

This presentation premiered at WaterSmart Innovations

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DEVELOPING SUSTAINABLE URBAN LANDSCAPES: *AWE'S Research and Programs*




AWE: A Voice for Water Efficiency

- Our mission is to promote an efficient and sustainable water future
- **450+** member organizations in **200 watersheds** delivering water to **50 million water users**
- A unique network and forum for collaboration around research, policy, information sharing, education, and stakeholder engagement



Our 2030 Sustainable Water Vision

Efficiency First	Homeowners and businesses are smart water users, empowered by awareness of the value of water, real-time information, and technologies that help them save indoors and outdoors.
Water-Smart Federal, State/Provincial, and Local Policies	Governments adopt and implement policies to use limited water supplies more sustainably.
Sustainable Water Rates and Fiscally Healthy Utilities	Price signals inform customers of the value of water, and financially resilient utilities can provide reliable, safe, and affordable water service today and into the future.
Right-sized, Water-tight, and Intelligent Systems	Utility systems are built to the right capacity, proactively managed to reduce water loss, and equipped with the latest technologies to ensure safe water quality and to leverage data for efficiency.
Integrated, Systems-based Approach	Water efficiency is addressed in the context of a broader, systems-based perspective.



“A main conservation priority has to be reducing outdoor water use, which remains poorly understood, largely unregulated, and ripe for innovation and improvement at the consumer, landscape contractor and designer levels.”



Outdoor Water Savings Research Initiative

PHASE 1 - ANALYSIS OF PUBLISHED RESEARCH

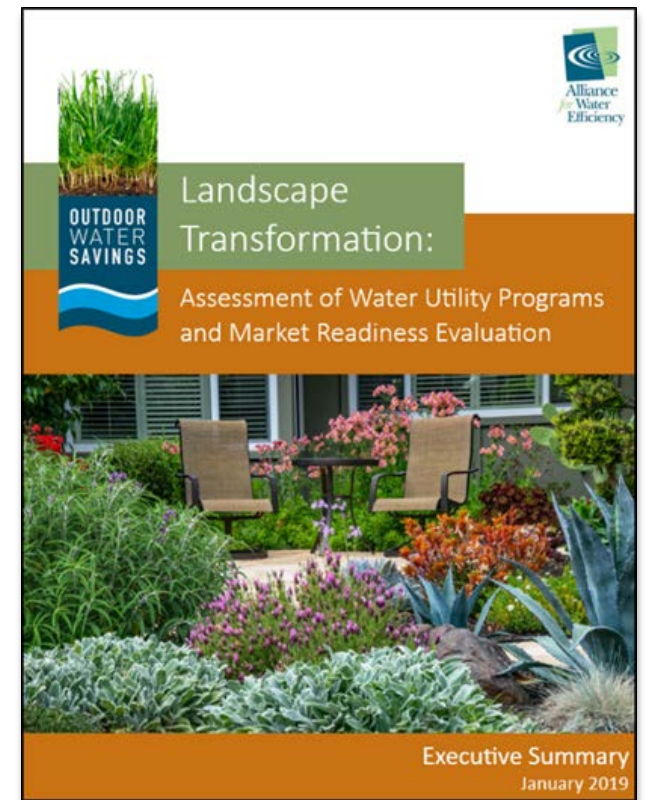
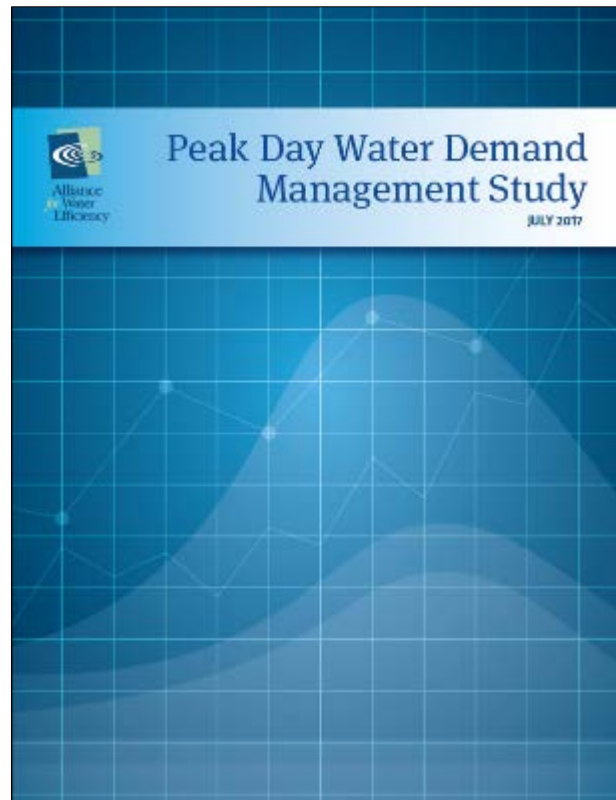


Phase 1

- Analyzed Published Research in 2015

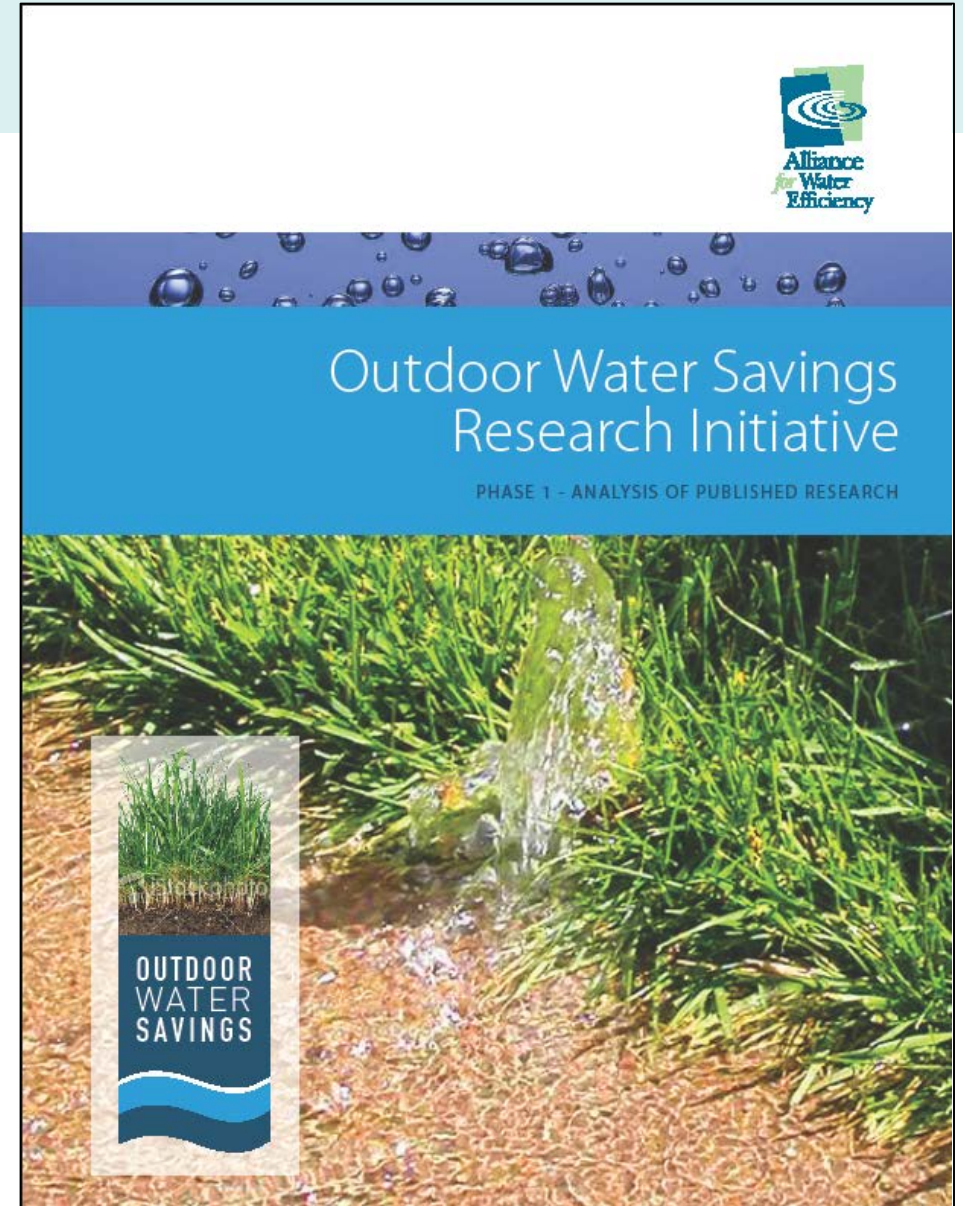
Phase 2

- Peak Day Water Demand Management
- Landscape Transformation Study
- Drought Restrictions Study – Q4 2019



What Has Been Studied So Far?

- Before mounting any new outdoor water savings studies, AWE wished to examine research conducted to date
- Phase 1 Report where gaps in research identified
- Report published in January 2015 and posted on AWE's web site
- First step in soliciting funding and choosing study projects



Phase 1 Report Findings

Outdoor water savings are achievable and can be significant.

- Specific measures can reduce outdoor water use by 15% - 65% or more.
- Successful approaches to reduce outdoor water use are being implemented.

Phase 1 Report Findings

Quantifying water savings from outdoor programs and measures is challenging.

- Remarkably few studies quantify water savings from measures such as xeriscape or landscape contractor training and certification.
- Many studies that originally sought to measure water savings instead report “hypothetical” or modeled savings results because of data collection problems or climate variability.

Phase 1 Report Findings

Reporting of outdoor water savings in research varies, with a lack of geographic and climate variability in the research.

- Many studies show savings as a percentage, but the basis of the percentage is not consistent across all studies.
- Some studies reported savings in gallons per square foot of landscape impacted.
- Much of the urban landscape outdoor water savings research to date of real significance has been conducted in Florida, California, and Nevada

Phase 1 Report Findings

Cost savings are rarely documented.

- Water savings are documented in some good studies, but cost savings – from either the customer perspective or the utility perspective - are documented in very few of the studies.
- If cost savings are documented, it is almost always based on water reductions only. Very few studies consider the time and maintenance costs associated with a landscape and how these may be impacted by the efficiency program.

Phase 1 Report Findings

Standardized approaches and methods for measuring and evaluating outdoor water efficiency programs are needed.

- Work has begun on establishing conservation metrics, and robust methods for measuring changes in water use are available.
- Developing standardized approaches and performance indicators, similar to what has been accomplished for water loss control, could be highly beneficial for water utilities in measuring their progress.

Where Does Adequate Research Already Exist?

1. Impact of water budget-based rates.
2. Irrigation control technology including weather-based controllers and soil moisture sensors.
3. Additional research in these areas would be welcome, but these are not currently the areas of greatest need.

Gaps in Research

1. Impact of native, water-wise, and xeric landscapes vs. turf on water use and cost.
2. Impact of water rate structures on demand.
3. Impact of various drought restrictions on demand.
4. Water requirements and drought tolerance of landscape turfs and plants under different climate and drought conditions.
5. Impact of landscape contractor training, education, and certification.
6. The human element of landscape water management.
7. Impact of improving system efficiency through audits, tune ups, sprinkler-head retrofits, and other measures.
8. Reasons and rationale for customer landscape choices.
9. Cost-effectiveness and cost savings of various outdoor water saving programs.
10. Impact of regional variability (climate, demographics, soils, etc.) on outdoor water demand and savings, with a standard measure for comparison across regions.
11. Standard methods for monitoring & verifying savings.
12. Long-term reliability and projected lifetime of outdoor water savings.

Recommended Research To Undertake

- ***Restrictions, Rates, Education, and Information:** Top down irrigation management including irrigation restrictions, efficiency oriented water rates, water budgets, education, & information programs.
- ***Landscape Transformation:** Creating landscapes that require less water, based on local and regional conditions. Includes: new and renovated landscapes, voluntary hands-on education programs, and regulations, codes, and standards that mandate and/or restrict landscape design and installation.

Landscape Transformation Study

1. Impact Analysis: Landscape Program Water Savings

- What range of water savings can be expected from reducing landscape water requirements?

2. Process Evaluation: Customer Motivations and Market Readiness

- What motivates people to change their landscape and irrigation practices to reduce the overall water requirement and usage?
- What are the reasons and rationale for their landscape choices?
- What barriers exist to landscape transformation and to utility-sponsored programs?

Research Team:

- A&N Technical Services, Inc.
- Maureen Erbeznik & Associates
- Sligo Creek Resources

Project Manager:

Peter Mayer, AWE Technical Advisor and Principal, Water DM

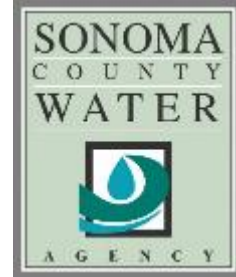
Additional support from AWE Staff and Project Advisory Committee



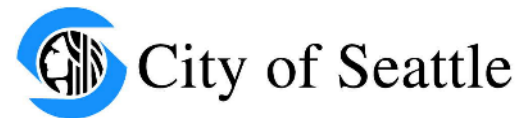
Partners and Participants



Southern Nevada
Water Authority



NORTH MARIN
WATER DISTRICT



Impact Analysis

Evaluated savings of nine landscape transformation programs from diverse geographies and climates; described fourteen diverse programs



Rebates for efficient irrigation technology



Free distribution of mulch



Customer site audits and education

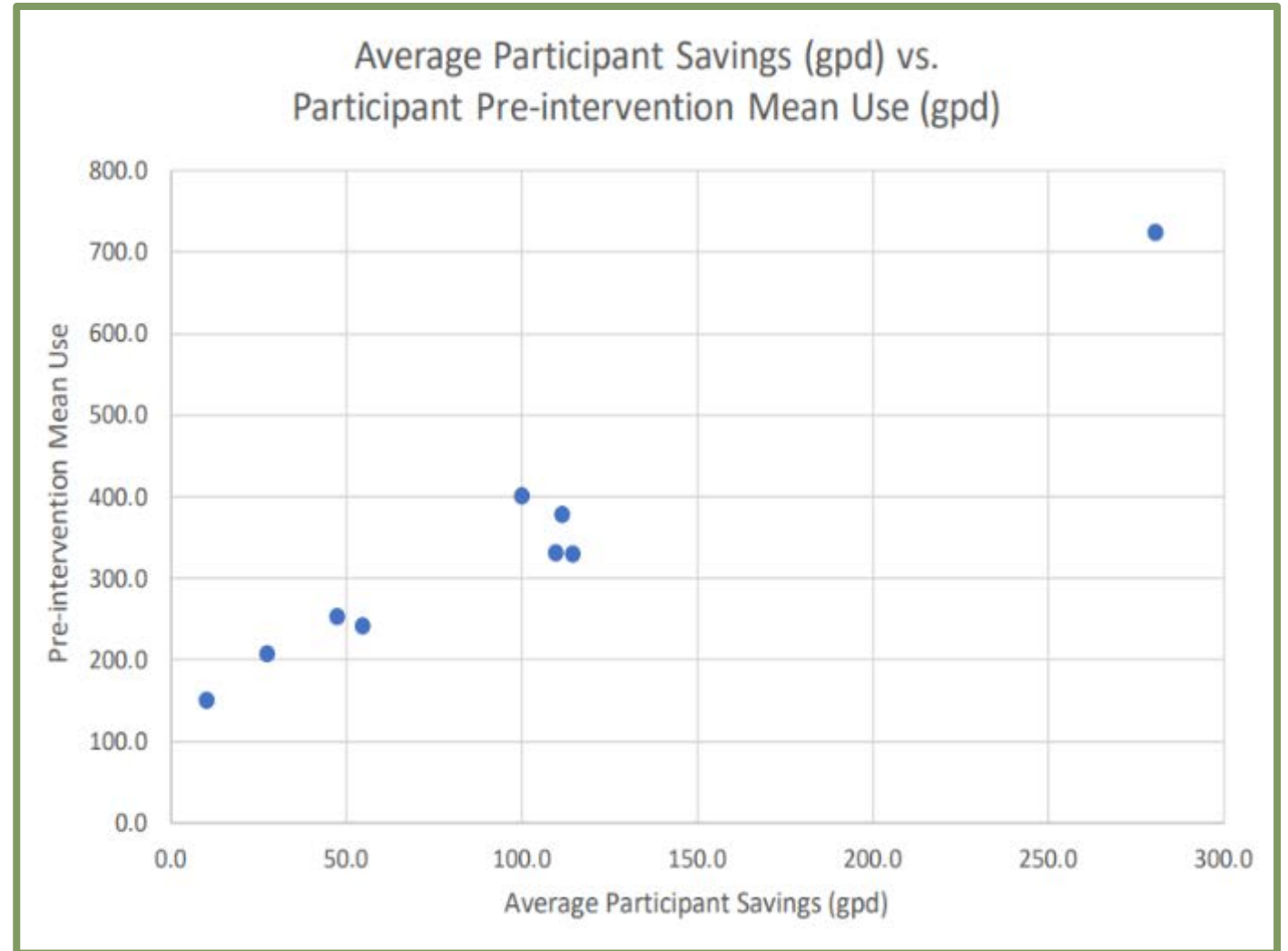


Turf removal and re-landscaping

All programs, of every type,
generated meaningful
water savings

Average participant water
savings ranged from **7%**
(Outreach & Support) to
39% (Cash for Grass)

Higher pre-intervention
water use was associated
with higher savings





Population served: 928,000

Average annual precipitation: 32.1 in.

Program type: Turf removal and replacement

Average participant savings: 18.9%



Population served: 3,200,000

Average annual precipitation: 10.0 in.

Program type: Education, technology rebates, technical assistance

Average participant savings: 34.8%



Population served: 60,200

Average annual precipitation: 25.0 in.

Program type: Free distribution of mulch

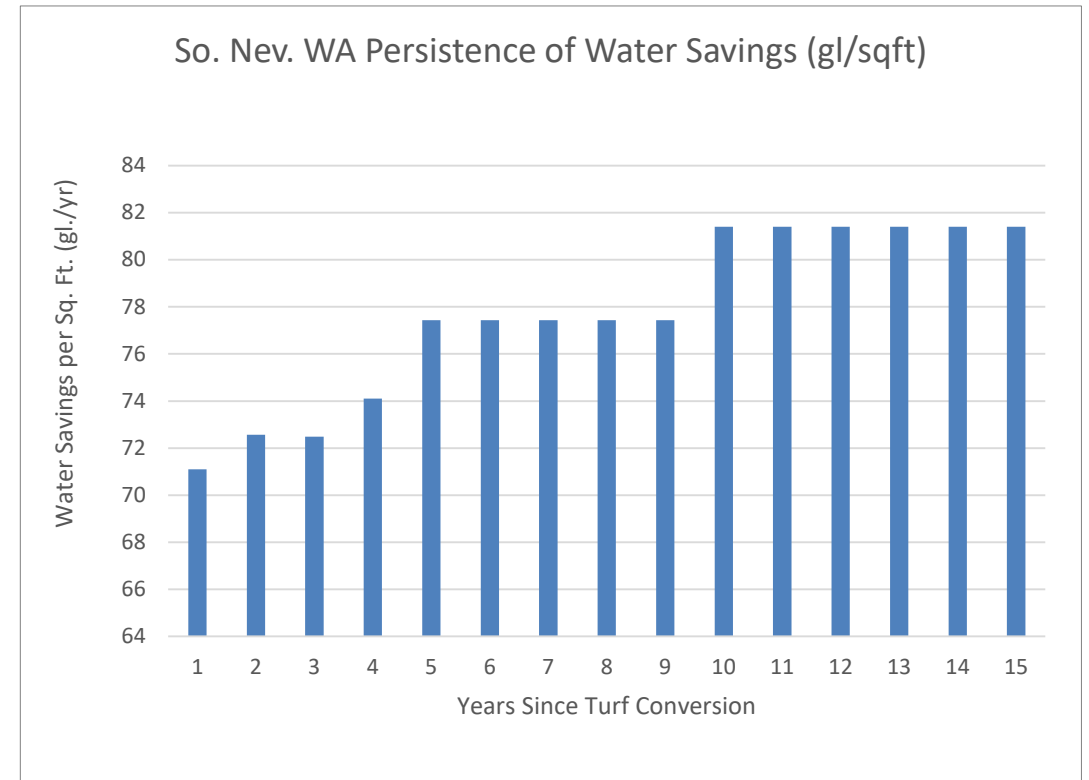
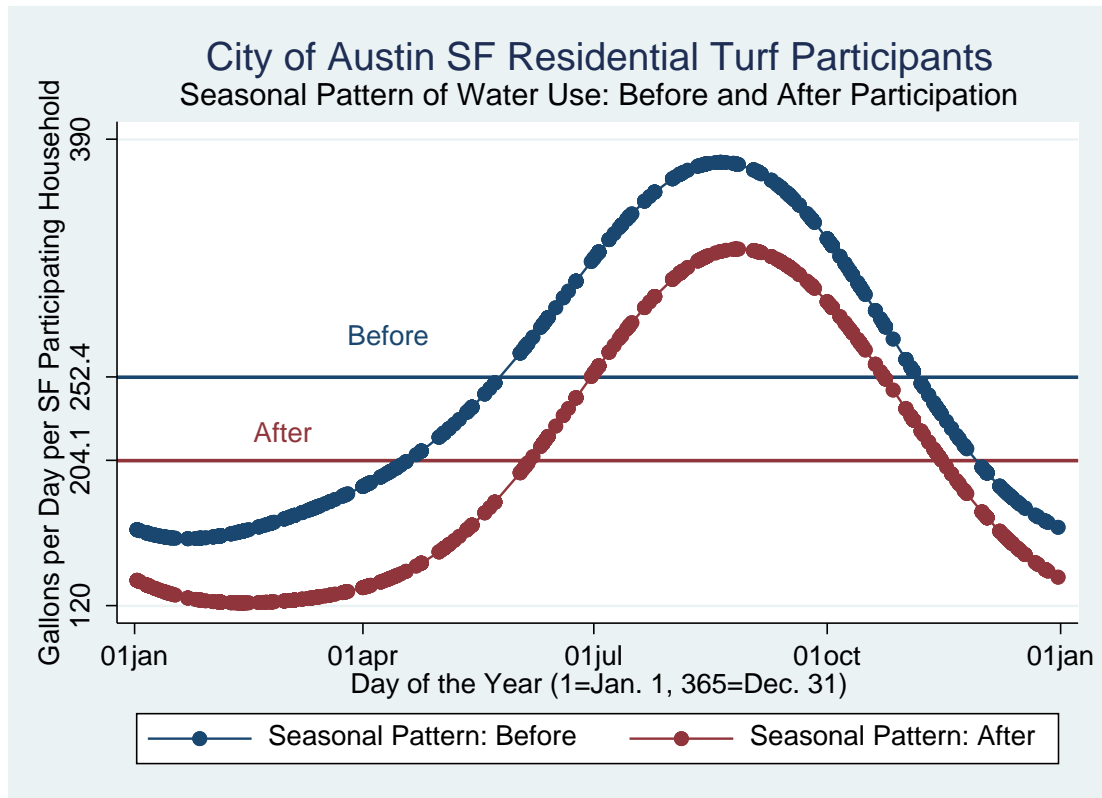
Average participant savings: 13.3%



42,000 gallons annually per participant

Meets the needs of a **four-person SD household for nearly 100 days**

Landscape programs effectively reduced peak demand



Water savings were observed to persist and increase over time

Market Analysis

AWE surveyed 3,390 water customers across the United States and Canada.


1,655 participated in a landscape transformation program.

We also conducted interviews with supply chain participants and analyzed industry reports.



- Austin, Texas
- Fort Collins, Colorado
- Guelph, Ontario, Canada
- Peel Region, Ontario, Canada
- Sacramento, California
- San Diego, California
- Seattle, California
- Sonoma, California
- Southern Nevada

TIME TO EDUCATE CONSUMERS



Consumers are generally disconnected from their outdoor water use

53%

believe they use **10-30 percent** of their water outdoors. (Truth: Most use **30 to 60 percent**)

41%

believe they own water-efficient sprinklers (Truth: **less than 20%** of equipment sold is efficient)

56%

believe they have a smart controller (**31%** are interested in getting one)

92%

state they have a timer on their system; about **25%** say they adjust based on season and weather; **89%** say they check regularly for leaks

NEARLY ALL CUSTOMERS NEED SOME ASSISTANCE

THEY ARE LOOKING TO THEIR WATER PROVIDERS TO HELP THEM MAKE CHANGES

85%

believe they need moderate to full assistance to change out their landscape

45%

will need a financial incentive

22%

want help with plant selection and layout

When they do transform their landscapes, they're pleased with the results



91%

Were satisfied or very satisfied with new landscape

85%

Thought the conversion was worth the investment

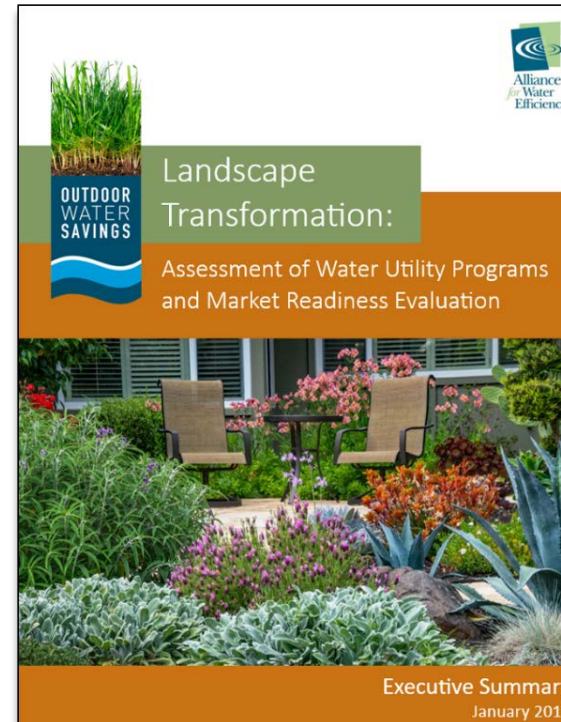
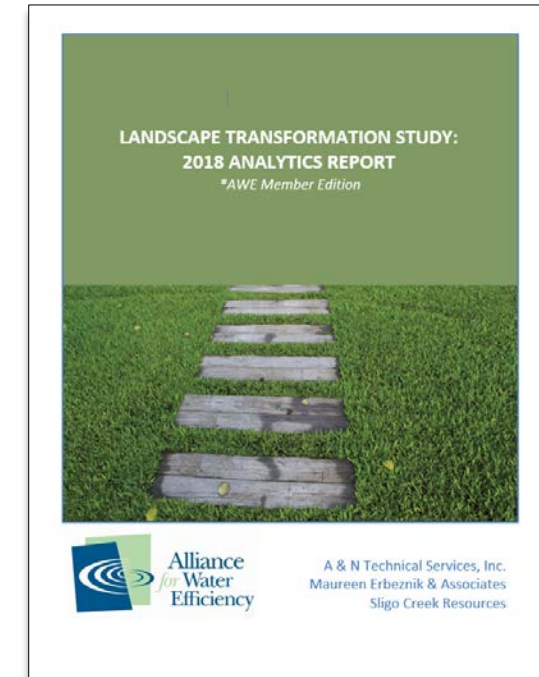
63%

Would not do anything differently

Learn More

Visit www.allianceforwaterefficiency.org to access:

- Executive Summary
- Impact Analysis Report
 - **Member Version** with Expanded Program Descriptions
- Process Evaluation Report
 - **Member Version** with Expanded Program Descriptions
- Fact Sheet: Making the Case for Landscape Transformation (Member-Only)
- Infographic



Immediate and Lasting Water Savings: Making the Case for Landscape Transformation

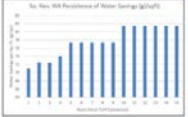
ABOUT THE RESEARCH
Landscape transformation is the act of customers transitioning from traditional high-water use landscape designs and products to water-efficient and sustainable landscapes, reducing the irrigation water requirement and outdoor water use. AWE's Landscape Transformation study examined various instant Landscape Transformation programs to provide new empirical data on their effectiveness.

KEY FINDINGS

Utility	Population Served	Average Annual Precipitation	Program Type	Average Participant Savings
City of San Diego	331,000	33.0 inches	Customer Site Audit	6.9 percent
City of Carmel	480,000	17.0 inches	Turf removal and replacement	29.6 percent
Avista Water Utility	928,000	32.1 inches	Turf removal and replacement	18.9 percent
City of Portlano	60,200	23.0 inches	Free distribution of mulch	13.3 percent
City of San Diego	1,378,000	10.0 inches	Turf removal and replacement	33.2 percent

CASE STUDY
The average participant in San Diego County Water Authority's Sustainable Landscapes Program saved approximately 42,000 gallons annually—enough water to meet the needs of a four-person San Diego household for nearly 100 days.

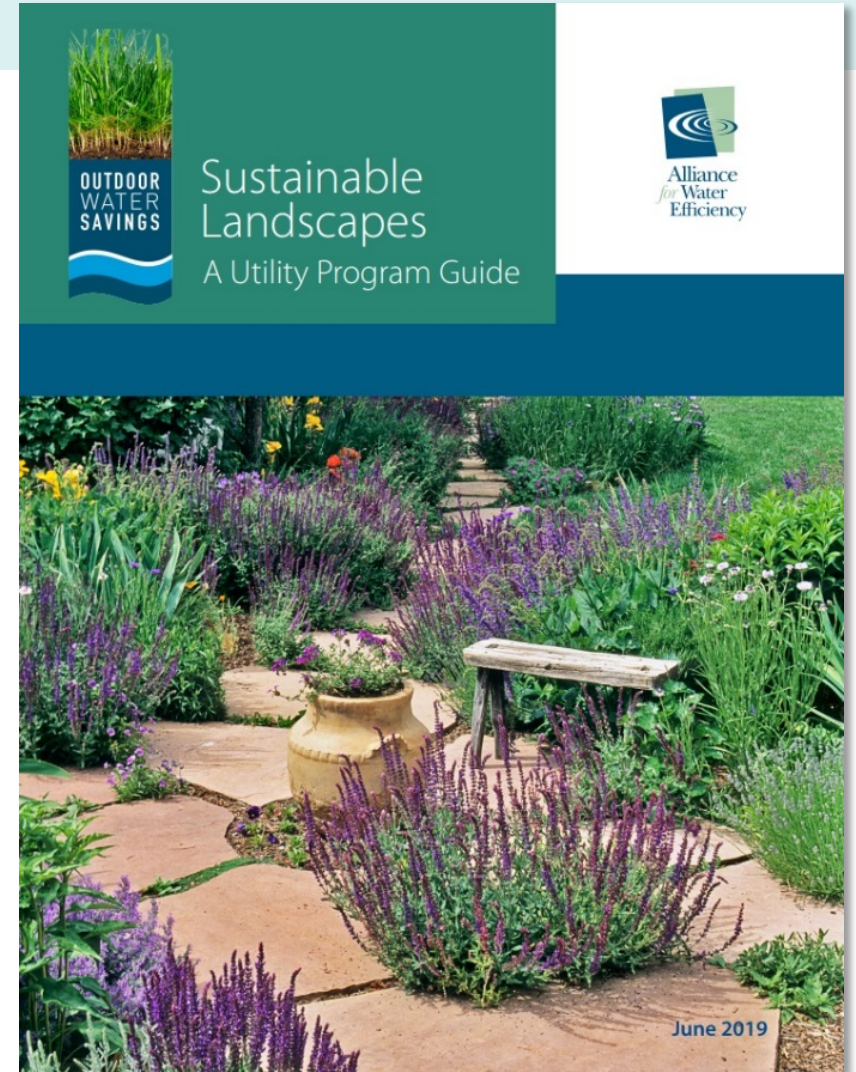
CASE STUDY
Southern Nevada Water Authority's Water Smart Landscapes program is one of the longest-running in the United States. Water savings achieved from this program increased with time, from 71 gallons/yr after the first year, to 81 gallons/yr after the tenth year.



To access the full Landscape Transformation study, visit <http://www.aawe.org>.

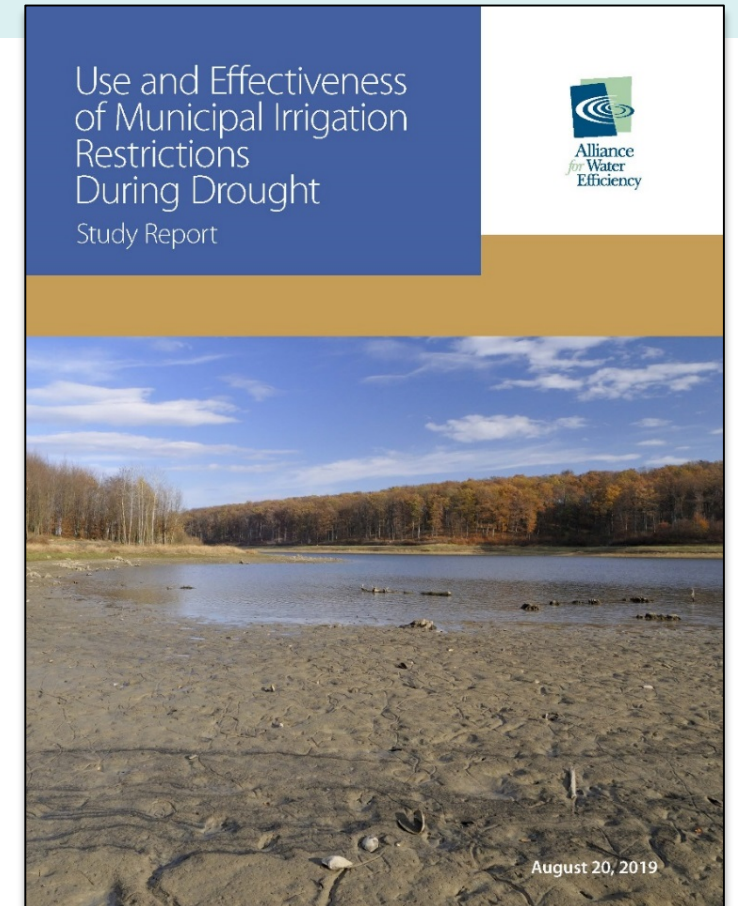
Sustainable Landscapes Guide

- Based on the findings of the AWE Landscape Transformation Study Report
- Targeted to utilities just getting started or those enhancing existing programs
- Organized into two sections:
 1. General considerations
 2. Considerations for specific types of outdoor landscape programs
- Features program examples with lessons learned
- Launched in late June (printed, electronic)
- AWE member-only resource



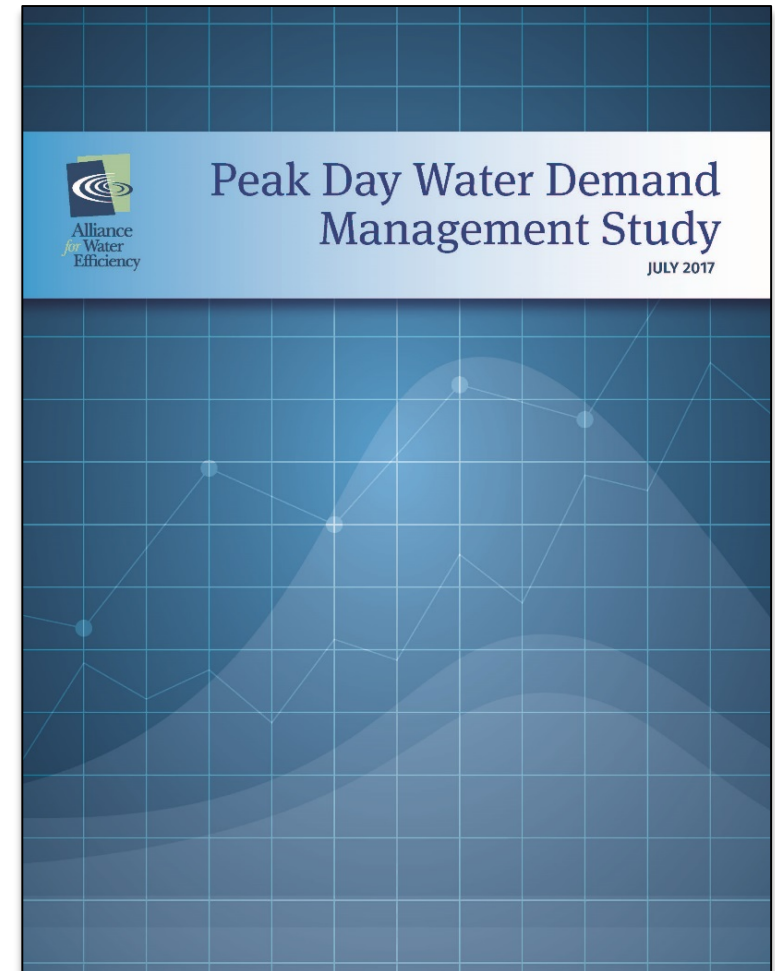
Drought Restrictions Study

- 14 participating & funding agencies in the US and Canada
- Most comprehensive study of drought restrictions to date
- Draft now undergoing PAC Review
- Study Launch set for January 2020
- 2 Case studies from Texas and 19 from California
- Study addresses **5** key questions:
 1. What demand reductions can be achieved through different levels of mandatory and voluntary restrictions?
 2. How do messaging and enforcement programs influence effectiveness of restrictions?
 3. During times of drought, what can water suppliers do to maximize effectiveness of restrictions?
 4. What is the longevity of demand reductions after the end of a drought?
 5. What are the different forms of mandatory and voluntary irrigation restrictions typically implemented by North American water providers?



Pilot Peak Day Reduction Research

- 4 Partners in the project



Peak Shaving Experiment

- August 19 and August 26, 2016
- Advance notice provided via email to study participants.
- Dates selected based on forecasted weather – hot and dry days
- Remote shut down of irrigation systems accomplished remotely by Rachio (from Denver)
- 14 of 15 irrigation systems successfully shut down during each experiment
- Manual override by one resident (different one each time) on day of experiment

Conclusions

- Only a Pilot study with a small sample
- Between 300 – 600 enabled systems (of different sizes) needed to shave 1 MGD (based on average results)
- Promising and powerful demand management tool
- More research needed – seeking new research partners
- Many web-enabled controller brands
- Common command protocol would greatly assist water providers
- In future, participants can be recruited (like energy sector) from existing customers



In Closing

- AWE is committed to continued research work in this area
- Watch for news about the launch of the Drought Restrictions Study
- Sign up for regular efficiency news and events: www.allianceforwaterefficiency.org

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