LAKE PREVATT DRAFT MINIMUM LEVELS

Peer Review Initial Findings

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April 10, 2025

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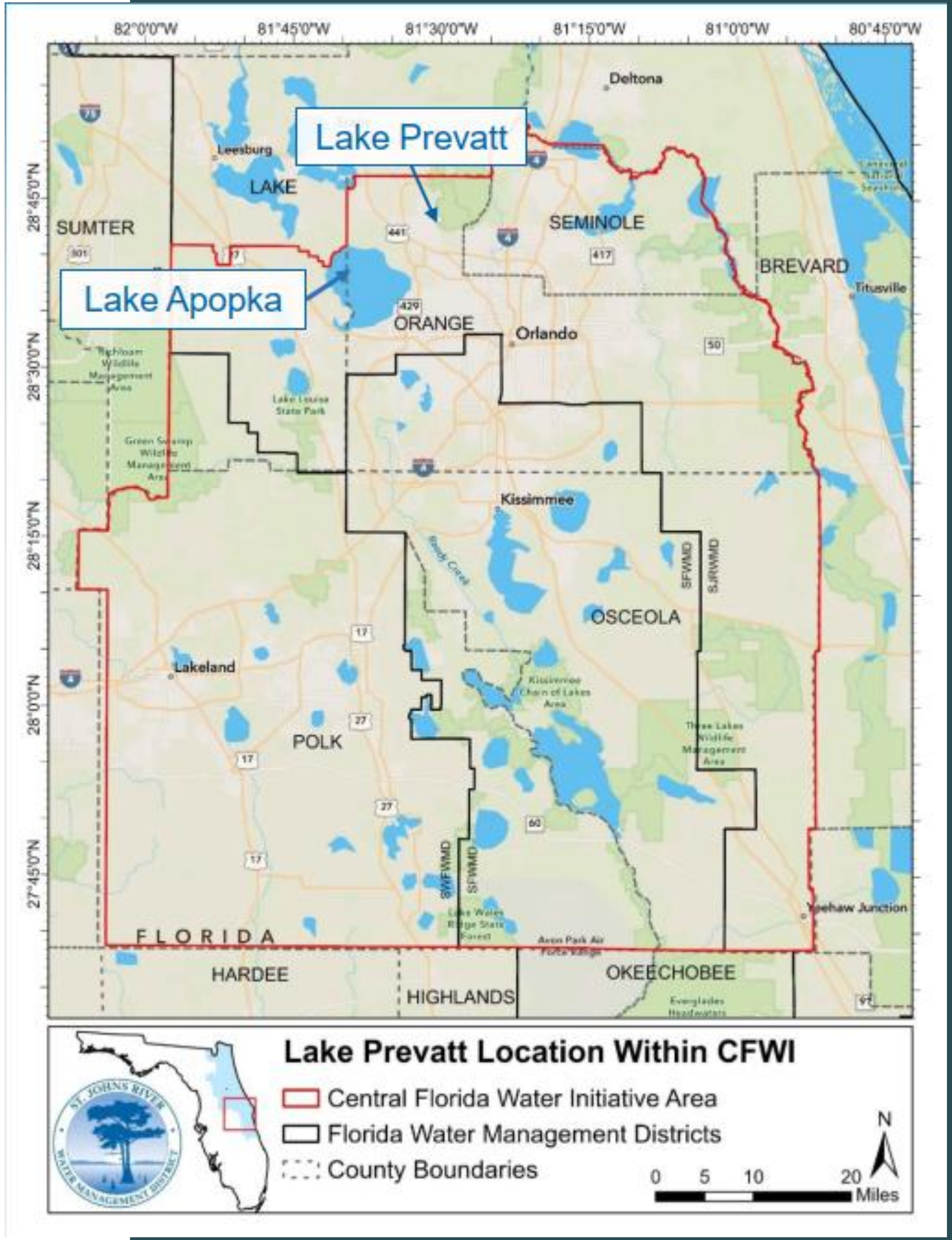
St. Johns River Water Management District

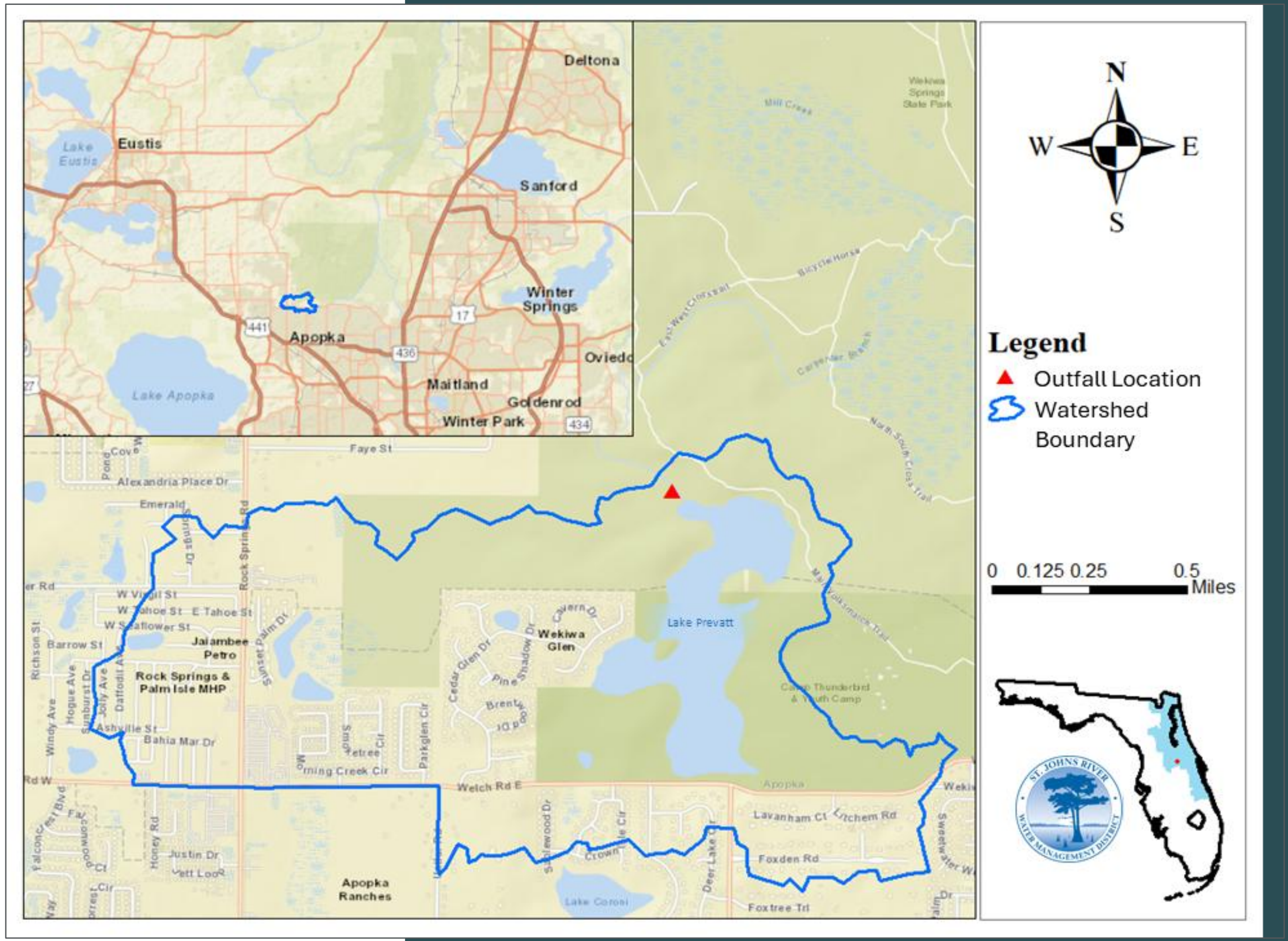
GOALS OF THE PEER REVIEW PROCESS

- Determine the appropriateness of environmental criteria, hydrological analyses, and recommended minimum levels;
- Determine validity and appropriateness of methods and procedures used for data analyses, assumptions used, and conclusions drawn regarding the recommended minimum levels;
- Determine the adequacy of data used to support conclusions and recommendations; and
- Identify and make recommendations regarding any deficiencies in the development of the draft recommended minimum levels for Lake Prevatt.



PRESENTATION OF INITIAL FINDINGS

- Hydrological Analyses (Appendix B)
- Environmental Methods, Data, and Metrics (Appendix C)
- MFLs Main Report
- MFLs Status Assessment (Appendix D)
- Water Resource Values (WRVs) Assessment (Appendix E)
- Topobathymetric DEM Development (Appendix F)



HYDROLOGICAL ANALYSES

- Review Focus -- Model Application and Methodology
- Overview of the Analysis

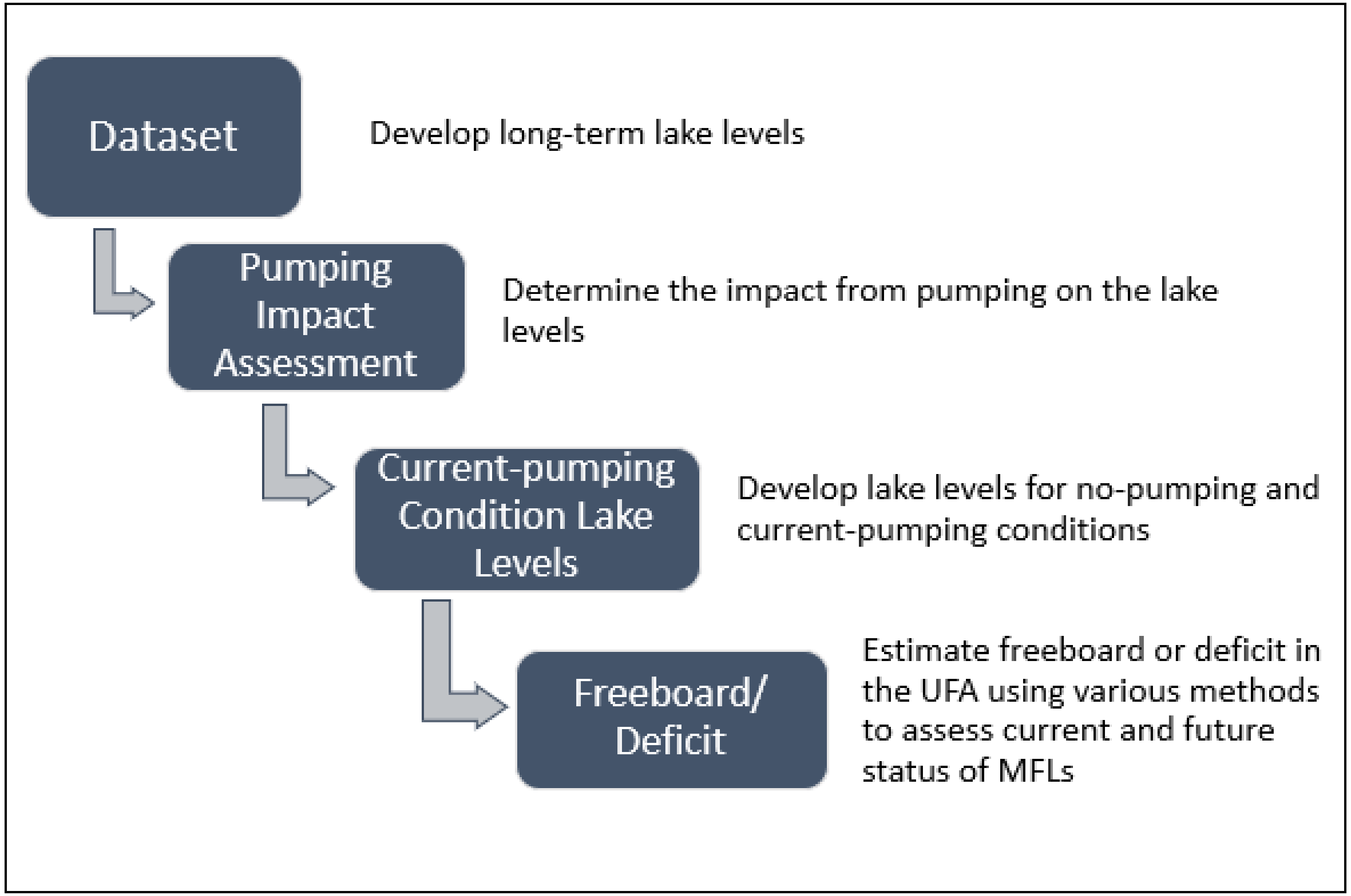


Figure B-1. Hydrologic analysis process.

HYDROLOGICAL ANALYSES

- Overview of the Analysis

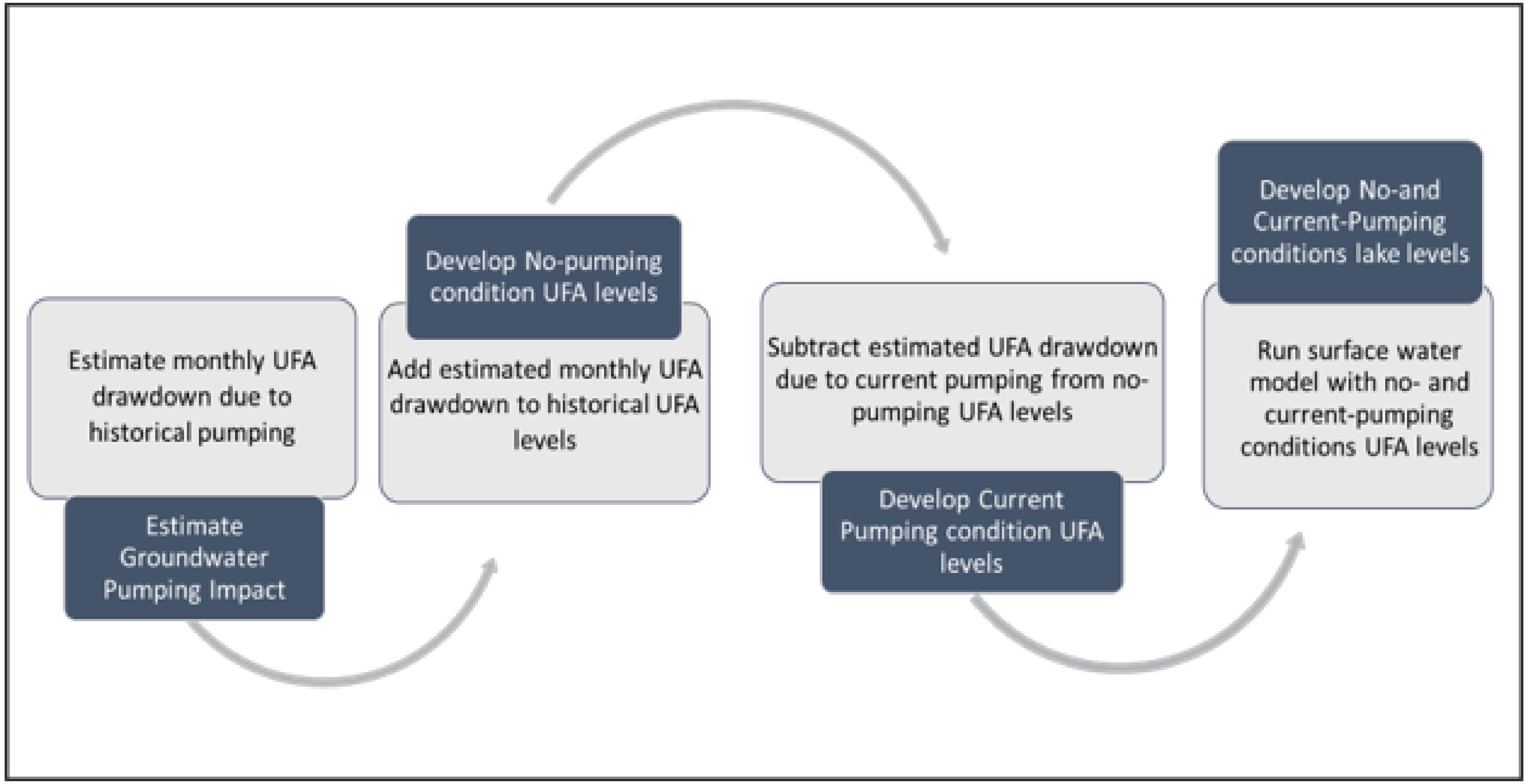


Figure B-3. Flow chart illustrating the groundwater flow model pumping impact analysis and development of no-pumping and current-pumping condition Upper Floridan aquifer and lake levels for an MFLs lake.

HYDROLOGICAL ANALYSES

PROCESS

- Estimate aquifer drawdown below Lake Prevatt over the analysis period.
    - The issue: The Upper Floridan Aquifer (UFA) groundwater model only goes back to 2004. Need a way to estimate UFA drawdown prior to 2004.
    - The solution: Use the UFA model (ECFTX v.2.0) to create a simple regression model (total pumping rate vs. drawdown) based on output from hypothetical model simulations (varying pumping levels). Defined 3 geographic buffer zones within which to calculate total pumping to use as the independent variable in the regression analysis.
- Select the best regression model based on R2 value.
- Use the regression model to estimate the drawdown time series at Lake Prevatt based on total historical pumping for the pre-2004 period; The UFA model is used to estimate drawdown for the post-2004 period.

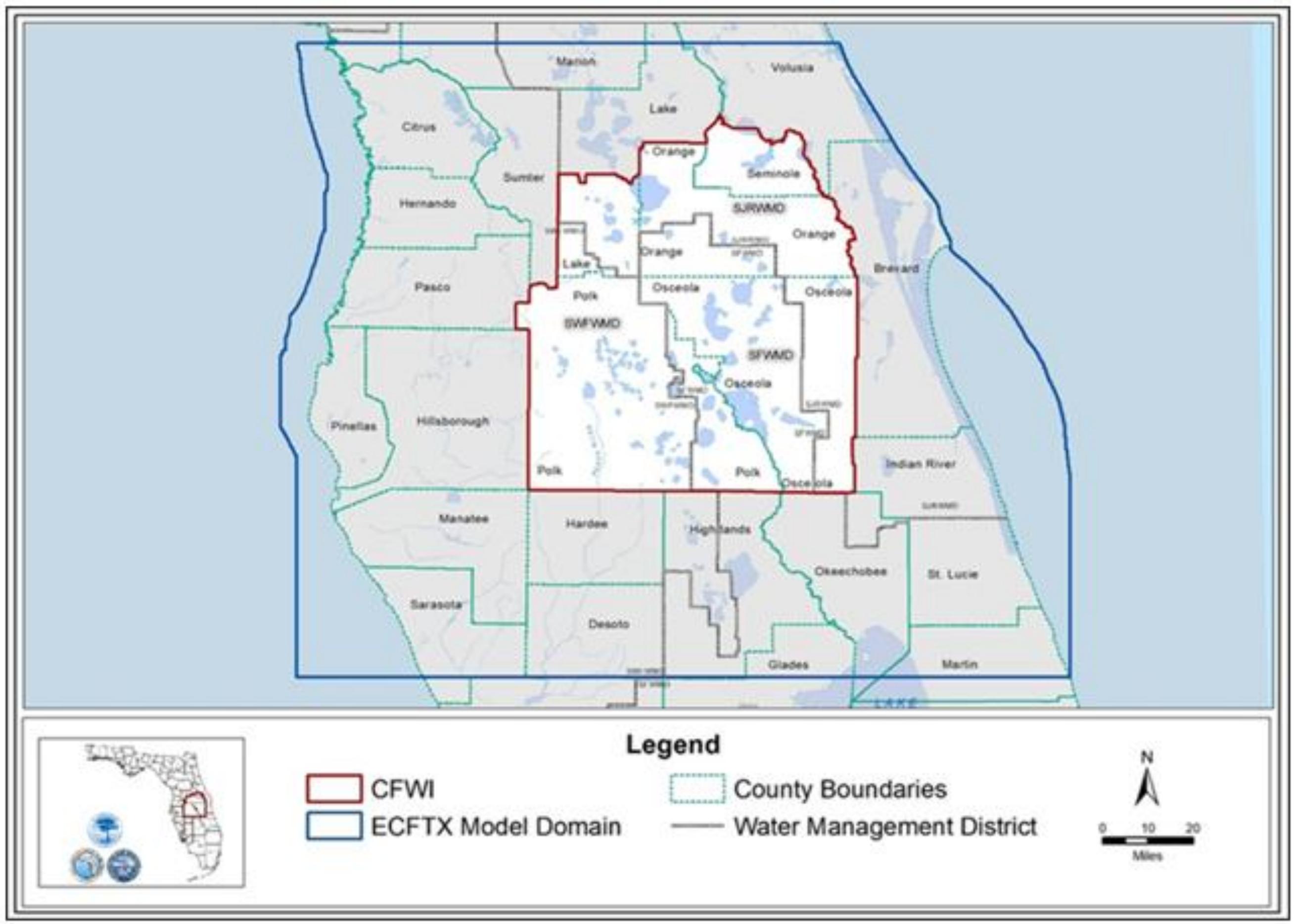


Figure B-4. ECFTX v2.0 model domain boundary (blue) and CFWI planning area (red).

HYDROLOGICAL ANALYSES

PROCESS (cont.)

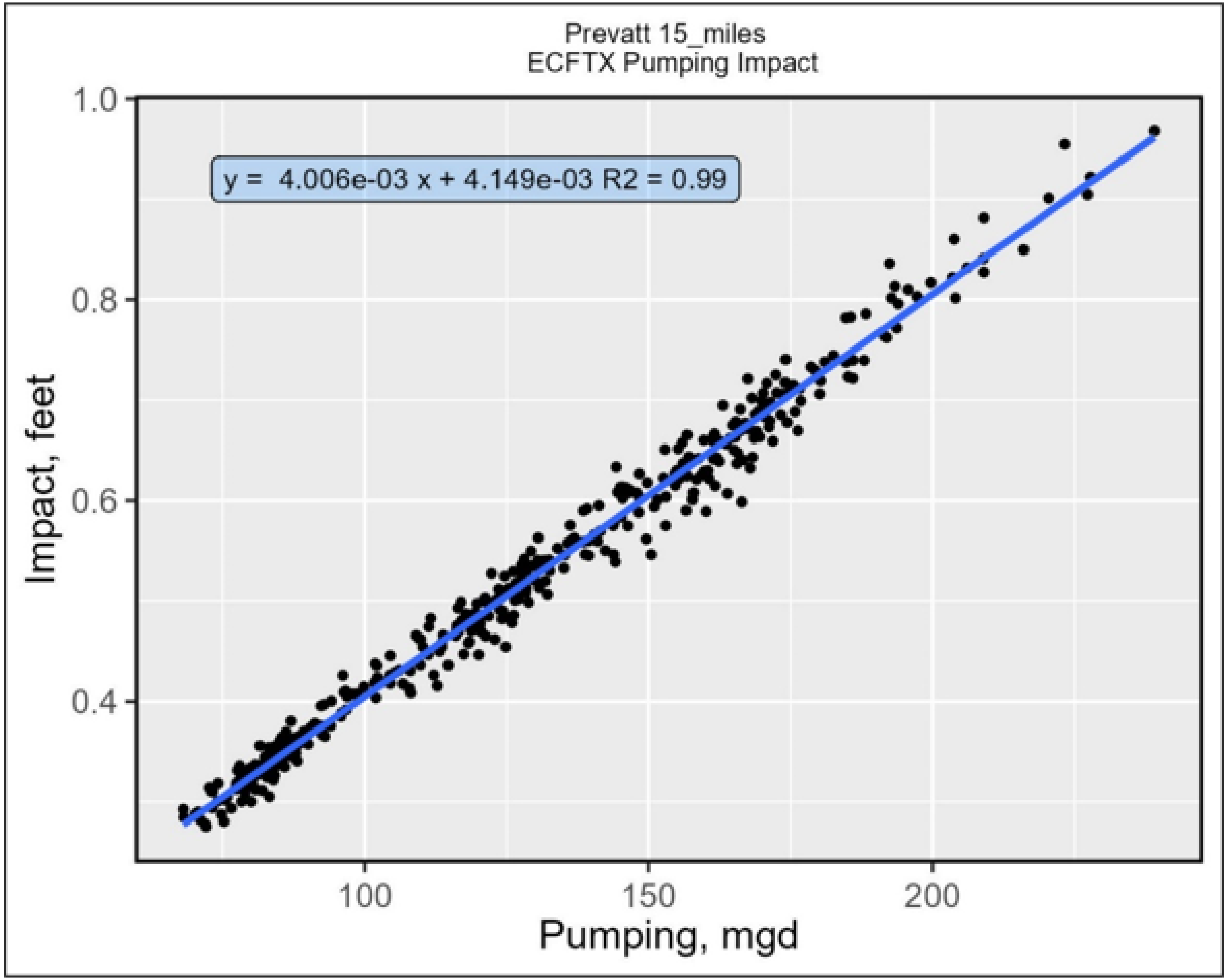


Figure B-7. Linear regression between UFA drawdown near Lake Prevatt and groundwater pumping within the Lake Prevatt 15-mile buffer area.

HYDROLOGICAL ANALYSES

PROCESS (cont.)

- The monthly drawdown time series is then converted to daily using linear interpolation.
- The daily drawdown time series is then added to the historical daily aquifer level at Lake Prevatt to create a "historical no-pumping time series”.
- The UFA model output was then used to calculate the average aquifer level beneath Lake Prevatt for the period 2016-2020. This is considered the "current pumping" condition.
- Using the already generated daily "no pumping" aquifer level time series, the average drawdown for 2016-2020 was calculated. This resultant value is **0.67 ft** and is called the "**simulated impact from current pumping**".
- This 0.67 ft is then subtracted uniformly from the no pumping condition from 1953-2020 to produce the "**current pumping condition groundwater levels**" time series.

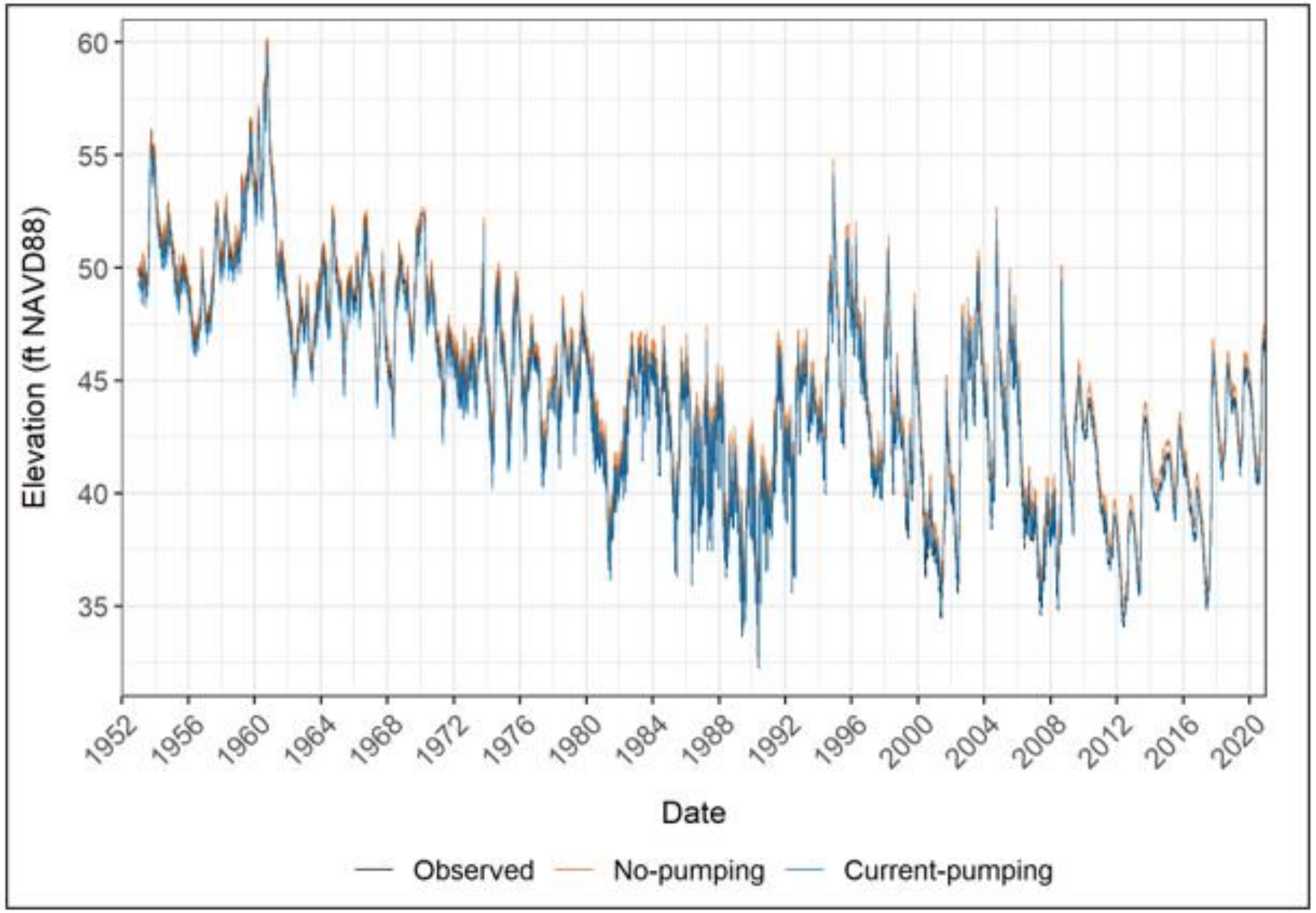


Figure B-11. ECFTX Observed (black), no-pumping (orange), and current-pumping (blue) condition of UFA levels near Lake Prevatt from groundwater use within 15-mile buffer.

HYDROLOGICAL ANALYSES

PROCESS (cont.)

- The "no pumping" and "current pumping" aquifer level time series were then used as boundary conditions in the surface water hydrologic models (HSPF). Note that separate HSPF models were developed for the North and South Lobes of Lake Prevatt.
- The HSPF models were applied over the period 1959-2018 (with pumping rates set as a constant based on averages from 2014-2018) for the "no pumping" and "current pumping" conditions to produce the simulated lake levels.

Table B-2. Summary stage (No-pumping, Historical Observed, and Current-pumping) descriptive statistics for the North Lobe of Lake Prevatt.

Statistics	No-pumping	Historical Observed	Current-pumping
Mean	54.47	54.34	54.30
Median	55.01	54.88	54.81
Standard Deviation	2.21	2.28	2.27
Range	11.99	12.11	12.08
Minimum	46.91	46.79	46.81
Maximum	58.90	58.90	58.89

Table B-3. Summary stage (No-pumping, Historical Observed, and Current-pumping) descriptive statistics for the South Lobe of Lake Prevatt.

Statistics	No-pumping	Historical Observed	Current-pumping
Mean	54.21	54.03	54.00
Median	55.00	54.87	54.80
Standard Deviation	2.78	2.91	2.89
Range	15.17	15.22	15.21
Minimum	44.18	44.13	44.13
Maximum	59.35	59.35	59.34

HYDROLOGICAL ANALYSIS

Review Comments

Section	Page	Comment
All	All	Need to tighten 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 pumps closer to the lake would have more of an impact vs pumps that are farther away. 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, Figure B-5	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?

HYDROLOGICAL ANALYSIS

Review Comments (cont.)

Section	Page	Comment
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 estimated, 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.

HYDROLOGICAL ANALYSIS

Review Comments (cont.), T. Richardson

Section	Page	Comment
Current-Pumping Condition Groundwater Levels	15	1997 MFLs report references a potentiometric surface at 25ft in Sept 1994 and at 30 ft May 1995. These values are not reflected in simulation - is the potentiometric surface (as noted in 1997 memo) equivalent/comparable to the UFA elevation in Figure B-11. If so why is there such a large difference. If not, why?
Lake Level Datasets for MFL Analysis	16	Figures B-12 and B-13: The 1997 MFLs report says the water level on July 30, 1997 was 48 ft (+/- 47 ft NAVD88). This does not seem to be reflected in the simulated stage data. How does the simulation compare with actual stage data - where are there differences and why? Statistics in Tables B-2 and B-3 appear to compare actual stage data "Historical Observed" with simulated data which have very similar descriptive statistics.
Lake Level Datasets for MFL Analysis	16	Figures B-12 and B-13: pre/post 1980 visually are quite different. Has there been any analysis of the rapid, large decreases in lake stage for those time periods (e.g., water budget of rainfall, groundwater inflow, PET)? This seems like it could be evaluated during multiple short period windows with little to no rainfall - is the dominant drop in lake stage due to PET?
Lake Level Datasets for MFL Analysis	16	Figures B-12 and B-13: Because of the drastic visual difference in the pre/post +/- 1980 stage it seems that an analysis of rainfall plotted with lake levels should be presented either here or in the MFLs status assessment. (e.g., 2 yr, 3yr, 4yr moving average of annual rainfall plotted with lake levels, cumulative rainfall assessment, double mass, water budget to show that rainfall and PET are dominant factors over downward leakance, or other appropriate analysis). This is a concern of the peer reviewers and was a public comment.
Lake Level Datasets for MFL Analysis	16	Are there any lakes in the region that do not have a strong connection to the UFA that show a more volatile hydrograph post 1970/1980? Or similar lakes for comparison?

HYDROLOGICAL ANALYSES

Review Comments (cont.), T. Richardson

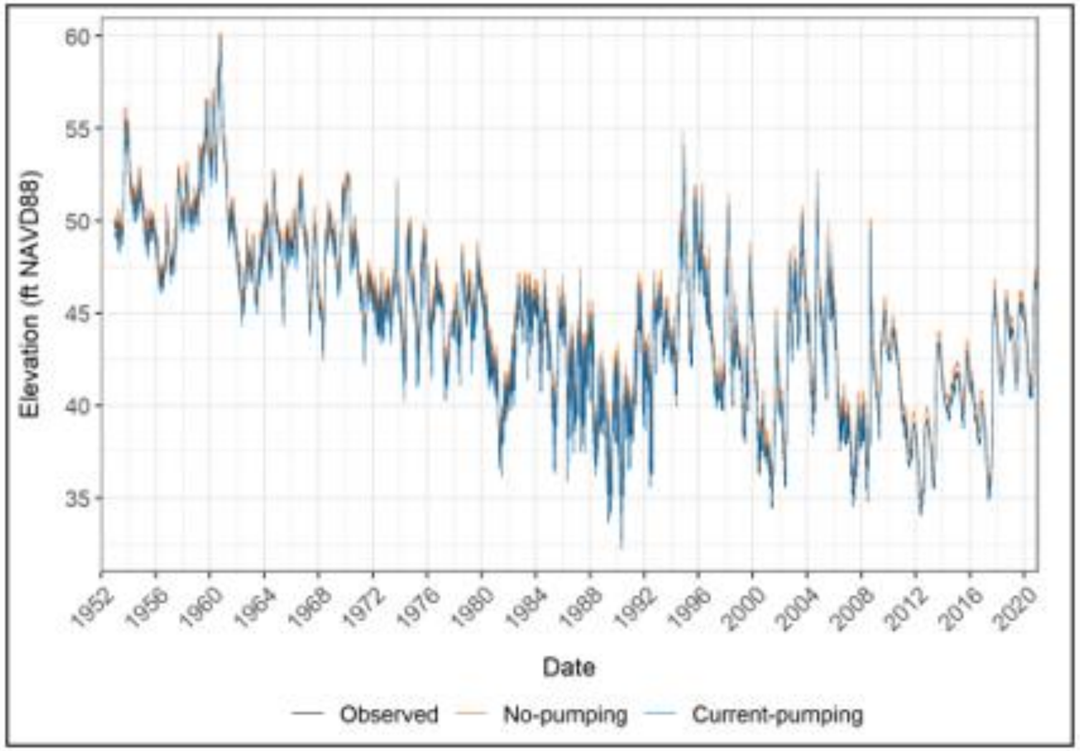


Figure B-11. ECFTX Observed (black), no-pumping (orange), and current-pumping (blue) condition of UFA levels near Lake Prevatt from groundwater use within 15-mile buffer.

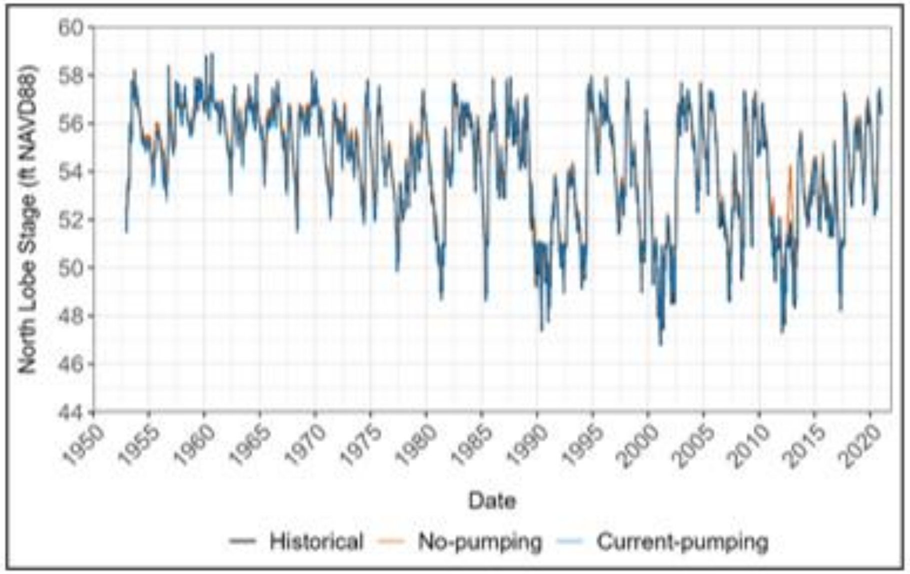


Figure B-12. Simulated stage levels of historical, no-pumping, and current-pumping at the North Lobe of Prevatt.

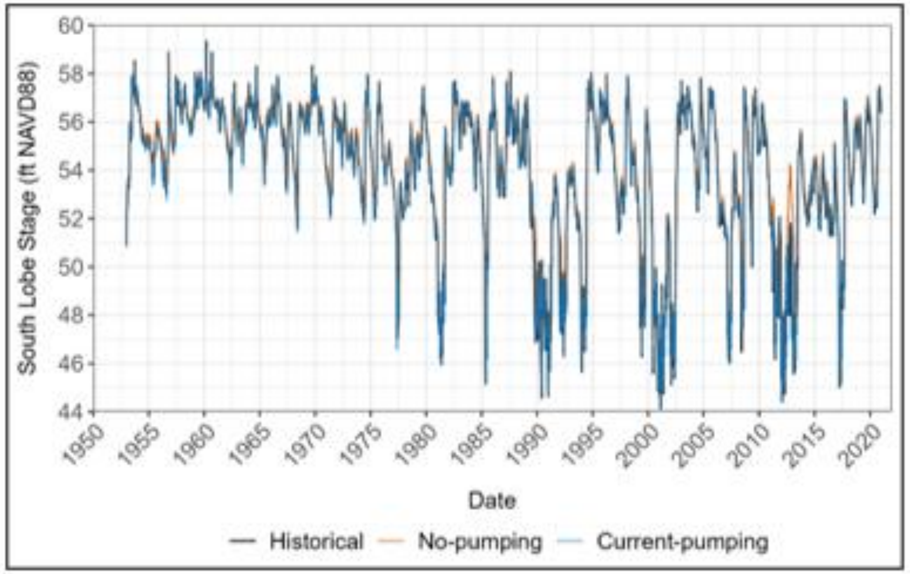


Figure B-13. Simulated stage levels of historical, no-pumping, and current-pumping at the South Lobe of Prevatt.

ENVIRONMENTAL METHODS, DATA, & METRICS (Appendix C)

Review Comments

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.
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, may be very different following a wet or dry period - consistent with discussion during the peer review site visit.
Transect Data	13-64	General Notes for future comments/discussion: comparisons using same datum: Min elevation of Mesic Hammock (current data 0.2, 2.2, 0.6 higher than 1997); Max shrub swamp (current data 1.5', 1.6', 1.9' lower than 1997 data); 0.5" muck (current data 1.25' and 1' lower than 1997 and T3 is 0.2' higher than 1997), Note for future discussion - CFWI wetland boundary (57.24, 58.12, 57.34) – 62-340 FAC wetland boundary is within Mesic Hammock on two transects; CFWI - half inch muck (54.5, 54.54, 54.53)
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.
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.

ENVIRONMENTAL METHODS, DATA, & METRICS (Appendix C)

Review Comments (cont.)

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?

Lakes in SWIDS Cluster :

- Apshawa South
- Cowpen
- Halfmoon
- Little Como
- Smith
- Swan
- Prevatt

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 (% acres)		
	Lower (P80-P60)	Upper (P60-P20)	Total (P90-P10)	Skewness	Kurtosis	High	Moderate	Low	Lake-UFA Correlation Strength	MCF (ft)		High	Moderate	Low
Apshawa South	1.99	3.1[illegible]	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	[illegible]	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.[illegible]5	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.[illegible]6	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	1.66	68.60	12.93	18.47	0.78	4.06	6.91	99.77	0.23	0.00
Little Como	1.97	1.8[illegible]	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
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	2.4[illegible]	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	2.83	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	1.6[illegible]	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	1.4[illegible]	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

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Appendix C

ENVIRONMENTAL METHODS, DATA, & METRICS (Appendix C)

Review Comments (cont.)

Section	Page	Comment
Transect Quadrat-level Cluster Approach – A Bottom-up Method for Vegetation and Community Frequencies and Return Interval Discussions	73	"After RIs were calculated for each site included in the PCA cluster, the final site RI was calculated by taking the mean ± standard error of all observed RIs. A mean + standard error was used for exceedance metrics and the mean - standard error for non exceedance." Is this consistently applied in other MFLs? What about when the system is on the other side of the mean? Should the Median be used to minimize effects of "outliers"? Should a straight 15% reduction (for exceedance)/addition (non-exceedance) be applied to the frequency of the hydrologic signature for the no-pumping condition. See Habitat metrics for 15% threshold.
Fish and Wildlife Habitat Metric using the Hydroperiod Tool	74	The hydroperiod tool is a meaningful data driven tool that allows comparison of habitat changes with changes in hydrologic regime. This is a fantastic 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?
Average Habitat Area	77	The average habitat area may not be the most appropriate metric for determination of a 15% change in habitat. Consider adjusting to habitat area and stating that average habitat area is used for some metric while differences in area at specific stage elevations are used for other metrics to capture critical ecologic functions. For example, the 5 ft water depth is not really critical until water levels drop below 52 ft. What does the percent habitat change look like no-pumping vs. current condition in half ft increments: 52, 51.5, 51, ... (Note: since the evaluation is 5 ft depth you would evaluate change from 57, 56.5, 55...)

ENVIRONMENTAL METHODS, DATA, & METRICS (Appendix C)

Review Comments (cont.)

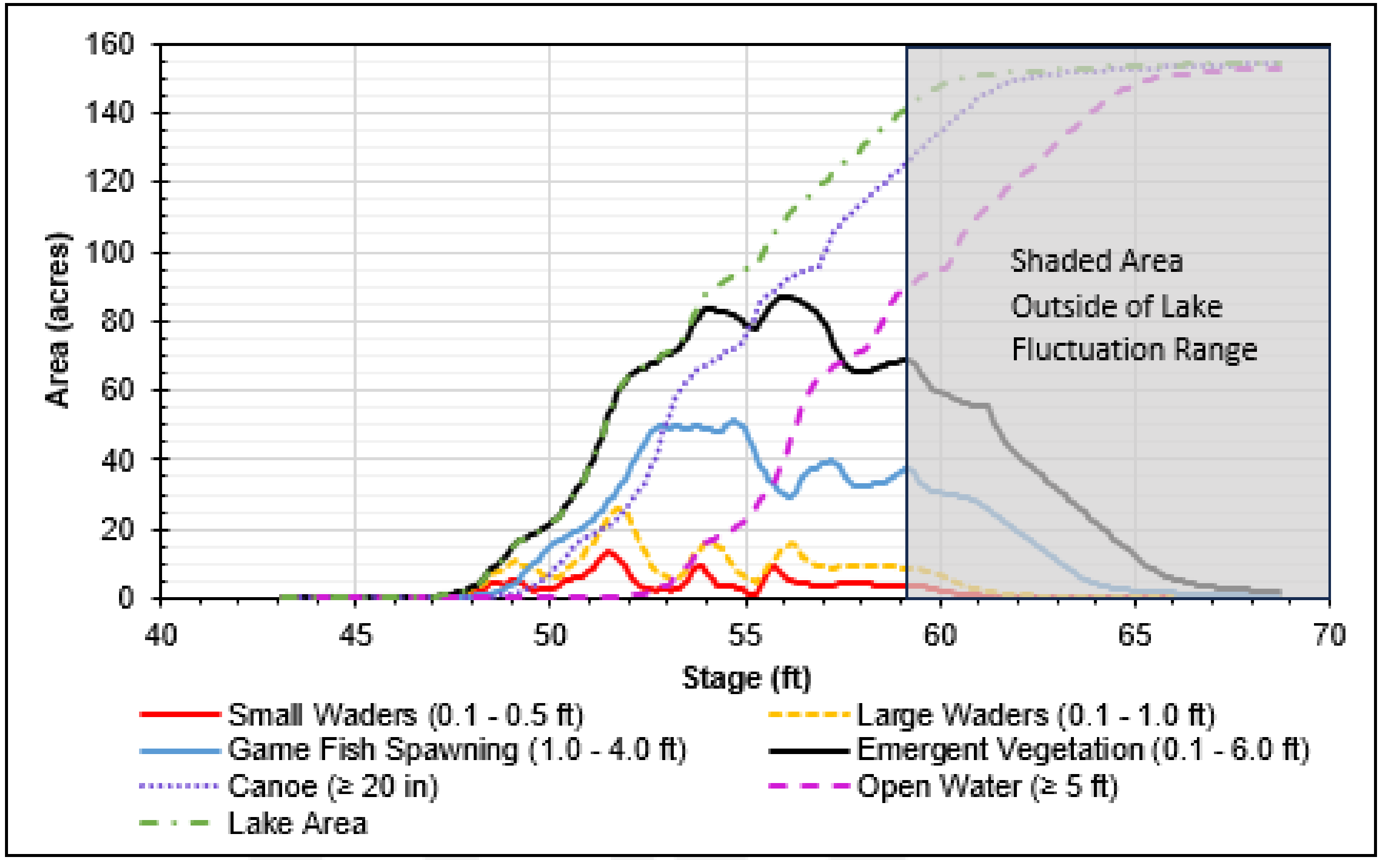

Figure 25. Stage-area trends for Lake Prevatt hydroperiod tool metrics.

ENVIRONMENTAL METHODS, DATA, & METRICS (Appendix C)

Review Comments (cont.)

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				

ENVIRONMENTAL METHODS, DATA, & METRICS (Appendix C)

Review Comments (cont.)

Section	Page	Comment
Average Habitat Area	77	What is the lake area change No-pumping vs. current for an elevation of 55.6' NAVD - to consider change in outflow to Carpenter Branch
Average Habitat Area	77	What is the change in lake area No-pumping vs. Current for a an elevation of 57.6' NAVD - to consider a change in wetland boundary.
MFL Determinations for Lake Prevatt	83+	Given that the lake is and intergrade between sandhill and stable and given the fluctuation range the ecological data selected to represent the FH, MA, FL are not the most sensitive criteria. Consider the following as potentially more sensitive ecological criteria for this type of system: FH - Mean transition zone with 30-day duration, Mean Shrub Swamp 180 day non-ex, and Landward Histosol -0.61m for 30-90 days (see Richardson et al. 2009) or Mean H/HE-1.67 for FL
Frequent High (FH) Level (53.8 ft NAVD 88)	109	Consider a more sensitive criteria given the lake type and adjust the duration and return interval. E.g., transition zone. In this type of lakes the shoreline or transition zone go from inundated (killing upland plants that have encroached) to very dry allowing recruitment of upland plants. The duration needed to kill mature pine trees could be extracted from Lake Sylvan stage data (pines may have been killed following 2004 hurricane season?) Or use the wetland boundary (as Infrequent high) (see CFWI transects) with minimum hydrology required to meet the wetland definition as a measure of significant harm. see 62-340.550 FAC (inundation for 7 continuous days or saturation for 20 continuous days)

MFLs MAIN REPORT

Review Comments (cont.)

Section	Page	Comment
Executive Summary		Is the adopted MFL met under current conditions
FH Magnitude	36	The mean of the max elevations of the transitional shrub swamp community is 0.7 ft lower than the max of the shrub swamp community in the 1997 memo. (same elevation shift when comparing just the replication of the 1997 transect)
FH Magnitude	36	Consider that the max elevation of this community (TSS) should be considered for the FH not the mean. Per Kinser - "Hydrology similar to that of cypress, hardwood swamp, or shallow marsh communities. ...lengthy seasonal inundation" or possibly mean of the Transitional Zone
MA Magnitude	38	Consider the mean elevation of SS as the MA level. Based on Kinser description of the hydrology of this community it would seem to be an appropriate elevation for the MA level.
MA Magnitude	39	Consider evaluating the landward most elevation (generally the max elevation) of hisitc epipedon and histosol. This may reduce variability in the SWIDS analysis by not incorporating lower elevation organics in what may be considered lake bed. See Richardson et al. 2009.
Frequent Low (FL)	40-41	While the maximum elevation of deep marsh would normally be appropriate for a FL level for lakes with a lower fluctuation range an allowable drawdown for organic soils may be more appropriate here.
Frequent Low (FL)	41	"Therefore, while still assessed and discussed in appendices, the FL at Lake Prevatt was not considered as a final event-based metric. 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." - Previous statement - the shallow morphology of the lake allows for permanent wetland communities. Also - The max elevation of Deep marsh 51.1 lines up pretty well with the Emergent Aquatic bed from 1997 memo (51.0 ft NAVD)

MFLs MAIN REPORT

Review Comments (cont.)

Section	Page	Comment
Group 2: WRV 2, WRV 4, WRV 5, and WRV 7	52	Group 2 WRVs (2, 4, 5, 7) - fish and wildlife habitats and the passage of fish. It is not clear that this WRV is protected. Evaluation of open water area (5 ft or deeper) at lower lake stages is needed to demonstrate that this WRV is protected. (see additional comments in Appendix D).
Group 3: WRV 1, WRV 6, and WRV 9	53	Group 3 WRVs (1, 6, 9) - recreation in and on the water. It is not clear that this WRV is protected. Evaluation of canoe depth (20") should be evaluated at specific stages to demonstrate that this WRV is protected. (see additional comments in Appendix D)
Recommended Minimum Levels	56	Recommended levels represent a 3.6 ft fluctuation range when the lake fluctuates 12-15'. Should additional P values be represented? Does this protect the temporal components. Does use of P values effect potential enforcement. Low lake levels are likely the most critical for fish habitat and susceptible to UFA drawdown. These P values do not seem to address low lake levels.
Recommended Minimum Levels	57	P25 - elevation lines up in the TZ, P50 lines up with Max TSS, P75 lines up with max SM. Again this suggests that most sensitive ecological transect data was not applied.

MFLs MAIN REPORT

Review Comments (cont.)

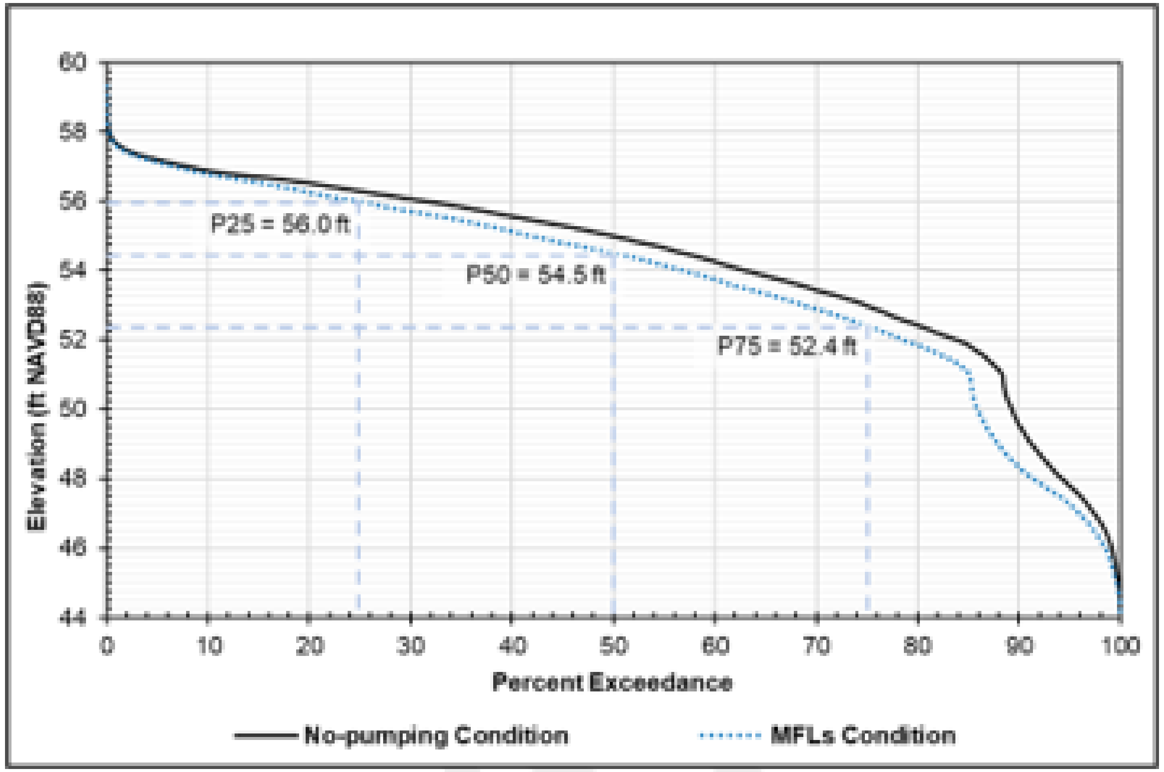

Figure 26. MFLs condition exceedance curve (blue, dotted) based on most constraining environmental metric as compared to the no-pumping condition exceedance curve (black, solid). Dashed lines indicate the recommended minimum P25, P50, and P75 elevations for Lake Prevatt, Orange County, Florida.

Table 15. Currently adopted and recommended Minimum Levels for Lake Prevatt, Orange County, Florida.

Original (adopted)			Recommended	
Level	Level (ft NAVD88)	Hydroperiod Category	Percentile	Recommended minimum lake level (ft NAVD88)
Minimum Frequent High	55.0	Seasonally Flooded	25	56.0
Minimum Average	52.0	Typically Saturated	50	54.5
Minimum Frequent Low	49.9	Semipermanently Flooded	75	52.4

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				

MFLS STATUS ASSESSMENT (Appendix D)

Review Comments (cont.)

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.
Minimum Average (MA)	4	Figure D-2: The Minimum Average is assessed with Mean Non-Exceedance in Appendix C. Should this be the Annual Mean Non-Exceedance Probability? Should the note at the bottom say 180-Day Mean Non-Exceedance? Re-assess freeboard 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? Does the SWIDS analysis with mean – or + SE result in an appropriate RI?

MFLS STATUS ASSESSMENT (Appendix D)

Review Comments (cont.)

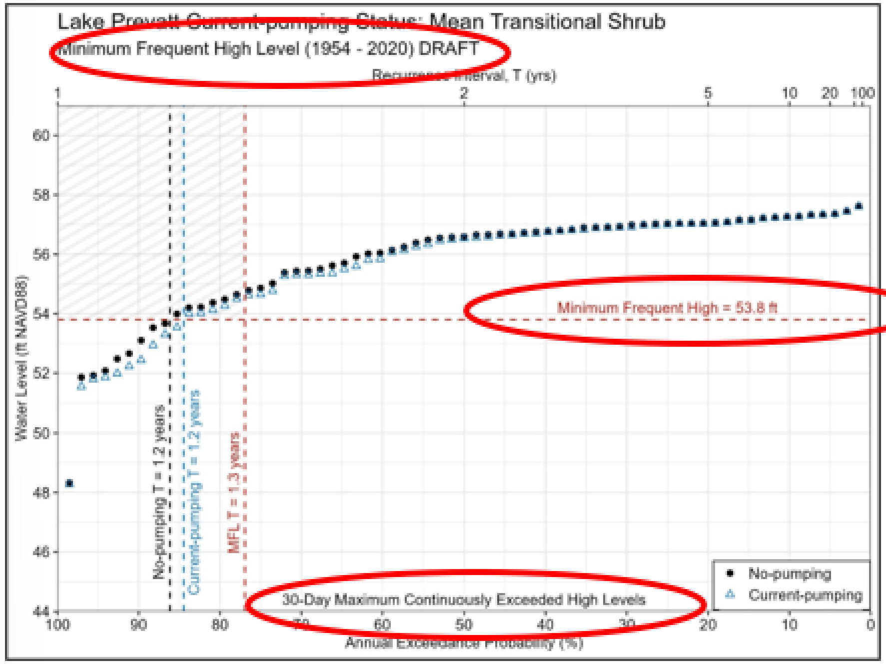

Figure D-1. Frequency analysis plot (i.e., Weibull plot) for the Lake Prevatt FH. Shown are the annual exceedance probability (bottom axis) and return interval (top axis) of the FH for the current-pumping condition (blue triangles) and no-pumping condition (black dots) versus the MFLs condition (red vertical and horizontal lines). The horizontal and vertical red lines represent the minimum magnitude (lake level) and return interval, respectively. The blue vertical line represents the current-pumping condition frequency and return interval. The black vertical line represents the no-pumping condition frequency and return interval.

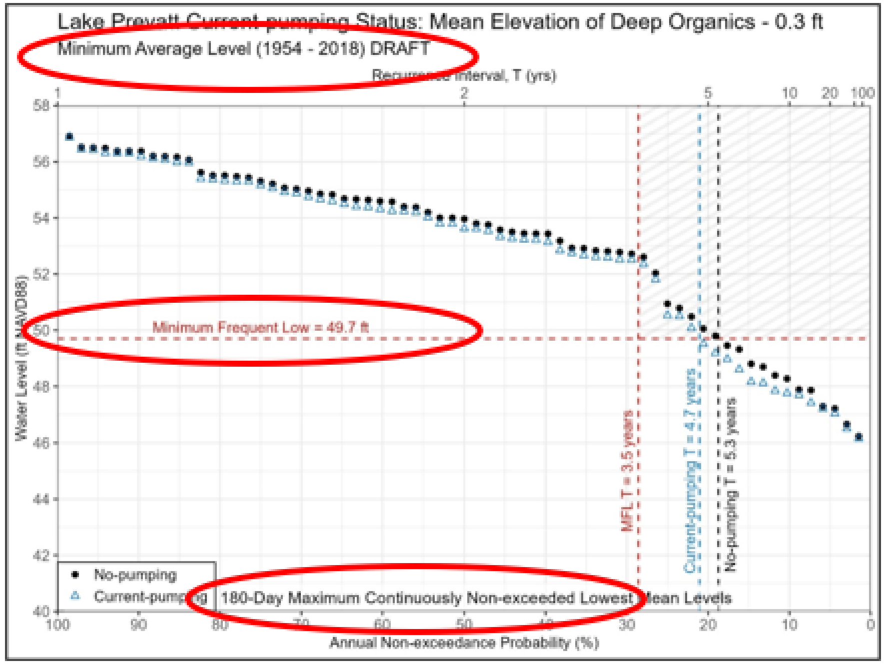

Figure D-2. Frequency analysis plot (i.e., Weibull plot) for the Lake Prevatt MA. Shown are the annual non-exceedance probability (bottom axis) and return interval (top axis) of the MA for current-pumping condition (blue triangles) and no-pumping condition (black dots) versus MFLs condition (red vertical and horizontal lines). The horizontal and vertical red lines represent the minimum magnitude (lake level) and return interval, respectively. The blue vertical line represents the current-pumping condition frequency and return interval. The black vertical line represents the no-pumping condition frequency and return interval.

MFLS STATUS ASSESSMENT (APPENDIX D)

Review Comments (cont.)

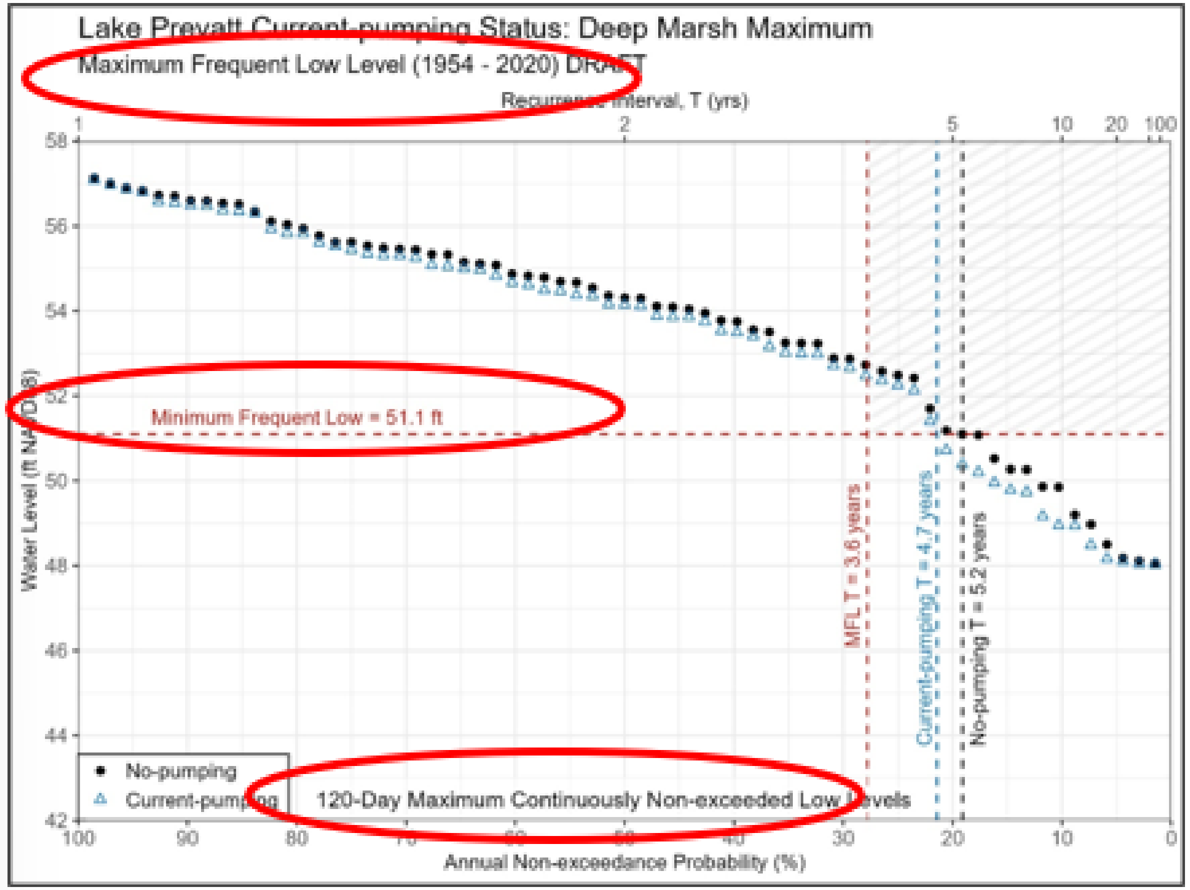

Figure D-3. Frequency analysis plot (i.e., Weibull plot) for the Lake Prevatt FL. Non-exceedance probability (bottom axis) and return interval (top axis) of the FL for current-pumping condition (blue triangles) and no-pumping condition (black dots) versus MFLs condition (red vertical and horizontal lines). The horizontal and vertical red lines represent the minimum magnitude (lake level) and return interval, respectively. The blue vertical line represents the current-pumping condition frequency and return interval. The black vertical line represents the no-pumping condition frequency and return interval.

WATER RESOURCE VALUES (WRVs) ASSESSMENT (Appendix E)

Review Comments

Section	Page	Comment
Group 1 (WRVs 3, 8, and 10)	3	Peer reviewers concur that these WRVs are not applicable to Lake Prevatt.
Group 2 (WRVs 2, 4, 5 and 7)	4	Consider breaking WRV2 (Fish and Wildlife Habitat) and WRV1 (Recreation in and on the water) into their own category and assess with them using area comparisons at specific elevations rather than average area.
Group 2 (WRVs 2, 4, 5 and 7)	4-5	Peer Reviewers concur that WRVs 4, 5, and 7 are protected with the proposed MFLs. Additional analysis is recommended for WRV2
Group 3 (WRVs 1, 6 and 9)	5-10	Peer Reviewers concur that WRVs 6 and 9 are protected with the proposed MFLs. Additional analysis is recommended for WRV1

TOPOBATHYMETRIC DEM DEVELOPMENT (Appendix F)
Review Comments

Section	Page	Comment
All	All	The Topobathymetic DEM is well developed and has been corrected for different vegetative communities with ground truthed data. Peer reviewers find no deficiencies in the Topobathymetric DEM Development.
All	All	Topobathymetic DEM construction is thoroughly documented.
All	All	Methodology clearly outlines steps for development of shoreline and upslope portions of DEM.
All	All	Data collection appears comprehensive, utilizing various methodologies across several years and validated against survey data.
All	All	Vegetation factor adjustments appear reasonable and well documented.
All	All	Smoothing and stitching functions, NNI and “Mosaic to Raster” are reasonable for use here.
All	All	Final surface results, based on Appendix figures review, appear acceptable.

PEER REVIEW of LAKE PREVATT INITIAL FINDINGS

SUMMARY OF INITIAL FINDINGS

Appropriateness of Environmental Criteria

- Event-based metrics applied are likely not the most sensitive given the type of lake
- Habitat based metrics should consider change in area at critical elevations
    - This leads to uncertainty in the appropriateness of the recommended levels

Validity and Appropriateness of:

1. Methods and Procedures used for Data Analysis
    - Generally appropriate using best available information
    - Lake Stage Simulation – a bit simplified but adequate
    - SWIDs Analysis – still a work in progress (standardization of data and clustering variables)
    - Hydroperiod Tool – Newer tool with a lot of potential (consider critical metrics)
2. Assumptions Used
    - Appropriate using best available information
    - Assumption that climate for the last 50 years will be the same for the next 50 years – debatable but climate models have substantial uncertainty
3. Conclusions Drawn
    - Conclusions will likely need to be reassessed following some additional data analysis
    - Conclusions based on data analyzed are well supported

PEER REVIEW of LAKE PREVATT INITIAL FINDINGS

SUMMARY OF INITIAL FINDINGS

Determine Adequacy of Data used to Support Conclusions and Recommendations

- Hydrologic Data and Analysis is adequate and appropriate
- Environmental Data is adequate and appropriate
- SWIDs Analysis provides best information available
- Hydroperiod Tool provides a powerful data driven assessment of habitat area

Identify and make recommendations regarding deficiencies in development of the draft recommended levels.

- Recommend an analysis of rainfall data to demonstrate that lake levels/UFA levels are a reflection of rainfall patterns vs water withdrawals.
- Recommend evaluation of additional environmental criteria to ensure appropriate metrics are applied and evaluated.
- Consider changes in and consistency of terminology, particularly with use of the hydroperiod tool the use of FH, MA, FL with the event-based metrics is somewhat misleading when the FH, MA, and FL are not the recommended minimum levels.

QUESTIONS

Trihydro

T. RICHARDSON SOILS & ENVIRONMENTAL LLC

St. Johns River Water Management District