

Georgia Water Loss Auditing Validation – A Learning Experience

Results and Analysis of Georgia’s 2011 Validated Water Audits for Large Systems

Lebone Moeti, Georgia EPD
lebone.moeti@dnr.state.ga.us
404.675.1674

Background and Regulatory Drivers

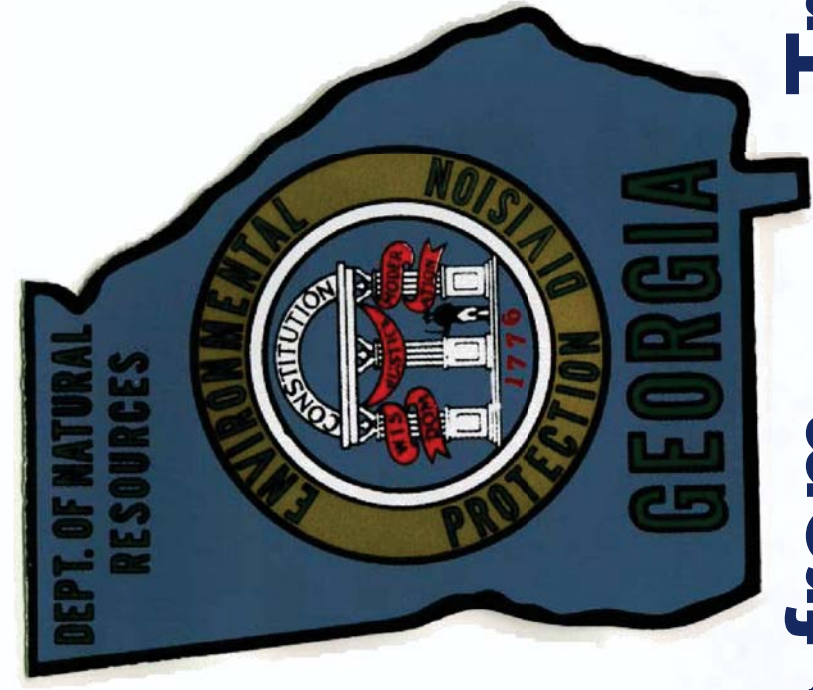
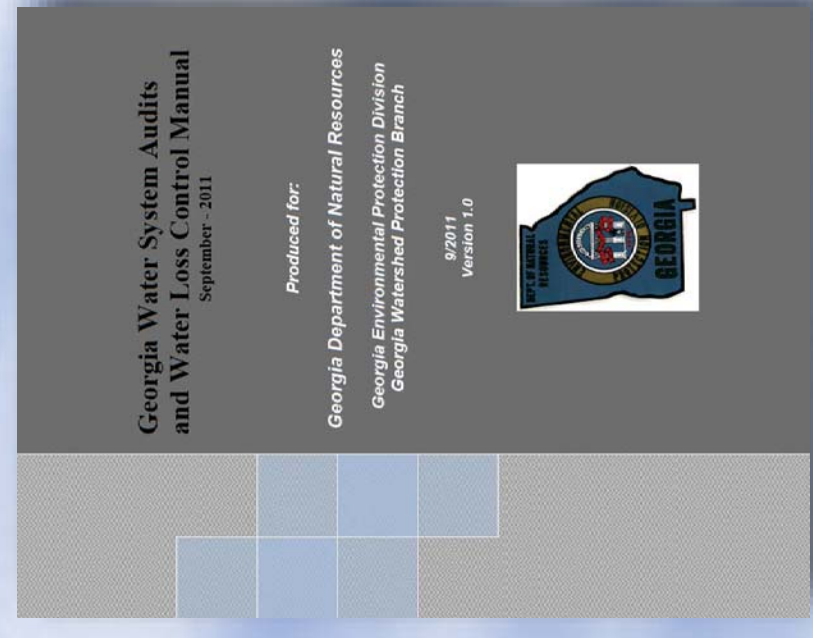
History of Lake Lanier Rulings

- 2009: Fed Court Ruling
 - Water supply was not originally authorized purpose of Lanier
 - Current supply use exceeds Army Corps authority
 - Restricts future water use (2012 deadline)
 - June 2011: Court of Appeals
 - Reversed 2009 Ruling
 - Vacated the 2012 deadline
 - Dismissed requirement for Congressional approval
 - June/July 2012
 - US Supreme Court declines to hear appeal.
 - Army Corps must determine how it will operate Lanier to meet water supply and the other authorized purposes.
 - August 2013
 - Florida Governor announces plans to sue Georgia
- Georgia Water Stewardship Act of 2010**
- Recognizes imminent needs to create a culture of water conservation in the State of Georgia and to plan for water supply enhancement during future extreme drought conditions and water emergencies. Six key provisions:
- 1)Requires state agencies to review and enhance conservation programs
 - 2)Revises standards for plumbing fixtures and devices
 - High efficiency plumbing fixtures (toilets, showerheads and urinals)
 - Sub-metering for multi-unit buildings (after July '12)
 - High efficiency cooling towers for commercial and industrial (after July '12)
 - 3)Mandates public water systems to conduct annual water audits and follow leak abatement best practices
 - 4)Modifies authorities to restrict outdoor water use and establishes a schedule for outdoor irrigation
 - 5)Calls for amendments to permitting system for farm water use
 - 6)Created a Water Supply Study Commission to study and analyze the state’s reservoir system and strategic needs for additional water supply



Specific Requirements for Water Suppliers

- Annual water system audits, phased-in based on size of service area:
- Water systems serving >10,000 individuals initial audit by 2012
 - Water systems serving 3,300 to 10,000 individuals audits by 2013
 - IWA/AWWA Method and Infrastructure leakage index (ILI)
- Submitted 2011 large system audits posted on EPD website http://gaepd.org/Files_PDF/whats_news/2011_GeorgiaPWS_WaterAuditResults.pdf
- EPD provided guidance for water systems conducting audits
- Georgia Water System Audits and Loss Control Manual (2011)
 - Full-day Workshops (5 in Fall 2011, 6 in Spring 2012, 3 in Fall 2012)
 - Technical Assistance for Audits and Leak Detection Grant Program (Small Water Systems) Starting June 2012
 - Expected future workshops statewide

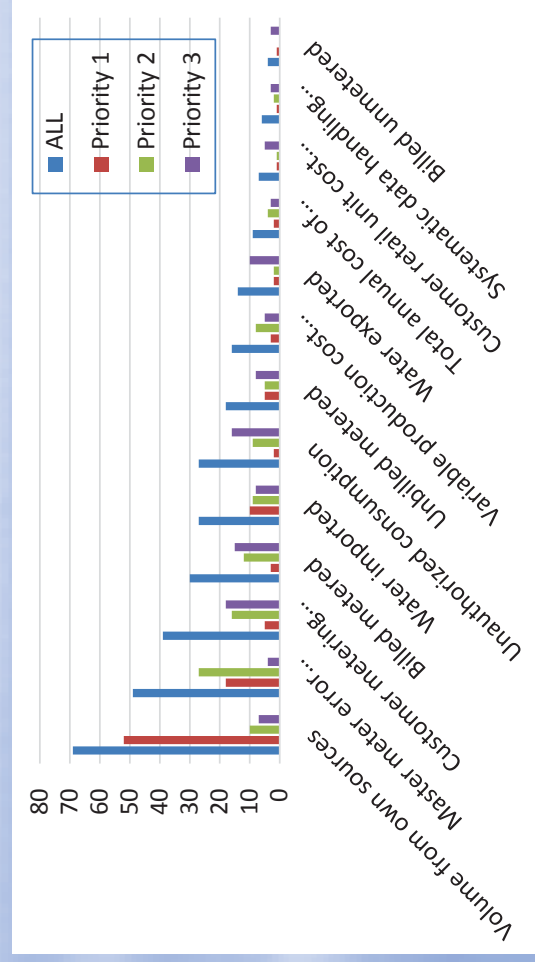


Validated Audit Results from the Large and Small Systems

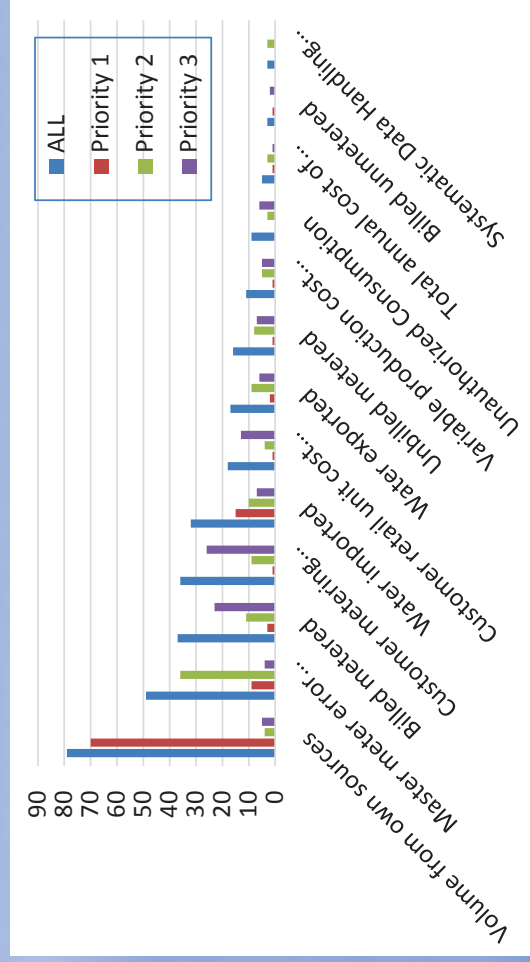
- Need for validation – based on initial review of large system audits in April 2012
- AWWA WLCC Water Audit Validation Process, standard set of questions, individual water system discussions about input and grading, uniform adherence to grading matrix definitions, consistent definitions and calculations
- 107 validated large system and 100 validated small system water audits - Combined 207 validated audits!
- Largest set of validated audits in North America, perhaps even in the world!

Form Source: AWWA Water Loss Control Committee EPD Large Systems 2011 Water Audit Validation 2011 Audit Validation Call Document									
Performance Improvement Data (Pre-Validation)		Water Utility Information (Pre-Validation)		Water Audit Data (Post-Validation)		Infrastructure Information (Post-Validation)		Validation Results (Post-Validation)	
Component	Quantity	Starting	Ending	Starting	Ending	Starting	Ending	Starting	Ending
Volume from own sources									
Master meter error adjustment									
Water imported									
Water exported									
Billed metered									
Billed unmetered									
Unbilled metered									
Unbilled unmetered									
Unauthorized consumption									
Customer metering inaccuracies									
Systematic data handling errors									
Length of mains									
# of active + inactive svc connections									
Average length of customer svc line									
Average operating pressure									
Annual cost of operating water system									
Customer retail unit cost									
Variable production cost									
Water Audit Data Validity Score	107	68.8	39	-	94	62.9	38	-	81

	n	AVG	Range	Pre-Validation	Post-Validation	Change
Volume from own sources	90	7.3	1 - 10	6.2	1 - 10	(1.1)
Master meter error adjustment	94	5.4	1 - 10	4.8	1 - 10	(0.6)
Water imported	50	7.9	3 - 10	6.4	2 - 10	(1.4)
Water exported	51	7.7	2 - 10	6.4	2 - 9	(1.3)
Billed metered	106	7.4	3 - 10	6.5	2 - 10	(0.9)
Billed unmetered	19	8.2	4 - 10	7.1	3 - 10	(1.1)
Unbilled metered	72	6.7	1 - 10	6.4	1 - 10	(0.3)
Unbilled unmetered	107	5.4	2 - 10	5.4	2 - 10	(0.0)
Unauthorized consumption	107	5.1	2 - 9	5.0	2 - 7	(0.1)
Customer metering inaccuracies	106	6.1	2 - 10	5.3	2 - 10	(0.8)
Systematic data handling errors	107	5.9	2 - 10	5.7	2 - 9	(0.1)
Length of mains	107	6.6	1 - 10	6.6	1 - 10	0.1
# of active + inactive svc connections	107	6.3	1 - 10	6.3	1 - 10	0.0
Average length of customer svc line	107	8.5	2 - 10	10.0	10 - 10	1.5
Average operating pressure	107	5.4	1 - 10	5.1	1 - 10	(0.2)
Annual cost of operating water system	107	7.9	1 - 10	8.5	1 - 10	0.6
Customer retail unit cost	107	7.4	1 - 10	6.4	1 - 10	(1.0)
Variable production cost	107	7.2	2 - 10	6.8	2 - 10	(0.4)
Water Audit Data Validity Score	107	68.8	39	-	94	62.9



Pre-Validation Priority Areas for Improvement



Post-Validation Priority Areas for Improvement

Brian Skeens, CH2M HILL
brian.skeens@ch2m.com
678.530.4327

Observations from Validated Audit Results

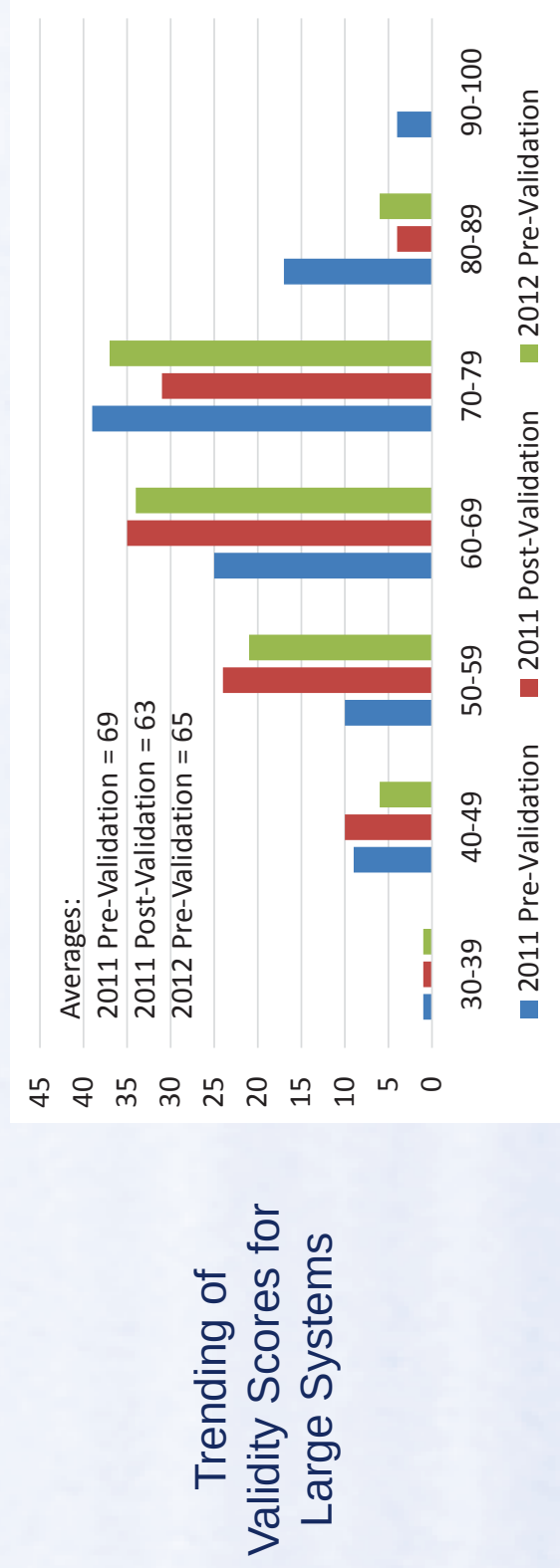
- Volume from own sources was the top area for improving audit results for both large and small validated systems
- For large validated systems, second top priority is master meter error adjustment, for small systems it is billed metered
- Validity scores decreased due to validation for both large and small systems; ILI scores increased
- Large system average validation score (63) was higher than average small system validation score (54)
- GEFA small system technical assistance program
- Trending for all variables for 2012 large systems show mixed results – not validated
- Real losses as percent of volume (water supplied) greater than 15% - large systems (47%) and small systems (56%)

Planned Use of Water Audit Results by EPD

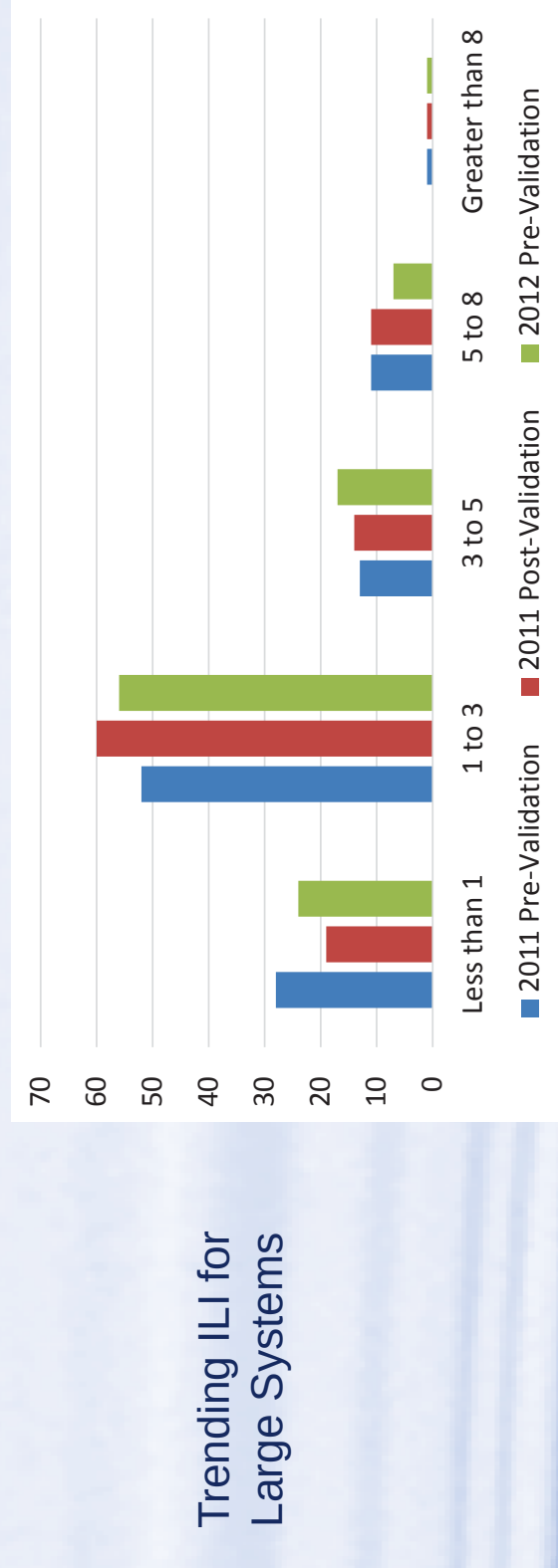
- Establish bench marks for real losses as percent by volume in a year or two (2014 or 2015)
- In consultation with the GAWP/GAWWA Water Loss Control Committee
- Audit results will inform decisions on:
 - water withdrawal permit applications
 - drinking water plant expansions
 - needs assessments for reservoir projects
 - GEFA funding for water projects
- Audit results will serve as Inputs into the Water Use and Efficiency Reporting Guidance
- Input for Regional Water Plans and the State Water Plan
- Ensure the continued and sustained momentum of water audits
- Determine the type and need of on-going technical assistance

Summary

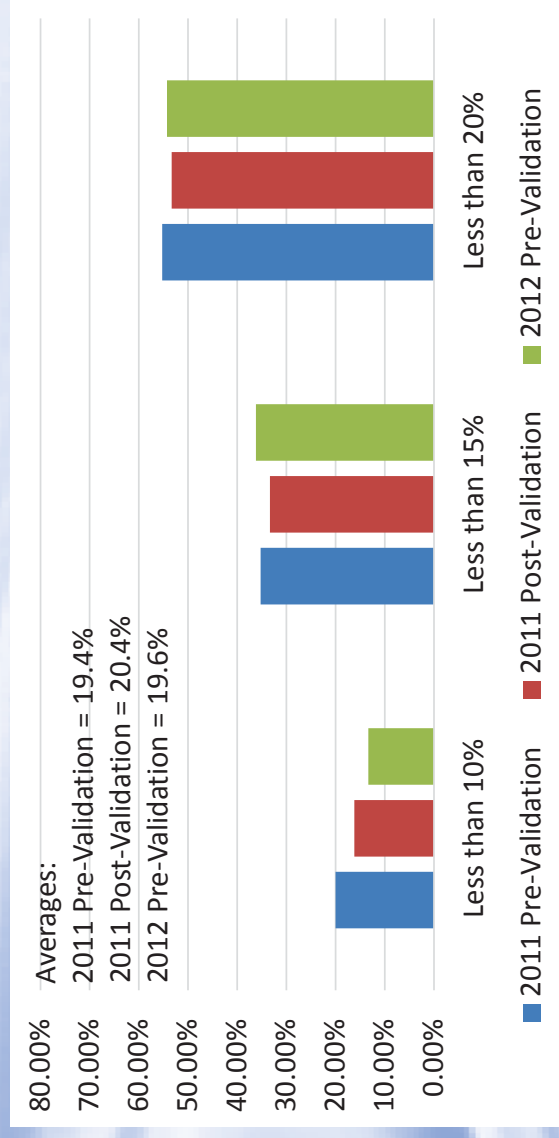
- Combined 207 Georgia validated audits are probably the largest set in the world
- Trending of large system water audits shows need for continued technical assistance – validation
- Sustaining the momentum of the water audit program through GAWWA Water Loss Control Committee
- Validity scores decreased after validation
- ILI scores increased after validation
- Trending for all audit variables for 2012 large systems show mixed results – not validated
 - Validity scores increasing and ILI scores decreasing
- Large systems (47%) and small systems (56%) have real losses as percent of volume (water supplied) greater than 15%



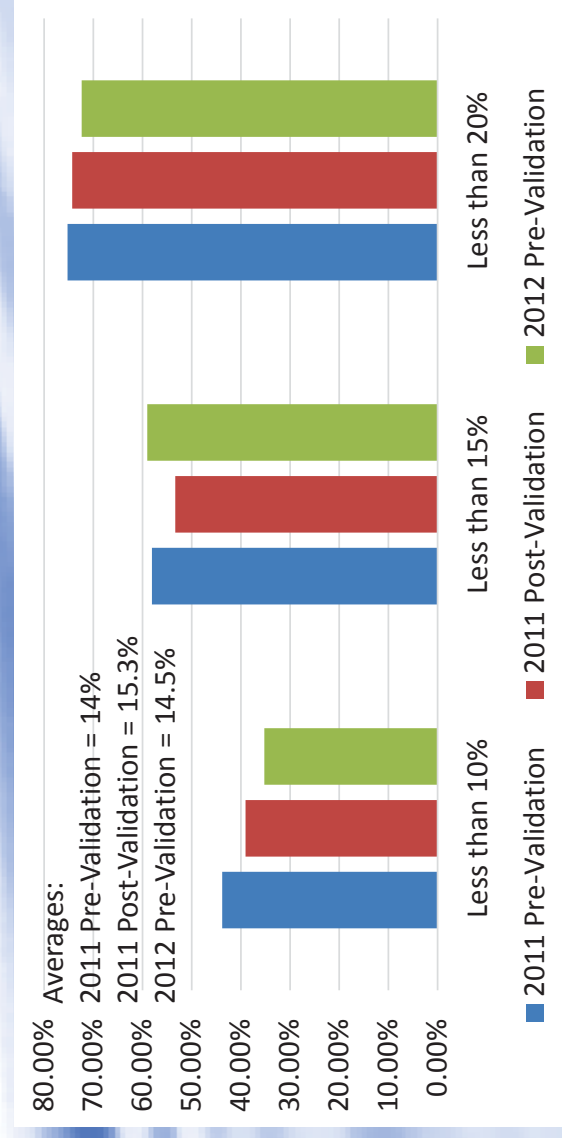
Trending of Validity Scores for Large Systems



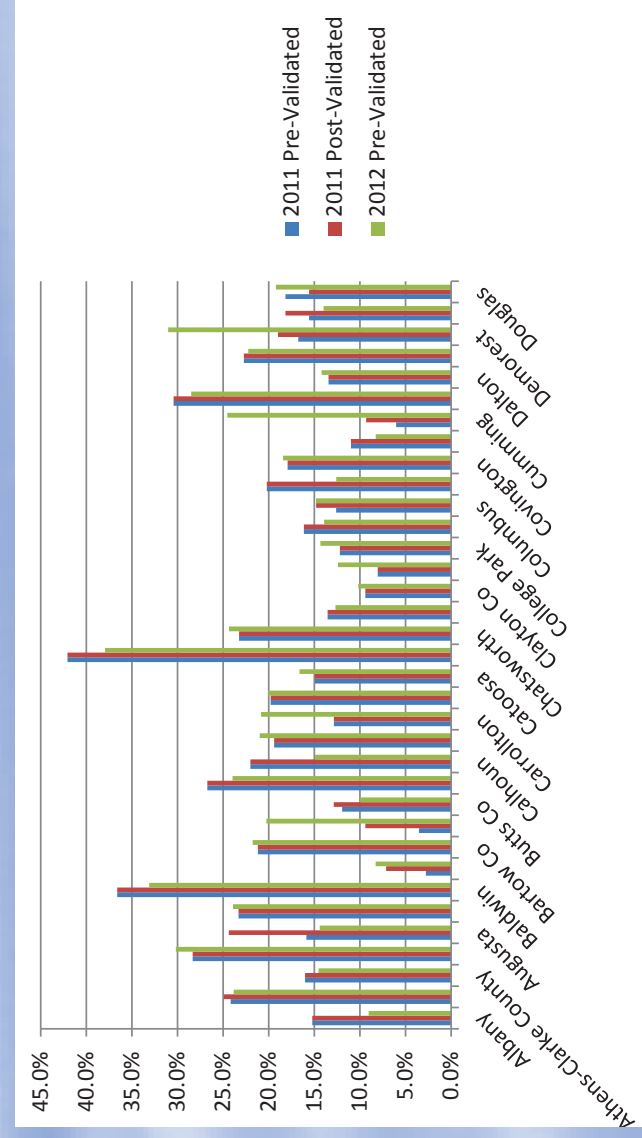
Trending ILI for Large Systems



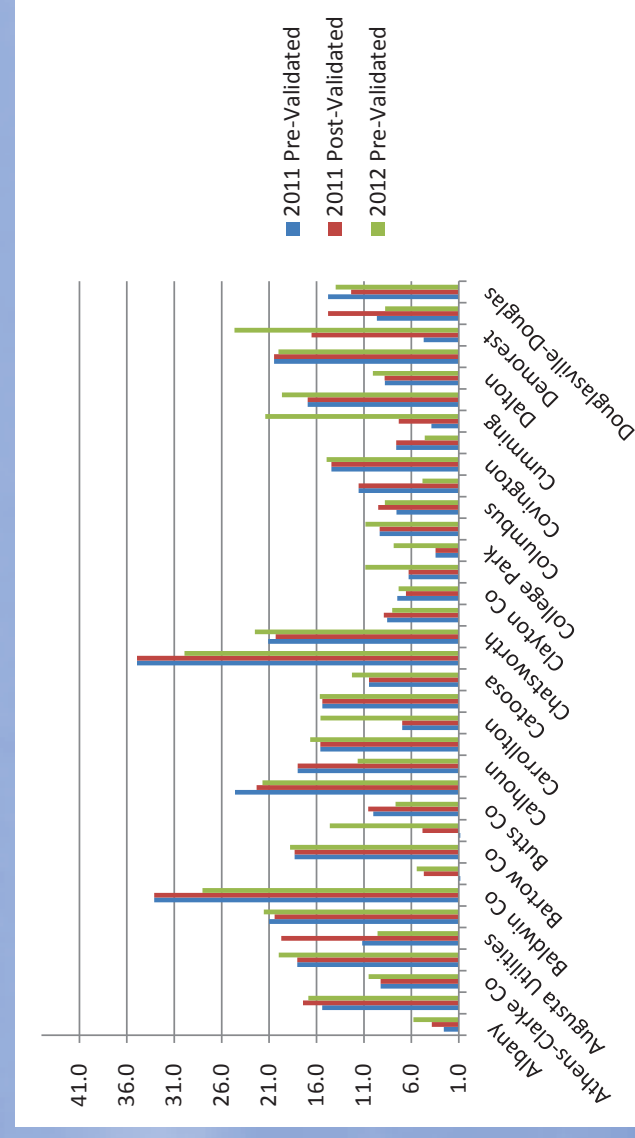
Trending NRW % by Volume for Large Systems



Trending Real Losses % by Volume for Large Systems



Trending Individual Large Systems Non-revenue Water percent by Volume



Trending Individual Large Systems Real Losses as percent by Volume