

This presentation premiered at WaterSmart Innovations

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TAKING THE GUESS WORK OUT OF WATER AUDITS



CENTER FOR
ReSource Conservation

Kate Larson • Senior Water Programs Manager • Boulder, CO



CENTER FOR RESOURCE CONSERVATION OVERVIEW

CRC Mission

- Putting conservation into action

CRC History

- 35 year old nonprofit organization, founded by concerned citizens in 1976



CRC's Water Program

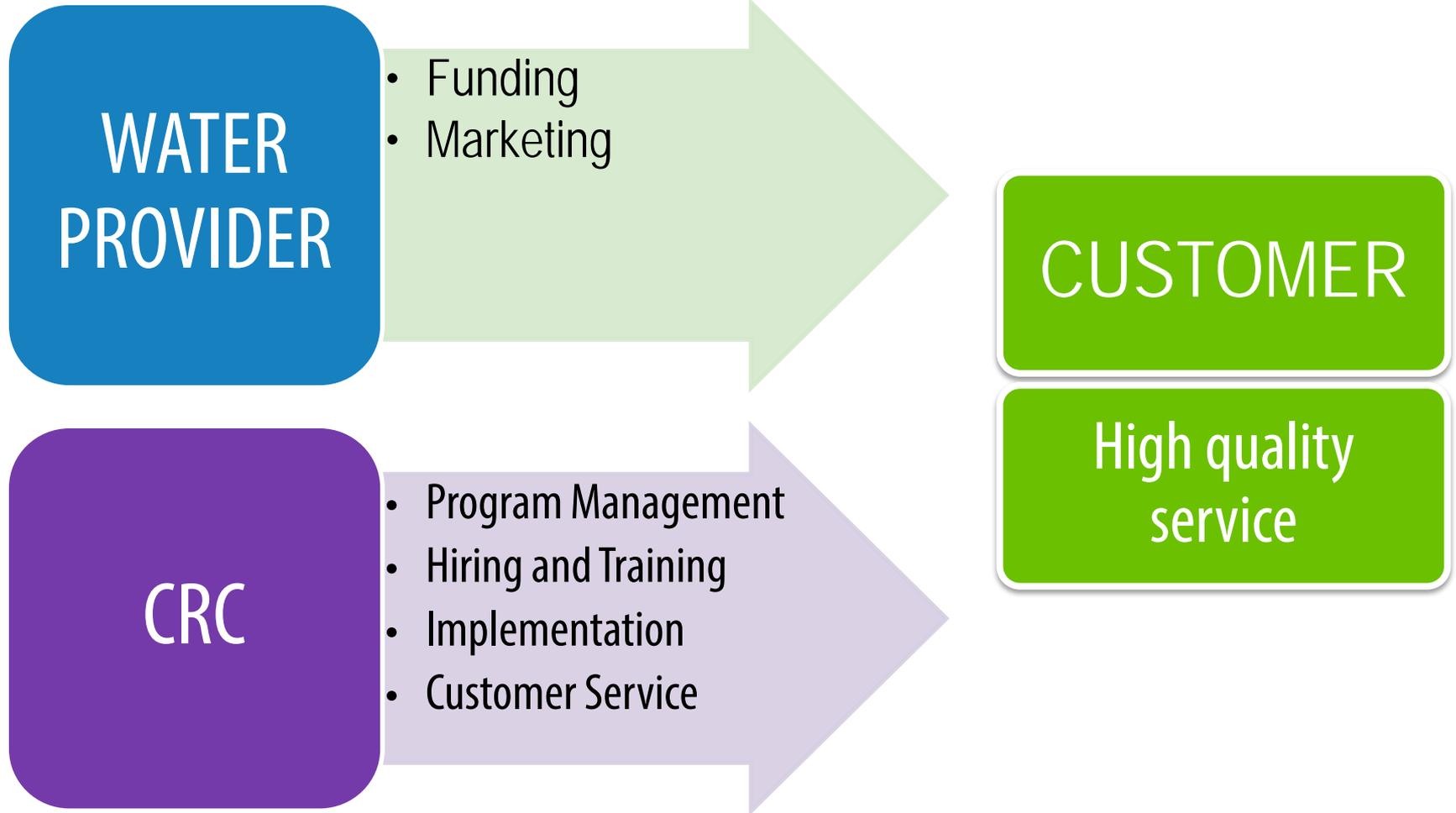
- Putting **WATER** action
- Imple pro
- Pr
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-
-
- Co.
- Water.

By the Numbers:

- 30 Water Provider Partners
- 5,000 Customer Interactions Per Year
- 7 Programs Offered
- 8,800,000 Million Gallons of Water Saved in 2015

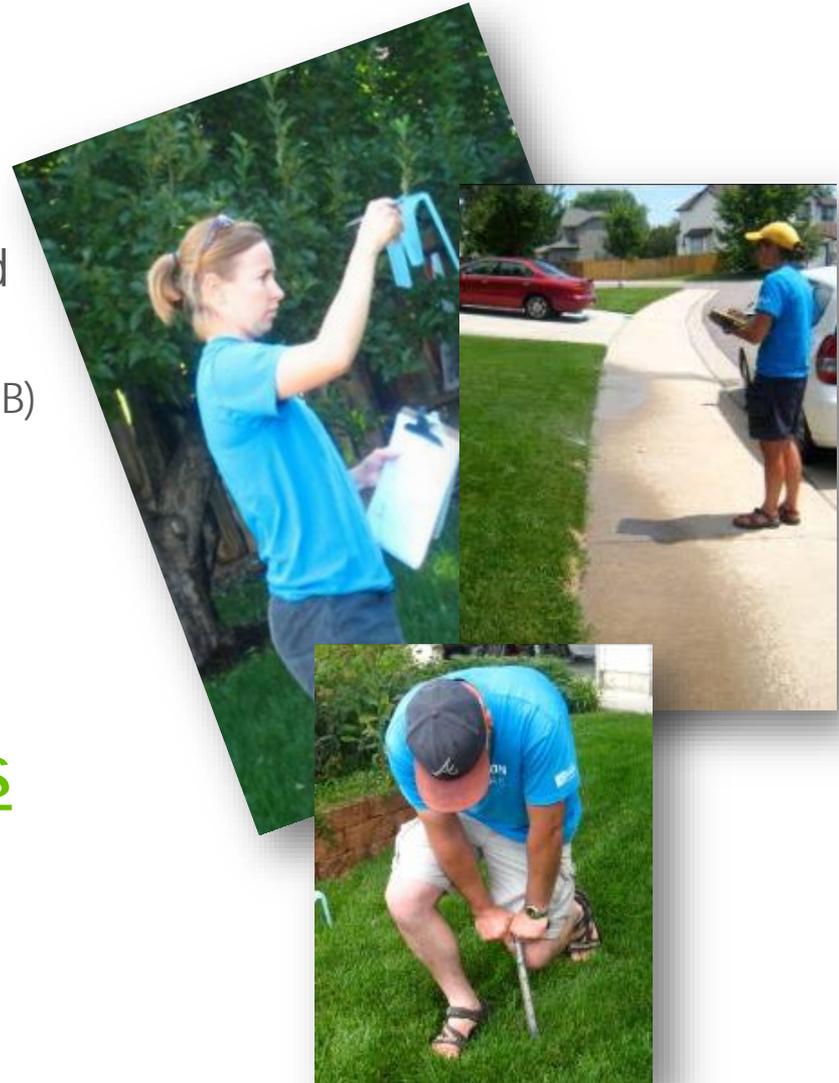


HOW IT WORKS



SLOW THE FLOW PROGRAM ROOTS

- Pilot Program of the City of Boulder in 2003
- CRC Run Since 2004
- Since 2007, Slow the Flow has been funded entirely by the participating water providers
 - 2004-2006 CWCB grant (55% utilities, 45% CWCB)
- In 2015 24 water providers participated in Slow the Flow
- Over 20,000 homes audited resulting in 90 Million gallons of water saved – average of 5,000 gallons/audit/year



STEPS OF THE AUDIT

1. Meet with Homeowner
2. Visual Inspection
3. Catch Cup Tests
4. Pressure Readings
5. Soil and Root Depth Tests
6. Landscape Measurements
7. Determine Watering Schedule
8. Share Test Results and Recommendations With Homeowner



SLOW THE FLOW PARTNERS



Parker Water and Sanitation District



CITY OF ARVADA



Town of Superior



City of Louisville



CENTENNIAL WATER AND SANITATION DISTRICT

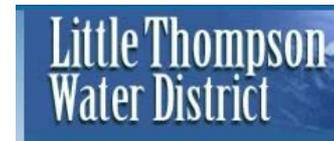
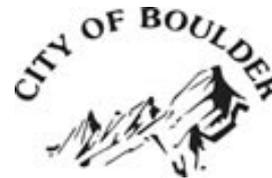


WESTMINSTER

Castle Pines North
METROPOLITAN DISTRICT



THE CITY OF ASPEN

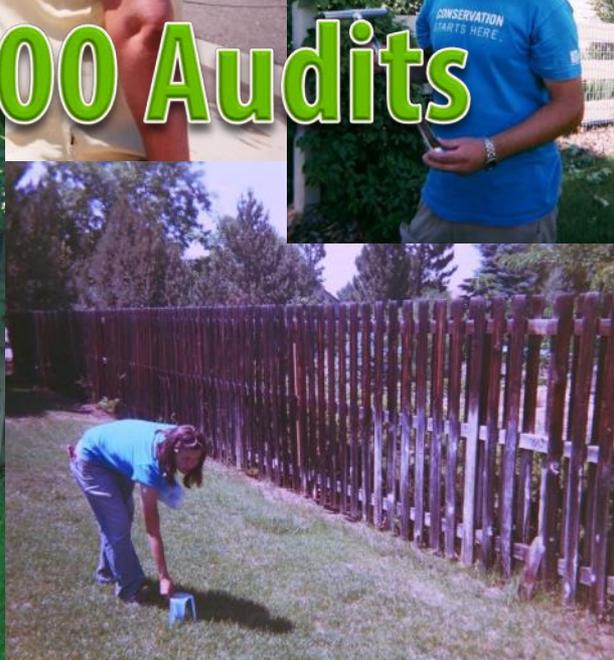


City of Northglenn
center of the future



City of Golden
PUBLIC WORKS DEPARTMENT
ENVIRONMENTAL SERVICES DIVISION

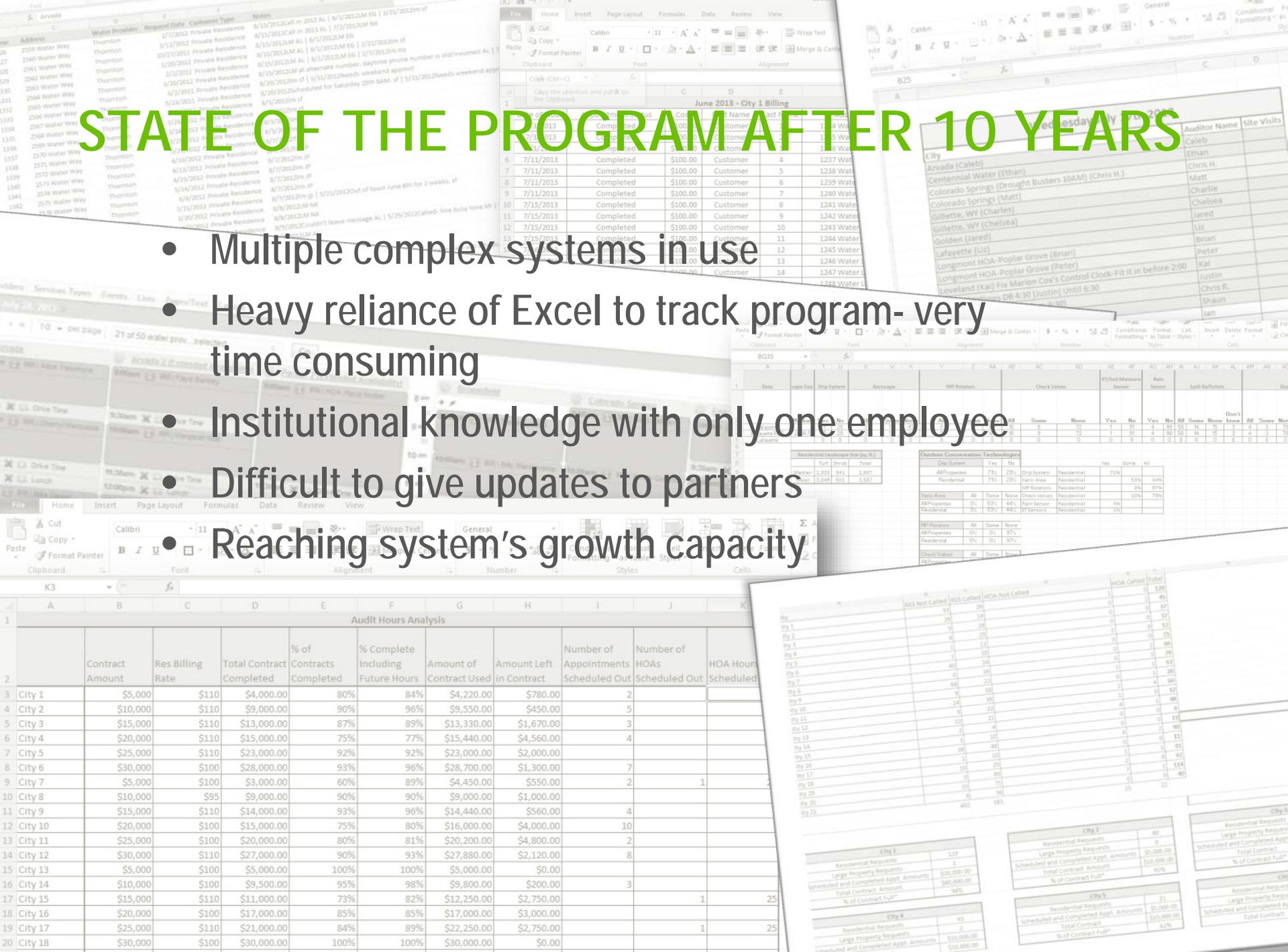




10 Years
20,000 Audits

STATE OF THE PROGRAM AFTER 10 YEARS

- Multiple complex systems in use
- Heavy reliance of Excel to track program- very time consuming
- Institutional knowledge with only one employee
- Difficult to give updates to partners
- Reaching system's growth capacity



OUR IDEA



- Conduct all audits with tablets
- Build software to merge scheduling/auditing and reporting functions

PROGRAM COSTS ADDRESSED

- **30,000** sheets of paper each summer
- **300** hours of data entry
- **500** hours of manual calculations and re-copying information



OUTCOMES

Fully integrated custom software

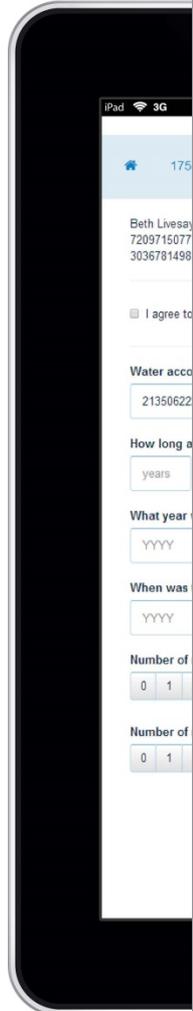
- Offline Audit App
- Scheduling
- Customer Profile Management
- Water Provider Dashboard
- Easy reporting, exporting
- Electronic homeowner report



🔹 = 25,000 gallons saved

 Download Audit data

OUT



iPad 3G

Visual Inspection

Program A

1

Spray Rotor Drip Mixed

Sprinklers

- Broken 1
- Tilted 1
- Low
- Blocked
- Clogged 3
- Mixed Heads

Pipes & Valves

- Broken or Leaking Pipes
- Broken or Leaking Valve 2
- Improper Pressure
- Overspray

Head & Nozzle

- Poor Head Spacing
- Inappropriate Head Type 1
- Incorrect Nozzle 1

Misc

- Inefficient Watering 1
- Unmatched Precipitation Rates

Continue



OUT

iPad 3G

1754 Foster Dr. 1 2 3 4 5 6 7 8 9

New Schedule

Spray

45 vs 18
minutes vs minutes
Current runtime vs Ideal runtime

Recommended runtime for Spray

18 minutes

Rotor

75 vs 48
minutes vs minutes
Current runtime vs Ideal runtime

Recommended runtime for Rotor

48 minutes

iPad 3G

1

Cat

Zone Nu

2

Root Dep

3

Head Ty

Spray

0. 2

0. 2

0. 2

0. 3

+ Add t

Precipital

+ Add t

iPad 3G

8 9

OUTCOME: HOMEOWNER REPORT

SLOW the FLOW COLORADO

Thank you for participating in the **Slow the Flow** sprinkler inspection program, provided to you for free by the Center for ReSource Conservation(CRC) and your water provider. The findings and recommendations from your audit performed on 2014-07-10 by the trained sprinkler inspector, Henry, are included in this report. For questions or comments please contact the CRC at 303-999-3824.

What is an Irrigation Inspection?

A landscape irrigation inspection is a series of tests performed on your watering system to determine your system efficiency. This includes how much water your system puts out (precipitation rate), the soil type, which affects infiltration rate, the evenness (distribution uniformity or efficiency) of the water application and the system pressure.

Tune Up Your System

You can tune up your system by fixing the maintenance problems identified in a visual inspection. Turn the system on at least once a year and watch each zone run for a minute or so to make sure the system is working properly. Check for broken, tilted, clogged, or blocked heads and make any needed repairs. Take the time to adjust sprinklers that are not covering the desired area and learn how to change your timer.

Top Recommendations:

1. Tilted Sprinkler Heads (Zones 1, 2, 3)
2. Mixed Sprinkler Heads (Zone 5)
3. Overspray (Zones 1, 2)
4. Poor Head Spacing (Zone 4)
5. Broken Sprinkler Heads (Zone 5)



Notes: Head near power box on E side of zone 6 is leaking. Aerate fall and spring, remember to water for a few weeks afterwards. Zone 6 has much lower pressure... Look at tilted heads in case brown patches appear.

For more details on the top recommendations and how to fix them [Click Here](#)

Soil Type

Many times irrigation systems apply water faster than the soil



Precipitation Rate

Precipitation rate (PR) is a measure of how many inches of



Soil Type

Many times irrigation systems apply water faster than the soil can absorb. It is important to know your soil type and adjust your watering to minimize run-off.



Soil Type: Clay

Precipitation Rate

Precipitation rate (PR) is a measure of how many inches of water per hour your irrigation system is applying. Different head types have different precipitation rates. The precipitation rate determines how long you need to run your sprinklers.



1.3 inches/hour in spray zones.

Distribution Uniformity

The distribution uniformity (DU) is a measurement of an irrigation system's ability to apply water uniformly over the surface of a landscape. Since the amount of water put out by an irrigation system is not completely uniform, some parts of the landscape will receive more water than others. Minor adjustments to most systems can improve distribution uniformity and green up the dry spots.



Your Distribution Uniformity is: 53% in spray zones.

Water Pressure

Most sprinkler heads apply water most efficiently at a water pressure between 20 and 30 PSI (pounds per square inch) for spray heads and 25-80 PSI for rotor heads. Sprinklers can't cover the desired area if the pressure is either too low or too high. If your pressure is low, try watering when less people are watering or modify your system so there are fewer sprinklers on each valve. High pressure causes misting and wears out your sprinklers faster. If your pressure is high, pressure regulating heads or a pressure regulator can be installed to lower pressure, minimize misting, and maximize irrigation efficiency.



Your Sprinkler head pressure is: 48 psi in spray zones.

Root Depth

For a healthy lawn, roots should be 6 to 12 inches deep. This is accomplished by deep infrequent watering that greatly enhances your lawns ability to withstand extreme temperatures and increased intervals between watering.



Your root system is about 2 inches deep.

Evapotranspiration

Evapotranspiration (ET) is one of the most important things to consider when scheduling run times for your irrigation system. ET is the amount of water a plants loses to evaporation and transpiration and is the amount of water needed for the plant to survive. Our recommended watering schedule is based on an average historical ET for the Denver area of 27 inches of water per year. If the weather is significantly hotter and drier or cooler and wetter than average, you may need to adjust your watering schedule.



Landscape Size and Water Usage

Your landscape has approximately 927 square feet



Irrigation Scheduling

The following schedule has been completed based upon



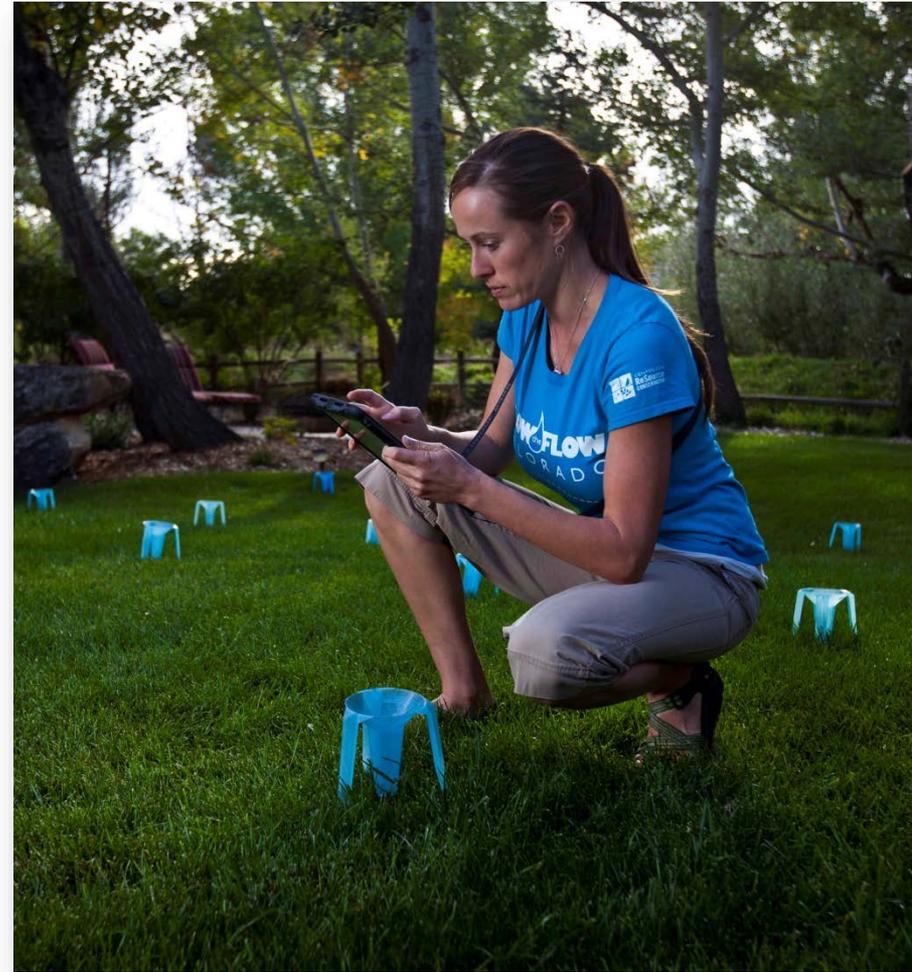
SOFTWARE ROLL-OUT

- In June of 2014 15 auditors began doing audits on iPad Minis
- Successfully completed over 3,000 audits using new software



PROGRAM SAVINGS

- Eliminated need for manual calculations/ re-copying information
- Savings of over **15 minutes per audit**
- Auditors able go from 4 to 5 audits per day
- **Send and resend reports instantly**
- Ability for water provider partners to log-in and view the audit information in their community
- Now completely paperless!
- 20% cost savings in two years



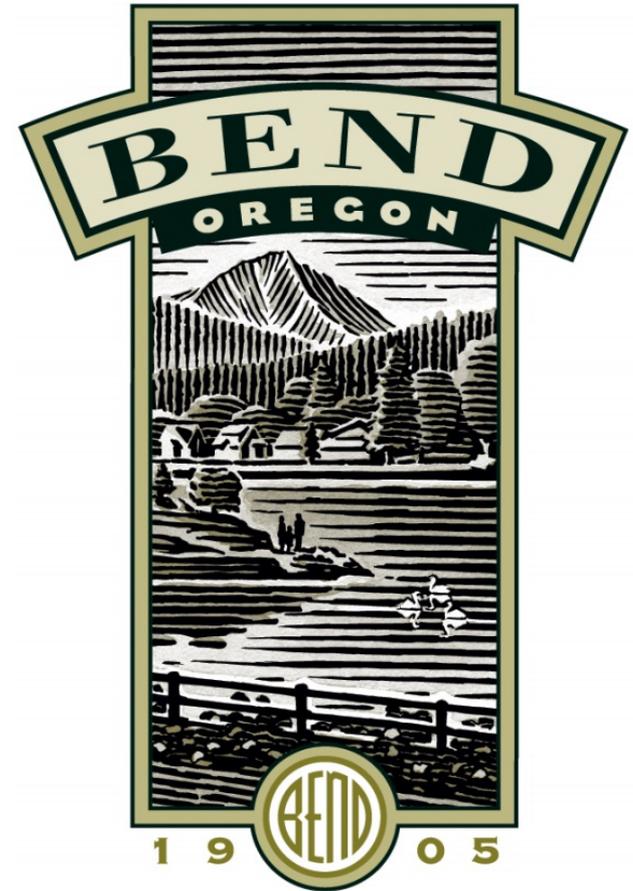
SHARING SUCCESSES



- We found our technology works not only for us but can be **valuable for water providers with existing programs or looking to start new programs**
- Capitalizing off of our 10 years of boots-on-the-ground learning
- In 2015 we began a small pilot with Bend, OR and Greeley, CO to license the software

TWO MODELS - NEW PROGRAMS

- Allowed for Bend, OR to **create a brand new audit program** in their community
- Required knowledge of audit procedures
- Partner was able to ramp up quickly and **perform over 100 audits** during a time of drought!



TWO MODELS - EXISTING PROGRAMS

- Greeley is set to **reduce staff costs drastically** and have increased reporting capability
- Has existing procedures and norms which required customization



WHAT WE LEARNED

- Licensing the software works well for cities that don't require significant customization and have strong internal capacity
 - Helpful to have some knowledge of auditing as a conservation tool
- Solves significant problem for more than one type of customer

NEXT STEPS

- 2nd year and expanded licensing pilot
- Currently selecting participants for 2016



QUESTIONS?



Kate Larson • KLarson@ConservationCenter.org • 303-999-3820 ext 215