

Executive Summary

Objectives

Mark Creek and Matthew Creek provide very high quality drinking water to the City of Kimberley, including Marysville. Both watersheds have been logged at various times, although the history of logging activity in Matthew Creek is much longer than in Mark Creek. Both watersheds are also the subject of on-going periodic mineral exploration and are subject to recreation pressures as the surrounding areas are logged and create new entry points, especially into Mark Creek.

The primary objective of this on-going study is to determine the current status of the water quality in Mark Creek and Matthew Creek, as it applies to drinking water, and to assess whether natural and/or human caused disturbances are negatively affecting the quality of the drinking water. Annual water quality reports are intended to form part of the Mark Creek Integrated Watershed Management Plan (IWMP), as recommended by the Water Monitoring Technical Committee (IWMP - WMTC) (Mark Creek IWMP, 1999).

This report contains data from the fifteenth year of sampling on Mark Creek above the City reservoir, and the third year of sampling (by the City of Kimberley) on Matthew Creek. Previous sampling on Matthew Creek was conducted by Tembec as part of the monitoring program for their forestry activities. Canfor continued to operate a remote water quality station on Lower Matthew Creek through in collaboration with the City; however they intend to discontinue the station after the summer of 2012.

Though not part of the scope or budget of this project, this report also contains 2012 data from the City's sampling program at the Mark and Matthew Creek chlorination plants and metals data from the distribution system. The bacteriology data were entered into a spreadsheet and plotted, in order to better understand the bacteriological status of the water supply, given recent trends of increasing bacterial loads. The metals data were tabulated for review.

Background

The City of Kimberley began monitoring the raw water quality within the Mark Creek watershed in 1998/99 under the guidance of the Mark Creek Integrated Watershed Management Plan Water Monitoring Technical Committee (IWMP - WMTC, hereafter referred to as the Watershed Advisory Committee). At that time, there was no such committee set up for Matthew Creek, primarily because considerable logging had already been underway in Matthew Creek for many years, and the focus was on establishing a baseline for Mark Creek water quality before any logging. Aqua - Tex Mark and Matthew Creek Water Quality 2012 xi commenced. Since that time, between seven and ten sites within the Mark Creek watershed have been sampled regularly, with new sites added to capture potential effects of new cutblocks, roads, and mining exploration drill sites, as needed.

Water quality sampling in Matthew Creek, immediately upstream of the drinking water intake, has occurred since 1998, under the administration of Tembec. This station aggregates any influences on water quality that occur elsewhere in the watershed, but does not provide information on site-specific influences. In 2010, the City of Kimberley began its own, limited, water quality sampling at four sites in the watershed with a goal of creating a program similar to that in operation in Mark Creek. Limited budgets have required that this program be developed over time, as funding allows. This report represents the third year of this limited data collection and will provide direction to the long-term sampling program design.

Key Conclusions

- Water quality remains very good at all sites in Mark Creek and Matthew Creek.
- Both Mark and Matthew Creek met Canadian Drinking Water Quality Guidelines at all times.
- During freshet, both Mark and Matthew Creek exceeded Interior Health's criterion of <1 NTU turbidity for raw water.
- Bacterial loads in the raw water of Mark Creek are higher than Matthew Creek. Mark Creek continues to see increased loads compared to historical levels.
- It appears that the braided channel between the remote station and the reservoir on Mark Creek is contributing sediment to the channel.
- Total Suspended Solids levels in upper Mark Creek remain low.
- Metals analysis of the raw and disinfected water shows consistently low metals in Mark Creek which met the Canadian Drinking Water Guidelines at all times for all parameters except aluminum and iron. Both metals are of aesthetic and not health concern.
- Water quality in Matthew Creek is similar to that in Mark Creek, but it has a slightly higher level of dissolved materials and an overall lower bacterial load.
- Access into Mark Creek by unauthorized users is increasing, particularly in winter. Access is mainly from the east, via Kimberley Creek whose access has increased due to logging.
- Pine beetle numbers in both Mark and Matthew Creek have stabilized and appear to be declining.

Key Recommendations

1. The City should pursue all options to ensure that access to the watershed, particularly by motorized vehicles, is restricted to authorized users. Increased recreational use places the watershed at risk of contamination from human waste and significantly increases the risk of fire. In the event of a serious fire, Kimberley does not have a back up long - term water supply.
2. The equipment at the Matthew Creek remote station is old, and is not owned by the City. Comparisons with grab sample data suggest it is no longer accurate. Budget should be set aside in 2013 for replacement of this station with new equipment as soon as possible. Since the Matthew Creek intake is often closed during freshet (a critical time for water quality testing) the Matthew Creek Chlorine Plant data cannot substitute for the Matthew Creek remote station.
3. The rain gauge at Mark Creek remote station should be replaced immediately ; the Matthew Creek rain gauge should be checked and replaced if necessary .
4. Field reconnaissance along Mark Creek Reservoir up stream to site 9 should be undertaken to see if the source of turbidity can be located .
5. Grab sampling and remote monitoring within the watersheds and at the chlorination plants should continue and should again focus upon those parameters which are most likely to be altered by the watershed activities of road construction, mining exploration and timber harvesting . Those parameters should include TSS, turbidity, specific conductance and bacterial loads. Metals levels and nutrients should be checked periodically. Extreme events appear to be increasing in frequency and may be attributable to changing climatic conditions .

6. The City now has almost fifteen years of water quality data for the Mark Creek watershed. These data should be collated and analyzed for medium - term trends. This database should be incorporated with the City's database on water quality in the distribution system in order to better understand water quality trends. Monitoring must continue given that the effects of forestry may not be seen for several years post - harvest.
7. The City should obtain digital copies of all data collected for Matthew Creek, both by Tembec/ Canfor and by other agencies such as the Ministry of Forests Research Branch. Some of these data are already available to the City, but need to be compiled and analyzed. Aqua - Tex Mark and Matthew Creek Water Quality 2012 xiii
8. The City should continue to pursue protection for Mark Creek watershed through the use of a designated Drinking Water Protection Plan, under the Drinking Water Protection Act.
9. The City should continue to work with the Ministry of Forests to update the Mark Creek Integrated Watershed Management Plan on an on - going basis.
10. Hydrometric data for Mark Creek should be compared to consumption records for the City of Kimberley in order to model the potential effects on supply of drier winters, lower snow pack and wetter summers (as predicted by climate change models).