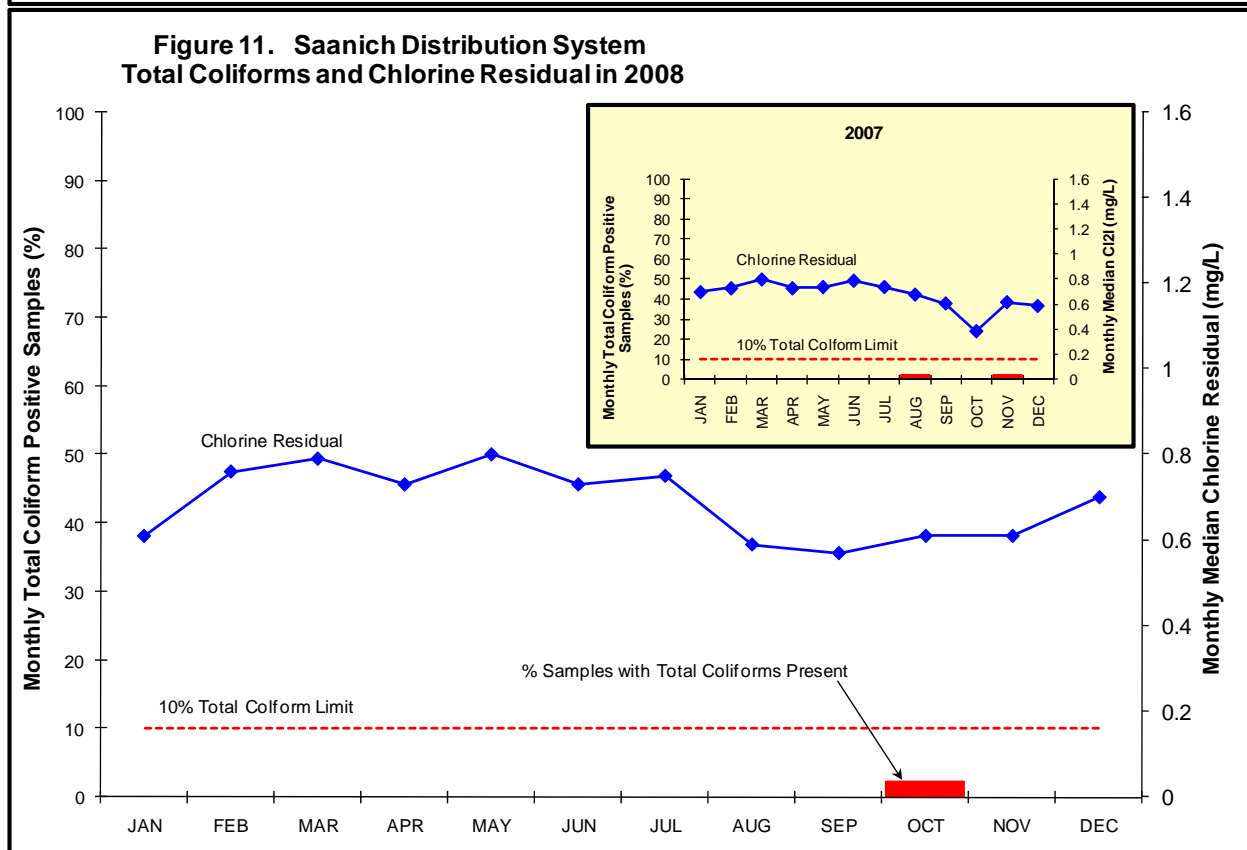
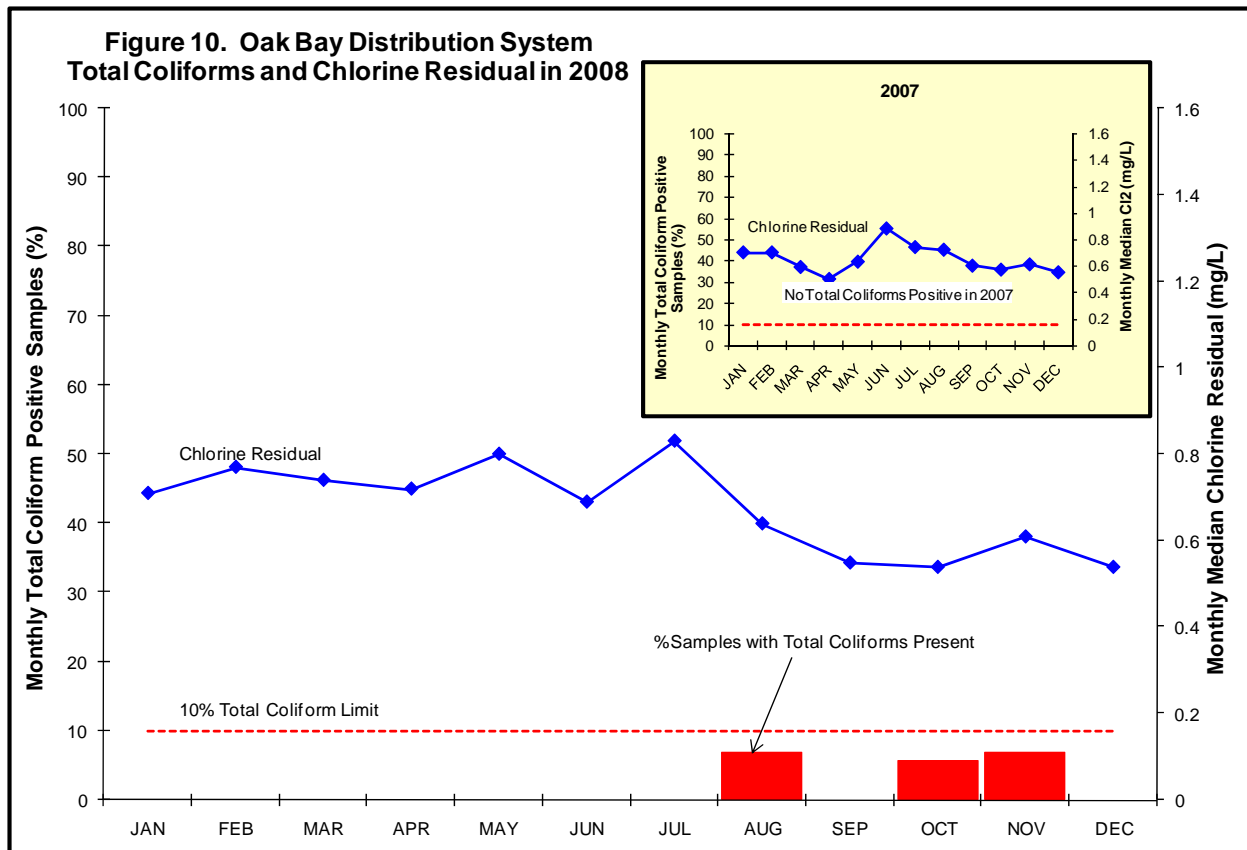


**Figure 8. Central Saanich Distribution System  
 Total Coliforms and Chlorine Residual in 2008**

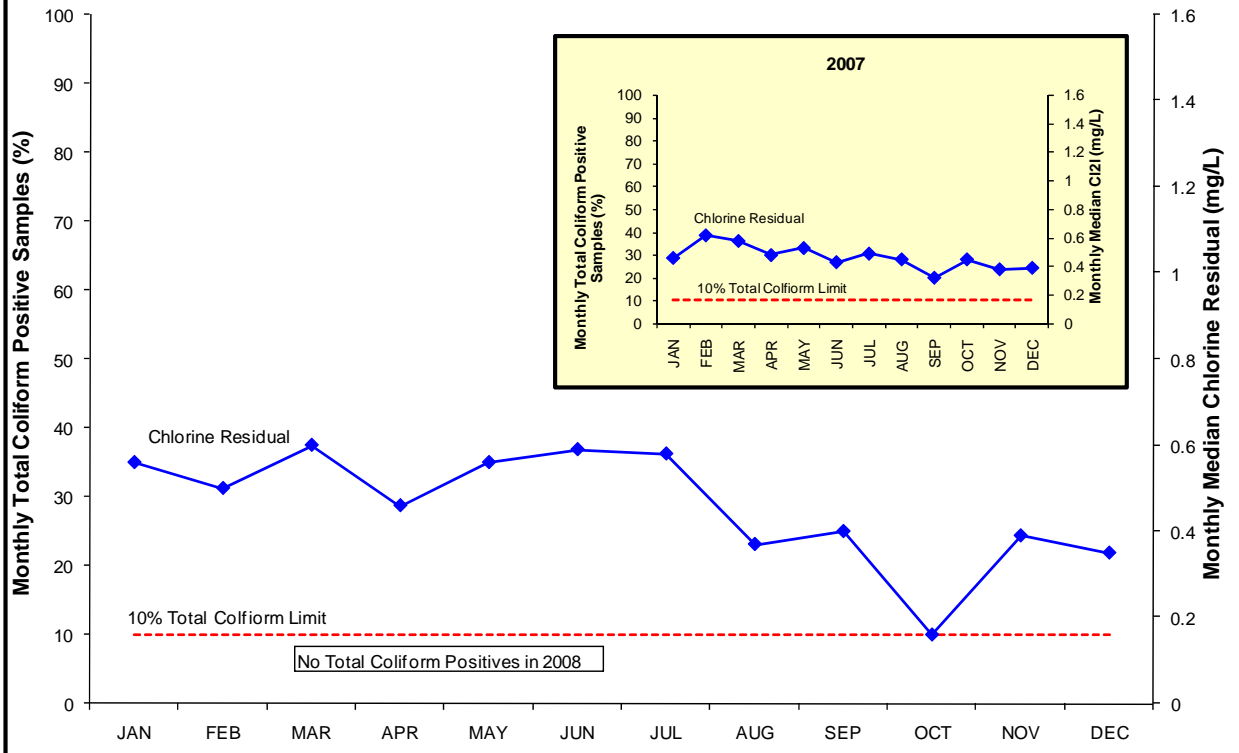


**Figure 9. North Saanich Distribution System  
 Total Coliforms and Chlorine Residual in 2008**





**Figure 12. Sidney Distribution System  
 Total Coliforms and Chlorine Residual in 2008**



**Figure 13. Victoria/Esquimalt Distribution System  
 Total Coliforms and Chlorine Residual in 2008**

