

## Technical Memorandum

TO: Natalie Ballew, P.G., - Groundwater Division Director  
Texas Water Development Board

FROM: James Beach, P.G., and Isaac Johnson

SUBJECT: Using TWDB GAM Task 10-005 for the GMA 9 2080 Planning Horizon

DATE: March 4, 2026

Joint planning requirements mandate establishing Desired Future Conditions (DFCs) through the 2080 decade. For the past three rounds of Joint Planning, Scenario 6 results from TWDB Task 10-005 (Hutchison, 2010) were selected as the basis for the DFC in the Trinity Aquifer. Task 10-005 model runs only extend to 2060. This memorandum provides technical justification for using 2060 average drawdown results from Scenario 6 of TWDB GAM Task 10-005 for the 2070 and 2080 decades.

In the current round of Joint Planning, Groundwater Management Area 9 (GMA 9) decided to use the Hill Country Trinity Groundwater Availability Model (HCTGAM) (Jones and others, 2009) to assess DFCs. The HCTGAM used in TWDB GAM Task 10-005 simulates the 50-year period from 2011 through 2060 using 2008 initial conditions. GMA 9 has expended considerable effort updating and implementing changes to pumping estimates and pumping distribution using the approach outlined in Task 10-005. However, after consideration of results, GMA 9 is considering proposing the same DFC based on Scenario 6 in Task 10-005 in this round of planning.

The initial approach involved extending the Task 10-005 model simulations to 2080 and repeating the process of running the 387 scenarios. However, this process proved cumbersome due to several modeling challenges encountered and the significant coding updates that would have been required. Therefore, we conducted an analysis of annual drawdown trends from the HCTGAM model for pumping Scenario 6 of GAM Task 10-005. Scenario 6 entailed an ensemble of 387 recharge simulations that varied based on tree-ring precipitation estimates (Cleaveland, 2006).

Our assessment demonstrates that the average of the ensemble of simulated water levels stabilize prior to 2060. Figure 1 presents GMA 9 simulated annual drawdown by model layer for the Scenario 6 ensemble. The majority of average drawdown in the Middle and Lower Trinity layers occurs within the first 20 to 30 years. By 2040, the average drawdown curves are largely stable through 2060. This pattern is also demonstrated by range of the ensemble, which shows minimum and maximum water levels have stabilized by 2040. The Edwards and Upper Trinity layers do not exhibit average long-term depletion over the simulation period.

Spatially, the timing of this stabilization varies slightly but generally occurs prior to 2060 for all districts in GMA 9. In six (6) of these districts – located in Bexar, Blanco, Comal, Hays, Kendall, and Travis counties – the majority of Middle and Lower Trinity drawdown occurs within the first five (5) years of the simulation. The remaining three (3) districts (Bandera, Kerr and Medina counties) exhibit more prolonged and higher declines in the Middle and Lower Trinity, yet still reach maximum average drawdown by 2040.

Because average drawdowns stabilize for all districts at least two decades prior to the end of the simulation, extending the simulation from 2060 to 2080 would not change the drawdown statistics for Scenario 6. Therefore, we request that the TWDB accept the 2060 average drawdown results from Scenario 6 of TWDB GAM Task 10-005 as the DFCs for 2070 and 2080 regional water planning horizon.

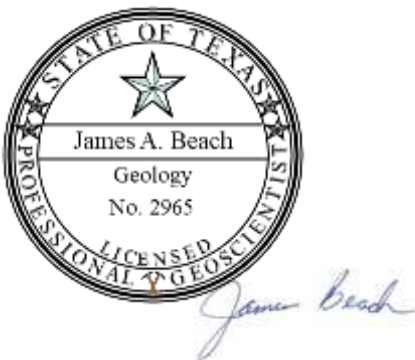
## References

Cleaveland, Malcolm K., 2006. Extended Chronology of Drought in the San Antonio Area. Report to the Guadalupe-Blanco River Authority.

Jones, I.C., Anaya, R. and Wade, S., 2009, Groundwater Availability Model for the Hill Country portion of the Trinity Aquifer System, Texas, Texas Water Development Board unpublished report, 193 p.

Hutchison, William R., 2010. GAM Task 10-005. Texas Water Development Board.

The seal appearing on this document was authorized by James Beach, P.G, 2965 on 3/4/2026.  
Advanced Groundwater Solutions, LLC, TBPG Firm Registration No. 50639



## Figures

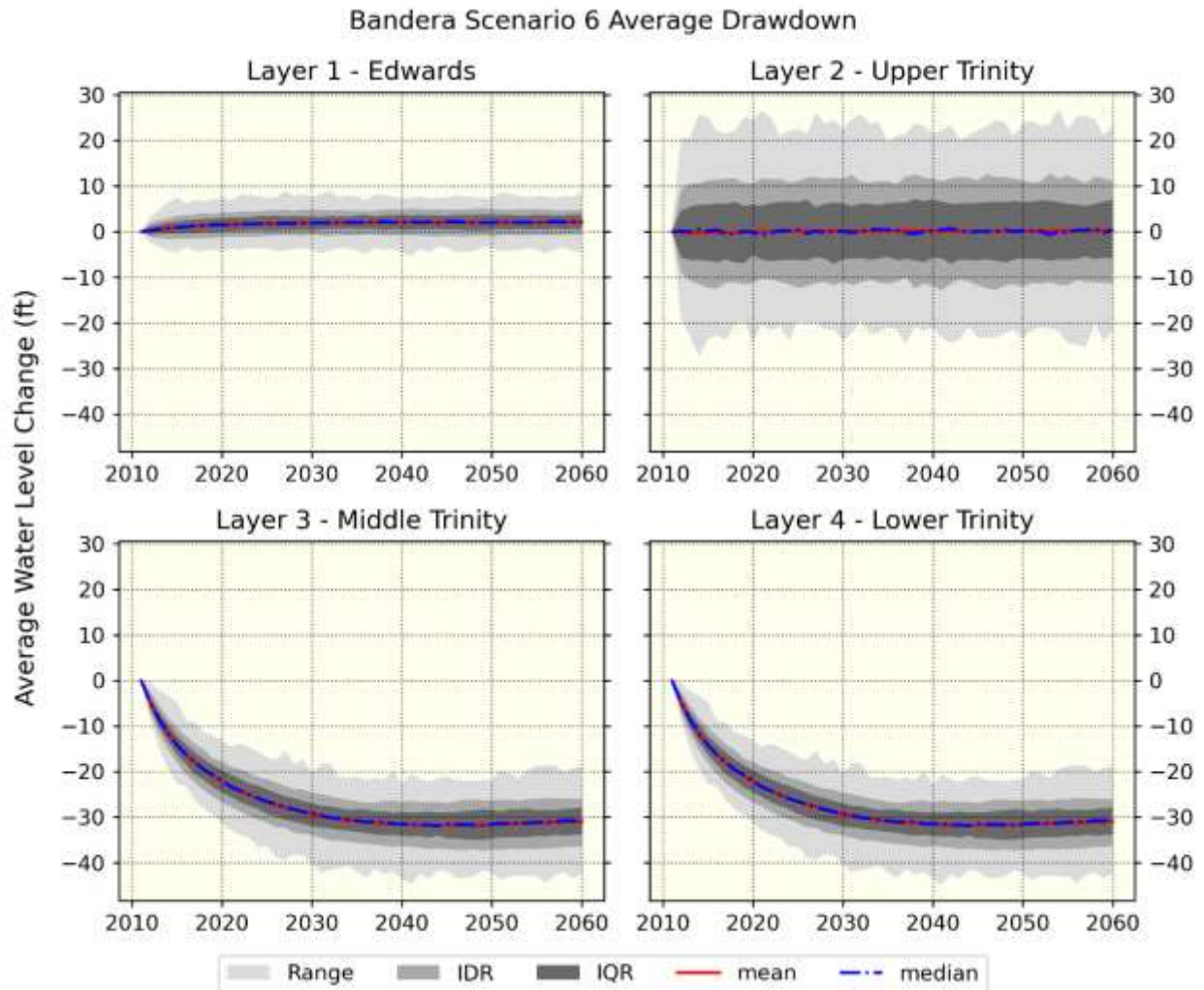
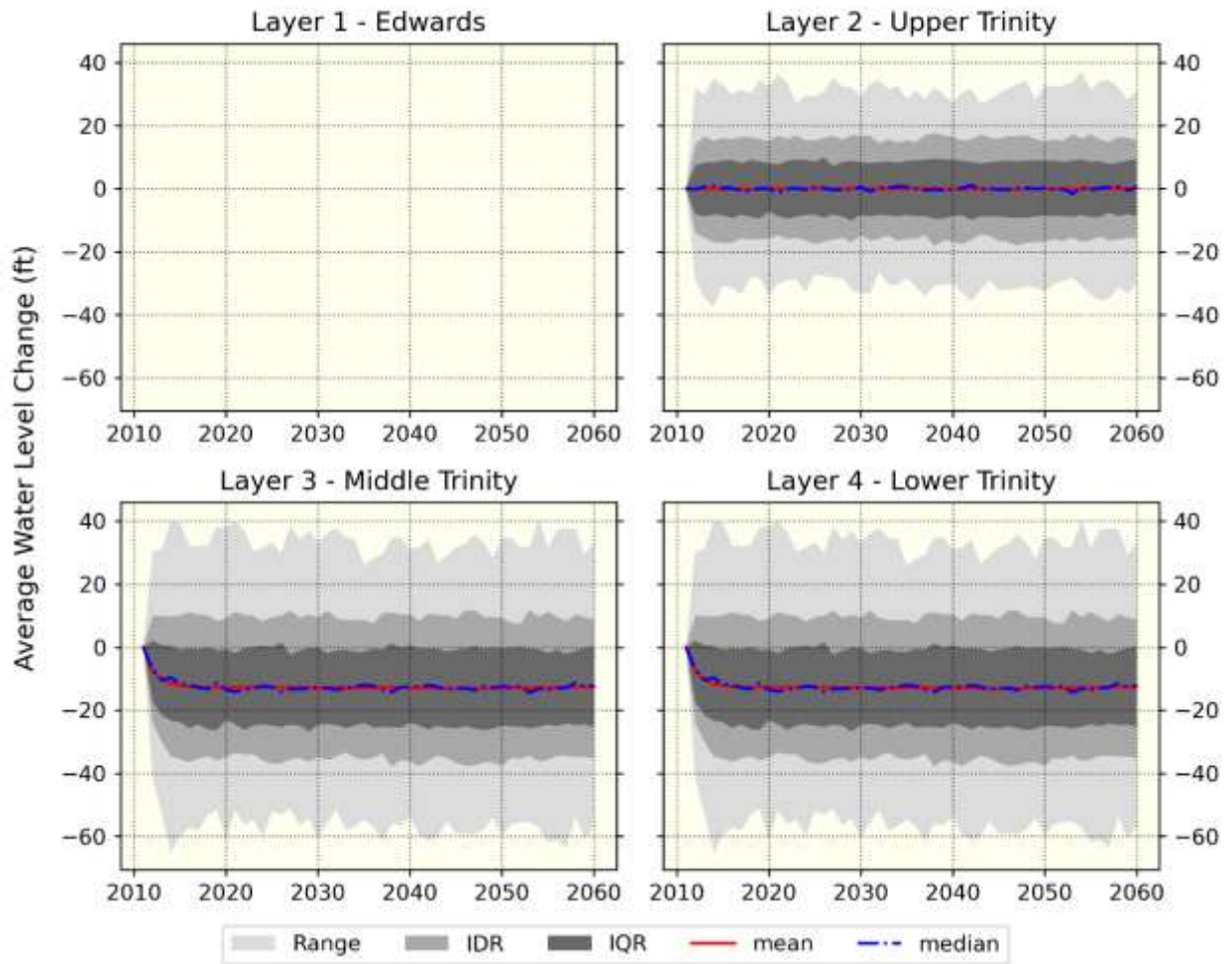
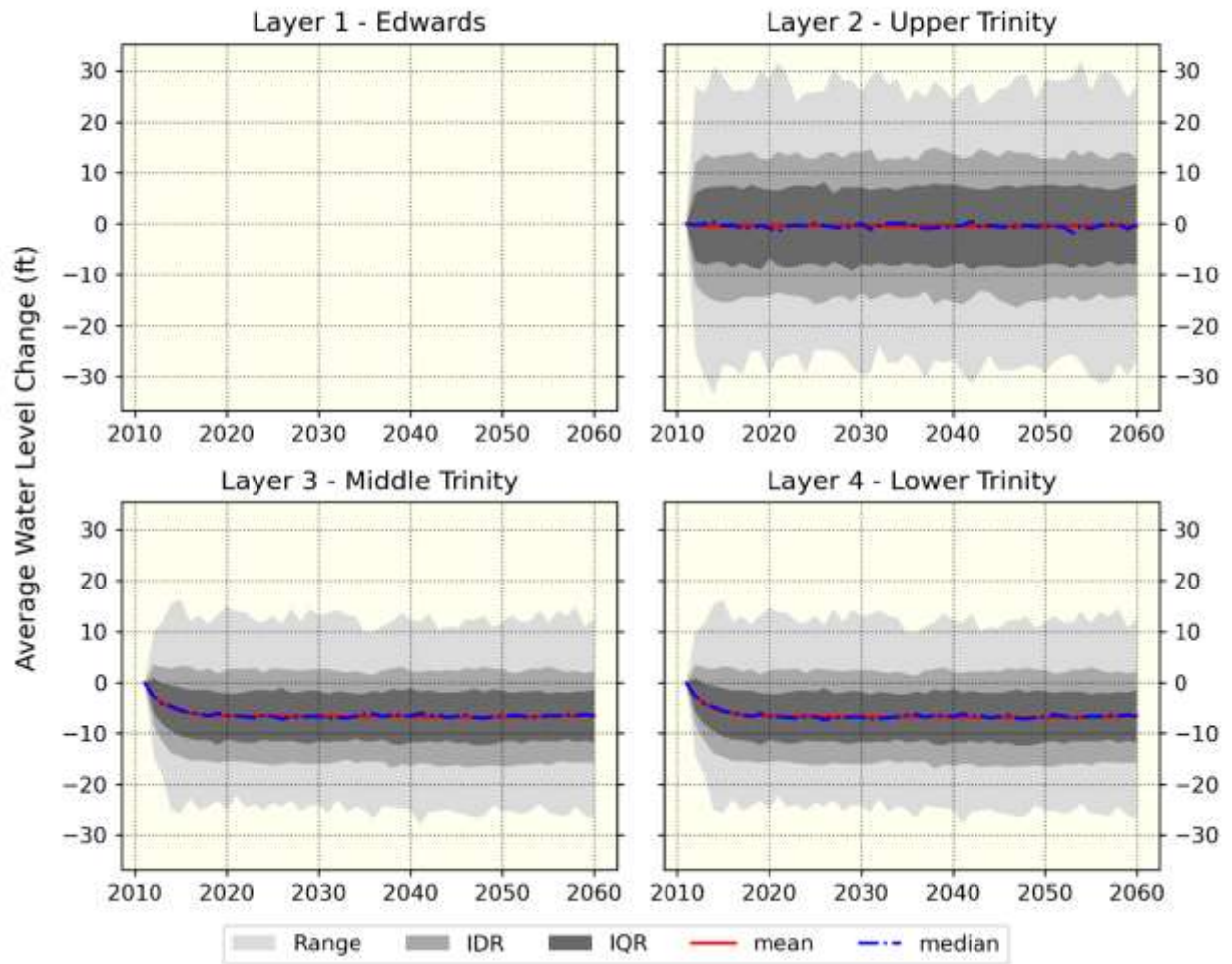


Figure 1. Time series plots of simulated drawdown from pumping scenario 6 of GAM Task 10-005. “IQR” refers to the interquartile range of 387 recharge scenarios while “IDR” refers to interdecile range.

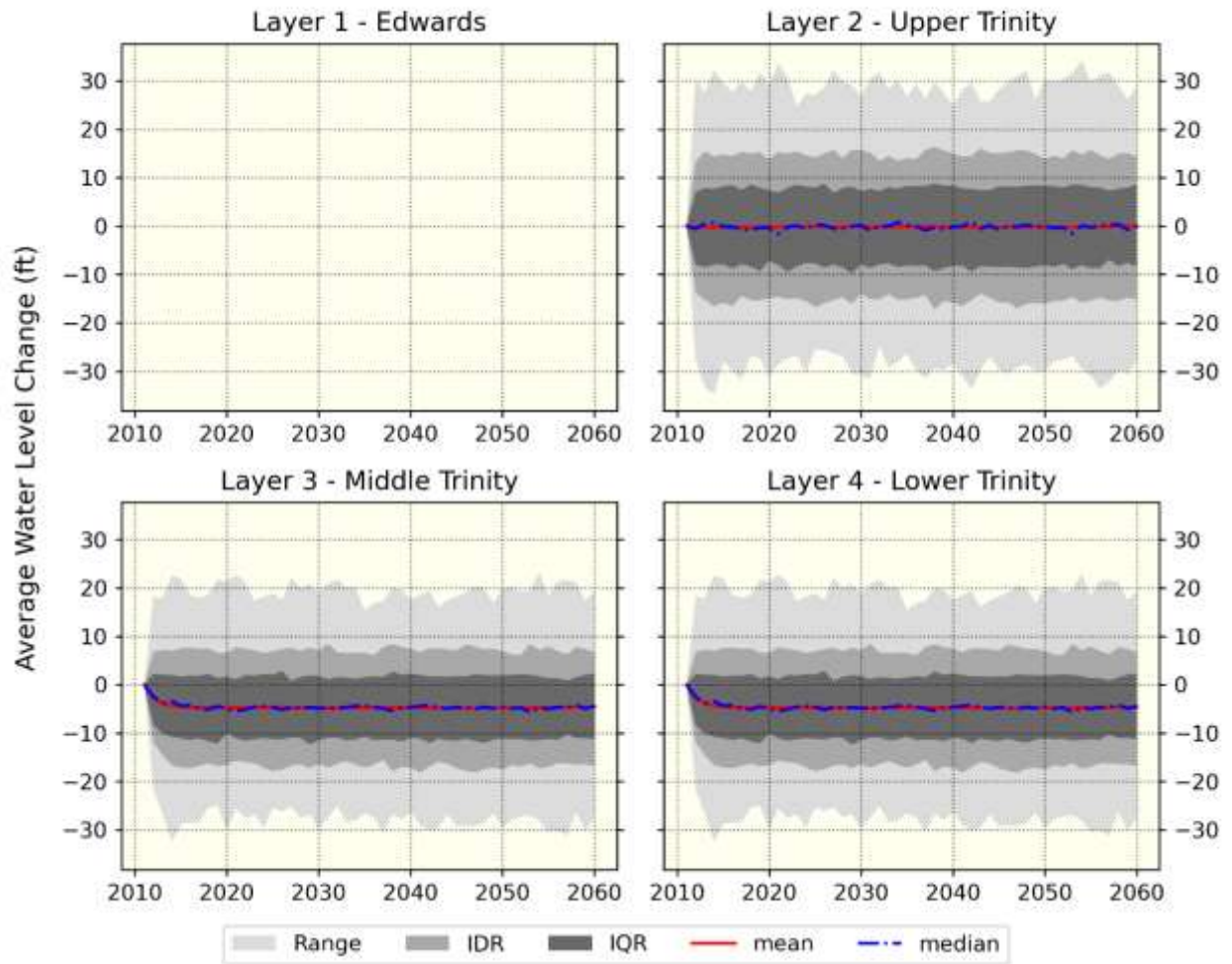
Bexar Scenario 6 Average Drawdown



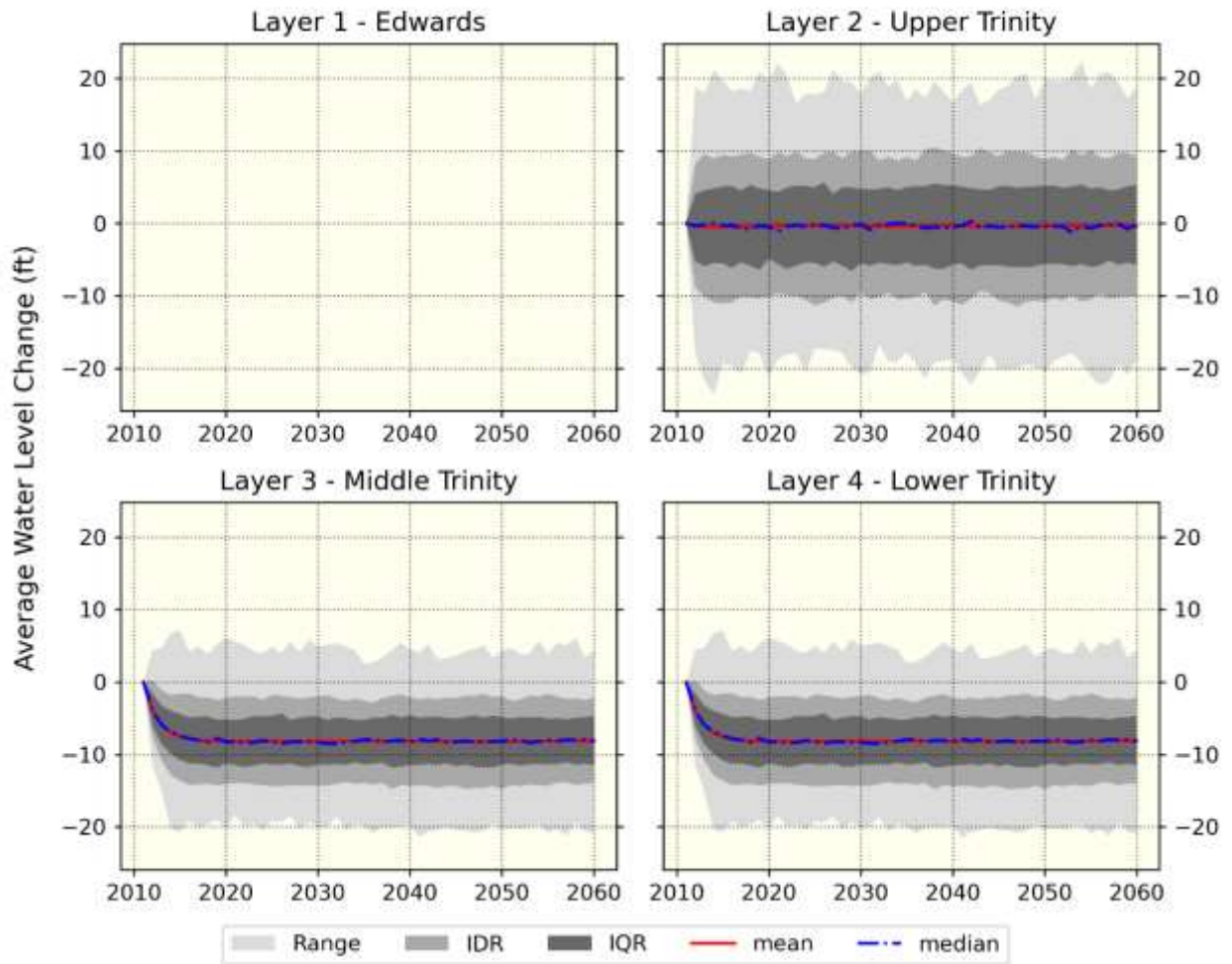
Blanco Scenario 6 Average Drawdown



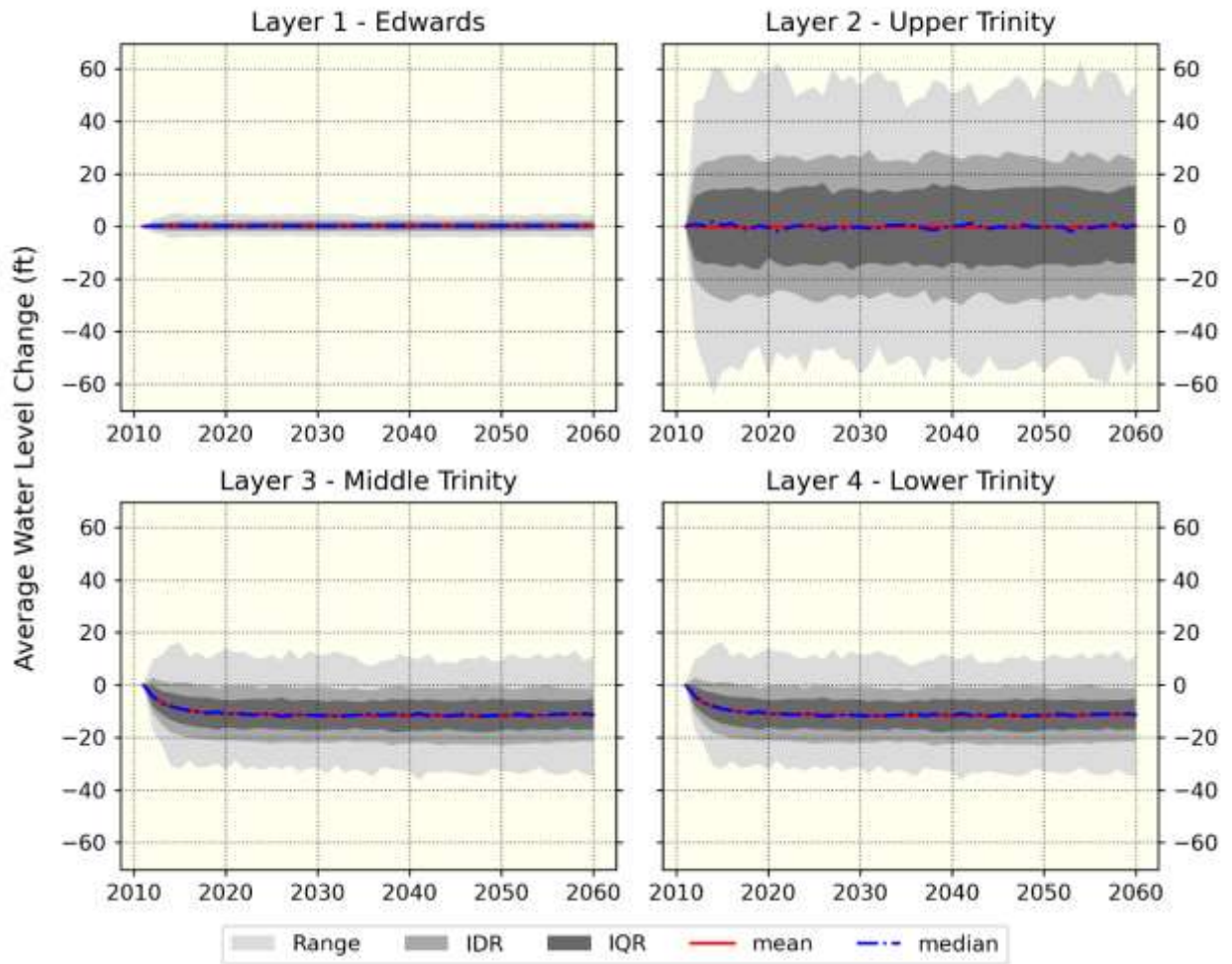
Comal Scenario 6 Average Drawdown



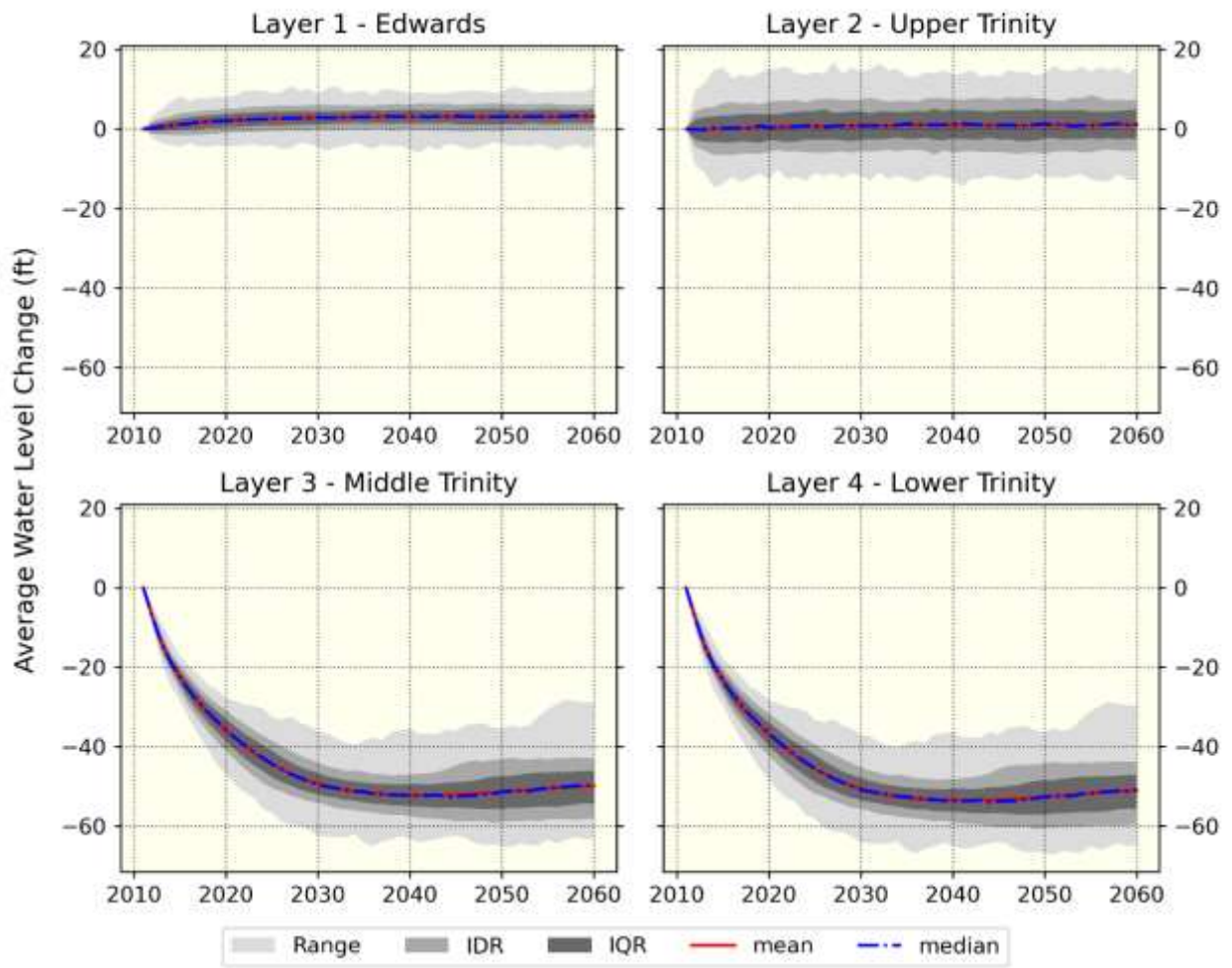
Hays Scenario 6 Average Drawdown



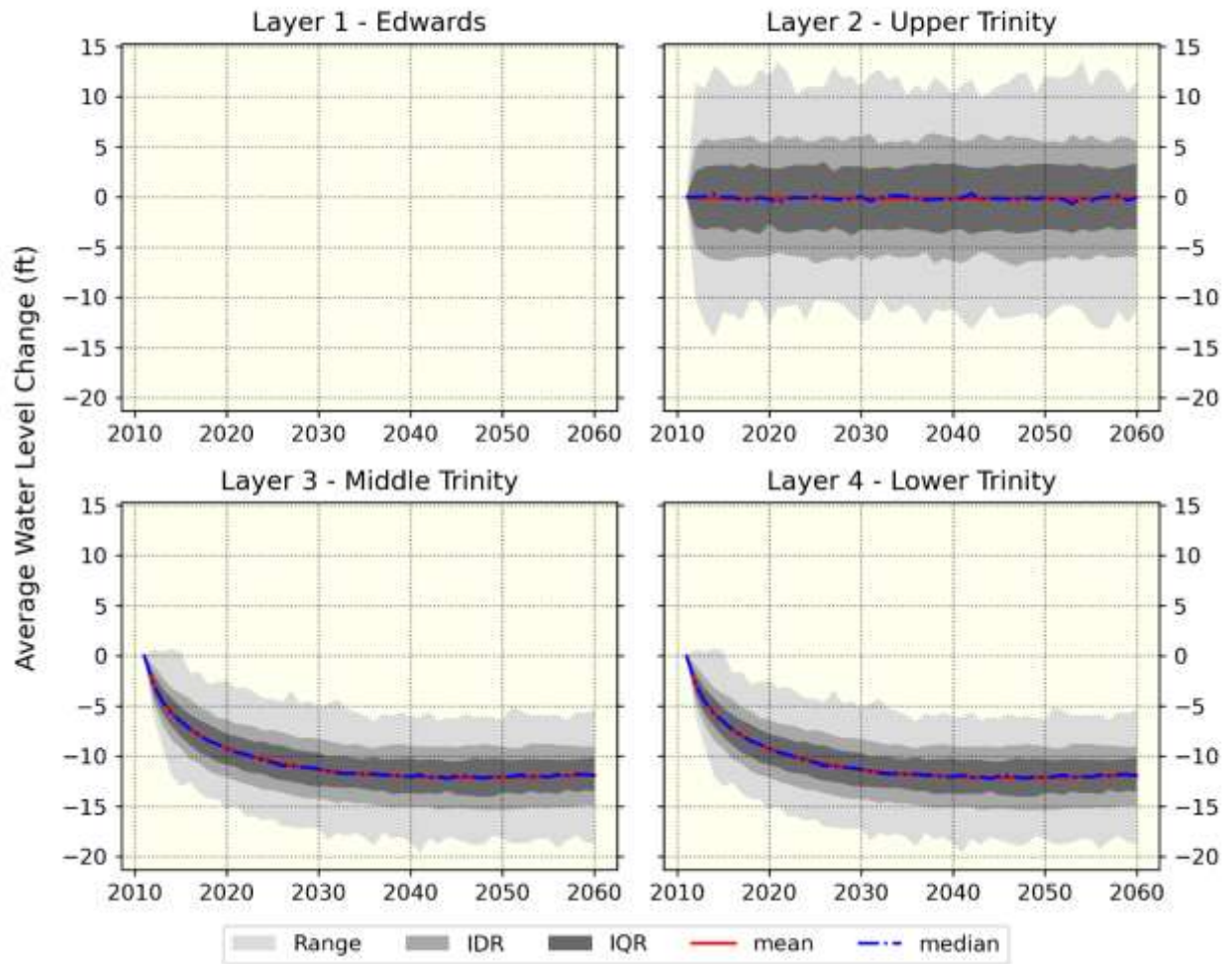
Kendall Scenario 6 Average Drawdown



Kerr Scenario 6 Average Drawdown



Medina Scenario 6 Average Drawdown



Travis Scenario 6 Average Drawdown

