Santa Clara Valley Water District
Large Landscape Program
2017 Annual Report

Santa Clara Valley Water District

Participating Retail Agencies:
Cities of Gilroy, Morgan Hill, Mountain View, Palo Alto, Santa Clara & Sunnyvale

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Waterfluence

Summary

The Santa Clara Valley Water District (District) in California contracts with Waterfluence to provide program services for improving irrigation efficiency at large commercial and public landscape sites. In 2017, six retail agencies within the District participated in this program including the cities of Gilroy, Morgan Hill, Mountain View, Palo Alto, Santa Clara, and Sunnyvale. In total, these cities include about 26% of the District's service population.

This report summarizes the program features, characteristics of participating sites, and customer engagement. It also identifies ways to focus and improve the program going forward. The San Jose Municipal Water System and San Jose Water Company joined the program in 2018 and will be included in the 2018 report.

- **Site Characteristics**. In 2017, the District had 1,305 sites irrigating 1,752 acres of landscape in the program. The average depth of water applied over all landscape area was 3.4 feet totaling 5,982 acre feet or about 2% of total District water use.
- **Customer Engagement**. In 2017, 69% of sites actively viewed information online via the Waterfluence website.
- **Landscape Field Surveys**. In 2017, we conducted 29 landscape field surveys at targeted sites agreeing to have our irrigation expert gather in-depth diagnostics and provide recommendations to improve irrigation efficiency. Over the last four years we conducted 84 field surveys.
- **Irrigation Efficiency Opportunities.** Significant reductions in overwatering can still be made with commercial sites, sites with less than 1 acre of landscaping, sites planted predominately with shrubs, and sites not including their landscape contractor as an online viewer. Overwatering by more than 2 feet occurred at 38% of sites in 2017. Eliminating 2017 overwatering over all sites would save 2,240 acre feet.
- **Irrigation Efficiency Trends**. Overwatering dropped significantly after 2013, by over 50% during the 2015 and 2016 drought years. Overwatering rebounded upward in 2017 but is still 35% below 2013 levels.

Program Description

Waterfluence partners with urban water agencies to improve irrigation efficiency at large commercial and public landscape sites using an online platform. The platform currently covers about 10% of California's population and helps:

- **Monitor.** For each site, we chart how actual water use compares to a budget benchmark based on site-specific characteristics and real-time weather. Regular updates help people track progress and receive feedback on their actions. Calculations can be difficult for customers and landscape managers to make, and so we assist. Our metrics are irrigation-focused and interactive.

- **Recommend.** Beyond identifying potential irrigation problems, we use our irrigation expertise to recommend solutions. Our internal algorithms continually analyze water use at each site to identify leaks, seasonal misapplications, and poor sprinkler performance. For targeted sites accepting additional help, our irrigation experts conduct on-site landscape field surveys to generate detailed diagnostics. When relevant, we encourage tapping water agency financial rebates to offset improvement costs.

- **Connect.** Stakeholders at commercial and public irrigation sites - water bill customers, property managers, HOA board members, maintenance staff, and landscape contractors - often oversee multiple sites in multiple communities. Our platform provides a centralized place to help stakeholders better understand, prioritize, communicate, and act on solutions toward the non-controversial goal of improving irrigation efficiency across all their sites.

Site Characteristics

In 2017 the District had 1,305 sites irrigating 1,752 acres of landscape in the program. Sites have progressively entered the program over time; some of Mountain View's sites started as early as 2011 while Morgan Hill sites most recently started June 2016. Although the average depth of water applied over all irrigated landscape in 2017 was 3.4 feet, application rates varied widely with site type and size, among other factors. We segment sites into commercial and public categories because of fundamental differences in how irrigation is managed. Commercial sites, such as HOAs and offices, account for 87% of sites and 77% of water use and are often managed by landscape contractors. Public customers, primarily parks and schools, account for the rest and are often managed by in-house staff. Across all sites, 49% of irrigated area is planted in turf grass and the remainder is in shrubs, trees, groundcovers, and pools/fountains. Public sites tend to have a large percentage of irrigated area in turf from large playfields and parks.

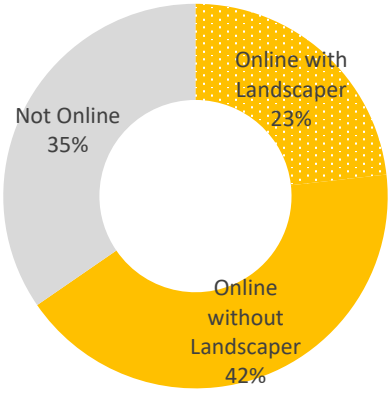
Description	Commercial	Public	Total
Number of Sites	1,140	165	1,305
< 1 Acre	62%	4%	66%
1-3 Acres	20%	3%	23%
>3 Acres	5%	6%	11%
Irrigated Acres	1,165	587	1,752
Average Acres per Site	1.0	3.6	1.3
Turf %	35%	78%	49%
Shrub %	65%	22%	51%
2017 Water Use CCF	1,994,906	611,115	2,606,021
2017 Water Use Acre Feet	4,579	1,403	5,982
2017 Water Use %	77%	23%	100%
2017 Depth Applied FT	3.9	2.4	3.4

Customer Engagement

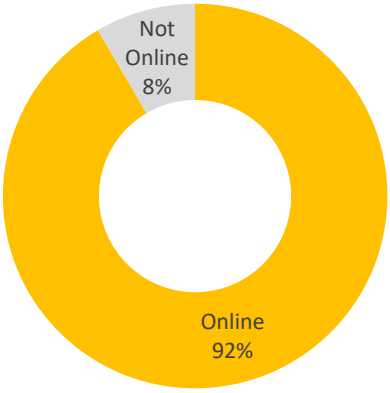
Waterfluence distributes monthly landscape reports to customers by mail or by online access. The online content has more depth and allows multiple stakeholders, such as HOA board members, park staff, and landscape contractors, to view site information. In 2017, 69% of sites were viewed online by at least one contact.

Public sites were highly engaged with 92% of their sites being viewed online. Commercial sites, in contrast, had 65% of sites viewed online. An important distinction with commercial sites is that their irrigation is frequently managed by independent landscape contractors. We find our program works best when landscapers are connected to the platform. In 2017, 23% of commercial sites were actively being viewed by a landscaper online. To improve engagement in the future, Waterfluence is looking into ways to better leverage other District water efficiency programs and communication channels, esecially with the San Jose Municipal Water System and San Jose Water Company participation increasing District program coverage to over 80% of the service area population. To more effectively meet needs of landscape contractors, Waterfluence is also upgrading its site mapping capabilities to include meter and controller locations.

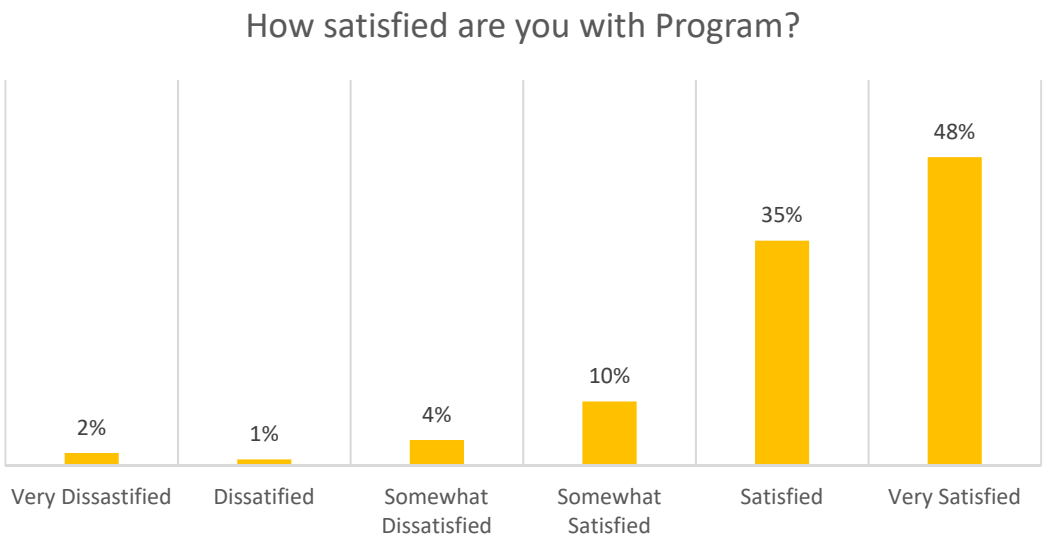
Online Engagement: Commercial



Online Engagement: Public



In December 2016, we surveyed all of our online viewers and 83% reported to be satisfied or very satisfied with the program. Satisfied contacts typically described the reports as an easy tool for tracking water use and potential problems. Dissatisfied contacts usually desired more timely reporting, clarification of report information, or adjustments to their water budgets. The next customer satisfaction survey is scheduled for December 2018.



Landscape Field Surveys

The District targets on-site landscape field surveys to sites in most need of additional help based on low performance metrics and high savings potential. For sites pre-approved by the District, the main contact at each site must accept the survey online with its conditions including granting the District permission to view site-specific information. The survey is free to customers and consists of an irrigation expert visiting the site to gather in-depth diagnostics and provide recommendations to improve efficiency. Field surveys compliment water use monitoring by troubleshooting complicated irrigation issues and improving the accuracy of water budget parameters with "boots-on-the-ground" observations. Between 2014 and 2017, 84 sites in the program (6%) accepted and received field surveys. All but one of the surveys have been at commercial sites, as few public sites qualify because of already high irrigation performance.

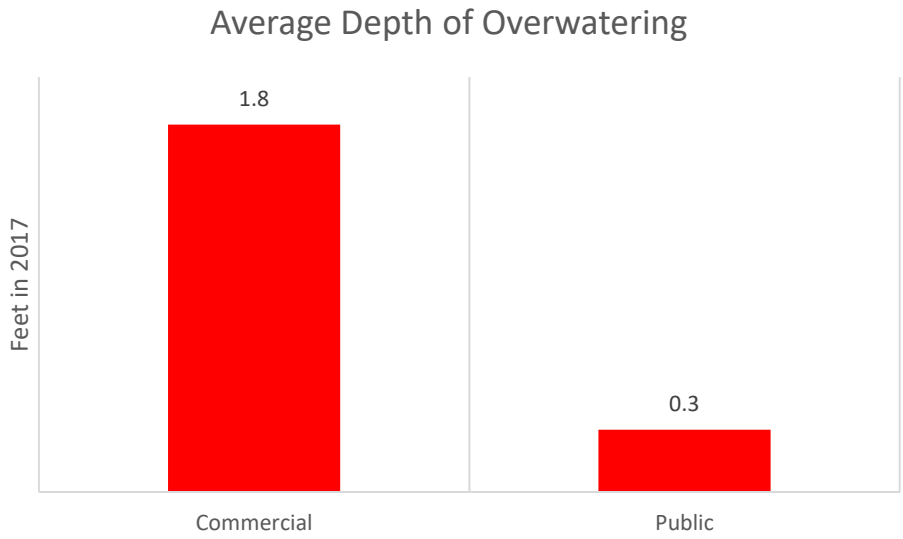
Year	Sites	Acres
2014	5	9.9
2015	22	55.9
2016	28	72.0
2017	29	78.0
Total	84	215.8

Irrigation Efficiency Opportunities

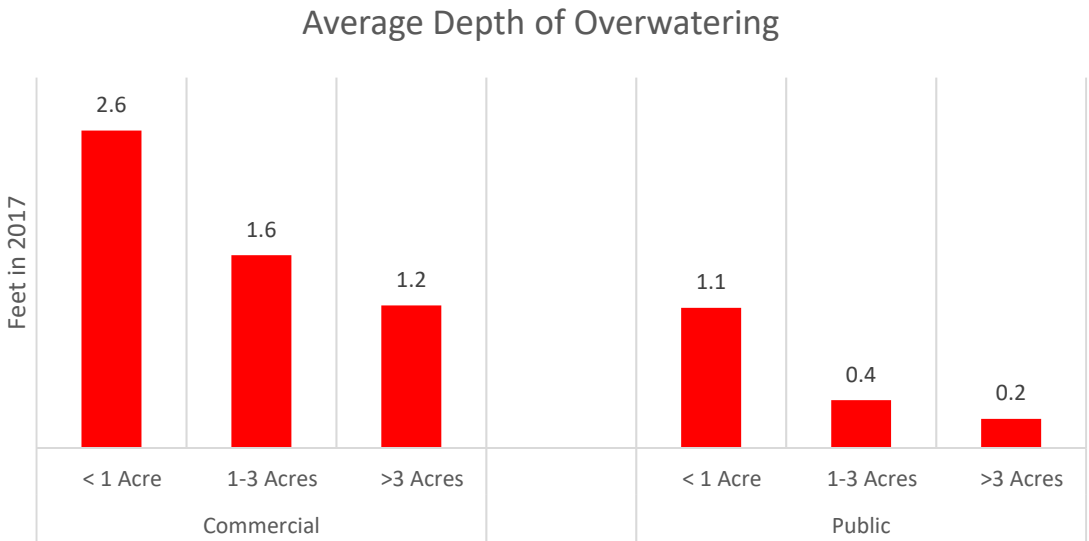
The program's key performance metric is minimizing the depth of overwatering—defined as the volume of water used above our calculated water budget divided by irrigated area. This metric is weather-normalized enabling year-to-year comparisons.

To guide future efforts to improve the program, we analyzed 2017 overwatering with respect to five elements: customer type, site size, plant type, engagement mode, and frequency of site overwatering.

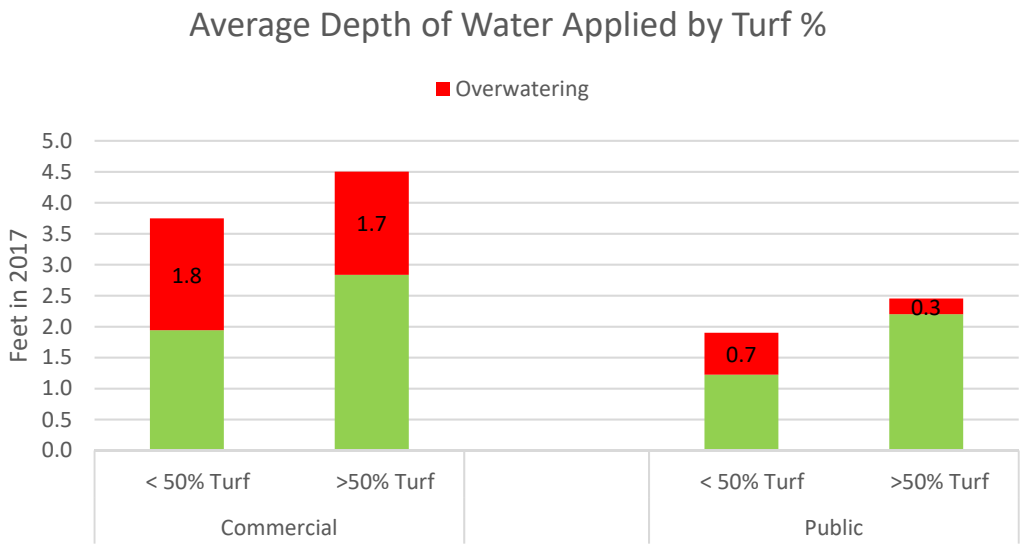
Customer Type. Commercial sites have made great progress but still have significant potential for improvement. Public sites are closer to optimal levels. Additional engagement efforts targeted toward commercial site managers can help close this gap, such as providing improved mapping features to help with irrigation management.



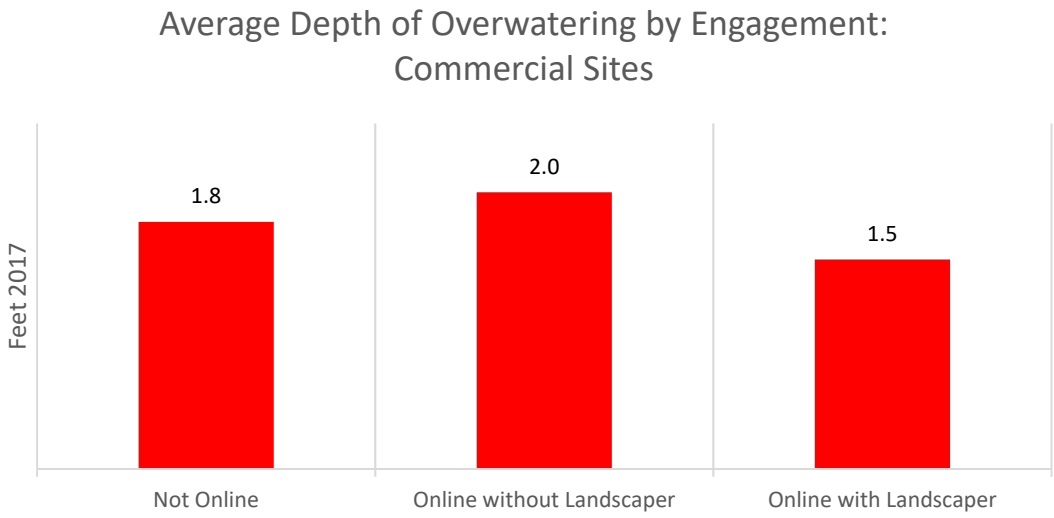
Site Size. Larger landscapes tend to be more efficiently irrigated. Although smaller sites use less water by volume, their potential to reduce overwatering on a percentage basis is greater. Small sites with less than one acre of landscape also make up two-thirds of total sites in the program.



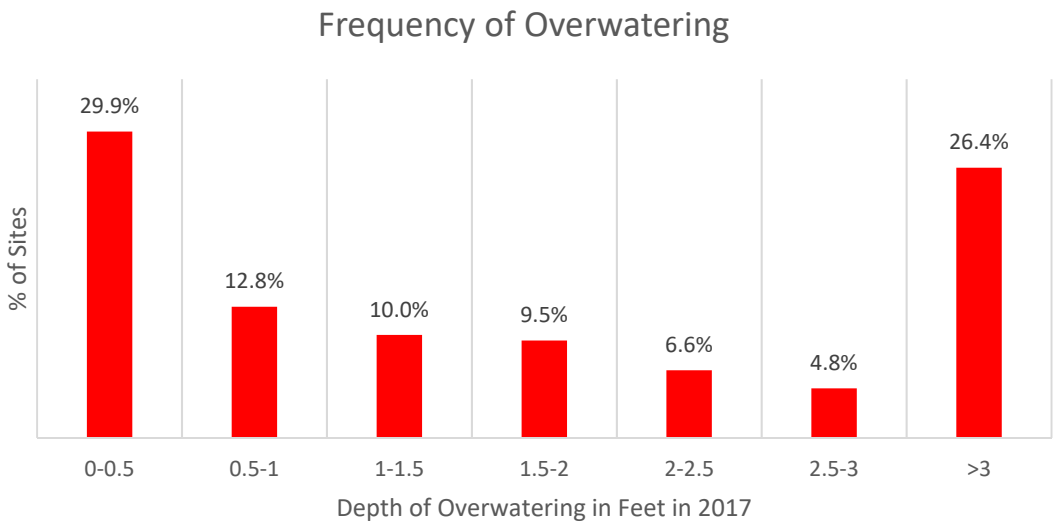
Plant Type. Within both the commercial and public groups, we find modest differences in depth of water applied between sites predominantly planted with turf grass and sites predominantly planted with shrubs, trees and groundcovers. Theoretically turf's water requirements are significantly higher. Shrubs have different irrigation system and scheduling considerations, and our data suggest they have significant potential for future efficiency improvements.



Engagement Mode. For commercial sites, those opting to include their landscape contractor as a viewer overwater by 25% less than sites not listing their landscaper. Landscape contractors frequently manage water use at commercial sites and enhanced feedback allows them to better optimize irrigation performance. There is little difference in overwatering between sites getting their reports by mail and those online without a landscaper. We conclude adding relevant landscape contractors as viewers to our platform is the single most important factor to its success.



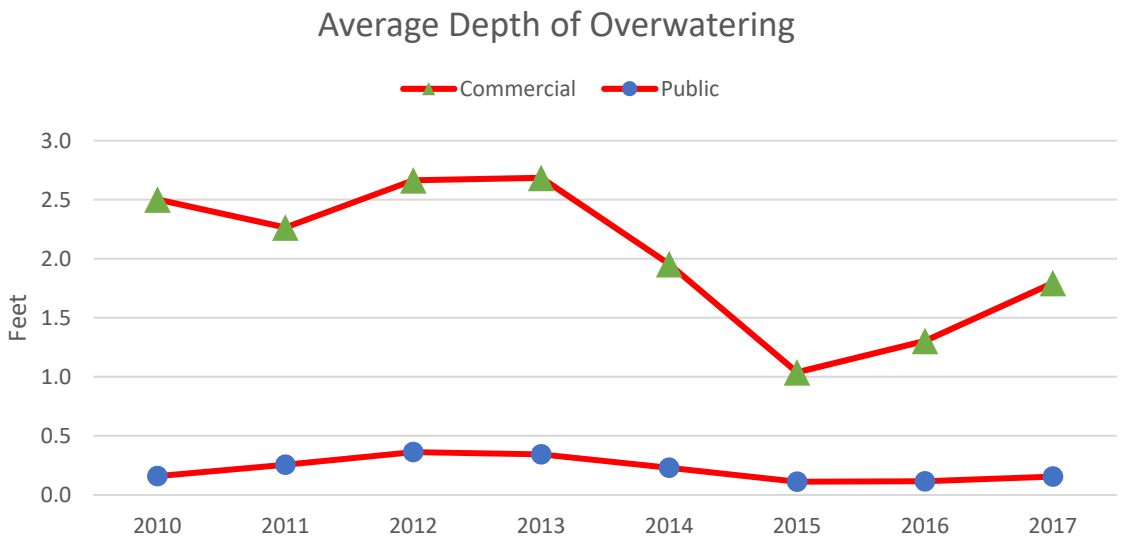
Frequency of Site Overwatering. A benefit of this program is that problem sites can be readily identified with respect to irrigation efficiency. Overwatering by more than 2 feet in 2017 occurred at 38% of sites, predominately small and commercial. These sites could be targeted for verification of water budget assumptions, landscape field surveys, program engagement, and financial incentives, among other tactics to improve performance.



Irrigation Efficiency Trends

For program sites, overwatering dropped significantly after 2013. Although commercial sites overwater more than public sites, both site types have made improvements. Overwatering was lowest during 2015 and 2016, years of heightened awareness because of statewide drought and local efforts to curtail water use. Overwatering increased in 2017 after drought related efforts ended, but is still 35% below 2013

levels. The rebound in overwatering undoubtedly would be higher if not for the continued awareness and investments by the District to improve irrigation efficiency.



The findings of 2017 support continued focus to reduce overwatering by targeting commercial properties, smaller landscapes, shrub-dominated landscapes, and sites without a landscaper actively viewing site performance online. And while many sites are doing an excellent job irrigating to plant needs, we estimate 38% of sites are overwatering by more than 2 feet per year.