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Executive Summary

The Scotts Valley Water District (SVWD or District) serves water to a majority of the residents in and around the City of Scotts Valley. SVWD currently operates six production wells: SVWD Wells #3B, #7A, #9, #10A, #11A, and #11B (Figure 1). Groundwater production in WY2013 was 1,399 acre-feet. Although production was slightly higher than in WY2012, it is still about 674 acre-feet (approximately 34%) lower than the maximum groundwater production of 2,073 acre-feet in WY2003.

The Scotts Valley region is experiencing a period of extended drought. Over the past three years, rainfall is a cumulative 52 inches below normal. The period from January to December 2013 was the driest 12-month period on record in Scotts Valley, with only 7.35 inches of rain (about 17% of average rainfall) which is 34.8 inches below normal. Groundwater level data from production and monitoring wells indicate that groundwater levels are remaining within recent trends during this drought. Ongoing groundwater level monitoring is necessary to better assess the long-term impact of the drought on the Santa Margarita Groundwater Basin.

SVWD derives nearly all of its potable groundwater supply from the Lompico and Butano aquifers. In WY2013, approximately 65% of SVWD’s groundwater production was from the Lompico and 33% was from the Butano. Historically, groundwater levels in the Lompico have declined by over 200 feet from pre-pumping levels. Currently, groundwater levels are not recovering or are recovering slowly in response to a decline in groundwater pumping in the Lompico. In contrast, groundwater levels in the Butano have increased by 40 to 50 feet since pumping in the Butano began to decline in WY2007; however, SVWD #7A is 140 feet below its pre-pumping groundwater level.

SVWD maintains a number of ongoing programs to support the sustainable management of the groundwater resource including water conservation and the use of recycled water. In WY2013, recycled water deliveries were approximately 199 acre-feet. Since 2002, approximately 1,429 acre-feet of recycled water has been delivered for use.

SVWD treats groundwater at four water treatment plants (WTPs) prior to distribution, primarily for naturally-occurring constituents such as iron, manganese, arsenic and hydrogen sulfide. By applying the appropriate treatment technology, the District is able to deliver potable water to customers that meets regulatory standards and is safe to drink.
Section 1: Introduction

The Scotts Valley Water District (SVWD or District) presents the 2013 Annual Report of the Groundwater Management Program describing the groundwater conditions in the Scotts Valley area.

1.1 Annual Reports

The purpose of the Annual Report is to provide a management-level summary of the primary activities and issues that occurred during 2013. Each annual report is presented to the SVWD Board of Directors, distributed among local agencies and stakeholders, and made available to the public at the SVWD office and website.

The District has been producing the Annual Report every year since 1994. The format of the annual report has changed over time to meet the evolving needs of the District. Starting with this 2013 report, the format of the annual reports will follow a two year cycle. The 2013 annual report will be a short summary of District operations. The 2014 annual report will be a more comprehensive assessment that will include an evaluation of regional data and update of the basinwide groundwater model. Based on past experience, there are only incremental year-to-year changes. The two-year cycle provides a more cost-effective approach to accomplish the objectives of the Annual Report.

1.2 District Overview

The Scotts Valley Water District was formed under County Water District Law, specifically Water Code section 30321, and received certification from the California Secretary of State in 1961. SVWD covers an area of about 5.5 square miles (Figure 1) in northern Santa Cruz County and provides water to a majority of the residents in and around the City of Scotts Valley.

Groundwater is the sole source of potable water supply for the District, so careful management is necessary to sustain the groundwater resource.

This annual report focuses on groundwater conditions and system operations in the Scotts Valley area of the Santa Margarita Groundwater Basin (Basin) that underlies the SVWD (Figure 1). SVWD currently operates six groundwater production wells (SVWD Wells #3B, #7A, #9, #10A, #11A, and #11B) to provide the District’s potable water supply (Figure 1).

SVWD utilizes groundwater from the Basin that covers over 30 square miles in a roughly triangular area that extends from Scotts Valley in the east, to Boulder Creek in the northwest, to Felton in the southwest. The main aquifers in the Basin include:

- Santa Margarita Sandstone (Santa Margarita),
- Monterey Formation (Monterey),
- Lompico Sandstone (Lompico), and
- Butano Formation (Butano).
1.3 Groundwater Management Goals and Objectives

SVWD has been actively managing the groundwater basin since the early 1980’s in an effort to increase water supply reliability and to protect local water supply sources. In 1994, SVWD formally adopted its Groundwater Management Plan (GWMP) in accordance with the California Groundwater Management Planning Act (Todd Engineers, 1994). The overall purpose of the GWMP is to develop a planning tool that will help guide the District in the management of the quantity and quality of the groundwater supply and to comply with the requirements of the California Groundwater Management Planning Act.

The California Groundwater Management Planning Act requires the development of Basin Management Objectives (BMOs). The BMOs for SVWD are currently summarized as:

- Encouragement of public participation through an annual report of groundwater management activities and its presentation at one or more public meetings.
- Coordination with other local agencies.
- Continued monitoring and evaluation of groundwater conditions.
- Implementation of groundwater augmentation projects.
- Investigation of groundwater quality and prevention of groundwater contamination.

These basin management objectives continue to guide the SVWD groundwater management program and serve as the major objectives of groundwater management for the District.

1.4 Groundwater Management Programs

The goals and objectives of the District’s Groundwater Management Plan are being supported through the following actions:

- Water Conservation Program - SVWD has implemented several water conservation policies and practices to encourage water conservation among customers through coordinating public outreach activities, issuing monetary rebates to customers, and implementing best conservation management practices.

- Groundwater Management Monitoring Program - SVWD has implemented a Monitoring Program for over 20 years to assess groundwater conditions in the Scotts Valley area for groundwater levels, pumping volumes, climate, and water quality. The updated data tables can be downloaded in PDF format directly from the SVWD website at the following web address: [www.svwd.org/index/District_Reports](http://www.svwd.org/index/District_Reports).

- Urban Water Management Plan (UWMP) - The District’s 2010 UMWP update met regulatory requirements. This plan also contains a Water Shortage Contingency Plan to be implemented during times of water shortage. The most recent UWMP plan is available at the following web address: [www.svwd.org/index/District_Reports](http://www.svwd.org/index/District_Reports).
• California Statewide Groundwater Elevation Monitoring (CASGEM) Program - The District coordinates with the Santa Cruz County Environmental Health Services (SCCEHS) which is the lead agency for reporting data for Santa Cruz County.

• Butano Formation Groundwater Monitoring Project – The District completed the requirements for the Butano Formation Groundwater Monitoring Project in 2013. The project was funded by a California Department of Water Resources (DWR) Local Groundwater Assistance (LGA) grant for two groundwater monitoring wells to provide additional spatial information on the groundwater levels and water quality in the Butano.

• Prop 50 Regional Emergency Intertie Project - The District obtained Proposition 50 Water Security funding from the California Department of Public Health (CDPH) for construction of an emergency system interties with San Lorenzo Valley Water District and Mount Hermon Association.

• Prop 84 Low-Impact Development Project - The District obtained funding under a Proposition 84 grant led by the County of Santa Cruz from the State Water Resources Control Board to implement low-Impact development (LID) stormwater management practices that include infiltration of stormwater to the groundwater.
Section 2: Groundwater Supply Assessment

This section provides an overview of the groundwater usage by SVWD. Analysis of groundwater operations and conditions are discussed in terms of a water year. The water year is defined as the period from October through September to capture the cause and effect relationship between the typical November through March rainy season and the subsequent season of higher groundwater pumping from June through October.

2.1 Precipitation Summary

Precipitation is the primary source of groundwater recharge in the Santa Margarita Groundwater Basin through both direct percolation of rainfall and the infiltration of runoff through streambeds. Therefore, evaluation of the annual precipitation is a key component to understanding groundwater conditions in the Basin. Average annual precipitation in Scotts Valley is 42.4 inches based on measurements collected since 1947 (Figure 2). Since 1947, the highest annual rainfall in Scotts Valley was 86.25 inches in WY1983, and the lowest annual rainfall was 19.89 inches in WY1976.

Below-average rainfall of only 31.9 inches occurred in WY2013, which is about 10.5 inches below average, or 75% of average. Over 80% (26.2 inches) of the WY2013 rainfall occurred from October through December 2012. The period from January to December 2013 was the driest 12-month period on record throughout California. In Scotts Valley, only 7.35 inches of rain fell during that period (about 17% of average rainfall). This is 34.8 inches below normal.

The region has been experiencing a period of extended drought. Over the past 2.25 years (from October 2011 through December 2013) rainfall is a cumulative 52 inches below normal. In addition, five of the past seven years have had below average precipitation with a cumulative rainfall deficit of 65.3 inches over the 7.25 year period from October 2006 through December 2013. The extreme drought conditions throughout California prompted Governor Jerry Brown to issue a Drought Emergency Proclamation on January 17, 2014. WY2014 will be an important year for monitoring groundwater levels to assess the long-term effects of the drought on the Basin groundwater supply.

2.2 SVWD Groundwater Production

The primary purpose of the District is to provide a safe and reliable drinking water supply to its customers. Groundwater production in WY2013 was 1,399 acre-feet (AF; Figure 3), which was 38 AF (approximately 3%) more than WY2012. This was the second straight year of slightly increasing groundwater production. However, groundwater production is still well below the historical maximum. Since WY2003, the District’s groundwater production has declined by almost 700 acre-feet per year (AFY; about 33%), and declines have occurred in seven of the past ten years. The increases in pumping over the past two years are likely due to extremely low rainfall totals causing earlier and increased outdoor water usage.
SVWD #3B, #7A, #10A, and #11B were the highest producing wells in WY2013 and provided nearly all of SVWD’s potable groundwater supply (Table 1). The wells are currently being operated well below their historical maximum annual production.

**Table 1: WY2007 to WY2013 SVWD Groundwater Production by Well (in Acre-Feet)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>#3B</td>
<td>409</td>
<td>409</td>
<td>186</td>
<td>235</td>
<td>150</td>
<td>226</td>
<td>143</td>
<td>208</td>
</tr>
<tr>
<td>#7A</td>
<td>991</td>
<td>456</td>
<td>452</td>
<td>504</td>
<td>427</td>
<td>312</td>
<td>501</td>
<td>369</td>
</tr>
<tr>
<td>#9</td>
<td>426</td>
<td>65</td>
<td>68</td>
<td>16</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td>#10</td>
<td>489</td>
<td>60</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>&lt;1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>#10A</td>
<td>544</td>
<td>92</td>
<td>544</td>
<td>397</td>
<td>357</td>
<td>362</td>
<td>378</td>
<td>390</td>
</tr>
<tr>
<td>#11A</td>
<td>152</td>
<td>132</td>
<td>84</td>
<td>36</td>
<td>20</td>
<td>1</td>
<td>13</td>
<td>59</td>
</tr>
<tr>
<td>#11B</td>
<td>683</td>
<td>550</td>
<td>365</td>
<td>319</td>
<td>400</td>
<td>397</td>
<td>323</td>
<td>338</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1,764</td>
<td>1,700</td>
<td>1,507</td>
<td>1,358</td>
<td>1,302</td>
<td>1,361</td>
<td>1,399</td>
</tr>
</tbody>
</table>

SVWD #11A has limited capacity due to its inability to sustain pumping rates, but is planned to be replaced because it is situated within the Woodside development. SVWD #10 is not considered an active production well due to limited production capacity, but it can be used as a backup well if necessary.

Groundwater production varies with seasonal changes in water demand. Groundwater production is highest in the dry season months of May through October and lowest in the winter months of December through March (Table 2). This is primarily due to changes in outdoor usage of water for landscaping. The timing of the increase in outdoor pumping is typically dependent upon the amount of springtime precipitation. The extremely dry conditions in WY2013 have resulted in only a modest increase in water usage that is primarily attributed to increased outdoor water usage.

**Table 2: SVWD Groundwater Production by Month for WY2013 (in Acre-Feet)**

<table>
<thead>
<tr>
<th>SVWD Well</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well #3B</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>19</td>
<td>41</td>
<td>19</td>
<td>23</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Well #7A</td>
<td>44</td>
<td>45</td>
<td>46</td>
<td>25</td>
<td>0</td>
<td>27</td>
<td>45</td>
<td>43</td>
<td>42</td>
<td>42</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Well #9</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Well #10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well #10A</td>
<td>37</td>
<td>31</td>
<td>16</td>
<td>22</td>
<td>41</td>
<td>26</td>
<td>0</td>
<td>45</td>
<td>43</td>
<td>44</td>
<td>44</td>
<td>42</td>
</tr>
<tr>
<td>Well #11A</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>11</td>
<td>13</td>
<td>7</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Well #11B</td>
<td>22</td>
<td>11</td>
<td>19</td>
<td>36</td>
<td>38</td>
<td>32</td>
<td>38</td>
<td>9</td>
<td>27</td>
<td>35</td>
<td>36</td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>115</td>
<td>87</td>
<td>81</td>
<td>83</td>
<td>79</td>
<td>98</td>
<td>109</td>
<td>152</td>
<td>148</td>
<td>151</td>
<td>156</td>
<td>140</td>
</tr>
</tbody>
</table>
In WY2013, nearly all of the groundwater production for the District water supply was derived from the Lompico and the Butano (Table 3). In WY2013, 902 AF were produced from the Lompico, making it the highest producing aquifer, accounting for 65% of the total SVWD production. The Butano is the second highest producing aquifer for the District, with 462 AF in WY2013 accounting for 33% of the total SVWD production. SVWD #10A, #11A and #11B produce exclusively from the Lompico. SVWD #3B and #7A are screened across both the Lompico and Butano; it is assumed that 80% of the production is from the Butano and 20% is from the Lompico.

These two aquifers are currently being operated below their historical maximum annual production. Annual groundwater pumping in WY2013 has decreased 31% in the Lompico and 53% in the Butano compared to their historical maximum in WY2003 and WY1997, respectively. The annual groundwater pumping from the Lompico and Butano has been fairly steady over the past several years after several years of large declines.

A revised geologic interpretation has now SVWD Well #9 screened completely within the Monterey. It was previously considered to be partially completed in the Santa Margarita. This new interpretation provides a better explanation for the groundwater level trends observed in SVWD #9. A more detailed discussion will be presented in the upcoming Groundwater Model Update report, and that will be summarized in the next annual report. The maximum estimated groundwater production from the Monterey was 426 AF in WY1984 when groundwater levels were about 200 feet higher. SVWD #9 has been utilized sparingly over the past seven years, and accounted for about 2% of the total SVWD production in WY2013.

Table 3: WY2007 to WY2013 SVWD Groundwater Production by Aquifer (in Acre-Feet)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Monterey</td>
<td>426</td>
<td>65</td>
<td>68</td>
<td>16</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td>Lompico</td>
<td>1,312</td>
<td>1,007</td>
<td>1,121</td>
<td>900</td>
<td>894</td>
<td>869</td>
<td>842</td>
<td>902</td>
</tr>
<tr>
<td>Butano</td>
<td>980</td>
<td>692</td>
<td>510</td>
<td>591</td>
<td>462</td>
<td>430</td>
<td>515</td>
<td>462</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1,764</td>
<td>1,700</td>
<td>1,507</td>
<td>1,358</td>
<td>1,302</td>
<td>1,361</td>
<td>1,399</td>
</tr>
</tbody>
</table>

2.3 SVWD Recycled Water Program

The Recycled Water Program replaces groundwater use with recycled water for some non-potable uses, especially for landscape irrigation, to augment the water supply by reducing the use of potable groundwater for landscape irrigation. This Program is a cooperative effort between SVWD and the City of Scotts Valley. Recycled water is produced at the City of Scotts Valley Wastewater Treatment Plant, where it undergoes tertiary treatment including nitrate removal, ultra-violet disinfection, and chlorination. Recycled water is then distributed by SVWD to customers through a specially designated, purple pipeline system. The City of Scotts Valley has passed an ordinance mandating use of recycled water for new construction where economically feasible.
Recycled water deliveries have continuously increased since the program started in WY2002. In WY2013, recycled water deliveries were approximately 199 AF (Figure 4). From September 2002 through the end of WY2013, approximately 1,429 AF of recycled water had been delivered. All of the current recycled water use sites are located within the Santa Margarita Groundwater Basin. Therefore, the entire 1,429 AF of recycled water usage represents an equivalent reduction in groundwater pumping. Groundwater not pumped from the basin is considered to be left in storage and available for future beneficial use.
Section 3: Water Quality Assessment

This section provides a summary of the water quality data collected by SVWD during 2013 from production wells and the recycled water program. The District also monitors activities as local environmental remediation sites. Each of these is discussed below.

3.1 Groundwater Quality and Treatment

SVWD monitors water quality at the groundwater production wells for the constituents required by the Safe Drinking Water Act and under Title 22 of the California Code of Regulations. The District annually prepares and distributes the “Scotts Valley Water District Water Quality Report” to keep customers informed on water quality issues. This report provides the public with detailed results of water-quality testing, a description of the water source, answers to common questions about water quality, and other useful water quality information. The District Water Quality Reports are available at [http://www.svwd.org/index/Water_Quality_Report](http://www.svwd.org/index/Water_Quality_Report).

Under the Safe Drinking Water Act, the USEPA and CDPH have set primary maximum contaminant levels (MCL) associated with public health risks as drinking water standards for various chemicals and constituents. These include industrial chemicals including volatile organic compounds (VOCs) and methyl-tert-butyl-ether (MTBE), and naturally occurring constituents such as arsenic. Secondary MCLs (SMCL) exist for constituents that are not defined as public health risks, but require treatment for taste, odor, and other aesthetic issues. These include iron, manganese, sulfate and total dissolved solids (TDS). MTBE has both an MCL and SMCL. Table 4 provides a brief summary of the constituents of concern for untreated groundwater in the SVWD production wells.

<table>
<thead>
<tr>
<th>SVWD Well</th>
<th>VOCs</th>
<th>MTBE</th>
<th>Arsenic</th>
<th>Iron and Manganese</th>
<th>Sulfate</th>
<th>TDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>#3B</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>Below SMCL</td>
<td>Below SMCL</td>
<td>Above SMCL</td>
</tr>
<tr>
<td>#7A</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>Below SMCL</td>
<td>Below SMCL</td>
<td>Above SMCL</td>
</tr>
<tr>
<td>#9</td>
<td>ND</td>
<td>Below MCL, Above SMCL</td>
<td>ND</td>
<td>Below SMCL</td>
<td>Above SMCL</td>
<td>Above SMCL</td>
</tr>
<tr>
<td>#10A</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>Above SMCL</td>
<td>Below SMCL</td>
<td>Below SMCL</td>
</tr>
<tr>
<td>#11A</td>
<td>Below MCL</td>
<td>ND</td>
<td>Below MCL</td>
<td>Below SMCL</td>
<td>Below SMCL</td>
<td>Above SMCL</td>
</tr>
<tr>
<td>#11B</td>
<td>ND</td>
<td>ND</td>
<td>Above MCL</td>
<td>Above SMCL</td>
<td>Below SMCL</td>
<td>Below SMCL</td>
</tr>
</tbody>
</table>

Note: ND – not detected in any samples collected in 2013
Above MCL or SMCL – At least one sample in 2013 exceeded respective primary MCL or secondary MCL
Below MCL or SMCL – Constituent detected in levels below respective primary MCL or secondary MCL
SVWD applies treatment technologies to raw water extracted from wells to compensate for groundwater with concentration levels for certain constituents above or approaching MCLs or SMCLs. SVWD treats groundwater at four water treatment plants (WTPs) prior to distribution. By applying the appropriate treatment technology, the District is able to deliver potable water that meets regulatory standards and is safe to drink. Table 5 summarizes the groundwater treatment utilized by SVWD. In addition, the District also treats for hydrogen sulfide for aesthetic reasons even through this is not a regulated compound.

Table 5: Summary of Water Treatment Processes Used to Treat Raw Groundwater Prior to Delivery to Customers

<table>
<thead>
<tr>
<th>Water Treatment Plant</th>
<th>SVWD Well</th>
<th>Aquifer Formation</th>
<th>Chemicals of Concern</th>
<th>Treatment Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orchard Run #3B and  #7A</td>
<td>Butano and Lompico</td>
<td>Iron, manganese, and hydrogen sulfide</td>
<td>Air stripper, chlorination, dual media filtration, and sequestering agent.</td>
<td></td>
</tr>
<tr>
<td>SVWD Well #9 #9</td>
<td>Santa Margarita and Monterey</td>
<td>Sulfate, MTBE, VOCs, and hydrogen sulfide</td>
<td>Chlorination and granular activated carbon (GAC) filtration</td>
<td></td>
</tr>
<tr>
<td>SVWD Well #10 #10 and #10A</td>
<td>Lompico</td>
<td>Iron, manganese, VOCs, and hydrogen sulfide</td>
<td>Air stripper, chlorination, dual media filtration, sequestering agent, and standby GAC filtration</td>
<td></td>
</tr>
<tr>
<td>El Pueblo #11A and #11B</td>
<td>Lompico</td>
<td>Iron, manganese, arsenic, and VOCs</td>
<td>pH adjustment, chlorination, dual media filtration, and sequestering agent</td>
<td></td>
</tr>
</tbody>
</table>

3.2 Environmental Compliance Sites

SVWD actively monitors environmental compliance sites in the Scotts Valley area where groundwater quality has been impacted by pollution or chemical spills. These include the following sites:

- The Scotts Valley Dry Cleaners Site located at 272 Mount Hermon Road
- The Watkins-Johnson Superfund site at 440 Kings Village Road
- The Camp Evers plume associated with four current and former gasoline stations located at the intersection of Scotts Valley Drive and Mount Hermon Road
- The Shaffer, Meisser & Rogers Property at 4556 Scotts Valley Drive
- The Hacienda Drive Shell Site located at 1 Hacienda Drive
- The former Frank’s Auto Dismantlers at 700 Mount Hermon Road
- The King’s Cleaners site at 222 Mount Hermon Road
Due to the potential impact of these sites to the water supply in the groundwater basin, SVWD has been closely involved with activities at these sites by reviewing monitoring data, status reports, work plans, and by providing comments to regulatory agencies. A discussion of the activities at these environmental compliance sites will be provided every other year in the more comprehensive Annual Report, and will be included in the 2014 Annual Report.

The most active site is the Watkins-Johnson Superfund Site where the owner has been performing an extensive offsite characterization study including the installation of 5 new monitoring wells in the Skypark area to assess the potential for upgradient sources of VOCs. This data are anticipated to be available in 2014 and will be discussed in the 2014 Annual Report. More detailed information about the Watkins-Johnson Superfund Site and other environmental remediation sites is available from the State Water Resources Control Board GeoTracker web site at geotracker.swrcb.ca.gov and the Department of Toxic Substances Control (DTSC) Envirostor web site at www.envirostor.dtsc.ca.gov/public.

### 3.3 Recycled Water Monitoring Program

The Regional Water Quality Control Board permit for recycled water use includes a Monitoring and Reporting Program (MRP), which requires effluent monitoring and system performance monitoring. The MRP Order No. 01-067 details recycled water monitoring requirements, standard observations, distribution system inspections, and reporting requirements. The presence of nitrate in recycled water has been noted in effluent samples, which is typical of treated wastewater. USEPA has established a primary drinking water MCL of 10 milligrams per liter (mg/L) for nitrate reported as nitrogen (nitrate as N). Reported recycled water nitrate as N levels in WY2013 in City of Scotts Valley recycled water ranged from 2.2 to 5.6 mg/L with an average of 4.2 mg/L (City of Scotts Valley, 2014). Nitrogen removal efficiency at the plant ranged from 89% to 96%.

Although ground or surface water monitoring is not required by the permit, the District has performed this monitoring as part of meeting the basin management objective of monitoring changes in water quality. During WY2013, however, no samples were collected from surface water sites or groundwater wells. There has been no evidence of increases in nutrients or salts based on the sampling data conducted in previous years.
Section 4: Assessment of Groundwater Conditions

This section provides a summary of the data and analysis of groundwater levels collected by the District in the Santa Margarita Groundwater Basin.

4.1 Groundwater Levels in Production Wells

The historical groundwater levels reporting for the production wells include both pumping (dynamic) and non-pumping (static) conditions, which provide means for evaluating well performance. When groundwater levels decline into the well screen, there is the potential to adversely affect the well efficiency due to the introduction of air into the well screen. This can lead to precipitation of minerals, biofouling, or corrosion of the well screen resulting in lower production and higher operating costs. Hydrographs are provided in Figures 5 through 10 for each SVWD production well to document the historical changes of groundwater levels relative to the well screen intervals during both dynamic and static conditions. The results of this analysis show the following for 2013:

- SVWD #3B: both the dynamic and static water levels were above the top of the upper well screen (Figure 5).
- SVWD #7A, #10A, #11A, and #11B: the dynamic water levels were below the top of the upper well screen and static water levels for these wells were above the top of the upper well screen (Figure 6, 8, 9 and 10).
- SVWD #9: both the static and dynamic water levels were below the top of the upper well screen (Figure 7).

To assess the potential for well efficiency problems, a hydraulic analysis may be carried out that compares the difference between static and dynamic water levels (drawdown) to historic conditions. If the well efficiency declines over time, as manifested by increasing differences between static and dynamic water levels, this could indicate that the well is in need of maintenance.

4.2 Groundwater Levels in Monitor Wells

Electronic data transducers were installed in five monitoring wells for collecting continuous groundwater level data in the Scotts Valley area. Figure 11 shows the groundwater elevation data from the SVWD #15, TW-18, TW-19, and the Canham and Stonewood wells. Data were collected continuously at 5 to 15 minute intervals over the 2013 calendar year. The data shown were corrected for variations in barometric pressure per the manufacturer’s specifications.

Of the five wells, SVWD #15 clearly shows the greatest variability because it is heavily affected by pumping at both SVWD #3B and SVWD #7A, located about 50 and 1,500 feet away from SVWD #15, respectively. The groundwater elevation data show about a 100-foot decline when SVWD #3B is turned on, and about a 10-foot decline when SVWD #7A is turned on.
The other four wells (Figure 11) exhibit groundwater elevation changes over the 2013 calendar year ranging from just over one foot at the Stonewood Well to about 14 feet at the Canham Well. These data show that no large-scale changes to groundwater levels were experienced during the extremely dry year of 2013. This may indicate that groundwater levels in the Basin are not very sensitive to short-term climatic variations.

Figure 11 is provided simply to demonstrate that the data were collected. A brief summary description of the data collected in 2013 is provided below. More detailed evaluation of this transducer data will be ongoing. The data collected by the transducers provide a key data set for evaluating long-term aquifer responses to pumping and recharge that will be included in future reports. It is recommended that additional transducers be obtained over the next few years to develop a more cost-effective method to collect detailed monitoring data for the Basin that can be used for groundwater management support.

4.3 Aquifer Conditions

The Santa Margarita Groundwater Basin is geologically complex. Groundwater levels in the Scotts Valley area have declined significantly (by over 200 ft in some areas) over the past 25 years. Groundwater elevation maps for the Santa Margarita, Lompico, and Butano will be produced in the 2014 Annual Report, since the construction of these maps requires additional data compilation of environmental remediation sites and other regional water purveyors. For this Annual Report, the aquifer conditions will be assessed based on the District’s groundwater elevation data.

4.3.1 Santa Margarita Aquifer

TW-18 is screened in the Santa Margarita Sandstone. This well exhibited only about a foot of change in groundwater elevation over the course of the 2013 calendar year (Figure 11). In general, the groundwater elevation declines slightly over the course of the year. This may either be due to pumping in the Santa Margarita Sandstone or to the very dry conditions of the year, which would have led to limited recharge to the aquifer. The Santa Margarita is the shallowest aquifer and would be most impacted by the drought conditions. A drop of only one foot over the course of the extremely dry year of 2013 indicates some level of resiliency of the Santa Margarita Aquifer to sustain groundwater levels in periods of reduced recharge.

4.3.2 Monterey Aquifer

As noted before, the geologic interpretation of SVWD #9 is that it is screened completely within the Monterey. SVWD #9 experienced over 200 feet of water level decline during the 1980’s and early 1990’s that diminished its water supply potential (Figure 7). Groundwater levels in SVWD #9 have risen slowly since WY2006, but are still about 150 feet below historical levels prior to 1980.

The historic groundwater trend in SVWD #9 followed a trend similar to that observed in the Lompico wells (see below). The interpretation is that in the 1980’s when groundwater levels in the Lompico were higher, it was able to recharge the sand layers in the lower Monterey where SVWD #9 was completed. After the Lompico groundwater levels declined, this recharge was greatly diminished such that SVWD #9 was no longer able to sustain its earlier pumping rates. A
more thorough discussion of the geologic interpretation will be provided in the Groundwater Model Report due in 2014, which will also be summarized in the 2014 Annual Report.

4.3.3 Lompico Aquifer

Most of the groundwater pumping in the Scotts Valley area is from the Lompico (approximately 65% of SVWD’s groundwater production in WY2013). Groundwater levels in the Lompico have declined by 150 to 250 feet relative to pre-pumping groundwater levels.

The recent data from SVWD #10A, #11A and #11B (Figure 8, 9 and 10) indicate that these wells are able to sustain current pumping rates without experiencing the large drawdowns that were observed from WY1983 through WY1993. It is interpreted that groundwater from other portions of the Basin is now flowing into this area to help sustain these levels. However, groundwater levels are not recovering in response to a decline in groundwater pumping in the Lompico. Therefore, it is recommended that SVWD look for opportunities to continue to shift pumping away from the Lompico in the future.

TW-19 is screened in the Lompico Formation and is located about half a mile west of SVWD #3B and #7A. This well exhibited a total range in measured groundwater elevations of about seven feet over the 2013 calendar year (Figure 11). The variability in groundwater levels is considered to result from changes in pumping in the Lompico Formation, with the lowest observed groundwater elevations occurring in the late summer, at the end of the season of greatest groundwater production.

4.3.4 Butano Aquifer

The Butano is also a significant groundwater source for SVWD. SVWD #3B and #7A draw primarily from the Butano, and in WY2013 made up approximately 33% of SVWD’s total groundwater production. During the first few years of pumping from this aquifer, from WY1993 to WY1995, groundwater levels in SVWD #7A declined nearly 200 feet relative to pre-pumping levels (Figure 6). However, since SVWD #7A is completed in both the Lompico and Butano, it is unclear whether this drop in groundwater levels is reflective of conditions in the Butano or the observed decreases in the Lompico. Since WY1996, static groundwater levels at SVWD #3B and #7A have fluctuated seasonally within an elevation range of 200 to 300 feet above mean sea level (amsl), but have generally remained relatively stable from year to year.

Groundwater pumping from the Butano has declined from over 700 AFY from WY2002 through WY2007 to an estimated 515 AFY in WY2012. Groundwater levels have increased by over 50 feet in SVWD #7A and about 40 feet in SVWD #3B since pumping began to decline in WY2007 (Figures 5 and 6). These trends in groundwater levels suggest that the Butano is a large aquifer system that is actively recharged, allowing water levels to recover each year in spite of the high volume of groundwater produced by these wells. This is in contrast to the Lompico, which is slow to recover.

Groundwater levels were monitored in the two new Butano wells. Groundwater levels in the Canham Well provide a reliable groundwater elevation for developing a regional groundwater elevation map, but do not show a response to pumping from SVWD #3B and #7A due to the distance. The Stonewood Well, also completed in the Butano Formation and located about two
miles north of SVWD #3B and #7A, shows only about one foot of variation over the course of the 2013 calendar year (Figure 11). The data indicate a slow rise of about a foot over the first three months of the year, followed by a slow decline of about half a foot over the rest of the year.
References


Figures
Legend

- GWMP Groundwater Well Location
- SVWD Production Well Location
- State Highways
- Major Roads
- Streets
- Streams
- Scotts Valley Water District
- Quarry Location

Note:
GWMP - Groundwater Monitoring Program

Location of Key Wells in Scotts Valley Water District

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2013 Annual Report
Scotts Valley Water District

K/J 1468003’00
June 2014
Figure 1
Scotts Valley Historical Precipitation

- Annual Precipitation (El Pueblo Yard)
- Average Annual Precipitation

Average Annual Precipitation = 42.2 inches

Water Year

Annual Precipitation (inches)
SVWD Service Connections vs. Groundwater Production

- **SVWD GW Production**
- **Number of Connections**

Water Year:
- 1976
- 1978
- 1980
- 1982
- 1984
- 1986
- 1988
- 1990
- 1992
- 1994
- 1996
- 1998
- 2000
- 2002
- 2004
- 2006
- 2008
- 2010
- 2012

Groundwater Production (Acre-feet):
- 0
- 500
- 1000
- 1500
- 2000
- 2500
- 3000
- 3500
- 4000

SVWD Service Connections:
- 0
- 500
- 1000
- 1500
- 2000
- 2500
- 3000
- 3500
- 4000

Figure 3

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Annual SVWD Groundwater Production

1468003*00
June 2014
Figure 3
Scotts Valley Recycled Water Usage

- Annual Recycled Water Usage
- Number of Recycled Water Customers

Water Year

- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013

Annual Recycled Water Production (Acre-feet)

Number of Sites Served

June 2014
SVWD Well #3B - Comparison of Water Levels and Screened Interval

Groundwater Elevation (feet msi)

Measurement Date

Jan-94 Jan-96 Jan-98 Jan-00 Jan-02 Jan-04 Jan-06 Jan-08 Jan-10 Jan-12 Jan-14

Static
Pumping
Screened Interval

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SVWD Well #3B Groundwater Elevations

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June 2014
Figure 5
SVWD Well #7A - Comparison of Water Levels and Screened Interval

Groundwater Elevation (feet msl)

Measurement Date

Jan-92  Jan-94  Jan-96  Jan-98  Jan-00  Jan-02  Jan-04  Jan-06  Jan-08  Jan-10  Jan-12  Jan-14

Static
Pumping
Screened Interval

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SVWD Well #7A Groundwater Elevations

1468003™00
June 2014
Figure 6
SVWD Well #10A - Comparison of Water Levels and Screened Interval

Groundwater Elevation (feet msl)

Measurement Date

Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12
Jul-12
Jan-13
Jul-13
Jan-14

Static
Pumping
Screened Interval

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SVWD Well #10A Groundwater Elevations

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Figure 8
Groundwater Elevations for Continuously Monitored Wells for 2013

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Groundwater Level Data from Continuously Monitored Wells

1468003*00
June 2014
Figure 11