Using DWSRF Set-aside Funds for State-wide Water Loss Initiatives

Presented by:
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Steve Cavanaugh, P.E.
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CAVANAUGH
Stewardship Through Innovation

Quiz

According to the AWWA M36 Water Audit Method, an acceptable level of Unaccounted For Water is:

A. 15%
B. 5%
C. 0%
D. 10%

A VertMarkets Magazine

Water Online

www.wateronline.com The Magazine

Clean Water Edition

State Of Loss

How Non-Revenue Water Is Impacting The U.S.

Also In This Issue:

Next-Generation Arsenic Removal

Disinfection Byproducts:
Treatment Options And Challenges

The New York Times

FIXES

The Art of Water Recovery

By DAVID BORNSTEIN JULY 10, 2014 8:00 PM 53 Comments

Fixes looks at solutions to social problems and why they work.

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Imagine that you run a company that sells bottled water. You spend lots of money, and use lots of energy, pumping the water out of the ground, purifying it and transporting it for sale. Then, one day, you discover that a large number of bottles never make it to the stores. They are falling through holes in the trucks.

Wouldn't you want to know what could be done about it? Wouldn't you be crazy to allow the situation to continue?

Well, that's what's happening with many water utilities in the United States. The Environmental Protection Agency estimates (pdf) that public water systems lose, on average, one-sixth of their water — mainly from leaks in pipes. The E.P.A. asserts that 75 percent of that water is recoverable. (In truth, the volume of leakage in the nation's 55,000 drinking-water systems is unknown, because few conduct water audits using the standards established by the International Water Association and the American Water Works Association.)

Connections Story

American Water Works Association

AWWA CONNECTIONS™

Read more stories from this issue.

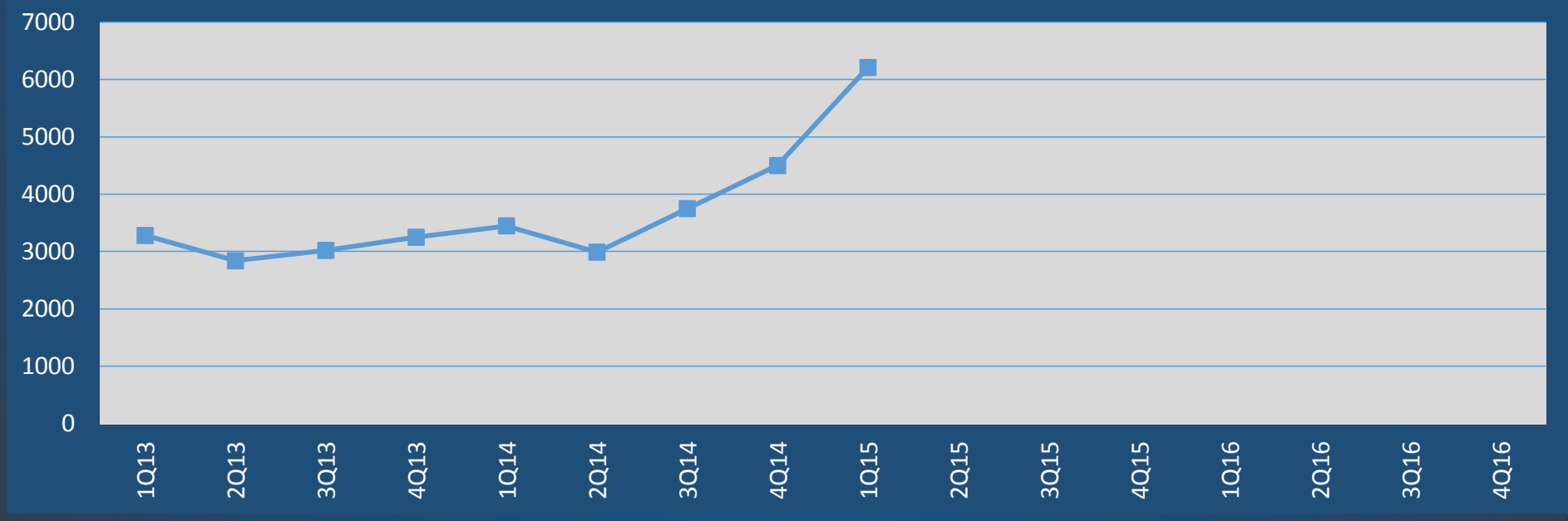
Controlling water loss more critical than ever

August 6, 2015

With a prolonged drought impacting California, media from th
renewed interest in how much water leaks out from utility pip

The issue is not new to AWWA. In fact, the association's Water
Control Committee has been helping utilities manage their nc

WEBPAGE	RANK (monthly avg)	January	February	March
Water Knowledge (RC landing page)		829	813	912
Water Loss Control	1	2,118	1,997	2,095
Water Conservation	2	645	585	728
Drought	13	115	99	158
Backflow	3	515	556	661
How Water Works	4	474	538	522
Wastewater	5	421	409	474
Asset Management	6	369	313	378
Small Systems	7	288	254	321
Emergency Preparedness	9	238	129	154
Wastewater-Collection-Systems	8	191	196	281
Stormwater	16	131	79	108
Groundwater	11	197	108	88
Climate Change	17	105	89	120



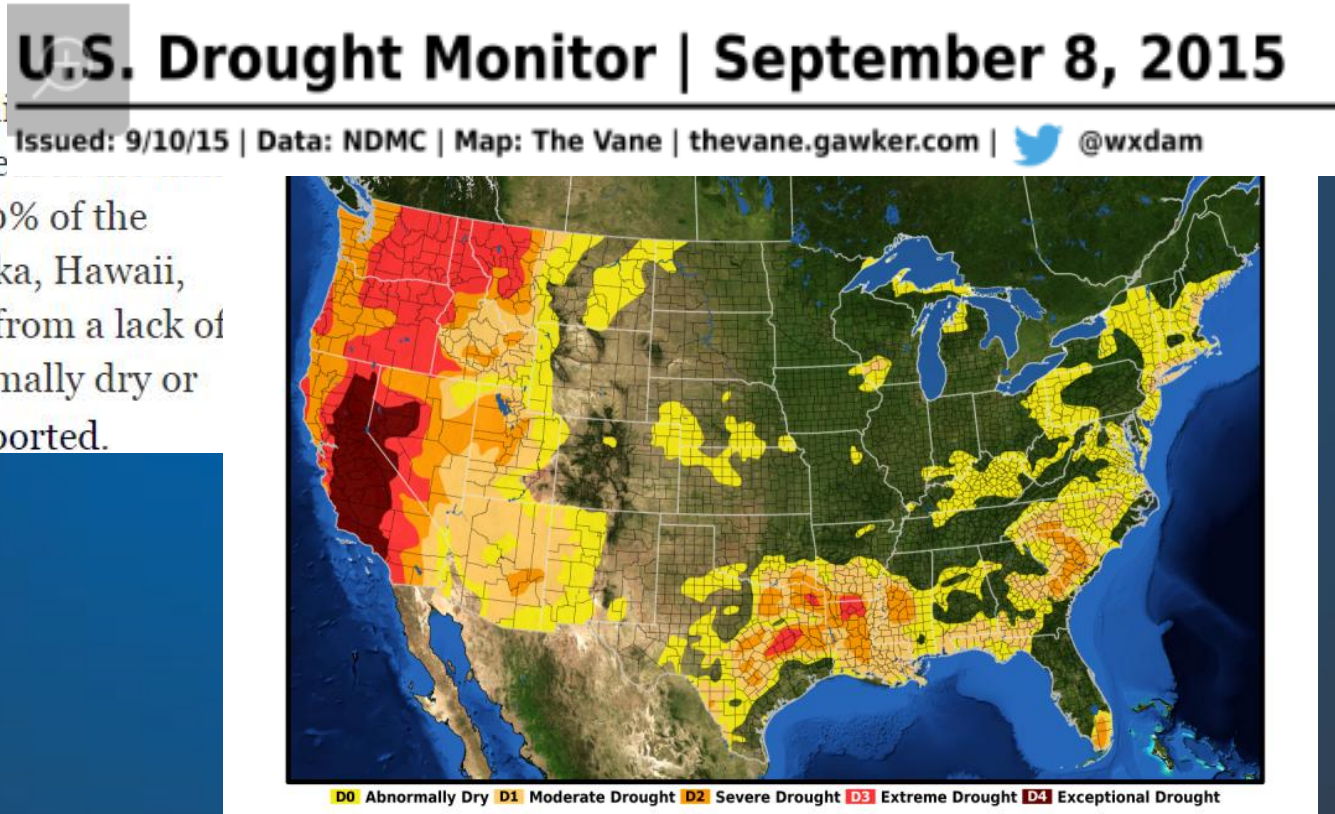
U.S. Has Reached 52 Percent Drought

By Sara Jerome
@sarmje

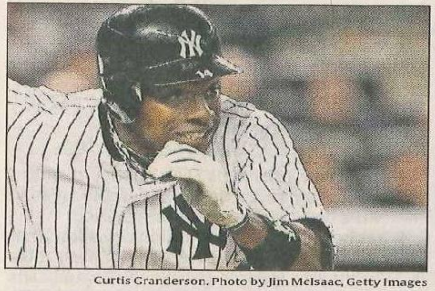
It's official: Most of the U.S. is facing drough conditions.

"The U.S. Drought Monitor, wh analyses every Tuesday and rele every Thursday, says that 52.00% of the United States — including Alaska, Hawaii, and Puerto Rico — is suffering from a lack of precipitation and is now abnormally dry or stuck in a drought," Gawker reported.

More Than Half of the United States Is Abnormally Dry or Officially in a Drought



One of the biggest weather stories in recent years is the distinct *lack* of



Curtis Granderson. Photo by Jim Mcisaac, Getty Images

2009 trade pays off

Yankees, Tigers and Diamondbacks are reaping benefits of 3-way deal, 1C

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FALL TV ratings

Pan Am, *Unforgettable* among those showing promise, but comedy proves to be king, 1, 3D

Newsline

WEDNESDAY, SEPTEMBER 28, 2011

By Matt Hamilton, AP

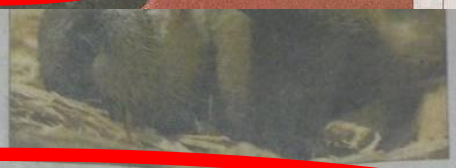
Insurance cost to

Can this government be fixed?

Hackers shake Web to the core

WINSTON-SALEM JOURNAL

February [illegible] 2014 75 cents WEDNESDAY www.journalnow.com



Greensboro Science Center / A4

Feed winter cravings with healthy soup / C1

City: Fired meter reader filed false water data

Officials recalculating affected accounts to prevent overcharges

BY WESLEY YOUNG

uary telling them that a meter reader had falsified water con-
ber-November billing cycle.

Division officials said they believe that 3,200 customers received incorrect billings, but that

On Facebook

Did you get an inaccurate

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said Ron Hargrove, the director

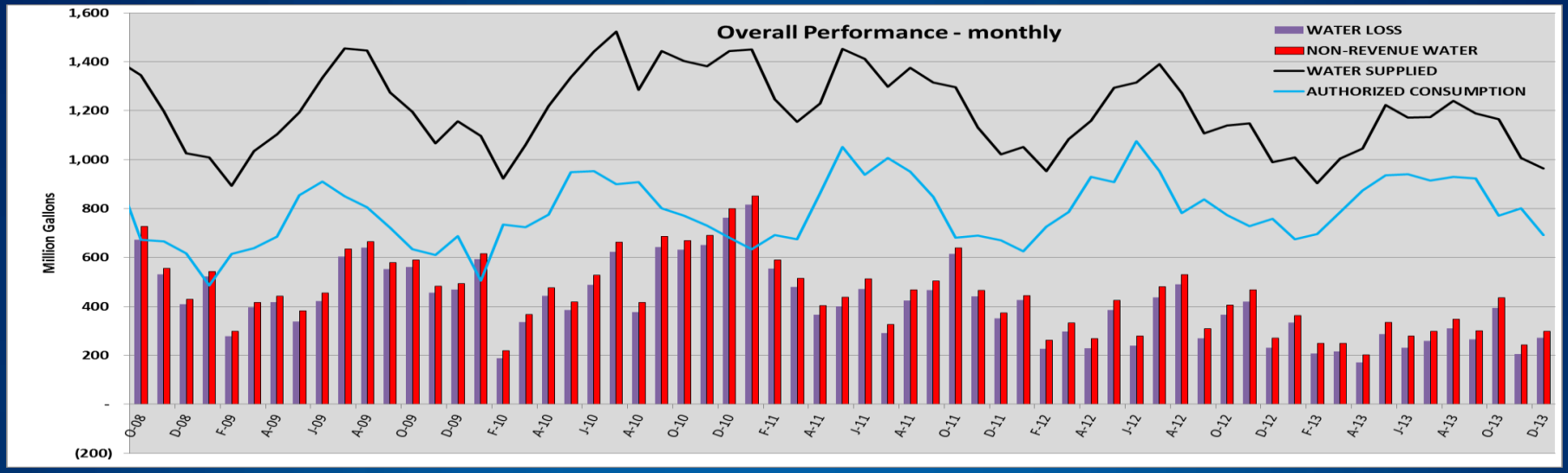
the falsified bills experienced unusually low readings for the

A correct reading in the following billing cycle resulted in those customers getting bills that were higher than normal.

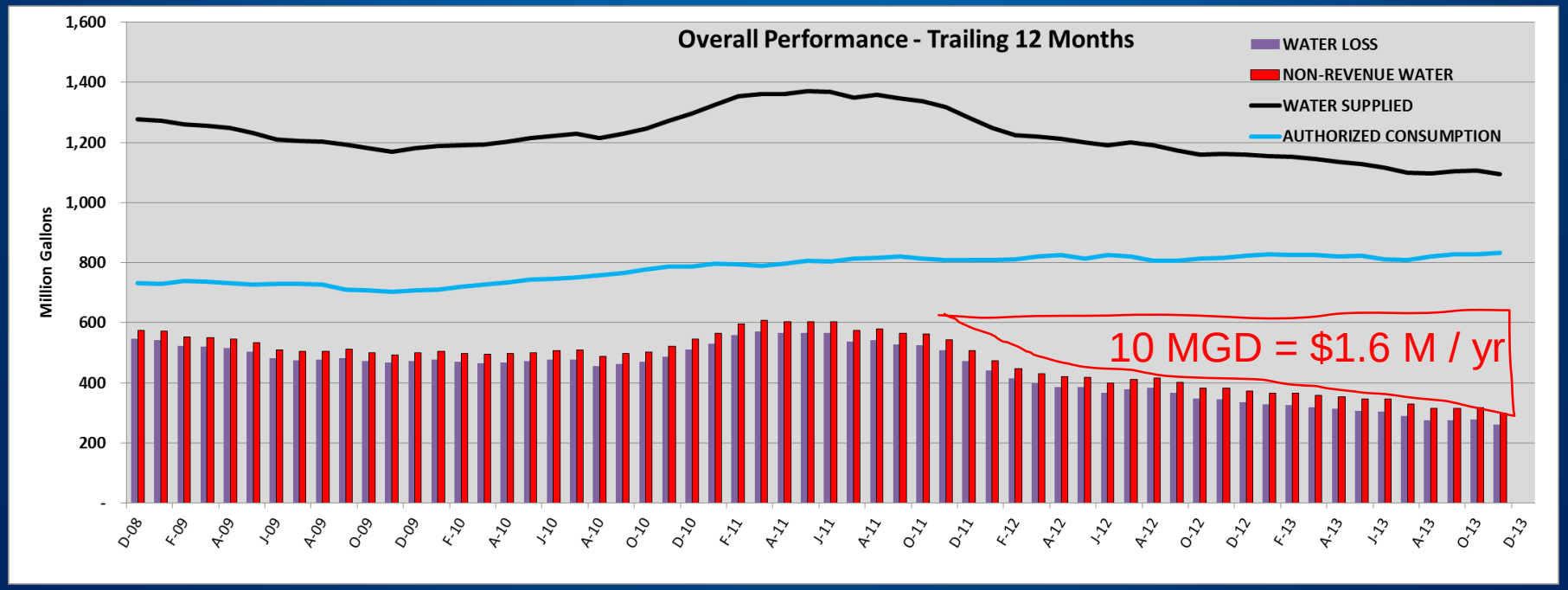
some number of
Hargrove said. "A lot of his readings were accurate, but when he would get behind he would put a false reading on."

Bellwether said it would not comment on the incident.

Monthly, Unadjusted



Rolling Average



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Impact on Bond Ratings

#48 Enterprise Risk Profile Assessment Factors (Table 10)

Strong – Utility has performed a water audit consistent with the AWWA M-36 methodology on an annual basis for the prior five years. The utility has a well-structured and documented Non-Revenue Water Management Program that includes ongoing leak detection work and annual accuracy testing of finished water meters and a representative sample of customer meters.

Good – Utility has performed a water audit consistent with the AWWA M-36 methodology on an annual basis for the prior three years. The utility has engaged in specific components of a Non-Revenue Water Management Program such as periodic finished water meter testing, accuracy testing of samples of customer meters and active leak detection.

Standard – Utility has performed a water audit consistent with the AWWA M-36 methodology but does not do so on an annual basis. The utility tracks some basic water loss information on a monthly basis but does not have an active Non-Revenue Water Management Program.

Vulnerable – Utility has not performed a water audit consistent with the AWWA M-36 methodology and does limited tracking of some basic water loss information on a monthly basis. This information is generally reported on a percentage of volume-supplied basis.

*** final review, expected publication – December 2015**

THE TEXAS TRIBUNE

Texas Gets Creative With Recycling Water

by Kate Galbraith | June 11, 2012 | 3 Comments

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Enlarge

Photo by Jerod Foster

Robert Hildreth, the plant operator of the Colorado River Municipal Water District's Raw Water Production Facility in Big Spring, Texas, inspects the geodesic dome roof of the site's million-gallon source water tank. The tank will stockpile water from the nearby waste water treatment plant before entering the production facility.

THE LAST DROP

On the outskirts of the Permian Basin town of Big Spring, workers have spent the last few weeks putting a roof on a facility that will, when it begins operating this year, become perhaps the first plant in the nation to process wastewater to put into a drinking water system.

Experts say such use of wastewater, a drought-proof resource, provides a key part of the water solution for fast-growing, drought-prone Texas.

Water wars boil in California drought: Our view

The Editorial Board 7:01 p.m. EDT April 19, 2015

Explore ways to increase the supply of water, not just ways to curb demand.

Senate Bill No. 555

October 9, 2015

Contact: Melissa Jones, (916) 651-4003

Governor signs Wolk drought preparedness, renewable energy bills

Bills improve water management & conservation, increase use of renewable energy programs

SACRAMENTO –Governor Edmund G. Brown Jr. signed into law a measure by Senator Lois Wolk (D-Davis) to improve water management and conservation in California, and another bill to boost participation in programs enabling utility customers to receive part of their electricity from renewable energy sources.

Today, Brown signed Senate Bill 555, which requires all urban water suppliers in California to conduct annual water loss audits to detect leaks and breaks in their water distribution systems and submit the results to the Department of Water Resources for public review. The measure would also require the State Water Resources Control Board to develop performance standards to minimize water loss in the water agencies' distribution systems.

"The fastest and cheapest way to save water is to identify and recover the water lost on a daily basis in our urban areas," Wolk said. "It is estimated that we could save hundreds of thousands of acre-feet this way. Every drop counts."

— 2 —

CHAPTER _____

ct to add Section 10608.34 to the Water Code, relating to

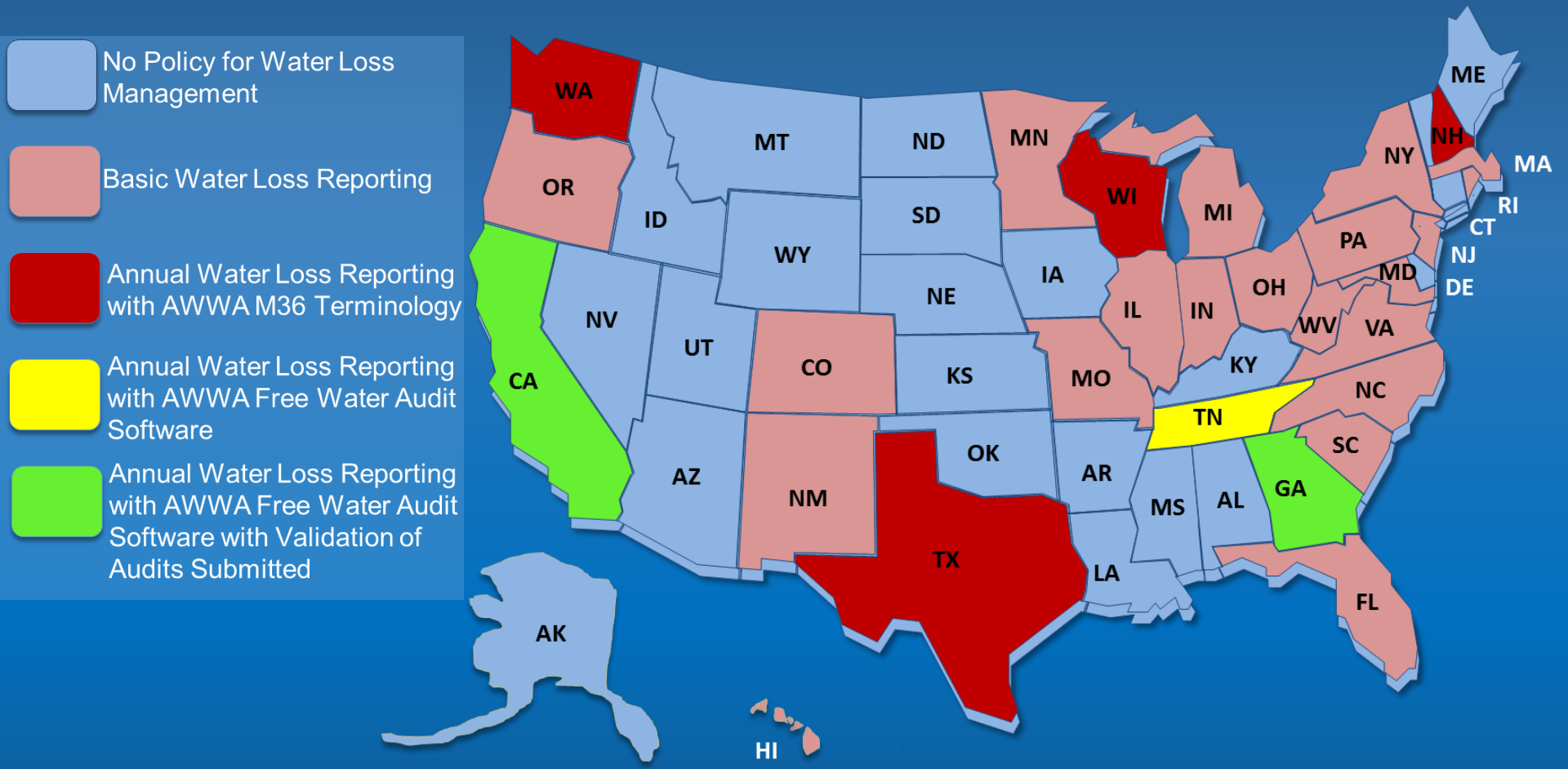
LEGISLATIVE COUNSEL'S DIGEST

555, Wolk. Urban retail water suppliers: water loss ment.

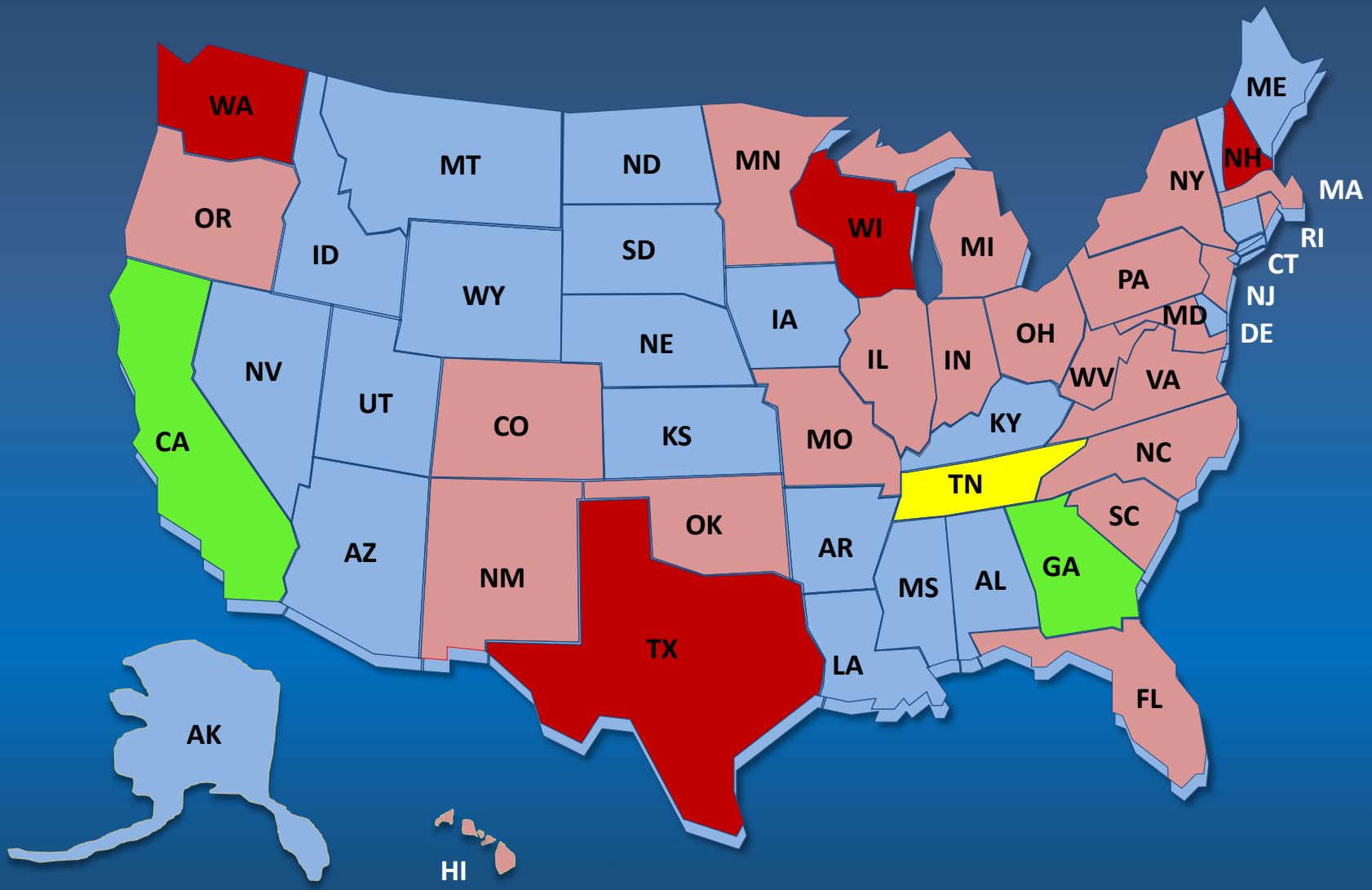
ing law requires the state to achieve a 20% reduction in er capita water use in California by December 31, 2020, uires the state to make incremental progress towards this reducing per capita water use by at least 10% on or before ber 31, 2015. Existing law requires each urban retail water to develop urban water use targets and an interim urban se target, in accordance with specified requirements.

bill would require each urban retail water supplier, on or October 1, 2017, and on or before October 1 of each year er, to submit a completed and validated water loss audit or the previous calendar year or previous fiscal year as ed by rules adopted by the Department of Water Resources efore January 1, 2017, and updated as provided. The bill equire the department to post all validated water loss audit on its Internet Web site in a manner that allows for isons across water suppliers and to make these reports e for public viewing. This bill would require the department de technical assistance to guide urban retail water suppliers' oss detection programs. The bill would require the State Resources Control Board, no earlier than January 1, 2019, ater than July 1, 2020, to adopt rules requiring urban retail appliers to meet performance standards for the volume of sses. This bill would require the board to contribute up to 0 using funds available for the 2016–17 fiscal year towards procuring water loss audit report validation assistance for urban retail water suppliers.

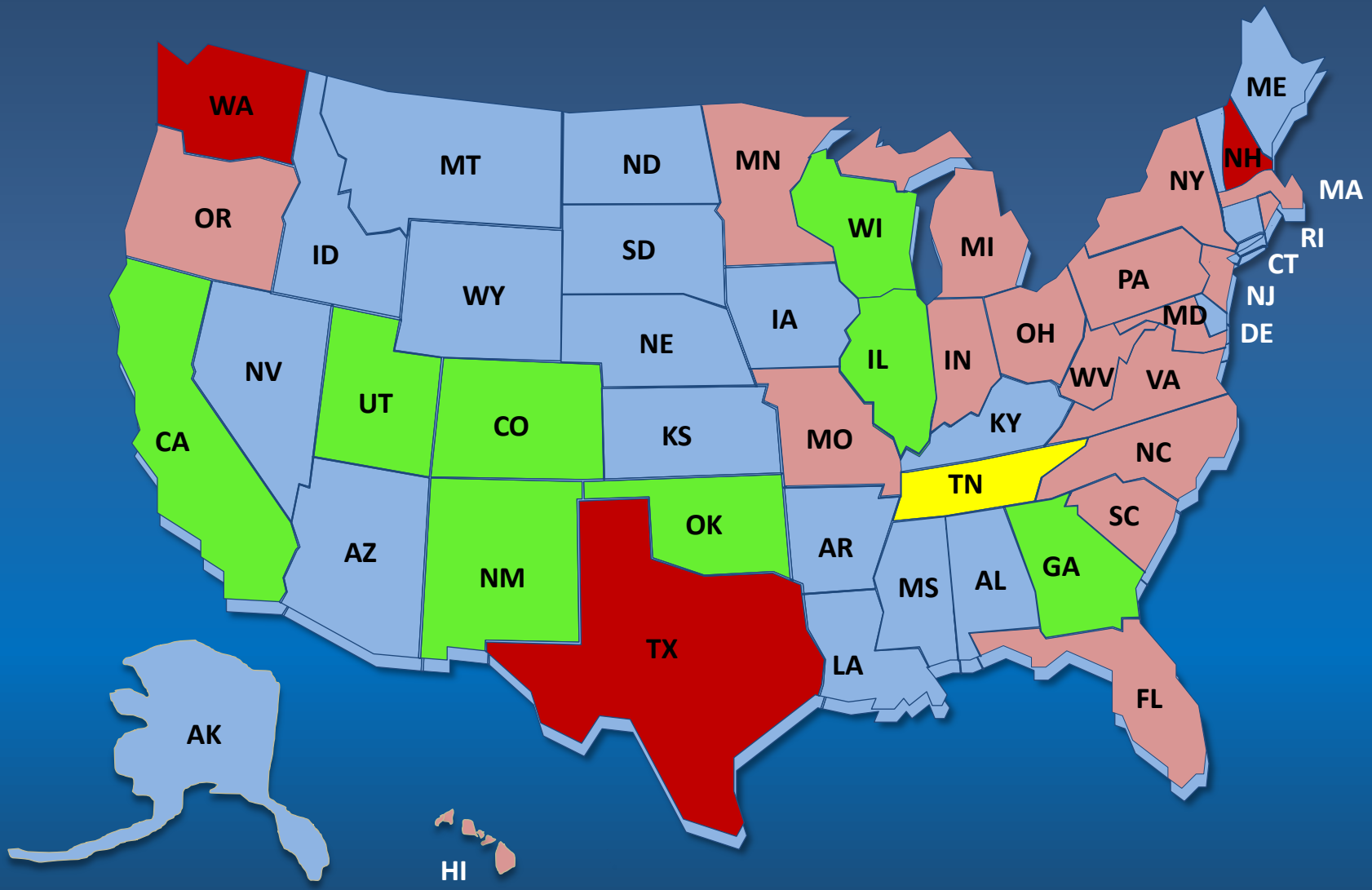
Landscape of Varying Levels of Water Loss Management Policy



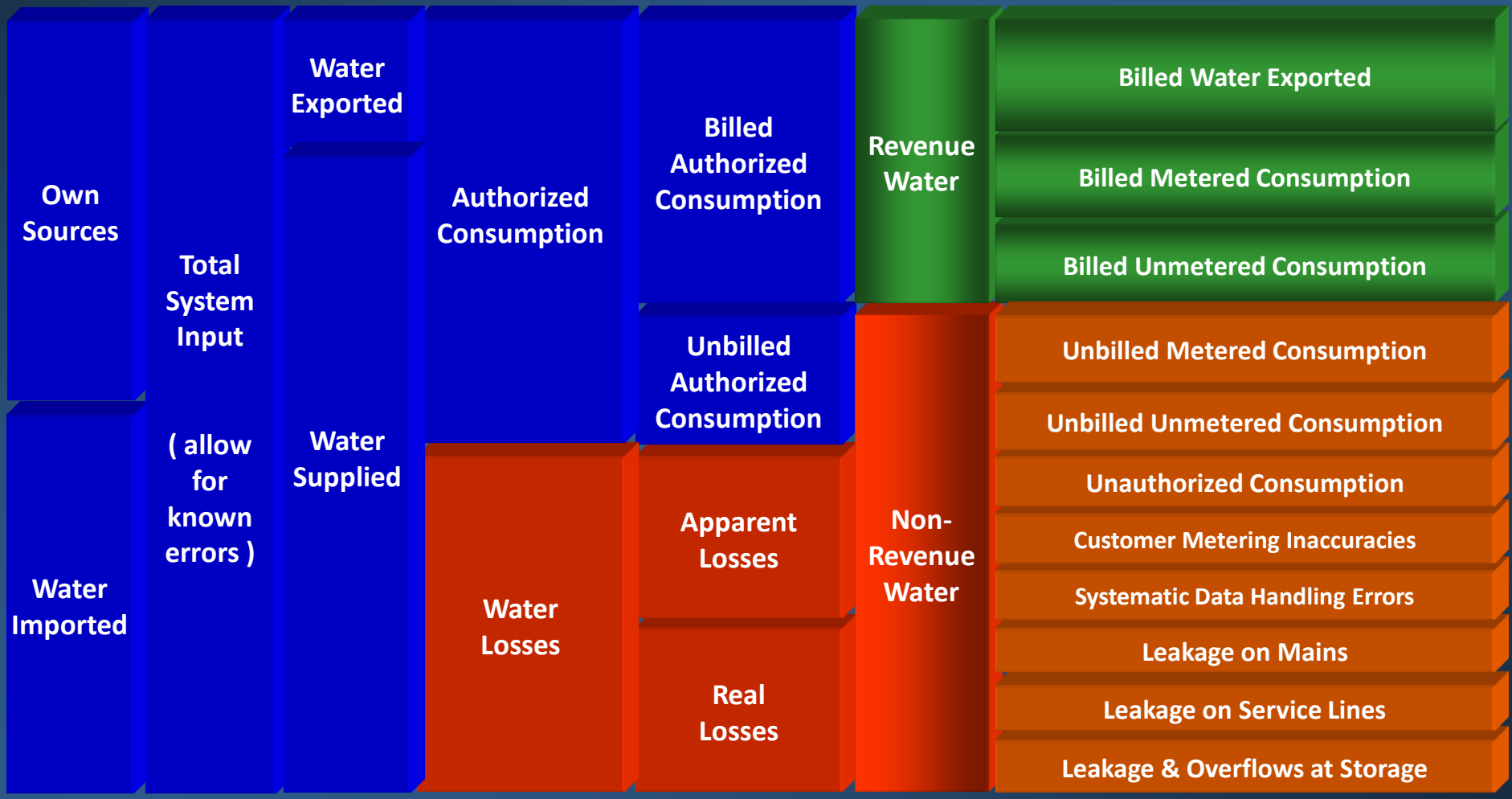
On the Horizon



On the Horizon



IWA/AWWA Standard Water Balance



Management of NRW

- Fire Dept Usage
- Operational Flushing
- Tools for control include efficient flushing practices and awareness campaigns

- Non-physical / revenue loss - slow meters, billing issues and theft
- Cost impacts at 'retail' rate
- Tools for control include data management, quality control policies/practices, & meter testing & repair

- Physical loss - leakage
- Cost impacts at 'wholesale' rate
- Tools for control include leakage and pressure management

Quiz

According to the AWWA M36 Water Audit Method, an acceptable level of Unaccounted For Water is:

A. 15%
B. 5%
C. 0%
D. 10%

Quiz

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D. 10%

~~Unaccounted For Water~~

~~Unaccounted For Water Percentage~~

2003

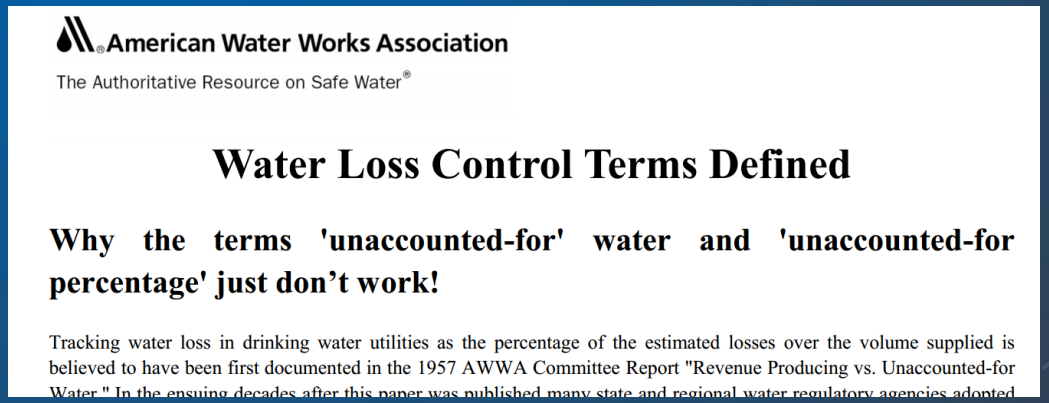
- Inconsistent use and interpretation
- Unreliable indicator of performance
- Fails to segregate loss into its components for effective management

BY AWWA WATER LOSS CONTROL COMMITTEE

COMMITTEE REPORT:

Applying worldwide BMPs in water loss control

Water resources today are less expensive and more accessible than they ever will be again, according to participants at a recent AWWA conference workshop on water resources. The North American water industry is facing growing challenges in developing new drinking water supplies, and the demands are staggering: source water protection, finished water quality, public health risks



American Water Works Association

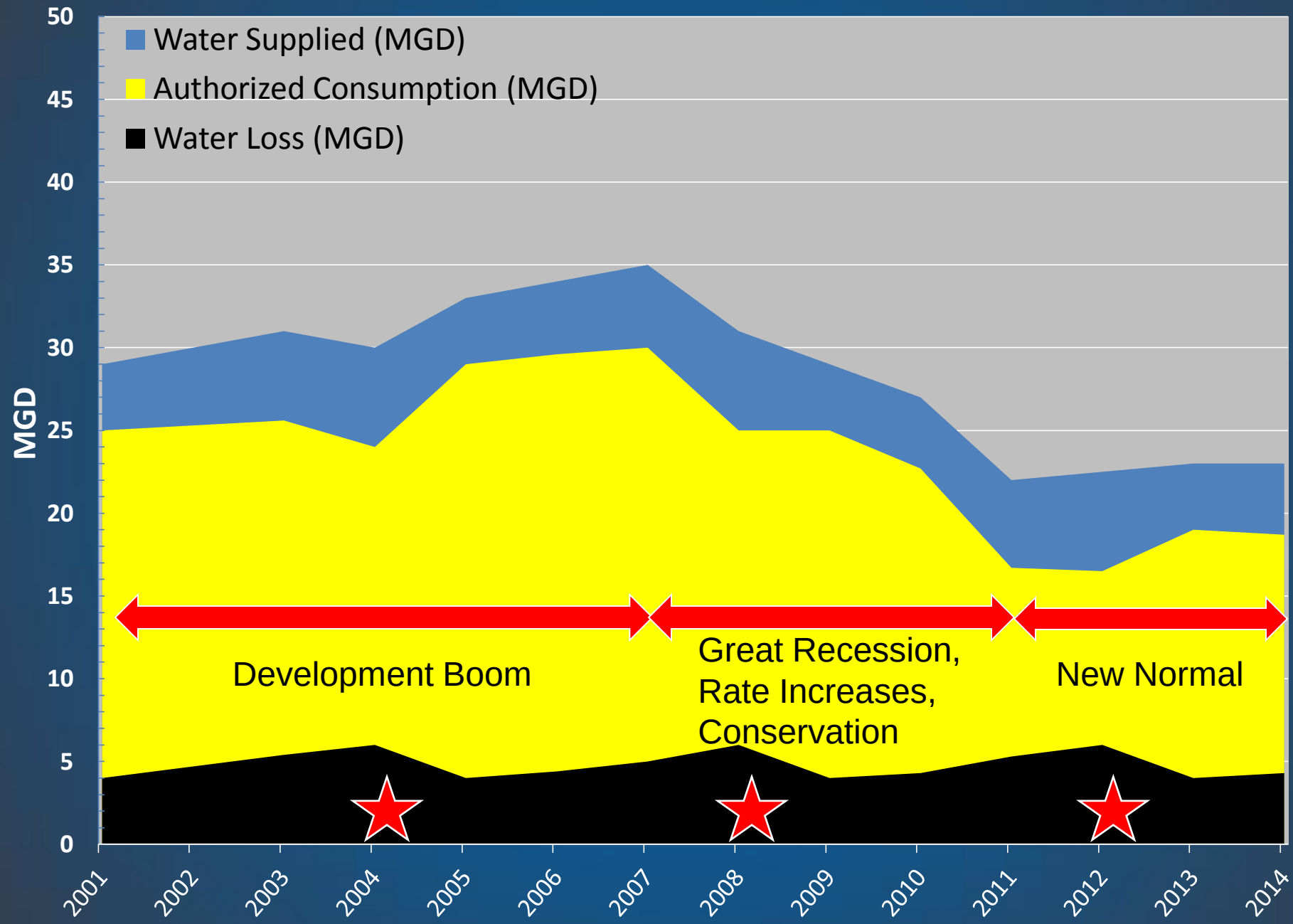
The Authoritative Resource on Safe Water®

Water Loss Control Terms Defined

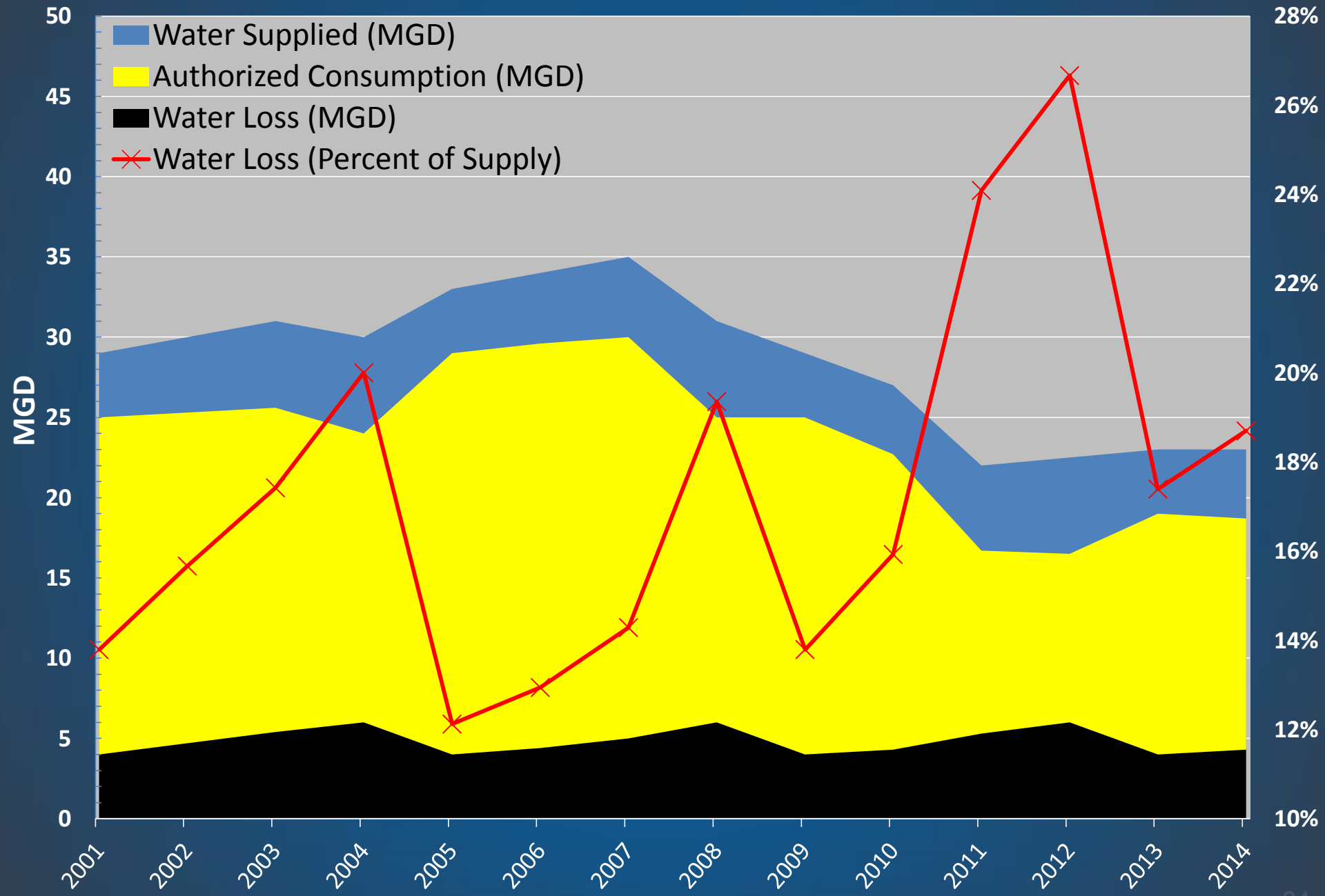
Why the terms 'unaccounted-for' water and 'unaccounted-for percentage' just don't work!

Tracking water loss in drinking water utilities as the percentage of the estimated losses over the volume supplied is believed to have been first documented in the 1957 AWWA Committee Report "Revenue Producing vs. Unaccounted-for Water." In the ensuing decades after this paper was published many state and regional water regulatory agencies adopted

Water Loss as a Percentage of Supply is not an Indicator of Performance



Water Loss as a Percentage of Supply is not an Indicator of Performance



Simplicity

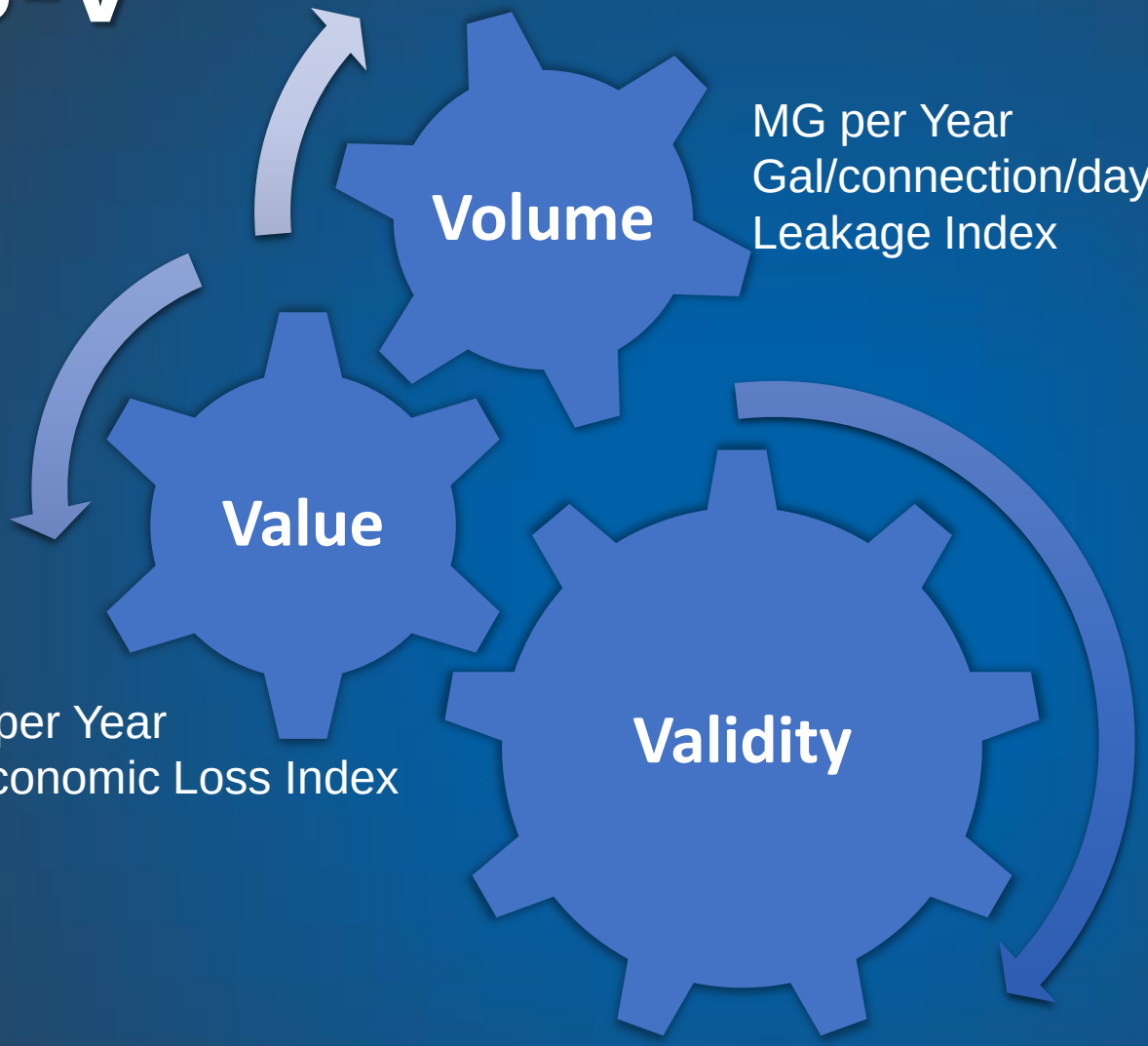
Everything should be made as simple as possible, but no simpler.

-Albert Einstein

For every complex problem, there is a solution which is simple, neat, and wrong.

-H.L. Mencken

3-V

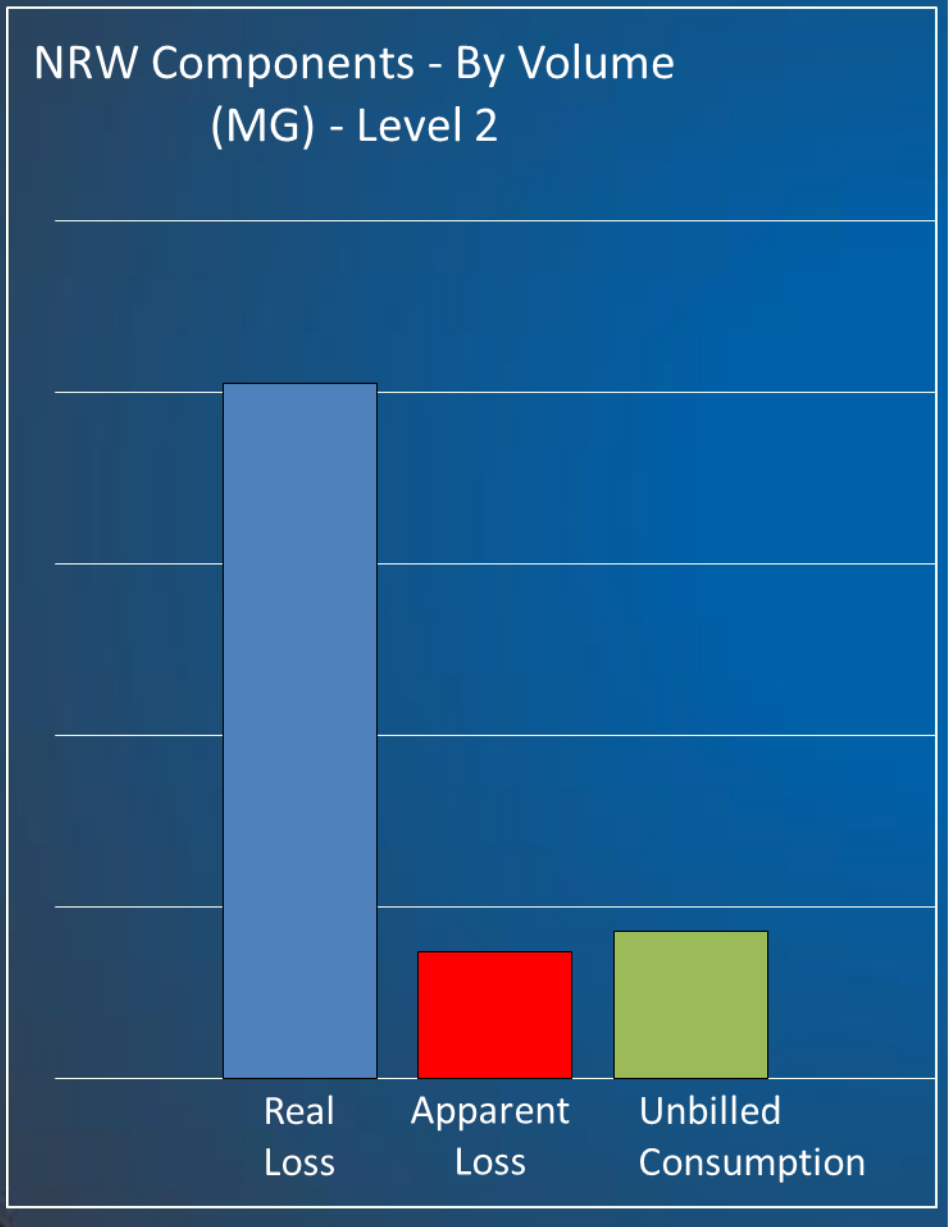


MG per Year
Gal/connection/day
Leakage Index

$ per Year
Economic Loss Index

Water Audit Data Validity Score
95% Confidence Limits
Key Data Input Grades

Volume



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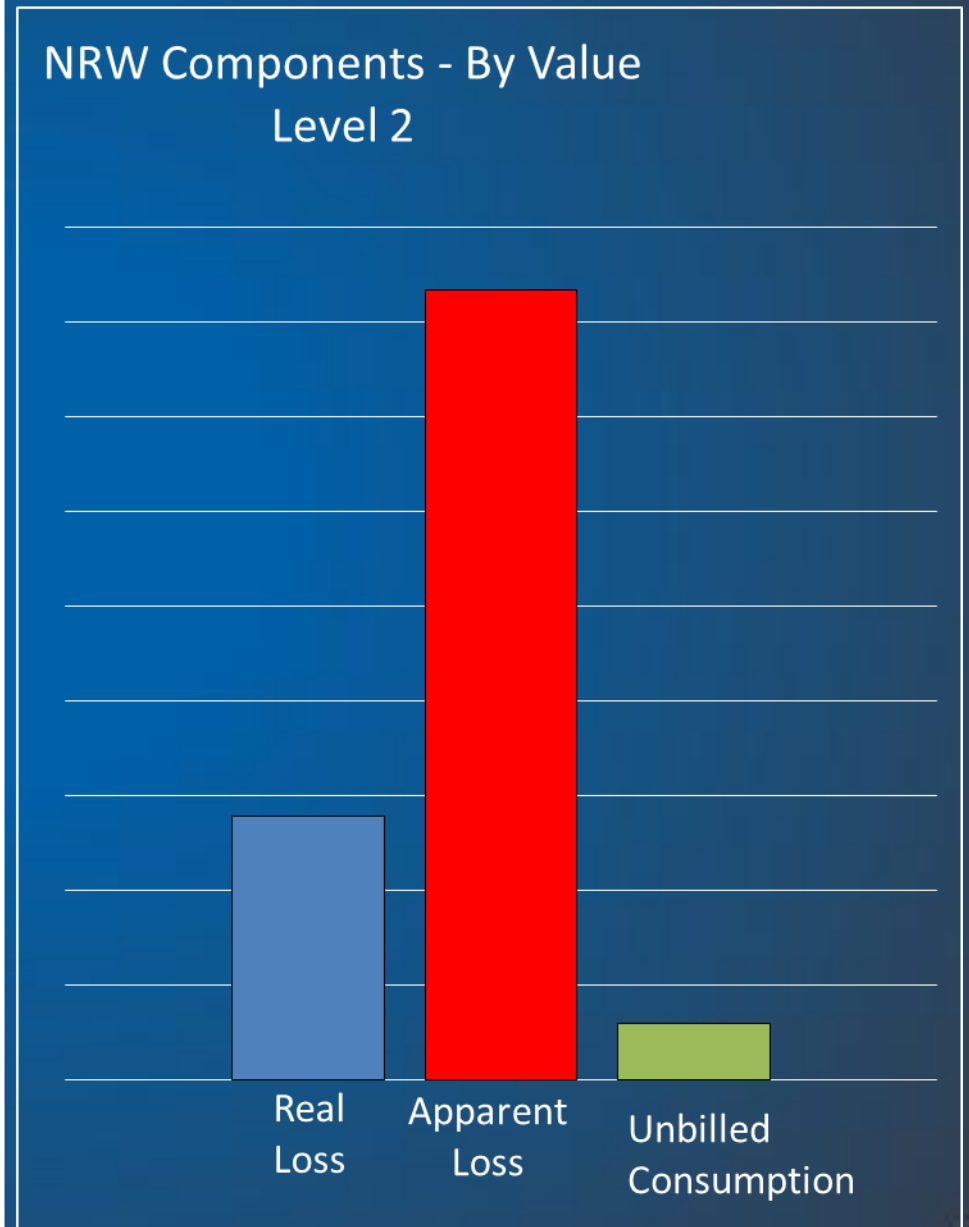
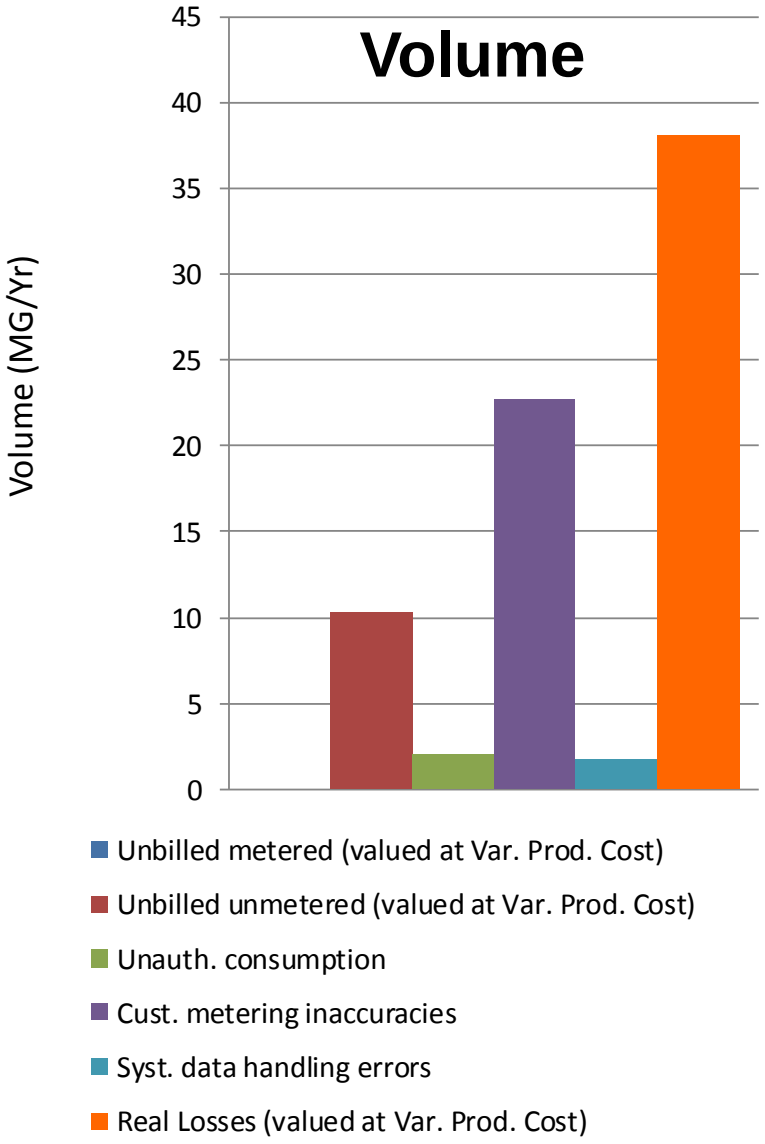


Show me the VOLUME of Non-Revenue Water

Show me the COST of Non-Revenue Water

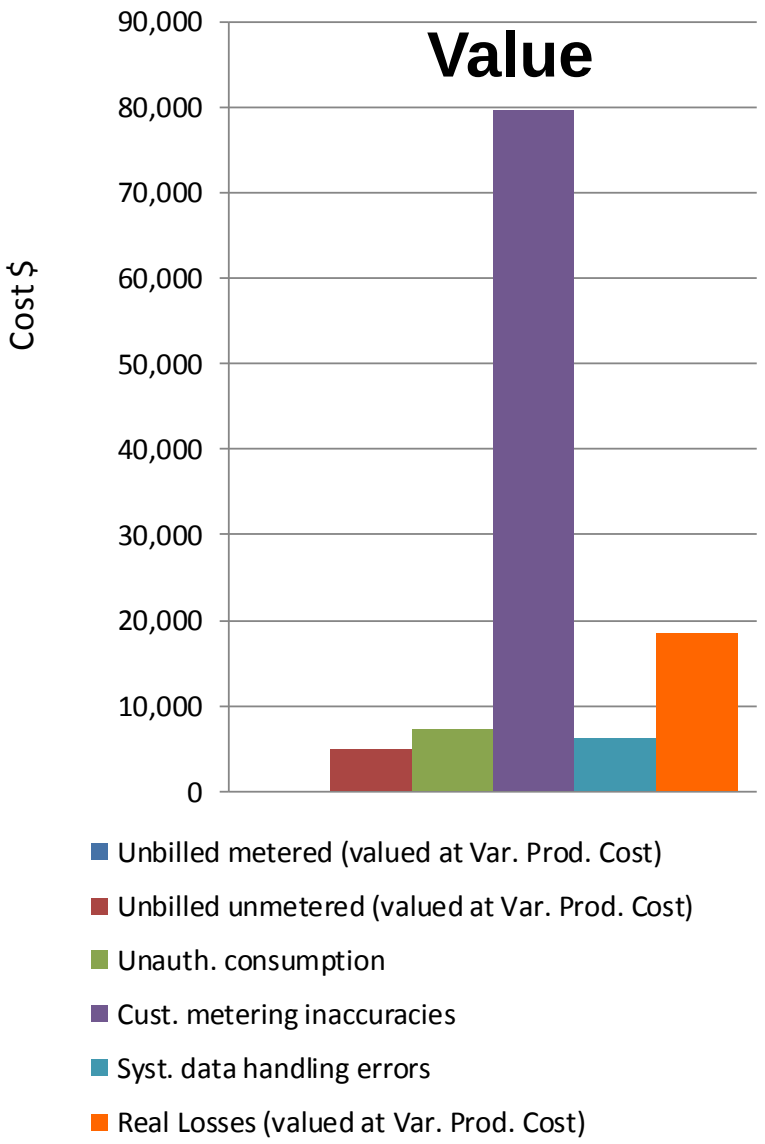
Total Volume of NRW = 75 MG/Yr



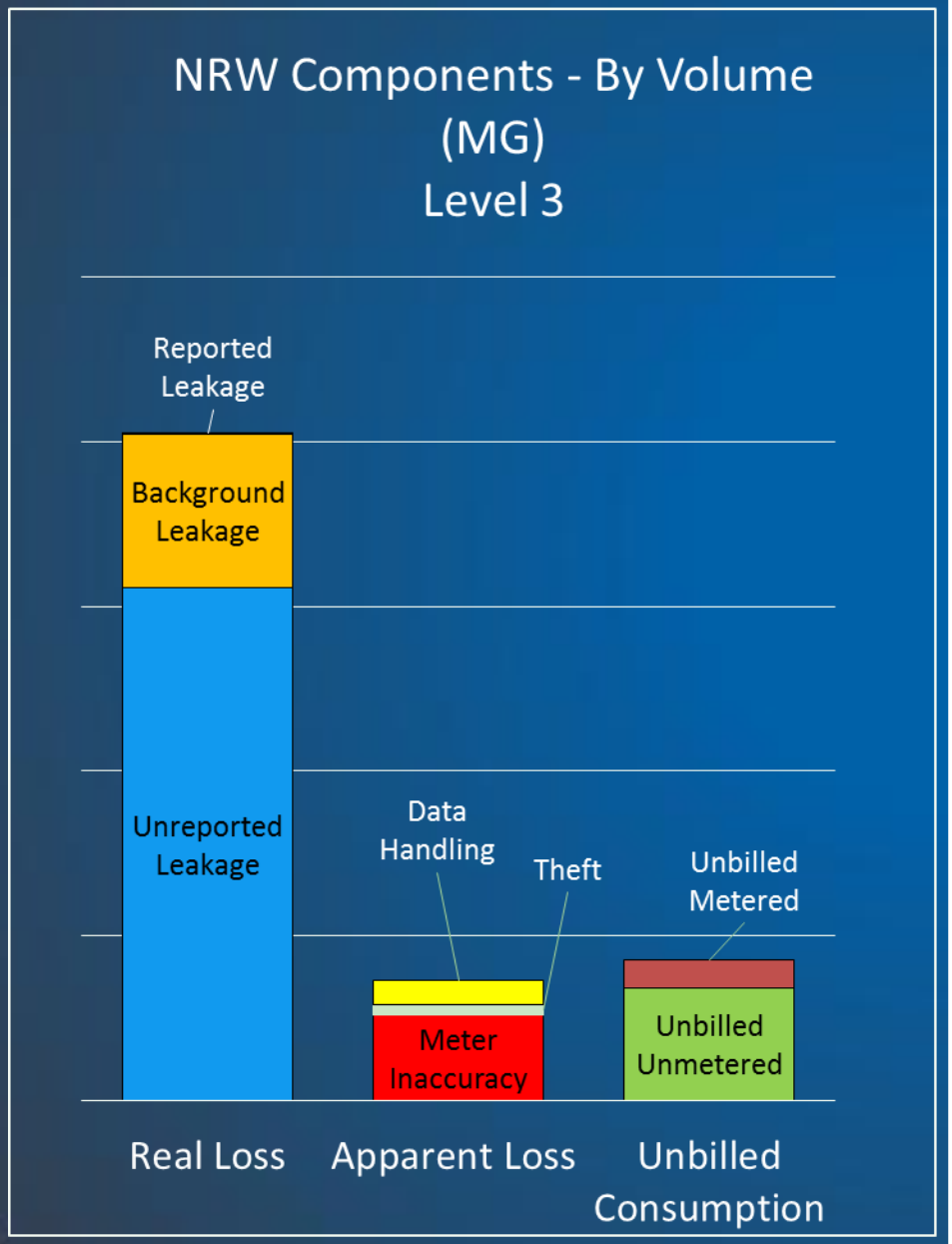
Show me the VOLUME of Non-Revenue Water

Show me the COST of Non-Revenue Water

Total Cost of NRW =$116,513



Volume



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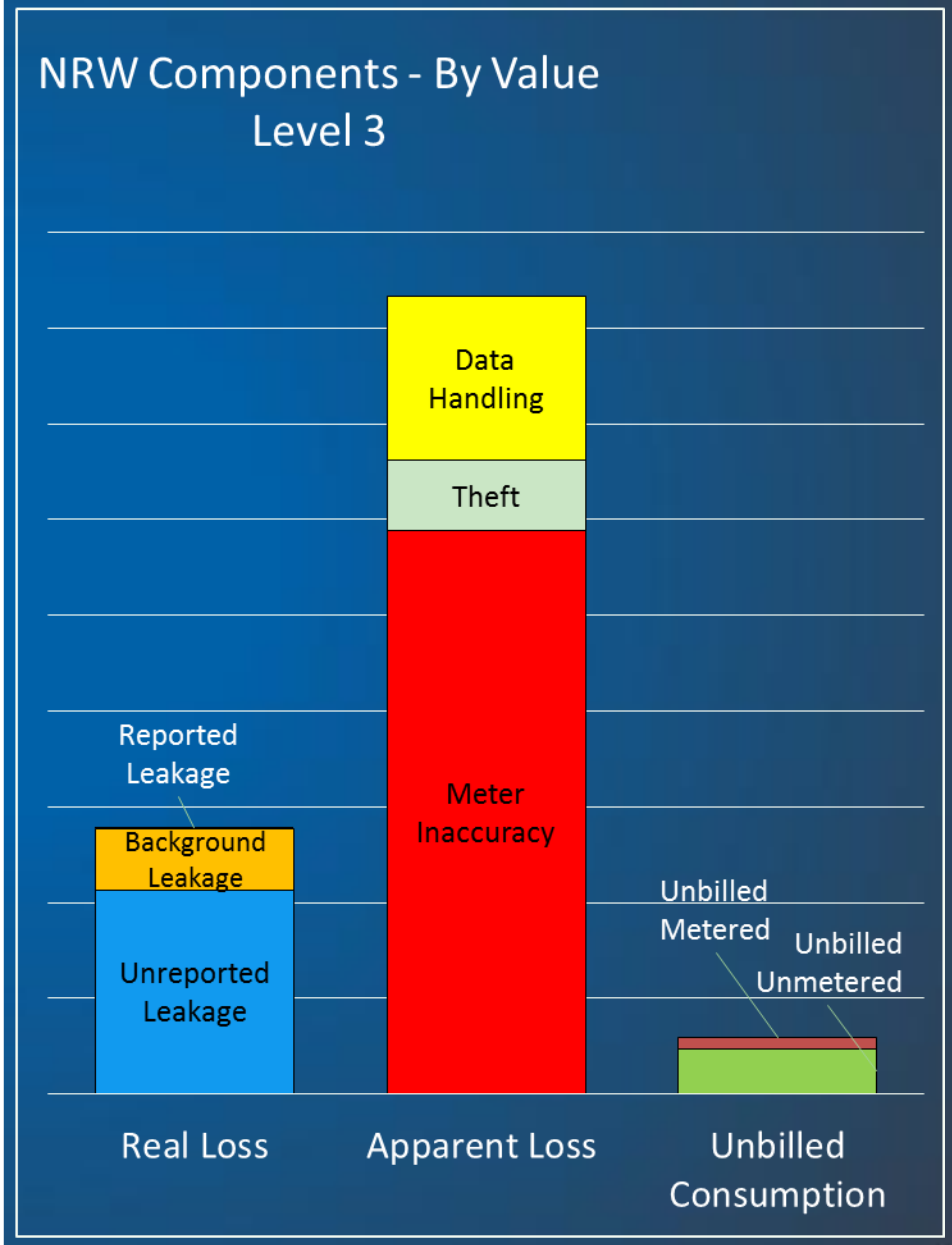
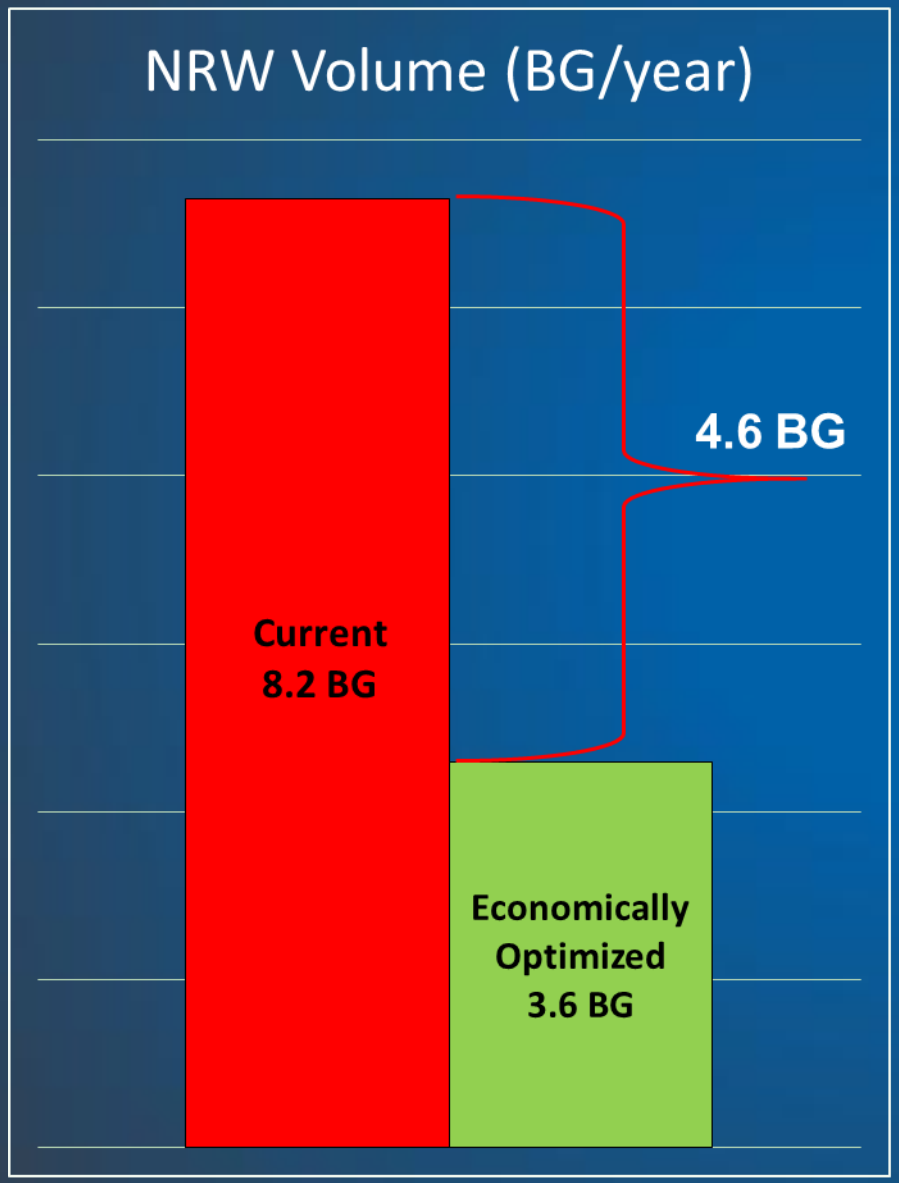


Volume



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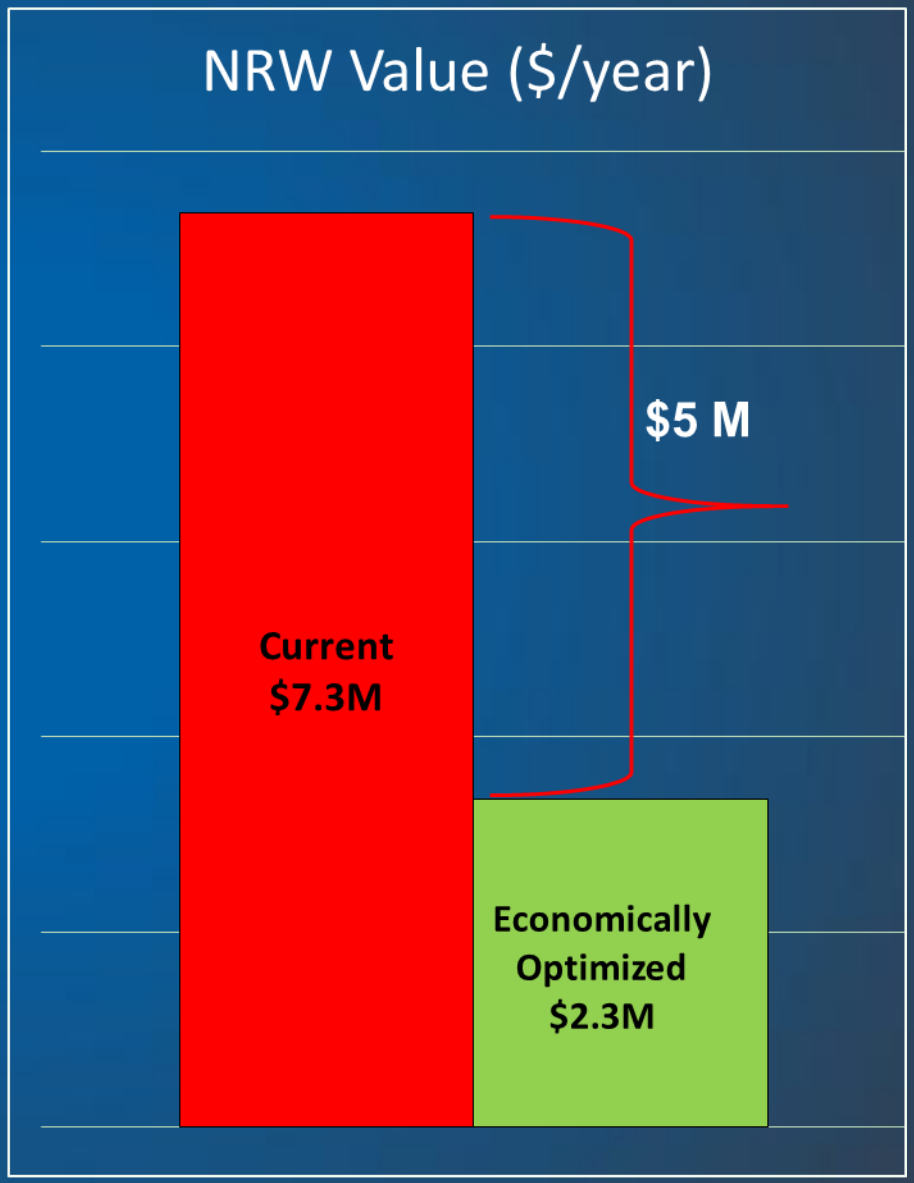

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Using DWSRF Set-aside Funds for State-wide Water Loss Initiatives

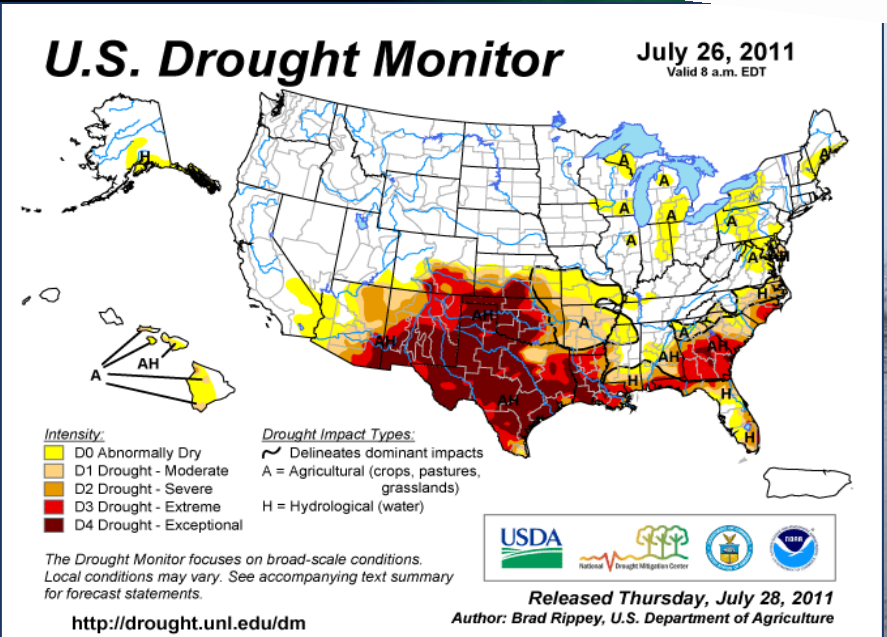
Jason Bodwell
CIFA – Fall 2015 - Tampa

November 2, 2015

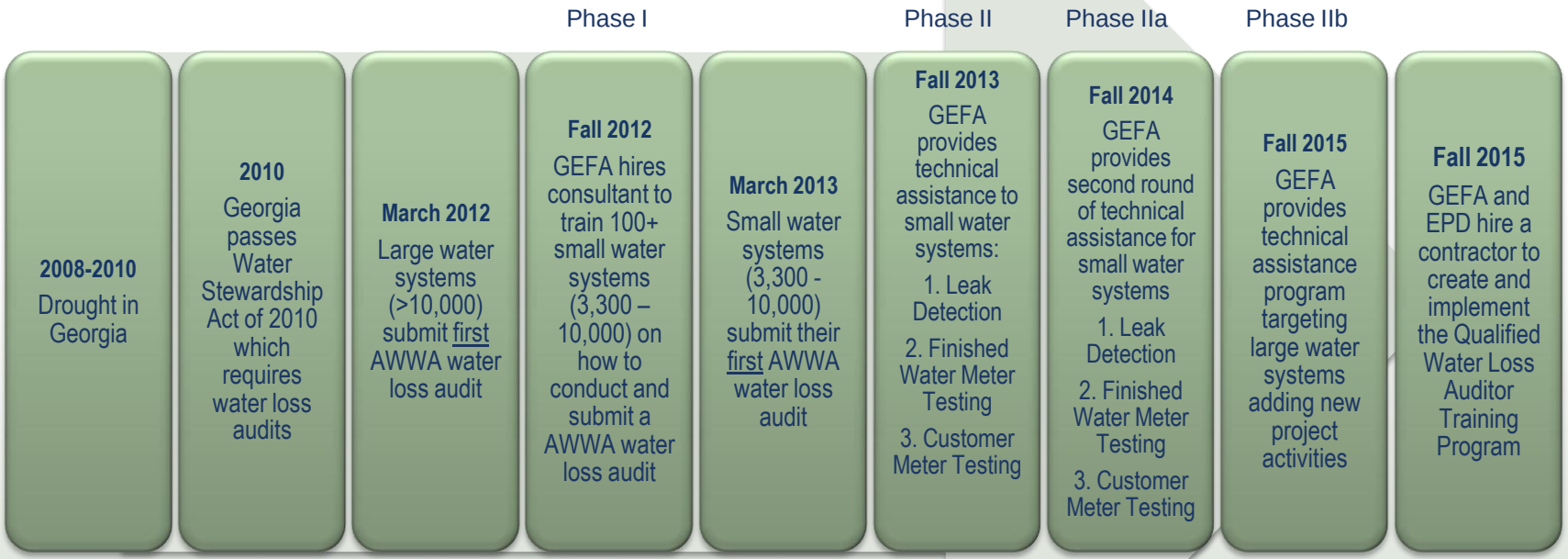
'Exceptional' drought wreaks havoc in southwest Georgia

Atlanta Expects Severe Water Restrictions Due to Drought

Historic Drought Prompts Water Wars in Normally Wet Region



Timeline of Events



Water Stewardship Act of 2010

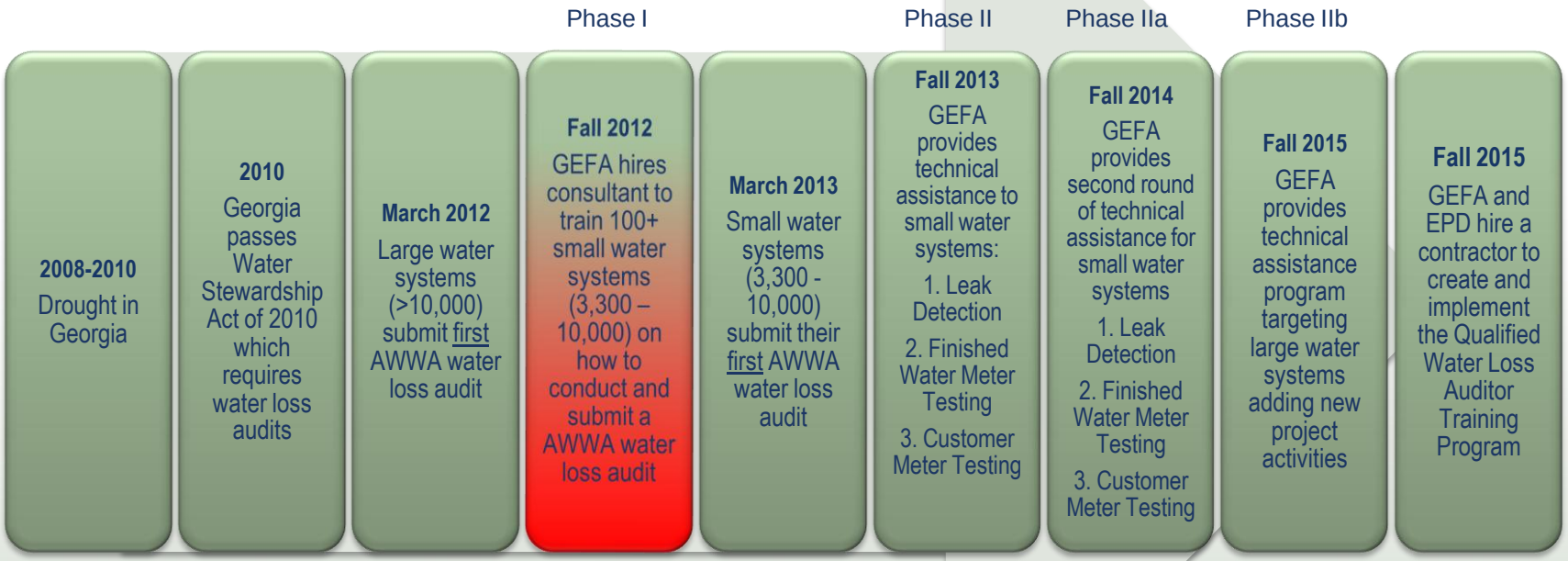
Phased approach based on service population size*:

- Systems with >10,000 population, audit due March 1, 2012 based on 2011 data
- Systems with 3,300 to 10,000 population, audit due March 1, 2013 based on 2012 data
- On going annual requirement
- Infrastructure leakage index (ILI)

Audits submitted to Georgia Environmental Protection Division and results will be posted online

*Water systems above 3,300 represent 80% of Georgia population

Timeline of Events

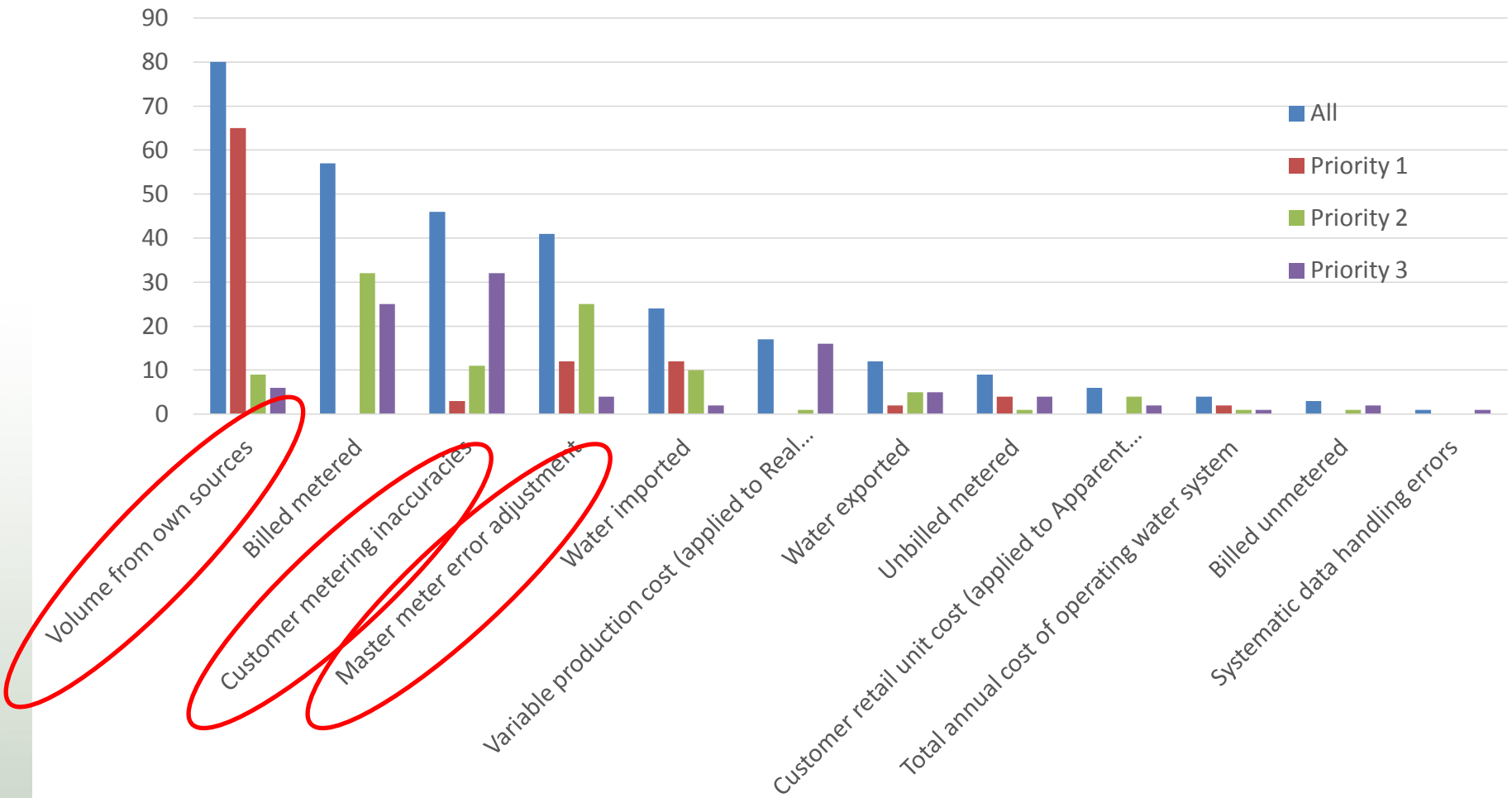


Phase	Amount Spent	Program Description	Funding Source
Phase I Training	$500,392	Small water system training (~100 systems)	Drinking Water SRF - 2% small water system set-aside

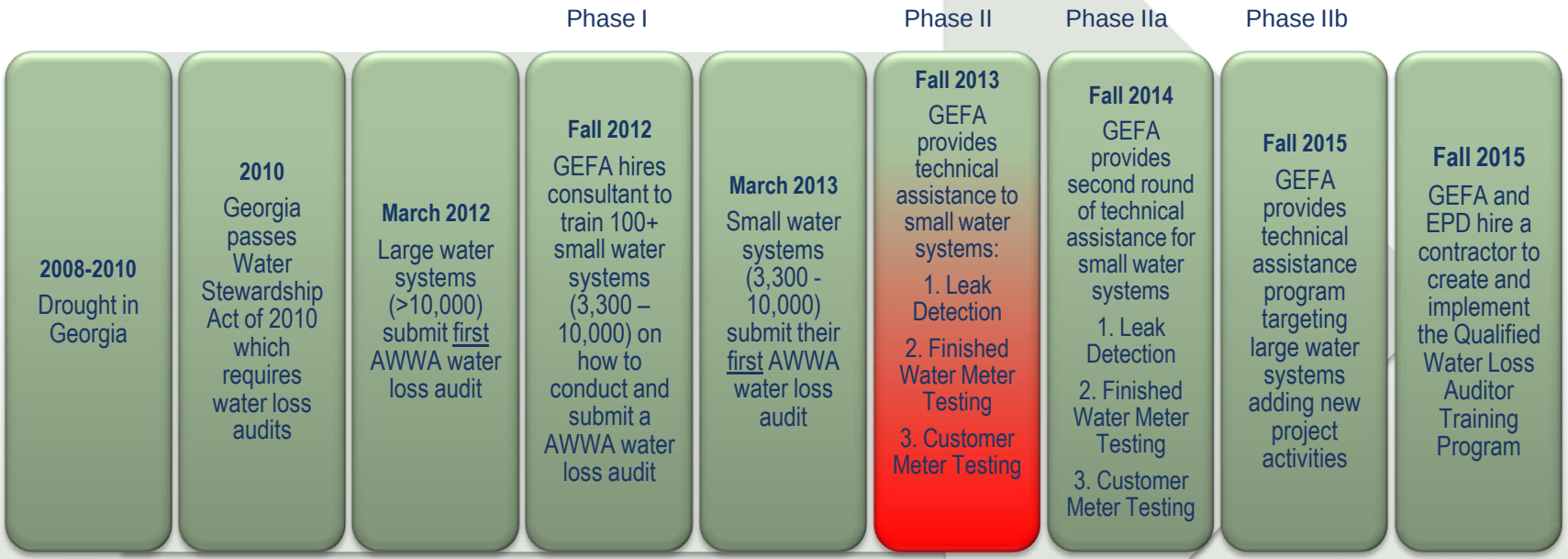
Small Water System Audit Training – Program Overview

• Webinar – kick off	June 2012
• Workshop 1: Basics	June 2012
• 2011 Practice Audit & Validation Call	July 2012
• Workshop 2: Next Steps & Momentum	August 2012
• Homework Phase	Sept – Dec 2012
• Workshop 3: Showtime for 2012 Audit	Jan-Feb 2013
• 2012 Audit Validation Call	Feb 2013
• Submittal of your 2012 Water Audit to EPD	March 2013

Small Water System Technical Assistance - All Priority Areas for Improvement



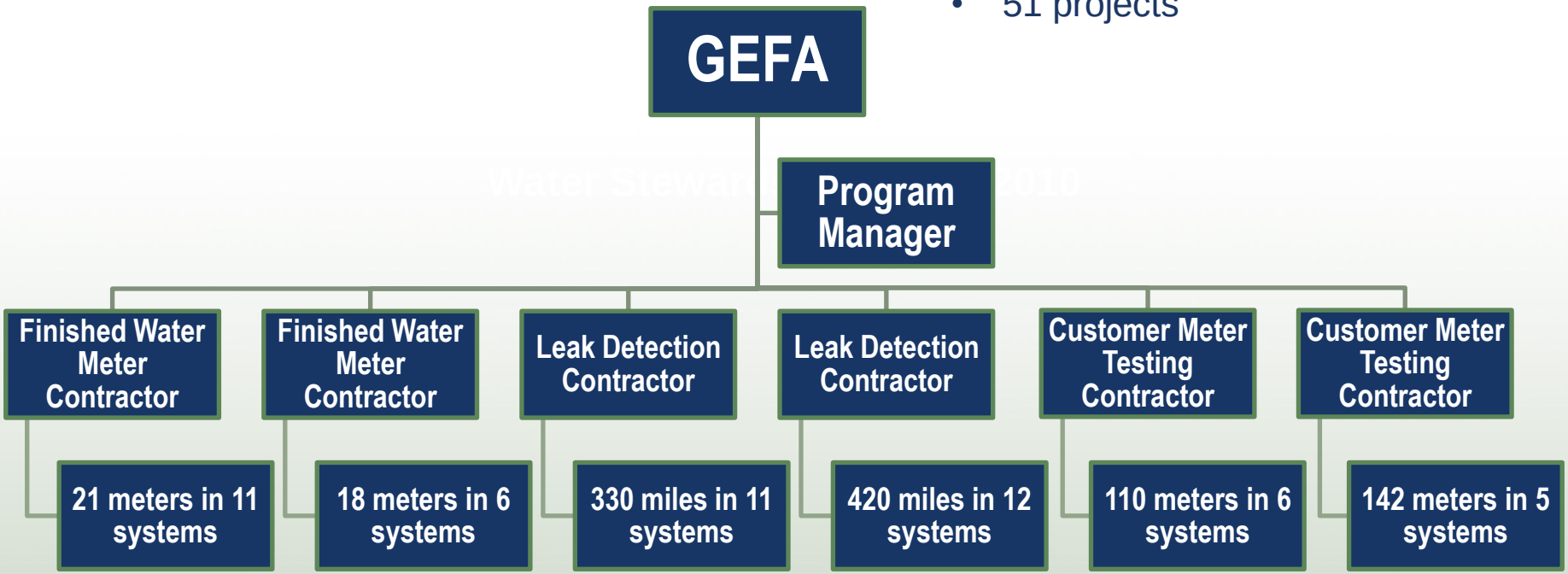
Timeline of Events



Phase	Amount Spent	Program Description	Funding Source
Phase II Technical Assistance	$494,000	Small water system technical assistance (51 systems)	Drinking Water SRF - 2% small water system set-aside

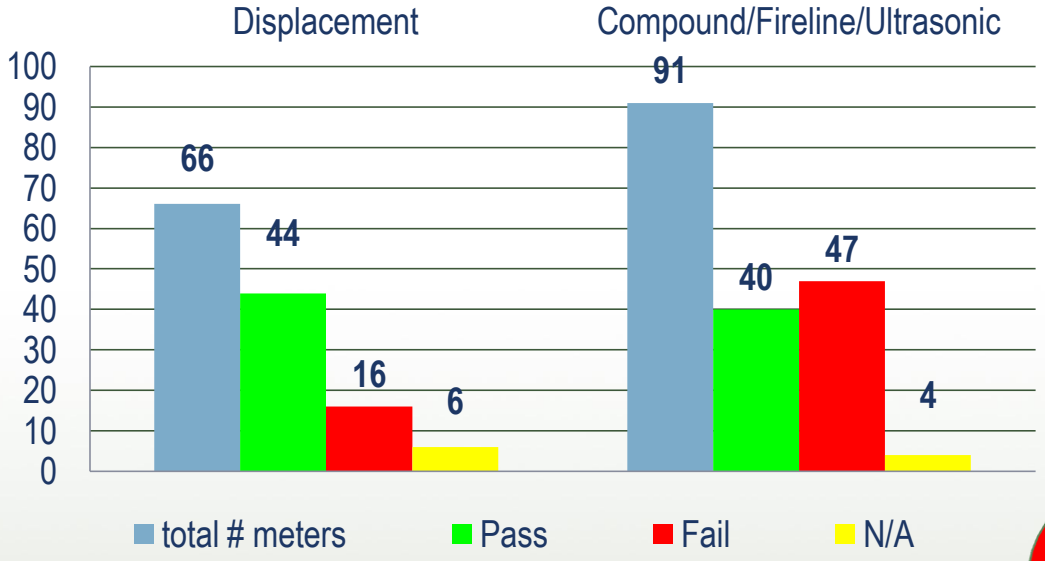
Small Water System Technical Assistance – Phase II Program Structure

- Hired two contractors per project type for negotiation purposes
- Program Manager manages the daily activities of contractors
- 51 projects

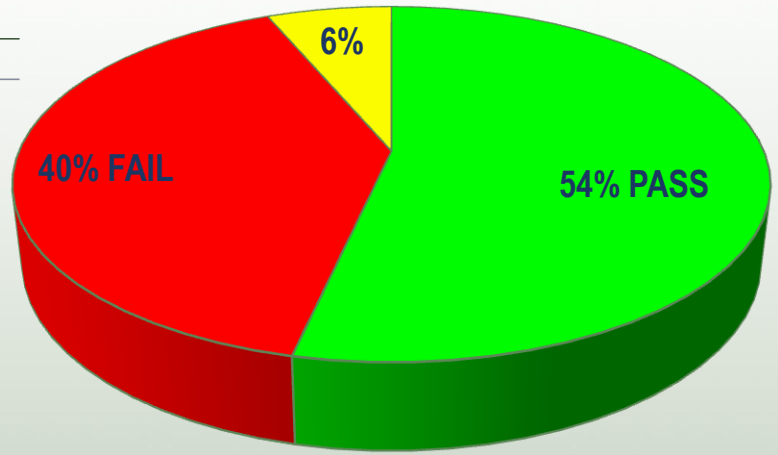


Small Water System Technical Assistance – Customer Meter Testing (CMT)

CMT Global Statistics Summary



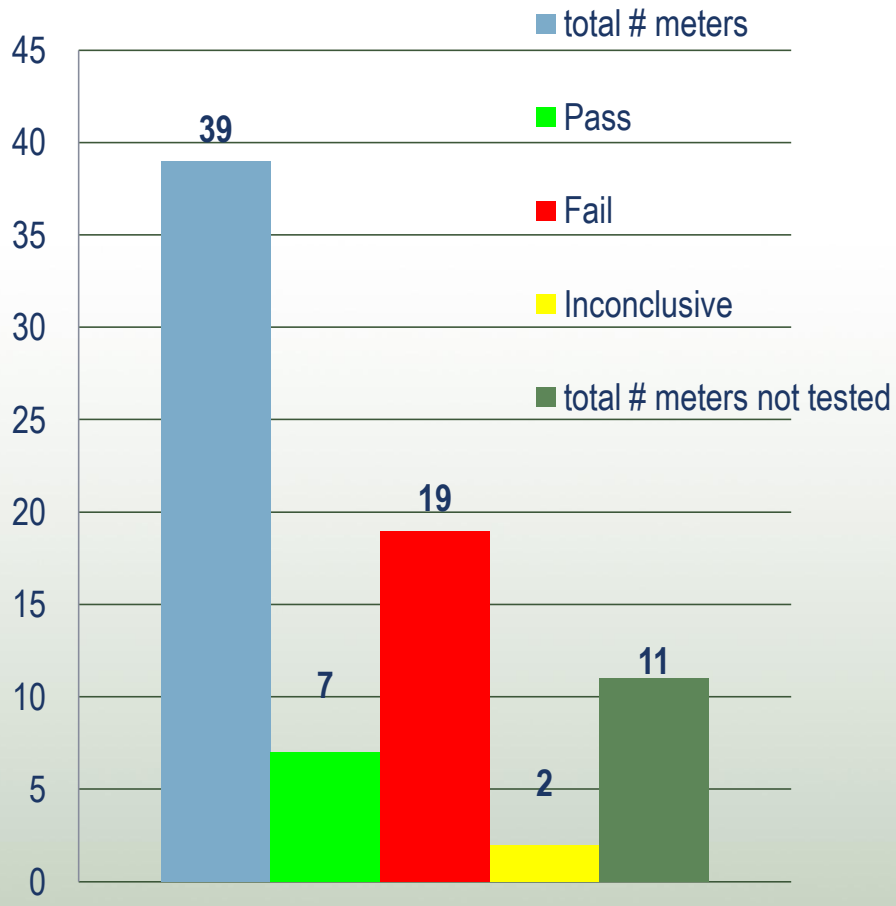
Customer Meter Testing

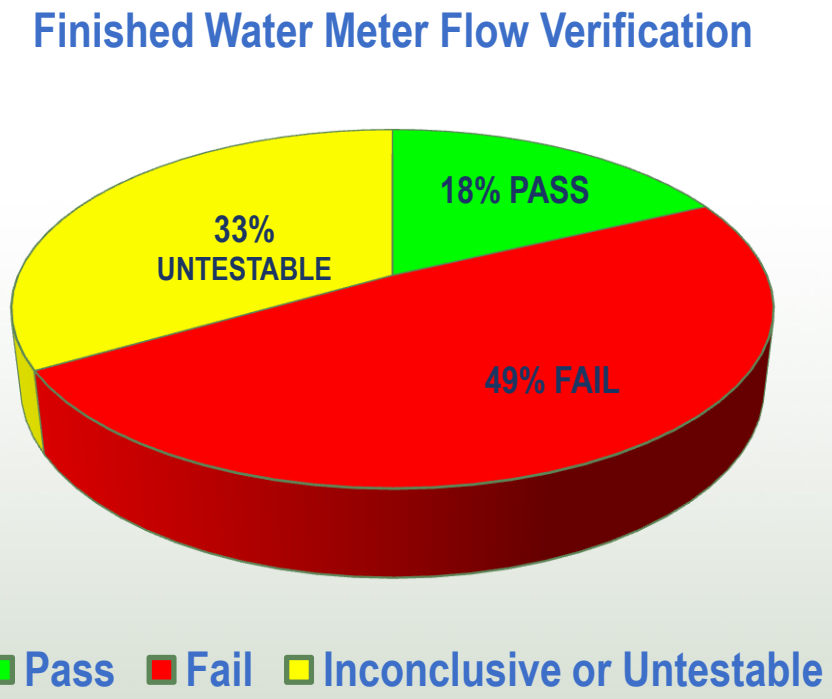


Pass Fail Inconclusive or Untestable

Small Water System Technical Assistance – Finished Water Meter Flow Verification (FWM)

FWM Global Statistics Summary





Small Water System Technical Assistance – Phase II - Project Summary

Finished Water Meter Flow Verification					
Number of Participating Water Systems	Number of Finished Water Meters tested	Number of meters passing within AWWA accuracy limits		Average inaccuracy for meters not passing within AWWA accuracy limits (%)	
17	28	7		13%	
Customer Meter Testing					
Number of Participating Water Systems	Number of Customer Meters tested	Number of meters passing within AWWA accuracy limits		Average inaccuracy for meters not passing within AWWA accuracy limits (%)	
12	147	84		24%	
Pilot Leak Detection					
Number of Participating Water Systems	Number of miles of distribution line surveyed	Number of leaks found	Annual leakage volume found (Mgal)	Annual Energy Cost Savings ($)	Annual Chemical Cost Savings ($)
23	731	118	270	35,700	67,800

Production costs include chemical and energy costs

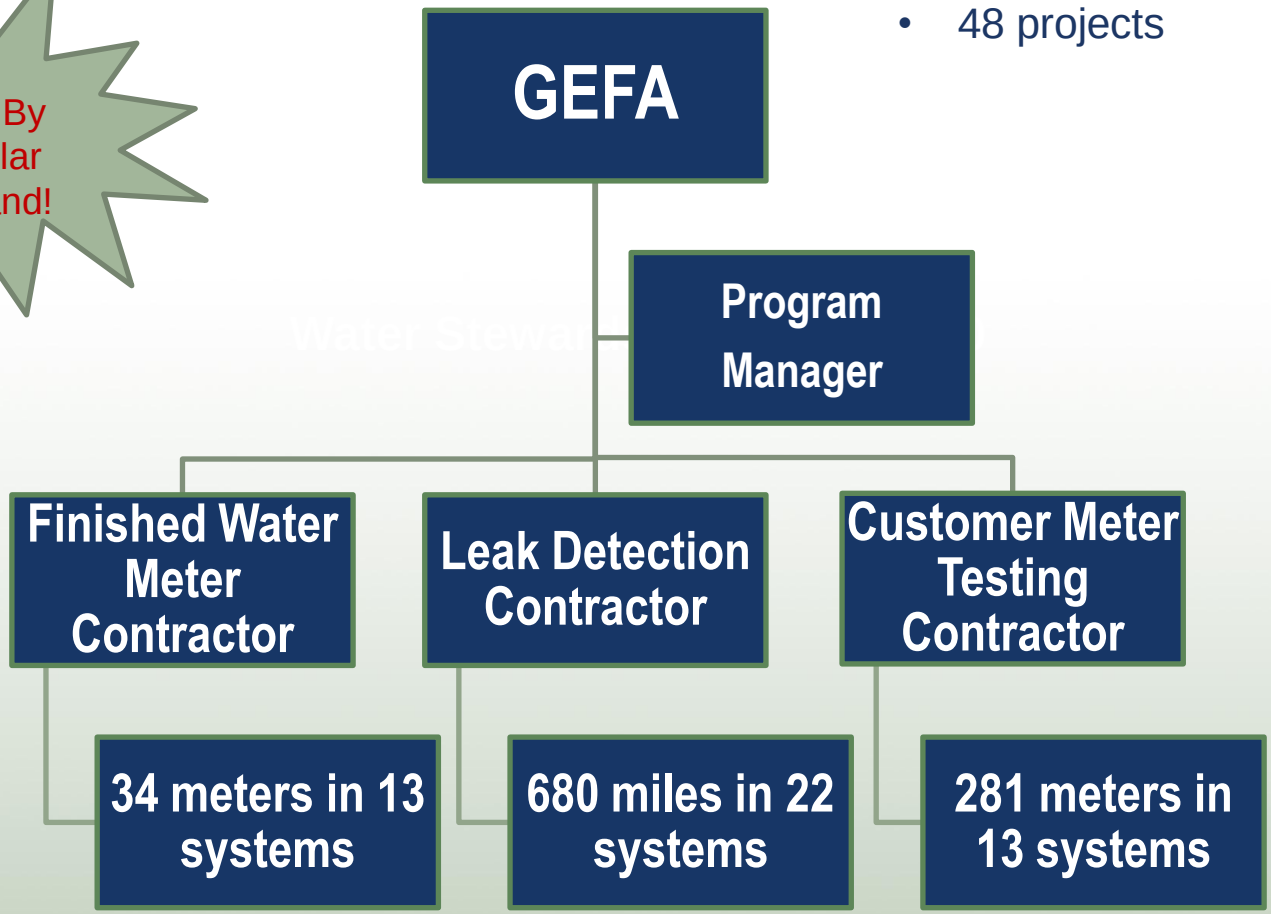
Timeline of Events

Phase	Amount Spent	Program Description	Funding Source
Phase IIa Technical Assistance	$443,970	Small water system technical assistance (47 systems)	Drinking Water SRF - 2% small water system set-aside

Small Water System Technical Assistance – Phase IIa Program Structure

- Hired one contractors per project type
- 48 projects

Back By Popular Demand!

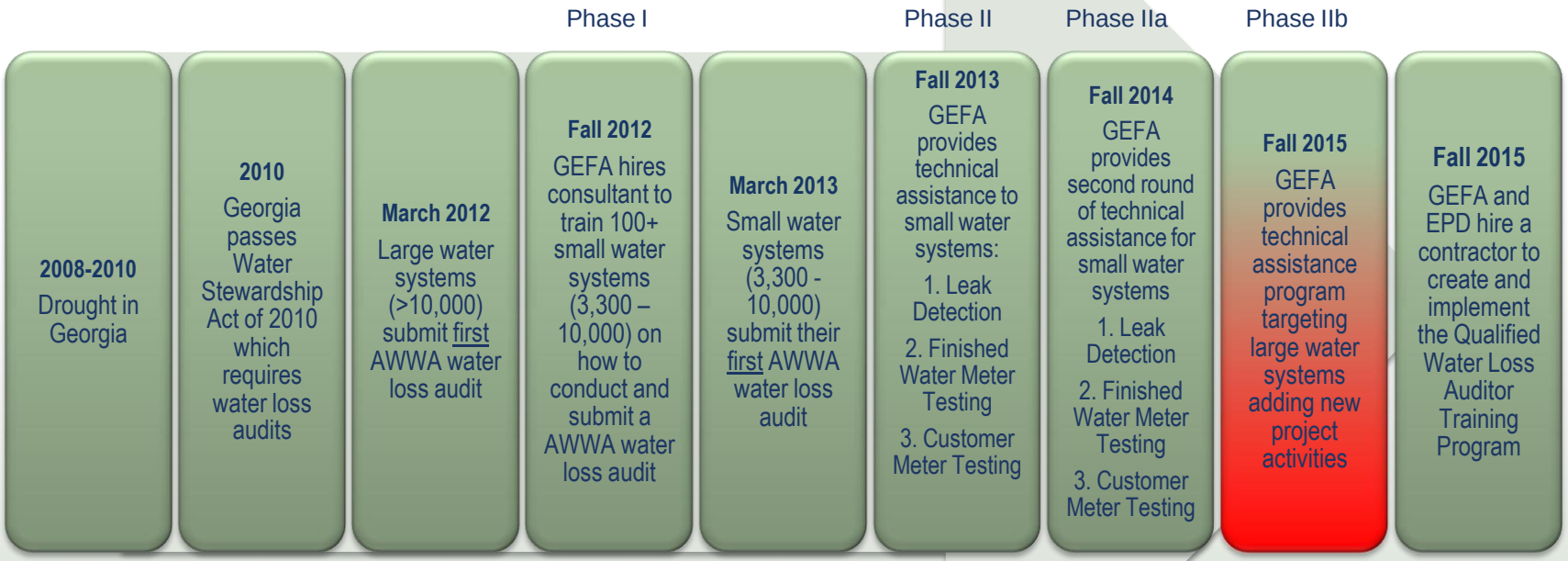


Water loss?

Small Water Systems Technical Assistance – Phase IIA Project Summary

Finished Water Meter Flow Verification				
Number of Participating Water Systems	Number of Finished Water Meters tested	Number of meters passing within AWWA accuracy limits	Average UNDER-registration of meters outside AWWA accuracy limits (%)	Average OVER-registration of meters outside AWWA accuracy limits (%)
12	25	8	20%	15%
Customer Meter Testing				
Number of Participating Water Systems	Number of Customer Meters tested	Number of meters passing within AWWA accuracy limits	Average UNDER-registration of meters outside AWWA accuracy limits (%)	Total annual revenue loss from discovered meter under-registration ($)
13	143	83	20%	$35,700
Pilot Leak Detection				
Number of Participating Water Systems	Number of miles of distribution line surveyed	Number of leaks found	Annual leakage volume found (Mgal)	Total annual energy and chemical cost savings from discovered leakage ($)
22	689	211	529	$388,988

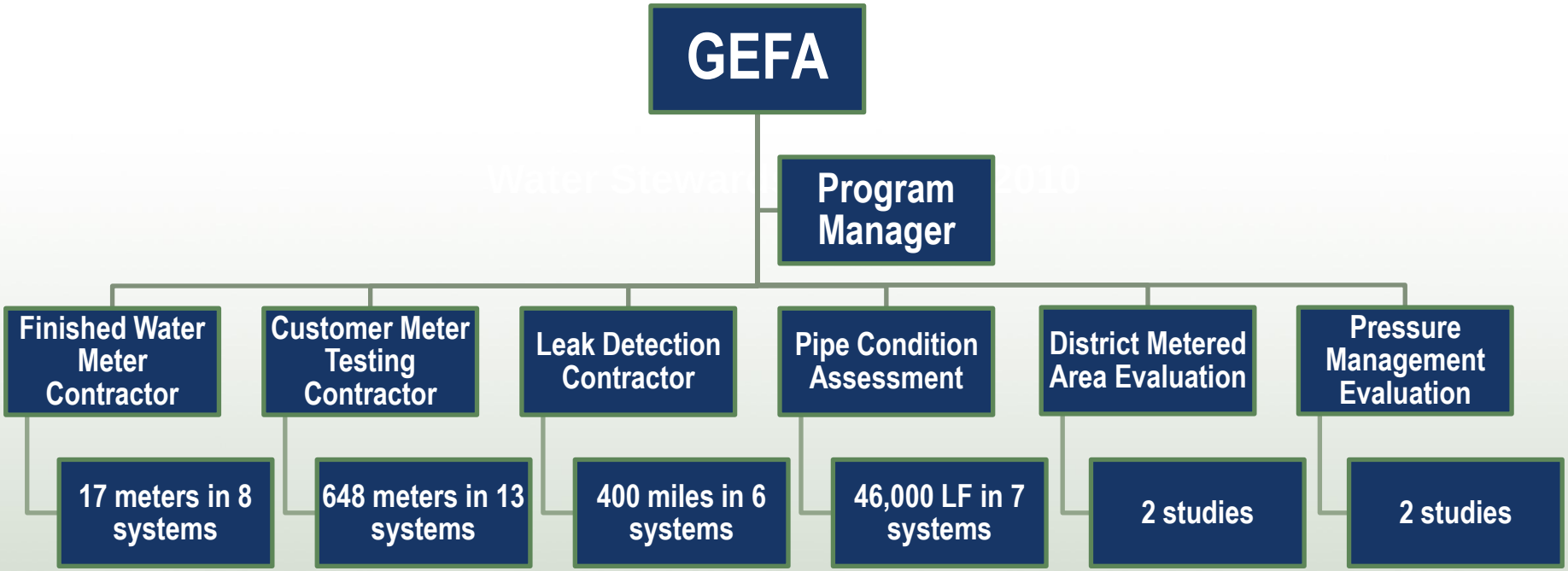
Timeline of Events



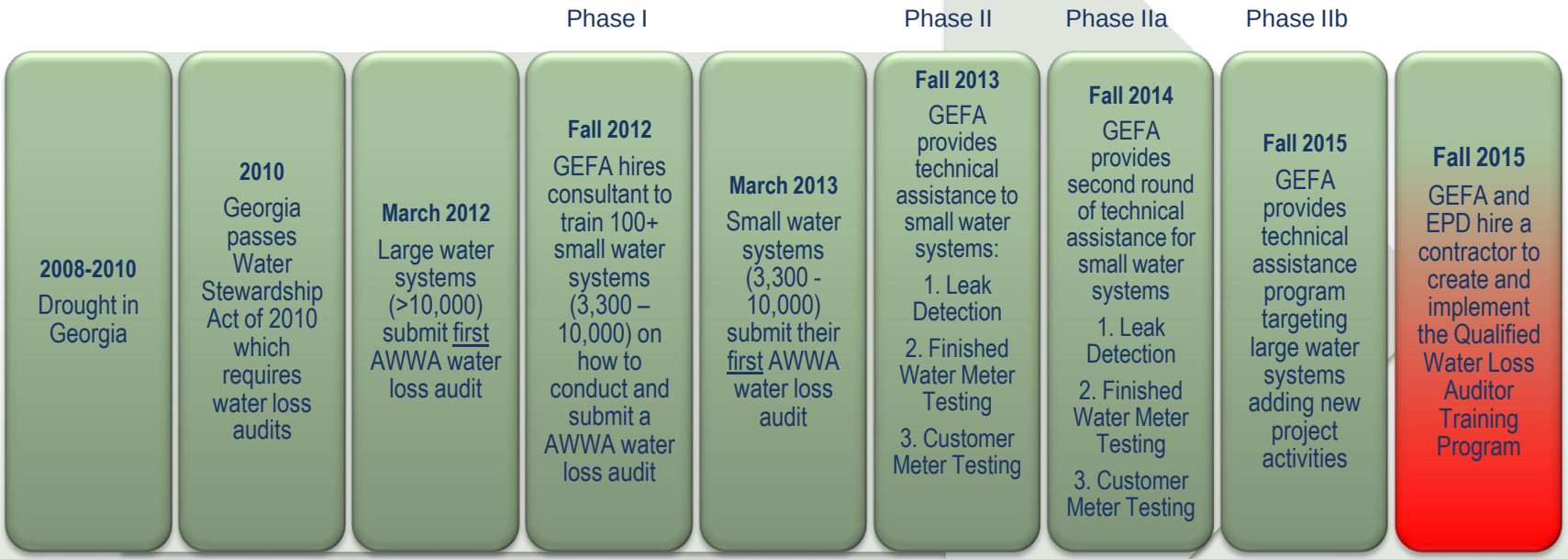
Phase	Amount Spent	Program Description	Funding Source
Phase IIb Technical Assistance	~$1,000,000	Large water system technical assistance (38 systems)	Drinking Water SRF fees

Large Water System Technical Assistance – Phase IIb Program Structure

- Program Manager manages the daily activities of contractors
- 38 projects
- New project types



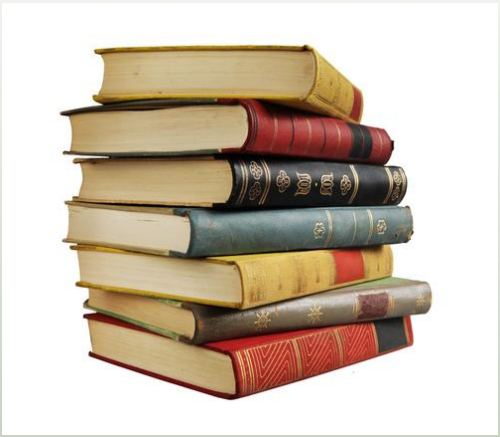
Timeline of Events



Phase	Amount Spent	Program Description	Funding Source
Water Loss Audit Quality Control Training Program	~$214,500	Design and implementation of a Water Loss Audit Quality Control Training Program	Drinking Water SRF fees

Water Loss Curriculum

- All water loss audits submitted must contain a certification statement.
- Certification statement must be signed by a Qualified Water Loss Auditor
- A Qualified Water Loss Auditor must pass a test to demonstrate understanding of quality control process
- Curriculum and courses designed and implemented by private contractor
- Curriculum and courses continued into the future by state-wide associations



Water Supply Efficiency Improvements

Each public water system shall:

1. Develop and conduct a water loss control program to improve water supply efficiency
2. Establish individual goals to measure and improve water supply efficiency
3. Make progress toward improving water supply efficiency

Total Program Funding

Phase	Amount	Program Description	Funding Source
Phase I Training	$500,392	Small water system training (~100 systems)	Drinking Water SRF – 2% small water system set-aside
Phase II Technical Assistance	$494,000	Small water system technical assistance (51 systems)	Drinking Water SRF – 2% small water system set-aside
Validation Round 1	$110,000	2011 large water system validation (107 audits)	Drinking Water SRF – 15% Local Assistance set-aside
Phase IIa Technical Assistance	$443,970	Small water system technical assistance (47 systems)	Drinking Water SRF – 2% small water system set-aside
Validation Round 2	$340,860	2013 small water system validation 2012 & 2013 large water system validation (358 audits)	Drinking Water SRF fee money
Phase IIb Technical Assistance	~$1,000,000	Large water system technical assistance (38 systems)	Drinking Water SRF fee money
Water Loss Audit Quality Control Training Program	~$214,500	Design and implementation of a Water Loss Audit Quality Control Training Program	Drinking Water SRF fee money
	$3,103,722		

Replicating Success

- Passage of state-wide legislation
- Legislation includes transparency through on-line posting
- Create a solid state-level team:
  - Quality contractor
  - Funding entity
  - Regulatory entity
- Focus on providing a quality service/product
- Free technical assistance will result in quality SRF projects
- Not just a regulatory requirement, but a proper business practice
- Reduction in apparent losses = increased revenues = greater likelihood to repayment SRF loans
- Focus on the wide range of set-aside activities

Statewide Water Loss Management Program – Model Implementation

Phase 1

Establish Annual M36 Water Auditing

Auditing

Establish annual M36 Water Auditing for all utilities

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 (funded)

Phase 2

Achieve Minimum Standard of Audit Reliability

Data Manage-ment

Develop and implement data management system

Establish posting system and communication protocols

Validation

Establish minimum standards of validation for quality assurance

Determine by Agency or 3rd Party

Establish validation program until certification program is in place

Certification

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

Statewide Water Loss Control Committee provides support

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

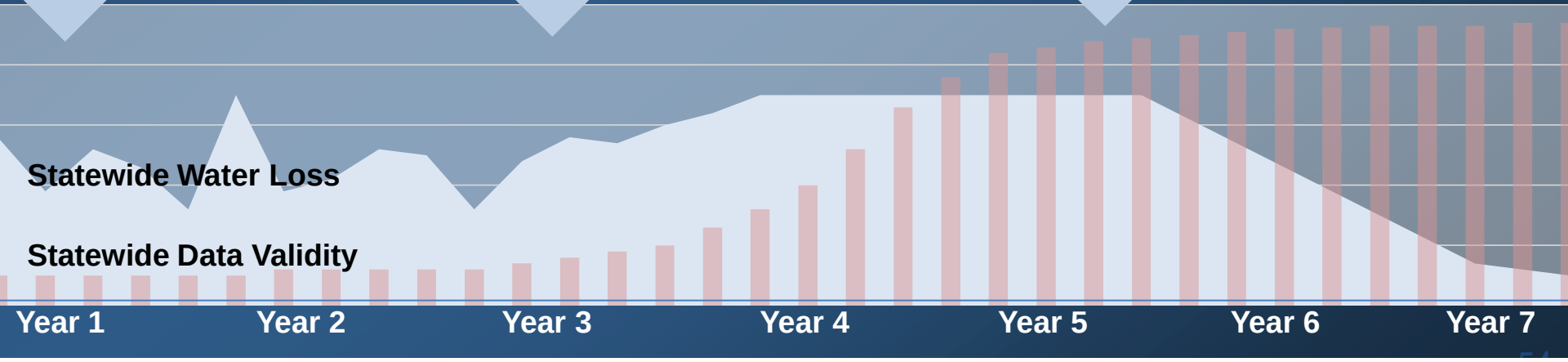
No universal targets

Excessive thresholds established

Improvement

Annual audit submission threshold exceedances

System specific progress review at designated regulatory touchpoints



Resource Management Grade C Resource Management Grade B Resource Management Grade A

AWWA Free Water Audit Software

American Water Works Association

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

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

Click to access definition
Click to add a comment

Water Audit Report for: Northern San Leandro Combined Water Sewer Storm Utility District (0007900)
Reporting Year: 2013 1/2013 - 12/2013

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: MILLION GALLONS (US) 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 it.

Master Meter Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ----------> Pcnt: Value:

Volume from own sources:	5	1,000.000	MG/Yr	1		○ ◉	100.000	MG/Yr
Water imported:	1		MG/Yr			◉ ○		MG/Yr
Water exported:	1	100.000	MG/Yr	9		○ ◉	25.000	MG/Yr

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

WATER SUPPLIED: 825.000 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

Pcnt: Value:

Billed metered:	8	700.000	MG/Yr			
Billed unmetered:	9	50.000	MG/Yr			
Unbilled metered:			MG/Yr			
Unbilled unmetered:		10.313	MG/Yr	1.25%	◉ ○	MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 760.313 MG/Yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 64.688 MG/Yr

Apparent Losses

Pcnt: Value:

Unauthorized consumption:	10	3.000	MG/Yr		○ ◉	3.000 MG/Yr

Unauthorized consumption volume entered is greater than the recommended default value

Customer metering inaccuracies:	5	7.071	MG/Yr	1.00%	◉ ○	MG/Yr
Systematic data handling errors:	4	5.000	MG/Yr		○ ◉	5.000 MG/Yr

Apparent Losses: 15.071 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 49.617 MG/Yr

WATER LOSSES: 64.688 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 75.000 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	7	100.0	miles
Number of active AND inactive service connections:	6	1,000	
Service connection density:		10	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

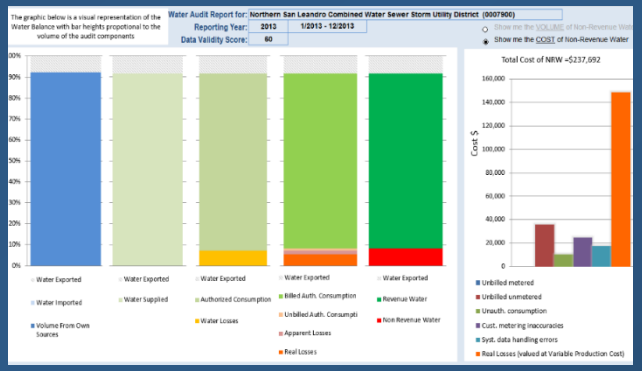
Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 6 60.0 psi

COST DATA

Total annual cost of operating water system:	5	$1,000,000	$/Year	
Customer retail unit cost (applied to Apparent Losses):	7	$3.50	$/1000 gallons (US)	
Variable production cost (applied to Real Losses):	7	$3,000.00	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses



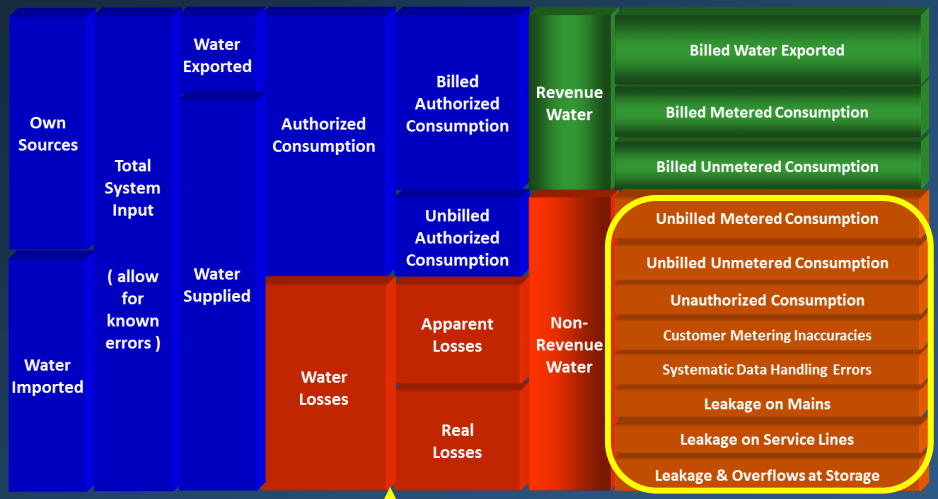
Industry Standard (M36)

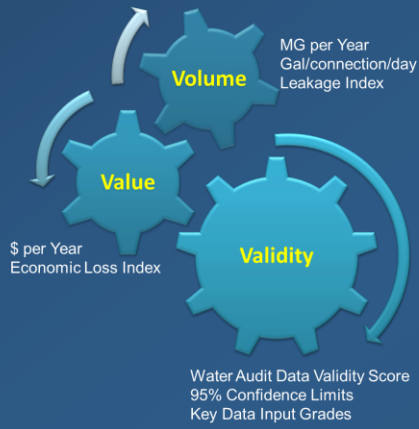
Free

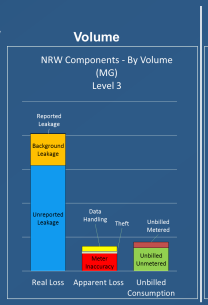
Defaults provided

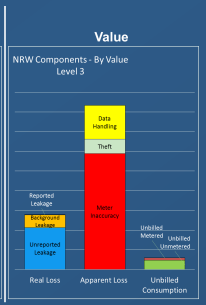
~10 Volume Inputs
~7 System Data Inputs

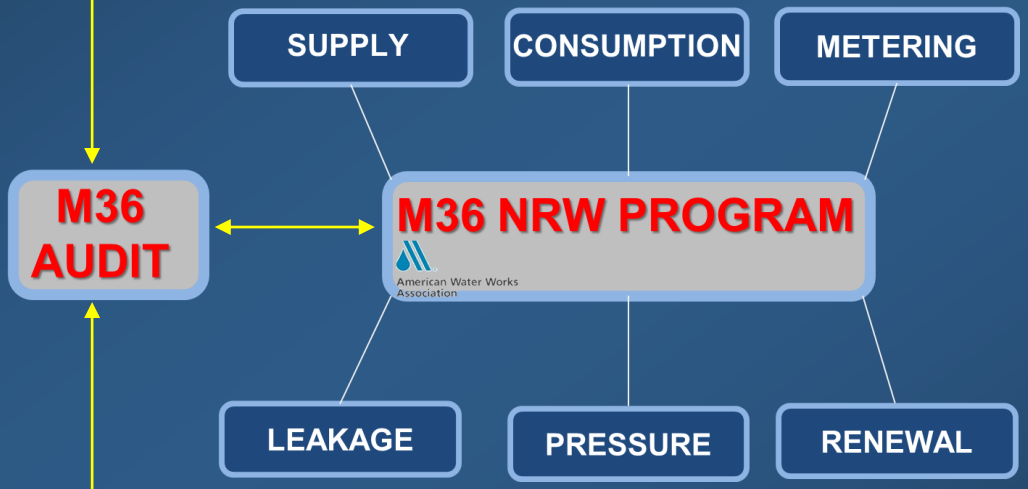
awwa.org/waterlosscontrol

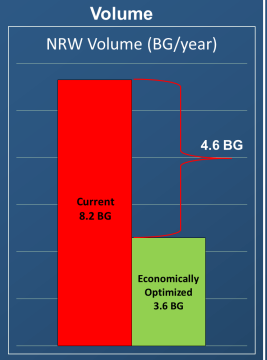

Own Sources
Water Imported
Total System Input
(allow for known errors)
Water Exported
Water Supplied
Authorized Consumption
Water Losses
Billed Authorized Consumption
Unbilled Authorized Consumption
Apparent Losses
Real Losses
Revenue Water
Non-Revenue Water
Billed Water Exported
Billed Metered Consumption
Billed Unmetered Consumption
Unbilled Metered Consumption
Unbilled Unmetered Consumption
Unauthorized Consumption
Customer Metering Inaccuracies
Systematic Data Handling Errors
Leakage on Mains
Leakage on Service Lines
Leakage & Overflows at Storage

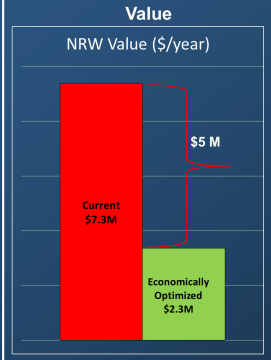

Volume
Value
Validity
MG per Year
Gal/connection/day
Leakage Index
$ per Year
Economic Loss Index
Water Audit Data Validity Score
95% Confidence Limits
Key Data Input Grades

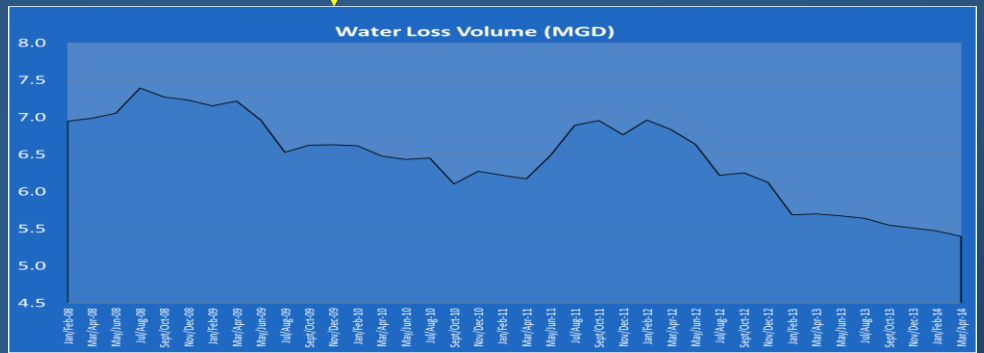

Volume
NRW Components - By Volume (MG) Level 3
Real Loss
Apparent Loss
Unbilled Consumption


Value
NRW Components - By Value Level 3
Real Loss
Apparent Loss
Unbilled Consumption


SUPPLY
CONSUMPTION
METERING
M36 AUDIT
M36 NRW PROGRAM
American Water Works Association
LEAKAGE
PRESSURE
RENEWAL


Volume
NRW Volume (BG/year)
Current 8.2 BG
4.6 BG
Economically Optimized 3.6 BG


Value
NRW Value ($/year)
Current $7.3M
$5 M
Economically Optimized $2.3M


Water Loss Volume (MGD)
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5

Utility Feedback: Discoveries

"Massive amounts of "unbilled" usage"

"Found accounts being metered and billed in different units (gallons vs. CCF)"

"Discovered production numbers were significantly off, even though they were "calibrating" the production meters"

"Water meters are our cash registers and our cash registers need to be functioning properly"

Utility Feedback:
Some of the Biggest Surprises

"Apparent vs Real Loss - didn't realize how much could be lost through faulty meters."

"Amount of money we do not collect"

"Impact of water loss on finances"

"The more money/water we find, the less we may need to borrow for capital projects"

"Performing the audit was easier than we originally thought."

Validation Levels Descriptions

Level	Descriptor	Validation Focus	What's involved	Outcome	Depends on
1	Top down score review validation	Data grades, data validity score, gross errors and anomalies in the metrics	Desktop review of what is immediately available. 1 to 2 hour phone call to interview utility staff, preparatory and documentation time. Interview questions are focused on practices to make sure the data grades have been applied correctly and consistently. Through this discussion, anomalies are discussed and either confirmed, corrected, or noted for needing further investigation.	Validation interview form documenting the call, including any recommendations from the validation expert.	System size & complexity
2	Top down data mining validation	Supply and consumption volumes from existing data that is mined	Data mining for limited desktop analysis. Analysis of available data, including production database and reports from SCADA system to identify gaps in the data chain. Data mining in the billing system to confirm and cleanse consumption volumes to remove redundancies from the data mining process which can come about from record duplications. Also validates exclusion of non-potable volumes in the	Technical Memo with findings and recommendations	Complexity of supply setup, metering setup and billing setup. Can limit scope to just look at 1 of the 3 between

Level 1 – Top Down Score Review Validation

Level	Descriptor	Validation Focus	What's involved
1	Top down score review validation	Data grades, data validity score, gross errors and anomalies in the metrics	Desktop review of what is immediately available. 1 to 2 hour phone call to interview utility staff, preparatory and documentation time. Interview questions are focused on practices to make sure the data grades have been applied correctly and consistently. Through this discussion, anomalies are discussed and either confirmed, corrected, or noted for needing further investigation.

Outcome	Depends on
Validation interview form documenting the call, including any recommendations from the validation expert.	System size & complexity

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.
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+ Click to add a comment

Water Audit Report for: Northern San Leandro Combined Water Sewer Storm Utility District (0007900)
Reporting Year: 2013 (1/2013 - 12/2013)

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: MILLION GALLONS (US) 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 it.

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ----------> Master Meter Error Adjustments

			Pcnt:	Value:	
Volume from own sources:	5	1,000.000 MG/Yr	1	100.000	MG/Yr
Water imported:		MG/Yr			MG/Yr
Water exported:	1	100.000 MG/Yr	1	25.000	MG/Yr

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

WATER SUPPLIED: 825.000 MG/Yr

AUTHORIZED CONSUMPTION

			Pcnt:	Value:	
Billed metered:	8	700.000 MG/Yr			
Billed unmetered:	9	50.000 MG/Yr			
Unbilled metered:		MG/Yr			
Unbilled unmetered:		10.313 MG/Yr	1.25%		MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 760.313 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

64.688 MG/Yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		2.063 MG/Yr	0.25%		MG/Yr
Customer metering inaccuracies:	5	22.767 MG/Yr	3.15%		MG/Yr
Systematic data handling errors:		1.750 MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 26.580 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 38.108 MG/Yr

WATER LOSSES: 64.688 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 75.000 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Water Supplied

data grading for each input, determine the highest grade where
eets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

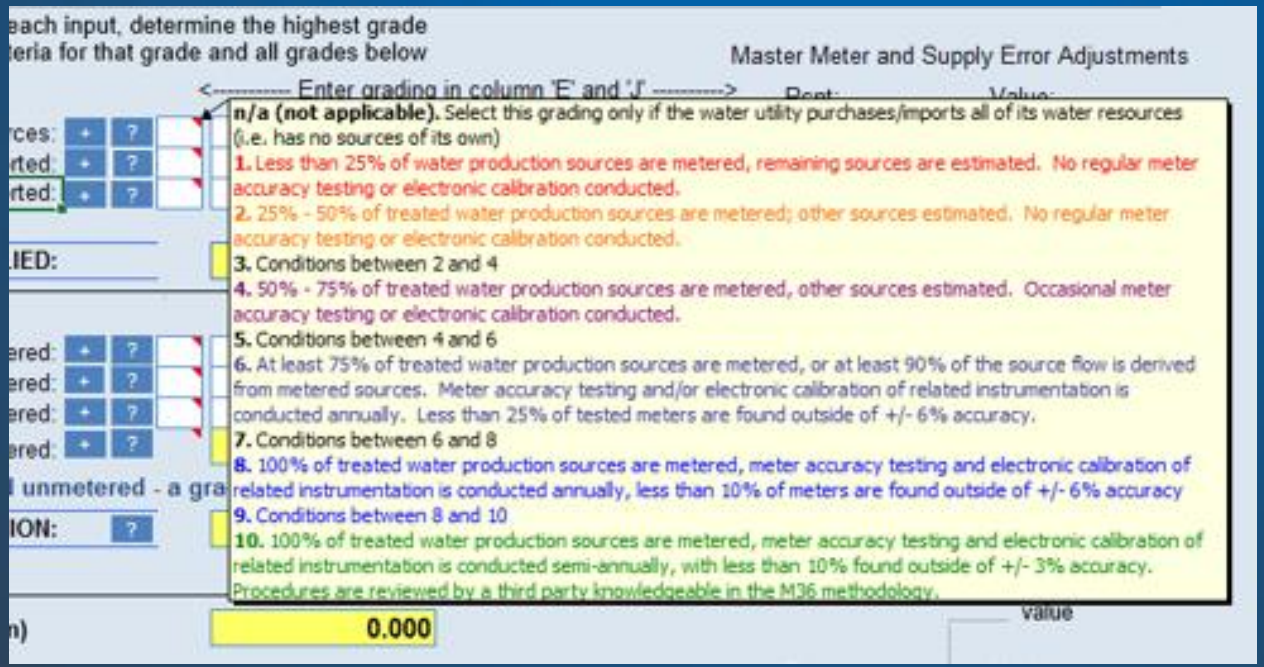
Master Meter Error Adjustments

							Pcnt:	Value:	
Volume from own sources:	+ ?	5	1,000.000	MG/Yr	+ ?	1		100.000	MG/Yr
Water imported:	+ ?			MG/Yr	+ ?				MG/Yr
Water exported:	+ ?	1	100.000	MG/Yr	+ ?	9		25.000	MG/Yr

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

WATER SUPPLIED: **825.000** MG/Yr

Data Validity



Form Source: AWWA Water Loss Control Committee
EPD Large Systems 2011 Water Audit Validation

2011 Audit Validation Call Document

Telephone Interview Date	EPD Team Member(s)
Nov 7, 2012 – 10am	Steve Cavanaugh

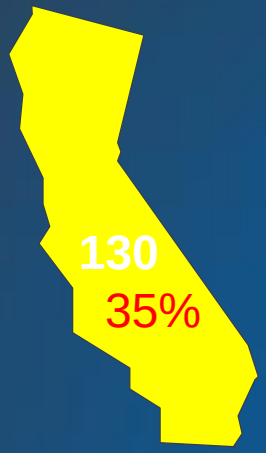
Variable production cost	$1,720.00	8	He calculated it by taking total cost budgeted number and divided by pumped water. We discussed the need to only include chemicals and power. His original calculation was for all costs divided by the gallons pumped. We made correction while on the phone. Calculation is: (Well power = $270,303.87 + Chemical – $35,941.30/(Gallons Produced – 1,220MGal) = $251.02/MGal	$251.02	4

Additional Comments:

At the end of the audit we discussed the fact that the ILI is lower than 1 and that it should not be. I told him that based on what I saw, I anticipated that the fact that he was not testing his well meters in 2011 likely meant that the volume from own sources was under recording. He agreed and said that the testing was proving that out. We also discussed how to put this in as an under registration in his 2013 audit. Excellent conversation, very proactive and stated that he learned quite a bit during the call. I shared that he has solid opportunity for improvement and the testing of meters is a very proactive step. Great call with Danny – he has a strong desire to manage the utility resources and is proactive.

Final Water Audit Data Validity Score (from revisions recommended by EPD Team Member):	Final Infrastructure Leakage Index (from revisions recommended by EPD Team Member):
48	**0.46**

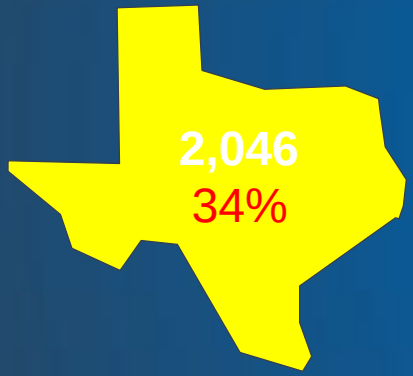
Critical Importance of Validation



California

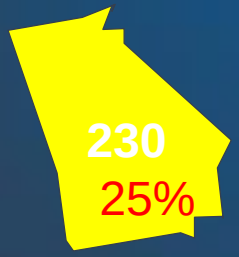
Table 2.6
CUWCC BMP 1.2 – 2010 Water Audit Data Set Validation Steps

	Count	Percentage
Number of Utilities Reporting Water Audit Result	130	100%
Number of Utilities Reporting Negative Water Losses	5	4%
Number of Utilities Reporting ILI<1	36	28%
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	85	65%



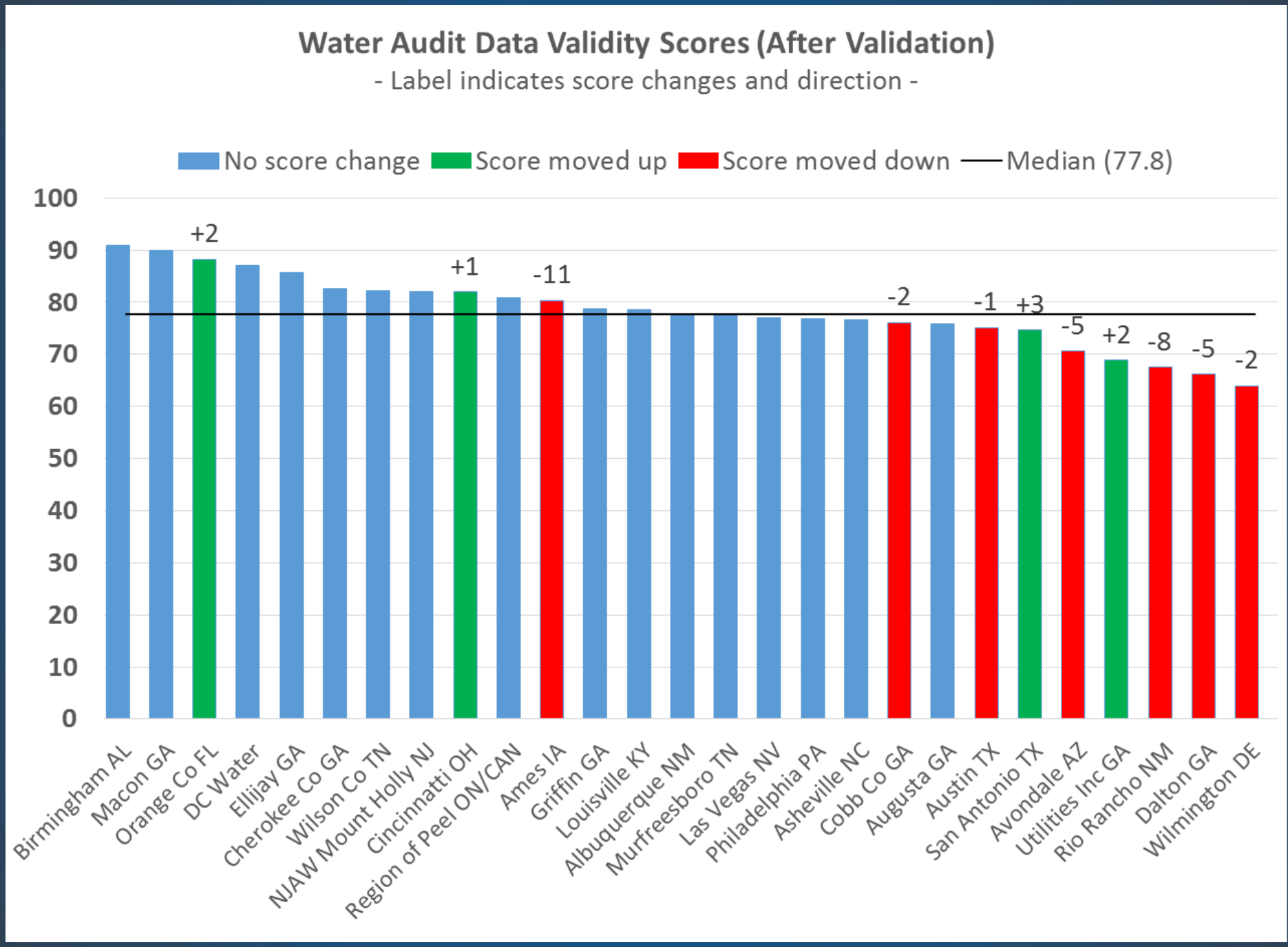
Texas

Item Number	Detail	Number of Audits
	Working from initial database, including 2,046 utilities	
6A	Zero Water Supplied	115
6B	Negative System input volume	1
6C	Negative cost of Real Losses	132
6D	Negative cost of Apparent Loss	4
6E	Negative real loss volume	8
6F	ILI <0.5	430



Georgia:

Database of 230 Utilities	Number of Audits (est)
Erroneous Units	15
Negative Water Supplied	4
Negative Water Loss	6
>100% Water Loss	3
ILI <0.5	30


Water Audit Data Validity Scores (After Validation)
- Label indicates score changes and direction -
No score change
Score moved up
Score moved down
Median (77.8)
100
90
80
70
60
50
40
30
20
10
0
+2
+1
-11
-2
-1
+3
-5
+2
-8
-5
-2
Birmingham AL
Macon GA
Orange Co FL
DC Water
Ellijay GA
Cherokee Co GA
Wilson Co TN
NJAW Mount Holly NJ
Cincinnatti OH
Region of Peel ON/CAN
Ames IA
Griffin GA
Louisville KY
Albuquerque NM
Murfreesboro TN
Las Vegas NV
Philadelphia PA
Asheville NC
Cobb Co GA
Augusta GA
Austin TX
San Antonio TX
Avondale AZ
Utilities Inc GA
Rio Rancho NM
Dalton GA
Wilmington DE

Validation Levels Descriptions

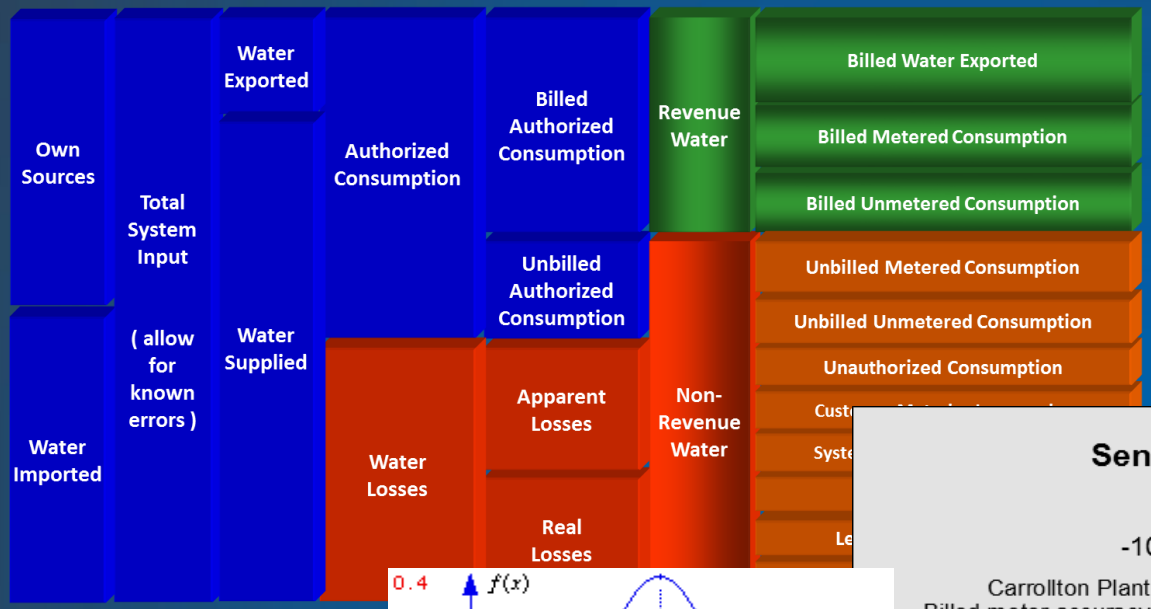
Level	Descriptor	Validation Focus	What's involved	Outcome	Depends on
1	Top down score review	Data grades, data validity score, gross errors and anomalies in the metrics	Desktop review of what is immediately available. 1 to 2 hour phone call to interview utility staff, preparatory and documentation time. Interview questions are focused on practices to	Validation interview form documenting the call, including any recommendations from the	System size & complexity
2	Top down data mining validation	Supply and consumption volumes from existing data that	Data mining for limited desktop analysis. Analysis of available data, including production database and reports from SCADA system to identify gaps in the data chain. Data mining in the billing system to confirm and cleanse	Technical Memo with findings and recommendations	Complexity of supply setup, metering setup and billing setup. Can

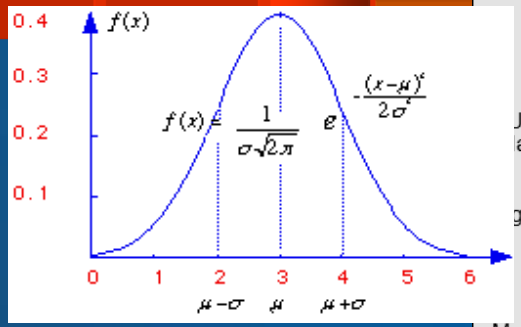
Level 2 – Top Down Data Mining Validation

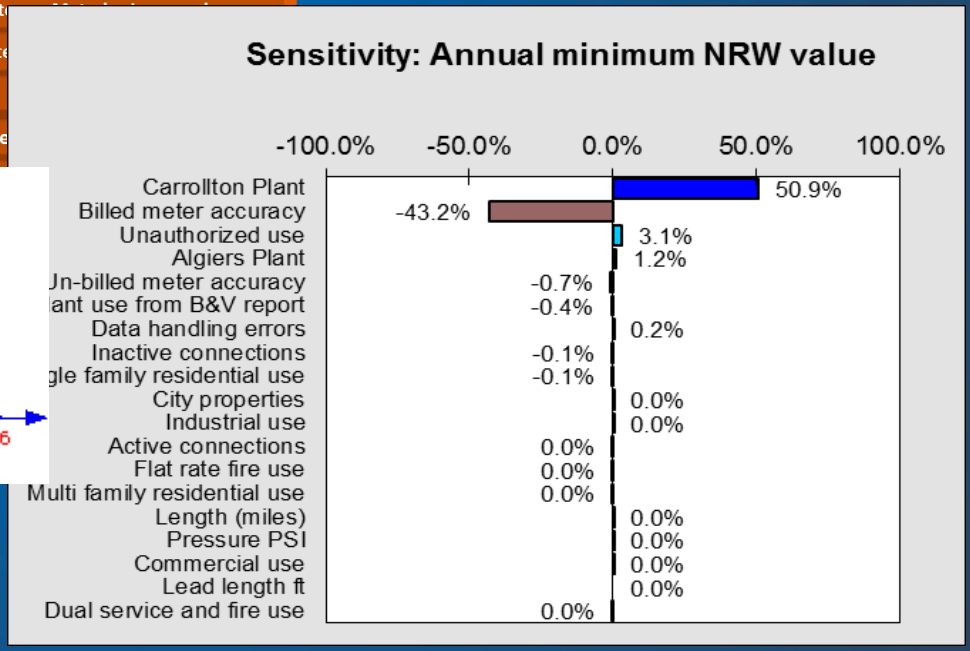
Level	Descriptor	Validation Focus	What's involved
2	Top down data mining validation	Supply and consumption volumes from existing data that is mined	Data mining for limited desktop analysis. Analysis of available data, including production database and reports from SCADA system to identify gaps in the data chain. Data mining in the billing system to confirm and cleanse consumption volumes to remove redundancies from the data mining process which can come about from record duplications. Also validates exclusion of non-potable volumes in the totals. Validates that consumption volumes from low mid and high level detail extractions are corroborated. Analysis of available meter testing data for audit calculations. Applies 95% confidence limits to the AWWA water balance.

Outcome	Depends on
Technical Memo with findings and recommendations	Complexity of supply setup, metering setup and billing setup. Can limit scope to just look at 1 of the 3 between supply, metering and billing.

Level 2 – Top Down Audit Validation







Validation Levels Descriptions

Level	Descriptor	Validation Focus	What's involved	Outcome	Depends on
1	Top down system review validation	Data grades, data validity score, gross errors and anomalies in the meters	Desktop review of what is immediately available (1 to 2 hour phone call interview / utility staff preparatory and documentation time. Interview questions are focused on practices to make sure the data grades have been applied correctly and consistently. Through this discussion, anomalies are discussed and either confirmed, corrected, or noted for needing further investigation.	Validation interview form documenting the call, including any recommendations from the validation expert.	System size & complexity
2	Top down data mining validation	Supply and consumption volumes from existing data that is mined	Data mining for limited desktop analysis. Analysis of available data, including production database and reports from SCADA system to identify gaps in the data chain. Data mining in the billing system to confirm and cleanse consumption volumes to remove redundancies from the data mining process which can come	Technical Memo with findings and recommendations	Complexity of supply setup, metering setup and billing setup. Can limit scope to just look
3	Bottom up field investigation validation	Supply and consumption volumes from new data that is gathered or mined	Field investigations and extensive data mining. Supply meter testing and in-field verification of meter-transmitter-SCADA data chain. In field customer meter testing. Night flow testing & analysis for leakage.	Technical Memo with field data, findings and recommendations	Varies widely by system, mainly on how much field work is involved

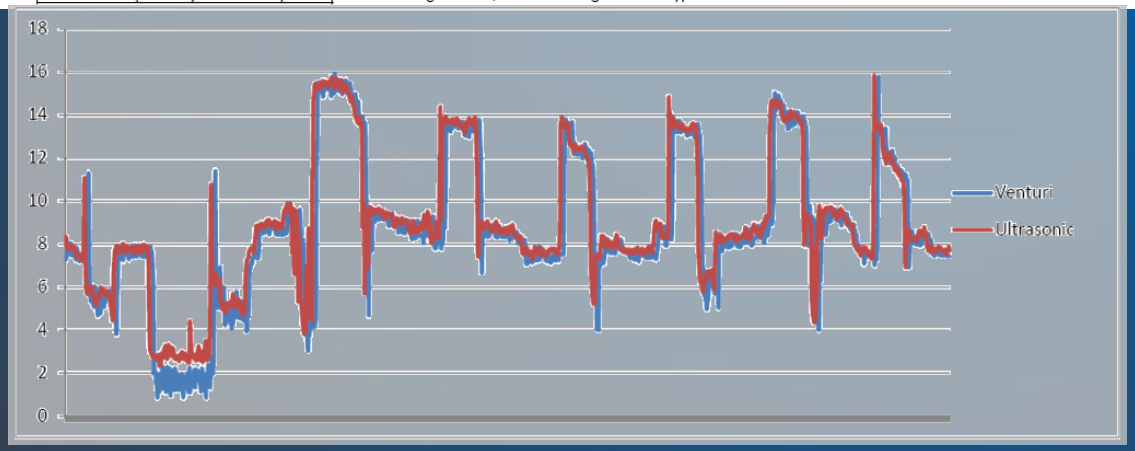
Level 3 – Bottom up Field Investigation Validation

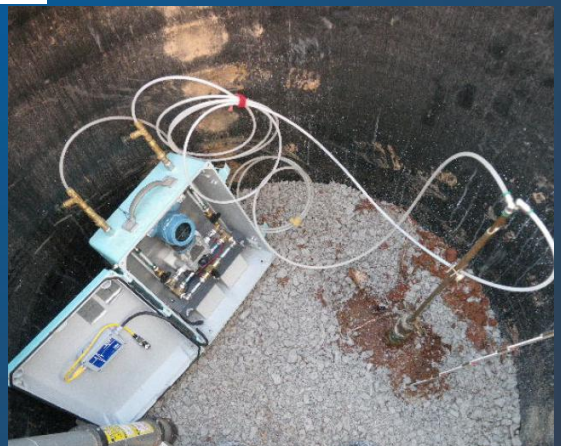
Level 3 – Bottom Up Field Investigation Validation

Summary of FWM Flow Verification Trials

FWM Site Number	FWM Site Name	Annual Flow (MG)	Estimated % of Total System Input	Normal Operating Flow Ranges (gpm)	Velocity (FPS)	# of Pump(s)	Pump(s) to Operate for Test	FWM Type	Pipe ø at FWM (Ft.)	Meets Separation	Test Conducted	Data from 1st trial	Data from 2nd trial	Signal Strength	Data Repeat-ability (chatter)	Data Pattern Correlation to FWM	Data Totals Correlate to FWM	Trial Result: Good test site?
	Highland WTP	9,730																
1	Old Central [10]	973	7%	1800+/- 100	2.8	0	Gravity	venturi	1.33	yes	no							YES
2	New Central [10]	973	7%	1150+/- 100	2.8	0	Gravity	venturi	1.33	yes	no							YES
3	Wrightsboro/Highland [35]	3,405	24%	6350+/- 100	2.9	0	Gravity	venturi	2.5	yes	no							YES
4	Auxillary PS East (Mag) [20]	1,946	14%	6000+/- 150	1.9	2	P12	mag	3	yes	yes	no	yes	4,846	good	good	0.5%	YES
5	Auxillary PS West [10]	973	7%	2200+/-300	1.6	1,2	P12	venturi	2	yes	yes	yes	yes	4,854	good	good	8%	YES
6	Fort Gordon Pump Station [15]	1,459	10%	2000;4000	1.4/2.8	1,2	P3,P4	venturi	2	no	yes	yes	yes	4,894	good	good	4%	YES
7	**Hicks WTP (Tobacco Rd.)**	2,613	18%	5000+/-300	0.8	4	any	venturi	3.5	close	yes	yes	yes	4,895	fair	fair	5.7%	YES
8	**Well Plant #1 (Peach Orchard Rd.)**	604	4%					venturi	2	no	no	n/a	no	no				NO
9	**Well Plant #2 (4H Club Rd.)**	879	6%	1600;3200	1.1/2.2	1,2	P3,P4,P5	venturi	2	yes	yes	yes	yes	4,860	good	good	9%	YES
10	**Well Plant #3 (Old Waynesboro Rd.)**	576	4%	2200	1.6	1	P1	venturi	2	yes	yes	no	no	4,816	good	good	17%	YES
	[ ] = percent of Highland total	14,401	100%															

Site	Name	Recommendation
1	Highland Old Central	Utilize test location along Central Ave. Testing must be coordinated with test on New Central Meter.
2	Highland New Central	Utilize existing tap adjacent to clearwell upstream from New Central.
3	Highland Wrightsboro/Highland	Utilize existing tap location in MH at the intersection of Wrightsboro and Highland
4	Highland Auxillary PS East	Utilize existing test site, with ultra-sonic type test for future flow verification.
5	Highland Auxillary PS West	Utilize existing test site, with ultra-sonic type test for future flow verification.
6	Highland Fort Gordon	Utilize existing test site, with ultra-sonic type test for future flow verification.
7	Hicks WTP	Utilize existing test site (location "1A"), with insertion type test for future flow verification.
8	Well Plant #1 (Peach Orchard Rd.)	Test site not viable, but no action recommended. Flow verification not warranted based on flow proportion to total system input.
9	Well Plant #2 (4H Club Rd.)	Utilize existing test site, consider using insertion type test for future flow verification.
10	Well Plant #3 (Old Waynesboro Rd.)	Utilize existing test site, consider using insertion type test for future flow verification.





Water Audits – pre and post Validation (before Training)

Before Training Program

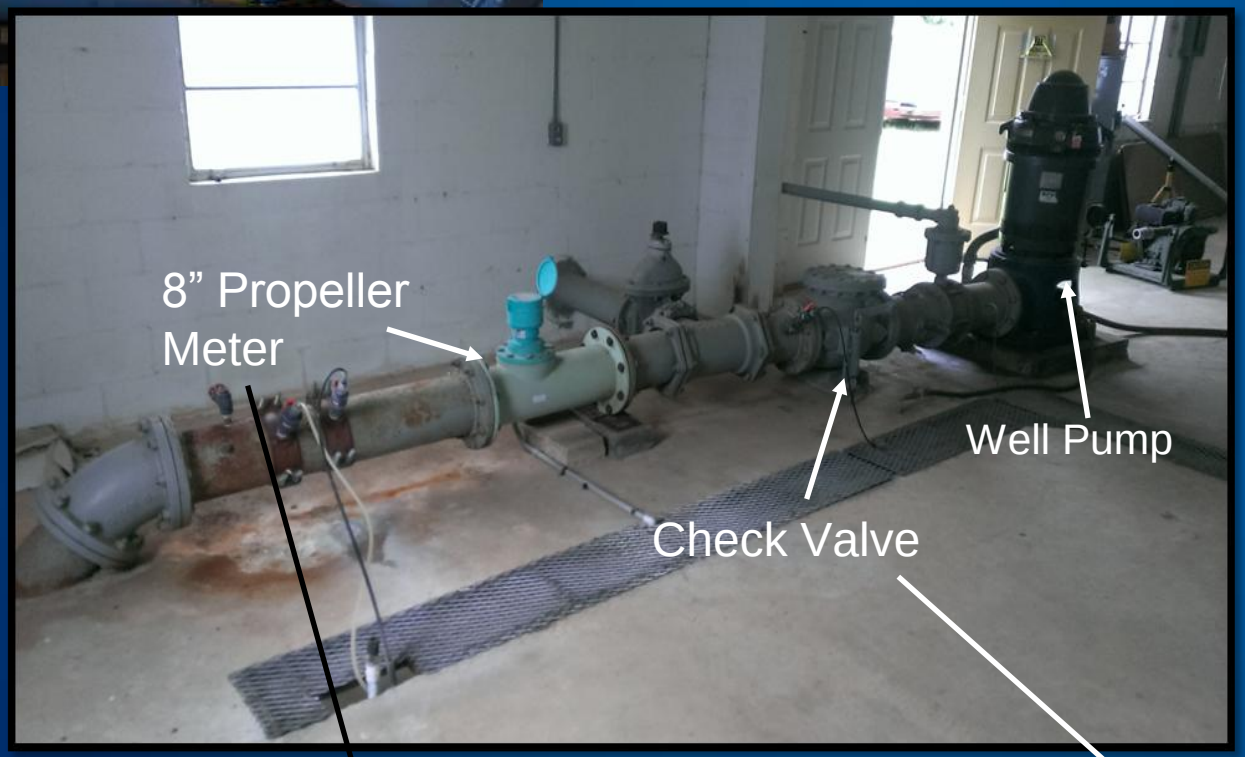
		Pre-Validation				Post-Validation				Change
	n	AVG	Range			AVG	Range			
Volume from own sources	78	7.3	1	-	10	4.5	2	-	10	(2.8)
Master meter error adjustment	76	5.4	1	-	10	2.9	1	-	9	(2.5)
Water imported	34	7.9	3	-	10	5.1	2	-	9	(2.7)
Water exported	22	7.7	2	-	10	5.0	3	-	9	(2.6)
Billed metered	91	7.4	3	-	10	5.6	2	-	10	(1.8)
Billed unmetered	22	8.2	4	-	10	5.4	1	-	10	(2.9)
Unbilled metered	64	6.7	1	-	10	5.3	1	-	10	(1.4)
Unbilled unmetered	92	5.4	2	-	10	4.9	0	-	9	(0.6)
Unauthorized consumption	92	5.1	2	-	9	5.1	5	-	10	(0.0)
Customer metering inaccuracies	91	6.1	2	-	10	3.9	1	-	9	(2.1)
Systematic data handling errors	92	5.9	2	-	10	5.1	4	-	9	(0.7)
Length of mains	90	6.6	1	-	10	4.7	1	-	10	(1.8)
# of active + inactive svc connections	90	6.3	1	-	10	5.5	1	-	10	(0.8)
Average length of customer service line	92	8.5	2	-	10	9.5	2	-	10	1.0
Average operating pressure	91	5.4	1	-	10	4.3	1	-	10	(1.1)
Annual cost of operating water system	90	7.9	1	-	10	7.2	1	-	10	(0.7)
Customer retail unit cost	91	7.4	1	-	10	6.0	2	-	10	(1.4)
Variable production cost	90	7.2	2	-	10	5.7	1	-	10	(1.5)
Water Audit Data Validity Score	**92**	**68.8**	**39**	**-**	**94**	**52.1**	**8**	**-**	**77**	**(16.7)**

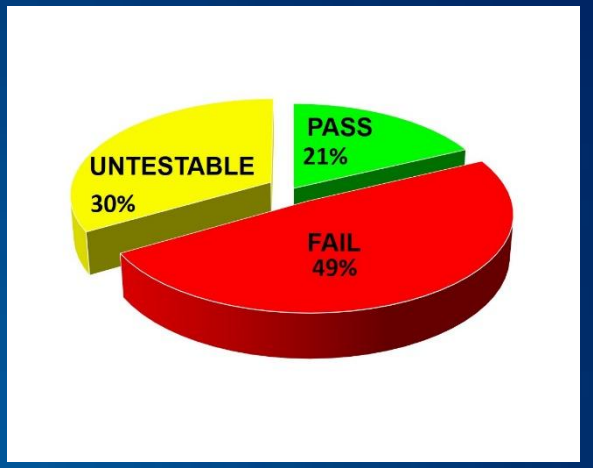
Water Audits – pre and post Validation (after Training)

After Training Program

		Pre-Validation				Post-Validation				Change
	n	AVG	Range			AVG	Range			
Volume from own sources	86	5.3	2	-	10	4.8	2	-	9	(0.5)
Master meter error adjustment	86	3.4	1	-	9	2.8	1	-	8	(0.6)
Water imported	37	5.9	2	-	10	5.7	2	-	9	(0.2)
Water exported	24	5.8	1	-	10	5.0	1	-	9	(0.8)
Billed metered	100	6.0	2	-	10	5.2	2	-	8	(0.8)
Billed unmetered	24	6.7	1	-	10	6.9	2	-	10	0.3
Unbilled metered	74	6.0	1	-	10	5.9	1	-	10	(0.1)
Unbilled unmetered	100	5.0	0	-	10	5.0	1	-	10	0.0
Unauthorized consumption	100	5.1	3	-	10	5.0	5	-	5	(0.1)
Customer metering inaccuracies	100	4.3	1	-	10	4.0	1	-	10	(0.2)
Systematic data handling errors	100	5.2	0	-	10	5.2	1	-	9	0.1
Length of mains	100	4.9	1	-	10	4.8	1	-	10	(0.1)
# of active + inactive svc connections	100	5.7	2	-	10	5.6	2	-	10	(0.1)
Average length of customer service line	100	8.9	1	-	10	9.9	4	-	10	1.0
Average operating pressure	100	4.2	1	-	10	3.7	1	-	10	(0.5)
Annual cost of operating water system	100	7.1	2	-	10	7.9	2	-	10	0.8
Customer retail unit cost	100	6.2	2	-	10	6.4	2	-	10	0.2
Variable production cost	100	5.6	1	-	10	5.3	1	-	10	(0.2)
Water Audit Data Validity Score	**100**	**55.4**	**3**	**-**	**86**	**53.8**	**31**	**-**	**74**	**(1.6)**

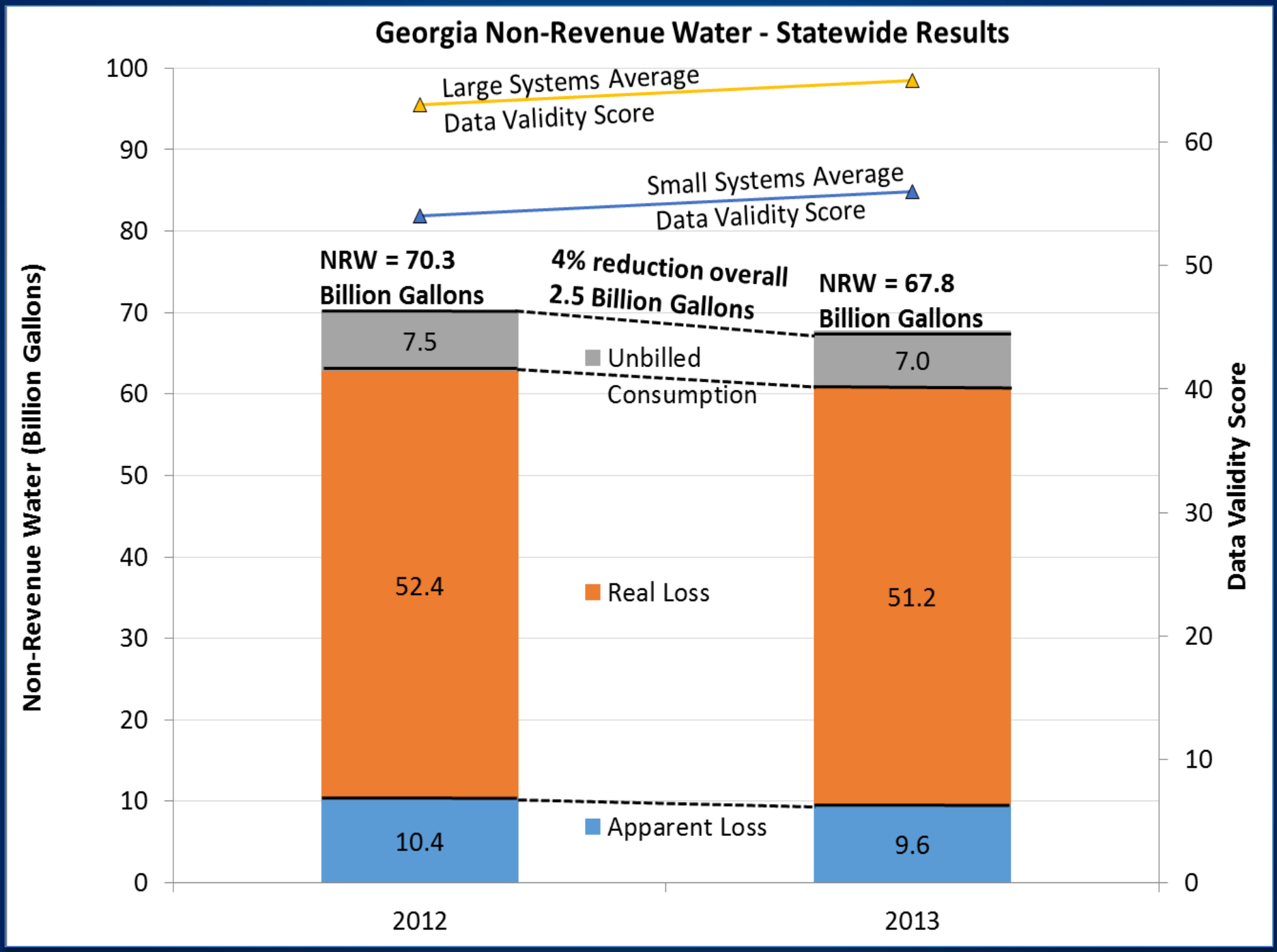
Finished Water Meter Testing





Accuracy results from MFR test bench: 99.5%

Accuracy results from in-situ test: 142.2%


Georgia Non-Revenue Water - Statewide Results
Large Systems Average Data Validity Score
Small Systems Average Data Validity Score
NRW = 70.3 Billion Gallons
4% reduction overall 2.5 Billion Gallons
NRW = 67.8 Billion Gallons
7.5
7.0
Unbilled Consumption
52.4
51.2
Real Loss
10.4
9.6
Apparent Loss
2012
2013
Non-Revenue Water (Billion Gallons)
Data Validity Score
100
90
80
70
60
50
40
30
20
10
0
60
50
40
30
20
10
0

Colorado Pilot:
50 systems
1 month
Wisconsin Pilot:
6 systems
6 months
California Full Scale:
460 systems
2 years
New Mexico Full Scale:
250 systems
9 months
Georgia Full Scale:
230 systems
3 years
COLORADO
Colorado Water Conservation Board
Department of Natural Resources
colorado waterwise
CAVANAUGH
Stewardship Through Innovation
Water Research Foundation
American Water Works Association
Rocky Mountain Section
WISCONSIN DEPT. OF NATURAL RESOURCES
PUBLIC SERVICE COMMISSION OF WISCONSIN
Wisconsin Water Association
A section of AWWA
American Water Works Association
California-Nevada Section
DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA
WSO
NEW MEXICO
ENVIRONMENT DEPARTMENT
Southwest Environmental Finance Center
DEPT. OF NATURAL RESOURCES
GEORGIA
GEFA
ENERGY · LAND · WATER
ch2m
WA
OR
CA
ID
NV
MT
WY
UT
AZ
CO
NM
ND
SD
NE
KS
OK
TX
MN
IA
MO
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VA
WV
PA
NY
ME
AK
MD
DE
NJ
CT
RI
MA
NH
DC

CALIFORNIA WATER LOSS CONTROL COLLABORATIVE

Stakeholders

American Water Works Association California-Nevada Section

CA-NV Section AWWA

CA Department of Water Resources

California Water Boards

State Water Resources Control Board

US Environmental Protection Agency

CUWCC California Urban Water Conservation Council

California Urban Water Conservation Council

Sweetwater Authority

NRDC

Natural Resources Defense Council

City of SACRAMENTO Department of Utilities

City of Sacramento

WSO

Water Systems Optimization

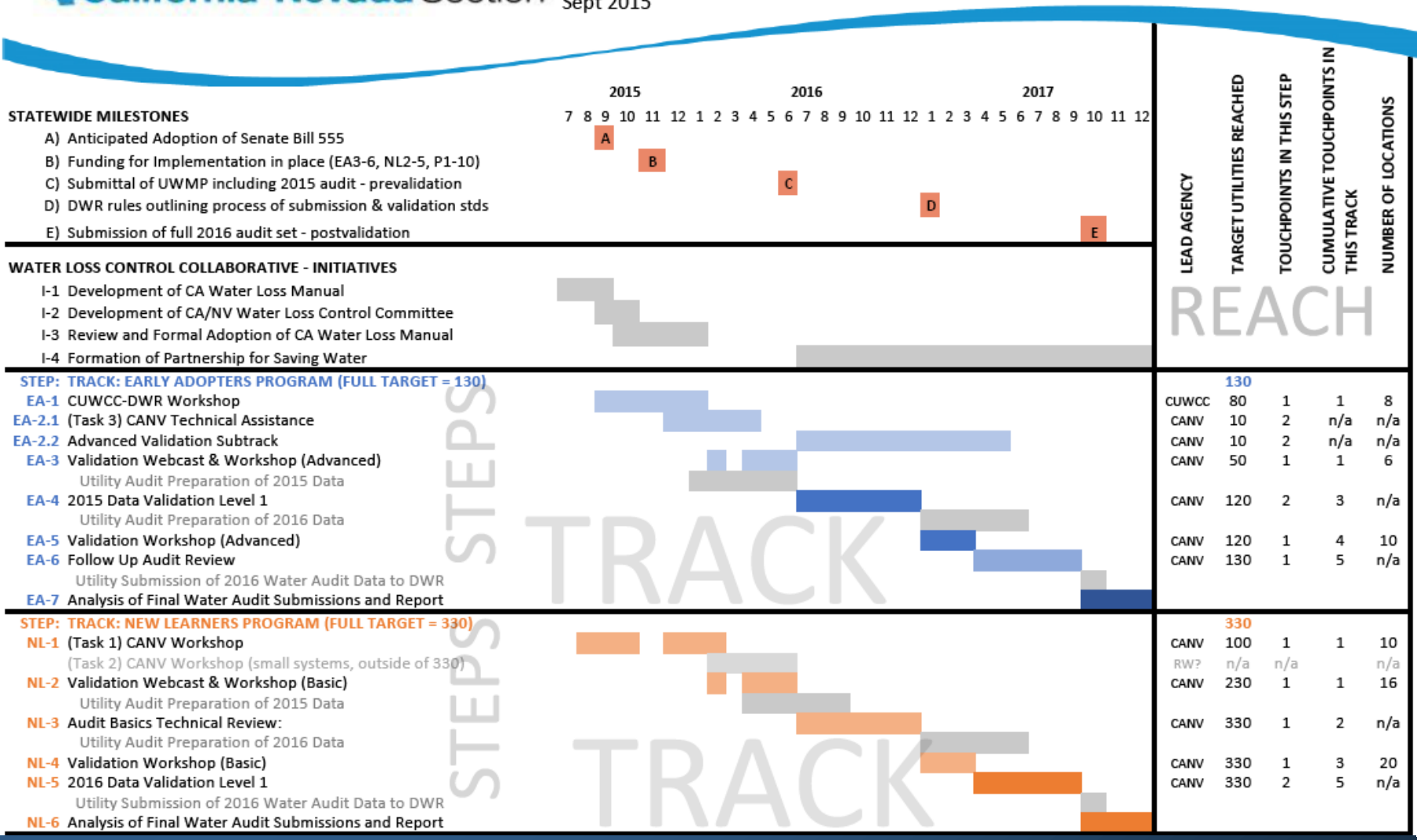
CAVANAUGH Stewardship Through Innovation

Cavanaugh

10435 Ashford Street • Rancho Cucamonga, CA 91730 • T 909.481.7200 • F 909.291.2107
www.ca-nv-awwa.org

American Water Works Association
California-Nevada Section

California Water Loss Control Collaborative
Timeline & Budget Document
Sept 2015



	LEAD AGENCY	TARGET UTILITIES REACHED	TOUCHPOINTS IN THIS STEP	CUMULATIVE TOUCHPOINTS IN THIS TRACK	NUMBER OF LOCATIONS
STATEWIDE MILESTONES					
A) Anticipated Adoption of Senate Bill 555					
B) Funding for Implementation in place (EA3-6, NL2-5, P1-10)					
C) Submittal of UWMP including 2015 audit - prevalidation					
D) DWR rules outlining process of submission & validation stds					
E) Submission of full 2016 audit set - postvalidation					
WATER LOSS CONTROL COLLABORATIVE - INITIATIVES					
I-1 Development of CA Water Loss Manual					
I-2 Development of CA/NV Water Loss Control Committee					
I-3 Review and Formal Adoption of CA Water Loss Manual					
I-4 Formation of Partnership for Saving Water					
				REACH	
STEP: TRACK: EARLY ADOPTERS PROGRAM (FULL TARGET = 130)		130			
EA-1 CUWCC-DWR Workshop	CUWCC	80	1	1	8
EA-2.1 (Task 3) CANV Technical Assistance	CANV	10	2	n/a	n/a
EA-2.2 Advanced Validation Subtrack	CANV	10	2	n/a	n/a
EA-3 Validation Webcast & Workshop (Advanced)	CANV	50	1	1	6
Utility Audit Preparation of 2015 Data					
EA-4 2015 Data Validation Level 1	CANV	120	2	3	n/a
Utility Audit Preparation of 2016 Data					
EA-5 Validation Workshop (Advanced)	CANV	120	1	4	10
EA-6 Follow Up Audit Review	CANV	130	1	5	n/a
Utility Submission of 2016 Water Audit Data to DWR					
EA-7 Analysis of Final Water Audit Submissions and Report					
STEP: TRACK: NEW LEARNERS PROGRAM (FULL TARGET = 330)		330			
NL-1 (Task 1) CANV Workshop	CANV	100	1	1	10
(Task 2) CANV Workshop (small systems, outside of 330)	RW?	n/a	n/a		n/a
NL-2 Validation Webcast & Workshop (Basic)	CANV	230	1	1	16
Utility Audit Preparation of 2015 Data					
NL-3 Audit Basics Technical Review:	CANV	330	1	2	n/a
Utility Audit Preparation of 2016 Data					
NL-4 Validation Workshop (Basic)	CANV	330	1	3	20
NL-5 2016 Data Validation Level 1	CANV	330	2	5	n/a
Utility Submission of 2016 Water Audit Data to DWR					
NL-6 Analysis of Final Water Audit Submissions and Report					

Statewide Water Loss Management Program – Model Implementation

Phase 1

Establish Annual M36 Water Auditing

Auditing
- Establish annual M36 Water Auditing for all utilities

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 (funded)

Phase 2

Achieve Minimum Standard of Audit Reliability

Data Manage-ment
- Develop and implement data management system
- Establish posting system and communication protocols

Validation
- Establish minimum standards of validation for quality assurance
- Determine by Agency or 3rd Party
- Establish validation program until certification program is in place

Certification
- Design and implement a Certified Water Audit program for sustained quality control
- Statewide Water Loss Control Committee provides support

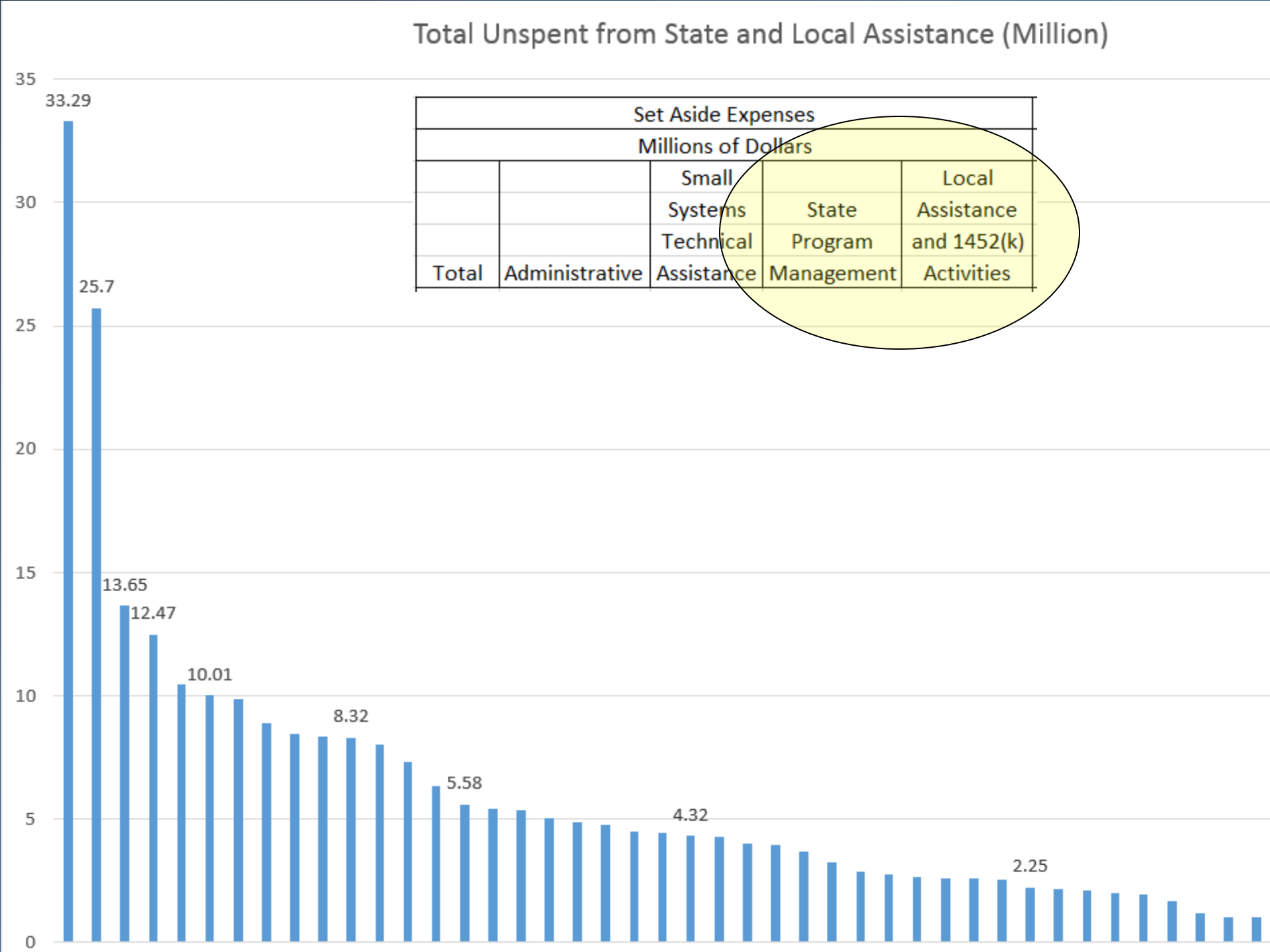
Phase 3

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
- <u>No universal targets</u>
- Excessive thresholds established

Improvement
- Annual audit submission threshold exceedances
- System specific progress review at designated regulatory touchpoints

Resource Management Grade C | Resource Management Grade B | Resource Management Grade A


Total Unspent from State and Local Assistance (Million)
Set Aside Expenses
Millions of Dollars
Total
Administrative
Small Systems Technical Assistance
State Program Management
Local Assistance and 1452(k) Activities
35
30
25
20
15
10
5
0
33.29
25.7
13.65
12.47
10.01
8.32
5.58
4.32
2.25

1. Awareness Stage: Discussions and presentations are underway sharing the need for Utilities to embrace NRW best practices, the Georgia model is used to demonstrate the proof that statewide training can and has worked. There is/may be, a desire to learn more.

Texas	Florida	New York	Michigan
Kentucky	Pennsylvania	New Hampshire	South Carolina
Alabama	Vermont	Rhode Island	Maine
Connecticut	Virginia	Mississippi	Nevada
New Jersey			

2. Conceptual Stage: Key state advocate has been identified and they see a need (benefit to the state and utilities) to provide Utilities with training on Water Auditing and NRW business practices. Words like “pilot, program development, statewide training concepts” are surfacing in the conversations.

Utah	North Carolina	Tennessee	Indiana (OUCC)

3. Internal Regulatory Training Stage: In this stage the key state advocate is desirous of bringing us in as the subject matter expert to raise internal awareness and build internal support, ideas of a program and the cost and reach are beginning to surface.

Massachusetts

4. Proof or Pilot Stage: In this stage the key state advocate is proposing a starting point as a proof to the other key stakeholders that there is a need to fund a statewide NRW training effort.

Colorado Wisconsin Illinois Oklahoma

5. Funding Stage: Funds are actively being sought by the key state advocate to fund a State-wide training initiative.

California

6. Execution Stage: Training or technical assistance oversight and management is currently underway.

Georgia New Mexico

Dec 8-9, 2015

Conference & Exposition

www.gawp.org

- Over 60 speakers from the United States and around the world
- Technical sessions on water auditing, loss control program implementation, addressing Non-Revenue Water through billing, theft, metering, leakage, pressure, energy and asset management, and regulatory policy development across North America
- Case studies for growing implementation of established IWA/AWWA best practices and innovations for Water Loss Management

Georgia Section American Water Works Association | Georgia Association of Water Professionals | Alliance for Water Efficiency | American Water Works Association | EPA WaterSense | Water Research Foundation | IWA the international water association

NORTH AMERICAN WATER LOSS 2015

Dec 8-9, 2015

Conference & Exposition

www.gawp.org

315 already registered

26 States

10 Countries

- Over 30 speakers from the United States and around the world
- Technical sessions on water auditing, loss control program implementation, addressing Non-Revenue Water through billing, theft, metering, leakage, pressure, energy and asset management, and regulatory policy development across North America
- Case studies for growth and implementation of established IWA/AWWA best practices and innovations for Water Loss Management

Georgia Section American Water Works Association | Georgia Association of Water Professionals | Alliance for Water Efficiency | American Water Works Association | EPA WaterSense | Water Research Foundation | IWA the international water association