

Final Peer Review of Cypress Offset/Mesic Wetland Offset Criteria for Proposed Minimum Lake and Wetland Levels

Prepared For:



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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 mesic wetland criteria, specifically, the report, "Validation of the Cypress Offset and Mesic Wetland Offset for Development of Minimum Wetland and Lake Levels (DRAFT)." 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 "Initial Peer Review of Cypress Offset/Mesic Wetland Offset Criteria for Proposed Minimum Lake and Wetland Levels". The second phase of the peer review was the District's evaluation 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 was the submittal of this report, "Final Peer Review of Cypress Offset/Mesic Wetland Offset Criteria for Proposed Minimum Lake and Wetland Levels". District staff made changes to the wetland criteria 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 Cypress Offset/Mesic Wetland Offset criteria 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

As 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, there are no recommendations for "new" studies other than periodic review of the MFL method as appropriately determined by the District.

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 Cypress Offset and Mesic Wetland Offset, which are currently used by the District to support development of minimum levels for certain lakes and wetlands. These offsets are used to identify withdrawal-related changes in 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 Cypress Offset and Mesic Wetland Offset based on information included in a draft District report entitled, "Validation of the Cypress Offset and the Mesic Wetland Offset for Development of Minimum Wetland and Lake Levels (DRAFT)", 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 Cypress Offset/Mesic Wetland Offset Criteria for Proposed Minimum Lake and Wetland Levels", 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, 2022. 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 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

As part of a Legislatively mandated requirement to establish Minimum Levels and Flows (Section 373.042, F.S.), the Southwest Florida Water Management District (District) has previously determined that cypress domes in the Northern Tampa Bay (NTB) area exhibit significant harm when the 50th percentile elevation (P50) is greater than 1.8 feet below the normal pool (NP) elevation (SWFWMD 1999b). This difference in elevations between the NP and the 50th percentile associated with significant harm became known as the "Cypress Offset." To derive this number, SWFWMD (1999b) assessed 36 cypress wetlands, divided into a sample of 21 "not significantly changed" wetlands and a sample of 15 "significantly" and "severely" changed wetlands (Figure 1). These wetlands were selected based on water level data availability, site accessibility (for ecological assessments), lack of structural alterations, and size (at least 0.5 acre in area). Each wetland's change designation resulted from expert assessments of wetland condition, i.e., wetland health, as indicated by the shrub stratum, stage of vegetative succession (changes in vegetative zonation), prevalence of "weedy" (opportunistic, invasive) species, and degree of soil subsidence; these four parameters were selected from among nine measured health parameters based on their stronger quantitative correlations to hydrology and to minimize redundancies.

The District currently uses a Cypress Offset and Mesic Wetland offset method in developing lake and wetland minimum levels. These methods are used to determine when a lake or wetland located within a mesic setting is likely to experience significant harm (Cameron et al. 2022). However, as more information accumulates, it is prudent to re-evaluate these methods to ensure that they adequately meet all statutory requirements.

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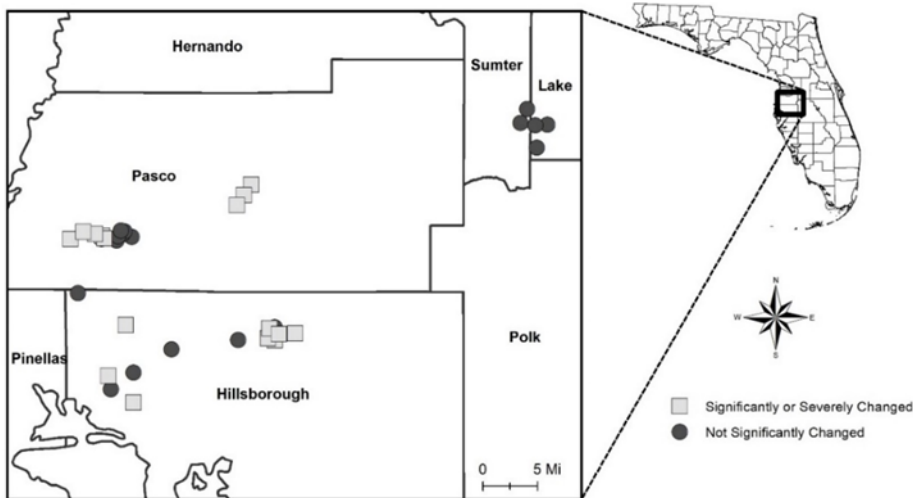


Figure 1. Locations 36 cypress wetlands used in SWFWMD (1999) to develop the Cypress Offset

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, 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, **Validation of the Cypress Offset and Mesic Wetland Offset for Development of Minimum Wetland and Lake Levels (DRAFT)** (Cortney Cameron, Doug Leeper, Gabe Herrick, Ron Basso, and TJ Venning) along with available supporting documentation and data
- Participate in Public Meetings including;
May 23, 2022 Web Kickoff Meeting, Web-Meetings (May 31, 2022, and June 6, 2022
- Review and provide support in development of meeting agendas and meeting summaries
- Submit Initial Draft Peer Review Report 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 Mesic 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 Cypress Offset and Mesic 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 Cypress Offset and Mesic Wetland Offset as identified by the Panel. Section 2.2 presents the Panel's individual comments in a tabular form.

2.1 Cypress Offset and Mesic Wetland Offset Report

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

- Concerns related to the range in values of calculated offsets relative to the central tendency.
- Computed offsets provide important guidance and are useful in landscape-level screening and impact characterization. However, there will always be variation in waterbody responses to hydrologic inputs and there will always be a need for specific investigation of site-specific lake or wetland offsets..
- In terms of future investigations that could be done to improve the establishment of minimum levels, and perhaps reduce misclassification, more work could be done on the ecological determination of stress. In these reports, the classifications are used as a grouping variable. Field investigations by experienced biologists may contradict the determination based on minimum level analysis. A "weight-of-evidence" analysis should be used whenever there are compliance decisions that are "close" to the established water level metric.

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 defensible 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 Mesic Wetland Offset report, District staff responses, and Peer Review Responses:

Pg	Rvwr	Paragraph	Comment	District Staff Response	Peer Review Response
5	JB	3	<i>“Therefore, contextualizing rainfall is important when comparing sets of percentiles within and between waterbodies.” While the report does explain the influence of varying rainfall totals on wetland hydrologic indicators over time, please consider expanding this statement to provide more specific examples or more detail on the need for contextualizing rainfall.</i>	A section called “The Effects of Rainfall” under “Addressing Misclassification” has been added to the District’s revised report. The new section includes a specific example of how rainfall can change the estimate of the Historic P50.	JB – response accepted, no further changes BO, JE - concur
6	JE	Normal Pool Elevation	<i>To avoid confusion, please indicate that the “Normal Pool” definition discussed in this Method is applicable only for Chapter 40D-8 F.A.C. issues, and remove the first sentence of this definition.</i>	The definition has been updated to remove the first sentence and add a final sentence limiting application of the definition to minimum level issues under Chapter 40-8, F.A.C.	JE - response accepted, no further changes BO, JB - concur
7	JB	After 2	<i>Please consider including the current definition of the Xeric Wetland offset, since it is referenced in the report.</i>	A proposed definition for “xeric” has been added to the “Definitions” section.	JB – response accepted, no further changes BO, JE - concur
8	JB	2	<i>The topic of misclassification error has come up in the discussions of the Expert Review Panel and is important as an index of the reliability of the method. While acknowledging that some error is inherent in the method, given the natural variation in wetland hydrology, physiography and landscape, please consider including a discussion of what degree of misclassification may be acceptable to SWFWMD, and the various provisions included to account for multiple lines of evidence.</i>	A section called “Addressing Misclassification” has been added, which discusses potential causes and outcomes of misclassification, justifies the District’s rationale for accepting the misclassification rates, and how a weight-of-the-evidence approach can help address misclassification. Additionally, a note on misclassification has been added to the “Key Findings” section and using a weight-of-the-evidence approach to status assessment has been added to the “Executive Summary” and “Recommendations” sections.	JB – response accepted, no further changes. BO, JE - concur

11	JE	3	<i>Caveat that NTB NP-P50 difference threshold should not be considered synonymous with CFWI WE-P50 difference threshold should be emphasized but there is language here that points to that observation</i>	An additional sentence has been added to emphasize that the two cannot be considered synonymous.	JE - response accepted, no further changes BO, JB - concur
11	JE	4	<i>The inclusion of a weight-of-evidence assessment should be emphasized as a necessary item in this method. The difference between a "changed" wetland and an "unchanged" wetland is not always due to groundwater withdrawals and can be more than not meeting MFL.</i>	A section called "Addressing Misclassification" has been added, which discusses how non-withdrawal factors can influence water levels and how a weight-of-the-evidence approach to status assessment can help address this. Additionally, using a weight-of-the-evidence approach to status assessment has been added to the "Executive Summary" and "Recommendations" sections.	JE - response accepted, no further changes BO, JB - concur
16	BO	Table 1	<i>Change "Windowmaker " to "Widowmaker"</i>	This typo has been corrected.	BO - response accepted, no further changes JB, JE - concur
19	JB	2	<i>The increase in misclassification error rate from 5% to 16% clearly shows the importance of spatial and temporal variation in environmental factors. More discussion is probably warranted (even though there are frequent and detailed discussions throughout). Please consider including worked examples of classification confirmation through multiple lines of evidence.</i>	A section called "Addressing Misclassification" has been added, which discusses potential causes and outcomes of misclassification and how a weight-of-the-evidence approach can address misclassification as part of the status assessment side of minimum levels. The newly added section includes an example for a specific waterbody demonstrating how water levels could fall below a hypothetical minimum level due to rainfall only, and how other data would support the classification of the wetland as not significantly harmed. Additionally, a note on misclassification has been added to the "Key Findings" section, and using a weight-of-the-evidence approach to	JB – Response accepted, no further changes BO, JE - concur

				status assessment has been added to the “Executive Summary” and “Recommendations” sections.	
20	BO	1	<i>Under the “Unimpacted Domes” section, it is mentioned of an alternative to crossing point method of using statistics from impacted and unimpacted samples. Although averages and ranges for NP-50 are presented for various reports in the text, the SD should also be reported if an alternative parametric method to estimating the threshold values was to be performed e.g., using the t-distribution. When reporting means and N reporting, the SD is standard statistical practice and recommended.</i>	Standard deviation (SD) information has been added to the text.	BO - response accepted, no further changes JB, JE - concur
20	JE	2	<i>The discussion between use of the Cypress Wetland Offset and Mesic Wetland Offset for lakes is well explained. However, there is no definitive statement which Offset is appropriate for non-Cypress wetlands. If non-Cypress wetlands with or without discernible NP indicators are not subject to this method, then it needs to be specifically noted. If they are, then that data and recommendation should be a part of this review.</i>	A section “Application of the Cypress Offset to Mesic Marshes” has been added under “Previous Work on the Cypress Offset”, which summarizes work showing that the Offset can be applicable to certain mesic marshes. Additionally, in “Conclusions Regarding the Cypress Offset”, the text has been expanded to explicitly identify the recommendation to use the Cypress Offset for cypress domes and certain mesic wetlands with reliable NP and which demonstrate hydrologic behavior similar to that of the cypress wetlands from which the offset was derived. Also, citations were added for TBW (2018) and Hancock (2020) were repeated here, which support using the Cypress Offset for some mesic marshes.	JE - response accepted, no further changes BO, JB - concur
22	BO	Table 3	<i>Recommend reporting the Standard Deviations.</i>	Standard deviation information has been added to the table.	BO - response accepted, no further changes JB,JE - concur

37	JE	3	See above comment for page 20 paragraph 2.	Our response to the referenced comment addresses this.	JE – response accepted, no further changes BO, JB - concur
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Pg = Page Rvwr = Reviewer

BO = Brian Ormiston, Ph.D.

JB = James Bays

JE = John Emery

1.4 Literature Reviewed

Cameron, C., Leeper, D., Herrick G., Basso, R., and Venning, T.J.,2022. Validation of the Cypress Offset and Mesic Wetland Offset for Development of Minimum Wetland and Lake Levels (Draft)

Hancock, M. 2007. Recent Developments in MFL Establishment and Assessment (Draft). Southwest Florida Water Management District, Brooksville, FL

SWFWMD (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 Cypress Offset and Mesic Wetland Offset report and supporting documentation against specific criteria. The following items outline these specific criteria;

1. Determine whether the conclusions in the "Cypress Offset/Mesic 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 Cypress Offset and Mesic 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 Cypress Offset and Mesic Wetland Offset document were deemed to be acceptable to the Peer Review Panel without any further changes. Additionally, there are no recommendations for "new" studies other than periodic review of the criteria as appropriately determined by the District.