technical memorandum

To:	Dr. Andrew Sutherland, PhD, SJRWMD
From:	Dr. Phil Burkhalter, P.E., PhD, Trihydro Corporation Mr. Travis Richardson, CPSS, MS, T. Richardson Soils and Environmental
Date:	June 18, 2025
Re:	Independent Technical Peer Review Minimum Levels Reevaluation for Lake Prevatt, Orange County, Florida

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Trihydro Corporation (Trihydro) and T. Richardson Soils and Environmental (TR Soils) are pleased to provide this scientific peer review of the Minimum Levels Reevaluation for Lake Prevatt, Orange County, Florida Minimum Flows and Levels (MFLs) Report. Phil Burkhalter, PE, PhD (Trihydro) and Travis Richardson, CPSS, MS (TR Soils) reviewed all documents provided for reference and Peer Reviewed the documents as requested in the Scope of Work. A Kickoff Meeting and Site Review took place on February 24, 2025. All documents were reviewed and initial findings were presented at a Public Meeting on April 10, 2025. The SJRWMD provided a response to the Initial Findings on May 15, 2025. The SJRWMD responses were evaluated, and the final comments have been adjusted with consideration of the additional analysis provided. A Draft Technical Memorandum and comments were presented on May 29, 2025. Final comments including several public comments are presented herein. Comments are grouped by specific topic with figures included in Attachment A. Typographical and editorial comments as well as items addressed by the SJRWMD responses have been removed from the final Comments Table (Attachment A). Initial comments and the SJRWMD response to initial comments are publicly available on the SJRWMD website (https://www.sjrwmd.com/minimumflowsandlevels/lake-prevatt/#lake-prevatt-mfls-report-peer-review).

The amount of water available (freeboard) or shortfall (deficit) are evaluated in the MFLs process using a combination of surface water and groundwater modeling (HSPF and MODFLOW-2005). The East-Central Florida Transient Expanded (ECFTX v. 2.0) groundwater model, which was developed using a regional MODFLOW-2005 model of the Floridan Aquifer, was recalibrated to the Wekiva Springs contributing basin and Seminole County and has been peer reviewed by others. The HSPF and MODFLOW-2005 models are industry standards and represent the best tools available to evaluate MFLs within the SJRWMD MFLs methodology.

The following documents were peer reviewed:

- Shadik, C.R., E. Revuelta, A. Sutherland, A. Karama and H. N. Capps Herron. 2025. Minimum Levels Reevaluation for Lake Prevatt, Orange County, Florida. Draft Report. Bureau of Water Supply Planning, SJRWMD.
  - Appendix B: Hydrological Analyses;
  - Appendix C: Environmental Methods, Data and Metrics;

- Appendix D: MFLs Status Assessment;
- Appendix E: WRVs Assessment; and
- Appendix F: DEM Development.

The original 1997 MFLs memo for Lake Prevatt and the Hydroperiod Tool Design; ESRI 2018 were reviewed as background material, but were not included as part of the formal peer review.

The objectives of the peer review are to answer the following questions:

1. Validity and appropriateness of environmental analyses and criteria:
   - Are the environmental data used to develop environmental criteria adequate and appropriate?
   - Are the methods and procedures used to develop and assess environmental criteria appropriate?
   - Have all relevant environmental values been evaluated?
   - Are assumptions reasonable and consistent given best available information?
2. Validity and appropriateness of hydrological analyses:
   - Are the hydrological data used to develop and assess environmental criteria adequate and appropriate?
   - Are the hydrological analyses used to develop and assess environmental criteria appropriate?
   - Are assumptions reasonable and consistent given best available information?
3. Appropriateness of recommended MFLs:
   - Are data used to support conclusions and recommendations adequate and appropriate?
   - Are the assumptions used and conclusions made in the development of protective minimum levels reasonable and appropriate given best available information?

KEY DISCUSSION TOPICS

Appendix B – Hydrological Analyses

The overall approach for the Hydrological Analysis Process described in the MFL Report Appendix B is generally valid and appropriate. The calibrated ECFTX v. 2.0 groundwater model is used to calculate a hydraulic head in the upper Floridan Aquifer (UFA) beneath the lake for a prescribed pumping condition. The calculated UFA head is then used as a boundary condition in the calibrated Lake Prevatt HSPF model to simulate the exchange of flow between the lake and UFA. Historical regional and local groundwater withdrawals are considered in the analysis.

The ECFTX v. 2.0 model only provides drawdown back to 2004. A simple regression model was therefore developed for the total pumping rate *vs.* drawdown from hypothetical model simulations using the ECFTX v. 2.0. The best fit regression model was used to estimate the drawdown time series at Lake Prevatt for the pre-2004 period. The ECFTX v. 2.0 was used to estimate the drawdown for the post-2004 period. Review comments for Appendix B include the following:

1. Consider tightening up terminology to make sure the reader can follow the analysis steps. For example, be sure to always specify between "simulated" vs "observed" or between "lake" vs "groundwater" levels. There were places in the text where it was not clear.
2. In reference to model performance, what are meant by "reasonably" and "adequately"? What were the calibration criteria, i.e., what constitutes a "good" calibration?
3. How many/which cells were used to extract the model output data? What is the cell size? How does the cell size compare to the lake area?
4. Although these simple single linear equations provide a high correlation, using a weighted function (i.e., multi-part linear or polynomial) that separates out the pumping locations by distance seems like it would be more physically realistic. The wells closer to the lake would have more of an impact vs wells that are farther away. However, it appears that using the linear approximation to represent the non-linear drawdown impacts is adequate in this case.
5. The regression analysis R^2 values are so high that it seems like it does not matter which buffer you use. Also, R^2 is generally presented r^2. Consider this standard use in all instances.
6. Inclusion of a figure that includes pumping well locations is recommended.
7. How does the 15-mile radius compare to the zone or radius of influence that would be calculated by the Theis equation for an average or maximum pumping rate for this region?
8. Related to filling the missing water use data, how well does the exponential growth assumption fit the periods where you do have historical data? Would be good to show or provide a comment here to confirm that this is a valid assumption.
9. Regarding the linear interpolation assumption to translate monthly data into daily, did you consider other interpolation methods (e.g., cubic spline) that might better capture seasonal behavior? Probably would not make much of a difference, but could be more realistic.
10. In reference to the "observed and estimated" groundwater levels near Lake Prevatt, how much of this data is observed, and how was it estimated?
11. Text on page 14 of Appendix B is the first mention of return flows. Need to add a definition and describe how they are calculated.
12. Related to future climatic conditions, it would be helpful to add some information on the current state of climate modeling for the southeast US and possible future changes to the hydrology (more or less

rain, higher temps, higher ET, etc.). Then describe how these possible changes might affect results. We agree that our understanding is limited, but think some broad statements would be appropriate.

The SJRWMD provided additional rainfall analysis using the Standard Precipitation Index as well as other data and analysis to demonstrate that there is a substantial rainfall deficit post 1980. While rainfall deficits likely account for much of the lake level fluctuation, other factors including land use changes in the basin as well as consumptive are likely contributing factors. The additional analysis illustrates that the lake level is relatively high during some periods of rainfall deficit (i.e. negative SPI) and low during some periods of higher rainfall (i.e., positive SPI). However, the six-month moving average of daily rainfall appears to have a direct relationship to the lake levels. The additional analysis addresses the peer reviewer and public comments regarding the difference in lake level fluctuations pre/post 1980.

Appendix C – Environmental Methods, Data and Metrics

Field Methods and Transect Data

Transects were selected based on where multiple commonly occurring wetland communities would be traversed including unique wetland communities. In addition, transects were established in areas to capture shallow reaches of the lake and at locations of previous MFL data collection sites where possible. Vegetation sampling procedures at the selected transects used the line-intercept method and the belt transect method. Soil sampling procedures at the selected transects documented the presence and extent of hydric soil indicators including histic epipedon and histosol.

1. The vegetation naming system follows the SJRWMD's Vegetation Classification System (Kinser 2012). Consider consistently using this naming convention for the mapped vegetation communities (topobathy/hydroperiod tool) or standardize names to another system to allow direct comparisons among data. Identify upland and wetland communities with a footnote if there are deviations from the classification system used.

   The SJRWMD Vegetation Classification System is a relatively simplified system and has substantially less detail on plant species, hydrology, and fire compared to FNAI Natural Communities. Consider shifting to FNAI or updating the SJRWMD Classification System with more detail and making it a Special or Technical Publication that is publicly available.

2. Community breaks were established with and understanding of ecology, substantial onsite data collection and application of reasonable scientific judgement. Reasonable scientific judgment is highly variable depending on the experience of the individual. To minimize the potential error with this method it may be valuable to have each staff member present in the field (minimum 3) establish community boundaries and names independently and then reconcile differences. Note: community breaks at Lake Prevatt, particularly for any community downslope of the shrub swamp, are very different following a wet or dry period - consistent with discussion during the peer review site visit.

   a. SJRWMD staff do an excellent job trying to understand a system prior to finalizing transect locations and collecting intensive data. As part of this initial assessment, consider identifying the

most likely criteria to support the FH, MA, and FL levels. If the criteria will likely be the maximum or minimum elevation of a community then collect multiple point elevations for that vegetative community boundary to get a better average elevation of the maximum or minimum.

b. Alternately, collect the maximum and minimum elevations of all the communities at numerous locations using submeter GPS and use aerial interpretation along with the topobatymetric assessment to determine the maximum, mean, and minimum elevations for the vegetative communities and transitional area for the entire lake. This is a substantial shift in methodology but may be more representative of the overall lake.

   i. This approach may reduce variability in SWIDS data.

   ii. This approach would allow a graduate student to re-evaluate vegetation communities on prior MFLs lakes and incorporate a uniform vegetation classification system into the SWIDS analysis.

3. Consider including a table(s) showing communities, deep organic soils, and elevation statistics for the most relevant information for all three transects (e.g. Minimum Mesic Hammock, TZ, TSS, SS, mean HE/H, etc.).

4. Table C-13 - Transition Zone is not reflected in the table. The transition zone in these systems is typically a zone that is too wet for upland species and too dry for the development of a stable wetland community.

5. Considered a reduced soil sampling effort similar to CFWI: wetland boundary, hydric, hydric to surface, and muck at surface and add landward histic epipedon and landward histosol. The drawdown criteria commonly used for organic soils can be applied to the landward histosol (less conservative) or landward histic epipedon (more conservative) with the same ecological function of minimizing soil loss and consolidating organic materials during low water events.

   As previously discussed, and noted in the SJRWMD response to initial comments, collecting elevations of the extent of histic epipedon or histosol may skew the elevation lower since there is not a consistently defined stopping point for assessing the thickness of organic soils.

6. Consider revising the statement “Hydric and non-hydric soils were mapped for the Lake Prevatt watershed using USDA NRCS Soil Survey Geographic (SSURGO) GIS data…”. Mapping has a specific meaning in Soil Survey. The mapping was completed by USDA, NRCS and digitized. The digitized data SSURGO was used to create a figure.

Surface Water Inundation/Dewatering Signatures (SWIDS)

The Surface Water Inundation/Dewatering Signatures (SWIDS) approach was modified for the Lake Prevatt MFLs reevaluation to lessen uncertainty by decreasing the range of frequencies for a given event. The Lake Prevatt approach uses both a Top-Down Method Cluster Approach for deep organic (MA) frequencies and a Transect Quadrat-level Bottom-Up Method Cluster Approach for vegetation and community frequencies. For the Top-Down Cluster Approach, the District used 28 lakes which were

selected from the same Ward method hierarchical cluster group (grouped by similar hydrologic and landscape conditions) as Lake Prevatt and had the required deep organics information available for analysis. For the Transect Quadrat-level Bottom-Up Method Cluster Approach, the District used 29 lakes including Lake Prevatt which had the required species coverage data and then assessed each transect's quadrat data concerning quadrat slope, percent exceedance of the quadrat's mean elevation, water level range (P10-P90), and the prevalence index (PI) of quadrat vegetation.

1. It takes significantly longer than 20 years to form a histic epipedon and histosol so use of the POR prior to data collection would be appropriate for SWIDS evaluation of HE/H. Twenty years may be more appropriate for evaluation of landward extent of muck (a more transient soil indicator). Consider using the landward most extent of histic epipedon and histosol which may reduce variability.
2. The effort to reduce variability in the SWIDS analysis is commendable. The use of a Cluster Approach seems appropriate.
    a. Are all of the other systems in the SWIDS analysis assessed with the same hydrologic data set (e.g., no pumping, existing conditions, restricted to a certain number of years, etc.)? Consider reducing variability in SWIDS by, standardizing an approach for community breaks, standardizing community types/names, recapturing and collecting data on MFLs transects, and incorporating CFWI transects into the SWIDs analysis. Fund an MS student to collect this data with survey support. Fund a PhD student to evaluate lake clusters and develop best suite of variables.
    b. If a current staff member is not familiar with the cluster of systems in the Lake Prevatt cluster, consider having a staff member physically go to the lakes used for the SWIDS analysis to provided visual confirmation of similarity among the lakes to ensure the cluster analysis is providing a reasonable cluster for QA/QC purposes.
3. "Although many variables may influence the composition of vegetation communities, PI provides a way to condense the composition down to the variability caused by moisture availability." Consider if this should be cited and if moisture availability is the intended terminology.
4. Comparing each transect quadrat's variables for the Transect Quadrat-level Bottom-Up Method Cluster Approach seems appropriate.
    a. Consider adding a variable to capture the length of positive slope uphill of the transect or a combination of length of positive slope and percent slope. This addition may provide a better metric at the transect scale than soil drainage class around the lake.
    b. The use of the percent exceedance of the mean elevation of the quadrat has circularity in the analysis. Consider if this variable is necessary and appropriate in this analysis.
    c. Continue to experiment with variables to develop a consistent set of variables that work well or that are specifically customized to certain types of lakes.

5. Are the return intervals (RIs) calculated the same for MFL event-based statistic when a system is on the dry side of the SWIDS cluster? If the system is already on the dry side of the cluster the mean ± standard error of all observed RIs may make the system wetter than it is naturally. This is a methodology question and not directly related to the Lake Prevatt MFL reevaluation. Note that this comment was partially addressed in the SJRWMD response to initial peer review comments but did not address how to deal with the RI for systems that are drier than the mean +/- 1 standard error.
6. When running the Top-Down Method Cluster Approach for deep organic (MA) frequencies consider using Kurtosis along with P10-P90 water level range rather than soil permeability. Soil permeability does not appear to responsive since all but 3 systems have > 80% of soils in high permeability class. Another way to evaluate soil permeability that may be more meaningful, would be to analyze the permeability of the most restrictive layer within the upper 2 meters of the soil profile.
7. Ensure that the use of percentile is the correct and intended terminology used versus percent exceedance or P value.

MFL Metrics – Event-Based Metrics

1. The SJRWMD evaluated numerous other relevant event-based metrics following the initial peer review comments. Several of the additional metrics evaluated resulted in similar freeboard to the Hydroperiod Tool metrics. Initial peer review comments suggested that the SJRWMD should evaluate more sensitive environmental criteria, however the comment should have suggested to evaluate criteria that are ecologically relevant, defensible, and better reflect the range of fluctuation of Lake Prevatt.
    a. The higher elevation event-based metrics are often the least sensitive but may be important to protect the upper fluctuation range of a system in certain scenarios. In addition, these may support evaluation of the WRVs.
    b. We stand by the comment that the most appropriate event-based criteria may not be applied to the MA and/or FL. The obvious reason is that the magnitude of the FL is higher than the magnitude of the MA. While durations and return intervals come into play, one would expect the magnitude of the FL to be lower than the MA magnitude.
        i. The return interval of the mean elevation of Shrub Swamp with a 180-day continuous non-exceedance event cannot be met under the no pumping scenario based on the RI derived from SWIDS analysis.
            a) Should average non-exceedance be evaluated since this is the MA?
            b) Does this suggest that the systems with Shrub Swamps that we are comparing with Lake Prevatt are less appropriate than we would like?
            c) Does this just indicate that one of the most stable wetland communities at Lake Prevatt is not actually well tied to hydrology?

d) Should a different statistic of the shrub swamp be evaluated?

e) Sandhill lakes tend to accumulate organic soils at lower elevations due to the high range of fluctuation and frequent low water events. Would use of a soils-based criteria be more appropriate for the FL in this type of system rather than the MA?

ii. A FL event-based metric based on soils criteria (Landward Histosol – 2ft) or Mean Histosol/Histic Epipedon with a 90-day continuous non-exceedance captures a little greater range of fluctuation for Lake Prevatt and result in similar UFA FB to the Open Water Hydroperiod Tool Metric, 0.9 and 1.3 feet, respectively. Both of these criteria would have similar support in the literature for consolidation of organic materials and vegetative growth during the dry season. Dewatering of organic soils for relatively short durations regularly occur in unaltered systems. Should the soil criteria be applied for the FL since soils accumulate at lower elevations in sandhill system rather than vegetative criteria that has been noted to fluctuate much more rapidly?

c. SJRWMD staff and T. Richardson discussed the use of 0.3 ft drawdown in organic soils as more defensible than the 1.67 ft drawdown criteria and having more support in published literature. Much of the literature related to minimizing oxidation of organic soils is conducted in the everglades or other marsh or swamp systems with a much lower range of water level fluctuations. When considering that Lake Prevatt is a sandhill type lake with a large fluctuation range the use of organic soils for the FL may be more appropriate. Also, sandhill lakes tend to have fairly rapid water level fluctuations which may result in use of normal vegetative and soils criteria for the MA (i.e., durations and return intervals) not lining up well with the system hydrology.

MFL Metrics - Hydroperiod Tool Metrics

The MFL considered both event-based and hydroperiod tool metrics. The minimum frequency of critical hydrologic events for long-term persistence of wetland and aquatic species and hydric soils is evaluated with event-based analysis. Elevation specific data are evaluated with the hydroperiod tool to create new raster surfaces for different criteria. The hydroperiod tool is a meaningful data driven tool that allows comparison of habitat changes with changes in hydrologic regime. This is a powerful tool for evaluation of WRVs as well as establishing critical habitat thresholds for MFLs. Average habitat area is appropriate for some assessments. Consider where the average habitat is not the best metric - what are critical elevations for certain metrics that should be evaluated? The SJRWMD evaluated numerous additional metrics for specific elevations under no-pumping, current pumping, and the MFLs condition. The additional metrics evaluated provide very strong evidence that the most limiting criteria has been applied to establish the MFL and that the Water Resource Values (WRVs) are protected.

1. The peer reviewers stand by comments that the change in area for certain criteria should be evaluated at specific elevations rather than the average elevation. SJRWMD completed assessments of multiple specific criteria/elevation as requested for consideration in the initial peer review comments. While these additional criteria were not the most limiting, the additional analysis provided for a better assessment of the WRVs.

2. The comment regarding water depth not being critical until water levels drop below 52 ft was specifically pertaining to the potential for fish kills. The full range of water level fluctuations are important for many wetland and water resource functions. The additional analysis has addressed this comment and demonstrated that the MFLs will not substantially increase low water events.
3. One consideration for significant harm is the loss of wetland area. The intention of a prior comment was to extract that information. Use of the hydroperiod tool can provide some insight on this question.
    a. Does the change of 0.3% exceedance (No- pumping to MFLs condition) at the wetland elevation (57.6 ft) result in a loss of wetland area or just a change in vegetative composition?
    b. What is the lake area at and below 57.6 ft NAVD compared with the lake area associated with an elevation with a 1.3% exceedance under the MFLs condition?

        Note: We believe the SJRWMD responded to "b." with approximately 5 acres. If the MFL were to result in 5 acres of wetland loss the peer reviewers would consider that significant harm. However, the maximum water levels are still achieved with a very minimal change and it is expected that the lake edge will stay the same and that there will only be a change in vegetative composition at the wetland boundary and not a true loss of wetland area.

MFLs Determination

The MFLs determination for Lake Prevatt involved the evaluation of critical environmental features applying two different methods: an event-based approach and a hydroperiod tool approach. Using the event-based approach, a frequent high (FH), minimum average (MA), and frequent low (FL) were evaluated and involved determining a minimum hydroperiod to maintain key environmental features (e.g. transitional shrub swamp). The hydroperiod tool utilizes a stage-area analysis of the lake in relation to key lake habitat or recreational features (e.g. emergent marsh, open water, etc.).

Initial peer review comments regarding event-based and hydroperiod tool metrics were dominantly addressed by the SJRWMD response to initial comments. Some additional discussion/consideration is needed regarding the event-based metric applied (see MFL Metrics - Event-Based Metrics Comments). While some comments remain, sufficient data and analysis has been provided to demonstrate that the most appropriate and sensitive criteria has been applied to establish the recommended MFLs and that the recommended MFLs protect the WRVs associated with Lake Prevatt.

1. The following paragraphs should be included at the beginning of the Main MFLs Report and Appendix C.
    a. The MFLs assessment involves comparing the minimum metric condition for each metric with the hydrologic regime subject to impacts from current groundwater withdrawals (termed the current-pumping condition). This comparison determines whether each criterion at each system is being achieved under the current-pumping condition and if there is water available for additional withdrawal (freeboard), or whether water is necessary for recovery (deficit). If any of

the MFLs environmental criteria are not being achieved under the current-pumping condition, indicating a deficit of water, a recovery strategy is necessary. If the MFLs are currently being achieved, but a deficit is projected within the 20-year planning horizon, a prevention strategy is needed. No-pumping and current-pumping condition water level datasets developed for Lake Prevatt were used to calculate freeboard or deficit and determine whether the system is in recovery, prevention, or neither (see Hydrological Analyses section above and Appendix B for more details).

b. The MFLs determination for Lake Prevatt involved the evaluation of critical environmental features applying two different methods: an event-based approach and a hydroperiod tool approach. Using the event-based approach, a frequent high (FH) and a minimum average (MA) were established (consider evaluated in place of established) and involved determining a minimum hydroperiod to maintain key environmental features (e.g. transitional shrub swamp). The hydroperiod tool method utilized a stage-area analysis of the lake in relation to key lake habitat or recreational features (e.g. emergent marsh, open water, etc.).

2. Consider modifying/standardizing terminology and heading regarding the event-based metrics.

   a. e.g., Event-based metrics evaluated for the FH level

      The heading MA Level, FH Level, and FL Level are not exactly correct.

   b. With the addition of the hydroperiod tool and evaluating the most limiting metrics by freeboard or deficit more than one event-based metric per level may be appropriate to consider in some instances.

MFLs Status Assessment (Appendix D)

The metrics were evaluated by comparing the Minimum Levels (Appendix C) scenario and the current pumping scenario to determine the UFA Freeboard. The most constraining metric (open water 5 ft) has a UFA freeboard of 0.9 ft. The projected UFA drawdown to 2045 is 0.16 ft. Therefore, under current-pumping conditions, all Lake Prevatt MFLs are met. Assuming all future pumping is equal to the projected 2045 water demand, there will be 0.74ft UFA freeboard in 2045. This implies that Lake Prevatt is not in prevention or recovery. The SJRWMD MFLs assessment methodology is well documented, defensible, and allows for assessment of the MFLs periodically during the water supply planning process. The assessment of the available freeboard or deficit for each metric allows for a comparison between the event-based metrics and the metrics assessed with the hydroperiod tool. This results in the most limiting metric being used for the recommended MFLs.

Since the event-based metrics evaluated for the FH, MA, and FL were not the most constraining criteria, consider adding a statement in the Appendix to this fact as well as that the FH, MA, and FL are not the recommended minimum levels for clarification.

Water Resource Value Assessment (Appendix E)
The SJRWMD must consider "environmental values associated with coastal, estuarine, riverine, spring, aquatic, and wetlands ecology" when establishing MFLs. These environmental values are commonly referred to as water resource values. The SJRWMD approach is to protect the most sensitive WRVs and therefore ensure that all relevant Rule 62-40.473, F.A.C. environmental values are protected. The SJRWMD divided the 10 values identified by Rule into 3 groups based on their relevance to Lake Prevatt and also on whether they protect ecological versus non-ecological structure and function. Of the 10 WRVs, 3 were determined not relevant and the other 7 were determined to be protected by MFLs condition based on protection of open water area (area $\geq$ 5 feet deep).

The SJRWMD provided additional analysis following the initial peer review comments. It is recommended that some of the additional analysis be incorporated into the WRV Assessment with respect to WRV1 (Recreation in and on the water) and WRV2 (Fish and wildlife habitat). The additional analysis utilizing the hydroperiod tool demonstrates that the open water area metric is the most sensitive criteria for establishing the recommended MFLs, and the criteria results in less than a 15% change in area for both average area available for canoeing (with 20" water depth) and lake area at low water levels (47.0 – 51.0 ft). In addition, the additional analysis demonstrates very little change in downstream discharge and only a 0.3% change in exceedance at the wetland boundary elevation established at the Central Florida Water Initiative transects.

Consider discussing WRV1 and WRV2 in their own categories. The additional analysis completed allows for a very clear assessment that these as well as all other WRVs (relevant to Lake Prevatt) are protected with the recommended MFLs and using the best available information.

Topobathymetric DEM Development (Appendix F)
The Topobathymetric DEM appears to be well developed and corrected with ground truthed data for different vegetative communities. It is thoroughly documented with the methodology clearly outlining steps for development of shoreline and upslope portions of the DEM. The data collection was comprehensive, utilizing various methodologies across several years and validated against survey data. The smoothing and stitching functions, NNI and "Mosaic to Raster" leading to the final surface results are reasonable and appropriate. No deficiencies were found in the Topobathymetric DEM development.

MFLs Main Report
The MFLs main report is a synthesis of the data and analyses presented in the appendices. Sufficient data and analyses are incorporated into the main report that a reader can use this as a stand-alone document or go to an appendix for more details and analysis. The peer reviewers consider this a good balance between the appendices and the main report.

1. See prior comments related to event-based metrics.
2. Work to have consistent terminology throughout this report and the appendices.

a. Consider "Metric(s) evaluated for the FH level" rather than just Frequent High Level, Minimum Average Level, and Frequent Low Level.

CONCLUSION

1. Assess validity and appropriateness of hydrological analyses.

   - Are the hydrological data used to develop and assess environmental criteria adequate and appropriate?

     Yes, models used are the industry standard and the ECFTX v. 2.0 has been peer reviewed and recalibrated for the Wekiva Springs contributing basin and Seminole County.

   - Are the hydrological analyses used to develop and assess environmental criteria appropriate?

     Yes, the SJRWMD provided additional rainfall analysis using the Standard Precipitation Index as well as other data and analysis to demonstrate that there is a substantial rainfall deficit post 1980. In addition, the ECFTX v. 2.0 model was recalibrated for the Wekiva Springs contributing basin and Seminole County. This model takes rainfall and climate data, hydrogeology, soils, water use, bathymetry, and other variables. The ECFTX v. 2.0 has been peer reviewed and represented the current best available tool for impact analysis of Lake Prevatt.

     Additional rainfall analysis presented illustrates a significant difference in rainfall pre/post 1980. The detailed view of modeled lake stage for the current/no-pumping scenarios illustrates that there can be substantial change in lake level between the current/no-pumping when other factors line up just right but the effect appears to have a short duration. The short duration effect is not considered significant harm.

   - Are assumptions reasonable and consistent given best available information?

     Yes

2. Assess validity and appropriateness of environmental analyses and criteria.

   - Are the environmental data used to develop environmental criteria adequate and appropriate?

     Yes. The environmental data collected, the topobathy developed, and the vegetation mapping completed for Lake Prevatt are extensive and represent the onsite conditions. Comparison of the 2022 data with the 1997 MFLs data and the CFWI monitoring data are similar providing additional confidence that the data is accurate and representative of the system.

   - Are the methods and procedures used to develop and assess environmental criteria appropriate?

     Yes. Clustering of lakes to allow for comparison of SWIDS for "like" systems and "like" transects is appropriate and an improvement from prior assessments. SWIDS ensure that appropriate return intervals are assigned to the event-based metrics. The addition of the

Hydroperiod Tool criteria to assess additional metrics provides a better quantification of the effects of the MFLs regime and a direct way to evaluate WRVs. The 15% threshold seems acceptable and is the best criteria available. Some additional research into this threshold would be beneficial.

- Have all relevant environmental values been evaluated?

  Yes. SJRWMD completed additional analysis following the initial peer review comments to evaluate multiple additional metrics. The high water metrics (e.g. wetland boundary, discharge elevation, etc.) are not sensitive criteria but allow the peer reviewers to confidently say WRVs are protected.

- Are assumptions reasonable and consistent given best available information?

  Yes, and when model improvements are made or water use data changes the SJRWMD will confirm that the recommended MFLs for Lake Prevatt are met when the 5-year water supply plan is developed.

3. <u>Appropriateness of recommended MFLs:</u>

   - Are data used to support conclusions and recommendations adequate and appropriate?

     Yes, data and recommendations are adequate and appropriate. The additional analysis completed by SJRWMD following the initial peer review comments confirmed that the open water metric is the most restrictive criteria. The water level drawdown from Landward Histosol – 2 ft or the more conventional metric with a 1.67 ft drawdown from the mean elevation of deeper organic soils (histic epipedon/histosol) result in the same or slightly more UFA free board.

   - Are the assumptions used and conclusions made in the development of protective minimum levels reasonable and appropriate given best available information?

     Yes, the assumptions, justification, and conclusions are thorough. The recommended MFLs are derived from the most restrictive criteria and allow for some change while preventing significant harm. Use of the hydroperiod tool allows for a direct evaluation of changes in area for specific criteria. This tool was used to establish the recommended MFLs, Open Water criteria for Lake Prevatt, and also support evaluation of the WRVs.

Project Number: STJOH-024-0002

ATTACHMENT A

LAKE PREVATT PEER REVIEW FINAL COMMENTS TABLE

ATTACHMENT A. PEER REVIEW OF LAKE PREVATT – FINAL COMMENTS TABLE

APPENDIX B – HYDROLOGICAL ANALYSES

Section	Page	Comment
Groundwater Modeling	7	Figure B-5: Where are the larger use wells (public supply, agricultural, industrial) with respect to the buffer zones?
General	All	Consider tightening up terminology to make sure the reader can follow the analysis steps. For example, be sure to always specify between “simulated” vs “observed” or between “lake” vs “groundwater” levels. There were places in the text where it was not clear.
Background	2	In reference to model performance, what are meant by “reasonably” and “adequately”? What were the calibration criteria, i.e., what constitutes a “good” calibration?
Groundwater Modeling	6	How many/which cells were used to extract the model output data? What is the cell size? How does the cell size compare to the lake area?
Groundwater Modeling	6	Although these simple single linear equations provide a high correlation, using a weighted function (i.e., multi-part linear or polynomial) that separates out the pumping locations by distance seems like it would be more physically realistic. The wells closer to the lake would have more of an impact vs wells that are farther away.
Groundwater Modeling	6	However, it appears that using the linear approximation to represent the non-linear drawdown impacts is adequate in this case.
Groundwater Modeling	6-10	The regression analysis R^2 values are so high that it seems like it does not matter which buffer you use.
Groundwater Modeling	7	Would be helpful to have a figure that includes pumping well locations.
Groundwater Modeling	10	How does the 15-mile radius compare to the zone or radius of influence that would be calculated by the Theis equation for an average or maximum pumping rate for this region?
Groundwater Use	11	Related to filling the missing water use data, how well does the exponential growth assumption fit the periods where you do have historical data? Would be good to show or provide a comment here to confirm that this is a valid assumption.
Historical Impact on Groundwater Levels	13	Regarding the linear interpolation assumption to translate monthly data into daily, did you consider other interpolation methods (e.g., cubic spline) that might better capture seasonal behavior? Probably would not make much of a difference, but could be more realistic.
No-Pumping Condition Groundwater Levels	14	In reference to the “observed and estimated” groundwater levels near Lake Prevatt, how much of this data is observed, and how was it estimated.
Current-Pumping Condition Groundwater Levels	14	This is the first mention of return flows. Need to add a definition and describe how they are calculated.
Lake Level Datasets for MFL Analysis	17	Related to future climatic conditions, it would be helpful to add some information on the current state of climate modeling for the southeast US and possible future changes to the hydrology (more or less rain, higher temps, higher ET, etc.). Then describe how these possible changes might affect results. I agree that our understanding is limited, but I think some broad statements would be appropriate.

APPENDIX C – ENVIRONMENTAL METHODS, DATA, AND METRICS

Section	Page	Comment
Appendix C		This is a very large appendix that includes a mix of methods, field data, SWIDS analysis, Habitat metrics, Event Based SWIDS Frequencies, MA, FH, FL Assessment, and Event Based Metric Results. Consider breaking this down into 3 appendices or providing a Table of Contents and adjusting the document structure. The three appendices could include Methods, Environmental Data, and MFLs Metrics and Data Analysis.
Vegetation Sampling Procedures	4	SJRWMD's Vegetation Classification System (Kinser 2012) is a relatively simplified system and has substantially less detail on plant species, hydrology, and fire compared to FNAI Natural Communities. Consider shifting to FNAI or updated the SJRWMD Classification System with more detail and making it a Special Pub or Technical Pub). Conversion to FNAI system would have cascading effects and result in reworking a lot of data but it may be a valuable shift in methodology that is overdue.
Vegetation Sampling Procedures	4	Reasonable scientific judgement is highly variable depending on the experience of the individual. To minimize the potential error with this method it may be valuable to have each staff member present in the field (minimum 3) establish community boundaries and names independently and then reconcile differences. NOTE - community breaks at Lake Prevatt, particularly for any community downslope of the shrub swamp, are very different following a wet or dry period - consistent with discussion during the peer review site visit.
Soil Sampling Procedures	6	The extent of soil data collection seems excessive (unless there is a future use of the data that is not explained). The soils data other than HE/H are generally not incorporated into the MFLs. Considered a reduced soil sampling effort similar to CFWI: wetland boundary, hydric, hydric to surface, muck at surface and add landward HE, Landward H, plus the typical extent of HE/H. - Consistent with data reported in Table C-6
Lake Prevatt Mapped Wetland Community Data	8	Consider standardizing names in Table C-2/Figure C-2 with community names on transects. Oak Hammock = Mesic Hammock? Buttonbush Shrub = Shrub Swamp? Add an asterisk and footnote to Table C-2 for any communities not traversed by one or more transects (e.g. Mixed Hardwood - Oak Hammock). Consider a second footnote to identify upland communities - oak hammock and mixed hardwood-oak hammock could potentially be wetland or upland.
Transect 1 - Vegetation	13-15	Nuphar (SJRWMD Veg Classes - Kinser) and I believe Ware - Nuphar should be in deep marshes and be semi permanently to permanently flooded. Cover class 3 and 2 in Shallow marsh 1 and 2, respectively. Do the assigned vegetation communities reflect the drier conditions? Nuphar (depending on rhizome length is likely a much longer-lived species than herbs.)
Transect Summary	63	Table C-13 - Transition Zone is not reflected in the table. The transition zone in these systems is typically a zone that is too wet for upland species and too dry for the development of a stable wetland community.

ATTACHMENT A. PEER REVIEW OF LAKE PREVATT – FINAL COMMENTS TABLE

Section	Page	Comment
Surface Water Inundation/Dewatering Signatures (SWIDS)	67	Cluster Analysis is an exploratory data analysis and does not represent statistical significance. Consider if the use of "significance" is the best terminology in this section.
Surface Water Inundation/Dewatering Signatures (SWIDS)	67	I commend the effort to reduce variability in the SWIDS analysis. I agree with use of hydrologic data prior to vegetation and soil data collection. *It takes significantly longer than 20 years to form a histic epipedon and histosol, so use of the POR prior to data collection would be appropriate for SWIDS evaluation of HE/H but 20 years may be more appropriate for evaluation of landward extent of muck (a more transient soil indicator). See Richardson et. al. 2009 - use of the landward most extent of histic epipedon and histosol may also reduce variability since the mean elevation may consist of soils within the lake bed or at elevations that are always inundated.
Surface Water Inundation/Dewatering Signatures (SWIDS)	67+	Consider reducing variability in SWIDS by, standardizing an approach for community breaks, standardizing community types/names, recapturing and collecting data on MFLs transects, and incorporating CFWI transects into the SWIDs analysis. Fund a MS student to collect this data with survey support. Fund a PhD student to evaluate lake clusters and develop best suite of variables.
Surface Water Inundation/Dewatering Signatures (SWIDS)	68	Is use of the percent exceedance of the mean quadrat elevation necessary for the transect level clustering. Use of this variable is circular.
Surface Water Inundation/Dewatering Signatures (SWIDS)	68	Consider the use of percentile vs. percent exceedance (P value) to make sure the appropriate terminology is used.
Surface Water Inundation/Dewatering Signatures (SWIDS)	68	Has a current or recent staff member physically gone to the Lake Prevatt clustered lakes used for the SWIDS analysis to provide a visual confirmation of similarity among the lakes - to ensure the cluster analysis is providing a reasonable cluster - a simple QA/QC.
Surface Water Inundation/Dewatering Signatures (SWIDS)	68-70	Is the hydrologic data being used for SWIDS consistently using a no-pumping or current pumping dataset? Which data set?
Transect Quadrat-level Cluster Approach	69	In addition to the quadrat level variables (Transect Quadrat-level Cluster Analysis) - consider adding a variable to capture the length of positive slope uphill of the transect or a combination of length of positive slope and percent slope. This will likely provide a better metric at the transect scale than soil drainage class around the lake.
Transect Quadrat-level Cluster Approach	68-69	General Comment - continue to experiment with variables to develop a consistent set of variables that work well or that are specifically customized to certain types of lakes.
Transect Quadrat-level Cluster Approach	68-69	Table C14 - Continue to adjust variables to improve the cluster analysis. Landscape soil drainage class and median depth to water table are directly related variables. Consider use of one or the other with different distances from the lake. Use of 100m may be better than 500m. In sandhill regions with steeper slopes it is common in the soil surveys to go from Candler (or similar -deep sandy well drained soil) to the lake. The scale does not capture variation between lake and xeric upland. Some county level soil surveys are much more detailed than others.

ATTACHMENT A. PEER REVIEW OF LAKE PREVATT – FINAL COMMENTS TABLE

Section	Page	Comment
Cluster Approach – A top-down method for deep organic soils	70	Table C14 - The P90-P10 for Prevatt has the highest range - 8.55 followed by Smith 8.07. Does Smith meet its MFLs? Kurtosis is fairly high for a subset of lakes - would use of only kurtosis and P10-P90 give the same clustering result or only use of those water level statistics with landscape features?
Transect Quadrat-level Cluster Approach – A Bottom-up Method for Vegetation and Community Frequencies	72	"Although many variables may influence the composition of vegetation communities, PI provides a way to condense the composition down to the variability caused by moisture availability." Consider if this should be cited and if moisture availability is the intended terminology.
Minimum Average (MA) Level (49.7 ft NAVD 88)	102	This is not the recommended MA level. Consider prior comments regarding terminology and headings.
Minimum Average (MA) Level (49.7 ft NAVD 88)	102	It was stated that organic soils do not provide good ecological data for setting levels in sandhill lakes – why use it them – other than to demonstrate that the MFLs established will prevent loss of those soils?
FH Duration	111	"Several months of flooding should be provided to ensure fish access to the floodplain and ensure nesting success (Knight et al. 1991)." -do you want to include this reference for a 30 day flooding event? This elevation may receive several months of flooding and the 30-day duration for this elevation may not be appropriate.
Event-based Metrics for Consideration	119	"…the FL at Lake Prevatt was not considered as a final event-based metric for consideration. Compared to the FH and MA, based on a longer-lived vegetation community (transitional shrub swamp composed of mainly buttonbush) and organic soils respectively, the FL may be considered a less reliable metric at Lake Prevatt. Such transient communities are not ideal for the creation of MFL metrics relying on long-term trends." Comment: While this boundary may be ephemeral (51.1 ft NAVD) it is similar to the Littoral Emergents/Lake bottom boundary in the 1997 memo about 50.6 or 49.6 NAVD88.
End of Appendix C	121	With the heading: MFL Determinations for Lake Prevatt - Should there be a discussion of the actual recommended levels following the Hydroperiod Tool Metrics?

Table C-2. Lake Prevatt vegetation communities within 67.3 ft NAVD88 and their respective areas from 2021 aerial imagery.

Vegetation Community	Area (acres)
Deep Marsh – Floating	36.0
Oak Hammock	30.0
Open Water	26.0
Deep Marsh – Emergent	18.5
Buttonbush Shrub	11.1
Mixed Hardwood – Oak Hammock	3.5
Shallow Marsh	2.1
Willow Scrub-shrub	1.2
Disturbed (anthropogenic)	0.1

Table C-13. Summary statistics of all community types documented at Lake Prevatt environmental transects.

Community	Mean Minimum Elevation	Mean Elevation	Median Elevation	Mean Maximum Elevation
Mesic Hammock	57.0			
Transitional Shrub	53.3	53.8	53.7	54.3
Shrub Swamp	52. 2	52.7	53.0	53.6
Shallow Marsh	50.6	51.5	51.5	52.8
Deep Marsh	47.7	49.6	49.8	51.1
Deep Organics (A1, A2)	48.9*	50.0*	50.0*	51.3
*Based on data from Transect 1 only				

Table C-14. Ward's D clustering parameters and values for 28 SJRWMD lakes, including Lake Prevatt, used in minimum average return interval calculations. Spatial parameters were calculated within 500 m of each lake; tabular parameters were calculated on monthly values. Skewness and kurtosis were calculated on a 1-month lake stage change distribution. MCF (maximum cumulative fluctuation) index is a measure of lake fluctuation with a connection to the UFA.

Site	Water Level Range (ft)			Monthly Water Level Change Symmetry		Landscape Soil Drainage Class (% area)			UFA Connection		Median Depth to Water Table (ft)	Soil Permeability (% area)		
	Lower (P80-P60)	Upper (P60-P20)	Total (P80-P10)	Skewness	Kurtosis	High	Moderate	Low	Lake-UFA Correlation Strength	MCF (ft)		High	Moderate	Low
~~Acoma~~ South	1.99	3.10	6.42	0.22	1.98	81.25	4.56	14.18	0.67	4.76	5.37	100.00	0.00	0.00
Ashby	0.57	1.01	2.70	1.22	5.84	0.00	3.52	96.48	0.91	1.26	3.20	82.70	8.05	9.25
Banana	1.58	1.32	3.81	0.72	0.69	43.45	35.92	20.63	0.84	4.77	9.88	92.02	7.98	0.00
Bowers	2.17	0.84	4.47	0.50	0.34	68.06	15.00	16.93	0.87	5.70	6.98	97.75	2.25	0.00
Cherry	1.28	0.73	3.21	0.48	0.59	62.47	5.75	31.78	0.74	3.13	11.89	95.66	1.66	2.68
Como	1.78	1.41	4.47	0.63	0.62	60.95	22.05	17.01	0.92	4.65	10.48	95.17	4.83	0.00
~~Cowpen~~	1.31	2.05	6.48	1.27	5.25	39.71	47.23	13.06	0.91	7.02	10.54	99.63	0.00	0.37
East Crystal	1.67	0.97	3.80	1.08	1.46	27.85	46.50	25.65	0.88	3.73	6.14	100.00	0.00	0.00
West Crystal	1.75	2.04	5.07	2.56	13.69	18.49	38.45	43.06	0.71	5.09	6.02	100.00	0.00	0.00
Daugharty	1.80	1.02	5.11	1.62	4.64	45.41	32.87	21.73	0.94	3.69	5.47	94.08	5.92	0.00
Dias	0.36	0.28	1.09	0.93	2.71	33.97	36.13	29.90	0.91	0.80	5.28	93.51	6.49	0.00
Gore	0.60	0.33	1.59	1.39	3.46	0.00	6.29	93.71	0.66	1.12	2.27	70.83	27.01	2.16
Halfmoon	2.41	1.36	6.46	0.96	1.74	40.90	6.07	53.03	0.80	6.46	2.01	98.01	1.99	0.00
Hopkins	1.25	1.00	3.54	1.22	3.38	49.91	16.43	33.66	0.74	2.69	2.16	96.55	3.45	0.00
Johns	1.96	1.36	4.64	1.50	3.22	57.80	14.49	27.71	0.81	2.61	4.21	96.60	3.40	0.00
Kerr	1.77	1.04	3.93	0.82	1.56	68.60	12.93	18.47	0.78	4.06	6.91	99.77	0.23	0.00
Little Como	1.97	1.83	5.14	1.43	13.90	79.37	14.03	6.60	0.91	3.23	11.36	100.00	0.00	0.00
Louisa	0.98	0.89	2.61	1.02	1.67	44.68	5.49	49.84	0.48	2.62	5.30	91.16	8.84	0.00

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Appendix C

Site	Water Level Range (ft)			Monthly Water Level Change Symmetry		Landscape Soil Drainage Class (% area)			UFA Connection		Median Depth to Water Table (ft)	Soil Permeability (% area)		
	Lower (P80-P60)	Upper (P60-P20)	Total (P80-P10)	Skewness	Kurtosis	High	Moderate	Low	Lake-UFA Correlation Strength	MCF (ft)		High	Moderate	Low
~~Lochloosa~~	1.40	1.76	3.86	1.16	3.70	0.00	10.54	89.46	0.95	3.50	3.64	89.52	0.00	10.48
Prevatt	2.47	2.47	8.55	0.92	4.22	49.80	33.70	16.50	0.84	5.23	7.02	97.82	2.18	0.00
Purdom	1.57	0.48	2.97	0.65	2.30	59.25	5.73	35.02	0.89	2.93	3.65	89.73	10.27	0.00
Savannah	1.24	0.68	2.53	1.50	2.21	14.72	32.84	52.44	0.59	2.94	3.28	70.14	29.86	0.00
Smith	2.98	1.63	8.07	0.65	0.55	88.41	8.08	3.51	0.86	11.08	8.87	100.00	0.00	0.00
Swan	2.93	1.46	6.21	0.59	0.74	61.78	23.91	14.30	0.87	6.21	13.74	100.00	0.00	0.00
Sylvan	1.38	2.39	4.47	2.17	7.64	17.85	43.83	38.32	0.73	3.92	4.98	100.00	0.00	0.00
Trone	1.70	1.45	4.49	0.53	1.69	47.62	39.05	13.33	0.88	3.58	8.72	98.16	1.84	0.00
Weir	1.12	1.25	3.32	0.60	0.12	65.47	16.69	17.84	0.84	3.40	5.42	96.25	3.64	0.11
Winona	0.82	1.96	3.75	0.45	0.87	40.54	53.59	5.87	0.25	4.52	7.77	99.75	0.25	0.00

ATTACHMENT A. PEER REVIEW OF LAKE PREVATT – FINAL COMMENTS TABLE

MINIMUM LEVELS REEVALUATION FOR LAKE PREVATT, ORANGE COUNTY

Section	Page	Comment
Mapped Vegetation	18	Table 7. Consider applying the same community names here as used in the MFLs transects. See additional Comments Appendix C
Mapped Hydric Soils	20	Hydric and non-hydric soils were mapped for the Lake Prevatt watershed using USDA NRCS Soil Survey Geographic (SSURGO) GIS data … Mapping has a specific meaning in Soil Survey. The mapping was completed by USDA, NRCS and digitized. The digitized data SSURGO was used to create a figure. Consider revising statement.
Environmental Analyses	32	"This process typically includes consideration of: • site-specific field-based ecological and soils data; • non-ecological environmental data (e.g., data used to assess recreational values);" Consider standardizing language throughout report and Appendices.
Environmental Criteria	32	Introduce Habitat Area metrics with specific terminology. First evaluate event - based then evaluation habitat area metrics to determine the most sensitive criteria for establishing the MFL.
Event-Based Approach	34	"Due to the shallow morphology of the lake, Lake Prevatt maintains permanent wetland communities despite having highly fluctuating lake levels." -Consider that the permanent wetland communities are a function of the shallow morphology, but the Button bush shrub swamp may be a reflection of the lower lake level fluctuation range prior to 1975/1980 and the frequent high stages are sufficient to maintain (see later comment) the community (Button bush shrubs can live 50+ years). The lower wetland vegetation communities are "permanent" but highly variable in species composition due to fluctuating water levels. Has there been any direct first person description of the lake prior to 1975/1980 - there may have been a lot more open water (so lower vegetative communities may not be permanent). Statement is just a little too simplistic and too conclusive.
Site Selection and Data Collection	34-35	Include a table(s) showing communities, deep organic soils, and elevation statistics for the three transects.
FH Duration	37	Recommend citing wetland hydrologic requirements listed in 62-340.550 FAC as well. (Note – this may not be necessary/relevant considering the SJRWMD response to initial peer review comments).
MFLs Determination Summary	44	This paragraph should likely be in the Exec Summary, At the beginning of the MFLs main report, and near the beginning of Appendix C. "The MFLs determination for Lake Prevatt involved the evaluation of critical environmental features applying two different methods: an event-based approach and a hydroperiod tool approach. Using the event-based approach, a frequent high (FH) and a minimum average (MA) were established and involved determining a minimum hydroperiod to maintain key environmental features (e.g. transitional shrub swamp). The hydroperiod tool method utilized a stage-area analysis of the lake in relation to key lake habitat or recreational features (e.g. emergent marsh, open water, etc.). "
MFLs Determination Summary	46	Table 11 - at the top of the Table is it really the MFLs condition? It is just the transect data metric threshold. Since the MFLs is based on open water.

ATTACHMENT A. PEER REVIEW OF LAKE PREVATT – FINAL COMMENTS TABLE

Section	Page	Comment
MFLs Determination Summary	49	This paragraph seems to be the most concise description of the MFLs assessment. "The MFLs assessment involves comparing the minimum metric condition for each metric with the hydrologic regime subject to impacts from current groundwater withdrawals (termed the current-pumping condition). This comparison determines whether each criterion at each system is being achieved under the current-pumping condition and if there is water available for additional withdrawal (freeboard), or whether water is necessary for recovery (deficit). If any of the MFLs environmental criteria are not being achieved under the current-pumping condition, indicating a deficit of water, a recovery strategy is necessary. If the MFLs are currently being achieved, but a deficit is projected within the 20-year planning horizon, a prevention strategy is needed. No-pumping and current-pumping condition water level datasets developed for Lake Prevatt were used to calculate freeboard or deficit and determine whether the system is in recovery, prevention, or neither (see Hydrological Analyses section above and Appendix B for more details)."

Table 7. Lake Prevatt vegetation communities within 67.3 ft NAVD88 and their respective coverage from 2021 aerial imagery.

Vegetation Community	Area (acres)	Percent Area
Deep Marsh – Floating	36.0	28.0
Oak Hammock	30.0	23.3
Open Water	26.0	20.2
Deep Marsh – Emergent	18.5	14.4
Buttonbush Shrub	11.1	8.6
Mixed Hardwood – Oak Hammock	3.5	2.7
Shallow Marsh	2.1	1.6
Willow Scrub-shrub	1.2	0.9
Disturbed (anthropogenic)	0.1	0.0008
Total	**128.5**	**100**

ATTACHMENT A. PEER REVIEW OF LAKE PREVATT – FINAL COMMENTS TABLE

Table 11. Summary of environmental criteria and MFLs condition for each criterion for Lake Prevatt.

Environmental Criterion	Environmental Value(s) Protected	MFLs Condition		
Event-based Metrics		**Level (ft)**	**Duration (days)**	**Return Interval (years)**
FH Average Transitional Shrub Swamp	Transitional shrub communities; fish and wildlife habitat	53.8	30	1.3
MA Mean elevation of organic soils minus 0.3 ft	Organic soils; seasonally flooded wetland habitat	49.7	180	3.5
Hydroperiod Tool Metrics		**No-pumping (average acres)**		**Minimum Metric Condition (15% reduction from NP condition)**
Small Waders	Fish and wildlife habitat	4.6		3.9
Large Waders	Fish and wildlife habitat	10.7		9.1
Game Fish Spawning	Fish and wildlife habitat	36.0		30.6
Emergent Vegetation	Fish and wildlife habitat	70.0		59.5
Canoe	Recreation/Aesthetics/Water Quality/Fish Habitat	66.9		56.9
Open Water	Recreation/Aesthetics/Water Quality/Fish Habitat	27.2		23.1
Lake Area	Recreation/Aesthetics/Water Quality/Fish Habitat	85.7		72.8

APPENDIX D – MFLS STATUS ASSESSMENT

Section	Page	Comment
Current Status Assessment	1	Consider adding a statement that the event based metric or ecological criteria evaluated for the FH, MA, and FL were not the most limiting criteria. As such, the FH, MA, and FL discussed are not the recommended minimum levels.
Frequent Low (FL)	5	Table D-1: Do you want to call this the MFLs condition when these are not the recommended MFLs
Frequent Low (FL)	5	Table D-1: I recommend adding the frequency of the No-Pumping condition to this table to be fully transparent.
Fish and Wildlife Metrics – Hydroperiod Tool	7	Average habitat area is likely not the most important comparison - depending on the metric and distribution of habitat vs. stage. If the habitat metrics are revised to compare average area for some and habitat area change at specific elevations for other metrics, revise text and tables as appropriate.
Event Based Metrics	9	Table D-3: The MA and FL criteria allow about a 50% increase in the frequency of low water events. Are the best metrics evaluated?

APPENDIX E – WATER RESOURCE VALUES (WRVS) ASSESSMENT

All comments addressed in the SJRWMD response to initial comments.

APPENDIX F – TOPOBATHYMETRIC DEM DEVELOPMENT FOR MFLS MODELING FOR LAKE PREVATT, ORANGE COUNTY, FLORIDA

No comments.