

# This presentation premiered at WaterSmart Innovations

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# Water Loss Control Collaborative California's doing it!

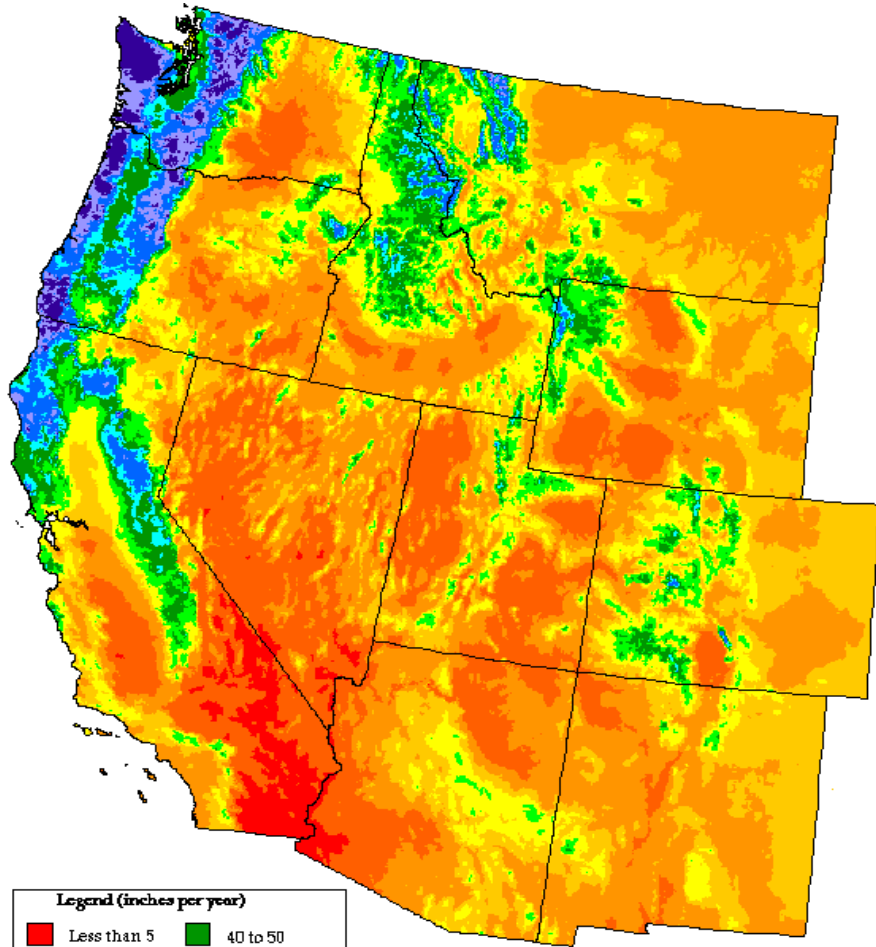
*October 5, 2016*

## WaterSmart Innovations Conference

Sue Mosburg  
Program Manager  
Sweetwater Authority

AWWA California-Nevada Section Past Chair  
AWWA California-Nevada Water Loss Committee Chair

# Annual Precipitation



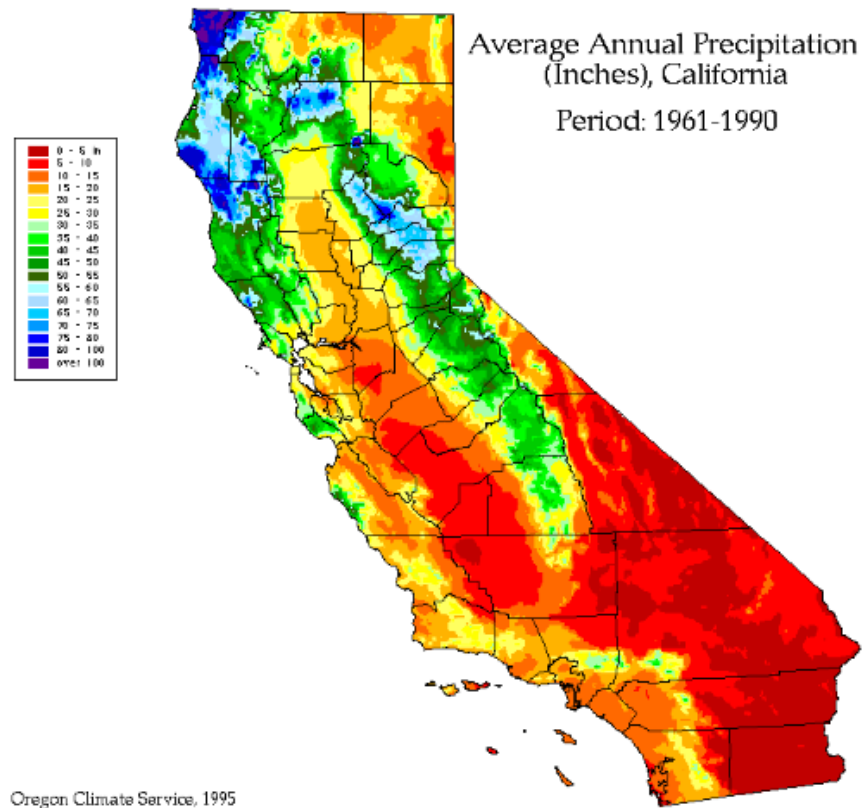
**Legend (inches per year)**

Less than 5	40 to 50
5 to 10	50 to 60
10 to 15	60 to 80
15 to 20	80 to 100
20 to 30	More than 100
30 to 40	

**Average Annual Precipitation**

Western United States

Period: 1961-1990 Units: inches



0 - 5 in
5 - 10
10 - 15
15 - 20
20 - 25
25 - 30
30 - 35
35 - 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
80 - 100
over 100

**Average Annual Precipitation (Inches), California**  
 Period: 1961-1990

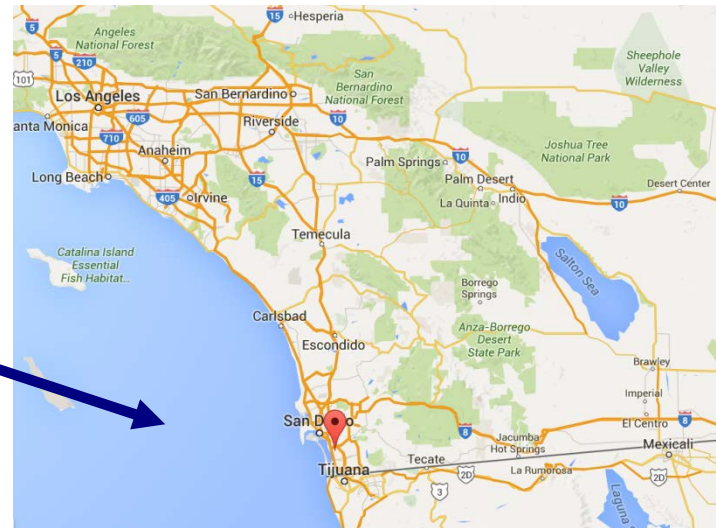
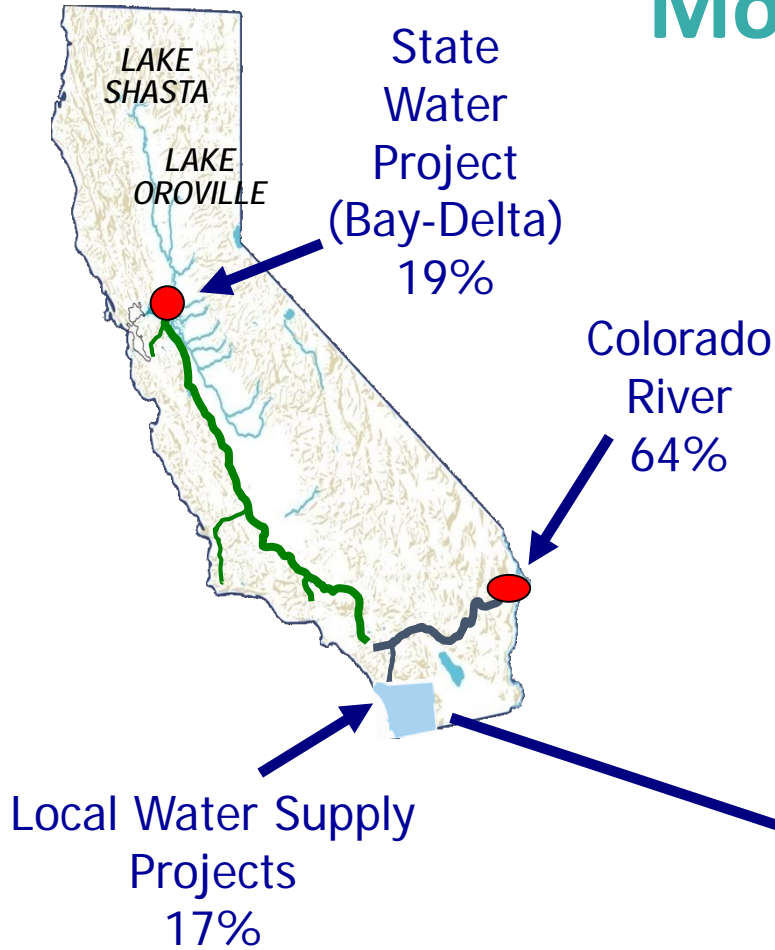
Oregon Climate Service, 1995

## Past Actions – Statewide

- Statewide Water Delivery Systems
- California Urban Water Conservation Council
  - Voluntary
  - Best Management Practices
- Urban Water Management Plans
  - Supply and Demand Forecasts
  - Every 5 years
  - Supply Development Projects
  - Shortage Contingency Plans
- Short Term Responses
  - Senate Bill 7X-7
  - 20% by 2020

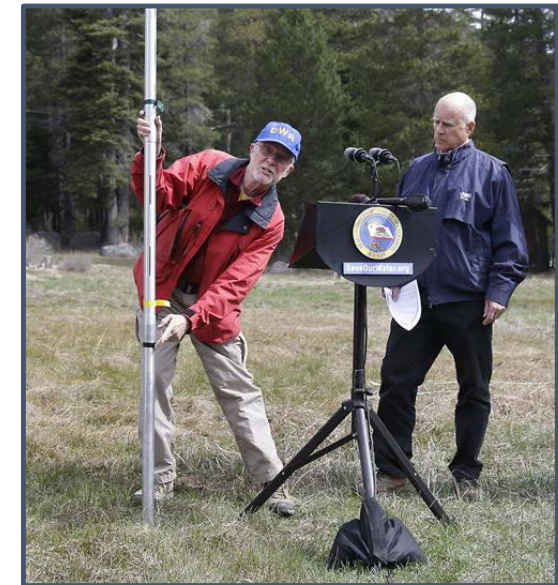


# Moving Water – From End to End



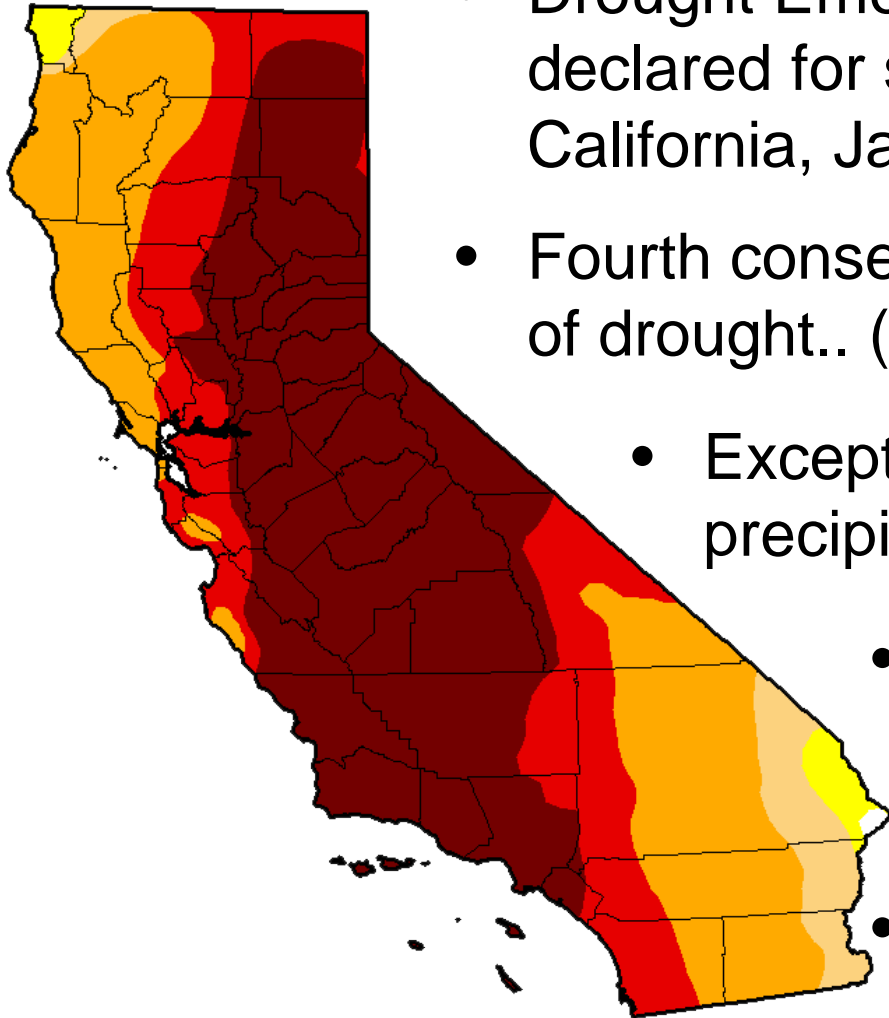
# Recent Drought

- Drought Emergency declared for state of California, January 2014
- Fourth consecutive year of drought.. (at that time)
  - Exceptionally low precipitation in 2015



AP Photo/ Rich Pedroncelli

- Record-low snowpack in Sierra Mountain Range, April 2015
- Governor directed statewide mandatory water use reductions



## It started with.... an email

Hi Tim,

I was talking to Steve Cavanaugh on an EPA matter and he mentioned that he was to be talking to you about the AWWA water audit software and Georgia's audit program, among other things. He also said that there'd be a Sunday workshop on this at ACE. Are you thinking about getting something going training-wise through the Section? Would be a good idea.

*January 22, 2015*

## Followed by a another...

These components would be the starting point for a CA/NV Section water loss program. Steve Cavanaugh described what was done in GA as involving three sequential workshops over 10 months, in order for participating utilities to get and validate their data, run the software and figure out what do to about the results. GA funded this effort using its DWSRF set aside money.

*January 23, 2015*

## Then a stakeholder conference call February 27, 2015...

“Predictions are now warning of yet another year of drought. System water loss (non-revenue water) was suggested as a prime target in the State Board's workshop on additional drought response actions. Leak detection and repair is a fundamental issue touching on the technical, managerial and financial (TMF) capacity every water utility should have.... a strong and coordinated program that makes use of the strengths ... of the entities receiving this message would be better than disparate and isolated actions. .. Along the lines of a model program implemented by the State of Georgia.”

# California ... Is unique

- Over 450 unique urban water utilities/systems
- Numerous industry groups and associations
- Drought as a driver – past and present
- Statewide water delivery system
- 7% total electric use goes to water supply, conveyance, treatment and distribution
- Stakeholder buy-in and accountability
- Varied pace of utility awareness and implementation



## WRF 4372 - 2010 Water Data Analysis and Validation:

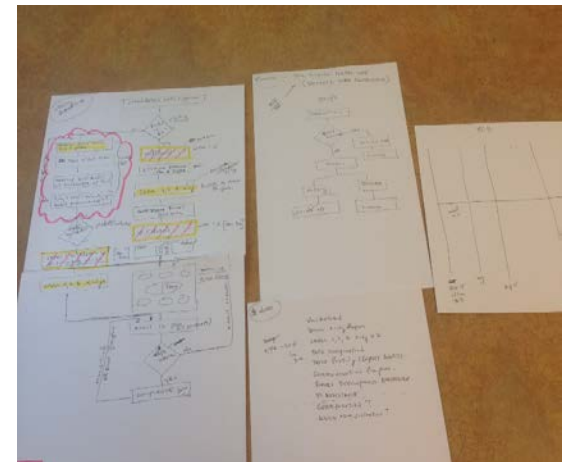
- Simple steps of data validation were applied

California – CUWCC BMP1.2	Count	Percent of Full Data Set
Number of Utilities Reporting Water Audit Result	125	100%
Number of Utilities Reporting Negative Water Losses	5	4%
Number of Utilities Reporting ILI<1	36	29%
Number of Utilities Reporting ILI>20	3	2%
Number of Utilities Reporting Erroneous Infrastructure Data	1	1%
Final Data Set After Removal of Erroneous Water Audit Reports	80	64%

- Results highlight the problems utilities are facing when completing an audit for the first time!

# Water Loss Collaborative Timeline

- **June 10, 2015 - AWWA ACE15**
- **July 1** – Rough plan put to paper
- **July 18** – First Steering Committee meets in Sacramento
- **July 28**
  - Initial cost estimate
  - Draft timeline
  - Preliminary scope
- **August**
  - Building out the program
  - Development Contract with CA Department of Water Resources
  - Senate Bill 555 moving forward with opposition



# Statewide Water Loss Management Program

## Phase 1

**Establish Annual M36 Water Auditing**

**Requirement**

Implement established requirement for annual M36 Water Audits

**Outreach**

Educate Regulatory Community on M36 Method and appropriate use of performance indicators

Establish Statewide Water Loss Control Committee

**Training & Tech Asst**

Develop State Manual and Training Framework

Provide extended, progressive training to utilities

## Phase 2

**Achieve Minimum Standard of Audit Reliability**

**Data Management**

Augment DWR Data Management & Review Process

Establish posting system and communication protocols

**Validation**

Establish minimum standards of validation for quality assurance

Determine by Agency or 3<sup>rd</sup> Party

Establish validation program until certification program is in place

Design and implement a Certified Water Audit program for sustained quality control

**Certification**

CA-NV Section Administers Qualified Water Loss Auditors Certification Program

## Phase 3

**Manage Water Loss Performance for Long-Term Reduction**

**Benchmarking**

Suite of Performance and Process Measures

System specific improvement over time in a cost-effective manner

No universal targets  
 Excessive thresholds established

**Compliance**

Annual audit submission threshold exceedances

System specific progress review during Urban Water Management Plan submissions

# A Plan is Hatched

2015 / 2016

**EARLY ADOPTERS** for utilities that have submitted an AWWA water audit to the EWCC

<p><u>Classes/Workshops</u></p> <ul style="list-style-type: none"> <li>- Statewide Program Introduction</li> <li>- Workshops                     <ul style="list-style-type: none"> <li>• Review of water audit concepts MS&amp;E software</li> <li>• Intro to Validation techniques</li> </ul> </li> <li>- UWWAP preparation</li> </ul>	<p><u>Utility Audit Preparation &amp; Submission</u></p> <ul style="list-style-type: none"> <li>- 2015 audit data collection</li> <li>- July 2016 UWWAP submission</li> </ul>	<p><u>Validation (Minimum Level 1)</u></p> <ul style="list-style-type: none"> <li>- 2015 audit as submitted</li> <li>• One on one conversation with experts to walk through data sources and compilation</li> <li>- Documentation of findings &amp; recommendations</li> </ul>
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**NEW LEARNERS** for utilities whose UWWAP water audit report will be their first AWWA software submission

<p><u>Classes/Workshops</u></p> <ul style="list-style-type: none"> <li>- Statewide Program Introduction</li> <li>- Workshops                     <ul style="list-style-type: none"> <li>• Intro to audit methodology MS&amp;E</li> <li>• Software Introduction</li> </ul> </li> <li>- Team building</li> <li>- Data collection</li> <li>- Common mistakes</li> <li>- UWWAP preparation</li> </ul>	<p><u>Utility Audit Preparation &amp; Submission</u></p> <ul style="list-style-type: none"> <li>- 2015 audit data collection</li> <li>- July 2016 UWWAP submission</li> </ul>	<p><u>Audit Basics Technical Review</u></p> <ul style="list-style-type: none"> <li>- 2015 audit as submitted</li> <li>• One on one question &amp; answer session with experts</li> <li>- Confirm Understanding</li> <li>- Review Questions</li> <li>- Address concerns after first compilation</li> </ul>
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2017

**EARLY ADOPTERS** for utilities that have submitted an AWWA water audit to the EWCC

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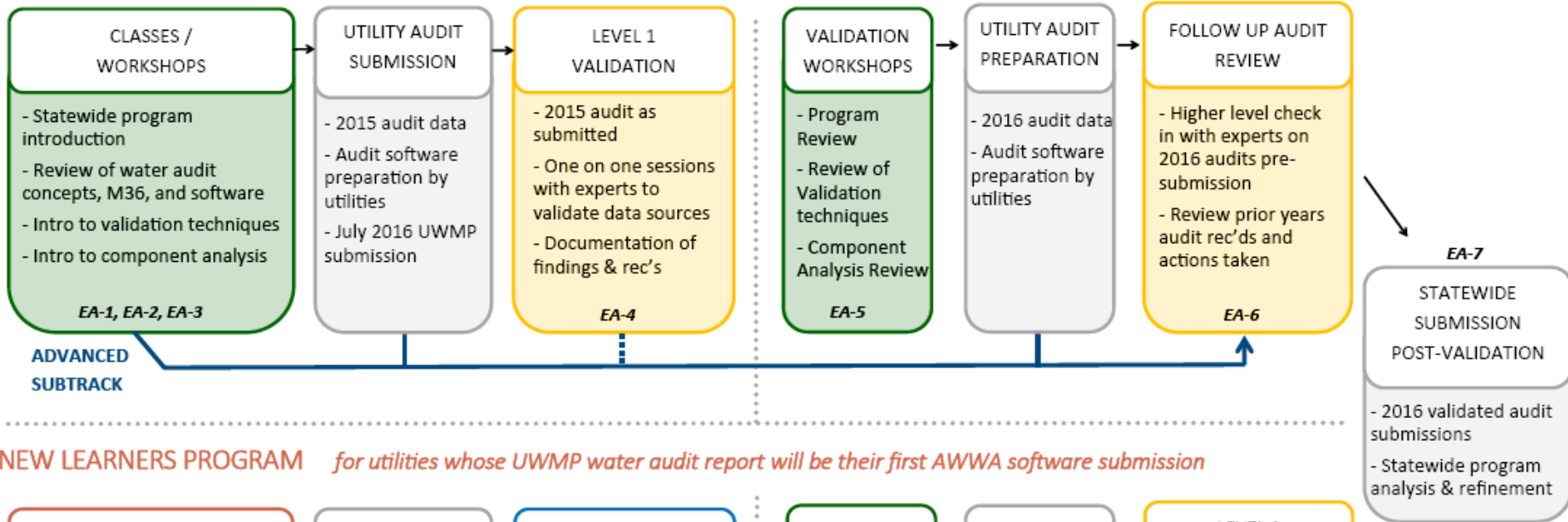
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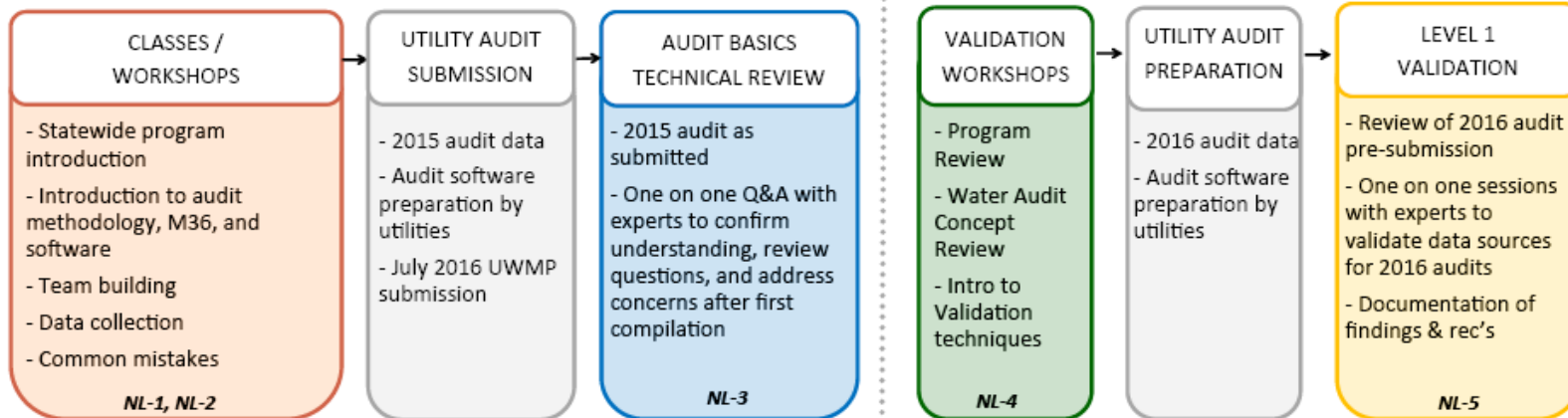
2015/2016

2017

**EARLY ADOPTERS PROGRAM** *for utilities that have submitted an AWWA water audit to the CUWCC*



**NEW LEARNERS PROGRAM** *for utilities whose UWMP water audit report will be their first AWWA software submission*



# Water Loss Collaborative Timeline

- **September 18** – Funding meetings
- **September 28**
  - CA-NV AWWA Water Loss Collaborative launch email
  - Water Loss Collaborative logo unveiled
- **October**
  - SB 555 signed into law
  - Leak Detection Training
- **November/December**
  - Solid budget estimate
  - Getting the word out
  - Funding meetings
  - Scope refinement
  - Basic Website

# A 'New' Way to Save

- October 9, 2015: Governor signs Senator Wolk's Urban retail water suppliers: water loss management bill
- **Senate Bill 555** requires *all urban water suppliers in California to conduct validated annual water loss audits*



# Senate Bill 555

- On or before January 2017 DWR shall adopt rules
  - Water loss audits in accordance with AWWA M36 method
  - Process for validating audits
  - Technical qualifications of validator
  - Method for submitting water loss audit reports
- October 1, 2017 – submit validated water loss audit report
- DWR shall post all validated reports on the Internet
- DWR shall provide technical assistance
- No earlier than January 1, 2019 (nor later than July 1, 2020) adoption of performance standard rules



# Water Loss Collaborative Timeline

- **January 5, 2016** – California Water Board votes to fund Water Loss Technical Assistance Program through CA-NV AWWA
- **February 26** – CA-NV AWWA Receives notice to proceed
- **March** – Request for Proposal issued by CA-NV AWWA
- **April** – Consultant Program Management Team Selection
- **May 4** – CA-NV AWWA Governing Board Approves Contracts
  - Notice to proceed issued to Program Management Team
  - Registration Website launched
- **May 26** – Outreach and Recruitment Stakeholders meet
- **May 31** – Water Loss TAP formal Launch press release
- **June 15** – Fully Executed Grant Contract
- **June 22** – Fully Executed Contract PM Team
- **June 28, 2016** – Program launch webinar
- **August 9** – First workshop

# Water Loss Technical Assistance Program

## Water Loss TAP

### Water Loss TAP Goals:

to provide:

- *Training on AWWA Water Audit Methodology*
- *Level 1 Validation of Water Audits*
- *452 Urban Water Agencies*

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0  
 American Water Works Association  
 Copyright © 2014, All Rights Reserved

Water Audit Report for: CA Water District  
 Reporting Year: FY2014-2015 7/2014 - 6/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

**All volumes to be entered as: ACRE-FEET PER YEAR**

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

Master Meter and Supply Error Adjustments

Enter grading in column 'E' and 'J' Pcnt: Value:

WATER SUPPLIED		Volume from own sources: + ? n/a		acre-ft/yr	Master Meter and Supply Error Adjustments	
Water imported: + ? 7	5,891.800	acre-ft/yr				acre-ft/yr
Water exported: + ? n/a		acre-ft/yr				acre-ft/yr
<b>WATER SUPPLIED:</b>		<b>5,891.800</b>	acre-ft/yr			

AUTHORIZED CONSUMPTION		Billed metered: + ? 7		acre-ft/yr	Click here: ? for help using option buttons below	
Billed unmetered: + ? n/a	0.000	acre-ft/yr				acre-ft/yr
Unbilled metered: + ? n/a	0.000	acre-ft/yr				acre-ft/yr
Unbilled unmetered: + ? 1	14,730	acre-ft/yr				acre-ft/yr
<b>AUTHORIZED CONSUMPTION:</b>		<b>5,734.440</b>	acre-ft/yr			

Enter negative % or value for under-registration  
 Enter positive % or value for over-registration

Pcnt: Value: 14,730 acre-ft/yr

Use buttons to select percentage of water supplied OR

### WAVE 1

in-person work session

### WAVE 2

teleconference work session

### WAVE 3

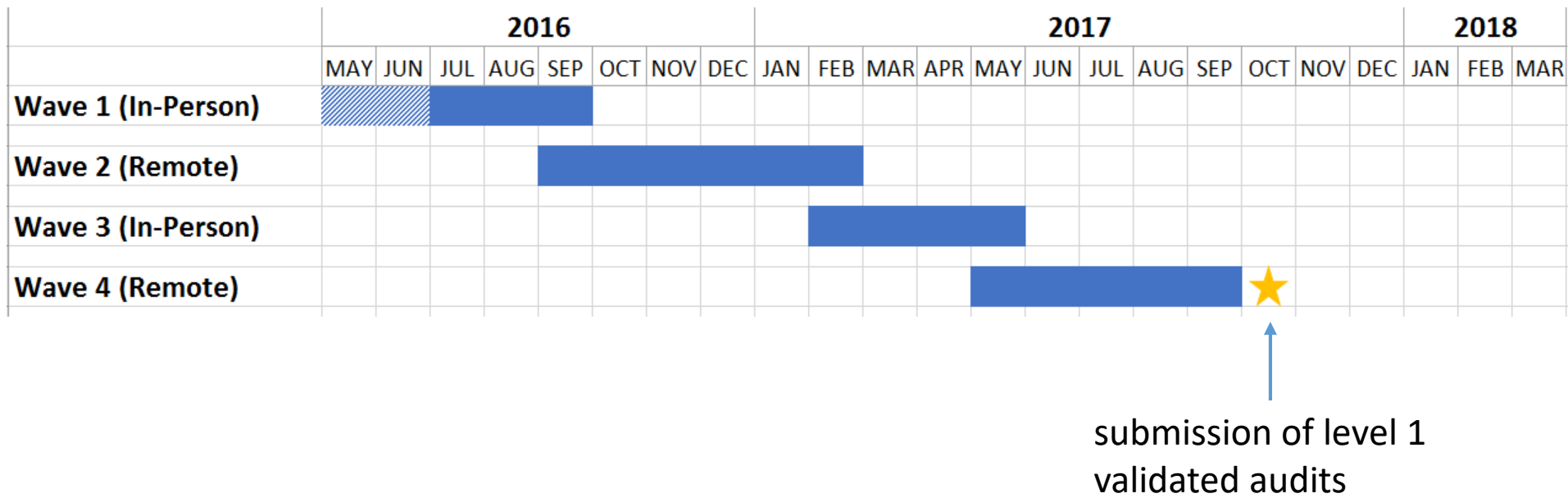
in-person work session

### WAVE 4

final validation  
 Teleconference work session



# Water Loss Technical Assistance Program Timeline





# CALIFORNIA WATER LOSS CONTROL COLLABORATIVE

**Water Loss Technical Assistance Program  
AKA: the Water Loss TAP**

*[waterlosscontrolcollaborative@gmail.com](mailto:waterlosscontrolcollaborative@gmail.com)*

# Water Loss TAP



**OVERVIEW**

**UTILITY STATUS**

**RESOURCES**

**CONTACT US**

The Water Loss Technical Assistance Program (Water Loss TAP) aids urban water suppliers in complying with California Senate Bill 555, requiring utilities to submit a completed and Level 1 validated water loss audit annually to the California Department of Water Resources (DWR).

The Water Loss TAP is brought to you by the California-Nevada Section AWWA.

## Timeline

July 2016

October 2017



## New Learner (NL)

Water Auditing 101: designed to build a strong foundation for water auditing and data validation.

- Limited prior involvement with AWWA M36 Water Auditing.
- Results in Level 1 Validated Water Audit for October 2017 submittal to DWR.

Check your track here

## Early Adopter (EA)

Water Auditing 201: designed to focus on data validation and advanced water loss analysis.

- Previous engagement with AWWA M36 Water Auditing.
- Results in Level 1 Validated Water Audit for October 2017 submittal to DWR.

### News

- [DWR Letter](#)
- [Water Loss TAP Update-August](#)

### Just Joined?

1. [Sign up](#) for a Wave 2 Session
2. [Review](#) Wave 1 Materials

### Water Loss TAP Progress

- 1033** Registered Individuals
- 362** Registered Utilities
- 137** Wave 2 Calls Scheduled



# WAVE 1

## Action Steps

Wave 1 is a day-long in-person work session (classroom) that covers the basics of water auditing and introduces water audit data validation.

### Objectives

- Introduce Water Loss TAP
- Begin technical assistance
- Create utility water audit teams

### Technical Assistance Themes

**New Learners:** *Water Audit Fundamentals*

**Early Adopters:** *Introducing Data Validity*



July 2016 - September 2016

- Register your utility and water audit team for the Water Loss TAP ([Register here](#))
- RSVP to attend an in person work session  
Not sure which track you are? Not sure if you've already RSVP'd? [Check here](#)
- Attend the work session (8AM - 3:30PM)

### Materials to bring:

1. Laptop Computer with the AWWA Free Water Audit Software v5.0 (optional: your most recent Water Audit, as submitted with your Urban Water Management Plan completed using this software - we will not work with your audit's specific data during the Wave 1 session, but this can serve as a good reminder of your audit volumes and practices to date).
2. Work Session Slides ([Downloadable here](#))
3. Lunch on your own (breakfast and snacks provided)
4. Questions on Water Audit Methodology and Validation



## WAVE 2

## Action Steps

Wave 2 is a teleconference work session in which water auditing experts and each utility's water audit team examine the utility's FY14-15 or CY15 water audit in a two-hour interview.

### Objectives

- *Review the FY14-15 or CY15 water audit*
- *Discuss water audit data and data validity scores*
- *Amendments as needed*



October 2016 - February 2017

- Compile** your FY14-15 or CY15 water audit and supporting documents
- Schedule** a teleconference session
- Send** your water audit and supporting documents to the Program Management Team (PMT) *one month* before your work session
- Attend your work session
- Implement any amendments or actions from your teleconference work session





# Water Loss Technical Assistance Program

## Level 1 Validation

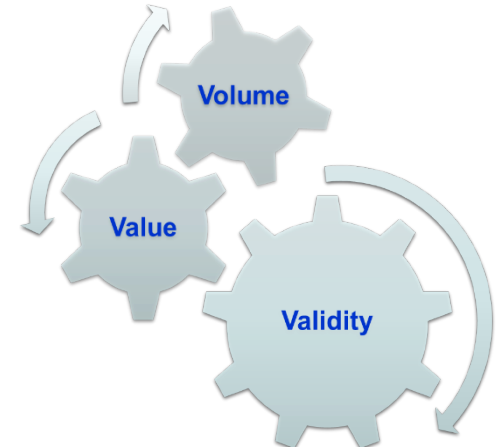
Top-down review of supporting documents for water audit

Review of input derivations

Affirmation of operational policies and practices to data grades

Documentation of basis for inputs and data grades

Flagging indicators of hidden inaccuracies requiring further investigation (gremlins)



Water Loss Control Planning Guide					
Water Audit Data Validity Level I Score					
Functional Focus Area	Level I (0-25)	Level II (26-50)	Level III (51-70)	Level IV (71-90)	Level V (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revis policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Chart Area assessment on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions

AWWA Water Loss Control Committee Water Audit Software Subcommittee Data Validation Form						
Interview Date	10/08/15					
Water Utility Name, Audit Year Reviewed:	Sue Menzberg, Mike Curritt, Jennifer Sabane, Rich Stevenson, Scott McCelland, P.E., Michael Currott, P.E.					
Validation Reviewer:	Water Audit Data Validity Score (from submitted data):		Infrastructure Leakage Index (from submitted data):			
Sweetwater Authority	Will Jennings, P.E. Cavanaugh		95		0.99	
City	Chula Vista, CA, 2013/14 (Acct-Fee)					
Evaluation of Water Audit Components – Quantities & Data Grades						
Item	Value	Weight	Score	Weight	Score	Weight
Water Audit Data Validity	95	10	950	10	1000	1000
Infrastructure Leakage Index	0.99	10	990	10	990	990
<b>Total</b>			<b>1940</b>		<b>1990</b>	<b>1990</b>
Validated Production Cost	\$795.58	10	7955.8	10	79558	79558

# Next Steps - Are We Healthy?

<b>Performance Indicators</b>	
Non-Revenue Water	gal/conn/year and \$/conn/year
Apparent Losses	gal/conn/day
Real Losses	gal/conn/day or gal/length of main
Real Losses (normalized for pressure)	gal/conn/day or gal/length of main/psi
Infrastructure Leakage Index (ILI)	
Data Validity Score	
<b>Practices</b>	
Water Auditing	
Level of Validation (1, 2, 3)	
Customer Meter Testing (CMT)	
Large	
Small	
NRW Component Analysis	
Active vs Reactive Leak Detection	
Utilization of District Metered Areas for Night Flow Analysis	
Pressure Management	
Meter Replacement	
Revenue Protection Programs	

## Lessons Learned... so far

- Build on what has already been created
- Embrace stakeholder collaboration and participation
- Designate a program lead
- Inform regulation and then capitalize on it
- Be willing to make the calls, and chart new territory

# Questions?

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