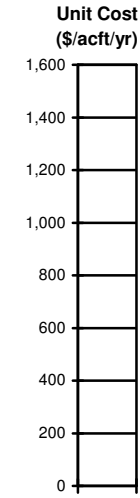
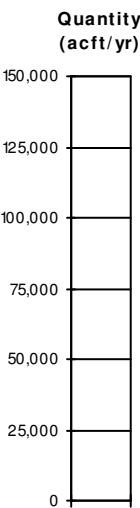
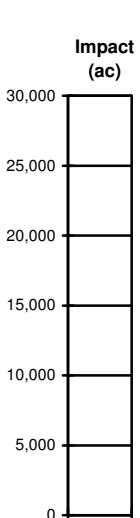


2011 South Central Texas Regional Water Plan Water Management Strategy Summary Sheet

  	<p>Name: <i>Balancing Storage</i></p> <p>Description: The Balancing Storage water management strategy is included to explicitly recognize that storage is needed at several locations within the region in order to firm up supplies from run-of-river diversions or interruptible groundwater sources and to ensure that supplies delivered through long distance conveyance facilities are available during drought and of sufficient quantity to meet daily and seasonal demands. The addition of Balancing Storage on the surface or in an aquifer is an activity consistent with the 2011 Regional Water Plan, if necessary authorizations are obtained pursuant to Texas Commission on Environmental Quality (TCEQ) or groundwater conservation district rules and applicable law.</p> <p>Decade Needed: 2010 – 2060</p> <hr/> <p style="text-align: center;">Cost, Quantity of Water, and Land Impacted</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Unit Cost of Water:</td> <td style="width: 15%;">Variable</td> <td style="width: 15%;">\$/acft/yr</td> <td style="width: 37%;">Raw or Treated Water</td> </tr> <tr> <td>Quantity of Water:</td> <td>Variable</td> <td>acft/yr</td> <td>Reliability = Firm</td> </tr> <tr> <td>Land Impacted:</td> <td>Variable</td> <td>acres</td> <td></td> </tr> </table> <hr/> <p style="text-align: center;">Additional Considerations per Regional Water Planning Guidelines</p> <p>Environmental Factors: Must consider effects associated with construction of new facilities, including aquatic and terrestrial habitats, threatened and endangered species, and cultural resources in accordance with applicable state & federal requirements.</p> <p>Impacts on Water Resources: Would be designed to take advantage of high flow conditions, and therefore would have minimal to no effects.</p> <p>Impacts on Agricultural & Natural Resources: Minimal, if any.</p> <p>Other Relevant Factors per SCTRWP: Improves efficiencies and reliability of other water management strategies.</p> <p>Comparison of Strategies to Meet Needs: Unit cost highly variable depending on location relative to water sources, proximate construction materials, land use, and/or aquifer characteristics.</p> <p>Interbasin Transfer Issues: None anticipated.</p> <p>Third-Party Impacts of Voluntary Transfers: None anticipated.</p> <p>Regional Efficiency: Increases efficiency and reliability of other strategies.</p> <p>Water Quality Considerations: Depends upon source water, but likely not of significant concern.</p>	Unit Cost of Water:	Variable	\$/acft/yr	Raw or Treated Water	Quantity of Water:	Variable	acft/yr	Reliability = Firm	Land Impacted:	Variable	acres	
Unit Cost of Water:	Variable	\$/acft/yr	Raw or Treated Water										
Quantity of Water:	Variable	acft/yr	Reliability = Firm										
Land Impacted:	Variable	acres											

4C.33 Balancing Storage

4C.33.1 Description of Water Management Strategy

Water management strategies of the 2011 South Central Texas Regional Water Plan are sized and scheduled to meet seasonal and daily variations of demand, but, without storage, some current and proposed supplies may not be fully reliable during extended droughts. Several recommended strategies involve long distance pipelines of more than 125 miles in length that will be supplied from a combination of run-of-river diversions and groundwater. Thus, the need for surface reservoirs, large scale Aquifer Storage and Recovery (ASR) systems, or multipurpose reservoirs that are adequate in size to store surplus flows of surface water during periods of high streamflows, including flood flows, to be available during extended periods of drought. The Balancing Storage water management strategy involves implementing such ASR and/or surface storage facilities.

The San Antonio Water System (SAWS) has implemented a large scale ASR program, and is expanding its size for the purpose of storing and recovering surplus Edwards Aquifer water to meet seasonal peak demands, and the Cities of Victoria and San Marcos have indicated to the SCTRWPG a need for such storage as a part of their water plans to meet their respective water needs. SAWS may consider further expansions of its ASR program for multi-year storage to develop additional supply.

If the water management concern is a supply for emergencies or drought, water could be stored in the Carrizo or Gulf Coast Aquifers for several years before it is recovered. Water treatment capacity necessary to meet peak day demands may be available at non-peak times (fall, winter, and spring) to treat water for aquifer storage and subsequent recovery. Thus, a Balancing Storage component that is integrated into the water production and water treatment system has the potential to reduce costs and increase reliability and efficiency of the water management strategies necessary to meet projected need.

Cases for which balancing storage is needed include, off-channel storage for run-of-river diversions from the San Marcos River by San Marcos, gravel pit systems for Victoria to firm up run-of-river diversions from the Guadalupe River, and terminal or seasonal balancing storage for the Lower Colorado River Authority/San Antonio Water System Water Project. Terminal storage helps meet seasonal and daily peaks, allows for economical uniform long distance delivery, and provides short-term supply in the event of transmission system outages. The

Surface Water Rights water management strategy (4C.32) has been included in the regional plan to explicitly recognize that use of water supplies made available under existing water rights by lease or purchase agreements between willing buyers and willing sellers is an activity consistent with the 2011 South Central Texas Regional Water Plan. The addition of balancing storage is also an activity consistent with the 2011 Regional Water Plan, if necessary authorizations are obtained pursuant to Texas Commission on Environmental Quality (TCEQ) rules and applicable law.

4C.33.2 Available Yield

Available yield associated with balancing storage is typically determined using the applicable surface water availability model (WAM) to simulate operations of the respective water management strategies. The Guadalupe – San Antonio River Basin WAM,¹ the Nueces River Basin WAM,² and the Edwards Aquifer Groundwater Availability Model (GAM) are the primary tools applicable for consideration of surface and groundwater flows in the South Central Texas Regional Water Planning Area (Region L).

4C.33.3 Environmental Issues

Potential environmental issues associated with implementation of the Balancing Storage water management strategy include consideration and mitigation of affected aquatic and terrestrial habitats, cultural resources, and threatened and endangered species, in accordance with applicable state and federal requirements.

4C.33.4 Engineering and Costing

Estimated costs for development of balancing storage are highly variable depending upon location relative to water source(s), proximate construction materials, present land use, and/or aquifer characteristics.

¹ HDR Engineering, Inc., “Water Availability in the Guadalupe – San Antonio River Basin,” Texas Natural Resource Conservation Commission, December 1999.

² HDR Engineering, Inc., “Water Availability in the Nueces River Basin,” Texas Natural Resource Conservation Commission, October 1999.

4C.33.5 Implementation Issues

Potentially significant implementation issues associated with the Balancing Storage water management strategy include the following:

- Quantification and consideration of any potential effects on water rights, streamflows, and freshwater inflows to bays and estuaries to the extent required by TCEQ rules and applicable state and federal law.
- Run-of-river water rights often require surface storage and/or groundwater to firm up supply for municipal water use and a determination as to the most economically feasible of these is necessary.
- Acquisition of State, Federal, and Local permits.
- Environmental studies.
- Relocations of affected roads, railroads, utilities, and cultural resources.

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