

## **Brazos G RWPG**

### **Draft List of Supplemental Funding Items**

**February 11, 2004**

#### **Direct Reuse as a Water Management Strategy for Multiple WUGs**

**\$140,500**

The Texas Water Development Board has indicated that direct reuse is a preferred water management strategy to be used to account for the availability of treated effluent produced by municipalities. Direct reuse projects can utilize treated effluent for golf course, park or other irrigation uses, can utilize effluent treated to drinking water standards in public water systems, or can be used by industry for manufacturing or steam electric cooling. This effort would provide funding to contact entities owning or operating larger wastewater plants throughout the Brazos G Region, investigate the future likelihood of those entities pursuing direct reuse projects, and develop water management strategies for those or nearby entities that could potentially utilize direct reuse water to meet future water needs. Approximately 50 wastewater treatment facilities in the Brazos G Region currently discharge 1.0 MGD (1,120 acre-feet/year) or more. For these entities, water needs proximate to the treatment facility will be identified for which direct reuse from the wastewater plant might become a viable water management strategy in the future. Candidate projects will be presented to the affected entities for consideration, and those projects deemed by local entities to be plausible will be presented to the Brazos G RWPG for consideration for the 2006 Brazos G Regional Water Plan. Note: The cost estimate for this item assumes that 30 of the estimated 50 wastewater plants will be proximate to water needs, 15 of those local entities contacted will express interest, and 10 of the potential projects will be evaluated for consideration in the 2006 Regional Water Plan.

**Changed Condition:** Direct reuse of wastewater effluent was not considered as a water management strategy for widespread application in the 2001 Brazos G Regional Water Plan, and the quantity of effluent currently discharged to rivers and streams that could be available for direct reuse is equivalent to the supply that would be developed from one or more major reservoirs.

#### **Consideration of Conservation BMPs Developed by Water Conservation Task Force**

**\$10,000**

The 78<sup>th</sup> Texas Legislature enacted Senate Bill 1094, creating a task force to evaluate matters related to water conservation. One of the mandates for this task force is to identify and evaluate best management practices (BMPs) related to water conservation. Results from this effort by the task force are scheduled to be available in time for the Brazos G RWPG to incorporate the findings of the task force into the 2006 Brazos G Regional Water Plan. This effort would provide funding for the Brazos G RWPG to evaluate, consider, and adopt these BMPs as water management strategies in the 2006 plan.

**Changed Condition:** This task force was commissioned after the start of this planning cycle and its findings will represent new information that should be considered by the Brazos G RWPG.

**Diversion During High Flow Periods from the Clear Fork to Hubbard Creek Reservoir to Augment Water Supply from Hubbard Creek Reservoir** **\$15,000**

The Brazos River Authority, TWDB, and US Economic Development Administration are completing a study investigating water supply strategies for the west-central portion of the Brazos Basin. The draft report from this study discusses the possibility of diverting from the Clear Fork into Hubbard Creek Reservoir during high flow periods to augment the yield of Hubbard Creek Reservoir. This item would provide funding for this strategy to be evaluated on an equal basis with other strategies considered for the 2006 Brazos G Regional Water Plan.

**Changed Condition:** The western portion of the region is undergoing a severe drought that some have estimated to be more severe than the current drought of record that occurred in the 1950's. Yield estimates for Hubbard Creek Reservoir are substantially smaller than assumed during previous studies due to (1) the ongoing new drought of record in the west-central region of the Brazos Basin, and (2) application of the TCEQ Brazos WAM computing substantially reduced reservoir yields for most of the major reservoirs upstream of Possum Kingdom Reservoir. In addition, this strategy was not evaluated during preparation of the 2001 Brazos G Regional Water Plan.

**Reallocation of Flood Storage in Federal Reservoirs** **\$60,000**

The Brazos River Authority and the U.S. Army Corps of Engineers have initiated a study to determine effective strategies for reallocating flood storage in Federal Reservoirs to conservation storage. Previous studies investigating this approach have found that relatively small amounts of reallocation can result in increases in firm yield, with minimal impact to downstream flood control. The study being conducted by the BRA and USACE will not be completed in time for consideration in the 2006 Brazos G Regional Water Plan. This effort would utilize previous studies, updated with additional simulations using the TCEQ Brazos WAM, to determine firm yield benefits gained through reallocation of relatively small amounts of flood storage. Due to the complexities of determining downstream flood impacts, only water supply benefits will be determined; costs of reallocation will not be developed. The effects of this reallocation on downstream expected flood damages will not be determined, but will be considered to be small. Each of the eight Federal reservoirs in the Brazos Basin in which the BRA holds a water supply interest will be evaluated individually on a stand-alone basis using the TCEQ Brazos WAM, except for Whitney Reservoir. Reallocation of storage in Whitney Reservoir was evaluated during the preparation of the 2001 Brazos G Regional Water Plan. The cost of replacing lost hydroelectric generating capacity removed that specific strategy from further consideration. Reallocation amounts investigated will be limited to 15 percent of flood storage capacity, not to exceed 50,000 acre-feet. The increased yield of each reservoir will be reported to the Brazos G RWPG for consideration in the 2006 Brazos G Regional Water Plan.

An alternative to reallocation would be to physically increase the heights of one or more of the dam structures in order to increase conservation capacity without reducing flood control capability. This effort would evaluate each of the eight Federal reservoirs and identify the two with the greatest potential benefit gained by raising the dam structures. Initial stand-alone yield estimates will be determined at each reservoir, with additional yield varied as a function of additional reservoir storage. Generalized cost curves will be applied to determine gross estimates for the costs of raising the dams, and two reservoirs

## DRAFT List of Supplemental Funding Items

will be selected for more detailed evaluation. This more detailed evaluation would involve a more detailed planning-level cost estimate of alternative dam heights.

**Changed Condition:** When the current round of planning was initiated, the joint study between the BRA and the USACE was not under consideration. While not taken to the level of detail as the BRA/USACE study, this initial evaluation is required in order to consider the benefits of this strategy in a timely manner for the 2006 Regional Water Plan.

### **Review Desalination in Region H Resulting in Additional Water Supply In Region G**

**\$10,000**

The Region H Water Planning Group will be considering one or more desalination projects as water management strategies to meet needs in Region H. If considered for specific water user groups, existing surface water supply contracts currently held between the BRA and entities in Region H could be modified, allowing more water from the BRA system to be supplied to water user groups in Region G. This effort would provide funding to coordinate with the Region H RWPG as a result of Region H pursuing desalination as a water management strategy.

**Changed Condition:** Desalination in Region H and its effects on surface water availability in Region G were not considered in the 2001 Brazos G Regional Water Plan and were not considered in the development of the Scope of Work for the 2006 plan.

### **Coordinate with and Analyze the Impacts to Water Supplies and Water Management Strategies of Ongoing Instream/Environmental Flow Studies**

**\$35,000**

This effort would provide funding for the Region G technical consultant to coordinate with the ongoing studies currently being performed by the National Academy of Sciences, the Texas Parks and Wildlife, and the Senate Select Committee related to instream and environmental flows. The Region G technical consultant would attend committee meetings as necessary, report back to the Brazos G RWPG on study progress, and determine what affects the different committee findings would have on current water availability and on water available from water management strategies selected by the Brazos G RWPG.

**Changed Condition:** Findings of these committees/studies could dramatically affect how water available to new water management strategies would be determined, particularly with regard to instream flows that new water supply projects would be expected to maintain.

### **Analyze the Effects of Groundwater Pumping on Instream Flows, Including Interactions of Ground and Surface Waters in the Brazos Alluvium**

**\$60,000**

If groundwater aquifers in the Brazos G Region are developed to the level estimated to be available, water levels would drop regionally in several of the aquifer systems. This would increase the potential for recharge from streams, and could also decrease groundwater discharge to streams. This effort would utilize the available Groundwater Availability Models (GAMs) in order to determine a gross estimate of

## DRAFT List of Supplemental Funding Items

the effects of increased groundwater pumping on flows in rivers and streams. These results would then be incorporated into the Brazos WAM as changes in streamflow, and the effects of these changes would be quantified with respect to water availability to Brazos Basin water rights. As this subject is physically and scientifically complex, sufficient data do not exist to adequately quantify the interactions between streams and aquifers on a regional basis to a level of confidence from which definite conclusions could be drawn. All estimates will be considered as gross, and only accurate within an order of magnitude at best. In addition to application of the available GAM's, a model of the Brazos River Alluvium will be applied to estimate interactions between the Brazos River and the adjacent alluvial aquifer. This model was developed during the preparation of the 2001 Brazos G Regional Water Plan.

**Changed Condition:** Concern has been raised during recent meetings of the Brazos G RWPG and in other forums as to the effects of groundwater development on stream flows and surface water availability. This effort would begin to address those concerns and questions.

### **Updated Evaluation of Millican Reservoir (Bundic Crossing site)**

**\$88,505**

The Millican Reservoir was identified and evaluated as a potential water management strategy during the preparation of the 2001 Brazos G water plan. Public comments and questions regarding this strategy have raised technical issues that the Brazos G RWPG chooses to study in developing its 2006 regional water plan in order to consider this reservoir project with regard to the Little River Reservoir project. This evaluation would include more detailed analyses than other reservoir options, and would include more detailed evaluation of expected water quality, sedimentation rates, socio-economic effects on area, environmental impacts to the aquatic environment, wildlife habitat, and threatened and endangered species. Expected mitigation costs will be developed. A cursory archeological investigation will be developed, as well as an analysis of the reservoir's impacts on mineral rights and mitigation costs.

**Changed Condition:** These more detailed evaluations are requested in response to the extensive public comments received regarding this project at the end of the last planning cycle.

### **Estimate Trinity Aquifer Pumpage**

**\$52,585**

Estimate current groundwater pumpage in the Trinity aquifer and compare to estimated sustainable yields. Using information from various sources, including groundwater districts, water utilities, aerial photos, tax appraisal districts, water well driller records and other sources, make estimates of the number and types of users of groundwater. By applying typical estimated usage rates for each type of user, make estimates of current groundwater usage from the Trinity Aquifer in these counties: Bosque County, Comanche County, Hill County, Hood County, Johnson County and Somervell County. This effort would augment the ongoing efforts to develop the Trinity Groundwater Availability Model (GAM) by providing pumping information in greater detail and improved accuracy over that with for the GAM funding is able to provide.

**Changed Condition:** Results from this effort will aid in refining groundwater availability in the study area, and allow a more detailed use of the Trinity GAM for evaluation of water supply and Aquifer Storage and Recovery (ASR) potential.

**Effect of Reservoir Level on Water Quality During Drought**

**\$12,235**

Correlations between water quality constituents and reservoir level will be developed for one selected reservoir in the western portion of the region with sufficient available data, in order to determine if degradation in water quality occurs at lower lake levels. The implications of any degradation of water quality during drought with regard to the usability of the water supply from the reservoir will be discussed.

**Changed Condition:** The western portion of the region is undergoing a severe drought that some have estimated to be more severe than the current drought of record that occurred in the 1950's. This analysis will allow the RWPG to determine if a continuation of the current drought could reduce water supplies to less than firm yield estimates due degraded water quality potentially rendering those supplies unusable.

**Impacts of Proposed and Existing Upper Basin Reservoirs on Water Quality**

**\$30,000**

The water quality in the upper Brazos River Basin can be characterized as high in Total Dissolved Solids (TDS), most of which originates as naturally occurring salinity (sodium chloride) discharged from "salt seeps" located predominately in the Salt Fork, Double Mountain Fork, and North Croton Creek watersheds. Salinity concentrations are large enough so as to limit the usability of Brazos River water for some irrigation and manufacturing uses, and require expensive desalination for municipal use. Coordinated operation of the major reservoirs in the upper basin might reduce or minimize salinity concentrations downstream by providing dilution water from reservoirs with higher water quality to locations on the main stem of the Brazos River above Possum Kingdom Reservoir. This study would compile information from existing studies, and develop a mass-balance modeling approach to evaluate various reservoir system operating strategies aimed at reducing downstream salinity concentrations.

**Changed Condition:** The western portion of the region is undergoing a severe drought that some have estimated to be more severe than the current drought of record that occurred in the 1950's. Needs in the western part of the region are expected to be increased over those projected by the 2001 Brazos G Water Plan due to (1) substantially reduced reservoir yields caused by the ongoing new drought of record, and (2) application of the TCEQ Brazos WAM computing substantially reduced reservoir yields for most of the major reservoirs upstream of Possum Kingdom Reservoir.