DRAFT

-- Peer Review --

Minimum Levels Determination: Lake Hiawassee, Orange County, Florida

By

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Overall Impressions

The MFL document for Lake Hiawassee, prepared by J.B. Slater, is well written and develops the ecological criteria for MFLs at Lake Hiawassee well. Descriptions of soils and plant-communities are thorough and understandable. The application of the SWIDS approach is well documented, and the discussion of MFL-development procedures using soils and plant communities are generally excellent.

I found no reasons for questioning the soils and plant community data and means for relating these to the stage-regime for MFL revisions.

I do have concerns that some critical steps have been referenced when the should have been included in the report, however. These largely deal with modeling and data development issues. Also, there is a need to provide hydrologic context.

General Issues

It is my belief that a document, such as this MFL report, should stand alone to the extent possible. As a result, there are some content issues that should be addressed. These are listed below.

1. The report mentions that the stage data for the lake had a long period of record (1960 – 2007), but the stage measurements were "random" in early years (1960 – 1993). Later, the data were collected monthly (1993 – 2004) and then daily (2006 - present). No stage data were collected from 2004 to 2006. As a result, stage data were apparently synthesized to extend the period of record (p. 5) using SSARR. The Appendix A does not describe SSARR or the results of the model. There is a need to present the results of the SSARR modeling, including how the model works and validation of any synthesized stage data.

2. Comparison of the pre-1990 stage data with post-1990 data in Figure 7 suggests that the pre-1990 data may not have been random. It appears there may be a bias toward low stages even though several extremely wet years occurred during that interval.

3. Appendix A by Robison presents an excellent discussion of the Weibul distribution and how to use a stage duration curve. It also mentions how the groundwater flow model was used to determine the effects of groundwater withdrawals on lake levels. There is a need to present more about the results of the groundwater model, including current modeled drawdowns and sample effects of projected withdrawals on Floridan and surficial (?) aquifer levels. What is level of discitization of the model and sensitivity of the model to lake levels and vice versa? What does model say the water budget is at/near the lake?

4. The interactions of the lake with the Floridan are not discussed in the report. Appendix A and several locations in the report suggest that there is an interaction of the lake and the Floridan. How so? What is the role of the drainage well in recharge? How deep is it and to what aquifer and formation does it drain. How often does it functions?

5. The description of a sandhill lake quoted from CH2MHILL on page vii is used to justify not establishing a Minimum Average MFL. If the stage duration curve is nearly linear from the FH to FL, the MFLs with recurrence intervals fixes the average, as well. However, I think reliance on the "astatic" argument is not well justified.

6. The statement that sandhill lakes are "astatic" suggests that there is little or no connection of the lake with the Floridan aquifer. Otherwise, levels in the Floridan should ameliorate variations in lake levels. The report refers to interactions with the Florida, and the recharge rates from Boniol's report suggest that Floridan recharge is greater under the sandhill than the lake. Can these differences be explained? There is a need for a well-developed hydrogeological discussion.

7. This brings up a lack of adequate background information. I think the following should be addressed in the report.

    a. Hydrological setting of the lake (is the lake a flow-through lake, are there connections with the Floridan aquifer, is the lake perched, etc.)

    b. What is the water budget? This should be available from the groundwater flow model.

    c. Is is possible to present a reconstructed stage hydrograph that shows synthesized data. What is/are the range of stages, population metrics, any historical shift related to rainfall or land-use changes, etc.

    d. How quickly does stage change during major rainfall events (an indicator of aquifer interactions and drainage basin size/characteristics)

    e. Details of the CUPs for any nearby wellfields and stress patterns

    f. Behavior of surficial (?) and Floridan aquifer water levels near the lake, including monitoring facilities and groundwater level data evaluation

g. Aquifer potentials relative to lake levels

h. Importance of seepage from shallow soils and the surficial aquifer to lake levels

i. While not critical, a brief description of the stratigraphy in the vicinity would be helpful to understand the relationship of the lake bottom to the top of the Floridan aquifer

8. A description of a sandhill lake and how it functions would be useful.

9. How are/were lake levels monitored (staff gage or automated gage)? How are these data handled?

MFL-Related Concerns

The term "dewatering" is used in several locations related to the proposed MFLs. This term needs to be defined; it may be misinterpreted. To me, dewatering implies human actions. Don't you just mean low stage, regardless of cause?

Editorial comments have been made on the manuscript. These will be transmitted to the District for the author's use.