

Valley Water

2019 Annual Report

Large Landscape Program



Valley Water

Clean Water • Healthy Environment • Flood Protection

Participating Retail Agencies:

City of Gilroy

City of Milpitas

City of Morgan Hill

City of Mountain View

City of Palo Alto

City of Santa Clara

City of Sunnyvale

San José Municipal Water System

San Jose Water Company

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Waterfluence LLC

PO Box 561 Menlo Park CA 94026

www.waterfluence.com

(800) 800-9519



Summary

Since 2014, Valley Water (formerly known as the Santa Clara Valley Water District) in California has contracted with Waterfluence to provide program services to improve irrigation efficiency at large commercial and public landscape sites. In 2019, nine retail agencies within Valley Water's service area participated in this program including the cities of Gilroy, Milpitas, Morgan Hill, Mountain View, Palo Alto, Santa Clara, Sunnyvale, and the San José Municipal Water System and San Jose Water Company. These retailers serve 91% of Valley Water's 1.8 million service population.

This report summarizes the program features, results, opportunities, and multi-year trends. Key points include:

- ▶ **Site Characteristics.** In 2019, Valley Water included 2,823 sites irrigating 5,062 acres of landscape in the program. The average depth of water applied over all landscape area was 3.3 feet totaling 16,818 acre feet or about 6% of total use of Valley Water sources by retailers.
- ▶ **Stakeholder Engagement.** In 2019, stakeholders at 55% of sites actively viewed program information via the Waterfluence website; sites not online get mailed paper reports. A survey of online stakeholders finds 79% to be satisfied or very satisfied with the program.
- ▶ **Landscape Field Surveys.** In 2019, we completed 41 landscape field surveys at targeted sites agreeing to have our irrigation expert gather in-depth diagnostics and provide recommendations to improve irrigation efficiency. Since 2014, we have conducted 162 field surveys. For sites using spray sprinklers, only 13% had heads in good mechanical condition operating at designed water pressures.
- ▶ **Irrigation Efficiency Opportunities.** Significant reductions in overwatering can still be made with commercial sites, especially those with less than 1 acre of landscaping, planted predominately with shrubs, and not including their landscape contractor as an online viewer. In 2019, overwatering totaled 5,720 acre feet or 34% of all water used at participating sites. Overwatering averaged 1.1 feet over all irrigated landscape, but was greater than 2 feet at 36% of sites.
- ▶ **Irrigation Efficiency Trends.** Overwatering dropped significantly after 2013, reaching a low point in 2015 during a statewide drought. Overwatering rebounded in subsequent years, but was lower in 2019 than 2018, and is still more than 20% below 2013 levels.

Program Description

Waterfluence partners with urban water agencies to improve irrigation efficiency at their large commercial and public landscape sites through monitoring, insights, and connection.

- ▶ **Monitoring.** For each site, we chart how actual water use compares to our budget benchmark based on site-specific characteristics and real-time weather. Regular updates help people receive feedback and track progress. These calculations can be difficult for site stakeholders to make, so we assist with our irrigation-focused and interactive metrics. Actual water use comes from monthly or bimonthly meter reads made for agency billing purposes; we also make use of hourly meter reads when advanced meter technology data are available. Our service includes mapping landscape areas; stakeholders can modify their maps online to improve water budget accuracy and to create controller maps to assist with irrigation operations.
- ▶ **Insights.** 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 possible leaks, poor scheduling, and ineffective irrigation equipment. For targeted sites accepting additional help, our irrigation experts conduct on-site landscape field surveys to generate detailed diagnostics. When relevant, we encourage stakeholders to tap water agency rebates to offset improvement costs.
- ▶ **Connection.** Our website provides a centralized location for stakeholders to better understand, prioritize, communicate, and act on solutions toward the non-controversial goal of improving irrigation efficiency and landscape appearance. Commercial and public irrigation sites frequently have multiple stakeholders such as property managers, property owners, HOA board members, in-house maintenance staff, and landscape contractors. Furthermore, these stakeholders are often associated with multiple sites in multiple communities. Our website has specialized customer relationship management (CRM) capabilities to enable stakeholders to securely access and interact with their portfolio of sites.

Site Characteristics

In 2019, Valley Water had 2,823 sites irrigating 5,062 acres of landscape in the program. Sites have progressively entered the program since 2014; most recently the City of Milpitas joined in 2019. Although the average depth of water applied over all irrigated landscape was 3.3 feet, application rates vary 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 83% of sites and 70% 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 their in-

house staff. Across all sites, 54% 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.

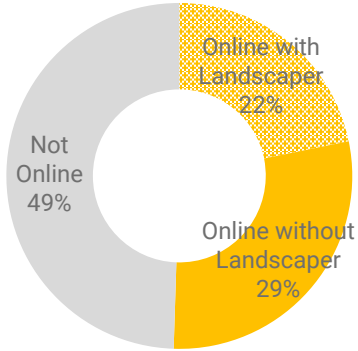
Description	Commercial	Public	Total
Number of Sites	2,346	477	2,823
<i>< 1 Acre</i>	62%	22%	55%
<i>1-3 Acres</i>	30%	32%	31%
<i>>3 Acres</i>	8%	46%	14%
Irrigated Acres	2,868	2,194	5,062
<i>Average Acres per Site</i>	1.2	4.6	1.8
<i>Turf %</i>	32%	84%	54%
<i>Shrub %</i>	68%	16%	46%
2019 Water Use CCF	5,110,319	2,216,030	7,326,349
2019 Water Use Acre Feet	11,731	5,087	16,818
2019 Water Use %	70%	30%	100%
2019 Depth Applied Feet	4.1	2.3	3.3

Customer Engagement

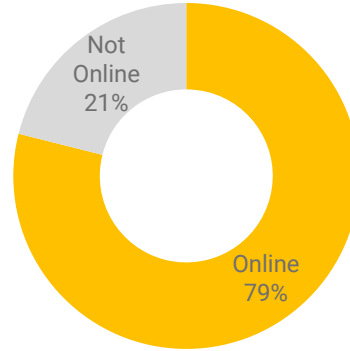
Waterfluence distributes monthly landscape reports to customers by mail or by online access to its website. The online content has more depth and allows multiple stakeholders, such as HOA board members, park staff, and landscape contractors, to view site information. In 2019, 55% of sites were viewed online by at least one stakeholder.

Public sites were highly engaged with 79% of their sites being viewed online. Commercial sites, in contrast, had 51% 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 as a stakeholder. In 2019, 22% of commercial sites were actively being viewed by a landscaper online. To improve landscape contractor engagement, Waterfluence recently upgraded its site mapping capabilities to facilitate creation of controller maps, an important component in irrigation management.

Online Engagement: Commercial

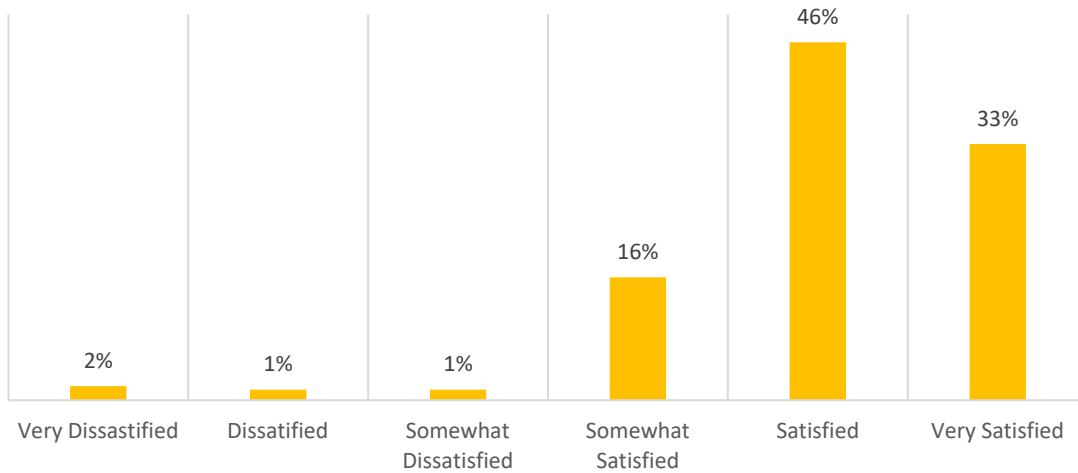


Online Engagement: Public



In December 2018, we surveyed our online users and 79% reported to be satisfied or very satisfied with the program. Satisfied users typically described the reports as an easy tool for tracking water use and potential problems. Dissatisfied users usually desired more timely reporting, clarification of report information, or adjustments to their water budgets.

How satisfied are you with Program?

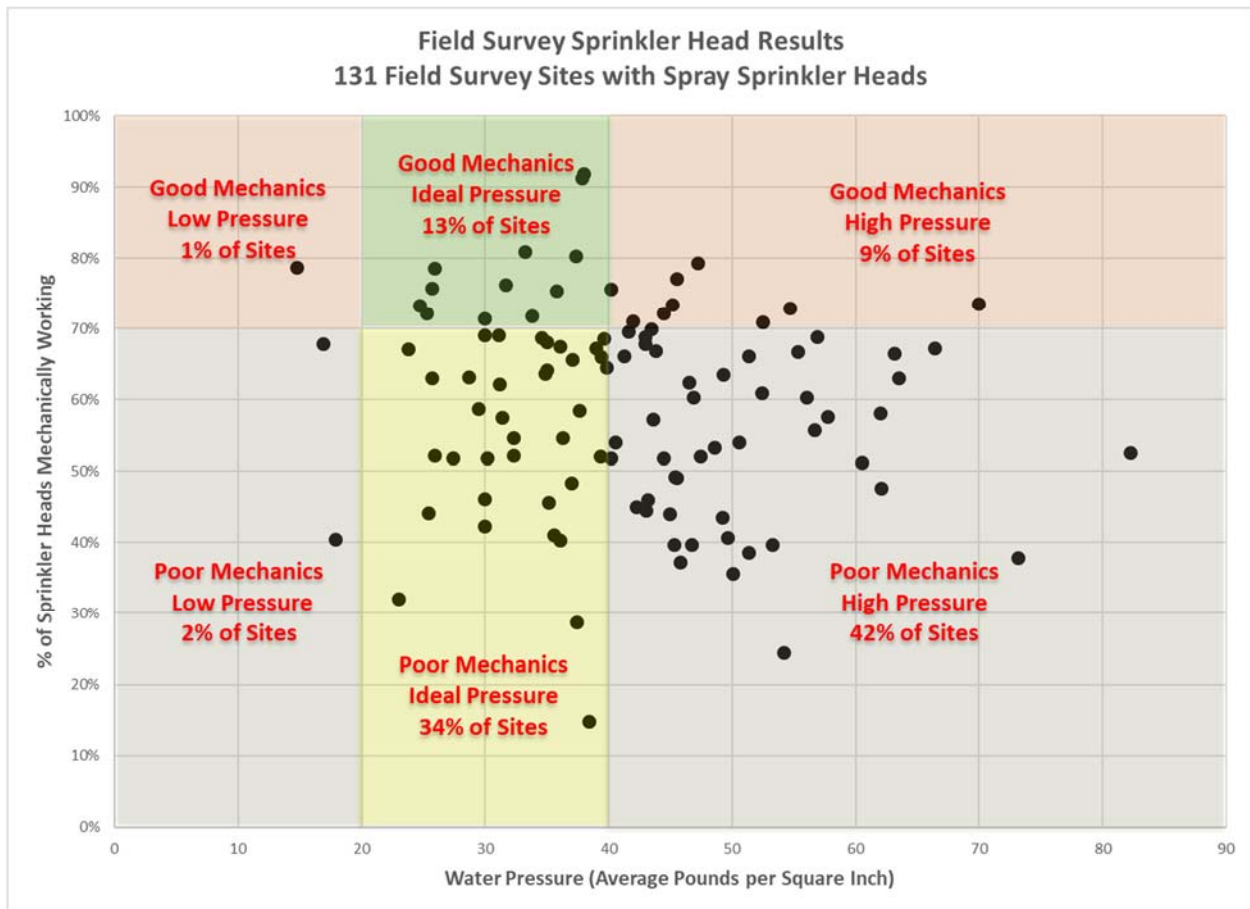


Landscape Field Surveys

Valley Water targets 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 Valley Water, the main stakeholder at each site must accept the survey online. The survey is free to sites and consists of an irrigation expert visiting the site to gather in-depth diagnostics and provide recommendations to improve efficiency. Field surveys complement water use monitoring by troubleshooting complicated irrigation issues and improving the accuracy of water budget inputs with “boots-on-the-ground” observations. Between 2014 and 2019, 162 sites received a field survey (6% of total sites). All but six of the surveys have been at commercial sites, as fewer public sites qualify because of low-savings potential.

Year	Surveys	Acres
2014	5	9.9
2015	22	55.9
2016	28	72.0
2017	29	78.0
2018	37	75.4
2019	41	260.6
Total	162	551.8

For 131 field survey sites having spray sprinkler heads, we measured both mechanical fitness and water pressure. Only 23% of sites had greater than 70% of their spray heads in good mechanical condition (delivering water to intended rootzones via non-leaking, properly-aligned spray bodies and nozzles). Only 47% of sites had average water pressures operating in their desired range (20 to 40 pounds per square inch). Only 13% of sites were both mechanical fit and operating at desired pressures; poor irrigation scheduling and/or inaccurate landscape area measurements caused these sites to be targeted for a field survey. Because field surveys are targeted toward low performing sites, these findings are not representative of all sites in the program.



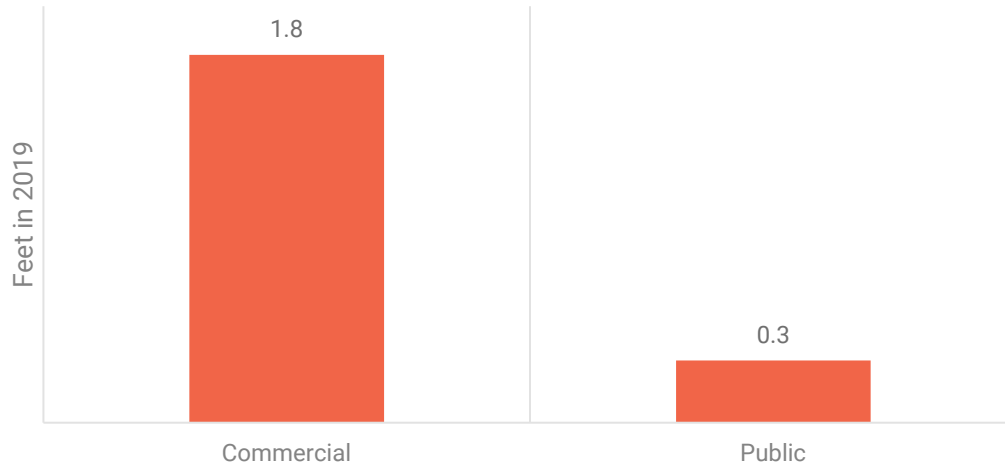
Irrigation Efficiency Opportunities

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. As a benchmark, overwatering averaged 1.1 feet over all irrigated landscape in 2019.

To guide future efforts to improve the program, we analyzed 2019 overwatering with respect to five elements: customer type, site size, plant type, engagement mode, and frequency of site overwatering.

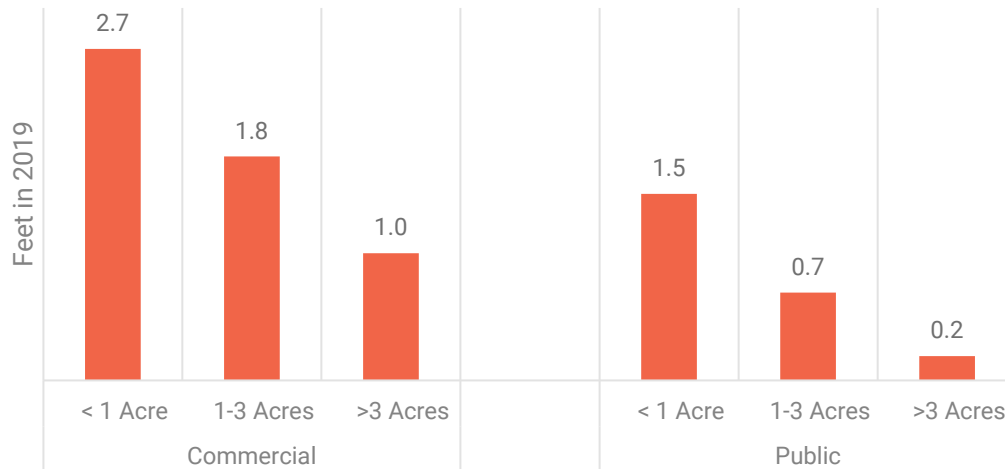
Customer Type. Commercial sites have made progress but still have significant potential for improvement. Public sites are operating closer to optimal levels. Additional engagement efforts targeted toward commercial stakeholders can help close this gap, such as improved customer relationship management and improved tools to create irrigation controller maps.

Average Depth of Overwatering



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 55% of total sites in the program.

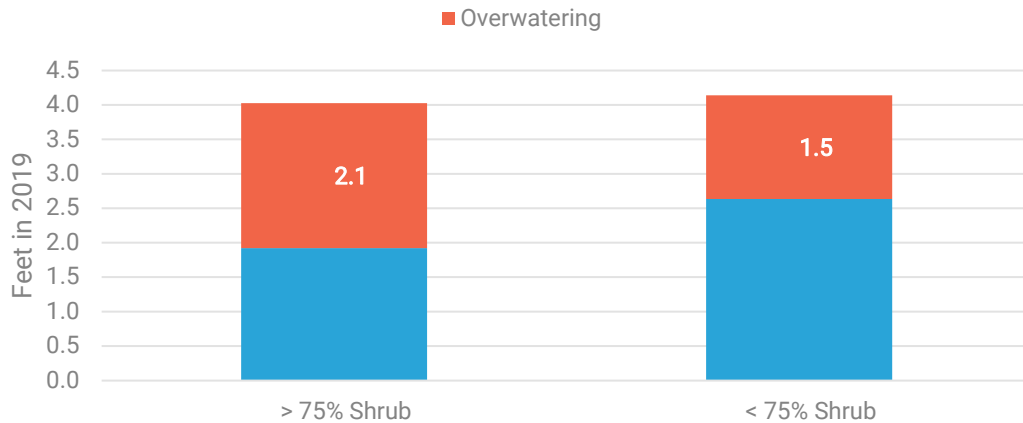
Average Depth of Overwatering



Plant Type. For commercial sites, we find the average depth of water applied is little impacted by the type of plants irrigated. About half of all sites are predominantly (greater than 75%) planted with shrubs, trees and groundcovers and applied 4.0 feet in 2019. Sites not predominately shrub (turf greater than 25%) applied 4.1 feet. This is a surprising result as theoretically shrub’s water requirements are significantly lower than turf. Shrubs have different irrigation system and scheduling considerations, and our data

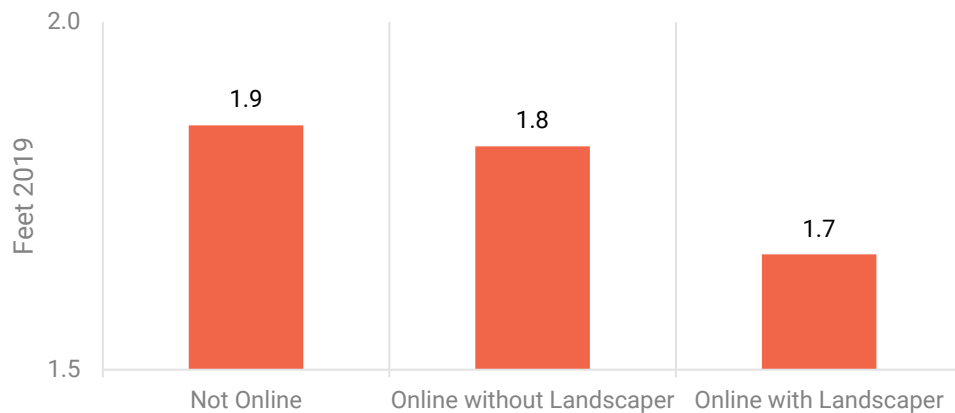
suggest they have significant potential for future efficiency improvements. We do not make a similar comparison with public sites because they are largely planted in turf.

Average Depth of Water Applied by Shrub % Commercial Sites



Engagement Mode. For commercial sites, those accessing the Waterfluence website overwater less than sites mailed paper reports. We find overwatering is 11% less when landscape contractors are included as stakeholders, relative to sites mailed reports.

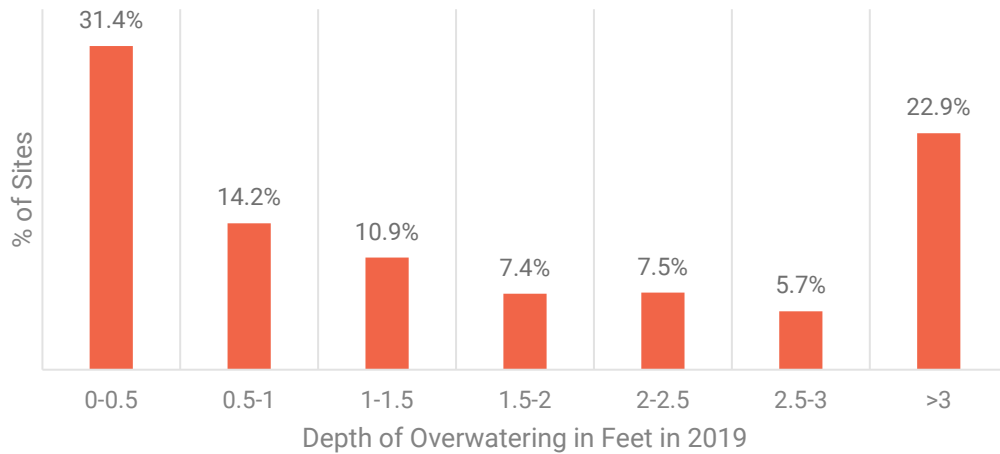
Average Depth of Overwatering by Engagement: Commercial Sites



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 occurred at 36% of sites, predominately small and commercial. These sites are targeted for verification of water budget

assumptions, landscape field surveys, program engagement, and financial incentives, among other tactics to improve performance.

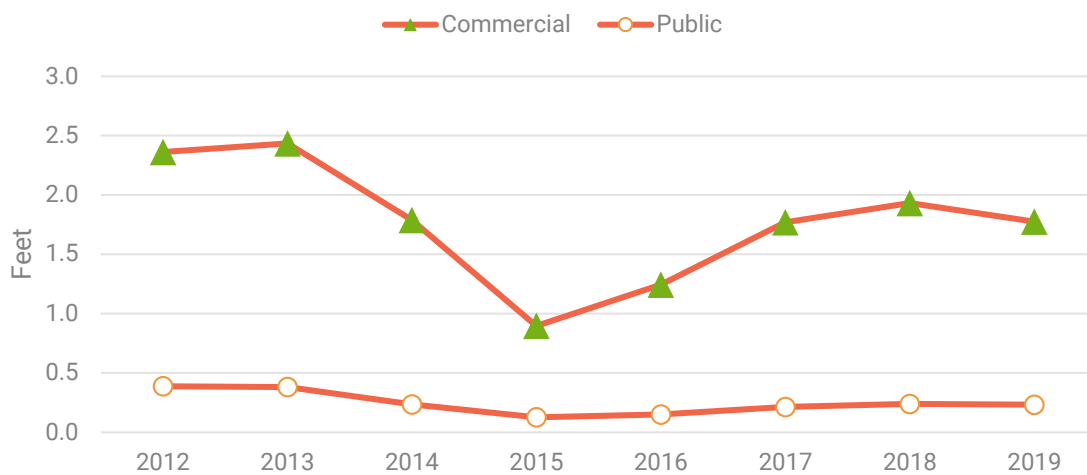
Frequency of Overwatering



Irrigation Efficiency Trends

Overwatering at both commercial and public sites trended lower after 2013, reaching a low point in 2015 during a statewide drought. Overwatering has rebounded since, but 2019 overwatering is 8% lower than 2018 and 31% lower than in 2013.

Average Depth of Overwatering



All retailers generally followed these overall trends between 2012 and 2019. Gilroy commercial and public sites have made the most improvement over this time period.

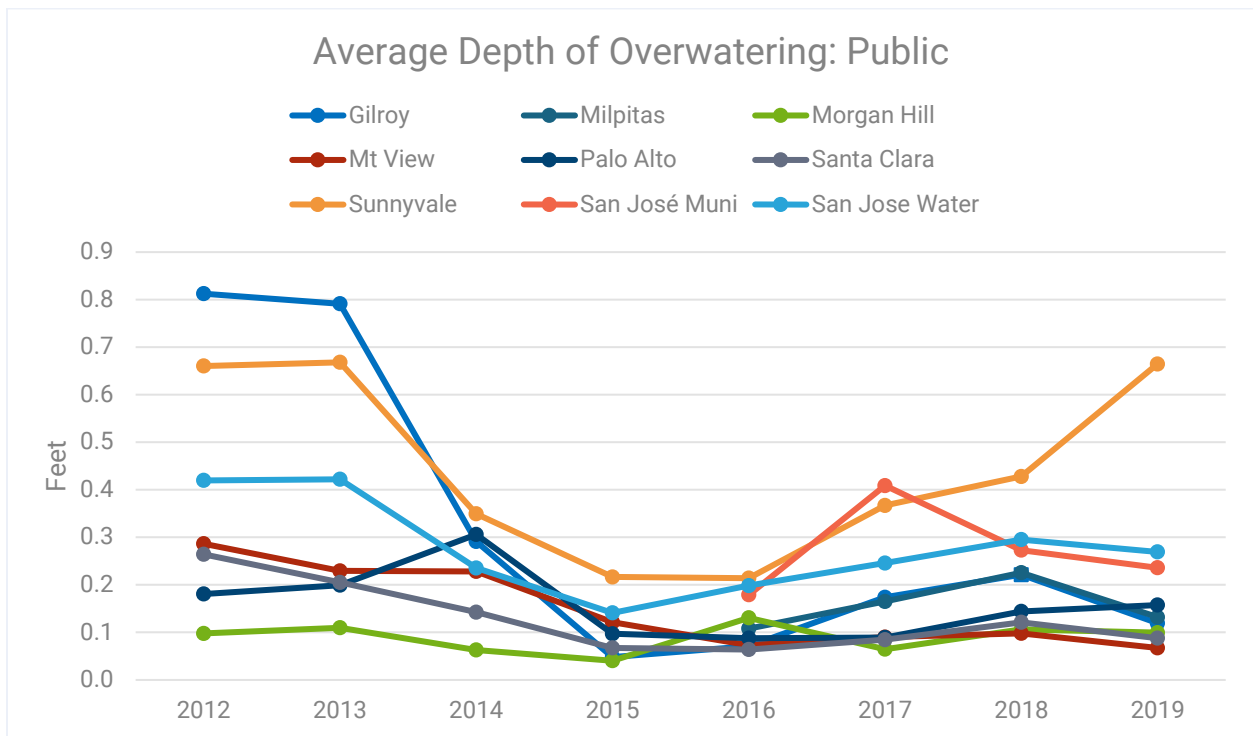
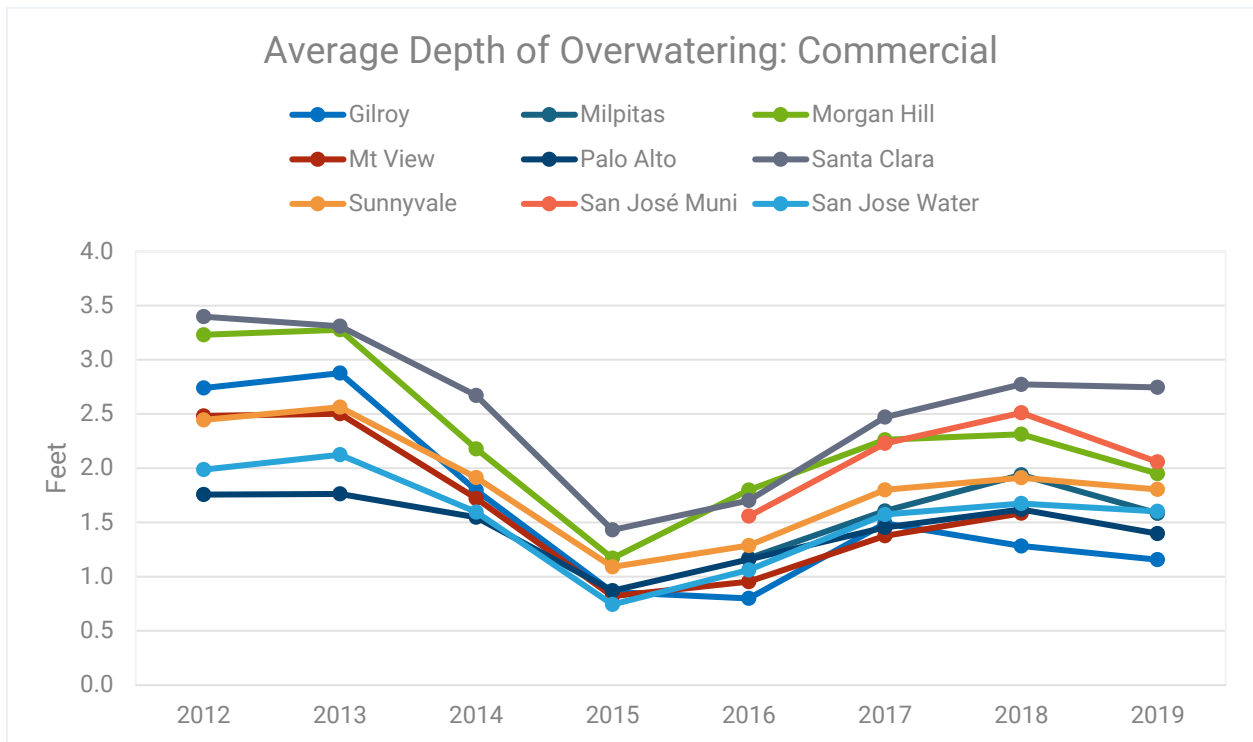


Exhibit A. Public Site Count and Irrigated Acres by Retailer

Agency	Type*	Site Count	Acres
Gilroy	Park	10	39
	School	7	40
Milpitas	Park	18	50
	School	13	57
Morgan Hill	School	12	42
Mt View	Park	47	117
	School	5	11
	Other	7	13
Palo Alto	Park	11	63
	School	7	14
	Other	2	1
San José Muni	Park	15	41
	School	17	73
	Other	5	167
San Jose Water	Park	92	288
	School	76	439
	Other	34	255
Santa Clara	Park	24	78
	School	14	50
	Other	12	124
Sunnyvale	Park	31	175
	School	16	53
	Other	2	3
Total		477	2,194

*Other type includes streetscapes, golf courses, and Caltrans.