

Lake Avalon, Orange County

Proposed Peer Review Resolution Document: Shaw, Wilson, Upchurch, and PB Americas, Inc.

May 18, 2010

Reviewer	Peer Review Comments	Resolution
Peer Reviewer Comments - April 2009		
Shaw	1. Pages 2-3, Factors to be Considered When Determining MFLs and Pages 25-26, Consideration of Environmental Values Identified in Rule 62-40.473, <i>F.A.C.</i> – it would be helpful to indicate here which factors were considered in the development of the Lake Avalon 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 Lake Avalon 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.	WRV table has been added to report.
Shaw	2. Pages 19-20, Sandhill Lake Stage Indicators Sampling Procedures and Minimum Frequent high (FH) Lake Stage Indicators – It would be helpful to include better explanation and more information regarding the empirical correction factors (i.e., -0.59 ft, -0.35 ft, -0.24 ft) that are referred to in these sections, citing the Richardson (2006) and Nkedi-Kizza and Richardson (2007) references. Perhaps some additional explanation of why these correction factors were deemed necessary and how they were derived could be included as a footnote or short appendix. In some cases, the correction factors appear to have been derived from the mean correction required at all lakes studied by Richardson or from laboratory experiments. In such cases, it would also be useful to know the variance of the data to understand how well the mean predicts the sample. Field validation of laboratory measurements of the height of the capillary fringe would also be helpful if available.	LSI indicators were found to be inconsistent and have been removed from report.
Shaw	3. Page 21, Minimum Frequent Low (FL) Lake Stage Indicators – The paragraph beginning with the sentence “Lake stage indicator thresholds used to determine MFLs...typical low levels” is difficult to understand and the first two sentences may need to be re-written for greater clarity. Also, material about the capillary fringe in this and the subsequent paragraph are repetitive, and were also included in the previous section on page 20.	LSI indicators were found to be inconsistent and have been removed from report.
Shaw	4. Page 40, Lake Avalon – Two Hydrologic Systems -- I concur with the District’s decision to confine for now the recommended minimum levels to the main (western) lobe of Lake Avalon in light of compelling evidence that the eastern lobe may behave differently when water levels fall below a dividing ridge. However, given their close proximity to each other, it would seem unlikely that the hydrology of the two lobes is completely independent. Ultimately, a single model may be required that explains the differences in both lobes at lower stage levels. Care should also be taken in	States in last sentence in exec. sum and “conclusions and recommendations” “MFLs for the eastern wetland lobe should not be adopted until a hydrologic model is produced and the elevations of wetland communities are studied using surface water inundation/dewatering signature and frequency analysis.

Reviewer	Peer Review Comments	Resolution
	communicating the recommended Lake Avalon MFLs to ensure that they are not erroneously applied to the eastern lobe until further analysis is complete.	
Shaw	5. Page 42, Minimum Frequent High (FH) Level – In the third paragraph in this section, the first sentence states that “The recommended FH level was calculated from the mean of all elevations of the wet prairie communities...” I assume the mean elevation referred to here is the average minimum elevation of the wet prairie communities. Please clarify in the text.	Mean of mean elevation of the 2 wet prairie communities was added to report.
Shaw	6. Page 44, Figure 14 and Page 49, Figure 16 – Although the drawdown signatures (SWIDS) from other sandhill lake sites are used only as additional support for the minimum levels recommended for Lake Avalon, it would be helpful if the wide range of variability observed in the signatures shown in these figures were better explained. The wettest and driest sites in each figure (Lake Geneva and Wekiva River for Fig. 14 and Lakes Dias and Pierson for Fig. 16) appear so different from the others that special attention should be given to these to ensure that they are not outliers and are used appropriately in this and subsequent MFL analyses. It would also be helpful to indicate on these figures which sites are sandhill lake sites and which are not.	The current SWIDS dataset was re-evaluated to “cull-out” any systems that were not considered “healthy” so that to the extent possible, the existing analysis was completed on lakes that had hydrology comparable to the lake being assessed.
Shaw	7. Recommendation: Improve Lake Avalon MFL Report by addressing the editorial comments 1-6 above.	Editorial comments addressed during the report update.
Shaw	8. Finding: Based on my review of the Lake Avalon MFL and Hydrology Reports and field inspection of transects, I feel that the environmental data from the site and the data collection procedures used to support this MFL determination are appropriate, repeatable and scientifically sound. The District has done a commendable job through research and modeling to gain an understanding of how sandhill lakes such as Johns Lake function over the long term. That knowledge is appropriately incorporated into this MFL determination. 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.	SWIDS analysis and data presentation was clarified to ensure, to the degree possible, that statistical outliers or already-harmed sites are not used to set MFLs and explaining the apparent variability in SWIDS data.
Shaw	9. Finding: Similarly, the methods and procedures for data analysis, including selection, parameterization and calibration of the hydrologic model for Lake Avalon 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. I concur with the District’s decision to limit the recommended minimum levels to the main or western lobe of the lake until additional model development and analysis are completed for the eastern lobe.	No response necessary. Reviewer’s comments support the District MFLs procedures and processes.
Shaw	10. Finding: 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 decision to focus MFL determination on FH and FL and not recommend a minimum average is reasonable and appropriate. The Lake Avalon MFL determination relies on the natural	No response necessary. Reviewer’s comments support the District MFLs procedures and processes.

Reviewer	Peer Review Comments	Resolution
	drawdown and inundation characteristics of stable vegetation communities and soils on site to set minimum frequent low and frequent high. SWIDS are used as additional support for these elevations and return periods and are consistent with the in-situ indicators.	
	Peer Review Comments: Dr. Lee Wilson	
Wilson	1. As I have stated before, it is my opinion that the SJRWMD MFL program is scientifically sound and at the forefront of the application of ecological principles to protection of instream flows. The six lake reports are professionally done and in conformance to the District’s MFL guidance.	No response required. Comment supports District approach.
Wilson	2. The fact that my comments are critical of certain aspects of the reports is a reflection of my assignment, which is to identify issues and find possible problems, and should be read in that spirit. Many of the comments are at the nit-picking level and others are aimed more at suggesting improvements to future reports rather than changes that need to be made in these drafts. Many comments reflect the fact that different authors addressed a given issue in different ways, which may not matter. Put another way, I don’t expect all comments to be responded to.	No response required. Comment supports District approach.
Wilson	3. There are two areas of substantive comments that I do need think to be addressed. One is that these reports all deal with sandhill lakes where hydrology is not as straightforward as SJR floodplains and lakes, but extremely important to how the MFLs were approached. Each report would benefit from an extended discussion of hydrology and its relation to soils and vegetation (see detailed comments below). Moreover, based on our field visits I expected similarities in MFL approach and results. However, the reports differ in this regard as much or more as they are similar. Each author needs to stand back and feel comfortable that his/her results are consistent with the sandhill lake literature.	<p>The District recently developed a lake classification procedure (Epting et al. 2008) based upon statistical measures of exceedence and level change analyzed with principal component analysis. Stage range and stage rise/fall symmetry accounted for 88% of the variance of six original hydrologic variables. These indicators of hydrologic regime classified 135 lakes into eight lake classes. The generally close correspondence of the lake classes to geomorphic and landscape classification lends strong support to the utility of this classification approach.</p> <p>Each report now includes a discussion of the assigned lake class and more details regarding the geomorphic, landscape, and the relationship between hydrology and the observed patterns of soils and vegetation. While a number of the lakes are assigned to the same lake class, some difference in approach and results is clearly expected. For example, Sylvan Lake is very unusual for this lake class in that it has extensive areas of deep organics. As a result, a minimum average</p>

Reviewer	Peer Review Comments	Resolution
		level was set focusing on protection of these soils. Also, different management practices at each lake may result in differences in the type of plant communities found at the lake “rim,” where the Frequent High levels were set. Mowing and cattle grazing would be expected to result in different plant communities than fire or the absence of any management scheme.
Wilson	4. The second substantive area is that the MFLs, and especially the FH, recommend a fairly large increase in “permanent drought” hydrology. I didn’t find the justifications for this to be sufficiently rigorous or entirely satisfactory. Again, there is more detail below.	More explanation was included in the reports Results and Discussion sections to clarify the justifications. See response to Wilson Comment No. 40.
Wilson	5. From this and other reports reviewed in the same timeframe, it appears that SJRWMD has gone a long way toward settling on a consistent outline for its MFL reports, but is not yet quite to the point of complete consistency. I encourage the District’s continued efforts toward settling on a “best” organization.	The report format and outline will be re-evaluated to achieve consistency across reports to the extent possible and within reason.
Wilson	6. One specific example where organization is not consistent is that in the section called “General Information” or “Background Information” (neither one a great title), wetlands are sometimes presented before soils, sometimes after. As the soils are the foundation, but dependent on hydrology, I suggest soils go before wetlands.	Comment is addressed in each report re-write.
Wilson	7. Some reports provide a lot of detail on published soils maps and descriptions; others ignore this almost entirely. Since MFLs are based on field soils data, cutting out the details in this background section would help shorten some reports. A citation to the published soils survey, a map and perhaps a table would provide good routine content; or just the citation.	An effort was made to provide consistency between reports..
Wilson	8. Land use maps are in some reports and probably should be in all.	Comment was addressed in the current reports.
Wilson	9. Sylvan has a section on morphometry which was helpful, and I suggest something similar be in all future reports.	More lake morphometry information will be added to future reports, depending on data availability.
Wilson	10. There is quite a variation in Executive Summary content, detail and organization. It might be useful to develop a standard template that ensures that the essential information, and nothing more, appears at the beginning of the report. If there is already guidance to this effect, then please consider how best to ensure the guidance is followed in future reports.	Format and content will be standardized for future reports. Some effort has been applied to rectify this issue in the current reports.
Wilson	11. The Executive Summaries differ most dramatically in that some have extended discussions of each MFL, others simply contain the summary table. I think one paragraph on each MFL, plus the table, is about right.	Comment noted. Some effort has been applied to rectify this issue in the current reports.
Wilson	12. Another difference in the Executive Summaries is that some discuss methodologies (including SWIDs) and/or the hydrologic model; others don’t really do much with that; and those that do have such discussions say different things. I think at least one somewhat consistent paragraph on the method and on the hydrologic compliance analysis is worth having, though it isn’t essential in the current drafts.	Comment will be applied in all future reports.

Reviewer	Peer Review Comments	Resolution
Wilson	13. Two statements appear in some reports and probably should be in all. One is the “intended to support” (e.g. Avalon) paragraph and the other is the “not effective until” and “reassessment” text (e.g. Johns).	Reports updated to include similar language to address these issues.
Wilson	14. Of all the Executive Summaries, I thought Sylvan came closest to having the necessary material without too much else. I suggest it be reworked per specific comments and shared as an example for others to at least consider in future reports.	No response necessary.
Wilson	15. There are report sections that are effectively boilerplate, such as the description of the MFL program, but the language still varies a bit from report to report. Making this true boilerplate, where each author copies from a master, is probably advisable for future reports.	Comment will be applied in all future reports.
Wilson	16. All the reports have a location map early on (except Indian Lake). But they are too large in scale to allow most folks to know exactly where the lake is. I recommend a more regional location map. This is something for consideration in future reports, though it wouldn’t hurt if it could be addressed now.	More regional location maps were added to the existing reports and will be added to future reports.
Wilson	17. Note that many of the color graphics are hard to read when printed or copied in black and white. Something to keep in mind as future graphics are prepared.	Staff believes that color figures provide more clarity for presenting data. Reports are made available to the public as digital copies on the District website or on cds from the District library.
Wilson	18. The next comments all relate to the fact that the reports use a large amount of verbiage to describe various aspects of MFLs in general and the MFLs of each particular lake. For future reports, the more this information could be captured in text tables, and the text shortened, the better. By text table I mean something that is used where the same kinds of things are said repeatedly about different subjects -- in this case, for example, the text on each different MFL has the same pattern and is well suited for a table.	Comment will be applied in all future reports.
Wilson	19. Three examples of text tables could be: what each MFL level is intended to protect and what they typically represent as to frequency and duration; the field transect results (all transects on one table); how the MFLs relate to observed vegetation, observed soils and modeled hydrology.	Comment will be applied in all future reports.
Wilson	20. It is not clear how the District intends to address the 10 factors. In these reports they are typically noted as part of the introduction and there is an expanded listing a bit later. But there is no standalone section that then discusses the role of the factors in setting MFLs, or the effect of the MFLs on the factors. At most there are mentions of individual factors somewhere in the body of the report. In other words, the factors are highlighted, but their application is buried. I suggest there be a section on the factors “as applied” near the end of each MFL report. This would state whatever is to be stated on this subject, even if it was judged that none of the factors required any in-depth study. This would be useful in the existing reports as well as future ones.	Reports updated to include language to address the issues regarding the assessment of the WRVs and clarify the reviewer’s comments.
Wilson	21. The essence of MFLs is the relationship between hydrology and soils/vegetation. Indeed MFLs are as much about hydrology as anything else. The reports present some	Each report was updated to include an expanded section on hydrology and to demonstrate an

Reviewer	Peer Review Comments	Resolution
	information on hydrology (mostly stage data) without any analysis. I suggest there is a need to do more, and in particular to demonstrate an understanding of essential hydrologic relationships for each lake as a predicate for defending each MFL determination.	understanding of essential hydrologic relationships for each lake summarized in Wilson comment No. 22. However, staff believe the details regarding hydrologic modeling and compliance are more appropriately presented in the hydrologic modeling reports for each lake and the hydrologic compliance appendix in each report. These will be more extensively referenced in the MFLs determination reports.
Wilson	22. Specifically, each report should explain what it is that controls the hydrology (that then controls the ecology), and how the controls may have changed (or not changed) over time. For these lakes that discussion will consider runoff, surface precipitation/evaporation, outlets, and seepage. Since there are model reports for each lake, it might be possible to cut and paste at least some of this in-depth hydrology into the existing reports.	See response to Wilson comment No. 21.
Wilson	23. I understand most if not all the lakes are sandhill lakes. The characteristics of sandhill lakes receive extensive attention in some reports (e.g. Avalon, see pp. 19-21) and are barely mentioned in others (Indian Lake). The fact of sandhill lakes is justified as a reason for no MA in some lakes, making it unclear why MA is defined in others.	See response to Wilson Comment No. 3. A justification was added in each report to clarify why or why not a MA was determined.
Wilson	24. An issue that reflects sandhill lake hydrology is that one might expect the exceedence graphs to be similar and to not show the mean as representing a particularly common condition, i.e. (per CH2M-Hill 2005) “because they appear to lack a mean around which the system is organized”, and this is used to justify no MA. In fact, several of the hydrographs suggest that conditions near the mean are common enough that they would impact vegetation but there is no MA (example Johns Lake) while others show the mean to be just another number in a highly variable system, but there is an MA (example Indian Lake).	See responses to Wilson comments No. 3 and 23.
Wilson	25. Suggest putting the MFLs on the curves showing stage history (as done for Hiawassee).	Figures were updated to include MFLs labels.
Wilson	26. One particularly important aspect of hydrology is the compliance analysis. The use of MFLs to impose pumping limits creates impacts on the regulated community and offers opportunity for controversy and legal challenge. Therefore I think it is particularly important that the compliance analysis be as transparent as it can be. Rather than rewrite the compliance appendices, I suggest an expanded discussion in the text.	The compliance section of each report was expanded to clarify how MFLs constrain the regulated public. The interaction of the Floridan aquifer and lake levels was described and drawdown limits were referenced in each report.
Wilson	27. One specific element in this discussion would to summarize the causality relationships determined in the hydrologic model and in particular to present something that shows that aquifer levels predict lake levels.	See response to Wilson Comment No. 26.
Wilson	28. Only Indian Lake contains a statement as to the result of the compliance analysis. I recommend the aquifer drawdown limit be stated explicitly, with whatever caveats are needed. It should be clear that the value is a limit on the long-term average, i.e. it doesn't	See response to Wilson Comment No. 26.

Reviewer	Peer Review Comments	Resolution
	mean that the hydrograph can't decline more than the indicated level during droughts.	
Wilson	29. The compliance analysis appears to assume constancy in other controls of lake levels, when the available information does not make that a certainty. Is this covered by the "reassessment" language?	See response to Wilson Comment No. 26.
Wilson	30. The bottom line results of the compliance analysis should be given a higher profile in the report, show up in the Table of Contents, and be stated in the Executive Summary. It might properly be the last item in the main body of the report.	See response to Wilson Comment No. 26.
Wilson	31. I'm not sure I understand how the District uses SWIDs. In some reports (Johns) it looks like a SWIDs graph was used to determine an appropriate duration-frequency and the MFL selected accordingly. In others the MFL was determined by vegetation and "supported" by the SWIDs.	More explanation of SWIDs was included in the methods section of each report. The SWIDs data are used as supporting evidence and not as the primary criterion. The reports were edited to reflect this more clearly.
Wilson	32. Whichever way, there seems to be a pattern in which it is considered appropriate for the MFL to allow future conditions to be in the "dry" part of a SWIDs. This is necessary for there to be allowable drawdowns, and I recall it reflects some prior peer review suggestions. Somewhere the approach needs to have rigorous justification and in particular the existing "dry" SWIDs need to be for healthy communities where the hydrology is comparable to the lake being assessed.	See response to Wilson Comment No. 31. The current SWIDs dataset was re-evaluated to "cull-out" any systems that were not considered "healthy," to the extent possible. SJRWMD intends to refine the SWIDs analysis by expanding data collection by lake class in an effort to reduce data variability and uncertainty regarding SWIDs application.
Wilson	33. The shrub swamp SWIDs in Johns Lake and Prevatt are different.	The shrub swamp SWIDs graphs should be different for these lakes. The Prevatt report references the <u>maximum</u> elevation of the shrub swamp, while the Johns lake report references the <u>mean</u> elevation.
Wilson	34. The Sylvan Lake report shows the effects of the proposed MFL compared to existing conditions on each SWIDs graph. I thought this was excellent and recommend it be used universally.	Reports containing SWIDs analysis graphs were updated to compare existing and MFL conditions as done in the Sylvan Lake report.
Wilson	35. For some lakes, sandhill lake stage indicators were evaluated, but this was not done at all lakes. Will the District be able to defend the absence of this approach in some reports?	Examination of the findings from the sandhill lake soils indicator method produced inconsistent results for these particular lakes. A decision was made to remove any reference to the approach from all reports.
Wilson	36. The discussions of sandhill lake indicators make it sound like these were used as the basis of the MFLs, but when the MFLs are actually presented, they are based on vegetation, with soils observations "supporting" the MFL determination. Perhaps there could be a clarifying sentence or two when the soil indicators are introduced that makes their role in the process more clear.	See response to Wilson comment No. 35.
Wilson	37. The soils sampling sections should probably all either have a "we looked for these indicators" description (Avalon is an example where this is done).	The sandhill lake soil indicators were not examined during routine field data collection efforts at each lake. See response to Wilson comment No. 35.
Wilson	38. Some reports discuss calculations of TWSV, others don't. For those that do, it may	The TWSA analysis was only completed for the

Reviewer	Peer Review Comments	Resolution
	help to indicate why this was done and how the results were used. For the others, perhaps the file needs to have a note as to why.	Sylvan Lake report. Results from the TWSA analysis can sometimes be spurious due to the occurrence of opportunistic plant species in communities where they do not typically occur, due to hydrologic excursions (high or low water levels) of various durations / frequencies. In attempt to make the report analyses / format consistent, the TWSA analysis was removed from reports were it occurred.
Wilson	39. For the vegetation sampling in particular, it seems as though there should be a standard methods reference that could be cited, so that the report could focus on the transect results.	The MFLs Methods Manual is referenced in each report and contains more information on vegetation sampling. The discussion of vegetation and other sampling in the methods section of each report is designed to orient the reader. The methods section will be stream-lined in future reports, where possible.
Wilson	40. I will repeat here my general concern that the MFLs seem to reflect a basic assumption that each and every ecosystem can be sustained even if it receives substantially less inundation. Is this supportable?	Yes, we do believe that this assumption is supportable. A key assumption of the SJRWMD method (Neubauer et al. 2008) is that steady state or dynamic equilibrium conditions do not exist between the hydrology and the ecology of a system. That is, not all measurable changes to system hydrology result in subsequent changes to the ecology or the water resources of a system. Thus, defining hydrologic thresholds of events (i.e., MFL return interval components) is more important than developing response curves that describe relationships between flow alteration and ecological responses, habitat-flow curves that define habitat availability at a given flow, or species-discharge relationships that predict numbers of fish species from mean annual discharge. Steady state/equilibrium conditions and the importance of relatively short time scales are assumptions made when developing and using such curves. For the SJRWMD method, a threshold is the return interval of an event beyond which an effect begins to be produced.
Wilson	41. Each report contains (usually as Figure 1) a “Hypothetical percentage exceedence curve”. I strongly recommend that a “real” curve be developed which compares the existing versus MFL defined condition for each lake. This should be done for the current drafts.	An actual exceedence curve is available in each report. See the corresponding hydrologic modeling report for a more accurate exceedence curve based upon long-term modeled hydrology and the MFLs.

Reviewer	Peer Review Comments	Resolution
Wilson	42. The FH indicators vary considerably between the lakes - two shrub swamps, two wet prairies, one hardwood swamp, one transitional swamp. For future reports it might be of value to cite local edaphic or other factors that explain why a particular community is found at the dry end of transects on a particular lake.	Comment will be addressed in future reports.
Wilson	43. The return interval for the 30-day duration MFH ranges from 2 to 5 years. This seems like a large variation and the 5 year return (Sylvan) seems especially long.	Comment noted. See response to Wilson Comment No. 44.
Wilson	44. The changes in terms of percentage of years when the 30-day level will be reached also seem large - for Sylvan the frequency is cut in half, and for most others the change is one-third.	Sylvan has a unique hydrologic condition caused by a rather large increase in DCIA and concomitant rise in lake stage to produce a new hydrologic regime. Therefore, Sylvan Lake is an outlier when compared with the other lakes. The Sylvan Lake report was updated to clarify what changes occurred in the hydrologic regime due to increased basin runoff (~200% increase in DCIA) and why the MFLs statistics seem abnormal. The report text was expanded to try to clarify the reasons for these large changes in return intervals.
Wilson	45. I would judge the wet prairie analysis (Avalon, Hiawassee) is about as far as the District should go in using SWIDs to justify increased withdrawals.	We understand and agree with the reviewers' concerns regarding uncertainty with the SWIDS analysis.
Wilson	46. See comment on astatic nature of sandhill lakes with respect to the MA MFL.	No response necessary.
Wilson	47. The return interval for the 120-day duration MFL ranges from 3 to 5 years. This seems like a large variation.	See response to Wilson Comment No. 44.
Wilson		
Wilson	Wilson Comments specific to Lake Avalon report	
Wilson		
Wilson	48. The dates on the title page may need to be changed.	Dates have been changed.
Wilson	49. The Executive Summary is organized differently than others and is missing the "intent" paragraph. The MFL discussions should probably be one paragraph each.	Paragraph 5 of exec sum has "intended to support" sentence. MFL discussion paragraphs (3 and 4) added to exec. sum.
Wilson	50. It would be helpful to have page numbers for figures and tables, even in drafts.	Page numbers will be added.
Wilson	51. P. 1. I didn't see a similar "background" discussion in other reports.	Changed to "General Information."
Wilson	52. P. 12. Need to describe the wetlands communities at least a bit.	Added information, see page 12.
Wilson	53. P. 17. Other reports have an eighth bullet on rare and endangered species, and also discuss the goals of the transect selection process.	Added bullet and rewrote preceding paragraph for better explanation.

Reviewer	Peer Review Comments	Resolution
Wilson	54. Transects: the organization of this discussion is different than some other reports, but I think it works okay. I did enjoy seeing field photos in other reports.	Photos will be added, put in appendix.
Wilson	55. P. 13. The figure title might mention soils.	Title has “biological features” which includes soils.
Wilson	56. Is it correct that Figure A11 indicates that the selection of the minimum frequent high has no margin of safety?	Shows FH is maximally allocated with a 1.6 ft aquifer drawdown.
	Peer Review Comments: Dr. Sam Upchurch	
Upchurch	<p>1. The Executive Summary begins with CH2M Hill’s rather strange description of water level fluctuations in a sandhill lake. What they are saying is that sandhill lake levels fluctuate greatly and are either platykurtic or, in some cases, almost bimodal. The quote implies that they lack a mean, which is not true. Their distributions are certainly not the classic “bell-shaped” distribution, but they do have a mean and a distribution.</p> <p>I wouldn’t start the reader off with this expectation for uncertainty in the stage data, since you rely upon stage duration curves. For one thing, Figures 5 and 6 do not match the CH2M Hill quote. The data appear to have a unimodal distribution and would have a well-defined mean and other population metrics. I would start the report (and Exec. Summary) off with a statement that the lake is a sandhill lake and that water levels can vary greatly.</p>	CH2M HILL quote removed. Stated that sandhill lakes can vary greatly.
Upchurch	<p>2. The report mentions Robison’s hydrologic model for the lake many times. There is a need to develop the basis for the model and some of its results within this MFL document. My suggestion is that Robison’s model report be included as an Appendix. If not, then the salient points of the model should be included at a minimum. Some issues that should be included are:</p> <ul style="list-style-type: none"> a. The function of the model (is it a mass balance, water budget model or some other form?) b. Calibration methods and evaluation (residuals analysis, etc.) c. Results of the model, including water budget for the lake, modeled interactions with the surficial and Floridan aquifers; seepage components; evaporation, etc. <p>Evaluation of what the model tells you about the lake (sensitivity to a particular water budget component, function of a sandhill lake (why are water levels so “flashy” for</p>	A reference to Robison’s hydrologic model report is included in the Avalon MFLs determination report.

Reviewer	Peer Review Comments	Resolution
	example), etc.)	
Upchurch	3. Price Robison’s Appendix (B) deals with stage duration curves and how they are constructed. It also presents a nice discussion of how the stage duration curves are applied to water resource planning and evaluating the effects of pumpage, etc. on lake levels. It does not detail what is modeled or how the model was used. This is an excellent presentation, but does not suffice for the description of the lake model.	A reference to Robison’s hydrologic model report is included in the Avalon MFLs determination report.
Upchurch	4. The introductory remarks do mention that the lake is a sandhill lake, it is a sinkhole lake, it loses water to the Floridan, and other geologic/hydrologic details. However, there is a need to develop the geologic and hydrologic setting more and perhaps in a better organized fashion. For example, brief paragraphs on hydrogeology (aquifers, etc.), stratigraphy (geologic formations in play), physiography, and sinkhole and karst would provide organization and set the stage for water level discussions to follow. There are some other issues of concern, as well. What is the extent of the lake drainage basin (it must be very small, which means the source of water and lake level variation may be controlled by groundwater or some other process - explain)? How is the lake connected to the Floridan and/or surficial aquifers? Presumably there are sinkholes in the bottom of the lake. What do we know about them? Is there a lake bathymetric map? Withdrawals from the lake and irrigation within the basin?	A reference to Robison’s hydrologic model report is included in the Avalon MFLs determination report.
Upchurch	5. I found no significant information on rainfall, evaporation, and other water-related information. This should be included. I would characterize the data for each and then used the lake model water budget to summarize sources, sinks, and interactions of the lake.	A reference to Robison’s hydrologic model report is included in the Avalon MFLs determination report.
	Peer Review Comments: PB Americas, Inc	
PB Americas, Inc.	1. Assess adequacy of environmental data in terms of quality and length of record. Are there any deficiencies and/or errors regarding data availability? Response: The elevation data for all transect points are not included in the report; therefore, it was not possible to determine the accuracy of the mean elevations determined. In addition, photographs of the monitoring transects taken at the time of the vegetation monitoring survey were not included in the draft report. These photographs should be included in the final report to substantiate and document the vegetative data collected.	Raw data will be made available upon request. Transect photos were supplied and will be added to the report.
PB Americas, Inc.	2. Evaluate the validity and appropriateness of the environmental assumptions used in the development of the MFLs analysis. Are the assumptions reasonable and consistent given the “best information available”? Response: The mean maximum elevation of the deep marsh community was used to	Prefer to keep deep marsh because explanation is more logical. Although deep marsh was not used in other lakes reviewed, it has been used quite often in other MFLs determinations.

Reviewer	Peer Review Comments	Resolution
	<p>determine the minimum frequent low (FL) for Transects 1 and 2 (page 47, paragraph 2). While this makes sense due to the paragraphs that follow pertaining to the landward extent of <i>Nymphaea odorata</i>, all other minimum level reports reviewed use the mean minimum elevation of the shallow marsh community to determine the FL. As the mean maximum elevation of the deep marsh community is the same as the mean minimum elevation of the shallow marsh community, it is recommended that the latter criterion be used for the sake of consistency with all other minimum level reports. If this recommendation is followed, the criterion will need to be changed in all subsequent areas of the report where the maximum elevation of the deep marsh community is mentioned.</p>	
PB Americas, Inc.	<p>3. Evaluate the validity and appropriateness of the environmental assumptions used in the development of the MFLs analysis. Are the assumptions stated clearly?</p> <p>Response: The minimum frequent high (FH) level for Lake Avalon was determined as the average of the mean elevations for transects in the wet prairie community. Minimum level determinations for other lake systems reviewed have used either the average of the mean elevations of the upper wetland community or the mean maximum elevation for this community to determine FHs. Minimum frequent lows (FLs) were consistently determined utilizing the mean minimum elevations of the shallow marsh communities.) However, the reports do not give the rationale used as to why a certain criterion was selected for a particular project. During a telephone conversation with Cliff Neubauer (SJRWMD), it was agreed that a recommendation be made that each report contain an explanation and rationale for the criterion used to determine the FH and FL for each project, to be included in the appendices.</p>	Added explanatory paragraph to MFL Determination p. 43. Also added comment to following discussion.
PB Americas, Inc.	<p>4. Page 35, Table 3: Laurel oak is listed as <i>Quercus hemispherica</i> with an upland Florida Wetlands Delineation Manual (FWDM) code from Chapter 62-340.450, F.A.C. (The proper spelling of the species epithet is <i>hemisphaerica</i>). <i>Quercus laurifolia</i> is the currently accepted scientific name for laurel oak, with <i>Q. hemisphaerica</i> in synonymy, and the proper Florida Wetlands Delineation Manual (FWDM) code is FACW (facultative wet). The scientific name and FWDM code for laurel oak should be changed in the table.</p>	Changed to <i>Q. laurifolia</i> .
PB Americas, Inc.	<p>5. The water quality and rare and endangered flora and fauna aspects of Lake Avalon were not provided in the report. Therefore, these scope items could not be reviewed by EMD as required by the scope of work.</p>	Rewrote Field Site Selection Section (p. 17) to indicate what data were searched for but may not have been available.
PB Americas, Inc.	<p>6. EMD reserves the right to continue their review of the minimum levels evaluation for Lake Avalon and provide comments to the St. Johns River Water Management District until the evaluation report has been finalized.</p>	OK

Reviewer	Peer Review Comments	Resolution
Peer Reviewer Comments - August 2009		
Upchurch	1. The revised MFL document reads well and is a great improvement over the first draft. Chris Ware and other staff are to be complimented.	No response required.
Upchurch	2. The relationships of the proposed Lake Avalon MFLs and the 10 environmental criteria are better developed in this version of the MFL report. The use of fish and wildlife habitats & passage of fish criterion is well justified in this edition. The new tables dealing with evaluation of the 10 criteria are very helpful.	No response required.
Upchurch	3. As noted in my April review of the first draft of the MFL report, I have some reservations about the lack of a brief summary of the setting of the lake, especially with respect to interactions with the underlying aquifer(s) and the geologic setting. For example, I recommended that the water budget worked out by Robison (2008) modeling report. I was not looking for a detailed discussion, just a simple context for the lake setting. The Peer Review Resolution Document includes a note that Robison's report supplies this information. While the water budget is in Price's report, the general setting information is not. I still have the same opinion that a <u>brief</u> discussion of the lake setting would enhance the report. This is not a deal breaker, it is just a recommendation. However, as a physical limnologist in a former life, I am more comfortable seeing a brief discussion of where the aquifers are, how they interact with the lake, etc. than not. A sample of what I have been looking for is included with this submission.	Water budget discussion added to report.
Upchurch	4. I am satisfied that the MFL document is sufficient and accurately defends the proposed MFLs.	No response required.
Upchurch	Table 2: I like this table. It lays out why fish and wildlife habitats & passage of fish is the most restrictive criterion.	No response required.
Upchurch	p. 52, Structural Alterations section: Paragraphs 1 and 2 repeat each other, in part.	Comment noted.
Upchurch	p. 54, 2nd para.: Suggest that the following sentence be modified as follows: "Because of the nature of water levels in sandhill lakes to fluctuate"	Corrections made.
Upchurch	p. 55, 1st para.: Change spacial to spatial.	Corrections made.
Shaw	I have read and reviewed the edited MFL reports for the above referenced lakes, as well as the peer review resolution documents for each. I believe the District has done a great	No response required.

Reviewer	Peer Review Comments	Resolution
	<p>job addressing both the spirit and the letter of my previous peer review comments on the original draft documents from April 2009. I particularly appreciate the additional explanation of how the SWIDS technique was used and additional assessment on the SWIDS data that was done in response to my and other peer reviewers comments. I also found the responses to other peer reviewers comments helpful and resulting changes added much to the readability of the latest drafts and the confidence in the results.</p>	
Wilson	<p>SJRWMD staff has done a good job in responding to my prior comments. For most instances where I might prefer a bit more be done, I don't see it necessary or appropriate that additional changes to the reports be made at this time. I have limited my comments to a few substantive issues, mostly for the record for the next round of reports, and to a few editorial matters specific to the Lake Hiawassee report. I do not anticipate any need for further review on my part and believe that once editorial changes are finished, the reports are ready to go public.</p>	No response required.
Wilson	<p>1. By far the most important aspect of the MFL reports is the need to give further thought to the issue of how much change should be allowed. There is a systematic outcome of these MFLs which will allow significantly less inundation, especially for the FH. The response to my concern about the "less inundation is okay" underpinning of the MFLs was interesting and one I hope we will have a chance to discuss at some future time. In particular, while I agree with the response that the system is not steady state, that doesn't mean that systemic changes can be dismissed. We need some field data on modified systems to really figure this out.</p>	Comments noted.
Wilson	<p>2. The rewrites generally responded well to my request that the reports demonstrate an understanding of essential cause-effect hydrologic relationships for each lake. Certainly the information added to the Lake Hiawassee Lake report was helpful.</p>	Comment noted.
Wilson	<p>3. Regarding my general comment on the need to explain how sand hill lake hydrology relates to soils and vegetation, the response documents indicate that the reports have been substantially changed. The Lake Hiawassee report did a good job in this respect, though I wasn't clear about why Sylvan Lake was referenced in the response document.</p>	Comments noted.
Wilson	<p>4. Over and above the issue in No. 1, there is a need for the reports to explain the logic of what is being proposed, i.e. to justify the changes (even if I don't agree with them!). Hiawassee could be improved in this respect; refer to Sylvan Lake for a discussion that was more convincing.</p>	Comments noted.
Wilson	<p>5. Regarding my comment on the inconsistent organization of reports, the new versions are better but still show a fair amount of variation. There were many responses that attribute this problem (and other editorial issues) to an outside force.</p>	Comments noted.

Reviewer	Peer Review Comments	Resolution
	I'm not sure what your peer reviewers can do to help staff in this regard, but feel free to offer me up as an advocate for common sense and good practice, if that would help.	
Wilson	6. The reports generally did well in improving the executive summaries, the discussions of soils and land use, and more. I also appreciate the commitment to further improvements on future reports.	No response required.
Wilson	7. For future reference, it appears my comment regarding Figure 1 was not clear, as the response was not what I expected. My recommendation is that the hypothetical relationship in Figure 1 be made real in a separate figure, in which the actual exceedence curve is compared to one that has the frequency characteristics allowed by the proposed MFLs.	Comments noted.
Wilson	8. I was quite astonished (and very pleased) with the amount of information now presented on the 10 factors. The Hiawassee report was notable for not including the matrix table, which was a useful part of the other reports. Also, given the intensity of development at the lake, I wonder about the applicability of the general survey results as to what users will accept.	Comments noted.
Wilson	9. Some general comments on the 10 factors are as follows. First, I suggest some sort of continuation title for multi-page tables. Second, the District may want to reconsider whether it wants to conclude that recreation water depths are adequate for "safe operation" given the lack of substantive analysis. Third, I'm not sure "navigation" shouldn't be NA given all the issues are covered under recreation.	Comments noted.
Wilson	10. I appreciate the new compliance discussion. I still am concerned that the current approach is not sufficiently clear in explaining the extent to which pumping controls lake water levels, and not sufficiently transparent in revealing the implications of the MFLs to the regulatory community.	Comments noted.
Wilson	11. With respect to SWIDs, the general response indicated that more explanations were included in the methods section of each report.	No response required.
Wilson	12. My comments that were specific to Lake Hiawassee all seem to have been addressed sufficiently for now, although there is still no land use map. Good job especially in trimming the Executive Summary.	Comments noted. Land-use map will be added to final report.
Wilson	13. Note there is a font problem at the top of p. 6.	Comments noted.
PB Americas, Inc.	No comments.	No response required.

