

Appendix B
General Assumptions for
Applications of Hydrologic Models

Appendix B

General Assumptions for Applications of Hydrologic Models

Following are general assumptions for applications of hydrologic models in the technical evaluations of water management strategies for the South Central Texas Regional Water Planning Group. Pertinent exceptions to, or clarifications of, these general assumptions are enumerated in the subsection of Section 4C summarizing the technical evaluation of each water management strategy.

1. Full exercise of surface water rights.
2. Edwards Aquifer permitted pumpage consistent with Senate Bill 3 (80th Texas Legislature). Breakdown of use type and geographical distribution of pumpage is based on EAA permits (including permanent transfers). Minimum permitted Edwards Aquifer supply of 320,000 acft/yr during drought.
3. Operation of Canyon Reservoir at firm yield in accordance with Certificate of Adjudication No. 18-2074E, including subordination of all senior Guadalupe River hydropower permits to Canyon Reservoir.
4. Delivery of GBRA's present contractual obligations from Canyon Reservoir (about 86,000 acft/yr) to points of diversion. Uncommitted yield assumed to be diverted at Lake Dunlap.
5. Effluent discharge / return flow in the Guadalupe - San Antonio River Basin is assumed equal to that reported for 2006, adjusted for current SAWS direct recycled water commitments. Smaller reuse deliveries by San Marcos, New Braunfels, Seguin, Kyle, San Antonio River Authority, and Cibolo Creek Municipal Authority in 2006 are reflected in analyses of cumulative effects of plan implementation.
6. Operation of power plant reservoirs (Braunig, Calaveras, and Coletto Creek) subject to authorized consumptive uses at the reservoir, with makeup diversions as needed to maintain full conservation storage to the extent possible subject to senior water rights, instream flow constraints, and/or applicable contractual provisions.
7. Desired San Antonio River flows at Falls City gage of 55,000 acft/yr under current SAWS/SARA/CPS draft agreement (reporting purposes only).
8. Operation of Choke Canyon Reservoir/Lake Corpus Christi (CCR/LCC) System at firm yield subject to the Corpus Christi Phase 4 (maximum yield) policy and TCEQ Agreed Order regarding freshwater inflows to the Nueces Estuary.
9. Historical Edwards Aquifer recharge estimates developed by EUWD/HDR.^{1,2}

¹ HDR, "Nueces River Basin Regional Water Supply Planning Study, Phase I," Nueces River Authority, May 1991.

² HDR, "Guadalupe - San Antonio River Basin Recharge Enhancement Study, Phase I," Edwards Underground Water District, September 1993.

10. Period of record for simulations: Guadalupe-San Antonio River Basin (1934-89, Critical Drought = 1950s) and Nueces River Basin (1934-97, Critical Drought = 1990s).

The following hydrologic models were used in the technical evaluation of water supply, water management strategies, and/or the cumulative effects analyses for the 2011 South Central Texas Regional Water Plan:

- Guadalupe – San Antonio River Basin Water Availability Model (GSA WAM)³
- Guadalupe – San Antonio River Basin Water Availability Model, as modified for Regional Planning
- Nueces River Basin Water Availability Model (Nueces WAM)⁴
- Lower Nueces River Basin & Estuary Model (NUBAY)⁵
- Edwards Aquifer (Balcones Fault Zone) Model (GWSIM-IV)⁶
- Southern Carrizo-Wilcox Aquifer Groundwater Availability Model (SCW GAM)⁷
- Central Carrizo-Wilcox Aquifer Groundwater Availability Model (CCW GAM)⁸
- Southern Central Carrizo System Groundwater Model⁹
- Central Gulf Coast Aquifer Groundwater Availability Model (CGC GAM)¹⁰
- Hydrologic Simulation Package - Fortran¹¹

³ HDR, “Water Availability in the Guadalupe – San Antonio River Basin,” Texas Natural Resource Conservation Commission, December 1999.

⁴ HDR, “Water Availability in the Nueces River Basin,” Texas Natural Resource Conservation Commission, October 1999.

⁵ HDR, “Water Supply Update for the City of Corpus Christi Service Area,” City of Corpus Christi, January 1999.

⁶ Texas Water Development Board, “Summary of a GWSIM-IV Model Run Simulating the Effects of the Edwards Aquifer Authority Critical Period Management Plan for the Regional Water Planning Process,” July 1999.

⁷ INTERA, Inc., “Groundwater Availability Models for the Queen City and Sparta Aquifers,” Texas Water Development Board, October 2004.

⁸ Bureau of Economic Geology, “Groundwater Availability Model for the Central Part of the Carrizo Aquifer in Texas,” Texas Water Development Board, February 2003.

⁹ HDR, “South Central Carrizo System Groundwater Model, SAWS Gonzales-Carrizo Project,” San Antonio Water System, November 2004.

¹⁰ TWDB, “Groundwater Availability Model of the Central Gulf Coast Aquifer System: Numerical Simulations through 1999,” September 2004.

¹¹ USGS, “Hydrologic Simulation Program – Fortran User’s Manual for Release 11,” September 1996.