



**State of the States – A Comparison of Approaches to Statewide Water Loss Programs**

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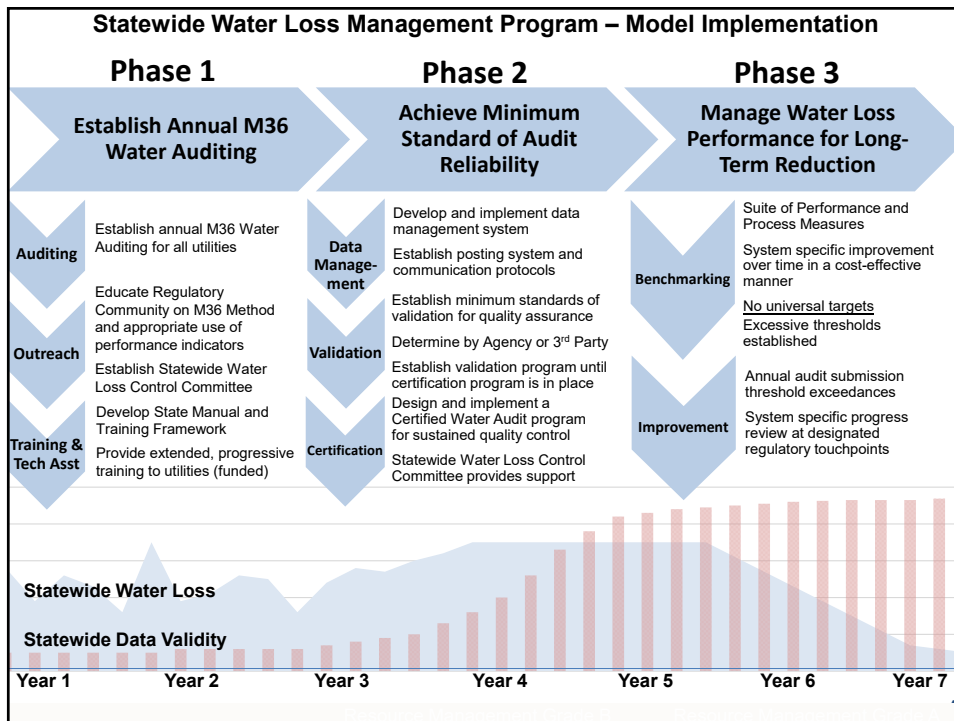
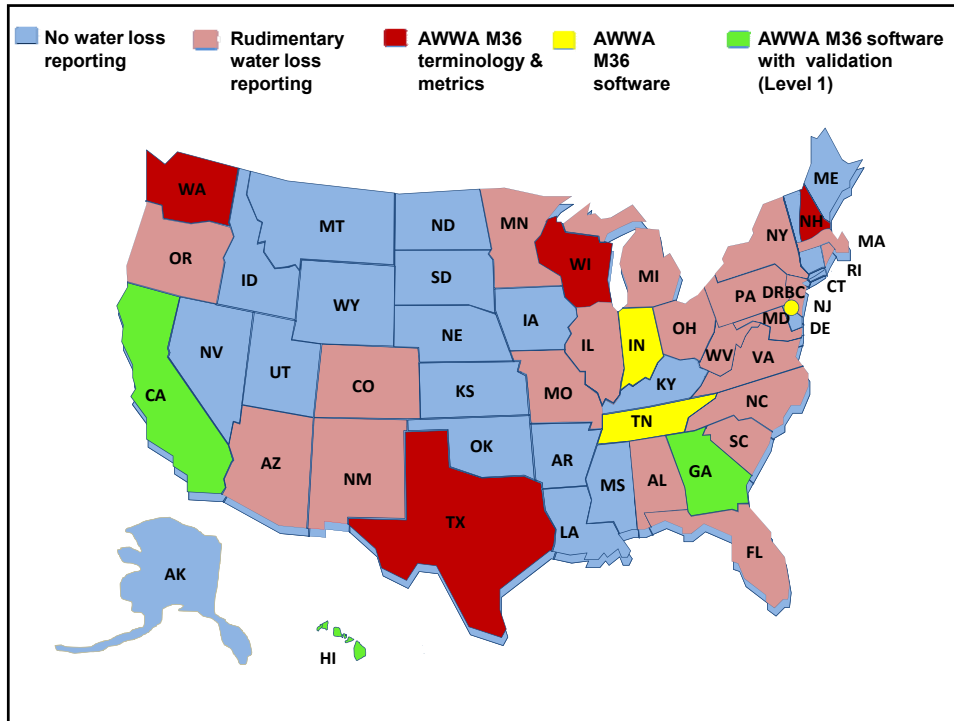
March 15, 2017

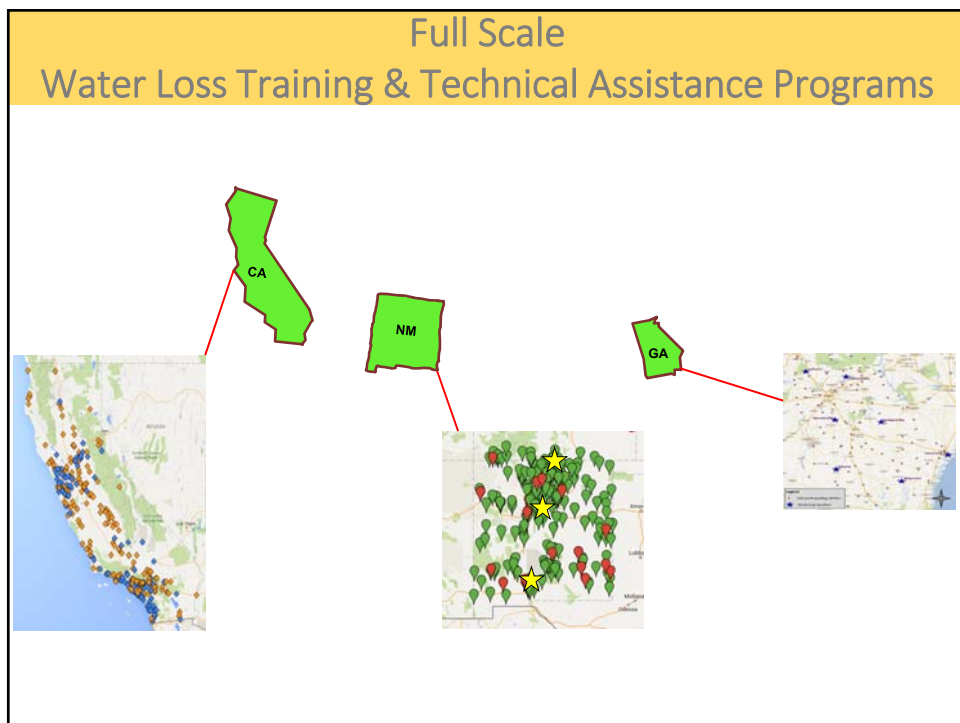
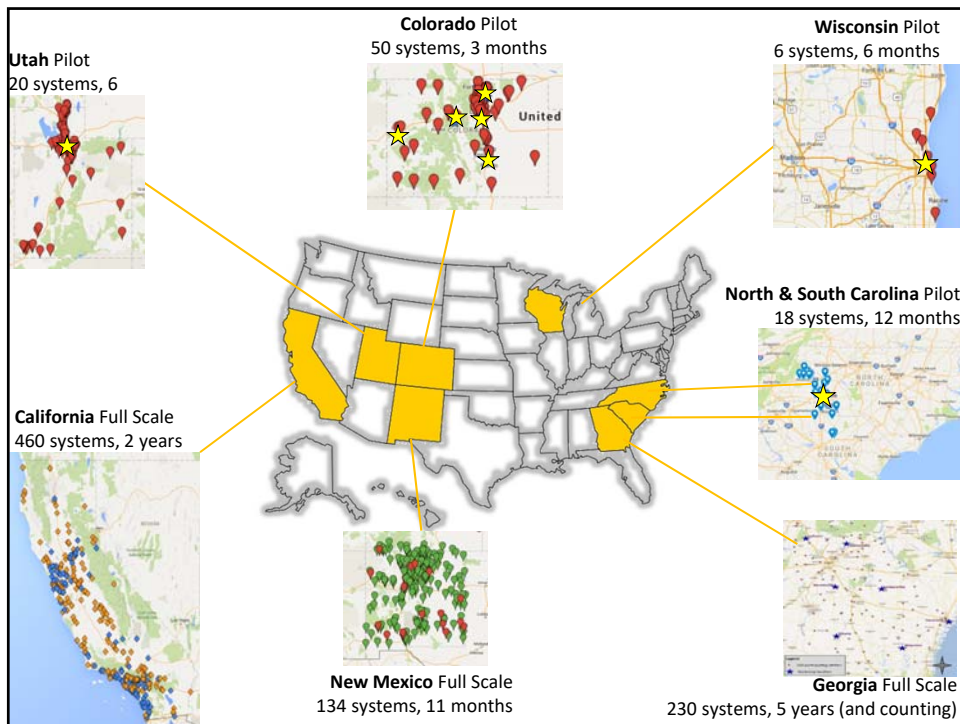


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**33 States are reviewing their Water Loss Control reporting Requirements. Most are reconsidering failed % based performance targets**

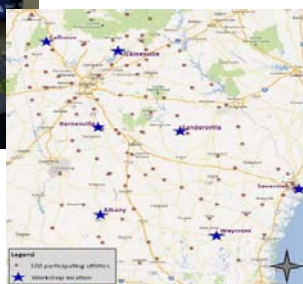




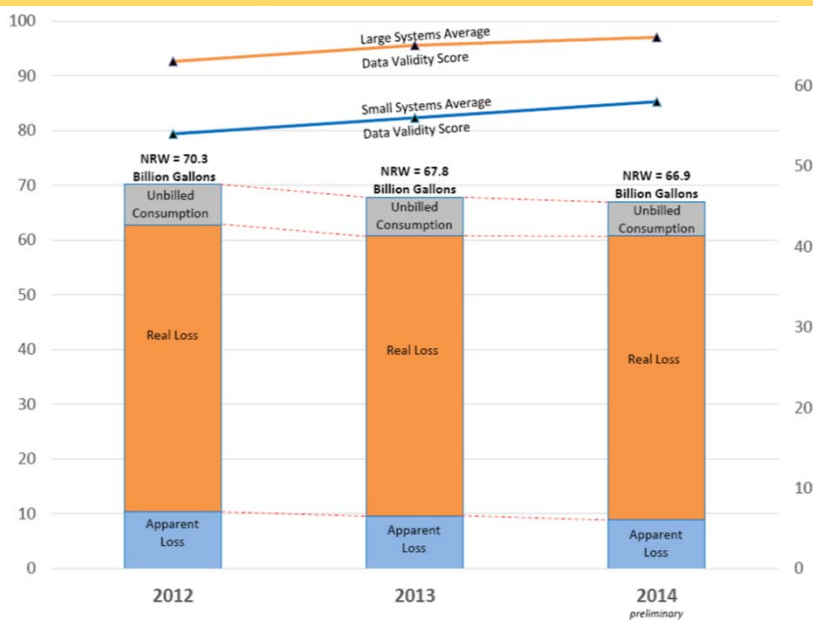
# Georgia

- Under regulatory framework
- Multiple Tracks
- Extended touchpoints of technical assistance
- Multiple phases over several years

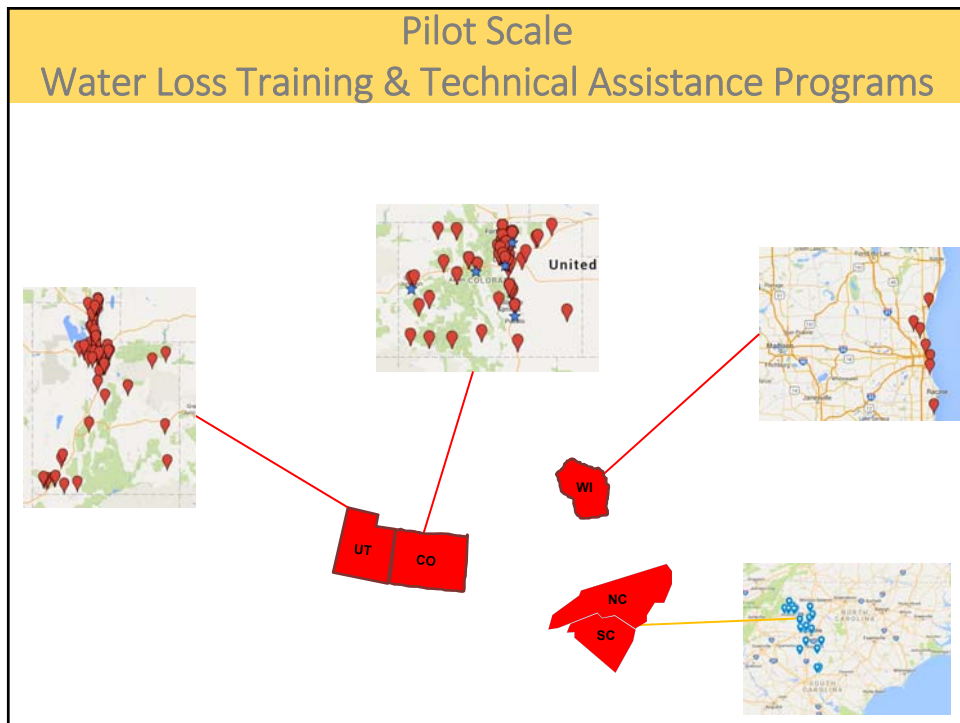
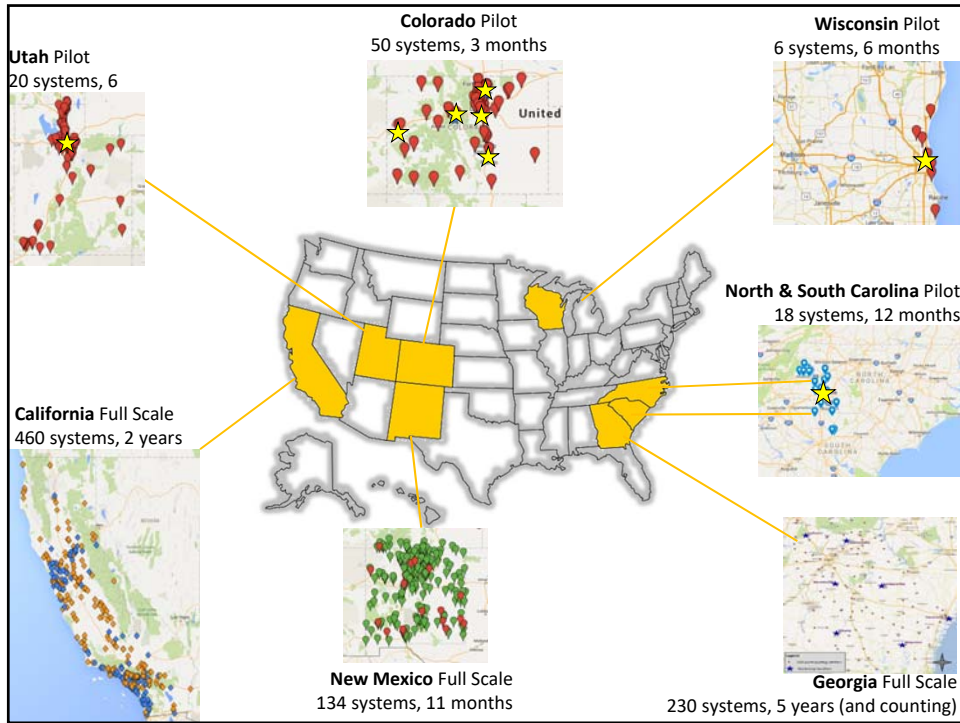
2010	2011	2012	2013	2014	2015
Following 2008 Drought, the Water Stewardship Act was Passed into Law	Annual Auditing Begins, Initial Workshops WLC Committee Formed & Manual Developed	Phase 1: Statewide Training on Water Auditing	Phase 1A: Validation of Audits Phase 2: Statewide Technical Assistance Projects (Small Systems)	Phase 1B: Validation of Audits Phase 2A: Statewide Technical Assistance Projects (Small Systems)	Phase 1C: Audit Certification Program Phase 2B: Statewide Technical Assistance Projects (Large Systems)



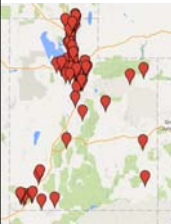

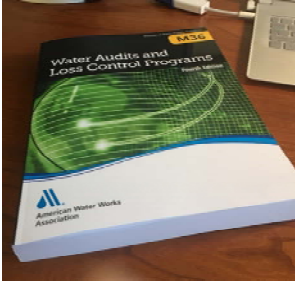
## Georgia Non-Revenue Water - Statewide Results








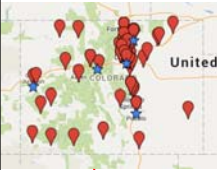

## Utah

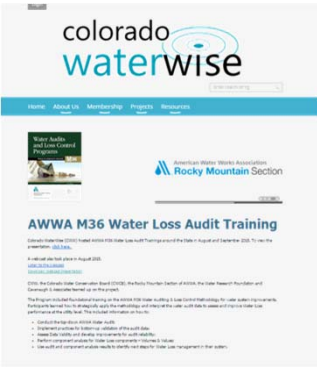









- Under NO regulatory framework
- Political context
- High level training (many utilities)
- Learning exercises with common data
- Pilot training (3 utilities)
- Learning exercises with utility specific data

## Colorado



- Under semi-regulatory framework
- High level training (50 utilities)
- Multiple locations across the state
- Learning exercises with common data

# Colorado

Second Regular Session  
Seventieth General Assembly  
STATE OF COLORADO

INTRODUCED

LLS NO. 16-0531.02 Thomas Morris x4218

HOUSE BILL 16-1283

### A BILL FOR AN ACT

101 CONCERNING MEASURES TO DECREASE WATER LOSS BY DOMESTIC  
102 WATER SUPPLIERS.

#### Bill Summary

(Note: This summary applies to this bill as introduced and does not reflect any amendments that may be subsequently adopted. If this bill passes third reading in the house of introduction, a bill summary that applies to the reengrossed version of this bill will be available at <http://www.leg.state.co.us/bills/summaries>.)

Section 2 of the bill requires that, on or before June 30, 2018, and on or before June 30 of each year thereafter, each covered entity must submit to the Colorado water conservation board (board) a completed and validated water loss audit report pursuant to guidelines that the board must adopt by January 1, 2018. A "covered entity" is a public entity that supplies at least 2,000 acre-feet of water per year to its customers. The

# Wisconsin

**MILWAUKEE WATER WORKS**  
(W12410100)

Carla Lavelle, MWW Superintendent  
Tom Spornbach, Assistant to Public Works—Water  
Jeff Rensch, Water Business Operations Manager, Public Works—Water  
Dan Krasnowski, Office Assistant & Neighborhood Services  
Alex Wroch, Water Distribution Business System Supervisor

**Recommendations for Milwaukee Water Works**

**Volume From Chain Sources**  
Conduct hydraulic flow verification testing on treated water meters. As there are a large number of these meters, the volume required to test these in conjunction with the utilization of geospatial/intermittent closures of the water location could be considered as a testing strategy. Verify and document legitimacy of metering supply volume on low Service District - Howard.

**Volume From Chain Sources: Meter, Meter & Supply Error Adjustments**  
Volume From Chain Sources: Meter, Meter & Supply Error Adjustments  
MWW should test test results for derivation of this input.

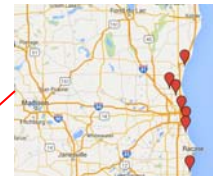
**Water Expired**  
Analyze specific test results from 10 report meters for derivation of meter adjustments.

**Average Length of Customer Service Line**  
Conduct study on available meter database for investigation of this estimate.

**Average Operating Pressure**  
Investigate true average pressure by pressure district, then conduct weighted average among all pressure districts using number of connections as basis for weighting.

**Water Loss at Meter - Total Utility**

**Water Loss at Meter - Public Use**




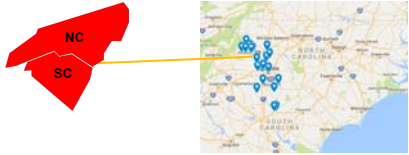
- Under regulatory framework
- Small group (6 utilities)
- Learning exercises with utility specific data





## Catawba Wateree Water Management Group

- Watershed based group of utilities
- 18 utilities with involvement from Duke Energy
- Learning exercises with utility specific data
- Level 1 Validated Water Audits
- Basinwide Economic Analysis

## Hawaii

THE SENATE  
TWENTY-EIGHTH LEGISLATURE, 2016  
STATE OF HAWAII

S.B. NO. <sup>2845</sup>

**A BILL FOR AN ACT**

RELATING TO WATER AUDITS.

**BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:**

SECTION 1. Article XI, section 7 of Hawaii's Constitution obligates the State to protect, control and regulate the use of Hawaii's water resources for the benefit of its people.

Fresh water is the lifeblood of society. The quantity and quality of fresh water directly impacts the health, welfare, economy, and quality of life in Hawaii. Fresh water infrastructure has been constructed to withdraw water from available sources, to treat it to acceptable standards, and to distribute it to our various communities.

Based on the department of health's database, there are a little over fifty county-run public water systems statewide and another fifty large capacity public water systems and public water systems operating in designated ground water management areas. Many of these water distribution systems, however, may be operating with inefficiencies that result in the loss of water, increased energy costs, and lost revenue.

Water conservation is among the least expensive and most efficient ways to increase the available supply of fresh water. It requires improving the efficiency of water delivery and identifying losses to the system. A water audit helps a utility understand how much water is lost from a distribution system through the detailed analysis of data, which the utility can use to make informed decisions to reduce real or apparent losses.

There is a growing trend across the United States where states, including California, Colorado, Delaware, Georgia, New Mexico, Pennsylvania, Tennessee, Texas, Washington, and Wisconsin, and their water authorities have begun to mandate water audits by water utilities.

The purpose of this Act is to establish a program to implement standardized water audits of public water systems in accordance with the method adopted by the American Water Works Association's Water Audits and Loss Control Programs, Manual of Water Supply Practices - M36, as amended.

SECTION 2. The commission on water resource management shall establish a five-year program to conduct standardized water audits of public water systems in accordance with the method adopted by the American Water Works

# Indiana

**Indiana General Assembly**  
**2016 Session**

Information - Session - Committees - Legislation - Laws - Publications

## Senate Bill 347

**Enrolled Senate Bill (S)**

**Authored by** Sen. Ed Charbonneau, Sen. Douglas Eckerty, Sen. Mark Stoops.  
**Co-Authored by** Sen. Michael Delph, Sen. Lonnie Randolph.  
**Sponsored by** Rep. David Wolkins, Rep. Greg Beumer, Rep. Steven Stemler, Rep. Christina Hale.

**Authors / Sponsors** +

**DIGEST**

Water resources. Repeals the law requiring all water utilities to annually report to the utility regulatory commission on the utilities' operations and maintenance costs in providing water service to their customers. Requires the Indiana finance authority (authority), before November 1, 2017, to prepare and submit in an electronic format to the executive director of the legislative services agency a report on non-revenue water (the difference between the volume of water entering a water distribution system and the volume of water consumption billed to customers served by the water distribution system) and water loss in Indiana. Requires the authority to perform a quality assurance review of the water resources data compiled from the reports submitted annually by owners of significant water withdrawal facilities for all calendar years since 1985, and to present the results of its quality assurance review as those results become available to the water rights and use section of the division of water of the department of natural resources. Requires the authority to study, analyze, and report to the executive director of the legislative services agency by November 1, 2016, on the infrastructure needs of Indiana's water utilities. [View less](#)

# New Jersey

**NJ SPOTLIGHT**  
NEWS, ISSUES AND INSIGHT FOR NEW JERSEY

BUDGET EDUCATION ENERGY & ENVIRONMENT HEALTH

VIDEOS WEBINARS ROUNDTABLES WATER IMMIGRATION ELECTIONS

## ENERGY & ENVIRONMENT

ARTICLE
COMMENTS (4)

### FINE PRINT: USING WATER AUDITS TO CURB LOSSES IN DRINKING SUPPLIES

TOM JOHN | FEBRUARY 6, 2017

In a state where up to 30 percent of treated water is lost before it reaches the tap, water audits can be a critical tool

What's going on: The state has a well-recognized problem with an aging drinking-water infrastructure, some of it 100 years old or older. Water-main breaks disrupt service, and occasionally lead to boil-water advisories for customers. On top of that, projections are that between 20 percent and 30 percent of treated drinking water is lost through leaks before it ever gets to a home or business.

Why they're needed: From many perspectives, including annual rainfall, New Jersey is a water-rich state. Precipitation is plentiful in most years, but as 2016 demonstrated, droughts do occur. Much of the state is currently under a drought warning, demonstrating the system's vulnerability. Projections of drought deficits in the future point out possible problems in other areas. The state needs to be more conservative in how it manages its water.

What's being proposed: Bills have been introduced in the Assembly (A-4415), sponsored by Assemblyman Tim Eustace (D-Bergen) and Senate (S-2926), sponsored by Sen. Linda Greenstein (D-Mercer), to require water-loss audits of all public and private water companies. The legislation would require companies with 3,300 customers or more to conduct annual water-loss audits. Proponents argue validated water losses are a key step toward achieving cost-effective reductions in these losses. The audits, to be completed no later than 24 months after the bill is enacted into law, would have to be submitted to the state Department of Environmental Protection.


What the bill would accomplish: Conducting water audits, routine for most large purveyors, will conserve water and save money for consumers. The audits also could pinpoint areas where purveyors need to fix aging infrastructure.

What the measure will fail to do: The proposed legislation will not provide a stable source of funding that could guarantee some part of the projected \$8 billion that needs to be invested in the state's drinking-water infrastructure over the next couple of decades. A special joint legislative task force on drinking-water infrastructure is examining other problems related to water losses. Coming up with a fiscal solution, however, without spiking water bills, is going to be hard to accomplish in an election year.

What happens next: Look for relatively quick action on the audit bill by the Legislature. It is a commonsense approach to a big problem and is likely to be recommended by the legislative task force.




10

**Executive Summary**



Water Research Foundation  
Level 1 Water Audit Validation

Research Team:






WSO  
CAVANAUGH  
KUNKEL

**Quick Facts**      **Project Number: 4639 • Date Available: November 2016**

- Water audit validation is the process of examining water audit inputs to improve the water audit's accuracy and document the uncertainty associated with water audit data.
- Level 1 water audit validation confirms that American Water Works Association M36 water audit methodology was correctly applied to a utility's specific situation, identifies evident inaccuracies in summary water audit data, and verifies that data validity grades accurately reflect utility practices.
- While some uncertainty may persist in the water audit, the water audit is more reliable for having been Level 1 validated.

**Executive Summary**



Water Research Foundation  
Level 1 Water Audit Validation

VALIDATION LEVEL	DEFINITION
self-reported	<ul style="list-style-type: none"> <li>• Water audits have not been validated</li> <li>• Water audit accuracy/reliability is not well understood</li> </ul>
1	<ul style="list-style-type: none"> <li>• Validated water audits have been examined for errors evident in summary data and application of methodology</li> <li>• The data validity grades assigned to inputs accurately reflect utility practices</li> </ul>
2	<ul style="list-style-type: none"> <li>• Validated water audits have been corroborated with investigations of raw data and archived reports of instrument accuracy</li> <li>• The best sources of data to inform the water audit have been identified</li> </ul>
3	<ul style="list-style-type: none"> <li>• Validated water audits have been bolstered by field tests of instrument accuracy</li> <li>• Minimum night flow analysis and/or pilot leak detection supplement the water audit</li> </ul>



## Best Practice in Water Loss Control: Improved Concepts for 21st Century Water Management

In 2003 the American Water Works Association (AWWA) adopted improved best practice methods for defining and measuring water loss in water distribution systems. This transition into a new era of effective water management marked a departure from previous terms and practices no longer useful to the industry. The following explains this departure from obsolete practices and articulates key points and best practices in water loss control today.

### Improved Terminology: Non-revenue Water

In 2003 AWWA abandoned use of the term “unaccounted-for” water (UFW) because all volumes of water supplied within a distribution system go toward either beneficial consumption or wasteful loss. *All water sent into the distribution system can be accounted for.* Today, the industry term favored by AWWA and its Water Loss Control Committee when quantifying water loss is “non-revenue” water (NRW).

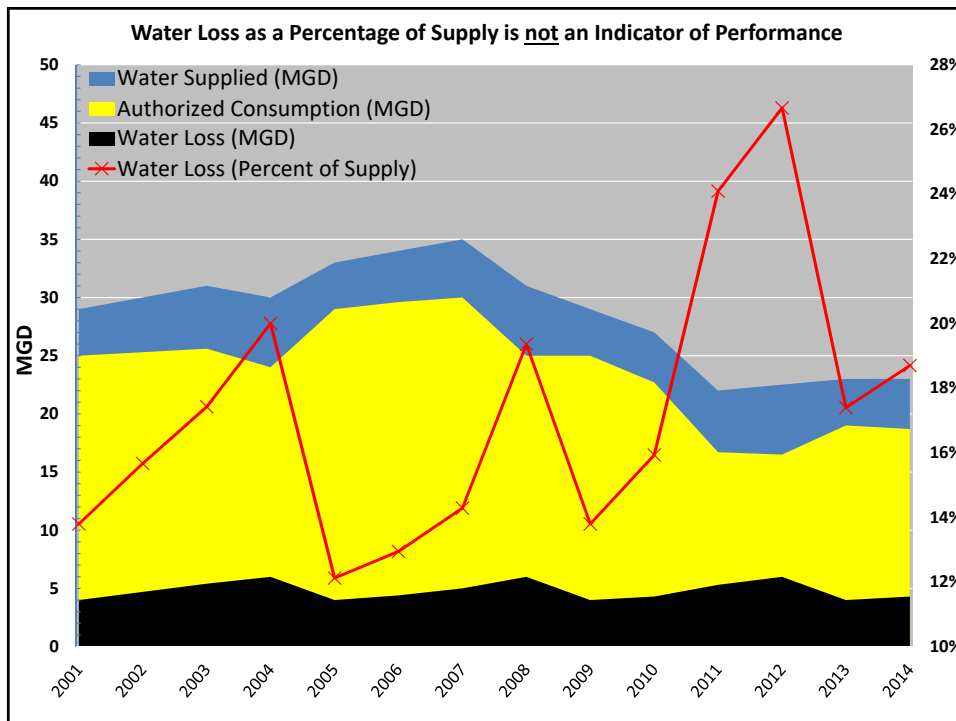
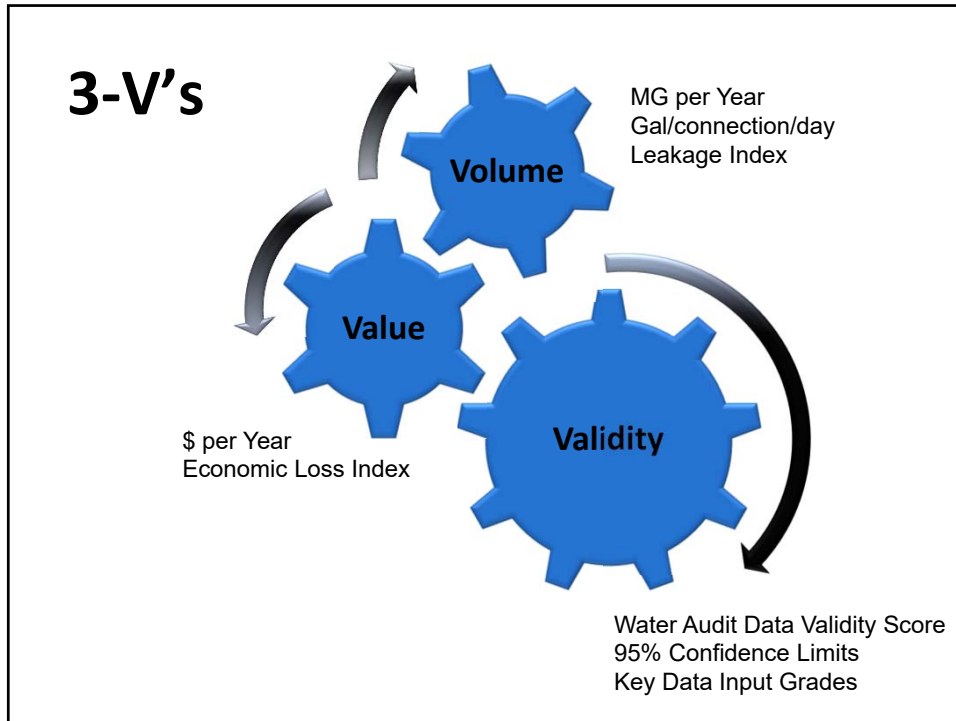
**NRW is specifically defined to include the sum of specific types of water loss and any authorized, unbilled consumption that occurs within water distribution systems.**

## Correct Terminology

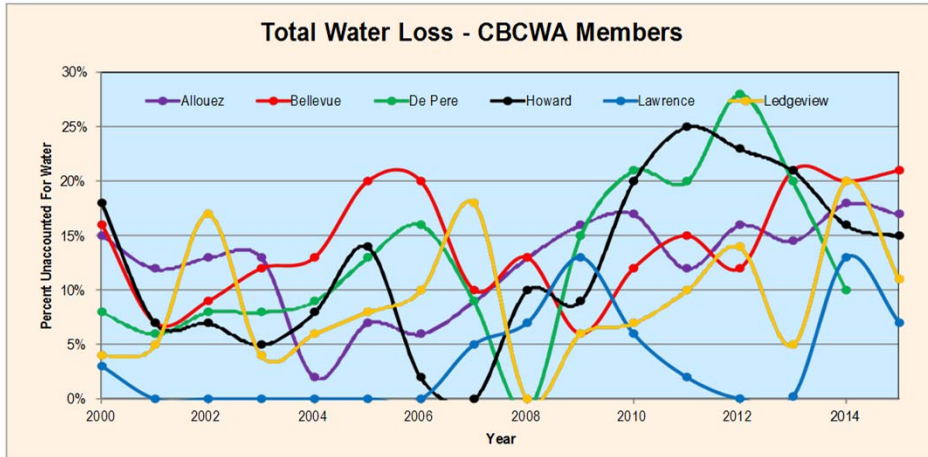
The following table provides a guide to the most up-to-date industry best practices and water loss control terminology.

Editorial Guide for Use of Up-to-Date Water Loss Control Terminology		
INCORRECT	CORRECT	WHY
Unaccounted-for water (UFW)	Non-revenue water (NRW)	All water entering a distribution system can be defined as a component of either authorized consumption or water loss
% of system input volume to measure water loss performance	Suite of key performance indicators for water loss as outlined in IWA/AWWA audit method (As an example: gal/service connection/day)	A %-based expression obscures the underlying causes of water loss and impedes realistic solutions based on system specifics

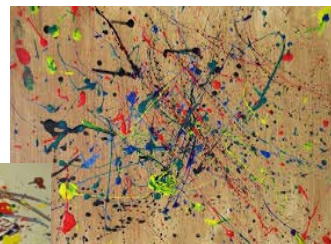
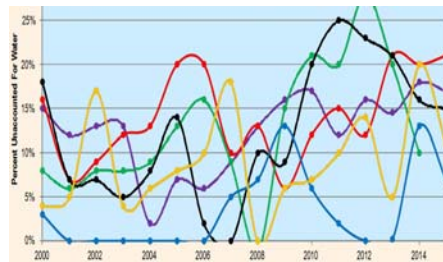
It is important to understand that all water utility distribution systems incur leakage (real losses). Similarly, all water utilities fail to recover revenue from all of the water that is (or should be) billed to customers (apparent losses). Although every system is unique, all water utilities should employ leakage control and revenue recovery programs that strive to keep losses contained to appropriate, economically justified levels. AWWA’s Manual: *Water Audits and Loss Control Programs* (M36) and the [AWWA FREE Water Audit Software](#) provide a robust pathway for utilities to develop data-driven programs to cost-effectively manage all water loss components (apparent and real) in distribution systems, as shown below in the IWA/AWWA Water Balance.

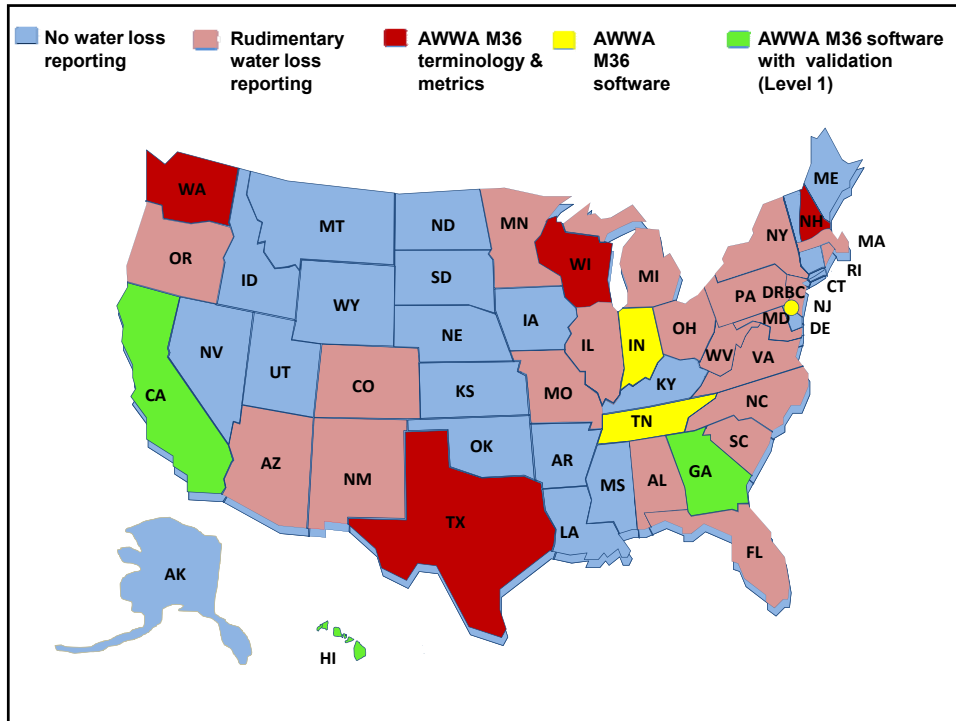


# Historical Losses



C:\Users\SBEDUHN\Dropbox\Howard\UFW Comparison CBCWA Members.xlsx\Sheet2





## SAVE THE DATE

**December 4 - 5, 2017**  
Paradise Point Resort · San Diego, CA

The North American Water Loss Conference (NAWL) will assemble policy and technical experts on non-revenue water management in North America.

Visit [ca-nv-awwa.org](http://ca-nv-awwa.org) after January for more information.

# NORTH AMERICAN WATER LOSS 2017

SAN DIEGO, CALIFORNIA

**Presented by:**  
 American Water Works Association  
**California-Nevada Section**

In cooperation with the Alliance for Water Efficiency and the NAWL 2017 Conference Planning Committee.

Sponsorships will be available.