



# Ashland's Water Supply Strategies

## Climate Change Adaptation

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**MANAGING OUR RESOURCE WISELY**

**JULIE SMITHERMAN, WATER CONSERVATION SPECIALIST**

**PNWS-AWWA KENNEWICK CONFERENCE MAY 4, 2017**



# City of Ashland, Oregon

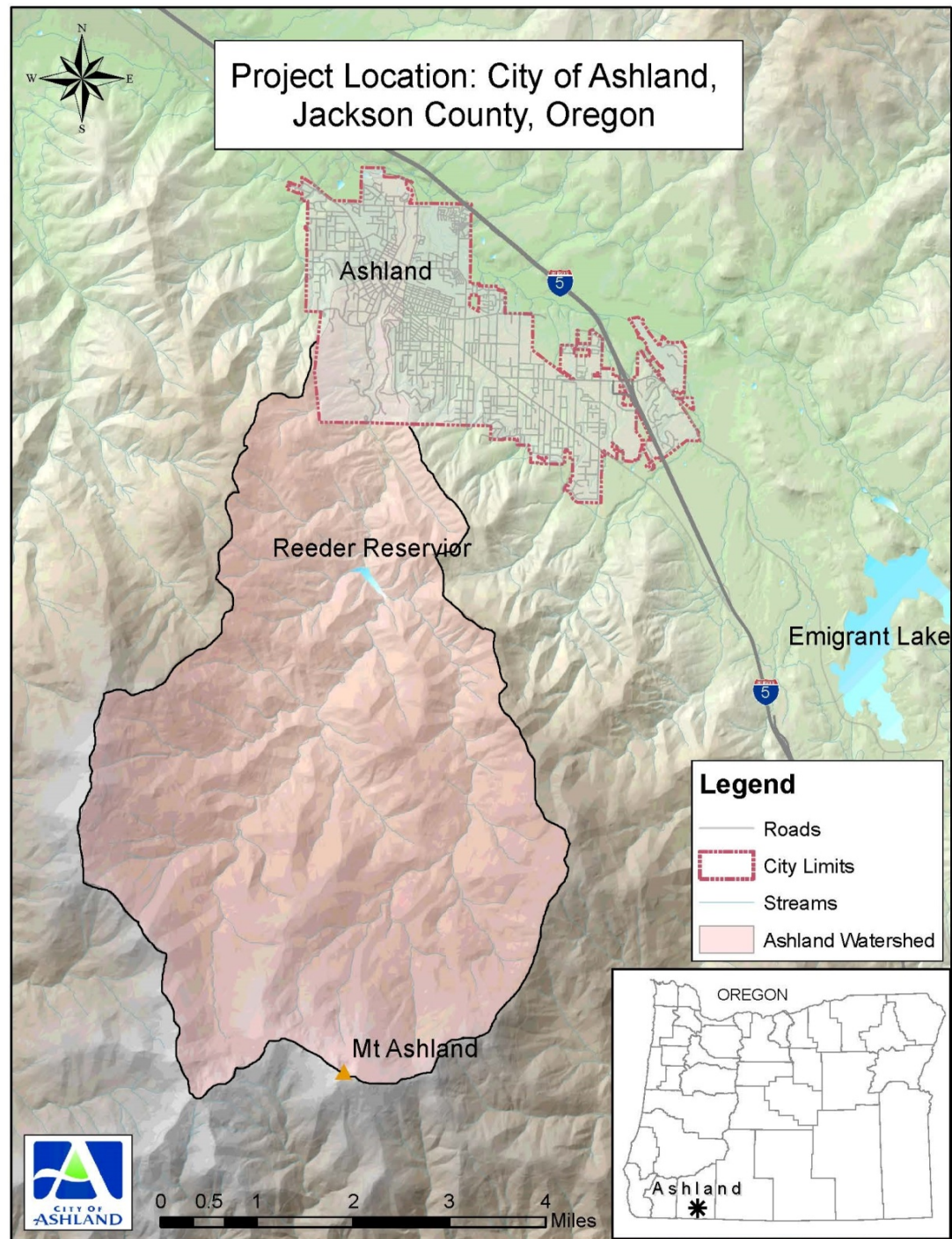
- Location: Southern Oregon
- Population: 21,000
- Elevation: 1,695 – 2,700 feet
- Annual Rainfall: 18 inches
- Average Summer Temp: 90 degrees





# Ashland Creek Watershed

- Siskiyou Mountains
- Mount Ashland: 7,500 ft.
- Approx. 14,425 acres
- Geology: Granitic
- Depend on surface runoff
- Ashland East & West Forks
- Fills Reeder Reservoir



# Ashland's Water Source

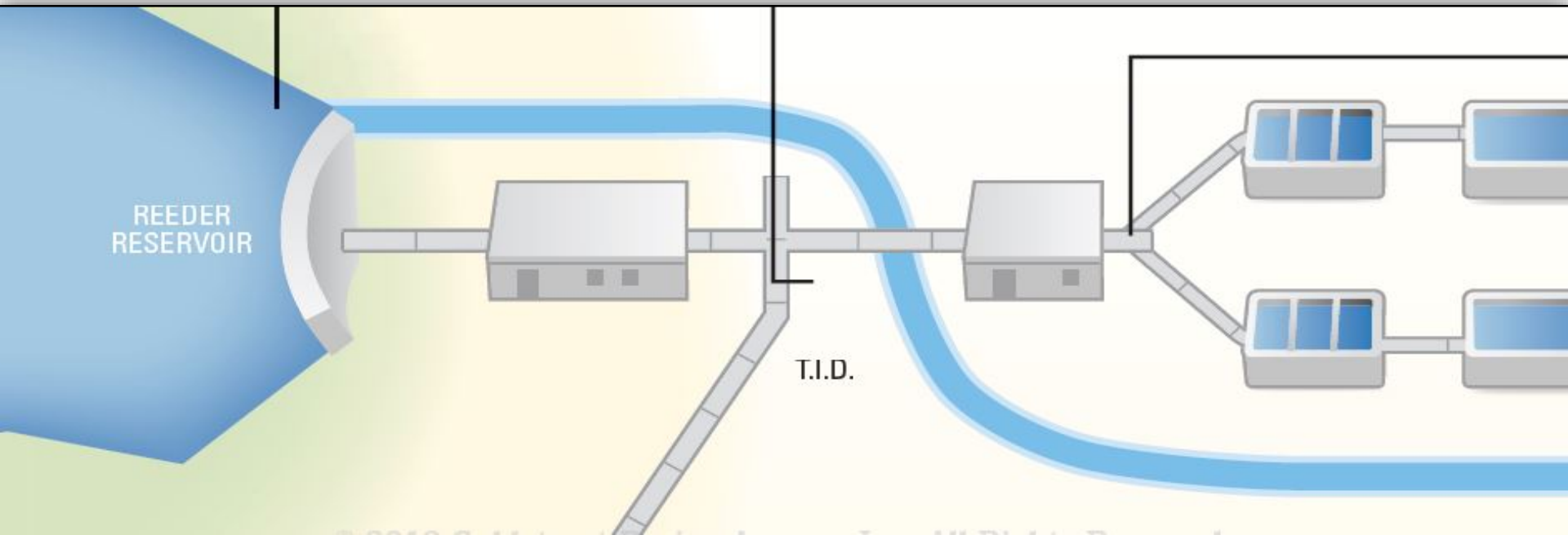
- Reeder Reservoir 280 MG
- Minimal aquifer storage
- Rely mainly on snowpack
- East & West Forks Ashland Creek
- “Normal” July flows: 15-18 MGD
- 2014 & 2015 flows 2-3 MGD





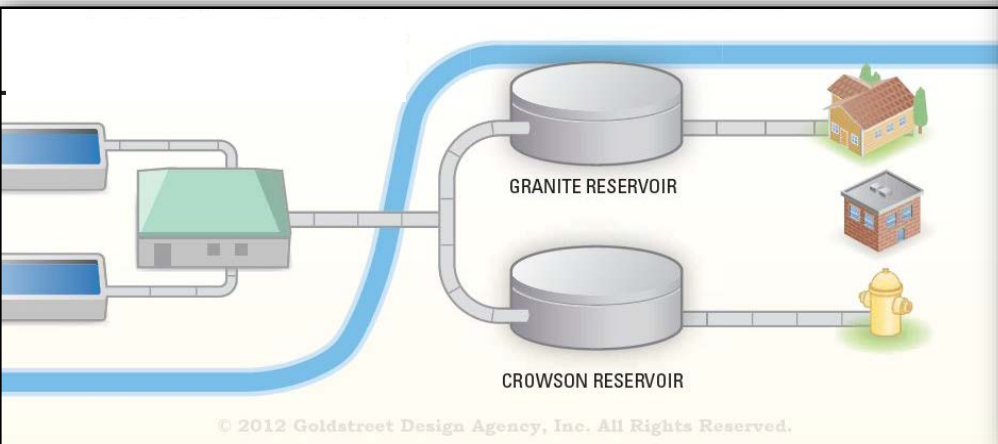
# Ashland's Water System

- Reeder Reservoir
- Water Treatment Plant
- Four reservoir tanks
- Four pump stations
- 32 PRV stations
- 126 miles of distribution



# Ashland's Water System

- First constructed in 1887 for fire flow
- Current WTP Capacity 7.5 MGD
- WTP – High rate direct filtration Plant
- Four Reservoirs = 6.8 MG Storage
- Serving 8 pressure zones
- 8,900 service connections



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# Water Use Statistics

- Winter use - 2 MGD
- Summer use - 6.5 MGD
- Outdoor use is 60%
- Snowpack is summer storage
- Rely on flows into Reeder
- 6.5 MGD lasts for 30 days





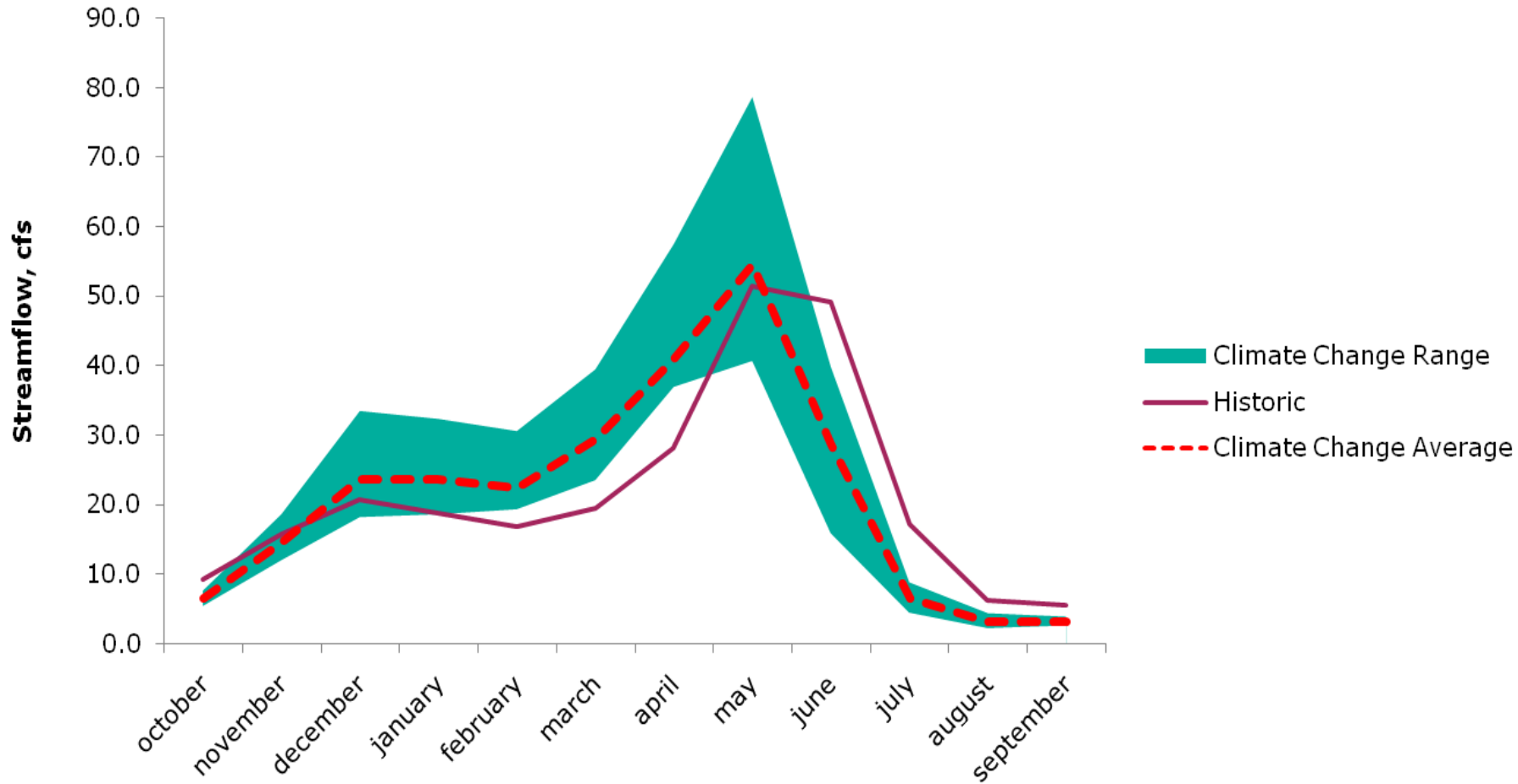
# Factors Impacting Water Supply

- Climate Change
- Limited Aquifer storage
- Drought
  - (2014 & 2015 worst on record)
- Flood
- Fire
- Landslides
- Water Quality





# Change in Ashland Creek Flows

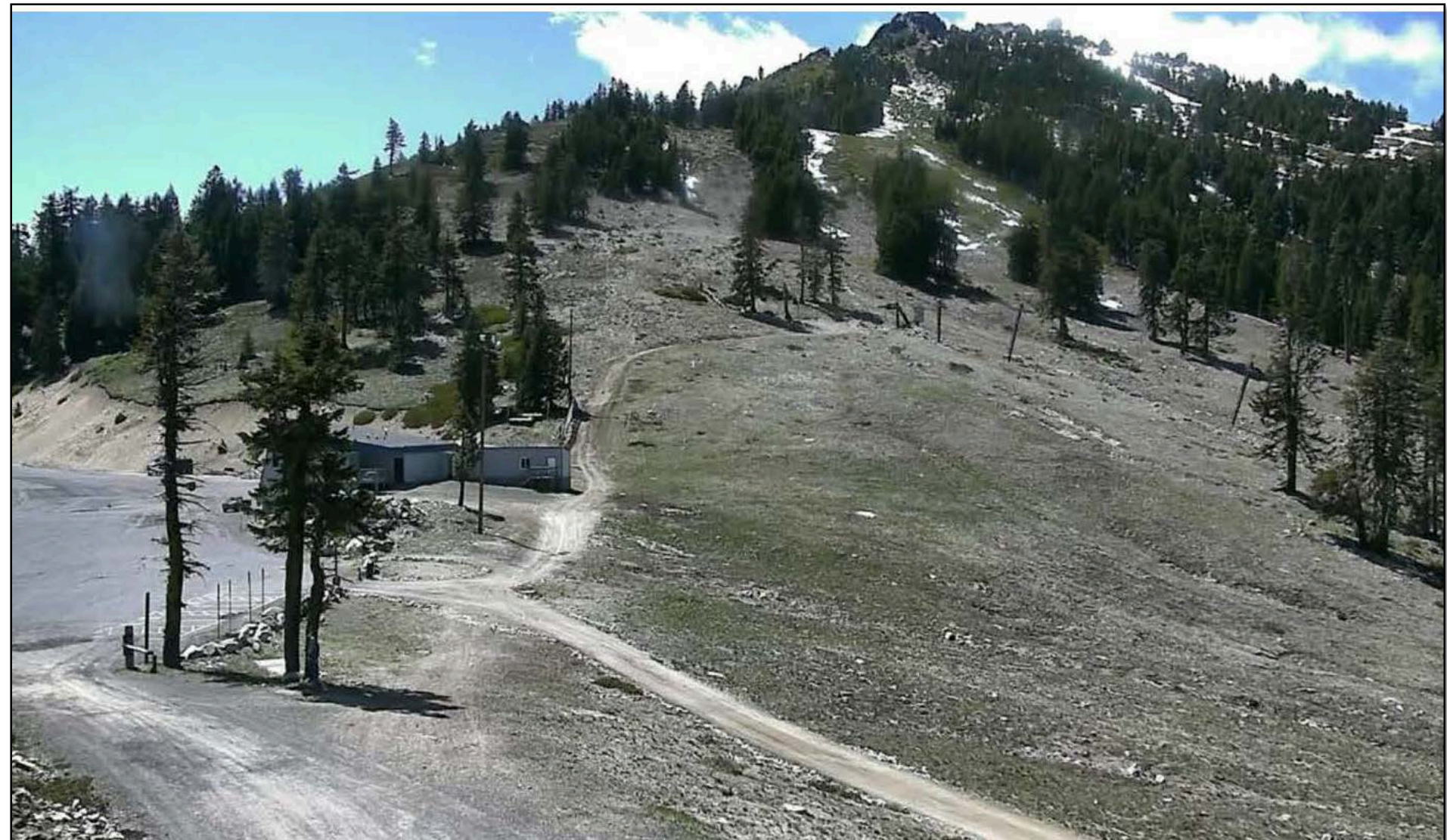


# Mt. Ashland in a “Normal” May





# Mt. Ashland May 2015





# Additional Water Supply Options

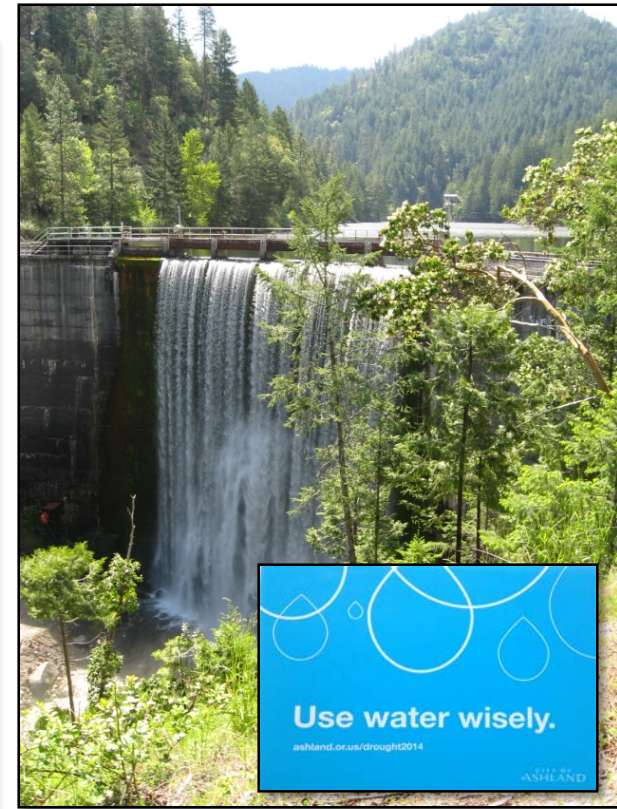
**Irrigation Water**



**Buy Water**



**Use Efficiently**





# Talent Irrigation District (TID)



- Canal runs along the hillside parallel to the City.
- Customers along the canal use for irrigation
- Source - Hyatt and Howard Prairie Lake.
- Used when snowpack is low.
- 2 million gallons per day.
- Treated to drinking water standards.
- Only available May to mid Sept.

# Talent Ashland Phoenix (TAP)

- Emergency Water Supply
- Completed in August 2014
- Source – Medford Water Commission (Big Butte Springs and Rogue River)
- Water Right – 2.13 (MGD)
- Already treated to drinking water standards.

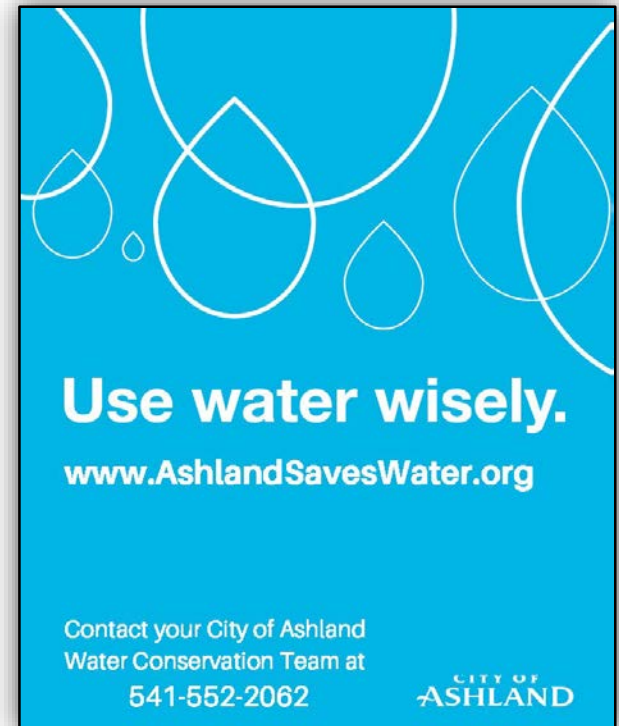




# Water Efficiency – Source of Supply

Water Efficiency should be one of the main strategies used in managing a water supply

- Least Cost Resource
- Implemented more quickly
- Predictable Supply
- Broad-based Effectiveness
- Reduce Utility Resources
- Minimizes the impact of drought



# Water Distribution System





# Water Treatment Plant Constraints

- Historically, no secondary potable water supply
- 2014 Built TAP Intertie to Medford
- WTP is vulnerable to floods, fires and landslides
- In 1997, mudslide caused a two week shortage
- In 1974, flood caused a month shortage





# Historical WTP Hazards



Flood



Fire



Landslide



# New 2.5 MGD WTP

2<sup>nd</sup> Site Option

1<sup>st</sup> Site Option

Current Water Treatment Plant

Reeder Reservoir

City of Ashland





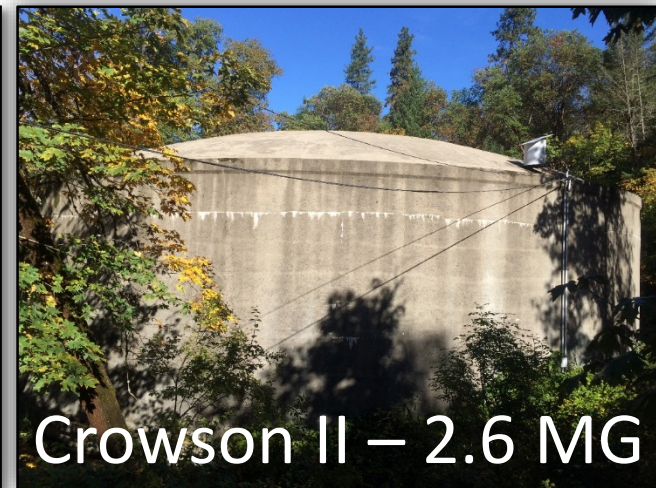
# Additional Capital Improvements

## TID

- Piping of the open canal
- Reduce evaporation and seepage up to 20%
- Clean Water SRF loan
- Complete in couple of years

## TAP

- Current emergency source
- Expand to 3 MGD – need additional water right
- Consider using for future needs





# Water Conservation - A Source of Supply

## Council Goal

- “Adopt an integrated water master plan that addresses long-term water supply including climate change issues, security and redundancy, watershed health, conservation and reuse and stream health.”

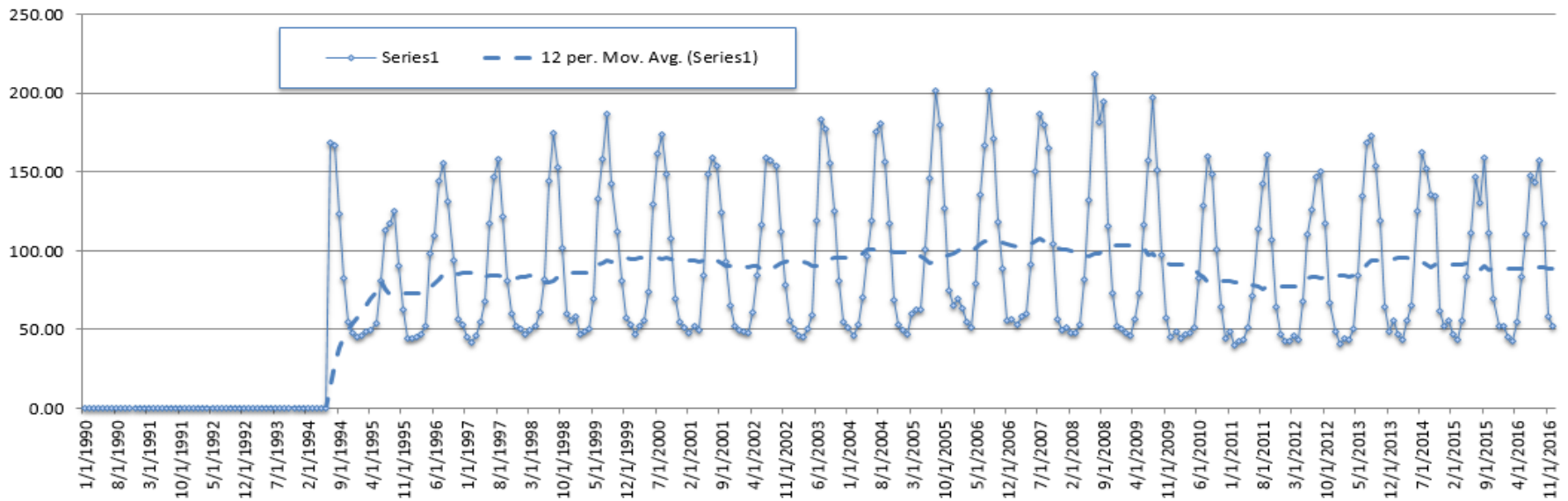
## Level of Service Goals

- Have sufficient supply to meet projected demands that have been reduced based on an additional 5% conservation.
- With an overall goal of achieving a reduction of 15% by 2038.

CITY OF  
ASHLAND

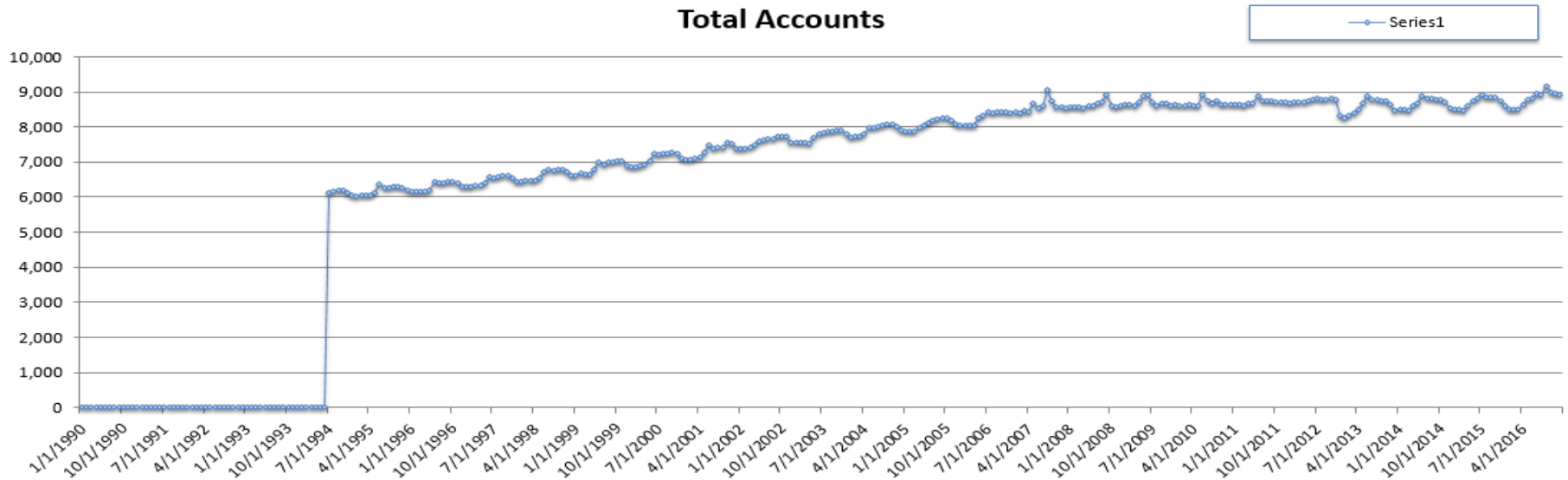


## Total Historical Consumption



## 2017 WATER MASTER PLAN - DSS Modeling

### Total Accounts







# Water Conservation Programs

- Irrigation Evaluations
- Lawn Replacement Program
- Water Wise Landscaping Website
- Indoor Water Use Evaluations
- Appliance Rebates
  - Toilets, washing machines, dishwashers
- Giveaways
  - Showerheads, aerators, soil moisture meters
- Public outreach & resources

# Conservation & Curtailment

## What's the Difference?

- **Conservation (proactive)** – long term reduction strategy
  - Upgrade plumbing fixtures.
  - Retrofit landscaping to drought tolerant.
- **Curtailment (reactive)** – a short term response to a water shortage
  - Taking shorter showers
  - Watering landscape less





# Ashland's Water Supply





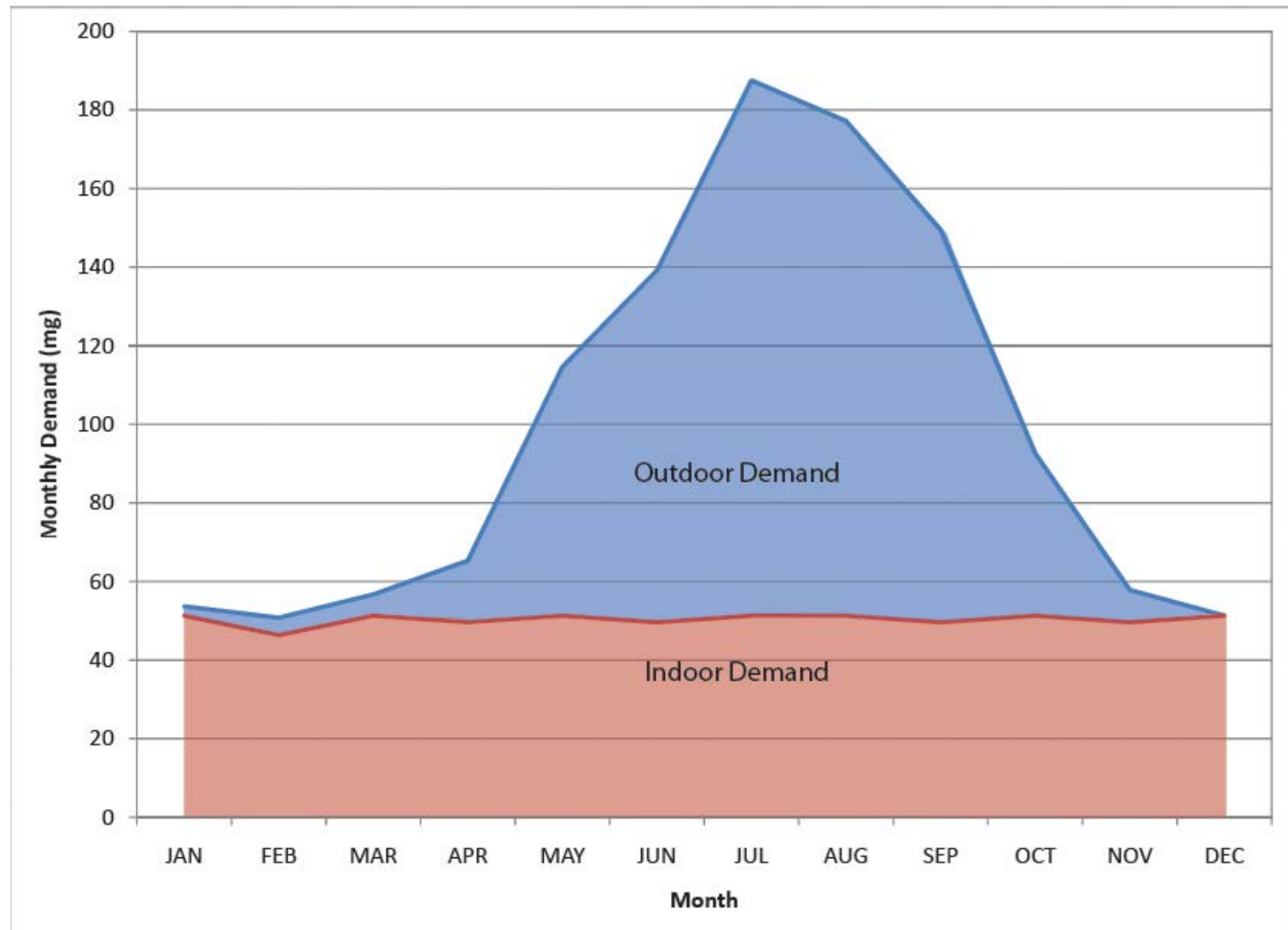
# Q: What percentage of total home water use is used on landscapes?

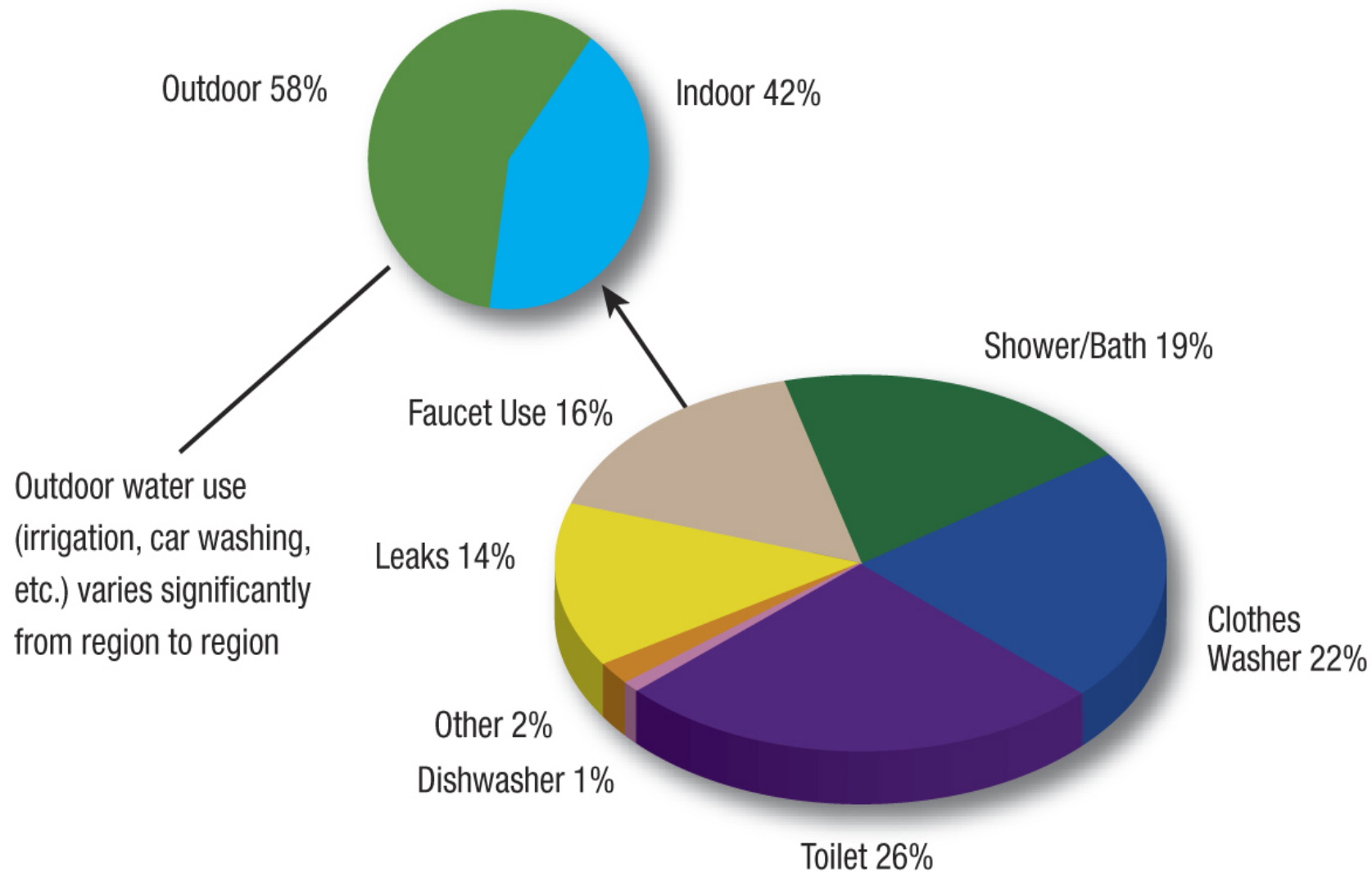
- Under 15%
- 25%
- 40%
- Over 50% ←





# Indoor & Outdoor Water Use



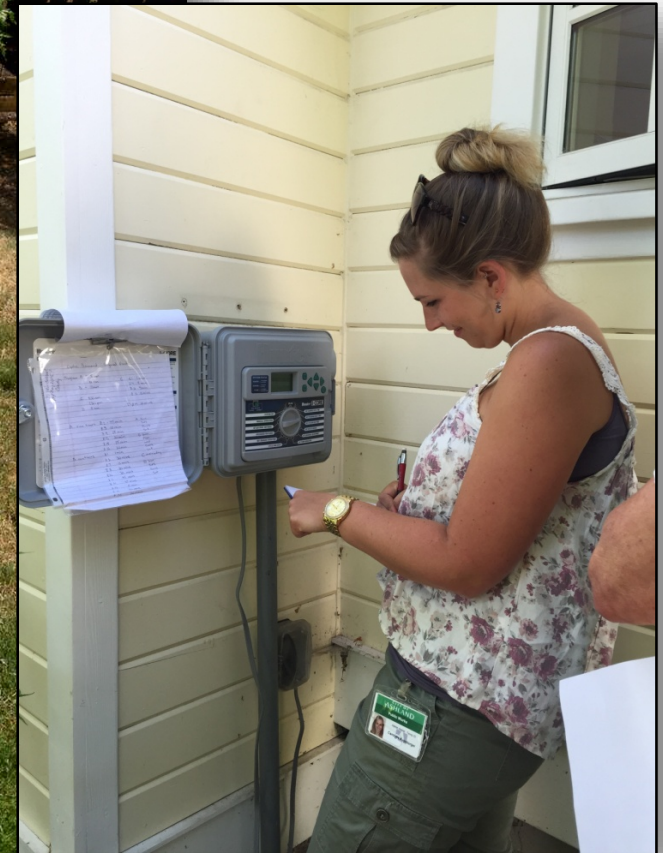


**Residential uses of water in the United States (typically 200 gallons per day per household).**

Data from Mayer, et al. Residential End Uses of Water, 1999.

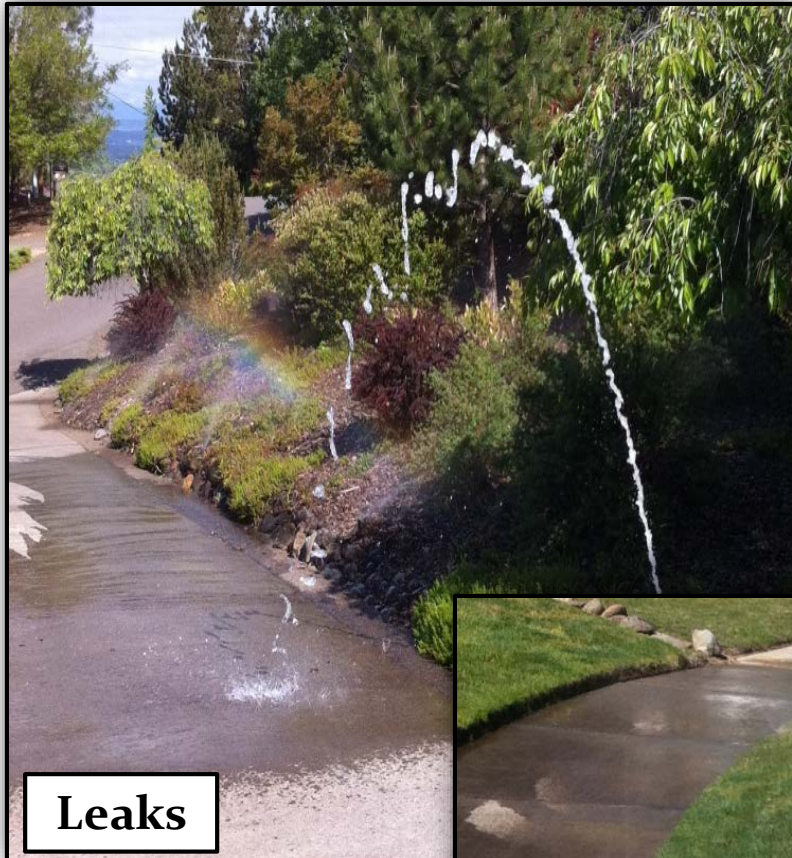


# Irrigation Evaluations





# My Sprinklers Are Fine!



**Leaks**

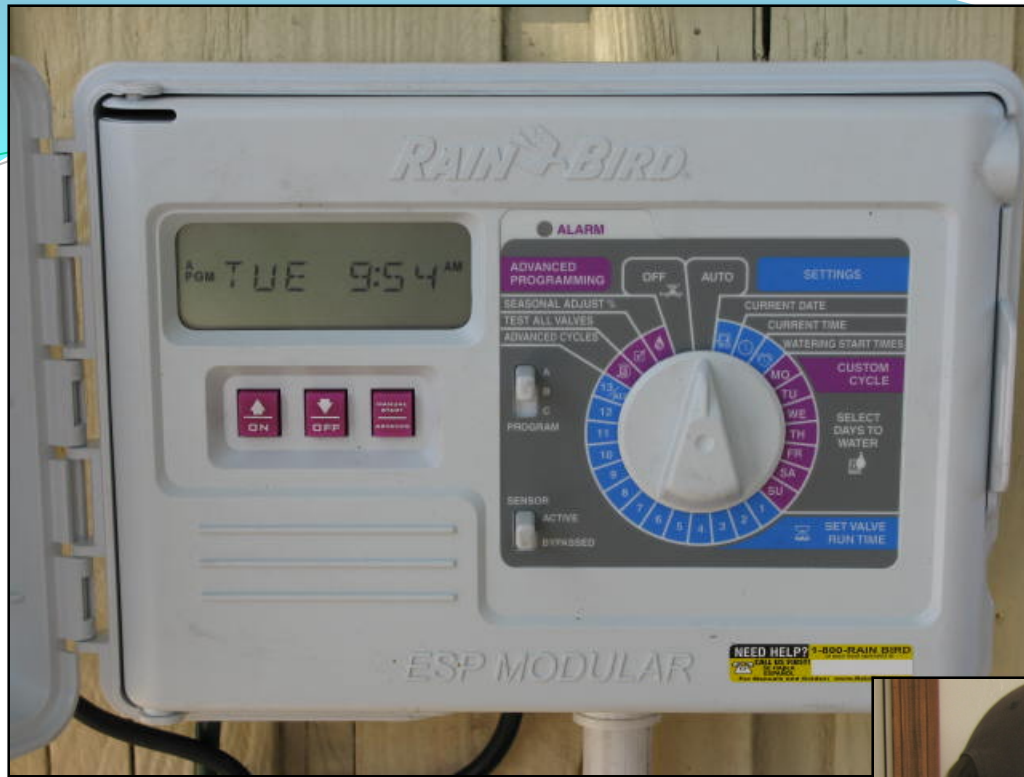


**Broken Sprinklers**



**Sprinkler Overspray**





# Sprinkler Controllers

Set it and Forget it??

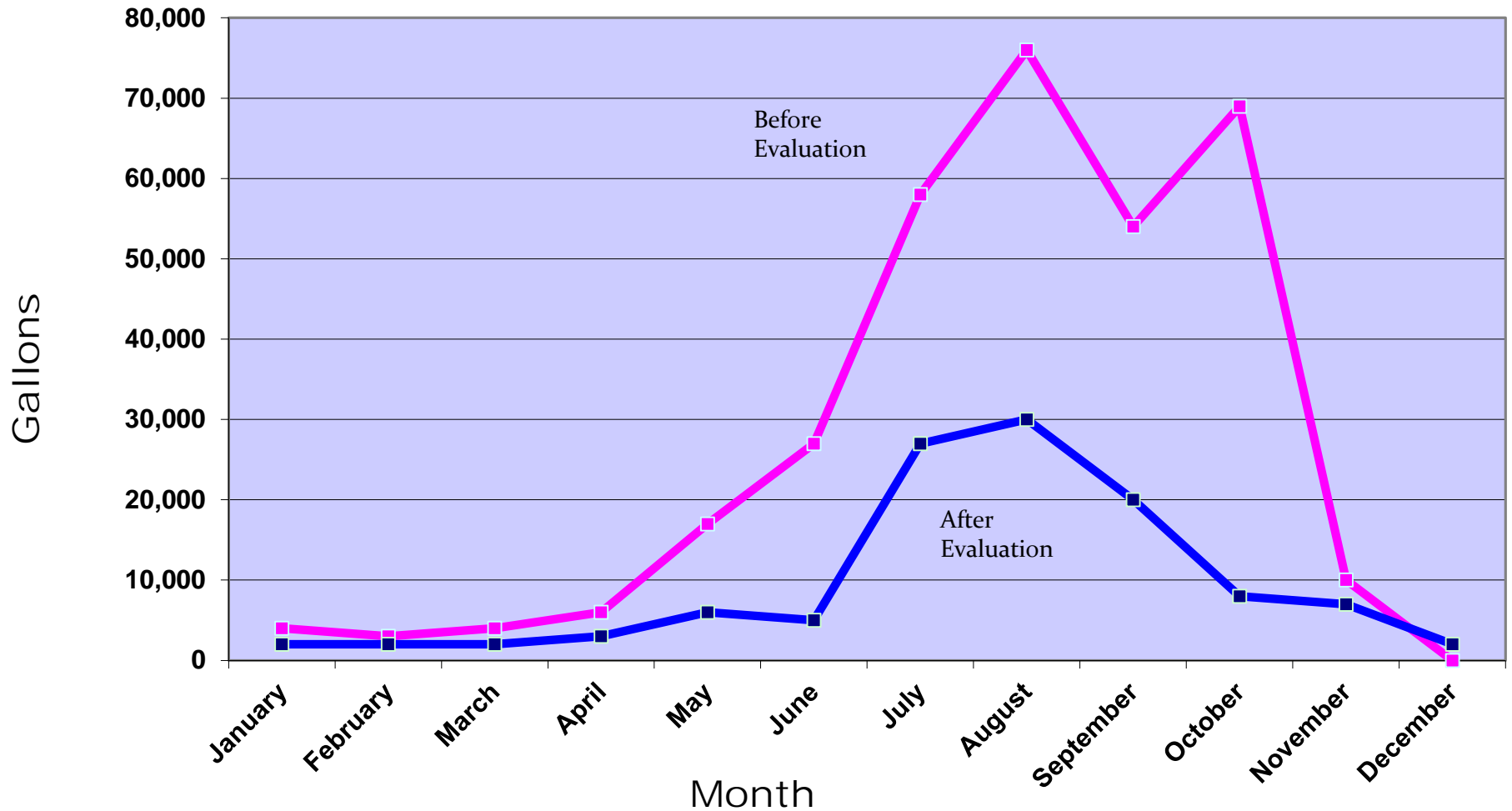
NO!

## Regular Adjustments

Save up to 60% on  
water use

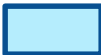
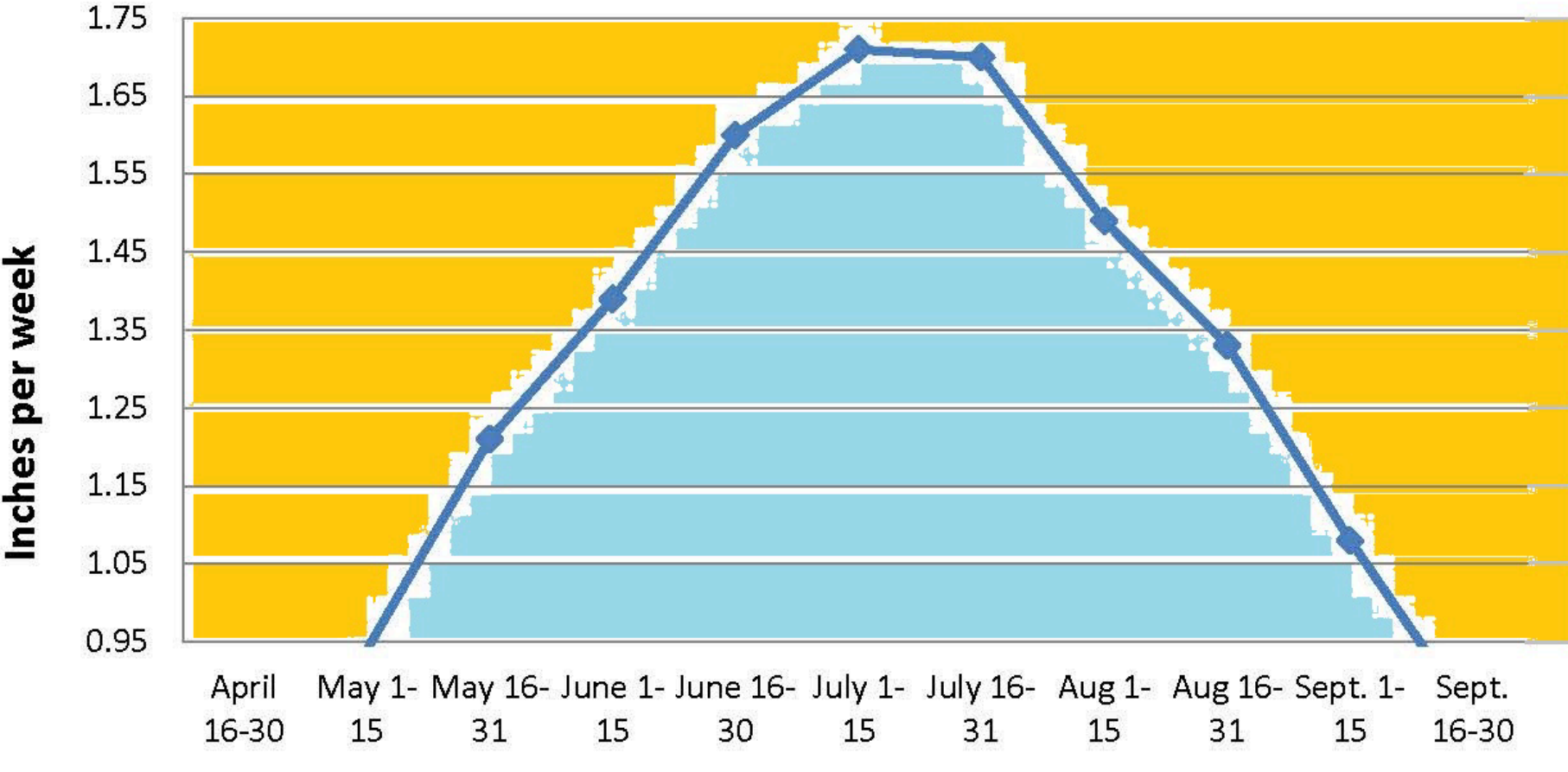


# Scheduling & Savings





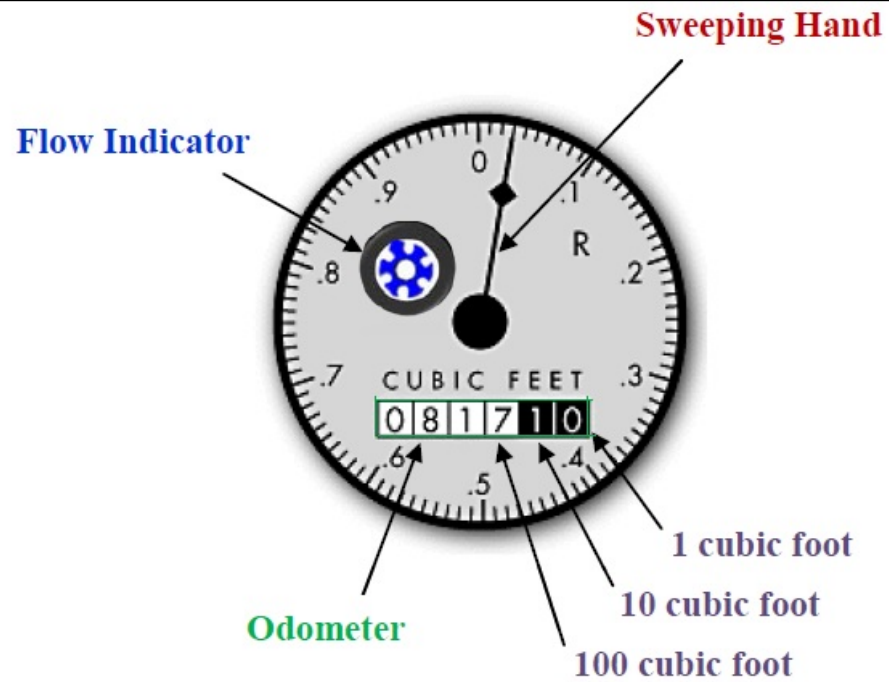
# Lawn Water Needs in Summer



Water Need



Water Wasted





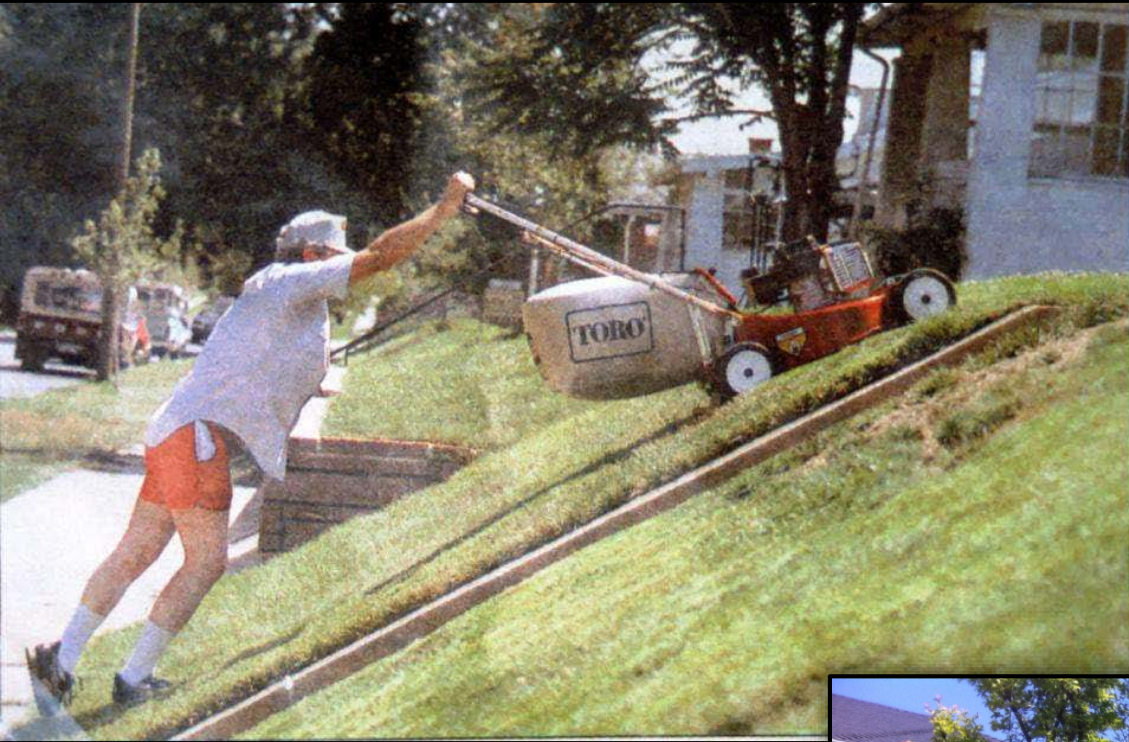
# ASHLAND



WATER WISE LANDSCAPING

[www.ashland saves water.org](http://www.ashland saves water.org)



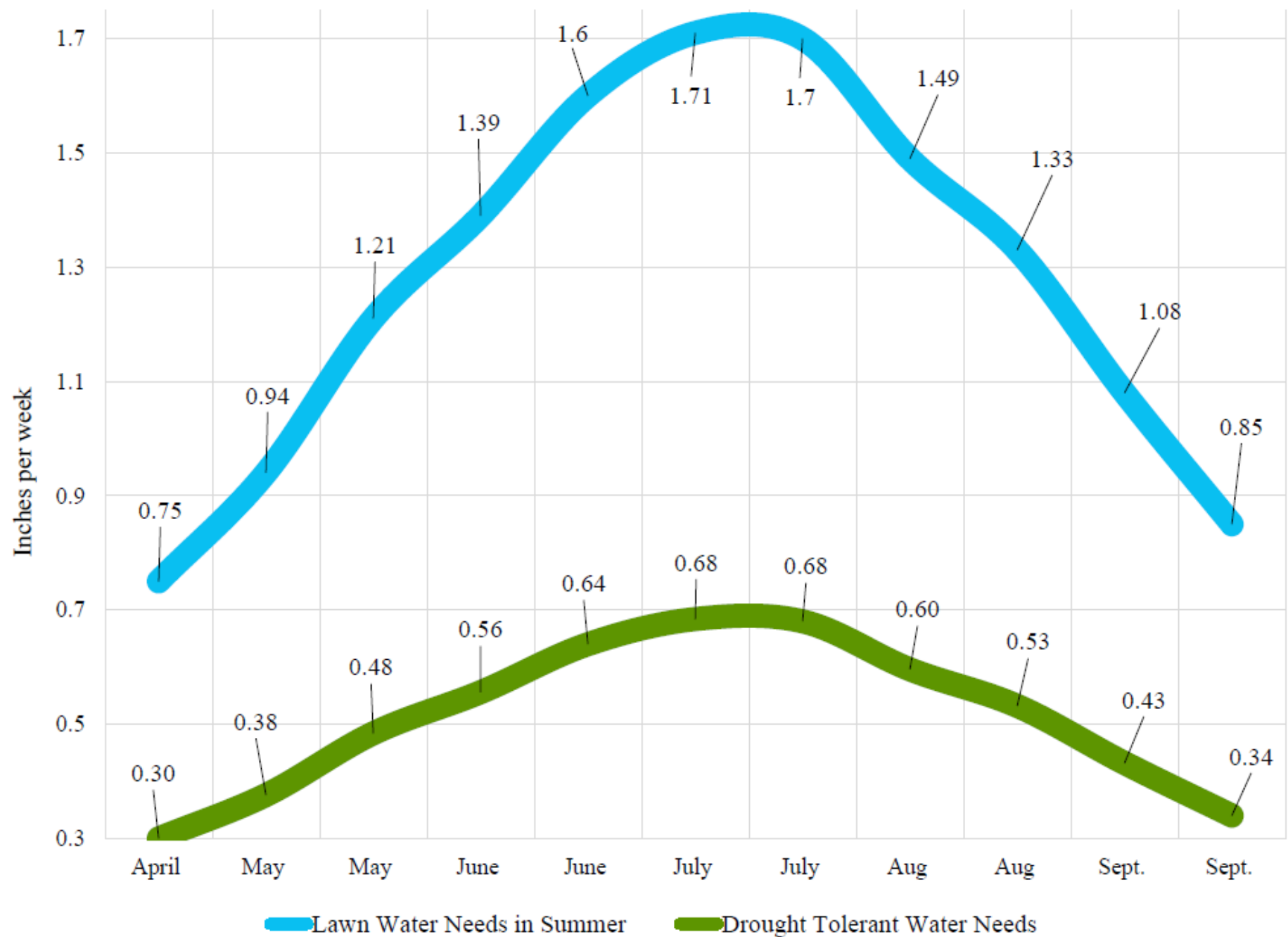


# Lawn Replacement Program (LRP)

Savings:  
10,000 - 30,000  
gallons per summer!







# Case Study: Mt. Meadows

- Lawn Replacement
- Pressure Regulating Valves
- Drought Tolerant Turf
- One of City's highest users
- Replaced 20,000 ft<sup>2</sup> of lawn
- Reduced water use by 35%





# Pilot Projects



**Synthetic Turf**



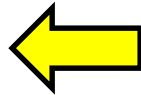
**Drought  
Tolerant Plants**



**Drought  
Tolerant Turf**

# Q: What is the largest use of water in an average home in the US?

- Showers
- Toilet Flushing
- Dishwashing
- Clothes Washing





# Water Savings Potential

*(Family of 4)*

Toilets = 40 gpd

Washers = 25 gpd

Showers = 30 gpd

Aerators = 30 gpd

= 45,000 gallons per year



# 2016 Program Savings

Incentive Programs	Gallons Saved
Toilets	663,661
Showerheads	675,250
Aerators	336,256
Kitchen	57,488
Washing Machine	151,256
Dishwashers	10,368
Outdoor Audits	250,000
Lawn Replacement	1,281,991
<b>Total Savings</b>	<b>3,426,270</b>





## **In the future, any number of factors may pose challenges to the water system and may result in a water shortage**

- Climate change
- Stream Flows
- Future demands
- Aging infrastructure
- Water quality
- Environmental standards
- Flood, Fire Landslide
- Drought

# Water Shortage Operating Procedures

- Determine a shortage based on conditional variables
- Water Management Team
- Supplement with TID or TAP
- Enact voluntary curtailment
  - 2009 reduced water use by 1 MGD
  - 2014 & 2015 reduced water use by 30%
- Provide conservation messages and resources to the community, including discouraging uses that waste water.



# Drawdown Curve



# Drought Response Plan

- Ask the community to reduce water use to between 4.5 and 5 million gallons per day.
- Keep the reservoir full as long as possible
- Add TID water when Ashland Creek water does not meet daily demand
- Shut off a portion of the TID ditch to allow more water to be treated at the WTP
- Add TAP water when both Ashland Creek and the TID water cannot meet our community's demand
- **USE WATER WISELY**



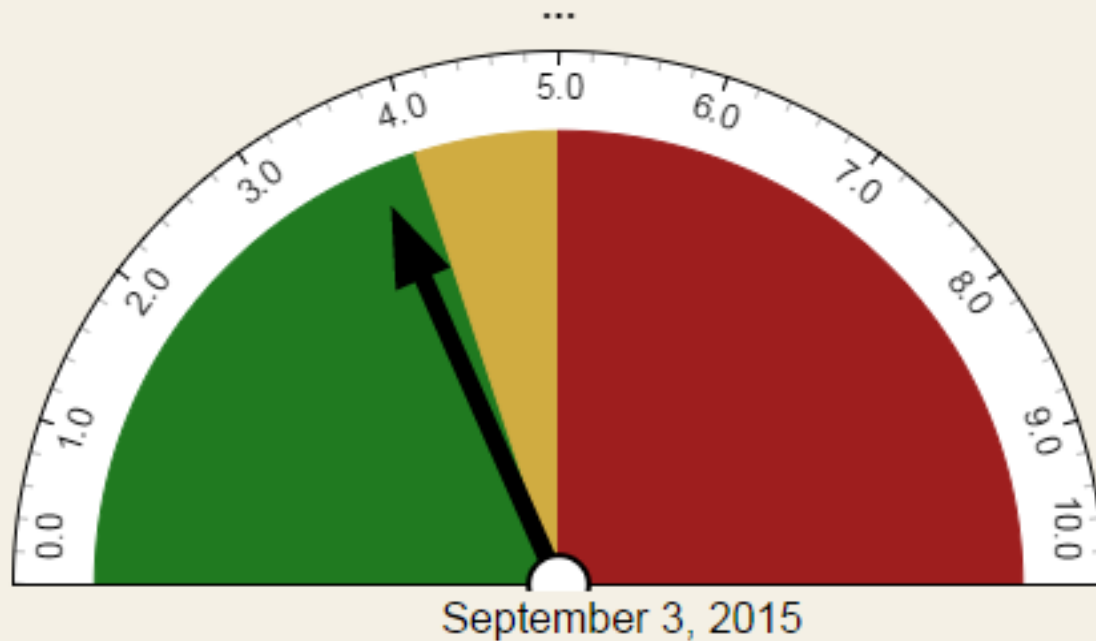
# Use Water Wisely Campaign

- Proactive - get ahead of the situation
- Presented the problem to the community – asked for help and to be a part of the solution
- Request the community reduce wherever they could.
- Provided attainable solutions and resources.
- Drought website and FAQs
- Conservation programs



# City Water Use Gauge

**Previous Day's Water Usage, Millions of Gallons**





# Drought Messaging Success!

- City wide water consumption was reduced by 107 million gallons during summer months (30% reduction)
- We were able to keep usage at about 4.5 MGD
- Never had to implement mandatory curtailment
- Community teamwork
- Public Relations



# Looking to the Future

- Long term planning is very important – Master Plans
- Be proactive and not reactive – drought/shortage response
- Communication with City Officials and Local Organizations
- Invest in water efficient technologies – hardware changes
- Encourage changes in habits – permanent change over time
- Use water appropriately without diminishing quality of life
- Understanding the water system – take pride in your water



# Questions?

**Julie Smitherman**

**[julie.smitherman@ashland.or.us](mailto:julie.smitherman@ashland.or.us)**

**541-552-2062**

**Water-Wise Landscaping Website**

**[www.ashlandsaveswater.org](http://www.ashlandsaveswater.org)**



FIXTURE	TYPE	WATER USE RATE		FAMILY SIZE		
				1	2	4
TOILETS		Gallons / Flush	* Uses / Day	Daily Water Use (Gallons) 1 gal = 0.133 cu.ft.		
	Older than 1950	6.0	5.0	30.0	60.0	120.0
	1950 - 1980	5.0	5.0	25.0	50.0	100.0
	1980 - 1994	3.5	5.0	17.5	35.0	70.0
	1994 or newer	1.6	5.0	8.0	16.0	32.0
	WaterSense	1.3	5.0	6.5	13.0	26.0
	Dual Flush	1.0	5.0	5.0	10.0	20.0
SHOWERS		Gallons / Minute	* Minutes / Shower	Daily Water Use (Gallons) 1 gal = 0.133 cu.ft.		
	Older than 1980	5.0 - 7.0	10.0	50.0 - 70.0	100.0 - 140.0	200.0 - 280.0
	1980 - 1994	3.5	10.0	35.0	70.0	140.0
	1994 or newer	2.5	10.0	25.0	50.0	100.0
	WaterSense	2.0	10.0	20.0	40.0	80.0
	WaterSense	1.5	10.0	15.0	30.0	60.0
KITCHEN & BATHROOM FAUCETS		Gallons / Minute	* Minutes / Day	Daily Water Use (Gallons) 1 gal = 0.133 cu.ft.		
	No aerator	7.0	8.0	56.0	112.0	224.0
	Older than 1980	5.0	8.0	40.0	80.0	160.0
	1980 - 1994	3.0	8.0	24.0	48.0	96.0
	1994 or newer	2.5	8.0	20.0	40.0	80.0
	Standard	2.2	8.0	17.6	35.2	70.4
	WaterSense	1.5	8.0	12.0	24.0	48.0
	WaterSense	1.0	8.0	8.0	16.0	32.0
BATHTUB (22" x 54")	Water Depth	Gallons / Use	* Uses/Person/Day	Daily Water Use (Gallons) 1 gal = 0.133 cu.ft.		
	4 inches	21.0	1.0	21.0	42.0	84.0
	8 inches	41.0	1.0	41.0	82.0	164.0
CLOTHES WASHERS		Gallons / Full Load	* Loads/Person/Week	Daily Water Use (Gallons) 1 gal = 0.133 cu.ft.		
	Older than 1980	55.0	2.0	15.7	31.4	62.8
	Top Load	40.0	2.0	11.4	22.8	45.6
	Front Load	25.0	2.0	7.1	14.2	28.4
	Energy Star	14 OR LESS	2.0	4.0	8.0	16.0

\* Actual usage may vary. Table by Julie Smitherman Sources: American Water Works Association (AWWA), Residential End Uses of Water, 1999. Amy Vickers, Handbook of Water Use and Conservation, 2001. Environmental Protection Agency (EPA), Water and Energy Savings from High Efficiency Fixtures and Appliances in Single Family Homes, 2005. EPA, WaterSense & Energy Star



# Resources & Giveaways







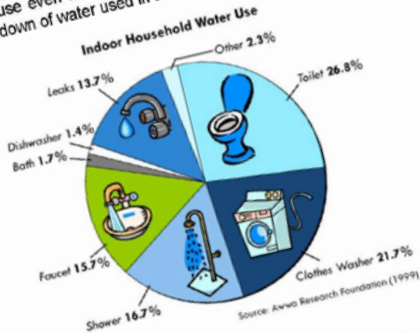
# WATER SAVINGS GUIDE



## INDOORS

### Did You Know?

The average single family residential customer in Ashland uses around 5,000 gallons (668 cubic feet) of water per month indoors. Homes with 1 to 2 residents often use even less. The chart below shows the typical breakdown of water used in the home. (1 cu.ft. = 7.48 gal)



### In the Kitchen

- Your dishwasher uses the same amount of water whether it is full or not, so wait until it's full to run it. Consider replacing your old dishwasher with an **Energy Star** model to save even more water, and energy too.
- Keep a container of drinking water in the refrigerator, instead of letting the faucet run until the water cools down.
- Avoid letting the water run when rinsing vegetables, cleaning dishes or to defrost food.
- Fix leaks promptly! Even a small faucet drip can waste 20 gallons of water each day. Large leaks can waste hundreds of gallons per day.

### In the Laundry Room

- Wait until you have full loads of laundry to run your washing machines. Otherwise, just adjust the water level to fit the size of the load.
- Replace old washing machines with efficient **Energy Star** models, which can use 40 - 75% less water and energy than older machines.

### In the Bathroom

#### Toilet

- Replace an old toilet with water efficient **WaterSense** labeled models and use 20-75% less water each time you flush.
- For water savings with an existing toilet, install early-closing flappers or place small containers filled with water inside the tank to displace the existing water.
- Toilet leaks are common and can easily be repaired with inexpensive replacement parts.
- Check for toilet leaks by adding about 10 drops of food coloring to the tank. If the toilet is leaking, color will appear in the bowl within 15 - 20 minutes.
- Avoid using the toilet as a wastebasket.

#### Shower

- Replacing a shower head can be easy and relatively inexpensive. Today's standard models use 25-50% less water than older models. **WaterSense** models can save even more, while also being certified to perform well.
- Taking shorter showers can save many gallons of water. A bath can use more or less than a shower depending on how high it is filled.

#### Faucets

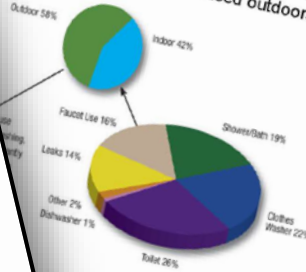
- Changing an aerator is both simple and very low cost. Look for **WaterSense** aerators that flow 0.5 to 1 gallon per minute for bathroom faucets. These function well while using half as much water as current standard faucets and up to 80% less than older faucets. If the faucet currently has no aerator at all, savings from adding one will be even more.
- Avoid letting the water run while brushing your teeth or shaving.

Many products are now **WaterSense** certified. Look for **WaterSense** labels to help you identify products that meet high water efficiency standards and perform well too.



### Did You Know?

In the summer, average residential water use is approximately 5 times higher than in the winter; mainly due to landscape irrigation. The chart below shows the breakdown of water used outdoors.



United States (typically 200 gallons per day per household). Source: U.S. Dept. of Water, 1992

## OUTDOORS

### Sprinkler Care

- Adjust sprinklers to avoid watering sidewalks and driveways.
- Be sure to fix all leaks promptly no matter how small they may seem. Even a small leak can waste hundreds of gallons of water.
- Give your sprinkler system an occasional checkup. If you haven't observed your system operating lately, turn it on and make sure sprinklers are all facing the right direction and functioning properly.

### Yard Maintenance

- Mulching and adding compost to soil can help soil absorb and store water, minimize evaporation, reduce erosion and help control weeds.
- Use a broom instead of a hose to clean your driveway or sidewalk. A hose can use 100 gallons in 10 minutes.
- Raise your lawn mower level to 3 inches. This encourages grass roots to grow deeper, shades the root system and holds soil moisture better than a closely clipped lawn.
- Keep your lawn mower blades sharpened. Dull blades tear grass, forcing it to use more water.

### Car Washing

- Consider using a commercial car wash that recycles water.
- If you use a hose to wash your car, be sure to use a hose nozzle that turns the water off when you are not using it. Washing a car for 10 minutes can easily use 100 gallons of water if you let the water run the entire time.
- Wash with a bucket of water and use the hose only for quick rinses.
- Wash items such as bicycles and trash cans on the lawn to prevent the water from running down the storm drain.

### Questions? Contact Us.

Conservation Division  
51 Winburn Way  
Ashland, Oregon 97520

Phone: (541) 552-2062



Water-wise: [www.ashlandsaveswater.org](http://www.ashlandsaveswater.org) Watering Hotline: 541-552-2057





## LAWN WATERING

Biweekly Period	Approximate Lawn Water Needs (ET) (Inches per Week) <sup>(1)</sup>	Total Watering Time Per Week for Standard Spray Heads <sup>(2)</sup>	Total Watering Time Per Week for Rotary Heads <sup>(2)</sup>
May 1-15	0.94	38 Minutes	90 Minutes
May 16-31	1.21	48 Minutes	116 Minutes
June 1-15	1.39	56 Minutes	134 Minutes
June 16-30	1.60	64 Minutes	154 Minutes
July 1-15	1.71	68 Minutes	164 Minutes
July 16-31	1.70	68 Minutes	164 Minutes
Aug 1-15	1.49	60 Minutes	144 Minutes
Aug 16-31	1.33	54 Minutes	128 Minutes
Sep 1-15	1.08	44 Minutes	104 Minutes
Sep 16-30	0.85	34 Minutes	82 Minutes

(1) Plant water need is often described as inches of water needed per week. *Evapotranspiration (ET)* is the sum of evaporation from the soil and water being used and transpired by the plants.

(2) These run times are based on an average application rate of 1.5 inches per hour for standard spray heads, and 0.625 inches per hour for rotating sprinklers.

### Example water requirement calculation:

Weekly irrigation = 1.70 in. (ET) / 1.5 in/hr (application rate of sprays) x 60 = 68 minutes per week

**SHRUB AND TREE WATERING:** The watering times above apply only to lawns. Most shrubs and trees prefer deeper, less frequent watering. The following is a recommendation for determining other vegetation water needs:

- **Vegetables:** 75-100% of lawn (ET)
- **Shrubs & Perennials:** 50-60% of lawn (ET)
- **Waterwise plants:** 30-40% of lawn (ET)
- **Trees:** Newly planted trees need regular water for the first couple of years, while established trees may need only a deep soak once or twice in summer.

# Reading Your Meter & Calculating Water Use

## 1.) Example



Reading #1



Reading #2

(Days or minutes between readings)

First Date or Time: \_\_\_\_\_ Second Date or Time: \_\_\_\_\_

## 2.) Water Use (Cubic Feet):

Reading #2 \_\_\_\_\_ (cubic feet)  
 Reading #1 - \_\_\_\_\_ (cubic feet)  
 = \_\_\_\_\_ (cubic feet used)

## 3.) Average Water Use:

Cubic Feet Used: \_\_\_\_\_  
 + \_\_\_\_\_ (# of days or minutes between readings)  
 = \_\_\_\_\_ (average cubic feet per day or per minute)

## 4.) Water Use (gallons):

Cubic feet used: \_\_\_\_\_  
 x 7.48 gallons  
 = \_\_\_\_\_ (gallons used)

## 5.) Practice

(Days or minutes between readings)  
 First Date or Time: \_\_\_\_\_ Second Date or Time: \_\_\_\_\_

## Water Use (cubic feet):

Reading #2 \_\_\_\_\_ (cubic feet)  
 Reading #1 - \_\_\_\_\_ (cubic feet)  
 = \_\_\_\_\_ (cubic feet used)

## Water Use:

Cubic Feet Used: \_\_\_\_\_  
 ÷ \_\_\_\_\_ (# of days or minutes between readings)  
 = \_\_\_\_\_ (average cubic feet per day or per minute)

7.48 gallons

(gallons used)

Flow Indicator

Sweeping Hand



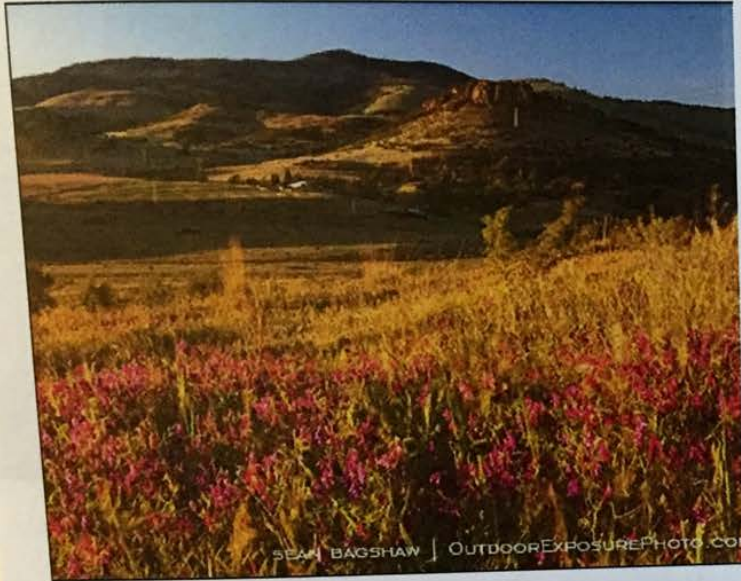
Odometer

1 cubic foot  
 10 cubic foot  
 100 cubic foot

inklers for 5 minutes  
 minute  
 = 80 cubic feet / week  
 (gallons)  
 = 2,393 gallons)



# Surviving Drought

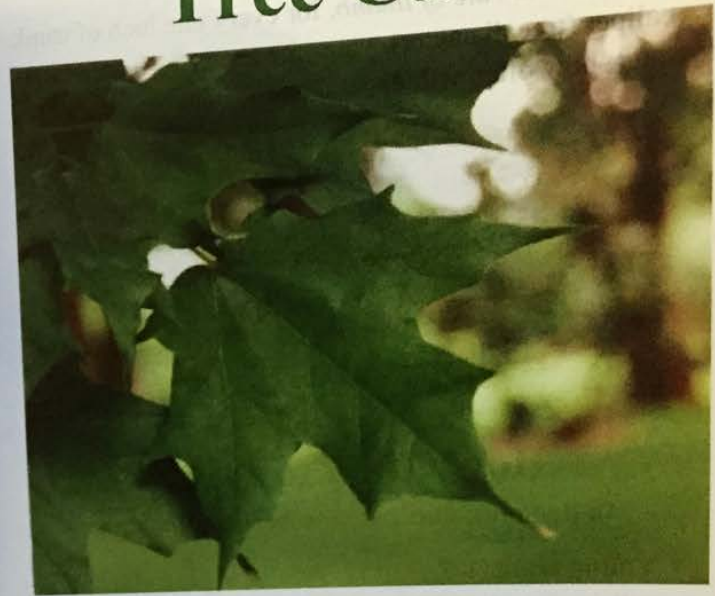


## *A Guide for Water Conservation*

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Learn how you can help to  
preserve Ashland's precious water

# Tree Care



## *A Guide for Watering Trees*

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Learn how Ashland residents  
can properly and efficiently  
water their trees



CITY OF  
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The Permit Process for

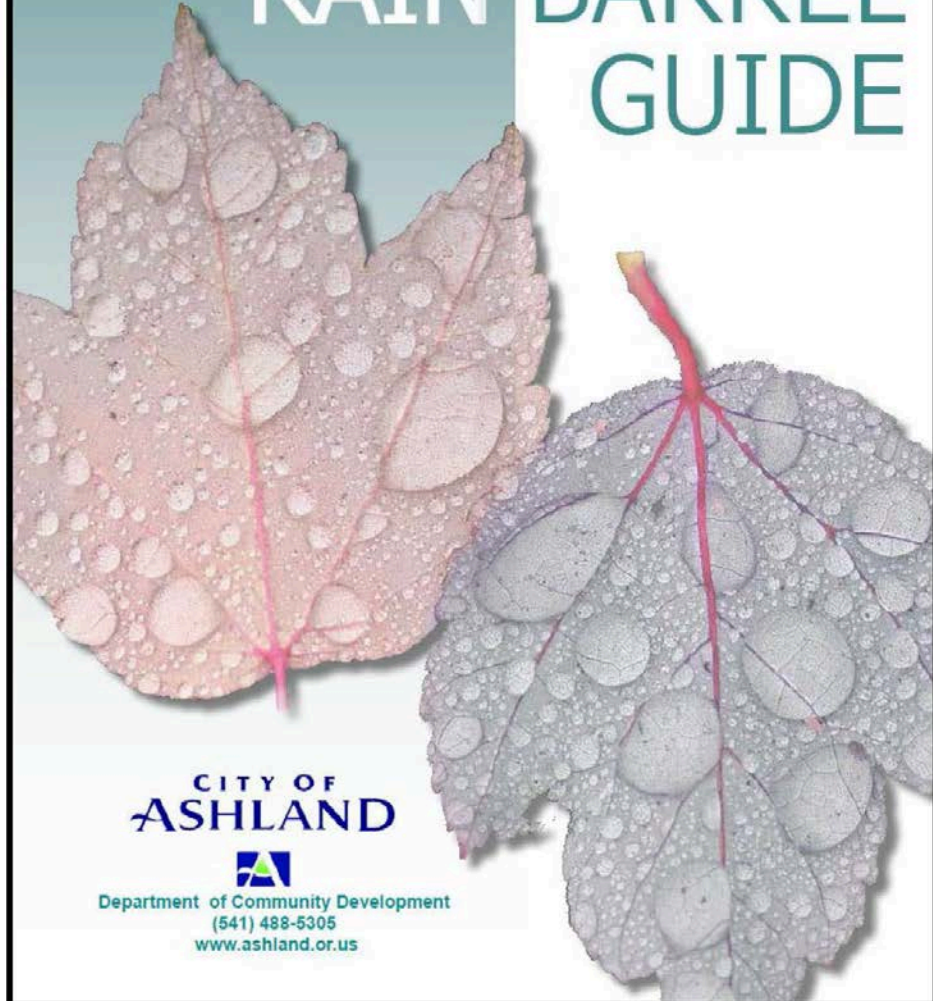
**OUTDOOR**



Applications



**RAIN BARREL  
GUIDE**

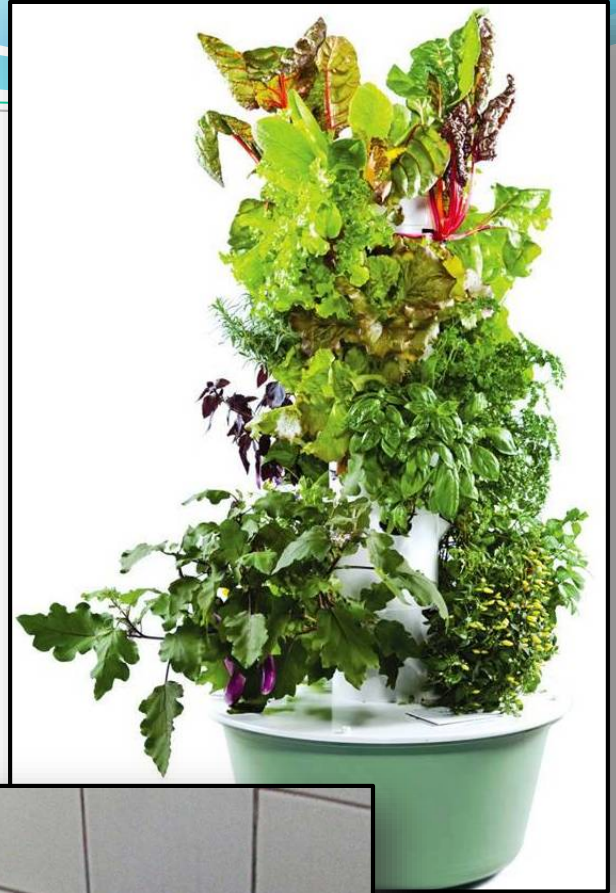


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Department of Community Development  
(541) 488-5305  
[www.ashland.or.us](http://www.ashland.or.us)







# Sprinkler Application Rates (PR)

Fixed Spray  
Sprinklers



Rotating  
Sprinklers



**Standard spray sprinklers apply water at a faster rate than rotating sprinklers, so should be run half as long.**



# Use Water Wisely Campaign

- Use Water Wisely signs were placed throughout town
- Presentations to civic groups and community organizations
- Provide information on how the water system works
- Drought website and FAQs
- Signs to restaurants and hotels
- Large water users reduced usage
- Conservation programs

