MEMORANDUM
RESPONSE TO PEER REVIEW COMMENTS

TO: Kirk B. Webster, Deputy Executive Director

FROM: John C. Good, P.E., Water Resources Engineer

DATE: November 20, 2006

RE: Peer Review of Draft Report titled "TECHNICAL REPORT–MFL Establishment for the Wacasassa River, Estuary and Levy (Bronson) Blue Spring," by Water Resource Associates, Inc., dated June 2006

The attached material addresses comments provided by the peer review team for the draft report titled "TECHNICAL REPORT–MFL Establishment for the Wacasassa River, Estuary and Levy (Bronson) Blue Spring," by Water Resource Associates, Inc. (WRA), dated June 2006 (the report). The review panel conducted a technical review and identified several concerns to be addressed. Based on their comments, the draft report has been revised by the WRA team.

The original peer review consists of a combined summary report, individual table of comments from each reviewer, and reviewer resumes. Specific comments from each reviewer were addressed by the WRA team in the individual tables in the space provided. Responses were then inserted in the summary report as needed.

The following pages include, first, the original signature pages for the individual tables followed by the entire text of the original peer review summary report document with the responses inserted as appropriate in a distinct font ***[bold italicized]***. The individual review tables with responses and the resumes of the peer review panel are included as attachments (separate files).

JCG/

PEER REVIEW FORM
SUWANNEE RIVER WATER MANAGEMENT DISTRICT

Project or Report Name: Technical Report – MFL Establishment for the Waccasassa River, Estuary & Levy (Bronson) Blue Spring

Instructions:

1. The results of this review are for the use of the District and they are not to be revealed to others without the express permission of the District.
2. By signing this form, the reviewer certifies that the peer review was conducted according to the guidelines listed above and that the opinions and recommendations included in the review constitute an independent review per Chapter 373.042(4)(b), in the discipline noted above.
3. The reviewer also certifies that the review was conducted according to the Scope and Conditions specified above.

Signature of Reviewer:	**Date of Peer Review:** 7/30/06

Responder's Certification: The comments and criticisms provided by the Peer Reviewer have been addressed as noted in column C in a separate response document, which is attached, and in the report.

Name and Affiliation of Responder to Peer Review Comments:	
Signature of Responder: WRA SDII Jones Environmental	**Date of Response:** 11-15-06

PEER REVIEW FORM
SUWANNEE RIVER WATER MANAGEMENT DISTRICT

Project or Report Name: Technical Report – MFL Establishment for the Waccasassa River, Estuary & Levy (Bronson) Blue Spring

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Signature of Reviewer:	**Date of Peer Review:** 8/14/06

Responder's Certification: The comments and criticisms provided by the Peer Reviewer have been addressed as noted in column C in a separate response document, which is attached, and in the report.

Name and Affiliation of Responder to Peer Review Comments:	
Signature of Responder: WRA SWRI JAMES ENV.	**Date of Response:** 11-15-06

PEER REVIEW FORM
SUWANNEE RIVER WATER MANAGEMENT DISTRICT

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Signature of Reviewer: Mark E Luther	**Date of Peer Review:** Aug. 13, 2006

Responder's Certification: The comments and criticisms provided by the Peer Reviewer have been addressed as noted in column C in a separate response document, which is attached, and in the report.

Name and Affiliation of Responder to Peer Review Comments:	
Signature of Responder: WKA STEL JAMES ENV.	**Date of Response:** 11-15-06

FINAL REPORT

OF THE SCIENTIFIC PEER REVIEW PANEL ON THE DATA AND METHODOLOGIES IN

MFL Establishment for the Waccasassa River, Estuary and Levy (Bronson) Blue Spring

Prepared for

SUWANNEE RIVER WATER MANAGEMENT DISTRICT
9225 CR 49
Live Oak, Florida 32060

Prepared under Contract 03/04-137
By

HSW Engineering Peer Review Panel
Scott Emery, Ph. D.
Mark Luther, Ph. D.
Ken Watson, Ph. D.

August, 2006

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INTRODUCTION

The Minimum Flows and Levels (MFL) Program within the State of Florida is based on the requirements of Chapter 373.042 Florida Statutes. This statute requires that either a Water Management District (WMD) or the Department of Environmental Protection (DEP) establish minimum flows for surface watercourses and minimum levels for groundwaters and surface waters. The statutory description of a minimum flow is "the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area" (Ch. 373.042 (1)(a), F.S.).

The statute provides additional guidance to the WMDs and DEP on how to establish MFLs, including how they may be calculated, using the "best information available," to reflect "seasonal variations," when appropriate. Protection of non-consumptive uses also are to be considered as part of the process, but the decision on whether to provide for protection of non-consumptive uses is to be made by the Governing Board of the WMD or the DEP (Ch. 373.042 (1) (b), F.S.).

WMDs are to develop priority lists of water courses and water bodies for which to establish MFLs and the proposed schedules to do so. These lists are to be updated yearly and sent to DEP for review and approval. In developing these lists, the WMDs are to examine the importance of the watercourse or water body to the State or region and the potential for significant harm to the water resources or ecology. Beginning in 2003, each priority list and schedule must include all first magnitude springs (Ch. 373.042 (2), F.S.). For such springs within the Suwannee River Water Management District (SRWMD), the District may choose not to establish MFLs on first magnitude springs provided the District submits a report to DEP containing evidence demonstrating that such first magnitude springs are not currently experiencing adverse impacts from withdrawals and are not anticipated to experience adverse impacts during the next 20 years.

In the fall 2004 the District Board targeted development of MFLs for the Waccasassa River and Levy Blue Spring for 2006. Levy Blue Spring is an historic third magnitude spring and is an important source of flow in the Waccasassa River.

The District enlisted a team of technical consultants to develop proposed MFLs, pursuant to the direction and guidance provided within the Florida Statutes (summarized in the preceding paragraphs). Shortly thereafter, the District chose to enlist a separate team of technical experts to undertake a voluntary peer review of the data and methodologies used in the determination of MFLs for the Waccasassa River and Levy Blue Spring. The Peer Review Panel consists of Dr. Scott Emery, Dr. Mark Luther, and Dr. Ken Watson. Resumes of the qualifications of these three technical experts are provided in Appendix A at the end of this Peer Review Report.

The District provided the Peer Review Panel with a set of general review constraints, a specific set of charges, and a specific set of limitations defining what the Peer Review Panel was to consider in its review, summarized as follows.

SCOPE OF REVIEW REQUIRED BY THE DISTRICT

Task 1. Determine whether the method used for establishing the minimum flows is scientifically reasonable.

a. Supporting Data and Information: Review the data and information that supports the method and the proposed minimum flows, as appropriate. The panel shall assume the following:

1. The data and information used were properly collected;
2. Reasonable quality assurance assessments were performed on the data and information;

Note: The reviewers are not expected to provide independent review of standard procedures used as part of institutional programs that have been established for the purpose of collecting data, such as the USGS and District hydrologic monitoring networks.

b. Technical Assumptions: Review the technical assumptions inherent in the methodology and determine whether:

1. the assumptions are clearly stated, reasonable and consistent with the best information available; and
2. assumptions were eliminated to the extent possible, based on available information.

c. Procedures and Analyses: Review the procedures and analyses used in developing quantitative measures and determine qualitatively whether:

1. the procedures and analyses were appropriate and reasonable, based on the best information available;
2. the procedures and analyses incorporate appropriate factors;
3. the procedures and analyses were correctly applied;
4. limitations and imprecision in the information were reasonably handled;
5. the procedures and analyses are repeatable; and
6. conclusions based on the procedures and analyses are supported by the data.

Task 2. **If a proposed method is not scientifically reasonable, the CONTRACTOR shall:**

a. Deficiencies: List and describe scientific deficiencies.
b. Remedies: Determine if the identified deficiencies can be remedied and provide suggested remedies.
c. If the identified deficiencies cannot be remedied, then, if possible, identify one or more alternative methods that are scientifically reasonable, based on published literature to the extent feasible.

REVIEW CONSTRAINTS

CONTRACTOR and the review panel shall acknowledge the statutory constraints and conditions (Sections 373.042 and 373.0421, Florida Statutes) affecting the District's development of MFLs. CONTRACTOR shall also acknowledge that review of certain assumptions, conditions, and established legal and policy interpretations of the Governing Board (hereinafter referred to as "givens") is not included in the Scope of Work. These givens include:

1. the selection of water bodies for which minimum flow and/or levels are to initially be set;
2. the determination of the baseline from which "significant harm" is to be determined;
3. the definition of what constitutes "significant harm" to the water resources or ecology of the area; and
4. the determination of the specific water-resource values considered in development of the MFL.

Instructions:

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3. The reviewer also certifies that the review was conducted according to the Scope and Conditions specified above.

The above instructions and limitations were provided to the peer review team as part of a peer review form that the reviewers were instructed to use. The completed forms are included in Appendix B.

TIMETABLE

The Peer Review Panel received a draft document titled: "DRAFT MFL Establishment for the Waccasassa River, Estuary and Levy (Bronson) Blue Spring" by Water Resource Associates, Inc., on June 21, 2006. That report included five sections and approximately 120 pages describing the approach used to recommend the proposed MFLs. The five appendices contain additional text, figures, data summaries, and analyses summaries of supporting information.

The Peer Review Panel was given a deadline to have its Peer Review Report to the District within 75 days of receipt of the draft report. This was accomplished on schedule, with a Peer Review Report that provided SRWMD questions about the methods and procedures, suggestions for text and figure clarification, and an assessment of the extent to which the report being reviewed had succeeded in developing scientifically valid methods and procedures.

RESULTS OF PEER REVIEW

The technical report presents that data and analyses that provide technical support for establishing MFLs for the Waccasassa River and Levy Blue Spring. The stated goals of the MFLs are

- to implement the intent and policy of the governing board (Board) of the Suwannee River Water Management District (District); and
- to satisfy the requirements of the state water law and policy

The MFL report is divided into five chapters:

1. Introduction
2. Introduction to the Waccasassa River Basins and Study Area
3. Hydrologic Analyses
4. Ecological Analyses
5. Establishment of MFLs for the Waccasassa River System.

Chapter 1. Introduction provides a brief and concise introduction to the legal basis for establishing MFLs, an overview of the water bodies for which MFLs are being developed, and a discussion of the relevance of specific water resource values that may be considered when developing MFLs. As discussed, Chapter 62-40.473 F.A.C lists ten water resource values (WRVs) that may be considered when developing MFLs. These include

1. recreation in and on the water
2. fish and wildlife habitats and the passage of fish

3. estuarine resources
4. transfer of detrital material
5. maintenance of freshwater storage and supply
6. aesthetic and scenic attributes
7. filtration and absorption of nutrients and other pollutants
8. sediment loads
9. water quality
10. navigation

The authors use a qualitative screening method for ranking WRVs and selecting those WRVs that are relevant, important and for which data for evaluating are available. Based on this preliminary screening, selected WRVs are retained for further evaluation. Based primarily on the value of the estuary as habitat and because protection of flow to maintain the estuary appears to protect the other WRVs, the MFL for the Waccasassa River was based on WRV 3 Estuarine Resources. The MFL for Levy Blue Spring was based on WRV-5 - Maintenance of freshwater storage and supply.

[Response: Please be aware that <u>all</u> water-resource values are retained and considered throughout the MFL investigation process. The screening is for the purpose of identification of potentially critical data needs and initiates evaluation of limiting criteria.]

As stipulated in the peer review instructions, the selection of WRVs for protection is a given and the selection process and rationale were not explicitly evaluated.

Chapter 2. Introduction to the Waccasassa Basin and Study Area provides very good background information on the physiography, hydrogeology, ecology, climate, water use, land use and habitat of the study area. The reviewers found the background information very informative and complete, providing the reader with both a technical and visual impression of the basin. The literature cited was current and relevant to project goal of providing analyses for the development of MFLs, although a number of literature citations were not included in the references.

[Response: Report corrected as noted in tables.]

Chapter 3. Hydrologic Analyses presents the hydrologic data and analyses used to support the development of MFLs. These data include groundwater level and use, surface water stage and discharge, tide, and precipitation. The summary of data availability and quality in Section 3.1.3 (page 3-9) is helpful.

Analysis of the data begins on page 3-9 and includes a variety of techniques for identifying data gaps and extending data records to fill those gaps. Synthesized data records were verified against measured values, and rating curves and flow duration curves were developed. The verification step includes a discussion of uncertainty inherent in data generated using record extension techniques.

River stage and discharge data are available at several locations, with relatively extensive data sets available for the gages near Gulf Hammock (02313700) and on Ten Mile Creek. The gage near Gulf Hammock is tidally influenced; however, using filtering techniques, the authors were able to show that the daily discharge data were suitable for evaluating MFLs for the Waccasassa River.

> ***[Response: While it was possible to filter the 15-minute flow data from the Gulf Hammock gage, the period of record of these data was insufficient to establish the MFL. Furthermore, the best flow metric for relating salinity to river discharge was the two-day average flow at the Gulf Hammock gage (cf. Section 5.3.2). In the final document all references to numerical filtering were removed because the data were neither suitable nor utilized for development of an understanding of the hydrologic behavior of the river or development of the MFL recommendations.]***

Probably the single most pressing issue regarding the hydrologic data and analysis is the paucity of flow data for Levy Blue Spring coincident with groundwater data, as the relationship between groundwater level and flow was used to extend the discharge record of Levy Blue Spring. It appears that four data values were used to generate a period of record for discharge from the spring. The reviewers do not necessarily disagree that this is the "best available" information but are concerned that, regardless, it is simply not enough data to extend the discharge record.

> ***[Response: As noted in the report text, this spring is on the District's priority water body list for MFL development, thus it was deemed necessary to attempt to generate a time series of discharge values in spite of the small number of available data points. The historic data are biased towards a relatively wet period centered on the early 1970s. While the associated predictive uncertainty is high, the degree to which the results reproduce a hydrologic time series pattern that follows observed conditions during the period, as well as the four values (see final Figures 3-7 & 3-8) gives assurance that the regression is reasonable for an initial MFL management tool.]***

Chapter 4. Ecological Analysis begins with the supposition that the objective of the MFL is to protect the estuarine and tidal habitats and that adequate flows to the lower portion of the river also provide adequate flows to the upper portions. The description of the physical setting is consistent with that observed during the Peer Review Panel field trip.

Sections 4.1 through 4.5 provide referenced information and summaries of available data on water quality and riparian and benthic communities. The water quality section provides a discussion of some differences in water quality values relative to other rivers

studied in the area, such as lower DO and higher color, suspended solids, turbidity, and P and most N species. The literature was both relevant and reasonably complete.

The most salient portion of Chapter 4 begins on page 4-28 and runs through the end of the chapter on page 4-74, and is designed to meet the following objectives:

- Identify the dominant benthic/nekton taxa
- Determine associations between abiotic and biotic variables
- Determine the spatial structure of benthic/nekton assemblages
- Determine if salinity distribution and other abiotic variables could explain benthic/nekton spatial patterns

A variety of statistical techniques were used to evaluate potential associations, including Pearson correlation coefficients, multivariate analyses (cluster analysis), analysis of similarity, and PRIMER's BIO-ENV procedure.

The authors note the availability of data from only two single sampling events (for benthos) and concluded that there was a positive relationship between number of taxa and diversity with salinity.

Similarly, the authors note that the nekton relationships were constrained by a single synoptic sampling event and only 27 samples. The relationship between preferred salinity regimes and nekton could not be quantitatively evaluated. Some concurrent work by Janicki on the Alafia River was discussed as being applicable to this MFL effort.

Chapter 5. Establishment of MFLs for the Waccasassa River System presents the rationale for the proposed MFLs. A weight-of-evidence approach is used with the basic premise that variation in freshwater flow affects water quality, benthic macro-invertebrates, nekton and shoreline vegetation associated with the Waccasassa River and Waccasassa Bay.

On page 5-15 the authors state that "based on the ecological considerations discussed above, the 5 ppt surface water isohaline was identified as the isohaline which contributed most to the delineation of both the low salinity habitat necessary as nursery areas for nekton and maintenance of vegetative communities of the Waccasassa."

Linear interpolation and linear regression were used to estimate isohaline positions as a function of discharge. Two-day average flow using the data for the gage near Gulf Hammock (02313700) was used in the analysis, after adjusting for tidal influence. To establish the MFL, the flow corresponding to the location of the downstream limit of the oligohaline vegetative habitat (i.e., rkm 5.6) was predicted. This flow of 98 cfs is exceeded 31.4 % of the time, presumably based on Figure 3-24. The peer reviewers think this is incorrect and 31.4% is the non-exceedance percent.

[Response: This was corrected in the final report.]

The authors then introduce a term called "relative risk," defined as

RRI=(RR-1)*100 where

RR=proportion under MFL conditions (MFL)/proportion under baseline condition (BL)

Rearranging this equation and solving for the MFL condition yields

MFL = (RRI/100 + 1) * BL

The authors posit that an increased risk of 15% would be unacceptable. Solving for MFL yields

MFL = (15/100 + 1) * 31.4
= 36.1 %

A non-exceedance value of 36.1% represents a flow of 112 cfs on the baseline flow duration curve (FDC). By multiplying 112 by 98/112 (or .875), and shifting the baseline FDC down by this proportion, a new FDC reflecting the MFL condition is generated.

The net effect of this approach is to allow for reduced flow of 12.5% under all conditions and results in greater available water at high flows and less at low flows. Because the flow reduction is a constant proportion, the relative risk will vary depending on particular baseline risks.

The authors propose an MFL FDC that is limited to 90% of the baseline FDC for Levy Springs.

Chapter 6. Summary and MFL Recommendations provides a very brief recap of the physical setting and evaluation process and summarizes the approach as follows.

1. Use of best available information.
2. Determination of which flow and/or level relationships lead to adverse impacts.
3. Identification of limiting target criteria, the protection of which will protect all other applicable criteria.
4. Recommendation of MFLs that will protect water body and related resources for significant harm.
5. Consideration of specific WRVs to ensure applicable values are sufficiently protected.

REVIEW SUMMARY

Specific review comments are contained in the Review Forms in Appendix B. As stipulated in the peer review scope, reviewers focused on data and data analysis procedures, and on whether or not comments would materially impact the MFLs. If the peer review panel was uncertain about the impact of a stated comment or concern, a "yes" was entered in the column reflecting that the comment "may" identify an issue that could materially affect the MFLs. A "no" generally means that the peer review panel is requesting/suggesting clarification on a subject that would not appear to affect the MFLs.

The MFL for the Waccasassa River was determined as follows:

1. Data for USGS gage # 02313700 were used to develop baseline FDC. Filtered data were compared to median flow data and found to be very similar, so there was no need to use filtered data.
2. The location of the downstream limit of oligohaline marsh was determined.
    a. Linear interpolation was used to determine location of isohalines.
    b. Regression was used to develop predictive equations to estimate the location of isohalines as a function of discharge.
3. Flow was determined such that the 5 ppt isohaline is located at the oligohaline position. More generally, the isohaline positions in the estuary related to known habitat requirements were predicted.
4. The percent flow reduction that results in a 15% relative risk for the flow established in No. 3 above was determined.
5. The percent flow reduction was applied to the baseline FDC to generate a MFL FDC.

The MFL for Levy Blue Spring was set based on 90% of the baseline FDC.

Task 1. Determine whether the method used for establishing minimum flows is scientifically reasonable.

a. Supporting Data and Information

The reviewers generally were very complimentary of the thoroughness of the data review and presentation of background information.

The reviewers note only the lack of data for Levy Blue Springs and question the validity of the FDC developed from only four data points and an association with groundwater levels. The peer review panel concurs with the record extension technique and that these limited data constitute best available information; however, the confidence in any MFL

based on so little information is a concern. Our only recommendation on this topic is to collect discharge data and modify the baseline FDC accordingly.

[Response: As noted in the report text, this spring is on the District's priority water body list for MFL development, thus it was deemed necessary to attempt to generate a time series of discharge values in spite of the small number of available data points. The historic data are biased towards a relatively wet period centered on the early 1970s. While the associated predictive uncertainty is high, the degree to which the results reproduce a hydrologic time series pattern that follows observed conditions during the period, as well as the four values (see final Figures 3-7 & 3-8) gives assurance that the regression is reasonable for an initial MFL management tool. Levy Blue Springs is not currently on a programmed discharge monitoring schedule due to fiscal constraints and gauging priorities. When sufficient additional data is collected, it will be assessed and the MFL revisited.]

b. Technical Assumptions

The peer reviewers found several assumptions/assertions that might materially affect the conclusions of the report.

- use of Lithia Springs as a proxy for Blue Springs for fecal coliform

[Response: Lithia Springs is not meant to be used as a proxy but is rather information to provide the reader with the knowledge that even heavily used springs for recreational purposes are not necessarily limited by coliform standards. The text has been revised to make this clear.]

- assertion of marginal relevance of fish and wildlife habitat for Levy Blue Springs

[Response: Added the following to report: "This water-resource value is considered of marginal relevancy with respect to Levy Blue Spring MFLs because of the highly modified spring bowl and lack of fish and wildlife habitat within the spring. Fish and wildlife criteria are dealt with in the MFL for the river itself."]

- assertion that adequate flow to the lower portion will provide adequate flow upstream. For example, given that the river bifurcates upstream, what would be the effect if all withdrawal were taken from the Waccasassa upstream of the confluence with the Wekiva?

[Response: This concern would be addressed in the water permitting process. Withdrawals would not be permitted so that 100% of withdrawals came out of the Waccasassa. This is precluded by the application of the "harm standard" in 40B-2.]

- 15% reduction is not supported with citations

[Response: Added the following to report: "Various acceptable levels of risk have been defined in the literature, based upon similar MFL work taking place throughout Florida. Shaw and colleagues' peer review panel found the 15% loss benchmark established for the Middle Peace River MFL evaluation to be "reasonable and prudent" (Shaw et al., 2005). The 15% benchmark was also supported by the Upper Myakka River MFL peer review panel (SWFWMD Peer Review Panel, 2005). Other values, ranging between 10-33% have also been reported in the literature as acceptable levels of habitat loss. The choice of an appropriate level of acceptable loss or change needs to be based upon various ecological and physical factors, place within the larger context of the status of the system at hand."]

- 10% reduction for Levy Blue springs is not sufficiently supported

[Response: The 10% reduction (i.e., the proposed MFL of 90% of baseline from the FDC) is based on our anticipation of balancing the needs of the spring, for recreation and flow to the Waccasassa, with the need for water supply for the Bronson area.]

c. Procedures and Analysis

The peer review panel found the methods used for data syntheses, record extension, and correlation techniques to be appropriate. One reviewer provided a number of comments on the statistics but primarily requested only clarification. A specific comment was made regarding the qualitative grouping in the factor analyses instead of using available quantitative procedures. Additional explanation was requested. Another reviewer offered suggestions on averaging tidal data over 25 hours.

[Response: These comments were noted and addressed in each individual reviewers table.]

Two reviewers commented on the volume of information presented in Section 4 of the report that was either not used or had only limited direct relevance to the MFLs that are proposed. The reviewers understood that much of the information was presented because of lack of site specific information, but inasmuch as this "related information" was little used or only used in general, perhaps an attachment or simple reference might suffice.

One reviewer questioned why some of the extensive and good information was not used more extensively such as in PHABSIM.

> ***[Response: The information presented in Chapter 4 was crucial in the understanding of the relationships between flow/salinity and benthos and fish. It was necessary to perform these analyses to determine what could be carried over and applied to selecting the MFLs in Chapter 5, for this reason we chose to include it in Chapter 4. Regarding the consideration of PHABSIM, the MFL for this river was concerned with estuarine resources and PHABSIM is not applicable to estuaries.]***

Two reviewers noted what might be an error on pages 5-18 to 5-19 regarding whether or not 98 cfs is equaled or exceeded or equal to or not exceeded 68.6% of the time.

> ***[Response: Corrected as addressed above.]***

Task 2. Scientific Deficiencies

a. Deficiencies

Some potential deficiencies and suggested remedies were provided by the reviewers. However, in most cases these were offered as suggestions, and clarification may be all that is needed. Most specifically, the reviewers requested support for the 15% risk increase and 10% flow reductions proposed as being protective.

> ***[Response: See prior responses.]***

CONCLUSIONS

The data used in the analyses appear to be the best available and the methodologies utilized in developing the MFL is technically sound with respect to the protection of estuarine resources from significant harm. The methodology, as presented, does not provide clear protection of the Wacasassa River above the confluence with the Wekiva River from significant harm.

> ***[Response: Although the peer review did not specifically critique the methodology used with respect to the Waccasassa upstream of the confluence with the Wekiva River, the previous statement requires a response. Basically, the Wekiva basin provides low flows to support the MFL and the Waccasassa basin upstream from the Wekiva supplies the medium to high flow components of discharge. As noted in the report (cf. Figs. 3-15 through 3-17 and Table 3-6) the range in flows from Wekiva Springs is relatively low compared to the range of flows of the Waccasassa at Gulf Hammock (cf. Figs. 3-24 and 3-25; Table 3-8). At low flows, the Wekiva is a significant contributor to flow of the***

Waccasassa at Gulf Hammock. However, at medium and high flows, the spring and spring run (Wekiva River) contribution is relatively minor compared to flows in the main Waccasassa River. The data clearly illustrate that the range of discharge <u>required</u> as part of the Waccasassa River MFL is highly dependent on maintenance of the range of flows in the mainstem of the Waccasassa upstream of the Wekiva confluence. Therefore, the MFL established at the Waccasassa at Gulf Hammock gage will provide clear protection to the entire drainage system, including the Waccasassa upstream of the mouth of the Wekiva. It is physically impossible to over allocate water in either the basin of the mainstem of the river above the Wekiva or in the Wekiva River basin and preserve flows required by the MFL .]

1. The paucity of data and the associated lack of confidence in the FDCs and resulting MFLs remain a concern.

[Response: Based on the original comments in the attached tables, we presume this comment refers to the four data points at Levy Blue Springs. As asserted previously, while the drawbacks to the lack of data are recognized, the results are believed to be sufficient for an MFL management tool. When sufficient additional data is collected, it will be assessed and the MFL and associated FDCs revisited.]

2. The assertion that protection of the salinity regime will also protect other WRVs, including the upgradient portion of the Waccasassa River (particularly above the confluence with the Wekiva), is not supported.

[Response: As addressed above, MFLs are not applied in a regulatory vacuum. All water use permit applications must meet the the "harm standard" in 40B-2 which will preclude the scenario described by the reviewers. Also as discussed above, it is physically impossible to over allocate water in either the basin of the mainstem of the river above the Wekiva or in the Wekiva River basin and preserve flows required by the MFL . This is implicit in the development of other single-location MFLs for other coastal river in Florida which have, to date, served to adequately address such issues. Waterbodies for which a single MFL has been developed or is in the process of being developed include the Caloosahatchee, Little Manatee, Manatee, Weeki Wachee, Anclote, and Myakka Rivers, and Shell Creek.]

The lack of data and associated confidence can be remedied only by more data and adjusting the FDCs accordingly. The reviewers request additional explanation regarding how protecting the salinity regime also protects other WRVs, particular above the confluence with the Wekiva River. One suggestion is to investigate limiting withdrawal from the Waccasassa flow above the confluence with the Wekiva.

APPENDIX A

RESUMES OF THE PEER REVIEW PANEL

APPENDIX B

PEER REVIEW COMMENTS