



Tackling WaterSense® Outdoor Water Use

Andrea Schnitzer
ENERGY STAR®

Tara O'Hare
WaterSense

Justin Shelby
BrightView

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Tackling WaterSense



WaterSense and ENERGY STAR are hosting a joint webinar series throughout 2016 to help you tackle your facility's water use

| | |
|--|---------------------|
| <i>Tackling WaterSense – Sanitary Fixtures & Equipment</i> | January 28 |
| Tackling WaterSense – Outdoor Water Use | March 30 |
| Tackling WaterSense – Mechanical Systems | May 10 |
| Let's Go on an Energy and Water Treasure Hunt | July 12 |
| Tackling WaterSense – Commercial Kitchens | September 20 |



Agenda



- Introduction to WaterSense
- Landscape design and maintenance best practices
- Irrigation system savings opportunities
- Pools and spas
- Case study
- WaterSense resources

WaterSense Can Help



WaterSense is a voluntary program launched by EPA in 2006 that provides a simple way to identify water-efficient:

- Products
- Programs
- Practices
- Homes

Products are independently certified for water efficiency and performance



WaterSense Labeled Products



Flushing Urinals



Lavatory Faucets



Irrigation Controllers

More than 16,000 product models have earned the WaterSense label



Tank-Type Toilets



Showerheads

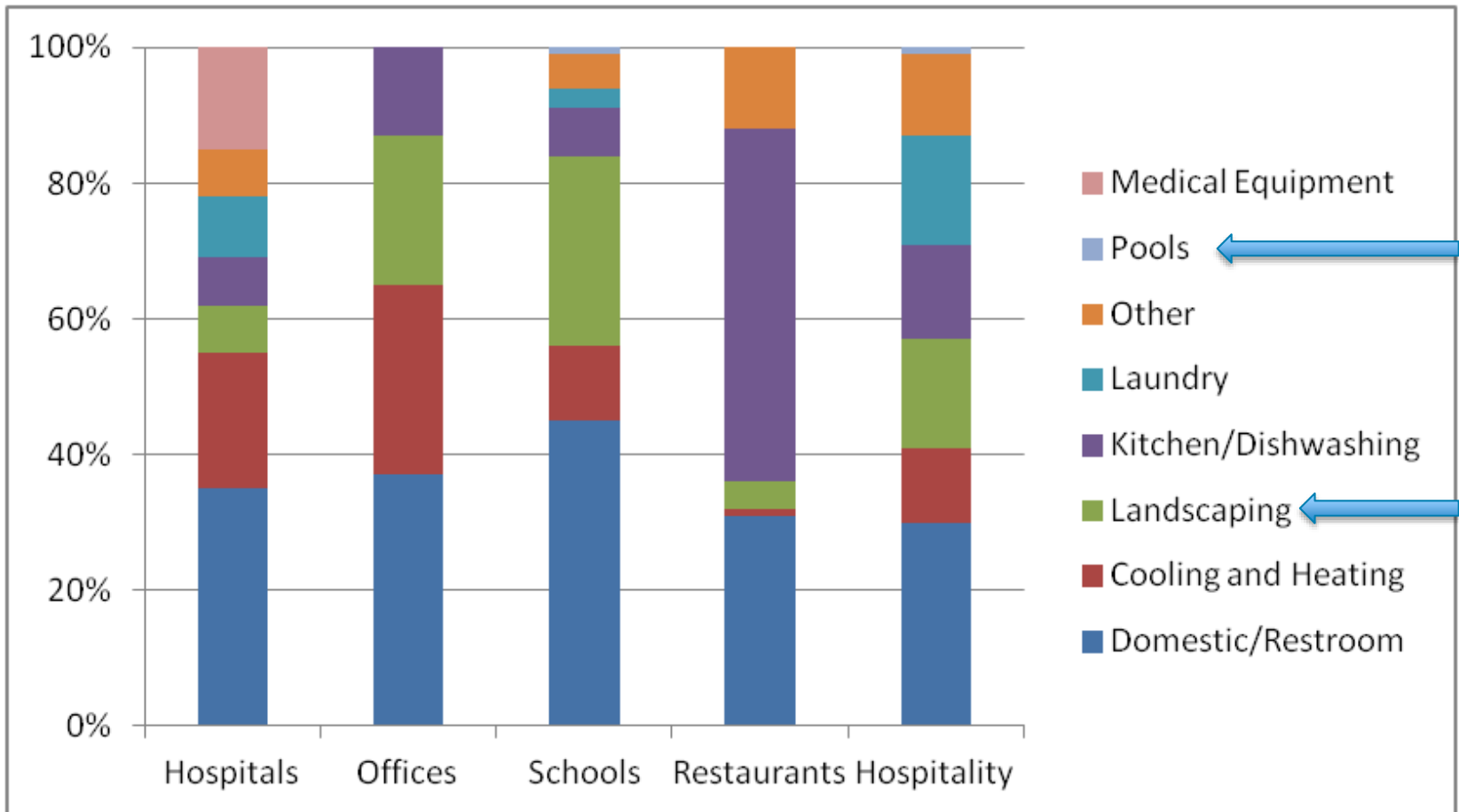


Pre-Rinse Spray Valves



New! Flushometer-Valve Toilets

Water Use Profiles of Commercial Facilities



Created by analyzing data from: New Mexico Office of the State Engineer, American Water Works Association (AWWA), AWWA Research Foundation, and East Bay Municipal Utility District

Why Look at Outdoor Water?



- Outdoor water use is a primary driver of “peak” use
 - Water providers must size their systems to meet the peak demand—capacity which is seldom used
 - This makes it an appealing target for jurisdictions looking to reduce their demand
 - Can be the first use to be restricted during droughts or other shortages
- Outdoor water use is visible and easy to police
 - It is easier to enforce outdoor watering restrictions than it is to regulate the interior of a building
- It can be more expensive
 - Higher water use, higher water rate tier
 - Protect your investment—proper maintenance of landscape and irrigation systems prevent plant loss

Just Add Water!



Include indoor and outdoor water usage in existing energy management efforts

Track water usage in ENERGY STAR Portfolio Manager[®]

Measure water use with properly installed meters and submeters

Conduct a facility water audit and include leak detection in regular assessments





Outdoor Water Metrics in Portfolio Manager



Outdoor Water Use (all water sources)—sum of all 4 sources

- **Municipally Supplied Potable Water:** From public water systems and classified for human consumption
- **Municipally Supplied Reclaimed Water:** Wastewater treatment plant effluent purchased from a public water system
- **Alternative Water Generated On Site:** Rainwater or stormwater harvested onsite, sump pump water harvesting, gray water, air-cooling condensate, reject water from water purification systems, water reclaimed onsite, or water from other reuse strategies
- **Other Water Sources:** From natural freshwater sources (including surface and groundwater systems such as onsite wells, lakes, streams, etc) that are not municipally supplied



How Is Water Used Outdoors?



Irrigation systems to supplement natural precipitation

Water features (e.g., fountains, ponds)

Pools and spas





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Factors Affecting Outdoor Water Use



Amount of water used outdoors is dictated by size and design of landscape, the need for supplemental irrigation, and management of pools and other systems

Facility type and use

- Athletic fields, outdoor pools and spas, vehicle washing

Climate

- Rainfall
- Evapotranspiration (ET)
- Drought status (check www.drought.gov)

Design

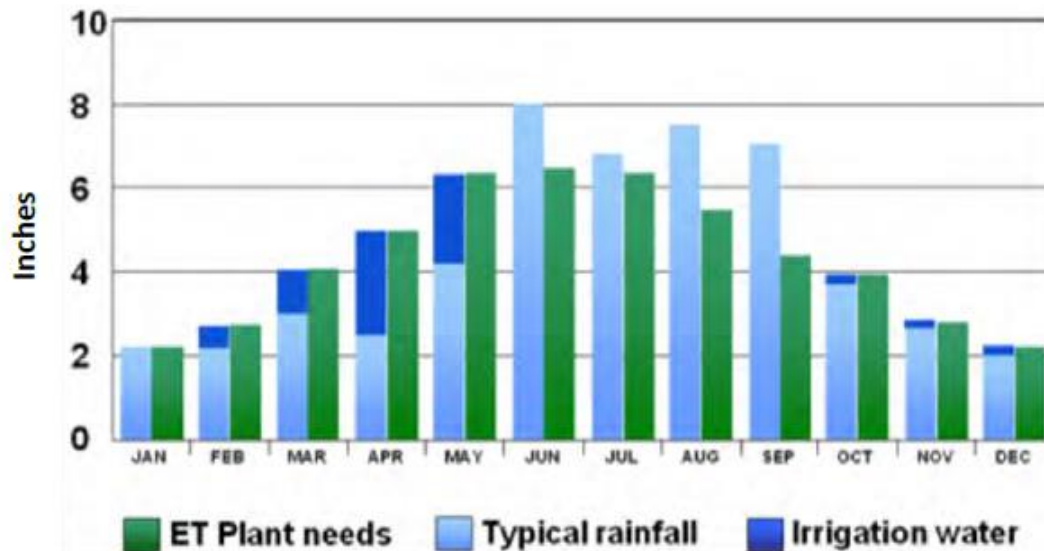
- Size of landscaped and irrigated areas
- Plant selection
- Microclimates on site

Balance of Plants, Rainfall, ET, and Irrigation



- Irrigation may be needed to provide adequate water for plants during periods of higher evapotranspiration
- Can minimize need for irrigation by selecting plants that have lower water needs
- Water budget data finder—for peak watering month, ET, and rainfall by zip code

https://www.epa.gov/watersense/new_homes/wb_data_finder.html



Monthly Evapotranspiration (ET) demand, rainfall and supplemental irrigation needs of a typical Florida lawn

Source: South Florida Water Management District, Water Efficiency Improvement Self-Assessment Guide for Commercial and Institutional Facility Managers. 2011



Landscape Planning

- Goal of a well-designed landscape is to minimize the need for supplemental water from an irrigation system
- What is the landscape used for?
 - Aesthetics: appearance, pleasant spaces for clients and employees, improved property value
 - Shading and climate mitigation
 - Recreation: athletic fields, high-foot traffic areas
 - Stormwater management: rain garden, bioswale, ecosystem benefits
 - Function: privacy screening, noise reduction, area definition
- Different plants and design strategies can minimize water needed to maintain landscapes for each purpose



Landscape Design



A well-designed, healthy, water-efficient landscape includes:

- Healthy soils to promote water infiltration and root growth
- Appropriate grading with gentle slopes
- Mulching of landscaped beds to keep soils cool and moist
- Drought-tolerant, native, or climate/regionally appropriate plant species
- Minimal turf area
- Hydrozoning





Landscaping: Operations and Maintenance (O&M)



Hire a landscape professional trained and certified in water-efficient or climate-appropriate landscaping

- Incorporate water efficiency goals and requirements into service and maintenance agreements

Maintain soil quality

- Maintain good topsoil
- Incorporate soil amendments to clay or sandy soils
- Add mulch to trap in nutrients and water
- Aerate soils that undergo regular foot traffic





Landscaping: O&M

Maintain existing plantings

- Remove weeds so water is available for desired plants
- Raise the blade - allow turfgrass to grow longer, promoting deeper root growth
- Make shade and apply less water to shaded areas

Minimize water used for other purposes

- Shut off water features whenever possible
- Recirculate in water features
- Sweep, don't water hard surfaces



Right Plant, Right Place



- Select plants appropriate for the soil type and exposure to sun and wind
- Use drought-tolerant, native, or climate-appropriate plants
- Incorporate shade trees
- Avoid “strip grass”
- Install rain gardens



To find native plant lists, visit:

https://www.epa.gov/watersense/outdoor/what_to_plant.html

Savings Potential



A water-efficient landscape can reduce irrigation water use by up to 50 percent

Additional benefits

- Reduce fertilizer use
- Reduce maintenance
- Reduce fuel use
- Reduce labor costs



Agenda



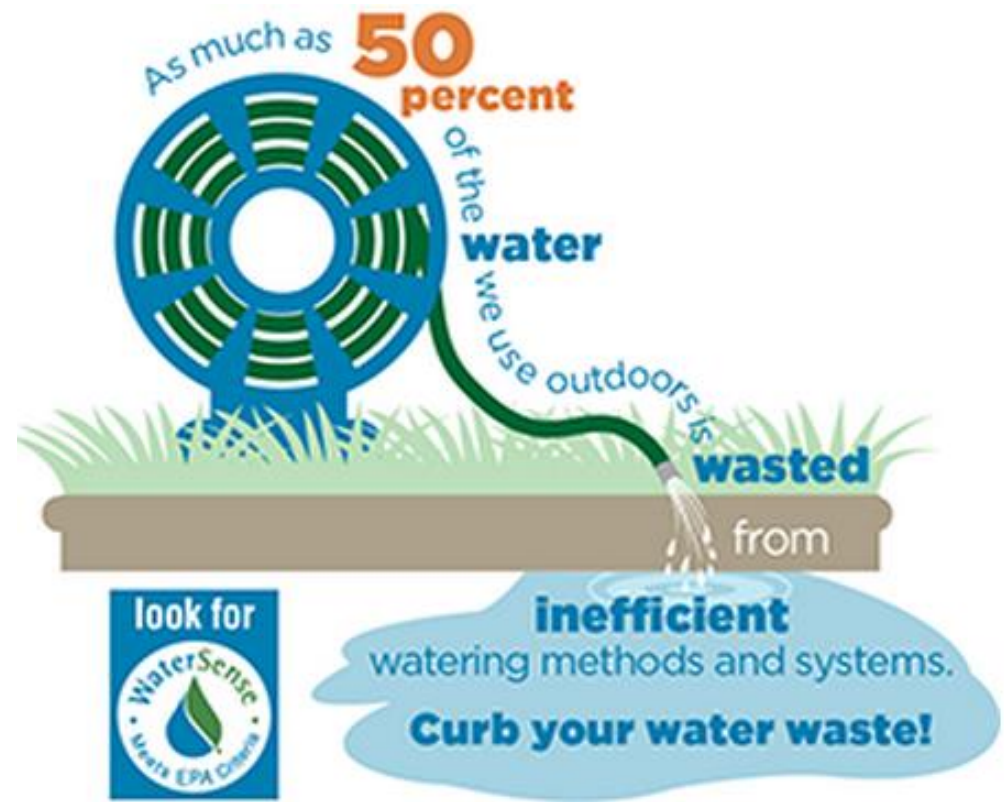
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Irrigation

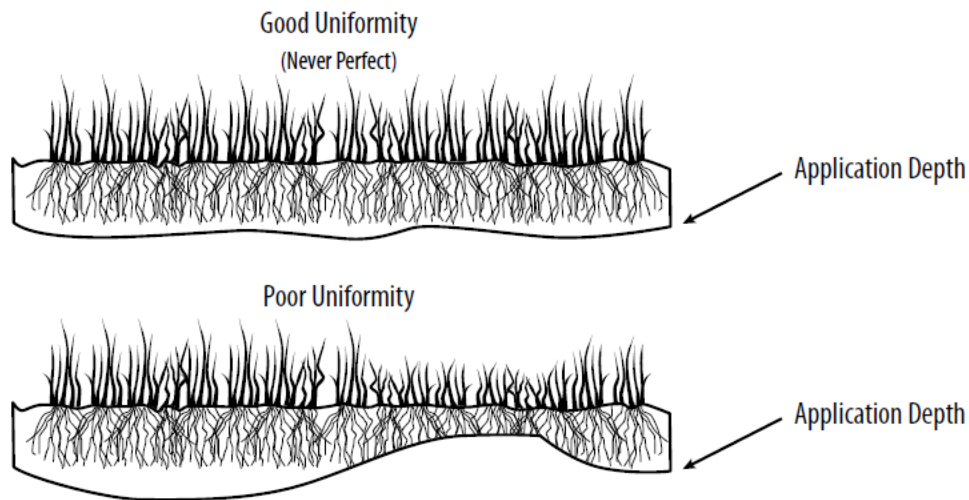
Water losses from wind, evaporation, and over-watering caused by:

- Poor irrigation system design
- Improper system installation and management
- Lack of maintenance
- Improper scheduling



Irrigation

- An efficient irrigation system should have good distribution uniformity (DU) to apply water evenly
- Over-watering can damage landscapes more than under-watering





Irrigation Professionals

Irrigation professionals can be certified for different aspects of irrigation system management:

- **Designers** to create water-efficient systems
- **Installers** and maintenance professionals
- **Auditors** to ensure systems meet design intent and review existing systems for improvement opportunities

Find a Pro: Professionals certified by a WaterSense labeled certification program are tested on water-efficient techniques and technology

www.epa.gov/watersense/outdoor/irrigation_professionals.html

Irrigation Technologies



Irrigation controllers

- Replace traditional manual or clock timers
- Install rain shutoff devices or sensors
- Install smart controllers
 - Weather-based controllers
 - Soil-moisture sensors



Sprinklers

- Spray nozzles
- Multi-stream, multi-trajectory (MSMT)
- Rotors (for larger areas)

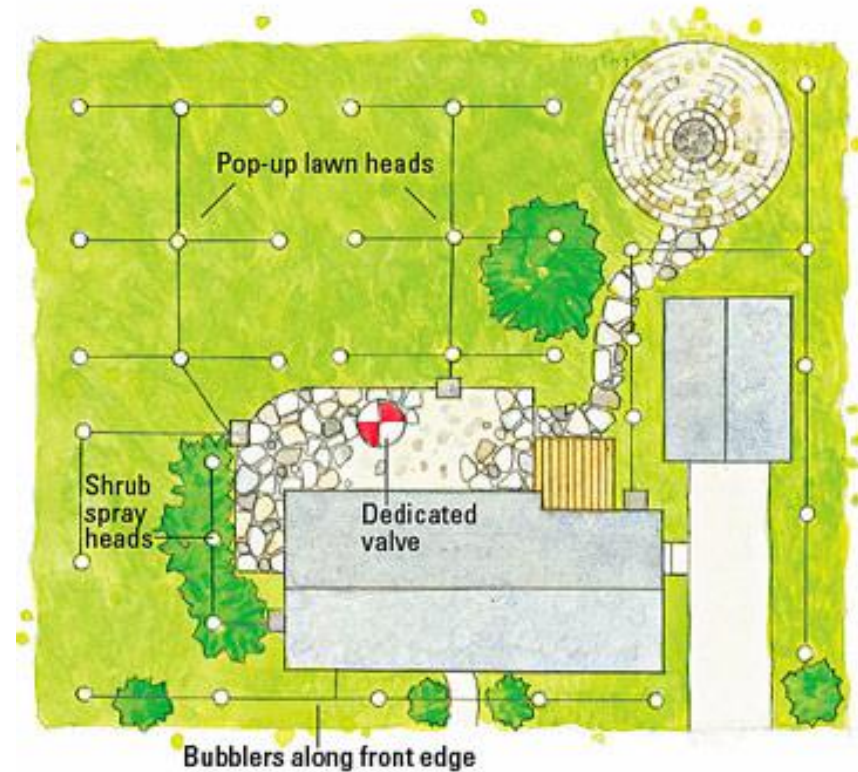
Micro-irrigation or drip irrigation



Irrigation Sprinklers



- Retrofit spray heads that water trees, shrubs, and plant beds with drip irrigation
- Replace existing sprinkler heads with more efficient heads
 - Pressure-regulating
 - Matched precipitation
 - Multi-trajectory rotating
- Provide head-to-head coverage when replacing heads
- Match the head to the plant type and only use one type per zone





Irrigation System Operation



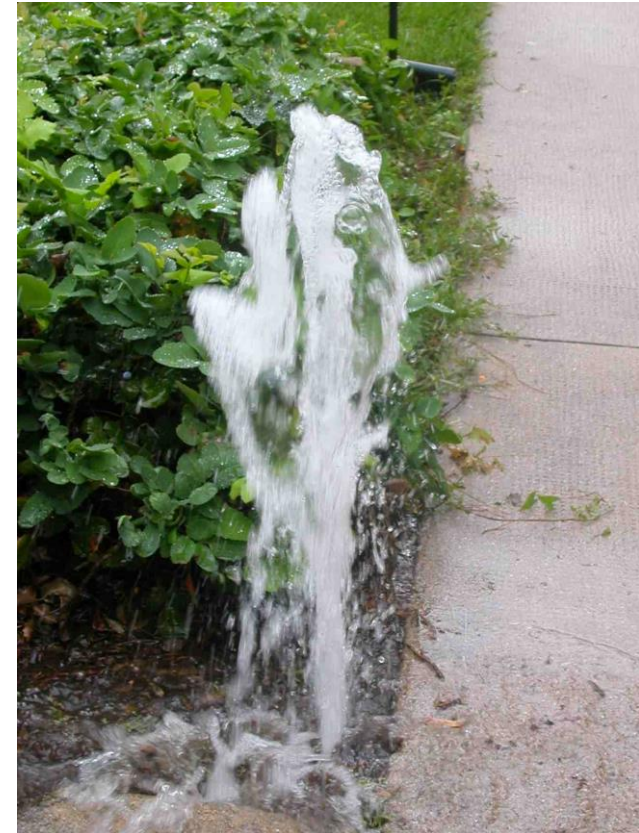
- Update irrigation schedules regularly to account for changing weather conditions
- “Cycle and soak” by irrigating steep slopes or clay soil types with less water more frequently to reduce runoff
- Encourage deep root growth by irrigating gentle slopes and normal soils in larger volumes, but less frequently
- Get in the zone by scheduling each individual zone for specific irrigation needs
- Look for pooling or puddling, which indicate system leaks or inefficiencies



Irrigation System Maintenance



- Check the system for broken or clogged sprinkler heads
- Move or adjust sprinkler components to avoid watering of pavement or other hardscapes
- Install and monitor water submeters for irrigation system
- Monitor monthly use trends throughout the irrigation season
- Audit your irrigation system every three years



Alternative Water Sources



Potential sources include

- Rainwater/stormwater
- Treated gray water
- Condensate from air conditioning equipment
- Filter and membrane reject water





Savings Potential



| Technology Type | Potential Water Savings vs. Traditional |
|--|---|
| WaterSense labeled irrigation controller | 15 percent |
| Efficient sprinkler heads | 30 percent |
| Smart irrigation controllers | 15 percent |
| Drip irrigation | 20 to 50 percent |



Bringing Design and Irrigation Together—Water Budget Tool



STEP 1 Location and Area

STEP 2 Plants and Irrigation

STEP 3 The Results

Fill out the chart below with all the appropriate information to calculate your landscape's water needs.

| Zone | Area (sq. ft.) | Plant Type / Landscape Feature | Water Demand | Irrigation Type | Impact on Water Use | Required Water (gal/month) |
|------|----------------|--------------------------------|--------------|-----------------|---------------------|----------------------------|
| 1 | 10000 | Nonvegetated Softscape | NA | NA | | 0 |
| 2 | 10000 | Permeable Hardscape | NA | NA | | 0 |
| 3 | 10000 | Turfgrass | Low | Rotor | ●●●●●●●● | 35208 |
| 4 | 10000 | Groundcover | Low | Drip (Standard) | ●●● | 11736 |
| 5 | 10000 | Trees | NA | No Irrigation | | 0 |
| 6 | | | | | | |

Total: **50000**
 + add zone

0
 Remaining Area (sq. ft.)

143,764
 Water Allowance (gal/month)

46,944
 Total Water Requirement for the Site (gal/month)

96,820
 Below Allowance (gal/month)

NEXT STEP >

http://www.epa.gov/watersense/water_budget



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Pools and Spas

Reduce water losses in pools and spas:

Minimize evaporation by controlling temperature and using pool covers

Reduce splashing with a gutter or grate system

Optimize filter cleaning

Control mineral buildup

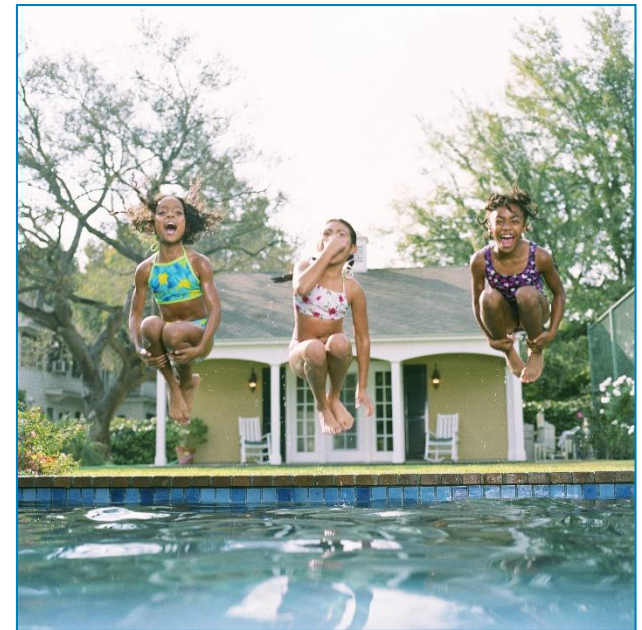
Look for leaks by monitoring pool levels



Potential Savings



| Technology Type | Potential Savings |
|----------------------------|--|
| Pool covers | 90 to 95 percent evaporation savings when in use |
| Solar heating rings | 50 percent evaporation savings when in use |
| Liquid evaporation barrier | 15 percent evaporation savings |
| Cartridge filters | 68 to 98 percent reduction in backwash water |





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Case Study

Project Background

- Corporate Campus in Dallas Texas
- Site maturity approximately 25 years
- 60 acres of landscape
- 30 Irrigation Controllers
- 1,000 Irrigation zones
- One 18” domestic water supply
- Approximately 40,000 sprinklers
- Approximately 10 miles of dripline





Case Study



Proposed Project Goals

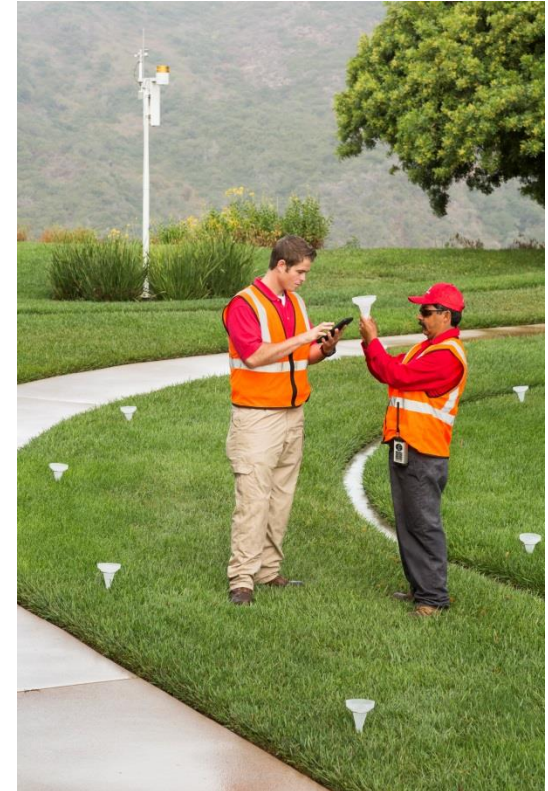
- Reduce liability concerns
- Reduce overspray onto concrete
- Minimize excessive wet / dry areas
- Improve property aesthetics
- Improve landscape health
- Reduce consumption by 10%



Case Study

How We Saved!

- Performed audits on 18 specific zone types
- Conducted minor repairs and adjustments
- Regulated excessive flow
- Measured PR and DU
- Advanced programming techniques

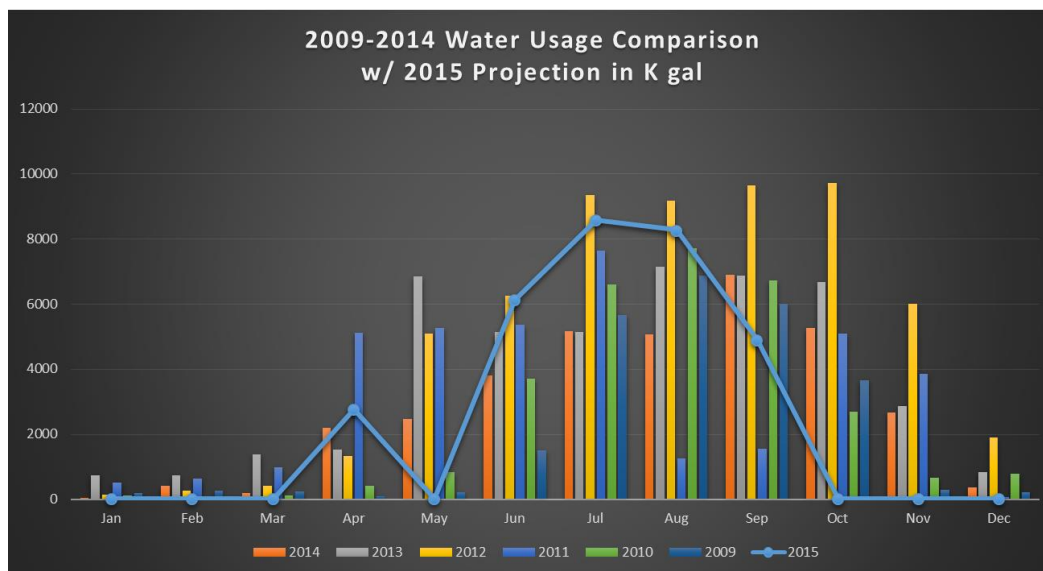




Case Study

Saving Success

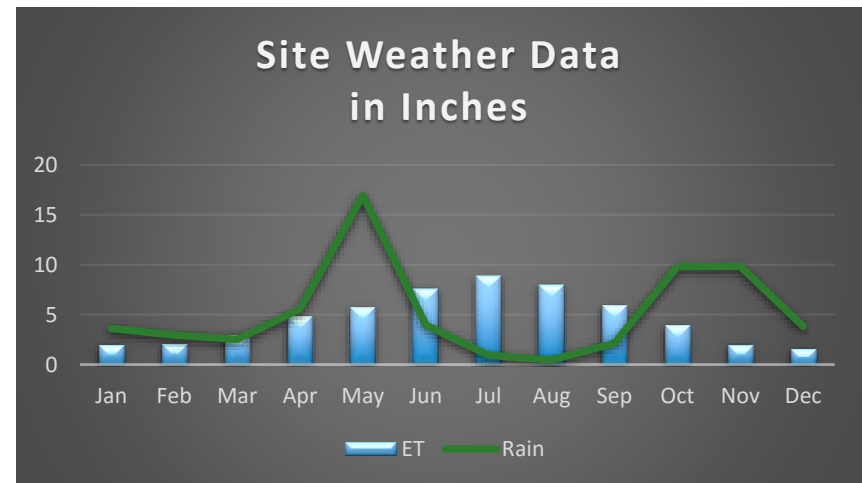
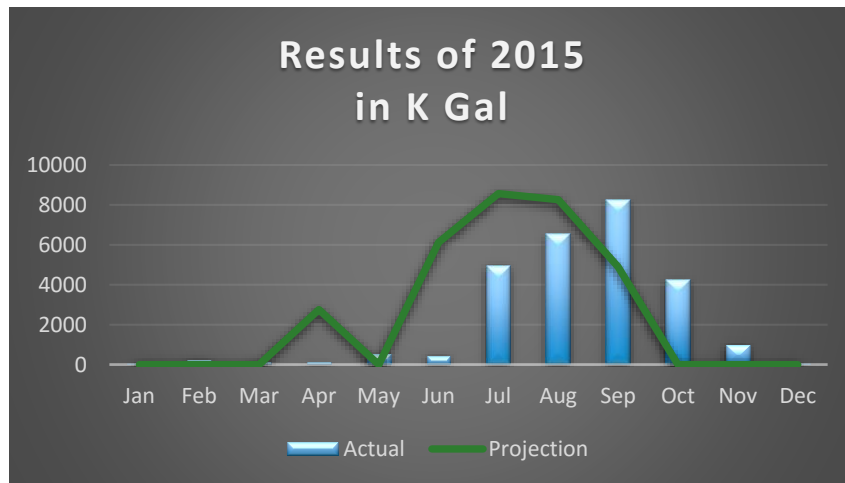
- Projected annual savings: 8,000,000 gallons (12 month ROI)
- Actual 2015 savings: 12,000,000 gallons (31%)
- Cost savings based on \$3 per Kgal: \$36,000.00



Case Study

Summary

- Results are only as good as the operator
- Link zones (similar landscape with same application)
- Push for continuous improvement





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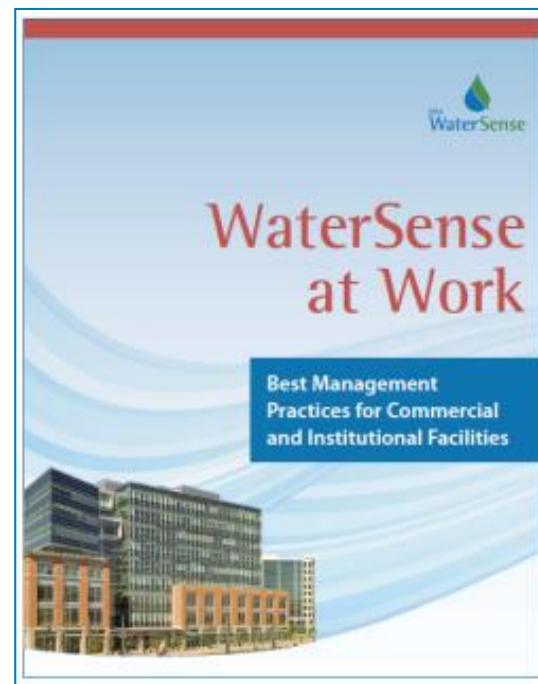
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Water Efficiency Best Management Practices



WaterSense at Work is an online guide facilities can use to manage water use:

- Water management planning
- Water use monitoring and education
- Sanitary fixtures and equipment
- Commercial kitchen equipment
- Outdoor water use
- Mechanical systems
- Laboratory and medical equipment
- Onsite alternative sources of water



www.epa.gov/watersense/commercial

WaterSense Resources



- Water use information by facility type
- Water-saving tips
- Best management practices
- Assessment tools
- Worksheets and checklists
- Live and recorded training webinars
- Case studies and more!



www.epa.gov/watersense/commercial/tools.html



What You Can Do Right Now



- Walk your property to check for broken or misdirected sprinkler heads—water plants not pavement!
- Get a handle on your outdoor water use—do a quick inventory or compile information to get the whole picture
- Look at your water bills to monitor trends in water use throughout the year
 - Summer v. winter will show relative outdoor water use
- Use regionally appropriate, and drought-tolerant plants whenever possible
- Allow turfgrass to grow longer before cutting it
- Install a water submeter dedicated to the irrigation system
- Tracking irrigation water use in Portfolio Manager



Upcoming Webinars



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Tackling WaterSense – Mechanical Systems

May 10

Let's Go on an Energy and Water Treasure Hunt

July 12

Tackling WaterSense – Commercial Kitchens

September 20

www.epa.gov/watersense/commercial/webinars.html



Questions?

ENERGY STAR

For technical questions related to Portfolio Manager or the ENERGY STAR program, please visit:

www.energystar.gov/buildingshelp



WaterSense

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Email: watersense@epa.gov

Helpline: (866) WTR-SENS (987-7367)