

Appendix B
General Assumptions for
Applications of Hydrologic Models

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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 of 400,000 acft/yr (plus domestic & livestock pumpage of 12,312 acft/yr) subject to Demand Management and Critical Period rules adopted by the EAA. This is consistent with provisions in the EAA statute (SB1477) regarding permitted pumpage of 400,000 acft/yr after year 2007 and with potential critical period management actions reducing pumpage by up to 15 percent to 340,000 acft/yr. Breakdown of use type and geographical distribution of 400,000 acft/yr pumpage is based on proportional reduction of EAA initial regular permits (including any permanent transfers). Edwards Aquifer simulations necessary to determine resultant springflows for inclusion in the WAMs were performed using the Edwards (Balcones Fault Zone) Aquifer Model (GWSIM-IV).^{1,2} Note that, by agreement with the TWDB, an Edwards Aquifer supply of 340,000 acft/yr has been assumed for assessment of regional water needs.
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 65,000 acft/yr) to points of diversion. Uncommitted balance of firm yield assumed to be diverted at Lake Dunlap.
5. Effluent discharge / return flow in the Guadalupe - San Antonio River Basin as reported for year 1997 and adjusted for SAWS direct recycled water use of 35,000 acft/yr (of which 7,723 acft/yr is consumed for industrial purposes and 18,994 acft/yr is consumed for landscape irrigation purposes). A reuse commitment on the order of 3.5 MGD by the City of San Marcos for steam-electric power generation in Hays County has also been included.
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.

¹ Texas Water Development Board, "Model Refinement and Applications for the Edwards (Balcones Fault Zone) Aquifer in the San Antonio Region, Texas," Report 340, July 1992.

² Texas Department of Water Resources, "Groundwater Resources and Model Applications for the Edwards (Balcones Fault Zone) Aquifer in the San Antonio Region," Report 239, October 1979.

7. Desired San Antonio River flows at Falls City gage of 55,000 acft/yr, with seasonally varying minimums under a current SAWS/SARA/CPS draft agreement.
8. Application of Consensus Criteria for Environmental Flow Needs (CCEFN)³ or site-specific information in the calculation of water potentially available for diversion and/or impoundment as a part of a water management strategy.
9. 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 a TCEQ Agreed Order regarding freshwater inflows to the Nueces Estuary.
10. Historical Edwards Aquifer recharge estimates developed for the Edwards Underground Water District and others^{4,5} as updated in the Trans-Texas Water Program⁶ and recent studies of the Nueces and Blanco Recharge Basins for the EAA.⁷

The following hydrologic models were used in the technical evaluation of water management strategies for the 2006 South Central Texas Regional Water Plan:

- Guadalupe – San Antonio River Basin Water Availability Model (GSA WAM)⁸
- Nueces River Basin Water Availability Model (Nueces WAM)⁹
- Lower Nueces River Basin & Estuary Model (NUBAY)¹⁰
- Nueces River Basin Model¹¹
- Edwards Aquifer (Balcones Fault Zone) Model (GWSIM-IV)¹²
- Southern Carrizo-Wilcox Aquifer Groundwater Availability Model (SCW GAM)¹³
- Central Carrizo-Wilcox Aquifer Groundwater Availability Model (CCW GAM)¹⁴

³ Texas Water Development Board, “Guidelines for Regional Water Plan Development, Section 4.2.8,” July 2002.

⁴ HDR, “Nueces River Basin Regional Water Supply Planning Study, Phase I,” Nueces River Authority, May 1991.

⁵ HDR, “Guadalupe – San Antonio River Basin Recharge Enhancement Study, Phase I,” Edwards Underground Water District, September 1993.

⁶ HDR, “Edwards Aquifer Recharge Analyses, Trans-Texas Water Program, West Central Study Area, Phase II,” Texas Water Development Board, San Antonio River Authority, March 1998.

⁷ HDR, “Pilot Recharge Models of the Nueces and Blanco River Basins,” Edwards Aquifer Authority, June 2002.

⁸ HDR, “Water Availability in the Guadalupe – San Antonio River Basin,” Texas Natural Resource Conservation Commission, December 1999.

⁹ HDR, “Water Availability in the Nueces River Basin,” Texas Natural Resource Conservation Commission, October 1999.

¹⁰ HDR, “Water Supply Update for the City of Corpus Christi Service Area,” City of Corpus Christi, January 1999.

¹¹ HDR, “Nueces River Basin Edwards Aquifer Recharge Enhancement Study, Phase IVA,” Edwards Underground Water District, June 1994.

¹² 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.

¹³ INTERA, Inc., “Groundwater Availability Models for the Queen City and Sparta Aquifers,” Texas Water Development Board, October 2004.

¹⁴ Bureau of Economic Geology, “Groundwater Availability Model for the Central Part of the Carrizo Aquifer in Texas,” Texas Water Development Board, February 2003.

- Southern Central Carrizo System Groundwater Model¹⁵
- Central Gulf Coast Aquifer Groundwater Availability Model (CGC GAM)¹⁶
- Hydrologic Simulation Package - Fortran¹⁷

¹⁵ HDR, “South Central Carrizo System Groundwater Model, SAWS Gonzales-Carrizo Project,” San Antonio Water System, November 2004.

¹⁶ TWDB, “Groundwater Availability Model of the Central Gulf Coast Aquifer System: Numerical Simulations through 1999,” September 2004.

¹⁷ USGS, “Hydrologic Simulation Program – Fortran User’s Manual for Release 11,” September 1996.