

# GEORGIA WATER DEVELOPMENT AND CONSERVATION PLAN

## PRELIMINARY LIST OF MANAGEMENT PRACTICES

MAY 2010

The following list provides an initial “universe” of Management Practices. Please add additional suggestions and highlight those Management Practices that are likely to be the most effective and have a high probability of implementation.

#	Water Management Practice	Description	Unit	Specific Notes
<b>WATER DEMAND MANAGEMENT PRACTICES</b>				
WD-1	Municipal (Domestic & Commercial) Water Conservation & Efficiency	Programs to conserve water and reduce water loss for residential and commercial water users.	\$/MG	Low Range: Includes residential water use audits. High Range: Includes rebate programs, government efficiency programs, and programs targeting high water users. Other: The effectiveness depends on the current level of efficiency.
WD-2	Industrial Water Conservation & Efficiency	Programs to conserve water and reduce water loss for industrial water users.	\$/MG	Low Range: Includes facility inspections and water use audits. High Range: Includes facility upgrades, such as cooling tower efficiency improvements or replacement of older equipment. Other: The effectiveness depends on the current level of efficiency and number/type of industries.
WD-3	Agricultural Water Conservation & Efficiency	Programs to conserve water and reduce water loss for agricultural water users.	\$/MG	Low Range: Sod based rotation with conservation tillage. High Range: Improvements such as replacement of irrigation equipment to Variable Rate Irrigation to lower water use. Other: The effectiveness depends on current irrigation practices, water use rate and size of irrigated acres.

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WD-4	Reduce Non-Revenue Water (Water System Asset Management)	Routine activities by water providers to identify and reduce non-revenue water, which includes water loss (leaks), unbilled-authorized uses (fire fighting, line flushing), and apparent losses (metering/data handling errors).	\$/MG	Low Range: Includes reactive response to leaks and customer complaints, completing a self-audit annually. High Range: Includes proactive leak detection, meter calibration, and programmatic water line replacement. Other: The costs are related to the age of the pipes in the system, pipe material, and maintenance history.
WD-5	Conservation-Oriented Rate Structures	Implement or modify rate structures to provide inclining block rates (such as a three-tiered program) that charge customers more per unit for higher use.	\$/MG	Low Range: Includes rate analysis and minor adjustments to billing system. High Range: Includes rate study with replacement of billing system to accommodate tiers. Other: Cost range depends on the quality of the billing systems in the region.
WD-6	Landscape Conservation Measures	Implement programs to reduce or eliminate potable water use for the maintenance of landscaping.	\$/MG	Low Range: Installation of irrigation rain sensor shut-off valves. High Range: Replacement of landscaping (over time) with low water usage, native landscaping.
WD-7	Golf Course Water Conservation & Efficiency	Implement programs to reduce water consumption at golf courses in Georgia.	\$/MG	Low Range: Includes training for golf course superintendents & workers. High Range: Includes training and water use assessments with leak detection & repair, as needed.
<b>WATER SUPPLY MANAGEMENT PRACTICES</b>				
WS-1	New Surface Water Storage Reservoirs	Construct a new surface water supply reservoir.	\$/MG	Low Range: Quarries or other sites that do not require dams. High Range: Larger dams

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WS-2	Increase Existing Surface Water Storage Reservoirs	Increase the height of existing surface water reservoirs to provide additional water supply.	\$/MG	Low Range: Minor adjustments to the existing dam structure. High Range: Major renovations to the existing dam structure.
WS-3	New Groundwater Sources	Locate and develop new groundwater wells for water supplies. Costs do not include land acquisition, wellhead protection, or treatment.	\$/MG	Other: Dependent on well depth, water quality, soil conditions, piping distance and number of pump stations.
WS-4	Aquifer Storage and Recovery	Develop a program to recharge a groundwater aquifer to withdraw later to supplement supply during seasons of water shortage or drought.	\$/MG	Other: Dependent on well depth, water quality, soil conditions, piping distance and number of pump stations. Not currently allowed in certain areas.
WS-5	Interbasin Transfers	Transfers can supply water to areas of need. These may not have adverse impact on the donor basin and will only be considered following consumptive use assessments.	\$/gal/ Mile	Other: The cost for interbasin transfers is associated with the piping.
WS-6	System Interconnections for Water Supply	Interconnection of water supply systems between counties or even cities can provide a back up supply during a natural disaster or provide for routine sale of water.	\$/gal/ mile	Other: The cost for water system interconnections is associated with the piping.
<b>WATER TREATMENT PRACTICES</b>				
WT-1	Water Treatment Plant (New) <sup>1</sup>	Treatment of surface water or a combination of surface and groundwater making it a viable water supply source.	\$/MGD	Low Range: Includes simple processes on clean surface water supplies or well water supplies. High Range: Includes chemical precipitation, color and organics removal, and advanced disinfection.

#	Water Management Practice	Description	Unit	Specific Notes
WT-2	Water Treatment (Ground)	Treatment of groundwater making it a viable water supply source.	\$/MGD	Low Range: Includes basic treatment components with manual control and minimal monitoring High Range: Includes basic treatment components with advanced controls & monitoring
WT-2	Water Treatment Plant Expansion <sup>1</sup>	Upgrade existing facilities to replace antiquated equipment, increase capacity, or improve level of treatment.	\$/MGD	Low Range: Includes upgrade of existing systems with minimal modification or replacement of existing process components. High Range: Includes upgrade of existing systems with replacement of existing systems and modification / addition of treatment components.
WT-3	Desalination <sup>1</sup>	Desalination is the removal of chlorides from well water or seawater, down to potable water levels.	\$/MGD	Low Range: Includes processes for brackish water supplies. High Range: Includes processes for seawater water supplies. Other: Dependent on water quality, pre-treatment, post-treatment and size of system.
<b>WASTEWATER TREATMENT AND RETURN MANAGEMENT PRACTICES</b>				
WW-1	Land Application System (LAS) <sup>1</sup>	Construct new land application systems. Costs do not include permitting or land acquisition.	\$/MGD	Low Range: Includes basic land application system. High Range: Includes land application system with underdrain.
WW-2	Constructed Treatment Wetlands <sup>1</sup>	Treatment wetlands can provide wastewater treatment and also promote water reuse, wildlife habitat and public use benefits.	\$/MGD	Low Range: Cost for constructed treatment wetlands with moderate earthwork. High Range: Constructed treatment wetlands with extensive earthwork.

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WW-3	WWTP (Secondary Treatment) <sup>1</sup>	Construct new wastewater treatment facility with secondary treatment levels.	\$/MGD	Low Range: Includes basic treatment components with manual control and minimal monitoring. High Range: Includes basic treatment components with advanced controls & monitoring.
WW-4	WWTP (Tertiary Treatment) <sup>1</sup>	Construct new advanced wastewater treatment facility with tertiary treatment.	\$/MGD	Low Range: Includes basic treatment components with manual control and minimal monitoring. High Range: Includes basic treatment components with advanced controls & monitoring.
WW-5	WWTP upgrade <sup>1</sup>	Upgrade existing facilities to replace antiquated equipment, increase capacity, or improve level of treatment.	\$/MGD	Low Range: Includes upgrade of existing systems with minimal modification or replacement of existing process components. High Range: Includes upgrade of existing systems with replacement of existing systems and modification / addition of treatment components.
WW-6	Wastewater Collection System Asset Management Program	Reducing sanitary sewer overflows (SSOs) through a wastewater asset management program or a collections systems operations and management (CMOM) program.	\$/MGD	Costs will depend on miles of pipe, condition of system at start of program, and frequency of inspections and maintenance.
WW-7	WWTP decommissioning <sup>2</sup>	Decommissioning of inefficient/antiquated facilities.	\$/MGD	Low Range: Includes abandoning treatment facilities in place. High Range: Includes complete removal /demolition of structures.

#	Water Management Practice	Description	Unit	Specific Notes
WW-8	Increase water returns by decreasing use of OSSMSs <sup>2</sup>	Decommission OSSMSs and connect to the centralized treatment system.	\$/MGD	Low Range: Adopt rules to require new development to connect to sanitary sewer. High Range: Extend sanitary sewer to connect OSSMSs to the centralized system.
WW-9	Increase water returns by decreasing use of LASs <sup>2</sup>	Convert existing LAS sites to conventional treatment/discharge.	\$/MGD	Low Range: Adopt rules to require new development to connect to sanitary sewer. High Range: Extend sanitary sewer to connect OSSMSs to the centralized system.
<b>EDUCATION MANAGEMENT PRACTICES</b>				
E-1	Stormwater Public Education and Outreach	Develop and implement a stormwater education program.	\$/capita	Low Range: Includes print educational materials. High Range: Includes print materials, workshops/classes, and mass media (television, billboards, etc.).
E-2	Water Conservation Education/Outreach Programs	Public education would be used to raise awareness of other conservation measures available to customers.	\$/capita	Low Range: Includes print educational materials. High Range: Includes print materials, workshops/classes, and mass media (television, billboards, etc.).
<b>ORDANCE AND CODE POLICY PRACTICES</b>				
OP-1	New Development Stormwater Management (such as the blue book)	Adopt an ordinance/policy that requires stormwater management standards for new development to reduce stormwater pollution.	\$/capita	Cost to develop ordinances or standards.
OP-2	Source Water Supply Protection (reservoir buffers, lot size, septic setbacks, reservoir use restrictions, etc.)	Includes regulations and ordinances, such as prohibiting or restricting land uses that could release contaminants in critical source water areas.	\$/capita	Cost to develop ordinance to protect areas within the drinking water supply watershed.

#	Water Management Practice	Description	Unit	Specific Notes
OP-3	Groundwater Recharge Protection	Protecting groundwater quality by restricting land uses that generate, store or use pollutants in recharge areas.	\$/capita	Cost to develop ordinances or policies to protect groundwater recharge areas.
OP-4	Wastewater Collection System Asset Management Program	Reducing sanitary sewer overflows (SSOs) through a wastewater asset management program or a collections systems operations and management (CMOM) program.	\$/capita	Costs will depend on miles of pipe, condition of system at start of program, and frequency of inspections and maintenance.
OP-5	Reduce Impervious Surfaces (LID, land conservation, transfer of development rights, etc.)	Develop a program to reduce impervious surfaces.	\$/capita	Cost to develop ordinances or policies to reduce impervious surfaces or plan areas for acquisition.
OP-6	Establish a Stormwater Utility to Increase Funding	Develop a stormwater user fee to provide stable funding for stormwater programs.	\$/capita	Cost to develop stormwater utility. The cost per capita is higher for smaller communities than for larger populations.
OP-7	Protect Sensitive Land (stream buffers, floodplains, wetlands, steep slopes, etc.)	Develop a program to protect sensitive land.	\$/capita	Cost to develop a greenspace plan.
OP-8	Pollution Prevention Programs	Develop a program to identify and prevent stormwater pollution from commercial and industrial properties.	\$/capita	Low Range: Inspect outfalls every 5 to 10 years. High Range: Perform outfall inspections plus prioritize inspections of industries without NPDES industrial stormwater permits.
OP-9	Coordinated Environmental Planning	Intergovernmental coordination between comprehensive land use planning, stormwater management and wastewater (collections and septic) programs to enhance water quality protection.	\$/capita	Cost for planning and coordination.

#	Water Management Practice	Description	Unit	Specific Notes
OP-10	Maintenance for OSSMS (education, inspections, pumping, etc. for homeowners with OSSMSs)	Develop educational programs for homeowners with OSSMS's on proper use and maintenance	\$/capita	Low Range: septic system education (workshops or mailings). High Range: Adopt an ordinance requiring regular pumping of septic tanks; track and enforce maintenance along with education and training.

1. Treatment plant costs typically have a decreasing unit cost as the size of the facility increases.

2. Decommissioning costs only reflect the cost of removal from service. Cost for treatment and piping must be added, as appropriate.