
MFL PEER REVIEW REPORT

Subject: Technical peer review, minimum flows and levels (MFL) evaluation, Johns Lake, Lake and Orange Counties, Florida

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

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

Date: December 10, 2009

Introduction and Scope of Review

This letter report comprises my peer review of the District's minimum level evaluation for Johns Lake in Lake and Orange Cos., Florida. The evaluation and proposed minimum levels are documented in the draft SJRWMD technical report ***Minimum Levels Evaluation: Johns Lake, Lake and Orange Counties, Florida*** by C.P. Neubauer, Ph.D., St. Johns River Water Management District, Palatka, Florida, 2009 ("Johns Lake MFL Report"). My report is based on review of the draft technical report, documentation provided during our earlier field visits to Johns and five other 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. Robsion, R.B. Hupalo and L.W. Keenan, *Environmental Management* 42(6):1101-1114, 2008 ("MFL Methods Paper").
2. *Minimum Levels Evaluation: Johns Lake, Lake and Orange Counties, Florida* by C.P. Neubauer, St. Johns River Water Management District, Palatka, Florida, 2008 ("2008 Draft, MFL Report")

Detailed comments below are confined to the Johns 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 Johns Lake MFL Report unless otherwise noted)

1. Page 5, Johns Lake Wetlands, Transitional Shrub, it would be helpful to include one or two characteristic or typical shrub species that help identify this community.
2. Resurveying two transects at this site several years after the initial surveys provided valuable insight that contributed to the decision to re-formulate the approach for setting the MFLs at Johns Lake. Will re-surveying transects in this manner become standard practice? I recommend developing a procedure and protocol for re-surveying transects and identifying how much change would warrant re-evaluating a previously adopted MFL.
3. Page 33, Minimum Frequent High (IH) Level. Definition of IH from the cited rule seems biased toward a riverine setting. Make sure this definition truly applies to the Johns Lake setting. It is not clear how the defining flood event described in the rule applies to the site-specific goal of maintaining the position of the upland ecotone of a lake. This disconnect could probably be addressed with one or two additional sentences describing how the District is interpreting the flood event described in the rule for a lake setting like Johns.
4. Page 34, second full paragraph. “The 96.3 ft NGVD...represents the location of the saw palmetto root zone if the extreme high water events of 1960 and 2004-2005 had not occurred...” and Page 36 “Recorded stage data are higher than they should be...” The explanation for this important point here is weak, especially when considered in light of other parts of the narrative in this section. It appears that you are discounting actual water level data from real high water events that appear to fall within the definition of IH cited in the rule (p. 33) and later in the narrative (p. 34, first full paragraph) simply because the model did not predict these events. The observation of “two dead saw palmetto rhizomes...at slightly lower elevations...” though intriguing, seems shaky evidence by itself. More explanation and justification is needed to support this critical line of reasoning – it may be helpful to include more information from the hydrologic modeling report here in the MFL document to support the rationale for lowering the IH from values determined in the field. My understanding is that this rationale is derived from the observation that under real conditions, both in 1960 and in 2004-2005, the outlet conditions and discharge structure were not maintained or operated as modeled, so water levels were unusually high. There needs to be more explanation of this rationale, why this situation warrants treating those high water events as outliers and why the model results are considered superior to observed

levels. Showing a comparison of modeled and actual water levels with and without idealized structure and outlet conditions may be helpful here, as would support from additional field indicators. It appears that most of the corroborating evidence from the field is derived from a single transect.

To be clear, I believe that there is solid justification for the 97.0 elevation determined from field indicators for the root zone of saw palmetto. It is the further reduction from 97.0 to 96.3 ft NGVD that requires additional explanation.

5. The District should consider reviewing past rainfall records to see if the assumptions about typical length of wet and dry seasons inherent in the duration criteria for IH and IL, 120 days and 90 days, respectively, have held true over the past couple of decades.

Minor Edits (Page citations refer to Johns Lake MFL Report unless otherwise noted)

1. Throughout document: change footer from “DRAFT 5/29/2008” to present version.
2. Pages ix-x, List of Figures, missing page numbers for figure citations.
3. Page 3, Johns Lake Background Information, “City of Winter Park” should be “City of Winter Garden”
4. Page 4, Johns Lake Bathymetry and throughout document, the “lobes” of Johns Lake are variously referred to as Lobes A and B (Fig 3), Southwest and Northeast lobes (this section), and east and west lobes (most other references in the report). The nomenclature for referring to these lobes should be consistent throughout the document. Another statement in this section (end of second paragraph) suggests there are more than two lobes comprising the lake.
5. Page 4, Johns Lake Bathymetry, note that the flow-way referred to in the third paragraph is difficult to see on the map (Fig 2)
6. Page 5, Johns Lake Hydrology, third paragraph, consider using “...minimum low...” in the fourth sentence instead of “...extreme low...”
7. Page 6, Hydric Hammock, second sentence: “...is with saturated...” should be “...has saturated...”
8. Page 6, Bottomland Hardwoods: does this description, which refers to “floodplains of rivers and streams” and alluvial soils apply to Johns Lake?
9. Page 12, Fig 4 – it would be helpful to label some of the elevation contours on this map
10. Page 18, Field Data Collection, third sentence: “The main purpose...minimum time (Martin and Coker 1992).” This sentence and citation is probably not needed.

11. Page 19, Vegetation Sampling Procedures, second paragraph, second sentence: “Reasonable scientific judgment...basis for decision making (Gilbert et al. 1995).” This sentence and citation is probably not needed.
12. Page 20, third paragraph: be careful citing a three-year old draft document if this is not accessible to all readers. Perhaps include a link to the document’s location on the District’s web site as part of the citation.
13. Page 28, Results and Discussion, third paragraph. Consider moving this paragraph to the Methods section of the report.
14. Page 32, third full paragraph, first sentence: “Despite the changes...fieldwork₂ performed...” should be “Despite the changes...fieldwork was performed...”
15. Page 32, third full paragraph, third sentence: “...updated conditions drainage conditions...” should be “updated drainage conditions...”
16. Page 33, lines 4-5: “An assumption is that protection...listed in this Rule” This sentence should refer to the WRV assessment table in the Appendix (Appendix C?).
17. Page 33, Minimum Levels Determination, first paragraph, last sentence: “However, an IH and IL levels were subsequently...used to determine the FH and FL were astatic and could not be used...” should be “However, IH and IL levels were subsequently...used to determine the FH and FL were found to be astatic and could not be used...”
18. Page 37, first full paragraph, first sentence “...do no increase...” should be “...do not increase...”
19. Page 37, second full paragraph: the description of the specific indicator is awkwardly written.
20. Page 38, second paragraph, fourth sentence: consider replacing “tropics” with “southern areas” or “southern parts of its range.”
21. Page 38, third paragraph, last sentence: this sentence should be clear that the number of events referred to is the number of events per century.
22. Page 50, second paragraph, fourth sentence: “Based on on-sited collected data...” should be “Based on on-site collected data...”
23. Page 50, second paragraph, fifth sentence: “Notably...recommended MFLs.” This sentence may not be necessary.
24. Page 50, second paragraph, sixth sentence: “...hydrologic model should be run...” should be “...hydrologic model was run...”
25. Page 50, third paragraph: this sentence should refer to the WRV assessment table in the Appendix (C?)
26. Page 61+, header should be changed to “Appendix B”
27. Page 85+, header should be changed to “Appendix C”

Findings and Recommendations

1. **Recommendation:** Improve Johns Lake MFL Report by addressing the review comments 1-5 and minor edits 1-27 above.

2. **Finding:** Based on my review of the Johns Lake MFL and Hydrology Reports 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. Although there is little data available that reflect the unaltered conditions of the lake and its watershed, the District has done a commendable job through research, modeling and re-evaluation of transect survey data to gain an understanding of how sandhill lakes such as Johns Lake function over the long term. Additional transect data to support some elements of this MFL determination (especially the IH) may be warranted if such data can be obtained cost effectively.
3. **Finding and Recommendation:** The District has been very responsive to previous peer review recommendations on a prior draft of this MFL Report and has produced a much improved report with a simplified methodology that avoids many of the shortcomings seen in the previous iteration. The District should be commended for re-evaluating the basic data collection used to support previous draft MFL recommendations. Resurveying two transects at this site several years after the initial surveys provided valuable insight that contributed to the decision to re-formulate the approach for setting the MFLs at Johns Lake. I recommend developing a procedure and protocol for re-surveying transects for other water bodies where MFL studies have already occurred and identifying how much change would warrant re-evaluating a previously adopted MFL.
4. **Finding:** The decision to set Infrequent High and Infrequent Low Levels for Johns Lake is sound and appropriate for a highly variable sandhill lake with a heavily altered watershed. Likewise, the rationale for setting the Infrequent Low is sounds and based on solid information from the field and the technical literature. The rationale for setting the Infrequent High is more problematic. Although the reasoning is likely sound, more explanation and justification is needed in the MFL Report to support the decision to lower the IH from 97.0 to 96.3 based on modeling results. See Review Comment 4 above.