



Draft Technical Memorandum

Prepared For: Middle Ocmulgee Water Planning Council and
Georgia Environmental Protection Division

Prepared By: Jacobs JIG Planning Team

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Subject: **Demand Management Practices**
Section 6 Supplemental Document
Middle Ocmulgee Regional Water Plan

Introduction

This Technical Memorandum outlines the process for evaluating the water conservation/demand management practices recommended by the Middle Ocmulgee Water Planning Council (Council). This document supplements Section 6 of the Regional Water Plan¹, which details management practices recommended to address the quantity and quality water issues based on Resource Assessments² conducted by the Georgia Environmental Protection Division (EPD).

Summary of Council Recommendations

The comparison of regional water demand forecasts to Resource Assessment modeling results has shown that there are no current or projected future water quantity gaps for the Middle Ocmulgee Water Planning Region. On this basis, the Council supports the implementation of the required Tier 1 water conservation/demand management practices and encourages each water user or permittee to evaluate and implement Tier 2 practices where practicable, or as required by permit conditions. Implementation of Tier 3 practices is voluntary and should be determined based on each entity's needs. Tier 4 practices are not required for the Middle Ocmulgee Region because no potential water quantity gap exists.

The Council recognizes the diverse needs and interests of the stakeholders in the region. The Council encourages water users/permittees to evaluate the cost and operational implications of these practices, and implement them when they are beneficial to their operation.

Background

According to the Comprehensive State-wide Water Management Plan (State Water Plan), "water conservation will be a priority water quantity management practice implemented to help meet water needs in all areas of the state and will be practiced by all water user sectors (Section 7, Policy 3)." To comply with this policy, EPD issued "Detailed Guidance For Evaluating Practices to Manage Demand" (Detailed Guidance)³ on September 21, 2010 for use by regional water planning councils. EPD

initially introduced the tiered approach to evaluating water conservation/demand management practices prior to Council Meeting 6 (referred to as CM6 Guidance⁴, June 2010). The Detailed Guidance replaced the CM6 Guidance.

In the Detailed Guidance, water conservation practices were divided into four tiers, as follows:

- *Tier One* includes basic water conservation activities and practices that are currently required by statute or will soon be required in EPD's upcoming amended rules (regarding the State Water Plan and SB370 – Water Stewardship Act).
- *Tier Two* includes basic water conservation activities and practices that will be addressed in EPD's upcoming amended rules, but not required of all permit applicants.
- *Tier Three* includes basic water conservation activities and practices that will not be addressed in current or upcoming amended rules.
- *Tier Four* includes “beyond basic” water conservation practices to be considered if a gap exists between current or future water supplies and demands for the region.

Each Council was expected to include demand management in its Regional Water Plan. The Detailed Guidance indicated that the level of regional demand management should be determined by:

- sustainable capacity of the regional resources (based on Resource Assessments)
- level of conservation already implemented by water users in the region
- economic benefits of demand management as compared to other quantity management practices

Summary of Water Availability Resource Assessments

There is no predicted surface water availability gap for the two planning nodes of the Middle Ocmulgee Region (Jackson and Lumber City nodes). Newton, Crawford, Houston and Jasper counties may need additional permitted capacity or infrastructure (Table 5-2 in the Regional Water Plan). A planned reservoir project (Bear Creek Reservoir) is underway in Newton County in anticipation of the county's projected 18 MGD shortfall in permitted capacity by 2050. Construction of the Bear Creek Reservoir project will eliminate a major infrastructure need in Newton County. Estimated shortfalls in permitted capacity for Crawford (0.1 MGD), Houston (2.4 MGD), and Jasper (1.1 MGD) counties are relatively small and may potentially be within the margin of error of the 40-year water demand forecast. The entities within these counties are encouraged to perform evaluations that determine where the future population growth and service area may be located and when, if any, potential future sources and/or infrastructure plans are needed (based on economical and operational considerations).

Based on the EPD's revised groundwater modeling results, the estimated total sustainable yield for the prioritized Cretaceous Aquifer units exceeds the demand of the areas within multiple regions relying on the Cretaceous Aquifer. Therefore, no groundwater availability gap is expected for the Middle Ocmulgee Region during the 40-year planning horizon.

Initial Evaluation Process

Prior to Council Meeting 6, the Planning Contractor (PC) for the Middle Ocmulgee Council conducted a survey of council members to gauge understanding of demand management practices listed in the CM6 Guidance. Based on the survey results, the tiered approach and the initial Tier 2 and 3 practices listed in the CM6 Guidance were discussed at Council Meeting 6 (June 30, 2010). Discussions were conducted both with the full Council and in small groups by sector (municipal, industrial, and agricultural). In the small group discussions, council members were asked to suggest additional practices not mentioned in the CM6 Guidance and to recommend practices for consideration by entities in the region. The results of these discussions were documented in the summary for Council Meeting 6⁵.

At Council Meeting 7 (September 22, 2010), the council members ranked the importance of all programmatic management practices (including demand, water supply, and water quality) as low (1), medium (2), and high (3). The average ranking of each programmatic management practice was calculated from these individual rankings.

EPD made the Detailed Guidance available to the Council after Council Meeting 7. The PC held two conference calls with the Council's Technical Committee to discuss the additional information listed in the Detailed Guidance and its incorporation into the plan under development. On September 29, the PC reviewed the background of the guidance and asked each of the Technical Committee members to review the guidance and accompanying tier worksheets for their sectors and to provide comments during a subsequent conference call. On October 7, the Technical Committee went over the 25 conservation goals (Table 1) and each one of the Tier 2 and Tier 3 practices (Table 2), and commented in detail. The revisions based on these comments are included in Tables 1 and 2 at the end of this technical memorandum. The management practice table in the draft Regional Water Plan was restructured to incorporate these results (by tier) in the October 15 draft plan submitted for EPD review.

In addition to demand management practices, the Technical Committee led the iterative development, review, and revision of all water quantity and quality management practices. The full Council reviewed these recommendations in subsequent Council meetings. The region's vision and goals were used to guide the council members in the selection of management practices. Finally, the comments received from general public and local governments were considered in finalizing the recommended management practices.

Prioritization of Management Practices

The Council prioritized the recommended management practices so that stakeholders can focus their efforts on the most important and pressing water resource issues. The initial menu of management practices was divided into two groups: 1) priority management practices; and 2) additional management practices. The tables detailing recommended management practices are in Section 6 of the Regional Water Plan.

The priority management practices were selected to address water resource gaps and existing regulations. The Middle Ocmulgee Region has no water resource (quantity/availability) gap, but does have potential water quality (assimilative capacity) gaps. Therefore, the region only needs to address the Tier 1 demand management practices required by the Water Stewardship Act (SB370) and Tier 2 practices that EPD plans to address in upcoming rules and regulations. These Tier 1 and Tier 2 practices are included as priority management practices. The Technical Committee evaluated and refined the recommended Tier 2 and Tier 3 practices, but did not rank them; the Council believed that the benefits would differ throughout the region. Instead, individual counties, utilities, and permittees may decide which demand management practices will be best suited for their service area and customers. In addition, development or updating of local water and wastewater master plans is recommended as a priority practice for identifying specific local needs and issues not examined in detail in the high-level Regional Water Plan. The Council stated repeatedly that it is important for entities within the region to conduct their own master planning following Regional Water Plan recommendations.

Tier 3 practices are listed in the “Additional Management Practices” (Table 6-2 of the Regional Water Plan) for entities to consider if they wish to further reduce future water demand and improve efficiency. Tier 4 practices are not required for the Middle Ocmulgee Region because no potential water quantity gap exists and, therefore, are not included in the Regional Water Plan.

Projected Savings from High Efficiency Plumbing Fixtures

The Council recommends the implementation of Tier 1 demand management practices and other SB 370 requirements. One significant element of SB 370 is the requirement of high efficiency toilets using 1.28 gallons per flush (gpf), instead of the currently required 1.6 gpf fixtures. EPD requires that this savings be documented in this technical memorandum and in the Regional Water Plan. The estimated water savings and revised municipal forecasts are summarized in Table 3 (also Table 6-3 in the Regional Water Plan). Region-wide, the estimated reduction in water demand and wastewater flow for the 40-year planning period is approximately 5 MGD on an annual average daily basis. The methodology used to estimate this “savings” is described in the draft technical memorandum “Municipal and Industrial Water and Wastewater Demand Forecasts” (October 2010, Jacobs).

References

1. Regional Water Plan - Council Review Draft (Working Draft), December 2010, EPD
http://www.middleocmulgee.org/documents/MOC_WDCP_council_review_draft_120810.pdf
2. Resource Assessments (Baseline and Future Conditions), EPD
http://www.middleocmulgee.org/pages/resource_assessments/index.php
3. Detailed Guidance For Evaluation Practices to Manage Demand, September 2010, EPD
http://www.georgiawaterplanning.org/documents/DetailedGuidanceforEvaluatingPracticestoManageDemand-WebDocument_000.pdf
4. CM6 Guidance, June 2010, EPD
http://www.georgiawaterplanning.org/documents/DetailedGuidanceforEvaluatingPracticestoManageDemand-WebDocument_000.pdf, page 37 to 46
5. Council Meeting 6 (June 30, 2010) Summary, EPD/Jacobs
http://www.middleocmulgee.org/documents/07222010_MO_CM6_Mtg_Summary_000.pdf
6. Draft Technical Memorandum: Municipal and Industrial Water and Wastewater Demand Forecasts (October 2010, Jacobs)
http://www.middleocmulgee.org/documents/11012010_MOC_CM8_PreMeeting_Materials_000.pdf

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Table 1: Water Conservation Goals

Foundational Water Conservation Goals
Educate and empower Georgia's water users
Create incentives to encourage water use efficiency
Enhance data collection, monitoring, research, and evaluation
Measure water use efficiency
Plan for the future
Integrate water conservation and energy conservation
Secure funding to implement water conservation
Agricultural Irrigation
Goal #1 : Research institutions and state agencies, in cooperation with farmers, should enhance their understanding of water use and levels of efficiency of existing agricultural irrigation.
GOAL #2 : Farmers should improve the efficiency of their irrigation systems.
GOAL #3 : Farmers should consider crop varieties, cropping systems and irrigation systems to maximize the efficient use of water on farms.
GOAL #4 : Farmers should minimize water loss from farm ponds, reservoirs and other rainfall collection systems.
Golf Courses
Goal #1: Golf course superintendents or managers should develop and implement a site-specific Best Management Practices (BMPs) plan for turfgrass water conservation.
GOAL #2 : Through a cooperative effort, research institutions and golf-related associations should determine a typical water use range for golf courses in Georgia that accounts for variations in rainfall and other climatic conditions.
GOAL #3 : GCSs, GGCSA and other golf industry groups should help foster a culture of water conservation inside and outside of Georgia’s golf industry.
Landscape Irrigation
GOAL #1 : Landscape and irrigation professionals and water providers should educate their customers on proper and efficient landscape water use practices.
GOAL #2 : Landscape and irrigation professionals and professional associations should establish state-wide standards for design, installation and maintenance of Georgia landscapes, landscape irrigation systems, and other systems dealing with landscape water conservation, such as rainwater catchments systems.
GOAL #3: Landscape and irrigation professionals, water providers, and local governments should help water customers reduce summer peak use.

Table 2: Tier 1 Recommended Water Conservation Practices for the Middle Ocmulgee Water Planning Region
(Practices addressed in statute and current or upcoming amended rules for non-farm water withdrawal permittees and drinking water providers)

T1 Practice	Associated WCIP Goals	Status	Reference	Adjust demand	Reference for more information
<p><u>Applicants for non-farm water withdrawal permits or permit modifications</u> must demonstrate progress toward water conservation goals or water efficiency standards.</p>	<p>Domestic GOAL #2 : Water providers should maximize the efficiency of the systems that treat and deliver water to customers.</p>	<p>Upcoming amended rule</p>	<p>SWP, Imp Action 2</p>	<p>No</p>	<p>SWP, Sec. 8 Policy 1; WCIP pg 82 & 118</p>
	<p>I/C GOAL #2 : Industrial and commercial facilities should establish reduction targets for existing water uses and implement practices to achieve those targets.</p>				
	<p>Electric GOAL #3 : Electric utilities should implement practices to improve water efficiency at existing facilities and identify, to the extent practicable, ways to minimize the amount of water necessary to generate electricity.</p>				
<p><u>Water withdrawal permittees and drinking water providers</u> must submit annual reports on non-farm water use that shall include data and information regarding implementation of water conservation plans and progress toward water conservation goals.</p>	<p>I/C GOAL #2 : Industrial and commercial facilities should establish reduction targets for existing water uses and implement practices to achieve those targets.</p>	<p>Upcoming amended rule</p>	<p>SWP, Imp Action 3</p>	<p>No</p>	<p>SWP, Sec. 8 Policy 1; WCIP pg. 89</p>
	<p>Domestic GOAL #4 : Water providers and local governments should help customers maximize the water efficiency of indoor residential and domestic uses.</p>				

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T1 Practice	Associated WCIP Goals	Status	Reference	Adjust demand	Reference for more information
<p>Drinking water providers must meet minimum standards and best practices for monitoring and improving the efficiency of public water systems, using a method developed by the International Water Association, and implement in a phased approach a water loss detection program. Providers serving over 10,000 individuals shall conduct water loss audits by March 2012, and those serving greater than 3,300 individuals by March 2013.</p>	<p>Domestic GOAL #2 : Water providers should maximize the efficiency of the systems that treat and deliver water to customers.</p>	<p>Current statute and upcoming amended rule</p>	<p>WSA, Section 3</p>	<p>Yes, consider current water loss levels and efficiency goals.</p>	<p>WCIP - pg 118 & 121</p>
<p>All multi-tenant buildings (residential, commercial, and industrial) constructed after July 1, 2012, to enable sub-metering by each tenant. This new requirement does not apply to renovations or rebuilding. The owners of the buildings shall charge for water and wastewater use by tenants and may charge for common area water and wastewater use.</p>	<p>Domestic GOAL #4 : Water providers and local governments should help customers maximize the water efficiency of indoor residential and domestic uses.</p>	<p>Current statute and upcoming amended building code or rule</p>	<p>WSA, Section 7</p>	<p>Yes</p>	<p>WCIP - pg 139 & 182</p>
<p>All new construction permitted on or after July 1, 2012, must meet the minimum water flow and performance standards including:</p>	<p>Domestic GOAL #4 : Water providers and local governments should help customers maximize the water efficiency of indoor residential and domestic uses.</p>	<p>Current statute and upcoming amended</p>	<p>WSA, Section 8; WCIP</p>	<p>Yes</p>	<p>WCIP - pg 140</p>

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T1 Practice	Associated WCIP Goals	Status	Reference	Adjust demand	Reference for more information
<p>Water closets or toilets may not exceed 1.28 gallon per flush; Urinals (and associated flush valves) must use no more than .5 gallons per flush; Lavatory faucets (and aerators) may not exceed 1.5 gallons per minute; and Kitchen faucets (and aerators) may not exceed 2.0 gallons per minute.</p>		building code or rule			
<p>Non-farm water withdrawal permittees must submit water conservation plans.</p>	<p>GOAL #2 : Water providers should maximize the efficiency of the systems that treat and deliver water to customers.</p>	Current statute and current rule	R&Regs 391-3-6 & 391-3-2	No	WCIP pg 118
<p>Water users in Flint River Basin, Coastal Georgia, and North GA Metropolitan Water Planning District, must comply with water conservation elements in regional water plans.</p>	<p>Landscape GOAL #2 : Farmers should improve the efficiency of their irrigation systems.</p>	Current statute and current rules	O.C.G.A. 12-5-572, R&Regs 391-3-2, R&Regs 391-3-28	Yes	Flint River Basin Regional Water Plan, Coastal Permitting Plan, and Metro North GA Water Planning District
	<p>Domestic GOAL #3 : Water providers and local governments should implement conservation-oriented rates to encourage citizens to conserve, and to help maintain the water system’s financial stability.</p>				
	<p>Domestic GOAL #1 : Water providers and local governments should implement a comprehensive water conservation education and outreach program.</p>				
	<p>Domestic GOAL #2 : Water providers should maximize the efficiency of the systems that treat and deliver water to customers.</p>				

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T1 Practice	Associated WCIP Goals	Status	Reference	Adjust demand	Reference for more information
Water use for landscape related purposes is restricted between 10am and 4pm.	Landscape GOAL #3: Landscape and irrigation professionals, water providers, and local governments should help water customers reduce summer peak use.	Current statute	O.C.G.A. 12-5-7	No	WSA, Section 4
Water use for non-landscape outdoor purposes is limited to three days a week (determined by customer address).	Domestic GOAL #5 : Water providers and local governments should help customers and citizens maximize efficiency of outdoor water uses, such as pools, spas, pressure washing, and non-commercial car washing.	Current rules	R&Regs 391-3-30	No	
Public car wash facilities can be certified water efficient if employing water conservation practices.	Domestic GOAL #5 : Water providers and local governments should help customers and citizens maximize efficiency of outdoor water uses, such as pools, spas, pressure washing, and non-commercial car washing.	Current statute and current rule	R&Regs 391-3-31	No	

Table 3: Tier 2 Recommended Water Conservation Practices for the Middle Ocmulgee Water Planning Region
(Practices outlined in the SWP, to be addressed in rules and regulations as options for non-farm water withdrawal permit applicants seeking permit expansion or modification.)

T2 Practice	Associated WCIP Goals	Status	Reference	Adjust demand
T2 Practices for Municipal Water Providers (as outlined in SWP)				
Consider conservation-oriented rate structures and consider informative bills.	Domestic GOAL #3 : Water providers and local governments should implement conservation-oriented rates to encourage citizens to conserve, and to help maintain the water system’s financial stability.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(b)	Yes
Meter all water users.	Domestic GOAL #2 : Water providers should maximize the efficiency of the systems that treat and deliver water to customers.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(d)	No
Adopt a beneficial meter calibration, repair and replacement program.	Domestic GOAL #2 : Water providers should maximize the efficiency of the systems that treat and deliver water to customers.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(e)	No
Adopt a program to collect information on water use by the largest customers.	Domestic GOAL #4 : Water providers and local governments should help customers maximize the water efficiency of indoor residential and domestic uses.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(f)	No
Adopt a program to collect information on water use by the largest customers.	Landscape GOAL #1 : Landscape and irrigation professionals and water providers should educate their customers on proper and efficient landscape water use practices.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(g)	No

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T2 Practice	Associated WCIP Goals	Status	Reference	Adjust demand
Support the enforcement current outdoor water use schedule as required by State laws and regulations.	Domestic GOAL #5 : Water providers and local governments should help customers and citizens maximize efficiency of outdoor water uses, such as pools, spas, pressure washing, and non-commercial car washing.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(g)	No
	Landscape GOAL #3: Landscape and irrigation professionals, water providers, and local governments should help water customers reduce summer peak use.			
Meter water reuse and report reuse as required.	Domestic GOAL #4 : Water providers and local governments should help customers maximize the water efficiency of indoor residential and domestic uses.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(h)	Yes
	Landscape GOAL #3: Landscape and irrigation professionals, water providers, and local governments should help water customers reduce summer peak use.			
Consider reuse feasibility studies.	I/C GOAL #2 : Industrial and commercial facilities should establish reduction targets for existing water uses and implement practices to achieve those targets.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(i)	No
Consider the use of grey water.	Landscape GOAL #3: Landscape and irrigation professionals, water providers, and local governments should help water customers reduce summer peak use.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(j)	No

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T2 Practice	Associated WCIP Goals	Status	Reference	Adjust demand
Consider programs to replace or retrofit inefficient plumbing fixtures.	Domestic GOAL #4 : Water providers and local governments should help customers maximize the water efficiency of indoor residential and domestic uses.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(k)	Yes
Update water conservation plans on a regular basis as required.	Domestic GOAL #4 : Water providers and local governments should help customers maximize the water efficiency of indoor residential and domestic uses.	Upcoming amended rules	SWP Sec. 8(2)a.iii.1(l)	No
T2 Practices for industrial water users with water withdrawal permits (as outlines in SWP)				
Consider facility-specific audits.	I/C GOAL #1 : Industrial and commercial facilities should determine baseline water use, in terms of water use intensity or another efficiency metric.	Upcoming amended rules	SWP Sec. 8(2)a.iii.2(a)	No
	I/C GOAL #2 : Industrial and commercial facilities should establish reduction targets for existing water uses and implement practices to achieve those targets.			
Measure all water withdrawals.	I/C GOAL #1 : Industrial and commercial facilities should determine baseline water use, in terms of water use intensity or another efficiency metric.			

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T2 Practice	Associated WCIP Goals	Status	Reference	Adjust demand
	I/C GOAL #2 : Industrial and commercial facilities should establish reduction targets for existing water uses and implement practices to achieve those targets.	Upcoming amended rules	SWP Sec. 8(2)a.iii.2(b)	No
Measure or estimate water reuse and report reuse as required.	I/C GOAL #2 : Industrial and commercial facilities should establish reduction targets for existing water uses and implement practices to achieve those targets.	Upcoming amended rules	SWP Sec. 8(2)a.iii.2(c)	Yes
Consider rain or moisture sensor shut-off devices for irrigation systems.	Landscape GOAL #3: Landscape and irrigation professionals, water providers, and local governments should help water customers reduce summer peak use.	Upcoming amended rules	SWP Sec. 8(2)a.iii.2(e)	Yes
Irrigate landscapes in compliance with outdoor water use schedule.	Landscape GOAL #3: Landscape and irrigation professionals, water providers, and local governments should help water customers reduce summer peak use.	Upcoming amended rules	SWP Sec. 8(2)a.iii.2(f)	No
Consider reuse feasibility studies.	I/C GOAL #2 : Industrial and commercial facilities should establish reduction targets for existing water uses and implement practices to achieve those targets.	Upcoming amended rules	SWP Sec. 8(2)a.iii.2(g)	No
Consider the use of grey water.	I/C GOAL #2 : Industrial and commercial facilities should establish reduction targets for existing water uses and implement practices to achieve those targets.	Upcoming amended rules	SWP Sec. 8(2)a.iii.2(h)	Yes

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T2 Practice	Associated WCIP Goals	Status	Reference	Adjust demand
Update water conservation plans on a regular basis.	I/C GOAL #2 : Industrial and commercial facilities should establish reduction targets for existing water uses and implement practices to achieve those targets.	Upcoming amended rules	SWP Sec. 8(2)a.iii.2(i)	No

Table 4: Tier 3 Recommended Water Conservation Practices for the Middle Ocmulgee Water Planning Region
(Basic practices that will not be addressed in rules and regulations*)

* Many of these practices are discussed in the "Handbook on Water Use and Conservation" by Amy Vickers (2001) and are described in the Resource Library for the Alliance for Water Efficiency - www.a4we.org.

T3 Management Practice	WCIP	Other Resources
T3 Practices for Regions with Agricultural Water Use		
Conduct irrigation audits.	WCIP pg 47	http://pubs.caes.uga.edu/caespubs/pubcd/B1253/B1253.htm and TX Water Development Board (2004) pg. 210
Meter irrigation systems.	WCIP pg 46	www.gaswcc.georgia.gov
Irrigate during time with low evaporation rate.	WCIP pg 50	TX Water Development Board (2004) pg. 201
Inspect pipes and plumbing.	WCIP pg 49	Thomas, D.L. ed., (1998) and TX Water Development Board (2004) pg 226
Compile data on cropping and water conservation practices.	WCIP pgs 41 & 46	TX Water Development Board (2004) pg 204
Attend Irrigation workshops.	WCIP pg 48	
Use rain sensors on irrigation systems.	WCIP pg 50	http://www.nespal.org/SIRP/IWC/default.asp
Inform cropping and management practices using water demands.	WCIP pgs 44 & 52	http://www.nespal.org/SIRP/IWC/default.asp
T3 Practices for Regions with Electric Generation		
Integrate water conservation into educational programs.	WCIP pg 64	
Integrate water supply and water conservation impacts into long-term energy plans.	WCIP pg 63	
T3 Practices for Regions with Golf Courses		
Conduct routine site surveys and system audits.	WCIP pg	TX Water Development Board (2004) pg 71
Develop and implement a Best Management	WCIP pgs 69 & 74	www.commodities.caes.uga.edu/turfgrass/georgiaturf/water/articles/

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T3 Management Practice	WCIP	Other Resources
Practices (BMPs) Plan.		bmps_water_cons_07.pdf
Maintain a water use database.	WCIP pg 75	
Maintain water conservation logs.	WCIP pg 76	
Educate staff, members, and the community about conservation.	WCIP pg 73	
Educate the public about golf course water use and conservation efforts.	WCIP pg 74	
Offer training for Course Superintendent.	WCIP pg 73	
Consider regular water audits.	WCIP pg 88	www.p2ad.org and CUWCC
Practice dry methods for cleaning and dust control.	WCIP pg 92	
Discontinue discretionary use of water.	WCIP pg 93	TX Water Development Board (2004) pg 138
Consider conservation educational programs.	WCIP pg 95	TX Water Development Board (2004) pg 179
Determine water use efficiency metrics.	WCIP pgs 83 & 89	www.ofee.gov/eo/eo13423_main.asp
Consider cost-benefit analyses of water conservation practices.	WCIP pgs 80 & 90	http://www.a4we.org/benit_Cost_Introduction.aspx?terms=direct+install and TX Water Development Board (2004) pg 195
Calculate water use intensity and establish efficiency targets.	WCIP pgs 82 & 84	www.ofee.gov/eo/eo13423_main.asp

T3 Management Practice	WCIP	Other Resources
T3 Practices for Regions with Heavy Landscape Water Use		
Adapt existing educational programs to include outdoor focus.	WCIP pgs 100 & 105	www.ConserveWaterGeorgia.net and http://www.ugaextension.com/
Offer continuing education for landscape and irrigation professionals.	WCIP pg 102	http://apps.caes.uga.edu/urbanag/GCLP/index.cfm
Distribute information to high-use customers.	WCIP pg 106	
Offer homeowners checklists and certification for sustainable landscapes.	WCIP pgs 106 & 195	www.ConserveWaterGeorgia.net and http://www.ugaextension.com/
Assess outdoor water use.	WCIP pg 108 & 199	
Calculate peaking factor.	WCIP pgs 98 & 108	
Distribute information about efficient outdoor water use.	WCIP pg 135	www.ConserveWaterGeorgia.net and http://www.ugaextension.com/
Offer guidance documents for outdoor water uses.	WCIP pg 140	www.ConserveWaterGeorgia.net and http://www.ugaextension.com/
T3 Practices for Regions with Urban and Suburban Areas		
Consider an education and outreach program for community residents.	WCIP pg. 119	www.ConserveWaterGeorgia.net and http://www.ugaextension.com/
Analyze customers water use data.	WCIP pg 127	
Categorize water customers by class.	WCIP pg 130	
Calculate average utility-specific per capita residential indoor water use.	WCIP pg 130	Regional Planning Water Conservation Guidance Appendix B
Integrate water conservation into existing education curriculum.	WCIP pg 134	www.ConserveWaterGeorgia.net and http://www.ugaextension.com/
Target education and outreach programs to high water users.	WCIP pg 133	www.ConserveWaterGeorgia.net and http://www.ugaextension.com/

T3 Management Practice	WCIP	Other Resources
Adopt water waste ordinances.	WCIP pg 141	Athens Clarke County Code Sec, 5-3-120 to 125 on http://www.municode.com/Library/clientCodePage.aspx?clientID=5225 and TX Water Development Board (2004) pg.25
T3 Practices for Regions with State Agency Facilities		
Conduct regular water audits.	WCIP pg 151	Hawaii (2007) and www.ofee.gov/eo/eo13423_main.asp
Meter and measure all water users.	WCIP pg 151	Hawaii (2007)
Conduct regular cost-effectiveness or cost-benefit analysis.	WCIP pg 151	Hawaii (2007) and www.ofee.gov/eo/eo13423_main.asp
Develop long-term water conservation plans.	WCIP pg 152	Hawaii (2007)
Adopt efficiency standards adopted by the GA General Assembly.	WCIP pg 153	O.C.G.A. 50-8-18 - www.legis.state.ga.us/legis/2007_o8/sum/sb130.htm

Table 5: Estimated Demand Reduction (AAD-MGD) from High Efficiency Plumbing Fixtures

County	2010	2020	2030	2040	2050
Municipal Water Demand					
Initial Forecast ¹	79.1	94.0	112.3	131.3	150.8
Estimated Savings ²	0.00	0.5	1.4	2.9	4.9
Revised Forecast ²	79.1	93.5	110.9	128.4	145.9
Municipal Wastewater Generation					
Initial Forecast ¹	74.2	88.2	105.5	123.8	142.9
Estimated Savings ²	0.0	0.4	1.3	2.7	4.6
Revised Forecast ²	74.2	87.8	104.2	121.1	138.3
Notes:					
1. Based on existing plumbing fixtures using 1.6 gallons per flush (gpf).					
2. Based on replacement of existing plumbing with 1.28 gpf, as required by Water Stewardship Act (SB 370).					