

This presentation premiered at WaterSmart Innovations

watersmartinnovations.com



A Model for the Nation: Georgia's Statewide Water Loss Management Program



Presented by:



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CAVANAUGH
Stewardship Through Innovation

U.S. Has Reached 52 Percent Drought



By Sara Jerome
@sarmje

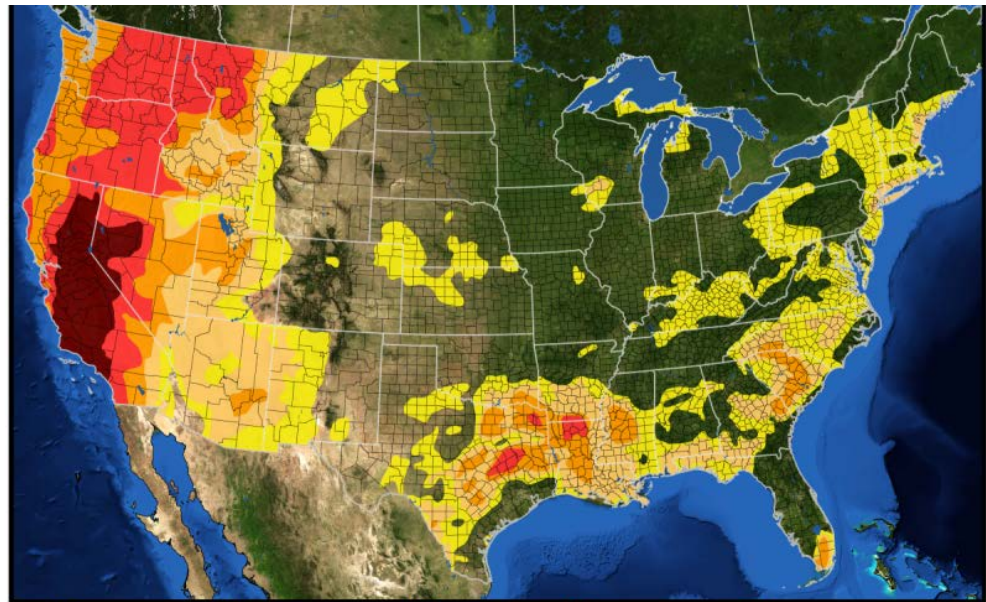
It's official: Most of the U.S. is facing d conditions.

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

U.S. Drought Monitor | September 8, 2015

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

Issued: 9/10/15 | Data: NDMC | Map: The Vane | thevane.gawker.com | [@wxdam](https://twitter.com/wxdam)



D0 Abnormally Dry **D1** Moderate Drought **D2** Severe Drought **D3** Extreme Drought **D4** Exceptional Drought

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



A VeriMarkets 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.

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?

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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.)





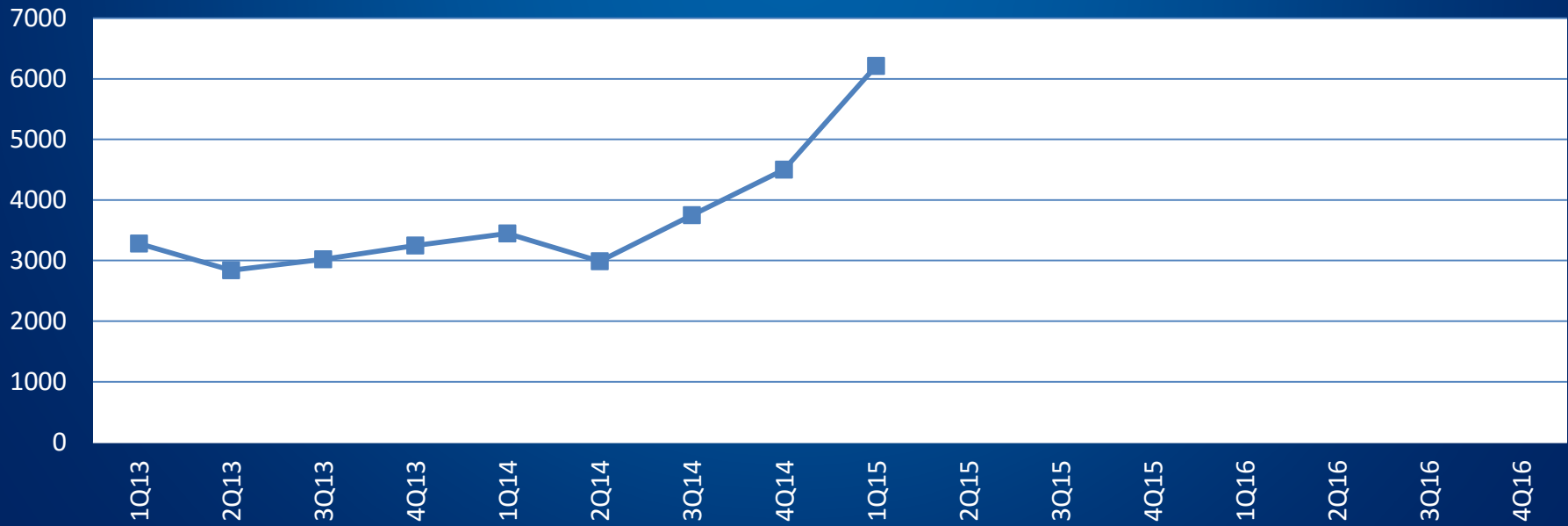


American Water Works Association

Dedicated to the World's Most Important Resource™

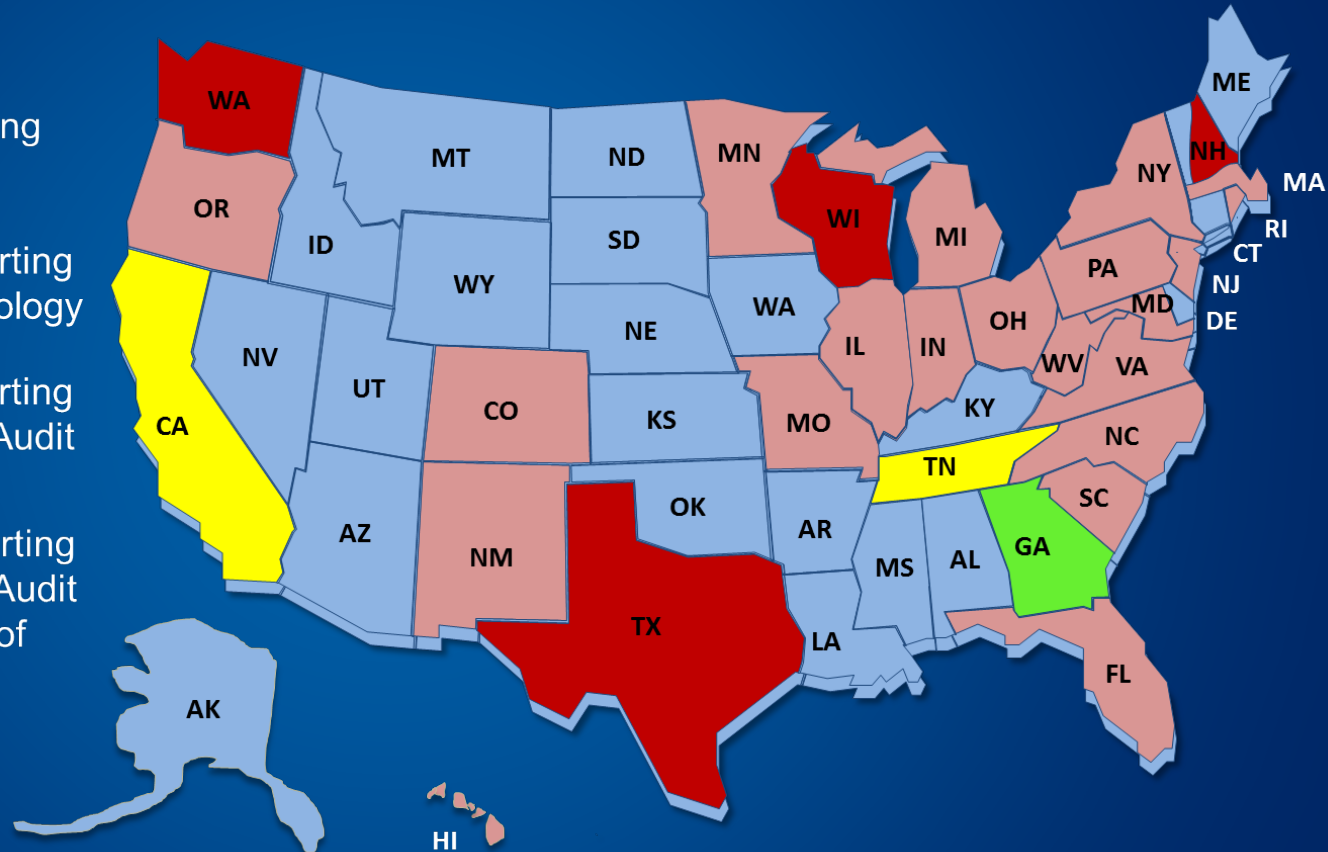
WEBPAGE	RANK	(monthly avg)	January	February	March
Water Knowledge (RC landing page)			829	813	912
Water Loss Control	1		2,118	1,997	2,095
Water Conservation	2		645	585	728
Drought	13		115	99	158
Backflow	3		515	556	661
How Water Works	4		474	538	522
Wastewater	5		421	409	474
Asset Management	6		369	313	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
Source Water Protection	14		103	96	151
Customer Service	10		151	122	144
Desalination	12		101	124	152
Reuse	15		86	131	119
TOTAL			7,077	6,638	7,566

AWWA Water Loss Control - Quarterly Webpage Views

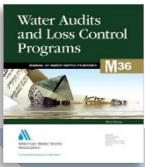


Landscape of Varying Levels of Water Loss Management Policy

- No Policy for Water Loss Management
- Basic Water Loss Reporting
- Annual Water Loss Reporting with AWWA M36 Terminology
- Annual Water Loss Reporting with AWWA Free Water Audit Software
- Annual Water Loss Reporting with AWWA Free Water Audit Software with Validation of Audits Submitted



Statewide Water Loss Management Program – Model Implementation



Phase 1

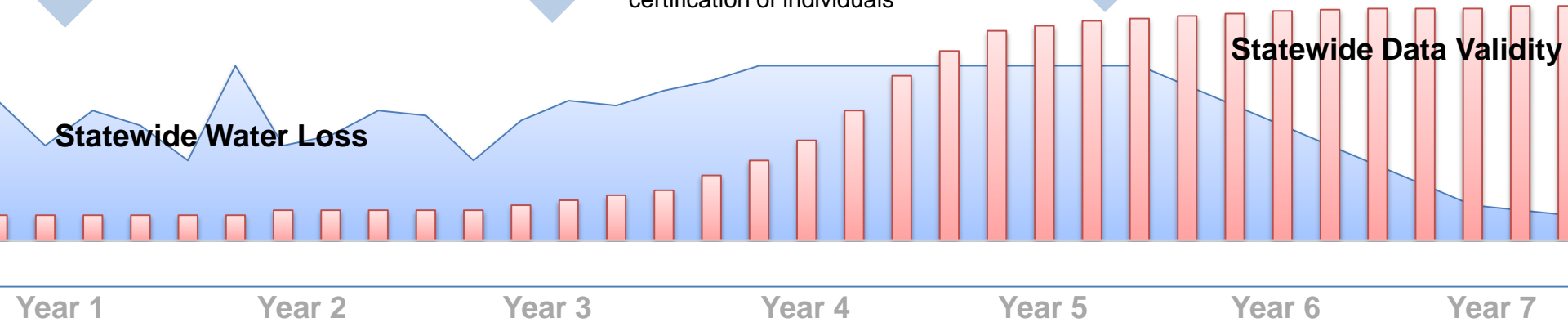
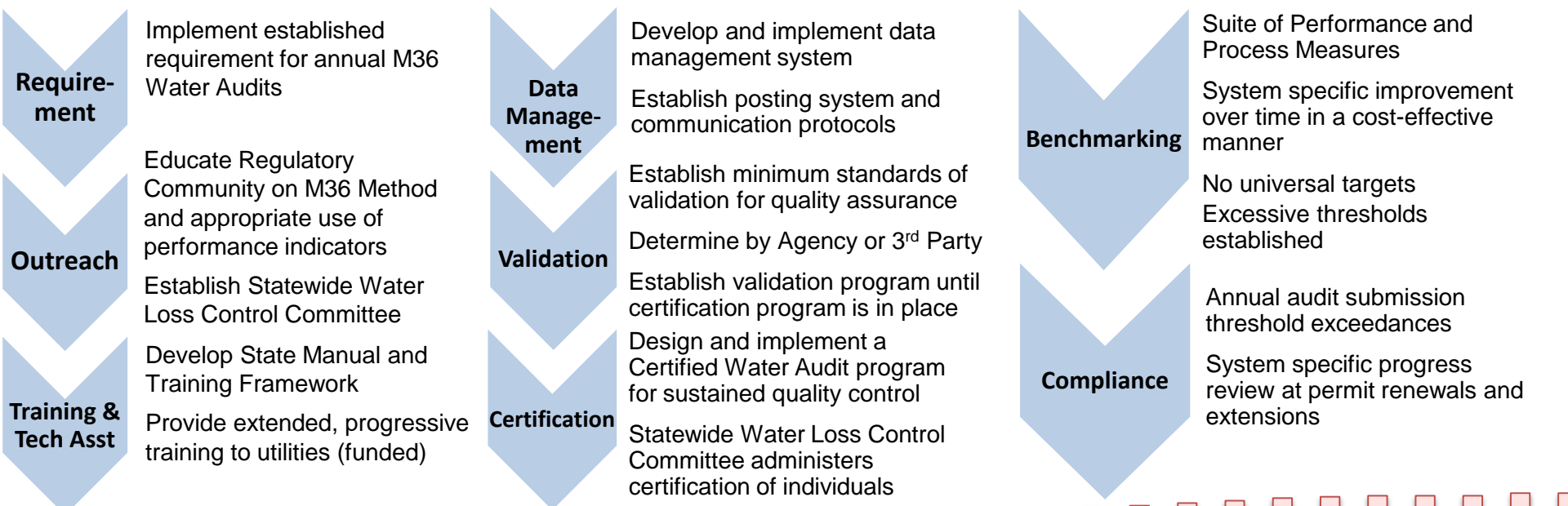
Establish Annual M36 Water Auditing

Phase 2

Achieve Minimum Standard of Audit Reliability

Phase 3

Manage Water Loss Performance for Long-Term Reduction



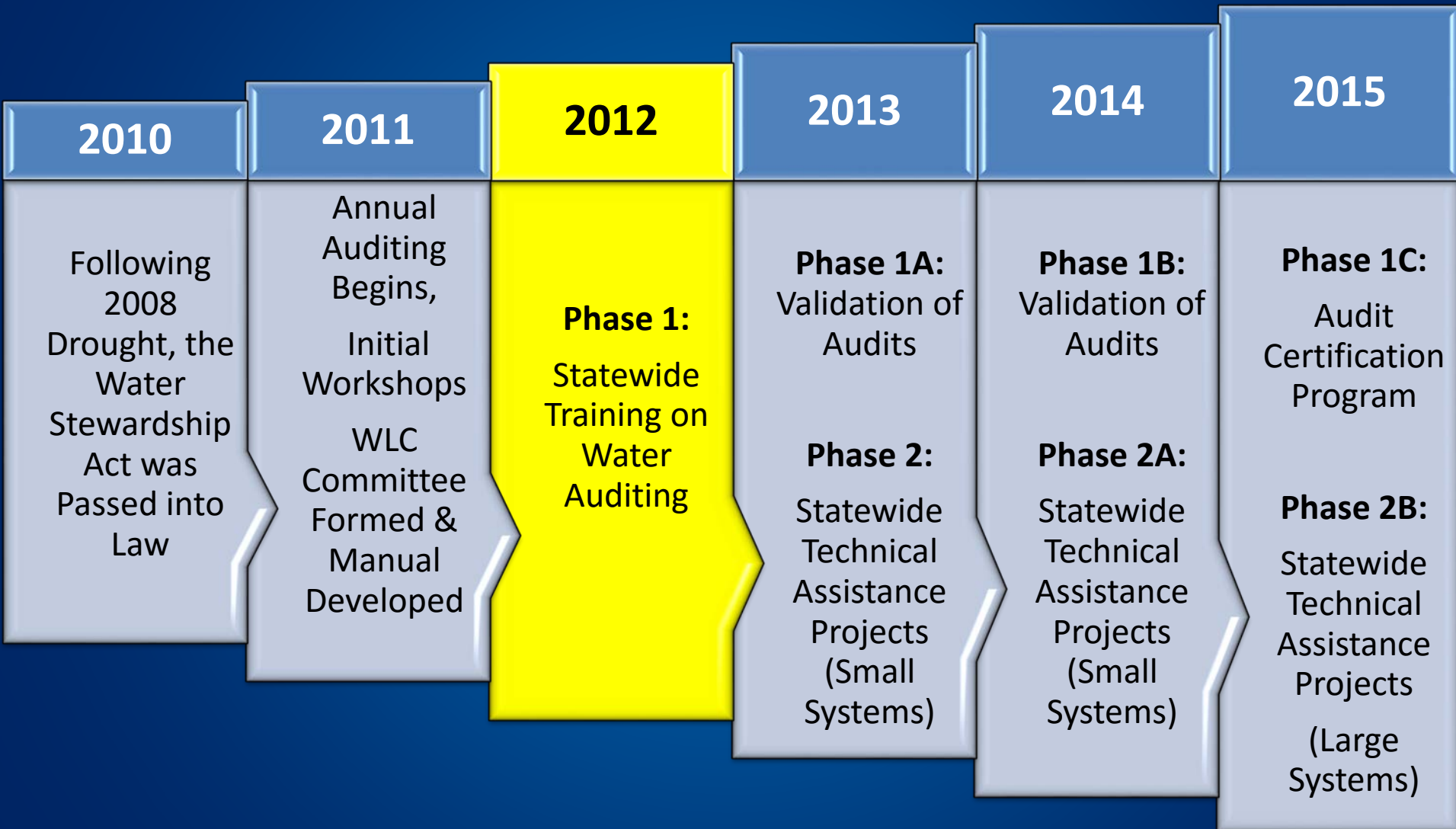
Year 1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7

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

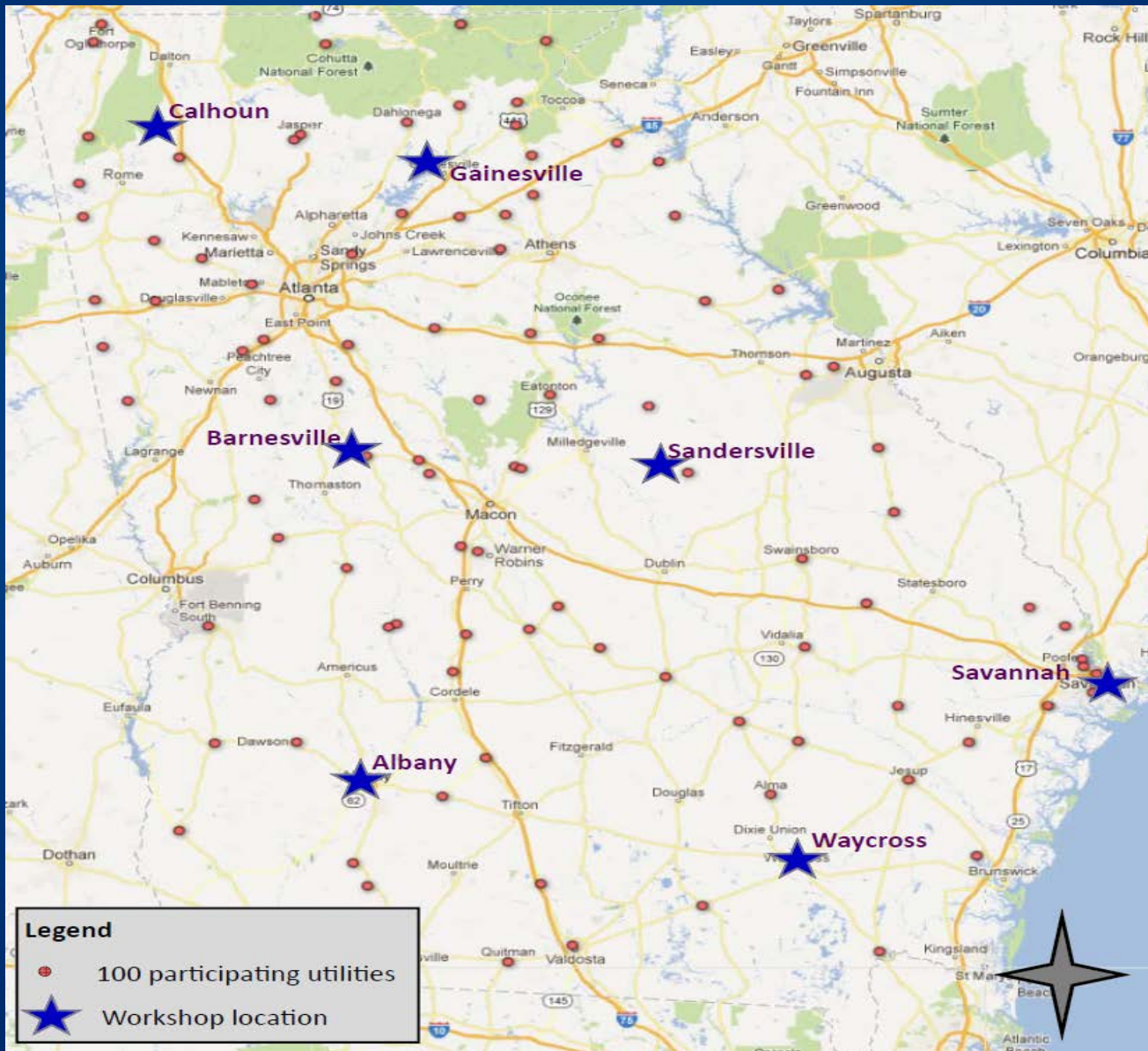
Georgia Water Loss Program Phasing



Georgia Water Loss Program Phasing

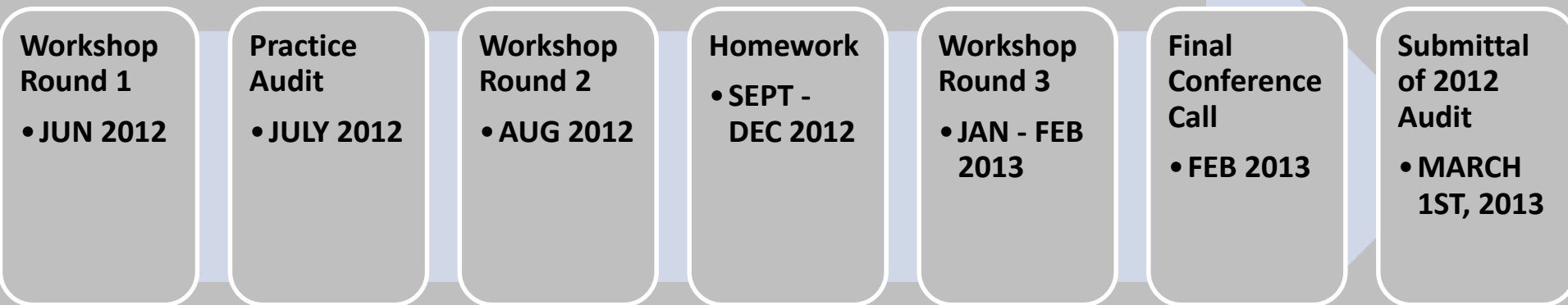


Phase 1 - Water Loss Audit Training



Phase 1 - Water Loss Audit Training

- 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 2012 Water Audit to EPD March 2013



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.”



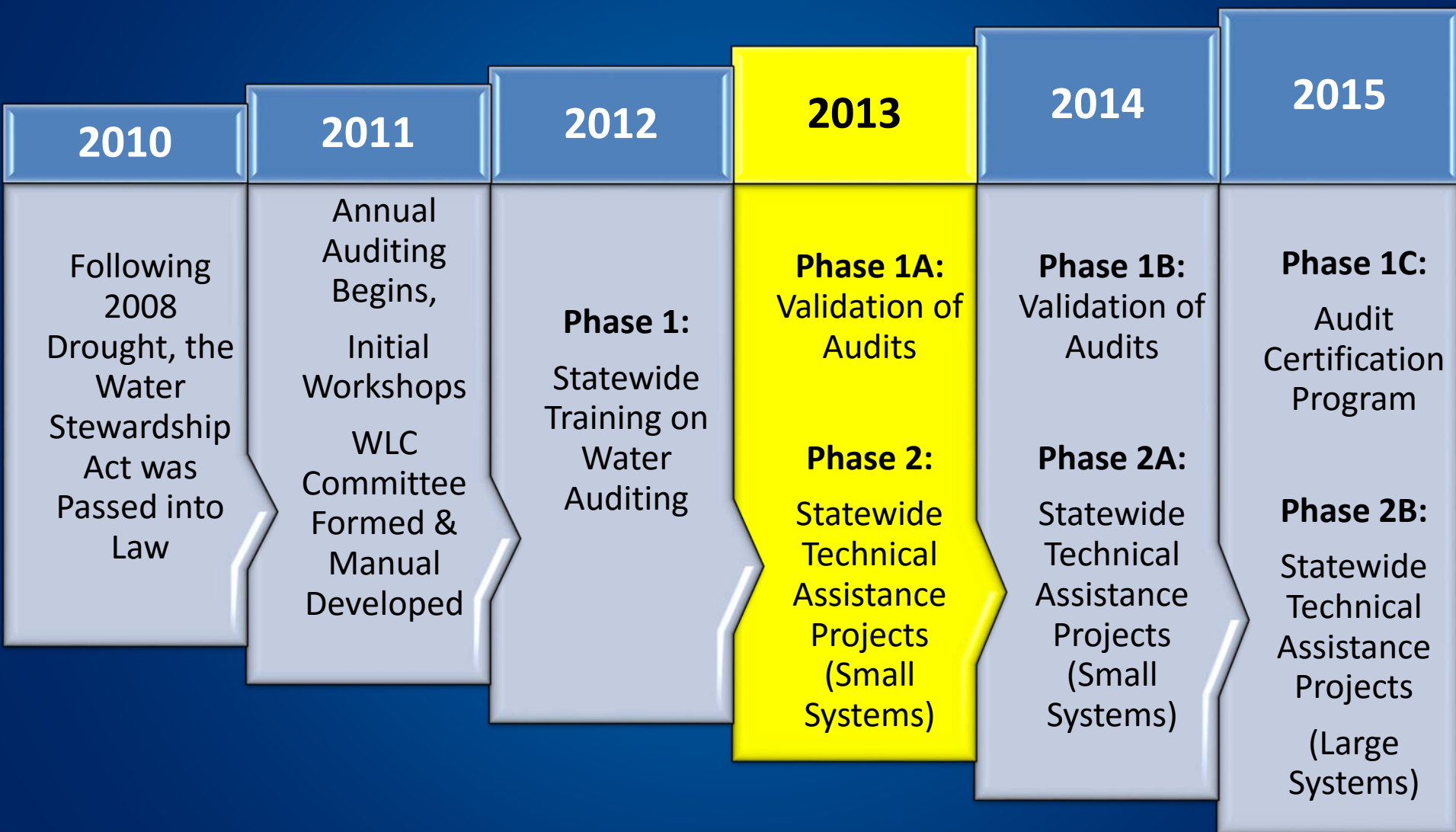
Water Audits – pre and post Validation (before Training)

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)

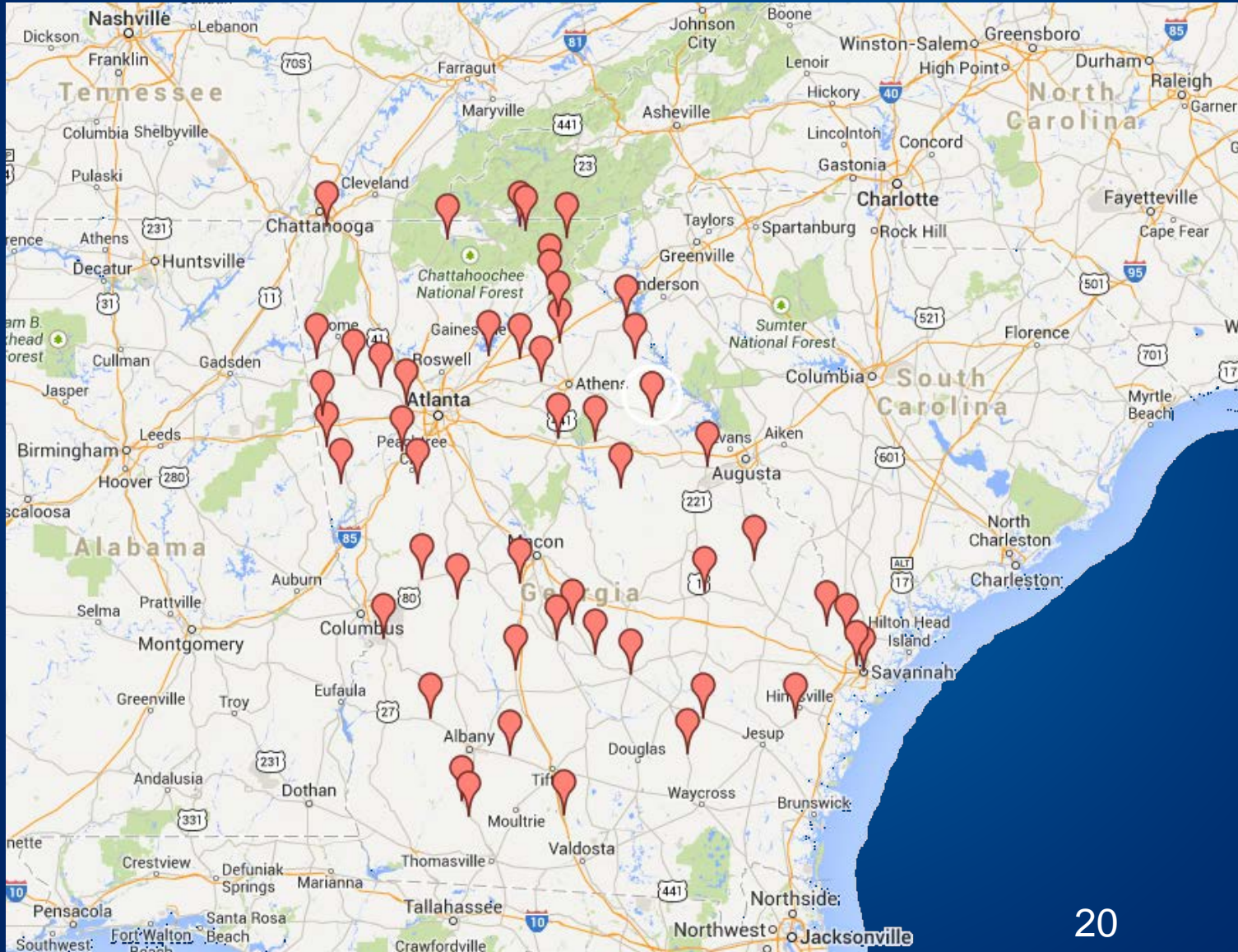
Water Audits – pre and post Validation (after Training)

After Training Program	n	Pre-Validation			Post-Validation			Change		
		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)

Georgia Water Loss Program Phasing

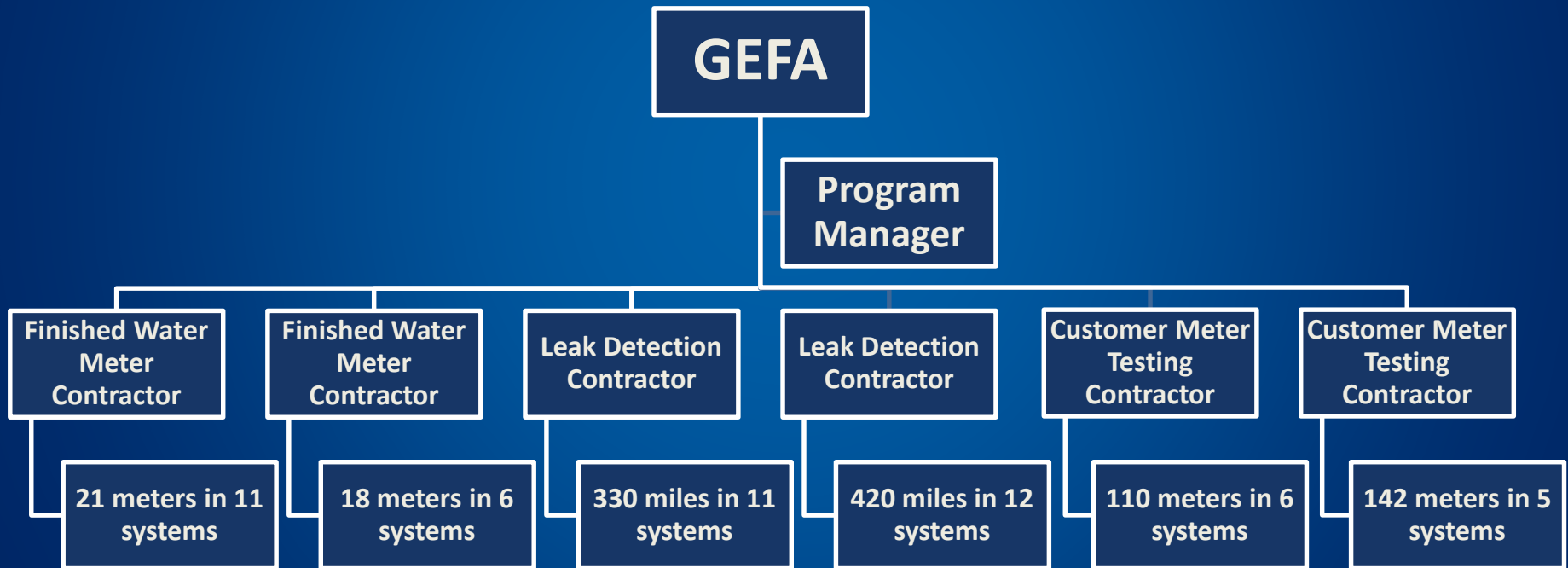


Phase 2 - Water Loss Technical Assistance (Small)

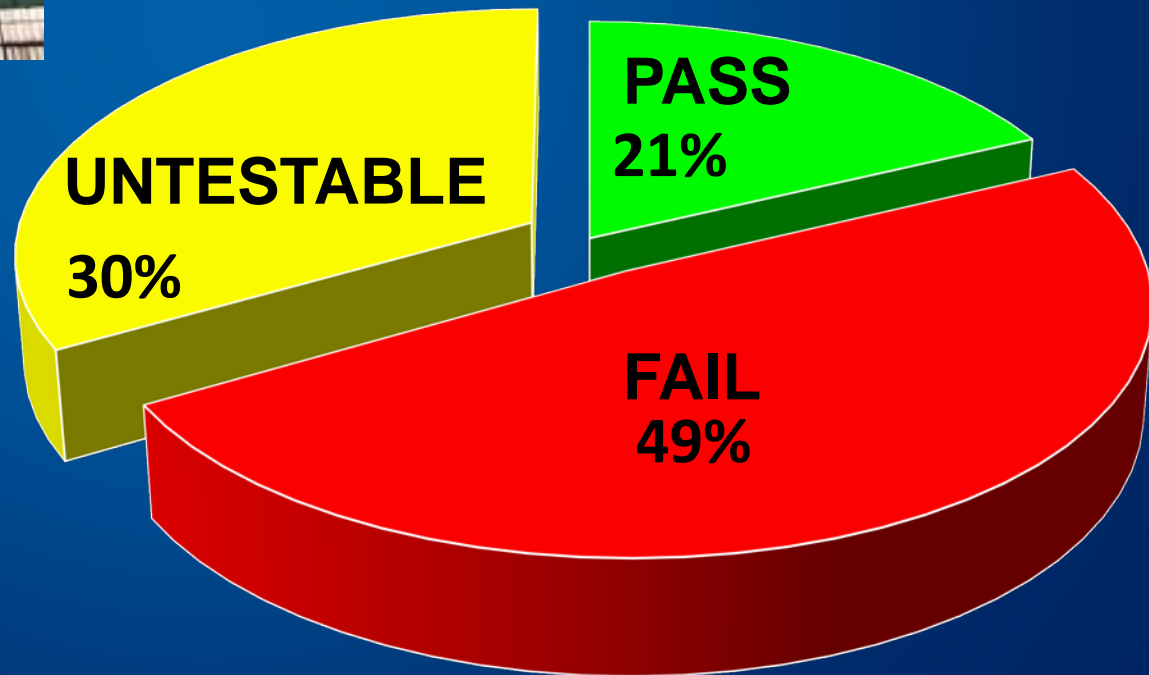


Phase 2 - Water Loss Technical Assistance (Small)

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



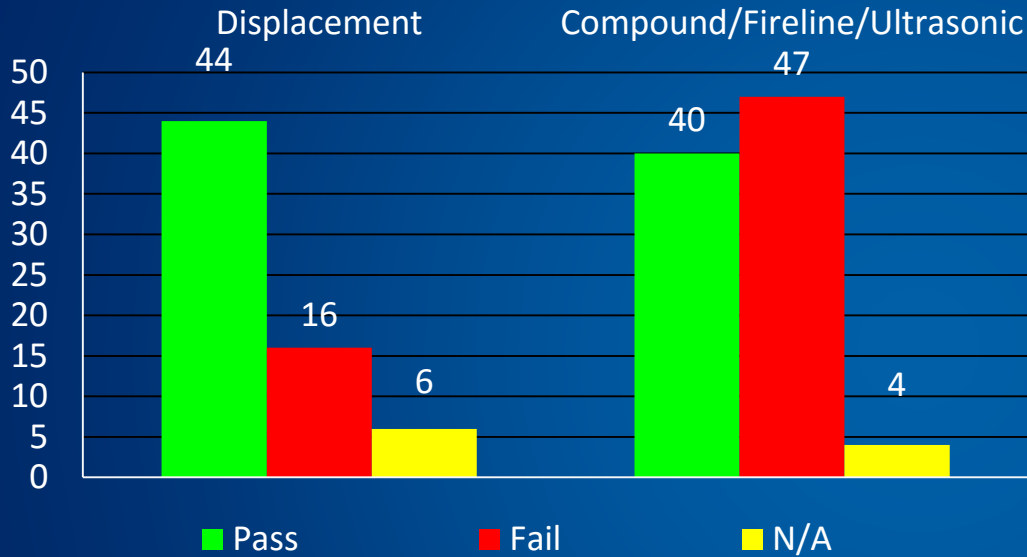
Finished Water Meter Testing



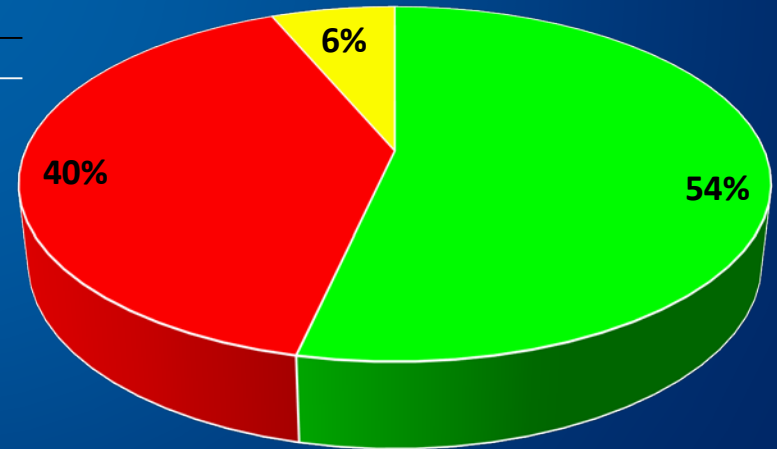


Customer Meter Testing (CMT)

CMT Global Statistics Summary



Customer Meter Testing



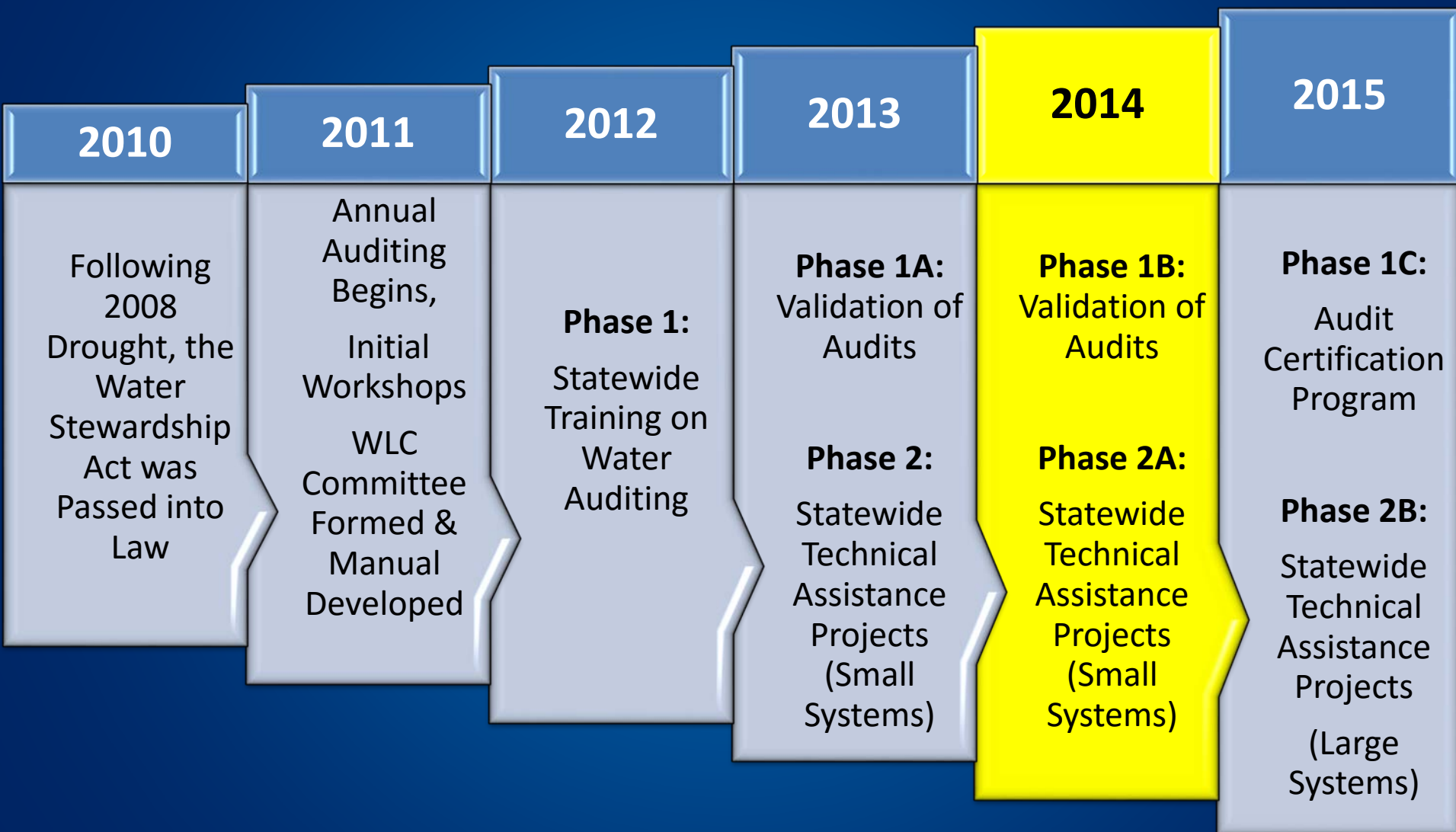
■ Pass ■ Fail ■ Inconclusive or Untestable



Phase 2 - Water Loss Technical Assistance (Small)

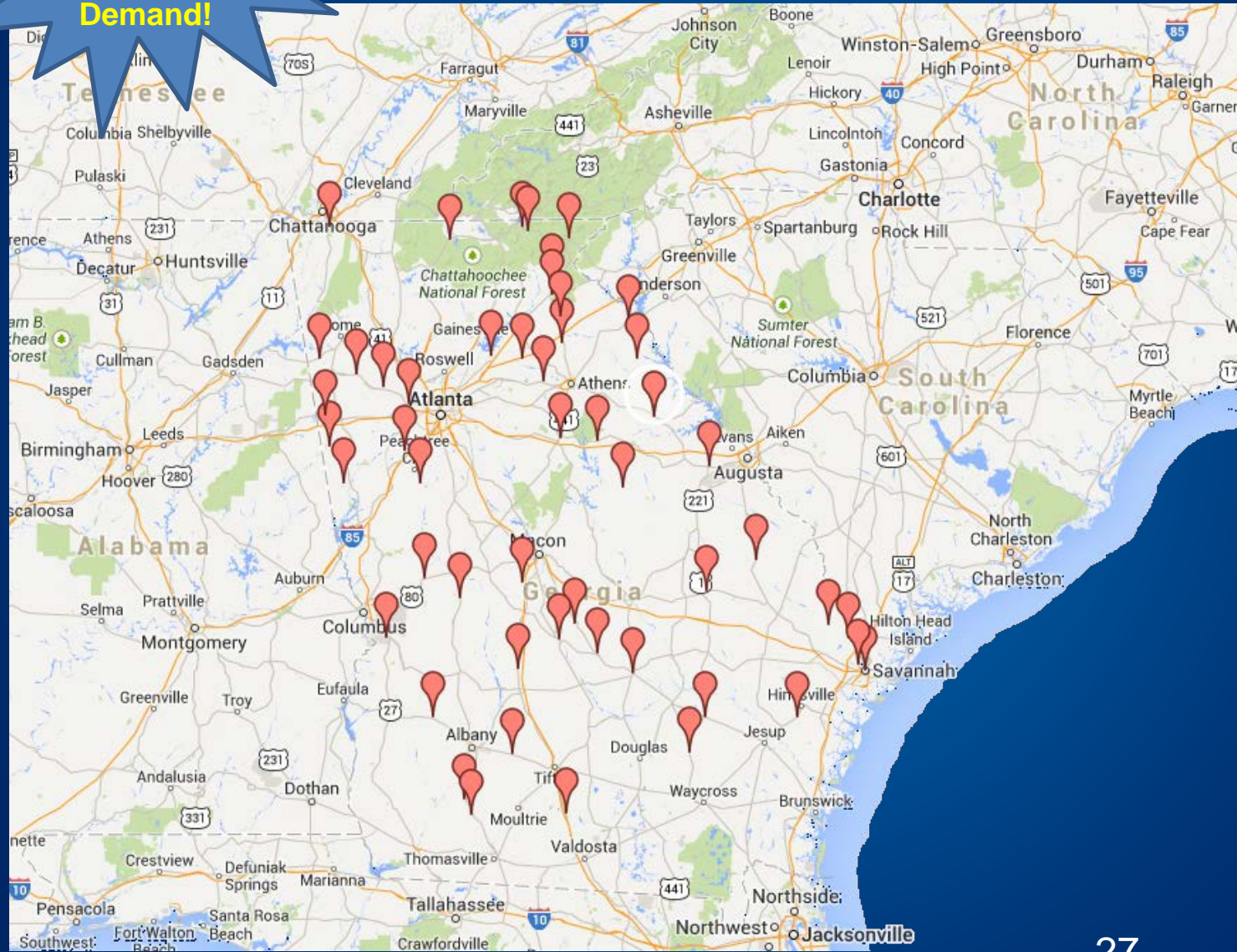
Finished Water Meter Flow Verification					
Number of Participating Water Systems	Number of Finished Water Meters tested	Number of meters passing within AWWA accuracy limits		Average inaccuracy for meters not passing within AWWA accuracy limits (%)	
17	28	7		13%	
Customer Meter Testing					
Number of 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

Georgia Water Loss Program Phasing



Phase 2A - Water Loss Technical Assistance (Small)

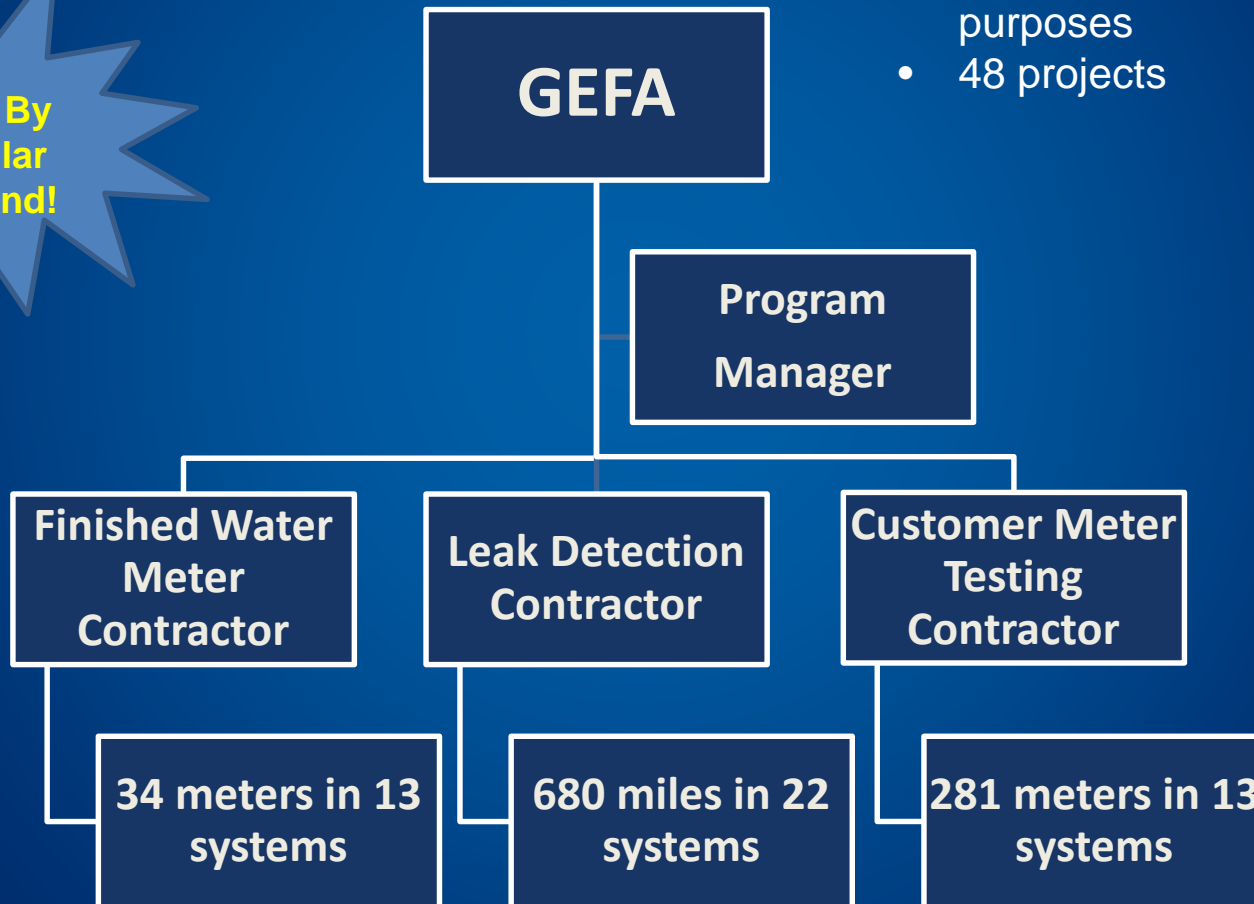
Back By
Popular
Demand!



Phase 2A - Water Loss Technical Assistance (Small)

- Hired one contractor per project type for negotiation purposes
- 48 projects

**Back By
Popular
Demand!**



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

Georgia Water Loss Program Phasing



Statewide Water Loss Management Program – Model Implementation

Phase 1

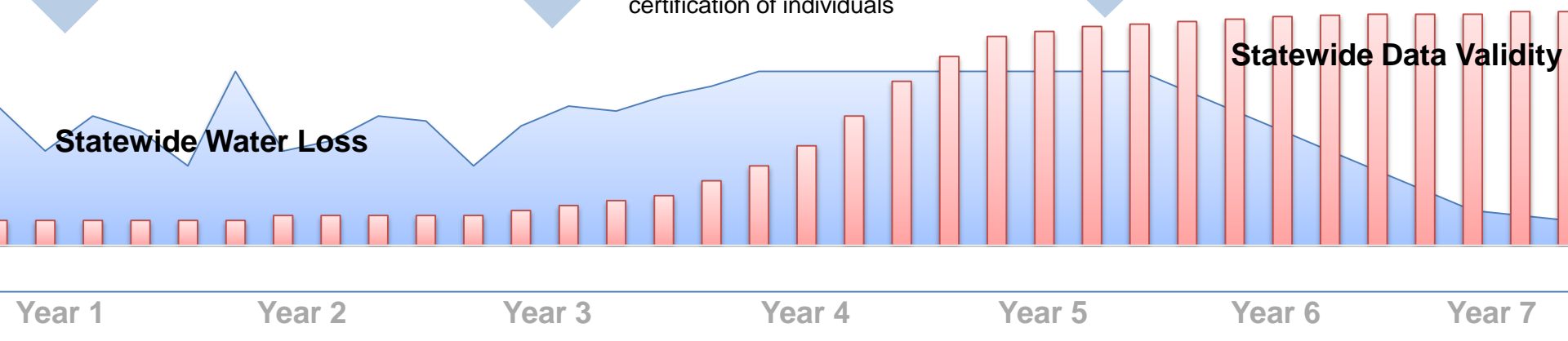
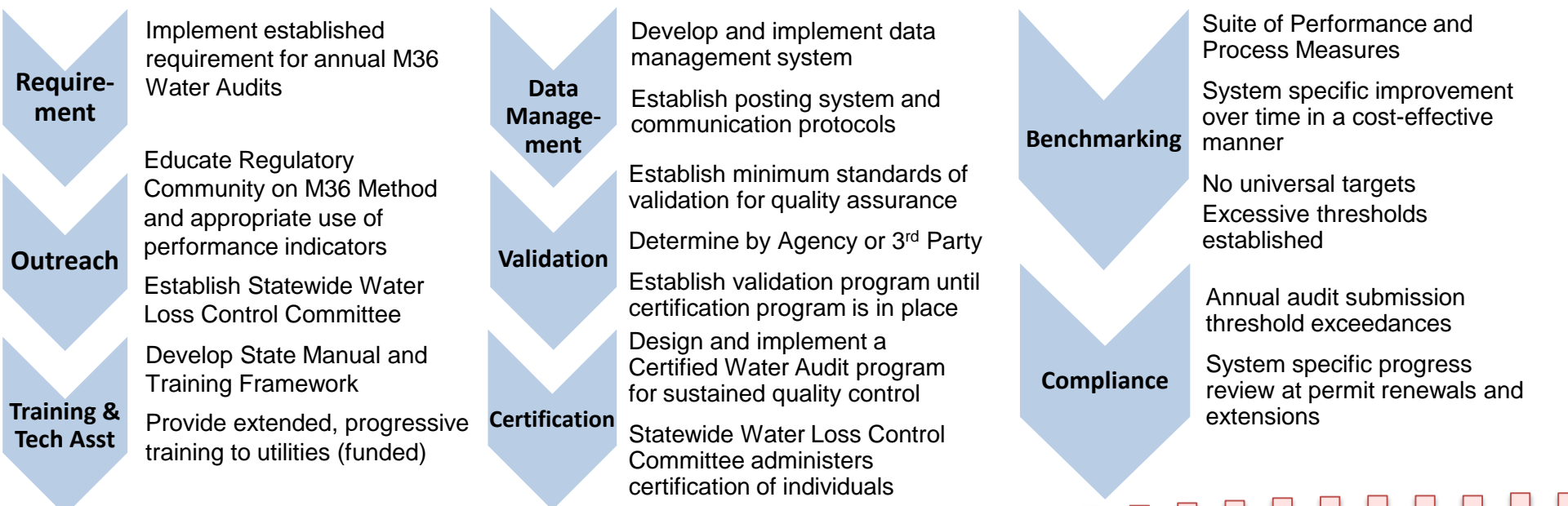
Establish Annual M36 Water Auditing

Phase 2

Achieve Minimum Standard of Audit Reliability

Phase 3

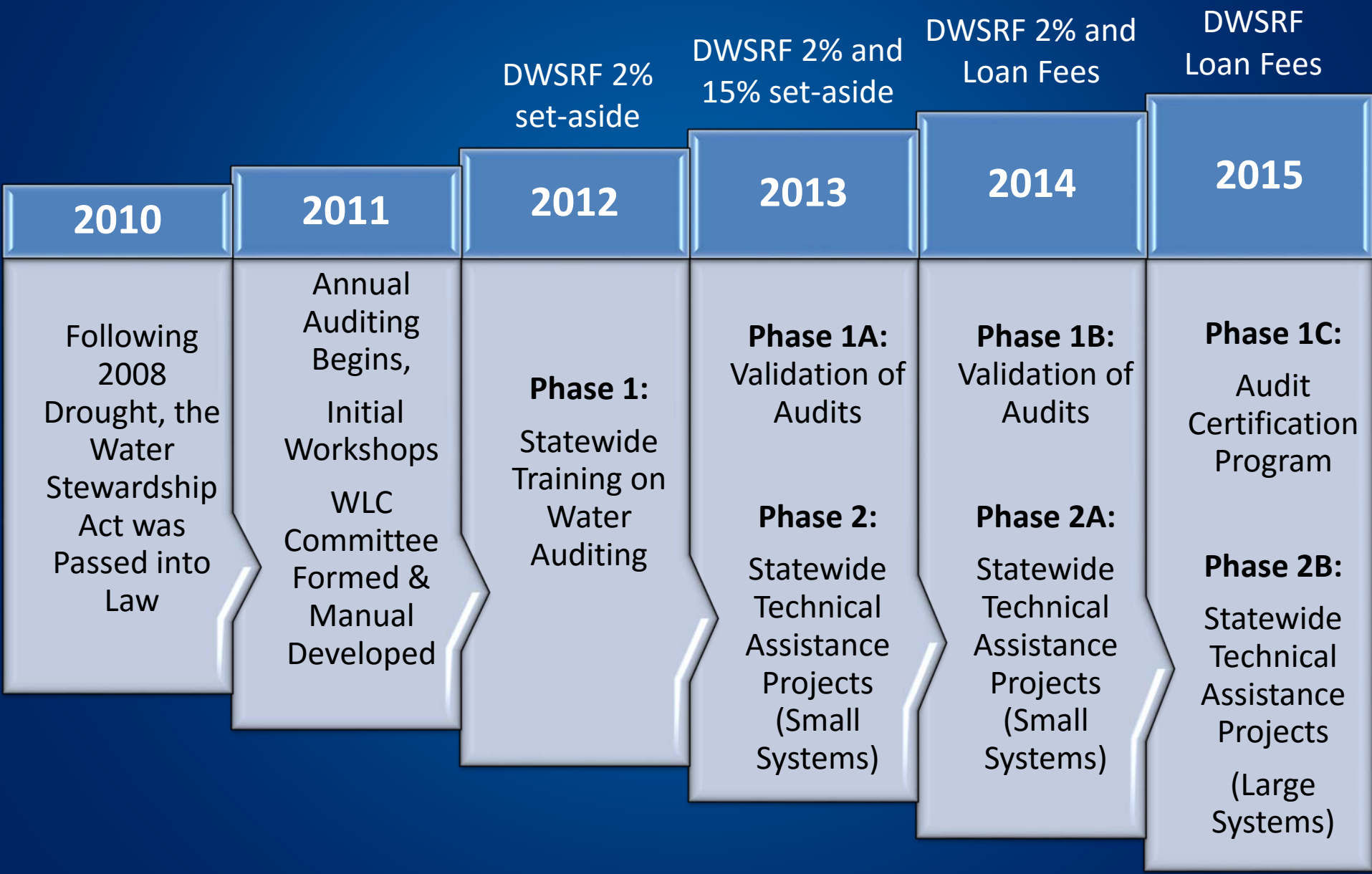
Manage Water Loss Performance for Long-Term Reduction



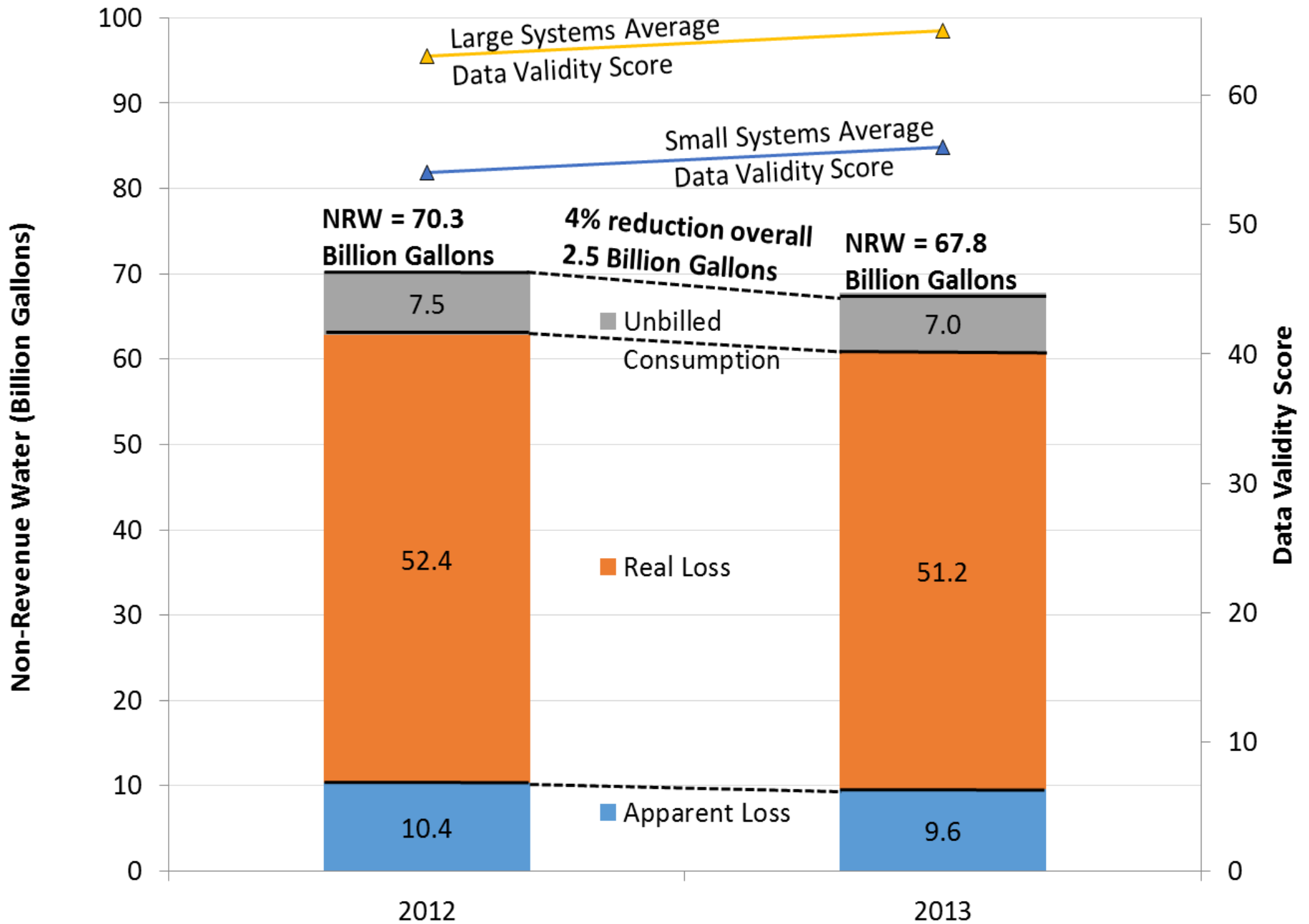
Year 1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7

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

Funding Sources for the Statewide Water Loss Management Program



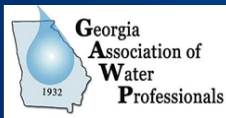
Georgia Non-Revenue Water - Statewide Results





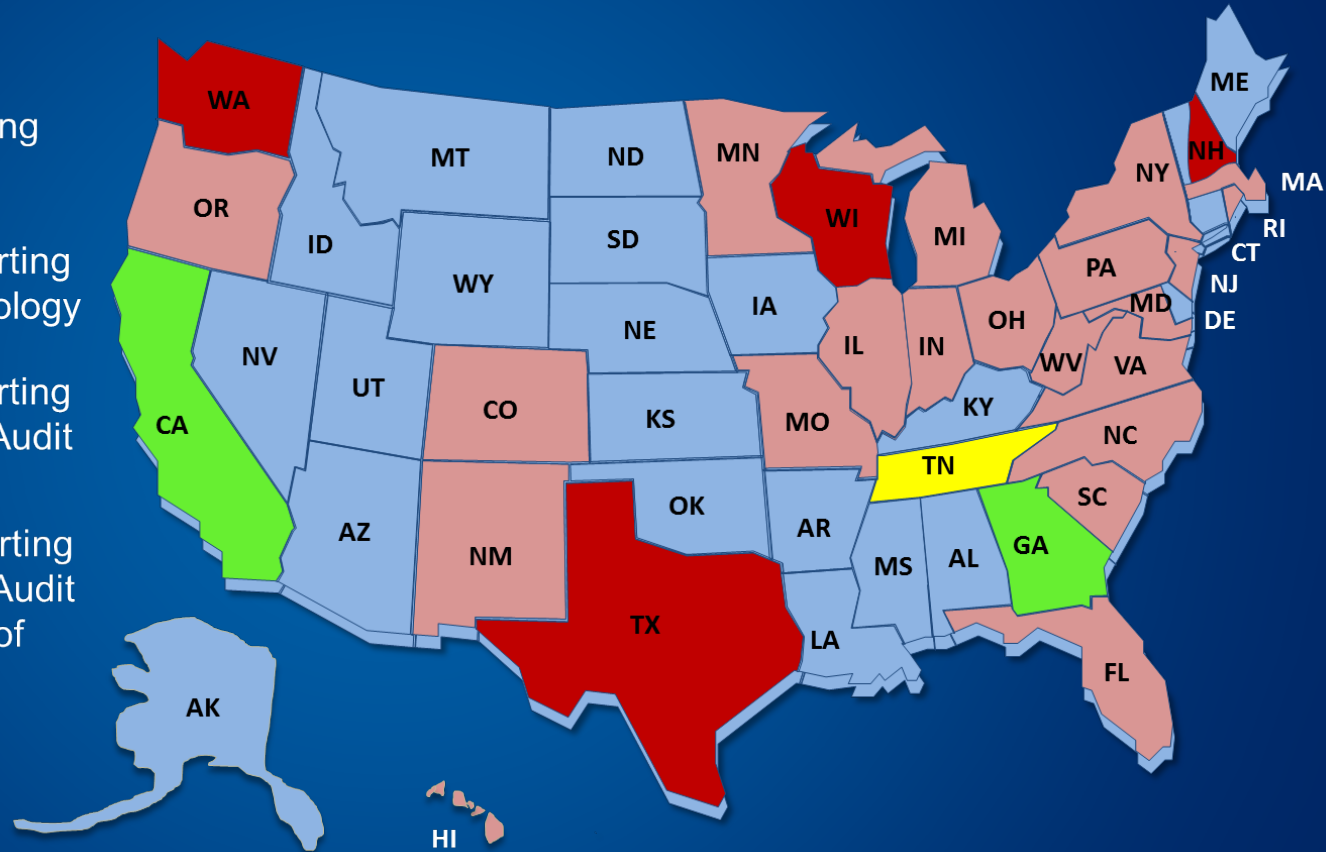
Dec 8-9, 2015
*Conference &
Exposition*
www.gawp.org

- 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
- Use special code **LEAK** for discounted registration rate



Landscape of Varying Levels of Water Loss Management Policy

- No Policy for Water Loss Management
- Basic Water Loss Reporting
- Annual Water Loss Reporting with AWWA M36 Terminology
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