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Overview of Georgia's New Water Conservation and Efficiency Efforts

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Presentation Outline

- Conservation in Georgia
- Water Stewardship Act of 2010
- Water Audit Background and Preliminary Results
- Variances from Outdoor Watering
- Databases and Capacity
- Resources
- Summary

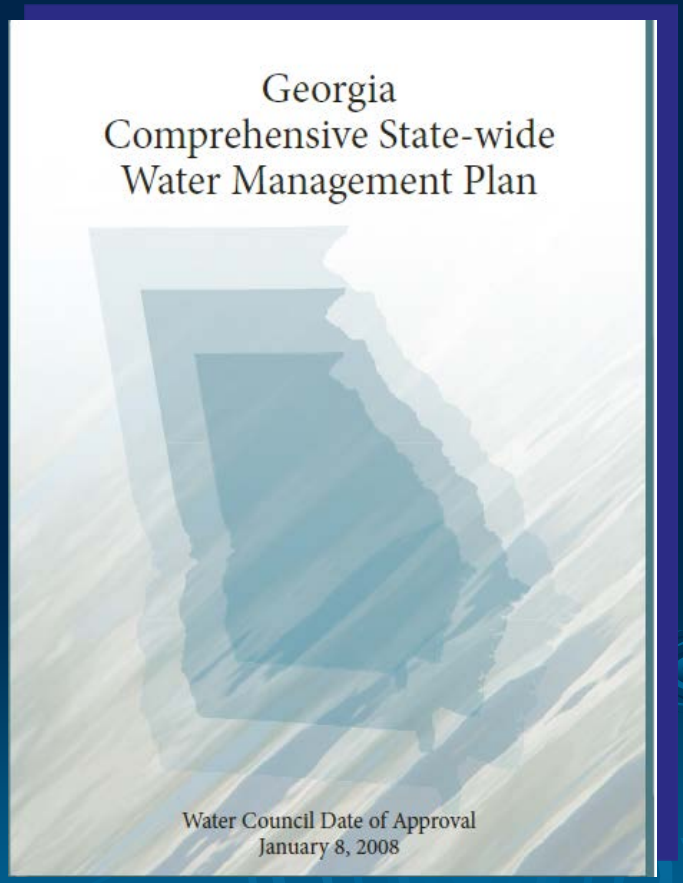
Conservation in Georgia

- The beneficial reduction in water waste, water loss and water use
- Many Benefits:
  - Protect river flows and aquifer levels
  - Extend the life of existing supplies
  - Demonstrate responsible use of shared waters

The ultimate goal of water conservation is not to prevent water use, but to maximize each gallon of water used (WCIP 2010)

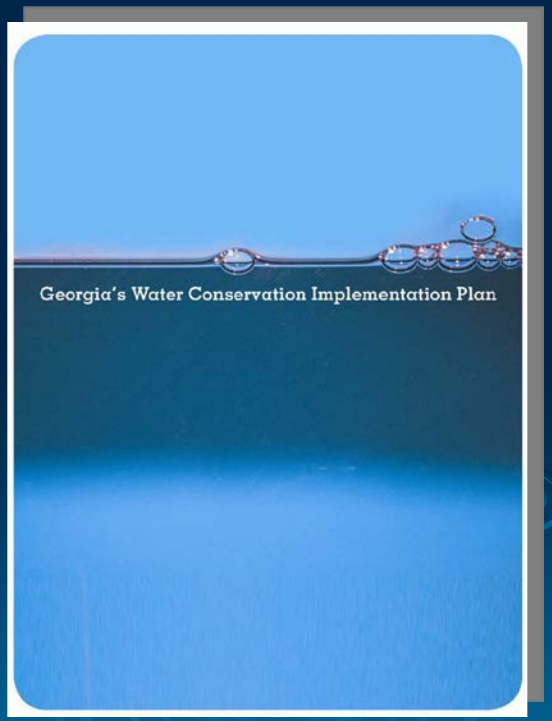
Statewide Water Management Plan

- The State Water Plan identifies WC as a ***priority*** water quantity management practice (SWP Sec. 7, Policy 3)
- While WC is not expected to fully meet water needs, it is an effective and efficient practice for all water users (SWP Sec. 8, Policy 1)



Water Conservation Implementation Plan

- The WCIP creates a common vision for water conservation
- Called for through Executive Orders and Statewide Water Management Plan
- Can be used by organizations, agencies, water user sectors, regional water planning councils and individual water users

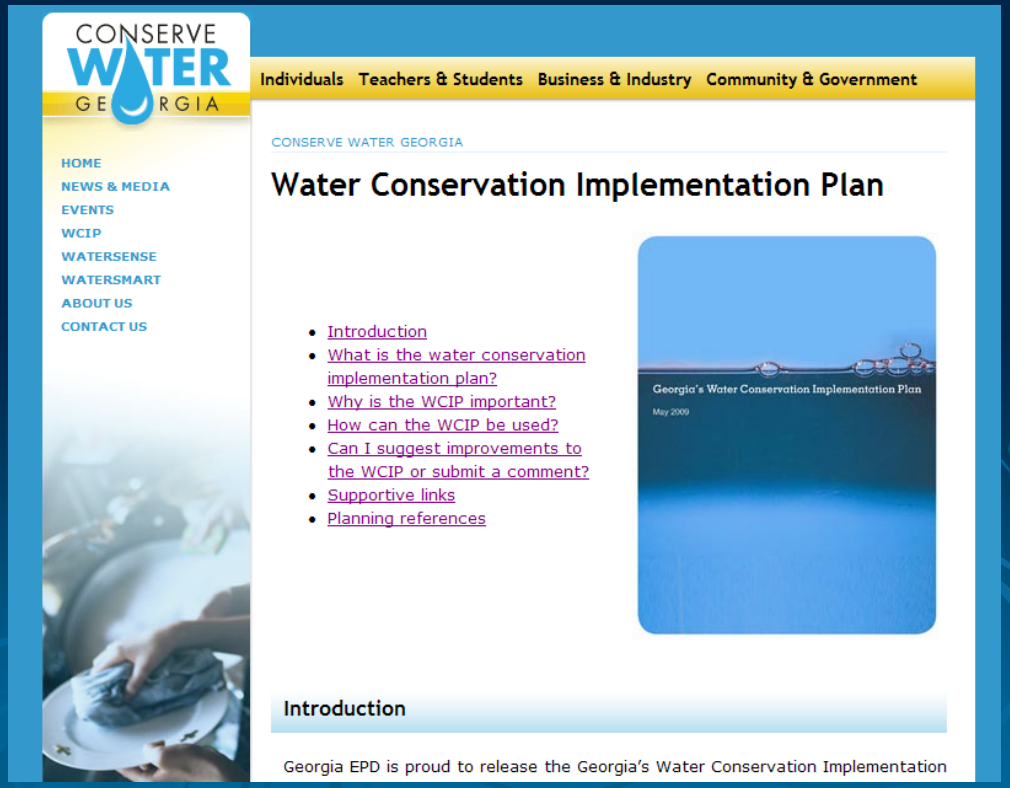


WCIP

- The WCIP is not regulation, but a resource for all Georgia water users.
- Includes sector specific goals, benchmarks, practices, and implementation actions for:
  - Agricultural Water Use,
  - Electric Generation,
  - Golf Course Water Use,
  - Industrial and Commercial,
  - Landscape,
  - Public water providers, and
  - State agencies.

WCIP

- The WCIP can be found through : www.ConserveWaterGeorgia.net or www.GeorgiaWaterPlanning.org

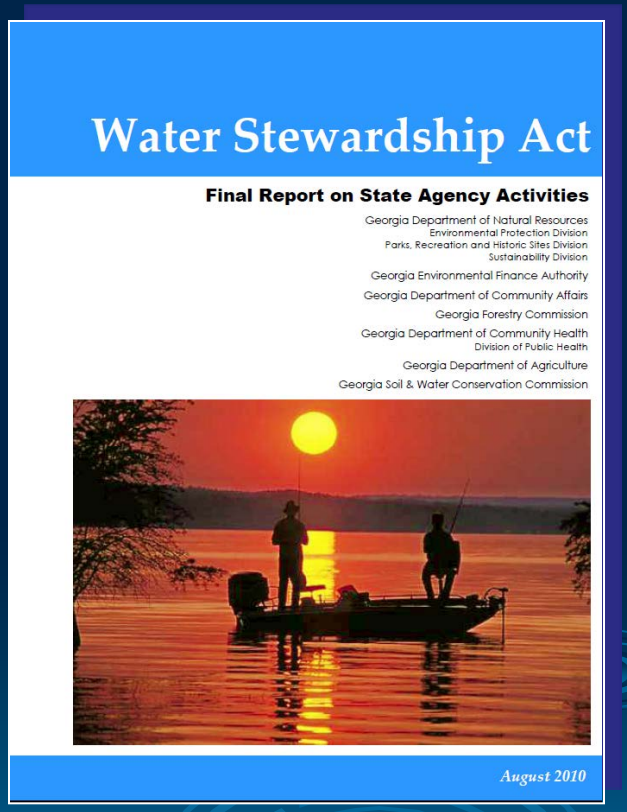


Water Stewardship Act of 2010

- WSA was enacted by 2010 General Assembly
- Reaffirms "the imminent need to create a culture of water conservation in the State of Georgia"
- Based on recommendations of Water Contingency Task force and supported by details of the WCIP

WSA - Key Provisions

1) Requires state agencies to inventory and enhance policies and programs that encourage conservation.
2) Mandates medium and large public water systems to conduct annual water audits and follow leak abatement BMPs



Key Provisions of the WSA (cont)

3) Revises state construction standards for buildings constructed after July 2012
   - High efficiency plumbing fixtures (toilets, showerheads and urinals)
   - Sub-metering for multi-unit buildings
   - High efficiency cooling towers for commercial and industrial
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

High Efficiency Plumbing

- New requirements effective July 1, 2012:
  - High efficiency plumbing fixtures (toilets, showerheads and urinals)
  - Sub-metering for multi-unit buildings
  - High efficiency cooling towers for commercial and industrial
- Dept of Community Affairs amended State Plumbing and Building Code in November 2011.
- Educational efforts
  - Informational sessions to building officials – DCA
  - Professional Plumbers and Builders - Associations
  - **Citizen Education**

Upcoming Amended WC Rules

- Per the WSA and the SWP, DNR is to amend rules related to conservation and water loss
- Strawman Draft Rules released in Nov. 2011
  - Informally collected stakeholder comments
  - EPD redrafting using input to begin formal process
    - Conservation Guidance Document for Public Water Systems
    - Rules to follow at a later date
- Amended rules will likely include:
  - Clarification/update of terminology
  - Incentives for reporting efficiency
  - Water audit standards and procedures
  - Consolidated reporting requirements

Water Audit Background and Preliminary Results

- GA WSA requires annual water system audits (calendar year)
- Phased-in approach 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
  - Infrastructure leakage index (ILI)
  - In accordance with the International Water Association (IWA) method/standard
- Submitted audits to EPD to be posted online

What will EPD do with the Audits?

- Increase adoption of IWA/AWWA methodology and AWWA Free Water Audit Software ©
- Post results to website
- Create guidance and technical assistance for systems to improve validity over time
- Track water loss control statewide through annual water system audits

Guidance and Assistance for Water Suppliers

- EPD provided guidance for water systems conducting audits – GEFA funded
  - Georgia Water System Audits and Loss Control Manual (2011)
  - Full-day Workshops (5 GAWP Fall 2011, 6 GRWA Spring 2012)
  - Technical Assistance for Audits and Leak Detection Grant Program (Small Water Systems) Started June 2012
  - Technical assistance for small systems based on lessons learned from the large systems audit submissions
  - Future workshops statewide for large systems

Specific Requirements for Water Suppliers

- Requirement for public water systems to conduct standardized annual water loss audits.
- Technical assistance program
  - Georgia Water Systems Audit and Loss Control Manual
  - Supporting Workshops
- Water audits to be done in accordance with International Water Association/ American Water Works Association (IWA/AWWA) methods
  - AWWA Free Water Audit Software ©
- Minimum Guidelines (Rule Making) which will require the above for specific water providers.

Water Industry Drivers

- Terminology; Historically a Lack of standardized definitions of water and revenue losses
- Technical; Not all water supplied by a water utility reaches the customer
- Financial; Not all of the water that reaches the customer is properly measured or paid for

IWA/AWWA Methodology

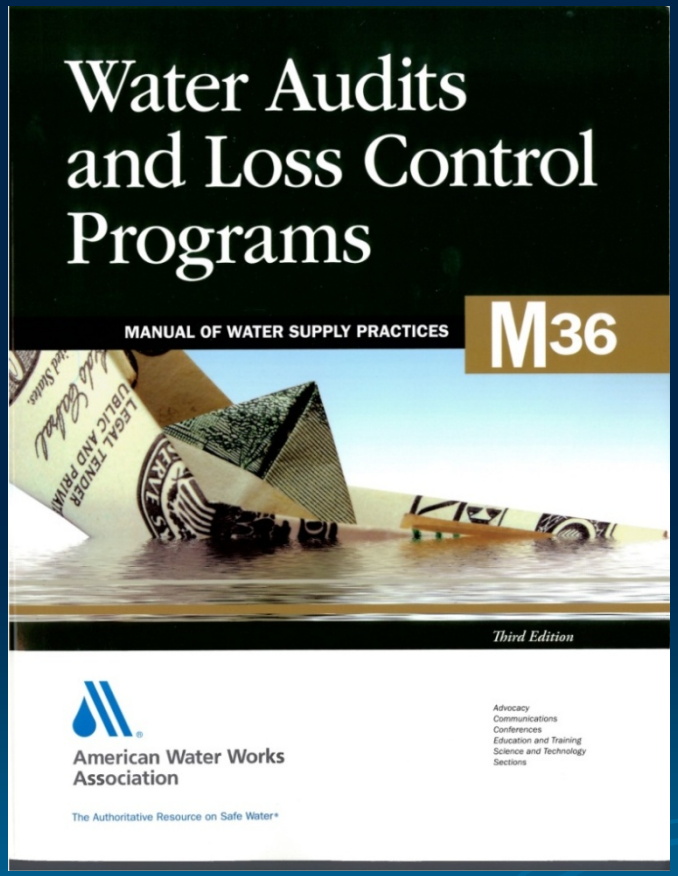
- International Water Association (IWA) and American Water Works Association (AWWA)
- Nationally and internationally accepted methodology
- Provides definitions and a standard set of performance indicators
- Fully vetted and continually critiqued

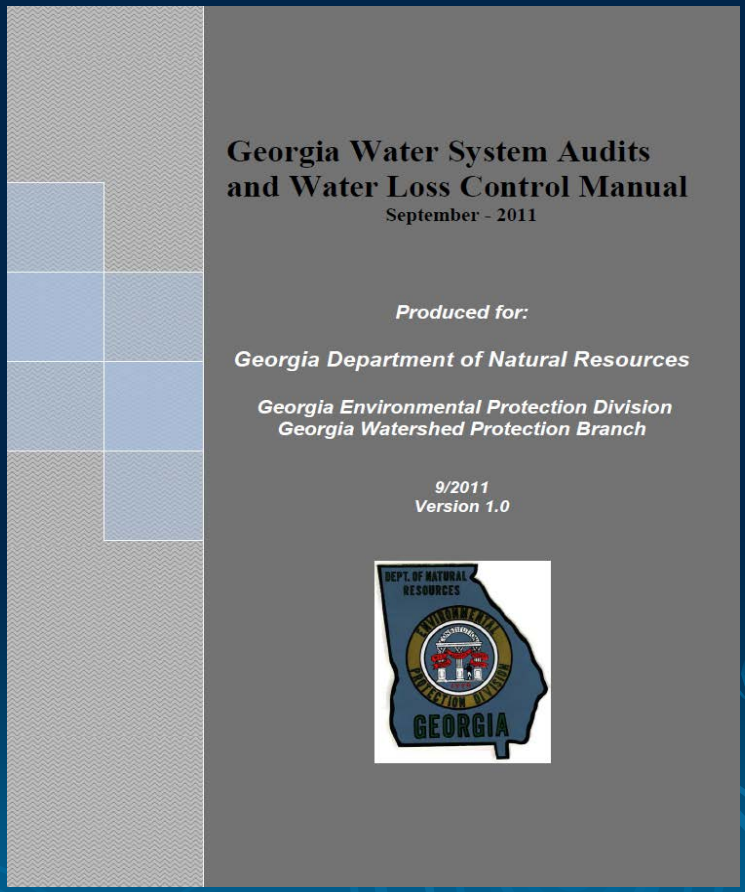
GA Water Loss Control Manual

- EPD contracted with Georgia Association of Water Professionals (GAWP) to assist in developing best practices and training
- Convened 12 in- and out-of-state experts
- Stakeholder input collected
  - Informational sessions
  - Email communication

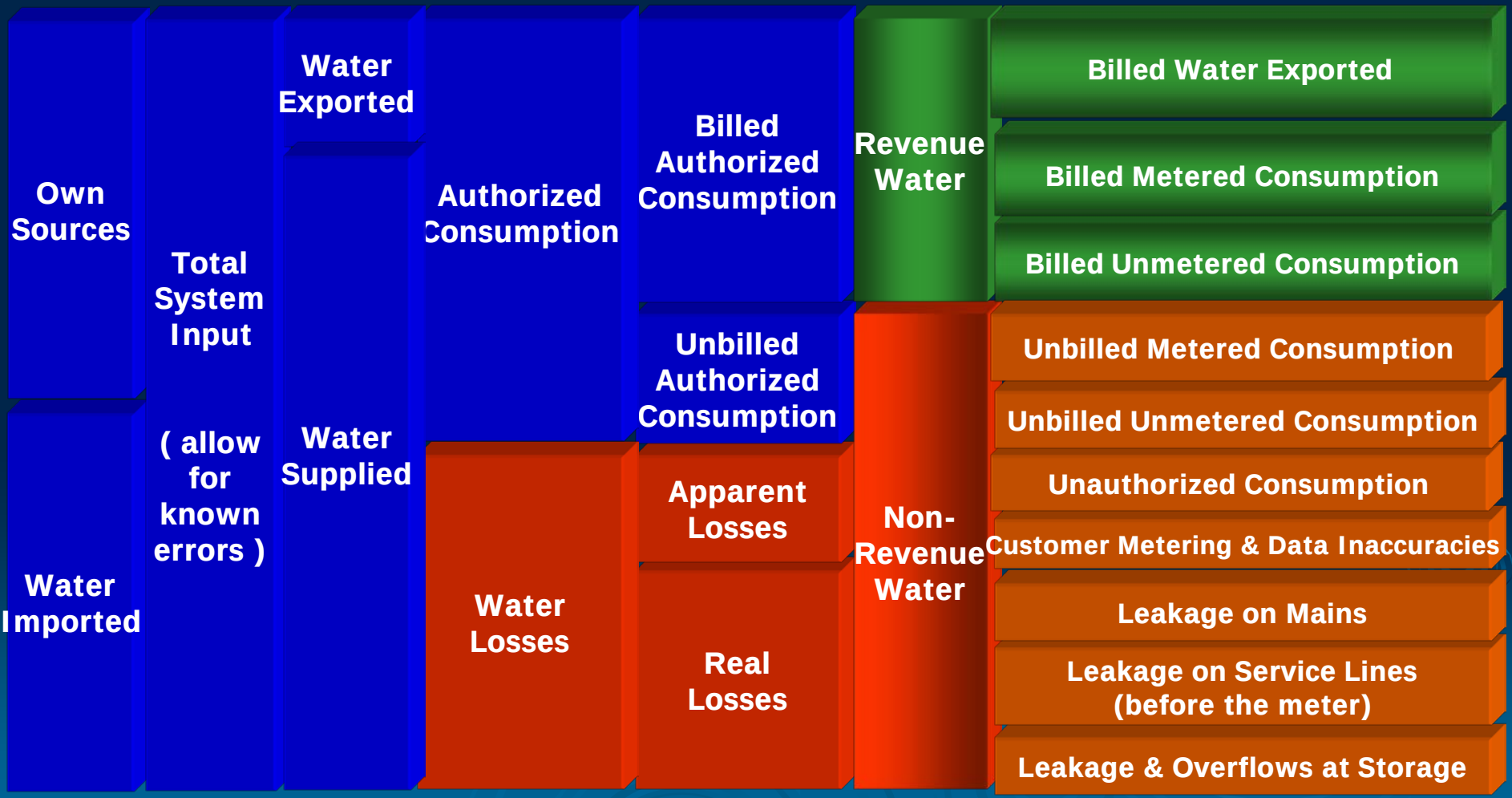
- Best practices captured in new *GA Water System Audits and Water Loss Control Manual*
  - Based heavily on the AWWA M36 Manual (3rd Ed)
  - Metropolitan North Georgia Water Planning District

AWWA M36 Manual and Georgia Water Loss Manual





IWA/AWWA Standard Water Balance



AWWA Water Audit Software - Grading Matrix

AWWA WLCC Free Water Audit Software: Grading Matrix — WASv 4.2

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Back to Instructions

In the Reporti, grades were assigned to each component of the audit to describe the confidence and accuracy of the input data. The grading assigned to each audit component responding recommended improvements and actions are highlighted in yellow. Audit accuracy is likely to be improved by prioritizing those items shown in red

Grading

	1	2	3	4	5	6	7	8	9	10
Billed metered:	Less than 50% of customers with volume-based billings from meter readings; flat or fixed rate billed for the majority of the customer population	At least 50% of customers with volume-based billing from meter reads; flat rate billed for others. Manual meter reading, under 50% read success rate, remainder estimated. Limited meter records, no regular meter testing or replacement. Billing data maintained on paper records, with no auditing.	Conditions between 2 and 4	At least 75% of customers with volume-based billing from meter reads; flat or fixed rate billed for remainder. Manual meter reading used, at least 50% meter read success rate, failed reads are estimated. Purchase records verify age of customer meters; only very limited meter accuracy testing is conducted. Customer meters replaced only upon complete failure. Computerized billing records, but only periodic internal auditing conducted.	Conditions between 4 and 6	At least 90% of customers with volume-based billing from meter reads; remaining accounts are estimated. Manual customer meter reading gives at least 80% customer meter reading success rate, failed reads are estimated. Good customer meter records, limited meter accuracy testing, regular replacement of oldest meters. Computerized billing records with routine auditing of global statistics.	Conditions between 6 and 8	At least 97% of customers with volume-based billing from meter reads. At least 90% customer meter read success rate; or minimum 80% read success rate with planning and budgeting for trials of Automatic Metering Reading (AMR) in one or more pilot areas. Good customer meter records. Regular meter accuracy testing guides replacement of statistically significant number of meters each year. Routine auditing of computerized billing records for global and detailed statistics; verified periodically by third party.	Conditions between 8 and 10	At least 99% of customers with volume-based billing from meter reads. At least 95% customer meter reading success rate; or minimum 80% meter reading success rate, with Automatic Meter Reading (AMR) trials underway. Statistically significant customer meter testing and replacement program in place. Computerized billing with routine, detailed auditing, including field investigation of representative sample of accounts. Annual audit verification by third party.
Improvements to attain higher data grading for "Billed Metered Consumption" component:	to qualify for 2: Conduct investigations or trials of customer meters to select appropriate meter models. Budget funding for meter installations. Investigate volume based water rate structures.	to qualify for 4: Purchase and install meters on unmetered accounts. Implement policies to improve meter reading success. Catalog meter information during meter read visits to identify age/model of existing meters. Test a minimal number of meters for accuracy. Install computerized billing system.		to qualify for 6: Purchase and install meters on unmetered accounts. Eliminate flat fee billing and establish appropriate water rate structure based upon measured consumption. Continue to achieve verifiable success in removing manual meter reading barriers. Expand meter accuracy testing. Launch regular meter replacement program. Conduct routine audit of global statistics.		to qualify for 8: Purchase and install meters on unmetered accounts. Assess cost-effectiveness of Automatic Meter Reading (AMR) system for portion or entire system; or achieve ongoing improvements in manual meter reading success rate. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Refine routine auditing procedures based upon third party guidance.		to qualify for 10: Purchase and install meters on unmetered accounts. Launch Automatic Meter Reading (AMR) system trials if manual meter reading success rate of at least 95% is not achieved within a five-year program. Continue meter accuracy testing program. Conduct planning and budgeting for large scale meter replacement based upon meter life cycle analysis using cumulative flow target. Continue routine auditing and require annual third party review.		to maintain 10: Regular internal and third party auditing, and meter accuracy testing ensures that accurate customer meter readings are obtained and entered as the basis for volume based billing. Stay abreast of improvements in Advanced Metering Infrastructure (AMI) and information management. Plan and budget for justified upgrades in metering, meter reading and billing data management.
Billed unmetered:	Water utility policy does not require customer metering; flat or fixed fee billed. No data collected on customer consumption. Only estimates available are derived from data estimation methods using average fixture count multiplied by number of connections, or similar approach.	Water utility policy does not require customer metering; flat or fixed fee billed. Some metered accounts exist in parts of the system (pilot areas or District Metered Areas) with consumption recorded on portable dataloggers. Data from these sample meters are used to infer consumption for the total customer population. Site specific estimation methods are used for unusual buildings/water uses.	Conditions between 2 and 4	Water utility policy does require metering and volume based billing but lacks written procedures and employs casual oversight, resulting in up to 20% of billed accounts believed to be unmetered. A rough estimate of the annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 4 and 6	Water utility policy does require metering and volume based billing but exemption exist for a portion of accounts such as municipal buildings. As many as 15% of billed accounts are unmetered due to this exemption or meter installation difficulties. Only a group estimate of annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 6 and 8	Water utility policy requires metering and volume based billing for all customer accounts. However, less than 5% of billed accounts remain unmetered because because installation is hindered by unusual circumstances. The goal is to minimize the number of unmetered accounts. Reliable estimates of consumption are obtained for unmetered accounts via site specific estimation methods.	Conditions between 8 and 10	Water utility policy requires metering and volume based billing for all customer accounts. Less than 2% of billed accounts are unmetered and exist because meter installation is hindered by unusual circumstances. The goal exists to minimize the number of unmetered accounts to the extent that is economical. Reliable estimates of consumption are obtained at these accounts via site specific estimation methods.

Page 2

Transition away from “Unaccounted-for Water Percentage”

- No consistent definitions for the components
- Percentage indicators have been found to be suspect in measuring technical performance
- Percentage indicators translate nothing about water volumes and costs
- Water systems now translating UAW components into IWA/AWWA standard water balance about water volumes and costs

Non-Revenue Water (NRW)

- Is the difference between the volume of water produced and the volume of water billed to customers
- It consists of three elements with different values in $/gallon:
  - Real Losses
  - Apparent Losses
  - Unbilled authorized consumption
- Calculate the $ value of each NRW component

Real Losses

- Also called Physical Losses
- Includes:
  - Leakage on transmission and distribution mains
  - Storage tank overflows
  - Service Line leakage up to customer meter
- Reducing real losses creates an additional resource which reduces operating costs and can be used to defer capital expenditure

Apparent Losses

- Also called Paper or Economic Losses
- Includes:
  - Theft
  - Customer metering inaccuracies
  - Data handling errors
- Reducing Apparent losses increases revenue but creates no new water

Water Audits Current Status

- For public water systems serving populations:
  - Greater than 10,000 - Initial list of 113 systems, 6 fell below 10,000. 106 out 107 audits submitted to date.
  - Greater than 3,300 to 10,000 – Initial list 124, now up 127 (3 fell below 3,300)
    - WSA requires water audit reports submitted to EPD by March 1, 2013 (small systems)
    - Reporting period covers 12 month calendar year

Key Performance Indicators

- Financial Performance Indicators
  - allow for economic understanding of losses and provides comparison for project payback
- Operational Performance Indicators
  - defines and quantifies industry standards
  - highlights areas of comparison and annual tracking
  - creates indices for comparison across water systems

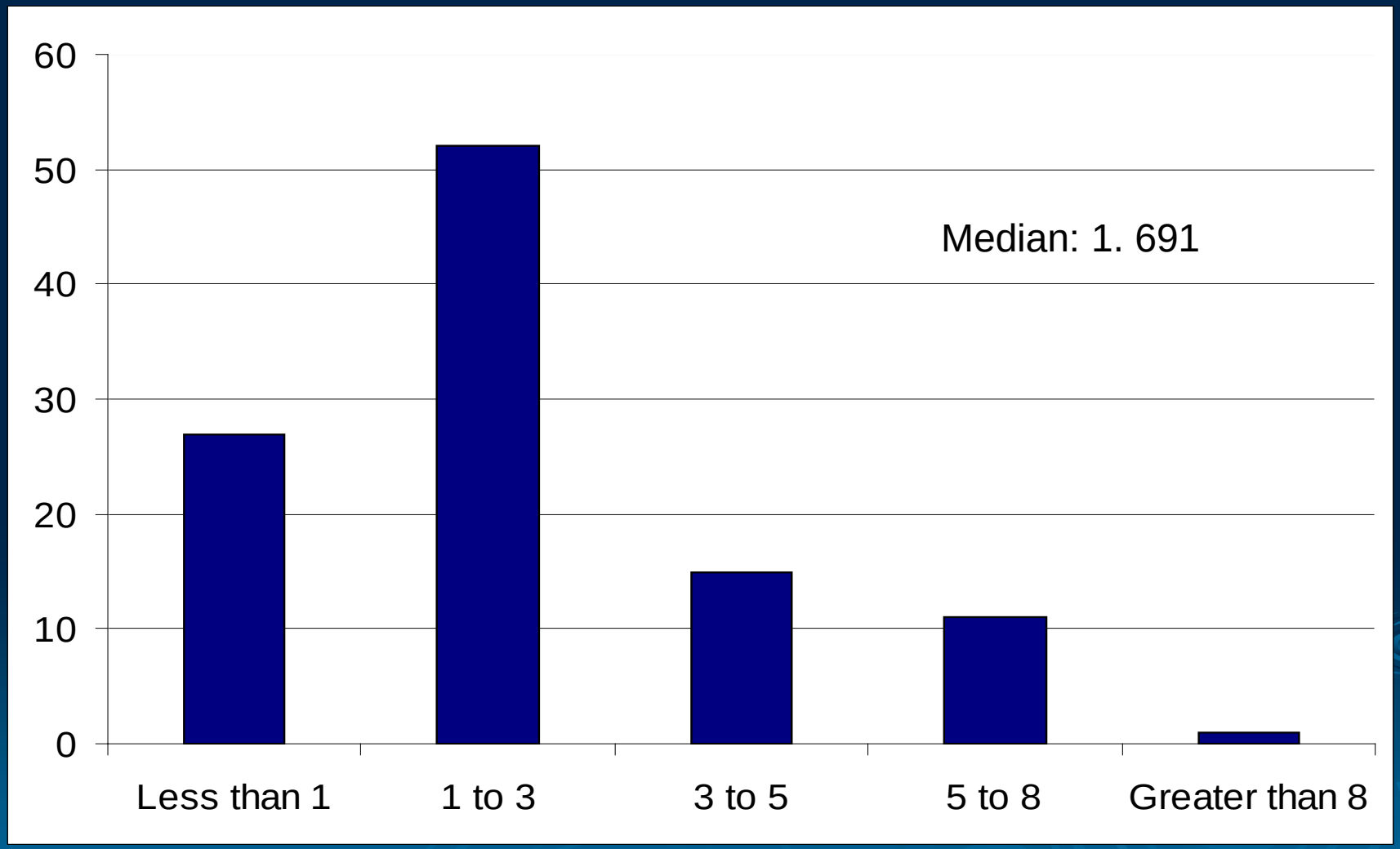
Preliminary Audit Results from Large Systems

- Water audit results will be posted on EPD website as required by law (after quality review)
- Key Performance Indicators
  - Financial and Operational
  - Infrastructure Leakage Index (ILI)
    - dimensionless
    - CARL/UARL
  - VALIDITY!
  - Top 3 Priority Areas to improve

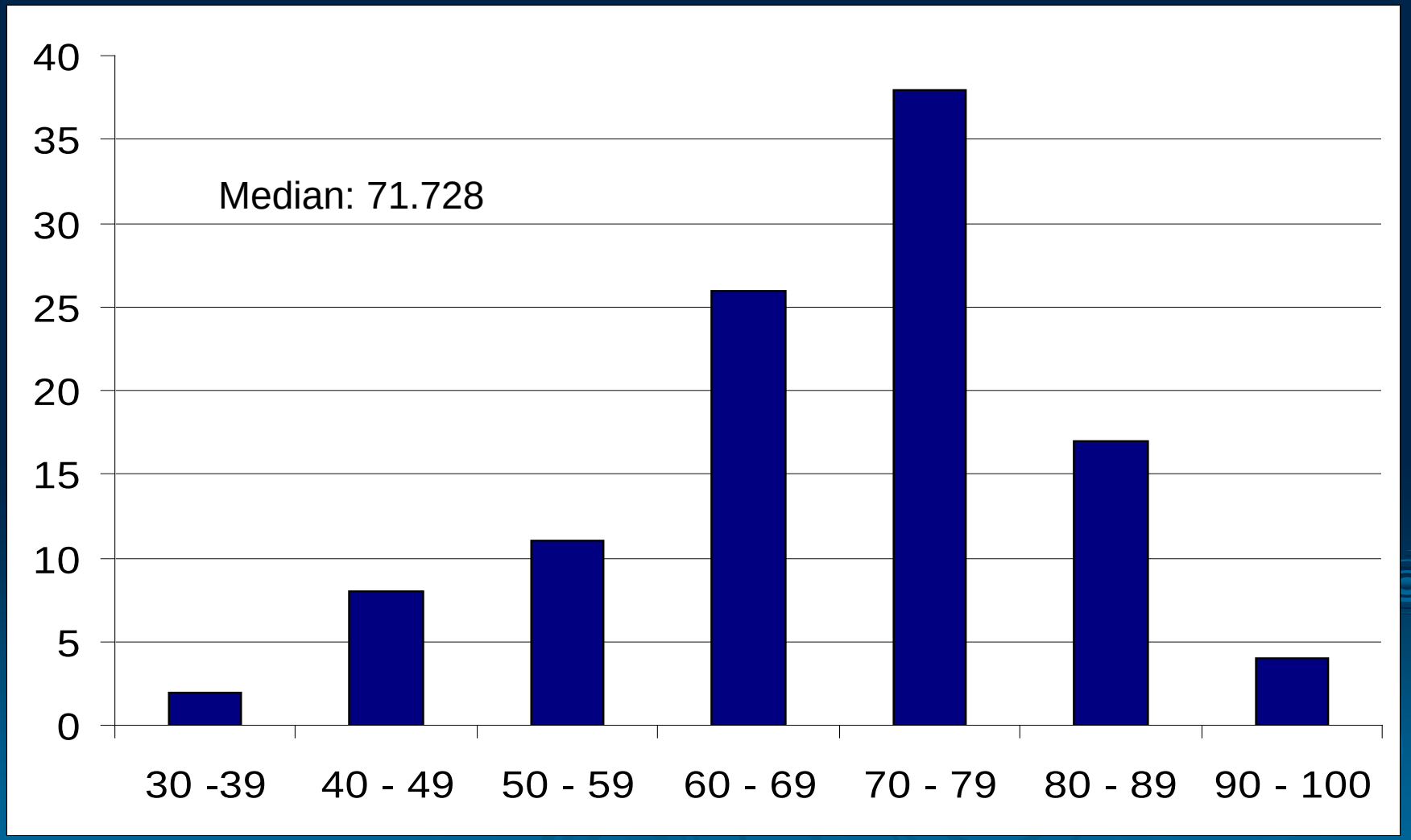
Bottom 3 bullets to be posted on website

*Random number generator used to shield water systems until quality check is completed

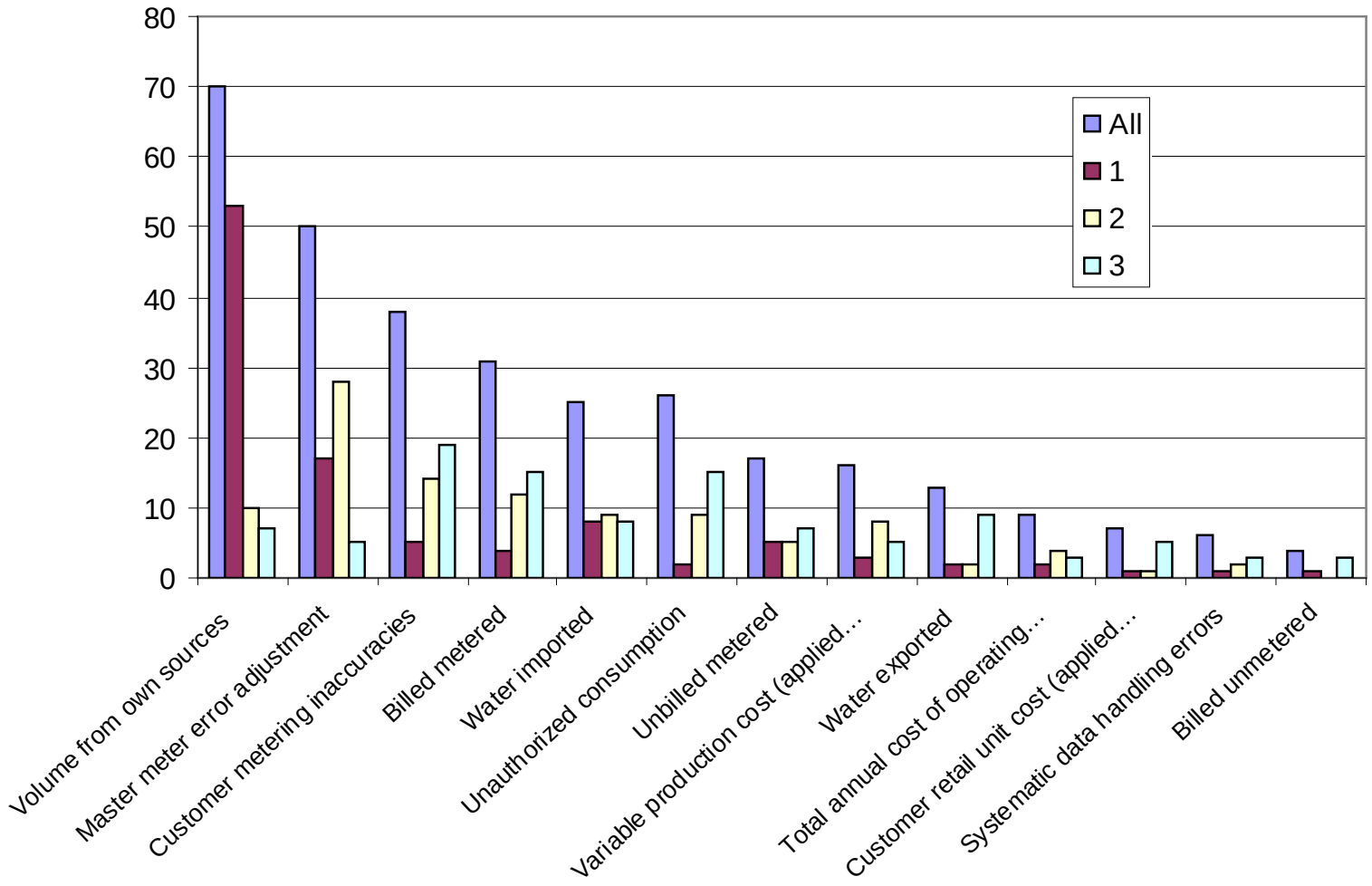
Preliminary Data for ILI Scores



Preliminary Data for Validity Scores



All Areas for Improvement



Variances from Outdoor Watering Restrictions

- Persons may not irrigate outdoors between 10 am and 4 pm - Planting, growing, managing ground cover, trees, shrubs, or plants
- 13 Outdoor water uses exempt, include – commercial agriculture, personal food gardens, reuse of gray water, drip irrigation or soaker hoses, and others
- Variance can be granted for 'good cause' to impose more stringent restrictions to local government authority
  - To avoid or relieve a local water shortage
  - To protect public health, safety, or welfare
- Approval of the EPD Director required after application
  - 6 variances granted to date: Americus, Clarkesville, Jefferson, Manchester, Winder, and Upper Oconee Basin Water Authority
- Government authorities required to adopt ordinances for outdoor watering (January 1, 2011)

Requirements for High-Efficiency Plumbing Fixtures (DCA)

- High efficiency requirements effective July 1, 2012
  - Plumbing fixtures and cooling towers
  - Required in all new construction
  - Encourage residential and commercial retrofits for water efficient fixtures and equipment
  - Amendments to the International Plumbing Code of 2006
- Single flush water closet – average flush not to exceed 1.28 gallons
- Urinal – flush valve that uses no more than 0.5 gpf
- Lavoratory faucet – flow of no more than 1.5 gpm at 60 psi
- Shower head – flow of no more than 2.5 gpm at 60 psi

Databases and Capacity

EPD is working to enhance our internal capacity

- Employ the AWWA "Compiler" for water system audit results & data
  - Aggregates data statewide and regionally
  - Enables identification of statewide "issues" requiring training or assistance

American Water Works Association
The Authoritative Resource on Safe Water
www.awwa.org

- Develop a WC planning and tracking tool to support EPD water planning and permitting programs
  - Adjusted from existing conservation tools – partnered with Alliance for Water Efficiency
  - Provide consistency and ease in reporting for public water providers

Alliance *for* Water Efficiency
www.a4we.org

GA Modified AWE Water Conservation Tracking Tool

- WSID information worksheet – added to the Navigation worksheet
- Modified Water Saving Summary worksheet – per capita or per account usage
- Export Worksheet for further processing and aggregation
- Utilize AWWA water audit outputs to set percentage of non-revenue water for demand projections

Water Use and Efficiency Reporting Guidance for PWS

- In the process of completing draft guidance (October 2012)
- Conduct workshops and encourage water utilities to complete baseline water use and efficiency profiles – GAWP assistance
- Water systems document investments in conservation activities
- Streamline data collection at EPD
  - AWWA Water Audits, Water Use and Efficiency
  - Modified AWE Water Conservation Tracking Tool

Resources

- www.ConserveWaterGeorgia.net
  - Georgia Clearinghouse for water efficiency information
  - Conservation documents:
    - WCIP, GA Water audit manual, Educational material
- www.Home-water-works.com
  - NEW fabulous water use and efficiency calculator for home-owners

homewaterworks

Summary

- Beneficial reduction in water waste, water loss and water use
- WCIP creates a common vision for water conservation
- WSA reaffirms "the imminent need to create a culture of water conservation in the State of Georgia"
- Preliminary water audits submitted, to be posted after validity analysis

Summary

- **6 outdoor variances for outdoor water restrictions granted to date**
- **High efficiency plumbing fixtures**

  July 2012 - deadline for new plumbing and building standards – adoption of ordinances
- **GA Modified AWE Water Conservation Tracking Tool – accepted**
- **Water Use and Efficiency Reporting Guidance for PWS - being finalized**

Questions?

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