
MFL PEER REVIEW REPORT

Subject: Technical peer review, minimum flows and levels (MFL) re-evaluation, Sylvan Lake, Seminole County, Florida (Contract #SK376F0, Work Order #3)

For: St. Johns River Water Management District (SJRWMD or “District”)

Reviewer: Douglas T. Shaw, Ph.D., The Nature Conservancy

Date: April 3, 2009

Introduction and Scope of Review

This letter report comprises my peer review of the District’s minimum level re-evaluation for Sylvan Lake in Seminole Co., Florida, one of six lake MFL evaluations reviewed as part of this contract. The evaluation and proposed minimum levels are documented in the draft SJRWMD technical report ***Minimum Levels Reevaluation: Sylvan Lake, Seminole County, Florida*** by G.B. Hall, St. Johns River Water Management District, Palatka, Florida, 2009 (“Sylvan Lake MFL Report” or “MFL Report”). My report is based on review of the draft technical report, documentation provided during our field visits to the six lakes August 27-29, 2008, as well as the following supplemental documents:

1. *Minimum Flows and Levels Method of the St. Johns River Water Management District, Florida, USA* by C.P. Neubauer, G.B. Hall, E.F. Lowe, C.P. Robison, R.B. Hupalo and L.W. Keenan, *Environmental Management* 42(6):1101-1114, 2008.
2. *A Quantitative Method for Determining Surface Water Inundation/Dewatering Signatures for Riparian Plant Communities*, Draft manuscript by C.P. Neubauer, C.P. Robison, T.C. Richardson, P. Valentine-Darby and G.B. Hall, *Ecological Engineering*, 2008.
3. *Hydrology of Central Florida Lakes – A Primer* by D.M. Schiffer, U.S. Geological Survey, Circular 1137, 1998.

Detailed comments below are confined to the Sylvan Lake MFL Report.

The scope of the review includes the following:

- Assessment of the adequacy of the environmental data used in the MFL evaluation in terms of quality and length of record
- Assessment of the methods and procedures for data analysis, including statistical analyses where appropriate

- Evaluation of the validity and appropriateness of all assumptions used in the development of MFLs
- Determination if the data, analyses, and interpretation of results support the recommended MFLs.

Review Comments (Page citations refer to Sylvan Lake MFL Report unless otherwise noted)

1. Some additional minor editing is still needed throughout this document; for instance, paging is still missing from the List of Figures (Page x). Also, the reference for the hydrologic model report by CDM is cited erroneously as “CMD, 2005) throughout the document.
2. Page 1, Introduction -- it would be helpful to document any general criteria that are used by the District to trigger a re-evaluation and the specific reasons for re-evaluating Sylvan Lake. Also, in the introduction please include the reasons why Sylvan Lake was originally placed on the MFL priority list.
3. Pages 1-2, Factors to be Considered When Determining MFLs and Pages 21-22, Consideration of Environmental Values Identified in Rule 62-40.473, *F.A.C.*– it would be helpful to indicate here which factors were considered in the development of the Sylvan Lake MFLs. Also, for riverine MFLs, the District typically contracts or conducts a water resource values (WRV) assessment in addition to preparing an MFL determination study. Because it is not mentioned in the Sylvan Lake MFL Report, I am assuming a separate WRV assessment will not be conducted for this MFL. However, it would be helpful if this were clarified in the MFL Report.
4. Pages 3-4, Sylvan Lake Background Information – Given that increased DCIA in the lake’s watershed appears to be a primary reason for re-evaluating the MFL, it would be helpful to include an estimate of impervious cover, if possible.
5. Page 15, Field Transect Site Selection – general information regarding the site history survey indicates that occurrence records of rare and endangered flora and fauna, yet I can find nowhere in the report where such records, if any are documented. Please add a brief discussion of any rare or endangered species that were found on the Sylvan Lake site.
6. Pages 19-20, Surface Water Inundation/Dewatering Signatures (SWIDS) and accompanying figure (Fig 10, page 27) --- this MFL report includes an expanded and excellent discussion of the SWIDS approach here in the Methods section that is missing (or abbreviated) in all other lake MFL reports I reviewed. This discussion addresses some of my comments on

the other reports regarding this approach and should be included, in its expanded form in all reports that make use of SWIDS.

7. Pages 36-37, Structural Alterations and Other Changes -- In the last paragraph in this section, it is stated that the soils and vegetation did not appear to be in transition due to anthropogenic changes. Can any evidence of this conclusion be cited here? Also, was there any evidence of changes in vegetation communities since the field work for the original MFL assessment was conducted?
8. Pages 39-41, Minimum Average (MA) Level (38.9 ft NGVD) – Comparison of the adopted and recommended MA indicates they are each the same value (38.9 ft), despite using different assessment techniques, and that this is the reason why no change is recommended to the adopted value. However, nowhere in the text does the District explicitly say this. Please add some narrative to this section explicitly stating that no change will be recommended and why. Also, it is not completely clear to me that this lake is different from the other sandhill lakes whose MFL assessment reports I reviewed for which no MA was recommended because of the large level fluctuations inherent to lakes in this kind of setting. If this lake is in a different setting or landscape context (e.g., a karst solution basin) then this should be made more clear in the text and an explanation given that distinguishes it from sandhill lakes.
9. Pages 37-39, Minimum Frequent-High (FH) Level (41.2 ft NGVD) and Pages 41-44 Minimum Frequent-Low (FL) Level (36.7 ft NGVD) – The method used for determining FH and FL relies on locations of existing wetland plant communities and SWIDS information from other similar sites, and is a conceptually sound approach. However, the SWIDS data for transitional shrub community shown in Figure 17 (page 65) and for shallow marsh shown in Figure 21 (page 69) display a wide range of variability that needs better explanation. Based on visual inspection of the graphs in Figs. 17 and 21, it appears that the data may include several sites that are hydrologically quite different from the others. Given this variation in the SWIDS for the same communities from different locations, should we always be using the driest of these signatures to define allowable hydrologic shifts when that signature could be, statistically, an outlier or represent a different population of sites? This outlier question becomes especially significant for communities like “transitional shrub” that are not always “natural” communities, but instead are often a successional stage indicative of an altered fire or hydrologic regime in another wetland community, like emergent marsh. So choosing the driest transitional shrub site could in fact be starting from a baseline that is already disturbed (possibly over-drained), perhaps even “significantly harmed.” These concerns could be addressed in several ways: (1) more careful statistical treatment of the SWIDS reference curves to minimize the

possibility that any of the curves used to set the FH (or other minimum levels) are statistical outliers, (2) more detailed explanation of how the SWIDS reference sites were selected to ensure that no outliers or already-harmed sites are included. Also, in the legends of the figures, it would be helpful to indicate which of the reference sites are from sites that are the same landscape setting (e.g., sandhill lake or karst solution basin) as Sylvan Lake.

Findings and Recommendations

1. **Recommendation:** Improve Sylvan Lake MFL Report by addressing the editorial comments 1-9 above.
2. **Finding:** Based on my review of the Sylvan Lake MFL Report and field inspection of transects, I feel that the environmental data data from the site and the data collection procedures used to support this MFL determination are appropriate, repeatable and scientifically sound. As noted above, additional explanation of the observed variability of SWIDS data should be better explained to ensure that this method is applied and interpreted appropriately in this and subsequent MFL assessments.
3. **Finding:** Similarly, the methods and procedures for data analysis, including selection, parameterization and calibration of the hydrologic model for Sylvan Lake are valid and appropriate, and the assumptions used in data analysis and MFL determination are reasonable and justified by the District's previous experience and literature citations.
4. **Finding and Recommendation:** The data interpretation and analyses, which build on the District's extensive previous experience setting MFLs for rivers, lakes and wetlands, is scientifically sound and supports the recommended minimum levels. The Sylvan Lake MFL determination relies on the natural inundation characteristics of vegetation communities and soils on site to set minimum frequent low and frequent high, with SWIDS data used to estimate an allowable hydrologic shift due to future consumptive use. However, as noted above in the comments, more attention should be focused on the selection of particular SWIDS curves from reference sites to ensure that no statistical outliers or already-harmed sites are used to set MFLs and explaining the apparent variability in SWIDS data.
5. **Recommendation:** Because this is a re-evaluation of a previously adopted MFL, I recommend that the District include a narrative section in the report that more directly compares the currently adopted and recommended minimum levels, documents the reasons why re-evaluation was warranted, explicitly identifies the baseline for the recommended

MFLs and identifies any benefits to the resource of the new (recommended) levels. This is particularly important to avoid the erroneous impression that the District is merely changing the baseline for the minimum levels.