This presentation premiered at WaterSmart Innovations

watersmartinnovations.com



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





Presented by:



Will Jernigan, P.E. will.jernigan@cavanaughsolutions.com

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.

"The U.S. Drought Monitor, whi

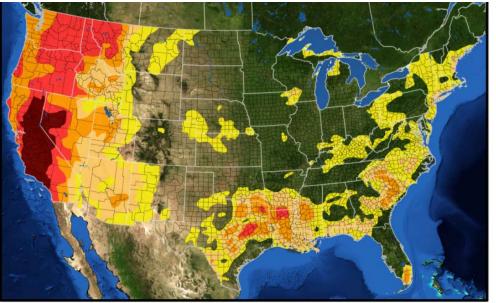
every Thursday, says that 52.00% of th United States - including Alaska, Hav and Puerto Rico - is suffering from a] precipitation and is now abnormally d stuck in a drought," Gawker reported.

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

U.S. Drought Monitor | September 8, 2015

analyses every Tuesday and rele

@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

* * * * * * * * * * * * * * *

Y A VertMarkets 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:

<u>Water Online</u>

ww.wateronline.com The Magazine

Treatment Options And Challenges

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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.



ORIGIN

TCH TRAILE

JULY 18

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?

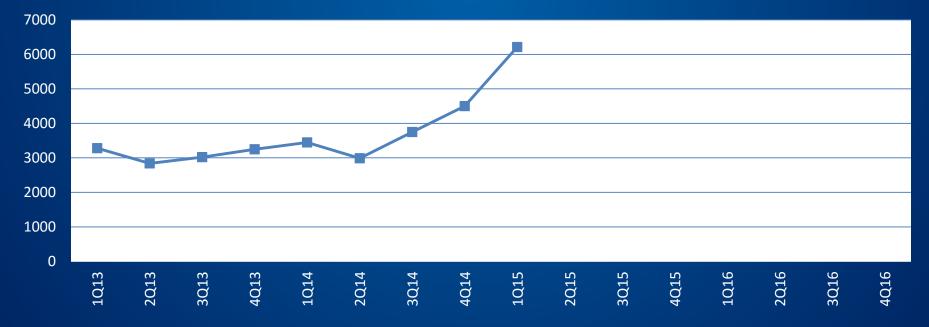
Well, that's what's happening with many water utilities in the United States. The Environmental Protection Agency estimates (pdf) that public water systems lose, on average, one-sixth of their water — mainly from leaks in pipes. The E.P.A. asserts that 75 percent of that water is recoverable. (In truth, the volume of leakage in the nation's 55.000 drinking-water systems is unknown, because few conduct water audits using the <u>standards</u> established by the International Water Association and the American Water Works Association.)





	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
American Water Works	Water Conservation	2	645	585	728
Association	Drought	13	115	99	158
ASSOCIATION	Backflow	3	515	556	661
T	How Water Works	4	474	538	522
Dedicated to the World's Most Important Resource [™]	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

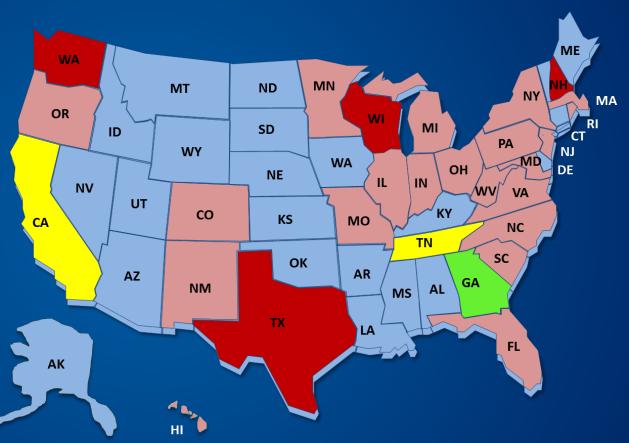
No Policy for Water Loss Management

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



Landscape of Varying Levels of Water Loss Management Policy

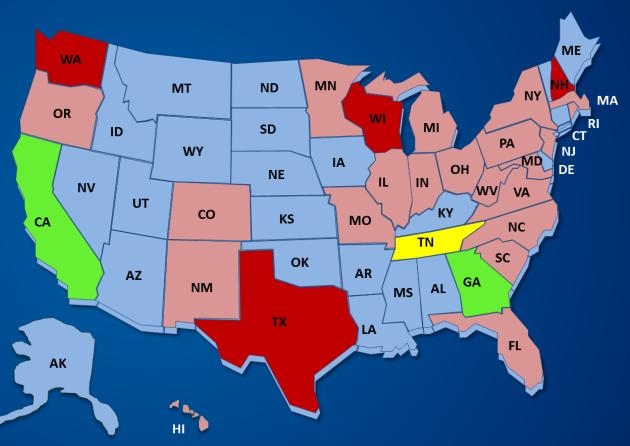
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Outreach

Training &

Tech Asst

Statewide Water Loss Management Program – Model Implementation

Phase 1

Phase 2

Establish Annual M36 Water Auditing

	Implement established
Require-	requirement for annual M36 Water Audits
ment	

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

Establish Statewide Water Loss Control Committee

Develop State Manual and Training Framework

Certification Provide extended, progressive training to utilities (funded)

Achieve Minimum Standard of Audit Reliability

Develop and implement data management system

Establish posting system and communication protocols

Data

Manage-

ment

Validation

Year 3

Establish minimum standards of validation for quality assurance

Determine by Agency or 3rd Party

Establish validation program until certification program is in place

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

Statewide Water Loss Control Committee administers certification of individuals

Phase 3

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

Suite of Performance and **Process Measures**

System specific improvement over time in a cost-effective manner

No universal targets Excessive thresholds established

Benchmarking

Compliance

Year 5

Annual audit submission threshold exceedances

System specific progress review at permit renewals and extensions

Statewide Data Validity

Year 7

Statewide Water Loss

2.2		 			 	
Yea	r 1		Yea	r 2		

Resource Management Grade C

Resource Management Grade B

Year 4

Resource Management Grade A

Year 6

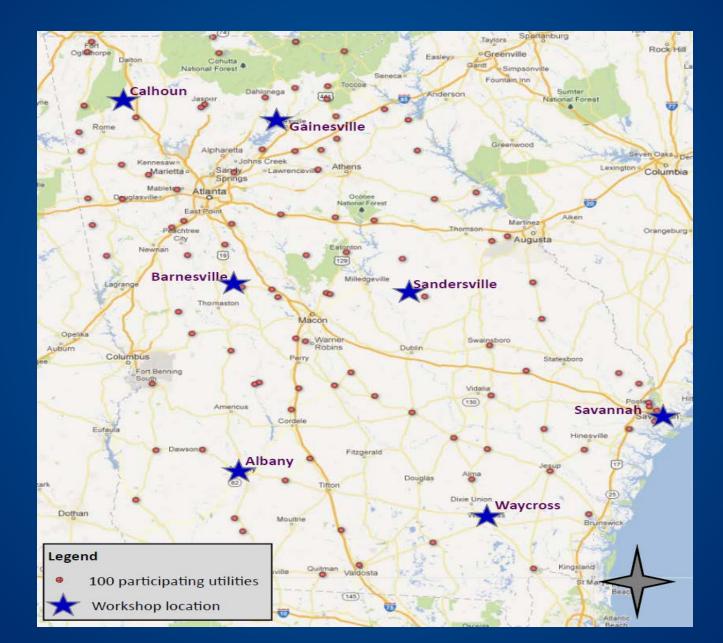
Georgia Water Loss Program Phasing

	1				
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)

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Passed into Law	Committee Formed & Manual Developed	Auditing	Statewide Technical Assistance Projects (Small Systems)	Statewide Technical Assistance Projects (Small Systems)	Phase 2B: Statewide Technical Assistance Projects (Large Systems)

Phase 1 - Water Loss Audit Training



Phase 1 - Water Loss Audit Training

- Webinar kick off
- Workshop 1: Basics
- 2011 Practice Audit & Validation Call
- Workshop 2: Next Steps & Momentum
- Homework Phase
- Workshop 3: Showtime for 2012 Audit
- 2012 Audit Validation Call
- Submittal of 2012 Water Audit to EPD

June 2012 June 2012 July 2012 August 2012 Sept – Dec 2012 Jan-Feb 2013 Feb 2013 March 2013



Utility Feedback: Discoveries



"Discovered production numbers

were significantly off, even though

"Massive amounts of "unbilled" usage"

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

<image>



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		
		AVG	R	Range		AVG	Range		ge	
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		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		5.4	1	-	10	4.3	1	-	10	(1.1)
Annual cost of operating water system		7.9	1	-	10	7.2	1	-	10	(0.7)
Customer retail unit cost		7.4	1	-	10	6.0	2	-	10	(1.4)
Variable production cost		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		Rai	nge	AVG	Range		e	
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		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)

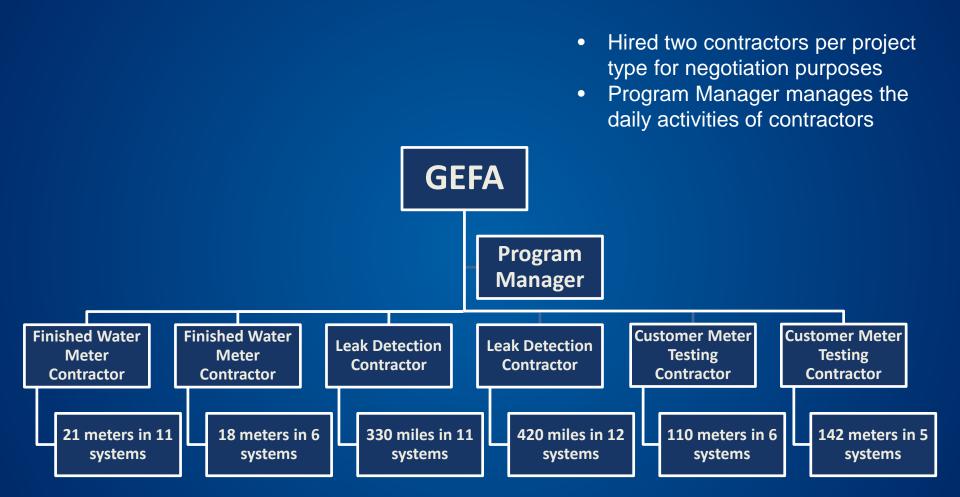
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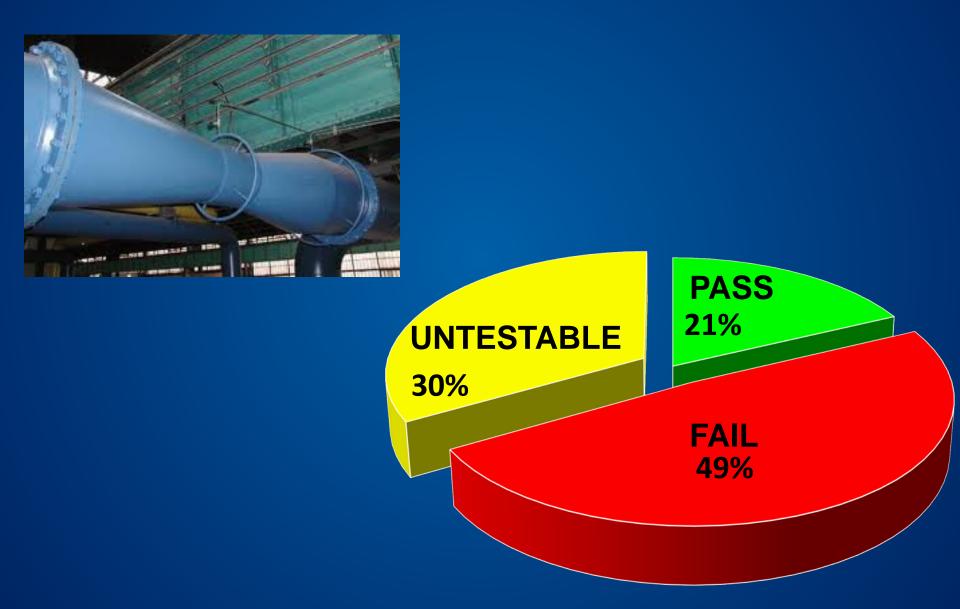
Phase 2 - Water Loss Technical Assistance (Small)



Phase 2 - Water Loss Technical Assistance (Small)



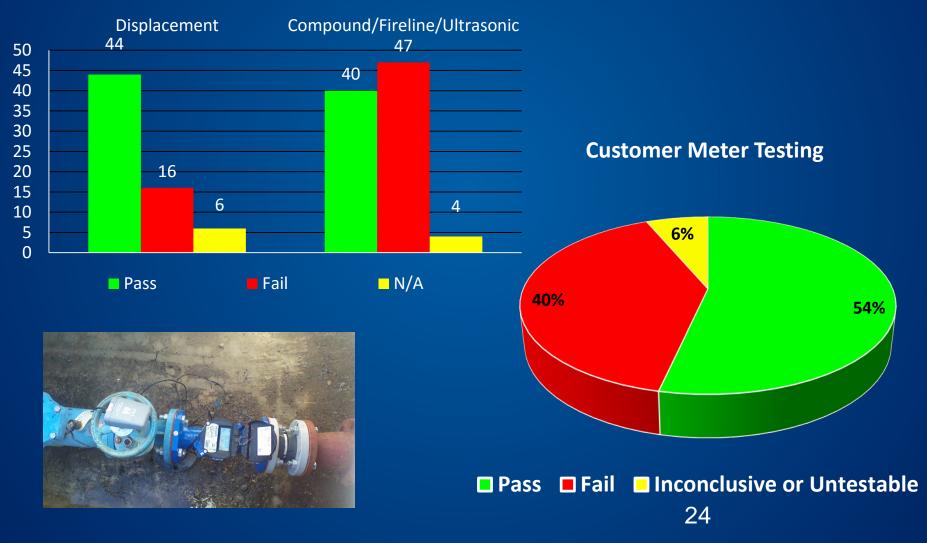
Finished Water Meter Testing





Customer Meter Testing (CMT)

CMT Global Statistics Summary



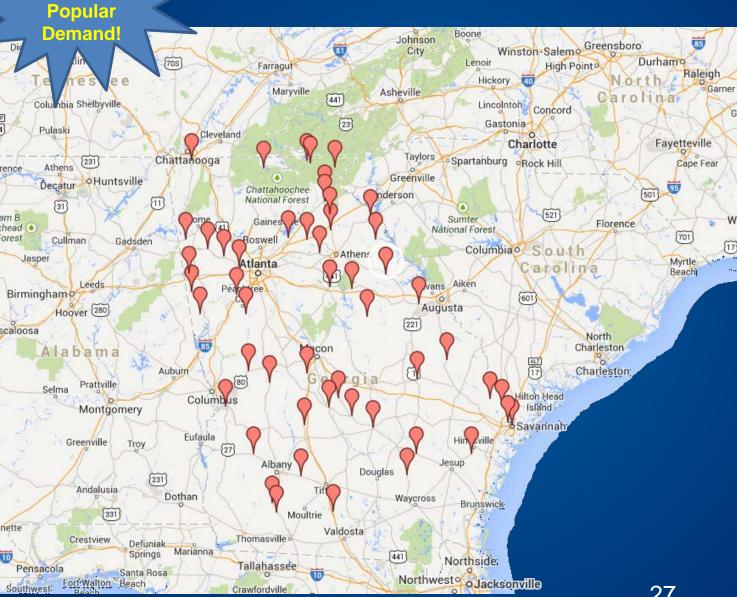
Phase 2 - Water Loss Technical Assistance (Small)

Finished Water Meter Flow Verification									
Number of Participating Water Systems	Number of Finished Water Meters tested		f meters passing WWA 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%				
	Pile	ot Leak Det	tection						
Number of Participating Water Systems	Number of miles of distribution line surveyed	Number of leaks found	Annual leakage volume found (<u>Mgal</u>)	Annual Energy Cost Savings (\$)	Annual Chemical Cost Savings (\$)				
23	731	118	270	35,700	67,800				

Georgia Water Loss Program Phasing

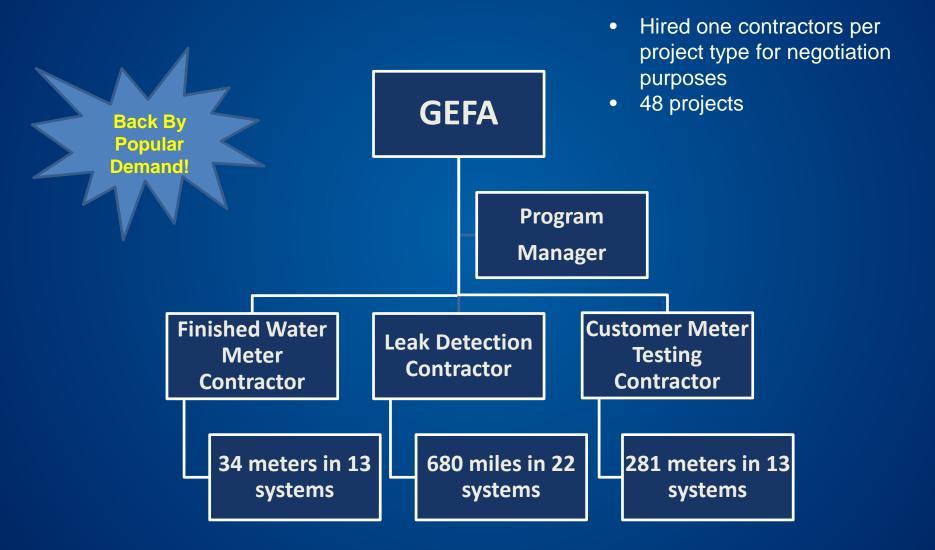
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Phase 2A - Water Loss Technical Assistance (Small)



Back By

Phase 2A - Water Loss Technical Assistance (Small)



Small Water Systems Technical Assistance – Phase IIA Project Summary

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

Georgia Water Loss Program Phasing

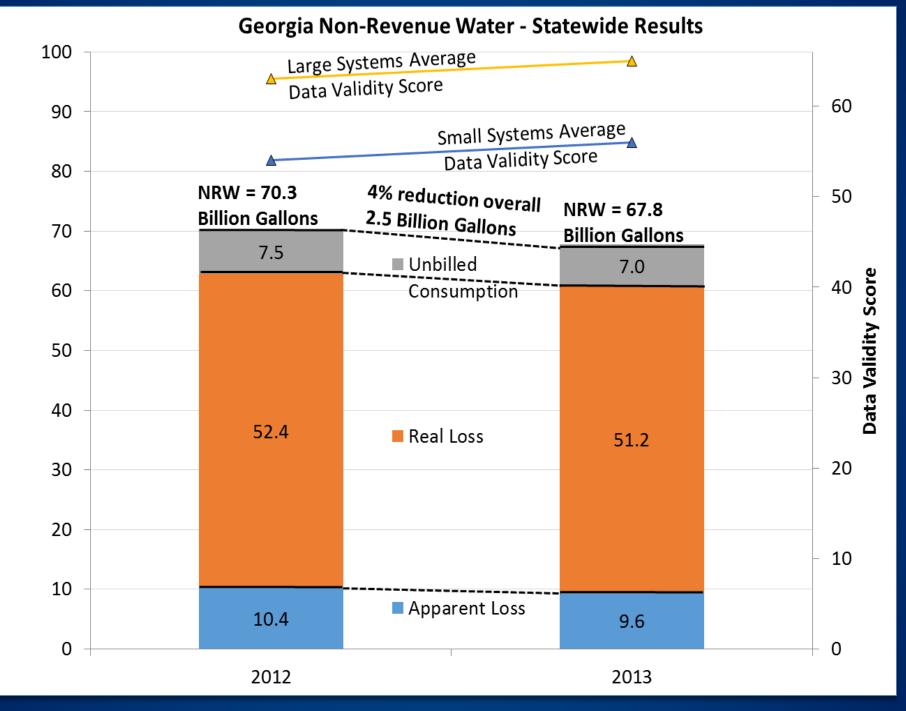
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Statewide Water Loss Management Program – Model Implementation

Phase 1		Phase 2		Phase 3		
Establish Annual M36 Water Auditing			Achieve Minimum Standard of Audit Reliability	Manage Water Loss Performance for Long- Term Reduction		
Require- ment Outreach Training & Tech Asst	Implement established requirement for annual M36 Water Audits Educate Regulatory Community on M36 Method and appropriate use of performance indicators Establish Statewide Water Loss Control Committee Develop State Manual and Training Framework Provide extended, progressive training to utilities (funded)	Data Manage- ment Validation Certification	Develop and implement data management system Establish posting system and communication protocols Establish minimum standards of validation for quality assurance Determine by Agency or 3 rd Party Establish validation program until certification program is in place Design and implement a Certified Water Audit program for sustained quality control Statewide Water Loss Control Committee administers certification of individuals	Benchmarking Compliance	Suite of Performand Process Measures System specific imp over time in a cost-e manner No universal targets Excessive threshold established Annual audit submis threshold exceedan System specific pro review at permit ren extensions	provement effective s ls ssion aces gress
State	wide Water Loss				Statewide Da	ata Validity
Year 1	Year 2	Year 3	Year 4	fear 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

		DWSRF 2%	DWSRF 2% and 15% set-aside	DWSRF 2% and Loan Fees	DWSRF Loan Fees
2010	2011	set-aside	2013	2014	2015
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Law			Statewide Technical Assistance Projects (Small Systems)	Statewide Technical Assistance Projects (Small Systems)	Statewide Technical Assistance Projects (Large Systems)





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ATLANTA, GEORGIA

- 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

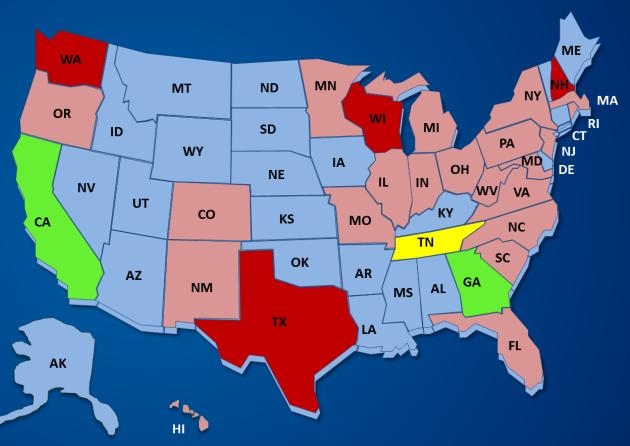
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