



## Section 6. Addressing Water Needs and Regional Goals

This Section presents the Altamaha Council's water management practices selected to address resource shortfalls or gaps identified and described in Section 5, and/or to meet the Council's Vision and Goals described in Section 1.

### Summary

*Insert text regarding the summary of this section.*

### 6.1. Identifying Water Management Practices

The comparison of Resource Assessments and forecasted needs presented in Section 5 identifies the Region's likely resource shortfalls or gaps and demonstrates the need for region and resource specific water management practices. In the cases where shortfalls or gaps appear to be unlikely based on the comparison of the Region's Resource Assessments and forecasted needs, the management practices described in this section have been selected to also meet those needs specified by the Council (e.g., facility/infrastructure needs and practices, programmatic practices, etc.) that are aligned with the Region's Vision and Goals. In selecting the actions needed (i.e., water management practices), the Council considered practices identified in existing plans, the Region's Vision and Goals, and coordinated with local governments and water providers as well as neighboring Councils that share these water resources.

#### Review of Existing Plans and Practices

The Council conducted a comprehensive review of existing local and regional water management plans and relevant related documents to frame the selection of management practices. The types of plans/studies that were reviewed to support identification and selection of management practices for the Altamaha Region consisted of the following:

- Comprehensive Work Plans (local and regional scale)
- EPD databases (permitted withdrawals, planned projects, and proposed reservoirs)
- State-wide guidance documents (conservation, cost, and water planning)
- Best Management Practices (forestry, agriculture, and stormwater management)
- Water quality studies (basin, watershed, and local scale)

- TMDL evaluations

When possible, successful management practices already planned for and/or in use in the Altamaha Region formed the basis for the water management practices selected by the Council.

### 6.2. Selected Water Management Practices for the Altamaha Region

Table 6-1 summarizes the Altamaha Council's selected management practices by source of supply for the relevant demand sector(s), permitted municipal and industrial water and wastewater capacity, water quality assimilative capacity (dissolved oxygen) challenges, current water quality impairments, and nutrient considerations for the Satilla River watershed. Information on shared resources is provided to identify where management practices in other regional Councils are also needed to address identified gaps. The table summarizes general information regarding management practices needed to meet forecasted needs, and more detailed information on management practices needed to address gaps between available resources and forecasted needs.

In the Altamaha Region, there are both surface water flow regime and demand gaps. A flow regime gap occurs when surface water consumption results in low flow conditions more severe than those occurring without consumption, so there is not sufficient flow to meet both offstream and instream needs. The low flow condition used was the lower of the unimpaired 1 in 10 year 7-day low flow for each month of the year or the cumulative unimpaired daily flow. A demand gap occurs when there is insufficient flow to meet the current or forecasted water supply need for the specified demand sector.

The selected management practices will over time address identified gaps when combined with practices for all shared resource regions. The Altamaha Region addresses closure of gaps by: identification and implementation of specific actions to add/improve infrastructure and improve flow and water quality conditions; confirming the presence and magnitude of gaps; and assessing the impact of infrequent surface water gaps and the associated costs and benefits associated with these gaps.



**Table 6-1: Management Practices Selected for the Altamaha Water Planning Region**

No.	Description/Definition of Action	Relationship of Action or Issue to Vision and Goals (Section 1.4)
<b>Management Practices to Address Surface Water Gaps</b>		
<b>Data Collection/Additional Research (DCAR)</b> to confirm frequency, duration, severity, and drivers of surface water gaps and identify significant causes (climate, timing, water use, land cover, etc.) of 7Q10 low-flow conditions and advance research/feasibility of potential solutions		
DCAR-1	<ul style="list-style-type: none"> <li>Acquire additional data/information on agricultural consumptive use to confirm or refine if agricultural consumption is less than 100% consumptive<sup>1</sup></li> <li>Conduct “modeling scenario analysis to bracket a reasonable range of consumption” with Resource Assessment models with “new” information on consumptive use to assess affect on surface water gap<sup>1</sup></li> </ul>	2,6
DCAR-2	<ul style="list-style-type: none"> <li>Refine surface water agricultural forecasts and Resource Assessment models to improve data on source of supply and timing/operation of farm ponds<sup>1</sup></li> </ul>	2,6
DCAR-3	<ul style="list-style-type: none"> <li>Continue to improve metering data regarding agricultural water use<sup>1</sup></li> </ul>	2,3,6
DCAR-4	<ul style="list-style-type: none"> <li>Support research (University, State, and Corporate) on improved irrigation efficiency measures and development of lower water use crops and lower water use plant strains<sup>1</sup></li> </ul>	2,3,6
DCAR-5	<ul style="list-style-type: none"> <li>Improve education and research on when and how much water is needed to maximize crop yield with efficient irrigation<sup>1</sup></li> </ul>	2,3
DCAR-6	<ul style="list-style-type: none"> <li>Promote management practices and educate water users to minimize impacts to surface water associated with excessive pumping/use of shallow/surficial aquifers that may impact surface water flows</li> </ul>	2,3,6,9
DCAR-7	<ul style="list-style-type: none"> <li>Conduct research to determine the feasibility and potential benefits and limitations of aquifer storage and recovery and/or recharge of surficial and other aquifers to help retime flows to gap periods</li> </ul>	1,2,4,11
DCAR-8	<ul style="list-style-type: none"> <li>Develop plan of study and conduct research to evaluate the opportunities and limitations associated with improving river flow conditions via creation/restoration of wetlands systems and potential water retention structures including streams, and if deemed potentially feasible, identify potential location(s) and estimates of potential improvements to stream flow conditions. This effort should include the identification of the incentives that could be used to make this a viable water supply option and a cost-benefit analysis of these incentives.</li> </ul>	2,6,9,11

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No.	Description/Definition of Action	Relationship of Action or Issue to Vision and Goals (Section 1.4)
DCAR-9	<ul style="list-style-type: none"> <li>Conduct analysis of the socioeconomic benefits and cost in comparison to ecological benefits of addressing surface water gaps that are larger in magnitude, but occur infrequently. Results from gap analysis indicate that approximately 85-90% of the gaps in the region can be addressed with approximately 20% of the water supply that is needed to address the largest gap.</li> </ul>	2,5,6,11
<p><b>Water Conservation (WC)</b> – Encourage the development and use of higher efficiency and cost effective agricultural irrigation practices including consideration of the following Tiers 3 &amp; 4 practices from the Water Conservation Implementation Plan (WCIP)</p> <p>*Not all practices are needed to realize conservation savings since practices are not additive.</p>		
<b>Tier 3 Conservation Practices<sup>1</sup></b>		
WC-1	<ul style="list-style-type: none"> <li>Conduct irrigation audits</li> </ul>	3
WC-2	<ul style="list-style-type: none"> <li>Meter irrigation systems</li> </ul>	3
WC-3	<ul style="list-style-type: none"> <li>Inspect pipes and plumbing to control water loss</li> </ul>	3
WC-4	<ul style="list-style-type: none"> <li>Minimize or eliminate the use of high-pressure spray guns on fixed and traveler systems where feasible</li> </ul>	3
WC-5	<ul style="list-style-type: none"> <li>Utilize cropping and crop rotation methods that promote efficiency</li> </ul>	3
WC-6	<ul style="list-style-type: none"> <li>Practice conservation tillage</li> </ul>	3
<b>Tier 4 Conservation Practices<sup>1</sup></b>		
WC-7	<ul style="list-style-type: none"> <li>Control water loss</li> </ul>	3
WC-8	<ul style="list-style-type: none"> <li>Install end-gun shutoff with pivots</li> </ul>	3
WC-9	<ul style="list-style-type: none"> <li>Install low pressure irrigation systems where feasible (soil specific)</li> </ul>	3
WC-10	<ul style="list-style-type: none"> <li>Encourage and improve use of soil moisture sensors, ET sensors or crop water use model(s) to time cycles</li> </ul>	3
<b>Additional/Alternate to Existing Surface Water Supply Sources (ASWS)<sup>1</sup></b>		
ASWS-1	<ul style="list-style-type: none"> <li>Future surface water uses - If surface water (ponds and withdrawals) is sought for future water supply in gap areas (new permits), the Applicant, GSWCC, and EPD should work collaboratively to promote surface water use patterns that will not significantly contribute to frequency or magnitude of 7Q10 low-flow conditions</li> </ul>	2,6,9
ASWS-2	<ul style="list-style-type: none"> <li>Future and existing surface water uses - Utilizing incentives and collaborative partnerships, examine opportunities to modify farm and other pond operations to obtain releases in dry/gap years</li> </ul>	2,4,6



No.	Description/Definition of Action	Relationship of Action or Issue to Vision and Goals (Section 1.4)
ASWS-3	<ul style="list-style-type: none"> <li>Future and existing agricultural surface water uses - Using collaboration and incentive based program(s), encourage additional groundwater development as preferred source of supply for future demand where feasible and within the sustainable yield of the resource. Identify the need for, and feasibility of, incentive-based seasonal surface water permit conditions to address 7Q10 low-flow conditions.</li> </ul>	2,4,6,9
ASWS-4	<ul style="list-style-type: none"> <li>Monitor gap closure. If progress toward gap closure is not achieved, evaluate need and feasibility to conjunctively manage groundwater and surface water to address surface water flow shortages during 7Q10 low-flow conditions</li> </ul>	2,4,6,9
ASWS-5	<ul style="list-style-type: none"> <li>Based on outcome of research (DCAR-8 above), consider incentive-based programs to restore wetlands and other areas if this practice can improve river flows during shortages to 7Q10 dry periods without impairing timber harvesting opportunities</li> </ul>	2,6,7,9,11
ASWS-6	<ul style="list-style-type: none"> <li>Incentive-based land use practices to help promote infiltration and aquifer recharge</li> </ul>	1,9,12
ASWS-7	<ul style="list-style-type: none"> <li>Identify incentive-based programs to increase wastewater returns; modify/manage land application systems, septic systems, and stormwater returns to address 7Q10 low-flow conditions</li> </ul>	2,6,10,11
ASWS-8	<ul style="list-style-type: none"> <li>If deemed fiscally and technically effective (based on outcome of research in DCAR-7), implement aquifer storage and recovery and/or recharge of surficial and other aquifers to help retime flows to gap periods</li> </ul>	1,2,4,11
ASWS-9	<ul style="list-style-type: none"> <li>Evaluate feasibility and need for regional joint reservoir with Savannah-Upper Ogeechee and Oconee Councils, and/or use of existing reservoirs and/or multiple new smaller reservoirs</li> </ul>	2,6,10-12
ASWS-10	<ul style="list-style-type: none"> <li>Inter-basin transfers from within the region or collaborating regions that can address regional water needs and benefit both the areas from which the transferred water is withdrawn and the area receiving the water</li> </ul>	2,6,9-12
ASWS-11	<ul style="list-style-type: none"> <li>Stormwater practices to address water quality (see Water Quality Practices)</li> </ul>	9,11
<b>Management Practices to Address Water Quality Gaps</b>		
<b>Point Sources – Dissolved Oxygen (PSDO)</b>		
PSDO-1	<ul style="list-style-type: none"> <li>Data collection to confirm loading and/or receiving stream chemistry</li> </ul>	2,6,9

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No.	Description/Definition of Action	Relationship of Action or Issue to Vision and Goals (Section 1.4)
PSDO-2	<ul style="list-style-type: none"> <li>Modification of wastewater discharge location. In areas with no shortages to 7Q10 low-flow conditions, identify feasibility to move discharge location to higher flow streams with greater assimilative capacity.</li> </ul>	9-11
PSDO-3	<ul style="list-style-type: none"> <li>Upgrade/improve treatment to address low dissolved oxygen conditions in receiving streams</li> </ul>	2,6,9-11
<b>Management Practices to Address Permit Capacity Gaps</b>		
<b>Available Municipal Wastewater Permit Capacity (MWWPC)<sup>2</sup></b>		
MWWPC-1	<ul style="list-style-type: none"> <li>Expand or construct new facilities and/or obtain additional wastewater permit capacity to meet forecasted needs</li> </ul>	9-11
<b>Available Industrial Wastewater Permit Capacity (IWWPC)<sup>3</sup></b>		
IWWPC-1	<ul style="list-style-type: none"> <li>Obtain additional permit data regarding flow volumes and permit conditions for industrial wastewater facilities forecasted needs</li> </ul>	9-11
<b>Municipal Groundwater Permit Capacity (MGPC)<sup>4</sup></b>		
MGPC-1	<ul style="list-style-type: none"> <li>Obtain groundwater permit capacity</li> </ul>	6,9,11
<b>Industrial Groundwater Permit Capacity (IGWPC)<sup>5</sup></b>		
IGWPC-1	<ul style="list-style-type: none"> <li>Obtain groundwater permit capacity</li> </ul>	6,9,11
<b>Management Practices to Address Future Groundwater (GW) Needs<sup>6</sup></b>		
GW-1	<ul style="list-style-type: none"> <li>Continue to sustainably drill wells and withdraw groundwater from the Upper Floridan and other prioritized aquifers and use of other aquifer systems in the region to meet regional needs</li> </ul>	2,6,9
GW-2	<ul style="list-style-type: none"> <li>Continue to refine sustainable yield metrics, monitor and improve understanding of historic, current, and future trends in groundwater levels</li> <li>Use best available science when evaluating potential value and/or impact associated with aquifer storage and/or recovery of surface water</li> </ul>	2,4,6
GW-3	<ul style="list-style-type: none"> <li>Encourage implementation and adherence to WCIP by local governments/utilities and agricultural water users:                             <ul style="list-style-type: none"> <li>-Tiers 1 and 2 for municipal and industrial users</li> <li>-Tiers 3 and 4 for agricultural groundwater use in gap areas</li> </ul> </li> </ul>	3
GW-4	<ul style="list-style-type: none"> <li>Encourage land use practices that sustain and protect aquifer recharge areas (both inside and outside the region) for the aquifers that are present in the region</li> </ul>	1



No.	Description/Definition of Action	Relationship of Action or Issue to Vision and Goals (Section 1.4)
<b>Water Conservation (WC) Practices</b>		
WC-1	<ul style="list-style-type: none"> <li>Encourage implementation and adherence to WCIP by local governments/utilities for Tiers 1 and 2 conservation measures for municipal and industrial uses</li> </ul>	3
WC-2	<ul style="list-style-type: none"> <li>Encourage implementation of Tiers 3 and 4 conservation measures and adherence to WCIP by agricultural groundwater users</li> </ul>	3
<b>Management Practices to Address Surface Water (SW) Current and Future Needs Outside Gap Areas</b>		
SW-1	<ul style="list-style-type: none"> <li>Continue to apply for permits and use surface water in non-gap areas within the available surface water resource capacity</li> </ul>	2,6,9
SW-2	<ul style="list-style-type: none"> <li>Monitor Atlantic slope river flow conditions to help determine flow conditions that sustain estuary conditions</li> </ul>	9,11
<b>Management Practices to Address Future Water Quality Non-Point Source (NPS) Needs (Dissolved oxygen, fecal coliform, nutrients, and other impairments)</b>		
NPS-1	<ul style="list-style-type: none"> <li>Data collection/analysis to confirm if dissolved oxygen and/or fecal coliform is human induced</li> </ul>	9-11
NPS-2	<ul style="list-style-type: none"> <li>Collect data to determine the sources of nutrient loading and other NPS impairments to waters of the State, and upon confirmation of source, develop specific management programs to address</li> </ul>	9-11
<i>The following practices are selected by the Altamaha Council to encourage implementation by the applicable local or state program(s).</i>		
<b>Urban Best Management Practices (NPSU)</b>		
NPSU-1	<ul style="list-style-type: none"> <li>Use soil erosion and sediment control measures</li> </ul>	9,11
NPSU-2	<ul style="list-style-type: none"> <li>Stormwater retention ponds, wetlands to manage runoff and help support river flows</li> </ul>	9,11
NPSU-3	<ul style="list-style-type: none"> <li>Promote measures to increase infiltration of stormwater to help reduce nutrient and other pollutant runoff (City of Baxley Watershed Protection Plan, 2007)</li> </ul>	1,9,11
NPSU-4	<ul style="list-style-type: none"> <li>Protect and maintain riparian buffers along urban streams</li> </ul>	9,11
NPSU-5	<ul style="list-style-type: none"> <li>Implement street sweeping program (City of Baxley Watershed Protection Plan, 2007)</li> </ul>	9,11

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No.	Description/Definition of Action	Relationship of Action or Issue to Vision and Goals (Section 1.4)
<b>Rural Best Management Practices (NPSR)</b>		
NPSR-1	<ul style="list-style-type: none"> <li>Implement BMPs to control runoff from dirt roads by encouraging County implementation of the BMPs identified in Georgia Resource Conservation and Development Council, "Georgia Better Back Roads – Field Manual"</li> </ul>	9,11
<b>Forestry Best Management Practices (NPSF)</b>		
NPSF-1	<ul style="list-style-type: none"> <li>Support Georgia Forestry Commission (GFC) water quality program consisting of BMP development, education/outreach, implementation/compliance monitoring, and complaint resolution process</li> </ul>	9,11
NPSF-2	<ul style="list-style-type: none"> <li>Improve BMP compliance through State-wide biennial BMP surveys and BMP assurance exams, Master Timber Harvester workshops, and continuing logger education</li> </ul>	9,11
NPSF-3	<ul style="list-style-type: none"> <li>Incentives to restore wetlands and historically drained hardwood and other areas. Where applicable, support United States Department of Agriculture (USDA) incentive programs through the Farm Service Agency and NRCS to restore converted wetlands back to forested conditions.</li> </ul>	9,11
<b>Agricultural Best Management Practices for Crop and Pasture Lands (NPSA) - Support and encourage implementation of GSWCC BMP and Education Programs</b>		
NPSA-1	<ul style="list-style-type: none"> <li>Conservation tillage and cover crop</li> </ul>	3,9
NPSA-2	<ul style="list-style-type: none"> <li>Field buffers, riparian forested buffers, and strip cropping to control runoff and reduce erosion</li> </ul>	3,9,11
NPSA-3	<ul style="list-style-type: none"> <li>Livestock stock exclusions from direct contact with streams and rivers and vegetation buffers</li> </ul>	9,11
NPSA-4	<ul style="list-style-type: none"> <li>Responsible manure storage and handling</li> </ul>	9,11
NPSA-5	<ul style="list-style-type: none"> <li>Incentives to restore wetlands and historically drained hardwood and other areas</li> </ul>	9,11
<b>Existing Impairments – Total Maximum Daily Load Listed Streams (TMDL)</b>		
TMDL-1	<ul style="list-style-type: none"> <li>Data collection and confirmation of sources to remove streams listed due to "natural sources"</li> </ul>	8,9
TMDL-2	<ul style="list-style-type: none"> <li>Data collection to refine river/stream reach length for impaired waters; focus on longest reaches to refine location and potential sources of impairments</li> </ul>	8,9

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No.	Description/Definition of Action	Relationship of Action or Issue to Vision and Goals (Section 1.4)
TMDL-3	<ul style="list-style-type: none"> <li>Stormwater Management:               <ul style="list-style-type: none"> <li>-Urban Best Management Practices</li> <li>-Forestry Best Management Practices</li> <li>-Agricultural Best Management Practices</li> </ul> </li> </ul> <p><i>See Above Non-Point Source for Details</i></p>	9,11
<b>Nutrients – Satilla River Watershed Model (NUT)</b>		
NUT-1	<ul style="list-style-type: none"> <li>Align current land use with phosphorous and nitrogen loading data to help optimize effectiveness of management practice based on consideration of land uses and actual nutrient loading (i.e., predominant land use is not necessarily the predominant source of nutrient)               <ul style="list-style-type: none"> <li>-Urban Best Management Practices</li> <li>-Forestry Best Management Practices</li> <li>-Agricultural Best Management Practices</li> </ul> </li> </ul> <p><i>See Above Non-Point Source for Details</i></p>	9,11
<b>Management Practices to Address Future Educational Needs (EDU)</b>		
EDU-1	<ul style="list-style-type: none"> <li>Support Water Conservation Programs</li> </ul>	2,3,5,6
EDU-2	<ul style="list-style-type: none"> <li>Support Stormwater Educational Programs</li> </ul>	9,11
EDU-3	<ul style="list-style-type: none"> <li>Support Septic System Maintenance Programs</li> </ul>	9,11
EDU-4	<ul style="list-style-type: none"> <li>Support GFC Forestry BMP and UGA-SFI Logger Education Programs</li> </ul>	9,11
EDU-5	<ul style="list-style-type: none"> <li>Conduct stream clean-up events (Lumber City Watershed Protection Plan, 2007)</li> </ul>	9,11
<b>Management Practices to Address Future Ordinance and Code Policy Needs (OCP)</b>		
OCP-1	<ul style="list-style-type: none"> <li>Encourage local government to develop ordinances and standards to implement and/or update stormwater and land development regulations. Possible resource documents include: Georgia Stormwater Management Manual, Coastal Stormwater Supplement, Metro North Georgia Water Planning District Model Ordinances, and Lumber City Watershed Protection Plan (2007)</li> </ul>	9,11
OCP-2	<ul style="list-style-type: none"> <li>Identify opportunities for green space on incentive and voluntary basis</li> </ul>	1,7,11
OCP-3	<ul style="list-style-type: none"> <li>Encourage coordinated environmental planning, land use, stormwater, and wastewater</li> </ul>	1-3,5,6,9-12
<b>Shared Resources</b>		
<b>To Be Determined from other Councils</b> Suwannee-Satilla, Upper Oconee, Savannah-Upper Ogeechee, and Coastal Georgia		



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Notes:

<sup>1</sup>Seek to reduce frequency and severity of human impacts to 7Q10 low-flow conditions in the region, which are associated with agricultural water use in portions of the Altamaha Region. Focus on surface water permit holders and new surface water permit requests in Canoochee Watershed [(Candler, Evans, Emanuel, Tattnall, and Bulloch Counties (Claxton Gap)] and Satilla Watershed [(Appling, Jeff Davis, and Wayne Counties (Atkinson Gap)].

<sup>2</sup>Wastewater utilities should coordinate with EPD to obtain needed capacity. Regionally sufficient capacity exists; however, localized gaps may occur in Candler and Evans Counties.

<sup>3</sup>Additional industrial wastewater capacity may be needed. EPD to update and refine discharge limit databases.

<sup>4</sup>Additional groundwater permit capacity may be needed in Candler, Emanuel, Evans, Jeff Davis, Montgomery, Wayne, Wheeler, and Wilcox Counties. Utilities in regions should evaluate long-term needs and, if needed, work with EPD to obtain additional permit capacity.

<sup>5</sup>Additional groundwater permit capacity may be needed in Evans and Wayne Counties. Industries in regions should evaluate long-term needs and, if needed, work with EPD to obtain additional permit capacity.

<sup>6</sup>Additional municipal groundwater permit capacity may be needed in the following counties: Candler, Emanuel, Evans, Jeff Davis, Montgomery, Wayne, Wheeler, and Wilcox Counties.



## Section 7. Implementing Water Management Practices

This section presents the Altamaha Council's roadmap for the implementation of the water management practices identified in Section 6. Schedules for implementation, in addition to the early step(s) required to initiate implementation of a given practice, are presented for both short and long-term actions. The Altamaha Council has defined short term as years 2010 to 2020 and long term as 2020 to 2050. As the State Water Plan provides, this plan will be primarily implemented by the various water users in the region, therefore, the Altamaha Council has described the roles and responsibilities of the implementing parties as well as the fiscal implications of the practices.

The Altamaha Council also emphasizes that the implementation of recommended management practices are predicated on a number of planning assumptions related to: projected growth of population, industry, agricultural and energy needs; data sets and assumptions related to water use, water withdrawals and returns; data regarding water quality and watershed models; and resource assessment tools for surface water availability, surface water quality and groundwater availability. Consequently, significant changes or departures from these planning assumptions, forecasts, and resource assessment tools may require a modification of the recommended management practices, the implementation schedule, and/or the implementing entities/affected stakeholders. Future planning efforts should confirm current assumptions and make necessary revisions and/or improvements to the conclusions reached during this round of planning.

### Summary

*Insert text regarding the summary of this section.*

### 7.1. Implementation Schedule and Roles of Responsible Parties

Table 7-1 ties the resource shortfalls and the needs specified by the Council and the corresponding management practices detailed in Table 6-1 to the parties who will implement those practices. This table also describes the timeframe for implementation and the specific steps required for implementation.



## 7. Implementing Water Management Practices

**Table 7-1: Implementation Schedule**

Action Needed (Management Practice)	Issue to be Addressed and Resource(s) Affected	Permittee Category of Responsible Parties (if applicable)	For All Actions: Initial Implementation Step(s) and Associated Date(s)	For Short-term Actions: Further Action to Complete Implementation and Associated Date(s)	For Long-term Actions: Further Action to Complete Implementation and Associated Date(s)	Responsible Parties
<b>Surface Water Management Practices</b> (Alapaha, Altamaha, Canoochee, Ocmulgee, Oconee, and Ohoopsee Rivers)						
Analysis of water availability to prevent impact to gap periods	Forecasted agricultural withdrawals at Claxton	Agricultural Surface Withdrawal	EPD to develop Data Needs and Guidance for Analysis Requirements  Applicants to submit analysis from 2010-2015	EPD from 2010-2015 revise and expedite application process based on refined resources assessment tools	Determine if expedited or revised permitting process is warranted to allow for use of the resource and protection of critical low flows	EPD  Applicant for Agricultural Surface water permit
Issuance of new surface water permits	Forecasted agricultural withdrawals at Doctortown, Lumber City, and Mount Vernon	Agricultural Surface Withdrawal	Present though first update of Water Plan	Issue additional surface water permits by 01/2020	Verify flow conditions and gaps	EPD
Refine agricultural education and data collection practices	Gaps: education, data, and flow regime	NA	June – December 2011 Develop scope of work and key partnering agencies January 2012-2015	Complete data collection and evaluation by 01/2015  Incorporate data/findings in next water plan revision	NA	EPD in partnership with UGA, GSWCC, GDA Other key institutions

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Water conservation practices (T3-T4)	Programmatic practices	NA	<p>June 2011- December 2011 confirm and verify status of selected conservation practices</p> <p>Conduct outreach/education/ incentives to encourage implementation of conservation measures</p>	Implement water conservation practices thorough 01/2020	Verify Conservation savings estimates	<p>EPD, GSWCC others?</p> <p>EPD, GSWCC, GDA others for support</p> <p>Individual agricultural users for implementation</p>
Increase/ replace surface water supply with groundwater	Gaps: flow regime	Agricultural Groundwater Withdrawal	Need to verify council support	Replace surface water supply by 01/2020		
Identify opportunities to restore historically drained wetlands	Gaps: flow regime and water quality	Need EPD guidance on selection of permit		NA	Restore wetland characteristics by 01/2050	
<b>Groundwater Management Practices</b>						
(Majority of 2010 pumping from Floridan Aquifer (93%), remainder from Surficial/Claiborne/Gordon/Cretaceous Aquifers)						
Sustainable withdrawals to satisfy multi-sector uses	Regional pumping	Agricultural , Industrial, and Municipal Groundwater Withdrawal	<p>Present through first update of Water Plan</p> <p>2015 verify sustainable yield metrics consider any relevant localized impacts</p>	Provide guidance and implement sustainable groundwater withdrawal rates through 01/2020	Modify resources assessments and sustainable yield criteria	



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Potential facility/ infrastructure needs at County scale	2050 municipal gaps (Candler, Emanuel, Jeff Davis, Montgomery, Wayne, Wheeler, and Wilcox Counties)	Public Water System	June 2012 to first update of Water Plan	Will refine based on County level infrastructure graphics and determine timing between short and long-term projects		
Water conservation practices (T1-T2)	Programmatic practices	NA	Present through 2020 Update in next Water Plan	Implement water conservation practices by 01/2020 Estimate and verify conservation savings	2020-2050 Continue implementation of practices and estimate/verify conservation savings	
Additional well development in Upper Floridan and other aquifers	Increase in forecasted groundwater withdrawals	Municipal Groundwater Withdrawal	Present through 2020 issue permits improve data formats for first Water Plan update		2020-2050 issue permits and incorporate relevant technical data for resource assessments	
Incentive-based land use practices to promote infiltration and aquifer recharge	Maintain sustainable yield of prioritized aquifers	NA	Present through 2020 Monitor landuse changes and further delineate aquifer recharge areas	Include information in Water Plan update	2020-2050 continue to monitor landuse and hydrologic relationships	
<b>Wastewater Management Practices</b>						
Increase water returns by decreasing LASs	Gaps: flow regime	General Wastewater	Site specific need direction this is facility level			
Increase water returns by decreasing OSSMSs	Gaps: flow regime	General Wastewater	Site specific or County specific			Counties

## 7. Implementing Water Management Practices



Potential facility/ infrastructure needs at County scale	2050 municipal facility/ infrastructure gap (Candler and Evans Counties)	General Wastewater	Site specific need direction this is facility level			
Utility system upgrades and replacements	Facility/ infrastructure needs	General Wastewater	Site specific need direction this is facility level			
<b>Water Quality (Dissolved Oxygen) Management Practices</b>						
Utility system upgrades and replacements	Facility/ infrastructure needs	General Wastewater	Site specific need direction this is facility level			
Investigate reaches with limited assimilative capacity identified through DO modeling	Surface water quality gaps identified through DO modeling	NA				
Non-point source pollution reduction	Programmatic practices	Municipal/ Industrial/ Construction Stormwater				City, county, for urban Silva culture for forestry Individual and corporate for agriculture
<b>Water Quality Impairment Management Practices</b>						
Non-point source pollution reduction	Programmatic practices	Municipal/ Industrial/ Construction Stormwater				City, county, for urban Silva culture for forestry Individual and corporate for agriculture
Identify opportunities to restore historically drained wetlands	Help address quality and quantity nexus	Need EPD guidance on selection of permit				



## 7. Implementing Water Management Practices

### Water Quality (Nutrients) - Satilla River Watershed Model

Non-point source pollution reduction	Programmatic practices	Municipal/ Industrial/ Construction Stormwater				City, county, for urban Silva culture for forestry Individual and corporate for agriculture
<b>Education/Ordinances</b>						
Water Conservation Education/ Outreach Programs	Help promote sustainable use of surface and groundwater resources	NA				WCIP agencies
Non-point source pollution associated with OSSs, stormwater, and land uses (urban, forested, and agricultural)	Improve awareness of water quality and land use practices.  Improve water quality in watershed and LDA	Municipal/ Industrial/ Construction Stormwater				Cities, Counties, GSWCC, GFC
<b>Shared Resources Coordination</b>						
Resource coordination with Savannah-Upper Ogeechee and Coastal Georgia Councils	Flow regime gap (Eden and Kings Ferry)	NA	Need to identify selected practices for all regions first			
Resource coordination with Suwannee-Satilla Council	Flow regime gap (Atkinson and Statenville)	NA	Need to identify selected practices for all regions first			



## 7.2. Fiscal Implications of Selected Water Management Practices

**Table 7-2: Cost Estimates for the Implementation Responsibilities**

Action Needed (Management Practice)	Issue to Be Addressed	Capital/Programmatic Cost	O&M costs	Non-monetary Costs	Funding Sources and Options	Notes and Sources for Costs
{NOTE: ACTIONS carried over from Table 6-1}	{NOTE: ISSUES carried over from Table 6-1}					

*{Planning Contractors will describe the planning level cost of the water management practices as well as funding sources and options (14.7.c.xiv).}*

*The Planning Contractor may want to outline potential mechanisms (e.g. GEFA loan and grant programs) that could be used to support the local government implementation of the selected water management practices.*

*The costs in Table 7-2 may be dollars based on calculations or may be rough estimates based on the cost guidance. The sources for costs is to be detailed in the “Notes and Sources For Costs” column.}*

## 7.3. Alignment with Other Plans

*{Note here consistencies and differences between the Regional Water Plan and other regional and local plans (14.7.c.x), specifically addressing alignments and/or inconsistencies associated with timing, budgeting, or responsibilities. Explanations for inconsistencies should be provided, and recommendations to promote future compatibility between plans should be made}.*

### 7.4. Recommendations to the State

The Altamaha Council supports the concept of regional water resource planning with a focus on planning Councils composed of local governments, water users, water providers, industry, business and affected stakeholders. Local representatives are typically most familiar with local water resource issues and needs. The State has a vital role providing technical support, guidance, and funding to support locally focused water resource planning. This plan should be viewed as a living, iterative document and the State should focus on the following principles:

#### **Education, Incentives, Collaboration, Cooperation, Enabling, Supporting**

The Altamaha Council is sensitive to unintended consequences if plan recommendations become mandates. The State must help balance plan recommendations with assessing measurable progress toward plan implementation. If additional rules or other administrative or regulatory actions are deemed necessary, the State should work with Councils to help ensure workable solutions.

The following specific recommendations to the State are provided to help aid in the successful implementation of the plan.

#### Georgia EPD

- Consider “institutionalizing” planning. This would entail a long-term commitment of staff and funding to: monitor and support plan recommendations; coordinate improved data collection, management and analysis; continue to develop and improve resource assessment tools; and help provide funding, permitting and technical support to address gaps and water resource needs.
- Work with Georgia Soil and Water Conservation Commission, Georgia Department of Agriculture, University of Georgia, and other relevant institutions to improve agricultural water use data collection and management. This effort would focus on refining source(s) of supply for multiple irrigation sources, continuing to assess data on crop water requirements, evaluating the effects of farm ponds on direct irrigation withdrawals and the hydrologic cycle, and further research on crop consumptive use. This data in turn should be coordinated with Resource Assessment tools to ensure accurate simulation of any gaps and assumptions.
- Focus funding support and permitting assistance to projects and programs aimed at addressing gap areas. Where possible, leverage federal funds to help support and expedite project implementation.
- Consider collaborative approaches to collecting more standardized water use data and improving data on water demands. This would include continued improvement and updating databases used in the planning



process. It would also involve working with the Georgia Municipal Association and other relevant stakeholders to improve water use information.

- Working with Georgia Environmental Finance Authority, examine opportunities to improve coordination among water providers and users and create incentives to maximize existing infrastructure and coordinated operations.
- Continue to engage in dialogue and data-sharing with the State of Florida regarding current and forecasted groundwater use. South Georgia and North Florida rely heavily on the Upper Floridan aquifer to meet water supply needs and it is in EPD's best interest to include the most accurate available information on growth and groundwater use in both states in our resource assessment modeling.

#### Georgia Environmental Finance Authority

- Meeting forecasted water supply needs will require stable and flexible funding sources to assist water users and water and wastewater utilities in meeting forecasted needs. A stable GEFA financing source(s) should be provided for necessary water supply, water and wastewater plant construction and plant upgrades to address current and future gaps.


#### Georgia Forestry Commission (GFC)

- Continue to support and fund the GFC Forestry Best Management Practices Program. Providing education and incentives to control erosion and segmentation will help the region prevent/address TMDL listed segments, reduce nutrient loadings, and support wetland areas. This will have the benefit of helping to sustain baseflow conditions of streams and water quality.

#### Georgia Soil and Water Conservation Commission (GSWCC)

GSWCC should continue to provide leadership and locally focused efforts in the following programs:

- Continue education and outreach associated with *Urban Erosion and Sediment Control* program including certification of individuals involved in land disturbing activities and on-site implementation of erosion, sedimentation, and pollution control plans. This will help address the water quality needs of the region.
- Continue education and outreach efforts to agricultural interests through annual Irrigation Meetings and other avenues to inform farmers of available technologies and funding sources to make more efficient use of water resources without incurring hardship.



## 7. Implementing Water Management Practices

- Support completion, maintenance and improvement of the *Agricultural Water Use Measurement Program*, which is aimed at cost effectively collecting agricultural water use data across the State, and integrating cooperative arrangements with the private sector and partnerships with other State agencies. This program is a vital component to helping the State and regions effectively manage and utilize water resources.
- Support *Georgia Agricultural Conservation Incentive* program, which provides funding support to help implement conservation practices that benefit water quantity and quality. Funding for this program is essential to help implement conservation measures, especially in the regional watersheds where there are surface water gaps.

Coordination with Agencies Identified in the Water Conservation Implementation Plan and Identification of other key State agencies. (CDM would like your input on this topic during our Review Meeting.)



## Section 8. Monitoring and Reporting Progress

The selected water management practices identified in Section 6 will be primarily implemented (as described in Section 7) by the various water users in the region, including local governments and others with the capacity to develop water infrastructure and apply for the required permits, grants and loans.

The benchmarks prepared by the Altamaha Council and listed in Table 8-1 below will be used to assess the effectiveness of this plan’s implementation and identify any required revisions. As detailed below, the Council selected both qualitative and quantitative benchmarks that will be used to assess whether the water management practices are closing gaps over time and allowing the water planning region to meet its vision and goals. The benchmarks will be used to evaluate the Regional Water Plan effectiveness at the next 5-year plan review.

### Summary

*Insert text regarding the summary of this section.*

### 8.1. Benchmarks

*{Benchmarks should be specific, measurable, achievable, realistic, and time-phased. In the text below the table the Council should outline how to collect and analyze the data necessary to evaluate implementation progress. The time period is intended to show the timeframe between evaluations to provide meaningful results – some benchmarks may be long-term and not measured well on a short timeframe.}*

**Table 8-1: Benchmarks for Water Management Plans**

Action Needed (Management Practice)	Benchmark	Measurement Tools	Time Period
{NOTE: ACTIONS carried over from Table 6-1}	{Identify quantitative and qualitative benchmarks that can be used to evaluate the region's progress toward achieving their regional vision and the guiding policy of the State Water Plan}	{TBD by Council}	{TBD by Council}

### 8.2. Plan Updates

Meeting current and future water needs will require periodic review and revision of Regional Water Plans. The State Water Plan and associated rules provide that each Regional Water Plan will be subject to review by the appropriate Regional Water Planning Council every five years and in accordance with this guidance provided by the Director, unless otherwise required by the Director for earlier review. These reviews and updates will allow an opportunity to adapt the Regional Water Plan based on changed circumstances and new information arising in the five years after EPD's adoption of these plans. These benchmarks will guide EPD in the review of the Regional Water Plan.

### 8.3. Plan Amendments

*{Language TBD -- Councils may provide recommend language here e.g. "triggering events" to the degree the Council has discussed and has opinions on this topic.}*



## Bibliography

Cowie, G. and Davis, D. Georgia's State Water Plan. Retrieved on March 2, 2009.

[www.robinson.gsu.edu/ethics\\_pub/2009/cowie.pdf](http://www.robinson.gsu.edu/ethics_pub/2009/cowie.pdf)

Georgia Comprehensive State-wide Water Management Plan. Georgia Water Council. January 8, 2008.

Georgia Department of Community Affairs Georgia County Snapshots website.

Retrieved on July 21, 2010, [www.dca.state.ga.us/CountySnapshotsNet/default.aspx](http://www.dca.state.ga.us/CountySnapshotsNet/default.aspx)

Georgia Department of Community Affairs, Regional Planning Rules "Standards and Procedures for Regional Planning." Chapter 110-12-6, et seq.

[www.dca.ga.gov/development/PlanningQualityGrowth/PAGES/Legal.asp#RegionalRules](http://www.dca.ga.gov/development/PlanningQualityGrowth/PAGES/Legal.asp#RegionalRules)

Georgia Department of Corrections website Facility Search. Retrieved on July 21,

2010, [www.dcor.state.ga.us/GDC/FacilityMap/jsp/FacQrybyCounty.jsp](http://www.dcor.state.ga.us/GDC/FacilityMap/jsp/FacQrybyCounty.jsp)

Georgia Department of Economic Development's GeorgiaFacts website. Retrieved

on July 21, 2010, [www.georgiafacts.net](http://www.georgiafacts.net)

Georgia Department of Labor's LaborMarket Explorer and Local Area Profiles.

Retrieved on July 21, 2010, [www.explorer.dol.state.ga.us/mis/profiles.htm](http://www.explorer.dol.state.ga.us/mis/profiles.htm)

Georgia Department of Natural Resources. Environmental Protection Division.

Coastal Georgia Water and Wastewater Permitting Plan for Managing Salt Water Intrusion. June 2006.

Georgia Department of Natural Resources. Environmental Protection Division. Draft August 2003. Altamaha River Basin Management Plan 2003.

Georgia Department of Natural Resources. Environmental Protection Division.

Georgia's State Water Plan. Regional Water Planning Guidance. July 2009.

Georgia Department of Natural Resources. Environmental Protection Division.

Georgia's Water Resources. A Blueprint for the Future. Draft Submission to the Water Council. June 28, 2007.

Georgia Department of Natural Resources. Environmental Protection Division. The State of Georgia's Environment. 2009.

Georgia Department of Natural Resources. Wildlife Resources Division. A

Comprehensive Wildlife Conservation Strategy for Georgia. August 31, 2005.

Georgia Department of Natural Resources. Wildlife Resources Division. Fisheries Section Annual Report. 2006.

Heart of Georgia Altamaha Regional Commission website. Retrieved August 3, 2010, [www.hogarc.org/](http://www.hogarc.org/)

Southeast Regional Climate Center. Climate summaries obtained for the following stations: Swainsboro (ID 098496), Abbeville (ID 090010), Eastman (ID 092966), Mt. Vernon (ID 096126), Glenville (ID 093754), and Metter (ID 095811).

University System of Georgia, Map of USG Institutions. Retrieved on July 21, 2010, [www.usg.edu/inst/map/](http://www.usg.edu/inst/map/)