CITY OF BEND

City of Bend WaterWise Program

Environment & Climate Committee Engagement Summary

December 2021

The City of Bend is updating its award-winning WaterWise Program to build on current successes and continue to improve water-use efficiency. Prior to implementing updated measures, City staff sought policy-level advice from the Environment and Climate Committee (Committee) on the best-suited strategies to implement new water efficiency codes/standards.

This summary highlights advice from the Committee to the City's WaterWise Program team and documents the engagement process completed in fall 2021.

Background

The City's WaterWise Program uses national standards to establish water efficiency measures best-suited to Bend's community and climate. In 2021, the City prepared a state-approved Water Management and Conservation Plan that identified and modeled cost-effective water efficiency measures and related incentives. This included potential changes to better align existing codes/standards across the City. Along with reducing water waste, implementing these conservation measures can potentially save $21 million by delaying the need for three new wells and a large reservoir.

As part of the engagement process leading into updates to the City's WaterWise Program, City staff shared information and collected feedback from the Committee. The nine-member Committee serves as an advisory body to City Council with a primary focus on providing input and recommendations related to environmental stewardship.

Meeting Series Overview

The discussion topics for the three-part meeting series with the Committee are outlined below.

- Oct. 14, 2021: Part 1: Water Supply & Conservation Overview
- Nov. 10, 2021: Part 2: WaterWise Program History & Progress
- Dec. 9, 2021: Part 3: WaterWise Program Future & Next Steps

Key Questions

The key questions posed to the Committee are noted below.

1. Do you think Bend should continue focusing on education or shift to enforcement to promote existing water waste regulations (Bend Code 14.20 Use of Water)?
2. Where do you think Bend should fall on the spectrum of voluntary to mandatory adoption of new indoor water efficiency standards? (Think faucets, showerheads, toilets, dishwashers, and other appliances.)
3. Where do you think Bend should fall on the spectrum of voluntary to mandatory adoption of new outdoor water efficiency standards? (Think outdoor irrigation equipment and controllers.)
4. Which perspectives do you think are most important to have at the table when the City forms the Conservation and Efficiency Technical Work Group in 2022?

Committee Advice

Themes from the advice provided by the Committee are highlighted below, including a selection of quotes from individual Committee members shown in italics.

Augment current methods to increase awareness and adoption of water efficiency

- *"Education is always a place where we can do better."*
- *"It's a great program, but like many conservation efforts it's hard to get people's attention. Perhaps increased incentives and enforcement will get that attention."*
- *"Education/training AND incentive/rebates will make the transition to mandatory more accessible for the community."*
- *"People need to know that it's worthwhile, for a good reason. And also how to do it most cost-effectively themselves."*

Balance education with enforcement for existing water waste regulations

- *"Education and enforcement go hand in hand, and both should be used appropriately to make sure it's most effective without being draconian."*
- *"Don't give up on education, that's by far the first piece. But once people are educated, enough with the excuses."*
- *"Enforcement actions don't need to be large for them to be effective."*
- *"I thought of it as a three strikes you're out sort of policy. Using those first two strikes for education, letting them know third strike here comes the enforcement."*

Set a path toward mandatory water efficiency codes/standards

- *"Codes and standards work--they lower the baseline and give contractors, builders, homeowners, retailers a clear directive."*
- *"If outdoor water use is the primary driver of demand and if demand is the long term issue, then mandatory adoption is necessary."*
- *"For new construction or new permits for existing development, no reason efficiency should not be imposed."*
- *"A period of incentives and rebates is a reasonable step to transition to new standards and codes, giving folks an opportunity to help off-set the costs."*

Use data to prioritize new codes/standards on areas of greatest return

- *"Data-driven as much as possible, on costs, benefits, performance."*
- *"Use the tools and policies to address the places where you get the most effectiveness. If it's outdoor water use, then focus on that."*
- *"Some of the ways the program has been effective so far is using meter data to do direct outreach to consumers."*
- *"Think about new ways and new targets for information… that 10 percent that are going way over their water budgets, that would seem like a logical place to start."*

Keep equity and affordability front and center when evaluating new requirements

- *"Perspective of environmental justice is critical any time mandates are discussed. Citations and upgrades affect community members differently."*
- *"Make sure enforcement doesn't become something that has an impact that's inequitable for people who are not able to easily make fixes."*

- *"Incentives would help. There is an equity piece to be aware of, and grandfathering buildings too."*
- *"Smart mandatory adoption and enforcement of standards can be much more effective than simply voluntary standards… It's a balance and all factors must be considered, including equity, affordability."*

Engagement Process

Over the course of a three-part meeting series, City staff shared information and collected input from the Committee on four key questions. The following section summarizes the engagement process with the Committee. Additional meeting materials are provided in the appendix, including read-ahead resources and presentation materials.

Participants

Participants included the City team and Committee members listed below.

City Team

- Mike Buettner, City of Bend Utility Director
- Patrick Griffiths, City of Bend Water Resources Manager
- Dan Denning, City of Bend Water Conservation Program Manager
- Aubrie Koenig, Communications Support (Barney & Worth)

Committee

- Bill Welch
- Kavi Chokshi
- Kellie Jensen
- Kersey Goodwin
- Mark Buckley
- Neil Baunsgard
- Peter Grube
- Rory Isbell
- Serena Dietrich
- Tess Gardner (alternate)

Part One: Water Supply & Conservation Overview

At the October 14, 2021, Committee meeting, City staff introduced the WaterWise Program topic and the ask of the Committee, then addressed some of the common questions about water conservation before taking a closer look at the WaterWise Program.

Meeting Topics

- Planning for a Reliable Water Future: Water Supply Myths & Facts
- Regional Collaboration: Bend's Role in the Deschutes Basin
- Managing Our Slice: Bend's Best Opportunities to Improve Water Efficiency

Part Two: WaterWise Program History & Progress

At the November 10, 2021, Committee meeting, City staff described goals and opportunities for the WaterWise Program moving forward and asked for the Committee's initial input on policy-level implementation strategies for new codes/standards.

Meeting Topics

- Bend's Water Use Demands and Conservation Opportunities
- Current Water Waste Regulations
- Home Water Use Efficiency Standards: Voluntary or Mandatory
- Landscape and Irrigation Standards: Voluntary or Mandatory
- Next Steps: Policy-level Advice

Survey Highlights

After the second meeting, Committee members were asked to respond to an 8-minute online survey. A selection of write-in comments to the survey are incorporated in the Committee Advice section of this document. Additional abbreviated highlights from the survey responses are noted below, and a detailed summary of survey feedback is provided in the appendix.

Policy-level Advice: Current Water Waste Regulation

The Committee was asked for policy-level input regarding the City's existing water waste regulations, which include provisions for runoff and approved irrigation hours and days. The Committee suggested now is an appropriate time to start introducing more enforcement for existing regulations.

1. Do you think Bend should continue focusing on education or shift to enforcement to promote existing water waste regulations (Bend Code 14.20 Use of Water)?
    - **Average: 4.4** on scale of 1=stick with education to 5=start enforcement.

Policy-level Advice: New Codes/Standards

The Committee was asked for policy-level input related to potential new codes/standards for indoor and outdoor water efficiency measures. The Committee suggested moving towards mandatory water efficiency codes/standards for indoor and outdoor water use.

- Where do you think Bend should fall on the spectrum of voluntary to mandatory adoption of new indoor water efficiency standards?
    - **Average: 5.3** on scale of 1=all voluntary to 7=all mandatory.
- Where do you think Bend should fall on the spectrum of voluntary to mandatory adoption of new outdoor water efficiency standards?
    - **Average: 6.0** on scale of 1=all voluntary to 7=all mandatory.
- If new standards/codes are mandatory, how quickly do you think those should be implemented?
    - **Top ranked: '**after a period of more education/training,' 'phased in over time,' 'after a period of incentives/rebates.'

Conservation and Efficiency Technical Work Group

The Committee was asked for feedback related to a future Technical Work Group that will work with City staff to consider code alignment and other implementation details of updates to the WaterWise Program. The Committee suggested including a cross-section of professional and community perspectives and emphasized the importance of using an equity lens to evaluate potential updates.

1. Which perspectives do you think are most important to have at the table when the City forms the Technical Work Group in 2022?
    - **Top ranked:** landscape and irrigation contractors, large water users, ECC.
    - Additional perspectives: equity, homeowner groups, water resources, conservation habitat, multi-family residences, youth, behaviorist, economist.

Part Three: WaterWise Program Future & Next Steps

At the December 9, 2021, Committee meeting, the City team and Committee discussed survey responses and advice for the three policy-level areas and the future Technical Work Group.

Meeting Topics

- Survey Feedback Highlights
- Advice on Three Policy-level Areas
- Advice for Technical Work Group
- Next Steps: Dec. 16 Subgroup Meeting to Finalize Memo

Subgroup Meeting

A subgroup of five Committee members met with the City team on December 16, 2021, to review and finalize this summary document.

Additional advice from the subgroup discussion is noted below.

- Establish a roadmap to achieve mandatory water efficiency codes/standards that allows time for ramping up education/training and a period of incentives/rebates.
- Use the engagement with the Technical Work Group to help identify clear, measurable outcomes to guide potential new water efficiency codes/standards.
- Consider implications for non-City water when looking at updates to the WaterWise Program and potential new water efficiency codes/standards.

Summary

The Committee's advice to the City's WaterWise Program team will inform next steps in the planned public engagement process. In 2022, the City plans to form a Technical Work Group with 8 to 10 members representing a cross-section of perspectives who will meet regularly over the course of 12 months. This summary of the Committee's policy-level advice will be shared with the Technical Work Group as a starting point. The Technical Work Group will consider code alignment and other implementation details for updates to existing water waste regulations as well as new indoor and outdoor water efficiency codes/standards and incentives.

Appendix

CITY OF BEND

City of Bend WaterWise Program
Environment and Climate Committee Memo

October 5, 2021

To: Environment & Climate Committee

Subject: WaterWise Program Update Part 1 (October-December 2021 Topic Series)

Overview & Purpose

The City of Bend is updating its award-winning WaterWise Program to build on current successes and continue to improve water use efficiency. The City's recent state-approved Water Management and Conservation Plan modeled and identified 11 cost-effective water conservation measures with the highest indoor and outdoor water-saving potential. Along with reducing water waste, implementing these measures can potentially save $21 million in capital spending by delaying or eliminating the need for three new wells and a large reservoir.

Prior to implementing the updated WaterWise Program, the City is looking to share information and get advice from the Environment and Climate Committee on the best-suited strategies for implementing new measures, creating new standards, and maintaining community support while achieving water efficiency goals.

Three-Part Meeting Series Overview

The below outline previews the planned discussion topics over the coming three meetings.

- **Oct. 14, 2021:** Part 1: Water Supply & Conservation Overview
- **Nov. 10, 2021:** Part 2: WaterWise Program History & Progress
- **Dec. 9, 2021:** Part 3: WaterWise Program Future & Next Steps

These conversations will inform next steps in our planned public engagement process, including formation of a Technical Conservation Work Group in 2022 to consider implementation details.

Part 1: Water Supply & Conservation Overview

At the Oct. 14 meeting, we'll introduce the WaterWise Program topic and our ask of the Environment and Climate Committee, then address some of the common questions about water conservation before taking a closer look at the City's WaterWise Program. To help prepare for this introductory conversation, we've provided links to three brief read-ahead resources.

Part 1 Topics:

- Planning for a Reliable Water Future: Water Supply Myths & Facts
- Regional Collaboration: Bend's Role in the Deschutes Basin
- Managing Our Slice: Bend's Best Opportunities to Improve Water Efficiency

Part 1 Resources:

- Integrated Water System Master Planning Video (9-min)
- Water Management and Conservation Plan Fact Sheet
- WaterWise Program Facts (attached)

CITY OF BEND

Planning for a Reliable Water Future: Bend's WaterWise Program Facts

The City of Bend is updating its award-winning WaterWise Program to build on current water conservation successes and continue to improve water-use efficiency. The WaterWise Program uses national standards to establish cost-effective indoor and outdoor water-saving measures best-suited to Bend's community and climate. Bend's continued focus on water efficiency will help sustain water supplies, reduce energy use, save infrastructure dollars, and contribute to a healthy environment for current and future generations.

Frequently Asked Questions

What steps is the City taking to plan ahead for a reliable water supply?

The City recently completed a 20-year Integrated Water System Master Plan to identify what steps are needed to maintain reliability of Bend's drinking water system and supplies. This data-driven planning effort brought together conservation, operations, and economic analyses to take a comprehensive look at the water system.

Does Bend have enough water for the future?

Based on recent planning and modeling analyses, the City's current water supplies and rights are sufficient to meet projected 2040 demands. The City's WaterWise Program and doing more with less will continue to be an important part of the City's approach to maintaining a reliable supply of high-quality drinking water.

What role does the City play in sustaining regional water supplies?

The City is an active partner in the Deschutes Basin Water Collaborative working with other stakeholders on regional solutions to balance water use in the basin. This work includes the Deschutes Basin Study, which uses the best available science and technology to model current and future regional water supplies. Collectively, the cities of Bend, Redmond, Madras, Sisters, and La Pine, account for less than 2 percent of overall water use in the Deschutes Basin.

5 Things to Know

1. Municipalities account for less than 2 percent of the overall Deschutes Basin water use—doing more with less is one of the ways the City of Bend is helping sustain regional supplies.
2. Water efficiency has been a City priority for the past two decades. Despite Bend's population doubling since 2000, the highest water-use day demand is less than in 2008.
3. The City's WaterWise Program uses national standards selected to provide the highest indoor and outdoor water-saving potential for Bend's unique community.
4. Continued success of the data-driven WaterWise Program can potentially save $21 million in capital spending by delaying or eliminating the need for three new wells and a large reservoir.
5. In Bend, 60 percent of the current annual water use is used for outdoor landscape irrigation in the summer months.

Why is the City updating the WaterWise Program?

The City recently completed a state-approved Water Management and Conservation Plan that modeled and identified cost-effective measures with the greatest indoor and outdoor water-savings potential. By implementing this updated plan, the City will not only save water, but can also potentially save $21 million dollars by deferring new water infrastructure.

What are the biggest opportunities to improve water efficiency?

In Bend, 60 percent of annual water use is residential landscape irrigation in the summer months. Some of the City's most successful initiatives include the sprinkler inspection program, large landscape program, and contractor education. When it comes to indoor water use, the biggest opportunity for saving water is high-efficiency toilets. Toilet use alone typically accounts for 24 percent of indoor use.

What can customers do to be more water efficient?

The City has a variety of resources to help customers improve water efficiency both indoors and outdoors. The list below includes links to online tips, tools, and guides.

- **Customer Service Portal:** Bend customers who register with the City's water use tool (WaterSmart) are able to track their daily water use online, see how they compare to similar water users, and get notification of potential water leaks.
- **WaterWaste Prevention Program:** Bend irrigation system owners can work with the City's WaterWise Program to reduce waste using practical and cost-effective solutions.
- **WaterWise Indoors:** The City offers indoor water conservation kits and tips on selecting efficient plumbing fixtures. Faucets, toilets, and showerheads with the Environmental Protection Agency's 'WaterSense' label have been tested and approved by industry experts.
- **WaterWise Landscaping:** The City offers resources, tools, and guides to help make landscaping more water-efficient and drought-resistant.
- **WaterWise Irrigation:** The City provides homeowner irrigation tips and tools, including guidance on regular system inspections and irrigation schedule adjustments to avoid over-spray or runoff.
- **Sprinkler Inspection Program:** The City offers free sprinkler inspections by scheduled appointment on a first-come, first-served basis between June and September.
- **WaterWise Contractors:** The City works with landscaping contractors to promote water-efficiency, including through the Large Landscape Program which pairs water conservation staff with contractors and owners or large landscapes to find water savings.
- **WaterWise Demo Garden:** Working with local partners, the City created a demonstration garden at Hollinshead Park that uses low-water plants and irrigation techniques well-suited for Central Oregon landscapes.

ENVIRONMENT & CLIMATE COMMITTEE

PART 1: WATER SUPPLY & CONSERVATION OVERVIEW

OCTOBER 14, 2021

Presented By:
Mike Buettner
Dan Denning
Patrick Griffiths
Aubrie Koenig

ONE WATER APPROACH: STEWARDSHIP & EFFICIENCY

Water

Delivering the highest quality water from pure sources to our residents, businesses and visitors

Sewer

Collecting local used water, safely treating it for reuse and/or returning it back into our aquifer

Storm

Protecting both surface and ground water quality, and preventing localized flooding

PATH TO AN UPDATED WATERWISE PROGRAM

A look ahead at the next 3 months:

- **Today - Oct. 14, 2021:**
  Water Supply & Conservation Overview

- **Nov. 10, 2021:**
  WaterWise Program History & Progress

- **Dec. 9, 2021:**
  WaterWise Program Future & Next Steps

Photo: Prowell Springs

Part 1: Water Supply & Conservation Overview

1. Planning for a Reliable Water Future: Water Supply Myths & Facts
2. Regional Collaboration: Bend's Role in the Deschutes Basin
3. Managing Our Slice: Bend's Best Opportunities to Improve Water Efficiency

PLANNING FOR A RELIABLE SUPPLY

SOME MYTHS AND FACTS

THE DESCHUTES BASIN IS VERY UNIQUE - GROUNDWATER

KEY QUESTIONS, MYTHS & FACTS

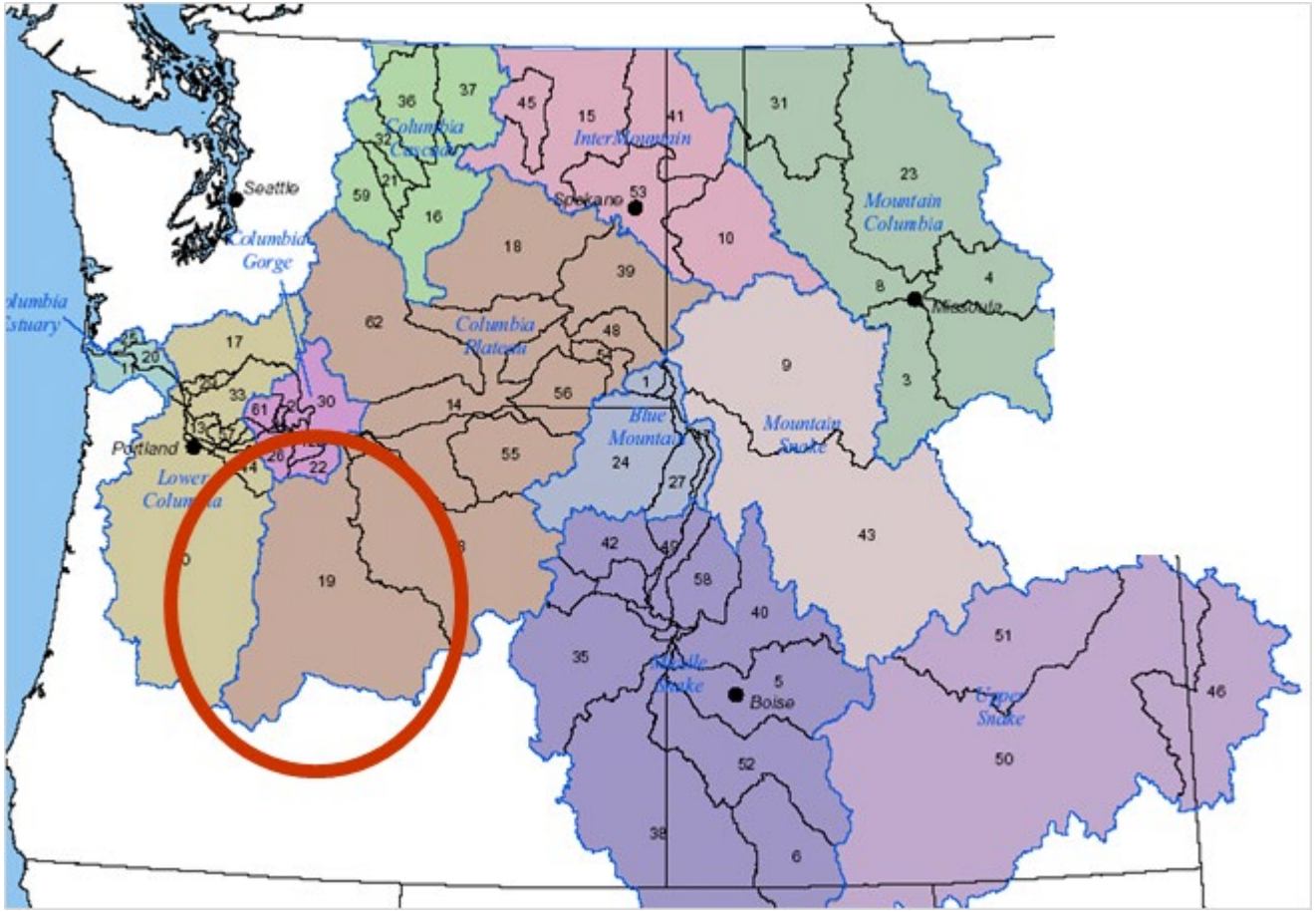
Planning Related Questions

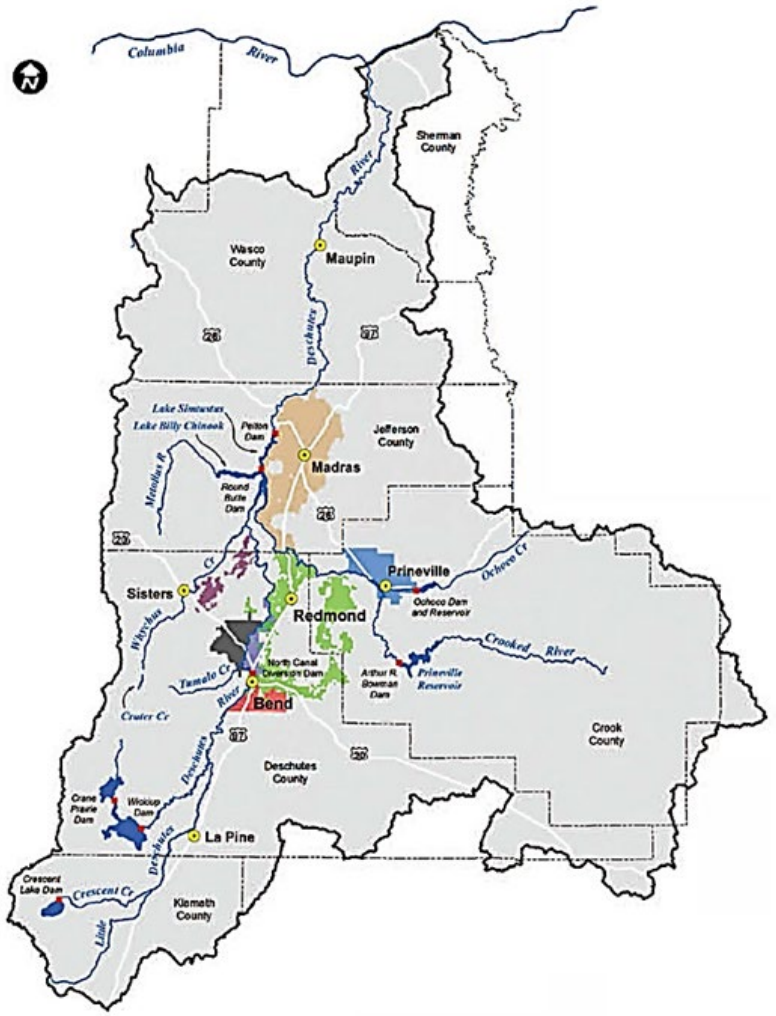
- Will Bend growth dry up the Deschutes basin?
- Who are the largest users of water?
- Are we planning for the right water future?
- Deschutes Basin Water Collaboration

Other Myths…

- Golf courses use all the water
- Breweries / distilleries use all the water
- Water reuse and graywater is the solution

DESCHUTES BASIN: PART OF COLUMBIA RIVER BASIN SYSTEM



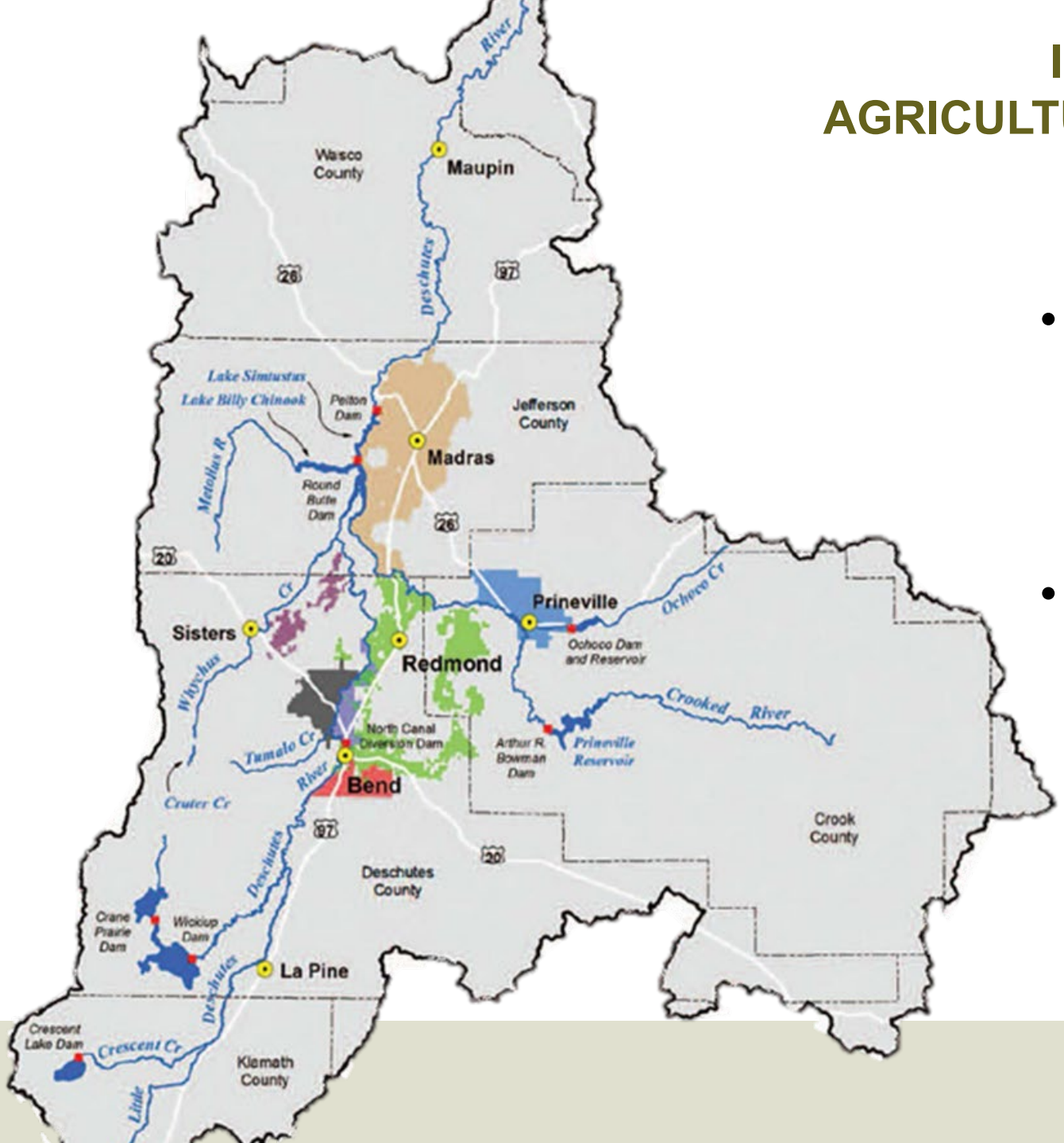


EXISTING SUPPLY! - NATURAL CONDITIONS

- Less than 12 inches of precipitation in Bend, only about 5 inches during growing season!
- Over 100 inches of rain or snow along Cascade crest: Recharge!
- Annual Upper Basin water inputs range from 860,000 AF to 2.3M AF

PLANNING FOR A RELIABLE SUPPLY: ROLE OF REGIONAL COLLABORATION

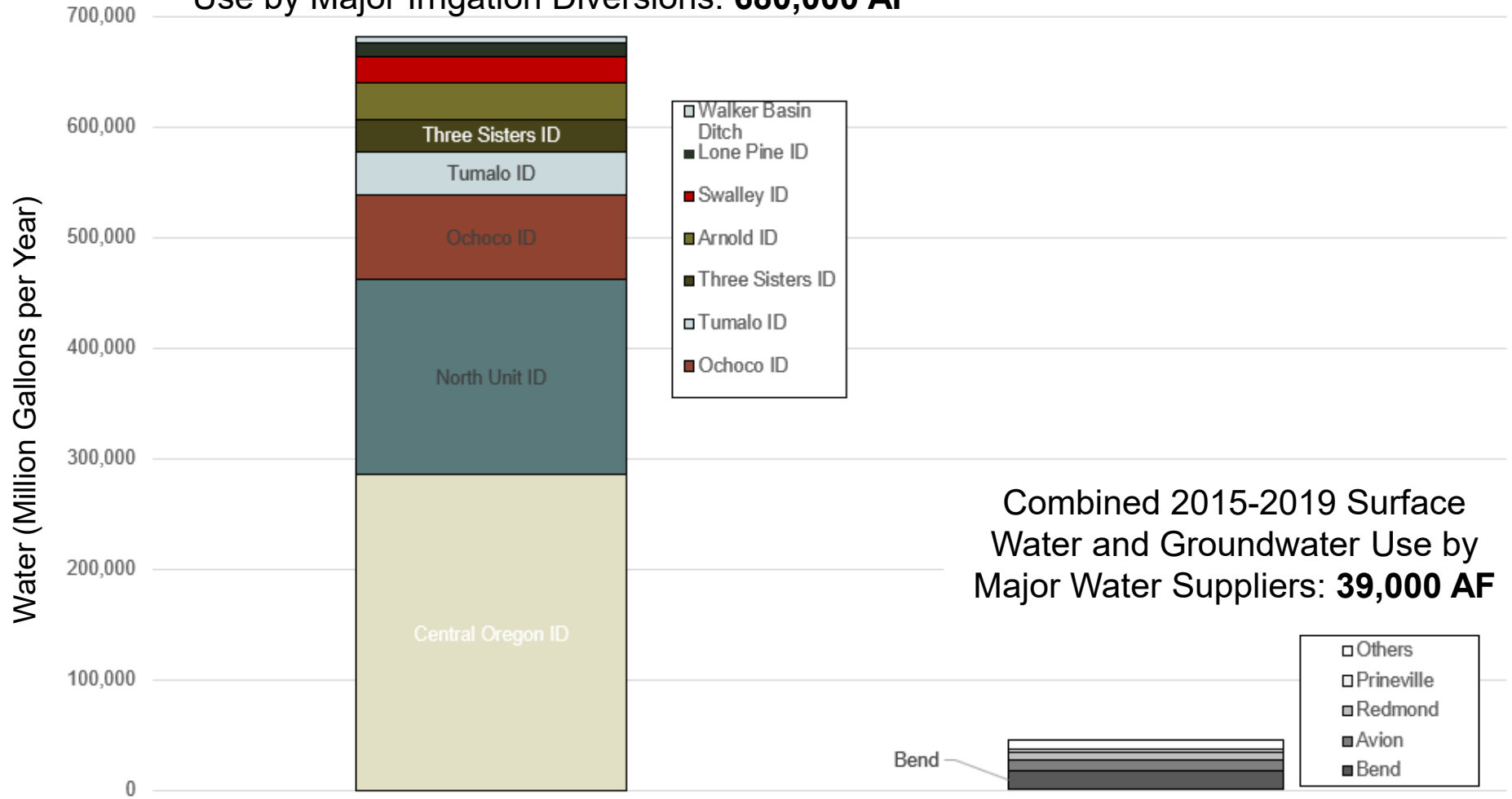
IRRIGATION DISTRICT AGRICULTURAL LAND IN BASIN



- +/- 160,000 acres in irrigation district boundaries through Federal Settlement Acts
- Nine Central Oregon cities have been added on top of/next to irrigation districts

DESCHUTES BASIN PRINCIPAL WATER USES 2015-2019

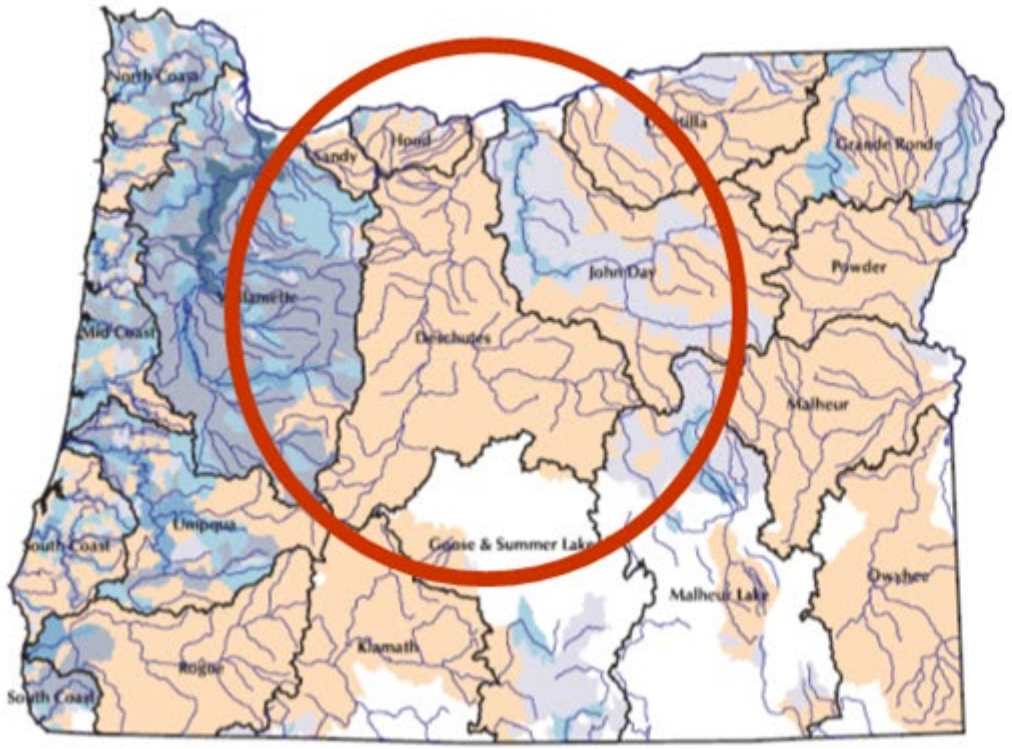
Combined 2015-2019 Average Surface Water Irrigation Use by Major Irrigation Diversions: **680,000 AF**



Combined 2015-2019 Surface Water and Groundwater Use by Major Water Suppliers: **39,000 AF**

NO ADDITIONAL SURFACE WATER AVAILABLE
(MOST BASINS IN WEST ARE ALREADY OVERALLOCATED!)

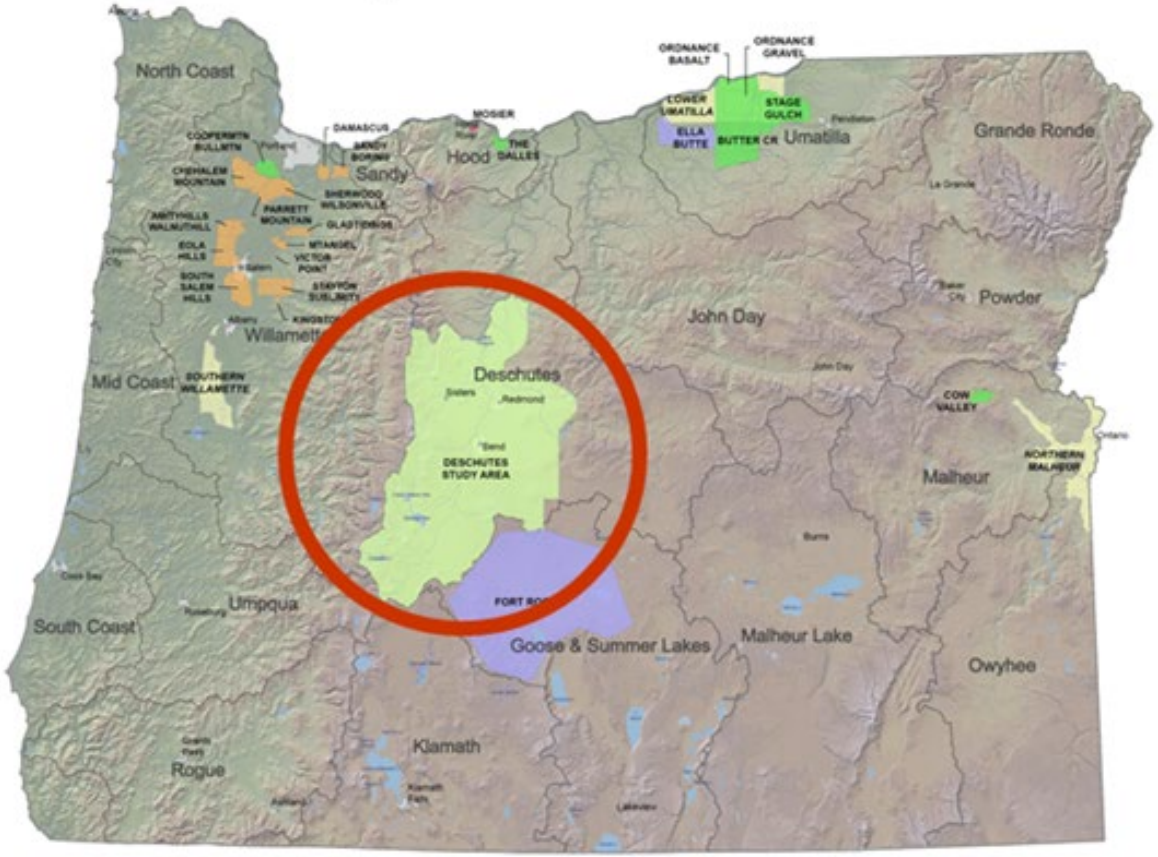
JANUARY



AUGUST

GROUNDWATER REQUIRES MITIGATION
(MITIGATION COMES FROM EXISTING WATER)

Groundwater Management Areas



Deschutes Basin

DESCHUTES BASIN SELECT FUTURE WATER NEEDS

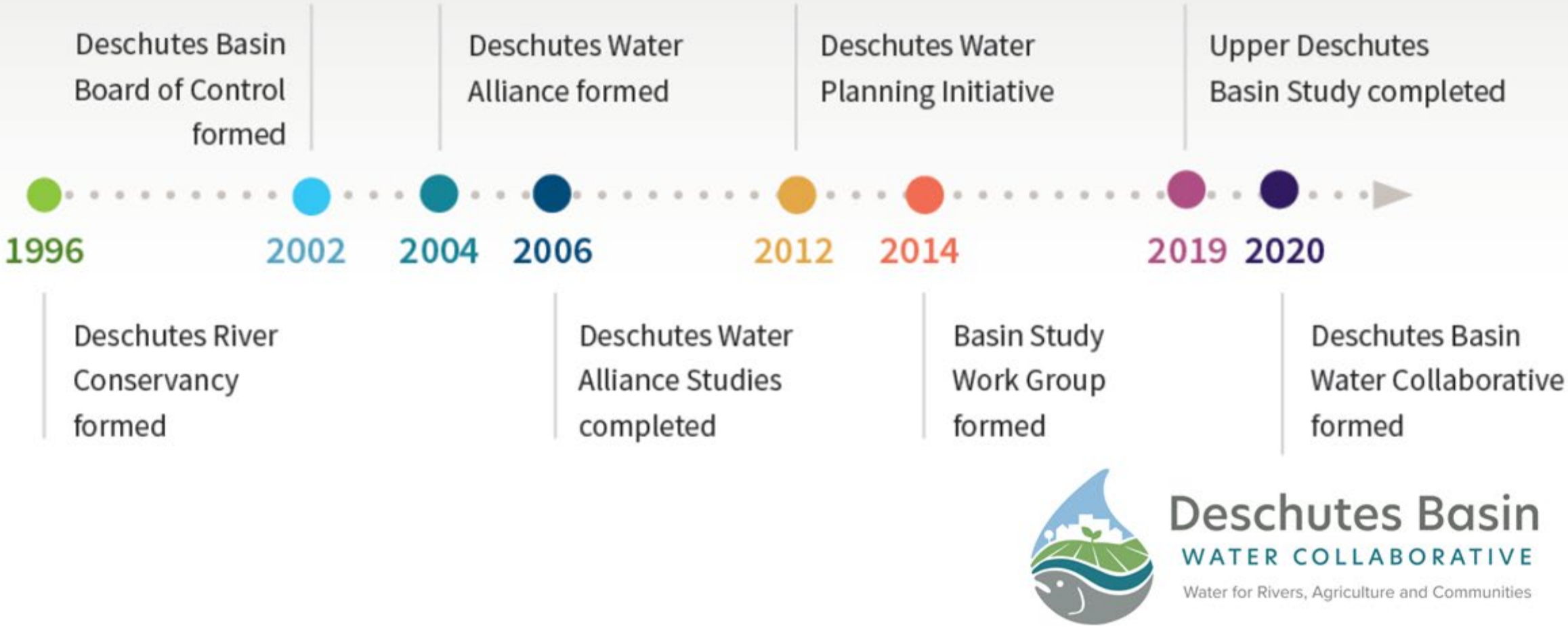
Current Surface Water Diversion for Comparison
(40-60% is loss, plus on-farm losses of 20-50%)

Future Groundwater Needs
Cities & private water companies to 2050+. Water must be dedicated instream to create mitigation credits.

Median Year Irrigation District & Instream Shortages
(Water needed to meet junior water rights & instream flow targets. Note: more is necessary in dry years.)

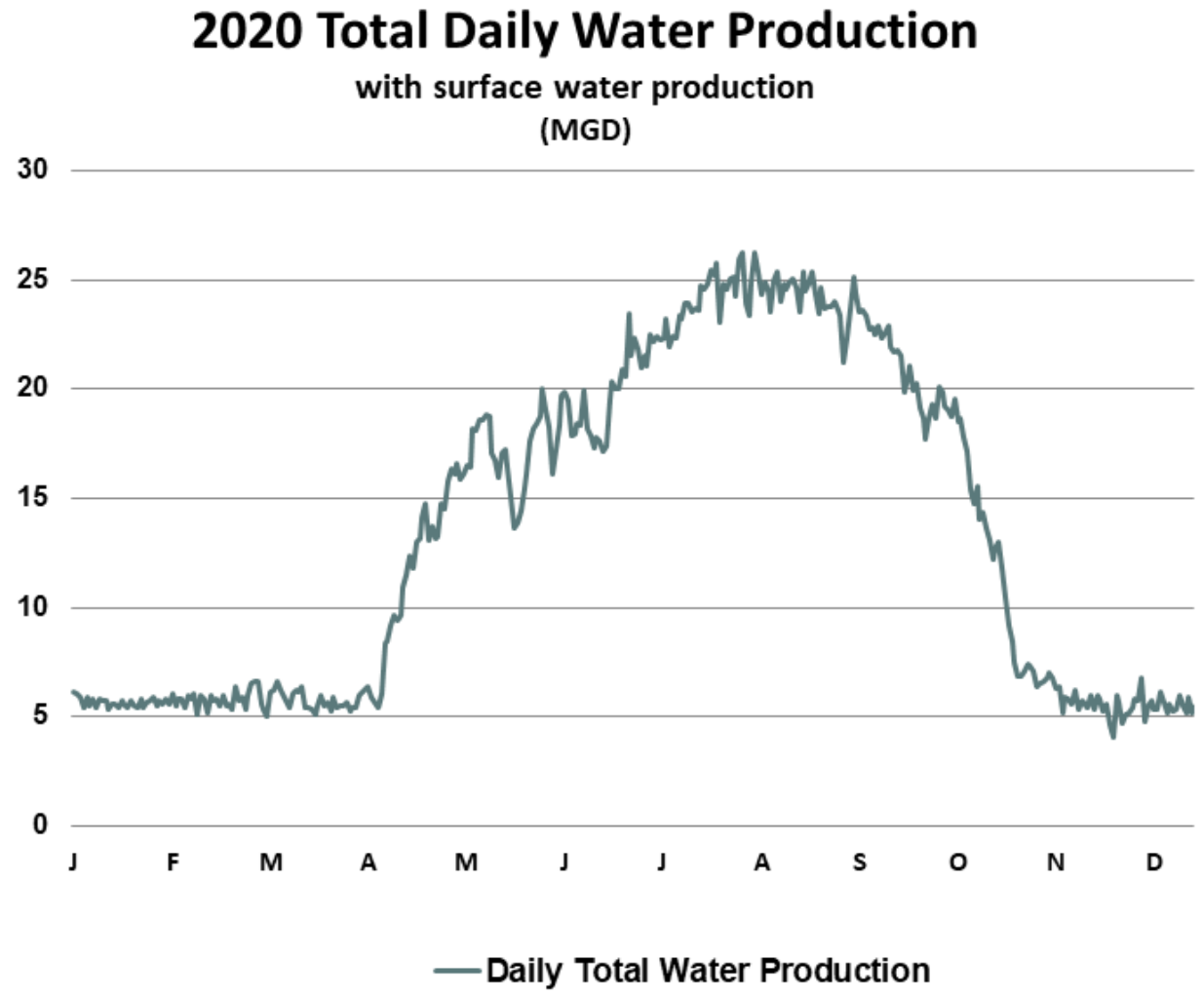
Source: 2019 Upper Deschutes Basin Study

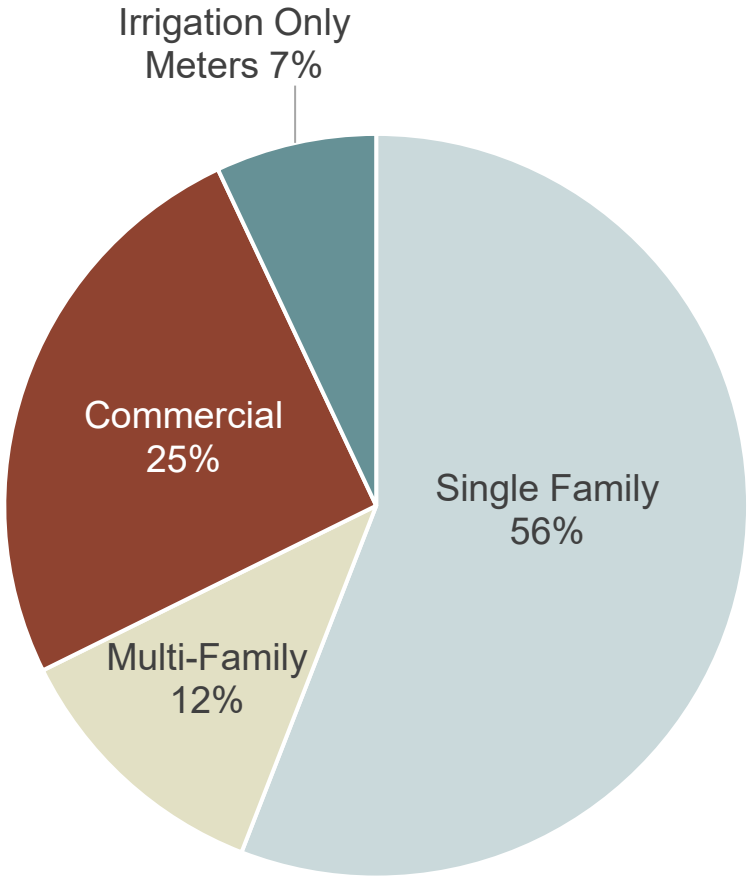
DESCHUTES BASIN: LONG HISTORY OF COLLABORATION



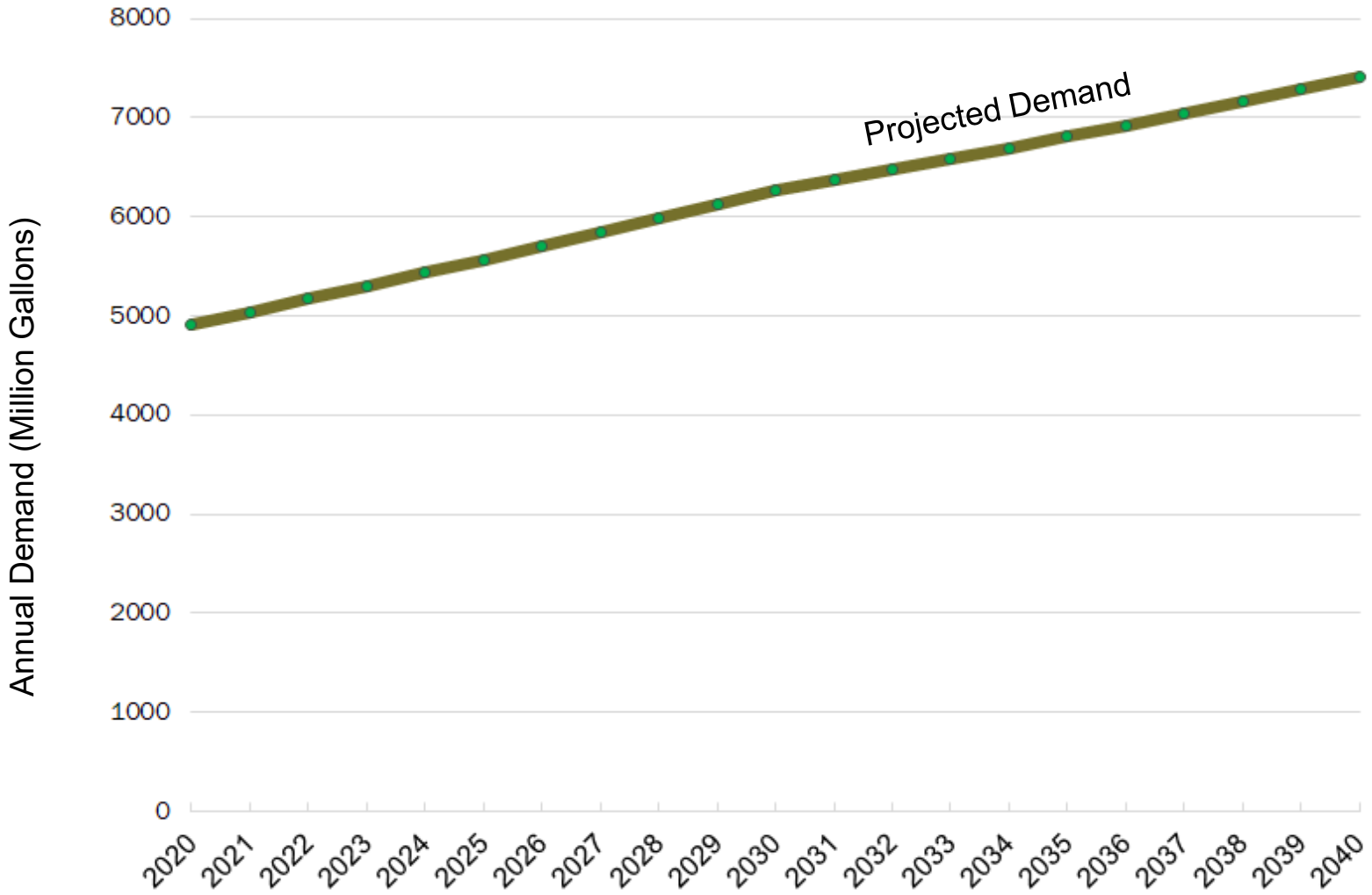
MANAGING OUR SLICE:
BEND'S BEST OPPORTUNITIES TO IMPROVE WATER EFFICIENCY

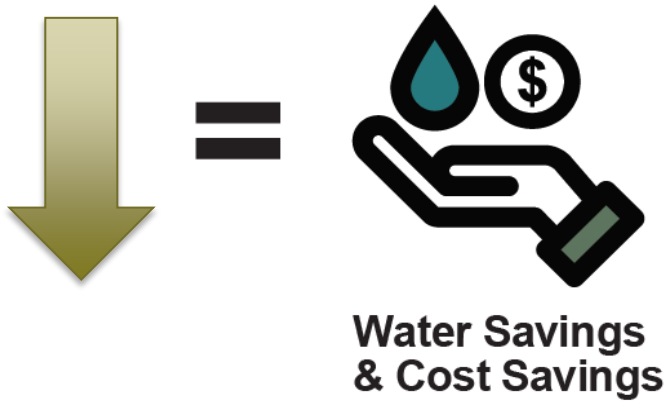
HOW BEND USES WATER





BEND WATER NEEDS

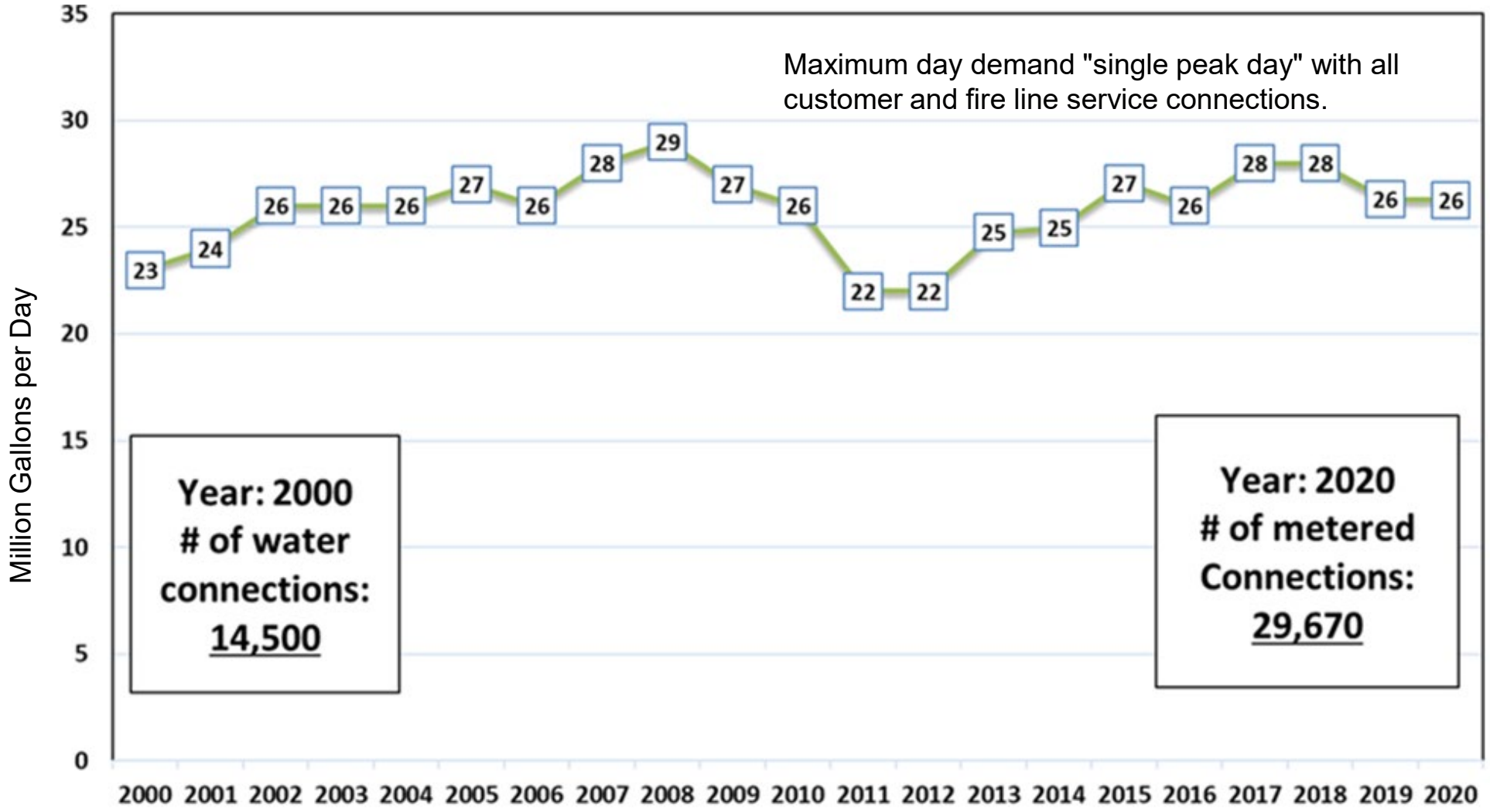




EXISTING WATERWISE PROGRAMS ARE WORKING

- Achieves all state requirements in Water Management & Conservation Plan
- Takes an integrated, data-driven approach to water efficiency
- Awarded “Best Conservation Program” by Oregon Water Resources Department and "G480 Silver" by Alliance for Water Efficiency
- Implementing ADDITIONAL water efficiency measures in 2022 and beyond
- Learn more: bendoregon.gov/water

CITY WATER DEMAND SUMMARY DATA 2000-2020



BEND'S CONSERVATION PROGRAM

Existing Conservation Measures

+

New Conservation Measures

=

Water Savings & Cost Savings

CITY OF BEND

City of Bend WaterWise Program
Environment and Climate Committee Memo

November 1, 2021

To: Environment & Climate Committee

Subject: WaterWise Program Updates Part 2 (October-December 2021 Topic Series)

The City of Bend is updating its award-winning WaterWise Program to build on current successes and continue to improve water use efficiency. In the October Environment and Climate Committee meeting, we highlighted some of what Bend has accomplished over the past two decades through voluntary water efficiency programs. With the updated WaterWise Program, the City is looking at ways to do more. One of these opportunities is to consider new standards/codes to achieve broader adoption of indoor and outdoor water efficiency measures with the greatest water-saving potential for Bend.

What we're asking the Committee:

We're seeking the Committee's advice on the best-suited policy-level strategies to implement new standards/codes and maintain community support. Some of the questions we'll be asking along the way include:

- Do you think Bend should continue focusing on education or shift to enforcement to promote existing water waste regulations (Bend Code 14.20 Use of Water)?
- Where do you think Bend should fall on the spectrum of voluntary to mandatory adoption of new indoor water efficiency standards? (Think faucets, showerheads, toilets, dishwashers, and other appliances.)
- Where do you think Bend should fall on the spectrum of voluntary to mandatory adoption of new outdoor water efficiency standards? (Think outdoor irrigation equipment and controllers.)

Three-Part Meeting Series Overview

The below outline identifies the planned discussion topics over the three meetings.

- ✓ **Oct. 14, 2021:** Water Supply & Conservation Overview
- **Nov. 10, 2021:** WaterWise Program History & Progress
- **Dec. 9, 2021:** WaterWise Program Future & Next Steps

Part 2: WaterWise Program History & Progress

At the Nov. 10 meeting, we'll describe goals and opportunities for the City's WaterWise Program moving forward and ask for the Committee's initial input on policy-level implementation strategies for new standards/codes. We plan to send a brief online survey after the meeting to collect additional feedback and ideas.

Part 2 Discussion Topics:

- Bend's Water Use Demands and Conservation Opportunities
- Current Water Waste Regulations
- Home Water Use Efficiency Standards: Voluntary or Mandatory
- Landscape and Irrigation Standards: Voluntary or Mandatory
- Next Steps: Policy-level Advice

Part 2 Read-ahead Resources:

- Bend's Water Use Demand – *summary figures presenting an overview of Bend's existing water use demands (3 pages).*
- Residential End Uses of Water – *executive summary from a national Water Research Foundation study outlining residential water efficiency potential (15 pages).*
- Water Management and Conservation Plan Exhibit 3-1: Conservation Measures and Benchmarks – *summary table describing the City's progress implementing water conservation measures (4 pages).*
- Water Waste Prevention Program – *webpage overview of Bend's current Water Waste Prevention Program and regulations.*
- Water Waste Prevention Program Report – *brief summary reports from 2019 and 2020 with metrics highlighting the City's Water Waste Prevention Program (10 pages).*

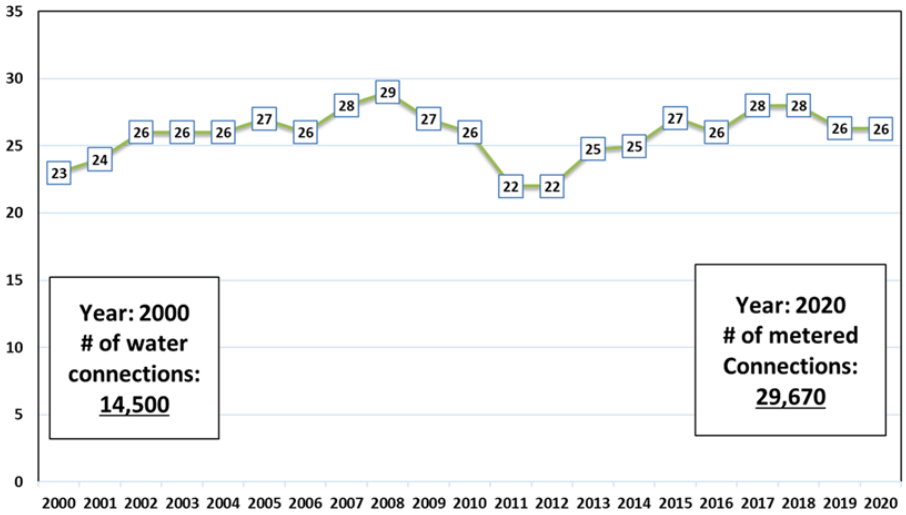
CITY OF BEND

Planning for a Reliable Water Future: Bend's Water Use Demand

The City of Bend's updated WaterWise Program leverages water use data to identify the greatest water savings opportunities to improve indoor and outdoor water efficiency. The following graphics are presented as an overview of Bend's water use demand patterns.

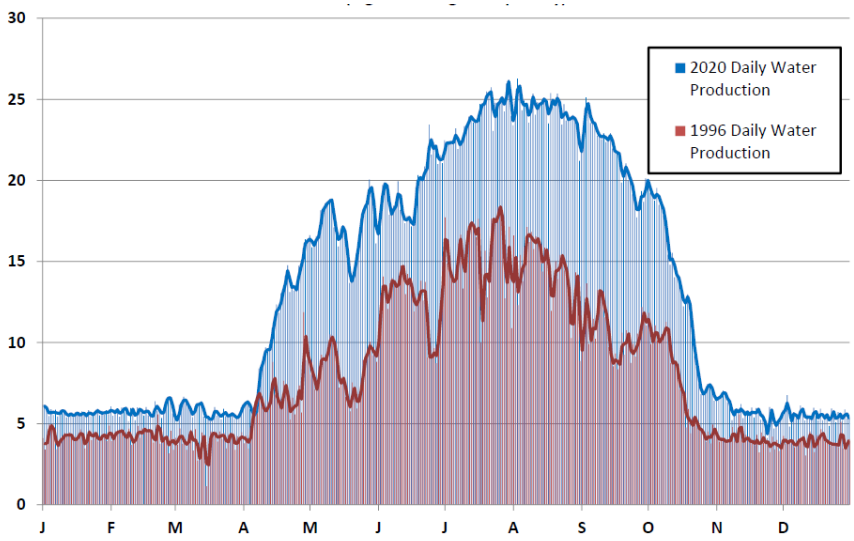
Bend's Annual Peak Day Water Demand

Water efficiency has been a City priority for the past two decades. Despite Bend's population doubling since 2000, the highest water-use day demand is less than in 2008.



Bend's Annual Water Production Growth Patterns 1996-2020

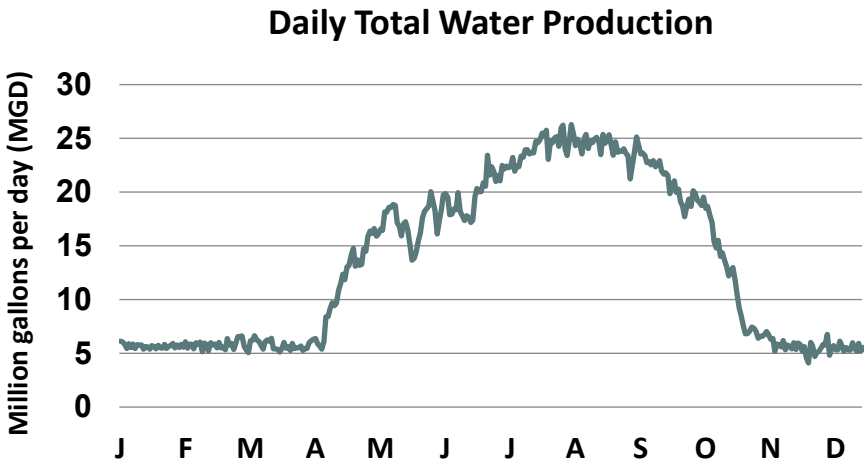
The figure below shows the growth trend in Bend's total water production from 1996 to 2020 in million gallons per day.



CITY OF BEND

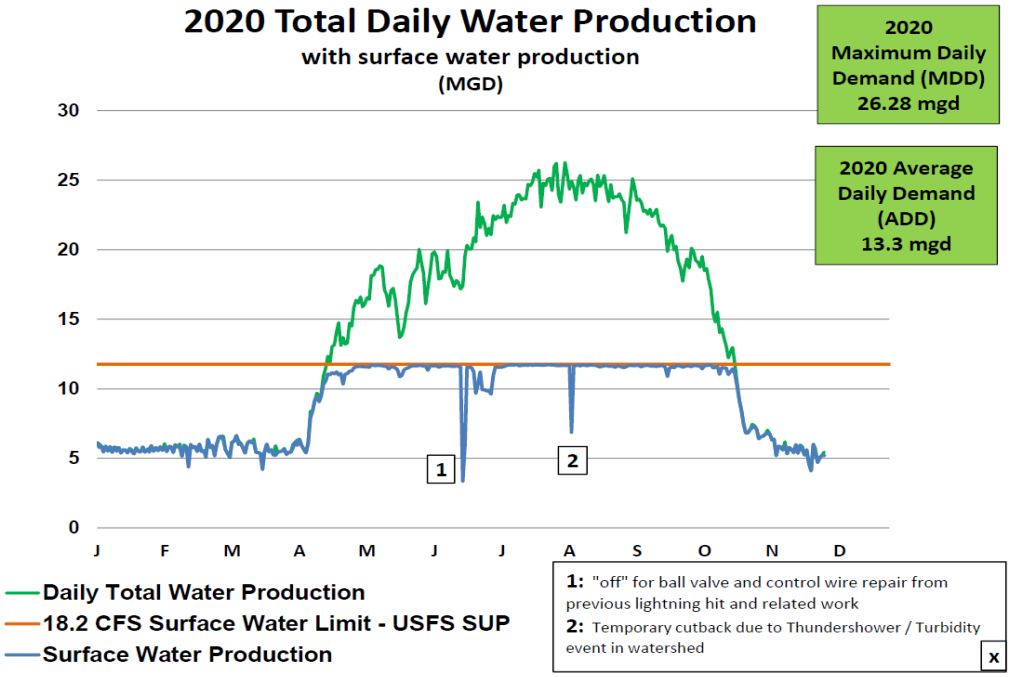
Bend's 2020 Total Annual Water Production

The figure below describes the total surface water and groundwater production to meet Bend's water needs in 2020. This shows the seasonal increase in summer months.



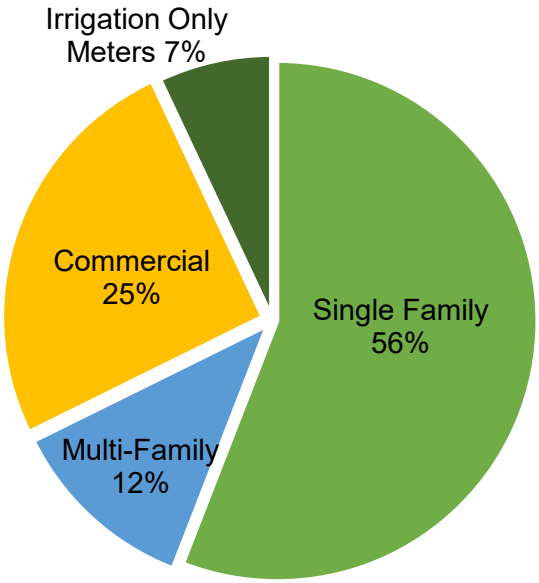
Bend's 2020 Annual Water Production by Source

The figure below breaks out Bend's total water production by source. This shows that groundwater is needed to meet peak demands during the summer months.



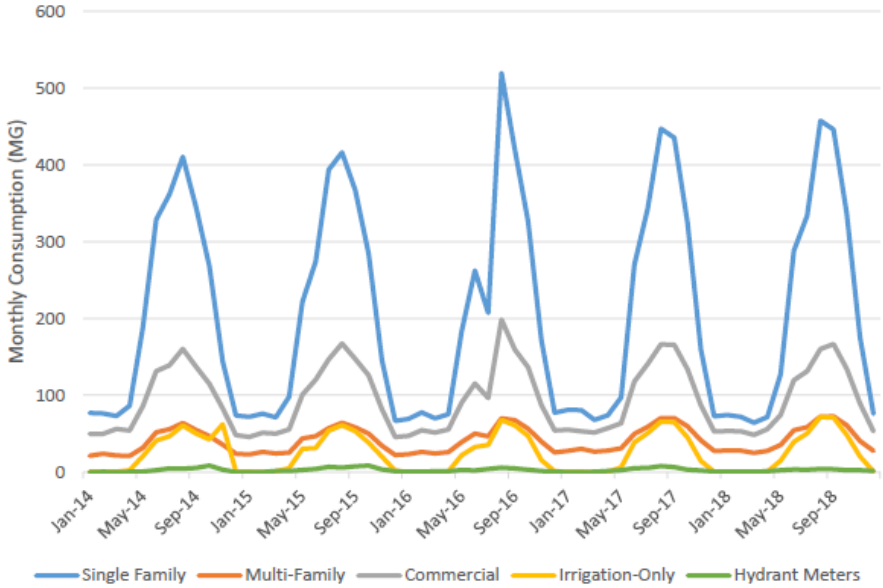
Bend's Water Use by Customer Category

The pie chart below shows single-family homes make up more than half of Bend's water use.



Bend's Monthly Water Use by Customer Category

The figure below shows how water use changes for each customer category throughout the year. This shows the highest use is from single-family homes with seasonal spikes during the summer months.



Residential End Uses of Water, Version 2

EXECUTIVE REPORT

Water Research Foundation℠

Contents

Disclaimer:

This study was jointly funded by the Water Research Foundation (WRF), City of Fort Collins Utilities, City of Scottsdale Water Department, Clayton County Water Authority, Denver Water, Portland Water Bureau, Region of Peel, Region of Waterloo, San Antonio Water System, Tacoma Public Utilities, Toho Water Authority, Tampa Bay Water, and the Alliance for Water Efficiency on behalf of Portland Water Bureau, Region of Peel, San Antonio Water System, and Tampa Bay Water (co-sponsors). WRF and the co-sponsors assume no responsibility for the content of the research study reported in this publication or for the opinions or statements of fact expressed in the report. The mention of trade names for commercial products does not represent or imply the approval or endorsement of WRF or the co-sponsors. This report is presented solely for informational purposes.

Published April 2016

Residential End Uses of Water, Version 2: Executive Report

For more information about this project, please visit **www.waterrf.org/4309**

Prepared by:

William B. DeOreo, Aquacraft, Inc. Water Engineering and Management
Peter Mayer, Water Demand Management
Benedykt Dziegielewski, University of Southern Illinois
Jack Kiefer, Hazen and Sawyer, P.C.

Jointly sponsored by:

Water Research Foundation, City of Fort Collins Utilities, City of Scottsdale Water Department, Clayton County Water Authority, Denver Water, Portland Water Bureau, Region of Peel, Region of Waterloo, San Antonio Water System, Tacoma Public Utilities, Toho Water Authority, and Tampa Bay Water. The Alliance for Water Efficiency coordinated the financial support from Portland Water Bureau, Region of Peel, San Antonio Water System, and Tampa Bay Water.

Project Technical Advisory Committee:

Doug Bennett, Southern Nevada Water Authority
David Bracciano, Tampa Bay Water
Robert Day, San Jose Water Company
Mary Ann Dickinson, Alliance for Water Efficiency
Warren Liebold, New York City Department of Environmental Protection

Published by: Water Research Foundation℠

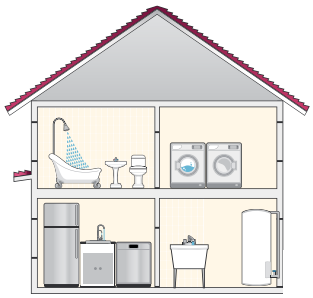
ISBN 978-1-60573-236-7

Residential End Uses of Water, Version 2: Executive Report

Single-family homes typically use the most water of any utility customer sector. The 23 utilities studied show a decline of 22 percent in average annual indoor household water use since WRF's landmark 1999 study. Water providers should consider lower household water use when making future plans.

Introduction

It is essential for water providers and the urban water supply industry to have a detailed understanding of how water is used in residential settings. While water use in homes was studied as early as the 1940s, interest intensified after the Energy Policy Act of 1992, which sought to improve energy and water efficiency. This Act established maximum flow rates for new residential toilets, showerheads, and faucets. Later federal regulations included clothes washers. Water efficiency in homes has also been encouraged by programs like EPA's WaterSense.



22%
DECREASE
1999-2016

Average annual indoor household water use

Until now, the most significant residential end use study conducted in North America was the Water Research Foundation's 1999 report, *Residential End Uses of Water* (REU1999) (Mayer et al. 1999). WRF's new report, *Residential End Uses of Water, Version 2* (REU2016) (DeOreo et al. 2016), provides an updated and expanded assessment of water use. It includes more varied study site locations, hot water usage data, more detailed landscape analysis, and additional water rate analysis.

The new study identifies variations in water use by each fixture or appliance, providing detailed information and data on changes since the REU1999 study. Looking to the future, the study's research evaluates conservation potential, and includes predictive models to forecast residential demand.

The decline in water use across the residential sector, even as populations increase, poses new challenges for water utilities. Information on single family home water consumption is significant for utility rate and revenue projections, capital planning (water supply and infrastructure needs), daily operations to provide water, water efficiency programs, and more.

Current Residential Water Use: the REU2016 Study

The homes studied in REU2016 showed an average annual use of 88,000 gallons per household per year (gphy).[1]

Annual Use

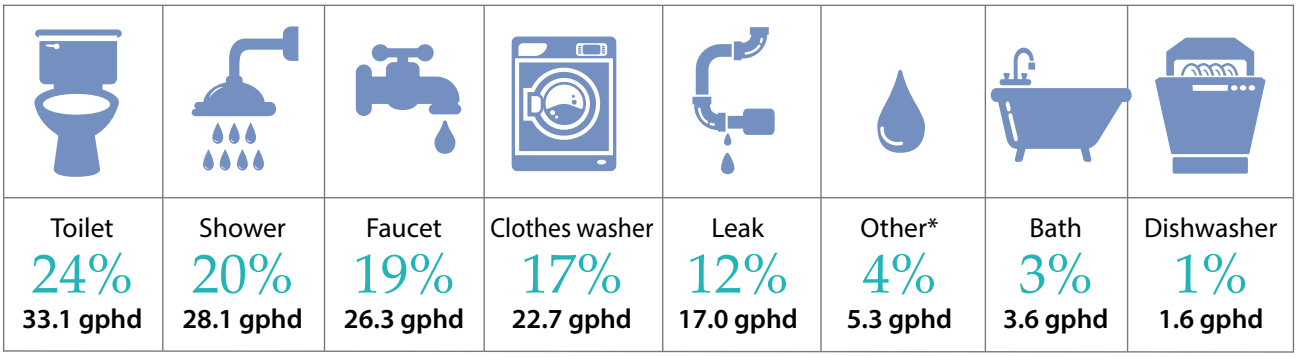
In REU2016, approximately 1,000 single-family residential accounts were randomly selected from each of 23 study sites (see Figure 8). Billing records showed average annual per household water use ranging from 44,000 to 175,000 gphy.

The large range in use reflects the strong influence of climate and weather patterns. Agencies participating in the study come from across the United States and Canada and encompass a tremendous geographic and climactic diversity. Outdoor use is more variable than indoor use, and homes in warmer climates have higher outdoor use, continuing to irrigate in winter.

A fundamental goal of REU2016 was to quantify how much water is used both indoors and outdoors, as well as per capita and household. Such metrics are valuable for understanding water use patterns, establishing efficiency levels, and developing predictive models of future demand.

[1]This REU2016 statistic is based on 23,749 homes (23 study sites, mostly 2010 billing data) with a standard deviation of 32,000 gphy. The median annual water use was 83,000 gphy.

Figure 1. Indoor household use by fixture



* The "Other" category includes evaporative cooling, humidification, water softening, and other uncategorized indoor uses.

Indoor Use

Toilet flushing is the largest indoor use of water in single-family homes, followed by faucets, showers, clothes washers, leaks, bathtubs, other/miscellaneous, and dishwashers (see Figure 1).

Mandated reductions in toilet flush and clothes washer volumes and shower and faucet flow rates have contributed to the declines in residential water use. REU2016 showed indoor water use at 138 gallons per household per day (gphd). A sample of new homes built according to EPA's WaterSense New Home Specification Version 1.0 had an average daily per household water use of 110 gphd (DeOreo et al. 2011[2]).

Hot Water

In a sub-sample of 94 homes, the average household hot water use was 45.5 gphd, which accounted for 33.2% of total indoor water use. Showers and faucets each consumed substantially more hot water than all the other end uses combined. For showers, the average daily household hot water use was 17.8 gallons, and for faucets, 15.4 gallons.

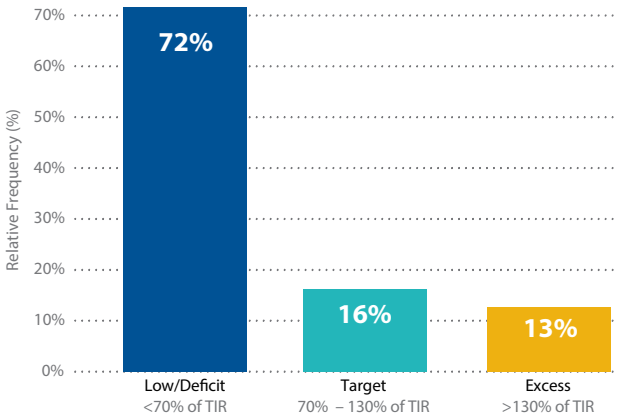
Table 1. Average daily hot water use per household

Shower	39.1%	**17.8 gphd**
Faucet	33.8%	**15.4 gphd**
Clothes washer	9.7%	**4.4 gphd**
Bath	5.7%	**2.6 gphd**
Dishwasher	4.8%	**2.2 gphd**
Leak	4.6%	**2.1 gphd**
Other	2.0%	**0.9 gphd**
Toilet	0%	**0.0 gphd**
Total		**45.5 gphd**

[2]Nearly 100 percent of the 25 new homes studied in DeOreo et al. 2011 met the following efficiency criteria: clothes washers with capacities of ≤ 30 gallons per load (gpl), shower flow rates ≤ 2.5 gallons per minute (gpm), and toilet flushes ≤ 2.0 gallons per flush (gpf).

Outdoor Use

Figure 2. Percent of the Theoretical Irrigation Requirement (TIR) applied to landscape.



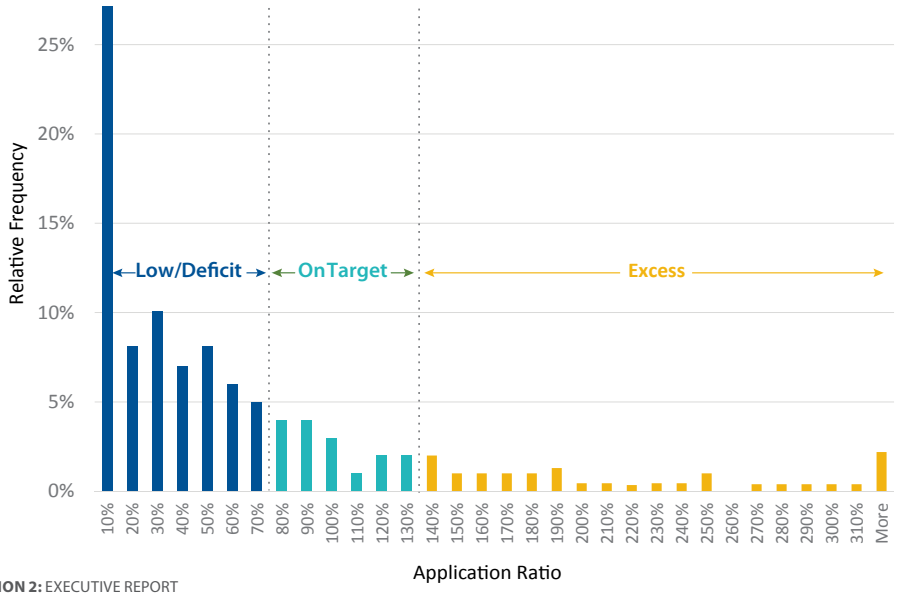
Outdoor water use was studied more extensively in REU2016 than REU1999, specifically, the efficiency of landscape irrigation. The Landscape Group was comprised of a sample of 838 homes selected as a representative subset from participating water utilities. Local weather conditions, irrigated area, water cost, and type of plant material are major drivers of outdoor use. The outdoor water use category is comprised of water uses like landscape irrigation, water used through hose bibs, water for filling and backwashing swimming pools, water for washing pavement and cars, and so forth.

While the average annual use for all sites (23,749 homes) was 88,000 gphy, the Landscape Group's annual use averaged 101,000 gphy, of which outdoor use constituted 50 percent, or 50,500 gphy.

To analyze outdoor water use, the estimated actual use was compared to the theoretical irrigation requirement—an estimation of water needs for residential and park landscapes. The theoretical irrigation requirement is considered the amount of irrigation that is theoretically required, although many landscapes can thrive on a lesser amount. The theoretical irrigation requirement was customized for each lot in the Landscape Group, considering irrigation area, groundcover type, and other local factors.

The majority of study participants—72 percent—applied considerably less water than was theoretically required and were termed "low/deficit irrigators." Sixteen percent of study participants were considered "target" irrigators, because they applied close to the theoretical irrigation requirement. A small group of over-irrigators applied gross excess water compared to the estimated theoretical requirement. This 13 percent accounts for the bulk of excess irrigation for the whole group.

Figure 3. Distribution of application ratios, Landscape Group (n=838)



Comparison with the 1999 *Residential End Uses of Water* Study

Reductions in household water use are largely due to more efficient fixtures and appliances and are not the result of either occupancy or behavior.

Annual Use

While it is tempting to compare annual use from REU1999 (146,100 gphy) to REU2016 (88,000 gphy), it is inappropriate to do so, since the participating utilities differed between the two studies. Neither of these studies was designed to be representative of all North American locations. This limits the statistical inferences and generalizations that can be drawn from the data.

REU1999 had 12 participating utilities, with 12,055 households in the sample group. Ten of the 12 participating utilities were located in the western and southwestern United States.

REU2016 had 23 participating utilities, with 23,749 homes in the sample group. The REU2016 participating utilities are spread more diversely throughout the United States, with many more eastern sites.

For both REU1999 and REU2016, the sites show extreme variation in climate and weather, and therefore it can be supposed that households will vary greatly in outdoor water use. It is more useful and appropriate to compare indoor water use between the two studies.

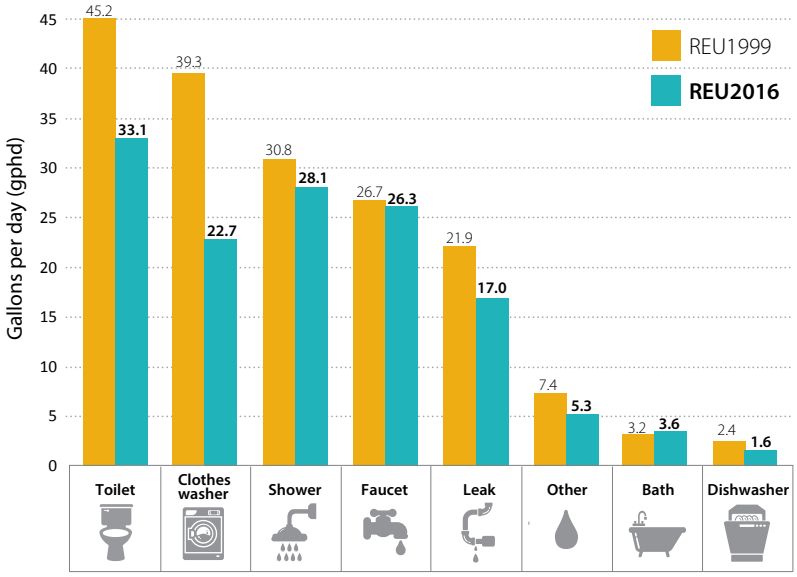




Indoor Daily Per Household and Per Capita Use

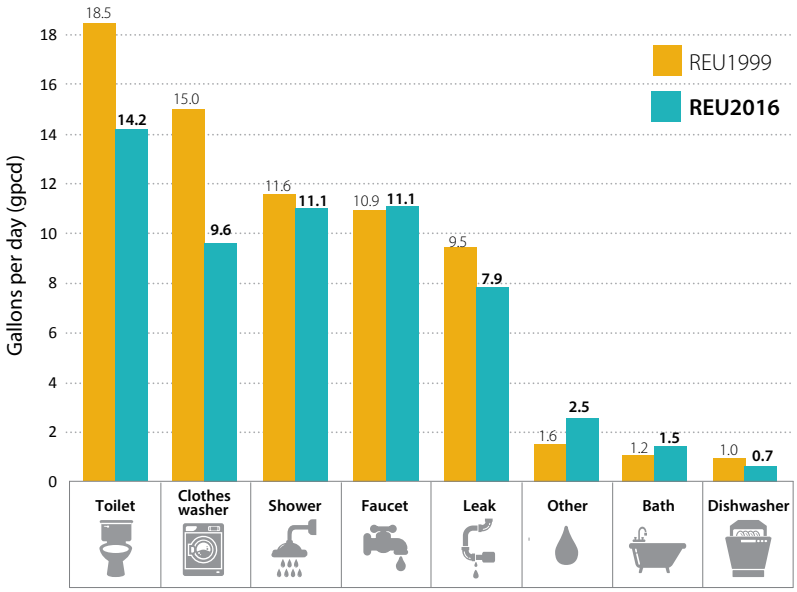
Residential indoor water use in single-family homes has decreased. The average per household daily water use has decreased 22 percent, from 177 gphd (REU1999) to 138 gphd (REU2016). Per capita average water use has decreased 15 percent, from 69.3 gpcd (REU1999) to 58.6 gpcd (REU2016). In REU1999, a household averaged 2.77 people and in REU2016, a household averaged 2.65 people. The improved water efficiency of clothes washers and toilets accounts for most of the decreases in indoor use.

Figure 4. Average daily indoor per household water use REU1999 and REU2016



22%
DECREASE
PER HOUSEHOLD
DAILY WATER USE
1999 TO 2016

Figure 5. Average daily indoor per capita water use REU1999 and REU2016



15%
DECREASE
PER CAPITA
DAILY WATER USE
1999 TO 2016

Clothes Washers

The biggest reduction in per capita water use between the two studies was measured in the clothes washer category. Starting in the mid-1990s, efficiency improvements dramatically reduced water usage, from an average volume of 41 gallons per load (REU1999) to 31 gpl (REU2016). Per capita use decreased 36 percent, from 15.0 gpcd (REU1999) to 9.6 gpcd (REU2016).

36%
DECREASE (gpcd)

Toilets

The flush volume of toilets has decreased 29 percent, from 3.65 gallons per flush (REU1999) to 2.6 gpf (REU2016). Toilet flushing frequency has remained the same—5.0 flushes per person per day. In REU1999, just 8.5 percent of homes had average toilet flushes less than 2.0 gpf. In REU2016, 37 percent of homes had average toilet flushes less than 2.0 gpf.

29%
DECREASE (gal/flush)

Dishwashers

An automatic dishwasher was present in 84 percent of the end use study homes in REU2016. The average water volume per dishwasher load decreased 39 percent, from 10.0 gallons per load (REU1999) to 6.1 gpl (REU2016). A comparison of households showed that if a house lacked a dishwasher, faucet use did not increase, which would normally be supposed. Regardless of the presence of a dishwasher, faucet use averaged 26 gphd.

39%
DECREASE (gal/load)

Leaks

The average daily per capita leakage decreased 17 percent, from 9.5 gallons per capita daily (REU1999) to 7.9 gpcd (REU2016). Thirty-two percent of homes had higher leakage rates, as high as 600 gallons per household per day.

17%
DECREASE (gpcd)

Showers, Faucets and Bathtubs Showed Minimal Change

REU2016 shows minimal change in showering patterns. The average duration held steady at 7.8 minutes per shower. The flow rate decreased just 0.1 gallon per minute. The average faucet use per household and per capita did not change at a statistically significant level from REU1999 to REU2016. Bathtubs showed a small increase, from 1.2 gpcd (REU1999) to 1.5 gpcd (REU2016). The presence of children (aged 12 and under) increased bathtub use.

0%
DECREASE

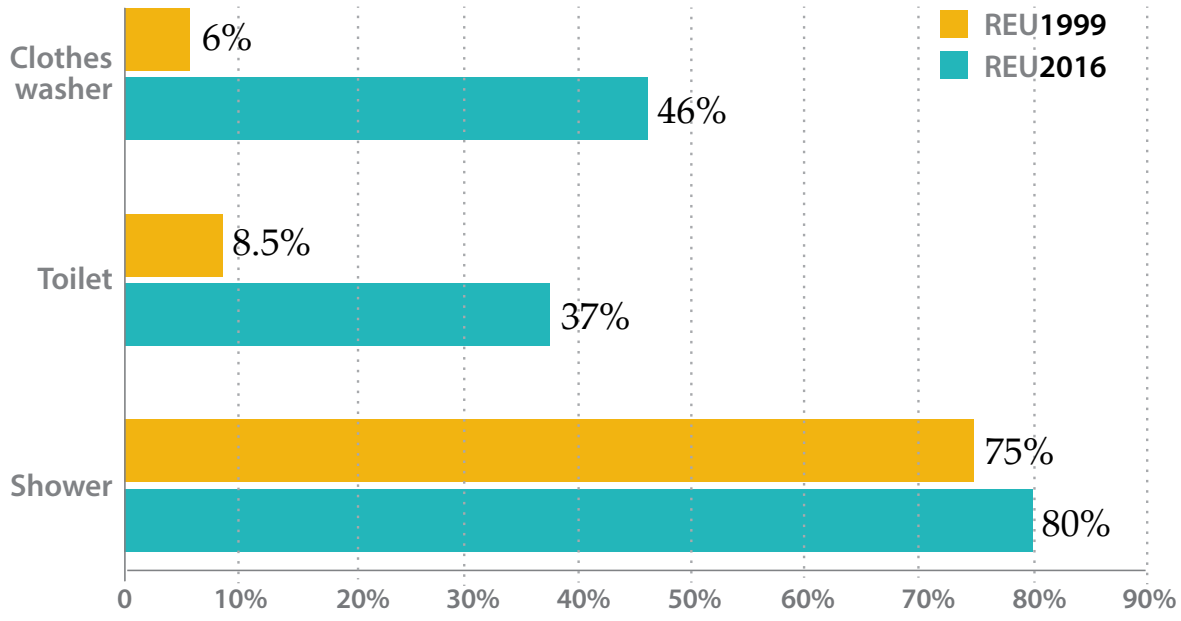
The Future: Conservation Potential

Substantial indoor and outdoor conservation potential exists in the single-family sector. With 100 percent occurrence of higher efficiency devices, indoor household water use could drop 35 percent or more, to below 40 gallons per capita per day. Aggressive outdoor water conservation could reduce outdoor use even further.

More efficient appliances and fixtures have contributed to significant reductions in residential indoor water use, but there remains much potential for additional savings. In REU2016, more than half of residences did not meet the study's efficiency criteria for clothes washers and toilets, and 20 percent did not meet those standards for showers (see Figure 6). In addition, households that currently over-irrigate could change their habits and substantially reduce their outdoor use.

Figure 6. Percent of homes meeting efficiency criteria, REU1999 and REU2016

Efficiency criteria include: clothes washers <30 gal/load, toilets <2.0 gal/flush, showers <2.5 gal/minute.



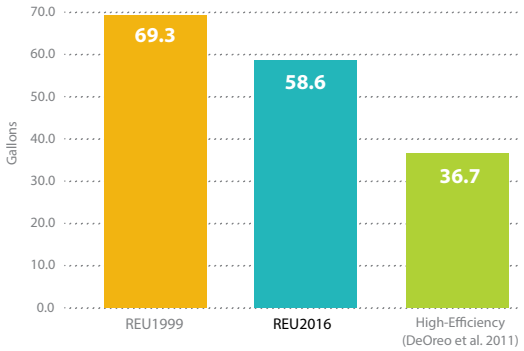


Indoor Conservation Potential

Even without a concerted effort on the part of homeowners to switch to more efficient appliances and fixtures, reductions are anticipated as old toilets and clothes washers wear out and are replaced. The current average daily indoor per household use of 138 gphd is expected to reduce to 110 gphd. Per capita use of 58.6 gpcd is expected to reduce to 36.7 gpcd in the coming years.

Further reductions are anticipated as customer side leakage is reduced (through automated metering and leak alert programs) and through on-site reuse. There are many variables that contribute to indoor water use patterns, such as the age of the fixtures and appliances, the age of housing stock, and the frequency of remodeling. Utilities should determine appropriate efficiency targets for their own service area based on local factors.

Figure 7. Indoor average gallons per capita per day, REU1999, REU2016, High Efficiency Studies



Outdoor Conservation Potential

There are a number of common strategies to maximize outdoor efficiency. Utilities should target water efficiency programs at excess irrigators. Deficit irrigators (those using less than the theoretical irrigation requirement) should be prevented from increasing their irrigation in the future. Pricing programs and reduction in planting areas may achieve outdoor demand reductions beyond efficiency measures. For example, water reductions of 20-50% are estimated when using mild to aggressive landscape conservation programs.

If excess irrigation could be eliminated in the Landscape Group, the average outdoor use would drop by 8.2 kgal per house, or 16 percent.

About the Utilities in this Study

The 23 utilities studied in this report represent a time and place snapshot of how water is used in single-family homes in North America, based on a statistically representative sample of customers from these locations.

Research Approach

Random samples of representative single-family customers were the center of the research. The study collected highly detailed information from 2010 to 2013 on water use, demographics, and the homes' landscapes.

REU2016 followed the same basic research approach as REU1999, with some notable additions. The new study included more varied site locations, collection of hot water data, and more detailed landscape analysis.

Study Participants

Utilities from across the United States and Canada were invited to participate as study sites. Ultimately, 23 utilities joined the study as full participants. Each selected a sample of approximately 1,000 single-family homes from their active customer accounts. From that database, billed consumption data were collected from 23,749 homes. An extensive survey was mailed to a total of 13,749 selected households and a total of 4,643 usable surveys were returned. The 23 utilities also provided information on metered consumption, water conservation programs, drought and conservation plans, budgets, staffing levels, and water and wastewater rates.

Nine of the utilities, called Level 1 study sites, participated more extensively. Nine hundred homes were selected for additional end use sampling. Of these, 762 analyzed flow traces, 110 were selected for hot water flow monitoring, and 838 homes participated in a Landscape Analysis Group. (The other 14 locations are called Level 2 study sites.)

The 23 utilities participating in REU2016 come from across North America and encompass a tremendous climatic, geographic, and demographic diversity.

Survey data collection

23,749
Billed consumption data

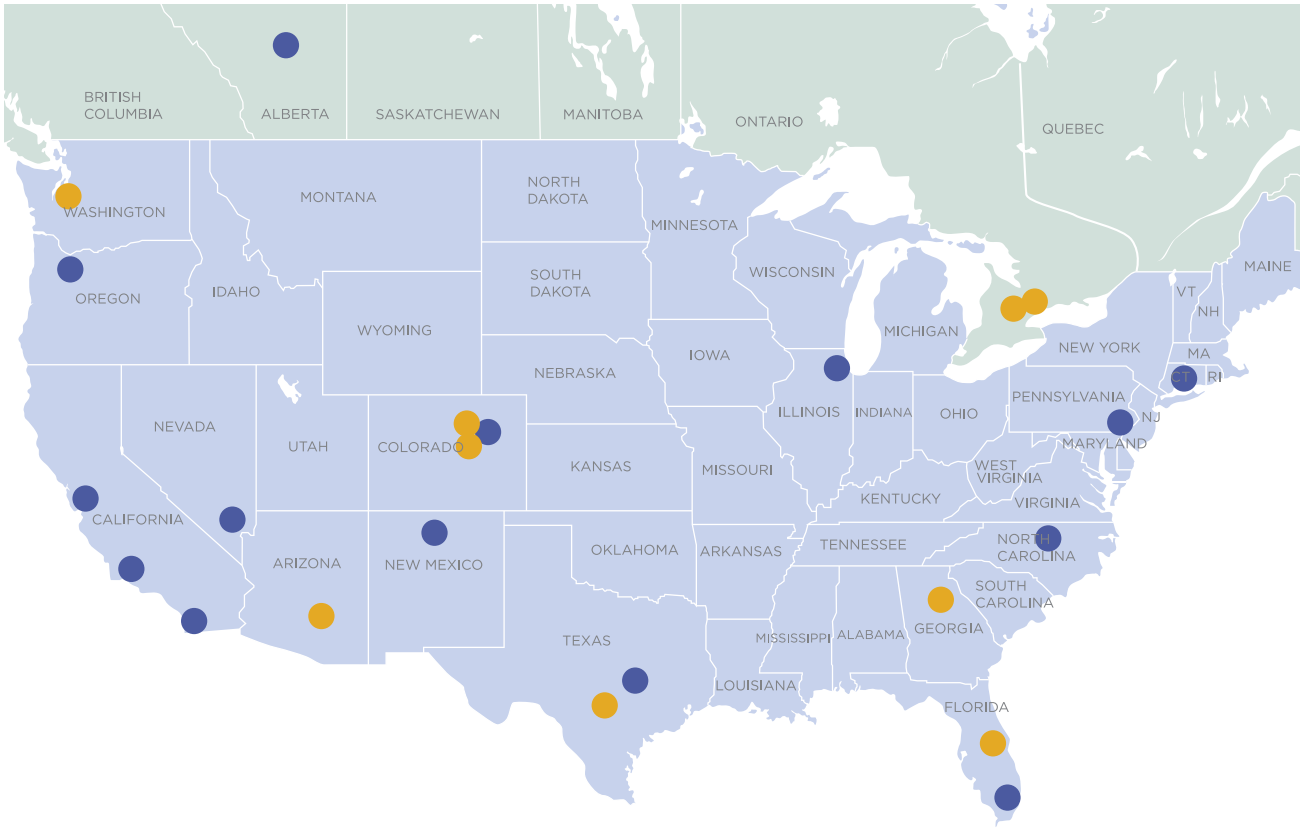
4,643
Extensive surveys

838
Landscape analysis group

762
End use monitoring samples

94
Hot water end use flow monitoring

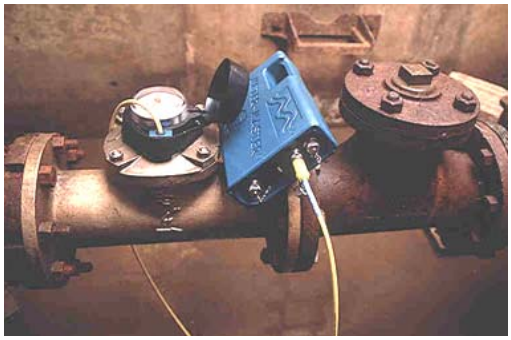
Figure 8. Diversity of the Level 1 and Level 2 study site locations



LEVEL 1 STUDY SITES: Clayton County, GA • Denver, CO • Fort Collins, CO • Peel, Ontario • San Antonio, TX Scottsdale, AZ • Tacoma, WA • Toho, FL • Waterloo, Ontario

LEVEL 2 STUDY SITES: Aurora, CO • Austin, TX • Cary, NC • Chicago, IL • Edmonton, Alberta Henderson, NV • Miami, FL • Mt. View, CA • New Haven, CT • Otay, CA • Philadelphia, PA • Portland, OR Santa Barbara, CA • Santa Fe, NM

Flow Trace Monitoring



Meter-Master flow recorder installed on a magnetic drive water meter.
(Photo courtesy of the F. S. Brainard Company)

After the surveys were tabulated, 900 homes (100 from each of the nine Level 1 utilities) agreed to participate in detailed flow trace monitoring, which involved recording flow through each customer's water meter every 10 seconds for a period of about two weeks. The flow trace monitoring portion of the study took more than a year to complete, as the research team installed the equipment, collected the data, and moved the equipment from city to city. High-level flow data were successfully obtained from 762 homes.

Hot Water Flow Trace Analysis

A subset of the end use sample group was selected for hot water flow trace analysis. Accurate and usable hot water data were obtained from 94 homes that had been monitored for hot water use for approximately two weeks. This represents one of the largest efforts to date to collect and analyze hot water end use data in North America.

Outdoor Use Investigation

The Landscape Group was comprised of a sample of 838 households. The primary aim was to explore the efficiency of irrigation practices through a comparison of the volume of irrigation water applied to the theoretical irrigation requirements of each residential lot. Annual outdoor water use was estimated for each house using historical billing records, flow trace monitoring, and pre-existing high-resolution aerial photographs of each home's landscape.

Improved Understanding of Residential Water Use

The information provided by utilities in this study is significant because single-family homes typically use the most water of any customer sector. These data are essential for understanding demand patterns and establishing end-use benchmarks. Indoor water use will continue to decline in the future, which will impact utility water sales. REU2016 provides current data, evaluates conservation potential, and develops predictive models to assess and forecast residential demand.

Works Cited

DeOreo, W.B., P.W. Mayer, L. Martien, M. Hayden, R. Davis, et. al. 2011. *Analysis of Water Use in New Single Family Homes*. Aquacraft, Inc. Water Engineering and Management. Boulder, CO.

DeOreo, W.B., P.W. Mayer, B. Dziegielwski, J.C. Kiefer, 2016. *Residential Uses of Water 2016*. Water Research Foundation. Denver, CO.

Energy Policy Act of 1992, Pub. L. No. 102–486, 106 Stat. 2776 (1992).

Mayer, P.W., W.B. DeOreo, E.M. Optiz, J.C. Kiefer, W.Y. Davis, B. Dziegielewski, J.O. Nelson. 1999. *Residential End Uses of Water*. Denver, Colo.: AwwaRF.

Participating Utilities

Level 1 Study Sites

City of Fort Collins Utilities, Fort Collins, CO
City of Scottsdale Water Department, Scottsdale, AZ
Clayton County Water Authority, Morrow, GA
Denver Water Department, Denver, CO
Region of Peel Public Works, Brampton, ON, Canada
Region of Waterloo, Kitchener, ON, Canada
San Antonio Water System, San Antonio, TX
Tacoma Water, Tacoma, WA
Toho Water Authority, Kissimmee, FL

Level 2 Study Sites

Austin Water Utility, Austin, TX
City of Aurora Water Department, Aurora, CO
City of Chicago Water Management, Chicago, IL
City of Henderson, Henderson, NV
City of Portland Water Bureau, Portland, OR
City of Santa Barbara Public Works Department, Santa Barbara, CA
City of Santa Fe, Santa Fe, NM
EPCOR Water Services, Inc., Edmonton, AL, Canada
Miami-Dade Water and Sewer Department, Miami, FL
Mountain View City Water Division, Mountain View, CA
Otay Water District, Spring Valley, CA
Philadelphia Water Department, Philadelphia, PA
S. Central Connecticut Water Authority, New Haven, CT
Town of Cary Water Department, Cary, NC

Other Utility Participants

City of San Diego, San Diego, CA
Cobb County Water System, Marietta, GA
Colorado Springs Utilities, Colorado Springs, CO

UTILITY DEPARTMENT

Water Waste Prevention Program Report 2019

Two images of typical outdoor water waste.

Excessive irrigation in planting beds wastes water and can be detrimental to plant health due to anaerobic soil conditions.

Street strips are especially prone to water waste due to limiting shapes and extreme environmental conditions

2019 OUTDOOR WATER WASTE PREVENTION

Preventing outdoor water waste is a fundamental component of the City of Bend WaterWise program. The EPA Water Sense program estimates up to 50%-60% of water used for landscape irrigation purposes can be wasted due to inefficient irrigation practices. Our Water Waste Prevention Program (WWPP) focuses on reducing this type of water waste. This report includes data from the 2019 outdoor watering season and includes reporting categories, types of water waste violations, technology use and post response savings calculations.

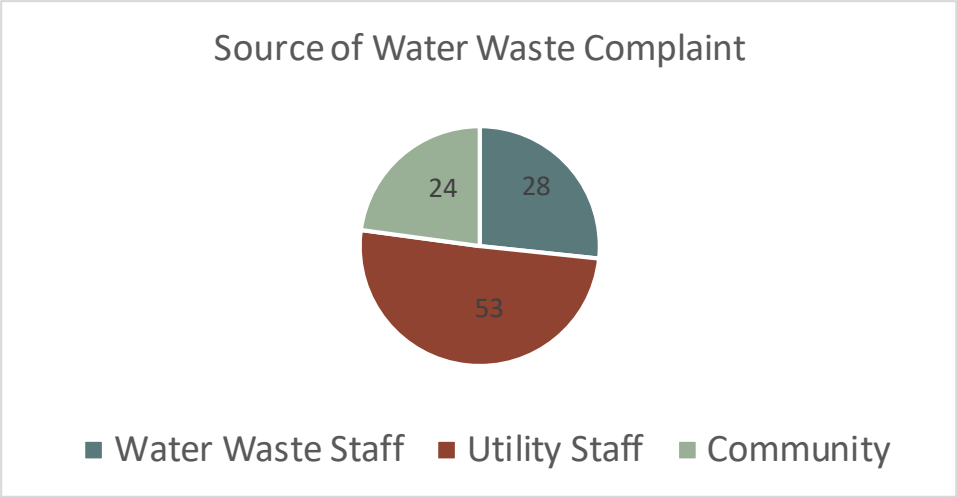
WATER WASTE PREVENTION PROGRAM

The Water Waste Prevention Program (WWPP) is dedicated to reducing water waste, as defined in the Bend Code 14.20, through education, technical assistance and customer outreach. The program also helps satisfy OAR 690-086-0150 (4)(f) for Public Education and OAR 690-086-0150(6)(b) for Technical and Financial Assistance as outlined in the Water Conservation and Management Plan.

In order to allocate appropriate resources toward effectively eliminating outdoor water waste, the WWPP designates Active Management Areas (AMA) throughout town to address areas of prevalent waste. In addition to addressing AMAs, program staff respond to public reports of water waste made through the City of Bend website online reporting form, phone calls and emails.

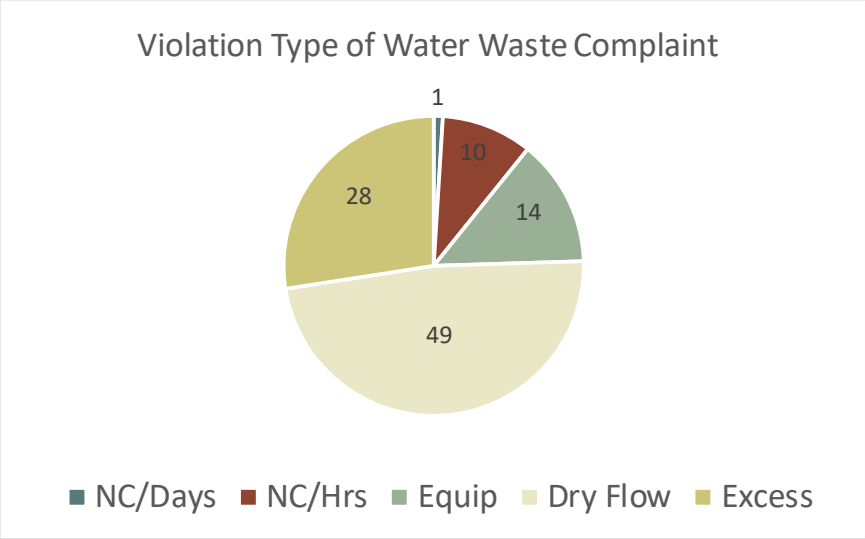
REPORTS OF WATER WASTE

Reported or observed water waste typically occurs along driveways, sidewalks, and roadways where it is in plain sight of Utility Department staff or passing community members. Other instances of excessive irrigation and water waste are reported by property owners concerned about irrigation water flowing onto their property from an adjacent property. Recorded instances of Water Waste are entered into the WaterWise Program's SharePoint tracking data base.

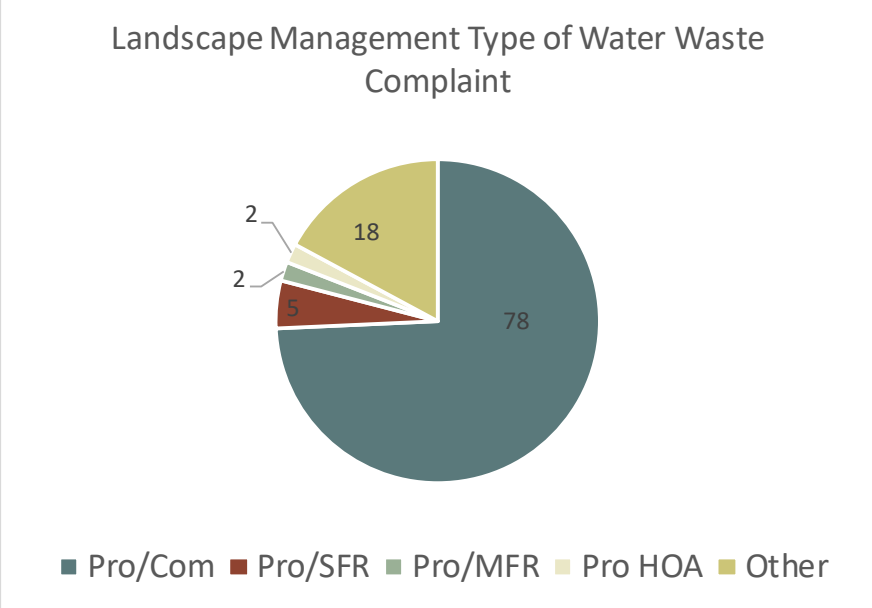


WATER WASTE VIOLATION CATEGORIES

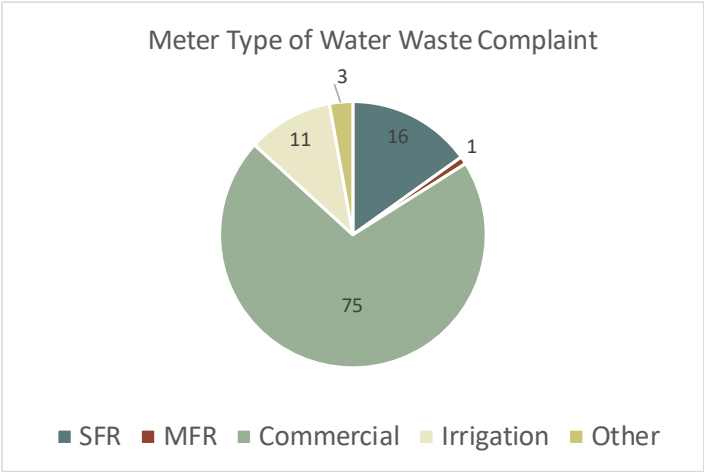
- NC/Days = Noncompliant even/odd watering day - Even addresses water on even days, odd addresses water on odd days
- NC/Hrs = Noncompliant watering hours - Prohibits watering between the hours of 9 a.m. and 5 p.m.
- Excess = Excessive irrigation in streets strips - Leads to violations of excess water leaving property because of proximity to street.
- Dry Flow = Excessive flow to Right-of-Way - Leads to wasted water and transportation of nutrients.
- Equip = Faulty irrigation piping or equipment broken or leaking - Waste of water, can cause damage to property, pedestrian safety etc.



Landscape management is an integral part in the creation and prevention of water waste. The majority of commercial properties in Bend rely on professional landscape maintenance vendors for their landscape services.



Commercial metered properties made up the majority of recorded water waste complaints; a reflection of the emphasis to reduce water waste in Active Management Areas.



INCORPORATING TECHNOLOGY

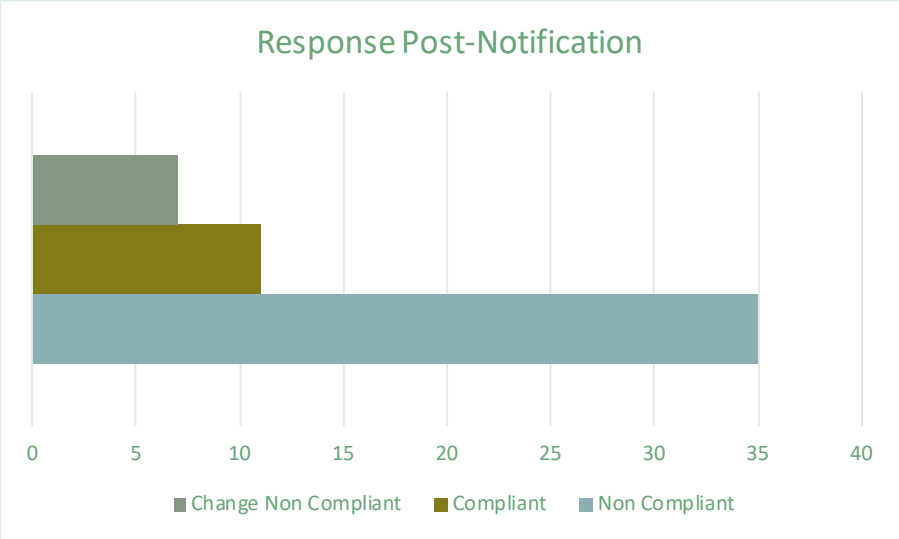
The WaterWise Waste Prevention program is currently evaluating the use of newly acquired WaterSmart analytic software to assist with water waste prevention efforts. The “Irrigators Last Week” analytic tool can be used to identify customers who are non-compliant with the City of Bend odd/even schedule for watering days. Once per month, April through October, 50 non-compliant customers are contacted by letter requesting their irrigation schedule be adjusted in compliance with City of Bend code for irrigation days. Recent updates to the tool have helped reduce the number of irrigators reported as non-compliant for irrigation days due to irrigation events starting before midnight and spanning into the next calendar day. Errors can also occur from flows similar to the WaterSmart algorithm for irrigation (2gpm for 1-12 hrs.)

Date of Letter	Recipients
4/15/19	41
5/20/19	50
6/17/19	50
7/15/19	50
8/15/19	50
9/15/19	50
10/15/19	50

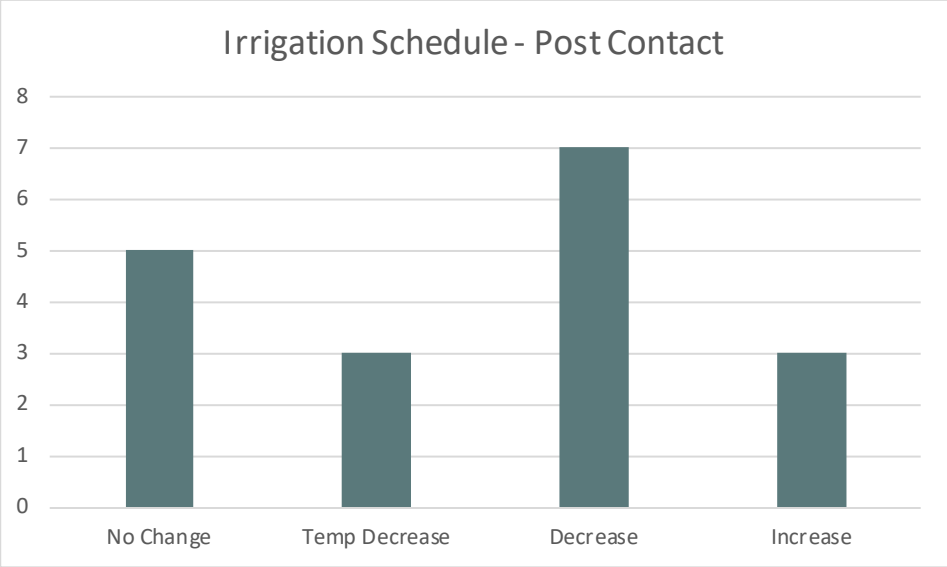
RESULTS

Measurement of program effectiveness can be difficult to aggregate, due to the customer type characteristics, the type of violation and timing of the violation. For instance, a leak that gets fully resolved is able to show an immediate decrease in water use and compliance with code. Other violations such as time of day or even odd watering days may become compliant but are not as easy to calculate a benefit of water saved. Excessive water use violations may not result in dramatic annual water savings if notifications occur in the spring, as water use will likely increase due to the seasonal water need increasing as the season progresses. Conversely, violations of waste late in the growing season may reflect a reduction in use without any irrigation efficiency improvements taking place as water demand naturally decreases.

Response to waste notification letter for non-compliant customers July 15, 2019. Non-compliant customers are identified monthly throughout growing season using WaterSmart analytics.



The response to a waste notification, based on the changes made to the irrigation schedule, was recorded for fifteen commercial and three single family residential customers and is listed in chart below.



SUCCESS HIGHLIGHT: SOLUTION IMPLEMENTED BY LOCAL CONTRACTOR

BEFORE: High pressure, obstructed sprinklers, disproportionate nozzles and improper scheduling all contribute to water waste at this site.

AFTER: The contractor shut flow to every other sprinkler, creating a proportionate area in which strip spray nozzles are a much better fit.

WATER WASTE PREVENTION REPORT: 2020

2020 IN REVIEW

Preventing outdoor water waste is a fundamental component of the City of Bend WaterWise Program. The EPA Water Sense Program estimates 50%-60% of the water used for landscape irrigation purposes may be wasted due to inefficient irrigation practices. The City of Bend WaterWise Program addresses this type of water waste through the Waste Prevention Program. Reported or observed water waste typically occurs in plain sight, along driveways, sidewalks, and roadways. Other instances of excessive irrigation and water waste are reported by property owners concerned of damage caused by irrigation water flowing onto their property from an adjacent property.

Waste Water Complaints

The majority of water waste complaints are reported by City of Bend staff members or directly observed by City of Bend WaterWise team members. Water waste complaints generated by community members are directed to the “Report Water Waste” page maintained on the City of Bend WaterWise website. All reported cases are tracked on a Water Waste Tracking Sheet stored within the WaterWise Water Conservation Share Point page.

Source of Complaint	2018	2019	2020
Report Water Waste	N/A	N/A	10
Water Waste Prevention Staff	89	81	37
Front Desk / COB Staff	19	18	17

The majority of water waste complaints responded to are found on commercial properties; 25 of all cases in 2018 - 2020 have received a complaint for three or more consecutive years. City of Bend properties accounted for 16 registered complaints between 2018 and 2020.

Property Type	2018	2019	2020
COV Properties	3	8	5
Single Family Residents (SFR)	32	21	21
Multi Family Residents (MFR)	4	2	5
Commercial	65	77	30
Repeating Cases (Year-to-Year)			25

Flows to street drains (Dry Weather Flows) and the excessive application of irrigation water (Excessive), where water pools and flows to adjacent areas make up the majority type of water waste complaints.

Type of Complaint	2018	2019	2020
Dry Weather Flows	35	50	27
Equipment	13	14	18
Excessive	30	28	8
N.C. Days	14	1	5
N.C. Hours	13	10	6
Total Cases	104	105	64

A Call for Improved Design

Narrow landscape strips along public roadways, irrigated with overhead irrigation systems, are the leading cause of water waste complaints received by the city of Bend Water Waste Prevention Program. A combination of restrictive size and the high flow rate of pop up sprinklers typically used in these areas creates a situation where overspray and runoff are difficult to avoid. Overspray and runoff that makes their way to street drains (Dry Weather Flows) are of particular concern because they can introduce pollutants directly to water resources. In the fall and spring transitional months, these flows can freeze on streets and walkways, creating a unique hazard for vehicles and pedestrians.

Changes to Engineering Standards and Specifications addressing the future right-of-way landscapes have been updated to address this problem for all city of Bend capital improvement projects. Changes include: restricting the use of overhead irrigation in strips 10 feet or less; requiring low flow or drip irrigation; and using high-efficiency nozzles where overhead irrigation is approved. These changes apply to City of Bend capital improvement projects only, and as of date, have not been applied to the City of Bend private development code. Changes in the private development code addressing overspray and runoff along area roadways is a needed step in eliminating water waste for the city of Bend.

Additional Examples of Water Waste

Dry Flow Examples

Public Safety Hazards - Ice Formation

ENVIRONMENT & CLIMATE COMMITTEE

PART 2: WATERWISE PROGRAM HISTORY & PROGRESS

NOVEMBER 10, 2021

Presented By:
Mike Buettner
Patrick Griffiths
Aubrie Koenig

Conservation Update Overview

- **Oct. 14, 2021:** Water Supply & Conservation Overview
- **Nov. 10, 2021:** WaterWise Program History & Progress
- **Dec. 9, 2021:** WaterWise Program Future & Next Steps

Meeting 2 Topics:

- Quick Conservation History
- Managing Our Slice:
  - How Bend Uses Water Today
  - Existing WaterWise Programs
  - New Measures

Photo: Prowell Springs

WHAT WE'RE ASKING THE COMMITTEE

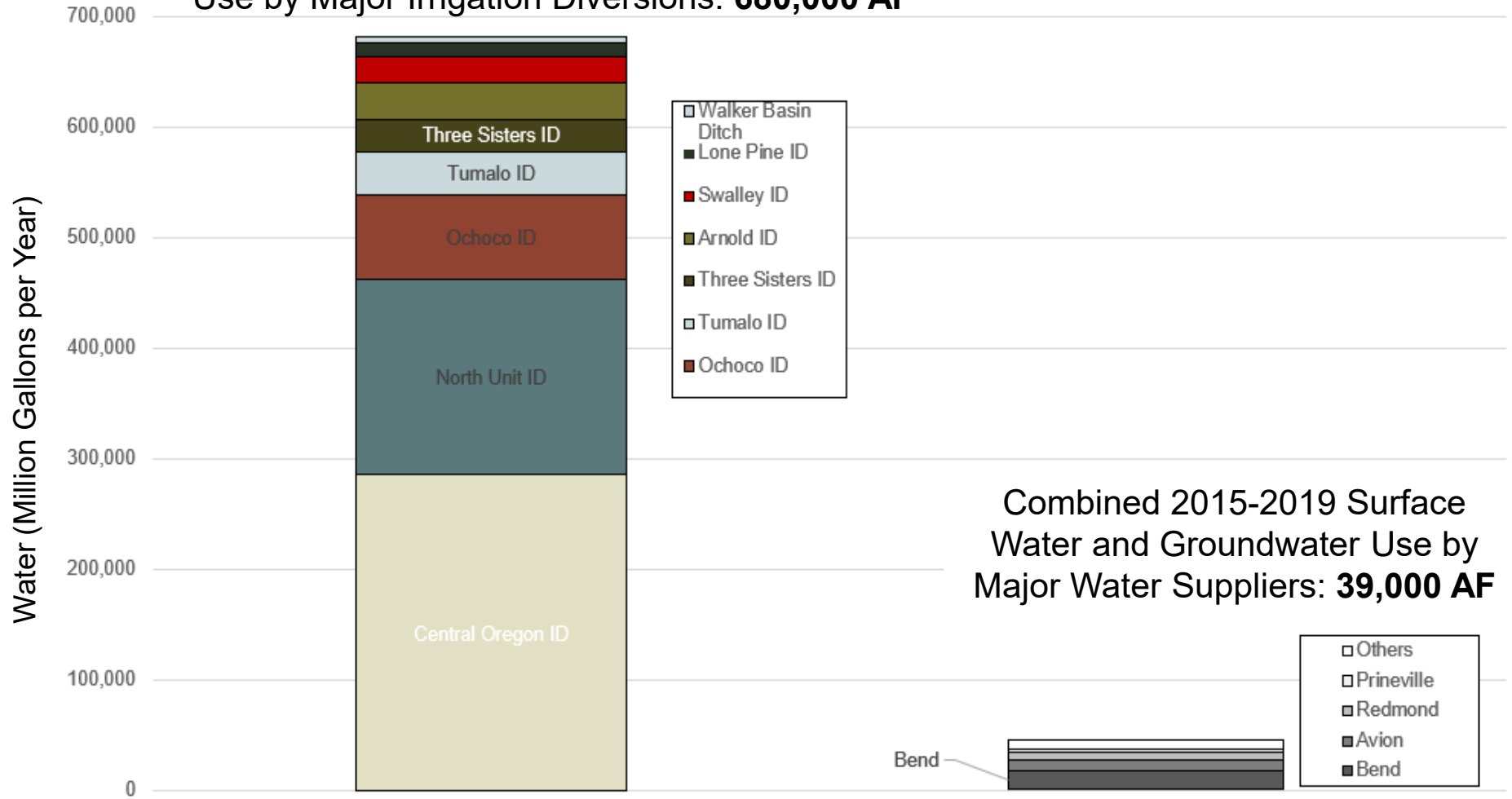
- **Today's meeting:** information-sharing and initial feedback on three areas of 'policy-level advice'
- **Online survey** between meetings to gather more detailed feedback
- **December meeting:** discuss themes and clarify feedback, share additional information, confirm Committee's advice
- **2022**: advice will help guide next phase of engagement with Conservation and Efficiency Technical Work Group

MEETING #1

RECAP:
FUTURE WATER SUPPLY COMES FROM EXISTING USES
DATA-DRIVEN EXISTING CONSERVATION PROGRAMS ARE WORKING

DESCHUTES BASIN PRINCIPAL WATER USES 2015-2019

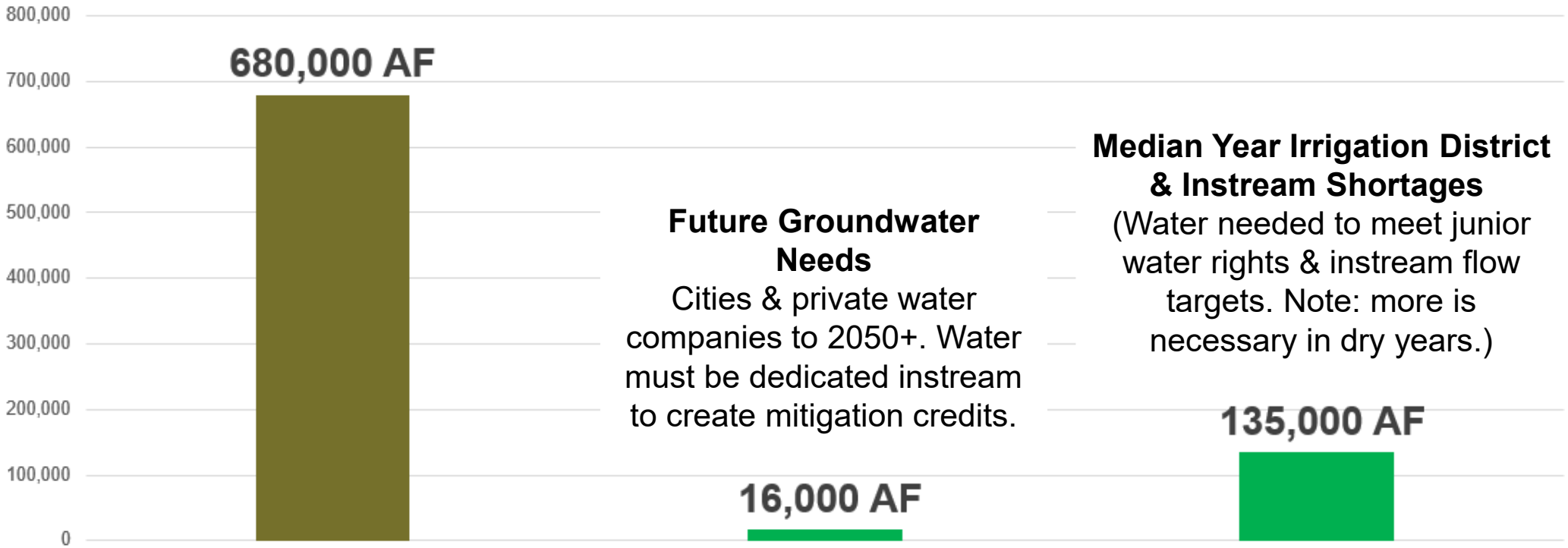
Combined 2015-2019 Average Surface Water Irrigation Use by Major Irrigation Diversions: **680,000 AF**



Combined 2015-2019 Surface Water and Groundwater Use by Major Water Suppliers: **39,000 AF**

DESCHUTES BASIN SELECT FUTURE WATER NEEDS

Current Surface Water Diversion for Comparison
(40-60% is lost in transport, *plus* on-farm efficiency losses of 20-50%)



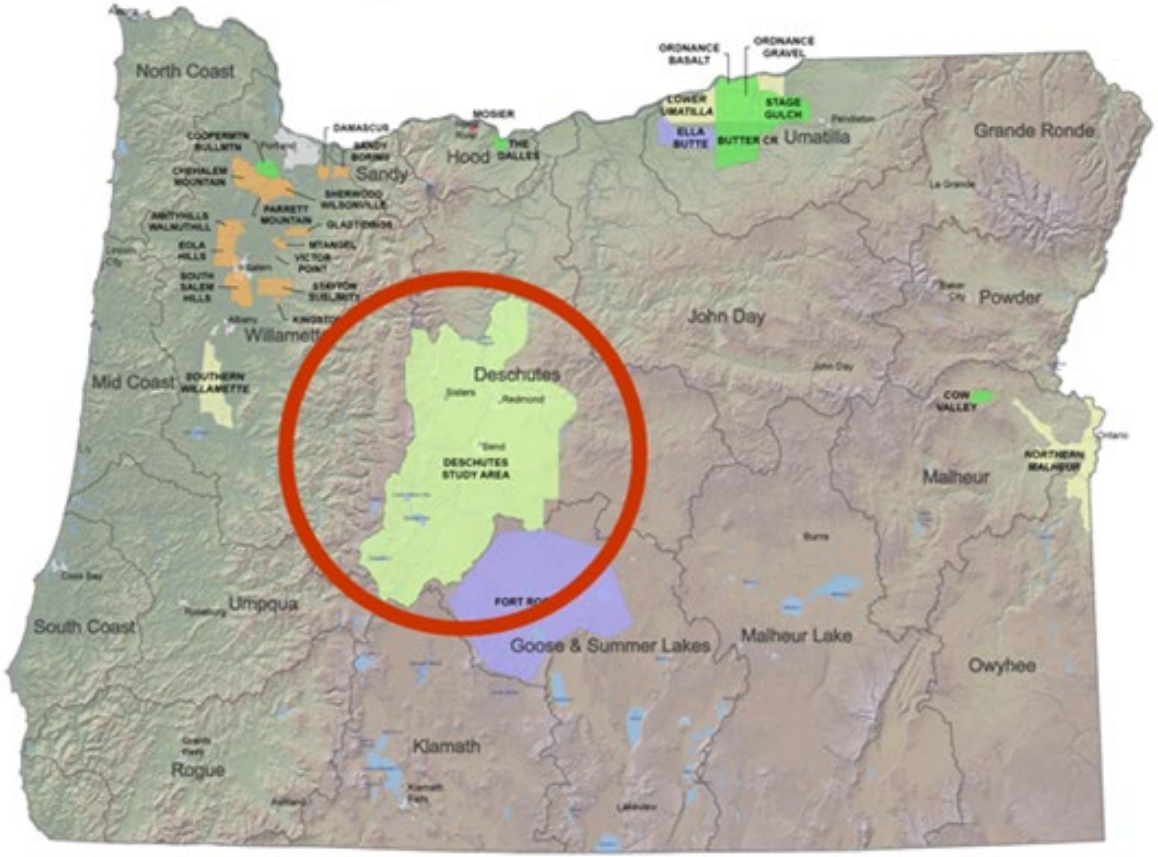
Future Groundwater Needs
Cities & private water companies to 2050+. Water must be dedicated instream to create mitigation credits.

Median Year Irrigation District & Instream Shortages
(Water needed to meet junior water rights & instream flow targets. Note: more is necessary in dry years.)

Source: 2019 Upper Deschutes Basin Study

GROUNDWATER REQUIRES MITIGATION
(MITIGATION COMES FROM EXISTING WATER)

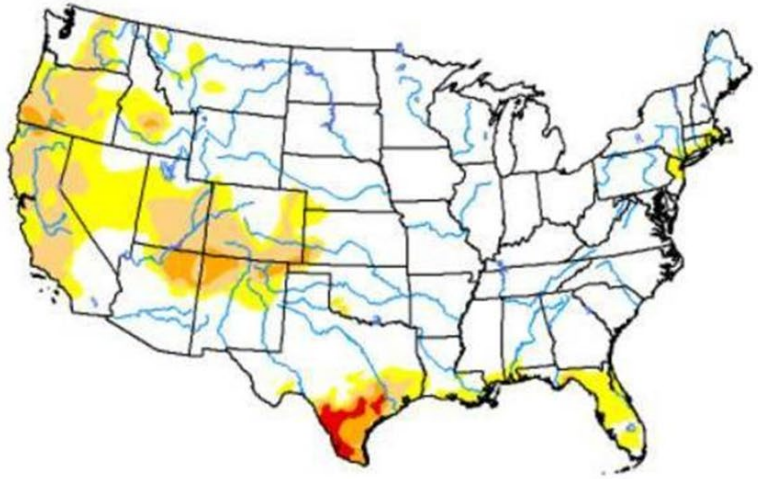
Groundwater Management Areas

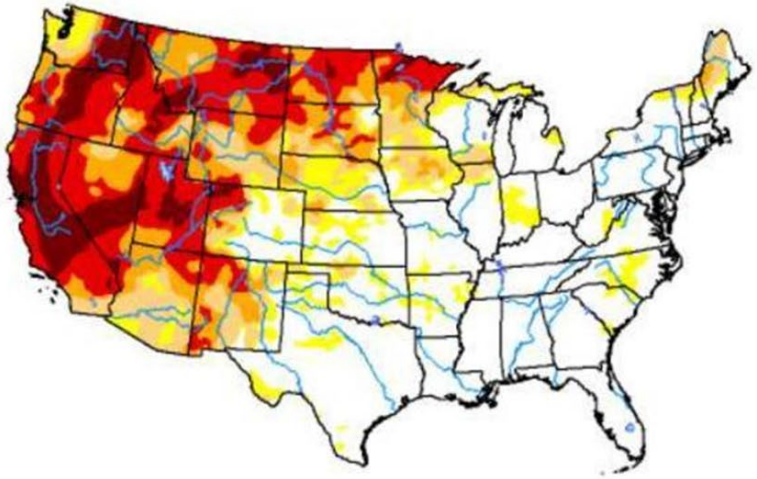


Deschutes Basin

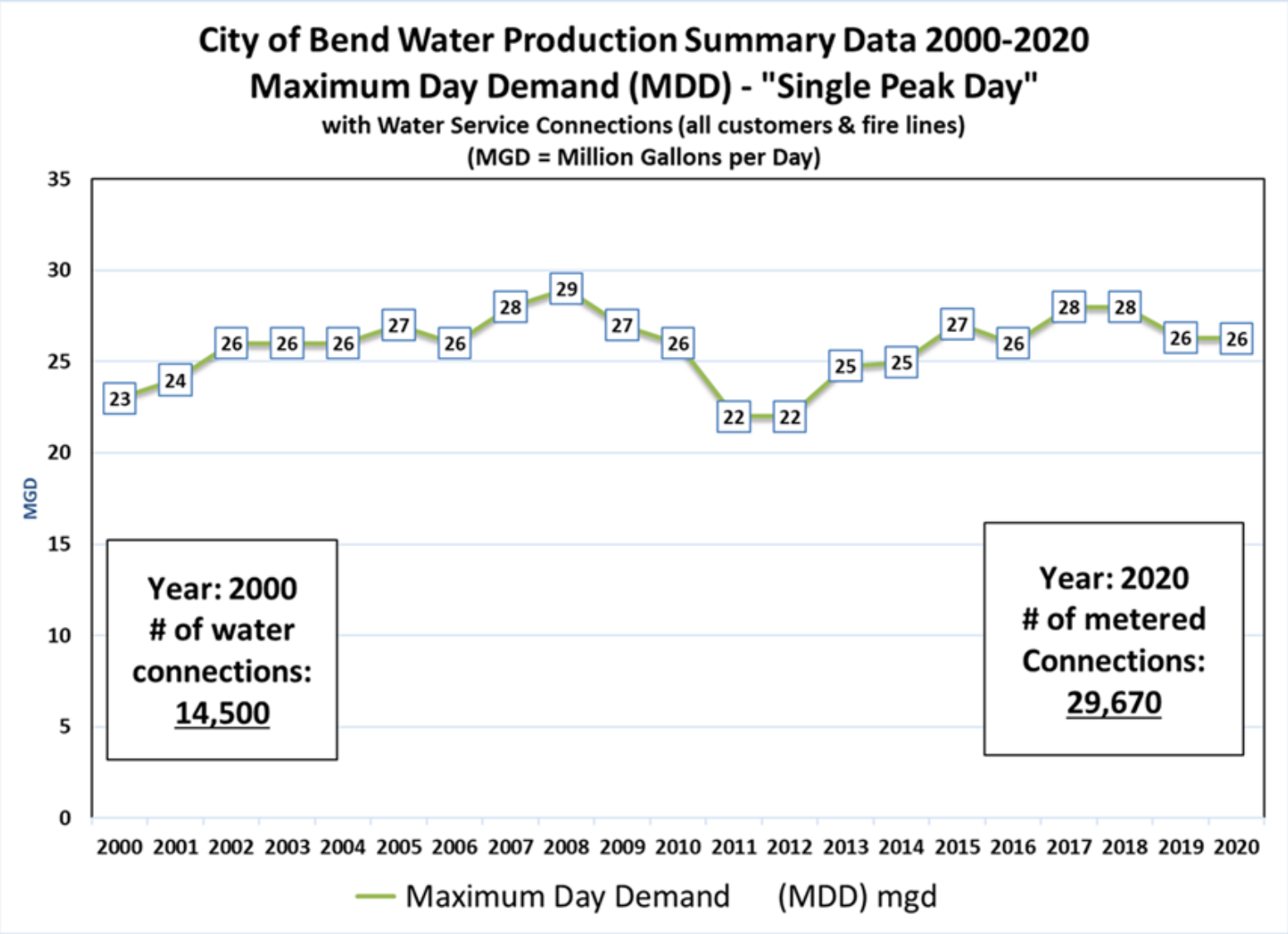
Conservation and Efficiency Measures modeled within iWSMP show $21M in CIP savings

Conservation is part of a "no regrets" strategy that has multiple benefits, and part of a key adaptation and resilience strategy for climate change

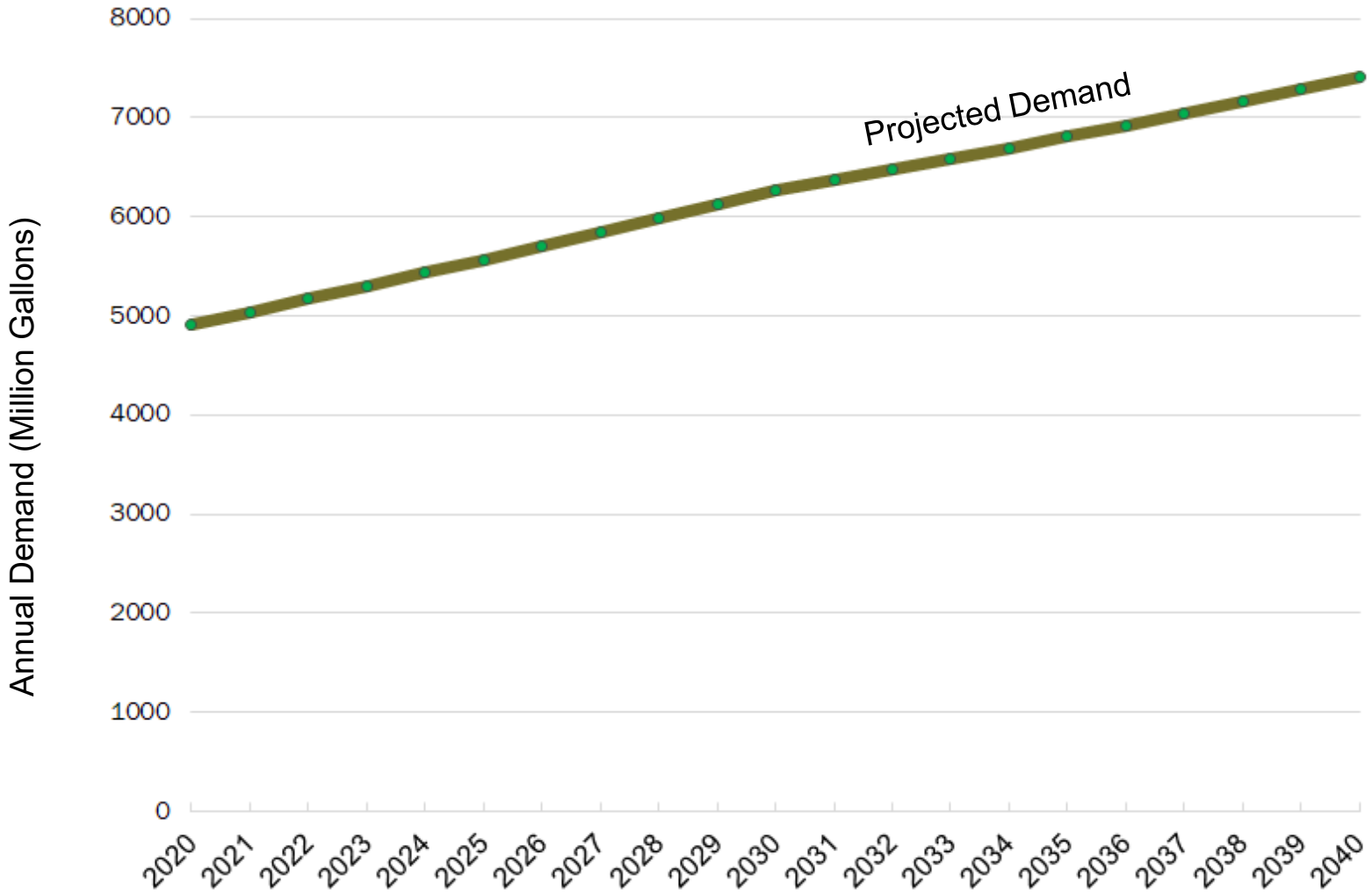


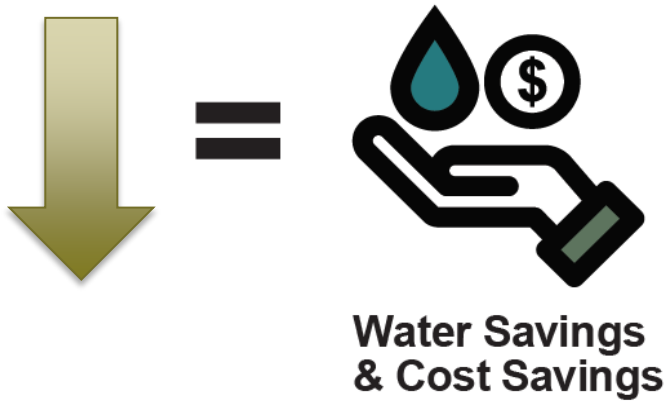


WATER DEMAND



BEND WATER NEEDS





Any questions or takeaways from Meeting #1?

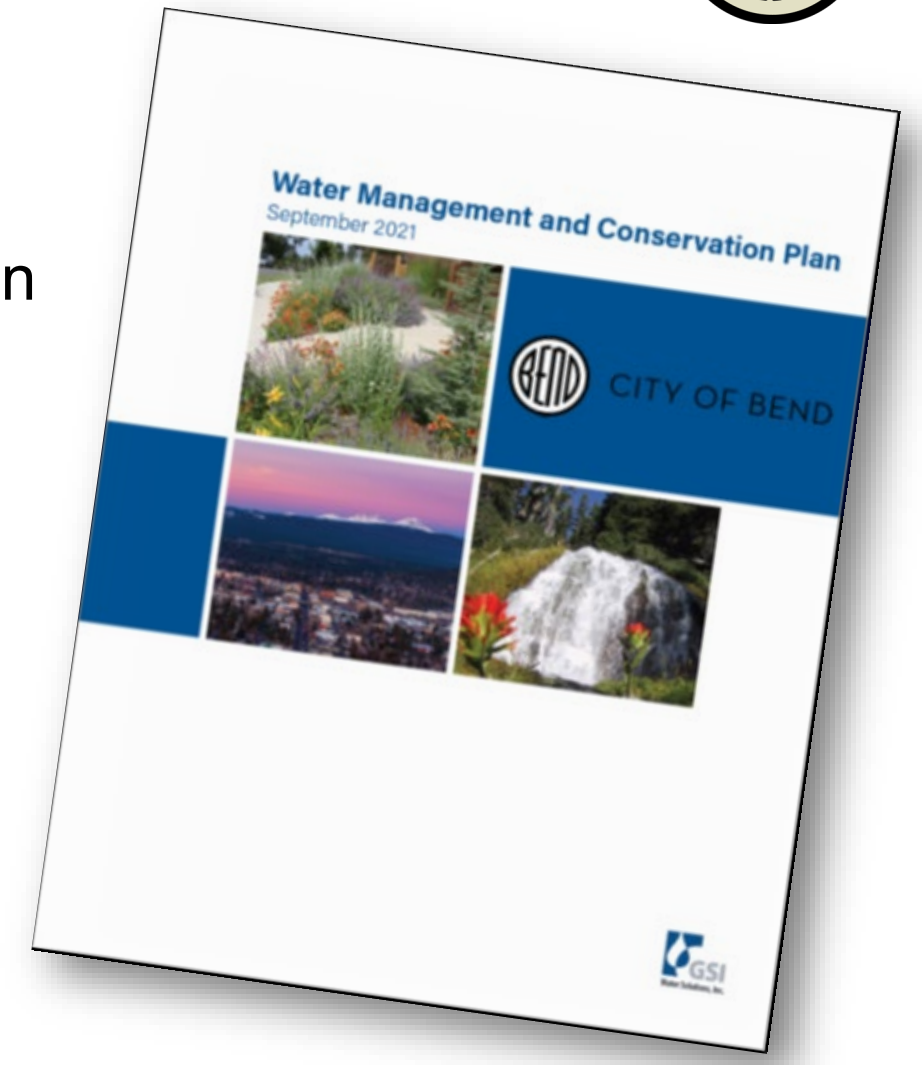
MANAGING OUR SLICE

BEND'S BEST OPPORTUNITIES TO IMPROVE WATER EFFICIENCY

BRIEF BEND CONSERVATION HISTORY
HOW AND WHERE BEND USES WATER TODAY

HISTORY OF WATER MANAGEMENT AND CONSERVATION PLANS

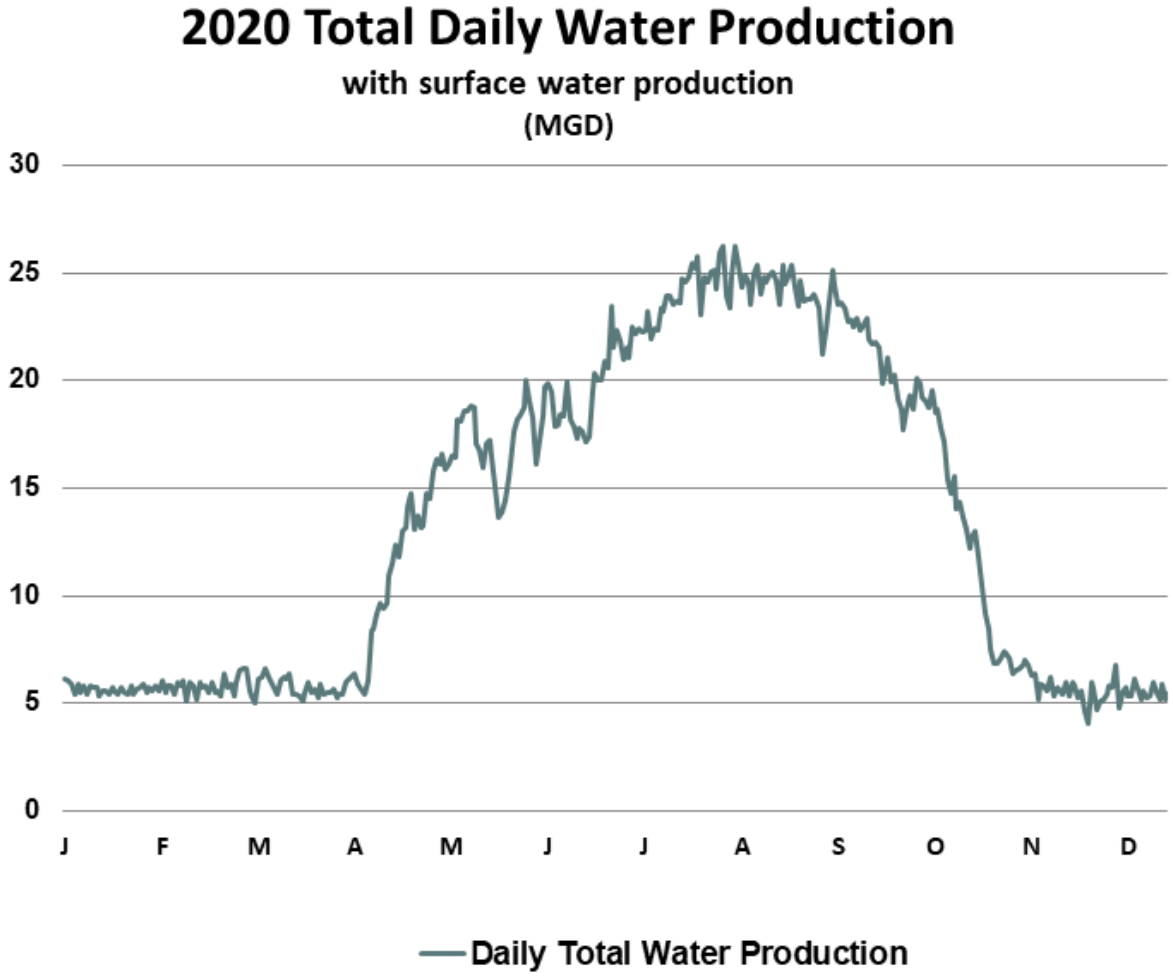
- Established by Oregon Administrative Rule through Oregon Water Resource Commission (1994, 2002)
- WMCP is *legal requirement* or "condition" placed on a water right/permit process
- Goal: promote stewardship of the state's public waters…
  - Must include cost benefit analysis of conservation
  - Emphasis on integration & coordination
  - *Ongoing regulatory requirement, progress reporting*
  - ***MUST… "CONSERVE IT, TO DESERVE IT"***

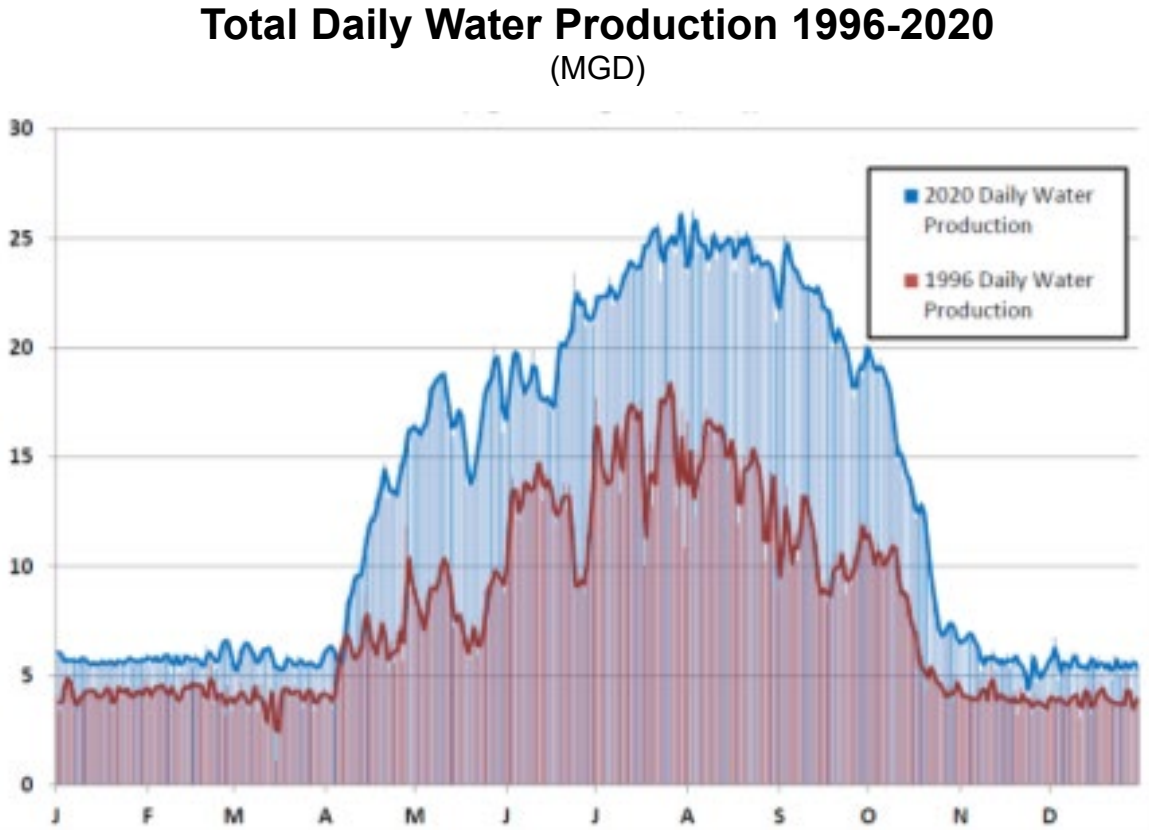


BEND'S CONSERVATION PROGRAM HISTORY HIGHLIGHTS

- **1998:** Bend's first WMCP Submitted and Approved in 1999
  - State Approved Work plan issued, *required full metering* of all customers
- **2000:** Bend hires first conservation position (1/2 time)
- **2001:** Launch of Bend's WaterWise Program / Large Landscape Program
- **2004:** Bend Became Fully Metered! / First OSU Partnership on Xeriscape Guide
- **2004-2006:** Bend wins several related program awards, AWWA, OWRD award and Governor's Office
- **2010:** integrated data from AMI Water meter technology (customer side leak notifications)
- **2011:** New WMCP Submitted and Approved – more fully integrated with Water master plan
- **2014:** First ***Water Audit*** Using new National Standard (AWWA M-36) (Internal Team)
- **2015:** Rate Modernization Program – Adopted significant new water and sewer rates / rate structure changes
- **2016:** WMCP Progress Report to OWRD
- **2018:** Bend wins state "Best Integrated Conservation Program" award from OWRD
- **2021:** Latest Updated WMCP and integration with Water Master Plan – OWRD approved

HOW BEND USES WATER: OUTDOOR A KEY FOCUS





HOW BEND USES WATER

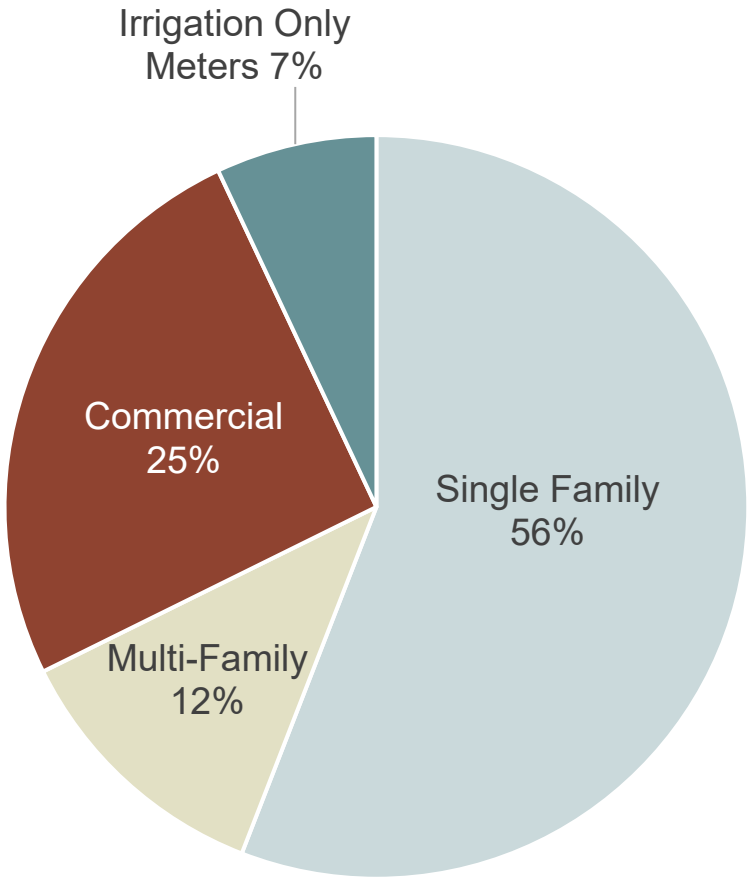
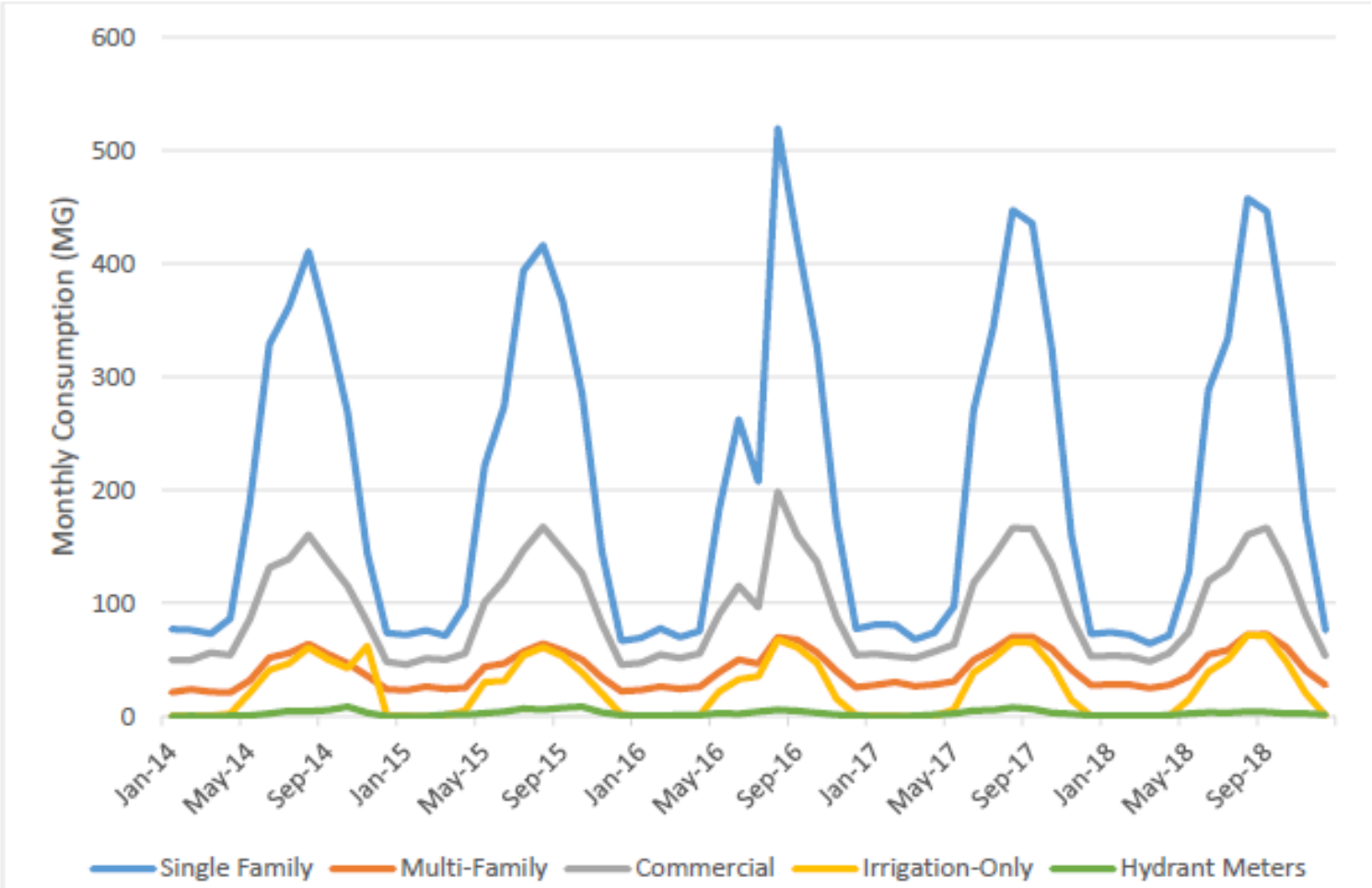


Exhibit 2-13. Monthly Consumption by Customer Category, 2014 through 2018



What surprises you or stands out about current water use?

EXISTING REGULATIONS

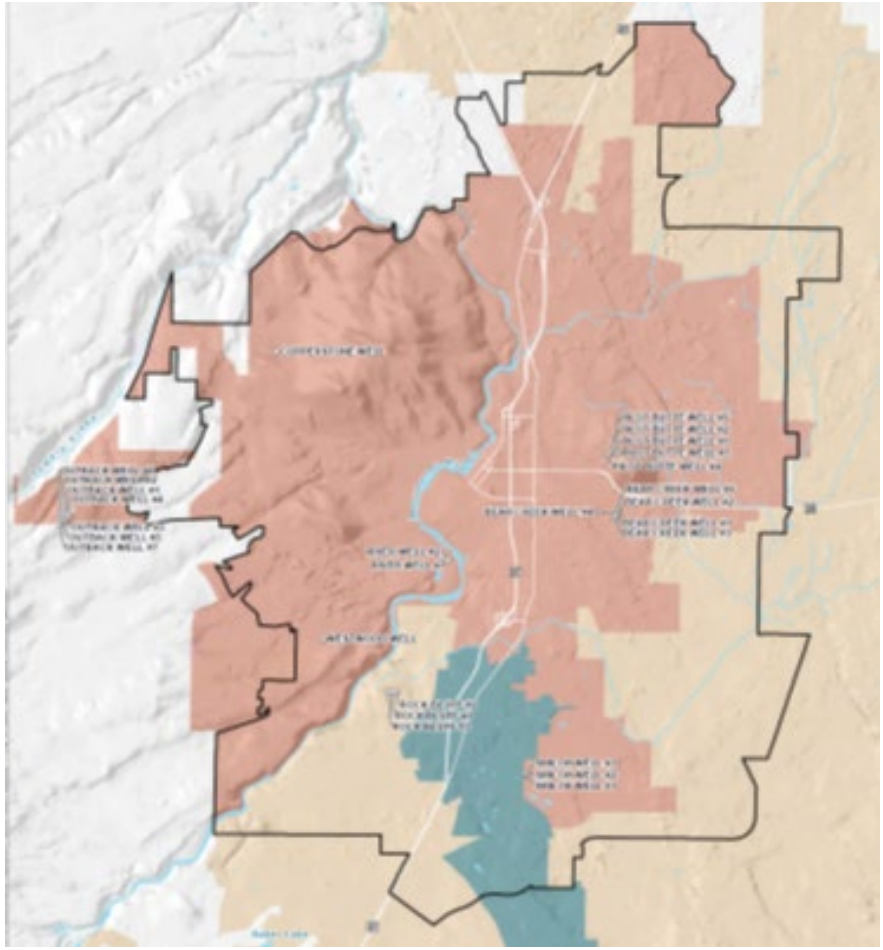
Q: Do you think Bend should continue **focusing on education or shift to enforcement** to promote existing water waste regulations?

EXISTING REGULATIONS

- Outdoor Irrigation Rules
  - 9-5 Daily - No watering regulation
  - Even – Odd Watering Day Regulation

- Water Waste Code – Title 14 in Bend Code
  - Runoff / waste
  - Stormwater / water quality protection rules

- Applicability:
  - City of Bend Water Customers
  - *Any* water flowing onto another's property or public right-of-way



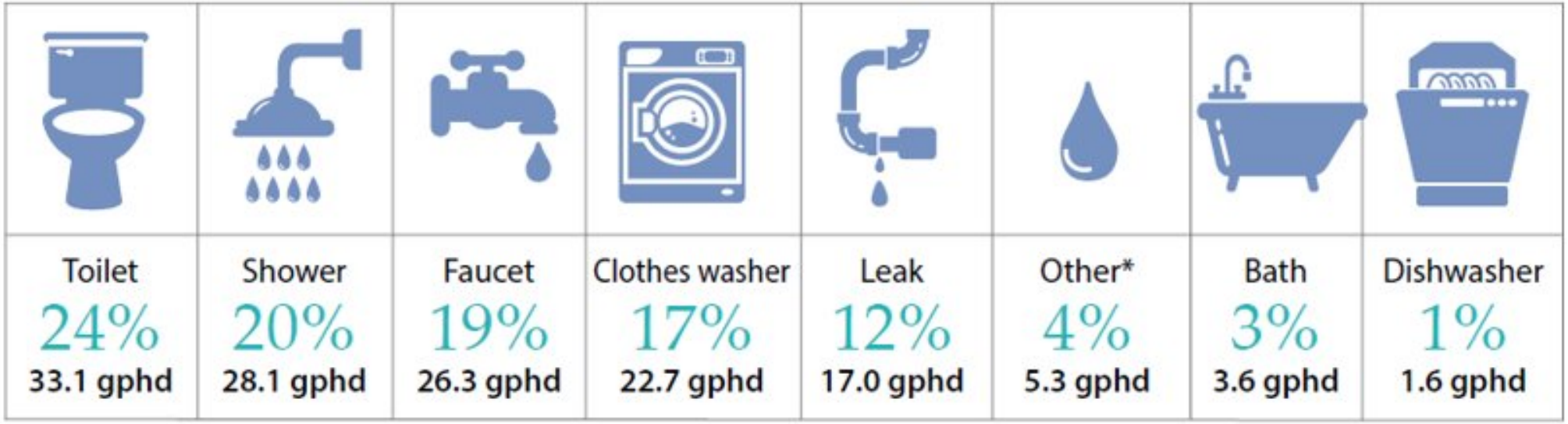
Do you think Bend should continue **focusing on education or shift to enforcement** to promote existing water waste regulations?

INDOOR WATER USE PROGRAMS

Q: Where do you think Bend should fall on the spectrum of **voluntary to mandatory adoption of new indoor water efficiency standards**?

TYPICAL SINGLE-FAMILY HOME INDOOR WATER USE
2016 RESIDENTIAL END USE STUDY

Figure 1. Indoor household use by fixture



* The "Other" category includes evaporative cooling, humidification, water softening, and other uncategorized indoor uses.

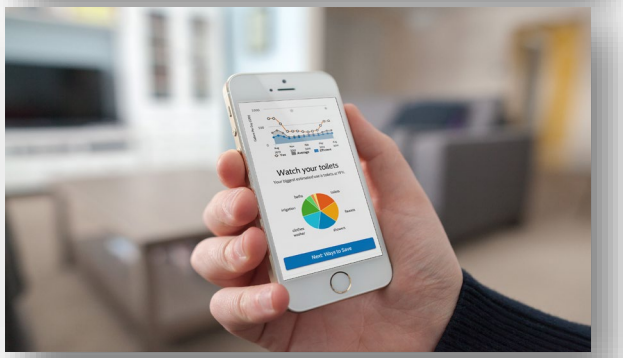
Fun *Water Use* Fact: Most folks flush a toilet 5 times a day!

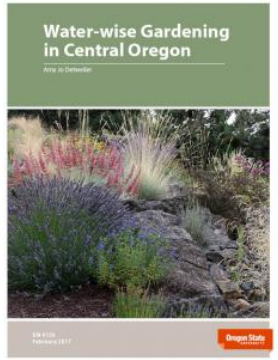
EXISTING INDOOR PROGRAMS

Indoor

Indoor Conservation Kits

Customer Leak Detection-WaterSmart





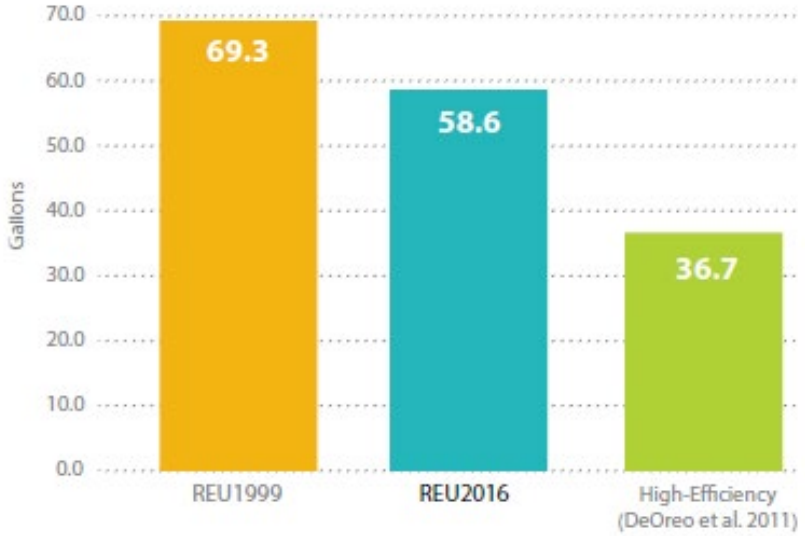
INDOOR EFFICIENCY POTENTIAL – ACCELERATE?

Indoor Conservation Potential

Even without a concerted effort on the part of homeowners to switch to more efficient appliances and fixtures, reductions are anticipated as old toilets and clothes washers wear out and are replaced. The current average daily indoor per household use of 138 gphd is expected to reduce to 110 gphd. Per capita use of 58.6 gpcd is expected to reduce to 36.7 gpcd in the coming years.

Further reductions are anticipated as customer side leakage is reduced (through automated metering and leak alert programs) and through on-site reuse. There are many variables that contribute to indoor water use patterns, such as the age of the fixtures and appliances, the age of housing stock, and the frequency of remodeling. Utilities should determine appropriate efficiency targets for their own service area based on local factors.

Figure 7. Indoor average gallons per capita per day, REU1999, REU2016, High Efficiency Studies



Where do you think Bend should fall on the spectrum of **voluntary to mandatory adoption of new indoor water efficiency standards**?

Should we accelerate adoption?

OUTDOOR WATER USE PROGRAMS

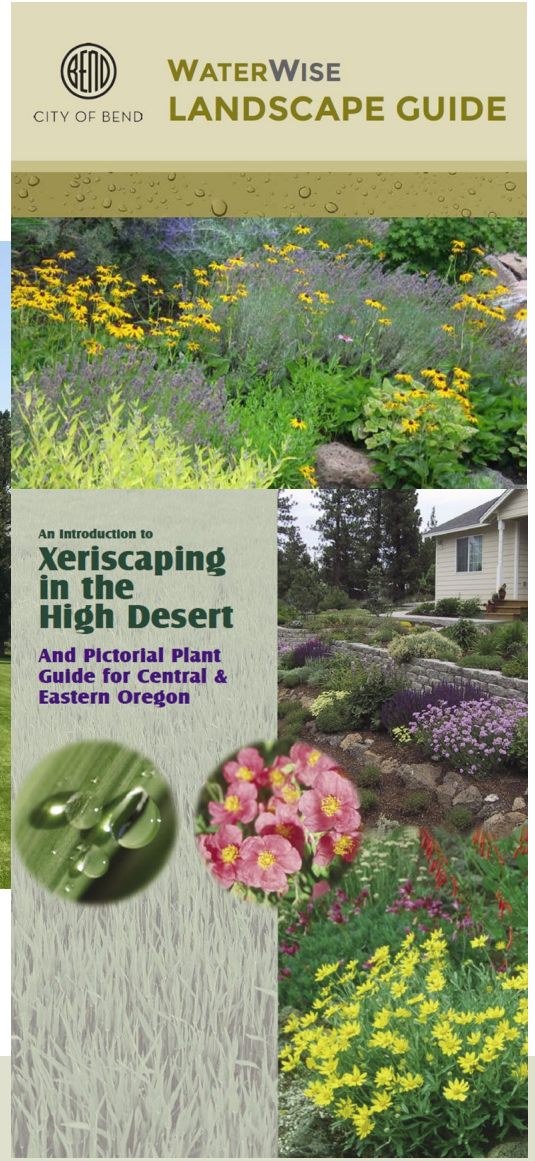
Where do you think Bend should fall on the spectrum of **voluntary to mandatory adoption of new outdoor water efficiency standards**?

WaterWise Program waterwisetips.org

Goal: Inspire WaterWise landscape transformations

- Large Landscape Program
- Sprinkler Inspection Program
- WaterWise Enforcement

- WaterWise Landscaping Tour
- WaterWise Landscape Guides
- COB / OSU Plant Guide
- Contractor Program / Guide
- Water Audits / Asset Management
- Key partnerships



WaterWise Program www.waterwisetips.org

Goal: Inspire WaterWise landscape transformations

Right of water examples (new standard)

FOCUS ON OUTDOOR WATER USE

Where do you think Bend should fall on the spectrum of **voluntary to mandatory adoption of new outdoor water efficiency standards**?

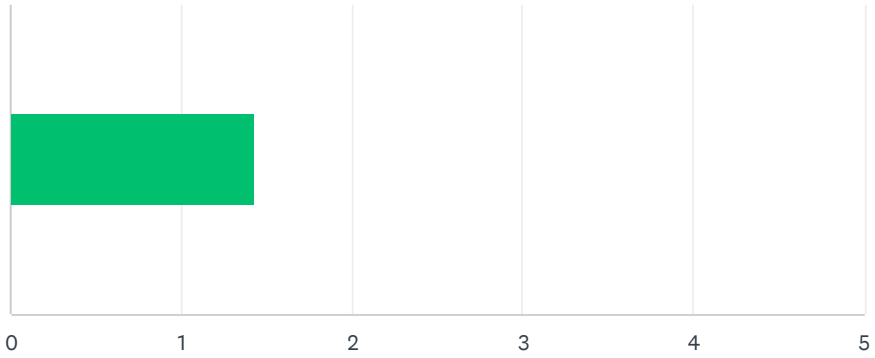
- Near-term Focus: Internal Code Alignment Review
  - Determine Regulatory Options (add, change, enforce, educate)
    - Applicable in Bend Service Area only, City-wide, franchisee?
    - Ripples into stormwater and sewer
  - Outdoor: Review existing landscape and irrigation codes in Engineering, Bend Development Code, Comprehensive Plan
  - Indoor: Review existing indoor code requirements related to efficiency
    - Plumbing code, toilets, showers, faucets, appliances
- 2022: Convene Conservation and Efficiency Technical Workgroup in late 2022 (TBD)
  - Include diverse stakeholders and those impacted: low-income, landscape industry, builders, NGOs, ECC member?

WHAT WE'RE ASKING THE COMMITTEE

- **Today's meeting:** information-sharing and initial feedback on three areas of 'policy-level advice'
- **Online survey** between meetings to gather more detailed feedback
- **December meeting:** discuss themes and clarify feedback, share additional information, confirm Committee's advice
- **2022**: advice will help guide next phase of engagement with Conservation and Efficiency Technical Work Group

Q1 How aware of the WaterWise Program do you feel community members are currently?

Answered: 7 Skipped: 1



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	1	10	7
Total Respondents: 7			

Q2 What surprised you or stood out most in the information that's been shared?

Answered: 8 Skipped: 0

#	RESPONSES	DATE
1	How little of the total water consumption in the region is municipal/domestic.	12/1/2021 8:49 AM
2	The thing that surprised me the most is the amount of supply infrastructure that is dictated on fire hydrant pressure and water demands	11/30/2021 5:50 PM
3	What a small percentage the City's water usage is relative to commercial irrigation. And how many gallons are consumed per person.	11/30/2021 3:24 PM
4	That water use has largely held constant through the last ~20 years of growth; but also that city capital planning includes for new sources of water (wells).	11/30/2021 10:46 AM
5	How little water the city uses compared to the IDs	11/30/2021 9:56 AM
6	Single homes use more than double the amount of water than any other facility	11/15/2021 1:37 PM
7	The misconception of what people believe the city provides, versus reality	11/13/2021 8:19 PM
8	While I intuitively knew Bend would be a summer peaking water utility, I didn't realize the magnitude of difference between indoor and outdoor use. Also didn't know additional groundwater extraction had to be offset with equivalent surface water rights.	11/13/2021 9:40 AM

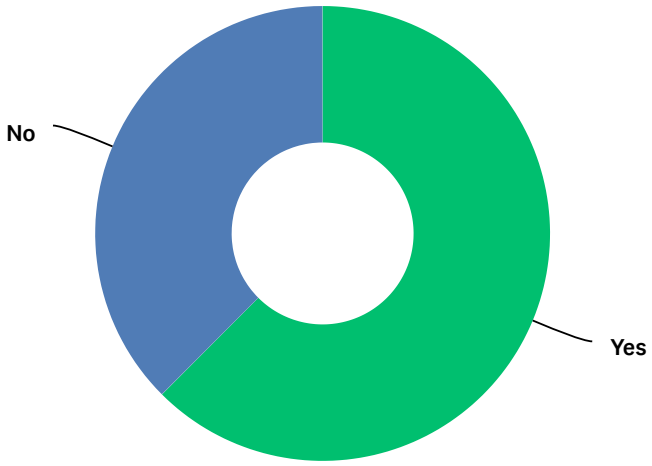
Q3 Is there one key piece of information about the WaterWise Program you feel the community should know?

Answered: 8 Skipped: 0

#	RESPONSES	DATE
1	What a large share of our water consumption is seasonally discretionary, and likely elastic when scarcities increase.	12/1/2021 8:49 AM
2	Most water use comes from irrigation, and conservation has done an amazing job to accommodate the growth we have experienced	11/30/2021 5:50 PM
3	That there are City irrigation rules.	11/30/2021 3:24 PM
4	Municipal water conservation is independently important, but the greater conservation need in our basin is in irrigation districts with senior water rights.	11/30/2021 10:46 AM
5	We can create a culture of conservation by understanding the top used of household water and working to reducing wastage.	11/30/2021 9:56 AM
6	Seeing the data displaying the time of year and amount of water would be impactful for the community to see. There is a misunderstanding that commercial use is higher than their lawn use. Also important to include information showing which parts of town use more water. Transparency will lead to more trust with the city.	11/15/2021 1:37 PM
7	Benefits to the community	11/13/2021 8:19 PM
8	That irrigation needs to be made more efficient and it will be the driver for any new system costs.	11/13/2021 9:40 AM

Q4 Were you aware the City has a water waste code (Bend Code 14.20)?

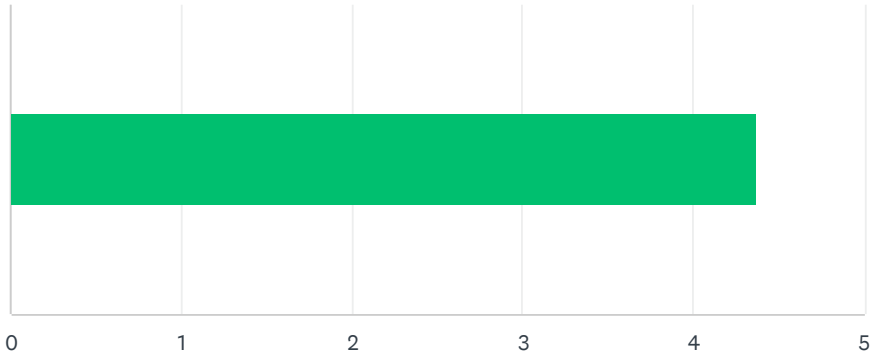
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	62.50%	5
No	37.50%	3
TOTAL		8

Q5 Do you think the City should continue focusing on education or shift to enforcement to promote existing water waste regulations (Bend Code 14.20)?

Answered: 8 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	4	35	8
Total Respondents: 8			

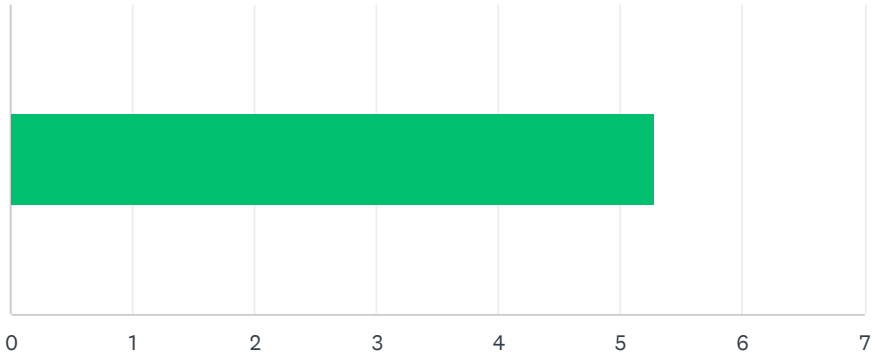
Q6 Why do you think that?

Answered: 8 Skipped: 0

#	RESPONSES	DATE
1	My perception around town is that homeowners/private residences are generally responsible, but the major leakages and waste are tied to businesses where individual responsibility is more diffuse and tied to financial bottom lines. So a financial impact is likely more important particularly for businesses that are repeat offenders.	12/1/2021 8:51 AM
2	I think enforcement actions don't need to be large for them to be effective. I think the noncompliance rate is very high and some enforcement could help spread the information more rapidly.	11/30/2021 5:52 PM
3	I have become increasingly skeptical of the further effectiveness of education efforts. An educational transition time is reasonable, but then enforcement becomes necessary to make an impact.	11/30/2021 3:26 PM
4	Both are important. Some water users simply need education; others will require enforcement. Perhaps a "three strikes" policy or something similar is needed.	11/30/2021 10:47 AM
5	I think education is always most important, but for any flagrant abuse, enforcement is also necessary as a deterrent and to make sure people understand that there are penalties to not following the code.	11/30/2021 9:58 AM
6	Increase enforcement to the affluent neighborhoods through HOAs first. Continue education everywhere. It needs to be an equitable and united effort. Acknowledge that people water their garden for food they're eating is different than people water large lawns.	11/15/2021 1:39 PM
7	Education is an important piece, but if there is no penalty for breaking regulations why would having a regulation even matter?	11/13/2021 8:21 PM
8	Education is necessary and preferred, but sometimes it ends up preaching to choir. If folks aren't paying attention in the first place, they won't pay attention to education efforts. They will pay attention to enforcement, though certainly don't want to be heavy handed.	11/13/2021 9:42 AM

Q7 Where do you think the City should fall on the spectrum of voluntary to mandatory adoption of new indoor water efficiency codes and standards? (Think faucets, showerheads, toilets, dishwashers and other appliances.)

Answered: 7 Skipped: 1



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	37	7
Total Respondents: 7			

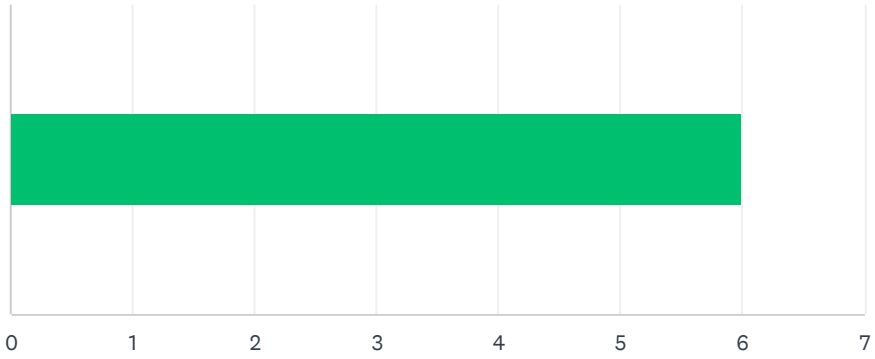
Q8 Why do you think that?

Answered: 8 Skipped: 0

#	RESPONSES	DATE
1	I think it's an important signal to send, but in the scheme of total water consumption in Bend, it's such a small portion.	12/1/2021 8:53 AM
2	People make more of these decisions on an individual basis so voluntary and incentive based programs can be more effective.	11/30/2021 5:56 PM
3	I believe the primary issue lies with older homes, newer homes have pretty efficient plumbing fixtures. Then the challenge for some becomes the financial issue for folks who don't have disposable income. Logistics would also need to be addressed, some of the fixtures, like toilettes are not necessarily a DIY project and would require contractors. Therefore while I support more efficient indoor fixtures I am reluctant to make them mandatory.	11/30/2021 3:35 PM
4	For new standards, applicable to new construction or new permits for existing development, no reason efficiency should not be imposed.	11/30/2021 10:51 AM
5	I think smart mandatory adoption and enforcement of standards can be much more effective than simply voluntary standards that most people would not even be aware of. It’s a balance and all factors must be considered, including equity, affordability, and so forth.	11/30/2021 10:01 AM
6	Mandates also need to include incentives and programs with free installs. Most people cannot afford to update their appliances. It is imperative that we reduce water waste and the weight can't go on individual people to pay for it all.	11/15/2021 1:45 PM
7	For new building, absolutely. For existing, using incentives would help. There is an equity piece to be aware of, and grandfathering buildings too.	11/13/2021 8:23 PM
8	Codes and standards work--they lower the baseline and give contractors, builders, homeowners, retailers a clear directive.	11/13/2021 9:52 AM

Q9 Where do you think the City should fall on the spectrum of voluntary to mandatory adoption of new outdoor water efficiency standards? (Think outdoor irrigation equipment and controllers.)

Answered: 8 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	6	48	8
Total Respondents: 8			

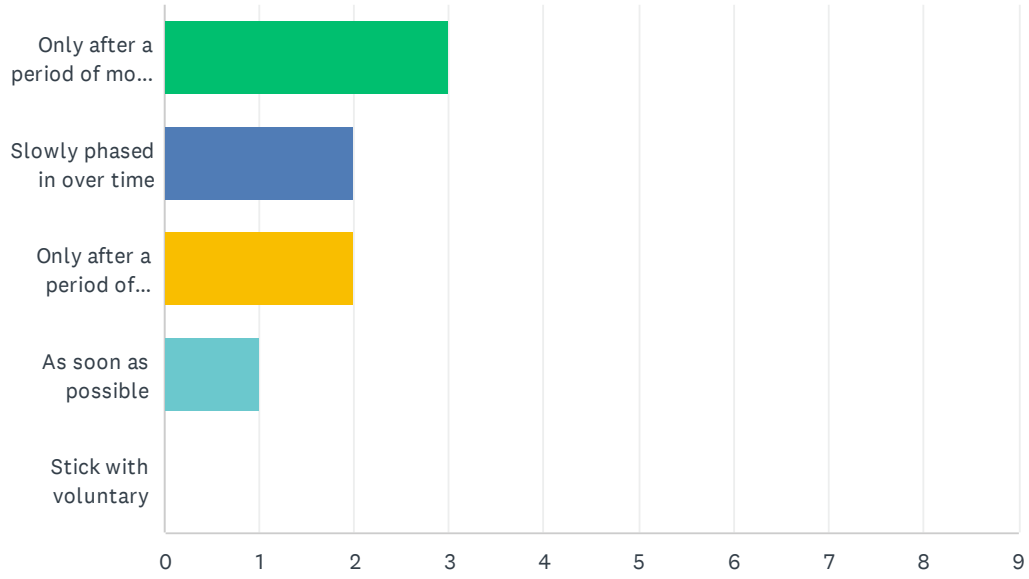
Q10 Why do you think that?

Answered: 8 Skipped: 0

#	RESPONSES	DATE
1	This is a larger share of consumption than indoor, so performance and outcomes are more consequential. So more mandatory makes more sense.	12/1/2021 8:53 AM
2	Most of this work is done by contractors that have little to no incentive to focus on efficiency and mandatory will be the only way to get them to change.	11/30/2021 5:56 PM
3	I believe more mandatory adoption of outdoor standards is more reasonable than mandating indoor fixtures.	11/30/2021 3:35 PM
4	Same as above.	11/30/2021 10:51 AM
5	Same answer as above, but especially because lawn sprinklers are such a high use of water and is usually associated with richer homes/neighborhoods.	11/30/2021 10:01 AM
6	This is the easiest way to reduce water waste. Accountability for people violating mandates needs to be distributed thoughtfully. Educate every home owner before citations go out. Send city staff to talk to people or mail education materials.	11/15/2021 1:45 PM
7	Same as #8	11/13/2021 8:23 PM
8	Gave it a slightly lower score--seems like the outdoor standards are a bit less clear cut--but same rationale as for indoor uses. It gives everyone involved a clear baseline and target. If outdoor water use is the primary driver of demand and if demand is the long term issue, then mandatory adoption is necessary.	11/13/2021 9:52 AM

Q11 If new standards/codes are mandatory, how quickly do you think those should be implemented?

Answered: 8 Skipped: 0



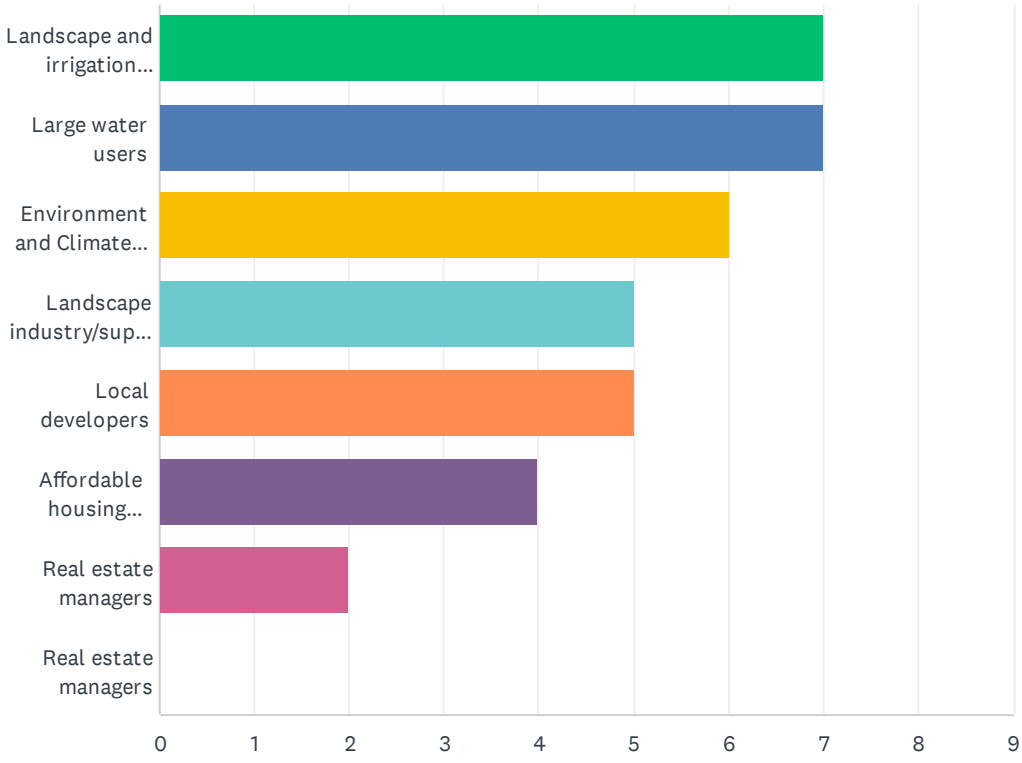
ANSWER CHOICES	RESPONSES	
Only after a period of more education/training	37.50%	3
Slowly phased in over time	25.00%	2
Only after a period of incentives/rebates	25.00%	2
As soon as possible	12.50%	1
Stick with voluntary	0.00%	0
TOTAL		8

#	WHY DO YOU THINK THAT?	DATE
1	We'll need to do a good job of explaining why and how. People need to know that it's worthwhile, for a good reason. And also how to do it most cost-effectively themselves.	12/1/2021 8:53 AM
2	I think it depends on the measure, Code to reduce the amount of lawn space wouldn't be changed by a longer implementation timeline, but a transition that will take time to learn could benefit from a longer timeline for education and incentives	11/30/2021 5:56 PM
3	I believe a period of incentives and rebates is a reasonable step to transition to new standards and codes, giving folks an opportunity to help off-set the costs of the new standards.	11/30/2021 3:35 PM
4	Should be ASAP, but realistically will be phased in over time. Combo of education/training/incentives/rebates should be included with new mandatory code standards.	11/30/2021 10:51 AM
5	Education and enforcement go hand in hand, and both should be used appropriately to make sure it's most effective without being draconian.	11/30/2021 10:01 AM
6	Education/training AND incentive/rebates will make the transition to mandatory more accessible for the community. This is about the community aligning with the necessary	11/15/2021 1:45 PM

	changes to reduce waste. Working with the community will make it smoother and more sustainable.	
7	If they're important, then they should be implemented in a timely manner. ASAP doesn't work well for people who are running a business--but a clear path can work (even though there will be complaining.) I also don't think any of these choices are exclusive of the other--combo of education, incentives, and phase in seems preferable.	11/13/2021 9:52 AM

Q12 Which perspectives do you feel are most important to have at the table when the City forms the Technical Work Group? (Check all that apply.)

Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Landscape and irrigation contractors	87.50%	7
Large water users	87.50%	7
Environment and Climate Committee representatives	75.00%	6
Landscape industry/suppliers	62.50%	5
Local developers	62.50%	5
Affordable housing stakeholders	50.00%	4
Real estate managers	25.00%	2
Total Respondents: 8		

Q13 Are there other perspectives you feel should be represented in the Technical Work Group?

Answered: 7 Skipped: 1

ANSWER CHOICES	RESPONSES	
1	100.00%	7
2	42.86%	3
3	14.29%	1

#	1	DATE
1	Conservation/habitat (why maintaining viable instream flows matters)	12/1/2021 8:58 AM
2	Water resource experts	11/30/2021 6:03 PM
3	Landscape design professionals	11/30/2021 3:37 PM
4	Large HOA executives or staff (if applicable).	11/30/2021 10:58 AM
5	Equity - marginalized communities	11/30/2021 10:04 AM
6	Anna Allen, Bend's Equity and Inclusion Director	11/15/2021 1:52 PM
7	Maybe homeowner group?	11/13/2021 9:59 AM
#	2	DATE
1	Engineering/economic/financial expertise (quantitative, empirical basis for policy and evidence-based decisions)	12/1/2021 8:58 AM
2	Behavior change experts (People who actually study or are trained in some form of social psycology)	11/30/2021 6:03 PM
3	Multi-family residences?	11/30/2021 10:04 AM
#	3	DATE
1	Youth	11/30/2021 10:04 AM

Q14 Do you have other advice for the Technical Work Group?

Answered: 6 Skipped: 2

#	RESPONSES	DATE
1	Data-driven as much as possible, on costs, benefits, performance.	12/1/2021 8:58 AM
2	I think the TAG should consider rate design as a potential avenue to encourage the behavior shift we are looking for, I would also encourage developing programs that can be measured and have an outcome based approach.	11/30/2021 6:03 PM
3	Include new standards for irrigation district water rights used in UGB in TWG scope. Specifically, explore policy ideas to conserve irrigation water use in the UGB and transfer conserved water to instream use.	11/30/2021 10:58 AM
4	Help people understand the City's usage compared to the Irrigation districts.	11/30/2021 10:04 AM
5	Perspective of environmental justice is critical any time mandates are discussed. Citations and upgrades affect community members differently.	11/15/2021 1:52 PM
6	Be firm and clear on needed outcomes and focus on how to best meet those outcomes	11/13/2021 9:59 AM

Q15 What's your best advice for the WaterWise Program moving forward?

Answered: 6 Skipped: 2

#	RESPONSES	DATE
1	Focus on the biggest sources of water withdrawal. Ultimately this region's highest and best uses of water have shifted dramatically over time. The largest consumers need to justify their continued primacy. Water rights matter, but we see from more arid parts of the country facing greater demand, that market and political forces prevail in the long run.	12/1/2021 8:58 AM
2	I took a training in community based social marketing that was really helpful for any project involving behavior change. Also I think it would be helpful to better articulate what the goals of the projects should be. The program design should be different if it is evaluating the peak water demand getting too high, or if it is trying to reduce the total volume of water we use throughout the year. I think we should also have a focus on modeling for what climate change and population growth could do to our water resources	11/30/2021 6:03 PM
3	Must recognize climate change and "business as usual" water use is not sustainable going forward. City should continually reduce reliance on Tumalo Creek water because it degrades critical aquatic habitat in the Creek and the Middle Deschutes. Ie conservation via the WaterWise program should benefit Tumalo Creek, and City should shift to greater reliance on groundwater. City should pursue balance of education and enforcement.	11/30/2021 10:58 AM
4	A presence for every new homeowner or renter so that they are aware of the program and ways they can help reduce wastage.	11/30/2021 10:04 AM
5	Talk to the community through school meetings, at coffee shops, at the public library, at community gardens, etc. It's important to meet people in their every day lives. Often the only people that hear about these changes can afford to stop their lives to research it themselves. Go to them to educate and listen.	11/15/2021 1:52 PM
6	It's a great program, but like many conservation efforts it's hard to get people's attention. Perhaps increased incentives and enforcement will get that attention. Seems like many folks only pay attention when they're making a purchase or when something breaks.	11/13/2021 9:59 AM

Q16 Let us know who you are!

Answered: 8 Skipped: 0

NAME
Mark Buckley
Neil Baunsgard
Peter Grube
Rory Isbell
Kavi Chokshi
Kersey Goodwin
Serena Dietrich
Bill Welch

CITY OF BEND

City of Bend WaterWise Program
Environment & Climate Committee Memo

December 3, 2021

To: Environment & Climate Committee

Subject: WaterWise Program Update Part 3 (October-December 2021 Topic Series)

The City is seeking policy-level advice from the Environment and Climate Committee on the best-suited strategies to implement new water efficiency standards/codes and maintain community support for the updated WaterWise Program.

Part 3: WaterWise Program Future & Next Steps

At the Dec. 9 meeting, we'll discuss the survey responses and the Committee's advice for the three policy-level areas and the Technical Work Group. Following the meeting, we plan to draft a summary memo to document what we've heard.

Part 3 Topics

- Survey feedback highlights
- Advice on three policy-level areas
- Advice for Technical Work Group
- Next steps: Dec. 16 subgroup meeting to finalize memo

What We're Asking the Committee

The key questions posed to the Committee are noted below along with a preview of the survey feedback and a few follow up questions for additional discussion in the Dec. 9 meeting.

- Do you think Bend should continue focusing on education or shift to enforcement to promote existing water waste regulations?
    - **Average: 4** on scale of 1=stick with education to 5=start enforcement.

- Where do you think Bend should fall on the spectrum of voluntary to mandatory adoption of new indoor water efficiency standards?
    - **Average: 5** on scale of 1=all voluntary to 7=all mandatory.

- Where do you think Bend should fall on the spectrum of voluntary to mandatory adoption of new outdoor water efficiency standards?
    - **Average: 6** on scale of 1=all voluntary to 7=all mandatory.

- Which perspectives do you think are most important to have at the table when the City forms the Technical Work Group in 2022?
    - **Top ranked:** landscape and irrigation contractors, large water users, ECC.
    - Additional perspectives: equity, homeowner groups, water resources, conservation habitat, multi-family residences, youth, behaviorist, economist.

Follow up Questions

- Do you think incentives and rebates should be offered prior to ramping up enforcement of existing water waste regulations?
- What type of customer education/training do you feel would be most effective for new water efficiency codes/standards?
- Which of the three policy-level areas (existing regulations, indoor or outdoor codes/standards) do you think staff should prioritize?

How Feedback Will Be Documented

We'll develop a brief summary memo that documents the Committee's advice on the four key questions as well as discussion over the three-part meeting series. On Dec. 16, we'll meet with a subgroup of committee members to review and finalize the summary memo.

Draft Table of Contents

1. Background
2. Committee Advice
    - Policy-level advice to inform Technical Work Group
    - Other feedback for WaterWise Program
3. Engagement Process
    - Summary of three-part meeting series
    - Summary of survey feedback
4. Summary

The Committee's advice will inform next steps in the planned public engagement process, including formation of a Conservation and Efficiency Technical Work Group in 2022 to consider implementation details.

ENVIRONMENT & CLIMATE COMMITTEE

PART 3: WATERWISE PROGRAM FUTURE & NEXT STEPS

DECEMBER 9, 2021

Presented By:
Mike Buettner
Patrick Griffiths
Dan Denning
Aubrie Koenig

Three-Part Meeting Series

- ✓ **Oct. 14:** Water Supply & Conservation Overview
- ✓ **Nov. 10:** WaterWise Program History & Progress
- • **Dec. 9:** WaterWise Program Future & Next Steps

Dec. 9 Meeting Topics

- Survey highlights
- Policy-level advice
- Technical Work Group advice
- Next steps

Photo: Prowell Springs

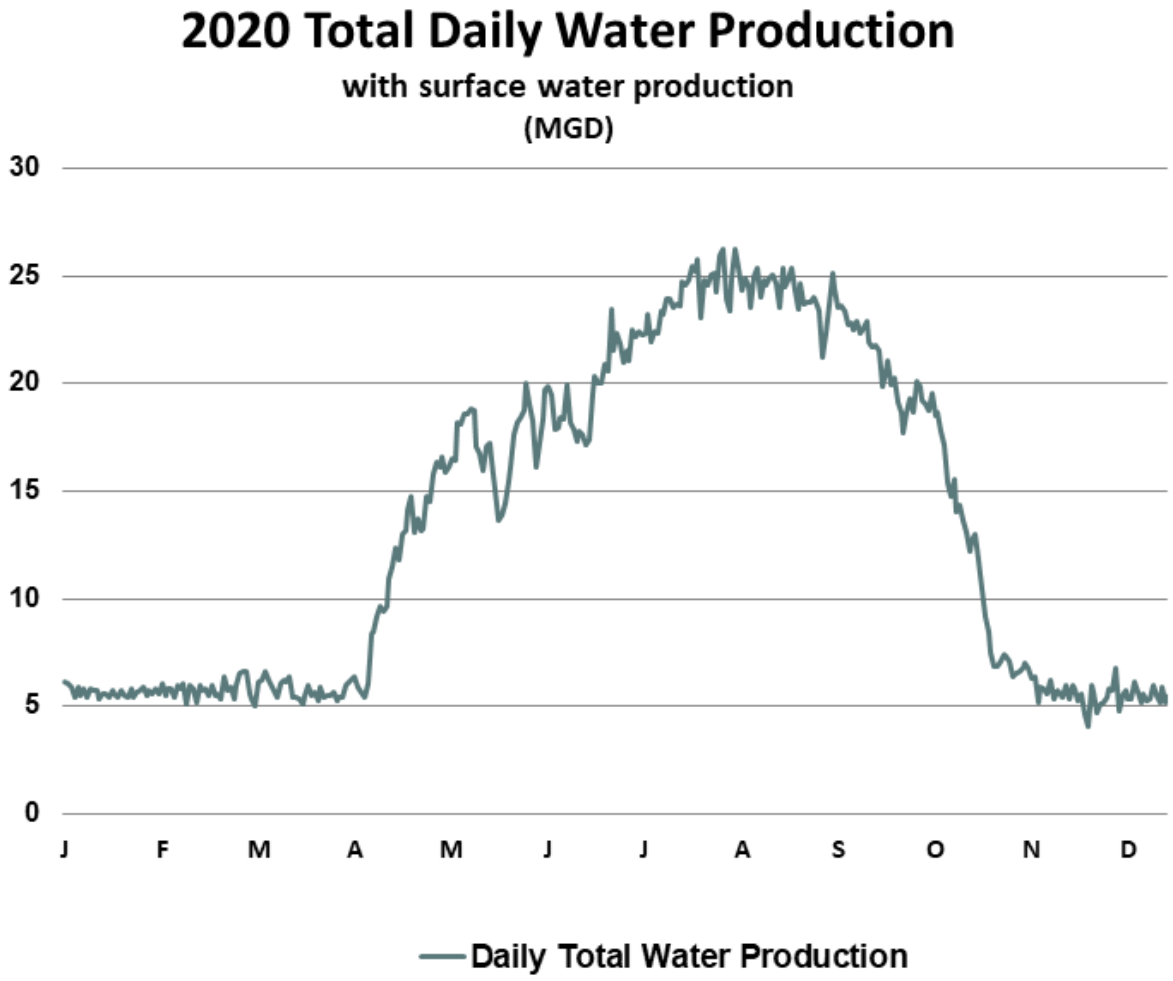
WHAT'S THE GAMEPLAN?

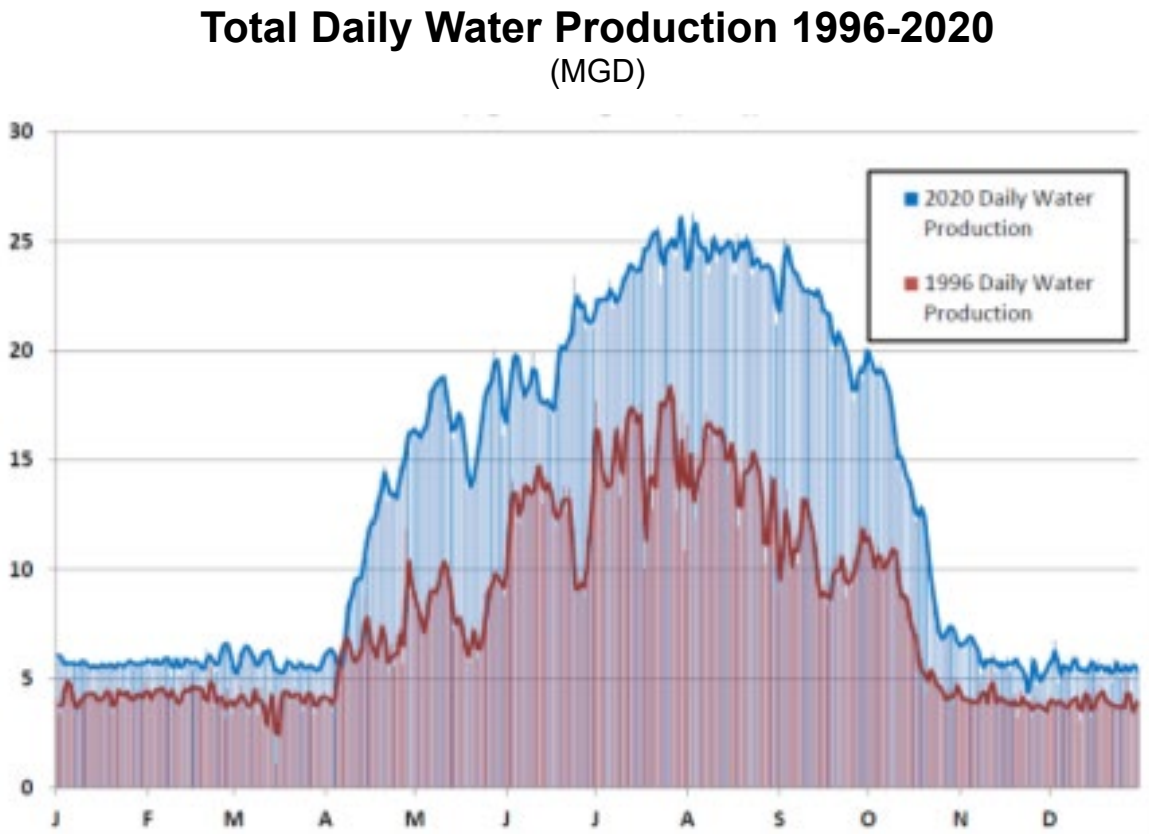
- **Today's meeting:** discuss survey feedback and confirm Committee's policy-level advice
- Prepare summary memo that reflects advice from survey feedback and meeting discussion
- **Dec. 16:** meet with ECC subgroup to review and finalize summary memo
- **2022**: use advice to help guide next phase of engagement with Conservation and Efficiency Technical Work Group

NOV. 10 MEETING RECAP

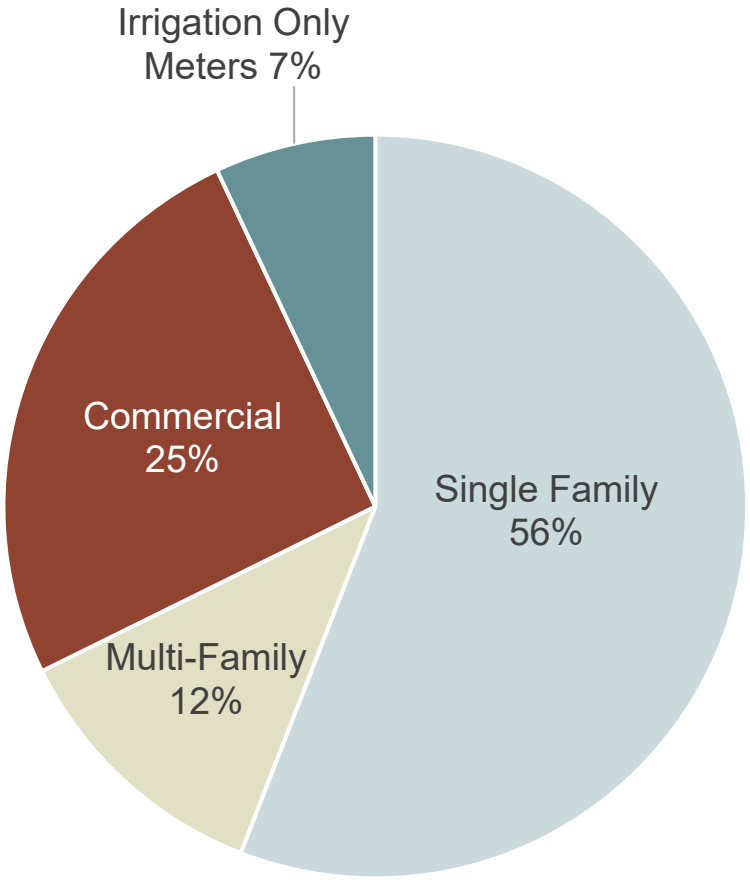
- Bend’s water use and best water-saving opportunities
- Current water waste prevention regulations
- Existing indoor and outdoor efficiency programs

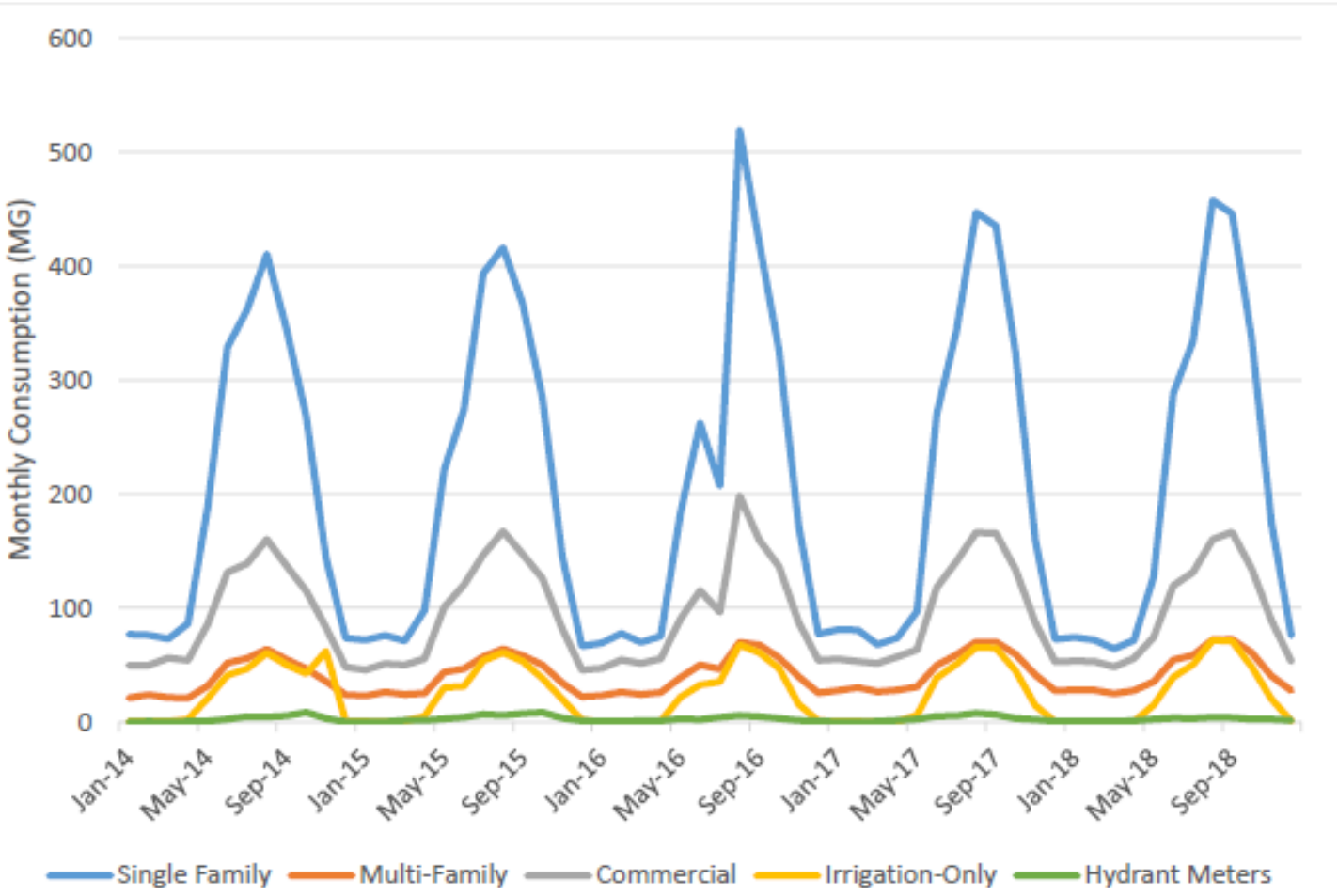
HOW BEND USES WATER: OUTDOOR A KEY FOCUS





HOW BEND USES WATER: SINGLE-FAMILY A KEY FOCUS





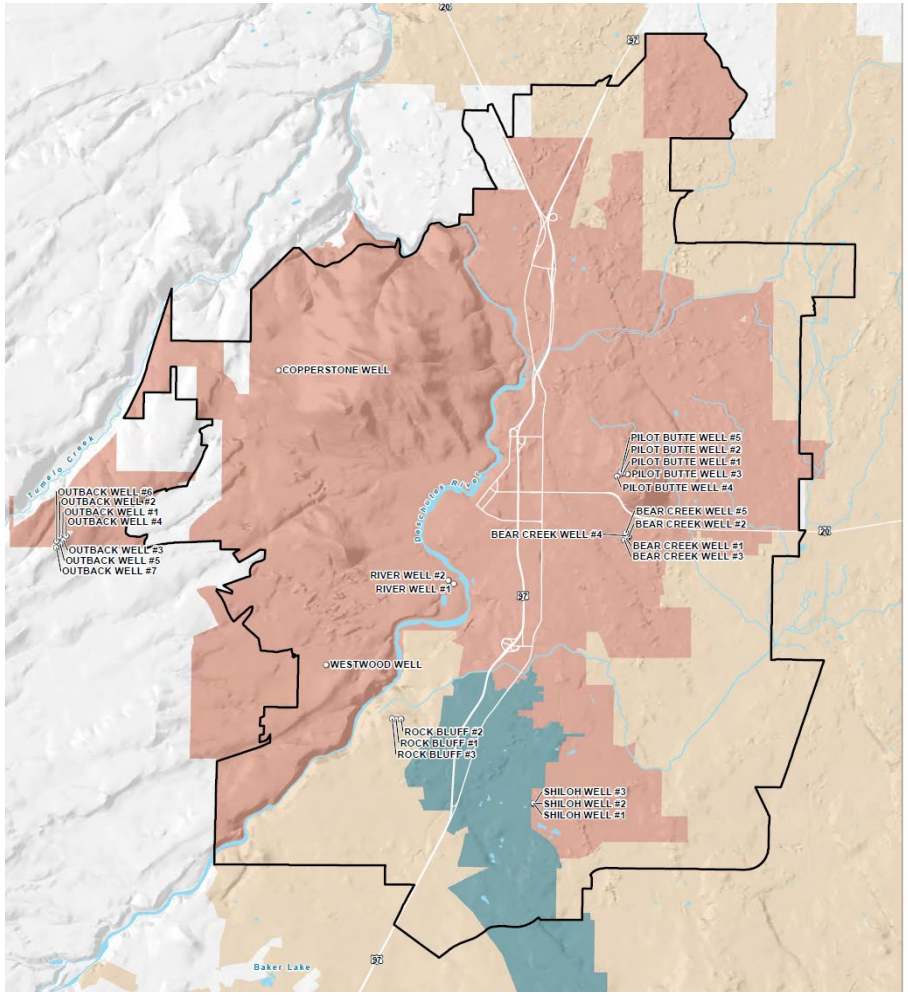
EXISTING REGULATIONS & WATERWISE PROGRAMS

Bend Code 14.20

- No watering 9am-5pm (demand management)
- Even/odd day watering (demand management)

Water Waste (Bend Code Title 14)

- Runoff/waste
- Safety (ice)
- Water quality protection



ADVICE ON POLICY-LEVEL AREAS

How **aware of the WaterWise Program** do you feel community members are currently?

AVERAGE

1

Most are **not** aware

Most are aware

Do you think Bend should continue **focusing on education or shift to enforcement** to promote existing water waste regulations?

AVERAGE

4

Stick with education

Start enforcement

ADDITIONAL DISCUSSION

Do you think incentives and rebates should be offered prior to ramping up enforcement of existing water waste regulations?

What would an appropriate model of enforcement look like for existing water waste regulations?

Where do you think Bend should fall on the spectrum of **voluntary to mandatory adoption for new indoor water efficiency standards**?

AVERAGE

5

All voluntary

All mandatory

Where do you think Bend should fall on the spectrum of **voluntary to mandatory adoption for new outdoor water efficiency standards**?

AVERAGE

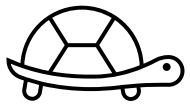
6

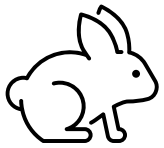
All voluntary

All mandatory

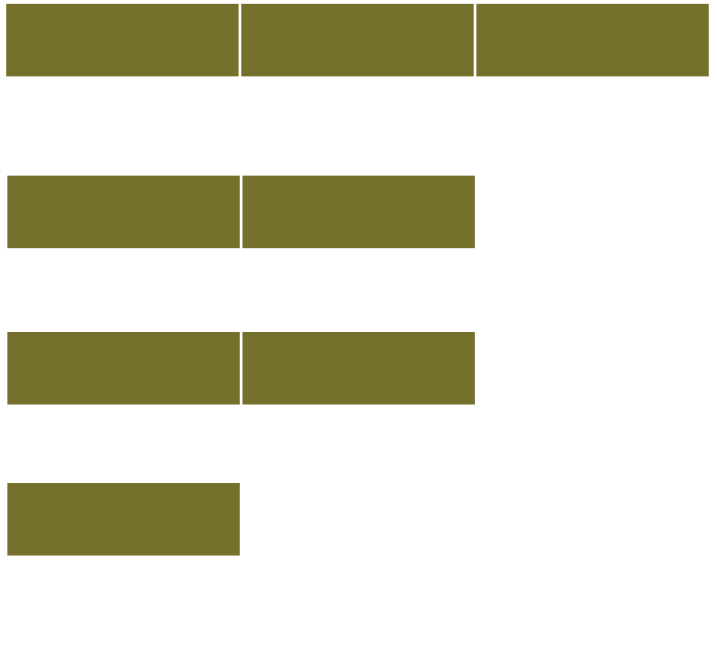
If new standards/codes are **mandatory, how quickly** do you think those should be implemented?

SUMMARY

7 

1 

DETAIL



ADDITIONAL DISCUSSION

What type of customer education and training do you feel would be most effective for new water efficiency codes/standards?

What timescale are you envisioning for phasing in new water efficiency codes/standards?

Which of the three policy areas (existing regulations, indoor and outdoor codes/standards) do you think staff should prioritize?

ADVICE FOR TECHNICAL WORK GROUP

PRELIMINARY TECHNICAL WORK GROUP PLAN

Purpose

- Update and align three areas: Water Waste Regulations; Consider and Propose Updates to Indoor Codes & Efficiency requirements; Consider and Propose Efficiency Updates (and alignment of) Outdoor Irrigation Codes/Standards

Format

- 8-10 member group representing cross-section of customers
- Meet twice monthly for 2 hours over 12-month period

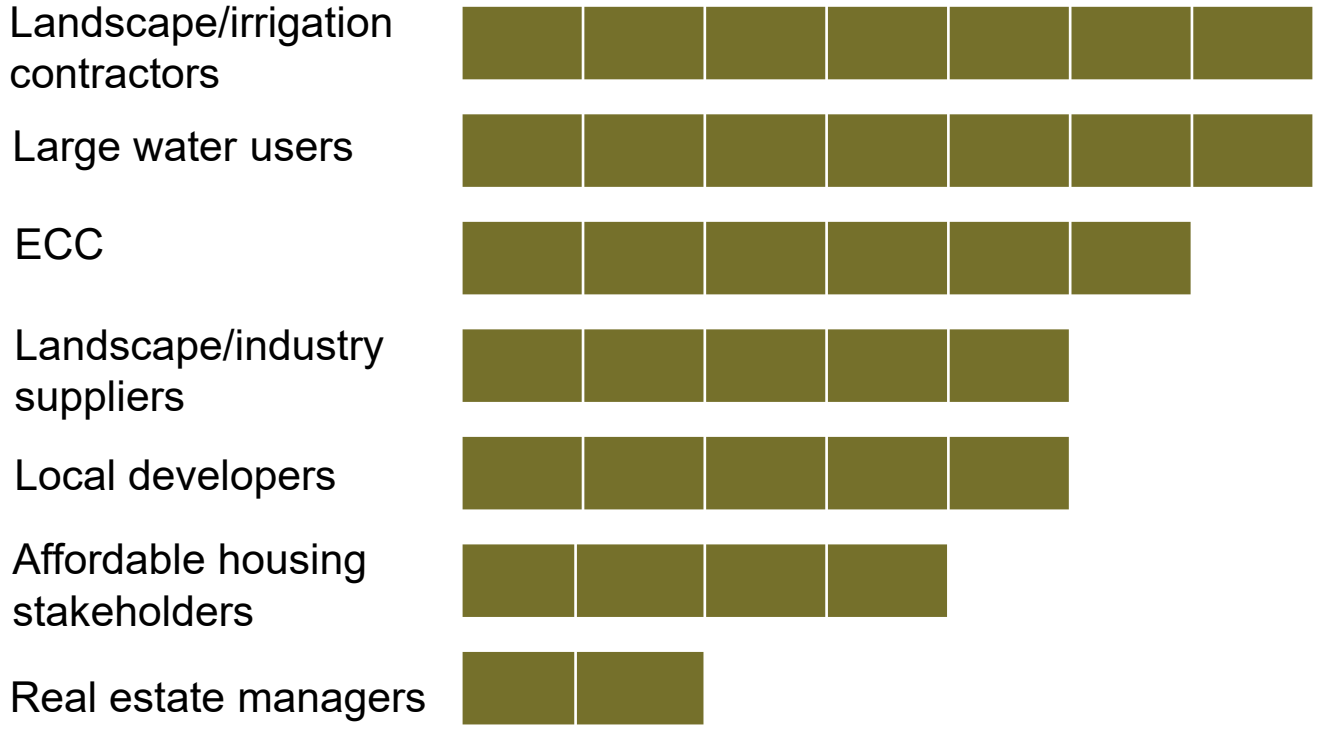
Key Topics

Implementation strategies for…

- Updates to water waste regulations
- Updates/incentives for new indoor efficiency codes/standards
- Updates/alignment/incentives for outdoor efficiency codes/standards

What **perspectives do you think are important to have at the table** when the City forms the Conservation and Efficiency Technical Work Group in 2022?

RANKED



OTHER

- Equity (2)
- Homeowner group (2)
- Water resources
- Conservation habitat
- Multi-family residences
- Youth
- Behaviorist
- Economist/engineer

NEXT STEPS

WHERE DO WE GO FROM HERE?

- Prepare a summary memo that reflects advice from survey feedback and meeting discussion
- **Dec. 16:** meet with ECC subgroup to review and finalize summary memo
- **2022**: use advice to help guide next phase of engagement with Conservation and Efficiency Technical Work Group

WHAT WILL THE MEMO LOOK LIKE?

- **Background**
- **Committee Advice** - *what we heard*
  - Policy-level advice to inform Technical Work Group
  - Other feedback for WaterWise Program
- **Engagement Process** - *how we got here*
  - Summary of three-part meeting series
  - Summary of survey feedback
- **Summary**

THANK YOU!

WaterWise Program: bendoregon.gov/government/departments/utilities/conservation