Johns Lake, Orange County
Proposed Peer Review Resolution Document

June 2009 comments (Shaw, Wilson, Upchurch, and PB Americas, Inc.)
January 2010 comments (Shaw, Wilson, and Upchurch)
February 2010 comments (Wilson and Shaw only)
May 2010 comments (Wilson, Shaw, and Upchurch)

Reviewer	Peer Review Comments	Resolution
June 2009 comments (Shaw, Wilson, Upchurch, and PB Americas, Inc.)		
Shaw	1. Page ix, List of Figures – Paging is incorrect for Figs 7-14.	To be corrected in final copy of report. Figures will be imbedded in the proper location in the report by editorial staff.
Shaw	2. Page 1, Introduction – It would be helpful to include here any particular reasons why Johns Lake was placed on the priority list for MFL development.	Some information was added to the first paragraph to indicate why Johns Lake was on the priority list.
Shaw	3. Pages 1-2, Factors to be Considered When Determining MFLs and Pages 19-20, 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 Johns 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 Johns 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.	A qualitative approach, based on professional judgment, was used to consider the 10 WRVs. The table presented (see Table 7) and the results of the assessment are summarized in Table 3.
Shaw	4. Page 4, Johns Lake Wetlands – Please include one or two characteristic species (e.g., wax myrtle?) in the description of the Transitional Shrub community to better distinguish it from the Shrub Swamp community.	Descriptions by Kinser for this community do not have examples of characteristic species. Dominant species for a given community located at Johns Lake are listed in the results section.
Shaw	5. Page 19, Surface Water Inundation/Dewatering Signatures (SWIDS) – In the second paragraph, the first sentence includes the phrase "…up to three vegetation community elevations…" it is not clear what three vegetation communities this sentence refers to.	SWIDS was removed from the latest draft because the IH and IL minimum levels are recommended. SWIDS are not currently used to support these MFLs.
Shaw	6. Pages 27-28, Structural Alterations and Other Changes – The information on the three control elevations is unclear. If there is no discharge from the	The structure operation information presented is from the Johns Lake Drainage Study (1990).

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	lake when level is less than 96.9 and positive discharge from the lake when greater than 98.9, what happens when lake levels are between these two elevations? Also note that the Johns Lake watershed impervious cover of 17% approaches or exceeds published thresholds for urbanized watersheds and associated degradation of water quality, biotic integrity and hydrologic regime, leading one to suspect that the lake's plant communities reflect disturbed conditions. In the last sentence 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?	There is no discharge from the lake when levels are less than 96.9 ft NGVD. My interpretation is that some discharge occurs when water levels exceed 96.9 ft NGVD. Both structures are open when the water levels are greater than 98.9 ft NGVD. That is, maximum water releases occur when levels are greater than 98.9 ft NGVD. My interpretation might not reflect reality. Therefore, I only included what was in the citation and I did not include my opinion of how I thought the structures might be operated. Some discussion of how vegetation might have been affected by more recent high and low water events was included. Pictures showing dead saw palmettos and oaks were discussed and included as figures.
Shaw	7. Page 29, Minimum Levels Determination – The discussion of sandhill lake hydrology and the decision to focus MFL determination on FH and FL and not recommend a minimum average is reasonable and appropriate. However, the way this part of the narrative is written suggests that water levels "fluctuate dramatically," lack stable vegetative communities and are strongly influenced by multi-decadal cycles. This, for some readers, may call into question the confidence in vegetation-based determinations of Frequent High and Frequent Low Levels. It would be helpful here to include more discussion, or perhaps a diagram, here that better explains the relationships between multi-decadal highs and lows and the vegetation signatures used in determining FH and FL levels.	The latest draft explains why the FH and the FL were not determined. An IH and IL are recommended because some wetland species appear to be astatic and move up-slope and down-slope depending on hydrologic conditions.
Shaw	8. Page 29, Minimum Frequent High (FH) Level and Page 30, Minimum Frequent Low (FL) Level – Better explanation is needed to document how the "event duration" for each of these levels, 30 days for FH and 120 days for FL, is chosen. Is this professional judgment or standard practice for defining hydrologic events or is there a more substantive basis? I think this may be addressed to some extent in the MFL methods paper, but here in the MFL Report it comes across as arbitrary.	NA, an IH and IL are recommended. The reasons for the durations chosen are discussed to avoid the appearance of being arbitrary.
Shaw	9. Page 29, Minimum Frequent High (FH) Level with reference to Figure 11 – Several related concerns here: Given the large variation in the SWIDS for the same communities from different locations, should we always be using the driest of these signatures (e.g., Lake Hires in this case) to define MFLs when that signature could be, statistically, an outlier? Or would it be better to use a	NA, SWIDS were not used to support the recommended IH. However, using a median SWIDS return interval might cause problems because the 50% of systems with a drier return interval might be considered in violation of the

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	SWID that is closer to the median of all the reference curves? This outlier question becomes especially significant for communities like "shrub swamp" 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 shrub swamp 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 (e.g., Fig. 11) were selected to ensure that no outliers or already-harmed sites are included. In any case, the Lake Hires site used here is so much drier than the others in Fig. 11 that it should not be used unless the District can explain why it needs so much less inundation than the others.	recommended MFL. Therefore, using a driest return interval might be more appropriate. Removing outlier return intervals must be done with great care.
Shaw	10. Page 36, Figure 9 – not clear why there are two communities each at approximately the same elevation, one called "shallow marsh" and the other called "emergent marsh." Please reconcile or more clearly distinguish between these two communities.	These communities are essentially the same. This has been corrected in the latest draft.
Shaw	11. Page 40, Figure 13 – in the upper part of the figure, the curve for Halfmoon Lake should be better highlighted to further distinguish it from the other SWIDS curves, since it is a critical site for the Johns Lake analysis. Also, in the legend, it would be helpful to indicate which of these reference sites are sandhill lakes and which are not; or if all are sandhill lakes, please indicate.	SWIDS curves were not used in the latest draft report.
Shaw	**12. Recommendation:** Improve Johns Lake MFL Report by addressing the editorial comments 1-11 above.	We attempted to address the comments.
Shaw	**13. 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 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.	No resolution statement required.
Shaw	**14. Finding:** Similarly, the methods and procedures for data analysis, including selection, parameterization and calibration of the hydrologic model	No resolution statement required.

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	for Johns 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.	
Shaw	**15. Finding and Recommendation:** The SWIDS-based methodology for determining minimum levels at Johns Lake is conceptually sound and provides a useful basis for quantifying the hydrologic regimes of different wetland plant communities in a way that enables the use of traditional event frequency analysis. However, 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. In the case of Johns Lake, I believe that the data may not support the use of the Lake Hires site (i.e., the driest of the sites) for setting the Frequent High level. As noted above in Comment 10, the Lake Hires site is so much drier than the others in Fig. 11 that it should not be used unless the District can better explain (1) why it is an appropriate comparison with the shrub swamp community at Johns Lake, especially given that this community type is often indicative of an altered hydrologic regime, and (2) why it needs so much less inundation than the others. I recommend that this issue be addressed as noted in Comment 10, through more careful statistical treatment of the SWIDS reference data, more detailed explanation of how the reference sites were selected to avoid outliers, and the possible selection of a different (wetter) reference site for setting the Frequent High. The determination of Frequent Low level will also benefit from better explanation of the variability shown in the SWIDS curves for shallow marsh and from more details regarding reference site selection.	SWIDS curves were not used for the recommend IH or IL.
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.

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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.	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. 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 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 a 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. Consider that different criteria may need to be developed at different lakes. For example, saw palmetto was used to recommend an IH at Johns Lake and Lake Geneva. However, saw palmetto was not present at Cowpen Lake and mature live

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		oaks were used to determine an IH.
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. Smaller decreases in the number of high water events are recommended for the IH. Justification was discussed in the latest draft.
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. Some differences in format might still occur because different MFLs, based on different criteria, are recommended.
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	Comment will be applied in all future reports.

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	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.	
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	Reports updated to include language to address the issues regarding the assessment of the

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	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.	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 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.	Each report was updated to include an expanded section on hydrology and to demonstrate an 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	See responses to Wilson comments No. 3 and 23.

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	mean to be just another number in a highly variable system, but there is an MA (example Indian Lake).	
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 mean that the hydrograph can't decline more than the indicated level during droughts.	See response to Wilson Comment No. 26.
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.

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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 maximum elevation of the shrub swamp, while the Johns lake report references the mean 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 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.	The TWSA analysis was only completed for the 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

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		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 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.
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. A FH was not recommended. An IH was recommended. Uplands edge, as defined by the minimum elevations of saw palmetto, was used for the IH elevation component. Reasons were presented/discussed.
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.

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		IH was recommended for Johns Lake. SWIDS were not used to support the IH.
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. SWIDS were not used to support the recommended IH for Johns Lake.
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. IL rather than a FL was recommended for Johns Lake. The reasons for the increased number of events per century, on average, was presented/discussed.
Wilson		
Wilson	**Wilson Comments specific to Johns Lake report**	
Wilson		
Wilson	48. This is the only title page where the Ph.D. credential of the author is cited. It may be that the date needs changing.	Date was changed. Ph.D. credential was deleted from the report.
Wilson	49. I suggest mentioning in the Executive Summary the reason for not including an FA MFL.	Reason for not including a MA was added to Executive Summary.
Wilson	50. Per general comments, 1 paragraph on each MFL would probably be appropriate in the Executive Summary. Also needs the paragraph on "intended to support".	A short paragraph on each MFL was added to the Executive Summary.

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Wilson	51. Appendices should have names and these should be included in the Table of Contents.	Appendices and figures will be imbedded in the appropriate locations in the report and the tables of contents/figures/tables updated to reflect the appropriate pagination in the final report that will be released to the public.
Wilson	52. There are pagination errors in the list of figures.	Pagination will be corrected in the final report by SJRWMD editorial staff.
Wilson	53. The reports where figures and tables immediately follow the first citation come across as more reader friendly.	Figures will be imbedded in the final report. Imbedding figures in draft reports is time consuming.
Wilson	54. There is a lots more USDA soils data here than in most reports.	I prefer to leave this information.
Wilson	55. If use was made of the FWS work, the text needs to say so; otherwise suggest Table 1 be deleted.	FWS work was deleted.
Wilson	56. Figure 3 would be better placed when actual transects are first discussed.	Figures will be imbedded in the correct locations in the final report.
Wilson	57. Figure 4 could be omitted, and the reference simply cited in the report. Do the hydro. model results fall within the range shown on the map?	The potential recharge map was left in the report to provide for a comparison to Epting and others paper.
Wilson	58. The inclusion of Table 1 is confusing. Is it needed?	Table 1 information was deleted.
Wilson	59. P. 13. Does Figure 6 show duration or frequency? Others reports call this an exceedence curve. It does seem to flatten out quite a bit, which seems inconsistent with the rationale for not doing a minimum average.	Period of record duration curve and cumulative frequency curve terminology has been used in the literature. The legend was changed to exceedence curve to be consistent with other reports.
Wilson	60. P. 14. Figure 7 could use a citation.	Citation was added to latest draft.
Wilson	61. P. 18. I did not find a TWSV discussion in most other reports.	TWSV information was deleted.
Wilson	62. P. 23. Table2 & 3 typically not found in other reports.	Tables 2 and 3 were left in the report to provide the reader with useful information.
Wilson	63. Figure 8 was blank in the copy I downloaded.	Figure 8 (belt transect illustration) was at the end of the reviewed draft and will be moved to the appropriate location in the final report.
Wilson	64. Transects: I enjoyed seeing field photos in other reports.	Some photos are added to the most recent draft.
Wilson	65. Transects: other reports have data tables summarizing the field results.	Some additional tables were added.
Wilson	66. For the duration and frequency considered, Hires is by far the driest SWID referenced for FH. This curve is such an outlier that its use needs justification. In particular: can we be confident that the Lake Hires shrub swamp community is natural and healthy; can we explain how it prospers with so much less inundation than the others; and can we say that this explanation	SWIDS were not used to support the recommended IH for the most recent draft report.

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	makes it appropriate as the basis for defining or comparing the FH hydrology needed at other lakes? If not, given how different this swamp is from others, this SWIDs should not be considered an acceptable management target.	
Wilson	67. The FL value seems more frequent that would be suggested by the guideline that FL is typically associated with 20% exceedence.	An IL was recommended in the most recent draft report.
Wilson	68. Appendix A does not add value. It belongs in a methods manual.	Staff at other (e.g., Suwannee Water Management District) Districts found the form shown in Appendix A useful to their MFLs efforts. Therefore, the form was included in the latest report draft.
Wilson	69. Is it correct that Figure B11 indicates that the selection of the minimum frequent low has no margin of safety? Is the analysis accurate enough for this to be a comfortable determination?	An IL is currently recommended. Conceptually, the location where "no margin of safety" exists is a threshold beyond which significant harm is expected to occur. The MFLs legislation, unlike TMDL legislation, does not provide for a "margin of safety."
	Peer Review Comments: Dr. Sam Upchurch	
Upchurch	1. The report mentions Price Robison's hydrologic model many times. The Appendix (B) deals with stage duration curves and how they are constructed. It does not detail what is modeled or how the model was used. I have reviewed the modeling report and believe that it should be included as an appendix. Also, there is important output from the model that should be presented, rather than referenced. For example, the water budget developed for Johns Lake is mentioned in the report, but not presented. I think it is important that the budget be presented so we can evaluate the relative sources and sinks for water, especially with respect to recharge to underlying aquifer(s) and seepage as opposed to inflows from Black Lake and the Turnpike wetland. Is the latter spring fed? What are the water sources?	The appendix has been update with information on the hydrologic models and how the information is used to assess protection of MFLs.
Upchurch	2. There is a need to develop the geologic and hydrologic setting more. For example, what are the ages and geologic formations associated with the lake and its drainage basin? Is the lake connected to the Floridan or Intermediate aquifers? Are there sinkholes in the bottom of the lake?	Such information may be added to future reports. Our time lines for Johns Lake will not allow for including a detailed discussion of such information at this time. Such a discussion will be considered for future reports.
Upchurch	3. It would be helpful to include a drainage basin map in the first section. This could be on the location map or one of the others.	Such information may be added to future reports. Our time lines for Johns Lake will not allow for including such information at this time.

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Upchurch	4. The use of Brooks' (1982) physiography is OK but the work is not widely used and has some careless names that have created problems in the past. One problem has developed in the vicinity of Johns Lake. Brooks used the term "The Gap" without considering that White and Vernon and Puri (both Florida Geologic Survey publications) used the term elsewhere (High Springs Gap, Dunnellon Gap, etc.) prior to Brooks. Therefore, there is a naming confusion.	We are currently working with the District librarian to obtain a copy of, *White, Vernon, and Puri. 1964. Proposed physiographic divisions. Unpublished manuscript.* This classification scheme will be evaluated for application in future reports.
Upchurch	5. Is this a considered sandhill lake? Any unusual variability in the lake hydrograph?	Some additional discussion of lake hydrology was added to the latest draft.
Upchurch	6. On page 4, the report mentions that the stage data for the lake had a long period of record (1959 – 2007). Are the measurements daily? Any changes in measurement methods or timing? It doesn't sound like there has been any data synthesis to complete the record. Is this true. If not, what was done and how?	Most data were biweekly. Daily values were calculated with linear interpolation. These statements were included in the latest report.
Upchurch	7. Appendix B 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?	Details regarding these issues should be addressed in Robison's Johns Lake model report.
Upchurch	8. The interactions of the lake with the Floridan are not discussed in the report. Appendix B and several locations in the report suggest that there is an interaction of the lake and the Floridan. How so?	Details regarding these issues should be addressed in Robison's Johns Lake model report.
	Peer Review Comments: PB Americas, Inc.	
P B 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.	Tables with elevations and stationing are included in an appendix. Photos from the lake and transects are included.

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P B Americas, Inc.	2. Evaluate the validity and appropriateness of the environmental assumptions used in the development of the MFLs analysis. Are the assumptions stated clearly? Response: The minimum frequent high (FH) level for Johns Lake was determined as the mean elevation for the transect in the shrub swamp 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 rational 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.	An IH and IL are currently recommended. An explanation for the magnitude component (elevation in ft NGVD), duration component (number of days continuously exceeded or continuously not exceeded), and the return interval (years) were included in the most recent draft of the report. The criteria and indicators of protection were presented in the most recent draft of the report.
P B Americas, Inc.	3. Are there deficiencies and/or errors in the environmental assessments or application of findings? If so, describe each deficiency and/or error. If the identified deficiencies can be remedied, then enumerate and describe each necessary remedy, including the precision, accuracy, and an estimate of time and effort required to develop and implement each remedy. If the identified deficiencies cannot be remedied, then identify one or more alternative methodologies that are scientifically defensible given the available data. If the reviewer identifies an alternative methodology, the reviewer will also describe the precision, accuracy, and estimate the time and effort required to develop and implement that methodology. If the identified deficiencies cannot be remedied without additional data, then identify what additional data is needed and provide recommendations for capturing such data. Response: Wetland vegetation communities were classified according to the St. Johns River Water Management District's Wetland Vegetation Classification System (Kinser, 1996), as stated on page 5, paragraph 6. This system uses the deep marsh classification for areas dominated by a mixture of deep-water emergent species and water lilies, as stated in paragraph 4 on the same page. However, the report refers to this community as 'aquatic bed' or 'aquatic bed/deep marsh' instead of deep marsh in the following places: page 25 (paragraph 2), page 26 (paragraph 8), page 32 (Table 4), and page 37 (Figure 10). It will be less confusing if one term was used consistently for	An IH and IL were recommended. The deep marsh/aquatic bed will be standardized to that of Kinser 1996).

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	this community. Since the community is classified as deep marsh by Kinser (1996) and deep marsh is used consistently in other minimum levels evaluation reports, it is recommended to change 'aquatic bed' to 'deep marsh' throughout this report.	
P B Americas, Inc.	4. The FL level for Johns Lake uses the minimum elevation of shallow marsh community along the two transects. However, since Transect 2 is parallel to the main shore and the shallow marsh community from Station 0 to Station 187 does not have an ecotone change to a lower elevation community (as it has an arbitrary beginning point in the middle of the community), the minimum elevation for this portion of the transect is invalid and should not be used to determine the FL. The only valid minimum elevation for Transect 2 is the minimum value for the section of shallow marsh between Station 279 and Station 300 where the shallow marsh changes to deep marsh.	An IL has been recommended. The comment no longer applies.
P B Americas, Inc.	5. The shallow marsh and wet prairie communities located between the main shore of the lake and the parallel island are not typical of this or most lake systems. As they are sheltered from wave action by the island, they more closely resemble isolated herbaceous communities instead of lakeshore herbaceous communities. The area is also not representative of Johns Lake as a whole. The emergent marsh community, however, is representative of the majority of the littoral zone in this lake. This 'emergent marsh' community corresponds with the 'shallow marsh' vegetative community that is used to determine FLs in other minimum level evaluations reviewed. The minimum elevation recorded for the emergent marsh on Transect 1 is approximately one foot higher than the minimum elevation recorded for the shallow marsh system between the shore and the island as well as the FL determined from this data. Since Transect 2 is located in atypical vegetative communities for this lake system, it is recommended that this data not be utilized to determine FHs and FLs. It is recommended that additional transects be installed and sampled in more typical lakeshore habitats on Johns Lake. The data for the portion of Transect 1 corresponding to Station 189 to beyond Station 280 could be combined with the new data to determine more reliable minimum levels.	An IL has been recommended. The comment no longer applies.
P B Americas, Inc.	6. The FH is determined from only one transect (Transect 1) on Johns Lake. The vegetative communities on this transect are not typical of the vegetative communities on Johns Lake, although they are more natural communities. Data from one transect is insufficient to determine a reliable FH and more data needs to be included. As it was recommended above that additional transects be installed and sampled in more typical lakeshore habitats on this lake, the	An IH has been recommended. The comment no longer applies. The IH elevation component was determined from four saw palmetto plants located at three different locations on the lake making this component more reliable.

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	additional data can be combined with Transect 1 data to determine a more reliable FH elevation.	
P B Americas, Inc.	7. Page 3, paragraph 3, line 2: Change 'Winter Park' to 'Winter Garden'.	Changed.
P B Americas, Inc.	8. Page 27, paragraph 3, line 2: Use the common name for Coelorachis cylindrica (Carolina-tail grass) in the narrative instead of the scientific name to be consistent with all other species in which common names only are used.	Recommended change was made.
P B Americas, Inc.	9. Page 33, Table 5: Beggarticks (Bidens alba) is listed as an obligate wetland species. While Bidens alba is the currently accepted name for this species, an older synonym for the species is Bidens pilosa. The Florida Wetlands Delineation Manual (FWDM) from Chapter 62-340.450, F.A.C. lists B. pilosa as a facultative species. Therefore, the code for beggarticks should be changed in the table from OBL to FAC.	I believe this change was made.
P B Americas, Inc.	10. Page 33, Table 5: Two species of panic grass (Dichanthelium commutatum and D. dichotomum) were designated as upland species on this table. These are the currently accepted scientific names for these two species; however, their old synonyms (Panicum commutatum and P. dichotomum) are listed in Chapter 62-340.450, F.A.C. Using the FWDM codes given for their synonyms, the correct code for D. commutatum is FAC and the correct code for D. dichotomum is FACW, and should be changed to such on this table.	Change made.
P B Americas, Inc.	11. The water quality and rare and endangered flora and fauna aspects of Johns Lake were not provided in the report. Therefore, these scope items could not be reviewed by EMD as required by the scope of work.	No response required.
P B Americas, Inc.	12. EMD reserves the right to continue their review of the minimum levels evaluation for Johns Lake and provide comments to the St. Johns River Water Management District until the evaluation report has been finalized.	No response required.
January 11, 2010 Comments		
Wilson	**General comments**	
Wilson	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 fact that my comments are critical of certain aspects of this report is a reflection of my assignment, which is to identify issues and find possible problems, and should be read in that spirit.	No response required.
Wilson	The Johns Lake report as revised departs substantially from prior MFL reports in approach, methodology and results.	Further explanation is probably needed here. I hope that explanations clear this issue up. The

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		report does not differ in approach, methods or results. The SJRWMD MFLs approach and method was used (see Neubauer and others 2008). The result is a minimum hydrologic regime based on protection criteria associated with an IH (upland ecotone) and IL (fish habitat). The difference is the recommended MFLs (i.e., IH an IL rather than FH, MA, and FL) and the criteria and indicators of protection associated with the MFLs.
Wilson	The report can be read as demonstrating that a fundamental assumption of the MFL program -- that ecology depends on hydrology -- has been shown to be false.	Further explanation was added to the general information section of the introduction section. The fundamental assumption has not been shown to be false. The locations of wetland communities and the upland ecotone are depended upon hydrology. More specifically, these communities are located where the numbers of flooding and dewatering events over a long time result in hydrologic conditions that allow populations of species of a given community to survive. Static wetland communities similar to those along the St. Johns, Wekiva, Ocklawaha Rivers and wetland type lakes (e.g., Lakes Dias and Pierson) do not appear to exist on some sandhill lakes with very large ranges of fluctuation (i.e., Geneva = 22.16 ft, Brooklyn = 31.38 ft, and Pebble = 39.34 ft). Extreme high water levels and extreme low water levels result in hydrologic conditions that are too wet and too dry to support seasonally flooded wetland communities. Wetland species that occur at such sandhill lakes tend to move up-slope and down-slope depending on multi-decadal cycles. Johns Lake has an approximate 14 ft range of fluctuation (i.e., 13.95 ft based on period of record (September 1959 through August 2009 stage data). Some wetland species may be astatic at Johns Lake. For example, the shrub swamp and shallow marsh communities appear

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		to be affected by events that occurred between 2000 and 2009. The most recent extreme high water levels and extreme low water levels that occurred since 2000 might affect the species on these communities.
Wilson	Unless changes in the ecology of this lake's wetlands can be explained (which they are not in the current report), I am concerned that the report establishes a foundation which might be used to attack the overall MFL program.	Further explanation concerning the differences between the hydrology of sandhill and wetland type lakes was added to the general information section of the introduction. An appendix might be an alternative place for such information. We might want to expand on the idea that the lowest annual maxima are almost always higher than the highest annual minima on wetland systems. Conversely, many annual maxima are much lower than annual minima on sandhill lakes systems that are affected by multi-decadal hydrologic cycles. This hydrologic condition at sandhill lakes result in conditions that are too wet and too dry to support static wetland communities. However, based on the current schedule for this system, such an appendix might be added to future sandhill lake system MFLs reports.
Wilson	I do not fully understand the logic behind either of the newly proposed MFLs and note that the hydrologic appendix does not discuss them.	Further explanation was added. I tried to make several points more clear for the reader. First, the hydrology of the lake has been altered by the canal and control structure. At least two extreme high water level events (one in 1960 and one in 2004-2005) occurred. The elevation of the upland ecotone reflects the effects of these two events. That is, the current location of the uplands edge is slightly higher than it should be if the outfall structure and canal had existed, been maintained, and been operated appropriately during the entire simulation period. A number of dead large oak trees and a pair of dead saw palmetto plants support the assumption that the water levels were too high for too long during the

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		last high water event of 2004-05. Second, these events would not have occurred based upon modeled existing conditions hydrology. Finally, the elevation component was moved downslope by 0.7 ft to a location where the palmetto edge should exist if these extreme high water events had not occurred. This was done by holding the duration and return interval components as constants and determining a new magnitude component that would have been met if the system was managed under existing conditions. The discussion might also need to be added to the appendix. However, our very short timeframes for this MFLs determination might not allow for the development of such an appendix at this time. Such an appendix might be considered for future reports.
Wilson	I note that my prior review contained a number of generic and specific comments. Some of these have been mooted by the new approach and some have effectively been addressed, but many have not. If the report is to be further revised, I suggest these earlier comments be revisited. Examples of such comments are: the reports read much better when figures and tables are fully integrated; likewise background and field data work best when soils discussions occur before wetlands; it is useful to include a land use map. None of these are essential to getting a report out the door.	We have attempted to address the comments in the report according to the responses in the resolution document.
Wilson	In my original comments I addressed the need for each report to more fully address the 10 WRV factors. The other reports responded with a very substantial matrix (e.g. Table 18 in the revised report for Sylvan Lake). Given how the Johns Lake MFLs are now being proposed, something similar is needed here.	A matrix approach similar that used in the Sylvan report was included in the reviewed draft. This may require additional expansion to address this comment. I hope what has been added is sufficient.
Wilson	Neither the report nor Appendix B provides a sufficient understanding of the hydrology of Johns Lake. For example one can't read this report and really understand the relative significance of runoff, surface precipitation/evaporation, outlets, and seepage such that there is a logical water balance that explains the hydrograph and does so in the context of what it means to be a sandhill lake. P. 5 cites Robison 2009 as a hydrologic water budget model of the lake; this appears to be different than Appendix B and	An appendix presenting a discussion of sandhill lake hydrology may be needed. Time constraints might not allow for the development of such an appendix. Some general discussion of water budgets were added to the text as per comments by Sam Upchurch.

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	probably has the information I'm interested in. If so it should be an appendix, or at least summarized.	
Wilson	**Page-specific comments**	
Wilson	Title page. No other report cites the Ph.D. credential of the author. I think it is ok to do so, but it should be done in other reports as well.	My Ph.D. credential was deleted.
Wilson	P. v, Executive Summary, states that fish + habitat = the primary value protected by the proposed MFLs. It takes work to find in the report the analysis that is being summarized.	Table 6 was cited in Executive Summary to help a reader find the information
Wilson	Also p. v, the paragraphs on the recommended MFLs each contain a "that is" statement that doesn't seem to follow from the prior statement.	The "that is" was deleted and "a goal is that" was added to clarify the statements.
Wilson	It is preferred to have the Executive Summary contain specific language that MFLs are intended to support ecosystem protection. The language here isn't as good as page v. of the Lake Avalon report.	The language from the Lake Avalon report was added to the Executive Summary and Introduction section
Wilson	Table of contents, Appendices should have names and these should be included in the Table of Contents.	The table of contents will be properly formatted by Editor's office staff before the report is released.
Wilson	P. 2 mentions MFLs as applying to permitting in the first full paragraph, and this is somewhat repeated in the third full paragraph. One mention would be sufficient.	Paragraph 3 was deleted.
Wilson	The discussion of bathymetry on p. 4 mentions various features which would be better understood if they were identified on a map.	The inflow, outflow, and control structure locations were added to the map.
Wilson	Throughout the report reference is made to the "upland ecotone" without ever defining that term for the lay audience, nor stating in a straightforward manner exactly what that ecotone consists of in this case. I gather it refers to the saw palmetto community, though that is never said. The discussion of wetlands p. 5-6 is at least one place where the report should make absolutely clear what is meant by "upland ecotone".	Definition was added on pg. 1 paragraph 2 of the report.
Wilson	P. 6-7. There is more USDA soils data here than in most reports.	I prefer to leave the information in the report.
Wilson	P. 9. Is it possible to draw this graph using Johns Lake information?	Future reports will address this comment.
Wilson	P. 11. Figure caption does not match Figure (e.g. T3, T4 not in caption).	Figure caption updated to show T3 and T4.
Wilson	P. 12. Without labels on the isolines, the bathymetric map has limited value. Given that the map is fundamental to IL, it seems more is needed.	The maximum depth value was needed for the IL. A map with labeled contours would be helpful but time constraints might not allow for such a map at this time.
Wilson	P. 13. Figure 5 could be omitted, and the reference simply cited in the report. This figure made me even more acutely aware of how little we seem to know about the hydrology of the lake.	I prefer to leave the figure in the report as background information that can be compared with Epting et al 2008 citation.
Wilson	P. 14. This is an interesting hydrograph and just adds to the interest in having	Additional discussion of the hydrograph in relation

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	the hydrology of this lake explained.	to other Florida lakes was included.
Wilson	P. 15. Are these one-day values or some other duration?	Daily values calculated with linear interpolation indicated in hydrology section. Figure heading was corrected.
Wilson	P. 16. Figure 7 could use a citation.	Figure 7 is on pg 15 and Figure 8 is on pg 16. I added a citation to Figure 8. The figure is now "10" in the newest draft.
Wilson	P. 25. Tables 1 & 2 typically not found in other reports.	I prefer to include this information even though these tables are not typically found in other reports.
Wilson	P. 26. Not sure a blank version of the WRV table adds much.	I don't disagree. Blank form was removed. However, I have had staff from other WMDs request our forms so they might not have to "re-invent the wheel" when they do MFLs determinations.
Wilson	P. 28. Resurveyed transects are not provided, so we don't know what has changed. Therefore, the astatic nature of the wetlands is not documented. In my view this lack of information is a severe problem.	Resurveyed transects are included.
Wilson	P. 29. The information that is provided on the resurveys is generally either a) something found before is not there now; or b) silence. Silence may mean that no change was observed, but we aren't told that. Where "not found" is stated, we have no idea what **was** found, and thus what to make of what was found.	Resurveyed transect information has been added to the latest draft.
Wilson	P. 29. The disappearance of a hammock community needs to be explained. In fact the entire concept of "big change" with no change in hydrology needs to be explained, as otherwise it seems to undermine the basic "hydrology drives ecology" underpinnings of the MFL program. Apparently had the previously recommended MFLs been used, they would have protected nothing. Likewise, SWIDs proved to not predict the behavior of this lake. The implication to defense of MFLs in general is evident.	Mesic hammock (a.k.a., uplands) did not disappear.
Wilson	P. 30. On Transect 2, the shrub swamp is said to be now found at a higher elevation, but no details are given and the drawing of the transect suggests the change couldn't have been much.	Resurveyed transect information added to report
Wilson	P. 32. I found the discussion of structural changes hard to follow. What exactly is it that happened after 2005 such that a repeat of the 2005 hydrology would produce a different result?	I tried to clarify the discussion with information added here and to other sections of the report
Wilson	P. 33. Per prior comment, this WRV assessment is much less complete than	I can add more discussion if the currently written section is not sufficient. Short time frames might

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	in the other reports.	not allow for an extensive discussion.
Wilson	P 35. It may be the limited time I had to review these reports, but I didn't understand what the wetland and habitat consequence would be if the saw palmetto moves downslope a bit. Moreover, given that the 25-year return interval is a statistic, not a management strategy, some episodic downslope movement seems inevitable.	The number of events (4) and the slow growth rate of saw palmetto should keep ecotone at an appropriate location. Oaks that moved downslope were killed by the recent high water event. Pictures were added to support the discussion.
Wilson	P. 36. As I understand it, the IL doesn't prevent large fish kills, it just increases (and limits) their frequency. Is that correct?	IL should prevent large fish kills because sufficient water depths are maintained in at least one refugia. Much longer return interval low water events (e.g., 100 year) could result in fish kills. However, such event would recur infrequently enough for the fish population to recover. Recovery would occur even if such an extreme event cause extirpation of a species because the lake has inflow and outflows that would allow fish to return to Johns Lake after such an infrequent low event.
Wilson	P. 37. More is needed on the 8-foot depth criteria to demonstrate that it should apply to this sandhill lake where trophy bass are being grown. Are we confident that this is enough water to maintain adequate DO? The volume and carrying capacity of the protected refugia would be interesting to know.	IL fish and game criterion was focused on 8-15 ft depth rather than volume or carrying capacity
Wilson	P. 42. As noted, other reports had much more info. than shown on Table 6.	Comment noted.
Wilson	P. 43. Make clear these are 2000 results? Same for Figure 11. And add 2009 results?	Done
Wilson	Appendix A does not add value. It belongs in a methods manual.	I'd prefer to leave the form because staff from other Districts (e.g., SRWMD) are planning to use our method and our forms
Wilson	Appendix B is specific to the prior report and has not been updated to discuss the new MFLs.	Price will update
Wilson	The header of Appendix B is wrong.	Thank you for catching this. Headers, Tables of Contents and Lists of Figures will be corrected by SJRWD Editorial staff

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Wilson	I suggest the bottom line result of the compliance analysis (1.5 ft allowable drawdown based on current info.) be included in the Executive Summary.	Done
Wilson	I find the issues above of sufficient concern that my recommendation is that the report is not ready for release.	We are trying to address these concerns in the latest draft.
Shaw	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.	Kinser does not include characteristic species. The characteristic species of the plant communities at Johns Lake are included in the results section.
Shaw	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.	Resurveyed transect information was included. We will likely make this a standard practice to assess wetland community/species "stability."
Shaw	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.	The quoted definition is in our rules. I don't disagree that the rule language could be rewritten so it can be applied to all lotic and lentic systems.
Shaw	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	I believe that additional explanation was added.

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	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.	
Shaw	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.	This might be done for future MFLs reports. Our time frames might be too tight to do such an assessment at this time
Shaw	**Minor Edits** (Page citations refer to Johns Lake MFL Report unless otherwise noted)	Heading. No comment needed.
Shaw	Throughout document: change footer from "DRAFT 5/29/2008" to present version.	Footer was corrected on right and left facing pages. SJRWMD editor will ensure footers are corrected in final, released document.
Shaw	Pages ix-x, List of Figures, missing page numbers for figure citations.	Table of contents, lists of figures and tables will be formatted by SJRWMD editorial staff before the report is made public.
Shaw	Page 3, Johns Lake Background Information, "City of Winter Park" should be "City of Winter Garden"	Corrected
Shaw	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.	I attempted to be consistent when referencing lake lobes in the most recent report.
Shaw	Page 4, Johns Lake Bathymetry, note that the flow-way referred to in the third	Inflow and outflow locations to USGS quad figure

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	paragraph is difficult to see on the map (Fig 2)	
Shaw	Page 5, Johns Lake Hydrology, third paragraph, consider using "…minimum low…" in the fourth sentence instead of "…extreme low…"	I prefer extreme low because any reference to minimum might cause a reader to think that I am referring to one of our MFLs.
Shaw	Page 6, Hydric Hammock, second sentence: "…is with saturated…" should be "…has saturated…"	Hydric hammock description was deleted because this community was not on the wetlands map.
Shaw	Page 6, Bottomland Hardwoods: does this description, which refers to "floodoplains of rivers and streams" and alluvial soils apply to Johns Lake?	The description was deleted because this community was not on the wetlands map
Shaw	Page 12, Fig 4 – it would be helpful to label some of the elevation contours on this map	Our time constraints might make this difficult.
Shaw	Page 18, Field Data Collection, third sentence: "The main purpose…minimum time (Martin and Coker 1992)." This sentence and citation is probably not needed.	I'd prefer to leave it in because someone might want to know why other sites with very long transects were not developed/used
Shaw	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.	I'd prefer to leave this because such statements are becoming "standard language" for all MFLs reports
Shaw	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.	The MFLs Methods Manual is a dynamic document. Sections are updated or replaced as the approach is developed. The document will likely be in "draft" format for some time. Maybe another word other than "draft" is needed to describe the Methods Manual.
Shaw	Page 28, Results and Discussion, third paragraph. Consider moving this paragraph to the Methods section of the report.	I don't necessarily disagree with this comment. However, putting this paragraph at the beginning of the transect results does not seem like a bad idea. I would prefer to leave it here since I am short on time to finish the report.
Shaw	Page 32, third full paragraph, first sentence: "Despite the changes…fieldwork, performed…" should be "Despite the changes…fieldwork was performed…"	Correction was made
Shaw	Page 32, third full paragraph, third sentence: "…updated conditions drainage conditions…" should be "updated drainage conditions…"	Correction was made
Shaw	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?).	Correction was made. A table was referenced. This table appears to be in Appendix C but at this point figures and tables have been placed at the end of a given section so that the SJRWMD editor can format these in the final report
Shaw	Page 33, Minimum Levels Determination, first paragraph, last sentence:	Correction was made

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	"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…"	
Shaw	Page 37, first full paragraph, first sentence "…do no increase…" should be "…do not increase…"	Correction was made
Shaw	Page 37, second full paragraph: the description of the specific indicator is awkwardly written.	Correction was made
Shaw	Page 38, second paragraph, fourth sentence: consider replacing "tropics" with "southern areas" or "southern parts of its range."	I'd prefer leaving the word tropics because southern areas or south parts of the range are a bit vague and might be misleading to a reader. Tropics seems to be a more specific term.
Shaw	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.	Correction was made
Shaw	Page 50, second paragraph, fourth sentence: "Based on on-sited collected data…" should be "Based on on-site collected data…"	Correction was made
Shaw	Page 50, second paragraph, fifth sentence: "Notably…recommended MFLs." This sentence may not be necessary.	I'd prefer to leave the sentence to clarify that we do not usually use on-site, heterogeneous data to assess MFLs protection
Shaw	Page 50, second paragraph, sixth sentence: "…hydrologic model should be run…" should be "…hydrologic model was run…"	Correction was made
Shaw	Page 50, third paragraph: this sentence should refer to the WRV assessment table in the Appendix (C?)	Correction was made
Shaw	Page 61+, header should be changed to "Appendix B"	Corrections will be made by SJRWMD editor before final report is released
Shaw	Page 85+, header should be changed to "Appendix C"	Corrections will be made by SJRWMD editor before final report is released
Shaw	**Findings and Recommendations**	
Shaw	1. **Recommendation:** Improve Johns Lake MFL Report by addressing the review comments 1-5 and minor edits 1-27 above.	Attempts to address these comments have been made.
Shaw	1. **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	Comment noted.

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	done a commendable job through researc, 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.	
Shaw	1. **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.	Comment noted.
Shaw	1. **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.	An attempt was made to clarify the 0.7 ft shift in the elevation component of the IH.
Upchurch	Overall Impressions This document by Dr. Clifford Neubauer is a revision of an earlier report that had been submitted for peer review. I provided a review of the earlier report in April, 2009. At that time, I concluded that the report was well written and understandable. For the record, the revised report is much clearer and easier	Thank you.

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	to read and understand. Dr. Neubauer is to be complimented for the improvements he has made in the report.	
Upchurch	General Issues One of my concerns is that documents such as MFL reports should be understandable by lay persons, including District Board members, and that they should stand alone in terms of understanding the purpose and conclusions of the report. To this end, I was critical in April of the fact that little had been done to provide context for the reader in terms of describing the lake and behavior of water in the lake. There was little included in the report to explain what a sandhill lake is and how it functions.	I added some paragraphs concerning water budgets and sandhill lake hydrology. These are mostly general so that "lay persons" will understand the context of the material. An in-depth discussion of water budgets might not help a lay person understand our process.
Upchurch	The current report addresses some of these issues and is much better in terms of explaining the physical setting of the lake. It does not discuss how groundwater and the lake interact, which I consider important if one wants to understand the rationale for why only Infrequent High (IH) and Infrequent Low (IL) levels are proposed for adoption as MFLs. Understanding why the lake is "astatic" is important and critical to explaining, in my opinion, why other lake-level regime levels are recommended for adoption.	I added some information concerning water budgets and why we focused on IH and IL rather than FH, MA, and FL. I referenced astatic species rather than astatic wetlands. Such astatic wetland are present on lakes with very large ranges of fluctuation. Johns range is relatively large but not so large that all wetland communities are astatic.
Upchurch	I had suggested that a water budget for Johns Lake be included in the next draft as a means for understanding why the lake levels fluctuate so much. This inclusion was suggested because there are some apparent inconsistencies in the text that could have been cleared up. For example, there is discussion of connection with the Floridan aquifer and a recharge map is included in the report. However, astatic lake levels are a result of the high level of influence of surfacewater inflows, not dominant interactions with the aquifers. By the same reasoning, the surficial and Floridan aquifers are only able to sustain certain minimum levels. By understanding the water budget, one can understand why the IL was set based on the Floridan. To me, including a minimal discussion of the water budget and aquifer interactions should result in a better understanding of the MFLs by the public and persons who are not familiar with sandhill lakes and potentially reduce criticism of the MFLs.	I added a paragraph on water budget components and reason for managing surface and groundwater withdrawals to the MFLs overview section. A reference to water budget components and some discussion about the rather large range of fluctuation of Johns Lake stage are included in the Johns lake hydrology section.)

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Upchurch	Specific Comments The following are paper by page comments about the report. Some are simply editorial, others cut to the need for clarity as to how the lake functions, as discussed above.	
Upchurch	Page v, 4th para. - Suggest that the 2nd line should read "…recommended, although it is more common…." This seems to make more sense.	Recommended change made
Upchurch	Page 4, 2nd para. Under Johns Lake Bathymetry – Suggest changing "zero-17.8" to "zero to 17.8" for clarity.	Recommended change made
Upchurch	Page 4, 2nd para. – Please define "solution basin." One presumes that a solution basin is a sinkhole, but there are other definitions. Solution basin suggests specific processes for which there are no data. There are enough studies using sub-bottom profiling in the area to allow one to conclude that the depressions are probably sinkholes, but their mode of origin has not been established.	Comment noted. We will attempt to clarify this in future reports.
Upchurch	Page 5, Johns Lake Hydrology – This is where the water budget should be discussed. How well connected is the lake with the Floridan aquifer (Boniol's recharge map says not very well connected [0 – 4 in./yr]) and the surficial aquifer? Organic soils are maintained by the flux of water from the surficial aquifer to the lake, so how is the lake connected to the surficial?	A general paragraph on water budget was included in MFLs overview section to clarify why we want to manage surface and groundwater withdrawals. A few sentences were added here to link the water budget to a relatively large range of fluctuation for Johns Lake. Some discussion of how the range of stage fluctuation compares to other Florida lakes was included.
Upchurch	Page 6, 3rd line on page – "is with" should read "is".	The words "is with" changed to "has" saturated soils
Upchurch	Page 6, 2nd para. – "…hardwoods are….'	Recommended change made
Upchurch	Page 6, Shrub Swamp para. – Cypress and hardwood swamps are not discussed in the report, so any similarity of the Shrub Swamp with these communities is not helpful	reference to cypress and hardwood swamps removed
Upchurch	Page 6 – Figure 8 also includes bayhead communities. A discussion of this community is not presented here.	"Bayhead" added and "hydric hammock" and "bottomland swamps" deleted. These later two

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		are not on Figure 8
Upchurch	Page 6, 1st line in Hydric Soils para. – The first sentence seems to have process and response reversed. Hydric soils are related to lake levels (and aquifer levels), not the reverse.	Recommended change made
Upchurch	Page 6 and 7 – The disconnect in soil types across the county line is interesting. The Orange County cited in the report are well known hydric soils, and the Placid depressional soil has a nearly permanent high water table, but the Myakka soils on the Lake County side is puzzling. The Myakka has a seasonally high water table, and often an organic pan, but why no organic soils? Is this a mapping error, scale of mapping difference, or something real? Just curious.	I do not know why this occurred. I suspect that different soil scientists did work in different counties.
Upchurch	Figure 1 – I strongly suggest that the hypothetical stage duration curve not be a normal distribution. The population median is rarely the average in lake level data, and I am afraid that use of an example like this is misleading. Sandhill lake levels are highly skewed, so the mean (average) ≠ median, as shown in Figure 7.	Not all are highly skewed. For example, the mean and median water level for Johns Lake are 92.55 and 92.41 ft NGVD, respectively. I would prefer to leave Figure 1 as is because this figure is used in all MFLs reports. A special figure may not be needed for sandhill lakes because a reader might question if Johns Lake is a sandhill lake because the mean and median are within 1-2 inches even though the lake fluctuates 14 ft
Upchurch	Figure 3 – I found one instance where T4 was mentioned in the text, and none where T3 is mentioned. Either discuss T3 and T4 as you have T1 and T2, or omit from this figure. This is confusing.	T3 and T4 are mentioned in the beginning of the Results and Discussion section. These transects are mentioned so a reader will know that additional transects were done. Additionally, a reader will know why these transects are not presented in detail as were T1 and T2.
Upchurch	Figure 5 – On page 5, the text indicates that this map shows recharge to the Floridan. According to this map, recharge to the Floridan is lowest under the lake and highest under the sandhills. The caption of the figure does not indicate to what aquifer recharge is directed. This is why a water budget would be so helpful. Highest recharge on hillsides with steep slopes seems counter intuitive. Low recharge under the lake suggests that the lake is not well connected to the Floridan.	Figure heading corrected to include Floridan aquifer.
Upchurch	Figure 6 – Data such as these make me nervous about use of terms such as astatic and saying that the lake has no mean. What is being implied is that the mean or median lake level is transient over the time span of monitoring. There is a mean lake level; the lake levels just have high variance and skewness, and they show moderate term trends. This is a result of the period	Lake has no mean was statement by CH2MHill reference. Astatic wetland communities statement was softened to certain astatic wetland species. I agree, the idea of completely astatic wetland communities makes me nervous for this

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	of record, not a fundamental property of the lake.	lake. I think these system types (wetland lakes to completely astatic sandhill lakes [e.g., Lake Geneva] occur over a continuum. I feel less uncomfortable about making such a statement for Lake Geneva. However, Johns is somewhere between a wetland lake and an astatic lake. Johns Lake might have relatively stable wetland communities where some species are astatic.
Upchurch	Page 20, 4th para. – Please define FWDM. I think this is the first use of the acronym.	Recommended change made. FWDM stands for Florida Wetland Delineation Manual. Citation was added.
Upchurch	Page 94, 4th para. – Use of the term organic "bodies" is confusing. Why not say "horizons", lenses, etc.? I keep waiting for the author to say he had found Jimmy Hoffa.	Organic bodies term was changed to hydric soils indicator A6 (organic bodies). A citation was added. Organic bodies term was used thereafter because organic bodies term is likely better understood by a lay reader than A6 terminology. Our soil scientist considers the term to be a valid and useful term.
Upchurch	Page 31, Structural Alteration section – What is the current effect of these levels or the control structures on the hydrograph? Examination of Figure 7 seems to indicate that there is no effect. Certainly the peak levels so not appear flattened.	The canal system draining the lake had vegetation (e.g., trees) growing. The effect was to slow the drainage of water from the system. This resulted in extreme high water levels that would not have occurred if the canal had been maintained and the structure had been operated in an appropriate and consistent manner for flood control. I expect the more recent peaks will be flattened since the canal was cleared in the fall 2009 [pictures included in latest draft]
Upchurch	Page 35, 2nd para. – This first full paragraph on the page is the only place I note T4 being mentioned. I think I would get rid of T3 and T4 in text totally if the position of one palmetto is the only use of T4.	I'd prefer to leave the sentence or two that explains that additional transect were done but the information was not used for this MFLs determination.)
Upchurch	Page 36, IL Level discussion – Isn't maintenance of trophy size bass more of a recreational resource value than protection of the fish population. I suspect that it might be hard to defend, as well. This argument would sound less trivial (I know it isn't, but it reads that way) if it were oriented toward protection of the fish population, including mature adults.	Correction made. Discussion includes reference to fish population including mature, trophy size fish
Upchurch	If the MFL is indeed to protect the trophy-sized fish in the lake, then I would	Protecting the largest species should protect the

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	establish the uniqueness of this fishery in the introduction to the report. What is the basis for protecting trophy-sized bass from this lake and not others?	smaller species if water greatest depths are needed for the largest fish
Upchurch	Page 36, IL Level discussion, middle of the 2nd paragraph - Here, it is stated that the IL would not result in "large" fish kills. Do you mean large size or large numbers? Again, if the context is size, you are protecting a recreational resource as much as the fish population in general.	Point was clarified to mean large numbers killed rather than only large size fish
Upchurch	Page 36, IL Level discussion, bottom of the 2nd paragraph – A list of "benefits" of low water vents is given here. Some of these events seem less a benefit than a problem.	Such low water events occur infrequently in systems with no pumping. Some aspects of the biota benefit. MFLs protect the system from too many such low water events (i.e., naturally + anthropogenically caused events).
Upchurch	Page 61 – Appendix B is labeled Appendix A in the header of this section.	Headers will be formatted by SJRWMD editor's office staff in the final version of the report).
Upchurch	Page 61 and forward – Robison's discussion of stage duration curves and how the groundwater flow model is used in developing MFLs is excellent. It does not address the water budget issues mentioned above.	Water budget and how they fit into MFLs were included near the beginning of the MFLs Overview section in the Introduction. The information was very general so that non-technical readers might see why withdrawals are managed.
Upchurch	Summary As noted above, this edition of the Johns Lake report is excellent and a great improvement over the previous version. My concerns are that the report leaves some questions about the physical limnology of the lake. Since I taught physical and chemical limnology for many years, I tend to look for such issues. I do think that explaining why lake levels behave as they do and why only the IH and IL are realistic MFLs should be included, however.	Comment noted. Some attempts were made to clarify this comment in the report. My time frames are very short. We will consider including such discussions in future reports.
Comments below are from Wilson and Shaw (February 2010) with responses added April 2010.		

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Wilson (Feb 19, 2010) Primary concerns	The District needs to be confident that it can defend the finding that vegetation at this lake is not sufficiently stable to allow designation of an MFH or MFL, when such levels have been designated at other lakes that, at first appearance, would seem to be similar (i.e. very large swings in water levels, where the lowest highs are far higher than the highest lows). The references in the report to other lakes where vegetation moves up and down slope have much greater swings than Johns Lake.	The shrub swamp (species) appeared to move at Johns Lake based on comparisons between 2000 and 2009 transects. The shift is likely the result of the extreme high- and low-water events of 2001-2004 rather than a function of the total range of fluctuation during a long period (e.g., 50 years of stage record). A FH and FL are appropriate for the other lakes if the vegetation did not shift in response to recent events that occurred between the date of the original fieldwork and the fieldwork associated with a reevaluation. I added some discussion in the Appendix C about the frequency of high- and low-events at sandhill lakes vs. wetland lakes. The comment above (i.e., "very large swings in water levels, where the lowest highs are far higher than the highest lows") might be reconsidered. As written, the statement describes a hydrology associated with a wetland type lake or river where the lowest highs are almost always higher than the highest lows. Sandhill lakes have periods of time where the annual lows (highest lows of the series) of a wet period are much higher than the annual highs (lowest highs of the series) that occur during a dry period. This condition results in considerable overlap in the stage frequency curves. It is not know at this time if the degree of this overlap is useful for identifying sandhill type lakes from wetland lakes. There is likely a continuum of hydrologies among lakes from the wetland class to the most extreme sandhill type lakes. Johns Lake is in between these extremes. As noted in the report (pg. 7), the range in stages of Johns Lake is less than Geneva, Brooklyn, and Pebble but greater than 90% of the 121 lakes in a report by Motz and others (1991). It seems reasonable for some wetland species to be astatic at Johns Lake when all the wetland

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		species or "communities" are completely astatic at Lakes Geneva, Brooklyn, and Pebble.
Wilson (Feb 19, 2010) Primary concerns	The report itself needs more discussion of what was actually found that caused only an MIH and MIL to be designated.	Some discussion of what was found was added to the report (see page 33).
Wilson (Feb 19, 2010) Primary concerns	Outside the report, the District needs to look at lakes like Sylvan, Hiawassee and Prevatt and be confident that (if challenged) it can point to specific differences (geology, hydrology, land use, management) that clearly distinguish them from Johns Lake. For example, if someone challenges MFLs for Sylvan Lake on the basis that the methodology used didn't work at Johns Lake, what specifically will the response be? Another example: if SWIDS are diagnostic at several lakes with big swings in water levels, why don't they work here?	The questions here are whether to focus on static or astatic wetlands. Clearly, focusing MFLs on astatic wetlands or wetland species is not easy to defend. Using SWIDS to defend the locations of astatic wetland would also not be defendable. The other lakes likely have relatively stable wetlands and therefore such a resource can be the focus of MFLs. To date, SWIDS have not been developed for the minimum elevations of saw palmetto. Such curves could have been used to support the return interval component of the recommended IH if they had been developed. All SWIDS are developed with the assumption that plant community elevations (minimum, mean, and maximum) are relatively stable. However, SWIDS based on astatic species might not be valid. For example, the SWIDS for shrub swamp of 2000 transects at Johns Lake would be much drier than SWIDS for the same community on 2009 transects. Several SWIDS from certain sandhill lakes (Geneva and Swan) have been removed from the SWIDS analysis graphs to better define these flooding and dewatering

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		signatures.
Wilson (Feb 19, 2010) Primary concerns	I would like to see much more information on the water balance of this (and other lakes). As we have discussed this matter several times, without a really successful resolution, here is a specific suggestion. For the report proper, I suggest you prepare a table in which the column headings relate to each component of the water budget (each inflow and outflow term; along with lake level and volume) and the rows represent different conditions. The conditions might be for "wet period" (i.e. a time leading to high water levels when inflows exceed outflows) and "dry period" (i.e. a time leading to low water levels and outflows exceed inflows). Conditions would also be distinguished for different times: prior versus current land use; prior versus current outlet conditions; future with 1.5 foot aquifer drawdown. This would provide a reasonably complete and quantitative understanding of how the lake works. If you have any questions about what I am proposing, please have Cliff give me a call.	We developed water budget tables with existing conditions landuse, future landuse, and with 1.8 ft Floridan aquifer drawdown. Changes in outflow canal and structure are not modeled and therefore the output for this scenario is not available. The scenarios with a brief discussion of how to use the tables were included in a new appendix (D).
Wilson (Feb 19, 2010) Ancillary comments	It is still the case that there is never a completely straightforward identification of what vegetation community constitutes the "upland ecotone", i.e. "the upland ecotone is characterized by …".	I added the following statement, "Characteristic species of the Johns Lake uplands included: Virginia live oak (Quercus virginiana), saw palmetto (Serenoa repens), wild cherry (Prunus serotina), laurel oak (Quercus laurifolia), and beauty berry (Callicarpa americana)." The information was added to page 2 of the document.
Wilson (Feb 19, 2010) Ancillary comments	Also, at p. 42-43, it is stated that saw palmetto doesn't move downslope in long dry periods. If so, why is there a need for periodic flooding to maintain the elevation of the ecotone?	I added the sentences to the IH rationale section to clarify why saw palmetto was used as an indicator. "Thus, saw palmetto is a good indicator of uplands edge. Flooding this species should not kill upland species at and up-slope of the palmetto line but will kill other species (e.g., live oak) that can move down-slope during extended dry periods."
Wilson (Feb 19, 2010) Ancillary comments	The margin of safety for the IL is so large, that my concerns relate entirely to the methodology.	I added "A discrepancy between the margin of safety shown in the modeled hydrologic regime (Figure 23) and the hydrologic regime based on the on-site collected stage data (Figures 22) exists. This difference may have been caused by

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		increased leakance to the aquifer during the 1972 to 1995 time-period (Robison 2008, 66-69). Alternatively, the eight-foot depth criterion might not be limiting for Johns Lake and might be reassessed at a later date" to page 51.
Wilson (Feb 19, 2010) Ancillary comments	For example, is the selected criterion (8' minimum depth) equivalent in frequency and duration to the MFL (which allows extended times <8')?	If I understand this question correctly, the 8' minimum depth criterion when added to the minimum elevation in the lake (i.e., 76.2 ft NGVD) equals 84.2 ft NGVD. The percent change of non-exceedence associated with such a low water event (84.2 ft NGVD continuously not exceeded for 90 days) is approximately 0.1% based on the model hydrology and approximately 1% based on frequency analysis of the on-site collected stage data. This elevation corresponds to approximately 0.1% to 0.5% chance of non-exeedence based on modeled hydrology +1.8 ft of aquifer drawdown. These extremely low probabilities are probably beyond the accuracy of graphs developed with 50 years of data.
Wilson (Feb 19, 2010) Ancillary comments	If contour values can't be added to the bathymetric map, can you at least show the IL contour?	The contour that is near the IL elevation component was color-coded. Also, contour depths were added but are not easily seen in the "reduced" figure. The updated figure was added to the report.
Wilson (Feb 19, 2010) Ancillary comments	The lack of quantification of "large fish kills" leaves it to the readers' imagination as to what fish kills are allowed for in the MFL.	The large fish kills although not quantified, were described as basin wide (i.e., occurring in the main lobes) while smaller fish kills might occur in small, shallow isolated lobes during infrequent low events (see pgs 48-49). Such smaller fish kills will not likely affect the recovery of the lake-wide bass population while lake-wide fish kills could lengthen the recovery time.
Wilson (Feb 19, 2010) Ancillary comments	What does Figure 21 look like with a 1.5 ft lower aquifer?	A figure with a 1.8 ft lower aquifer is presented in Appendix B (see Figure B11).

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Wilson (Feb 19, 2010) Ancillary comments	How much does the water budget change (that question will be answered if you do the water budget table above). My sense of the analysis is that the increased recharge from a lowered aquifer is tiny compared to the overall water budget. Is that based on a K value that is pretty well nailed down? If there is uncertainty in the K value, is 1.5 ft sufficient (i.e. does it provide a 95% probability of being sufficient)? Does it matter if the recharge interface is a large area (IH) versus low (IL)? Is the recharge difference so small that it is lost in the noise of the overall water budget, and if so, can the District defend against claims that more lowering is okay because it is lost in the noise?	Some of these questions might be more relevant to Price's modeling report for Johns Lake. The modeling graphs in my report are presented to show if the recommended MFLs are protected or are not protected.
Wilson (Feb 19, 2010) Ancillary comments	Please add a discussion of the transects (including T3, T4) that makes it clear why you determined the vegetation to be astatic.	The information from T3 and T4 cannot be used to illustrate which species might be astatic because these two transects were not done in 2000 (as were T1 and T2). Therefore, we cannot compare vegetation changes along these "new" transects. I would prefer to not include an extended discussion of these transects because the information was not used to determine the recommended MFLs.
Wilson (Feb 19, 2010) Ancillary comments	This discussion needs to be such that, if MFLs in other lakes are challenged, it doesn't cause confusion. Explain what happened between 2000-2009 to cause changes (e.g. what caused shrub swamp to disappear).	I added the following sentences to page 33 near the beginning of the Results and Discussion Section; "The shrub swamp on transect 1, located near uplands during the 2000 field survey (Figure 12), was found at a much lower elevation during the 2009 field survey (Figure 15). The shrub swamp likely became established near uplands following the extreme high water levels (stages > 98 ft NGVD) of 1998. The stage was 89.31 ft during the 2000 field work. Lake stages continued to fall to an extreme low during 2001 (Figure 8). The shrub swamp species were likely still present near uplands during 2001. Water levels increased to near record levels during 2004-05 (i.e., > 98 ft NGVD). These stages were very high for a very long durations (e.g., months). This extended flooding period likely killed the shrub swamp species near uplands. The lake levels declined to approximately 91.5 ft during 2008. This low water event likely allowed shrub

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		swamp species to become established at the lower elevations on transects 2. The shrub swamp, located on transect 2, was reflooded as water levels increased during 2009 when these transects were resurveyed. The flooded conditions will likely result in the death of shrub swamp species and the reestablishment of shallow marsh species along transect 2. Similarly, the "drier" wet prairie species located on transect 2 during 2000 were no longer present during the 2009. Flooding likely killed wet prairie species and allow shallow marsh species to become established. Some of these short-lived, wetland species may be considered astatic at Johns Lake because they moved from up-slope locations to down-slope locations or where eliminated from transects when the lake fluctuated over an extreme range during a several year period-of-time. Therefore, setting a FH and FL based on protection of wetland species / seasonally flooded wetland communities, that appeared to be astatic was not done at Johns Lake."
Wilson (Feb 19, 2010) Ancillary comments	Are we confident that the wetland communities that remain (e.g. shallow marsh) are protected by just the IH and IL?	Yes. The frequency curves used to assess protection of the five MFLs are based on annual maxima and annual minima series analyses. Protecting the more extreme MFLs (e.g., IH and IL) will protect the less extreme MFLs (e.g., FH and FL). Conversely, it is reasonable that a system with a FH and FL will have sufficient numbers of high water events and low water events to protect criteria that might be used to set an IH or IL.
Wilson (Feb 19, 2010) Ancillary comments	Do the transects really show shallow marsh to be astatic?	The shrub swamp species were astatic between the two sampling dates. Therefore, by definition the shallow marsh might be considered astatic because the upper edge of this community changes as shrub swamp species become

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		established at lower elevations and are killed at the elevations near uplands (i.e., transect 1 in 2000). Interestingly, the upland/wetland interface and the deep marsh shallow marsh interface appear to be relatively stable for Johns Lake. Such a condition might not be true for extremely unstable lakes like Lake Geneva.
Wilson (Feb 19, 2010) Ancillary comments	There was never a clear explanation of the hydrologic function of the canal.	The purpose of the outfall canal was for flood control at Johns, Black, and Tilden Lakes (see pg 6 of new draft).
Wilson (Feb 19, 2010) Ancillary comments	Put the canal on a map?	The locations of the inflow and outflow are shown in Figure 2. The figure legend now references where the inflow comes from and where the outflow goes. Developing a new map with an appropriate scale to show the canal was not done because of time constraints.
Wilson (Feb 19, 2010) Ancillary comments	The hydrology appendix still has lots of text that references MFH etc. It cites a hydro report for the lake that isn't in the refs, and I couldn't find it on the SJRWMD web-site.	The corrections were made to the appendix.
Wilson (Feb 19, 2010) Ancillary comments	I didn't understand the concept that a heterogeneous data set is not typically used to assess the protection of MFLs, but apparently can be used at this lake.	Sentences were included in the Executive Summary and were added to the Conclusions and Recommendations section to clarify why this additional assessment was done. These sentences are: "Because of differences between the modeled hydrologic regime and the long-term stage data collected at Johns Lake, frequency analysis of long-term existing stage data (i.e., a heterogeneous data set not typically used to assess the protection of MFLs) was performed as an additional check of MFLs protection. SJRWMD concludes that the recommended IH and IL are also protected based on analysis of on-site collected stage data."
Wilson (Feb 19, 2010) Ancillary comments	A WRV table similar to that in the other reports would be useful (e.g. Table 18 in the revised report for Sylvan Lake).	This table (see Table 7, Johns Lake report) was in the report. The Table is currently located at the end of the document. The table will be moved to

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		an appropriate location in the final report when the SJRWMD editor formats the report. I believe the Johns Lake table is very similar to the Sylvan Lake Table 18.
Wilson (Feb 19, 2010) Ancillary comments	My editorial review is mostly for the Executive Summary. Line 5 of p. 1, "available" should be "availability".	Recommended change was made.
Wilson (Feb 19, 2010) Ancillary comments	Suggest the paragraph on Johns Lake as a sandhill lake be moved before the paragraph on the environmental values.	Recommended change was made.
Wilson (Feb 19, 2010) Ancillary comments	Define the term "astatic".	The term was defined.
Wilson (Feb 19, 2010) Ancillary comments	What does the last sentence of the next to last paragraph mean - it seems to suggest that every data set ever actually relied on was determined to be homogeneous; if true, I'd be surprised.	I tried to clarify this sentence by adding, "Because of differences between the modeled hydrologic regime and the long-term stage data collected at Johns Lake, frequency analysis of long-term existing stage data (i.e., a heterogeneous data set not typically used to assess the protection of MFLs) was performed as an additional check of MFLs protection. SJRWMD concludes that the recommended IH an IL are also protected based on the analysis of on-site collected stage data." I did not mean to imply that all data sets relied upon might be homogeneous.
Wilson (Feb 19, 2010) Ancillary comments	It is really okay to have Cliff's Ph.D. on the cover -- my comment is to do this for all your reports where author has survived that much graduate school.	Ph.D. added back to title page.
Wilson (Feb 19, 2010) Ancillary comments	The evidence from two dead rhizomes should be given less weight.	A reference to "Anecdotal support" was added to provide less weight to the dead saw palmetto rhizomes.
Shaw (Feb 19, 2010)	The one improvement I feel is still needed is to further explain the conceptual hydrologic model (water balance) for Johns Lake and how it differs from other sandhill-type lakes for which MFLs have been recently proposed, and then use this as the rationale for the selection of IH and IL, rather than FH and FL or MA, for this lake. The rationale used in the narrative is that the choice of IL	I included an appendix (i.e., D) that deals with the water budget of the lake with tables for three scenarios. An example shows how to use the tables to determine how the inflows/outflows change with different amounts of impervious

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	and IH is a result of extremely large (and erratic) fluctuations in water levels at this lake and the fact that wetland plant communities were found to be "astatic." Although this is a plausible rationale, it would be very helpful if it were better justified through the hydrology, if that is indeed the cause of the variability in the wetland communities. Comparison with other sandhill lakes does not to me suggest that lake level fluctuations are any more extreme at Johns than others for which FH and FL minimum levels (and in some cases MA) are proposed. Including a conceptual model or at least more detail about how we think the hydrology works at this site may be helpful in explaining such differences. If this lake is in a different landscape setting or context (e.g., a heavily urbanized basin) then this should be made more clear in the text and an explanation given that distinguishes it from other sandhill lakes.	surface or with increased groundwater pumping. Appendix C was added to clarify how different lake types might have different MFLs criteria. Reasons why an IH and IL might be used rather than a FH and FL are included.
Peer Review Comments on April 2010 Draft Johns Lake Report (May 22 – 25, 2010)		
Shaw	The new material in Appendix C was very helpful to further explain how the District identifies which of the five MFL criteria to set for a given water body. It is clear from the explanation that these decisions are based more on which wetland features and other edaphic (e.g., soils) characteristics are observed in the field than on any *a priori* classification of a lake's setting or hydrologic signature. Different MFL criteria are associated with particular features, and if those features are not present or are considered "astatic," then the MFL associated with that feature is not determined. This is a pragmatic approach that allows for flexibility in setting MFLs based on what is actually observed in the field, but it also argues for more rigorous observations over a longer duration. For Johns Lake, there are several questions that still could use additional explanation: Is the quality (resolution, duration) of field observations sufficient to determine whether wetland features are truly astatic?	The term astatic is problematic and has been replaced with unstable. In the case of Johns Lake, certain species typically associated with the shrub swamp community were found to be unstable while some wetter communities (e.g., lower end of shallow marsh and deep marsh) were considered to be stable. For this reason, a minimum frequent low level was developed and recommended for Johns Lake to protect the location of the shallow marsh/deep marsh ecotone. Long-term monitoring of MFLs systems might provide for the data necessary to address this comment.
Shaw	Which specific features are considered astatic? Is this a temporary change or does it reflect some kind of long-term change in the system or its hydrology?	Some species typically associated with the shrub swamp community appeared to be unstable. I think the movement of these unstable species is a temporary change caused by recent high and low water events and are not related to some kind of a long-term (centuries) change in the system or its hydrology. This is because only one group of species seems to have moved.
Shaw	What stresses, hydrologic or other, are responsible for this astatic behavior?	The effects appear to be the result of recent

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		hydrologic events associated with a severe drought that was followed by a very active hurricane season. The unstable behavior was attributed to these causes and the effect was only observed with some shrub swamp species.
Shaw	Is there another wetland community type (e.g., marsh) that would be a suitable alternative for setting more frequently occurring MFLs (e.g., MA, FH, FL), perhaps in addition to IH and IL?	Yes, the ecotone between the shallow marsh and upper end of the deep marsh communities appears to be stable over the last decade. A minimum frequent low was recommended to protect the location of the ecotone between these two communities.
Shaw	Distinguishing between "sandhill lakes" and "wetland lakes" (while acknowledging that there is a continuum of hydrologic behaviors in between) is a simple and useful classification and is stated here more clearly than in any previous report I have reviewed. However, the descriptions in Appendix C largely focus on the extreme situations or exceptions that may warrant selecting IL and IH, rather than more typical sandhill or wetland lakes. For completeness, it would be helpful to add some description and discussion of the more typical situations for each of these lake types to the narrative on pages 107-110. Some discussion is also warranted of the special modeling problems posed by sandhill lakes, on which the District has invested considerable study and effort over the past several years. Given the utility of this lake classification, it would be helpful in the future to similarly stratify SWIDS graphs for a given plant community according to whether the setting is a sandhill or a wetland lake.	A descriptive figure was developed for the continuum of hydrologies resulting in a continuum of lakes with different criteria and therefore might result in different MFLs being determined for different lakes. The figure was presented at the June 3rd meeting. The figure was further modified to show examples of intermediate (i.e., less extreme) examples. Discussion of special modeling problems should probably be addressed in the modeling reports and not necessarily in the MFLs determination reports. We agree that this lake classification might help to define more defendable (and less variable) SWIDS graphs for selected plant communities. For example, SWIDS for shrub swamp communities might be reconsidered entirely. SWIDS for upper shallow marsh communities that had shrub swamps immediately upslope might be more closely scrutinized.
Shaw	Some of the discussion in Appendix C suggests that if a water body (e.g., Lake Geneva) exhibits different hydrologic "states" as a result of multi-decadal climate oscillations, this situation may warrant setting IL and IH levels in lieu of FH, FL and MA. I would urge the District to be cautious with this kind of approach given our poor understanding at present about how these long term climate changes affect the hydrology of lakes and the lack of data of sufficient duration and resolution to document such changes in the field. It is entirely	Agree; care should be taken here. A solid MFLs monitoring program might provide for better information about stable vs. unstable plant communities and hydric soil indicators. Such information might provide for reevaluation of adopted MFLs at some later date.

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	possible that over multiple decades, the hydrology of many of our lakes and wetlands may be changing, but we have yet to observe it. What we now consider "stable" wetland features may in fact be changing over time; likewise, features that are observed in the short term to be "astatic" may in fact be surprisingly persistent over the long term. Perhaps a better approach would be to set MFLs based on the features judged to be most stable that are present on the site now and then implement an adaptive approach for reassessing and modifying the MFLs over time. This kind of approach necessarily requires a long-term investment in and commitment to hydrobioloigical monitoring.	
Upchurch	This document by Dr. Clifford Neubauer is a new revision of a report that has been previously submitted for peer review. My most recent review concluded that the report was well written and understandable, although there were deficiencies. For the record, this revised report is much clearer and easier to read and understand. Dr. Neubauer is to be complimented for the improvements he has made in the report. It is easy to read and understand.	No response required
Upchurch	One of my concerns has been that documents such as MFL reports should be understandable by lay persons, including District Board members, and that they should stand alone in terms of understanding the purpose and conclusions of the report. To this end, I have been critical of the fact that little had been done to provide context for the reader in terms of describing the lake and behavior of water in the lake. Previously, there was little included in the report to explain what a sandhill lake is and how it functions. To a large extent, this concern has been eliminated in the current draft of the document.	No response required
Upchurch	The current report continues to improve on addressing some of these issues and is much better in terms of explaining the physical setting of the lake. There is now an appendix that discusses the lake water budget as it has been conceptualized by the District. It does not discuss in lay terms how groundwater and the lake interact, which I consider important if one wants to understand the rationale for why only Infrequent High (IH) and Infrequent Low (IL) levels are proposed for adoption as MFLs. Understanding why the lake is considered "astatic" is important and critical to explaining, in my opinion, why other lake-level regime levels are not recommended for adoption.	Discussion of surface and groundwater interactions are addressed in the hydrologic modeling report. Which MFLs are recommended for a give lake are a function of system specific criteria. Text explaining why different MFLs are used at different systems has been included in more recent drafts. As pointed out in the Appendix C material, a lake (theoretically) can be very stable (i.e., exhibit a very narrow range of fluctuation) with regard to water levels (e.g., Kingsley Lake) and not have

<table>
<tr><th>Reviewer</th><th>Peer Review Comments</th><th>Resolution</th></tr>
<tr><td></td><td></td><td>stable seasonally flooded wetland communities.</td></tr>
<tr><td>Upchurch</td><td>I agree that use of frequent high and frequent low MFLs is not necessary to protect the lake and that use of the infrequent high and low regimes will suffice to establish a stage regime. This is simply because the lake levels undergo wide fluctuations in lake levels, so determining if stage conforms to frequent high and low regimes will be problematic to verify. IH and IL regimes will suffice.</td><td>No response required</td></tr>
<tr><td>Upchurch</td><td>I had previously suggested that a water budget for Johns Lake be included in the next draft as a means for understanding why the lake levels fluctuate so much. This inclusion was also suggested because there are some apparent inconsistencies in the text. For example, there is discussion of connection with the Floridan aquifer, and a recharge map is included in the report. However, astatic lake levels are a result of the high level of influence of surfacewater inflows, not dominant interactions with the aquifers. By the same reasoning, the surficial and Floridan aquifers are only able to sustain certain minimum levels. By understanding the water budget, one can understand why the IL was set based on the Floridan and why it is difficult to model high lake stands. To me, including a minimal discussion of the water budget and aquifer interactions should result in a better understanding of the MFLs by the public and persons who are not familiar with sandhill lakes and potentially reduce criticism of the MFLs.</td><td>No response required</td></tr>
<tr><td>Upchurch</td><td>The current water budget appendix presents the data, but the discussion of what it means is still lacking. Based on the presentation in the appendix, the water budget includes the following components:

<table><tr><th>Water Sources</th><th>Water Sinks</th></tr><tr><td>• Runoff from “impermeable” land surfaces
• Runoff from “permeable” surfaces
• Inflow from Black Lake
• Direct rainfall on lake surface</td><td>• Direct evaporation from lake surface
• Seepage into Floridan aquifer from sinkhole A and B
• Outflow to Lake Apopka</td></tr></table>
Clearly, surfacewater interactions are the driving mechanism for the rapid changes in lake levels. However, other potential sources and sinks are</td><td>These discussions do not belong in the MFLs determination report. The comments are pertinent to the hydrologic modeling of the Johns Lake system, which has been peer reviewed separately.</td></tr>
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	important to managing the lake and determining if consumptive uses can cause harm. To that end, there are other potential sources and sinks that have not been discussed. These are interactions with the surficial aquifer and intermediate aquifer and confining unit. The USGS has shown that sandhill lakes (i.e., Lake Barco) in the northern part of the District are, at least in part, flow-through lakes with significant contributions and outflows of water from the surficial aquifer. Certainly some of the water that infiltrates in the permeable portions of the Johns Lake drainage basin makes its way to the lake as interflow. The intermediate aquifer and confining system is poorly known and may or may not be significant. It is present at Johns Lake and, like the surficial aquifer, should be discussed. Also, the sources and sinks probably vary in importance with lake stage. There is no discussion of water fluxes related to lake stage or climatic variations. Figure 7 shows the modeled recharge to the Floridan aquifer in the vicinity of Johns Lake. The caption should indicate the source of this map, and the text should discuss the fact that this recharge is an estimate. Is it a calibration variable in the flow model? What has been done to verify the data? The extremely large recharge numbers are in the sandhill uplands. Is all recharge going to the Floridan through the intermediate aquifer and confining system? Is there no shallow interflow to the lake and surficial aquifer discharge to the lake and flow out of the lake?	
Upchurch	Modeled and measured high stages did not agree. The explanation as to why is weak. I do not see how the discrepancy would cause difficulties with the MFL process. The statement on page 44 that "… the recorded stage data are higher than they <u>should</u> <u>be</u> [emphasis added] (based on the hydrologic model), …." is problematic. Assumption that the model is right and that the data are wrong should be based on an analysis of the data. Otherwise, the reverse should be the concern.	The report language will be changed from "should be" to "would have been." There should be no question that Johns Lake stages were higher than they would have been if the outlet structure and canals had been properly maintained and operated. Nowhere does the report state that the POR stage data are in error.
Upchurch	Evaluation of the 10 water resource criteria is excellent, and the case has, in my opinion, been made that protection of fish passage and habitat is the appropriate criterion for MFL development. I agree that this criterion is limiting for Johns Lake.	No response required
Upchurch	Several times in the document there is mention of the 14 foot fluctuation in lake levels between 2001 and 2004. This statement gives the impression that this fluctuation is atypical. The fluctuation is simply a result of juxtaposition of drought and then high rainfall and is an excellent demonstration as to how	This was clarified in the latest draft report. For example, high and low stages over long periods of time are the result of climatic cycles while the same large range of fluctuation over a short

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	sensitive sandhill lakes are to climatic events. This should be explained.	period during the 2000-2009 time frame was the function of a severe drought followed by two very active hurricane seasons.
Upchurch	I have also reviewed the modeling report by Price Robison. It was this review that created my concern that the SSARR model did not account for all potential water sources and sinks in the water budget and that an explanation as to why these other sources/sinks were not included should be presented. This modeling document and Appendix B place considerable emphasis on the groundwater flow model (East-Central Florida or ECF model), which includes an active surficial aquifer. Is there a problem using one model that does not include the surficial aquifer and another that apparently does not?	These discussions do not belong in the MFLs determination report. The comments are pertinent to the hydrologic modeling of the Johns Lake system, which has been peer reviewed separately.
Upchurch	***Summary*** As noted above, this edition of the Johns Lake report is generally excellent and a great improvement over the previous versions. My concerns are that the report leaves some questions about the physical limnology of the lake.	No response required
Wilson	These comments relate to the report on the Johns Lake MFLs by Dr. Clifford P. Neubauer as revised and dated April 2010. The report is greatly improved and I have only a few comments.	No response required
Wilson	The most important aspect of these particular MFLs is that they are not based on a relationship between water levels and stable wetland communities. The reasons are now clearly explained. However, I have difficulty reconciling the explanations with the data. One of my difficulties is with the explanation that the wetland communities are astatic because the Johns Lake hydrograph shows a large swing from low water (2002 after the first surveys) to high water (2005). When I compare the hydrograph for Johns Lake to that for Lake Avalon or Lake Hiawassee, the swing seems broadly similar in magnitude and timing, yet at the latter two lakes the District was able to establish MFLs based on stable wetland communities. All three lakes also have a comparable and large downward drop from 1999 to 2002. My other difficulty is with the conclusion that the communities at Johns Lake are astatic. Really only the shrub swamp in Transect 1 changed radically. In	Agree; some dominant species of the shrub swamp community appear to be unstable. Therefore, a minimum frequent low was developed to protect the shallow marsh/deep marsh ecotone because this ecotone appears to be stable over time. Text was included that indicated that some seasonally flooded, shrub swamp species were unstable and given as a reason for why a minimum frequent high was not recommended for Johns Lake.

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	most respects the marsh community elevations stayed the same, and at other lakes that has been enough to support an MFL based on those elevations. What is there that precludes the same approach as at Johns Lake?	
Wilson	These two comments are important, because unless conditions at Johns Lake can be clearly distinguished from other lakes, the rejection of the "standard method" at Johns Lake will raise doubts about whether that standard method is appropriate at all. In my view, the standard method must be used at Johns Lake unless conditions at Johns Lake can be demonstrated as so different that the method cannot be used AND the reasons for the difference can be explained convincingly.	The comment about a "standard method" not being used at Johns Lake required a response. The SJRWMD MFLs method allows for the determination of multiple levels based on system specific protection criteria. That is, different MFLs may be used depending upon which criteria exist at a particular system. An appendix (C) was added with a discussion of how a continuum of hydrologies can result in a continuum of protection criteria. A figure summarizing that discussion was presented at the June 3, 2010 meeting. The figure has been slightly modified and improved based on discussions at the June 3rd meeting. The improved figure was included in the updated John Lake report and will be included in future MFLs lake reports. The Appendix C materials might be removed from the Johns Lake report and added to the methods manual to reduce the size of the MFLs reports.
Wilson	As to the IH and IL, I believe these are now adequately explained and justified with respect to their conceptual and specific basis. In particular the write-up on the upland ecotone is much improved. I appreciate the addition of a water balance appendix, and ask only that future write-ups be made more user friendly.	No response required
Wilson	In the executive summary, I didn't think the explanation of "astatic" was clear; I'd also expand upon how the IH protects fish and wildlife habitat.	Astatic was changed to unstable because all peer reviewers and this author do not like the word and connotations associated with "astatic." I believe that unstable was defined parenthetically as follows (i.e., species existed up- or down-slope depending upon high and low water events that preceded field data collection efforts in 2000 and 2009). The IH level really results in no net loss of lake area that indirectly results in protection of

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		fish and wildlife habitat. The IL level is directly focused on the protection of fish habitat. Therefore, no additional discussion of how the IH (or FL) protect fish and wildlife habit was made. Repeating the obvious might be considered redundant.
Wilson	The WRV analysis is responsive to prior comments. As I have commented on other reports, it isn't clear how the low-end MFL protects the WRVs that relate to boating, and I'd be cautious about any implication that the District is somehow signing off on "safe" conditions, as I'm willing to bet someone will smash aground before the decade is out.	No response required