

# Agenda Item 7.A.5: Presentation and Discussion of Hydrologic Variance Assumptions for 6th Cycle of Regional Water Planning

# Surface Water Modeling

Tool to determine availability from reservoirs or run-of-river water rights

## TCEQ Water Availability Model (WAM)

- TWDB requires the RWPGs use this publicly-available model to evaluate surface water availability.
- Required to incorporate anticipated sedimentation into the WAM for major reservoirs.
- Region M has used the TCEQ Rio Grande River WAM Run 3 and the Nueces-Rio Grande Coastal WAM Run 3 models to determine the surface water availability for past planning cycles.
  - Run 3 means all water rights attempt to divert their fully authorized water volume, and no return flows are assumed.
- TCEQ most recently updated the Rio Grande WAM in October 2021 and the Nueces-Rio Grande WAM in January 2013 (per what is available for download from TCEQ).

# Surface Water Modeling Definitions

- Firm Diversion (run of river availability)
  - Evaluated for municipal sole-source water use (i.e. not firmed up with other sources) is defined as the minimum monthly diversion amount that is available 100 percent of the time during a repeat of the drought of record.
  - Evaluated for all other water users, the ‘firm diversion’ is defined as the minimum annual diversion, which is the lowest annual summation of the monthly diversions reported by the WAM over the simulation period (lowest annual summation being the calendar year within the simulation that represents the lowest diversion available).
- Firm Yield (reservoir availability)
  - The maximum water volume a reservoir can provide each year under a repeat of the drought of record using anticipated sedimentation rates and assuming that all senior water rights will be totally utilized and all applicable permit conditions met.

# Hydrologic Assumptions from Last Cycle

(Assumed to be used again this cycle, some will have modifications)

- The most current WAM Run 3 will be used for all Surface Water Rights Modeling for existing supplies and future WMS, which includes:
  - a. Full exercise of existing surface water rights;
  - b. Zero effluent discharges unless specifically required by a surface water right (hydropower, industrial rights, etc.); and
  - c. Best available water rights information as of June 2018.
  - d. In the evaluation of the cumulative effects of water management strategies, the Rio Grande WAM Run 3 may be used to estimate the impacts of future urbanization (limited to the reclassification of water rights) on the firm yield of the system. The results of these analyses will be limited to the discussion of cumulative effects.
- Reservoir capacities for Amistad and Falcon will be based on the current estimates for sedimentation in 2020 and 2070, and a linear interpolation will be used to determine capacity for the decades between.
  - a. Existing supplies will be based on the 2020 Firm Yield; and
  - b. Projected supplies and WMS will rely on estimated decadal averages of Firm Yield.

# Hydrologic Assumptions from Last Cycle

(Assumed to be used again this cycle, some will have modifications)

- Period of record for simulations:
  - a. Rio Grande WAM: 1940 – 2000
  - b. Nueces-Rio Grande WAM: 1948 – 1998
- The Rio Grande WAM will be run to be consistent with Region E with respect to the following:
  - a. Irrigation demand patterns above Fort Quitman will be modified so that diversions only occur March through October, which is consistent with the operations of the Rio Grande Project. This demand pattern change does not have a discernible impact on the firm yield of the Amistad-Falcon system in Region M.
- Source water available for a reuse water management strategy will be determined based on the estimated amount of water returned to a utility's WWTPs for each decade, less the amount of reuse water already being utilized as existing supply.
  - a. The amount of water returned to a utility's WWTP will be estimated at 50% of the utility's projected water demands, adjusted for water conservation and drought management strategies, unless site-specific information is available
    - i. Direct Reuse does not require WAM modeling, since there are no return flows
    - ii. Indirect Reuse would be entered as a return flow to assess downstream availability

# New or Modified Hydrologic Assumptions for This Cycle

- Modification • There is a new version of the Rio Grande WAM which will be used.
  - a. Period of simulation: 1940-**2018**
- Modification • Best available water rights as of July 2023
- New • The Rio Grande WAM will be run to be consistent with Region E by modeling the San Solomon Springs (within Region E) to be cut off from the rest of the basin (impact to Region F).
  - a. Region E used this assumption last cycle, but it does not appear that Region M incorporated it.
- New • When modeling the Delta Region Water Management Strategy using the Nueces-Rio Grande Coastal Basin WAM, the priority dates for the three reservoirs will be modified to reflect one or more reservoirs as senior, and the others as more junior, with respect to one another.
- Modification • Reservoir capacities for Amistad and Falcon will be based on the current estimates for sedimentation in 2030 and 2080, and a linear interpolation will be used to determine capacity for the decades between.
  - a. Existing supplies will be based on the 2030 Firm Yield