

To: Brazos G Regional Water Planning Group	
From: Kristi Shaw, P.E. David D. Dunn, P.E.	Project: 2011 Brazos G Regional Water Plan
CC: Trey Buzbee	
Date: August 13, 2009	Job No: 100489

RE: Proposed Water Conservation Approach for the 2011 Brazos G Regional Water Plan

Texas Water Development Board (TWDB) Rules¹ for regional water planning require regional water planning groups to consider water conservation and drought management measures for each water user group with a projected water need (shortage). In support of such a requirement, Senate Bill 1094 created a Water Conservation Implementation Task Force to describe water conservation best management practices (BMPs) and provide a guidance document for use by the regional water planning groups in development of their regional water plans. In November 2004, the TWDB and Water Conservation Implementation Task Force released a "Water Conservation Best Management Practices Guide"² to provide guidance for municipal, industrial, and agricultural water conservation. A previously released report by GDS Associates³ provides additional region-specific guidance for municipal water conservation.

The 2006 Brazos G Regional Water Plan (Plan) includes water conservation as a recommended water management strategy. In September 2004 and February 2005, the Brazos G Regional Water Planning Group (RWPG) recommended water conservation strategies for municipal, irrigation, and industrial water users with projected needs (shortages) identified during the Year 2010-2060 planning period. The Brazos G RWPG encouraged water conservation for all entities, with specific target goals for water user groups with water needs. A summary of Brazos G RWPG water conservation recommendations from the 2006 Plan are described below as categorized by water user. HDR recommends that the Brazos G RWPG consider adopting these water conservation recommendations for use in the 2011 Brazos G Regional Water Plan.

Municipal Water Conservation

For the 2006 Plan, the Brazos G RWPG recommended conservation for municipal water user groups with a projected water need and a projected per capita water use rate greater than 140 gallons per capita per day (gpcd) in Year 2060 based on the Water Conservation Implementation Task Force's⁴ statewide per capita water use target. The Brazos G RWPG did not recommend specific conservation BMPs for each municipal entity to encourage entities to choose those conservation strategies that best fit their individual situation. However, the Brazos G RWPG did include a list of BMPs identified by the Water Conservation Implementation Task Force, and provided an estimated water savings for specific water conservation BMPs (when available) and estimated costs to assist water user groups in identifying low-cost water conservation measures.

¹ In accordance with Texas Administrative Code §357.7(a)7(A).

² Texas Water Development Board and Water Conservation Implementation Task Force, "Water Conservation Best Management Practices Guide," Report 362, November 2004.

³ "Quantifying the Effectiveness of Various Water Conservation Techniques in Texas," Texas Water Development Board, prepared by GDS Associates, Austin, Texas, July 2003.

⁴ Water Conservation Implementation Task Force, report to the 79th Legislature, Texas Water Development Board, Special Report, Austin, Texas, November 2004.

Water savings and cost information for selected water conservation BMPs from the 2006 Plan are provided in Table 1.

If all of the programs listed in Table 1 were implemented by a utility, an estimated total per capita water use reduction of 21 gpcd can be expected. It was assumed that the 21 gpcd reductions would occur by Year 2020 for all municipal WUGS with needs and per capita rate greater than 140 gpcd, regardless of the timing of the needs. Based upon available costs, the average cost per acft of water saved would be between \$325 and \$400.

Table 1.
Savings and Costs Associated with Municipal Water Conservation
(from the 2006 Brazos G Regional Water Plan)

Conservation BMP	Savings	Estimated Cost (\$/acft of water saved)
Advanced Conservation	7 gpcd*	\$325 to \$385
• Toilet retrofit		
• Showerheads and Aerators		
• Irrigation Audit – High User		
Landscape Irrigation	11 gpcd	\$400
Public Education Programs	3 gpcd	N/A
Total	21 gpcd	\$325 to \$400
<small>* Note: This is an average for the WUGs analyzed, and represents 50 percent replacement of existing fixtures. In contrast, the TWDB maximum savings for a specific WUG in Region G (Brazos County-other) is about 13 gpcd, representing 100 percent replacement of existing fixtures for a WUG projected to have declining population and, consequently, minimal new construction.</small>		

The current TWDB municipal water demand projections account for expected water savings due to implementation of the 1991 State Water Efficient Plumbing Act, and include a 100 percent replacement of existing plumbing fixtures to water efficient fixtures by Year 2045. Consequently, any best management strategy intended to replace inefficient plumbing fixtures installed prior to 1995 would constitute an acceleration of the effects of the 1991 Plumbing Act, but provide no additional long-term savings. A portion of the 21 gpcd reduction is therefore an acceleration of the savings expected due to full implementation of the 1991 Act.

The 2006 Plan included a table of estimated water savings with conservation on a decadal basis for municipal entities with water needs and per capita rate greater than 140 gpcd. A similar table would be provided for the 2011 Brazos G Regional Water Plan.

Irrigation Water Conservation

In February 2005, the Brazos G RWPG recommended that counties with projected irrigation needs (shortages) reduce their irrigation water demands by 3 percent by 2010, 5 percent by 2020, and 7 percent from 2030 to 2060 by using BMPs identified by the Water Conservation Implementation Task Force. Limited information regarding specific water savings and costs to install irrigation water savings systems was available.

The Task Force report did include water savings and costs for three irrigation water conservation BMPs: (1) furrow dikes; (2) low-pressure sprinklers (LESA); and (3) low-energy precision application systems (LEPA).

Furrow dikes are small mounds of soil to capture precipitation and hold it so that it soaks into the soil rather than running to the end of the field. Use of furrow dikes can have water savings up to 12 percent of the gross quantity of water applied using sprinkler irrigation. Low-pressure sprinklers (LESA) spray water directly above the crops as the sprinkler systems are moved across the fields. LESA systems improve irrigation application efficiency by reducing water requirements per acre by between 10 and 25 percent, as compared to furrow irrigation. LEPA systems discharge water directly into furrows at low pressure, thus reducing evaporative losses. When used with furrow dike systems, the expected water savings from LEPA would range from 0.25 acft/acre to 0.51 acft/acre.

The 2006 Brazos G Plan considered the three specific irrigation water conservation BMPs described above to evaluate the effects of water conservation on irrigation water use and application rates for those counties with irrigation water needs (shortages). For irrigation purposes, it is especially important to consider the economic feasibility for implementing BMPs to meet projected irrigation water needs (shortages), since the costs for water management strategies may greatly exceed the income that would be realized from land irrigated with these water supplies.

Industrial Water Conservation

In February 2005, the Brazos G RWPG recommended that counties with projected manufacturing, steam electric, or mining needs (shortages) reduce their water demands by 3 percent by 2010, 5 percent by 2020, and 7 percent from 2030 to 2060 by using BMPs identified by the Water Conservation Implementation Task Force. Limited information regarding specific water savings and costs to install industrial water savings systems was available. Since industrial water use is presented on a county basis and individual entities are not identified, recommendation of specific water management strategies was not a reasonable expectation. Costs to implement BMPs vary from site to site and the Brazos G RWPG recognized that industries will pursue conservation strategies that are economically feasible with water savings benefits.

Recommendation

The 2006 Plan was developed in accordance with TWDB rules. HDR recommends that the Brazos G RWPG consider adopting the water conservation recommendations from the 2006 Brazos G Regional Water Plan for use in the 2011 Brazos G Regional Water Plan.