Final Peer Review of Xeric MFL Methodology Development: Xeric Wetland Offset Development Using Combined Datasets for Northern Tampa Bay Area and Central Florida Water Initiative Sites Cypress Offset/Mesic Wetland Offset Criteria for Proposed Minimum Lake and Wetland Levels

Prepared For:

Southwest Florida Water Management District
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Peer Review Members

John Emery, Chair
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July 19, 2022

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Executive Summary

The Southwest Florida Water Management District (District) contracted with an independent panel of experts to provide a technical peer review of the proposed xeric wetland criteria, specifically, the report, "Xeric MFL Methodology Development: Xeric Wetland Offset Development Using Combined Datasets for Northern Tampa Bay Area and Central Florida Water Initiative Sites". These criteria may be used during the development of Minimum Levels and Flows (MFL) for water resources within the District. An MFL represents the limit at which further groundwater or surface water withdrawals would be significantly harmful to the water resources or ecology of the area. Additionally, the panel was tasked with the review of other materials related to the concepts, data, and models presented in the draft reports along with any new information received during Publicly Noticed panel meetings/teleconferences, and any other information received by the District.

The peer review for this report was conducted in three phases. The first phase was an initial peer review that culminated with initial conclusions and recommendations that were included within a report to the District entitled Xeric MFL Methodology Development: Xeric Wetland Offset Development Using Combined Datasets for Northern Tampa Bay Area and Central Florida Water Initiative Sites". The second phase of the MFL review process was the District's review of the Initial Peer Review Report and subsequent response to the Peer Review Panel of issues identified in the Initial Report, and incorporation of revised information into the proposed wetland criteria document. The third phase of the process the submittal of this report, "Final Peer Review of Xeric MFL Methodology Development: Xeric Wetland Offset Development Using Combined Datasets for Northern Tampa Bay Area and Central Florida Water Initiative Sites". District staff made changes to the wetland criteria Offset report and one of the appendices along with providing additional technical documents in response to the recommendations. The following summarizes the final determination made by the Peer Review Panel based on documents provided.

The Panel has reached a scientifically based opinion that the District has met its burden of proof for the proposed Xeric Wetland Offset Development Using Combined Datasets for Northern Tampa Bay Area and Central Florida Water Initiative Sites" reviewed for the following items requested in the District's charge to the Panel:

- Determine whether District conclusions are supported by analyses/results presented
- Determine whether data/information were properly collected and used, any data exclusions were justified, and the data were the best available information
- Determine whether technical assumptions are clearly stated, reasonable and consistent with the best available information, and if better analyses could be used
- Determine whether procedures and analyses were appropriate and reasonable, based on the best available data, correctly applied, limitations were handled appropriately, and conclusions are supported by the data

Also, the Panel was requested to opine:

- On methods judged to be not scientifically reasonable, describe scientific deficiencies, identify remedies, if any, or alternative methods
- As appropriate, to identify and characterize effort involved for preferred alternative methods that could be used in lieu of scientifically reasonable methods that were used

The District's responses and revisions to the proposed wetland criteria document were deemed to be acceptable to the Peer Review Panel without any further changes to the document. However, there are recommendations for "new" studies other than periodic review of the Xeric Wetland Offset method as appropriately determined by the District. Specifically, the equivalency of the CFWI Wetland Edge to the NTB PE03 is an assumption that should be validated with empirical data during the years prior to a subsequent MFL re-evaluation as well as, the 27% xeric ratio area should be applied to the CFWI sites for comparative purposes.

1.0 INTRODUCTION

On May 16, 2022, the Southwest Florida Water Management District voluntarily convened a panel for the independent, scientific peer review of wetland-based criteria (offsets). The criteria include the Proposed Xeric Wetland Offset for Proposed Minimum Wetlands and Lakes. These offsets will be used to identify withdrawal-related changes in xeric wetland water levels that are likely to be associated with significant harm and are among several criteria the District evaluates during the development of minimum levels.

Minimum water levels are defined in the Florida Statutes as the level of groundwater in an aquifer and the level of surface water at which further withdrawals would be significantly harmful to the water resources or ecology of the area. Upon establishment by rule, minimum water levels are used by the District or Department of Environmental Protection for water-use permitting, environmental resource permitting and water supply planning.

The Florida Statutes provide for the independent scientific peer review of all scientific or technical data, methodologies, and models, including all scientific and technical assumptions employed in each model, used to establish a minimum water level (or minimum flow). Independent scientific peer review means review by a panel of independent, recognized experts in the fields of hydrology, hydrogeology, limnology, biology, and other scientific disciplines, to the extent relevant to the establishment of the minimum water level (or flow).

The panel reviewing the proposed wetland criteria consisted of John Emery as Chairperson, and Panelists James Bays and Brian Ormiston, Ph.D. The panel was tasked with reviewing the proposed minimum flows based on information included in a draft District report titled, “Xeric MFL Methodology Development: Xeric Wetland Offset Development Using Combined Datasets for Northern Tampa Bay Area and Central Florida Water Initiative Sites”, dated May 4, 2022, and appendices associated with the report.

Three phases were identified for the peer review process. The initial phase involved the panel’s review of the District’s draft report and development of an initial peer review report entitled, “Initial Peer Review of Xeric MFL Methodology Development: Xeric Wetland Offset Development Using Combined Datasets for Northern Tampa Bay Area and Central Florida Water Initiative Sites”, dated June 7, 2022, authored by the Peer Review Panel. The second phase involved development of responses by District staff to the panel’s initial peer review report. In addition, the District’s draft report on the wetland-based criteria was updated during the second review phase based on recommendations identified in the panel’s initial peer review report, and as noted in this response document. The third phase of the review is the subject of this current document and involves the panel’s consideration of the District’s response document, the updated draft report on the wetland-based criteria, any other relevant information, and development of this final peer review report.

Development of the panel’s initial peer review report during the first phase of the review was supported by the District through facilitation of publicly noticed and accessible, internet-based teleconferences on May 23, May 31 and June 6, 2022, and use of an internet-based web forum (web board) that was made available to the panel and others on May 23, 2020. District facilitation of the review web forum continued through the second phase of the review and continued through the third review phase. In addition, two internet-based teleconferences were facilitated by the District during the third phase of the review, on July 11 and July 18,

2022, to further support the panel's development of a final peer review report, which is was completed July 19, 2022.

All Panel communications during the review process have occurred only during the review teleconferences and through use of the review web forum. District facilitation and the panel's sole use of the teleconferences and web forum for review-related communications ensures panel activities are conducted in accordance with Florida's Government-in-the-Sunshine Law and provides opportunities for public comment on the review process and the wetland-based minimum level criteria.

1.1 **Background**

The District currently uses a "mesic wetland offset" in developing lake and wetland minimum levels (e.g., Cameron et al. 2022). However, accumulated scientific evidence indicates that wetlands and lakes in xeric landscapes tend to have deeper water table environments and greater water level fluctuations than wetlands and lakes in more mesic landscapes. Therefore, upcoming reevaluations of District MFLs, particularly those planned for the Southern Water Use Caution Area, will benefit from an improved understanding of how the hydrology and appropriate significant harm thresholds for waterbodies in xeric landscapes differ from those in mesic settings.

Wetlands and lakes located in a xeric soil landscape setting (i.e., xeric sites) tend to have deeper water table environments and exhibit water level fluctuations larger than wetlands and lakes located in more mesic landscape settings, such as pine flatwoods, which tend to have shallower water table settings (e.g., Epting et al. 2008; FNAI 2010; GPI 2016, 2020); Nowicki 2021, 2022). In their minimum flows and levels (MFLs) evaluations for lakes, the St. Johns River Water Management District recognizes a hydrologic continuum; at one extreme are "wetland lakes" which exhibit wet and dry season stable water level patterns and have deep organic soils, and at the opposite extreme are "sandhill lakes" with multidecadal cycles resulting in unstable seasonally-flooded wetland vegetation with no organic soils (Mace 2015).

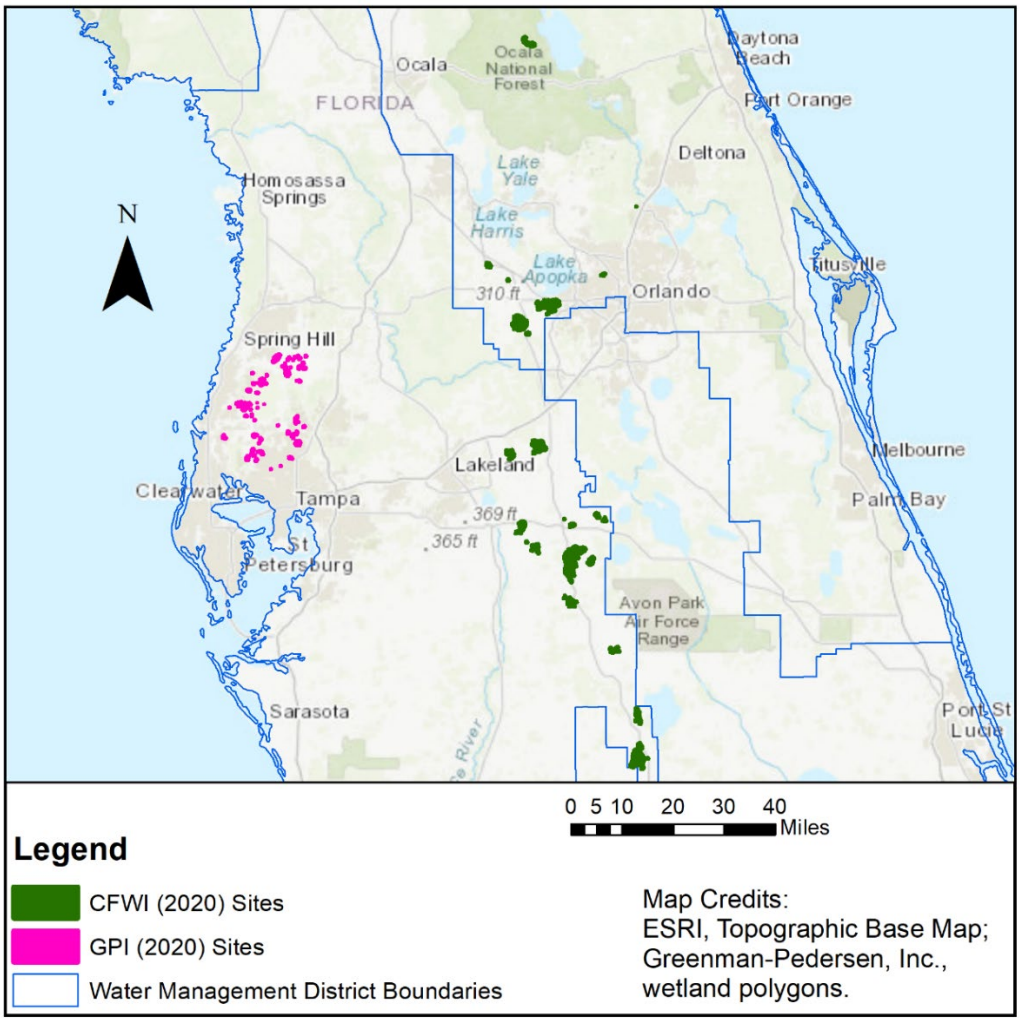

Figure 1. Map of all Xeric-Associated Sites Analyzed in Xeric Offset Report

1.2 Regulatory Basis For MFL And/Or Peer Review

Florida Statutes (F.S.) mandate that the District must establish MFLs for state surface waters and aquifers within its boundaries for the purpose of protecting the water resources minimum flow for a given watercourse, including isolated wetlands. A minimum flow is the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area and the minimum water level is the level of groundwater in an aquifer and the level of surface water at which further withdrawals would be significantly harmful to the water resources or ecology of the area.

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

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

Section 373.042, F.S., also addresses independent scientific peer review of MFLs, specifying the review of all scientific or technical data, methodologies, and models, including all scientific and technical assumptions employed in each model, used to establish a minimum flow or minimum water level.

1.3 Peer Review Panel Scope and Approach

The Peer Review Panel was scoped to complete the following tasks as part of the Peer Review:

- Review draft document, "Xeric MFL Methodology Development: Xeric Wetland Offset Development Using Combined Datasets for Northern Tampa Bay Area and Central Florida Water Initiative Sites" prepared by Greenman-Pedersen, Inc., along with available supporting documentation and data
- Participate in Public Meetings including;
  May 23, 2022 Web Kickoff Meeting, Web-Meetings of May 31, 2022, and June 6, 2022
- Review and provide support in development of meeting agendas and meeting summaries
- Submit Initial Draft Comments on June 7, 2022
- Receive District Comments on July 6, 2022
- Participate in Web Meetings on July 11 and 18, 2022
- Submit Final Peer Review Report on July 19, 2022

Section 2 of this report utilizes a tabular template (completed by each of the three peer reviewers) to meet the District's peer review requirements. The tabular comments are presented for specific sections of the Xeric Wetland Offset report. Narrative comments on various key aspects of the report and supporting documentation, precede the tabularized comments.

2.0 REVIEW OF REPORT, APPENDICES, AND EXTERNAL REPORTS

The following sections provide detailed review and comments on the Xeric Wetland Offset report and supporting documentation provided by the District for use by the Peer Review Panel. Section 2.1 presents a narrative review of key aspects of the development of the offset as identified by the Panel. Section 2.2 presents the Panel's individual comments in a tabular form.

2.1 Xeric Wetland Offset Report

Specific components of the MFL report and supporting documentation were identified by the peer review panel as critical in the MFL development. These were identified for specific review and discussion. These included;

- The need for a Definitions Section
- Some issues such as Wetland Edge concept and use of 27% Xeric Soils criterion and 500 ft. buffer boundary need further explanation through inclusion of specific information used in cited sources.
- Inclusion of a discussion of the statistical significance of differences between the y-intercept all method and NS Median method to bolster the preference based on environmental impact minimization and a discussion as to why the two methods yield a difference.
- Explanation of the bootstrapping method used. In terms of future investigations that could be done to improve the establishment for the PE50 threshold, identify minimum or recommended sample sizes for bootstrapping to reduce the effects of the lower (and unbalanced) sample size of the CFWI dataset on bootstrapped confidence ranges.
- The effects of inclusion one very positive outlier in PE50 water level dataset (Gator Lake)
- Consideration of any "weight-of evidence" methods
- A explanation of for the use of P50 level over the previously used P80 level documented in CFWI literature

In Section 2.2, all of these above items were addressed by the District and resulted in revisions to the proposed wetland criteria report. Upon review and consideration of the District's response to these issues, the Peer Review Panel concluded that the revised document is a better version and more defendable in the case of any legal challenges.

2.2 Individual Panel Member Comments

Individual panel member comments on specific sections of the District's original Xeric Wetland Offset report, District staff responses, and Peer Review Panel Responses:

Pg	*Rvwr*	*Paragraph*	*Comment*	**District Staff Response**	**Peer Review Panel Response**
i	*JE*	*Table of Contents*	*Need a Definition Section as was provided for the Mesic Method Report.*	A "Definitions" section has been added to the report.	JE – Response accepted with no further changes BO - concur JB – concur, but please include a definition for Wetland Offset (Xeric) to match format for Wetland Offset (Mesic)
ii	*JE*	*Table*	*Change "Table of Tables" to "Tables"; "Table of Figures" to "Figures"; Move these Sections so that they precede the "Appendices" section.*	These changes were incorporated into the report.	JE – Response accepted with no further changes BO, JB -concur
2	*JE*	*5*	*Concept of Wetland Edge needs more explanation for field characteristics used in [the] CFWI example and not just a citation. Its appropriateness for application to NTB xeric sites will require comparison of hydrologic and ecological information.*	To better explain the concept of Wetland Edge, we've added it to the new "Definitions" section of the report. Note that Wetland Edge elevations were used only for the CFWI sites, not NTB sites. For NTB sites, the PE03 elevation was used to normalize water levels. The reference elevations (Wetland Edge for CFWI, PE03 for NTB) are cancelled out during the calculation of PE50 Change (see equation 1 in the report), and as discussed in the narrative section of this staff response document, PE50 Change distributions for the NTB and CFWI sites were not significantly different. Also note that only the PE50 Change values from the NTB and CFWI areas were pooled to develop an overall xeric threshold, i.e., a Xeric Wetland Offset.	JE – Response accepted with no further changes Agree with the District's response to this comment for the addition the Definitions section. Based upon the best available information, the equivalency of the CFWI Wetland Edge to the NTB PE03 is an assumption that should be validated with empirical data as part of a future investigation or reassessment of the wetland criterion. BO, JB-concur

2	*JB*	*3*	*With reference to the method of establishing the PE50 Change threshold, the confidence intervals of the derived values for the y-intercept all method for NTB xeric sites of -2.67 feet (95% CI: -2.01 to -3.09 feet) and the median NS method for NTB xeric sites of -2.15 feet (95% CI: -1.49 to -2.57 feet) appear to overlap and have the same misclassification ratios. Yet the median NS method was selected as a more conservative offset. At an appropriate location in the main body of the text, please consider including a discussion of the statistical significance of differences between the two estimates to bolster the preference based on environmental impact minimization. Also, please consider including a discussion as to why the two methods yield a difference.*	To help clarify why the two methods yielded a difference in the PE50 Change threshold for the NTB xeric time series, text was added to Section 1.0 noting that the two methods produce different estimates of the Historic PE50, which translates into different estimates for the PE50 Change Threshold. As explained in the report, the median NS method results in a more conservative (i.e., environmentally protective) standard due to drawdown-related effects likely present (but not sufficient to result in a change in stress designation) at the unstressed sites. The median NS method was selected 1) because of the similarity of the results for the median NS method between the NTB and CFWI datasets, as seen in Figure 3.3-2 and Table 1.0-2 in the report, and 2) because the y-intercept all method could not be calculated for the CFWI sites due to a lack of statistical significance in the necessary regression (Section 3.1). Therefore, the median NS method allowed the NTB and CFWI samples to be combined, increasing sample size and geographic representation, producing an overall more robust result relative to using either dataset individually.	BO - response accepted, no further changes JB, JE-concur
2	*JB*	*4*	*At an appropriate location in the main body of the text, please consider expanding upon the substantial variability observed (sd = 2.07 feet), based upon CFWI documentation.*	We expanded Section 1.0 to further discuss the variability of Wetland Edge-PE03 differences. Compared to unstressed sites, stressed sites had larger and more variable Wetland Edge-PE03 differences. Wetland Edge is generally believed to predate major withdrawal-related impacts, whereas water level data available to calculate the PE03 may be too short to adequately identify an unimpacted reference high-water level for stressed sites. In some cases, the Wetland Edge elevation could reflect historical high-water levels no longer achievable due to surface drainage alterations or groundwater drawdown. These two factors would increase variability.	JB – response accepted, no further changes BO, JE - concur

3	*JB*	*2*	*The 22% misclassification rate stands out to this reviewer as something to look to improve through future studies.*	We recognize the 22% misclassification rate associated with the CFWI-only study, caused by a limited sample size, is relatively high. This is why the PE50 Change values from the CFWI sites were combined with PE50 Change values from the NTB area to develop the proposed Xeric Wetland Offset. With the combined larger dataset, the misclassification rate was reduced to 15%. As discussed in the revised Cypress and Mesic Wetland Offset report (Cameron et al. 2022), a 15% misclassification rate is considered acceptable by the District for various reasons. Among these reasons, status assessments that include multiple lines of evidence can help to address any misclassifications that would occur based solely on a PE50 Change metric. A description of a weight-of-the-evidence approach to status assessment is included as part of the revised Cypress and Mesic Wetland Offset report. However, we agree with continuing research efforts to improve classification accuracy.	JB – response accepted, no further changes BO, JE - concur
6	*JB*	*2*	*The explanation for the greater 95% CI range for the CFWI data base warrants reconsideration. "By comparison, a 95% confidence interval range of more than 5 feet was observed for the CFWI dataset (ranging from -0.01 to -5.28 in Table 1.0-2), likely due to the low and imbalanced sample sizes for the stressed and not stressed groups." While there is no argument that the sample is small or unbalanced, this reviewer questions whether an environmental or other feature of the CFWI waterbodies might contribute to that explanation.*	This comment is addressed in the narrative preceding this table, which describes a simulation and cites literature demonstrating how small sample sizes produce wider confidence intervals. Additionally, the narrative demonstrates that PE50 Change distributions for the NTB and CFWI sites are not statistically different when comparing like stress classes.	JB – response accepted, no further changes BO, JE - concur

6	*BO*	*2*	*Bootstrapping of PE50 change threshold - Could this bootstrapping process be explained in more detail, if necessary, in an appendix? Was the random sampling done on the unstressed and the stressed sites and then the threshold crossing point determined, for a total of 10,000 times? Text or a diagram would be helpful. Any known literature for bootstrapping methods to support assertion that the greater the confidence range in confidence limits for the CFWI dataset could be due to the lower (and unbalanced) sample sizes.*	The following text was incorporated into Section 2.4 to clarify the method: "The nonparametric bootstrap method (Efron and Tibshirani 1993) can be used to generate confidence intervals for statistics with unknown sampling distributions by making repeated random draws with replacement from the existing dataset, calculating the statistic of interest (in this case the crossing point), and—in the simplest implementation of confidence intervals—selecting the interval of interest from the bootstrapped sampling distribution of the statistic (e.g., 2.5% to 97.5% for the 95% confidence interval). More specifically, the entire combined dataset of PE50 Change values taken from both sources (NTB and CFWI) was sampled with replacement 10,000 times and for each time (i.e., resample) the crossing point method algorithm was executed, resulting in a bootstrap sampling distribution of the crossing point calculated value. This bootstrap sampling distribution provided the values from which specific quantiles were calculated designating either the 95% or 90% confidence intervals." The second part of this question about supporting the assertion of greater confidence ranges associated with lower and unbalanced sample sizes is answered in narrative form earlier in this document, which describes a simulation and cites literature demonstrating how small sample sizes produce wider confidence intervals.	BO- satisfactory response and treatment JB, JE - concur
7	*BO*	*Fig. 3.3-1*	*May want to explain the various symbols, lines and points shown since boxplot conventions can vary among software.*	Text was added to the report for clarification, indicating that the middle line in the boxplots represents the median, the top and bottom of the box represent the upper and lower quartiles, and the lines extend up to 1.5 times the interquartile range, beyond which data are displayed as individual points (outliers).	BO-satisfactory JB, JE– concur.

8	*BO*	*Fig. 3.3-2*	*Concern about the one very positive outlier for the Stressed CFWI group. Possible explanations?*	As described in detail in the narrative section earlier in this document, we completed the crossing point analysis excluding the site in question (Gator Lake) and found the method to be robust to this outlier, as its exclusion would result in no change to the PE50 Change threshold of 2.2 feet proposed for the Xeric Wetland Offset. We acknowledge this is an unusual point (i.e., an ecologically-stressed wetland with relatively high water levels) but, after reviewing the available CFWI documentation, failed to identify appropriate justification for removing it. Therefore, we recommend retaining this point in the analyses, given 1) the robustness of the crossing point analysis to removal of the outlier, 2) the lack of a justification for removing it, and 3) the need to avoid cherry picking data.	BO-acceptable discussion and treatment. The finding that excluding the Gator Lake site would change the threshold value by only 0.01 alleviates any concern about the influence of this site on the overall threshold derived from the dataset. JB, JE– concur
11-12	*JE*	*Section 3.2.1*	*The description of Xeric soils composition should be expanded beyond the 27% ratio. For example, was the "Hydric Rating" characteristic the definitive characteristic or were others included? This Key Assumption needs more supportive documentation.*	We have expanded Section 3.2.1 to include more information about how expert opinion was used to classify *soils* in the NTB area as mesic or xeric (BHI and SDI 2000), and how those expert classifications were subsequently used to train a machine learning model to classify soils in additional District counties. Clarification is also provided that the soils classification machine learning model considered many variables, of which the most important for prediction accuracy were depth to water table, drainage class, and hydric rating. Also, please note that the datasets used in our report relied on two different methods to classify *waterbodies* as xeric, depending on source location. The CFWI sites did not use the 27% xeric ratio. The CFWI sites were classified as "ridge" based on the wetland classification system described in Attachment E of CFWI-EMT (2013), which considers the following factors: "physiographic setting, landscape position, soils, size, depth (lake vs. shallow wetland), and existence of an outfall." The NTB sites were classified based on the 27% xeric ratio in a 500-ft	JE – response accepted based upon the use of best available information. At some point, the 27% ratio area should be applied to the CFWI sites for comparative purposes. BO. JB - response accepted; no further changes.

				buffer. This method is based on work from BHI and SDI (2000), Schmutz and Willis (2008), GPI (2016), and GPI (2020). As noted in GPI (2021), previous work found waterbody classifications robust to various buffer sizes, and the classifications were reviewed by District and Tampa Bay Water staff as part of Recovery Assessment efforts. While the review indicated that classification for some sites was uncertain, additional analyses found the sites did not substantially bias the results, and the overall high sample size used in the NTB study reduces the potential for the sites to bias results. Finally, it should be noted that we provide guidelines in Section 3.2 that multiple lines of evidence should be considered in developing an expert opinion classification of a waterbody as xeric or mesic for the purposes of minimum levels development. Soil information would be among various criteria evaluated.	
12	*JE*	*4*	*Need definition or note that depth to water="depth" as used going forward.*	As used in the report, the term "depth to water" (used as part of the process to classify *soils* as xeric or mesic) is a different concept than "site depth" (as a characteristic of xeric *waterbodies*, i.e., they tend to be deeper). To help clarify this difference, we added further explanation of the GPI (2016) results summarized in Section 3.2.2 of the report. Specifically, we noted that the discussed wetland depths were calculated as the difference between the Historic Normal Pool elevation and the staff gauge "dry" elevation.	JE - response accepted, no further changes BO, JB - concur
15	*JE*	*3*	*Delete "18" ; rephrase sentence for understanding.*	We deleted the "18" in the revised report to enhance clarity of the sentence.	JE - response accepted, no further changes BO, JB - concur

15	*JE*	*3*	*Are the 9 listed "hydrologic" metrics intended as factors that would be included in a "weight-of-evidence" assessment along with soils for P50 water elevation? Were any associated vegetative indicators reviewed?*	These hydrologic metrics, taken from a previous study (Schmutz 2019), are intended to provide guidance as part of a weight-of-evidence approach to determining if a site should be classified as "xeric" or "mesic". Many additional different characteristics are summarized in Section 3.2 of the Xeric Offset Report, including factors related to soils, physiographic setting, and water level behavior. These hydrologic metrics could be assessed along with these other criteria (including vegetative indicators) as part of the weight-of-the-evidence approach. Schmutz (2019), which identified the nine hydrologic metrics, did not use vegetative indicators to identify whether a site was classified as xeric or mesic. In that study, xeric sites were identified as those with great than 27% xeric (soil) ratio in a 500-ft buffer. However, in many cases, information about adjacent vegetation communities is reflected in the soil classification, because the method of characterizing soils into categories of xeric, mesic, and wetland (see GPI 2021) relies on an estimation of what type of vegetation community typically occurs on the soil type in question.	JE - response accepted, no further changes BO, JB - concur

NA	*JB*	*NA*	*In the CFWI Environmental Measures Report (2013), the EMT members considered the P80 value to be appropriate for characterizing wetland stress for both plains and ridge systems. The P80 was found to be better predictor of stress than P50 and a water level elevation frequently encountered during typical water years, even during relatively brief PORs.* *Given this previous evaluation, which was specifically intended to characterize the differences in hydrologic responses between xeric from mesic wetland types, discussion is warranted on the relative merits of the P80 compared to the P50 statistic for the proposed Xeric MFL offset.*	We studied in more detail Attachment F from CFWI-EMT (2013) and confirmed what David MacIntyre had shared during one of the public peer review meetings: that it was likely that the specified CFWI-EMT (2013) analysis did not take into consideration differences between ridge (i.e., xeric) and plains (i.e., mesic) sites. Therefore, it is unknown whether the PE80 is better than the PE50 at distinguishing stress classification when the research is focused only on xeric sites. However, even if we accept that the Attachment F results are applicable to xeric sites, meaning that the PE80 is better than the PE50 for calculating an offset, it seems unlikely to be much better. We reviewed the Conditional Inference Tree results in Attachment F (CFWI-EMT 2013) and noted that the Wetland Edge minus PE80 was selected as the best predictor of stress, but even with this likely overfit analysis there was a 15% false positive rate (4/27) and 11% false negative rate (2/19), with an overall misclassification rate of 13% (6/46). Recall that our combined dataset crossing point analysis resulted in an equalized and therefore overall misclassification rate of 15%. Therefore, given the similarity in misclassification rates between the earlier CFWI analysis based on PE80 and ours based on PE50, there is little evidence to suggest the PE80 is substantially better. Other reasons for focusing on a PE50 based offset rather than PE80 include the fact that the PE80 is more likely to represent a dry elevation in some cases, limiting the use of data from some sites. Finally, the use of a PE50 offset is consistent with the District's Water Levels and Rates of Flow Rules (Chapter 40D-8, Florida Administrative Code), which currently defines minimum wetland and lake levels with respect to the PE50.	BO-acceptable explanation. Agree with use of PE50 as explained by response. JB, JE – response accepted; no further changes.

NA	*JB*	*N/A*	*After consideration of the comments submitted by Chris Shea to the Webforum, please consider discussing whether the application of the Xeric Offset, which is a measure of central tendency, carries the associated confidence limits by inference. I expect that this question has been asked and answered before when setting in previous MFLs and may represent a policy vs a purely scientific application.*	A minimum level or flow is a threshold associated with preventing significant harm resulting from water withdrawals. District staff and numerous peer review panels convened to evaluate minimum flows and levels and methods used for their development, as well as the District Governing Board through their approval of minimum flows and levels and associated methods, have determined it is appropriate to use a measure of central tendency for development and application of minimum flow and level methods. Based on a weight-of-evidence approach, and best professional judgement, a specific criterion may be determined to not be appropriate for establishing a minimum flow or level. Similarly, this type of consideration may also factor into determinations regarding minimum flow and level status assessments (i.e., whether a minimum flow or level is met or not met). For these assessments, all current, best available information is considered.	JB – response accepted; no further changes. BO, JE - concur

Pg = Page Rvwr = Reviewer
BO = Brian Ormiston, Ph.D.
JB = James Bays
JE = John Emery

2.3 Other Issues of Note

During the course of the Peer Review Panel's evaluation of the proposed Xeric Wetland Offset method, there were several issues that did not rise to the level of requiring specific "Recommendations" to the District but nevertheless, were important to memorialize in this document. These issues are as follows;

- Review Panel's first item in Section 2.2 Table concerning the "Table of Contents", please include a definition for Wetland Offset (Xeric) to match format for Wetland Offset (Mesic).
- It is appropriate to accumulate more data after implementing a "new" wetland methodology as was the case with the Cypress Offset method. Of particular interest will be data collected from various physiographic and ecological xeric habitats throughout the District. For example, available data (Nowicki et al. 2021) indicate that xeric wetlands in the northern part of the District that were not included in the development or testing of the method may require a separate evaluation to determine the applicability of this MFL for them. Similarly, the District could review xeric wetlands along the Lake Wales Ridge in Highlands County for vegetative and hydrological characteristics and compare them to xeric wetlands in Hernando County. Comparative studies should test the robustness of the Xeric Wetland Offset method reviewed in this document.
- Although this Peer Review does not address any MFL criteria of "significant harm", the Panel recognizes that wetland hydrologic response to changes in water levels can occur on a continuum. The District should review past, present, and future xeric habitat data for any signs of observable impact correlated to hydrological and/or ecological data.

- Inter-District discussions between the District, other Water Management Districts, and FDEP should be regularly held with regard to reviewing all approaches to evaluating Xeric wetland habitats.
- The Xeric Offset Methodology should be reviewed and revised periodically, as warranted, consistent with review and update cycles for MFL methodologies.
- Appendix A – R Software Code was not reviewed or tested by Peer Review Panel.

2.4 Literature Reviewed

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Mace, J.W. 2015. Minimum Levels Revaluation: Lake Melrose, Putnam County, Florida. Technical Publication SJ2015-1. St. Johns River Water Management District. Palatka, Florida.

Nowicki, R.S., Rains MC, LaRoche JJ, and Pasek MA. 2021. The Peculiar Hydrology of West-Central Florida's Sandhill Wetlands, Ponds, and Lakes-Part 1:Physical and Chemical Evidence of connectivity to a Regional Water-Supply Aquifer. Wetlands 41(8):1-25.

Nowicki, R.S., Rains MC, LaRoche JJ, Downs, C, and Kruse SE. 2022. The Peculiar Hydrology of West-Central Florida's Sandhill Wetlands, Ponds, and Lakes-Part 2:Hydrogeologic Controls. Wetlands 42:43:1-1725.

SWFMWD (Southwest Florida Water Management District). 1999. Northern Tampa Bay Minimum Flows and Levels: Whiter Papers Supporting the Establishment of Minimum Levels in Palustrine Cypress Wetlands. Southwest Florida Water Management District, Brooksville, FL.

3.0 SUMMARY OF FINDINGS AND REVIEW REPORT GUIDELINES

A component of the Peer Review Panel's scope of work was to provide an assessment of the Xeric Wetland Offset report and supporting documentation against specific criteria. The following items outline these specific criteria;

1. Determine whether the conclusions in the Xeric Wetland Offset report are supported by the analyses presented.

2. Supporting Data and Information: Review the relevant data, and information that support the conclusions made in the report to determine whether:
   a. The data and information used were properly collected;
   b. Reasonable quality assurance assessments were performed on the data and information;
   c. Exclusion of available data from analyses was justified; and
   d. The data used were the best information available.

3. Technical Assumptions: Review the technical assumptions inherent to the analysis used in the report to determine whether:
   a. The assumptions are clearly stated, reasonable and consistent with the best information available;
   b. The assumptions were eliminated to the extent possible, based on available information; and
   c. Other analyses that would require fewer assumptions but provide comparable or better results are available.

4. Procedures and Analyses: Review the procedures and analyses used in the report to determine whether:
   a. The procedures and analyses were appropriate and reasonable, based on the best information available;
   b. The procedures and analyses incorporate all necessary factors;
   c. The procedures and analyses were correctly applied;
   d. Limitations and imprecisions in the information were reasonably handled;
   e. The procedures and analyses are repeatable; and
   f. Conclusions based on the procedures and analyses are supported by the data.

5. If a proposed method used in the report is not scientifically reasonable, the CONSULTANT shall:
   a. List and describe scientific deficiencies and, if possible, evaluate the error associated with the deficiencies;
   b. Determine if the identified deficiencies can be remedied.
   c. If the identified deficiencies can be remedied, then describe the necessary remedies and an estimate of time and effort required to develop and implement each remedy.
   d. If the identified deficiencies cannot be remedied, then, if possible, identify one or more alternative methods that are scientifically reasonable. If an alternative method is identified, provide a qualitative assessment of the relative strengths and weaknesses of the alternative method(s) and the effort required to collect data necessary for implementation of the alternative methods.

6. If a given method or analyses used in the report is scientifically reasonable, but an alternative method is preferable, the CONSULTANT shall:

a. List and describe the alternative scientifically reasonable method(s) and include a qualitative assessment of the effort required to collect data necessary for implementation of the alternative method(s).

The Panel has concluded that all methods used in the development of the Xeric Wetland Offset criteria were scientifically reasonable and that there is no need to address the following items:

- On methods judged to be not scientifically reasonable, describe scientific deficiencies, identify remedies, if any, or alternative methods
- As appropriate, to identify and characterize effort involved for preferred alternative methods that could be used in lieu of scientifically reasonable methods that were used

Upon completion of all three phases of the peer review process as described in Section 1.0 of this document, the District's responses and revisions to the proposed Xeric Wetland Offset document were deemed to be acceptable to the Peer Review Panel without any further changes. Additionally, there are two recommendations for "new" studies other than periodic review of the Xeric Wetland Offset as appropriately determined by the District. These recommendations are the following;

1) The equivalency of the CFWI Wetland Edge to the NTB PE03 is an assumption that should be validated with empirical data as well as,
2) the 27% xeric ratio area should be applied to the CFWI sites for comparative purposes.