Geosyntec consultants

ESA

JOHNS LAKE MFL
INITIAL PEER REVIEW COMMENTS

Tuesday, May 27, 2025

Welcome and Introductions

Peer Review Guidelines

Initial Peer Review Comments

Questions

Welcome and Introductions

Peer Review Team

- Robert Burleson, P.E. – Geosyntec Consultants
- Tony Janicki, Ph.D - ESA

Peer Review Guidelines

Validity and appropriateness of environmental analyses and criteria

- Are the environmental data used to develop environmental criteria adequate and appropriate?
- Are the methods and procedures used to develop and assess environmental criteria appropriate?
- Have all relevant environmental values been evaluated?
- Are assumptions reasonable and consistent given best available information?

Validity and appropriateness of hydrological analyses:

- Are the hydrological data used to develop and assess environmental criteria adequate and appropriate?
- Are the hydrological analyses used to develop and assess environmental criteria appropriate?
- Are assumptions reasonable and consistent given best available information?

Appropriateness of recommended MFLs:

- Are data used to support conclusions and recommendations adequate and appropriate?
- Are the assumptions used and conclusions made in the development of protective minimum levels reasonable and appropriate given best available information?

Documents Reviewed:

- Blais, C, O. Leta, C.R. Shadik, A. B. Sutherland, S.L.Fox, F. Gordu. Minimum Levels Determination for Johns Lake, Orange and Lake Counties, Florida. Draft Report. Bureau of Water Supply Planning, SJRWMD.
- Appendix A: DEM Development
- Appendix B: Hydrological Analyses;
- Appendix C: Environmental Methods, Data and Metrics;
- Appendix D: MFLs Status Assessment; and
- Appendix E: WRVs Assessment

Validity and appropriateness of hydrological analyses

- **Are the hydrological data used to develop and assess environmental criteria adequate and appropriate?**
  - Yes. The hydrologic data used to develop and assess the environmental criteria are considered adequate and appropriate.
  - Long-term meteorological and hydrological data record
  - The two (2) models used to develop the long-term no-pumping and current pumping time series (ICPR4 and ECFTX model) have undergone rigorous peer review.
  - Estimates of groundwater use were developed using either Annual water Use Survey data or were based on per capita water use, both considered best available information.
  - The period of record for both surface water and groundwater data were sufficient to develop strong relationships between Johns Lake water levels and UFA water levels as demonstrated in the report.

Validity and appropriateness of hydrological analyses, cont.

- **Are the hydrological analyses used to develop and assess environmental criteria appropriate?**
  - Yes, but with questions. The analyses used to assess the environmental criteria are considered appropriate. It allowed the District to apply their event-based analytical method as has been applied successfully in past studies to two fish and wildlife habitat metrics and to apply its Hydroperiod Tool to develop the minimum lake levels for the four fish and wildlife habitat metrics and three recreational values.
  - **Additional explanation needed related to the sudden change in simulated water levels around 1996 and prior as shown in Figure B-8.**
  - **Consider investigating the effect of the model over-prediction of Johns Lake water levels in the first half of the simulated time period on the environmental analysis.**

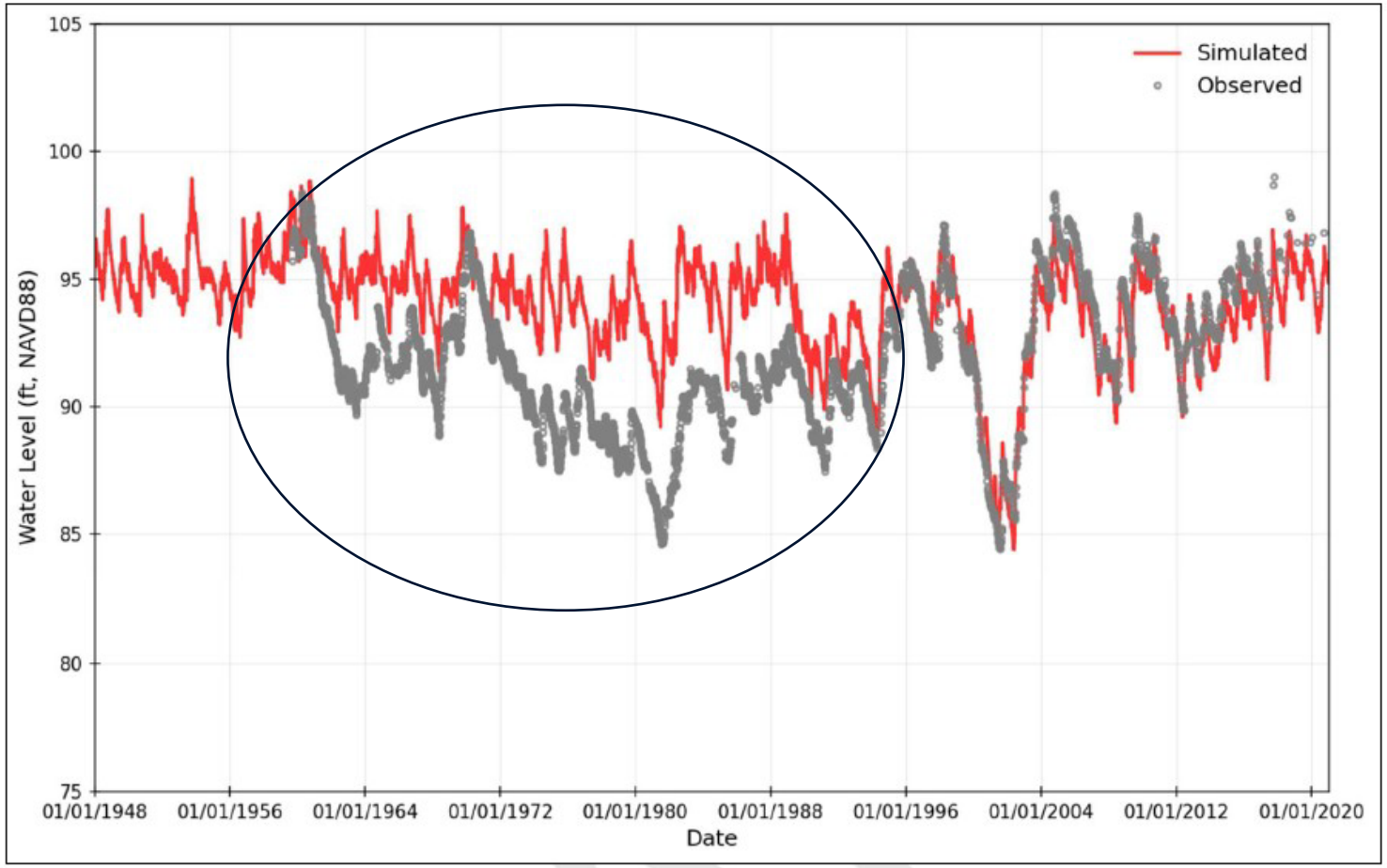


Figure B-8: Comparison of long-term observed and simulated water levels of Johns Lake.

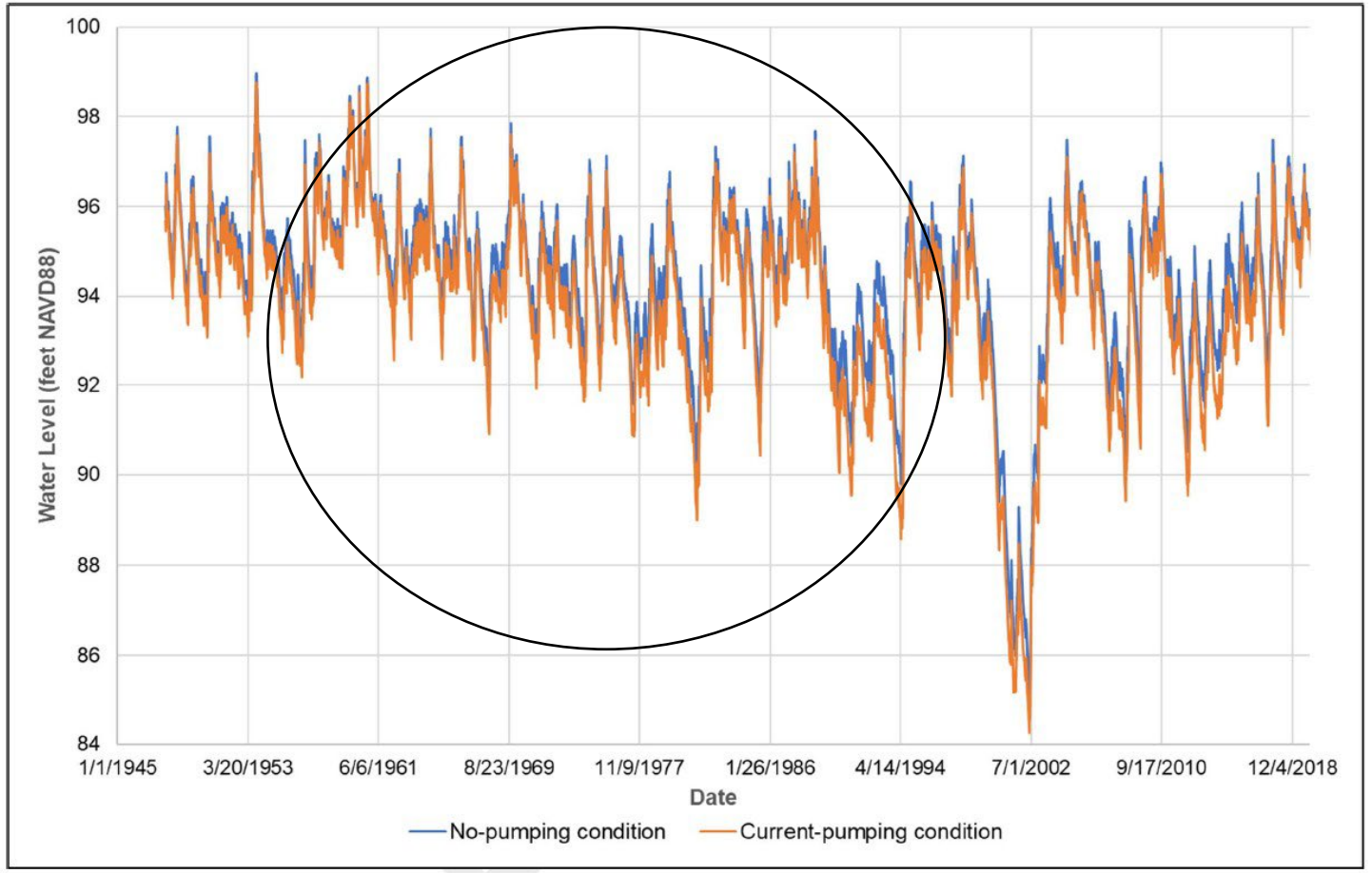


Figure 15: No-pumping condition lake levels compared to the Current-pumping condition lake levels.

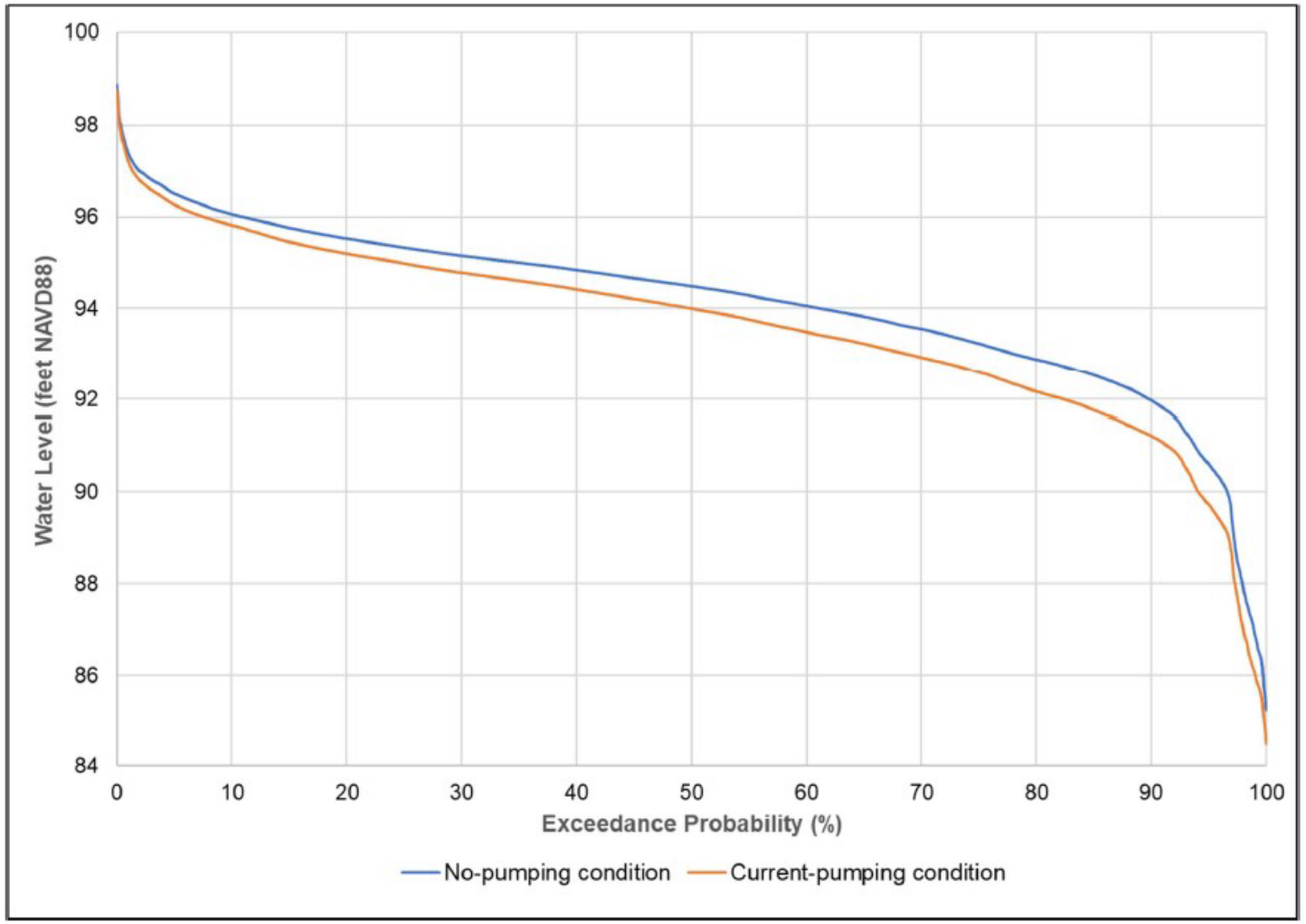
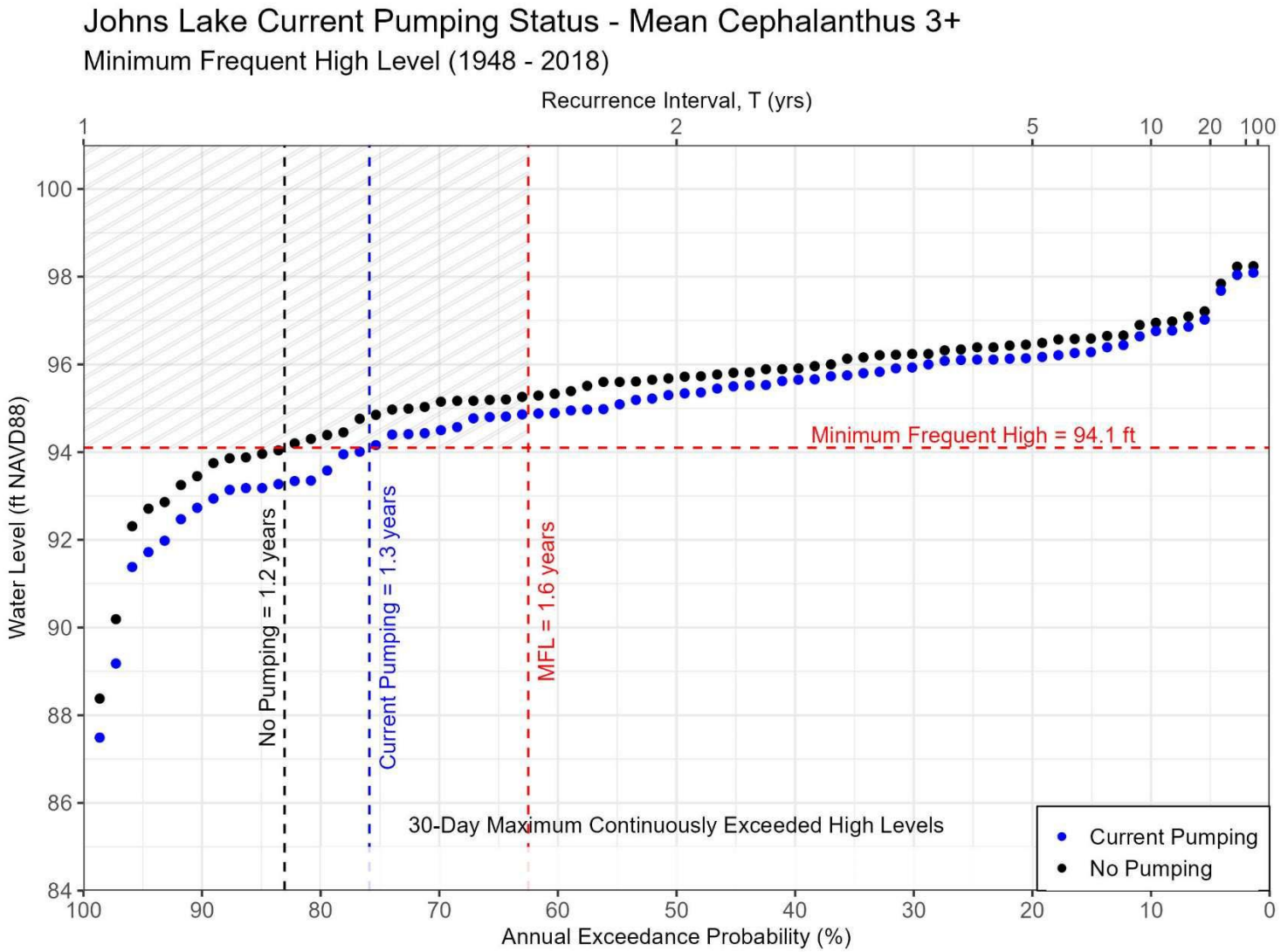


Figure 16: No-pumping condition exceedance curve compared to the Current-pumping condition exceedance curve.:

Curves would be shifted down some if model did not over-predict.



Curves would be shifted down some if model did not over-predict.

No pumping and current pumping frequencies for 94.1 ft would shift right (less frequent).

Consider:

1. Using the observed lake levels in the pre-development period to create a hybrid long-term lake level time series
2. Apply no-pumping and current pumping adjustments to the hybrid time series
3. Re-calculate statistics, including frequency statistics for duration, using the hybrid time series
4. Re-evaluate No-pumping and current pumping frequency analysis for FH #1 and compare to MFL recurrence interval (1.6 years) determined from SWIDS analysis.
5. Re-evaluate the open water area metric with the Hydroperiod Tool
6. Re-determine available water for FH #1 and compare to open water metric freeboard (1.3.ft) to determine if the open water metric is still the most constraining.

Validity and appropriateness of hydrological analyses, cont.

- **Are assumptions reasonable and consistent given best available information?**
  - Yes, but with a question. The biggest assumption is that the hydrological history will repeat itself. Given the uncertainties in future rainfall and temperature predictions, the District's approach of regularly testing this assumption by implementing and adaptive management strategy is considered reasonable.
  - **Need to discuss how you arrived at a 15-mile buffer zone when assessing groundwater pumping rate and UFA and Johns Lake drawdown impacts.**

Validity and appropriateness of environmental analyses and criteria

- **Are the environmental data used to develop environmental criteria adequate and appropriate?**
  - The District applied best available data.
- **Are the methods and procedures used to develop and assess environmental criteria appropriate?**
  - The District applied a similar event-based analytical method as has been applied successfully in past endeavors.
  - The District applied its Hydroperiod Tool to develop the minimum lake levels for the six fish and wildlife habitat metrics.
- **Have all relevant environmental values been evaluated?**
  - The District evaluated a number of potential environmental criteria and arrived at the Minimum Average event-based criterion and criteria for six (6) fish and wildlife habitat criteria.
- **Are assumptions reasonable and consistent given best available information?**
  - The District could provide further justifications for the assumptions made in developing the MFLs.

Appropriateness of recommended MFLs:

- **Are data used to support conclusions and recommendations adequate and appropriate?**
  - The data used to support conclusions and recommendations are adequate and appropriate.
- **Are the assumptions used and conclusions made in the development of protective minimum levels reasonable and appropriate given best available information?**
  - The assumptions used are reasonable and appropriate with some additional justification.

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Questions

"In general, considering the pre-development LULC (converting developed areas to agriculture land – assuming the pre-development agriculture as Grove) and adjusting the pre-development estimated groundwater levels at OR1123 (reducing the estimated levels by 6 ft) appeared to improve the match between observed and simulated levels of Johns Lake for the pre-development period. However, this could be at the cost of systematically underestimating the post-development observed lake levels (see Figures C – 21 and C – 22 of Appendix - 2). We thus believed that the large discrepancy between observed and simulated levels of the pre-development period could be due to additional uncertainties arose from lack of long-term observed groundwater and rainfall data in the watershed, including noticeable LULC change. **Therefore, the simulated levels of pre-development period should be used with caution. For example, given the long-term POR of Johns Lake, the MFLs analysis may use the observed levels adjusted with the differences derived from simulated historical and scenario levels instead of directly using the simulated lake levels. "**

From Leta O.T., Jia Y., and Jobes, T. 2022. Hydrologic Modeling for Minimum Flows and Levels Support – Johns Lake. Final Model Summary Report, pp16.