

## INTRODUCTION

Drinking water utilities that use surface water are required to conduct a watershed sanitary survey for that source, under the California Surface Water Treatment Rule (SWTR). This survey must be updated every five years. This Third Update to the Lytle Creek Watershed Sanitary Survey covers the period January 1, 2008 through December 31, 2012.

## OBJECTIVES OF THE UPDATE

The overall objective of this Third Update is to assess the source water quality of Lytle Creek to ensure the ability of the Oliver P. Roemer Water Filtration Facility (WFF) to continue to provide their customers with drinking water that meets all current drinking water standards. This Third Update also accomplishes some other specific objectives including:

- Review and evaluation of selected constituents of interest to identify potential water quality or treatment issues at the water treatment plant. Assess the ability of the Roemer WFF to meet drinking water standards based on current regulatory framework, as well as comment on the appropriate level of treatment for pathogens, specifically for *Giardia*, viruses, and *Cryptosporidium*.
- Review and evaluation of selected potential contaminating activities to identify potential impacts on source water quality.
- Development of recommendations that are economically feasible and within the authority of the West Valley Water District (WVWD) to implement.

## SIGNIFICANT CHANGES AND SOURCE WATER PROTECTION ACTIVITIES SINCE 2008 UPDATE

The West Valley Water District (WVWD) has implemented source water protection efforts as recommended in the 2008 Update Report. It is important to note the following source water protection efforts:

- WVWD coordinated with the United States Forest Service (USFS) during and after the Sheep Fire in October 2009 to ensure that fire retardants were not used near the Lytle Creek streambed.
- In April 2013, WVWD sent a letter to the USFS to support the continued collection of Forest Adventure Pass fees in the Lytle Creek watershed.

- WWWD participated in a Lytle Creek Watershed Action Project which received grant funding in 2007 from the CALFED Bay-Delta Program. Other partners for the project were the San Bernardino Valley Municipal Water District, USFS, the Santa Ana Regional Water Quality Control Board (Regional Board), and the California State University at San Bernardino Water Resources Institute. Educational materials were developed; outreach to schools was conducted, as well as a watershed clean-up day and coliform monitoring for two years along Lytle Creek. Unfortunately, the watershed project was discontinued in 2010 due to a lack of funding. Additional information can be found in **Section 4**.
- WWVD initiated *E. coli* monitoring of the Grapeland tunnel water to assess any impact from the Lytle Creek wastewater treatment plant percolation ponds.
- WWWD continues to investigate the feasibility of installing a turbidimeter at Fish Wheel to detect illicit discharges.
- WWWD has continued to conduct monthly visual inspections of the watershed.

There have been no significant changes in the watershed since the 2008 Update. In general, the pace of development is slow in the Lytle Creek area. There are approximately 375 homes in the communities of Scotland, Happy Jack and Lytle Creek.

The Roemer WFF has not undergone any significant treatment upgrades since the 2008 Update.

### KEY FINDINGS AND CONCLUSIONS

The key findings and conclusions for this report are organized as they pertain to source water quality, treatment and regulatory compliance, and watershed contaminant sources. Highlights of these findings and conclusions are presented below.

#### Source Water Quality

Overall, Lytle Creek provides excellent quality raw water. The raw water can be treated to meet all drinking water standards using conventional treatment processes. Key findings for the constituents of interest are presented below.

### *Turbidity*

The Roemer WFF has relatively low levels of raw water turbidity, with an average value less than 1 NTU. The peak daily raw water turbidity ranges from 0.1 to 6.6 nephelometric turbidity units (NTU), with an average value of 0.578 NTU. It should be kept in mind that the sampling location for plant influent turbidity is located after Lytle Creek is blended with State Project water. There are no clear trends in the data but turbidity peaks generally occur during the wet season, between October and April, but can also occur during the spring and summer months. There was an extended period of higher turbidity values during the late spring/summer of 2011, and there is no clear cause of the increase.

### *Coliform*

Total coliform, fecal coliform, and *Escherichia coli* (*E. coli*) data show generally low levels. Individual total coliform, fecal coliform, and *E. coli* samples had average values of 196 most probable number (MPN)/100 mL, 16 MPN/100 mL, and 12 MPN/100mL, respectively.

99 percent of monthly median total coliform values were less than 1,000 MPN/100 mL, and 100 percent of monthly median fecal coliform and *E. coli* values were less than 200 MPN/100mL. Only three monthly median calculations triggered additional log reduction of *Giardia*/viruses under current permit conditions for total coliforms. Coliform data support that 3/4-log treatment for *Giardia*/viruses is appropriate under most source water quality conditions during the study period.

Peak levels of coliform occurred in 2011. There is no clear cause, and it is suspected that this may be related to possible illicit discharges from Mountain Lakes Resort ponds.

Fecal coliform and *E. coli* data support 3/4-log treatment for *Giardia*/viruses is appropriate for all source water quality conditions during the study period.

### *Giardia/Cryptosporidium*

WVWD conducted monthly source water monitoring for *Cryptosporidium* under the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) from April 2007 through March 2009. Two years of monthly data show one sample with low-level detection of *Cryptosporidium* and no detect of *Giardia*. No detection of *Giardia* supports 3-log reduction is appropriate for the Roemer WFF. Maximum running annual average value for *Cryptosporidium* was 0.008 oocysts/L, well below the Bin 1 limit of 0.075 oocysts/L, resulting in Bin 1 classification with no additional action required under the LT2ESWTR.

### *Disinfection By-Product Precursors*

Limited TOC data as measured at the Southern California Edison (SCE) After Bay shows very low levels, with all samples less than 1 mg/L in Lytle Creek. Lytle Creek water can then be blended with SPW, which has higher TOC levels. Prior to blending with Lytle Creek water, SPW is sent through a pre-treatment facility. WVWD's strategy of blending and pre-treating SPW is effective at maintaining the plant influent TOC below the treatment trigger threshold of 2 mg/L. The influent and effluent of the GAC filters was sampled periodically through the study period. The influent location had an average TOC level of 1.14 mg/L and a median TOC level of 0.53 mg/L. The effluent location had an average TOC level of 0.63 mg/L and a median TOC level of 0.3 mg/L. There was an extended peak of TOC in the GAC influent and effluent samples during the late spring/summer of 2011 which is not clearly related to any activity in the watershed, and may be related to an illicit discharge.

### **Intake Evaluation**

#### *Oliver P. Roemer Water Filtration Facility*

The Roemer WFF is currently in compliance with all existing drinking water regulations. The Roemer WFF implements conventional filtration processes and meets all current drinking water standards, including maximum contaminant levels (MCLs) and treatment technology requirements. Below is a summary of the selected treatment and regulatory compliance issues.

#### Turbidity

All combined filter effluent (CFE) turbidity measurements between January 2008 and December 2012 met the turbidity treatment technique limit and were less than 0.14 NTU. The peak daily settled water had an average value of 0.048 NTU and the average daily CFE had an average value of 0.041 NTU. This shows that a large amount of the solids removal is achieved during the pretreatment process of flocculation and sedimentation.

Solids removal through plant averages 90 percent, meeting the 80 percent goal for conventional treatment. Removal is most difficult under low raw water turbidity periods.

#### Microbiological Constituent Review

Distribution system monitoring for coliforms as part of the Total Coliform Rule resulted in a few detections of total coliform in distribution system during the study period. In each month with a detection, less than five percent of samples

were positive and there were no fecal coliform detected. Therefore, there were no violations of the coliform maximum contaminant level (MCL).

### Disinfection Precursors and By-Products

The Roemer WFF CFE data (2011 through 2012) show an average TOC value of 0.434 mg/L with all samples less than 1.2 mg/L. The GAC facility effluent data (2008 through 2012) show an average TOC value of 0.63 mg/L with 88 percent of samples less than 2.0 mg/L. WVWD complies with the Stage 1 D/DBP Rule by meeting an alternative compliance criterion for the enhanced coagulation treatment technique, less than 2 mg/L in source or treated water.

Under the Stage 1 D/DBP Rule, WVWD sampled 24 sites in the distribution system on a quarterly basis for disinfection by-products. Since the Roemer WFF primarily services pressure zones 4 through 8, only the 15 sites in those zones were included in the data evaluation. When looking at the quarters when the Roemer WFF was in operation, the TTHM running annual average (RAA) of the 15 selected distribution sites ranged from 5 to 9.3 µg/L, well below the current MCL of 80 µg/L. The HAA5 RAA of the 15 selected distribution sites ranged from 2.2 to 4.1 µg/L, well below the current MCL of 60 µg/L.

WVWD converted to the Stage 2 D/DBP Rule monitoring sites in June 2012. Only eight distribution sites are required to be monitored, and six of those are located in the zones that represent water from the Roemer WFF. Locational running annual averages (LRAA) were calculated for the six sites, and THM LRAAs ranged from ND to 27.4 µg/L, with an average of 12.1 µg/L, all well below the MCL of 80 µg/L. HAA5 LRAAs ranged from ND to 11.6 µg/L, with an average of 5.2 µg/L, all well below the MCL of 60 µg/L. The highest levels of THMs and HAA5 continue to occur at Site 1.

There were no identifiable trends in the data due to variable plant operations and source water blending. IDSE monitoring results had data results similar to the Stage 1 sample sites.

### *Giardia/Virus/Cryptosporidium* Reduction Requirements

Based on the total coliform, fecal coliform, and *E. coli* data presented in **Section 3**, 3/4/2-log reduction of *Giardia/virus/Cryptosporidium* appear to be appropriate reduction requirements for the Roemer WFF under most source water quality scenarios.

The Roemer WFF is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia*, 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with sodium hypochlorite provides 0.5-log credit for *Giardia* and 2.0-log credit for viruses. This meets all of

the current microbial removal/inactivation requirements of the SWTR and the Interim Enhanced SWTR.

### **Watershed Contaminant Sources**

There are numerous types of potential contaminating activities (PCAs) in the watershed. Six activities were selected for evaluation in this report based on constituents of interest and predominance in the watershed. Selected findings for each of these activities are provided below.

#### *Spills*

There were four spills/incidents listed in the State Office of Emergency Services (OES) Hazardous Materials Release database from 2008 to 2012. Two of the spills involved sewage and two of the spills involved diesel fuel and carburetor cleaner.

The largest SSO involving raw sewage occurred on October 14, 2008 when 900 gallons of raw sewage was released from a manhole and 100 gallons impacted Lytle Creek. *E. coli* was sampled on the same day and results were 22 MPN/100mL, which is higher than the median *E. coli* value of 4 MPN/100mL, indicating that the source water was likely impacted by the spill.

#### *Recreation*

Recreational uses in the Lytle Creek watershed are primarily for camping, picnicking, hiking, fishing, hunting, off-highway vehicle use, and swimming in the creek. The watershed currently receives approximately 70,000 day-use visitors on an annual basis, and can experience as much as 10,000 visitors on peak summer weekends. The USFS does not have resources to actively manage people swimming in Lytle Creek. However, the USFS have placed portable restrooms at key locations along Lytle Creek from May through October to provide sanitation facilities for visitors.

Similar to the findings of the 2008 Watershed Sanitary Survey, fecal coliform and *E. coli* levels at the SCE After Bay increase in the summertime, possibly as a result of body contact recreation in Lytle Creek.

In April 2013, WVWD sent a letter to the USFS to support the continued collection of Forest Adventure Pass fees in the Lytle Creek watershed.

WVWD continues to have unexplained spikes of turbidity, coliforms, and TOC in the Lytle Creek source water which is suspected to be from Mountain Lakes draining/flushing their fishing lakes.

### *Wastewater*

There are no wastewater treatment plants which discharge treated effluent directly to Lytle Creek. The Lytle Creek wastewater plant disposes their secondary effluent to percolation ponds located near the USFS Ranger Station upstream of the Grapeland Tunnel. The Regional Board performs inspections of the Lytle Creek wastewater treatment plant, and the facility has been in compliance during the reporting period. However, it is possible that the Lytle Creek wastewater treatment plant's percolation ponds may impact water received by WVWD through the Grapeland Tunnel. It is recommended that the WVWD continue to monitor the Grapeland tunnel water for *E. coli* to assess any impact from the Lytle Creek wastewater treatment plant percolation ponds.

About 90 percent of Lytle Creek residences receive centralized sewer services, while approximately 10 percent remains off-line. The locations of the remaining septic systems in the watershed are unknown. The total number of sewer service connections for the Lytle Creek service area was 392 in 2012.

### *Developments*

Overall, there has been little to no development in the watershed over the past five years. Land uses in the watershed are either open space or residential, with very little commercial and no industrial uses. There were only two large construction projects in the watershed, conducted by the San Bernardino County Department of Public Works at South Fork Road for bridge replacement and rock slope protection

### *Fires*

The Lytle Creek watershed is entirely a high to extremely high fire risk based on vegetation. The largest wildfire over the reporting period was the Sheep Fire which occurred from October 3 to October 10, 2009. WVWD staff contacted the Lytle Creek Ranger Station to ensure that retardant drops did not occur near the stream bed of Lytle Creek. WVWD is able to minimize fire-related impacts to the Roemer WFF by shutting the plant down during times of degraded source water quality. However, the Roemer WFF remained on-line after the Sheep Fire.

### *Floods/Erosion*

Flooding and debris flows occur in the Lytle Creek watershed as it is a natural canyon area with steep topography and can receive high amounts of rainfall in a short time period. Debris and flood flows are also uncontrolled in the upper reaches of Lytle Creek, since there are no flood control facilities upstream of the Lytle Creek communities.

Modeling was conducted by the BAER team to predict the increase in peak discharge (cfs/square mile) for the 2-year, 5-year, 10-year and 25-year storm event for the year following the Sheep Fire. Examination of Lytle Creek flow records after the Sheep Fire did not show any noticeable increase above normal winter flows in Lytle Creek.

WVWD typically avoids using Lytle Creek water during high storm events, in order to prevent high turbidity and china clay from entering the treatment plant.

### TOPICS TO CONSIDER FOR THE 2018 UPDATE

Based on the information collected and evaluated as part of this report, a list of potential topics to consider for discussion in the next update to the Lytle Creek Watershed Sanitary Survey includes:

- Source water quality for all regulated constituents
- Possible impact of wastewater percolation ponds to Grapeland Tunnel water quality
- Status of pathogen total maximum daily load (TMDL) for Lytle Creek
- Changes to County requirements for septic systems due to 2012 State Water Resources Control Board policy (Resolution No. 2012-0032)
- Changes to collection of Forest Adventure Pass fees in Lytle Creek.

### RECOMMENDATIONS

A number of recommendations covering water quality and watershed management were developed for this Third Update. Please refer to **Section 6** for further information on the recommendations.