Initial Peer Review Report

Reevaluation of Minimum Flows for Lakes Angelo and Denton

Agreement Number: 24CN0004489

Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604

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TABLE OF CONTENTS

1.0 Executive summary

The Southwest Florida Water Management District (SWFWMD) has contracted with an independent panel of experts to provide technical peer review of the Reevaluations of Minimum Levels for Lakes Angelo and Denton in Highlands County, Florida.

Key components of the minimum lake level (MLL) development were mechanistic and empirical models developed to estimate lake surface water levels under current, historic, and reduced lake level scenarios. The models included a calibrated spreadsheet-based water balance model and a 60-year "line of organic correlation" (LOC) regression model. In addition to the models, significant field reconnaissance, field survey, and other data collection efforts were undertaken to support the analysis and recommended minimum lake levels.

The draft minimum levels presented within the reports were based on allowance of a reduction in critical habitats based on changes in lake levels relative to historic conditions (i.e., with no groundwater pumping):

- Lake Denton: A reduction in emergent marsh habitat of no more than 15% relative to historic conditions.
- Lake Angelo: A reduction in deep-water habitat of no more than 15% relative to historic conditions.

The Peer Review Panel has examined both Reevaluation Reports in detail. This examination includes the various sources of data utilized in the reports, the multiple modeling and statistical techniques employed in the use of the data, the logic train employed to develop the analytical processes, and the completeness of the evaluation. Modeling and statistical procedures generally followed scientifically sound methods using the best available data. The logic train correctly began with the analysis of period of record water levels and followed with the incorporation of all required components of a water budget model. The subsequent use of the predictive models was accomplished appropriately.

Weaknesses of the technical approach were limited to those common to many water budget models. These weaknesses include non-uniqueness in the calibrated parameter set and the use of a non-standard method for estimating surface water runoff contributions to the lakes.

Contributing to the non-uniqueness are uncertainties regarding leakances and transmissivities, actual watershed contributing areas and curve numbers, evapotranspiration, and possible missing information regarding non-metered pumpages in the past. A concern regarding the non-standard surface water runoff estimation method is ameliorated by the near certainty that runoff is a small component of the water balance for both lakes, based on the panelist's experience and as predicted by the models.

All technical investigations involve certain assumptions. A strength of the Technical Approach for the reevaluations of Lakes Angel and Denton utilized by the District limits assumptions to basic types such as the assumptions of recorded data being correctly entered into the databases, that the computer model runs were not in an undetectable way compromised. An additional strength is that we have detected no evidence of bias within any portion of either reevaluation report.

The panel did appear to uncover several errors in the draft reevaluation reports. These apparent errors were conveyed verbally to the District staff during the first and second Public Meetings and also provided in written form in our detailed written comments (provided on the public web board and in **Section 3.2** of this report). None of these apparent errors constituted fatal flaws. In a similar fashion, we did uncover several possible omissions (such as the failure to include information about a public boat ramp on one of the lakes). These were also conveyed verbally to the District staff during the first and second Public Meetings and are provided in written form in our detailed written comments. District staff subsequently addressed these errors and omissions, in their detailed responses and in the revised draft reevaluation reports, to the peer reviewer panel's satisfaction.

In our examinations of these model results, we have undertaken qualitative assessments of "reasonableness" of the findings, based upon our combined experience and technical expertise, plus our field visits to the lakes. The model results are consistent with what we would expect, given the rainfall, pumpage, hydrogeologic conditions, and watershed characteristics. Suggested revisions/clarifications to improve scientific accuracy, transparency, or clarity have been itemized in our written comments regarding the two reevaluation reports.

2.0 INTRODUCTION

2.1 BACKGROUND

The Southwest Florida Water Management District (SWFWMD) has contracted with an independent panel of experts to provide technical peer review of the Reevaluations of Minimum Levels for Lakes Angelo and Denton in Highlands County, Florida. The Peer Review Panel includes:

- John Loper, P.E. (Panel Chair)
- Scott Emery, Ph.D.

Lakes Angelo and Denton are both closed basin lakes in Highlands County Florida. The lakes are located in the Intraridge valley of the southern Lake Wales Ridge, which is characterized by karst geology and well-drained sandy soils with generally deep water tables. Water levels of both lakes have been measured and recorded by SWFWMD staff on a monthly basis since the early 1980's, resulting in a more than 40-year period of observations.

Key components of the minimum lake level (MLL) development were mechanistic and empirical models developed to estimate lake surface water levels under current, historic, and reduced lake level scenarios. The models included a calibrated spreadsheet-based water balance model and a 60-year "line of organic correlation" (LOC) regression model. In addition to the models, significant field reconnaissance, field survey, and other data collection efforts were undertaken to support the analysis and recommended minimum lake levels.

The draft minimum levels presented within the reports were based on allowance of a reduction in critical habitats based on changes in lake levels relative to historic conditions (i.e., with no groundwater pumping):

- Lake Denton: A reduction in emergent marsh habitat of no more than 15% relative to historic conditions.
- Lake Angelo: A reduction in deep-water habitat of no more than 15% relative to historic conditions.

Minimum Levels	Proposed Elevations (ft NGVD29)	Currently Adopted Elevations (ft NGVD29)
High Minimum Lake Level	112.1	114.1
Minimum Lake Level	108.8	112.8

Table 1-1. Proposed MLLs for Lake Denton (SWFWMD, 2025)

Minimum Levels	Proposed Elevations (ft NGVD29)	Currently Adopted Elevations (ft NGVD29)
High Minimum Lake Level	99.9	101.3
Minimum Lake Level	96.2	100.0

Table 1-2. Proposed MLLs for Lake Angelo (SWFWMD, 2025)

2.2 Regulatory Basis for MFL and Peer Review

Florida Statutes (F.S.) mandate that SWFWMD must establish minimum flows and levels (MFLs) for state surface waters and aquifers within its boundaries for the purpose of protecting the water resources and the ecology of the area from "significant harm." Section 373.042, F.S., provides that the minimum level for a lake is the limit "at which further withdrawals would be significantly harmful to the water resources or ecology of the area".

Section 373.042, F.S. also provides that MFLs shall be calculated using the best information available, that the Governing Board shall consider and may provide for non-consumptive uses in the establishment of MFLs and, when appropriate, MFLs may be calculated to reflect seasonal variation. The law also requires that when establishing MFLs, changes and structural alterations to watersheds, surface waters, and aquifers shall also be considered (Section 373.0421, F.S.). The State Water Resource Implementation Rules (Chapter 62-40, Florida Administrative Code) includes additional guidance for establishing MFLs, providing that "…consideration shall be given to the protection of water resources, natural seasonal fluctuations in water flows or levels, and environmental values associated with coastal, estuarine, aquatic, and wetlands ecology, including:

a) Recreation, in and on the water;
b) Fish and wildlife habitats and the passage of fish;
c) Estuarine resources;
d) Transfer of detrital material;
e) Maintenance of freshwater storage and supply;
f) Aesthetic and scenic attributes;
g) Filtration and absorption of nutrients and other pollutants;
h) Sediment loads;
i) Water quality; and
j) Navigation."

Section 373.042, F.S., also addresses independent scientific peer review of MFLs, specifying the review of all scientific or technical data, methodologies, and models, including all scientific and technical assumptions employed in each model, used to establish a minimum flow or minimum water level. In addition, the law requires that FDEP or the District Governing Board shall give significant weight to the final Peer Review Panel report when establishing MFLs.

2.3 Documents and Data Utilized in the Peer Review

The following documents and data were provided to the panel members to be utilized in the peer review.

- MFL Report: Reevaluation of Minimum Levels for Lake Angelo in Highlands County, July 18, 2025, Revised November 12, 2025
- MFL Report: Reevaluation of Minimum Levels for Lake Denton in Highlands County, July 18, 2025, Revised November 12, 2025
- Spreadsheet Model: Angelo Model Flow Through WBM
- Spreadsheet Model: Denton Flow Through WBM
- Spreadsheet: Angelo LOC Historic Hydrograph
- Spreadsheet: Denton LOC Historic Hydrograph
- Southwest Florida Water Management District (SWFWMD). (2022). Environmental Criteria and Methods Used to Support the Development of Lake Minimum Levels. Brooksville, Florida.

Peer Review Panel Scope and Approach

For this initial report the Peer Review Panel has been scoped with completing the following tasks as part of the MFL Peer Review:

- Review draft of the Recommended Minimum Levels for Lakes Angelo and Denton along with supporting documentation.
- Participate in Public Meetings including:
    - Kickoff Meeting (October 15, 2025)
    - Peer Review Meetings (October 22 and November 12, 2025)
- Post written review comments and collaborate with other panelists to develop a single peer review panel report
- Review and provide support in development of meeting agendas and meeting summaries

This Peer Review Process has been conducted pursuant to the “Sunshine Law” requirements of Article 1, Section 24, Florida Constitution and Section 286.011, Florida Statutes. This Peer Review identifies the strengths and weaknesses of the District’s technical approach to each of the Lakes Angelo and Denton and provides specific comments and recommendations for improvement. Following the process outlined above, the subsequent sections present the results, comments, and recommendations of the Peer Review Panel.

3.0 Review of MFL Report and Supporting Documentation

The following sections provide general and detailed comments on the MFL report and supporting documentation provided by SWFWMD for use by the Peer Review Panel. Section 2.1 presents narrative discussions of key aspects of the MFL by the Panel. Section 2.2 provides detailed comments in tabular format. The tables provide the following:

- Panel member providing the comment
- Identification of what document and location within the document to which the comment pertains
- Identification if the comment directly and materially affects the conclusions of the report
- The specific comment
- The reviewers' recommended corrective action
- Responses to the comment prepared by SWFWMD staff

3.1 General Comments

Specific components of the MLL reports and supporting documentation were identified by the Peer Review Panel as critical in the MLLs development. The following presents the reviewers' discussion of these items.

3.1.1 Strength and Weaknesses of the Technical Approach:

1. Best Available Information: The Peer Review Panel has examined both Reevaluation Reports in detail. This examination includes the various sources of data utilized in the reports, the multiple modeling and statistical techniques employed in the use of the data, the logic train employed to develop the analytical processes, and the completeness of the evaluation. Much of the data utilized comes from recorded District and USGS monitoring equipment. Both organizations have long-standing Quality Assurance/Quality Control procedures in place pertaining to the various water level, rainfall, monitor well recorders, and production well meters. Bathymetric surveys were conducted using advanced equipment with ongoing calibration. Modeling and statistical procedures generally followed scientifically sound methods using the best available data. The logic train correctly began with

the analysis of period of record water levels and followed with the incorporation of all required components of a water budget model. The subsequent use of the predictive models was accomplished appropriately.

2. Methodological Limitations: Weaknesses of the technical approach were limited to those common to many water budget models. These weaknesses include non-uniqueness in the calibrated parameter set and the use of a non-standard method for estimating surface water runoff contributions to the lakes. Contributing to the non-uniqueness are uncertainties regarding leakances and transmissivities, actual watershed contributing areas and curve numbers, evapotranspiration, and possible missing information regarding non-metered pumpages in the past. The reviewer's concern regarding the non-standard runoff estimation method is ameliorated by the strong likelihood that surface water runoff is a relatively small component of the water balance for both lakes as predicted by the models (this if further explained in **Section 3.1.2).**
3. Assumptions and Biases: All technical investigations involve certain assumptions. A strength of the Technical Approach for the reevaluations of Lakes Angel and Denton utilized by the District limits assumptions to basic types such as the assumptions of recorded data being correctly entered into the databases, that the computer model runs were not in an undetectable way compromised. An additional strength is that we have detected no evidence of bias within any portion of either reevaluation report.
4. Errors and Omissions: We did appear to uncover several errors in the draft reevaluation reports. These apparent errors were conveyed verbally to the District staff during the first and second Public Meetings and also provided in written form in our detailed written comments (provided on the public web board and in **Section 3.2** of this report). None of these apparent errors constituted fatal flaws. In a similar fashion, we did uncover several possible omissions (such as the failure to include information about a public boat ramp on one of the lakes). These were also conveyed verbally to the District staff during the first and second Public Meetings and are provided in written form in our detailed written comments.
5. Data Gaps: Overall, the data utilized for these analyses was relatively complete. Data gaps, when they occurred were duly noted, and the techniques used to fill in those data gaps were adequately explained.
6. In our examinations of these model results, we have undertaken qualitative assessments of "reasonableness" of the findings, based upon our combined

experience and technical expertise, plus our field visits to the lakes. The model results are consistent with what we would expect, given the rainfall, pumpage, hydrogeologic conditions, and watershed characteristics.

7. Suggested revisions/clarifications to improve scientific accuracy, transparency, or clarity have been itemized in our written comments regarding the two reevaluation reports.

3.1.2 Water budget model

The re-evaluations of MFLs for the two lakes generally appear to have used the best available data as input to a spreadsheet-based water budget model. The modeling served as the foundation for the other assessments involving the significant change standards and screening criteria. The comments in the following subsections pertain to certain data sources and approaches where clarification is needed and improvement may be possible.

3.1.2.1 **Water budget model physical system and data input**

Watershed Delineation – While the overall watersheds for both lakes appear to be under-represented, most, if not all, of the areas that would likely contribute runoff on a regular basis appear to be included in the model. Certain areas that would be included in a flood-event model, to account for the possibility of contributing runoff in an extremely rare event, were excluded from the water budget model. One potential exception is the eastern boundary of the watershed for Lake Denton, which is shown in Figure 2.2 of that report as following the Sebring Parkway (aka Panther Parkway). However, the topographic map indicates an area east of the Parkway, a portion of a citrus grove, that naturally (prior to construction of the road) would have drained westward into Lake Denton. Google Earth Streetview shows a pair of grate inlets on the east side of the Parkway that collect runoff from this area. Although not confirmed in the field, the reviewer suspects that these inlets are connected to a cross drain that moves the collected runoff westward across the right-of-way, where it ultimately could flow into Lake Denton unless it is piped elsewhere. While the orange grove has no impervious surface and should rarely contribute any runoff due to the excessively drained soils in the region, the boundary excludes much of the pavement associated with the Parkway itself. Upon conveying this comment to SWFWMD staff, the modelers performed a simulation with the additional area included. Reasonable adjustments to the runoff curve number and directly connected impervious area (DCIA) were made to achieve an identical calibration.

Lake Angelo's watershed delineation appears to be limited to those areas most likely to contribute runoff under typical seasonal conditions and not necessarily considering areas that potentially could contribute in rare, extreme events such as a 100-year (0.01 percent annual chance) rainfall. Previous studies such as Ardaman and Associates (2013), and Interflow Engineering (2017) have delineated larger contributing areas to include all potential areas that could contribute runoff. Considering the purpose of the water budget model, the delineation used in this analysis is appropriate.

Precipitation – Rainfall in the vicinity of Lake Angelo for the water budget model simulation period of January 1996 through December 2022 relied on radar-estimated (NEXRAD) rainfall. In the absence of a rainfall gage in the immediate vicinity with a complete dataset for the period of record, NEXRAD data can be considered the best available information. However, it should be noted that NEXRAD data in this area has been found to have a low bias for the late 1990s through the early 2000s (Interflow Engineering, 2017), with an underprediction of approximately 11% compared to data from the Avon Park NOAA gage. Some of the negative departures for the years 1998 through 2003 shown on Figure 2-10 (both reports) could be attributable to this known bias in the NEXRAD data. For the years prior to 2004, rain gage data, even from several miles away, may be better for long-term simulations.

Following initial comment on this subject, District staff conducted a sensitivity test of rainfall on minimum lake levels by substituting the Avon Park rain gage data for the suspect NEXRAD data. An acceptable calibration was achieved with reasonable adjustments to input parameters for Lake Angelo and no change to the Lake Denton parameters.

Evapotranspiration – The water budget models use monthly evaporation data from two USGS studies at nearby Lake Starr. This is an appropriate dataset, used and cited in numerous other lake water budget studies and can be considered the best available source of evaporation data for this application.

Water level measurements – The water budget models relied on measured water levels in the form of lake stages, surficial aquifer levels, and upper Floridan aquifer levels as input datasets. These time series came from databases developed by SWFWMD and the USGS.

Both organizations have long-standing Quality Assurance/Quality Control procedures in place pertaining to the various water level, rainfall, monitor well recorders, and production well meters. Datum adjustments to convert from NAVD88 to NGVD29 and vice-versa were made appropriately.

An initial peer review comment requested justification for using recorded Lake Letta stages as the basis for SA outflow fluxes. This comment and the District's detailed response, which is sufficient, are included in **Section 3.2.**

3.1.2.2 **Water Budget Model Parameters**

Surficial aquifer leakance coefficient – This is a calibration parameter. For Lakes Angelo and Denton, the calibrated values were estimated as 0.009 and 0.011, respectively. These are reasonable values and both compare well with the value of 0.010 used for both lakes in the 2017 Interflow study.

Surficial aquifer inflow water level adjustment – The surficial aquifer inflow and outflow water level adjustments are calibration parameters. Selection of these values "were guided by expected flow-through conditions at the lake", "ECFTX-modeled SA water levels and water table depths near the lake, and topographic differences between the well and the area around the lake". For Lake Denton, ROMP43XX Surf Aq Monitor was used as the SA inflow for most of the calibration period. This was an interesting choice, considering the water levels in this well are lower than the Lake Denton water levels. To compensate, a SA Inflow Water Level Adjustment of +10.2 feet was applied.

Upper Floridan aquifer leakance coefficient – This is a calibration parameter. For Angelo, the calibrated value is 0.00036. This within a reasonable range of values, but it is interesting to note that it is approximately one order of magnitude lower than the value of 0.0039 estimated from the 2017 MIKE SHE / MIKE 11 model prepared by Interflow Engineering (2017). This difference could be partly explained by the SWFWMD model applying a -1.0 foot offset to the ROMP 43XX water levels.

3.1.2.3 **Surface Water Runoff**

Surface water runoff is a relatively small component of the modeled water budgets for the two lakes, which is to be expected given the excessively drained soils surrounding the lakes,

the relatively low percentage of impervious surfaces, and the lack of any streams or other large surface water conveyances flowing in. For Lake Angelo, estimated surface water flow represents 10% of the overall water budget; for Lake Denton it is estimated to be only 5%. Both lakes are estimated to accept an average annual volume of runoff equivalent to approximately 9 inches per year multiplied by the surface area of the lake, which is less than one fifth of the volume of direct rainfall on the lake surface (about 52 inches).

Estimating surface water runoff volumes in watersheds lacking streamflow measurements is not easy or straightforward. Because of the difficulty and uncertainty associated with estimating the surface water runoff component of a lake's water budget, it is fortunate that in the cases of Lakes Angelo and Denton, large errors in these estimates likely have relatively small consequences.

Runoff volumes were estimated in the water budget models using NEXRAD rainfall and a modified version of the NRCS curve number (CN) runoff equation method, along with directly connected impervious area (DCIA) runoff (NRCS, 1985 and USDA, 1986). Both MFL reports refer to a version of the CN runoff equation described in Harper and Baker (2007), in which the CN is varied based on antecedent rainfall and used in continuous simulations. In the methodology described in the Harper and Baker report, hourly rainfall was used to divide the period of record into discrete rainfall events. The CN was then varied based on 5-day antecedent rainfall, and applied to each rainfall event to create a continuous record of estimated rainfall excess. In contrast, the water budget models for the two lakes applied the CN runoff equation to daily rainfall records, not individual rainfall events.

It should be noted that the CN runoff method was originally intended for use only for individual rainfall events with hourly or sub-hourly rainfall data, and not for continuous simulation and/or daily rainfall. According to the federal agency that developed the CN methodology and published the original procedures, "In the years following the development of the runoff equation, it has been adopted for use in applications that were not envisioned by the originator. Some of these applications are as an infiltration method for individual storm runoff events and as a loss function for continuous simulation. Such applications are not within the intended usage of curve number procedures" (NRCS, 2004). While the NRCS evidently does not endorse the CN runoff method for continuous simulations, the Harvey

and Baker method cited in both reports is defensible because each rainfall event was essentially treated as a single-event simulation.

Modified NRCS method, Curve Number (CN) and Directly Connected Impervious Area (DCIA) – In the modified NRCS CN method employed in the water budget models, CN was varied daily based on antecedent moisture conditions (AMC). The reports mention only the "normal" CN values; In the spreadsheet model input the CN values can vary. The antecedent 5-day rainfall amounts to determine whether to use AMC I (dry), AMC II (normal), or AMC III (wet) were published in the original Handbook of Hydrology (USDA, 1964):

AMC	TOTAL ANTECEDENT 5-DAY RAINFALL (inches)	
	DORMANT SEASON (October-February)	GROWING SEASON (March-September)
I	< 0.5	< 1.4
II	0.5-1.1	1.4-2.1
III	> 1.1	> 2.1

Table from National Engineering Handbook, Section 4 – Hydrology (USDA, 1964)

It should be noted that the authors of subsequent editions of that publication have concluded: "No apparent relationship between antecedent precipitation and curve number exists" (NRCS, 2004). While the newer versions of NEH-4 have disavowed the relationships in the above table, there is an obvious relationship between antecedent rainfall and depth to water table in Florida's sandy soils. As depth to water table decreases, available storage in the unsaturated zone also decreases. A reduction in soil storage increases runoff potential as the soils are more likely to become saturated due to heavy and/or prolonged rainfall.

Lake Angelo – In the Lake Angelo water budget spreadsheet model, CN is varied daily between AMC I, II, and III using the 5-day antecedent rainfall amounts in the above table. While the "Normal" (AMC II) CN of 58 with a DCIA of zero is reasonable for this watershed, the overall methodology of applying the CN runoff equation to continuous simulations with daily rainfall is questionable. This method would be more defensible if the approach described in Harper and Baker (2007), using hourly rainfall to divide the record into discrete rainfall events, had been applied here. It should also be noted that most continuous simulation models commonly used in Florida (e.g., MIKE SHE, ICPR, MODHMS) use more physically-based methods for estimating this component of the water balance.

Lake Denton – In the Lake Denton water budget model, CN varies between “Dry”, “Moderately Dry”, “Normal”, and “Wet” antecedent conditions. This is different from the original SCS/NRCS procedure, which has three AMC conditions, not four. Furthermore, it appears 0.25 inches of rainfall in the previous 3 days was used as the threshold to transition from “normal” (AMC II) CN to “wet” (AMC III) CN. And any amount of rainfall greater than zero was used to transition from moderately dry to normal. This differs from the method described in Harper and Baker (2007), and the USDA (1964) where larger (1.1 to 2.1 inches, depending on the season) cumulative rainfall amounts are considered over a 5-day period. In this setting with excessively drained soils, or in any hydrologic setting (other than pavement perhaps), 0.25 inches of rainfall over a 3-day period is not sufficient to “move the needle” on runoff potential. These thresholds are not supported by literature or observations.

For Lake Denton, a “normal” (AMC II) CN of 60 was estimated, with a DCIA of 3.5%. The CN of 60 is on the high end of literature values considering the excessively drained soils surrounding the lake and the relatively low impervious percentage (Maidment, 1993). This is acknowledged in the report, and the steepness of the topography of the basin is given as a reason for selecting this value. While the CN and DCIA values are reasonable, as with Lake Angelo, the overall methodology of applying the CN runoff equation to continuous simulations with daily rainfall is questionable. This method would be more defensible if the approach described in Harper and Baker (2007), using hourly rainfall to divide the record into discrete rainfall events, had been applied here. A more physically-based method would be preferable, especially for other lake MFLs where surface water runoff is a more significant water budget component.

3.1.2.4 **Water Budget model calibration**

Percentile objective – Exceedance percentile residuals are appropriate calibration objectives for lake MFLs. Coupled with the water level comparisons in Figures 3-3, the residuals indicate both are well-calibrated models.

Overall water balance – Overall water balances for both lakes appear reasonable based on the reviewer’s professional judgement and experience working on studies of similar lakes in this particular hydrologic / hydrogeologic setting.

3.1.3 Development of Historic percentiles

3.1.3.1 **Development of Historic Percentiles, Water Budget Model**

The establishment of MLLs requires an estimation of lake stage in the absence of consumptive use withdrawals. This was accomplished in the water budget model by simulating a “no pumping” scenario. The peer-reviewed East Central Florida Transient Expanded (ECFTX) 2.0 application was used to estimate drawdowns in the Upper Floridan aquifer caused by pumping for all consumptive uses including agriculture and public supply. This is the best available source known for this information in the area of interest for the two lakes. While the estimated drawdown was added to the input UFA levels to represent the “no pumping” condition in the lower of the two aquifers, the surficial aquifer drawdown from the ECFTX output was evidently not directly translatable to lakes Angelo and Denton due to scale/resolution issues. For SA drawdowns, the District used an empirical relationship based on UFA leakance coefficient developed from a different regional groundwater flow model. While this approach injects some uncertainty into the analysis, it is the best readily available method, to the reviewer’s knowledge.

3.1.3.2 **Development of Long-Term Historic Percentiles**

Rainfall patterns in peninsular Florida are subject to long-term variation, over multiple decades, in part due to periods of warming and cooling of the Atlantic Ocean known as the Atlantic Multidecadal Oscillation or AMO (Kelly, 2004). Warm phases of the AMO coincide with increased rainfall over the Florida peninsula and cool phases generally coincide with below-average rainfall (Kelly, 2004; Kelly and Gore, 2008). Each AMO phase persists for roughly 30 years, with a full AMO cycle taking about 60 years. Because the water budget models for both lakes had simulation periods of around 26 years, a longer period of record was needed to capture the variation in rainfall associated with the AMO in setting lake MFLs.

A linear fitting procedure known as a line of organic correlation (LOC) approach was appropriately used to extend the 26-year water budget model simulated record of historic (pumping effects removed) lake levels to a 60-year record. The LOC model is a stage-rainfall relationship with the independent variable being weighted rainfall running totals (6-years for Angelo and 7-years for Denton), where recent rainfall is given greater weight. Both LOC models achieved good agreement with the water budget model results, with

impressively high Nash-Sutcliffe Efficiency coefficients (0.76 for Denton and 0.81 for Angelo).

While there seems to be no consensus in the literature on precisely when, historically, the AMO has switched from warm to cool phases and vice versa, there was an apparent switch from warm to cool phase at some point in the mid-to-late 1960's or possibly as late as 1970. Then sometime in the mid 1990's to around 2000, there was another switch to a warm phase (van Oldenborgh et. al., 2007; Kelly and Gore, 2008). This means the water budget model period of simulation coincided mostly or entirely within a warm phase of the AMO, corresponding to higher rainfall. When the record was extended to 60-years, all of the most recent cool phase of the AMO (lower rainfall) was incorporated. This should explain why the historic 60-year LOC P50 stages for both lakes are predicted to be lower than those predicted by the shorter-period water budget models. The 60-year LOC P50 is 1.0 foot lower than the water budget model historic P50 for Lake Denton; for Lake Angelo the difference is 1.5 feet. The reports should include a discussion on this subject and attribute these differences to the AMO-influenced rainfall variations if appropriate.

3.1.4 Status Assessment / Future Projections

Based on results from the ECFTX scenario simulations, UFA drawdown at Lakes Denton and Angelo are projected to decrease by 5.0 feet and 4.8 feet, respectively, between 2014 and 2045 conditions. According to the reports, these UFA drawdowns would result in aquifer recovery of 0.5 and 0.6 feet, respectively, of aquifer recovery relative to the water budget model period. It was not explained how these decreases in drawdown relate to the projected levels of aquifer recovery, however, this section of the report was subsequently revised to the panelist's satisfaction.

SWFWMD staff provided a draft report of the 2025 Regional Water Supply Plan prepared by the CFWI (CFWI, 2025). The scenarios described included a 2045 scenario. However, the results presented focused on areas within the CFWI boundary, the southern edge of which coincides with the northern boundary of Highlands County. While the CFWI report did not include results presented for Highlands County, results from the ECFTX2 were added to the reevaluation reports in a map of projected drawdowns which does include Highlands County.

3.1.5 Environmental Screening Tools

In addition to the overall assessment of strengths and weaknesses of the two reevaluation reports, Dr. Emery was tasked with assessing the scientific validity, ecological appropriateness, and defensibility of the environmental screening tools applied in the draft Minimum Level reports for Lakes Angelo and Denton. The following "screening tool by screening tool" descriptions are based upon three distinct sources of information:

1. Use of the SWFWMD's December 12, 2022, Technical Report "Environmental Criteria and Methods Used to Support the Development of Lake Minimum Levels". This comprehensive document provides detailed descriptions of each of the standards and criteria utilized by the District for Lakes Angelo and Denton.
2. Results of field visits to Lakes Angelo and Denton, conducted on September 5, 2025. A Technical Memorandum summarizing Dr. Emery's observations and preliminary thoughts was prepared and is included within a previous submission to the web board;
3. Results from over 30 years of hands-on field experience working with and/or for the SWFWMD on the studies of many lakes within the boundaries of the District, in addition to assisting two other WMDs on the development of several lake MLs;

Each standard and criteria utilized by District staff in the two reevaluation reports for Lakes Angelo and Denton is described in detail in a separate Appendix to the December 12, 2022, Technical Report referred to in item #1 above. There are a total of seven Appendices. My descriptions of how each was used for the two lakes are provided in the following paragraphs.

APPENDIX 1: Cypress Offset and Mesic Wetland Offset Standards – These offsets and standards have been developed, modified and improved over the past several decades, and recently validated in a study by Cameron et al. (2022). For Lake Angelo, the District staff were unable to locate sufficient cypress trees to enable utilizing the Cypress Offset. Dr. Emery confirmed the lack of cypress trees on Lake Angelo during his September 5, 2025, visit. For Lake Denton, the District staff did locate multiple cypress trees but were unable to discern hydrologic indicators on a sufficient number of cypress trees to utilize a cypress offset. During his September 5 field visit, Dr. Emery confirmed the presence of multiple cypress trees, from very small to large. Consistent with the District staff's efforts, he also was unable to find clearly obvious hydrological indicators used to establish Normal Pool.

In the Draft Reevaluation Reports for Lakes Angelo and Denton, the District describes the factors for each lake system which resulted in each of these lakes being categorized as "xeric" lakes. As such, use of the "Mesic Wetland Offset Standard", as described in Appendix 1, was deemed not the appropriate standard to use for these two lakes. From his field visit and from the District's descriptions of these two lakes, Dr. Emery concurs with assessment of these two lakes being "xeric" lakes, hence being candidates for the use of the "Xeric Wetland Offset Standard", as described in Appendix 2.
The decisions by the District to not utilize the Cypress Offset or the Mesic Wetland Offset Standard are scientifically valid and ecological appropriate. The two draft lake reports include excellent descriptions of each lake and its surroundings. These descriptions are adequate to defend not using the Appendix 1 environmental screening tools.

APPENDIX 2: Xeric Wetland Offset Standard – The Xeric Wetland Offset Standard has a shorter history than its Mesic Offset counterpart. The Xeric Wetland Offset standard was peer reviewed in Emery et al (2022) (no relation). In Chapters 2 and 5 of the two draft reevaluation reports, the District staff describe in detail the multiple factors which indicate these two lakes are "xeric" lakes to which the Xeric Offset Standard can be applied. In short, Lakes Angelo and Denton are each geographically isolated in landscapes dominated by xeric soils. These two lakes are surrounded by deep surficial soil systems. Based upon the soils and deep surficial soils systems, pre-development native vegetative would likely have included turkey oak/sand pine scrub type or similar dry habitat systems. In addition, both lakes are internally drained with no outlet conveyance elevations until ground elevations are many feet above the recorded Period of Record high lake levels. The District is justified in classifying both lakes "xeric lakes", and in utilizing the "Xeric Wetland Offset Standard" to calculate the Lake Minimum Level (Chapter 5 of each report). The District's approach is scientifically valid, ecologically appropriate, hence defensible.
The "Xeric Wetland Offset Standard" was utilized appropriately in the determinations of the "MFL Condition Average Habitat Areas" in Chapter 5 (more detail on this is provided in the following analyses of Appendices 3-7.

APPENDIX 3: The Species Richness Standard was developed based upon several studies of bird usage of lakes of different lake surface areas. The most important of these field studies were those conducted by Hoyer and Canfield (1994) and Emery et al. (2009). Subsequent to these field studies, multiple analytical assessments have been completed

that demonstrate that bird species richness is the most sensitive species richness criterion to utilize with respect to lake surface area. In Appendix 3, District staff present a detailed description of the multiple studies and analyses that have been conducted pertaining to the Species Richness Standard. The 15% Species Richness Standard has survived these many analyses and critiques. It is a scientifically valid, ecologically appropriate and defensible standard for the District to apply to these two lakes.

In Chapter 5 of both Lake Angelo and Denton reevaluation reports, the District staff provide a description and graphic that compares the lake surface area at the Historic P50 water level with the lake water level at a 15% reduction in surface area. This water level was then compared with the water level resulting from use of the "Xeric Wetland Offset Standard". Per the procedure described in detail in SWFWMD (2022), the District staff correctly selected the more conservative (higher elevation water level) to use as the provisional Minimum Lake Level.

APPENDIX 4: Aesthetics Screening is the most subjective of the various standards/screening criteria utilized in MFL related work. In Appendix 4 of their comprehensive 2022 report, the District staff describe in detail the procedure developed to prevent unacceptable changes in lake aesthetics. Aesthetics Screening is seldom the most conservative criterion in the determination of minimum lake levels. A survey study by Hoyer et al. (2006) found that aquatic vegetation and lake bottom exposure were the two criteria associated with aesthetics, and that lake users were willing to accept water levels as low as P80 and as high as P10. The District subsequently has developed a procedure to compare the calculated Historic P80 of a lake with the most conservative (highest water level) standard calculated for that lake based upon the other criteria described in Appendices 1-7. If this most conservative standard is higher than the Historic P80, then the Minimum Lake Level associated with this conservative standard is deemed to be adequately protective of aesthetic and scenic attributes. In practice, the P80 associated with the aesthetic standard/screening is found to almost always be less protective than is one or more of the other calculated standards/criteria.

Over Dr. Emery's 40 plus years interacting with a significant number of lake users within Florida, when a large surface area of lake bottom is exposed, lake users consider it unattractive. Along similar lines, when a significant amount of lake shore vegetation is

totally out of water, lake users consider this unattractive. These two factors are associated with the slope of the lake bottom. A lake with a shallow slope will have significant lake bottom exposed even with a relatively small reduction in lake water level. In contrast, a lake with a steeply sloping lake bottom will have much less bottom exposed or vegetation stranded out of water per unit of water level reduction. Based upon the bathymetric evidence provided for Lakes Angelo and Denton, supported by my field visit, both of these lakes have moderately steep to steeply sloping shorelines and bottoms. Hence the aesthetics of each lake will not be unacceptably impacted from the adoption of Minimum Lake Levels based upon other criteria that are more conservative. Dr. Emery's comparison of the District's stated procedures in Appendix 4 with the results provided by the District in Chapter 5 of the reports on Lakes Angelo and Denton confirm that the District followed their stated procedures correctly. The use of the Historic P80 is based upon the best available information currently available hence it is appropriate to use for the assessment of lake aesthetics for Lakes Angelo and Denton.

APPENDIX 5: The Aquatic Habitat Zone Screening method is described in great detail in Appendix 5. This method takes different habitat zones and calculates different lake stage/area relationships for each habitat zone. The process involves seven steps, each of which is detailed in Appendix 5. These steps are: (1) Initial data compilation, which comprises acquisition and subsequent compilation of information plus coordination with outside relevant agencies; (2) field reconnaissance; (3) Digital Elevation Model Development; (4) water level and habitat time series development (such as a water budget model); (5) development of a presumptive Minimum Lake Level based upon a 15% reduction criteria; (6) possible repeat of Steps 4 and 5 if the presumptive Minimum Level exceeds a 15% reduction criteria; (7) an alternate approach if a water budget type model cannot be utilized.

SWFWMD has adopted the habitat zones and associated depth ranges for these zones from the SJRWMD. The SJRWMD developed these depth ranges during the development of MFLs for Lakes Brooklyn and Geneva (Sutherland et al., 2021) The habitat zones and corresponding depth ranges are:

- • small wading bird forage (0-0.5 ft),
- • sandhill crane nesting habitat (0.5-1.0 ft),
- • large wading bird forage (0-1.0 ft),

- • game fish spawning habitat (1.0-4.0 ft), and
- • emergent marsh (0-6.0 ft).
- deep water habitat is assessed as occurring at depths greater than 5 feet.

Multiple literature sources for these depths are provided in Sutherland et al. (2021). In addition, these depths are consistent with what ecologists regularly witness while evaluating these habitats.

The 15% criterion has been used by at least three different water management districts as a significant harm threshold on numerous flowing water systems and river systems. This threshold has been peer reviewed for a flowing water system (Shaw 2005). It is based upon a number of MFL-related studies in addition to the development of the Species Richness Standard described in Appendix 3. This percentage has proved to be a reduction which, when employed for many aquatic systems, appears to reliably avoid unacceptable adverse impacts.

Dr. Emery has compared the multi-step process described in Appendix 5 with the actual analyses described in the draft reevaluation reports for Lakes Angelo and Denton. The District staff have correctly followed their process. The various water depth thresholds were correctly and properly applied within the analytical process to appropriately protect the littoral and submerged habitats. This process is scientifically valid and ecologically appropriate. These specific environmental screening tools represent sensitive indicators of potential adverse impacts and are, therefore, defensible.

APPENDIX 6: Basin Connectivity Screening – In Appendix 6 of their December 12, 2022, Technical Report, the District defines basin connectivity as “the existence, extent, or temporal occurrence of continuous surface-water connections between lake basins or among sub-basins within lake basins.” From an ecological perspective basin connectivity is important as it affects the movement of aquatic biota among lake and wetland ecosystem segments. From a recreation perspective it is important as it can impact watercraft navigation. Leeper et al. (2001) stated that “review of basin connectivity for development of minimum lake levels is considered reasonable and in accordance” with state rules and laws concerning minimum level development.

From Dr. Emery's field visit on September 5, 2025, and from the detailed bathymetric information and Period of Record lake water elevation data provided in each of the draft reevaluation reports for Lakes Angelo and Denton, it is evident that both of these lakes are "closed basin" lakes. Even taking the highest water levels ever recorded for these two lakes, the record high water elevations would not result in water flow into another basin or sub-basin.

The bathymetric figures presented for each lake in Chapter 2 of the reevaluation reports indicate that both lake bottoms are generally "cone shaped" proceeding from higher water to low water. This information provides assurances that there are no "low water" lake bottom areas that would negatively impact boat usage or the movement of aquatic biota (such as fish passage).

In Appendix 6 of the District's 2022 Technical Report, the District staff make it clear that their screening mechanism for basin connectivity does not constitute a method for directly determining significant harm. The screening mechanism does allow a comparison with the other screening factors to provide assurances that basin connectivity could be protected by these other values. For some lakes, (usually mesic lakes and wetlands), assessing possible significant harm due to changes in basin connectivity can be somewhat problematic. However, in their reevaluation reports for Lakes Angelo and Denton, the District has provided substantial evidence that the connectivity criteria were appropriately applied to maintain ecological function at each lake.

APPENDIX 7: Dock Use – In Appendix 7 of the District's December 12, 2022 Technical Report, District staff have provided a detailed 8-step process to be utilized to assess whether dock usage could be adversely impacted from the implementation of a minimum level. Dr. Emery has compared this 8-step process with what is provided within the two reevaluation reports for Lakes Angel and Lake Denton. For Lake Angelo, there are only two stationary docks to measure, hence the process was modified from a "mean" dock height analysis to looking at each of the two dock individually. This simplifies the process. During his field visit on September 5, 2025, he noted that the dock platform for Dock 2 appeared to be non-existent (collapsed). In contrast, Dock 1 was in good condition, and was constructed at an elevation and platform water depth that boat use would not be curtailed under the proposed MFL scenario.

During Dr. Emery's field visit on September 5, 2025, to Lake Denton, the water elevations in the lake were so high that many of the docks were submerged. Due to the steepness of the slope of the lake bottom, and the high-water level, he was not able to access the lake bottom at the end of several of the dock platforms with his 8-foot-long measuring device. Hence his field observations of the dock use under proposed minimum lake level conditions are qualitative. Fortunately, the water clarity in Lake Denton was exceptional and Dr. Emery could see perhaps 17 feet down. He could see the pilings at the end of the docks. He noticed that many of them had extremely long pilings to get to the lake bottom. When he compared these qualitative observations with the dock measurements made by the District in their reevaluation of Lake Denton report, Dr. Emery's best assessment is that the District measured appropriately. Their results approximately matched his qualitative estimates. The application of the calculated lake stage thresholds appears to approximately reflect typical dock elevations and is likely to provide reasonable boat access specific to these systems. Note that the dock use screening was not the most conservative value, hence was not utilized in the final ML determination.

3.1.6 Comparison with Currently Adopted Levels

An initial question raised by the review panel stemmed from the fact that the proposed MLLs are several feet lower than the previously established MLLs. The proposed MLLs are 3.8 feet and 4.0 feet lower than the current MLLs for Lakes Angelo and Denton, respectively. After review of the data and documentation provided by SWFWMD in support of the re-evaluation, it is clear that the proposed levels are more appropriate.

Currently adopted MLLs for both lakes were established in 2008 based on the wetland offset elevation standard, which is 0.8 feet below the historic P50 elevation. The historic P50 elevation was estimated using a statistical model with three inputs: Lake stage for the subject lakes (Denton / Angelo), historic lake stage for a reference lake (Lake Letta), and rainfall measured at the Avon Park rain gage. There are significant limitations of this approach. The approach relies on historical measured stages from a reference lake, Lake Letta, that has different characteristics than Lakes Denton and Angelo. For example, Lake Letta is a flow-through lake for surface water while Lakes Denton and Angelo are closed-basin lakes. Furthermore, a model with only lake levels and rainfall as inputs relies

on the assumption that other variables including watershed characteristics, aquifer connectivity, and aquifer flow-through properties can be ignored.

In contrast, the water budget modeling approach taken in this re-evaluation is a more sophisticated approach, accounting for all of the important variables that can significantly affect lake stages.

3.2 Detailed Comments

This section presents detailed comments in tabularized form for the MLL report and (where specific comments were provided) supporting documentation. The tables include the location in the report the comment refers to, the specific comment, whether the comment materially impacts the conclusions of the MLL, and proposed corrective actions.

Detailed Comments on Reevaluation Minimum Flows for Lakes Angelo and Denton Draft Reports							
Comment No.	**Peer Reviewer**	**Figure, Table, or Page and Paragraph Number**	**Does Comment Directly and Materially Affect Conclusions of Report? (Yes/No)**	**A. Reviewer's Specific Comments**	**B. Reviewer's Specific Recommended Corrective Action**	**District Response**	**District Response Sufficient? (Yes/No)**
1	JL	Denton Figure 2.2	No	Watershed area for Lake Denton may be under-represented. Specifically, there is an area due east of Lake Denton, east of Panther Parkway, that naturally would have drained into Lake Denton. There appears to be pipes underneath the road that could convey runoff from east to west (refer to the narrative for a sketch of this).	Investigate the impact of adding this area to the runoff calculations. If the area is increased, could the runoff volumes remain unchanged with a reasonable adjustment to the CN?	After a field visit, we determined that this basin is unlikely to contribute runoff to Lake Denton – an outflow structure that would take the water from the grates to the lake was not found. If this area (approximately 800,000 ft^2 according to Ardaman (2013)) were to contribute runoff to the lake, runoff volumes identical to the current calibration could be achieved by adjusting the CN to 57.5 and DCIA to 0.03 (see supporting information for more details).	Yes
2	JL	Angelo Figure 2.2	No	Watershed for Lake Angelo is under-represented when compared to previous studies (Ardaman, 2013 and Interflow, 2017) However, the excluded areas probably rarely, if ever, contribute runoff to Lake Angelo.	None (for information only)	Understood.	Yes
3	JL	Denton and Angelo Figure 2-10	No	A previous study (Interflow 2017) found that NEXRAD significantly under-predicts rainfall in this area from 1998 through 2003, when compared against measured	Conduct sensitivity test on rainfall in WB model by substituting Avon Park Rain gage data for the NEXRAD for years 1998 through 2003.	The text below explains the effect of this replacement on the WB models. This adjustment in rainfall inputs for the Angelo model	Yes

				rainfall at Avon Park NOAA gage. This may account for some of the negative rainfall departures shown on the graphs (see narrative for rainfall figure).		leads to an increase in P50 by 0.3' with no adjustments to parameters. Reasonable adjustments to CN, SA leakage coefficients, and SA level adjustments were necessary to yield acceptable calibration (please see supporting information). The Lake Denton model used ROMP 43 gaged rain for 1995-2001, with NEXRAD from 2001-2022. Replacing NEXRAD data with Avon Park NWS gage data for 2001-2004 yields an increase in the P90 of 0.1' without any change in parameters. No change in parameters was necessary for acceptable calibration.	

Comment No.	Peer Reviewer	Figure, Table, or Page and Paragraph Number	Does Comment Directly and Materially Affect Conclusions of Report? (Yes/No)	A. Reviewer's Specific Comments	B. Reviewer's Specific Recommended Corrective Action	District Response	District Response Sufficient? (Yes/No)
4	JL	Both reports, page 31, third paragraph	No	Applying the CN runoff equation to continuous simulations (especially with daily rainfall) is questionable. Please refer to the review narrative for more discussion on this topic.	For future lake MFLs, please consider a more physically-based method for estimating rainfall excess.	Discussions on runoff estimation methods amongst the technical team are ongoing and will continue as part of lake MFL evaluations.	Yes
5	JL	Denton page 31, third paragraph	No	Harper and Baker (2007) was cited as the procedure for estimating runoff. However, the WB runoff calculations for Denton do not follow the method outlined in that report. Instead, a much smaller amount (0.25 inches) of rainfall was used as the threshold to transition from "normal" (AMC II) CN to "wet" (AMC III) CN. And any amount of rainfall greater than zero was used to transition from moderately dry to AMC II. These thresholds are not supported by literature, observations, or experience. Please refer to the review narrative for more discussion on this topic.	Because overland flow is only 3% of the modeled water balance for this lake, even very large simulation errors in this component will have minimal impact on the validity of the overall results. However, in developing future lake MFLs, please consider adopting a more physically-based approach for estimating rainfall excess.	See response to comment 4.	Yes

Comment No.	Peer Reviewer	Figure, Table, or Page and Paragraph Number	Does Comment Directly and Materially Affect Conclusions of Report? (Yes/No)	A. Reviewer's Specific Comments	B. Reviewer's Specific Recommended Corrective Action	District Response	District Response Sufficient ? (Yes/No)
6	JL	Both reports, page 32, first paragraph	No	Lake Letta water levels (with offsets applied) were used as the boundary condition for SA outflows for both lakes. While those levels are representative of SA water levels at that location, because they are also surface water levels, the range of fluctuations are lower than what one would expect to see a significant distance from the lakes.	Provide justification for selecting Lake Letta water levels as SA outflow boundary conditions. Consider conducting a sensitivity analysis on this input by substituting ROMP 43XX (with appropriate offset applied) for the Lake Letta levels.	For both lakes, using ROMP 43XX as both SA inflow and outflow results in overprediction of the P10 and underprediction of the P90.This is driven by low levels in 2008-2011 and high levels during 2016-2019. To offset the extremes during these periods, the SA response must be muted by significantly decreasing the leakage coefficient (please see supporting information showing Lake Angelo as an example). This decrease in leakance can result in acceptable P50 and P10 residuals, but this causes the model to smooth out the local (in time) highs and lows throughout the calibration period, thus giving a less realistic representation of each lake's water balance.	Yes
7	JL	Both reports, Figure 3-2	No	The figures show the observed water level data used in the WB models, without offsets applied.	Please provide a similar figure with the adjustments applied to the well and lake data used for SA and UFA inflows and outflows.	Please see supporting information for these figures.	Yes

8	JL	Denton page 34, first paragraph in Section 3.3.3.3	No	SA leakage coefficient of 0.011 is reasonable for lakes in the Intraridge valley.	None (for information only)	Understood.	Yes
9	JL	Angelo page 35, first paragraph in Section 3.3.3.3	No	SA leakage coefficient of 0.009 is reasonable for lakes in the Intraridge valley.	None (for information only)	Understood.	Yes
10	JL	Angelo page 37, Table 3-3	No	Net surficial aquifer flow is shown as a negative value. It seems this should be positive as it is a net inflow.	Check and correct the value in the table for net surficial aquifer flow.	Thanks for catching this mistake, the net SA water budget component will be changed to a *positive* 16.1”/yr in the report.	Yes
11	JL	Table 3-3, both reports	No	Overall water balances for both lakes appear reasonable based on my professional judgement and experience (assuming comment #10 above is resolved).	None (for information only)	Understood.	Yes
12	JL	Table 3-4, both reports	No	Exceedance percentile residuals are appropriate calibration objectives for lake MFLs. Coupled with the water level comparisons in Figures 3-3, the residuals indicate both are well-calibrated models.	None (for information only)	Understood.	Yes

13	JL	Denton Page 61, Angelo Page 64, third paragraph	No	Based on results from the ECFTX scenario simulations, UFA drawdown at Lakes Denton and Angelo are reportedly projected to decrease by 5.0 feet and 4.8 feet, respectively, between 2014 and 2045 conditions. The MFL reports say UFA drawdowns would result in aquifer recovery of 0.5 and 0.6 feet, respectively, of aquifer recovery relative to the water budget model period. It is not explained how these decreases in drawdown relate to the projected levels of aquifer recovery.	Consider re-wording this paragraph to clarify the relationship between decreases in UFA drawdowns and the projected aquifer recovery values.	This paragraph was re-worded, please see supporting information for details.	Yes
14	JL	Denton Page 61, Angelo Page 64, fourth paragraph	No	SWFWMD staff provided a draft report of the 2025 RWSP prepared by the CFWI (CFWI, 2025). The scenarios described included a 2045 scenario. However, the results focused on areas within the CFWI boundary. From a cursory review of this report, I did not see results presented for Highlands County.	Please provide documentation, if available, describing the CFWI RWSP 2045 scenario results for Highlands County.	Documentation is not available, but we provided a map of drawdown for the 2045 scenario that includes Highlands County. Please see supporting information.	Yes

15	SE	Angelo & Denton, throughout. Angelo: 17, 31, 44, 47. Denton: 17, 41, 43, 46.	No	The titles and uses of the various P10/P50/P90 data sets provided in the report are problematic. ("Issue 1" in Scott's narrative)	Answer the first several questions that are included in Scott's narrative document and create a more intuitive naming scheme for the data sets. "Which of the two "Historic" models shown on page 47 is being referred to?" The P50 and P90 elevation differences between the "Historic Water Budget Model" and the "Historic LOC Model" (Table 4-2) are close to the same elevation differences as were described earlier in the report (Table 4-1) between the "Calibrated" model and the "Historic Water Budget Model". This begs the question as to whether the "Historic LOC Model" results represent the "water withdrawal condition" or the "no water withdrawal condition"?	In each model, both the Historic water budget model P50 and the LOC model P50 consider water levels without pumping impacts. The LOC model considers a time period of 60 years vs the 25 year period of the water budget model. Rainfall in the first 35 years of the LOC model is lower than in the water budget model period. We will make edits to ensure that a consistent and clear nomenclature is applied to the various timeseries throughout both reports.	Yes

16	SE	Angelo & Denton, throughout.	No	Scott has some modeling questions that he is seeking clarification on pertaining to some key water levels and how they were derived. ("Issue 1" in Scott's narrative.)	Answer the questions that are included in Scott's narrative document. Angelo "Why is the LOC Model P50 result of 1.5' lower than the Historic Water Budget Model almost identical to the P50 of the Calibrated model (includes pumpage effects) being 1.6' lower than the Historic Water Budget Model (does not include pumpage effects)? Are not both of these model (Historic and LOC) results showing water levels without pumping impacts? Or is the LOC model showing a 60-year period that includes the effects of pumpage?" Denton "Why are the LOC Model results about a foot lower than the Historic Water Budget Model results? Are not both of these model results showing water levels without pumping impacts? Or is the LOC model showing a 60-year period that includes the effects of pumpage? Or is the long-term (60 year) rainfall substantially lower than the 25-year rainfall used in the Calibrated and Historic Water Budget Models?"	In each model, both the Historic water budget model P50 and the LOC model P50 consider water levels without pumping impacts. The LOC model considers a time period of 60 years vs the 25 year period of the water budget model. Rainfall in the first 35 years of the LOC model is lower than in the water budget model period. We will make edits to ensure that a consistent and clear nomenclature is applied to the various timeseries throughout both reports.	Yes
17	SE	Angelo & Denton throughout	Yes	HMLL error. ("Issue 1" in the Angelo and Denton narrative)	Provide the correct HMLL in the report.	HMLL issue will be corrected in the report, Denton HMLL was recalculated, Angelo had an incorrect HP10 in the table, the HMLL was correct	Yes

18	SE	Angelo	Maybe	Double check dock elevations and calculations. ("Issue 2" in Scott's Angelo narrative)	Either re-measure the dock elevations or recalculate w/ the data we have (if it is correct).	Dock elevations were checked and our numbers are similar to what Scott observed in the field. There was an issue with the excel formula that has been corrected, and dock platform information will be updated.	Yes
19	SE	Denton	No	The Lake Denton report does not include survey data for the public boat ramp. ("Issue 2" in Scott's Denton narrative.	Include a statement about the boat ramp and associated survey data. Also include a statement about how the levels will not affect SCUBA activity on the lake.	We will include the surveyed elevation of the end of boat ramp in the report and make mention of the SCUBA activity.	Yes
20	SE	Denton	No	Concur w/ the District decision to not consider reductions in available wading bird habitat or sandhill crane nesting habitat.	None.	No action necessary.	Yes
21	SE	Angelo & Denton	No	About bathymetry…. "It is unclear whether the 2007 data set that was mentioned was actually one of the data sets used in this reevaluation." ("Issue 3" in Scott's Angelo narrative) ("Issue 4" in Scott's Denton narrative)	Provide some clarifying language about the bathymetric products used.	We will update the report with clarifying language. The bathymetry used for the analysis of these two lakes was collected in 2021.	Yes
22	SE	Angelo & Denton	No	The difference between the existing ML elevation and the new, proposed ML elevations are substantial. ("Issue 4" in Scott's Angelo narrative) ("Issue 6" in Scott's Denton narrative)	A few added paragraphs listing the improvements in the newer data, methods, and models contrasted to those available 20 years ago may prove valuable. In addition, brief descriptions of "real world" on-site examinations of the lake indicate that the existing ML elevation is unrealistically high.	We will include information in the report better explaining the substantial differences from the previous work that was done.	Yes

23	SE	Denton	No	Several of the ten Environmental Resource Values (62-40.473 FAC), including transfer of detrital material, filtration and absorption of nutrients and pollutants, are not really discussed, but are considered to be protected due to their connection with wetland offsets and aquatic habitat zones (which are discussed).	Adding a few sentences describing how these undiscussed values are, in fact, protected could prove valuable.	We will include additional explanation of protection of these WRV's.	Yes
24	SE	Angelo & Denton Agnelo Pages 52 – 55 Denton Pages 51 - 52	No	The Deep Water Habitat & Emergent Marsh are demonstrated to be the most sensitive of the relevant ecological features, and that these criteria were exceeded resulting in an upward adjustments to the MLLs. Given the importance of this step in the process, I suggest that a Table be inserted to demonstrate at least a portion of the iterative process. Perhaps showing the increase in deep water habitat with every 0.1' increase in water elevation starting at (Angelo: 95.5' -96.5', Denton: 108.5' – 109.5'), or some similar type visual aid would assist the reader in understanding how the MLL's came to be.	Provide more detail on the use of Deep Water Habitat and Emergent Marsh.	We can include a table showing stage/area relationships for the iterative process.	Yes

25	SE	Angelo Page 58	No	The use of the P80 elevation for the Aesthetics Screening is appropriate. However, it would be helpful to provide a Table showing the lake water budget model results in 10% increments, so the P80 elevation of 95.4' NGVD29 can be confirmed.	Create a table and put it in the report.	We can include a table showing stage/percentile for the modeled historic results.	Yes
26	SE	Denton Pages 59 - 61	No	Provide a short summary of all factors examined as part of the minimum levels process.	Add some summary paragraphs for closing material.	We will include add an additional summary for this portion of the report.	Yes

4.0 Referenced Literature

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