Appendix 1-4: Authors' Responses to Comments on the Draft *2009 South Florida Environmental Report –Volume I*

A panel of outside experts provided peer review of the Draft *2009 South Florida Environmental Report* through WebBoard comments, participation in a two-day public workshop, and a written final report (Appendix 1-5). Authors revised their chapters and related appendices responsively. This appendix includes authors' responses to major comments and recommendations in the panel's WebBoard comments. With the exception of reformatting some information for better readability, this appendix was not edited by the SFER production staff.

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 1

Stacey Ollis and Garth Redfield

Level of Panel Review: Accountability (primary); Integrative (secondary)
J. Jordan (AA), R. Meganck (A) and O. Stein (B)

Comment #1: *Not sure of the point of Figure 1-1.*

Response #1: Comment appreciated. As suggested, this figure will be deleted in the final report.

Comment #2: *Figure 1-2: In the larger map, the blue line that separates North from South needs to be better highlighted.*

Response #2: Comment appreciated. As suggested, this figure will be revised in the final report.

Comment #3: *Line 130: Any need to also mention that high water levels affect the integrity of the levee around the lake?*

Response #3: It should be noted that the lake regulation schedule was revised last year to help avoid the higher lake levels while the USACE is undertaking repairs; further information is presented in Volume I, Chapter 10.

Comment #4: *Line 131: Citing Figure 2-1 in chapter 1 is confusing.*

Response #4: Comment appreciated. As suggested, this cross-referenced text will be deleted in the final report.

Comment #5: *Line 146: A quick mention that recent weather events have changed this and that WY2009 will look much different may be needed since this report comes out later.*

Response #5: Comment appreciated. As suggested, this text will be revised in the final report to reflect this note.

Comment #6: *In the section "System-wide Challenges and Initiatives" the narrative moves around in introducing topics in various upcoming chapters. This section might be better understood if it were preceded by the section "Report Objectives and Content" line 190–231.*

Response #6: Comment appreciated. This suggestion will be considered for next year's SFER.

Comment #7: *Is the section on legal and reporting requirements still necessary here? Could it be appendix information?*

Response #7: As this is a short sub-section that outlines the key legislative reporting requirements across the volume, it is preferable to highlight information in this manner.

Comment #8: *The many reporting requirements noted in the section of chapter 1 clarifies that the SFER has indeed replaced a number of separate reports. However it is not clear that chapters*

10-12 of the SFER meet the reporting requirements noted on page 1-14 (beginning on line 284) for Lake Okeechobee?

Response #8: In Volume I, Chapter 10 fulfills the annual reporting requirements of the Lake Okeechobee Protection Annual Progress Report, with additional supporting information also presented in Chapters 7A and 12 on the status of the Caloosahatchee and St. Lucie River Watershed Construction projects. Appendix 10-1 fulfills the annual reporting requirements of the Lake Okeechobee Water Control Structure Operations Permit.

Comment #9: *At what stage does the SFER outputs impact the overall strategic plan of the District. It seems that the production of the SFER is out of sync with other aspects of the plan and as a result is always one year behind the planning process. Is this a correct interpretation?*

Response #9: Each year, the Strategic Plan and Annual Work Plan together provide a roadmap with key milestones to guide the District throughout the next decade to most effectively manage and protect water and land resources for both the public and the environment. SFER outputs, which are published annually on March 1, are reflected in the Strategic Plan published later that year. The Strategic Plan includes strategies and success indicators that frequently and ideally are efforts and measures reported in the SFER. Success indicators are developed in brainstorming sessions that include SFER authors and support staff, and the first location for data that can serve as success indicators is the most recent SFER. Through this communication and coordination with SFER chapter authors, concepts initiated within SFER development normally translate into the Strategic Plan; for example, the sulfur issue is a topic emphasized in recent SFERs, and this has translated to a new success indicator in the most recently adopted Strategic Plan "All data gaps identified in the Sulfur Action Plan filled and Sulfur White Paper management questions addressed."

Comment #10: *Table 1-3 is an invaluable tool to better understanding the SFER and its various components. Is there a way to add a row that would cross-reference the most important inter-relationships between sectors (e.g., water quality x flood control; flood control x natural systems, etc.)? If this could be accomplished, this table would serve as a guide to reading the SFER on a sector basis as well as on a cross sector (integrated) basis. The difficulty will be in determining the level of comparison as the matrix could become quite complex.*

Response #10: Comment appreciated. This suggestion will be considered for next year's update.

Responses to Peer-Review Panel Comments on Special Section

Peter Rawlik and Linda Lindstrom

Comment #1: *What are the overall water quality information goals being used in the WCA-2A monitoring reengineering pilot study?*

Response #1: A review of WCA-2A monitoring mandates found six fundamental questions being asked.

What is the status of water quality and associated loads at inflows?

How has water quality changed in response to altered hydrology and loading?

As water quality changes are there associated responses in flora and fauna?

Can station-scale data be integrated to document landscape-scale patterns?

As landscape scale changes occur, how is hydrology altered?

Are there relationships from monitoring data that can be used as tools or indicators for long-term management?

From this information, District staff developed several monitoring plan goals to provide data in a cost effective manner to understand the system, meet regulatory objectives, estimate nutrient loads, determine station responses, develop response indicators, discern landscape changes, and develop management tools.

Comment #2: *How are the long-term (e.g. Everglade restoration accountability) and short-term (e.g. project completion accountability) information needs being addressed within a coordinated monitoring design?*

Response #2: It is recognized that the station, frequency, and parameter needs of short-term mandates may be more ephemeral than those of long-term mandates. Consequently, the reengineering team has set a rotational period of five years to review each reengineered area. In this manner, agency staff will be able to discern the status and progress of projects (both short- and long-term) and make adjustments, as needed.

Comment #3: *Are there subsets of sampling sites associated with describing 'what' is happening to water quality in WCA-2A (e.g., criteria achievement over the long term) while others answer 'why' questions (e.g., why changes are, or are not, occurring, with a more short-term research orientation)?*

Response #3: Under the existing independent monitoring projects, there are distinct programs for using water quality data to resolve short- and long-term criteria achievement as well as cause and effect studies and environmental manipulations. By standardizing the parameter list and eliminating duplicative sampling, the reengineered monitoring program is able to support the data needs of both criteria achievement and research.

Comment #4: *Is there an opportunity to use common sampling and laboratory methods across WCA-2A in the reengineered monitoring program? Or are there specific requirements associated with various projects and/or agencies that preclude using common sampling and laboratory methods? If there are separate methods, are they being documented in the data storage system?*

Response #4: Under the existing independent monitoring projects, there are minor differences in sampling protocols between monitoring and research programs. These differences and the resulting datasets have been reviewed and not found to be significantly different. Consequently, both groups have established a plan to use a grab sampling method to meet monitoring needs for both compliance and research when water levels are normal. However, if water levels at a station drop below 10 centimeters, then the legal requirement for compliance monitoring is removed, but there is a desire to continue monitoring to support research needs at a subset of 13 stations. Under these conditions, the sampling methodology will shift from grab sampling to using a peristaltic pump. Such a change requires a shift in sampling equipment and in quality assurance samples and will be documented in the field notes and DBHYDRO database accordingly. Under the reengineered program, it is planned that all samples will be submitted to a single laboratory.

Comment #5: *Is DBHYDRO able to serve the data storage needs of the reengineering monitoring system without modification?*

Response #5: For the most part yes, with only a minor modification of adding a new parameter to differentiate sampling depth, clear water depth, and total water depth.

Comment #6: *Are other local, state, and federal agencies collaborating with the reengineering effort or is the effort limited to SFWMD monitoring?*

Response #6: While the SFWMD is taking the lead in the reengineering effort, District staff routinely holds interagency meetings with state, federal, local, and tribal stakeholders to discuss technical issues, gather feedback, and discuss alternative designs.

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 2

Wossenu Abtew, Chandra Pathak and S. Huebner

Level of Panel Review: Accountability (primary); Integrative (secondary)
N. Armstrong (AA), R. Ward (A) and O. Stein (B)

- Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?

Comment #1: *As noted in the 2008 SFER report review, this chapter on hydrology is a mainstay of the SFER reports as it is the management of water that is one of the primary missions of the SFWMD, and it is the presence and movement of that water that influences water quality and ecological resources throughout the District's jurisdiction.*

Modifications have been made to the chapter organization so that it now includes an overview of selected hydrologic components (the "20,000 ft" level description of the hydrologic system), detailed description of the state of the system hydrology in WY2008, and the hydrologic feature of the year – the 2006-08 drought. This arrangement and content serves very well to introduce readers to the water resources mission and the water management system of the SFWMD while highlighting current water resource challenges facing South Florida. Even with the high level overview, the content of the chapter, except for the challenges being faced, is becoming routine. Even the challenges can be viewed as drought or flooding. To reduce the need to repeat the drought/flooding history in each SFER, a concise, readable, description of drought/flooding patterns in South Florida could be prepared separately of the SFER. An example of this type of drought description, over a large political jurisdiction, can be viewed at: http://www.cwi.colostate.edu/publications/wb/9.pdf.

Again as the 2008 SFER chapter made clear, the hydrologic system is an immensely complex one, and the chapter is still replete with facts about those factors that influence water sources, storage, flows, etc., and the chapter still assigns little meaning to the facts so the reader is left with a staggering amount of information with little sense of its consequence unless the reader is intimately familiar with the system. Thus, some of the same suggestions made last year to strengthen the chapter are made again this year, and there are a few new suggestions as follows:

1. There are two suggestions concerning the Overview of Selected Hydrologic Components section (lines 288-341).

a. *It should be a main section of the chapter at a level with the INTRODUCTION, DROUGHT IN SOUTH FLORIDA: AN OVERVIEW, etc.;*

Response #1: Chapter will be edited as suggested with "OVERVIEW ….." becoming a main section in the final report.

Comment #2: *b. The sections appears to be at the "40,000 ft" level rather than the "20,000 ft" level, i.e., it is too brief an overview to provide the reader with a real sense of the hydrologic system, how it operates, how it responds to spatial and temporal amounts of rainfall, how the*

system has been operated to accommodate the availability of water, and particularly the consequences of having too much, just the right amount, or too little water in terms of meeting management objectives.

Response #2: The number of pages devoted to Chapter 2 in this year's SFEP has been reduced from last year. Under the circumstances, as much information as possible is included. If there is an opportunity to expand Chapter 2, then more details will be included in the final report, as appropriate.

Comment #3: *i. Some of the SUMMARY material could be moved to this Overview such as Figures 2-1 and 2-2 and the text in lines 38-73.*

Response #3: The purpose of the *Summary* section at the beginning of the chapter is to provide a summary of the chapter for readers who have limited time or interest to go through the whole chapter. This section was developed as a result of previous recommendations. As suggested, Figure 2-1 will be moved to the *Overview* section in the final report.

Comment #4: *ii. Figure 2-1 should show watershed as well as political boundaries like Figure 4-1.*

Response #4: The current Figure 2-2 shows both watershed and political boundaries and it is now Figure 2-1. Figure 2-1, the rain areas map, will be crowded if watershed and political boundaries are added on top of it. Figure 2-1 will be moved to the *Overview* section as Figure 2-2 in the final report (see response above).

Comment #5: *iii. The information given in lines 50-73 could be incorporated into Table 2-10 which itself could be moved to the Overview and differences between WY2008 values and normal values calculated to show the extent of the drought conditions. WY rainfall amounts could also be added to show the spatial effects of rainfall.*

Response #5: The purpose of the *Summary* section is stated above. The *Overview* section is not focused only on WY2008 hydrology but on hydrology and water management in general. In the final report, additional information will be added to Table 2-10 (percent difference between WY2008 flows and historical averages).

Lake or Impoundment	Beginning of Record	Historic Mean Flow (ac-ft)	WY2008 Flow (ac-ft)	Percent of Historic Mean	WY2007 Flow (ac-ft)	Historical Maximum Flow (ac-ft)	Historical Minimum Flow (ac-ft)
Lake Okeechobee Inflow	1972	2,084,136	1,012,875	49%	619,189	3,707,764	37,761
Lake Okeechobee Outflow	1972	1,480,158	176,566	12%	907,527	3,978,904	176,566
Lake Kissimmee Outflow	1972	704,014	301,985	43%	121,156	1,694,513	7,942
Lake Istokpoga Outflow	1972	214,032	30,930	14%	64,372	561,924	17,790
St. Lucie (C-44) Canal Inflow	1972	267,318	13,688	5%	82,122	1,084,293	3,612
St. Lucie (C-44) Canal Outflow	1953	514,961	0	0%	21,340	3,189,329	0
Caloosahatchee River (C-43 Canal) Inflow	1972	536,845	42,301	8%	180,108	2,175,765	42,301
Caloosahatchee River (C-43 Canal) Outflow	1972	1,237,730	86,895	7%	694,124	3,615,526	86,641
Water Conservation Area 1 Inflow	1972	503,863	242,998	48%	251,232	1,307,517	205,674
Water Conservation Area 1 Outflow	1972	459,612	213,801	47%	232,258	1,433,399	116,366
Water Conservation Area 2 Inflow	1972	617,510	488,212	79%	584,391	1,754,710	113,225
Water Conservation Area 2 Outflow	1972	616,048	512,421	83%	459,722	1,729,168	93,564
Water Conservation Area 3A Inflow	1972	1,207,988	798,240	66%	849,324	2,590,417	477,113
Water Conservation Area 3A Outflow	1972	997,703	245,962	25%	563,676	2,693,337	245,964
Everglades National Park Inflow	1972	964,020	343,245	36%	578,244	2,940,082	245,676
Upper East Coast C-23 Canal	1995	141,574	81,662	58%	51,374	297,214	38,332
Upper East Coast C-24 Canal	1962	132,267	112,263	85%	41,876	340,313	15,174
Upper East Coast C-25 Canal	1965	134,795	136,211	101%	33,596	264,074	21,154

Comment #6: *iii. The arrows in Figure 2-2 need to be adjusted so the size of the arrow more accurately reflects flow magnitude. A second figure that shows average flows is needed so the reader can easily compare WY2008 flows to what is average – drought/flood conditions will be easily evident with such a visual comparison. These two figures then become the focal point of much more descriptive text about the hydrology in the study area and the management of that hydrology.*

Response #6: Adjustment to arrow size is made in Figure 2-2. Please note that in cases where there is more than one inflow or outflow point (example WCA-1 outflow, WCA-2 inflow, WCA-3 inflow); the multiple arrows are sized smaller so that the sum maintains proportionality. In the final report, historical average flows will be shown on Figure 2-2 (will be Figure 2-1) for visual comparison of the effect of the drought.

Comment #7: *2. It is suggested again that the District consider developing on a set of "dashboard" metrics that describes how the hydrologic system has been operated and managed in the past water year and in a historical context so the reader has a quick grasp of the "state of the hydrologic system" in space and time. The Districts response to this suggestion last year notes the kinds of problems that would have to be taken into account if such a system were developed, and those problems are appreciated but can be overcome. The regulation schedules and the actual WY water stages provide an excellent opportunity to pursue this further, and the District might look at some of the methods described in Chapter 16 Confirmation of Mechanistic Water Quality models in Steven Chapra and Kenneth Reckow. 1983. Engineering Approaches for Lake Management, Volume 2: Mechanistic Modeling that could be used. Most of these are statistically or probabilistically based, and one or more could provide the basis for a risk-based analysis of hydrology system management. It is strongly suggested that the District look at this opportunity again.*

Response #7: Since similar panel comments were provided last year, and to properly address these concerns, the District will be including a supplemental presentation on the District's water management operations and control as well as the opportunity for panelists to participate in an on-site tour of the agency's operations center. As part of the workshop, the District is inviting the panelists, as well as any other workshop guests and the public, for the special workshop agenda item, ***District Water Management Operations Strategy Overview and Control Room Tour***. During that time, we anticipate discussion on the development of "dashboard metrics" among panelists, chapter authors and District staff from Operations. To date, considerable effort has been devoted to discussing what these metrics might look like but the multiple factors that influence those metrics and the extent and complexity of the system contrast with the ability to provide consistent metrics that truly display the state of the system and allow it to be contrasted within an historical context.

- Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?

Comment #8: *Yes, the material is presented in a logical manner, and there is general continuity with previous versions of the report. The adjustments made to the format/outline of the chapter have already been noted, and this was a point of discussion during the last SFER review.*

Response #8: Comment appreciated.

- Are findings linked to management goals and objectives?

Comment #9: *As noted in last year's 2008 SFER comments, a significant enhancement to this chapter would be to tie hydrology more strongly to water management goals and objectives. The District's response to the suggestions raised describe the complexity of the system due to natural variability, project purpose change over time, and other things that suggest that measuring success may be difficult. Still, the District is evaluated by its stakeholders in how well it meets its water management objectives and some ways of measuring achievement of those objectives have likely been developed, but perhaps not.*

Two questions are posed here regarding management goals and objectives:

1. *If the District was going to develop performance measures for meeting its water management goals and objectives, what form might those take?*

2. *Last year a question was raised about the role that risk management played in operating water management systems? The District's response suggested a future incorporation of risk management, and the question is what progress has been made to this point to do so.*

Response #9: Please see response to panel comment (2) on page 4.

- Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?

Comment #10: *As noted above, the chapter could benefit from closer links to management goals and objectives as expressed in other areas of the SFER. Clearly, the hydrologic system has great impact on water quality, stormwater treatment areas, water conservation areas, restoration and management of Lake Okeechobee, the Kissimmee Basin, the Everglades National Park, and coastal estuaries.*

Response #10: Hydrology of the region covers the whole area and each water management unit has it chapters where detail influence of the water year's hydrology is discussed. If Chapter 2 is to cover these details, then it would require much more resources and time and the volume would increase notably. References to the other chapters are made in the chapter, as appropriate.

- Is the chapter cross referenced in a thorough and consistent manner?

Comment #11: *Again, the chapter could benefit from closer links to Chapter 3A Water Quality, Chapter 5 Stormwater Treatment Areas, Chapter 10 Lake Okeechobee, the Chapter 11 Kissimmee Basin, Chapter 12 Coastal Ecosystems, and the role that water management has on these areas and the role that management of these areas has on water management. Perhaps some introductory wording referencing the other chapters would be helpful to integrating the report for the reader. The wording could be similar to that in lines 119-122 in Chapter 7A.*

Response #11: Similar wording could be found on line 99-100, 113-114. In the final report, more cross-referencing will be added for water quality (Chapter 4), STAs (Chapter 5), Everglades ecology (Chapter 6), and coastal ecology (Chapter 12).

Editorial Suggestions

Comment #12: *Lines 22-29: Suggest the rainfall deficit for the whole region (given as -3.8 inches later in the chapter) be added so these sub-regional rainfalls can be compared to the total*

Response #12: This will be addressed in the final report.

Comment #13*: Line 38: There appears to be a contradiction in this sentence when it is stated that the Kissimmee "basins were dry, resulting in …" the reader might anticipate that "dry" means no flow would result.*

Response #13: This sentence will be edited and clarified in the final report.

Comment #14: *Line 97: "examples" should be "example"*

Response #14: This correction will be done in the final report.

Comment #15: *Lines 115-118: Once a watershed map is added, how might this paragraph be changed?*

Response #15: In the final report, sentence will be added that Figure 2-2 (now 2-1) has the Northern and Southern Everglades Restoration Areas shown at the top left corner of the figure.

Comment #16: *A subtitle "Water Management" appears in line 132 on page 2-7. The subsection "Water Management in 2008" on page 2-31 is followed by a subsection entitled "Water Levels, Flows, and Management". From these subtitles, it is hard to determine what distinct information appears in the subsections (especially, the difference between the second and third). Would it be possible to adjust the subtitle wording to be more clear as to the contents of each. From reviewing past SFER Chapter 2's, I gather the information included under the 'Water Management' subtitle in the page 2-31 area of the text was more extensive. The shorter version in 2009, without a corresponding adjustment of subtitles, appears to be part of the problem. Line 551's reference to details being provided elsewhere gives me an indication of a change in subtitle content.*

Response #16: "Water Management" on line 132 refers to water management of the system in general. In the final report, "Water Management in 2008" now edited to "Water Management in Water Year 2008" will refer to water management in WY2008. The subsection on page 2-34 will be changed from "WATER LEVELS, FLOWS, AND WATER MANAGEMENT" to "WATER LEVELS AND FLOWS". The sentence on line 551 will be edited to "Details on water levels and discharges are provided in following subsection".

Comment #17: *Line 158: In Table 2-1, the entries in the table "cells" need to be "top justified" so that, for example, "Lake Okeechobee" doesn't start at S351 but at CULV.*

Response #17: In the final report, table will be edited as suggested.

Comment #18: *Also, are figures available in the chapter that show the locations all of these structures? If so, need to reference them. Lines 170-178: Is there a figure available that shows the locations of all these structures? If so, need to reference it.*

Response #18: In the final report, reference to figures with structures will be added.

Comment #19: *Line 187: The "secondary system" is never described like primary and tertiary are.*

Response #19: In the final report, more details will be added.

Comment #20: *Line 199: Isn't the lack of topographic relief the main point, i.e., it dominates the water control system in South Florida.*

Response #20: In the final report, sentence will be edited as follows "This single feature, low topographic relief, dominates the water control system in South Florida*."*

Comment #21: *Lines 276-286: Why not add WY2008 ending storage ac-ft to this table for each lake/impoundment to show the effects of the drought?*

Response #21: As suggested, WY2008 ending storage and change in storage from average, two columns will be added to the table in the final report.

Comment #22: *Line 373: Shouldn't this line read "Historically, drastic declines in Lake Okeechobee stage are associated with droughts" rather than the other way around?*

Response #22: In the final report, sentence will be edited as suggested.

Comment #23: *Line 417: The term "Phase III" needs to be described.*

Response #23: The term phase III is defined in lines 456-458.

Comment #24: *Lines 433-440: Suggest adding the normal inflow to the paragraph so the WY number can be put into perspective.*

Response #24: This will be addressed in the final report.

Comment #25: *Lines 452-458: Should the text referring to Phases be moved to page 2-22 where Phase III is mentioned so that all the text is in one place?*

Response #25: The text referring to phases will be mentioned in one place (lines 452-458) in the final report.

Comment #26: Lines 486-487: What should the reader expect to take away from the figures in Appendix 2-1?

Response #26: The groundwater level plots show in color WY2008 groundwater level fluctuations in comparison to historical statistics (median, 1st percentile …. 99 percentile). The legends will be improved.

Comment #27: *Line 535: Shouldn't the title for Figure 2-14 be more tightly associated with the figure?*

Response #27: This will be addressed in the final report.

Comment #28: *Line 576: Some wording appears to be missing, or mixed up, on this line.*

Response #28: This will be addressed in the final report.

Comment #29: *Lines 633-645: Need to add some text that says what maps in the chapter or report can be used to locate the myriad of structures mentioned in this section on Water Levels, Flows, and Management.*

Response #29: This will be addressed in the final report.

Comment #30: *Line 876: Could there be some reminder as to what factors drive the lake regulation schedules for the lakes other than Lake Okeechobee (which has its factors listed on page 2-43)?*

Response #30: In the final report, sentence will be added on line 152 "Regulation schedule of lakes and impoundments are developed taking account of flood control, water supply and environmental needs."

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 3A

Grover G. Payne[1], Shi Kui Xue and Kenneth C. Weaver[1]

Level of Panel Review: Accountability (primary); Integrative (secondary)
R. Ward (AA) and E. van Donk (B)

Comment #1: *Table of Contents' comments.*

Response #1: In response to previous SFER panel comments, note that the Table of Contents, for a second year, has been provided as a quick reference to assist panelists in their review of the draft Volume I chapters. As this Table of Contents is generated in Adobe PDF with limited formatting features, its appearance is not as polished as the report itself. However, please note that this information will not appear in the final electronic-based version, which will simply contain PDF e-linked bookmarks as the Table of Contents.

Comment #2: *General organization of the chapter.*

Response #2: The authors agree that the combined and expanded chapter could benefit from reorganization. We will work to make the restructure the chapter to make it flow in a more logical sequence and will consider the panel's proposed organizational scheme.

Specific

Comment #1: *Why were the table summaries for the excursion analysis results removed from the 'Summary' section in 2009? This table contained elements of public accounting for criteria non-achievement that could evolve into a type of 'Consumer Confidence Report' for water quality management in South Florida.*

Response #1: Since the summary tables included an excessive amount of blank space indicating that most of the issues were localized within specific portions of the Everglades Protection Area (EPA), in an effort to further streamline the chapter, the tables were replaced with a few lines of text which more concisely summarized the results.

Comment #2: *Sulfate is not included in the list of constituents evaluated (page 3A-15), yet the chapter contains comments about sulfate (page 3A-29). Why?*

Response #2: In the final report, sulfate will be added to the list of parameters being evaluated.

Comment #3: *Table 3A-2 is presented in the 'Methods' (page 3A-18) section when it clearly contains results. Was there a reason for this placement?*

[1] Florida Department of Environmental Protection, Water Resource Management, Water Quality Standards and Special Projects Program, Tallahassee, FL

Response #3: Table 3A-2 should have appeared in the results section. The placement of the table will be corrected in the final draft.

Comment #4: *Lines 411-412 note it is assumed that no trends exist over five years of data in order to assess excursions where data is limited. Is there sufficient data available now to test the validity of this assumption? Or to at least note the percent of times it may not be a valid assumption?*

Response #4: Excursions are only assessed over a five-year period when data are limited during an annual period. This same data limitation would carry-over to any trend analysis performed to evaluate annual changes in a parameter. However, if any dramatic changes in excursion frequency are observed between years, that information would be noted in the analysis.

Comment #5: *Footnote 2, Table 3A-2 does not include a definition of 'NC' – needed for completeness.*

Response #5: In the final report, the footnote will be revised to indicate that 'NC' indicates a parameter of 'No Concern'.

Comment #6: *Why are there few subtitles in the Non-ECP section and many in the Cape Sable Seaside Sparrow section? A common strategy for summarizing larger reports (e.g., Appendices 3A-4 and 3A-5) into Chapter 3A sections would be helpful to the overall communication effectiveness of the chapter.*

Response #6: Concur. For the consistence of the two sections, some subtitles will be added to the non-Everglades Construction Project (non-ECP) section and some subtitles in the Cape Sable Seaside Sparrow will be combined in the final report. These two sections of Chapter 3A are the summaries of two larger permit reports (e.g., Appendices 3A-4 and 3A-5).

Comment #7: *It was noted that Appendices 3A-4 and 3A-5 (as well as Appendix 7A-4) present very similar, if not exactly the same, material regarding the design and operation of water quality monitoring (e.g. the excursion analysis, how data are retrieved from DBHYDRO, and the Class III criteria). In the current reengineering of water quality monitoring system, would it be possible to develop one monitoring design/operation description for all common water quality monitoring components and reduce presentation duplication in the SFER?*

Response #7: Concur, but it is not feasible. Each appendix (e.g., Appendices 3A-4 and 3A-5) is presented for one water quality compliance report requirement (i.e., non-ECP permit and IOP Emergency Order #9). Each permit is issued separately and it has its own monitoring and report requirement; therefore, it is difficult to combine all reports into one comprehensive report unless all the permits are combined for one permit (currently the permits are issued separately).

Comment #8: *The Cape Sable Seaside Sparrow section, as well as its supporting appendix, do not make clear the connection between protecting the species and the water quality monitoring. Is the connection simply the need to insure Class III water quality standards are met during construction? Or is there a water quality goal associated with species protection?*

Response #8: Concur, but the permit does not require making connection between protecting the species and the water quality monitoring. The Cape Sable Seaside Sparrow section presents the water quality report to meet water quality compliance requirement as stated in the IOP Emergency Order #9. The connection is simply the need to insure Class III water quality standards are met. There is no other water quality goal associated with species protection.

Comment #9: *The Cape Sable Seaside Sparrow section was added to the SFER this year after operating outside of SFER for the four previous years. What caused this section to be added to Chapter 3A this year? Are there other monitoring efforts that should be considered for inclusion in Chapter 3A, to further complete the total picture of water quality monitoring in the EPA?*

Response #9: Concur. The Cape Sable Seaside Sparrow section was added this year to meet the water quality compliance report requirement. The inclusion of this section in Chapter 3A is based on the permit modification agreement between the South Florida Water Management District and Florida Department of Environmental Protection. Same as the non-ECP and the Cape Sable Seaside Sparrow, there might be other monitoring efforts that should be considered for including in the Chapter 3A, to further complete the total picture of water quality monitoring in the EPA. If new water quality permits are issued, then summaries of these permits will be added into future SFER chapters and permit reports will be provided as appendices.

Comment #10: *Under the 'Total Phosphorus' subtitle, there are three presentations that address, basically, the following: (1) concentrations – pages 52–65; (2) loads – pages 66-72; and (3) criterion achievement assessment – pages 73-74. Why is the term 'status' used to title the presentation of concentrations across the EPA when the other two subsections also deal with status? More clarification of subsection content is needed.*

Response #10: In the final report, the subsection titles will be revised to better identify contents as needed.

Comment #11: *Given the continuity of presentation for the excursion analysis and phosphorus/nitrogen subsections, are these subsections ready for further streamlining into shorter annual summaries? For example, the 'methods' appear to be settling into a standard form, thereby lending themselves to an appendix where interested new readers of the report can reference. This general type of inclusive document, for a large scale network in Florida, appears to have been prepared by the Florida DEP for monitoring across the state (http://www.dep.state.fl.us/water/monitoring/docs/SamplingManual.pdf). Perhaps the reengineering of the monitoring program can consider this possibility and coordination.*

Response #11: The authors agree that many portions of the chapter have become somewhat routine and will continue look for ways to streamline the chapter. However, the multiple monitoring projects with different objectives and reporting requirements as well as the varied audience limit the amount streamlining that can be performed. The data handling and screening methods employed for the phosphorus criterion assessment were documented in the 2007 SFER and have been referenced since then. Where appropriate, we will continue to work to move the repetitive information to appendices or to stand alone documents which can be referenced.

Since much of the chapter has become routine, as the peer-review panel points out, we welcome the panel's suggestion that the frequency for the detailed peer-reviews could be reduced. A more cursory review could be done annually to assure there are no major changes in the methods. A more thorough review could be conducted every 3 to 5 years or as changes in monitoring or analytical approach warrant.

Comment #12: *In line 1390 reference is made to Appendix 3A-3. Should this not be Appendix 3A-8?*

Response #12: Yes, the reference should be to Appendix 3A-8 and will be corrected in the final report.

Comment #13: *Table 1 in Appendix 3A-8 summarizes current criterion assessment with available data. Unless one studies the table carefully, it is difficult to interpret network means. Is it possible to remove lines for individual sites in the network means columns?*

Response #13: In the final report, the table will be revised to make it easier to interpret.

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 3B

Donald M. Axelrad[2]

Level of Panel Review: Technical (primary); Integrative (secondary)
J. Burger (AA), O. Stein (A) and E. van Donk (B)

Comment #1:…*how does the MeHg in fish tissue problem in the WCA and ENP compare to other non-impacted sites in Florida and other SE US locations.*

Is it typical for the median level to exceed human ingestion standards? Recent levels are much lower than in the 1990's and the observed median levels outside of ENP are "close" to the standard.

Have such trends been observed elsewhere? Simply, is the South Florida problem unique or symptomatic of a larger regional problem? While this would be a short introductory section, it would give the reader not intricately involved in the research much-needed context.

Response #1: Current (2007) median mercury levels in largemouth bass (LMB) in the WCAs (0.30 µg/g, or ppm) do not differ greatly from the recent (2003-2004) median level determined for Florida lakes, rivers and streams (ca. 0.35 µg/g); LMB mercury levels in the Shark River Slough of Everglades National Park (ENP) are however substantially higher - the current (2008) system-wide median concentration is 1.10 µg/g (range; 0.36–3.50 µg/g; n = 21).

It is common at present for the median mercury level in LMB and other predator fish species across the U.S. to exceed human health standards (which vary according to state); hence, the U.S. Environmental Protection Agency (USEPA) mandate for mercury Total Maximum Daily Loads (TMDLs). Florida in particular has high mercury levels in fish possibly because atmospheric (wet) mercury deposition is higher in Florida than for most of the nation, with the highest rates in South Florida.

Comment #2: *This year the introduction to (report) sections) is much clearer, and provides a context for each area of research…(provide) a clear objective for the work (it can easily be inferred, but it should be stated).*

Response #2: An objective for each section of the chapter will be added in the final report.

Comment #3: *It is unfortunate that bird feathers could not be collected in 2008, and it suggests that perhaps feathers should be routinely collected from at least 2 species so that this bioindicator is present each year.*

Response #3: The Florida Department of Environmental Protection (FDEP) and the South Florida Water Management District are discussing this issue with the intent of selecting one

[2] Florida Department of Environmental Protection, Standards and Assessment Section, Tallahassee, FL

group to sample feathers, and possibly collecting from two species. For this year, too few great egret feathers were collected, and it would not have been possible to collect from another fish-eating bird species either as very few birds both nested and produced young from which feathers could have been collected.

Comment #4: *Further, the lack of wet deposition of mercury data is unfortunate…*

Response #4: The FDEP intends to assess mercury wet deposition levels and trends in next year's SFER mercury and sulfur chapter.

Comment #5: *There is, however, insufficient discussion of the mechanisms and real relationships between sulfur and methylation in the Everglades. Continued work on defining the biogeochemical relationship between the mercury and sulfur cycles continues to be a clear and important goal for those working with mercury. Sufficient support (money and personnel) should be directed toward the creation and refinement of this model.*

Response #5: Everglades sulfur science is complex and it appears that many of the findings of previous SFER mercury and sulfur chapters and appendices need repeating or, alternatively, findings could be consolidated in, for example, an Everglades sulfur Q and A document. This matter is under discussion.

Comment #6: *The studies being undertaken to evaluate sulfur effects on South Florida wetlands are important and key. They appear to be well thought out; although the methods and approaches are not clear from this report (perhaps this material could be placed in an appendix). However, some questions were not addressed, such as linkages between this years sulfate water quality data and previous years.*

Response #6: Linkages between this year's sulfate water quality data and previous years are discussed in Chapter 3A (which includes methods and approaches) with some of that material placed in Chapter 3B, e.g. "sulfate concentrations across the EPA continued to exhibit a general north-to-south gradient"; "During WY2008, the sulfate concentrations at both the inflow and interior sites measured in WCA-1 and WCA-2…were lower than for monitoring periods…. likely the result of reduced runoff from the EAA and reduced discharges from Lake Okeechobee during the dry conditions experienced for much of WY2007 and WY2008".

Comment #7: *The wading bird exposure studies are extremely important to understanding the effect of mercury on these indicators. Studies have found that seabirds have evolved with mercury (naturally-occurring in the ocean), and can tolerate higher levels than traditional laboratory animals. These no-effect level studies with white ibis will help determine whether wading birds are more like seabirds or laboratory animals. Every attempt should be made to continue this study.*

Response #7: This study is extremely important. Unfortunately, the no-effect level studies with white ibis currently lack sponsorship for the proposed last two years of work.

Comment #8: *It would be useful if the authors would write a Conclusion to this chapter that relates in a concise manner the findings, the data gaps, the relationship between on-going components of the program, and the research currently being undertaken. The chapter is excellent, but a section that ties it together would make it more useful for a range of stakeholders.*

Response #8: A conclusion will be added to the chapter in the final report.

Comment #9: *The provision of the criteria, and the notations of the locations where mercury levels in fish exceed the EPA level of 0.3 ppm in edible fish tissue is key to understanding the importance and relevance of both past and current levels, and of regions where special consideration should be given. The data provided also help the state and local stakeholders understand the need for and importance of Do Not Eat advisories. It could be improved by having one map (with accompanying table) that shows EPA mercury exceedances for fish.*

Response #9: A map of the Florida Department of Health's "Do Not Eat" advisories areas across the Everglades Protection Area will be added in the final report.

Comment #10: *Mercury and sulfur issues should be integrated among the chapters, and within chapter 3B. Further, the mercury chapter should provide an overview of how the data… are collect(ed), and the mercury cycling information that are accumulating, relate to overall restoration and management within the Everglades, as well as to specific regulations and acts or laws.*

Response #10: These suggestions will be considered – the chapter is a synthesis and the intent is to refer to reports and publications for information on how the data are collected, but often the chapter is often written before production of relevant reports and publications.

Comment #11: *The abstract could be improved by adding more quantitative data, such as percents and exceedances.*

Response #11: This will be considered in future SFERs.

Comment #12: *It might be useful to consider making a table that lists the major bioindicators used (bass, sunfish, birds etc) across the top and the areas sampled down, and give where they exceed human or wildlife criteria or effects levels.*

Response #12: In the final report, figures will be added to address this information need.

Comment #13: *It would help if the beginning of each research section clearly stated the objectives. There is a nice section on historical levels of mercury (for example, on page 3B-4), but then the authors go directly into sampling without given an overall objective for this research.*

Response #13: Agreed; this will be addressed in final report.

Comment #14: *There should be some mention of the goal of buying out the sugarcane farmers, and the implications for these cycles, including potential time constraints.*

Response #14: Please refer to Chapter 7A of this volume regarding such information.

Comment #15: *We are concerned that a comprehensive TMDL by 2012 is very optimistic considering additional monitoring is only being initiated in 2008. The listed elements look appropriate, but can this be done in the given time frame?*

Response #15: The FDEP's intent is to complete the Florida freshwater mercury TMDL by September 2012.

Comment #16: *What is the progress of the regional sulfur mass balance study? Last years comments suggested this should be a priority and provided considerable input/suggestions for*

how this study might be conducted. It seems as if a detailed plan has, to date, not been developed. When might we expect a more detailed presentation of the research plan and what mechanism is there to know if previous suggestions have been incorporated?

Response #16: Based on recommendations from the 2008 SFER peer-review panel, local stakeholders, and South Florida scientists, two separate sulfur mass balance studies – large-scale and small-scale – were planned. The large-scale study "Regional Sulfur Mass Balance Study for South Florida" is currently under way. A work plan for this project was provided as a reference to the panel at the workshop. The basis for the large-scale study is calculation of surface water sulfur (dissolved sulfate + particulate sulfur) loading exchange between South Florida major land-use areas, via an extensive literature review of science on major import and exports pathways that transport sulfur out of or into South Florida wetlands, e.g., agricultural sulfur applications, sulfur mobilization through mineralization and soil subsidence, H_2S flux, urban sulfur applications, and atmospheric deposition. Currently, calculations for 2004 and literature reviews are being conducted (see work plan for details). It is anticipated that these data will be presented at the 2010 SFER peer review and public workshop.

Work on a detailed work plan for the small-scale study will begin in Fiscal Year 2009. It is anticipated that the small-scale study will begin in Fiscal Year 2010 and will address many of the investigations suggested by the panel at the 2008 SFER workshop, e.g., water column-sediment sulfur fluxes, reaction/process rates of sulfide production, sulfide oxidation and plant uptake, adsorption-desorption dynamics of sulfur species, and what factors impact adsorption, vertical transects levels of sulfur in sediment, and H_2S air-water surface exchange. The two projects combined represent a comprehensive investigation of sulfur mass balance within South Florida wetlands.

Comment #17: *Project #2. At what scale and at what sampling intensity will this study be conducted. What location(s) have been selected to make these field observations? As with the mass balance study the panel offered several specific suggestions for how to conduct these experiments, but there is no way to know how these might have been implemented.*

Response #17: Samples will be collected on a quarterly basis in three Stormwater Treatment Areas: STA-5 (Cells 2A and 2B), STA-2 (Cell 1), and STA-3/4 (Cells 2A and 2B). Further questions regarding Project #2 are addressed in the work plan, *An Evaluation of the Role of Sulfate in South Florida Wetlands*, as provided at the workshop.

Comment #18: *Text (lines 684-688) suggests the ACME study has collected much more data than the MeHg in fish data reported earlier in the chapter. Is monitoring for other parameters continuing, and if so, why are updates on the other data not included? When will data from this study (lines 696-700) be available?*

Response #18: The data set for core ACME sites from the Refuge to ENP includes information on mercury and methylmercury (MeHg) concentrations in surface water, soil interstitial waters, soils, and the food web - invertebrates and small fish. Detailed biogeochemical data for the sites was also measured, including microbial activity and soils and water chemistry, with a focus on sulfur cycling and organic matter characterization. The second component of the ACME study was a series of field mesocosm experiments designed to test cause and effect hypotheses. Additions to mesocosms have included mercury, sulfate, dissolved organic carbon (DOC), and phosphate. Mesocosm experiments have been run at LOX, F1, U3, 2BS, and 3A15. The most detailed sulfate and DOC addition studies were carried out at site 3A15. Some of these data have been reported on in previous mercury and sulfur chapters and related appendices. A further

comprehensive report on ACME data is expected to be completed in June 2009, together with a spreadsheet of ACME data.

Additional Author Responses on Panel Comments:

The panel lists 43 additional detailed questions, most of which will be addressed in the final report.

Author Responses on Comments by Outside Persons and Organizations:

Tom DeBusk, DB Environmental, Inc., and Victor J. Bierman, Jr., LimnoTech, have provided useful comments and questions on the chapter. Many of these will be addressed in the final report; some answers are available in past chapters and appendices. The nature of many of the questions makes addressing these more amenable to face-to-face discussion rather than written replies, as dealing with these questions would be an iterative process. As such, it is encouraged that DB Environmental, Inc. and LimnoTech meet with FDEP staff at the Everglades sulfur workshop planned for April 2009, or earlier at their convenience.

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 4

Stuart Van Horn and Steffany Gornak

Level of Panel Review: Accountability (primary); Integrative (secondary)
J. Jordan (AA), N. Armstrong (A) and R. Meganck (B)

Comment #1: *As mentioned in the previous post, Chapter 4 works well in terms of accountability. That being said, the first part of the chapter dealing with the Lake watershed is very short on content. Obviously, BMP efforts, and the reduction in TP in the EAA Basin as a result, are impressive. Efforts in the Lake watershed are only getting started. However, the discussion in the first part of the chapter is so vague and redundant (numerous repeats of NEEP and other legislative matters) it lacks any analysis that would help the reader get a better idea of what is going on..*

Response #1: As in previous years, Chapter 10 provides an overview of the source control efforts necessary to support the Northern Everglades Initiative only for the Lake Okeechobee watershed. Chapter 4 previously focused on the Southern Everglades; however, it is evolving and expanding to capture the activities underway to develop and build a consistent and holistic approach to source control programs for all of the Northern (Lake Okeechobee, Caloosahatchee River, and St. Lucie River watersheds) and Southern Everglades. This chapter is in a state of transition for the 2009 SFER and the authors recognize that the level of detail, analysis, and discussion for the Lake Okeechobee Watershed source control programs, including that of the river watersheds, is not as comprehensive as the remainder of the chapter for the Southern Everglades portion. The authors expect more comprehensive coverage to be included in the 2010 SFER on the planning and technical efforts.

For the final report, the authors will review and cleanup the redundancies accordingly, and will add more information on the planning efforts underway, as appropriate, to help the reader get a better idea of what is going on.

Comment #2: *It is hard to tell how the success of in the EAA is to be duplicated in the lake watershed.*

Response #2: The success of the source control program in the Everglades Agricultural Area (EAA), implemented through District efforts for the past 15 years with EAA landowners, serves to provide a level of confidence that similar success can be achieved in the lake and river watersheds. However, there are numerous and very significant differences between the EAA and the watersheds of the Northern Everglades, including land use, water management and storage of excess runoff, soils, hydrology, water quality goals, performance measures and methods to identify overall program effectiveness, water quality monitoring, and even the legislative direction that has been provided to the District, FDACS, and FDEP to carry out their respective functions within the overall source control program. The one measurable constant learned from the EAA experience that will help achieve a successful source control program outcome in the Northern Everglades is to develop and successfully implement, on a continuous basis, a verification program to ensure proper implementation, operation, and maintenance of current and

planned agricultural and non-agricultural non-point source controls which the District will be reporting on in future annual SFER reports.

Comment #2: *This chapter has become so heavily weighted to just reporting legislative requirements that very little information is provided, particularly in the first half of the chapter on the Lake watershed.*

Response #2: See response to the first general comment.

Specific Comments and Questions

Comment #3: *The most glaring omission is any discussion of the reason for large TP flows from East Lake Okeechobee into the lake. According to table 4-1 45% of the TP load into the lake is from ELO. More important, 72% is from nonag sources. Yet most of the discussion of future work mentions BMPs that are usually ag related. What is going on in ELO and why is that not a priority is getting TMDL for the lake down to 140 mt?*

Response #3: While most Lake Okeechobee Sub-watersheds have a drainage pattern from north to south, three of these (East, West, and South) have unique conveyance systems whereby runoff can be conveyed either away from the lake or into the lake. The East (ELO) and West Sub-watersheds are gravity conveyance systems that typically discharge a majority of runoff generated within the sub-watersheds to the tidal estuaries. In times of severe drought, the District in coordination with the U.S. Army Corps of Engineers, has a need to ensure that water supply is available and that storage of runoff occurs to whatever extent possible. During WY2008, South Florida experienced a severe drought, and the runoff from the East Sub-watershed was captured and stored in Lake Okeechobee, representing a significant volume made available for regional water supply, but at the same time increasing the phosphorus load to the lake. This is not a normal situation, and for the most part the historic record indicates that the East Sub-watershed has contributed about 4 percent of total phosphorus inflow load to the lake between 1991 and 2005. The authors will make this distinction more clear in the final report.

In regards to the 72 percent non-ag figure for the ELO Sub-watershed, there is a significant amount of residential area. As stated above, the historic discharge from the ELO into the lake has been very minimal and has a relatively minor impact in regards to the lake TMDL. However, it will be a more important factor for the St. Lucie River (SLR) Watershed source control initiative. Bi-directional runoff and conveyance from the ELO Sub-watershed will need to be evaluated during the development of performance measures to track the effectiveness of the collective source control programs by the coordinating agencies in the SLR Watershed.

Comment #4: *line 1002: Where is EBWCD? Not on the map in 4-1. Is there a relation to ELO?*

Response #4: East Beach Water Control District (EBWCD) is a drainage district located on the south side of Lake Okeechobee and is shown in Figure 4-5. The EBWCD falls in an area of overlap between the Northern Everglades and Estuary Protection Program (NEEPP) and the Everglades Forever Act (EFA). The EBWCD lies in the both the South Lake Okeechobee Sub-watershed (NEEPP) and the EAA (EFA). There is no relation with the ELO, but there are some similarities for bi-directional flow issue. The District is in the process of coordinating the various legislative requirements and developing performance measures that are responsive to both the requirements of the NEEPP and the EFA.

Comment #5: *line 1102: Two tables 4-8. Should table on page 4-42 be 4-7?*

Response #5: Yes, Table 4-8 should be named 4-7 and the text will be revised to show the same in the final report.

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 5

Kathleen Pietro, Ron Bearzotti,
Guy Germain and Nenad Iricanin

Level of Panel Review: Accountability (primary); Technical (secondary)
O. Stein (AA), J. Burkholder (A) and J. Burger (B)

General Comments

Comment: *This lengthy chapter summarizes the many efforts that are in progress or being initiated to manage and optimize the phosphorus (P) removal performance of six major constructed shallow freshwater marshes, known as stormwater treatment areas (STAs). The chapter includes hydrologic information, water-column phosphorus concentrations and loadings, other environmental conditions in the water and soils, a summary of research in areas downstream from STA discharges (Water Conservation Area [WCA]-2A and the Rotenberger Wildlife Management Area [RWMA]), evaluation of the performance of the STAs including a demonstration Periphyton Stormwater Treatment Area (PSTA), and evaluation of rehabilitation/restoration efforts for some STA components (cells).*

Comment: *Maintenance of constructed wetlands to function sustainably in pollutant removal is extremely challenging, and the District is renowned for its leadership in this field. An enormous amount of work and excellent effort is represented in this chapter, such as the remarkable undertakings involved in converting cells from EAV to SAV, in the large-scale experiments described, and in rehabilitating STAs that accumulate soil deposits high in P over time. Interesting information is given about the use of STAs for various recreational activities. The question format on pp. 5-74 and 5-78 is helpful for readers, and the statistics describing the District's progress to date since 1994 (p. 5-3) are impressive, as is the clearly constant adaptive management that considers new information, as it becomes available, to improve STA performance.*

Accountability Review

Comment: *The Chapter 5 draft presents a defensible scientific account of data and findings for the areas addressed. The findings, in general, are clearly linked to management goals and objectives. For example, the chapter describes many ongoing, diligent efforts to track STA performance for P removal, major rehabilitation efforts for STAs that decline in efficiency, and an active research program maintained by the District for optimizing and sustaining STA performance. In addition, the chapter explains the technology-based effluent limitation (TBEL) requirement for all STAs except STA-3/4, and an analysis showing that the STAs were all in compliance with NPDES permits and TBELs in WY2008.*

Comment #1: *The overall organization of this chapter is somewhat unclear, however – the present version includes many sections, some of which seem incomplete (below), and organized in some cases without clear relationship or logical flow. Also missing from the writing is a clear explanation of how accountability will be evaluated as restoration efforts continue.*

Response #1: This chapter serves as the reporting mechanism for the operating permits as well as for the Long-Term Plan and contains numerous sections. The format of the chapter was significantly changed from last year to improve readability by consolidating like information into sections or tables. Directional sentences will be added to aid the reader in understanding the order that the various components are presented. The state and federal permits contain the mechanism for evaluating accountability for the STAs as restoration efforts continue.

Questions (others are included by line number below).

Comment #2: *Water Quality Permit Requirements (p.5-14) – STAs are considered to be in compliance if the annual average outflow does not cause or contribute to violations of Class III water quality standards – what is done to determine whether a STA is contributing to violations?*

Response #2: The language on page 5-14 is quoted verbatim from the EFA permits and it applies to all water quality parameters other than TP, HG, and DO. The determination as to whether or not an STA is contributing to a violation for a specific parameter is simply a comparison of the average annual inflow concentration to the average annual outflow concentration.

Comment #3: *In Figure 5-18, why do the data for STA-3/4 begin so late (2005), when this STA was permitted in 1994?*

Response #3: Incorrect figure reference? Figure shows water year, which starts in May and is named by the next year: STA-3/4 Cell 1 passed start-up 1/04, Cell 2A Cell 3 flow-though 6/04, Cell 2 9/04.

Comment #4: *How is background defined for conductivity and turbidity? (Table 5, Water quality parameters with Florida Class III criteria…; also affects Tables 5-9, 5-12, and 5-14, lines 836-839, 896-897, and interpretations).*

Response #4: Turbidity and Specific Conductance Criteria: Criteria or both parameters have the word background in them. For conductivity, the value "shall not be increased more than 50% above background or to 1275, whichever is greater." Since we are dealing with freshwater, background conductivities are typically lower than 1,275 µS/cm. For turbidity, the measured value shall be "< 29 above natural background conditions." Under Section 62-303, natural background is defined as "shall mean the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department. The establishment of natural background for an altered water body may be based upon a similar unaltered water body or on historical pre-alteration data." Since FDEP has not compiled any information on what it considers natural background, we determine that any measured value that is greater than 29 NTUs is considered to exceed the turbidity criterion.

Comment #5: *STA-5 had statistically higher N concentrations at the outflows for 36% of the samples (n = 12 of 33), yet was evaluated as in compliance because no numeric criterion exists for total nitrogen (p. 5-21). Is there any plan to establish a numeric criterion?*

Response #5: There are no proposed modifications to the State Standards that include nitrogen aside nitrates being < 10 mg/L in Class I waters and un-ionized ammonia being < 20 mg NH^3/L.

Comment #6: *Why are criteria for NH3, TDN, and TDP only established for STA-3/4 (older permit, Table 5-6)? Why are there no diel requirements in the permit for STA-6 (lines 448-449)?*

Response #6: The only differences between STA-3/4 permit and the other STA permits with regards to nitrogen and its species are that we are collecting total dissolved Kjeldahl nitrogen and ammonia in addition to TKN and NOX at STA-3/4. Based on previous data, most of the total nitrogen (TKN+NOX) was comprised of total dissolved nitrogen (TDKN+NOX). Therefore, it did not make sense to measure both. Ammonia was removed from the other STAs after no exceedances were observed for ammonia. When the STA-3/4 permit comes up for review, both TDKN and ammonia will probably be removed from it as well.

Comment #7: *Why are the accepted limits (mean annual SSAC limit) for DO so low (Table 5-8)? Would such limits support healthy fish life?*

Response #7: The reason for the low dissolved oxygen limit based on the SSAC has to do on how the SSAC is derived. It is based on a diel dissolved oxygen cycle that changes during the day in response to photosynthetic activity and respiration of the community. The SSAC accounts for natural variability. The SSAC limit is calculated using an equation derived from diel dissolved oxygen concentrations measured at a variety of interior marsh stations in the Everglades. The equation is a sinusoidal function that varies based on water temperature and time of day. Dissolved oxygen levels in unimpacted regions of the Everglades are frequently below 5.0 mg/L. Many of the fauna have adopted to these episodes of low oxygen. It is important to note that most of our monitoring occurs prior to times of the day when photosynthesis activity is at its maximum.

Comment #8: *What is planned next in the sawgrass mesocosm assessment (lines 1134-1139)?*

Response #8: This project may be expanded to a "field-scale" effort, depending on initial findings.

Comment #9: *Exotic species are well-represented in the STAs (e.g. lines 1421-1422 – 26% of the [vascular] plant taxa are exotics). Moreover, some exotics such as hydrilla are considered beneficial as SAV taking up P. What management strategies for exotic species other than hydrilla are planned for the STAs?*

Response #9: Minimum target stages are maintained to avoid inundation by exotic species. Helicopter flights are conducted monthly to access the exotics. Close coordination with the STA management division and the vegetation management division ensures that the appropriate management steps are taken and that the plants are treated accordingly.

Comment #10: *What are the effects of recreational alligator hunting (harvest of 151 alligators from STA-1W and 58 alligators from STA-5) on the alligator populations (line 1533)? Similarly, what are the effects of duck hunting (more than 17,000 ducks harvested by more than 4,600 hunters) on duck populations? Are there disturbance effects that should be considered, for example, from so many duck hunters, or have these effects been assessed and found to be negligible?*

Response #10: The STA hunting program is coordinated through the Florida Fish and Wildlife Conservation Commission (FWC) as our partner. The alligator hunt permit numbers are determined by the FWC to be sustainable harvest quantities. The waterfowl hunting is also a program partnered with the FWC and since these are migratory birds, federal agencies coordinate with the FWC on bag limits and seasons.

The hunting programs on the STAs are closely coordinated with the STA staff and many precautions are in place and have become part of the FWC rules as the program has evolved. The

high quality of the hunts and the limited opportunity through the permit process encourages high compliance with the additional rules. Most notably, motorized boats are not allowed at all, the STA host the only non motorized alligator hunts in the state.

Comment #11: *Rehabilitation projects describe removal of hundreds of thousands of cubic yards of P-rich soils. What was involved in disposal of these soils, and where were they disposed?*

Response #11: As to the disposal of soils during rehabilitation projects, the material was hauled by truck and earth moving equipment to areas within the STA project site but generally outside the treatment footprint.

Technical Review

Comment #12: *The figures and tables are nicely designed and most are very helpful. The Water Year 2008 Highlights and Individual STA Highlights sections, figures (5-2, 5-3, 5-4), and Table 5-2 were especially helpful. Suggestions are given below for altering the writing to include more supporting information and to enhance clarity.*

Response #12: Comment appreciated.

Comment #13: *An available (see below) appendix with acronyms and their definitions would be very useful to the reader. (Note: Every reviewer commented on this!) While they are generally defined the first time they are presented (not always e.g. DO SSAC, Table 5-2, p.5-8; defined on p.5-20) the overwhelming number makes for repeated digging for the definition when encountered again. A listing in a single source would be really helpful to the reader.*

Response #13: Please refer to the final 2008 SFER acronyms and abbreviations and glossary pages available at www.sfwmd.gov/SFER, which will also be updated accordingly in the final 2009 SFER.

Comment #14: *It is not possible to evaluate various parts of this Chapter without access to the many appendices (15?) that repeatedly are cited (lines 261, 263, 271…). Moreover, the appendices are cited out of order (p.5-14: the first a=Appendix cited is #5, then #6, then #10; p.5-16 – appendix #2 is cited, etc.).*

Response #14: Unclear about the meaning of this comment because appendices were made available for the draft report. All the draft appendices, except for those specified as final SFER only (Ch. 1 appendices and App. 7A-1 & 7A-3), were posted on the SFER web site as of August 29, 2008. Similar to last year, they all appear on the SFER web page under the *Appendices* tab.

Comment #15: *The Table of Contents does not match the text.*

Response #15: The Table of Contents was checked against the chapter and was found to match properly.

Comment #16: *The use of English and metric units, often in the same short paragraph (e.g. lines 538-542 – acre-feet, metric tonnes) should be altered. It is recommended that metric be used, with English given in parentheses.*

Response #16: The units that are used to report in are specialized and this is how quantities are understood and applied to the STA performance.

Summary

Comment #17: *16-80 This section, lengthy for a summary, combines summary information with information that normally is included in an Introduction and would benefit from restructuring.*

Response #17: This section consists of only 5 paragraphs which give an overview of the legal mandates, the agencies involved with the STAs, the operational permits in place, a brief description of the STA characteristics, the period of record performance, and a listing of the topics that are covered in the chapter. Please clarify how to restructure this format.

Comment #18: *18-19 The difference between overall acreage and effective treatment area should be briefly defined (as on p.5-8 or p.5-10).*

Response #18: The effective treatment area equates to acreage within the flow path and which contains the treatment vegetation, while total area of the project site includes canals, levees, control structures and all other areas that are not directly removing TP. Effective treatment area is based on the stage-area relationship derived from topography data – it is the wetted area corresponding to the target stage. Target stage is estimated as the average ground elevation in a cell plus the target depth. Typically, the total area is about 15 percent larger than the effective treatment area.

Water Year 2008 Highlights

Comment #19: *104-105 Where is supporting text for this statement?*

Response #19: Please clarify because I do not understand the comment. The sentence found on these line numbers is "Further refinements were made in the use of near real-time data in comparison to long-term performance estimates for operational decision-making".

Comment #20: *Table 5-2 Please define the operational envelope and excursions (also see lines 348-350; should be defined for each STA in Table 5-3 or in a separate table).*

Response #20: The original conceptual design of the STAs was based on a first-order phosphorus removal model. Because this design approach obscured the temporal/seasonal characteristics of the inflows, there was little reference against which actual inflows and resulting STA performance could be assessed. By contrast, the design of the STA enhancements and projections of performance were based on a dynamic model utilizing a 31-year set of simulated daily flows and phosphorus loads, also referred to as the Operational Envelope. This design approach captures the variability of inflows and provides a reference against which actual inflows can be compared to the predicted inflows. Weekly summaries comparing the actual inflows to the Operational Envelopes are used to assist in operational decision-making to try to ensure that the STAs are not subject to overload of either flow or nutrients.

Comment #21: *149-150 It would be helpful to briefly describe the positive results.*

Response #21: The following text will be added:" . . . positive results, **such as establishment of desired plant communities and decrease in outflow TP concentration**, were observed.

Comment #22: *204-210 It would very helpful if a Table (or text) were added to explain the various levels under the TBEL permitting system. It is not clear, but it looks like a hierarchy is; stabilization phase, then Interim performance? then normal flow?? This explanation should done before the descriptions of which STA's are in what phase.*

Response #22: Agree and the following text will be included: "The permits describe three phases with regard to application of the TBEL: Start-up Phase, Stabilization Phase, and Routine Operations Phase. The TBEL does not apply until the STA is in the Routine Operations Phase. Details about the permit phases can be found in the STA permits located at www.sfwmd.gov.

Comment #23: *230-231 Brief explanation should be added for why flows to STA-1W are expected to be higher than anticipated in the EAA Regional Feasibility Study for WY2006-2009.*

Response #23: STA-1W is expected to receive flows and loads higher than those anticipated during the conduct of the EAA Regional Feasibility Study because the canal conveyance improvements needed in the EAA to redistribute runoff won't be completed until later than originally anticipated. Until those canal improvements are completed, STA-1W will receive higher than anticipated inflows and the performance will as a result be less than optimal.

Comment #24: *240-242 When will STA 3-4 be given a new permit under the TBEL criteria? Is this in the works or will the current one expire at some point? Comment applies to Table 5-4 too. Add units (50 ppb)*

Response #24: The new STA-3/4 permit is currently being developed. The existing permit was extended to allow time to complete processing of the new permit.

WY2008 Permit Compliance for Phosphorus

Comment #25: *265-266; 603-604 Please add information on frequency of data collection.*

Response #25: The following text will be added: "The STA flow volumes are based on **daily average** surface water flow and the TP loads are calculated using **weekly** flow or time-proportional auto-sampler data."

Comment #26: *Table 5-4 Define AO. 1st line of legend - …and reporting criteria.*

Response #26: An Administrative Order (A.O.), which has been issued in conjunction with each of the STA permits, establishes a schedule for achieving compliance with the permit effluent limit.

Comment #27: *283 Types of performance enhancement projects should be briefly explained, or readers should be referred to the appropriate later section/page.*

Response #27: The following **text** will be added: "…performance enhancement projects, **such as addition of divide levees, improved water control structures and vegetation conversions**, within the STAs…"

Comment #28: *312-314 Is an important point, but for supporting information readers are referred to unavailable Appendix 5-2. It would be helpful to add some supporting information (graph etc.) here.*

Response #28: Appendix 5-2 is available and contains the supporting graphics. Reference to the average TBEL flow and load estimates (found in Table 5-2) will be added to the text.

Water Quality Parameters Other Than Phosphorus

Comment #29: *416-417 Wouldn't it be much easier to just say none of the data was normally distributed by the Shapiro-Wilkes test therefore we used the Mann-Whitney test for all data?*

Response #29: It would be easier to say that none of the data was normally distributed based on the Shapiro-Wilkes test. However, as shown in Table 5-7, alkalinity was found to be normally distributed and therefore a t-test was the appropriate comparison test for that data set. Now, we could have totally ignored the distributions and performed the Mann-Whitney test. But, the permit clearly identifies the t-test to be used for comparing inflow and outflow concentrations.

Comment #30: *Fig 5-7. The trends look encouraging even though there are only two years of data. Low flow years might be indicative of low DO too. Question however, can the SSAC limit vary by year or are the trend due solely to changes in concentration? Also, t would be instructive to include comparison of 2006 as a non-drought year.*

Response #30: The SSAC varies as a function of water temperature and time of day. Diel measurements at marsh transects were used to generate the SSAC equation which calculates the dissolved oxygen limit given a time of day and water temperature. For a more comprehensive description of the SSAC, please refer to:

Weaver, K. 2004. Everglades Marsh Dissolved Oxygen Site-Specific Alternative Criterion Technical Support Document. Available online at: http://www.dep.state.fl.us/water/wqssp/everglades/docs/DOTechSupportDOC2004.pdf, November 20, 2006. Florida Department of Environmental Protection, Tallahassee, FL.

Mercury

Comment #31: *497-514 Have these data been linked to Chapter 3B? I didn't notice any Hg in fish data from the STA's in that chapter. This section requires additional explanation (see question section above). Information should be added to explain the U.S. Fish and Wildlife Service and U.S. EPA predator protection criteria. It would be helpful to explain why the THg (fish tissue) parameter is so useful (approximates methylmercury, integrates etc.)*

Response #31: Text contained between 497-514 is a summary of the major findings described in Appendix 5-6. Chapter 3B briefly touches on findings from Appendix 5-6. The main focus of Chapter 3B is mercury monitoring and research (for several media types) in South Florida. This data is collected by the District and the U.S. Fish and Wildlife Service. Mercury in fish data from the STAs in that chapter is not provided. This section requires additional explanation (see question section above). Information should be added to explain the U.S. Fish and Wildlife Service and USEPA predator protection criteria and the reader will be referred to Appendix 5-6.

Comment #32: *What may have contributed to the increase in mercury concentrations in mosquitofish and sunfish from all STAs during 2007 as compared to 2006, versus minimal change in largemouth bass (p.5-28)? What may have contributed to the decrease in mercury burden for fish species in STA-1E, and the major increase in STA-1W?*

Response #32: Four possible reasons: (1) the increase could be part of random noise; (2) the observed temporal trends could be an artifact of the fish sampling location(s) and the migration patterns of each fish type; (3) analytical biases; and (4) there is a true lagged bioaccumulation effect occurring between lower and higher trophic species. We can gain a better sense of the observed temporal trends with more yearly data. What may have contributed to the decrease in

mercury burden for fish species in STA-1E, and the major increase in STA-1W? It could be due to (1), (2), and (3) stated above including others. STA-1E appears to have undergone significant changes in source water from WY2007 to WY2008. With next years data, we can be more confident in what is occurring for fish THg levels if in fact the changes are significant. Refer to Figures 14 and 17 in Appendix 5-6 for visual perspective.

Hydropattern Restoration Monitoring on the STA Downstream Areas

Comment #33: *514-912 The organization of this entire section, the Effects of Hydroperiod on downstream areas, could be organized better. The section starts with the RWMA then to data from the transects immediately below STA2 (N, C, S, and FS transects) then jumps to a more global presentation of data in the LNWR (same as WCA1) then comes back to some new and repeated transects near STA2 (AN, AS and FS) then jumps back to the RWMA. We suggest that the presentation be re-organized by geographic location (it seems the RWMA and WCA1 are geographically distinct so that they could presented separately). For the WCA2 which receives flow from ST-1W, STA-1E and STA2 organization could be by where the water comes from. Tables 5-14 and 5-15 are more or less organized around this format but it seems data in Tables 5-9 and 5-12 could included in those tables. The box and whisker plots are a good way to present the transect data, this could be done for all the transects including those in the RWMA and organized as suggested above. More specific comments on this section are provided below.*

Response #33: The sections under the Hydropattern Restoration monitoring on the STA Downstream Areas will be rearranged as suggested.

Comment #34: *603-604 Please add information on frequency of data collection.*

Response #34: Sampling is performed monthly. This will be added to the final chapter.

Comment #35: *520 Explanation should be added about how well the natural hydropattern is known, and supporting data.*

Response #35: The following explanation will be added to the final chapter: "Natural hydropatterns for the RWMA were estimated using a 31-year run of the Natural Systems Model (NSM), with the following revisions: (a) when the average NSM depth drops below ground, the base is set to ground level, and (b) to minimize the potential for excessive dry out during the dry season (approximately October through May), a 0.25 ft offset was added to the target stage to obtain the interim operational schedule." Figure 5-11 demonstrates this target stage. The "interim" operational schedule referred to in the 2004 report was officially adopted in 2006.

Comment #36: *535-536 Brief explanation should be added about why these sites were selected.*

Response #36: The following text will be added to the final chapter: "The sites were selected based on predicted flow patterns using flow estimates before STA-5 became operational. These flow estimates suggested that water would flow across the RWMA especially when the G-402C structure gate was open, therefore the RC1, RC2, and RC3 were selected as the best transect of stations to for permit monitoring. The RC4, RA1, RA2, RA3, and RA4 are also sampled when water levels allow. G-402C structure is also monitored when this gate is open. Both the RA and RC transects run from the G-410 structure to the G-402A and G-402C outflow structures respectively. The additional sites are not included in the permit, but provide the District good coverage for evaluating water quality conditions over the RWMA."

Comment #37: *542 The TP load should be added.*

Response #37: This will be added in the final version.

Comment #38: *Figs 5-9 and 5-10. If there was no outflow through the G410 structures how could there be an outflow? Oh, graph is for a period much long than WY08; That would be worth mentioning.*

Response #38: We are assuming that the reviewer meant "inflow through the G-410," as it is an inflow structure. The G-402 A-D gate structures are the outflow points. The figure legends for Figures 5-9 and 5-10 specify that the figures cover the time between WY06 to WY08. This clarification will be added in the text preceding the Figures 5-9 and 5-10.

Comment #39: *565-601 and Fig 5-11. Does the annual variation in target stage allow for annual cycles of inundated and dry soils? That is, what is the management goal for stage to meet the vegetation goal. Will this need to be modified in light of the subsidence and its influence on vegetation as shown in Fig 5-12?*

Response #39: There is currently no vegetation goal for the RWMA. Stage targets are set to limit the time period of drying that soils experience and to reduce the possibility of peat fires. The District is currently working with an interagency group to potentially redefine operations so that the desired hydrologic conditions can be achieved and maintained to minimize subsidence rates, minimize impacts to vegetation, and meet other performance goals for this area. Additional verbiage will be included in the write-up for clarification.

Comment #40: *678-691 The chapter states that the accuracy of the depth recorder measurements was estimated during 2006-2007 by comparing them with periodic field measurements. The reasons for the discrepancy between the two approaches should be explained, and the percent difference between field-measured water depth and depth recorder measurements should be included in Table 5-11 (means, medians, and range).*

Response #40: Water depths obtained using a meter stick (during field visits) were compared to the depths the water depth recorders were reading for the same dates. Results obtained from the water depth recorders are considered estimates, therefore we do not find it pertinent to estimate the means, medians, and range of differences between these two readings. Discrepancies could have been caused by (1) microtopographic variations which can vary by several centimeters (even within a foot or less of the recorder); and (2) The water levels in the porewater wells that are used by the water depth recorders may take some time to catch up to surrounding water depths, especially when water depths are rising or falling rapidly. A difference between the measured depths and the recorded depths ranging from 3.6 cm to 9.0 cm is likely not biologically significant. For these reasons we do not feel that the means, medians, and range for these error measurements is really necessary to report.

Comment #41: *722-725 Brief explanation should be added about why these parameters were selected.*

Response #41: An explanation will be added in the final chapter. These parameters were the main focus of the 2008 WCA-2A Report (Garrett and Ivanoff, 2008). We looked at the WCA-2A write-up in the 2009 SFER as an update to this much larger report. Also, the STA-2 permit requires that we monitor and report those factors that may affect flora and fauna in the area. Nitrogen and phosphorus are essential nutrients. There have been concerns about elevated sulfate levels in the WCA-2A and surrounding areas, so this was reported for this reason. Specific conductivity is specified in the permit.

Comment #42: *Table 5-12, and lines 727-743 Brief explanation should be added about desirable levels for these parameters.*

Response #42: As stated in the previous comment response, the desirable levels for the parameters listed are at concentrations that do not impact flora or fauna negatively within this region of WCA-2A.

Comment #43: *Table 5-13 Brief explanation should be added about the concentration thresholds that indicate "impacted" vs. "unimpacted" wetlands, to assist in interpreting this table (the related information on p.5-43 should precede this table or be included in its legend, and the basis for the thresholds should be explained).*

Response #43: An explanation will be added to this regard in the final chapter. Soil TP concentrations above 500 mg/kg are generally considered impacted.

Long-Term STA Performance

Comment #44: *913-1040 For organizational purposes this section dealing specifically with the STAs performance should come before the previous section describing the influence of the effluent on the on the downstream receiving sections. It is a little disheartening to see virtually no trend between outflow concentration and loading rate (either HLR or PLR), globally or by individual STA however it is possible that a better relationship might be seen if removal rate or removal efficiency (rather than outflow concentration) were plotted. Worth a try or maybe include both. More specific comments on this section are provided below.*

Response #44: Agree. Time series plots of the TP mass removal rate for each STA is found in Appendix 5-2, Figure 1. Plot of the removal efficiency will be added.

Comment #45: *915, 940 seem misleading, as the period of record has not been since 1994 for most of the STAs.*

Response #45: Agree and the following clarifying text will be added: The STAs began operation at different times since 1994 9 (see Table 5-2 for the start dates).

Comment #46: *937-939 The changes are credited to rehabilitation, which seems misleading since the drought alone could have been responsible for the changes (in lines 1732-1736 the authors acknowledge the difficulty in discerning rehabilitation from drought effects).*

Response #46: Agree and reference to the ongoing rehabilitation efforts will be removed from the sentence.

Comment #47: *948-950 These statements do not seem to match the information contained in Figures 5-21 and 5-22.*

Response #47: There are not clear trends associated with hydraulic or phosphorus loading rates or large climatic events, as indicated in the text and figures.

Comment #48: *957-963 Further interpretation of the interesting Figure 5-23 would be helpful.*

Response #48: Additional interpretation may be added in the final report.

Comment #49: *Figure 5-21 Climatic influences (hurricanes, droughts), by year, should be added to the top of this figure. Also, the legend should explain the apparent discrepancy between the years shown in this figure versus the initiation dates given in Table 5-2.*

Response #49: Figure 5-6 shows the climatic influence by year for the STAs. Figure 5-21 may already contain too much information to add these details, but additional annotation will be considered. The following text will be added to the legend to explain the differences in dates between Table 5-2 and Figure 5-21: "Table 5-2 shows the month and year of STA start-up while Figure 5-21 shows the water year (from May 1 through April 30)."

Comment #50: *Fig 5-24 It is not clear what data has gone into the performance analysis. Fig 5-22B shows many years of data by STA (STA5 for example) and since data in Fig 5-24A is separated by flow way, it would seem that it should have even more data points available, but clearly does not. Therefore it does not appear to be a POR data. The loading rate scales are not consistent either: the magnitudes look similar but one read mg and the other g. Fig 5-24B shows a relationship between k and Cout, but that really is nothing more than a plot of Eq. 1. The real question is why does k vary at all, not how does variation in k influence Cout.*

Response #50: A step-wise regression (forward selection method) of the components of the k value equation (TPin, TPout and the average water load Qavg) to investigate which component was most responsible for change in k. Qavg accounted for 54 percent of the variance in k values, TPout accounted for another 16 percent and TPin only 1 percent. The remaining 29 percent of variance in k is unexplained by this model. Qavg relates to operational control of the STAs, i.e., the water load the District moves into and out of these wetlands. TPout is a reflection of the biogeochemical processing within the STAs (as modified to some degree by STA operations). TPin, the quality of the inflow water, had little apparent influence over k. The take-home message is that slightly more than one-half of the change in annual treatment cell k values was related to how the District operated the STAs.

Also investigated was whether difference in the vegetation community as measured by percent SAV coverage was statistically related to variation in k values. No significant relationship was found. A quick sensitivity analysis indicated that relative importance of Qavg to the k value increases as the differences between TPin and TPout increases. A presentation and discussion of this analysis is well beyond the scope of the SFER.

STA-related Research and Activities

Comment: *1042-1227 This section summarizes the research projects initiated or ongoing in WY2008 that have been designed to strengthen understanding about the mechanisms that control STA performance. They include vegetation surveys, soil sampling, monitoring of newly rehabilitated STA cells, assessment of floc soil biogeochemistry, and several large-scale experiments that have examined biomass effects on SAV establishment and the influences of hydrologic extremes on cattail growth and survival to help identify stress indicators. This section clearly demonstrates the importance SFWMD puts on maintaining and improving performance of the STAs. The breadth and of studies is quite impressive and the overall format; a more detailed presentation of studies initiated this year followed by a brief summary of continuing studies, is effective. However that structure could be emphasized a bit more. More specific comments on this section are provided below.*

Comment #51: *1060-1075 and 1093-1110 Since these two studies are newly initiated the year (or at least newly reported) a more expansive description of the studies is warranted.*

Response #51: Additional details will be provided for the newly initiated studies.

Comment #52: *1060-1075 For the drought study it appears there are two treatments, water depth and time that depth is maintained, not one as suggested. What does the term "a 5 block random design" mean in light of the one (or two) treatments? I would suggest that the number of replicated pots per treatment/depth combination be given and state that these were placed in randomize block design would be a more appropriate of stating it (if that is what was done). Statements as to what will be measured to assess the physiological response and the expected length of the study are warranted. How were the plants established before the study was begun? Explanation should be added about the pot size, with justification from supporting literature because pot size can skew results for cattail growth. A brief explanation should be added as to how realistic the selected treatments are in simulating wet/dry conditions/durations in the STAs.*

Response #52: The following text will be added to further describe the Physiological Response of Cattail to Drought Conditions section: Cattail plants were harvested from STA-1W Cell 1B and 2 plants were planted per pot. The pots were constructed out of heavy-duty trash cans (22.5" x 22.75") that were modified to include drainage holes at the bottom and a central well for water delivery. The plants were allowed to establish in the pots for 6 weeks before the water deficient conditions began. Each treatment and depth duration consists of 17 replicates and there are 21 control pots inside the greenhouses and 11 control pots located outside the greenhouses. Five blocks (Greenhouse Pavilions) are being used in this study. There are three Water Conditions (Control (always saturated), Stage 12" below surface, Stage 18" below surface) and three time durations (2, 4, and 6 month of water deficient conditions). The source water is collected from canal upstream of STA-1W outflow station G-251.

The study consists of 5 phases: Phase 1: All pots are set at Control Water levels (saturated soil); Phase 2: For 2 months: Controls remain at saturated water stages while 51 pots are set at each water deficit stage (-12"/-18"); Phase 3 (after 2 months treatment duration): Controls remain at saturated soil. 3 pots each treatment are destructively sampled for physiology and biomass; 14 pots are set back to saturated water conditions for 2 months then evaluated for survivability; Phase 4 and 5: The same procedures as identified for Phase 3, after water deficit durations of 4 and 6 months.

Assessment of the plant stress will be evaluated using the following parameters: Plant survival, visual effects on aerenchyma tissue using light microscopy, osmotic potential, plant biomass by tissue type (leaves, roots, rhizomes), length of tallest live leaf, culm width, rate of plant growth and the following physiological and biochemical parameters: Weekly: Soil % moisture, Bi-Weekly: Photosynthesis, transpiration, and fluorescence and light response curve will be conducted at 0, 2, 4, 6, and 8 months. At each destructive harvest point, the following parameters may be measured, depending on the ability of the laboratory to conduct the analysis: cellular protein (leaf and root), RNA content (leaf and root), ABA and ethylene content, starch (root shoot/rhizome), ascorbate content, ethanol content, proline content, peroxide content, peroxidase activity, superoxide anion content, glutathione reductase activity, catalase activity, ATP and NADP.

The study will be conducted for 8 months once the drought conditions are reached in the pots. As suggested, justification from supporting literature regarding how pot size can skew results for cattail growth and a brief explanation as to how realistic the selected treatments are in simulating wet/dry conditions/durations in the STAs will be included.

Comment #52: *1093-1110 The description of the deep water stress study is a little closer to the suggested format, however what will be measured is not clear here either.*

Response #53: The following text will be added: Photosynthesis and fluorescence was measured weekly. Plant tissues will be sampled for biomass, tissue total phosphorus and nitrogen concentrations, and leaf elongation rates.

Comment #53: *1112-1227 As these studies appear to be ongoing a more abbreviated description is warranted, but for each study it would good to provide the initiation date, expected completion date, and where (or when) data are available. Is there an expectation that some of these studies might be published in scientific journals or is the expectation that they will be for internal management decisions only?*

Response #54: The start and end dates will be included in the text. The following studies are designed to address specific STA design and management issues. However, when appropriate, findings will be published in refereed scientific journals.

Comment #54: *1113-1126 Explanation should be added as to why STA-2 was selected for this study. Information is also needed about the number of stations (water quality, soil) and frequency of sampling.*

Response #54: STA-2 was selected for this study because of the diversity of vegetation types (2 EAV and 1 SAV-dominated flow path), and because it had an "appropriate" (modest) loading history at the time this study was initiated. Water quality monitoring in each wetland is performed along 9 transects oriented perpendicular to flow. Each transect contains 3 to 6 discrete sampling stations, depending upon the width of the cell. The project end date is yet to be determined, and depends on the utility of findings.

Comment #55: *1186-1187 versus line 1195 Both describe small changes in TP, yet the former is depicted as "only marginal improvement" while the latter is depicted as more substantial changes. The writing should be altered to be more consistent.*

Response #55: Agree.

Comment #56: *1206 This statement is a little misleading, the lowest FWMA concentration from any STA is 20 ppb. Is there some significance to the value of 10 ppb? This value is the phosphorus criterion for the Everglades Protection Area.*

Response #56: This value is the phosphorus criterion for the Everglades Protection Area.

Comment #57: *1243-1244 Please clarify – would there be any residual adverse effects of glyphosate after two months?*

Response #57: No, there would not be residual effects of glyphosate after two months. Supporting documentation: Glyphosate has been applied extensively to control nuisance weed species in aquatic environments (Barrett, 1985; Linz et al., 1999). It is readily absorbed and translocated after contact with targeted plant species (Sprankle et al., 1975) and rapidly dissipates through biodegradation, photolysis and sediment adsorption (Bronstad and Friestad, 1985; Reinert and Rodgers, 1987, Goldsborough and Beck, 1989).

Barrett, P.R.F. 1985. Efficacy of glyphosate in the control of aquatic weeds. Pp. 365-374. In: GROSSBARD, E. and D. ATKINSON (eds.), The Herbicide Glyphosate. Butterworth & Co. Ltd., London, U.K.

Bronstad, J.O. and H.O. Friestad. 1985. Behaviour of glyphosate in the aquatic environment. Pp. 200-205. In: Grossbard, E. and D. Atkinson (eds.), The Herbicide Glyphosate. Butterworth & Co. Ltd., London, U.K.

Goldsborough, L.G. and A.E. Beck. 1989. Rapid dissipation of glyphosate in small forest ponds. *Arch. Environ. Contam. Toxicol.* 18:537-544.

Linz, G.M., W.J. Bleier, J.D. Overland, and H.J. Homan. 1999. Response of invertebrates to glyphosate-induced habitat alterations in wetlands. *Wetlands* 19: 220-227.

Reinert, K.H. and J.H. Rodgers. 1987. Fate and persistence of aquatic herbicides. *Reviews of Environmental Contam. Toxicol.* 98:61-97.

Sprankle, P., W.F. Meggitt and D. Penner. 1975. Absorption, action and translocation of glyphosate. *Weed Sci.* 23: 235-240.

Comment #58: *1391-1392 Stilts were picked as an indicator species because there nest sites are most critical for water depth variation. But are they "conservative" in regards to breeding timing and operation management for moving and levee maintenance?*

Response #58: The mowing schedule is based on the species observed nesting in the STAs and not other species (although there are several other species of ground nesters that frequent the STAs, they have never been observed nesting there). The least tern was included because there were nests close to STA-3/4 found in the EAA reservoir.

There have only been two identified species of ground nesters that nest on the levee roads and slopes in the STAs. Those species are the black-necked Stilt (*Himantopus mexicanus*) and the killdeer (*Charadruis vociferous*). While the mowing schedule within the STAs is based on the breeding season of the Black-necked Stilt, it also incorporates the Killdeer breeding season. Both species start nesting on levee roads between the months of April and May and have a similar gestation period of 20-30 days. Furthermore, even if we were to look at the breeding season of other "rock-using" ground nesters, such as the state threatened species, the least tern (*Sterna antillarum*), that have not been found nesting in the STAs but in areas close-by, the modified STA mowing schedule that is based on the black-necked Stilt breeding season would encompass the least tern's breeding season in South Florida (start Mid-April – gestation 20-22 days).

Wildlife Issues and Avian Protection

Comment #59: *1443 vs. line 1456 Does line 1443 refer only to STA-1W and STA-5? Explanation should be added as to whether the other STAs have been surveyed and, if not, whether there are plans to survey the bird species in the other STAs.*

Response #59: The paragraph will be edited to make it clear that only STA-1W and STA-5 were surveyed and mention about the FAU Ecological Lift study will be added.

Comment #60: *1546, 1555, 1558 Brief explanation should be added about why these STAs were selected for opening to bird-watching activities.*

Response #60: STA- 5, STA-1W and STA-1E have prolific bird populations and public requests for access lead to the agreements to provide tours on those three STAs. During construction, tours on STA-1W changed to exclusively STA-1E. The contracted tours for STA-1E and STA-1W were discontinued when the public access sites were open. Hendry-Glades Audubon volunteers to

conduct tours on STA-5. The District would welcome a similar volunteer partnership for STA-1E and STA-1W. Bird watching and hunting occur on different weekend days during the federally set waterfowl season.

STA-1W Rehabilitation

Comment #61: *1560-1916 There is a lot of information on the rehabilitation efforts for STA-1W in this section and one gets the impression that the overall effort, especially the more recent efforts, have been rather successful in promoting the desired vegetation and outflow P concentrations. However authors should develop a more-easily-understood method to present this interesting information. As a suggestion: For each individual cell present the information in an expanded text-containing table that follows a clear time progression from the earliest pre-STA condition to the present. Items would include the target vegetation, the observed vegetation, the suspected cause (if those to are not equal) the remediation strategy and the analysis for success. The impression the reader gets is that several things were tried (sometimes due to a serendipitous event such as dewatering due to drought) and, through a trial-and-error approach, the current strategies have become largely successful. This format would allow an observation of the progression of the currently-successful management strategy and at the same time demonstrate the need for continued research projects to further optimize the management strategy. The main point is that the SFWMD is essentially negotiating uncharted territory as to management of wetlands of this size, and, overall, has done a very good job. Tell us how you got there!*

Response #61: A table summarizing the vegetation and conditions, as well as events will be included for each cell as recommended above.

Comment #62: *1567, 1568 Brief explanation should be added for these two bullets.*

Response #62: The two bullets will be combined and the following explanation will be included in the final chapter: "caused by accumulation and release of marl material from the collapsed SAV. The deposited material is easily resuspended with slight wind action and a large amount of fine particles remained suspended for extended periods, resulting in high turbidity."

Comment #63: *1587 Brief explanation/description of the Everglades Nutrient Removal Project should be included.*

Response #63: The Everglades Nutrient Removal Project has been explained in the summary and STA-1W sections of this Chapter. It is basically a smaller pilot scale version of STA-1W. The reference to ENRP will be removed, and the first sentence will be reworded as follows: "Historically, the Eastern flow-way was a cattail dominated system that performed fairly well since this flow-way became operational in 1994."

Comment #64: *1569-1571 Should not be bullets; they are not likely causes for the need for rehabilitation (line 1564).*

Response #64: Format will be edited accordingly and the last two items (Lines 1570 and 1571) will not be bulletized.

Comment #65: *1640-1642 – Brief explanation or speculation about why this effort was unsuccessful should be added.*

Response #65: The following explanation will be added: "This is likely due to persistent highly turbid condition even after draining and re-flooding."

Comment: *1652-1950 This section on STA-1W Post-Rehabilitation Monitoring presents interesting and valuable information, but it is difficult to decipher because of poor organization and certain statements made to not appear to be justified (below).*

Comment #66: *States that outflow TP concentrations have decreased steadily over the past two water years, implied (line 1681) to have been because of rehabilitation efforts. The drought should be mentioned here, however, as a strong influence on the data.*

Response #66: Agreed. Lines 1681-1683 will be revised as: "Overall, the performance and the environmental conditions in STA-1W have improved since rehabilitation was completed for each flow-way. The outflow TP concentrations, turbidity, and total suspended solids have decreased steadily. It should be noted that reduced flows and recent drought conditions could have also affected this observed improvement in performance."

Comment #67: *P.5-75 "Jumps" from previous Figure 5-27 to Figures 5-35 and 5-36, then to Figure 5-28, then to Figure 5-37. This problem creates considerable confusion and difficulty in following the text versus supporting data in figures. The text and figure numbers need to be altered to conform with the rest of the chapter.*

Response #67: The suggested format changes will be applied in the final chapter.

Comment #68: *1722 MK-9 should be added to a map in this chapter.*

Response #68: This was a typographical error; there is no sampling location MK-9, it was meant to cite Figure 5-35. Correction indicating reference to Figure 5-35 will be applied in the final chapter.

Comment: *1814-1815 Brief clarification should be added to inform readers of the source of the SAV. Line 1814 will be modified as: "Approximately 1,500 lbs of SAV, primarily southern naiad and pondweed obtained from STA-2 Cell 3, were aerially dropped…"*

Comment #69: *seems misleading or somewhat inaccurate in stating that pondweed (Potamogeton illinoiensis) was successfully transplanted into both cells, especially regarding STA-1W Cell 3. Also note that P. illinoiensis looks unhealthy in Figure 5-32 (no broad leaves apparent*).

Response #69: The photo presented was that of the new plants just becoming established in the cell. Lines 1850-1851 specified that pondweed establishment and expansion was slow post inoculation. Line 1852, which refers to successful transplanting, will be deleted.

Comment #70: *1903-1904 Explanation should be added for this statement, with supporting reference(s).*

Response #70: The sentence will be changed to: "The elevated soil TP levels was suspected as a factor to decline in P removal in this flow-way."

Comment #71: *Figure 5-36 Explanation should be added as to why turbidity is given (upper right panel) rather than SS.*

Response #71: This specific graph will be replaced with total suspended solids plot, for consistency.

Comment #72: *Figure 5-37 A very good overview of the vegetation change with time but cannot be read unless one blows it up to 300% or normal size; labels need to be enlarged, both dates and the turbidity scale are unreadable.*

Response #72: Figure will be modified to make them more readable.

Comment #73: *Figures 5-37, 5-40 The meaning of the species density scale (lines 1948-1949) should be added to the legend to help explain the keys.*

Response #73: The following clarification will be included in the legend: 1-Low density (up to 1/3 coverage), 2- Medium density (1/3 – 2/3 coverage), and 3-High density (2/3 –full coverage).

STA-3/4 Periphyton STA (PSTA) Implementation Project

Comment #74: *P.5-86 Although the stated intent was to operate the PSTA and Lower SAV cells in parallel, the two cells had to be operated differently, so it is not possible to compare their efficiencies without the confounding factor of differential flushing (discharge). In addition, the areal surface-water TP loading rate in the PSTA was only about half that in the Lower SAV cell (lines 1992-1994, Table 5-18). Therefore, the comparison given in lines 1995-1997 seems misleading and should be reworded. Considering these difficulties, explanation should be added of future plans regarding operation and use of the demonstration PSTA.*

Response #74: While the inability to compare the treatment efficiency of the PSTA and Lower SAV cells is unfortunate, it does not seriously affect the operation of the project. We have performance data for number of other SAV cells in the STAs to compare against the PSTA Cell, e.g., I made a comparison with STA-3/4 Cell 2B in the chapter.

The STA-3/4 PSTA Project is not a "demonstration," but rather the "implementation" of this technology in STA-3/4. Unless directed to do otherwise, the project will be operated indefinitely. The current intensive monitoring program is scheduled to continue for at least another year. Given the delays in the start of operations and the abnormal operating conditions in WY2007 and WY2008 due to the regional drought, intensive monitoring may be continued for additional years. However, at some point monitoring of the PSTA Project will be scaled back to a level comparable with the monitoring program in the rest of STA-3/4.

Evaluation of STA Soil Data

Comment #75: *2010-2173 This well-designed section on Evaluation of STA Soil Data (including nice figures) convinces readers of the great value of soils data in assessing and interpreting STA overall "health." Counsel forthcoming from the review of the entire STA soil monitoring program should make these data even more valuable for assessing P storage and stability, and other key parameters and processes that affect P uptake and release. The planned assessment of the quality and usability of the different soils datasets (lines 2167-2173) is an excellent action of the District, and the panel looks forward to seeing the key results from this validation process and comprehensive data analysis.*

Response #75: Thank you.

Comment #76: *2020 It should be made clear that higher AFDW corresponds to higher OM.*

Response #76: The following sentence will be added: "Higher AFDW indicates higher organic matter content."

Comment #77: *2011-2016 The number of replicates per cell should be clarified. Brief explanation of the reasons for floc occurrence/accumulation would be helpful.*

Response #77a: There are no true replicates in STA soil sampling. Soil samples are collected at every 1330' by 1330' grid point stations, whenever the area is accessible. The actual number of sampled locations per cell and per STA are indicated as "n" in Appendix 5-14 Tables D-1 and D-2.

Response #77b: The following explanation about floc formation will be included: "Flocculent materials (floc), in the STAs usually consist of a decayed vascular and unconsolidated living and dead periphyton material. Its composition and accumulation are regulated by the type of vegetation source, microbial activities, and a number of biogeochemical factors including hydrology and nutrient availability." These explanations will be included in the final chapter.

Comment #78: *2047-2066 and Fig 5-42 The description of the pre and post rehabilitation conditions is a bit confusing. It looks from the figure that TP when down but OM went up after rehabilitation but that doesn't seem consistent (maybe the answer is given on line 2070?). Also when was the rehabilitation process conducted relative to the sampling event; was only cell4 measured pre and post rehabilitation?*

Response #78: STA-1 West Cell 4 has been an SAV cell since 1994. The demise of the formerly healthy SAV establishment in late 2004 resulted in deposition of a thick layer of highly inorganic material. That material had very low organic matter content, and high levels of TP. Upon scraping, the underlying peat material was exposed, which contained lower TP levels and higher organic matter content.

Cells 4, 2B, and 1A were sampled before and after rehabilitation. There was no sediment removal in either Cells 2B and 1A, so data for those cells were included in the soil map, while post-rehabilitation data for Cell 4 was separated in the form of a pop-out map as shown in Chapter 5 Figure 5-42. This explanation will be included in the final chapter.

Comment #79: *2156-2160 Additional explanation of use of HA/FA ratios (rationale, ranges for "good" vs. "poor" ratios) should be included. Ranges and median values of the HA/FA ratios in peat versus floc should be given.*

Response #79: The following statements will be included in the final chapter: "The amount and quality of organic matter in the sediments is important factor for aggregate stability. The ratio of HA/FA is frequently used to indicate organic matter quality of soil and sediment. Higher HA/FA ratio facilitates the formation of water-stable aggregates." Ranges and median values will also be included in the final chapter.

Comment #80: *2161-2165 Explanation is needed as a basis for interpreting this information (please explain what these ranges mean with respect to the health of soils in the STAs).*

Response #80: Additional explanation will be included in the final chapter. Microbial activity (measured in terms of biomass) was investigated in this study as a potential cause for poor sediment aggregation in the highly inorganic floc layer. The results indicate much lower activities compared to upland soils and to areas with labile organic carbon sources.

Comment #81: *2176-2187 The Compartment B Build-out project should be explained first.*

Response #81: Agree and the order of the information about Compartment B and Compartment C Build-out projects will be reversed. Additionally, a map will be inserted showing the locations of these projects.

Comment #82: *2243-2245 Since no activities for the Operational Strategy project were scheduled or completed, why is this section included?*

Response #82: Operational Strategy project was completed years ago but we show it in case someone is looking for the status, or wants to know what the project involved. We have been following that reporting method for many years and have done similar reporting on other completed projects based on feedback from our editors from previous year. Next year, those projects deemed complete will be shown in a table as "complete – see previous SFER for details".

Comment #83: *2213-2214 A brief description of this Long-Term Plan is needed.*

Response #83: A short introduction above line 2175 will be added to introduce this section of the status reports on several Long-Term Plan projects. The following text will be added: "The Long-Term Plan contains the state of Florida's strategy for achieving compliance with the phosphorus criterion in the Everglades Protection Area. The following section contains status updates on several Long-Term Plan projects which focus on STA construction, operations, and monitoring. Updates on other Long-Term Plan projects, as well as the overall status of implementation of the Long-Term Plan, are presented in Chapter 8."

Comment #84: *2219-2228 Brief explanation is needed for how improved flow equations were created.*

Response #84: Stream-gauging data is collected in the field for use in calibrating flow equations, and flow rating analysis is conducted to improve computed flows, detect and correct anomalous data, and estimate missing data.

Editorial

Response #85: The following formatting or clarification suggestions will be added to the final:

Comment: *19-20 Should be changed; STA-5 Southern Flow-way (Cells 3A, 3B) is described as not having passed start-up but actually the tests have not been possible because of lack of water (according to p.5-12).*

Comment: *Table 5-1 The title should be re-worded or (better still) an additional column with total as well as effective treatment area should be provided (FYI Area units are missing).*

Comment: *124-125, 1068 Should be changed; these were not really field studies but, rather, large greenhouse and mesocosm studies.*

Comment: *Figures 5-2, 5-15, 5-16, 5-17 Need a scale.*

Comment: *Figure 5-22, legend line 3 - (PLR) is by…; and from sentence beginning "The long-term…" on, the writing should be omitted as it is redundant with the chapter text.*

Comment: *211…and this phase ends… (drop "is")*

Comment: *Table 5-3 legend, line 3 …are listed below;*

Comment: *234, For STA-1E Should be a new paragraph.*

Comment: *311 Should refer to Table 5-2 for TBEL limits.*

Comment: *Table 5-7, footnote, 2nd line …not be calculated and*

Comment: *459 …assessment of possible*

Comment: *463 Biweekly…*

Comment: *465 …limits is provided…*

Comment: *538 …water were discharged*

Comment: *584 1803 dominant*

Comment: *604-723 (depth ≥ 10…*

Comment: *759 characterization of the effects of STA…*

Comment: *764 …for each transect are*

Comment: *805 …data were retrieved…*

Comment: *Figure 5-15 Should identify Transects 1 and 2 (to match Table 5-14).*

Comment: *Figures 5-18, 5-19 - Legends should explain x's and o's.*

Comment: *Figure 5-18 to Figure 5-20 legends - It would be helpful to add, parallel to the chapter text, that these STAs discharge into the Loxahatchee National Wildlife Refuge (Figure 5-18), the WCA-2A (Figure 5-19), and the RWMA (Figure 20).*

Comment: *829 …in the Loxahatchee National Wildlife Refuge (Refuge)…*

Comment: *1169 Suggested study title: EAV Vegetation Resistance Assessment*

Comment: *1194 Provide values for "High" and "Low"*

Comment: *1203 column P concentrations*

Comment: *Line 1237 …suggests that periphyton;*

Comment: *Throughout section, black-necked stilt - the "s" in stilt should not be capitalized*

Comment: *Line 1270 - …indicate that beds…*

Comment: *1336 The common name for the eagles should be included.*

Comment: *1360-1361 Sentence needs some editing.*

Comment: *1488 Something is missing.*

Comment: *1490-1491 Sentence needs some editing.*

Comment: *1529 delete "the way"*

Comment: *2079 Emergent cells (plural)*

Comment: *2144 …are in Appendix…:*

Comment: *2161-2162 Microbial biomass P generally was low (mostly…) in floc…; however, it was…*

Comment: *2241 …the data are…*

Comment: *1924-1925 omit definition for SAV (was defined earlier).*

Comment: *1994 …respectively) (Figure 5-37).*

Comment: *2001 …period (Figure 5-37).*

Comment: *1650 macroalgal; pp. 5-74 - 5-85 should be checked for use of hyphens.*

Comment: *1676-1677 …total suspended solids…*

Comment: *1694 …(Figure 5-36)*

Comment: *1711 …(Figure 5-36)*

Comment: *1780 …particular cell.*

Comment: *1807 Chara does not have seeds. Macroalgal potential inocula should be referred to as spore beds.*

Comment: *1820 was successfully… ; Throughout, spelling should be Potamogeton illinoiensis.*

Comment: *1900 …years that this…*

Comment: *1914 …data look very…*

Comment: *1436 …similar to that of the…;*

Comment: *1442 …comparable to that of fish…*

Comment: *1883 …which is similar to, although lower than, the organic…*

Response #86: The text will be revised as: "…which is closer to values observed in 1996.."

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 6

Fred Sklar with Chapter Co-Authors

Level of Panel Review: Technical (primary); Integrative (secondary)
J. Burkholder (AA), J. Burger (A) and E. van Donk (B)

Panel Comment Number	Person Responsible for Update	Panel comment	Response
		Chapter 6: Ecology of the Everglades Protection Area	
		Questions	
1	Cook	Were the nest abandonments by wading birds correlated directly to water levels or food, and were they highly synchronized (lines 294-298)?	We were very fortunate to draw colony information from a rich pool of Everglades researchers in 2005-2007, but not in 2008 after research activity declined. We made the most of this increased research activity, and effective collaborations among the district and FL universities has led to a considerable increase in our understanding of wading bird ecology. Much of this information is not available in the SFER but will be published shortly in multiple peer reviewed journals. For 2008 we do have good evidence that wood stork colonies abandoned within days of rain-driven reversal events. Other spp also suffered abandonments but we have less confidence in the role of reversals because surveys did not coincide with rain events.
2	Cook	Why were cattle egrets not included in the nesting data counts (lines 267-268)? Might data on this undesirable species provide insights about how restoration efforts are encouraging some non-target species, of potential value in adaptive management?	Cattle egrets are not included because this total is used to examine annual changes of the key native species. We do monitor cattle egrets and other exotics such as sacred ibis and this data is available in the annual wading bird report.

3	Cook	How will the results from the observations described in lines 364-385 influence hydrology manipulation in the Everglades? In other words, what is the relationship of these research findings to management?	Bear in mind that this is one of a suite of studies examining the complex relationship between wading birds, hydrology, environmental characteristics and their prey. A synthesis of results from multiple studies will ultimately develop our understanding of these relationships and help guide management decisions. This particular study confirms that subtle differences in depth are vital for successful foraging and highlights the importance of managing for depth in the immediate or short-term. It also reveals that vegetation structure is less critical for foraging (at the densities tested), and suggests that managing long-term hydrologic conditions for vegetation structure is probably not an effective restoration strategy. This is in stark contrast to the snail kite, for example, where long-term hydroperiod appears to be essential for maintaining appropriate foraging habitat. For wading birds, managing long-term hydrologic conditions for prey production may be more appropriate and needs to be studied in detail.
4	Cook/Kobza	Are there plans to test the other 12 exotic fish species for temperature tolerance (lines 477-479)?	Not all species, no. The other eight cichlid spp in the Everglades are taxonomically and ecologically similar to the two examined here and likely exhibit comparable cold-tolerance thresholds; they are not a priority for research. Instead, we hope to examine thresholds of two common but distantly related catfish species. We also intend to examine biotic interactions between exotics and native species, and the role of exotics in structuring the aquatic community. (Fred – potential future studies related to climate change may examine the maximum temperature tolerance of native and exotic species).
5	Coronado	Are there plans to report on the distribution of the other four exotic plant species on tree islands in WCA-3A and WCA-3B (pp. 6-25 to 6-28)?	Yes, in February 2009 we will have a complete report on the distribution of the other four exotic species on tree islands. The report will include a detail description of the distribution and extent of infestation.
6	Coronado	In the Plant Ecology – *Lygodium* subsection (lines 570-577), how will the management implications be translated into actions (and who will be responsible)?	The management implications are currently being translated into action by treating all the tree islands where *Lygodium* has been found. This a collaborative effort with the Vegetation Management Division who is responsible of treating Tree Islands with *Lygodium*.
7	Sklar	While the emphasis on trees is laudable (p. 6-29), is the District also examining the role of herbaceous vegetation on tree islands?	Yes, we are also examining the role of the herbaceous vegetation, particularly those herbaceous species associated to tree seedling colonization, establishment, and recruitment. For instance, we are looking at the role that fern species play in creating microenvironments that tree seedling successfully colonize.

8	Newman	Were supporting water-column and floc sediment C, N and P data taken in the Decomposition study (pp. 6-52 to 6-54)?	Yes, these are collected as part of the larger CHIP project effort, at similar, though not identical times as the litter material.
9	Newman	How is creation of openings in the Everglades expected to affect secretive birds (p.6-57)?	Secretive birds are expected to become reduced in number in open areas. This is also provided in the hypotheses table.
10	Newman	When is completion of nutrient budgets planned to examine carbon cycling in the CHIP (lines 1208-1209)?	This will be completed at the conclusion of the third year of sampling, towards the latter part of 2009.
11	Miao	Redox data can provide valuable insights about geochemical processes and the general "health" of wetland ecosystems. Are there plans to conduct a more detailed redox study that captures the important 0-2 cm sediment depth? (p.6-64)	Added a comment about not sampling at these discrete depths. There are no plans to conduct a more detailed redox study at this time.
12	Troxler, Coronado	In the study estimating tree island nutrient fluxes, is it reasonable to assume that nitrogen fixation and denitrification are negligible (lines 1520-1521)?	The rationale for assuming that denitrification and N fixation rates is that our previous studies on a bayhead tree island have shown this to be true (Troxler and Childers, in review). However, it is important to mention that N fixation and denitrification should be evaluated in different tree island communities to estimate better both processes. Citation follow: Troxler, T.G. and D.L. Childers. Biogeochemical contributions of tree islands to Everglades wetland landscape nitrogen cycling during seasonal inundation. Submitted to Ecosystems.
13	Newman	Is there any way to relate the new trap (bottomless pull trap) to previously used traps, at least for the open water area (lines 1119-1125)? This would allow correlation between old and new methods, and improve data continuity.	It is not possible to do at this point in time, because the old techniques did not work well in highly vegetated areas. However, we have a comparison between this and throw traps planned in order to examine the relationship between the two methods.

14	Cook	Revisited from WY2007: In the 2008 SFER, the authors aptly called for further work to allow better characterization of the role of hydrology x food limitation on nesting success, especially how dry conditions and a rain-induced reversal event affect nesting success. Since "wet year" data will be important for overall interpretations, the authors had hoped for a wet year in WY2008, but an average precipitation year with aberrant timing occurred instead. Since the wet year did not occur, can the experimental study be extended when a wet year occurs?	We have demonstrated convincingly that white ibis can be food limited at the nestling stage, and that this limitation is directly related to hydrological conditions. We hope to continue this during a wet year in the near future.
		General Comments	
15	Sklar	Overall, this chapter contained a wealth of excellent information. It also was interesting because it examined the biological components of some of the bioindicators and processes used to assess the health and well-being of the Everglades, as well as performance measures. The clarification of section authors was nicely done, and will aid in ownership and overall improvements in the quality of the report.	No Response Needed
		Integrative Review	
16	Sklar	The 2009 SFER version of Chapter 6, as in previous years, presents hydrologic patterns (1 project) followed by a focus on four main areas including wildlife ecology (3 projects), plant ecology (5 projects), ecosystem ecology (5 projects), and landscape (4 projects), thus covering 18 projects in total. The stated aim continues to be selection of projects based upon District short-term operational needs and long-term restoration goals.	No Response Needed

17	Sklar	With few exceptions, the projects were presented so that overall goals were clear and well-linked to management and restoration goals. As in the 2008 SFER version, however, there still was little cross-referencing to other chapters, which would not be difficult, and little by way of integrative data summaries and analyses bridging projects, which would be more challenging.	We will discuss this with the SFER editors to see how this might be accomplished.
18	Sklar	Table 6-1 is excellent, very valuable in providing an overview framework of Chapter 6. Its legend makes the important integrative point (reinforced in various sections throughout the chapter) that the research projects described in the chapter are related to one to seven operational mandates, listed specifically for each of the 18 projects described. The hydrological set-up section also was excellent in integrating key processes (e.g. wading bird nesting) and made the descriptions of the water conditions both more understandable and more readable. Any such inclusions make it easier for policy makers and the general public to understand the significance of the findings. The first two of three subsections of the Wildlife section were well integrated, as were three of the four subsections of the Landscape section. Parts of the Plant Ecology and Ecosystem sections were integrated, but both sections would benefit from introductory discussion relating the "pieces", perhaps assisted by a supporting diagram. There was an integrative tie-in between the Tree Island Hydrodynamics (Ecosystem section) and the Plant Ecology section (lines 1432- 1434), but it would be helpful to provide introductory explanation about other points of integration between these two sections, as well.	An effort will be made to describe the integration of the plant and ecosystem sections of this chapter.

19	Sklar	The inclusion of studies of invasive species is an excellent example of the integration of accountability (Chapter 9) and biological significance and functioning (this chapter). It would be useful to know whether the management implications are being taken to the next step (actual management).	See reply to comment #6.
20	Sklar	It is suggested that Chapter 6 should have an overall "Conclusions" section that integrates the major findings and briefly describes at least short-term future directions (e.g. to be pursued in WY2009). The end of the Summary should then pull some highlight statements from the Conclusions section to briefly convey how the various subsections are being integrated to examine all of the levels of biological organization.	Wow, not asking for too much!
		Technical Review	
21	ALL/Warren	As a general comment, hypotheses are stated for some studies but not for others, and should be treated consistently throughout the chapter.	We will be consistent for the final document.
		Summary	
22	Sklar	This well-written section provides a succinct, clear overview of the chapter.	No Response Required.
23	Sklar	Line 25 (vs. p.6-20) should be – …and no or sparse slough vegetation.	Will correct in final document.
24	Sklar	Lines 35-50 – For some bullets, the significance of the findings is mentioned; this should be added for all.	Will add significance, done.
25	Sklar	Table 6-1 – Very helpful as mentioned; however, has some grammatical errors (below).	Will correct in final document.

26	Sklar	Line 52 – The periphyton polysaccharides section does not present information supporting that the production of these polysaccharides may be the most influential biological process associated with water quality, food webs, and floc sedimentary particle distribution. The writing should be changed to …and is hypothesized to be an influential…	Agreed.
27	Sklar	Line 99 – The duration of the wet season and dry season should be defined.	Done.
		Hydrological Patterns for WY2008	
28	Sklar	In WY2008 although the Everglades Protection Area (EPA) received average rainfall, the onset of the wet season was delayed and the seasonal patterning was "backward": water levels were low during the wet season and high during the dry season. As a result, the number wading bird nests initiated was at an all3 time low since the maximum in WY2002, even 50% lower than in extreme drought WY2007. This section was excellent (both writing and the table and figures) in providing clear explanation, area by area, of why these differences in nests initiated occurred – that is, as the author phrased it (lines 106-108), why "what might be expected from an [average or] above-average annual rainfall following a year of drought (i.e., a return to good foraging conditions for wading birds) did not come to fruition in WY2008". It also presents logical, clear expectations, based upon the hydrologic data, for how wading birds will fare in each Water Conservation Area (WCA) and the Northeast Shark River Slough during WY2009.	Thank you.
29	Sklar	Table 6-2 – Please define the historical period.	Each area has a unique historical period that is given in Chapter 2.
30	Sklar	Lines 128-138 – It would be helpful, also, to highlight this information in a separate table.	Not sure how to do this, but will consider it.

31	Cook	Wildlife Ecology The District's goals in studies on wildlife ecology in the EPA are (short-term) to prevent further environmental degradation and (long-term) to restore historical wildlife populations. Two of the three projects this year continued to focus upon interactions between wading birds, aquatic prey species, and hydrology. The wading bird studies provide a long-term dataset of great importance to the Everglades restoration program, and should be continued permanently. Similarly, the studies on fish tolerance to temperature have the potential to provide extremely useful information for management.	No Response Required.
32	Cook	1. Wading Bird Monitoring – This subsection clearly describes a difficult time for wading birds in WY2008 and many nest abandonments throughout the system because of the aberrant hydrologic conditions, with many nest abandonments throughout the system. In addition, all species of focus had significantly reduced numbers of nests (compared to the past decade); most nests were in WCA-1, with few in WCA-3; breeding and nesting did not occur in the important Alley North colony for the second consecutive year; endangered wood storks did not initiate nests at the historically important Corkscrew colony for the second consecutive year, and the few nests initiated elsewhere all failed; and nesting effort in estuarine habitats was minimal, with the lowest nest numbers on record for roseate spoonbills.	No Response Required.

33	Cook	In 2006-2008, two of four species/species groups (great egret and white ibis) considered in recovery parameter 1 (p.6-16) met the Comprehensive Everglades Restoration Plan (CERP) target. The other three recovery parameters (recovery of nesting in traditional rookeries in the southern mainland, return to early dry season nesting by wood storks, and increased frequency of supra-normal nesting events) were not met in WY2008. Specific comments:	No Response Required.
34	Cook	P.6-16 – The performance measures should be clearly defined. The methods (frequency of observations etc.) should be briefly described.	RECOVER CERP Performance Measures Related to Wading Birds are: 1. Increase and maintain the total number of pairs of nesting birds in mainland colonies to a minimum of 4,000 pairs of Great Egrets, 10,000 to 20,000 combined pairs of Snowy Egrets and Tricolored herons, 10,000 to 25,000 pairs of White Ibises, and 1,500 to 3,000 pairs of Wood Storks. 2. Shift in timing of nesting in mainland colonies to more closely match pre-drainage conditions. Specific recovery objectives would be for storks to initiate nesting no later than January in most years and for ibis, egrets and herons to initiate nesting in February – March in most years. 3. Return of major Wood Stork, Great Egret and ibis/small egrets and heron nesting colonies from the Everglades to the coastal areas and the freshwater ecotone of the mangrove estuary of Florida Bay and the Gulf of Mexico. 4. Reestablishment of historical distribution of Wood Stork nesting colonies in the Big Cypress Basin and in the region of mainland mangrove forests downstream from the Shark Slough and Taylor Slough basins. Increase the proportion of birds that nest in the southern ridge and slough marsh-mangrove ecotone to greater than 50% of the total for the entire Everglades basin. 5. For Wood Storks, restore productivity for all colonies combined to greater than 1.5 chicks per nest. 6. The last performance measure was not formally codified as a CERP parameter of interest, but we suggest it in a manuscript currently found in Fred's bathroom and about to be submitted to Ecological Indicators: An interval between exceptional White Ibis nesting events, defined as > 70th percentile of annual nest numbers for the period of record.
35	Cook	Line 300 – It seems that “relatively” is not an apt descriptor for this difficult WY for wading birds.	I will remove this in the final document.
36	Cook	Line 311 – Should identify the two groups that met the numeric nesting targets.	I will clarify for final document.

37	Cook	Lines 311-316 versus Table 6-3 – Seems confusingly written. Line 311 should identify the two groups that met the nesting targets. The "two other targets" described here (lines 313-324) are not included in Table 6-3 (readers go there to look for them because of the previous sentence).	This will be clarified by stating which species did and did not meet the numeric targets.
38	Cook	Table 6-3 – Although great egret and whit ibis met the target, it is disturbing that both showed declines from 2004. If this trend continues, they will no longer meet the target.	Great egrets nests have increased by > 200% since the 1930's. Of more concern is the decrease in ibis, which is why this species is the focus of much research.
39	Cook	2. Factors Affecting Foraging Habitat Selection and Foraging Success of Wading Birds – The Loxahatchee Impoundment Landscape Assessment (LILA) experimental study in January and March of WY2008 was described, emphasizing the effects of water depth and emergent vegetation (spike rush) on wading bird foraging habitats selection and foraging success. A clear description is included of the methods and experimental design. Wading birds were found to prefer sites with shallow water and sparse vegetation (habitats where higher prey densities were anticipated), but vegetation density did not affect foraging success.	No Response Required.
40	Cook	Table 6-4 - The selection index should be defined.	Will add to final document.
41	Cook	Line 329 – Are the relevant scientists making predictions or modeling how these changes will affect prey availability?	This question was addressed in the answer to Panel Comment #3.

42	Cook	3. Non-Native Fish Minimum Temperature Tolerances – Two exotic species, jewelfish and Mayan cichlid, found in freshwaters and estuaries, were examined for their tolerance to low temperatures as affected by salinity, considering two endpoints (loss of equilibrium [LOE] and death). The data indicate that these tropical exotic species use deep-water canal habitats, where temperatures are warmer than in surrounding marsh habitats, as a refuge to survive the winter season. Thus, the authors suggest that actions such as infilling canals and pools to water depths less than 1.5 meters in winter, if this can be done without adversely affecting water management, may reduce exotic fish populations.	No Response Required.
43	Cook	Line 421 – The reason for the range in acclimation (13-32 days) should be explained.	Because fish were obtained from the Everglades over a period of a week or two they were not introduced to the acclimation tanks at the same time. 13 d is more than sufficient for acclimation and the different durations are unlikely to affect the experimental response.
44	Cook	Lines 433-436 – Description is needed as to how quickly the temperature was adjusted to 25oC.	We will clarify.
45	Cook	Line 441 – Explanation is needed for the very low "n" value in the ENP deep water canal.	We did not plan on such a low sample size!
46	Cook	Line 466 – In contrast to this statement, the endpoints observed in the field did not match closely the endpoints determined in the laboratory – the field temperature decreased to 3.7oC (line 457) which was not tested in the laboratory Salinity is mentioned as a major part of this experiment (lines 237, 422-423), including a description of the levels used (methods), yet the salinity data are not discussed (lines 411-414). Either the data should be included here, or the information about salinity should be removed.	Temperatures in the lab were dropped until a death end point was reached and since the lowest endpoint reached was 8C it was pointless to drop to 3.7C. Nonetheless, we did not test the exact temperatures at which fish died in the marsh site, and it is conceivable that fish died at lower temperatures than the 10 C determined in the lab. However, what we did not include in this abridged version is that we also examined fish survival in alligator holes which are thermally more stable than the marsh site, and in this habitat many fish lost equilibrium or died when temperatures dropped to a minimum of about 10C. This suggests that endpoints temperatures in the field were similar to those determined in the lab. It was an oversight to omit this data and we will add it to the report. To accurately represent the details of the study in the methods we need to include the salinity and holding temperature components. We decided not to discuss these results because they had little effect on the laboratory endpoints yet would considerably lengthen the report.

		Plant Ecology	
47	Sklar	The focus of plant ecology studies in WY2008 was more synoptic or descriptive research than in WY2007, especially patterns across hydrologic gradients. As a general comment, the introduction of this section would benefit from description of the integration of the various subsections, and clearer rationale for these studies as related to management and evaluation of restoration efforts. In contrast, the rationale and importance to management considerations is well explained within most study descriptions.	An effort will be made to describe the integration of the various subsections in the introduction.
48	Coronado	1. *Lygodium* Survey on Tree Islands in WCA-3A and WCA-3B – Spatially stratified sampling was used to survey randomly selected tree islands in WCA-3A (136 islands) and WCA-3B (16 islands) with previously determined elevations. Thus far, fortunately, *Lygodium* was detected on relatively few tree islands (14%), and about half of these infestations consisted only of seedlings and juveniles within small affected areas.	No Response Required
49	Coronado	Lines 534-548 vs. Results – WCA-3B seems to have been omitted inadvertently from this paragraph.	No, the spatially stratified design to survey tree islands was applied only to the WCA-3A because we surveyed ALL the Tree Islands located in WCA-3B.
50	Coronado	The authors suggest that small patches on tree islands may be effectively controlled by herbicides.	We suggested that small patches may be effectively controlled. However, we also indicated that we should continue surveying and treating the same sites. So far Tree Islands that were previously surveyed and infested by *Lygodium* have been treated. Currently, we are surveying the same tree islands to know whether *Lygodium* has come back or not.
51	Coronado	Should this point be added as a management implication (lines 569-578)?	We will add the previous statement as a management implications.

52	Coronado	2. Woody Plant Recruitment and Survivorship Along a Hydrologic-Soil Nutrient Gradient on Two Tree Islands in WCA-3 – The objectives of this study were to examine regenerative processes of woody species on tree islands, and to assess influences of local hydrologic conditions and soil characteristics on species recruitment, growth and survival. In an interesting approach, woody species were assessed on two tree islands with contrasting flood regimes (short or long hydroperiod) and soil properties (nutrient-rich, nutrient-poor). Seedling and sapling density and survival were the variables of focus. Preliminary results were described.	No Response Required
53	Coronado	Line 607 – Seems to be in error; coastal plain willow is described as dominant, but it is not described as dominant elsewhere (lines 622-624, 628-631).	No, there is no error in the statement. Effectively, Willow dominates the canopy, as an adult tree; however, willow does not dominate the seedling or sapling population. Willow is a species that sprouts, a trait that confers this species a great advantage in environments that are harsh for successful seedling colonization and recruitment.
54	Coronado	Table 6-5 - Standard errors should be added.	We will add standard errors to Table 6-5.
55	Coronado	3. Tree Island Ecophysiology as a Measure of Stress – The objective of this study is to compare landscape-level changes in plant responses with ecophysiological responses (leaf instantaneous gas exchange and integrated CO2 uptake patterns, stem predawn water potential, plant sap-flow patterns) in the head versus near-tail areas of four tree islands with contrasting hydrologic regimes. The overall goal is to strengthen understanding about the responses of the vegetation to hydrologic management.	No Response Required.

56	Coronado	Although the wet-dry seasons of WY2008 were muted, some interesting preliminary data were obtained, and the authors did a very nice job of clearly summarizing a lot of complex information for nine species (e.g. Figures 6-15, 6-16, Table 6-6). Although the data are preliminary, some important 5 insights for management were gained. In addition, these physiologic measures appear to be sensitive, robust tools for assessing short-term plant response to hydrologic conditions.	No Response Required.
57	Coronado	Line 677 – Please check for accuracy;	3BS2 is indeed of higher elevation than 3BS10. Data obtained using EDEN Network; **3BS2 (nearest site, SITE_71):** Average ground elevation: 5.07 ft (NAVD 88)http://sofia.usgs.gov/eden/station.php?stn_name=SITE_71; **3BS10 (nearest site, TI_9):** Average ground elevation: 4.78 ft (NAVD 88); http://sofia.usgs.gov/eden/station.php?stn_name=TI-9;
58	Coronado	Line 687 - brief explanation should be added.	Added. Statement should now read: Stable isotopes of water (dD and $d^{18}O$) as ecological tracers of plant water uptake
59	Coronado	Lines 696-702 – Please include comment on the effects that the long-term trends in water cycle might have on the experiments, data, and management implications.	The text will be updated in the final document to address the panel comment.
60	Bellinger	4. Periphyton Polysaccharides – The objective of this study was to quantify and characterize the periphyton assemblages and associated extracellular polymers (EPSs) in softwater and hardwater Everglades habitats.	No Response Required.
61	Bellinger	Although periphyton assemblage structure can provide valuable information in interpreting water quality conditions, and although data on EPSs may be important, the general lack of data and/or data analysis (the data and variance on periphyton microalgal assemblages were not shown; statistical analyses were not given or indicated) made this a less solid addition to an otherwise strong section.	Variance and statistical data were added to the document and further interpretation (without overstating the data collected) of the potential significance of the data was included. This work was a first look at the abundance and composition of EPS to determine if structural characteristics were such that further studies into the varied roles of EPS within the mats should be pursued. Currently, based on the observed results, the role of EPS in calcite precipitation and further information into ion binding capacity are being investigated. Future studies will also hopefully shed light on the significance of EPS in carbon cycling in the mats."

62	Bellinger	Line 764 – What is the evidence for binding of heavy metals? Might this be an opportunity for integration between the mercury chapter (3B) and this chapter?	Metals commonly observed to get bound by EPS identified with corresponding references. While mercury has been found to be taken up by cyanobacteria EPS and the polymers identified should theoretically have the capability to bind Hg, linking this work with the mercury chapter may be a bit premature.
63	Bellinger	Lines 767-768 – Sentence needs a supporting reference.	Added.
64	Bellinger	Line 769 – Change autotrophic to phototrophic (most periphyton are auxotrophs).	Changed.
65	Bellinger	Lines 773-774 - …data) can exceed that… [the range given for the Everglades periphyton (10-20 mg/g) overlaps with the range given for periphyton found elsewhere (1-10 mg/g – only for estuarine mudflats – are data available for other benthic microalgal communities?)]	Verbiage changed and added observations from a freshwater lake as another point of comparison.
66	Bellinger	Line 780 – "grab samples" should be explained in more detail.	Noted the method was non-quantitative.
67	Bellinger	Line 781 – Simple, supporting environmental conditions should be included, such as the pH typical of the softwater and hardwater habitats.	pH and conductivity data added for clarification
68	Bellinger	Line 791 – Brief explanation should be included as to why these variables were selected, especially uronic acid and sulfate.	Section expanded briefly, with references.
69	Bellinger	Line 796 – "dominated" should be defined (also pertinent to line 810).	Amended to give proportions of "dominant" groups.

70	Bellinger	Lines 824-837 – The authors had asserted (lines 777-778) that the data would provide insights about the role of periphyton EPSs in nutrient cycling, food web structure, and sediment stability. The data from this study did not provide such insights. The "significance of the findings…" subsection should be rewritten because it does not capture why the information from this study may be relevant to management or to restoration evaluation. It would also help to include some indication or summary of how water levels directly affect these differences in periphyton composition and structure.	The pertinence to water management/Everglades ecosystem has been expanded. From the results we would anticipate that the EPS in WCA-1 would be similar to that of WCA-2A if the system became minerotrophic (via alterations to the algal assemblage). This could lead to calcite precipitation, binding of sediments, and increased sediment stability with the presence of a benthic algal mat. We also hypothesize that the EPS in the mats, given their high anionic nature (i.e., uronic acid content) have the capability to bind nutrients and metals.
71	Bellinger	Table 6-9 – Needs statistics; were any of these differences statistically significant?	Table amended to include standard deviations around mean values of saccharides and also if any significant differences between the abundance of a sugar for a particular fraction between the two sites are observed (t-test).
72	Sklar/Ross	5. Experiment at LILA on Tree Survival and Growth: – This large-scale experiment at the Loxahatchee Impoundment Landscape Assessment (LILA) facility is being conducted to improve understanding about the flood tolerances of tree island species. It is testing hydrologic effects on seedling growth/survivorship of eight species, and effects of tree spacing on individual tree and stand growth.	No Response Required.
73	Sklar/Ross	The complex experimental design is sound, nicely depicted in part in Figure 6-18. Based upon partial data (after two years), the cumulative (all species) average two-year survival was 63% and survival and growth were higher on drier sites. The study should yield valuable information to assist resource managers in maintenance and restoration of tree islands.	No Response Required.
74	Sklar/Ross	Lines 840-844 – Supporting references should be added.	On an area basis, they cover a small proportion of the Everglades, but perform disproportionately important ecosystem and cultural functions, especially nutrient cycling and provision of habitat for wildlife and humans alike (van der Valk & Sklar 2002). Recent declines in tree island density and area have been reported, mostly in the Water Conservation Areas (Sklar and van der Valk 2002).

75	Sklar/Ross	Line 842 – what are the cultural functions?	Cultural functions refer to tree islands as sites of human habitation as it is expressed in the corresponding sentence.
76	Sklar/Ross	Lines 856-859 – The planned duration of the study should be included. How were the spacings selected?	The four densities were chosen to provide the range characteristic of newly developing forest communities in nature. At 10,000 stems per hectare, the densest planting treatment represents numbers likely in young, post-disturbance forests where recruitment has been prolific and rapid. Conversely, the most open treatment represents early successional stages where recruitment is slow and dependent on distant seed sources. Sklar, F.H. and A. van der Valk 2002. Tree islands of the Everglades: an overview. P. 1-18. In F.H. Sklar and van der Valk (eds.) Tree islands of the Everglades. Kluwer Academic Publishers, Dordrecht, The Netherlands. The planned duration of the study is predicated on two issues: 1) survival assessment should be continued as long as density-dependent mortality exceeds background levels, as it does now; and 2) monitoring of individual and stand growth should continue long enough to assess differences among density treatments once crown closure has been achieved. In the high density treatment, crown closure began to take place within two years of planting, but the process has been much slower in the wider spacings. Swamp bay common name is missing : (Persea palustris)
		Ecosystem Ecology	
77	Newman	The focus of the Ecosystem section on more specific functioning aspects is laudable. Understanding periphyton, fish communities, and wading bird foraging are all key aspects of Everglades structure and function, and serve as bioindicators for accountability. The section introduction includes an excellent explanation of the overall relevance of the studies to management and restoration efforts. The Conclusions section also generally was well written and summed up the main findings.	No Response Required.

78	Newman	1. Cattail Habitat Improvement Project (CHIP) – The stated overall goal of this major in situ, large-scale experimental study is to examine whether/how habitat improvement of a (P-enriched) cattail zone is possible. The two major objectives are (i) to assess whether creating openings in P-enriched, dense cattail areas will cause a shift from emergent macrophytes to dominance by benthic microalgae or submersed aquatic vegetation and promote an increase in wildlife diversity and abundance; and (ii) to determine how well the created open areas function in comparison to natural Everglades habitats. As in the 2008 SFER, overall the results thus far support the hypothesis that openings are ecologically better for the Everglades ecosystem than thick, continuous emergent macrophyte growth.	No Response Required.

79	Newman	Table 6-8, of hypotheses relevant to the various trophic components and processes, is a nice addition since the 2008 SFER. In characterizing the microbial consortia, phospholipid fatty acid (PLFA) biomarkers and metabolic status ratios hold promise as valuable indicators of restoration status. In the Fish Community Composition section, the findings should be presented in "historical" context by describing the community in the reference area (e.g. are mosquitofish and slough crayfish 2/3 of the fauna in the reference area also?). The finding that removal of large stands of emergent macrophytes increases periphyton net primary productivity is encouraging for Everglades restoration, and suggests that such management action can potentially shift the opened areas to dominance by more labile benthic microalgae and submersed aquatic vegetation. The dissolved oxygen data were also valuable and encouraging, although they suggest that it will take time to reduce the DO sags in the diel patterns. Inclusion in the Decomposition section of indicator parameters β-glucosidase, leucine aminopeptidase, and phosphatases is an interesting and sound approach to compare differences in carbon, nitrogen and phosphorus regimes among the sites. The authors nicely presented the findings in Figure 6-21. Finally, a strong dataset on wading bird foraging continues to support the premise that openings help to provide better foraging habitat, although the influence of nutrient enrichment is not yet clear. The Conclusions section nicely pulls together the WY2008 major findings and clearly interprets their significance.	We are collecting data in the reference areas, however the current primary emphasis is the comparison of treatment effects. We will make the community composition comparison in a future report.

80	Newman	Lines 925-934 – Although the CHIP subsection contributes valuable information to Chapter 6, there was no clear up-front explanation of the control E, T, and U sites. Readers instead are referred to a website or to a previous SFER to go on a hunt for this simple, brief information, which is basic to understanding the subsection. (Note that partial descriptions are provided in lines 991-993, incomplete and back in the Algal Composition section.) The following information should be added, either in written form or as a small table:	Not a problem - we will add something similar to that suggested below.
81	Neman	WCA-2A is a large shallow impoundment, part of which has been impacted by agricultural runoff for decades. The net result has been development of a well-established nutrient gradient and a monotypic stand of cattail (>11,000 hectares). In this experiment (n=3 each), control plots (E) are monotypic cattail in a highly P-enriched area (water TP > 50 µg/L, sediment floc TP > 1,500 mg/kg); transitional plots (T) are a 50:50 mix of cattail and sawgrass in a moderately P-enriched area (TP > 15 µg/L, sediment floc TP > 900 mg/kg); and reference plots (U) are in a more natural, nutrient-poor site (add the water TP and floc TP information). The designation O stands for open; C stands for "closed" or macrophyte-filled.	No Response Required.
82	Newman	Line 946 – Brief description should be added about the approach and design for sample collection.	A sentence or two denoting the collection method will be added.
83	Newman	Line 962 – Needs a supporting reference. ;	A reference will be added.
84	Newman	Line 970 - …Actinomycetes (soil fungi) were…	While Actinomycetes were called fungi for many years, they are actually gram positive bacteria and are currently called Actinobacteria. We will changed the sentence to reflect this classification.

85	Newman	Lines 995-1003, 1186-1192 – These differences in percentages for various algal groups in the enriched, transitional and reference sites may be statistically significant, but they are very small. The greens (average relative abundance 0.5-2%) seem hardly worth comparing, significant differences notwithstanding. It would be helpful (less confusing to readers) to add a sentence acknowledging that the relative abundances of algal groups basically were similar among sites, although the slight differences were statistically significant.	Sentence will be added.
86	Newman	Line 1004 – Crayfish are not vertebrates or fish but, rather, decopod macroinvertebrates. This title should be changed to Finfish and Crayfish.	Title will be changed to Fish and Crayfish.
87	Newman	Lines 1030-1031 – Ash-free dry mass is not biomass-specific; it includes organic detritus as well as living organisms. The text should be altered accordingly.	Text will be modified.
88	Newman	Table 6-9 – statistical significance should be indicated and P values added.	This will be done.
89	Newman	Lines 1067-1077 – "N" values should be included. A supporting reference should be added for use of the 1.6-mm mesh size, and checks at six-month intervals.	N values will be addeded. Mesh selection and sampling interval based on past work we have conducted in the Everglades. Reference will be added.
90	Newman	Lines 1112-1113 – Indicate whether the difference (ergosterol, EC vs. EO) was statistically significant.	Statistical significance will be added.
91	Newman	Lines 1128-1131 – A sentence interpreting this information for readers should be added.	A sentence will be added.
92	Newman	Lines 1132- - The writing indicates that all wading birds were surveyed regardless of their activity. Is there any indication of the percent foraging in different habitats?	Not at this time, we record birds present. Foraging will be examined in the future using cameras.
93	Newman	Line 1165 – Are these the only secretive bird species of interest? Please clarify.	The birds noted are the only ones we can survey effectively, but we consider they are probably the most important.
94	Newman	Line 1192 – Needs supporting references.	As this is the conclusion section, we do not typically use citations. Will add elsewhere in the document.

95	Miao	2. Accelerating Recovery of Impacted Areas (Fire Project) – The fire project is extremely important in identifying and examining impacts. The rationale for this major project is to assess whether repeated prescribed fire is effective in accelerating ecosystem recovery of cattail-dominated, P-enriched areas by favoring re-establishment of sawgrass and other native species. The two main objectives, presented together with clear hypotheses, are (i) to improve understanding about the fundamental impacts of fire on soil, water, and vegetation processes in Everglades wetlands; and (ii) to assess whether repeated prescribed fires in accelerating ecosystem recovery from P enrichment. The project is supported by productivity in peer-reviewed publications. The Project Milestones subsection is helpful in orienting readers with good background information. Four studies within this project were conducted in WY2008:	We acknowledge the compliment.
96	Miao	A. Ash Nutrient Forms and Fire Intensity – Cattail and sawgrass ash nutrient forms and concentrations were compared to assess possible effects of fire on nutrient balance and cycling. The authors nicely explain the information and its implications for management.	We acknowledge the compliment.
97	Miao	B. Seasonal Variations of Seed Bank Germination and Response to Fire – This interesting study has broad implications for Everglades restoration, and for potential controlled burns. Higher macrophyte seed bank density and species richness were found in P-enriched sites. Cattail germinated quickly (2-3 days) relative to sawgrass (4 weeks), and cattail seed bank survival was much higher after fire in summer than in winter.	We agree.
98	Miao	Lines 1288 on: It would be useful to include further discussion about the potential management implications of controlled burns relative to ash and seed bank germination.	Yes, a good suggestion. We will address this later (FY09 report) as we are still waiting for the ash data after the 2nd burn.

99	Miao	C. Cattail Recovery Dynamics Following Fire – Cattail populations were monitored before vs. throughout a year after fire treatment to gain insights about the underlying mechanisms that control recovery. The complex data suggested a tradeoff between ramet density and biomass during the recovery period, influenced by water depth/soil redox potential. After a year, leaf litter biomass remained depressed relative to pre-fire biomass	We agree.
100	Miao	D. Soil Redox Temporal and Spatial Patterns in WCA-2A – The objective of this study was to assess the patterns and variability of soil redox in relation to water depth, dominant vegetation, and soil P concentrations. Redox data can provide valuable insights about geochemical processes and the general "health" of wetland systems. Because of its design, this study "missed the action" at the sediment-water interface (depth 0-2 cm) where, as many studies have shown, the steep gradients typically occur. It would have been instructive to dissect the 0-2 cm-depth because such data could reveal more distinct patterns in soils with different vegetation and P content. The authors did nicely relate the importance of their findings about water level and redox to management considerations (lines 1397-1398).	We acknowledge that a more discrete depth study may have captured greater landscape variability but it was not part of the experimental design.
101	Miao	Lines 1266-1274 – The study compared cattail and sawgrass, but focuses here only on cattail. Information should be added about sawgrass HCl-extractable P.	We agree and a brief information was added.
102	Miao	Line 1319 [fires, as in the Seed Germination study] vs. line 1402 [first burn], Table 6-12 (1 summer fire), vs. multiple summer and winter fires (lines 1405-1406) – The writing is very confusing because it variously refers to one fire and more than one fire. The writing and data presentation seem to focus mostly upon one summer fire. Are data available for a winter fire?	The writing has been corrected to make it more clearly that there was one winter fire at the moderately enriched site and one summer fire at the highly enriched site.

103	Miao	Lines 1321-1323 – Table 6-12 supports this statement for cohort 3, but not for cohort 4.	This sentence has been modify to make it clear that the sentence refers to cohort 3.
104	Miao	Lines 1323-1325 – It should be clarified whether this observation continued to hold after 12 weeks.	Not ready to clarify at this time, because the data are not ready for the analysis at the moment.
105	Miao	Line 1329 – Was density significantly greater?	The significant test will be conducted.
106	Miao	Lines 1331-1332 – The interesting data on leaf litter mass should be shown.	The data are not ready for analysis at the moment.
107	Miao	Figure 6-26 – Should indicate significant differences.	The significant test will be conducted.
108	Miao	Figure 6-27 – Curve fitting and statistics should be included.	This graph has been modified to include a fitted curve and statistics
109	Miao	Lines 1409-1410 – The only data presented in this subsection were about 1 fire or (seed germination) 2 fires.	The writing has been clarified to specify that there was one winter and one summer fire.
110	Miao	Thus, Summary (lines 1402-1418) – Mostly does not match the data presented from WY2008 studies except for the previous brief mention of leaf litter mass data, which were not shown. Should be restructured.	We have clarified the description of the timing and number of fires. The results were based on the first set of fires in a multiple fire experimental design. We had one winter fire in the moderately enriched plot and one summer fire in the highly enriched plot.

111	Dreschel/	3. Tree Island Hydrodynamics – Groundwater and surface water interactions on tree islands were examined in this innovative study, which was conducted to improve understanding about the effects of managed surface water levels on tree island formation and restoration. An impressive dataset on surface water levels, groundwater levels, and temperature was collected at 15-minute intervals by 26 in situ 500-TrollerTM pressure transducers, along with stage level recorders to supplement data collection on surface water levels. Helpful background information was included (e.g. geological differences between tree islands along a north-to-south trajectory, Lisse Effect, etc.). The data revealed that in the dry season, groundwater levels in limestone-core tree islands typically were lower than surface water levels, suggesting that surface water was recharging the groundwater (also supported by temperature data). In contrast, groundwater levels in peat-core tree islands were higher than surface water levels and the two were highly correlated, suggesting that groundwater was discharging to the surface water. The data indicate that managed surface water levels will affect groundwater-surface water interactions differently on peat-core vs. limestone-core tree islands and the important ecosystems that they support.	No Response Required.
	Price/Sullivan		

112	Troxler/Coronado	4. Tree Island Nutrient Fluxes – The stated (ambitious) objective of this field study and modeling exercise was to quantify the contribution of tree islands to the nutrient balance of the Everglades landscape. N and P budgets were estimated for the head and near-tail areas of one tree island, and preliminary data analyses were presented. A table of the values for all of the parameters should be included (with sources). The rationale should be explained for the assumption (lines 1520-1521) that denitrification and nitrogen fixation are negligible. The relevance of the findings to management and restoration efforts should be more clearly explained. Planned next steps in this study should be mentioned.	"determining the role of tree islands in the nutrient balance of the Everglades". We agree that this is an ambitious goal given the data we have to date. We will remove it, and replace it with "determining nutrient budgets for tree islands". The rationale for assuming that denitrification and N fixation rates is that our previous studies on a bayhead tree island have shown this to be true (Troxler and Childers, in review). Our future plans are to assess nutrient budgets for three tree island communities on 3AS3 that represent a gradient in P status. We need better data on N&P concentrations in the wells. Thus we will have a more intensive nutrient sampling as TP & TN hydrologic fluxes play a large role in TP budgets. The relevance to restoration goals is that we are developing baseline information anticipating major hydrologic modifications in the WCAs and these data will allow us to determine how these important ecosystems will be impacted. Tree islands also serve as critical experimental units in assessment of landscape-scale hydrologic change as they are intricately tied and sensitive to hydrology.
113	Gu	5. Evaluating P Flux – The Supplemental Sediment Core Study (SSCS) – The overall objectives of the Reflux Study are to (i) quantify in situ sediment P fluxes to the water column; (ii) use enclosures to evaluate management practices (herbicides, burns) to immobilize P in the sediments (addressed in WY2008); and (iii) apply a dynamic model to simulate sediment P flux under different conditions.	No Response Required.
114	Gu	Unfortunately, the instructive information gained was not encouraging: There was a slow, continuous flux of sediment P to the water column from intact cattail cores. Herbicide application alone caused a high, prolonged P release from decomposing cattail tissues. Herbicide application followed by calcium carbonate treatment resulted in an initial flush of high-P water, followed by lower P concentrations in outflow waters than achieved in the herbicide-	No Response Required.

		only control, but slightly higher concentrations than the outflow from the intact cattail cores. Countering expectations that iron chloride would sequester and immobilize sediment P, its addition after herbicide treatment actually caused the highest P release; the authors provide a clear explanation of the likely geochemical mechanisms involved. The only effective treatment, removal of the top 40 cm of sediment, greatly reduced P release but is cost-prohibitive.	
115	Gu	Lines 1571-1575 – This nice description of WCA-2A should also be included in the chapter Introduction, together with a description of WCA-3A and -3B.	No Response required.
116	Gu	Pp. 6-71, 6-72 – A total of 34 cores were collected, but 30 were used? Please clarify.	More explanations are provided. At the end of sentence "All 34 cores initially contained intact cattail plants.", please insert: Thirty cores were subjected to various experimental options. Two cores were used for initial characterization of the soil and porewater and the remaining two cores served as replacements in case some of the 30 initially deployed cores in the experiment failed early-on.
117	Gu	Figure 6-31 – should mention where the outflow went/disposal. The legend should also define the labels.	Figure 6-31 has been revised and more explanations have been provided. The new figure indicates where the outflow went. There is a revised figure and a new caption as follows: Figure 6-31. Schematic of the experimental design of the Supplemental Sediment Core Study. "Reflux" and "F3" denote original source of sediments. "Calcium" and "Iron" were the two separate chemical amendments that followed herbicide applications. The "Control" represents in-situ cattails without herbicide application. The "Herbicide" represents herbicide application only. The "Deep" treatment consisted of removal of the top 40-cm of sediment.
		Landscape	

118	Sklar	This exciting section describes three major milestones of progress in WY2008, and also a fourth study that evaluated decadal accretion rates in the mangrove salinity transition zone along Florida Bay to provide 9 insights about how climate change and/or reduced freshwater flows are affecting the area. Overall organizational suggestion: The introductory paragraph (lines 161-1658) should be restructured; the three milestone studies should be mentioned in the order in which they are discussed in the text, and the fourth study should also be mentioned.	Introduction will be re-structured.
119	Nungesser	1. Landscape Pattern Change – A time series of digitized maps was analyzed to evaluate more than six decades of changes in ridge-and-slough patterning (1940-2004). Historically (pre-drainage), the Everglades largely consisted of ridge-and-slough topography. Maps were created from digitized aerial photos (five years: 1940, 1953, 1972, 1984, 2004), and ridge and tree island measurements from 15 large study plots (4 x 6 km) for those years were used to provide spatial/temporal data on patterns at fixed sites over time. The quality of patterning was evaluated considering three variables as mean length/width ratios, total number of longer ridges and tree islands, and variability of ridge orientation within a plot. Six distinct pattern classes, detected for the 15 study plots for all five years, provide a quantitative measure of pattern changes in each plot over time. Local factors (water depths, flows) rather than regional factors controlled pattern changes, and the analysis showed that ridge-and-slough patterns can respond quickly to local hydrologic changes. Additional explanation (lines 1710-1711) would be helpful on what is planned next in this important effort.	Further research into the processes that create and degrade the microtopography is needed to expand upon these findings. Future research efforts will focus on identifying ridge-slough boundary changes through juxtaposing surface changes reflected in historic photography with subsurface records contained in peat cores.

120	Coronado	2. Relative Marsh and Tree Island Elevation: Spatial Patterns in WCA-3A and WCA-3B – A comprehensive field survey of slough water depth measurement was completed for 258 tree islands in WCA-3. This study was conducted to address the management need for information about topographic differences across a broad spectrum of ridge-and-slough systems in order to estimate effects of proposed hydrologic changes on tree islands. Water depth was measured to calculate the ground-surface height in sloughs and marshes adjacent to 258 tree islands that have available hydrograph information. A consistent relationship was detected between elevation difference (between maximum tree island elevation and surrounding marsh/slough) and maximum tree island elevation.	No Response Required
121	Rutchey	3. Vegetation Mapping – WY2008 marked the completion of the first comprehensive vegetation map of the entire ecologically complex landscape of WCA-1, so that there is now a complete set of vegetation maps for the WCAs. For WCA-1, ~1,400 color-infrared aerial photos (scale 1:24,000) were collected beginning in 2004. All of these photos were then geo-referenced, with the last of this effort completed in WY2008. Photo-interpretation and ground-truthing procedures were described for final map accuracy assessments. Difficulties created by the complex ecological landscape were nicely described, interestingly, including extensive coverage of the exotic plants *Lygodium* and melaleuca whose distribution was also mapped. The WCAs are to be remapped every six years for comparison with this powerful set of baseline maps.	No Response Required

122	Coronado	4. Elevation Change and Soil Accretion in the Mangrove Salinity Transition Zone (MSTZ) – The objective of this decadal study (1998-) has been to evaluate how water management practices, sea level rise, and regional ecology are influencing long-term soil elevation changes in the mangrove transition zone of Florida Bay. The inclusion of helpful background information makes this study much easier for readers to understand (terrigenous should be defined). Elevation change and vertical accretion have been measured at transects in the upper (freshwater), middle (transition), and lower (mangrove) zones of three study sites. Sites were designated as non-flooded, seasonally flooded, or permanently flooded based on water depth and inundation data. Significant differences were not detected in (small) elevation changes among the sites, but the upper (non-flooded) zone, but vertical accretion was much less in non-flooded sites than in seasonally or permanently flooded sites. These data, considered together with previous studies which have shown that mangrove forests are migrating into previously freshwater environments, suggest that the area is not keeping pace with declines in freshwater flows and present sea level rise.	Terrigenous coastal environments are settings where rivers play important role as sediment source for mangrove ecosystems. In contrast, carbonate systems are settings where rivers play a very small role as a source of inorganic sediment.
		Editorial changes	
123	Sklar	Table 6-1 Wildlife Ecology, Factors Affecting Foraging Habitat…, Findings, line 1 – change moderate to no or sparse levels of vegetation (see p.6-20).	This edit will be addressed in the final version.
		Specific Edits	
124	Bellinger	*Lygodium* Survey, Findings, line 1 – …has expanded into…; line 3 - …can be treated effectively with… Algal Polysaccharides – title should be changed to Periphyton Polysaccharides.	Will be updated in document.

125	Bellinger	Findings, line 2 – …algae and other microorganisms – were found…	This edit will be addressed in the final version.
126	Warren	LILA Tree Survival and Growth – change title to: Experiment at LILA on Tree Survival and Growth	This edit will be addressed in the final version.
127	Warren	Line 215, confusing as written – should be: …standard. These departures mostly…	This edit will be addressed in the final version.
128	Warren	Line 366 – …had no apparent effect… ; Line 422 - salinity should not have units.	This edit will be addressed in the final version.
129	Warren	Line 431 – Celsius ;	This edit will be addressed in the final version.
130	Warren	Line 433 - "Control fishes underwent the same treatment" should be reworded.	This edit will be addressed in the final version.
131	Warren	Line 467 – …suggest that habitat has a critical role in the… ; Line 472 - …Canals can act as a	This edit will be addressed in the final version.
132	Warren	Line 478 – …(m) in winter, if ; Line 504 - …exploration of periphyton ; Line 558 - …was observed…	This edit will be addressed in the final version.
133	Warren	Figure 6-11 – WCA-3A and WCA-3B boundaries should be shown.	This edit will be addressed in the final version.
134	Warren	Figures 6-12, 6-13 – Head → Tail should be added over the top of each graph to help readers.	This edit will be addressed in the final version.
145	Warren	Lines 649-650 – …water-tolerant…3AS5. More data are required to… ; Line 653 - …and establish on…	This edit will be addressed in the final version.
136	Warren	Line 689 – …on nine native species (n = 5 individuals each) ; Line 713 – …in the shorter hydroperiod sites.	This edit will be addressed in the final version.
137	Warren	Figure 6-16, Table 6-6 - to help readers, the common names should also be given, since that is how the results were discussed in the text (p.6-35).	This edit will be addressed in the final version.
138	Warren	Tables 6-7 through 6-9 – there are two Table 6-9s; Table 6-6 is followed by one of them.	This edit will be addressed in the final version.
139	Warren	Line 772 - …have suggested that… ; Line 776 - …the softwater and hardwater…	This edit will be addressed in the final version.

140	Warren	Lines 780-794 - …low-nutrient interior…(softwaters) and WCA-2A (hardwaters)…or glycocalyx matrix was determined from the water-soluble fraction (WS). The periphyton were treated…	This edit will be addressed in the final version.
141	Warren	Line 841 – an areal basis… ;	This edit will be addressed in the final version.
142	Warren	Line 844 - …tree islands is mainly	This edit will be addressed in the final version.
143	Newman	Line 928 – states that this subsection focuses upon an intensive sampling event in September – October 2007, but the wading birds information extends from October 2007 – May 2008 (lines 1132-1133).	Generally this is true- however, not all data were available…so we used the maximum datasets to show the reader results. This will be clarified.
144	Newman	Lines 927-928 - …focuses on an intensive sampling event that occurred from…	As noted above, more data collection description will be added.
145	Newman	Lines 971-973 – Sentence should be restructured.	Will be done
146	Warren	Lines 987-988 (for parallelism with line 995 - …Algal phyla (here, including blue-green algae or Cyanobacteria, also called Cyanophyta; green algae, Chlorophyta, and diatoms, Bacillariophyta) were compared…	This edit will be addressed in the final version.
147	Newman	Line 991 – UC is an oligotrophic site; sentence is confusing and should be restructured.	Sentence will be rewritten.
148	Warren	Lines 993-994 – (UC). Algal composition did… ; Line 1015 – differences, prey data were…	This edit will be addressed in the final version.
149	Warren	Line 1030 – biomass-specific ; Line 1038 – …than that of the… ; Line 1089 - …as indicated by…	This edit will be addressed in the final version.
150	Newman	Line 1103 – …2005). These new… ; Lines 1103-1105 – sentence should be restructured.	Restructuring will be done.
151	Warren	Line 1111 – …role. Other data suggest, in contrast, that fungal activity is…	This edit will be addressed in the final version.
152	Warren	Line 1123 – herbivores ; Line 1124 – detritivores	This edit will be addressed in the final version.
153	Warren	Line 1225 – …largely depend on ;	This edit will be addressed in the final version.
154	Warren	Line 1368 - …The objective of… ;	This edit will be addressed in the final version.

155	Warren	Line 1397 – spatial scale considered…	This edit will be addressed in the final version.
156	Warren	Line 1403 – …all play important… ;	This edit will be addressed in the final version.
157	Warren	Line 1411 - …will depend…	This edit will be addressed in the final version.
158	Warren	Line 1455 – …and tail canals…. ;	This edit will be addressed in the final version.
159	Warren	Legends, Figures 6-28, 6-29 - …a peat and a limestone…	This edit will be addressed in the final version.
160	Warren	Pp. 6-69, 6-70 – Throughout the chapter, "head" is used rather than "wet head" – alter for consistency?	This edit will be addressed in the final version.
161	Warren	Line 1537 – …and the near-tail had a ;	This edit will be addressed in the final version.
162	Warren	Line 1540 - …DIN in the near-tail of	This edit will be addressed in the final version.
163	Warren	Lines 1542-1543 - …less and, in fact, has net accumulations of nitrogen and phosphorus….	This edit will be addressed in the final version.
164	Warren	Line 1566 – …phosphorus from… ;	This edit will be addressed in the final version.
165	Warren	Line 1617 – …glyphosate… ;	This edit will be addressed in the final version.
166	Warren	Line 1631 – …FeCl3…	This edit will be addressed in the final version.
167	Warren	Line 1770 …are steeper… ;	This edit will be addressed in the final version.
168	Warren	Line 1772 - …of sawgrass,…	This edit will be addressed in the final version.
169	Warren	Table of Contents, Line 1862, Table 6-1 – Section title should be consistent	This edit will be addressed in the final version.

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 7A

Larry Gerry, Agnes Ramsey, Dewey Worth
and Beth Williams

Level of Panel Review: Accountability (primary); Integrative (secondary)
R. Meganck (AA), J. Jordan (A) and R. Ward (B)

We appreciate the Panel's review and comments on the chapter and provide the following for the Panel's consideration.

No. 1: Halt of Everglades Agricultural Area Reservoir Construction

Relating to the decision to halt construction on the Everglades Agricultural Area A-1 Reservoir referred to in lines 46-54:

> Another expedited project described in previous South Florida Environmental Reports is the Everglades Agricultural Area (EAA) A-1 Reservoir. The EAA Reservoir was to be the first above-ground water storage facility to be built for CERP, and its construction was initiated in 2006. In May 2008, a lawsuit was filed in the U.S. District Court by the Natural Resources Defense Council, the National Wildlife Federation, and the Sierra Club claiming that the USACE 404 Dredge and Fill Permit to construct the reservoir was inconsistent with the intent of WRDA 2000. Due to the potential for a permit revocation resulting from this litigation, construction was halted in June 2008 to avoid significant financial risks associated with mobilizing a massive workforce and related heavy equipment.

Comment #1: *The decision by the District to halt construction seems to be logical given the financial risks involved.*

Response #1: On May 15, 2008, the District's Governing Board took steps to protect the public's long-term investment by suspending temporarily the contract to construct the reservoir's 22-mile embankment. The decision to suspend was based upon uncertainties related to unresolved litigation, including a challenge to the permit, which had been issued by the U.S. Army Corps of Engineers (USACE) to construct the reservoir. The Governing Board determined that it was prudent to attain legal certainty and resolve the outstanding litigation before proceeding with the largest component of reservoir construction, which at $330 million, represents a significant investment of public resources.

Comment #2: *What are the specific points being raised by the non-governmental organizations filing the lawsuit? Filing a claim at this point is confusing, as the project has been outlined at least since the 2005 South Florida Environmental Report.*

Response #2: In May 2007, the Natural Resources Defense Council filed a lawsuit challenging decisions made by the USACE including its issuance of the permit to the District under the Clean Water Act. The basis of the challenge is the acceleration of the project by the District outside of the strict confines of the Federal-State partnership described in the Comprehensive Everglades

Restoration Plan that was authorized by Congress in the Water Resources Development Act of 2000.

Comment #3: *What are the possible impacts of halting construction from the point of view of the District?*

Response #3: The greatest impact is delaying restoration of the Everglades caused by delaying project construction. The District has invested more than $250 million to execute the first three phases of the reservoir's construction. As a result of suspending constructing, the District's contractor will incur increased costs of performance and may need to seek recovery of certain costs. This is still the least cost of the options – and associated risks – open to the District.

Comment #4: *Is there the potential for a chain reaction affecting project development and implementation as a result of the lawsuit referred to in lines 46-54?*

> Another expedited project described in previous South Florida Environmental Reports is the Everglades Agricultural Area (EAA) A-1 Reservoir. The EAA Reservoir was to be the first above-ground water storage facility to be built for CERP, and its construction was initiated in 2006. In May 2008, a lawsuit was filed in the U.S. District Court by the Natural Resources Defense Council, the National Wildlife Federation, and the Sierra Club claiming that the USACE 404 Dredge and Fill Permit to construct the reservoir was inconsistent with the intent of WRDA 2000. Due to the potential for a permit revocation resulting from this litigation, construction was halted in June 2008 to avoid significant financial risks associated with mobilizing a massive workforce and related heavy equipment.

Response #4: As the basis of this lawsuit is that the partners stepped outside the CERP process, the potential for a chain reaction exists. Although none of the other expedited projects are under construction, this certainly gives pause. The planning and design efforts on the C-111 Spreader Canal Project were accelerated during FY2008 to complete in FY2009, with the intent of beginning construction immediately.

Comment #5: *Could it potentially affect further submissions of Project Implementation Reports to the U.S. Congress?*

Response #5: The lawsuit is not affecting submission of any Project Implementation Report to Congress. In fact, the C-111 Spreader Canal Project Implementation Report has been expedited to maintain parallel efforts with design and permitting activities. The Project Implementation Report should dovetail with the NEPA documentation, timely, for the start of construction.

Comment #6: *Is there any prognosis as to the timeframe for a decision on the issues raised by the consortium of non-governmental organizations that filed the claim?*

Comment #6: It is in the hands of the courts now.

Comment #7: *Is there a line of communication with the litigants to preclude further disruption of this nature?*

Comment #7: Numerous attempts and different venues were used to directly address the representatives of these entities. Once court proceedings were entered, however, communications had to be discontinued.

No. 2: Effects of Lawsuit on Stormwater Treatment Areas

Referring to the lawsuit filed by a consortium of non-governmental organizations and its impact on a construction project in Everglades Agricultural Area A-1 Reservoir, lines 46-54 (above) and 632-646:

> Under the District's expedited design and construction initiative, design was completed and construction was started on the Everglades Agricultural Area (EAA) 1-A Reservoir. The master contract, executed in June 2006, called for construction of the reservoir in a triangular 25-square-mile footprint, 13 miles south of Lake Okeechobee where sugarcane once grew. Design specified a 21-mile-long perimeter embankment, meeting dam criteria, to rise 31 feet from the ground to the top of the parapet wall, to impound a pool of 190,000 acre-feet. The depth of the reservoir is designed to be 12.5 feet in order contain storm surges. The first three negotiated guaranteed-maximum-price phases – including the entire seepage canal that surrounds the perimeter of the reservoir footprint, a borrow area for fill, a rock-processing plant, and a stockpile of sorted embankment material — valued at $265 million, were completed during FY2008. Additionally, it should be noted that work to construct the $300-million dam, with a construction time of nearly three years, was suspended by the District's Governing Board in May 2008, due to a lawsuit challenging the federal construction permits. Further information on the CERP EAA Storage Reservoirs - Phase 1 Project is available on the CERP web site at www.evergladesplan.org/pm/projects/proj_08_eaa_phase_1.aspx.

Comment #8: *Can you clarify if construction in additional Stormwater Treatment Areas has been halted or otherwise impacted due to the lawsuit challenging federal construction permits? Can the District continue with project implementation in existing Stormwater Treatment Areas or is it considered too risky from a financial point of view?*

Response #8: The lawsuit affects CERP projects that were approved in the Water Resources Development Act of 2000, and which are cost-shared between the District and the USACE. Expansion of the Stormwater Treatment Areas into Compartments B and C is not dependent on the outcome of the Natural Resources Defense Council's lawsuit.

No. 3: Potential Conflicts of CERP and Northern Everglades Program

Comment #9: *It is obvious that the goals of CERP and the Northern Everglades and Estuaries Protection Program overlap to a large degree. Are there any inter-agency issues (e.g., conflicting mandates, timetables, milestones, etc.) that might be catalyzed by this reality? Are there specific mechanisms to reduce any potential conflicts?*

Response #9: CERP was a Reconnaissance Study. The Northern Everglades and Estuaries Protection Program is an inventory of projects that include state initiatives, federal-state partnerships – including CERP – and local projects. By design, CERP and the Northern Everglades and Estuaries Protection Program have over-lapping but compatible goals.

No. 4: Results from ASR Pilot Studies Regarding Chemicals

Referring to lines 218-220:

> Studies on the effects of chemicals on organisms and ecosystems, as well as potential for mercury contamination have been completed. Results from these studies will be integrated into a conceptual ecological model with data obtained during pilot project cycle testing over the next few years.

Comment #10: *Are there any preliminary indications of the effects of the pilot studies of the Aquifer Storage and Recovery (ASR) plan on the movement of chemicals to downstream portions of the Northern Everglades including the Lake?*

Response #10: The ASR Interim Report documents the results of the first five years of scientific and engineering investigations. ASR pilot project cycle testing, which is expected to answer questions such as yours, will begin later this year. The ASR Interim Report is available at: http://www.evergladesplan.org/pm/projects/project_docs/pdp_asr_combined/052808_asr_report/052808_asr_interim_rpt.pdf .

No. 5: Torpedograss and Other Exotic Plants

Referring to the note in lines 244-255 on the potential re-establishment of submerged aquatic vegetation (SAV) in the nearshore areas of the Lakes:

> Low lake levels also allowed large portions of the littoral region to be burned to remove torpedo grass (Panicum repens). Chemical treatment followed to control reemergence of this exotic invasive plant.

Comment #11: *Is there any indication as to whether torpedo grass and other undesirable plants will be able to be managed for the long term once normal lake levels return?*

Response #11: Dry, low water conditions treatments enabled large areas of torpedograss to be treated readily with high effectiveness. However, we've also had good treatment results under "average" water levels when the plant is flooded. When deeply flooded, there are areas of torpedograss we can not treat.

Luziola subintegra, another aquatic grass that has been found in the Lake and nowhere else in North America, is highly adaptable; thriving in both shallow and deep water conditions. It is responding well to treatments, but produced seed last year. The environmental survival and fertility of these seeds are unknown.

Melaleuca, Brazilian pepper and Australian pine can be managed regardless of water levels. Melaleuca and Australian pine have been nearly eradicated from the lake.

Water returning after drought induces water hyacinth and water lettuce seeds to germinate, rapidly generating large new populations of these floating plants, and potentially requiring chemical control.

Old World climbing fern has not yet appeared in Lake Okeechobee, although it is probably Florida's most threatening and difficult plant to manage. It does not establish as well in flooded conditions, so we're lucky it did not move in while the lake level was down.

Each plant differs in its complexity for management and response to environmental conditions, although torpedograss is one of the toughest. For more information, Chapter 9 provides an excellent Status of Non-indigenous Species in the South Florida Environment.

No. 6: Best Management Practices - Lake Okeechobee Technical Plan

The Technical Plan for Lake Okeechobee restoration (line 263) notes several components (lines 283-297) including implementation of best management practices (BMPs).

Components of the multi-phase technical plan include the following:

- Implementing agricultural BMPs on more than 1.7 million acres of farmland
- Adopting new regulations that will reduce the impacts of development on water quality and flow
- Building treatment wetlands to clean water flowing into the lake
- Using other innovative "green" nutrient control technologies to reduce TP loads from the watershed
- Creating between 900,000 and 1.3 million acre-feet of water storage north of the lake through a combination of above-ground reservoirs, underground storage, and alternative water storage projects on public and private lands

The Lake Okeechobee Watershed Construction Project Phase 2 Technical Plan (LOWCP P2TP) builds upon and dovetails with ongoing restoration activities and successfully consolidates many previous Lake Okeechobee restoration efforts into a broader, Northern Everglades-focused approach. Additional information on the NEEPP and LOWCP P2TP is available in Chapter 10 of this volume. The Annual Work Plan for Northern Everglades and Estuaries Protection Program is presented in Appendix 7A-5.

Comment #12: *I was under the impression that all agricultural areas in the Lake watershed had already been required to implement a number of phosphorus-reducing best management practices (BMPs) selected from a suite of alternatives for the past several years. However, this seems not to be the case (line 284): Implementing agricultural BMPs on more than 1.7 million acres of farmland*

Response #12: The phosphorus source control program in the Lake Okeechobee Watershed was first mandated under the Surface Water Improvement and Management Act (SWIM - 373.4595 F.S.) in 1987. This legislation required the District to develop a SWIM Plan to improve the health of Lake Okeechobee, which was receiving too much phosphorus. This SWIM plan mandated a loading target for the Lake of 397 tons, which is 360 metric tons.

The District's implementation guidelines subsequently were outlined in a new Rule adopted in 1989 (Chapter 40E-61 F.A.C.), the Lake Okeechobee Works of the District (WOD) regulatory program. The WOD limited the amount of phosphorus that could be discharged from a parcel based on land use and the target phosphorus concentrations established by Technical Publication 81-2. Since this program was performance based, source controls and BMPs were not a primary focus.

In 2000, the Florida Legislature revised the SWIM statute and it became the Lake Okeechobee Protection Act (LOPA), establishing a restoration and protection program for the lake and expanding the program's geographical area to the Upper Kissimmee and the Lake Istokpoga Sub-watersheds. The LOPA also established the total maximum daily load (TMDL) for the total phosphorus for Lake Okeechobee of 140 metric tons to be met by 2015, as well as identifying the District, Florida Department of Environmental Protection (FDEP) and Florida Department of Agriculture and Consumer Services (FDACS) as coordinating agencies to develop the Lake Okeechobee Protection Plan (LOPP).

In 2001, the coordinating agencies executed a Memorandum of Understanding to establish an agreement on the comprehensive implementation of the LOPA. After this agreement, FDACS

adopted rules for agricultural landowners to implement voluntary BMPs complementary to the District's LOWOD source control rule for phosphorus reductions and Environmental Resource Permitting rule for the design of stormwater management systems.

In 2007, the Florida legislature enacted the Northern Everglades and Estuaries Protection Program, which expanded the LOPA to the entire Northern Everglades system, including the Caloosahatchee and St. Lucie River Watersheds and estuaries. More information on the implementation of BMPs in the Lake Okeechobee Watershed can be seen in Chapter 4, pages 4-13 and 4-20.

Comment #13: *Are the regulations noted in line 285 specific to on-farm targets for total phosphorus and other chemicals for farms north of the Lake or do they also include the impact of Stormwater Treatment Areas and other projects, and therefore refer to water leaving the Northern Everglades and entering the Southern Everglades?*

> *Adopting new regulations that will reduce the impacts of development on water quality and flow*

Response #13: There are two new regulations that will affect construction of stormwater management systems for new agricultural and non-agricultural developments in the Lake Okeechobee Watershed:

1. **State Stormwater Treatment Rule**. This Rule is being developed by the Florida Department of Environmental Protection and will be based on a performance standard, whereby post-development nutrient (nitrogen and phosphorus) levels are not exceeding pre-development (natural state) conditions for any new development.

2. **Special Basin Environmental Resource Permit Rule.** This Rule is being developed by the District for special basins within the Lake Okeechobee, Caloosahatchee and St. Lucie Watersheds. It will be adopted with specific supplemental criteria that results in no increase in runoff from new development within the watershed.

Neither of these new regulations specifies on-farm targets to be used. More information on these programs can be seen in Chapter 4 (page 4-13) and Chapter 10 (pages 10-23 and 10-28).

No. 7: Dike and Lake Management Goals

Comment #14: *Is it a correct interpretation that the management goals of the USACE and the District are in conflict regarding the Herbert Hoover Dike? (line 334 = section heading)*

> In April 2008, the USACE announced its intent to keep Lake Okeechobee water levels lower than normal in order to attain a water level of 12.5 to 15.5 feet above sea level and thereby reduce the threat of failure of the aging Herbert Hoover Dike…

Response #14: Public safety is the highest priority of both agencies. The USACE and the District have agreed, as dike repairs are completed and lake stages can be increased safely, to move incrementally toward the lake management schedule that was in place prior to identifying problems with the dike. Known as the WSE – for Water Supply and Environment – Schedule, this schedule was adopted in 2000 after extensive public input, and is supported by an Environmental Impact Statement.

Comment #15: *The Corps will lower the average level of the Lake while this will increase the risk of water shortages (lines 337-339):*

> This will keep the lake on average approximately one foot lower than under previous normal operating conditions, increasing the potential for future water shortages.

Is there an agreement on the Lake level once the rehabilitation of the dike is completed?

Response #15: An agreement does not exist. Depending on the outcome of the dike repairs, a new regulation schedule study agreement will be needed. We expected that it will take into account construction of early CERP projects including the expedited projects and components, which should provide many additional options for water storage and management, and the adjusted lake level afforded by the Herbert Hoover Dike Rehabilitation Project.

No. 8: Ten Mile Creek Issues

The comment on the Ten Mile Creek Critical Restoration Project (lines 390-394) provides no indication as to the construction/design issues being confronted.

> Although initial construction has been completed on the Ten Mile Creek Critical Restoration Project, it has not been put into beneficial use. Analysis is being performed by the USACE to determine an appropriate course of action necessary to remedy design and construction issues for the project to meet its expected goals.

Comment #16: *Any comment on the potential impact/importance of resolving this issue, particularly to downstream areas, would be welcomed.*

Response #16: Unless the reservoir and stormwater treatment area are able to be placed in-service, the downstream Ten Mile Creek watershed will see neither water quality nor timing of deliveries benefits from this Critical Restoration Project. As a matter of public record, District staff has briefed its Governing Board regarding seepage and other issues affecting this project. It remains the obligation of the USACE to release the results of the analyses and any conclusions. We may change the beginning of the last sentence to read: "Dam safety, seepage, and other engineering and geotechnical analyses are being performed by the USACE …"

No. 9: Funding for Northern Everglades Watershed Plans

Comment #17: *Is funding approved to ensure timely implementation of the St Lucie River and Caloosahatchee River Watershed Protection Plans, construction projects, and monitoring programs?*

Response #17: The River Watershed Protection Plans capture a wide array of projects and programs; therefore, a variety of implementation and funding strategies will be used to move these projects forward. Many of these projects already are included in other planning or restoration efforts, such as CERP and local initiatives. This plan assumes that those projects will continue to be implemented through the existing funding mechanisms or programs as originally intended.

In addition, to provide a source of State funding for the continued restoration of the South Florida ecosystem, the 2007 Florida Legislature expanded the use of the Save Our Everglades Trust Fund to include Northern Everglades restoration and extended the State of Florida's

commitment to Everglades restoration through the year 2020. This is intended to be a recurring source of funding from the State, but must be appropriated by the Legislature annually.

It is recognized that because implementation of these projects is contingent upon funding from many different sources, that actual implementation timeframes may vary from current expectations. Changes in project schedules will be reflected in annual reports and three year updates as appropriate.

No. 10: Application of Study Methodology

Comment #18: *Is the methodology being used in undertaking the Southwest Florida Feasibility Study being used in other parts of the Everglades system? It seems that it has applicability given the flexibility in evaluation and comparison of alternative management strategies.*

Response #18: The methodology referenced, specifically, that of applying conceptual-level solutions to address multiple resource management needs and estimating the rough order magnitude construction costs and real estate needs to determine overall project scope, is employed for many CERP projects that have regional implications or have overlapping areas of interest. This is one method to try and keep CERP costs from ballooning and focus on practical solutions that can be quickly implemented. This approach of seeking incremental implementation of more practical solutions is consistent with the National Academy of Sciences recommendation for incremental adaptive restoration as a means to expedite ecosystem restoration.

No. 11: Lake Trafford Performance Measures

Referring to the section on Lake Trafford Critical Restoration Project (line 613).

> …With abundant rains during summer 2008, the District's Big Cypress Basin implemented additional hydraulic dredging to restore the lake by stabilizing sediments and reducing nutrients – specifically, phosphorus and nitrogen – that contributed to algal blooms and fish kills.

Comment #19: *Were the elevated levels of P and N exacerbated by the dredging project and the subsequent return to higher rainfall levels?*

Response #19: The nutrients, and their contributions to algal blooms and fish die-offs, were key stressors in Lake Trafford, which led to the authorization of this project; but neither weather patterns nor dredging exacerbated these problems during FY2008 The intent of the dredging is to remove nutrient-laden, organic sediments, down to the sandy lake bottom, with the objective of reducing phosphorus and nitrogen levels in the lake. Last year, regional water shortages caused lake levels to drop so low that the dredge was unable to operate. This past summer, plentiful rain allowed a new contract to be executed, and dredging of sediments to resume in Lake Trafford's shallow littoral zone. The final report will read simply: "With abundant rains during the summer of 2008, the District's Big Cypress Basin implemented additional hydraulic dredging to remove lake sediments."

Comment #20: *I recall previous projects to plant native SAV species for nutrient absorption were considered successful. Have the test plots referred to in lines 627-629 provided any preliminary indications as to success rates?*

> The FWC has been able to plant test plots of native aquatic vegetation, which are expected to help absorb nutrients that previously have caused massive algae blooms and fish kills.

Comment #20: Prior to the extreme fall of the lake level, new *Vallisneria* growth was observed in some of the areas recently dredged, providing some evidence of remaining seed sources within the lake. In May 2008, the Florida Gulf Coast University planted 30 test plots of *Vallisneria* within the previously-dredged southwestern area of Lake Trafford to see if the tape grass beds could be reestablished. With the recent five-foot increase in water level, the plantings can not yet be inspected, although, studies of the benthic invertebrate community within the lake have shown improvement with an increase in species diversity.

The FWC re-vegetation efforts that were planned for FY2008 were postponed to FY2009 due to unfavorable water levels in the lake. At the beginning of the year the water level was too low, then after Tropical Storm Fay, the water level rapidly rose too high for planting. FWC plans to continue major replanting efforts of both submerged and emergent vegetation for several years beyond FY2009.

No. 12: Decomp Early Restoration Benefits

The proposed benefits from including WCA-3/Northeast Shark River Slough in Decomp PIR 1 are substantial (lines 746-758) and quite clear:

> It is proposed that in addition to the Miami Canal, Decomp PIR 1 also focus on WCA-3/Northeast Shark River Slough connectivity. Including in PIR 1 features from the original Phase 1 of Decomp is critical to CERP's overarching goal of ecosystem restoration as it will (1) build upon the ecological/hydrological improvements provided by the MWD project, (2) achieve measurable, regional restoration benefits earlier, (3) improve survival of federally and state-listed avian species in the Everglades, (4) stop the continued degradation of ridge and slough habitat in the ENP and WCA-3, (5) reduce damaging high water conditions on tree islands in WCA-3A, (6) reduce the severe dry-down events that have caused substantial loss of peat soils in northeast Shark River Slough, (7) potentially reduce cost by better integration of features and operations between MWD and DECOMP components, and (8) potentially reduce overall planning costs for all of DECOMP by developing two PIRs instead of three. Further information on the WCA-3A/3B Decompartmentalization and Sheetflow Enhancement – Part 1 Project is available on the CERP web site at *www.evergladesplan.org/pm/projects/proj_12_wca3_1.aspx*.

Comment #21: *There is, however, an outstanding question in reviewing the CERP website concerning the contention that the overall restoration efforts can be achieved earlier, as the data generated to date seems to be preliminary. I raise this issue as the public will pick up on these types of statements, and then demand to know why a certain milestone might not have been met, even though there might be mitigating or extenuating factors involved.*

Response #21: A review of the web site four days before the Peer Review Panel Workshop reveals that it is in need of updating, as is the text in the draft chapter, due to decisions by the District and USACE. The Project Implementation Report No. 1 will not focus on WCA-3 Northeast Shark River Slough connectivity. The USACE and the District have determined that the focus initially must be only on the Miami Canal. Project Implementation Report Nos. 2 and 3 will focus on WCA-3 /Northeast Shark River slough connectivity. The final draft document should include only lines 723 through 732; lines 733 through 758 will be deleted. We will follow up with the Project Managers so that the web site is correct and consistent with agency direction.

No. 13: Acme Basin B Diversion of Runoff from Refuge

Comment #22: *The statement in lines 770-771 that by diverting nutrient laden water the "area's sensitive ecosystem can be restored" may be a bit overstated. As has been clearly demonstrated by any number of studies, restoration is not achieved except through a complex of actions. Perhaps it could be better stated that this action will positively impact the chances or the plans to restore the Refuge.*

Response #22: The purpose of the Acme Basin B Project, when fully implemented, is to divert urban stormwater runoff from the local drainage basin, away from the Arthur R. Marshall Loxahatchee National Refuge. Doing so will end all Acme Basin direct discharges into these federally-managed lands. We believe that by diverting nutrient-laden stormwater away from the Refuge, the natural hydrology of the area's sensitive ecosystem can be restored, which will allow the native flora and fauna to recover and flourish. The District's continuing partnership with the Village of Wellington to implement this project demonstrates how governments can work together successfully to achieve incremental restoration of the ecosystem. In the final report, all but the first paragraph of this section is expected to be deleted, which will obviate this objection.

No. 14: North Palm Beach County – Part 1

I did not find any information on the quality of the water being stored in the Palm Beach Aggregate's pond and referred to in line 959-971:

> In March 2008, the District made a $37.2 million payment to Palm Beach Aggregates. This is the second-to-last installment in the land acquisition that led to the creation of the 15-billion-gallon L-8 reservoir. A total of $213.9 million, which includes almost $620,000 in interest, has been paid into a court-controlled account. Out of the FY2008 payment, $15 million was to remain in the account until the District verified that the pits can hold water. With the agreement of Palm Beach Aggregates, the District deducted $2.4 million to compensate for an undisclosed lobbying fee that had been paid to an engineering consultant. The District is expected to make one final payment of approximately $6 million during FY2008 for an extra 1.6 billion gallons of storage space that have been created on the site. The agreement gives the District immediate ownership of approximately 1,200 acres of mining land, and then requires Palm Beach Aggregates to deliver a series of 58-foot-deep, leak-proof pits according to a predetermined schedule. Water stored in the pits has provided relief to the City of West Palm Beach during the recent regional water shortage.

Comment #23: *Is there any concern in this regard?*

Response #23: There are elevated levels of chlorides, dissolved solids and gross alpha (a by-product of radioactive decay that occurs naturally in the environment and is present in nearly all rock, soils and water) within the reservoir cells. In large part, these are the result of mining operations. We expect that as water is input and output from the reservoir cells, it will come into compliance with state criteria for discharge. The District has worked with the Florida Department of Environmental Protection to provide mixing zones, whereby regional water can be mixed with reservoir water to ensure compliance with state water quality standards.

We would direct your attention to Appendix 7A-4, which provides the L-8 Reservoir Annual Water Quality Assessment Report for more information on this matter. This report was prepared to evaluate the results of the project's monitoring program, and to determine whether any significant water quality degradation occurred as a result of using the reservoir project cells for temporary water storage.

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 7B

Kimberly Chuirazzi and Bruce Sharfstein

Level of Panel Review: Accountability (primary); Integrative (secondary)
R. Meganck (AA), J. Jordan (A) and R. Ward (B)

Comment #1: *A clear reference is made to the "strategic approach" that is being used to develop the revised Monitoring and Assessment Plan (MAP 2008) in lines 53-68. Has the District or other agencies found an effective way to support those monitoring programs that have lost funding as noted in lines 45-52? If not, how has the MAP been adjusted to address the gaps, and particular the loss of continual datasets, created by these decisions? Simply stating that MAP 2008 will "provide the flexibility to adapt to changing budgets and management priorities" does not fully clarify the underlying impact of such decisions.*

Response #1: The full suite of monitoring and research needs identified by the MAP has always been larger than the available funding and in kind support provided by non-RECOVER monitoring programs and various attempts at prioritization have been employed to maintain the most critical components of the plan as annual budgets and non-RECOVER efforts have changed. In MAP 2008, a number of low priority projects have been removed from the total projects list. In addition, an attempt was made to formalize the prioritization process by developing a series of rational guidelines for evaluating monitoring programs to ensure that the highest priority monitoring continues.

Comment #2: *There has been limited criticism of models such as the Total System Conceptual Ecological Model developed by Ogden and supported by the National Resource Council (NRC) related to the scale (level of detail) and cost of monitoring (lines 78-87). Additionally, the Total System Conceptual Ecological Model does not distinguish between small but vital changes in a monitoring strategy, as management may demand, and more notable changes that have less overall impact to the degree of confidence in the results. Have these and other aspects of the model been considered and have any changes been made to its application in the case of MAP 2008? Perhaps your comments in lines 88-96 address these concerns, but I believe it to be more one of the confidence that "essential" elements have been properly identified as Tier I and Tier II elements.*

Response #2: Although the Total System Conceptual Ecological Model gives an overall representation of the system-wide perspective and the stressors and key attributes that make up the Greater Everglades ecosystem, it is not used directly to develop the detailed monitoring programs. From the Total System and geographically located conceptual ecological models we developed "sub-conceptual ecological models along with hypothesis clusters that include all of the components of the stressor-attribute interactions at a level of detail that allows us to develop the design and cost of each monitoring component. This also helps illustrate how monitoring efforts may be interdependent - a factor in decision-making that may affect the sustainability of related monitoring. The concept of Tier I (essential) and Tier II (value added) monitoring was used as a conceptual tool when developing Map 2008.

Comment #3: *When mention of using "temporal" scales as a factor in assigning a Tier I or Tier II ranking is made (lines 111-113), are you referring to "outcomes" over a period of time*

benefiting the restoration goals, the time it takes to install a particular action as reflecting overall implementation success, or the quality of the data as it allows the hypothesis to be assessed? There seems to be reference to each of these: outcomes (line 108 noting "success"), time (lines 122-123), and quality of data (lines 117-118). Perhaps the correct interpretation is that all of these factors have a place in the overall evaluation process, but that is not clearly expressed.

Response #3: Since MAP 2008 is still under development, the specifics and wisdom of using a tier classification scheme is still under consideration. However, RECOVER recognizes the importance of all of the temporal components listed in your comment. Defining these temporal scales is difficult because of the scientific uncertainties involved, but also because of the uncertainty in the implementation schedule of the restoration projects.

Comment 4: *The concepts presented in the section on Desired Restoration Condition (line 178) is very important to understanding the reality of CERP and what it can help attain in the mid to long-term in South Florida. These concepts should be incorporated into other parts of the SFER in future years as is clearly noted in lines 242-245.*

Response #4: We agree, but it is up to the authors of other sections to incorporate this concept.

Comment #5: *The sheetflow restoration indicator (line 267) is fundamental to the overall CERP process. The selection of transects seems logical, but is there an additional transect needed in Water Conservation Area (WCA 2) given the impacts to that region from adjacent developed areas?*

Response #5: All components of the sheetflow performance measures were developed based on a flexible transect design. The current locations, north WCA 3A/2A, Tamiami Trail, and south Everglades National Park, are the first set of transects developed by RECOVER and are provided here primarily for illustrative purposes. Additional transects can be added as needed given the limitations/restrictions identified in the documentation sheet. The impacts due to adjacent developed areas will not have much effect on the sheetflow performance measure for WCA 2A unless there are large urban withdrawals affecting flow directionality; in which case another transect could be added.

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER — VOLUME I, CHAPTER 8

Tracey Piccone

Level of Panel Review: Accountability (primary); Integrative (secondary)
R. Meganck (AA), J. Jordan (A) and N. Armstrong (B)

Comment #1: *A specific reference in table 1-3 should be made to table 8-1 as the latter is a subset of greater detail of the former and may assist the reader with a specific interest in water quality throughout South Florida.*

Response #1: This suggestion will be considered for next year's SFER in Chapter 1.

Comment #2: *It is clear that, as stated in lines 99-102, until long-term plans have been implemented for a sufficient time period, it will be difficult to measure the "response of the EPA" to the actions of the program. While scientifically accurate, meeting the legal TP levels mandated in the EFA is also a valid goal and one that by all indications will have the intended impact on water quality. It seems that the comment in lines 102-105 is reported in a matter-of-fact manner, while the reductions in TP levels achieved to date represents measurable progress, and one towards which a substantial amount of public funds has been invested (BMPs, STAs, WCAs, etc.)*

Response #2: After receiving clarification from Dr. Meganck (per 9/18/08 WebBoard posting), no response is needed.

Comment #3: *Can the statement in lines 111-114 be substantiated to the degree implied? How can there be "overlap between many CERP projects and Long-Term Plan projects" and only "little overlap" between CERP and LOPP, LOER, on-farm BMPs, etc.? We have always assumed that the Everglades system included all lands and waters that impacted the Lake (including the Kissimmee drainage) and everything south of that to the EPA and the Bay. The logic presented in lines 124-135 seem to contradict or at least argue against the former statement.*

Response #3: After receiving clarification from Dr. Meganck (per 9/18/08 WebBoard posting), no response is needed.

Comment #4: *Is it correct that inflow datasets related to monitoring implementation of the long-term plan will be updated in FY 2009? Are these data subsequently used to alter workplans or is there a specified number of collection periods that must be completed before there is sufficient confidence in the trend data to justify such changes?*

Response #4: The inflow data sets will be updated again in FY2009. They are updated every other year and will continue on same schedule. The results can be used to alter future plans, as needed. There is no set number of updates needed to revise the Long-Term Plan. Long-Term Plan can be revised at any time through adaptive implementation process and Florida Department of Environmental Protection approval.

Comment #5: *Referring to the paragraph beginning on line 196. Have there been alterations in the location, size, design, etc. of EAA storage reservoirs as a result of data collected from CERP projects (inflow volumes and loads) or is this part of a longer term plan?*

Response #5: There have not been any CERP reservoir projects completed yet; therefore, no data monitoring has occurred.

Comment #6: *Referring to line 216. Do District scientists anticipate a marked increase in the percent of the water and load contributions to the STAs from the Lake in a wet cycle year or after several wet years?*

Response #6: Lake discharges are discretionary STA inflows. Basin runoff is to be addressed as the first priority. STA inflows are required by permit to be kept within the "Operational Envelope."

Comment #7: *What is the process for evaluating annual milestones or project goals in the implementation of the initial phase (pre-2016) of the long-term plan? Can corrections be implemented at any point in the implementation or is it considered necessary to implement the initial phase largely as designed before making adjustments to the process?*

Response #7: The Long-Term Plan projects are continually monitored and evaluated. Corrections can be implemented at any time. Major revisions follow the revision process including public/stakeholder involvement.

Comment #8: *Lines 159-163: To clarify the DMSTA Long-Term Plan refinement tasks for FY2008, it would be helpful if the changes made to DMSTA2 could be described here. It is not clear from the DMSTA website what changes were made to the model.*

Response #8: The District has contacted Dr. Walker for text to be added in the final report.

RESPONSES TO COMMENTS ON 2009 DRAFT SFER – VOLUME I, CHAPTER 9

Amy Ferriter[3], Dan Thayer, Mike Bodle and Bob Doren[4]

Level of Panel Review: Accountability (primary); Integrative (secondary)
J. Burger (AA), E. van Donk (A) and J. Burkholder (B)

Accountability Review

Comment: *CERP and the RECOVER programs for the Everglades have the potential to respond to new and emerging problems that the overall ecosystem faces. While the presence of nonindigenous species is an old problem, recognition of its severity and impacts on ecosystems is relatively new. The Everglades group is well ahead of other groups nationally in trying to understand, catalogue, and evaluate the effect of nonindigenous plants. The holistic approach of examining all nonindigenous plants that seem to be a problem in the Everglades is a daunting task, but an essential one, and this chapter is a thorough review of current knowledge. The inclusion of stoplight approach to key nonindigenous and invasive animals is an excellent start and focuses appropriate attention on the most severe problems. The chapter provides an excellent overview of the species biology of several nonindigenous invasive species that pose the greatest threat to ecosystem structure and function within the Everglades. This chapter does not include all nonindigenous species for which there is information (the reader is referred back to the 2008 report), it does include the ones considered to pose the greatest threat. While time and space constraints impose this limitation, it would be maximally useful to both agencies and organizations working with nonindigenous species if there were an updated appendix or document that did include current information about nonindigenous species so that managers, public-policy makers, scientists and other stakeholders could find all the updated information in one place.*

This chapter is an excellent extension of previous work with nonindigenous species. It provides information and evaluations of the key issues concerning nonindigenous species, including legislative initiatives for animals, the role of pets, impacts of education, public health concerns, innovations needed, and the district's role (including expenditures). Unlike past years, there is no discussion of the relative potential for threats within each module. Instead, the approach is to select priority nonindigenous species and provide an overview of each, including the key issues, with stoplight information on each species. The selections include both plants and animals of concern. This approach is very useful for managers, public policy makers and the public to obtain and quick and readable account of the species of concern, management, and current severity of the problem.

However, although the new streamlined format is very helpful at the "key selected species" level (improvements: abbreviated writing, key issues), it does not seem to cover the topic as well as in previous years. It is recommended that a "hybrid" format be adopted which presents the introductory information, then includes an updated Table 9-2 (excellent overarching table from

[3] Boise State University, Boise, ID

[4] Florida International University, Miami, FL

the 2008 SFER) with supporting discussion, and then explains that the chapter will highlight selected species.

The conclusions place the problem of nonindigenous species within the context of restoration in the Everglades, and appropriately indicate the overall lack of knowledge for many of these species. For the general public, it would be useful to have some overall observations or conclusions about the impacts of these species (and some indication of the key invasive and problematic ones) in the summary.

A number of agencies and organizations have recognized the problem of nonindigenous species, particularly nuisance plants and animals whose populations are affecting native species. The inclusion of the website where appropriate laws relating to nonindigenous species can be found is helpful to the public and managers. Several groups are working together to develop a database that can be used by all to track invasive species. The chapter rightly identifies one of the main problems: that invasive species work has centered around those with agricultural or other economic effects, rather than those species that cause ecosystem disruption. One of the key tools for management of invasive species is to track the spread and abundance of nonindigenous species so that the spatial and temporal aspects of the problem are known to all managers, public policy makers, and the public. Much of the monitoring is still aimed at the large, invasive tree species that can be easily monitored from the air to arrive at good estimates of acreage of each species. While this is useful for these species, it does not address smaller plants and most animals that would not be visible from the air.

Recommendation #1: *Provide some quantitative information on both the extent of concern and of management. While the stoplight approach provides an excellent overview, it does not provide specifics of the spatial and temporal problem.*

Response #1: The quantitative data is often not available for these species and/or control programs. The authors will add this information, where available, in the final report.

Recommendation #2: *The Summary should mention the worst exotic species problems (plant and animal), as well as some (albeit few) "success stories" in their management, control or eradication to show that, at least for some species, with concerted effort it can be achieved.*

Response #2: The authors will augment this information in the Summary section in the final report.

Recommendation #3: *Include a flow chart of agencies/entities engaged in assessment and management of which nonindigenous species within each module.*

Response #3: The authors will evaluate the feasibility of creating such a flow chart in this year's "update" chapter. It may be more appropriate to include this in next year's full report since this year's highlights are not in the module format.

Recommendation #4: *Develop a companion document that has the latest information on all nonindigenous species so that the public and public policy makers can find the latest information on all species.*

Response #4: This year's chapter was meant as an update to highlight certain issues. It references the 2008 SFER for details on other species of concern.

Recommendation #5: *Summarize the District's major accomplishments with respect to management of invasive species.*

Response #5: *The authors will add this information in the Summary section in the final report.*

Technical Review

Comment #6: *This year's report is a summary of the most severe nonindigenous and invasive species, rather than an attempt to include as many as possible. While this is laudable, and addresses the accountability aspect of this work, the authors and organizations involved should consider a summary document that each year includes all the species so that public policy-makers, scientists, managers, the public, and other stakeholders do not have to go through several South Florida Environmental Reports to find this information. This chapter is sufficiently new that this could be done and updated each year. That is, whenever new information (and stoplights) is added, could be included or substituted for the last one.*

The authors are to be commended for including animals in this chapter, despite the lower quantity and quality of much of the data. Table 9-2 of the 2008 Environmental Report was excellent, and was missing from this years report. It provided an excellent overview and should be reconsidered for inclusion.

The introduction provides an excellent statement of the problem of invasive species, the problem in the Everglades, the SFWMD role, and the agencies involved. The key issues rightly identify most of the key issues, but inclusion of legislative initiatives for plants should be considered as an issue. What controls are there on garden shops and landscapers to avoid the use of all nonindigenous plant species that can, or have, become invasive?

The descriptions of priority nonindigenous species are excellent, and include a short history, effects, and where it occurs, the control measures. Where possible, some quantification of both the problem and its solution would be useful. For example, Australian Pine occurs over 100 % of the Everglades in appropriate habitats, and has been removed from ?? %.

The conclusion section summarizes the main findings in terms of issues, documented impacts, and needs for future control and management. The use of the early detection and rapid response system is excellent, and has the potential to prevent future problems, but this will only work if the gardening, landscaping, and pet trades are onboard and cooperate with agencies. Providing information on successes (e.g. Melaleuca) is an excellent tool for engaging both the public and managers.

Response #6: Comment appreciated.

Integrative Review

Comment: *Non-indigenous species have the potential to drastically affect almost every aspect of the structure and function of the Everglades area. Yet many of the other chapters, including Ecology of the Everglades (6), Comprehensive Everglades Restoration Plan (7A), Lake Okeechobee (10) and Kissimmee Basin (11) make little mention of their effects. Further, since nonindigenous species affect the efficacy of the performance measures, they can potentially have a great effect on evaluation of restoration progress.*

Recommendation #7: *Integrate the presence and effects of non-indigenous species into the overall research plans, including Everglades Research Plan and the Coastal Ecosystem Strategy (Chapter 12).*

Response #7: The authors concur with this recommendation to include nonindigenous species in the District's research plans.

Recommendation #8: *Examine the effect of invasive species on performance measures, and on the other ecology studies (Chap 6).*

Response #8: The authors concur with this recommendation to include nonindigenous species in performance measures.

Recommendation #9: *Relate nonindigenous species management and control to specific recovery goals, which relates to a management strategy and evaluation of the overall critical species to control. Integrate invasive species concerns in relevant chapters when a given invasive species affects ecosystem structure or function.*

Response #9: The authors concur that the issue of nonindigenous species should be integrated systemwide.

Recommendation #10: *Include a section on initiatives for plants. What are the controls against garden shops selling nonindigenous species that have the potential to be invasive and affect native species?*

Response #10: The authors will add a section related to horticultural issues in the final report.

Recommendation #11: *Consider, evaluate, and discuss methods of evaluating potential impacts before species reach such critical stages of invasive effects.*

Response #11: The authors will add a section on risk assessments in the final report, although these tools are of limited use at this point in time.

Recommendation #12: *Consider putting some quantitative information in the individual species accounts. For example, what percent of Melaleuca has been controlled, what percent of the Everglades is it still a problem.*

Response #12: The authors will add this information, where available, in the final report.

Recommendation #13: *Consider developing a permanent document that has the stoplight approach for all species. This would entail adding new ones as they occur, substituting those priority species that are updated each year, and placing all this information in one place (on a website or searchable document). This document should have a reference list associated with each species. If started now, this would not be so impossible to achieve.*

Response #13: The authors will discuss this with the SFER editors. It may be beyond the scope of the updated chapter format.

Recommendation #14: *Organize the species accounts in some reasonable order (taxonomic or severity). As it is, the chapter skips around from plant to lizard, to weevil, and then back to lizards.*

Response #14: The authors will reevaluate the format for next year's report.

Recommendation #15: *Provide information on how the District plans to evaluate and refine performance measures that include invasive species.*

Response #15: In the final report, the authors will describe this process more fully.

Recommendation #16: *Provide a list of agencies involved with the invasive species work in this document.*

Response #16: The chapter references the Environmental Law Institute's report that details this information for the state of Florida.

Questions

Comment #17: *Why not include a list of the key nonindigenous species in the summary?*

Response #17: An all inclusive list was included in the 2008 Report.

Comment #18: *How many non-native plants are in Florida (lines 36-8)*

Response #18: Estimates vary. Authors will use Wunderlin's data to include this information.

Comment #19: *Why not include a legislative initiatives for plants section under key issues?*

Response #19: The authors will add this information in the final report.

Comment #20: *One of the pathways seems to be plants from garden shops and landscapers, shouldn't this be included (under key issues)?*

Response #20: As mentioned above, this will be added in the final report.

Comment #21: *References for introduced pathways (lines 101-108) should be included.*

Response #21: The authors will add this information in the final report.

Comment #22: *What is being done to develop methods of risk analysis before a species becomes a problem (e.g., Lines 109-116)?*

Response #22: As mentioned above, this information will be discussed in the final report, but risk assessments are of limited value in operational programs.

Comment #23: *Lines 123: Is the number of pythons removed as of July 2008 similar to, or higher than, last years?*

Response #23: These numbers will be updated in October 2008 and provided in the final report.

Comment #24: *Has Florida, or any other state, considered providing places for people to deposit unwanted pets (lines 124)?*

Response #24: Yes, Pet Amnesty Days are administered by the FWC, and further information is available at http://myfwc.com/nonnatives. In the final report, the authors will add information about this program.

Comment #25: *Am I to assume that there was an educational campaign about fish release ten years ago that might have had an effect on Sailfin Catfish> (lines 129-34)?*

Response #25: Educational efforts are rarely evaluated, which is unfortunate. Prevention is very difficult to "gauge."

Comment #26: *Some indication of any releases (or captures, removals) of the species mentioned in the paragraph starting at lines 176 should be included.*

Response #26: The authors will evaluate this information.

Comment #27: *Lines 203. How ere the 13 highlighted priority species selected.*

Response #27: The Priority species were selected by District staff based on potential and current implications to District infrastructure and ecological concerns.

Comment #28: *Lines 205 to 221: Can we assume that these species are not deemed important? The inclusion of the relevant websites is important.*

Response #28: These species are still "important," but not considered high priority to the District at this point.

Comment #29: *With so much more information needed in this chapter, it seems odd to have a full page picture of a helicopter (which everyone can picture).*

Response #29: The authors will reevaluate the graphic layout of the chapter for the final report.

Comment #30: *Lines 238-244; What percent of the Melaleuca problem has been solved?*

Response #30: The authors will estimate this based on District and Federal estimates in the Everglades and provide this information in the final report.

Comment #31: *Lines 246-248: To what degree have they been successful?*

Response #31: This program is showing signs of success.

Comment #32: Lines 262-268: excellent summary of the problem, with appropriate references.

Response #32: Comment appreciated.

Comment #33: *Lines 283 – what is the agent?*

Response #33: The authors will include more details on this program in the final report.

Comment #34: *Lines 332 – very useful statistic, and more would be appreciated, and could be added without taking up more space.*

Response #34: Acknowledged.

Comment #35: *Line 358: What kind of label changes? Why?*

Response #35: Changes in where this product can be used in Florida.

Comment #36: *Line 362: What species use it, and has it become critical for any wildlife?*

Response #36: The authors don't consider any nonindigenous species to be critical for native wildlife.

Comment #37: *Lines 367 on: Need to add a little information on why District biologists feet it will become a priority invasive species?*

Response #37: Acknowledged.

Comment #38: *Lines 425. Can you give any indication of the alarming rate? Are the only data available those relating to recoveries or captures?*

Response #38: This type of data is generally not available. The authors will reevaluate this information.

Comment #39: *Lines 459 – And what was the success?*

Response #39: Success and results will be reported, if available, in the final report.

Comment #40: *Lines 464-5: And what were the results?*

Response #40: Success and results will be reported, if available, in the final report.

Comment #41: *Lines 473-on: Is there any real evidence of adverse effects on native species?*

Response #41: Unfortunately, research in this area is lacking.

Comment #42: *Lines 546-on: this is a good quantitative statement.*

Response #42: Comment appreciated.

Other Questions

Comment #43: *Why has there been no information provided on the aquatic plant management program (especially if it is the country's largest (page 9).*

Response #43: The authors did not focus on this program. It would be possible to add a section.

Comment #44: *The potential impacts of invasive species were described as an emerging, high priority for CERP planning. How does the District plan to consider exotic species, across South Florida ecosystems, in evaluating and refining performance measures based on desirable organisms or conditions that are adversely affected by them? As an example, how does the District plan to consider the serious threat that green mussels (which went unmentioned in the chapter) pose to use of eastern oyster populations as VECs/PMs in hydrologic restoration efforts throughout most of the Southern Estuaries?*

Response #44: The authors concur with this sentiment; however, nonindigenous species have not been traditionally included in this type of work.

Comment #45: *Will the introduction of insects for biocontrol of invasive plants lead to induction of defense mechanisms (and thus be no longer effective?)*

Response #45: It is unclear if this question relates to the nonindigenous species developing defense mechanisms for the new biocontrol agent. The authors will investigate this question, but are not aware of any peer-reviewed work indicating that this is probable.

RESPONSES TO COMMENTS ON 2009 DRAFT SFER – VOLUME I, CHAPTER 10

Joyce Zhang and R. Thomas James

Level of Panel Review: Technical (primary); Accountability (secondary)
E. van Donk (AA), R. Meganck (A) and N. Armstrong (B)

General Comments

Comment #1: *As this chapter matures toward accountability status, it is probably time to consider refocusing the watershed-oriented sections of the chapter on nutrient loading and nutrient load controls and the lake-oriented sections to lake status only. The watershed research and lake research-oriented sections can be integrated more closely within those two major sections. The management section should be expanded to include watershed management activities so there is a closer link between watershed management and lake management because the idea is to manage the water quality in the lake to support intended uses and that ultimately is linked to watershed management.*

Response #1: Watershed nutrient management is primarily to meet the in-lake management goals [Total Maximum Daily Load (TMDL) of 105 metric tons] through phosphorus (P) control measures. This is covered extensively in the 2007 Lake Okeechobee Protection Plan Evaluation Report (SFWMD et al., 2007), which can be accessed on the District's web site at www.sfwmd.gov, under the *Lake Okeechobee*, *Documents* tab (under *Other Popular Publications* section)

The closer link between watershed management and lake management has been studied by Steinman et al. (1999). One of the study objectives was to examine lake responses to watershed P management. The strategies for reducing P loads were also discussed. The Lake Okeechobee Agricultural Decision Support System (LOADSS) (Negahban et al., 1994) was used to evaluate the effectiveness of BMP combinations in the basin for reducing P loads to the lake. The in-lake model, known as the Lake Okeechobee Water Quality Model (LOWQM) (James et al., 1997; James et al., 2005), was used to relate external loading rates to water column conditions. One scenario included a 20 percent surface load reduction from the watershed, and a total loading reduction (including rainfall inputs) of 17 percent. The corresponding reduction in surface inflow total phosphorus (TP) concentration was from 154 to 123 parts per billion (ppb). When considered in the context of a 24-year period of record (1973 to 1996 baseline period used in the model runs), this gave a 1,620 metric ton reduction in P accumulated in the lake. However, because the load reduction also affected the relative rate of P losses to lake sediments, the water column TP concentration was reduced, on average, by only 5.6 percent (from 82 to 78 ppb).

Comment #2: *The assessments of watershed and in-lake management activities should now begin to include costs so that in addition to performance being measured in terms of nutrient removal that performance can also be measured as capitol and operating costs per unit nutrient removed. Ultimately, BMPs in the watershed and lake will need to be assessed in terms of nutrient removal and cost effectiveness, so there should be efforts in this direction now.*

Response #2: The 2007 Lake Okeechobee Protection Plan Evaluation Report provided cost estimates associated with P reduction activities (SFWMD et al., 2007). The recent P legacy Task 3 Report (SWET, 2008) also covers this information. These references will be provided in the final report.

Comment #3: *The Conclusions section on page 10-80 reads like a summary. There are no conclusions identified in the section.*

Response #3: The authors will review and update this section accordingly in the final report.

Specific Comments and Questions

Comment #4: *Page 10-2, line 7: Here you use for the first time the abbreviation TMDL, explain this here and not for the first time on line 29. Write also in the summary that the TMDL is based on a five years average.*

Response #4: This text will be revised in the final report.

Comment #5: *Page 10-20. On this page you state that "funding shortfalls for FY2008-FY2009 and anticipated additional shortfalls in FY2009-FY2010 and FY2010-FY2011 will delay BMP planning and implementation efforts". My question is: why do you have these shortfalls and when will there be more money available?*

Response #5: The funding shortfalls are the result of decreased documentary stamp tax collections due to the significant downturn in the number and type of anticipated real estate transactions. Documentary stamp tax fees are the source of funding for virtually all of agricultural Best Management Practice (BMP) programs statewide implemented by the Florida Department of Agriculture and Consumer Services (FDACS). Until the real estate market recovers, there will be continued shortfalls of available cash to implement BMP programs. In addition, the general economic downturn currently being experienced across the country has resulted in a significant decrease in sales tax revenues which is the basis of the entire state government budget. In periods of economic stagnation, there are not enough sales tax revenues to run basic services like education, health care, transportation, etc. To keep those basic services running, the Florida legislature reallocates funds previously earmarked for environmental restoration programs to those basic services programs. Northern Everglades funding has suffered from this funding prioritization and reallocation process.

Comment #6: *Page 10-29: Does the Chemical Treatment Study also include a study to analyze whether direct suppletion of iron, aluminum or calcium to the lake may reduce the internal P load from the sediment to the lake? You mention that as a potential measure on page 10-49.*

Response #6: The Chemical Treatment Study is focused on source control measures within the watershed and does not address in-lake measures to reduce internal P loading. The preliminary studies mentioned on page 10-49 to address internal loading are a separate line of investigation and are not currently included in any formal agency management plan. There may be some useful information transfer between these studies as they progress. However, environmental factors affecting P availability on agricultural lands and in lake sediments are different in many respects and, therefore, require separate research efforts.

Comment #7: *Page 10-42. On this page you mention that the increased diatoms: cyanobacteria ratio may be linked to the current poor-light climate. I do not understand this because I thought that low light conditions are very beneficial for cyanobacteria.*

Response #7: In addition to poor light climate, there is also turbulent mixing in the lake that affects this balance. Studies in other shallow lakes in Florida (e.g., Schelske et al., 1995) have shown the sediments to be an important source of diatom cells to the water column. Our current understanding of the influence of the sediment on phytoplankton dynamics in Lake Okeechobee remains limited and will be the focus of planned research. This information will be provided in the final report.

Comment #8: *At the end of the Lake Performance Measures section, the statement is made that implies that SAVs are responsible for the 6 ppb drop in the nearshore TP concentrations in WY2008. Is the drop due to the SAVs directly, to associated periphyton, or to both?*

Response #8: Most likely it is a combination of factors, including increased submerged aquatic vegetation (SAV) and periphyton biomass, reduced intrusion of P-rich water from the pelagic zone as a result of lower lake levels, and more quiescent conditions leading to less sediment resuspension.

Comment #9: *Page 10-49, last paragraph: It is strange that you first state that in the deeper parts of the lake no algal blooms were detected due to low light conditions resulting from high suspended solids and that in the nearshore area no algal blooms were observed although the light conditions were good. I think that probably the presence of vegetation and the uptake of nutrients by these plants caused nutrient limitation in this area for algae as you also state on page 10-42.*

Response #9: Primary productivity in the pelagic zone is generally light-limited due to persistent turbidity. In the nearshore region, productivity alternates between nutrient and light limitation. During Water Year 2008, light conditions in the nearshore region gradually improved, leading to increased SAV-periphyton biomass and a greater sequestration of nutrients by this community. So, yes, it is likely that nutrient limitation has prevented algal bloom formation in this part of the lake during the past year.

Comment #10: *On page 10-57 is written that the increase in SAV was due to the growth of musk grass (Chara). This plant species may excrete allelopathic substances that inhibit algal growth. See reference paper: MULDERIJ G., E. VAN DONK & J.G.M. ROELOFS (2003). Differential sensitivity of green algae to allelopathic substances from Chara. Hydrobiologia 491: 261-271.*

Response #10: *Chara* "lawns" in Lake Okeechobee contain an abundant epiphyton community during the warmer months of the year. It is unlikely that allelopathy from *Chara* is affecting algal productivity in these areas.

Comment #11: *On page 10-54, 4th paragraph: The discussion about sensitivity of in-lake sulfate concentrations to surface-water inputs could be put into the context of simplified water quality models for conservative materials which would make clear the relationship of surface-water inputs to in-lake concentrations. Figure 10-11, panel B shows that the lake is a concentrator of sulfate either through evaporation or trapping of higher sulfate waters within the lake. Plotting surface-water loading on the X-axis would produce a similar plot and be more related to the simplified model analysis. The model would provide a predictive tool that would yield in-lake concentration changes with changes in the surface-water input.*

Response #11: The observed r^2 values that were tested to describe in-lake concentrations of sulfate are:

Inflow weighted sulfate concentration $r^2 = 0.32$ (presented)

Surface Inflow (acre-feet) r^2=0. 01

Net surface inflow (inflow-outflow) r^2=0. 177

The poor relationship between inflow volume and in-lake concentration is at least partly due to large differences in sulfate concentrations in runoff from different parts of the watershed. Runoff from croplands to the south has sulfate concentrations that are much higher than that from ranchlands to the north. Runoff from these different areas varies among years and partially confounds the relationship between total inflow volume and in-lake concentration.

Comment #12: *Page 10-56. You give here information about the levels of mercury in the fish populations in the lake and sate that this is a concern. Which measures will be taken to lower these levels of mercury?*

Response #12: The mercury issue in South Florida is the subject of Chapter 3B in this report as well as chapters in previous consolidated reports. Atmospheric deposition is the principal source of mercury to South Florida ecosystems. The State of Florida has enacted strict measures to limit regional sources of mercury, such as incinerators. However, global sources for this pollutant also exist. Factors such as elevated sulfate concentrations that may enhance rates of mercury methylation in the aquatic environment are the subject of investigation by several different research groups in South Florida.

Comment #13: *Page 10-61. Perhaps Chara is the dominant SAV because it is a pioneer plant that grows on sediments that have temporally fallen dry.*

Response #13: We agree that *Chara* is a pioneer species in Lake Okeechobee. This species maintains an abundant oospore bank in the sediments, and quickly reestablishes once the sediments are flooded if light levels are adequate and physical disturbance from wave action is not too great. The slower recovery of vascular SAV species may result from a diminished viable seed bank and more exacting requirements for germination. Future research is being planned to help understand the response of the SAV seed bank to drought conditions and the processes affecting the rate of recovery after lake sediments have reflooded.

Accountability

Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?

Comment #14: *The breadth of coverage is appropriate, but the depth could be greater. In the watershed section, there are significant opportunities to focus on nutrient management methods, their effectiveness, and unit costs. While these management methods are undoubtedly covered in other chapters, there was an absence of reference to those chapters. Likewise for the in-lake management methods.*

Response #14: See response to general comments.

Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?

Comment #15: *The chapter this year is consistent with earlier versions, but suggestions about changes in the organization are made above.*

Response #15: Please see our responses to the specific comments above.

Are findings linked to management goals and objectives?

Comment #16: *Overall the findings are linked to management goals and objectives, but those management goals and objectives could have been reinforced much more had a better Conclusions section been provided.*

Response #16: The *Conclusions* section will be revised in the final report. The authors appreciate further panel suggestions on what issues should be included here.

Literature Cited

James, R.T., V.L. Bierman, M.J. Erickson and S.C. Hinz. 2005. The Lake Okeechobee water quality model (LOWQM) enhancements, calibration, validation and analysis. *Lake and Reservoir Management*, 21: 231-260.

James, R. T., J. Martin, T. Wool and P.F. Wang. 1997. A sediment resuspension and water quality model of Lake Okeechobee. *Journal of the American Water Resources Association*, 33: 661-680.

Negahban, B. , C. B. Moss, J. W. Jones, J. Zhang, W. D. Boggess and K. L. Campbell. 1994. Optimal field management for regional water quality planning. ASAE Paper No. 94-3553, ASAE, St. Joseph, MI.

Schelske, C.L., H.J. Carrick and F.J. Aldridge. 1995. Can wind-induced resuspension of meroplankton affect phytoplankton dynamics? *Journal of the North American Benthological Society*, 14: 616-630.

Steinman, A.D. , K.E. Havens, N. G. Aumen, R. T. James, K.R. Jin, J. Zhang and B. Rosen. 1999. Phosphorus in Lake Okeechobee: Sources, Sinks, and Strategies. In: *Phosphorus Biogeochemistry of Subtropical Ecosystems: Florida as a Case Example*. Reddy, K.R., O'Conner, G.A. and Schelske, C.L. (eds). CRC/Lewis Publisher, New York.

SFWMD, FDEP and FDACS. 2007. Lake Okeechobee Protection Program, Lake Okeechobee Protection Plan Evaluation Report. Final Report prepared by the South Florida Water Management District, Florida Department of Environmental Protection and Florida Department of Agriculture and Consumer Services. February 23, 2007.

SWET. 2008. Task 3 Report, Legacy P Abatement Plan. Prepared by Soil and Water Engineering Technology, Inc. for the South Florida Water Management District, West Palm Beach, FL.

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 11

Stephen G. Bousquin and Chapter Co-Authors

Level of Panel Review: Accountability (primary); Technical (secondary)
J. Burkholder (AA), J. Burger (A) and R. Ward (B)

Comment #1: *The writing states (line 34) that the primary goal of the KRRP is to restore ecological integrity. In light of comments in Chapter 7B under the subsection entitled "Desired Restoration Condition" (line 178), how is ecological integrity defined here? In other words, it is not possible to restore the system to pristine conditions; thus, what is the goal of the KRRP with respect to restoration goals/integrity?*

Response #1: The ecological integrity goal for the KRR is defined as:

> Reestablishment of a river-floodplain ecosystem that is "capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region." (from Karr and Dudley, 1981).

We will add an abbreviated definition at line 34 and the full definition to the *Kissimmee River Restoration Project and Associated Initiatives* section in the final report.

Project restoration expectations (performance measures) are based on available data from the pre-channelized (pre-1960s) Kissimmee River, data from similar but relatively undisturbed systems, or experimental data from the Kissimmee River. The "Desired Restoration Condition" is ecological integrity, which is quantified by the expectations.

Taken together, the KRREP expectations therefore define project goals in terms of reestablishment of a functional ecosystem comparable to regional examples of similar systems, rather than a potentially unrealistic pre-settlement or pristine "historical" condition.

Comment #2: *The District conducts a water quality sampling program for five lakes and three main tributaries in the Kissimmee basin. What entities sample the other lakes for the KCOL LTMP (i.e. the other lake Management Areas described on pp. 11-63 to 11-64), and with what frequency for what parameters?*

Response #2: The Florida Fish and Wildlife Conservation Commission (FWC) also conducts a monitoring program which includes the lakes sampled by the SFWMD plus Alligator Lake, Lake Gentry, Lake Jackson, and Lake Marian. Water quality is sampled for parameters similar to the SFWMD parameter list, but sampling is done quarterly instead of monthly. The FWC program is being reevaluated, and the SFWMD and FWC are discussing how their two monitoring programs can be optimized.

Florida Lakewatch samples 12 of the 19 lakes—Alligator Lake, Brick Lake, Lake Lizzie, Coon Lake, Lake Center, Ajay Lake, Fells Cove, Lake Gentry, East Lake Tohopekaliga, Lake Tohopekaliga, Cypress Lake and Lake Kissimmee. Monitoring is conducted monthly for total phosphorus, total nitrogen, chlorophyll, and Secchi depth.

The Florida Department of Environmental Protection (FDEP) samples the Kissimmee Basin periodically. The FDEP utilizes the Florida STORET database (http://storet.dep.state.fl.us/), which includes data from the FDEP and other sources, in its water quality assessment that is prepared every five years.

In the final report, we will expand the discussion on lines 448-460 to include the information above.

Comment #3: *The authors frankly state that mercury data from fish tissues are sporadic and inconsistent, and that a larger and more representative dataset is needed for a definitive analysis of mercury levels in the Kissimmee watershed (lines 408-413, 438). Such a dataset would be valuable in helping to interpret restoration success since mercury contamination may adversely affect fish PMs. What is being done or planned to obtain more consistent data – for example, is the District engaged in planning efforts to assist in or coordinate an improved sampling effort?*

Response #3: Concerns about mercury in ecosystems of South Florida are shared by the FDEP, Florida Department of Health, FWC, and SFWMD. The SFWMD's role is to assess potential changes in mercury mobilization resulting from works constructed as part of the Everglades Construction Project, which includes Stormwater Treatment Areas, hydropattern restorations, water diversions, and other improvements. The Kissimmee Chain of Lakes and Kissimmee River are not part of that project.

For tracking of the mercury problem in the Kissimmee Basin, the District will continue to rely on the FWC's periodic analyses of mercury in fish tissue. The District and FWC are starting discussions to better coordinate water quality monitoring conducted by the two agencies, and expansion of mercury monitoring will be included in those discussions. However, this monitoring falls under the FWC's responsibility.

Comment #4: *The accelerating population growth and urbanization in the Kissimmee Planning Area are well described (p.11-17). Encroaching development, especially affecting the upper Kissimmee basin, poses a serious threat to the success of the KRRP. While this development cannot be controlled by the District, what studies are being conducted or planned that will enable the District to better assess impacts of this urbanization on the Kissimmee River and watershed?*

Response #4: The Kissimmee Chain of Lakes Long-Term Management Plan identifies the need to develop an integrated watershed management strategy to achieve the goals and objectives defined for the management of the lakes and their associated watersheds. The plan specifically identifies the need to minimize development impacts on the lake resources and identifies tools that can be applied to achieve these objectives. Additional assessment performance measures need to be developed to explicitly measure and address potential impacts from urbanization. Plan implementation and further assessment performance measure development is contingent on the availability of interagency resources to staff or fund the proposed initiatives.

Comment #5: *Figure 11-8 shows an abrupt, major increase in discharge from ~250 cfs to nearly 2,000 cfs (also described in lines 629-630). What were the effects of this abrupt change on the river ecosystem, and could this change have been effected more gradually? Are there plans to avoid such extreme changes in the future within the interim water regulation schedule?*

Response #5: The increase from 250 to 2,000 cubic feet per second (cfs) was more gradual than it appears in Figure 11-8. The change occurred over a two-week interval. No negative impacts were associated with the increase in water levels and such changes occurred in the pre-regulation system. This was managed to be a gradual increase in flow. District Operations could have made

the increase from 250 to 2,000 cfs in a much shorter period of time (one to two days) and did so before current interim schedule was in place. We have a close working relationship with operations staff (e.g., weekly meetings) that helps avoid the issues associated with rapid changes, with which the panel is rightfully concerned. In the final report, this section of the document will be revised to indicate that the change occurred over a two-week period.

Comment #6: *How does the District plan to integrate invasive species into restoration considerations for the Kissimmee watershed? [Examples: Hydrilla has been a serious problem in Lake Cypress in WY2008 (p.11-25); the noxious exotic bivalve Corbicula fluminea is the most abundant benthic macroinvertebrate in the restored segment (pp.11-49 to 11-50); and the exotic vermiculated sailfin catfish is an abundant fish in the restored Phase I segment (pp.11-54 to 11-55, 11-57).]*

Response #6: *Corbicula fluminea* was introduced in to Florida in 1964 and was present in the Kissimmee River as early as 1971, although its relative abundance at that time is unknown. At present, there is no intent to target *Corbicula* for eradication, if that is even possible. However, *Corbicula* will continue to be monitored over the course of the restoration evaluation program to determine population trends and whether it may be negatively impacting other benthic invertebrates.

The potential effect of exotic fish introductions was considered in target development for Expectation #22: Fish Community Structure. Success criteria targets are approximately 80 percent of the mean value for each species or family in the reference rivers to allow for the natural variability of riverine fish communities and for potential increase of non-indigenous species that were introduced to the Kissimmee River since channelization or after restoration. Discussion of the vermiculated sailfin catfish, and possible reasons for its current abundance, have been added to the chapter.

Comment # 7: *How is the extended herbicide treatment of hydrilla in Lake Cypress (p.11-25), imposed by FL DEP, affecting beneficial species in the lake/surrounding wetlands, and downstream waters?*

Response #7: The potential for herbicide impacts on non-target species is always a concern. The FDEP carefully monitored concentrations to avoid high concentrations that would impact non-target species. The 2004 Hydrilla Summit recommended monitoring to determine impacts on native species be conducted with large-scale hydrilla treatments. The FWC and the FDEP have made inspections to determine if impacts have occurred. Preliminary results suggest that the treatment has impacted pickerelweed (*Pontederia cordata*), floating aquatics including native species, and, in other lakes, soft-stem bulrush (*Scirpus validus*).

Comment #8: *Broadleaf marsh dominated the floodplain prior to channelization, and it has a deep hydroperiod requirement (0.3-1.1 m for 200 days or more; p.11-33). It would seem very important to reestablish for restoration success. Are there plans to move forward on development of broadleaf marsh as an additional hydrologic PM? (lines 692-694)*

Response #8: Yes, the broadleaf marsh indicator will be further developed and formally documented, then proposed for review as a possible additional KRREP restoration expectation. In the final report, a sentence will be added at the referenced location in the chapter to clarify this.

Comment #9: *Is the District conducting or planning studies to address "location effects" of monitoring sites (lines 779-785)? The available information suggests that improved*

understanding of/accounting for these effects could be important in interpreting restoration progress and success.

Response #9: Yes. The 2005 SFER contained a discussion of the differences in the slope of stage-discharge relationships at three locations near the upper, middle, and lower reach of the river channel reconnected by Phase I of the project (pages 11-20 and 11-21). This initial analysis showed that the slope of the stage-discharge relationship decreased from the most upstream site to the most downstream site. This pattern was interpreted to be due in part to a backwater effect at the downstream structure (S-65C). In the final report, text will be added to clarify this information.

More recently, we have realized that our measurements may be influenced by other location effects, such as variation in the width of the floodplain. In the past year, stage-discharge relationships were compared for the two locations with pre-regulation data and for output from the OKISS model developed for the Kissimmee Basin Modeling and Operations Study (KBMOS) future base under development. We anticipate additional work of this nature being conducted in the future, which would be reported in future SFERs.

Comment #10: *The addition of two DO monitoring stations (one each in Pools A and D) with near-real-time monitoring near the surface and bottom of the water column will provide valuable data to evaluate the health of benthic biota and effects of restoration. Are there plans to add another to Pool C, which has been the focus of many of the studies to date?*

Response #10: There are currently two near-real-time monitoring stations in Pool C and there are no plans to add additional near-real-time stations. However, during times of low flow, additional "soft" stations can be rapidly deployed to cover a larger area of river channel.

Comment #11: *As was mentioned in the chapter, low dissolved oxygen may play an important role in P release and increased P supplied downstream to Lake Okeechobee. Will the District include assessment of the effects of oxygen sags on P release from channel sediments (lines 934-940, 945-947)? Although the KRRP was not designed as a nutrient removal project, regarding how the restored system will influence P retention, have the data needs been clearly identified within the Kissimmee Basin P Project (line 1443)?*

Response #11: As stated on lines 946-947, we are considering a study of phosphorus release from channel sediment. Data needs for the proposed Kissimmee Basin Phosphorus Project are being reviewed.

Comment #12: *How does the monitoring plan discussed on p.11-61 interface with other hydrologic monitoring in South Florida?*

Response #12: The additional hydrologic monitoring proposed for Phase II/III of the restoration project will be part of the District's monitoring network. Before installation begins, the proposed expansion of the network will be reviewed the Environmental Monitoring Coordination Team to ensure that there is no duplication of monitoring effort. To ensure that data collected at these monitoring sites is consistent with the rest of the monitoring network, the installation of the new monitoring sites will be overseen by the SCADA and Hydro Data Management Department, which is also responsible for maintenance of the sites, quality assurance/quality control (QA/QC) of the data, and storage in the District's DBHYDRO database. This information will be added to the chapter in the final report.

Comment #13: *Will the KCOL LTMP Monitoring and Assessment Program be established in a sustainable manner (p.11-65)? [In other sections of the SFER (e.g. Chapter 12), situations are described wherein sampling was suspended in the past and, therefore, it was not possible to assess long-term changes.]*

Response #13: Implementation of the Kissimmee Chain of Lakes Long-Term Management Plan (KCOL LTMP) Monitoring and Assessment Program is part of the plan proposal and is currently unfunded. When and if implemented, the long-term monitoring to assess status and trends is intended to continue indefinitely, but will be dependent on interagency commitment of staff resources and/or funds.

Accountability Review

Comment #14: *The chapter reports on the District's actions (e.g. p.11-10) to coordinate among various governmental agencies and other entities involved in management to address watershed-scale water and natural systems issues not only in the Kissimmee basin, but in regions that are hydrologically connected to it. The District uses an emergency modeling team to guide operations during flood events in an attempt to minimize adverse effects on the Kissimmee and downstream ecosystems. Permanent revisions of the stage regulation schedules used for the C&SF Project structures in the Kissimmee watershed consider the potential for impacts on downstream systems through evaluation by the Kissimmee Basin Modeling and Operations Study (KBMOS). It would be helpful in the chapter, though, to provide more explanation about steps being taken to address water/natural systems issues in downstream regions.*

Response #14: The District is exploring options for better coordination of watershed-scale projects. Our purpose in Chapter 11's *Cross Watershed Activities* section is to describe how the Kissimmee Watershed Program interacts with downstream and other related initiatives. We briefly described and/or directed readers to other chapters and other District and external documentation for more information on how water and natural systems issues are being addressed. We feel that more detail on these topics is beyond the scope of Chapter 11.

Comment #15: *Invasive species are briefly mentioned in various sections (e.g. lines 196-203), but there is a clear need to more clearly integrate them into restoration considerations for the Kissimmee watershed. The stated goal of vegetation management in the Kissimmee River ecosystem is to "achieve maintenance control", but little else is said other than referring readers to Chapter 9. The problem with this approach is that Chapter 9 considers exotic species from a much broader perspective than the Kissimmee basin. Therefore, more is needed in Chapter 11 about how invasive species are considered in adaptive management of the Kissimmee basin to achieve restoration goals, and the exotic/invasive species information should be better integrated with Chapter 9.*

Response #15: The comment is partly due to an error in the draft chapter. The reference to Chapter 9 should have directed readers to the 2008 SFER, which includes the Kissimmee Basin Module in Chapter 9, rather than this year's (2009) Chapter 9. The 2008 Chapter 9 contains the most recent information on invasive species management in the Kissimmee Basin. SFER chapters, including Chapters 9 and 11, are designed to avoid excessive redundancy of information with previous reports, as well as with other SFER chapters, so all potential topics are not addressed each year or in every chapter. In the final report, the citation will be corrected in the last paragraph of the *Kissimmee River Restoration Project* section of Chapter 11. See the responses to Question #6 for discussions of exotic fish and snails.

Comment #16: *Table 11-3 is very helpful in listing PMs (Expectations) updates (2005-) on the status of information about them. Further explanation is needed about the five strategic plan success indicators (why [only] those?).*

Response #16: The Strategic Plan is a product of the District's Executive Office. We were asked to provide a maximum of five success indicators**.** The indicators were chosen from among Kissimmee River Restoration Evaluation Program (KRREP) evaluation studies for which data collection takes place at least annually, so that new data for the same subset of studies would be available for annual Strategic Plan updates. Other criteria: we wanted at least one indicator that is expected to show progress on a longer timescale than most (floodplain recession rate), more than one abiotic indicator of crucial components of river channel habitat (flow and dissolved oxygen) and floodplain habitat (recession rate). Lastly, we also included two "charismatic" taxa (fish and birds) because of their intrinsic importance both to lay readers and the ecosystem.

Technical Review

Summary

Comment #17: *The findings and interpretations in this chapter are supported by "best available information", and the only weak sections are the Summary and the Conclusions (below), so described because they do not do the rest of the chapter justice – that is, they do not give a clear picture of the objectives or of the many accomplishments in WY2008. The Summary section is important because it is all that some stakeholders will read. It should be restructured, including up-front statement of the overall objectives.*

Response #17: In the final report, the *Summary* section will be expanded, and the *Conclusions* section will either be expanded or eliminated.

Introduction And Background

Comment #18: *Lines 71-78 – It would be helpful to briefly describe the Plan here.*

Response #18: The LTMP, along with other projects mentioned here, are described later in the chapter in the *Basin Perspective* and *Project Updates* sections. This first paragraph in the section is intended as a brief introduction to the scope of our activities, with details on specific projects following later in the chapter.

Comment #19: *Figures 11-1, 11-2, 11-3 – These are great figures. Also mentioned in the text are the following entities that should be added: the G-11 structure and the Jackson Canal; stations PC61, PC11 and KRDR02 (e.g. from Figure 11-9); and Weir 1*

Response #19: These figures will be revised in the final report.

Comment #20: *(see Figure 11-12 – alternatively for Weir 1, the information on lines 779-780 should be added to the Figure 11-12 legend).*

Response #20: Information will be added to figure caption in the final report.

Comment #21: *Table 11-1 – One point of explanation should be added to this great table: the legend should explain that the information pertains only to the restoration aspects that deal with backfilling).*

Response #21: Clarification will be added to caption in the final report.

Cross-Watershed Activities

Comment #22: *The cross-watershed approach is excellent and has the potential to integrate science, data, and management. However, it is not clear as to how the greater coordination will occur between the Kissimmee Watershed Program and the downstream ecosystems.*

Response #22: The cross-watershed section of Chapter 11 describes how the Kissimmee Watershed Program interacts with other groups to address issues that may extend beyond the boundaries of the Kissimmee Basin, and provides brief descriptions of these activities. The section is not intended to define a plan for future coordination among District programs or projects.

Comment #23: *Line 214 – Please briefly include how ecological integrity is defined for this system (and does it relate to downstream systems?).*

Response #23: In the final report, the definition will be added to chapter at the referenced location and provided above in question #1. The goal of ecological integrity applies only to those sections of river and floodplain affected by the Kissimmee River Restoration Project.

Comment #24: *Lines 331-334 – Although a good point is made about P in agricultural vs. urban runoff, mention should also be made of the many other chemical environmental contaminants besides P that are contributed by urban runoff and atmospheric pollution.*

Response #24: Although we recognize that urban development can contribute other pollutants, lines 331-334 focus on phosphorus because that is the main concern with respect to the general health of the lakes, as well as the Total Maximum Daily Loads (TMDLs) to be developed for the lower lakes of the KCOL and the TMDL for Lake Okeechobee. Other potential pollutants are not mentioned in this paragraph because we have not gathered information that compares runoff of these pollutants from urban and agricultural watersheds. Although comprehensive monitoring for all potential pollutants is not done, the SFWMD and other agencies have sampled turbidity, BOD, coliforms, metals, organic chemicals, and other chemical constituents. The FDEP has assembled data sets from all monitoring programs conducted in the basin and has identified water bodies and watersheds that are potentially impaired or verified impaired for one or more pollutants. The water bodies that are verified impaired for various parameters are listed in the FDEP's Water Quality Assessment Report, as stated on page 11-12. Please see the responses to the next two comments for further information on the impairments identified by the FDEP.

Comment #25: *Lines 336-339 – Needs more explanation; it would be helpful to include a table of the impaired waters, to clarify which parameters are most widespread or severe.*

Response #25: The FDEP concluded that the major water quality problems in the Kissimmee Basin are nutrients, low DO, and mercury in fish tissue. In addition, iron, lead, copper, silver, and cadmium were detected at various locations, and concentrations of pesticides were found in the Reedy Creek drainage. However, most of these locations were not verified as impaired for these metals and pesticides.

A total of 34 water bodies were verified as impaired for one or two constituents. Of these, 18 were impaired for nutrients, 11 were impaired for mercury in fish tissue, 8 were impaired for dissolved oxygen, 2 were impaired for fecal coliforms, 1 was impaired for lead, and 1 was impaired for copper.

As the FDEP stated in its report, elevated nutrients, along with elevated heavy metals and pesticides, can be attributed to urban and/or agricultural land uses. Mercury contamination is thought to result from atmospheric deposition.

In the final report, we will expand the discussion in the cited paragraph and add the table, as suggested.

Comment #26: *Line 338 – lead and copper in the water column? (please clarify)*

Response #26: The FDEP concluded that Lake Mary Jane is verified as impaired for lead and Red Lake is verified as impaired for copper. According to the FDEP report, lead and copper can be associated with industrial or waste sites, and both can be associated with pesticides. Copper, in particular, is a widely used fungicide in the citrus industry and is also frequently used for algae and aquatic plant control in private lakes, stormwater ponds, and canals. The FDEP did not identify any particular land uses or activities that could cause detections of metals in these water bodies.

Comment #27: *The bioaccumulation of mercury is described as a major water quality issue in the Kissimmee watershed, which includes 20 water bodies that are under some level of health advisory. The writing (p.11-13) includes a clear explanation of why mercury in fish tissues is important consideration, and why the District is not monitoring for mercury (purview of other agencies). Frank discussion is also provided of the status and quality of the available data on mercury contamination of fish. Mercury is a topic that could be more integrated among different chapters; it should be noted, for example, that there was little mention of the Kissimmee basin problem in Chapter 3B.*

Response #27: Coordinating the mercury analysis with Chapter 3B is an excellent suggestion and will be addressed in next year's SFER.

Comment #28: *Lines 430-437 – This information needs to be coordinated with Chapter 3B; the U.S. EPA criterion is 0.3 ppm, and usually it is the States that issue advisories and not the EPA.*

Response #28: In fact, it is the FDEP that has set the criterion for methylmercury levels at 0.2 parts per million (ppm). This criterion was published in a July 2008 draft of the FDEP's "triennial review" of surface water quality standards and proposed rule development (Section 62-303.470, Florida Administrative Code). As far as coordinating the mercury chapter with Chapter 3B, please refer to previous response.

Comment #29: *Table 11.2 – Sample sizes are small, and it is not clear what the sample event means. Does year refer to the year of highest reported value? In addition to maximal values, this table should also present means and variance. There could be a change from the maximum, but no real change in the mean values (and, thus, no change in risk). If the issue is fish consumption (by either humans or wildlife), then the mean values are of considerable interest. A person who regularly consumed fish 1``````````````would end up with mean values over long periods of time. Are these sites fished regularly and, if so, which sites, by whom? Figures 11-4, 11-5 – Summary statistics and "n" values should be provided for these figures, which are otherwise excellent.*

Response #29: The values reported in Table 11.2 are means, but they are the highest annual means rather than the maximum value of an individual fish. The syntax of this table was adjusted for clarification. Summary statistics were also added to the table.

The lakes in the upper basin, especially Lakes Kissimmee and Tohopekaliga, receive heavy fishing pressure from both professional and recreational fisherman because of their superior bass fisheries.

In the final report, we will add n values for the means shown in Figures 11-4 and 11-5 to the chapter.

Kissimmee Basin Environmental Conditions in WY2008

Comment #30: *P.11-18, water reservation – Sounds potentially very promising, but is difficult for readers to understand. Additional description would be helpful.*

Response #30: In the final report, the section will be revised to provide more detail about the water reservation.

Comment #31: *Lines 503-503, 546-548 – The endangered snail kite is first mentioned here. Brief explanation about the basic biology of this species and its requirements (food, habitat, nesting) should be included (e.g. it would be helpful to repeat lines 591-593 here).*

Response #31: New material to clarify requirements will be added after cited mention of snail kite.

Project Updates

Comment #32: *Lines 336-348, 447-460 – Please provide a reference that describes the water quality monitoring program of the 34 water bodies in the Kissimmee Basin that is led by the Florida Department of Environmental Protection (it is assumed, then, that FDEP operates the monitoring program?). It should also be clarified as to where the data from this monitoring program are deposited (DBHYDRO? U.S. EPA STORET? State website?). It would be helpful to include a table of the water bodies that are excluded from TMDL development (lines 343-344). Chapter 10 is cited for further information about the Lake Okeechobee Watershed Assessment, but sources should also be provided for further details about ambient water quality monitoring in the remainder of the Kissimmee basin.*

Response #32: The FDEP utilizes the Florida STORET database (http://storet.dep.state.fl.us/), which includes data from various sources. This statement will be included in the Ambient Water Quality Monitoring section.

As stated in lines 343-344, the sections of the river that are part of the restoration project have been exempted from TMDL development due to expected improvement that will accompany restoration. We think that this statement is sufficient, although we have clarified it by reducing its wordiness.

Regarding the last comment, we have added references to the forthcoming KCOL Long-Term Management Plan and the Kissimmee River Restoration Evaluation Program baseline compendium.

Regarding the last comment, we have provided a summary of water quality monitoring programs in the Ambient Water Quality Monitoring section. We consider this summary and the cited FDEP (2006) report as a sufficient view of the available information.

Comment #33: *Table 11-3 – It would be helpful to indicate when indicators not addressed since 2005 are planned to be reevaluated (for example, the flow velocity indicator, herpetofauna indicators [not yet evaluated], etc.).*

Response #33: Indicators that have not been updated since 2005 are wetland-dependant floodplain response metrics, which are not expected to respond until floodplain inundation is reestablished. Post-restoration sampling will take place following implementation of the headwaters revitalization water regulation schedule.

Comment #34: *Line 688 – The first five of the 25 restoration expectations…*

Response #34: Corrected.

Comment #35: *Lines 708-709 – Please clarify – based upon mean monthly discharge?*

Response #35: Done.

Comment #36: *Line 720 – Please clarify that the "average groundwater elevation" refers to duration of floodplain elevation.*

Response #36: The text states average ground elevation not groundwater. No change was made to the text.

Comment #37: *Line 795 – Figure 11-2*

Response #37: This figure number will be changed to 11-2.

Comment #38: *Lines 799-800 – The years involved should be mentioned.*

Response #38: The period of record for data from the seven reference streams is 1973-1999. This information will be added to the chapter.

Comment #39: *P.11-35 versus p.11-24 – There seems to be a discrepancy in the durations of the wet vs. dry seasons – indicated as May – October and November – April on p.11-24, but stated as June – November and December – May on p.11-35. Please check/clarify.*

Response #39: The wet season is defined as June-October on page 11-18 line 509. This definition is based on rainfall and is the normal definition for the SFER (see Chapter 2 on hydrology). On page 11-24, the wet season is described as ending on October 31.

Comment #40: *Figure 11-15 legend – The station #s should be explained.*

Response #40: Station names are given in the District's DBHYDRO database format for consistency. This will be explained in the figure caption.

Comment #41: *Figure 11-16 legend – The dates for baseline and post-construction data should be included.*

Response #41: Dates for baseline data = 1997-1999, reference data = 1973-1999 and post-restoration data = 2001-present. This information will be added to the figure caption.

Comment #42: *Lines 808-817 – The components of PM (Expectation) 8 were clearly explained. Depth gradient data are mentioned for DO, and a graph of these data should be added. Did the reference streams have near-bottom DO data?*

Response #42: No near-bottom data exist for the reference streams. A graph depicting depth gradient data will be added in next year's update.

Comment #43: *Figure 11-17 – Can standard errors be added?*

Response #43: Error bars will be added in the final report.

Comment #44: *Figure 11-18 – The depth and time of day where these data were taken should be added*.

Response #44: Depth and time (96 values per station per day) will be added.

Comment #45: *Line 877 – It would be helpful to explain how much filling of ditches and removal of cattle has occurred.*

Response #45: Extensive filling of ditches has occurred as part of restoration construction. Many cattle have been removed from the floodplain, although some remain for now outside the restoration area under lease agreements. We do not have quantitative information to further address this comment.

Comment #46: *Lines 888-895 – Brief explanation should be added as to why there was such a large increase (from 51 mt/yr to 83 mt/yr) over such a relatively short distance, and why concentrations were greater during years of low flow.*

Response #46: We added text to the first paragraph of the Total Phosphorus section to explain that the sub-basins of Pools D and E have more intensive agricultural development. Since evaluations began in the 1970s, these sub-basins have always exported more phosphorus than the sub-basins of the upper pools of the Kissimmee River.

Comment #47: *Figures 11-19, 11-20 – It would be helpful to indicate years affected by droughts and major storms.*

Response #47: In the final report, we will add explanatory text to the caption in Figure 11-19.

Comment #48: *Line 939 – This seems to be a serious understatement that should be described differently, as the data indicate that there have been chronic problems with low DO (less than 4 mg/L, often less than 2 mg/L even toward the surface of the water column).*

Response #48: Dissolved oxygen in Florida waters is generally lower than it is further north where temperatures are cooler. Consequently, the expected increase in DO following restoration, which is based on reference data from nearby streams (lines 796-804), is not as high as one might expect in more northern streams. We expected mean daytime concentration to increase from < 2 mg/L to 3-6 mg/L during June-October. This expectation has been met, as shown in Figures 11-16 and 11-17. However, sometimes the river has experienced oxygen sags due to intense rainfall events (Figure 11-18). Therefore, we believe that the statement on line 939 is accurate, but we have clarified it by explaining what we mean by low DO (< 2 mg/L).

Comment #49: *Lines 993-997 – Please clarify what was done to ensure that disturbance from motorboat access was minimal.*

Response #49: Explanation will be added in the final report. Actual sampling was done from a non-motorized inflatable boat.

Comment #50: *Lines 1053-1054 – Brief explanation should be added for why sampling was temporarily suspended in 2004-2006, and why sample transect size was reduced in 2007-2008.*

Response #50: In the final report, the following text will include the requested explanations: *"Sampling was temporarily suspended from 2004–2006 to free staff and resources for other evaluation work. A randomly reduced transect sample size was collected in 2007–2008; this reduction was based on power analyses of previous years' data to determine that acceptable standard errors could be achieved with a smaller sample size."*

Comment #51: *Line 1064 – Explanation of midpoints would be helpful.*

Response #51: Explanation added.

Comment #52: *Lines 1071-1072 – Was vegetation in the water also considered? – please explain.*

Response #52: Yes, submergent species were recorded when visible. Clarification was added.

Comment #53: *Aquatic Invertebrates subsection (pp.11-49 – 11-51) – Should include a clear statement of objectives.*

Response #53: A statement of the objectives will be added to the text.

Comment #54: *Lines 1138-1140 – This writing describes encouraging progress toward restoration success. While some of the data for macroinvertebrates are indeed promising, the writing "overlooks" the fact that the major dominant benthic invertebrate is a noxious exotic species.*

Response #54: *Corbicula* was introduced into Florida in 1964 and was present in the Kissimmee River as early as 1971 although its relative abundance at that time is unknown. There was no intent to "overlook" the fact that *Corbicula* is the dominant benthic taxa at this time. The objective was to present an overview of the entire benthic community and focus on those changes in community structure that most reflect a return to a more natural state. *Corbicula* will continue to be monitored over the course of the evaluation program to determine population trends and whether this species may negatively impact native bivalves or other benthic invertebrates.

Comment #55: *Lines 1161-1165 – Identifies one of the three reference rivers is the St. Johns, yet then states that this river is below the St. Johns drainage. Please clarify.*

Response #55: The headwaters of the Kissimmee and St.Johns Rivers originate close to one another in central, peninsular Florida, but the Kissimmee flows south and the St. Johns flows north. Only data from the upper reaches of the St. Johns that are not influenced by brackish water and that support a fish community similar to the Kissimmee were used to develop reference targets.

Comment #56: *Lines 1178-1180, vs. lines 1211-1226 – Are the success measures, then, changes in relative abundance only?*

Response #56: Correct, the metric target reflects relative abundance only.

Comment #57: *Table 11-6 – It should be clarified as to whether differences among species in movement or seasonality patterns, or response to electroshocking, were accounted for.*

Response #57: Bias related to sampling method will be similar for all data in Table 11-6 because only electroshocking was used as the sampling method. Electroshocking as a standard method, is not without bias and selects for larger individuals, and is not equally effective for all species (i.e., *Hoplosternum littorale*, endemic to South America evolved with electric fish taxa and is not readily susceptible to electroshocking). However, electroshocking is the most resource friendly and effective single sampling method available. Sampling is conducted in early summer, prior to onset of wet season rains, when water levels are typically low and access to floodplain habitat is limited. Differences in potential movement up or downstream are not accounted for, however potential lateral movements onto the floodplain are limited by sampling period (early summer).

Comment #58: *P.11-61 – It should be clarified as to whether the hydrologic monitoring data that are discussed on this page will be deposited in DBHYDRO.*

Response #58: Yes. Text will be revised in the final report.

Comment #59: *Lines 1464-1465 – Brief explanation is needed as to why the selected KBMOS water control structure operating criteria are not intended to deliver Kissimmee Basin inflows that meet the desired stage envelope.*

Response #59: Text will be revised in the final report.

Comment #60: *Line 1485 – Which agencies and stakeholder groups?*

Response #60: Agencies and stakeholders are listed in line 1491. Text will be revised to be consistent with how agencies/stakeholders are referenced in line 1485, and additional stakeholder groups will be added in the final report.

Comment #60: *Lines 1514-1529 – It would be helpful to explain, briefly, the types of monitoring that had been done previously so that readers can understand how the approach was further refined.*

Response #60: Text will be revised in the final report.

Comment #61: *A reference should be added that describes the KCOL LTMP Monitoring and Assessment Program in detail.*

Response #61: Text will be added in the final report.

Comment #62: *Conclusions – As mentioned, this section does not do the chapter justice and needs to be expanded to include more information about the progress that has been made in restoration, including additional qualitative and quantitative statements.*

Response #62: The conclusions section will be expanded or removed.

Comment #63: *Comment regarding cross-system integration – Chapters 10, 11 and 12 provide overviews of Lake Okeechobee, the Kissimmee Basin, and the Coastal Estuaries as three separate components of the large, complex South Florida ecosystem. The panel appreciates that various separate laws and projects require distinct discussions, but from a scientific standpoint, more integration would be desirable. Chapter 11's Cross-Watershed Activities section is commendable in that regard.*

Response #63: Comment appreciated.

Editorial Changes

Comment: *Table of contents – the four main sections should be in bold or otherwise designated apart from subsections. [SO] In response to previous SFER panel comments, note that the Table of Contents, for a second year, has been provided as a quick reference to assist panelists in their review of the draft Volume I chapters. As this Table of Contents is generated in Adobe PDF with limited formatting features, its appearance is not as polished as the report itself. However, please note that this information will not appear in the final electronic-based version, which will simply contain PDF e-linked bookmarks as the Table of Contents.*

Comment #64 *Line 139 – Shouldn't this be KRHRP rather than HRHRP?*

Response #64: This will be corrected in the final report.

Comment #65: *Lines 172, 455 – The definition of what is meant by recarved (line 172) and remnant (line 455) is given much later (p.11-42), and, to help readers, should also be given where the terms are first used. [SGB]*

Response #65: Clarification will be added to the text in the final report.

Comment #66: *Line 311 - …Chapters 10 and 12…*

Response #66: This will be corrected in the final report.

Comment #67: *Lines 306-307, 320 - underway Line 327 – Please clarify the location of Osceola County (upper basin).*

Response #67: This will be corrected in the final report.

Comment #68: *Line 531 – 2007*

Response #68: This will be corrected in the final report.

Comment #69: *Figure 11-7 legend – Should explain the maroon-colored line in (B).*

Response #69: Text will be added to figure label.

Comment #70: *Lines 550-553 – Should refer to Figure 11-8B. Figure references have been added. Also, the wet season and dry season should be defined.*

Response #70: Wet season and dry season were defined under rainfall on page 11-18.

Comment #71: *Line 582 – Why is S-65C called a headwater stage? (briefly explain)*

Response #71: Two different water levels can be measured at a structure. The headwater is on the upstream side of the structure and the tailwater is downstream. Text will be changed to indicate that the headwater stage is measured upstream of the structure.

Comment #72: *Table 11-3 – The 2008 column needs to be completed.*

Response #72: The column for the 2008 SFER (WY2007) column was fully completed. We original opted to add the 2009 (WY2008) chapter updates next year because of difficulty determining page numbers until final editing is done. However, we have added a column for the updates contained in the 2009 chapter.

Comment #73: *Line 843 - …for 252 days…*

Response #73: This will be corrected in the final report.

Comment #74: *Line 844 – Oxygen concentrations increased for…*

Response #74: This will be corrected in the final report.

Comment #75: *Line 857 - …However, two of the four…*

Response #75: This will be corrected in the final report.

Comment #76: *Line 860 – Persimmon Mound Run? remnant control*

Response #76: This will be corrected in the final report.

Comment #77: *Figure 11-22 legend – Should explain "left monument"; and 2nd line should be: …and did not have a…*

Response #77: This will be corrected in the final report; caption of Figure 11-23 will also be modified to explain "left monument."

Comment #78: *Lines 1071-1078 – This paragraph and the succeeding paragraph should also state what happened – that the PM was not attained (Figure 11-24).*

Response #78: The first paragraph at line 1071 is a presentation of methods, so results are not needed here. In the final report, we will add clarification in the second paragraph that the expectation for floating and mat-forming species had not yet been met. However, both of the expectations shown in Figure 11-24 have been met.

Comment #79: *Lines 1096-1097 –…more natural substratum composition, and more natural floodplain hydroperiods.*

Response #79: This will be corrected in the final report.

Comment #80: *Line 1126 – Change dominant to common*

Response #80: This will be corrected in the final report.

Comment #81: *Figure 11-27 – The common name should be included above each graph. The Y axis should be labeled.*

Response #81: This will be corrected in the final report.

Comment #82: *Line 1152 - ....reptiles, birds, and mammals… ;*

Response #82: This will be corrected in the final report.

Comment #83: *Line 1158 – Restoration targets (below) for fish…*

Response #84: This will be corrected in the final report.

Comment #85: *Line 1294 - …before detectable shifts in their…;*

Response #85: This will be corrected in the final report.

Comment #86: *Line 1363 - …C.I. has…*

Response #86: This will be corrected in the final report.

Comment #87: *Lines 1561-1567 – The acreage should be included.*

Response #87: This will be revised to include map and include acreage.

Comment #88: *Figure 11-32 – The key labels are too small to read; and Catfish Creek should be labeled.*

Response #88: In the final report, the larger figure will be made and Catfish Creek will be labeled.

RESPONSES TO COMMENTS ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 12

Richard Alleman, Miao-Li Chang, Peter Doering
and David Rudnick

Level of Panel Review: Accountability (primary); Integrative (secondary)
N. Armstrong (AA), J. Burkholder (A) and R. Ward (B)

Recommendations and Questions related to the CED Science Plan

Comment #1: *The District is urged to seriously consider the use of simplified water quality models.*

Response #1: Concur. Simplified approaches/models are always considered and used before development of more complicated numerical models to provide necessary information for management if a complicate model is not available. The District's plan is to build upon simple approaches for water quality simulation. In the mean time, the sophisticated water quality routines/models will be considered or developed when data or information is available to get big-picture information for management decisions. At this point, District has CH3D hydrodynamic models that are well calibrated and verified in St. Lucie Estuary, Loxahatchee River, and Caloosahatchee River and estuary. It serves as an effective tool for simulating the transportation of water quality constituents in the estuary. Long-term simulations with CH3D are now possible with today's computer technology. Water quality model development in St. Lucie Estuary was initiated in 2000. Today a standalone EFDC-based water quality model has been calibrated and verified with field data collected from 1999 through 2005. The District has just completed a light version of EFDC water quality code. Direct coupling with CH3D are allowed for both versions of the EFDC model. Our goal is to combine both simplified and sophisticated water quality models as scientists continue to improve the understanding of the complex water quality processes in our estuarine systems.

Comment #2a: *In regard to Figure 12-3: What is the current status of the Division's Science Plan? Is it still in development and how would one describe its coherency?*

Response #2a: The Plan was updated to support the St. Lucie and Caloosahatchee River Watershed Protection Plans. Each year, the Plan will be updated for one or two estuaries. For example, results from a planned science symposium for Estero Bay will be used to update that section.

Comment #2b: *How are the basic research, management, and restoration tenants of the Plan being incorporated into the management of the coastal systems described in this Chapter 12?*

Response #2b: The research conducted by the CED is intended to provide a scientific basis for meeting four major coastal ecosystem management goals. These are: improving the timing, volume and delivery of freshwater, improve and protect water quality, rehabilitate estuarine habitats and finally, improve operation of District infrastructure. Three basic vehicles used to apply CED's research results to these management goals are the planning process, rule making, and operations of Lake Okeechobee. Recent examples of application through planning are the

Northern Everglades River Watershed Protection Plans for the Caloosahatchee and St. Lucie Estuaries. A recent example of the rule making process is the initial water reservation for the Biscayne Bay Coastal Wetlands CERP project. Aside from supporting the design and implementation of large CERP projects, CED continues to be involved in local, small scale restoration projects such as oyster reef construction and planting SAV to provide a seed bank. Lastly, ecological information is used weekly to advise decisions concerning flood control and environmental releases of water from Lake Okeechobee.

Comment #2c, d, e: *c) If one were to explain the interrelationships of the elements of Figure 12-3 of the 2009 SFER Chapter 12 draft, what would that explanation be? d) What is the relationships between Figures 2 and 3 in the 2008 SFER Coastal Ecosystem Science. e) Plan (Appendix 12-1) and Figure 12-3 of the 2009 SFER Chapter 12 draft and how do they convey the workings of the CED Science Plan?*

Response #2c, d, e: Figure 2 in the Science Plan is a conceptual diagram showing that Freshwater Inflow to an estuary affects physical and chemical Conditions in the estuary and that Conditions affect Estuarine Resources, which include both the plant and animal communities as well as estuarine processes such as productivity and nutrient cycling. Figure 3 in the Science Plan depicts the Integrated Modeling Framework, which formalizes the concepts presented in Figure 2. The watershed model estimates freshwater inflow, the estuarine hydrodynamic, sediment and water quality models simulate estuarine conditions, and the ecological models simulate the responses of resources and processes to these conditions.

SFER Figure 12-3 shows the relationship between Northern Everglades research (field and laboratory studies and empirical data analyses) and modeling programs and the goals of the research program. The goals are (1) to provide robust scientific support to reduce the uncertainty in the estimate of the TMDL (2) to reduce the uncertainty in salinity envelopes and to quantify not only what are undesirable flows and salinities, but to identify critical periods when meeting targets is most ecologically beneficial and (3) conduct short-term studies required to adaptively manage treatment and storage facilities to meet environmental objectives.

Northern Everglades Research, as defined above, centers on water quality and biological resources. Water quality research ("Water Quality" box in Figure 12-3) consists of a number of projects that should help refine TMDLs and should also provide data that can be used to build models. This research would fall under the Estuarine Conditions category in the Science Plan Figure 2. Biological resources research (Biological Resources box in Figure 12-3) concentrates on the relationship between biological resources and freshwater inflow/salinity. Results from this research can be used to improve salinity envelopes, environmental operations and help build models. This would be best represented by the Estuarine Resources box in Science Plan Figure 2. Science Plan Figure 3, the Integrated Modeling Framework, is represented in the "Modeling" box of SFER Figure 12-3. Integrated models can be used to refine salinity envelopes, evaluate various scenarios for achieving the TMDL and to test different methods of operating treatment and storage facilities.

SFER Figure 12-3 does not include sources of data, monitoring and other studies that might be only for model development.

Recommendations And Questions Related To Accountability

Comment #3: *It is recommended that one additional table be added, one that lists major District efforts and accomplishments for the Water Year in each of the estuaries.*

Response #3: Concur. We will include a table that lists major accomplishments in the 2010 SFER report.

Comment #4: *It is recommended that the four types of information listed [below] be made available for each estuarine system.*

Physical characteristics such as volume at mean tide, surface area at mean tide, average depth at mean tide, measures of tidal exchange such tidal prism, major currents, major geomorphic features;

Hydrologic characteristics such as annual average inflows by year for previous 20 years at least, annual average hydraulic residence times, average annual constituent residence times taking into account tidal exchange, and fraction of freshwater based on annual average salinities;

Water quality characteristics such as annual average concentrations and temporal variations of key constituents (e.g., salinity, DO, organics, and nutrients) bay wide and spatially that conveys general information about water quality conditions throughout the estuary;

Biological data such as general concentrations (volumetric, areal, etc. as appropriate) of primary producers (e.g., phytoplankton, submerged aquatic vegetation) and secondary producers (e.g., zooplankton, benthic organisms, key species/VEC's), and associated organisms.

Response #4: Concur. Much more of this information was included in the 2009 report than previously. We will continue to add more information about the estuaries such as the physical and hydrologic characteristics in future reports as available.

Comment #5: *It is recommended that a table of PMs for each system should be added.*

Response #5: Performance measures have developed for different purposes for the estuaries. Many of them, for example, have been designed to primarily evaluate results from the South Florida Water Management Model, but may not relate well to real world conditions. In some cases, while performance measures are useful qualitative, there is not consensus about using them quantitatively. We report primarily on the status of measures adopted as rules such as minimum flow criteria, and will report on the status of TMDLs when adopted..

Comment #6: *It is recommended that adequate information be provided for each estuarine system that permits one to evaluate accountability.*

Response #6: Many needs have been identified, but our ability to meet the needs is necessarily constrained by legislation, rules, policy and funding. Our priorities are evaluated annually and weighed against all other District priorities.

Comment #7: *It is recommended that repetition of text for sections that are repeated for each estuarine system be avoided by placing the text before these sections.*

Response #7: We will examine the text to see if it can be more efficient.

Comment #8: *It is recommended that progress being made in the CRE be provided in more detail.*

Response #8: Concur. More information will be added to the 2009 report.

Recommendations And Questions Related To Integration

Comment #9: *It is recommended that a realistic timeline for restoration of each coastal ecosystem and for integration of their data be developed.*

Response #9: Priorities for support of restoration of individual estuaries are typically set through legislation such as the Northern Everglades and Estuaries Protection Program, or by rule such as the Minimum Flows and Levels Priority List. We do not have the resources to collect all the data that may be needed for water quality and ecosystem models.

Comment #10: *Can the authors of this chapter interact with those of Chapter 2 to develop measures that reflect the management effectiveness of providing the amounts of water needed to sustain the SLE and CRE systems?*

Response #10: We indicated performance relative to established salinity envelopes for the St. Lucie and Caloosahatchee River Estuaries. We will include information about the quantity of freshwater derived from Lake Okeechobee. Management goals for Lake Okeechobee vary, however, depending on water levels and climate such that at times estuary goals are secondary.

Comment #11: *It is recommended that integration of the coastal ecosystems be strengthened through common linkages.*

Response #11: It is unclear that wading birds or exotic species link the estuarine systems, because habitats vary considerably among the watersheds and estuaries. The primary linkage among the coastal systems is the regional water system. We will consider providing an overview of the linkages between regional water management and estuarine systems in the 2010 report.

Comment #12: *It is also recommended that integration of the coastal ecosystems with inland systems like Lake Okeechobee be strengthened.*

Response 12: Concur. We will include more information and cross references to management measures in the watersheds.

Other Comments And Questions Related To Accountability And Technical Character

Comment #13: *The Summary should state that that primary role of the Coastal Ecosystem Program is to provide the information needed to design effective restoration and protection measures for the District's eight priority Coastal Ecosystems.*

Response #13: Concur. The 2009 report will be changed accordingly.

Comment #14: *While some sections nicely report metric units with English units following in parentheses, other sections report a mix of English and metric units. The chapter should be edited for consistency in units and units presentation.*

Response #14: Concur. The 2009 Chapter will be corrected for units.

Other Comments And Questions Related To Accountability And Technical Character For The St. Lucie River Estuary And Southern Indian River Lagoon

Comment #15: *Lines 197-200 – define "excess water" and "existing condition" in a way that one can relate them to the "best combination of management measures to achieve overall project objectives for water quality and quantity."*

Response #15: Concur. The text will be modified accordingly.

Comment #16: *Lines 200-210 – it is inferred from this text that the alternatives to be considered have already been identified and incorporated into one of these four alternatives groupings. Is this the case or is there flexibility to incorporate other alternatives not yet identified? It would appear that an adaptive management approach would dictate the latter approach.*

Response #16: The alternative formulation process was very inclusive encompassing proposed management measures by a working team to maximize both water storage and nutrient load reductions and reflects best available technologies for addressing planning objectives. With that being said, through the adaptive management process and with the implementation of research and monitoring program, progress towards meeting the water quantity and quality goals of the River Watershed Protection Plans will be monitored, and necessary revisions will be incorporated into the Plans every three years as required by the legislation.

Comment #17: *Lines 211-222: Are the Research and Water Quality Monitoring Plans discussed here coordinated with similar water quality monitoring efforts in the Kissimmee basin and Lake Okeechobee? Will the data be stored in DBHYDRO? Is there a brief outline, or citation, of such connections that could help the reader appreciate a total South Florida perspective is being taken with respect to water quality monitoring? Or are these connections to be developed as part of the water quality monitoring reengineering currently underway by the SFWMD?*

Response #17: All data SFWMD collects is stored in the DBHYDRO database. It is not clear that a document exists at this time that provides an overview of monitoring in all of these systems. We will look into it, and provide this type of information in future reports if possible.

Comment #18: *Lines 316-317; also lines 2420-2426, Estero Bay; and p.12-133, Florida Bay – SAV typically refers to submersed vascular plants (see Day et al., 1989, Estuarine Ecology; Wetzel, 2001, Limnology). The "lumping together" of seagrasses and macroalgae can be a problem because macroalgae (including some species of Caulerpa – see p.12-22) are not considered good indicators of ecosystem health (see Burkholder et al. 2007, Journal of Experimental Marine Biology and Ecology, 'Seagrasses and eutrophication'). Instead, macroalgae can be indicators of excessive nutrient pollution; under such conditions they commonly overgrow and kill seagrass meadows. Throughout the rest of p.12-18, seagrasses are mentioned without further mention of macroalgae.*

Response #18: Concur. The text will be clarified.

Comment #19: *Please clarify - are macroalgae being included in the aerial photo analyses as "SAV" (Figure 12-5)?*

Response #19: Yes, the maps created from aerial photographs include both seagrasses and algae as indicated in the map legend for Figure 12-5.

Comment #20: *Line 352 – It would be helpful to mention some environmental characteristics of Johnson's seagrass.*

Response #20: Concur. Additional information will be added.

Comment #21: *Lines 356-347, Figure 12-6 – Notwithstanding this previous study, historic information that might be available for SAV coverage in the SLE should be mentioned here.*

Response #21: Concur. Information is not extensive or quantitative, but additional information will be added.

Comment #22: *Figure 12-7 – Planned monitoring stations for SAV in the SLE should also be included.*

Response #22: All currently proposed SLE seagrass monitoring stations are already shown on Figure 12-7.

Comment #23: *Lines 465-489 – Is a similar floodplain vegetation study planned for the South Fork of the SLE?*

Response #23: The floodplain vegetation communities on the South Fork of the St. Lucie River will be examined in the future for general distribution patterns; however, extensive transect investigations are not planned since the District has no major water control structures on this tributary.

Comment #24: *Lines 493-495 – "Inflows less than 28 cfs", monthly average, seems very low. "Inflows lower than this threshold for two consecutive years" – seems inadequate to pro*tect key components of the SLE. The underlying rationale for both should be briefly explained.

Response #24: Additional information will be added. The 28 cfs monthly average flow at the head water structure on Ten Mile Creek of the North Fork is the only monitored structure for which the District has any influence. Many other sources that contribute inflow to the North Fork are not monitored including the Five Mile Creek, urban drainage ditches and most importantly, groundwater. The 28 cfs from the Ten Mile Creek and other sources provides for the oligohaline zone (0.5 to 5 psu) in the North Fork to be positioned in the area with increased habitat.

Comment #25: *Lines 502-503 – it is stated that maximum inflows were not exceeded implying that salinities in the St. Lucie River at Highway 1 did not fall below 7 psu during CY2007; however, it appears in Figure 12-23 does indeed fall below that level.*

Response #25: Daily values were mistakenly plotted rather than 30-day mean values. The figure will be revised.

Comment #26: *Figure 12-14 – this figure, currently on page 12-31, is not referenced until page 12-35 and should be moved to that page or later.*

Response #26: Concur. The figure will be edited as suggested.

Comment #27: *Table 12-3 – Information should be added on the nitrogen (especially nitrate and ammonium) and phosphorus component concentrations. Were these surface DO concentrations? Are bottom-water DO concentration data available? The legend should explain whether these are monthly data? Was the station added in 1997 included in these analyses?*

Response #27: Concur. These results will be added in future reports.

Comment #28: *Lines 522-541 – The Watershed Trends section requires expansion. Remarkably, these important data, some of the best for the SLE, are not even shown – not one graph or summary table – and interpretation of the trends is also required. For example, the trends suggest a decrease in organic N – why would that be the case. Clarification is also needed for inclusion of the S-50 structure on the C-25 canal.*

Response #28: Concur. Additional information will be added to the report.

Comment #29: *Lines 529-541 - As the number of samples in a time series increases over time and this data is then used, periodically, to 'test' for trends, there is a concern that at some point almost all time series will yield a statistically significant trend because of the large number of samples involved. Thus, if the Line 539 findings are statistically significant (and a large 'n' is used) are the changes nutrient significant? In other words, are the changes over 25 years significant from a nutrient point-of-view as well as a statistics test?*

Response #29: Concur. We will further examine the results.

Comment #30: *Lines 543-556 – loadings should be given in metric units. The data need to be interpreted relative to other estuaries of similar size/watershed size. The water quality targets should be stated.*

Response #30: Concur. Additional information will be added.

Comment #31: *Lines 567-580 – Please add a short description of the nutrient limitation bioassays performed or nutrient ratios calculated. There are significant misconceptions about the interpretation of results depending on the nature of the tests (batch or continuous flow), the concentrations used in the ratio (concentrations have to be in the realm of the Michaelis Constants for N and P before they are meaningful. Also, the concept of nutrient limitation should be expanded to include the importance of nutrient ratios (N:Si, N+P:SI, P:Si) because (i) in various eutrophic estuaries, nutrient co-management (N+P) has been shown to be important, and (ii) silica has been invoked as potentially limiting for diatoms in the SLE (lines 638-640). Also applies to the CRE (lines 1288-1290).*

Response #31: Concur. Additional information will be added to the report.

Comment #32: *Lines 589-591 – What are "the appropriate nutrient loads" for the SLE – the targets, if developed (see lines 652-654), should be stated.*

Response #32: "The appropriate nutrient loads" have not yet been developed. FDEP is developing them as part of establishing a nutrient TMDL based upon existing information and newly developed models.

Comment #33: *Table 12-4 – This "template" table, also used in modified form in the CRE section, requires further explanation. The legend states that the priority is indicated; they are missing and must be added.*

Response #34: It was not intended to indicate a priority ranking of needs. The caption will be changed accordingly.

Comment #35: *Lines 628-640 – please see comments above for nutrient bioassays in Lines 567-580.*

Response #35: Additional information will be added.

Comment #36: *Line 628 – Please clarify - sampled for what? It would be very helpful in such assays to have information on the dominant phytoplankton species.*

Response #36: The water column was sampled for the parameters described. Additional information about phytoplankton will be added.

Comment #37: *Lines 641-646 – The MERLINs are an exciting addition. After β-testing, where will they be positioned?*

Response #37: At this time, it is planned to deploy the MERLIN within the North Fork of the St. Lucie River Estuary.

Comment #38: *Lines 647-651 – what will the MDLs be for each constituent? Will they be low enough for the nutrients to detect low concentrations in the estuary?*

Response #38: It is expected to provide data equivalent to the District's certified wet lab.

Comment #39: *Lines 655-678 – has a nutrient budget been put together for the St. Lucie Estuary yet – even a preliminary one? In linear systems like this estuary, benthic flux only accounts for about 15% of the internal nutrient sources. Thus why is so much attention being focused on this potential source in this system and others right now when the larger components of the nutrient budget need to be tied down?*

Response #39: A nutrient budget was developed for the St. Lucie in 2007. However, this budget was based on benthic flux measurements (April, 2000-March, 2001) that were among the highest reported in the literature. The estimates of benthic flux contribution to the SLE's N and P pools was 72% and 89% respectively. These benthic flux rates could not be verified and the 2008 benthic flux projects were initiated in order to verify or refute the suspect flux rates.

Comment #40: *Lines 681-689 – The SLE is listed as impaired for low DO. The authors mention that BOD and/or chlorophyll a could be causative factors for the DO impairment, suggesting different origins. The BOD potential origin is explained; explanation similarly should be added for chlorophyll a.*

Response #41: Concur. Additional information will be added.

Comment #42: *Line 688 – need a period after "lagoon".*

Response #42: Concur.

Comment #43: *Lines 697-705 – are sources being estimated as well? Need to be sure that dissolved oxygen reaeration is being estimated properly, i.e., using velocities actually occurring in the system or via direct measurement techniques.*

Response #43: Concur. Re-aeration is an important source and proper methods to determine it will be conducted.

Comment #44: *Lines 713-715 – see comment for Lines 655-678.*

Response #44: A nutrient budget was developed for the St. Lucie in 2007. However, this budget was based on benthic flux measurements (April, 2000-March, 2001) that were among the highest reported in the literature. The estimates of benthic flux contribution to the SLE's N and P pools were 72% and 89% respectively. These benthic flux rates could not be verified and the 2008 benthic flux projects were initiated in order to verify or refute the suspect flux rates. A nutrient budget for the Caloosahatchee has not yet been developed, but should be completed in the near future.

Comment #45: *Line 715, "Further measurements are required" – have they been planned?*

Response #45: Yes, a Wet Season Benthic Flux follow-up is currently scheduled for July/August, 2009. Bimonthly in situ flux measurements are planned at 2 stations (TBD) in the SLE and 2 stations (TBD) in the CRE from November, 2008 – July, 2009.

Comment #46: *Lines 727-729 – Sentence requires further explanation.*

Response #46: Concur. More explanation will be added.

Comment #47: *Lines 732-734 – The underlying logic here seems flawed ("An agricultural paradigm…"). The point needs to be made that excessive nutrient loads repeatedly have been shown to be detrimental to estuaries (see National Research Council 2000, Clean Coastal Waters – Understanding and Reducing the Effects of Nutrient Pollution – National Academy Press).*

Response #47: Concur. The text will be clarified.

Comment #48: *Lines 773-783 – what is the rationale for choosing these particulate constituents and biota? Why not nutrients as well?*

Response #48: Question 1; These listed constituents for observation are address the biota and water quality that respond to variations of inflow within the low salinity zone. Emphasis is on the linkage among inflow and primary and secondary productivity related to the fish nursery function of the estuary. This information will be added to the text.

Question 2; Agreed, this was an oversight, nutrients will be added to the list.

Comment #49: *Line 776 – Phytoplankton species also are mentioned in Table 12-6.*

Response #49: Table 12-6 highlights the common components of all three priority projects to consider when designing future projects by maximizing efficiency.

Comment #50: *Line 783 – The depth where DO is to be measured should be clarified.*

Response #50: Concur. This information will be added.

Comment #51: *Table 12-6 – This table is confusing. Under Research Component – Canal Loads, why does water quality (color, turbidity, chlorophyll total suspended solids etc.) go unmentioned? (see comparable table for the CER, p.12-72). Shouldn't hatchings (indicating "commonality") be added for several boxes (e.g.benthic flux x low-salinity zone; denitrification x DO dynamics, larval/juvenile fish x DO dynamics)?*

Response #51: Question 1: Concur. Water quality constituents, including those mentioned above are an integral part of all three research projects. This is the commonality that we wish to exploit when designing a quality water monitoring program to meet the requirements of all projects instead of three individual sampling programs. We will look at ways to clarify the table.

Question 2: The "commonality" perspective that was used here is focused on the need to integrate the scopes of work for that research component with the specific needs of more than one priority project. The original intent of the Table was to accentuate the need for cooperation among PI's, which is not necessarily important for this document.

Comment #52: *Line 824 – "possible of future scenarios" should be "possible future scenarios"*

Response #52: Concur.

Comment #53: *Line 879 – "verification" is a term that often implies the model has been calibrated to one set of conditions and applied successfully to one other set. "Confirmation" is often used to mean that the model has been applied successfully to a number of other sets and gains credibility with each confirmation. How is "verification" being defined here*?

Response #53: The term "verification" as used here means the testing of a calibrated model to a second independent data set, usually under different external conditions, to further examine the model's capability and performance.

Other Comments and Questions Related to Accountability and Technical Character for the Caloosahatchee River Estuary and Southern Charlotte Harbor

Comment #54: *Lines 942-948 – The use of hydroacoustic data to obtain information on SAV percent cover, mean canopy height, and edge of bed location in turbid areas should be briefly explained, including groundtruthing.*

Response #54: This methodology has been described in the following publication: Sabol, S.M., R. E. Melton, Jr., R. Chamberlain, P. Doering, and k. Haunert. 2002. Evaluation of a digital echo sounder system for detection of submerged aquatic vegetation. Estuaries 25: 133-141. A citation an a short description of the method will be added to text.

Comment #55: *Lines 948-962, "Densities of shoal grass…matched or exceeded WY2007…" – does not seem to be supported by Figure 12-18. Was the decline in shoal grass during the dry season attributed to temperature, exposure, and/or other factor(s)?*

Response #55: "Matched or exceeded" pertains only to the growing season. Subsequently densities declined below WY2007. We will clarify in the text. The decline in shoal grass during the dry season (winter) is at least in part a reflection of a normal seasonal cycle, driven perhaps by temperature or day length.

Comment #56: *Line 972-974 – A SAV planting event was described (April 2008) for the CRE in an effort to re-establish tape grass (Valisneria americana). Are there plans to repeat this effort under more favorable (nondrought) conditions?*

Response #56: The planting was done upstream of the Franklin Lock and Dam in the freshwater reaches of the Caloosahatchee River. The text will be clarified. We feel that planting downstream in the estuary may establish plants only until the next significant intrusion of salt.

Comment #57: *Figure 12-18 – Error bars should be added.*

Response #57: Concur. Error will be indicated if available.

Comment #58: *Lines 1196-1199 – Writing should be altered unless bottom-water as well as surface DO data were available for consideration. This point should also be clarified in Table 12-10.*

Response #58: Concur. The report will be changed.

Comment #59: *Table 12-10 – some illustrative graphs would also be very helpful.*

Response #59: Concur. We will consider added some graphs.

Comment #60: *Table 12-11 – need to put together a preliminary budget to gain perspective on the relative magnitudes of the various components. Also, for line 2 – explanation is needed for "could be better" – what is the actual status?*

Response #60: Concur about budgeting effort. We will clarify the issue concerning data at S-79.

Comment #61: *Lines 1200-1209 and Lines 1222-1223 - How were the trends reported here analyzed?*

Response #61: Seasonal Kendall Tau. We will include this information in the text.

Comment #62: *Lines 1282-1286 – data in Table 12-10 indicates that there is enough inorganic N to fully support maximum growth rates of algae. Any organic N that can be used is in excess.*

Response #62: Table 12-10 does not report inorganic N. Inorganic N concentrations do fall below half-saturation constants for uptake of N. Recent incubation experiments seem to indicate that bacteria may be taking up DIN from the water column as well.

Comment #63: *Lines 1294-1335 – with a preliminary nutrient budget in hand, one could determine whether it is fruitful to give such a high priority to the degradation of riverine dissolved nitrogen and to benthic nutrient fluxes at this point.*

Response #63: Concur, a preliminary nutrient budget would be useful.

Comment #64: *Line 1342 – BOD stands for Biochemical Oxygen Demand, not Biological ….*

Response #64: Concur. The text will be corrected.

Comment #65: *Line 1295, organic N must be remineralized… - is in error; some phytoplankton can use dissolved organic N sources directly (e.g., see review by Burkholder et al. 2008, Harmful Algae, available online).*

Response #66: Concur. The text will be corrected.

Comment #67: *Line 1449 – There is no such thing as "benthic phytoplankton" – please change to benthic microalgae.*

Response #67: Concur. The text will be corrected.

Comment #68: *Line 1475 – "lad" should be "load"*

Response #68: Concur. The text will be corrected.

Comment #69: *Lines 1484-1485 – Maybe, maybe not – management may also significantly influence CDOM. Brief explanation should be added about what is known historically about CDOM levels.*

Response #69: Concur. The text will be revised accordingly.

Comment #70: *Table 12-14 – Hatching is suggested for DO time series x nutrient budget, since DO can affect sediment nutrient regeneration, and for DO time series x light attenuation (phytoplankton interaction).*

Response #71: We will reevaluate the table and revise accordingly.

Other Comments and Questions Related to Accountability and Technical Character for the Loxahatchee River Estuary

Comment #72: *Tide and salinity stations have been operable in the Loxahatchee River since 2002 (# stations?), and the Loxahatchee River District also maintains a water quality monitoring network at ~40 sites for ~30 parameters (frequency of sampling?).*

Response #72: The additional information about the number of stations (5) will be added. Frequency was already given- monthly.

Comment #73: *A planned new study of fish species during low-flow conditions sounds promising, but brief additional description would be helpful.*

Response #73: The additional information will be added.

Comment #73: *Figure 12-23 – Should also show the Hobe Grove Ditch and (for average flow conditions) the oligohaline, mesohaline, and polyhaline areas (corresponding to p.12-76 and line 1755).*

Response #73: Concur. The figure will be revised.

Comment #74: *Lines 1714-1716 – What is the estimated percent decline in SAV (area)?*

Response #74: Data are not available to quantify the decline.

Comment #74: *Figure 12-25 – It would be helpful to add a comparative figure showing SAV distribution prior to the drought.*

Response #74: Comparative data were not collected during the drought to create a similar map.

Other Comments and Questions Related to Accountability and Technical Character for the Lake Worth Lagoon

Comment #75: *Figures 12-31, 12-32, and 12-33 - Sites LWL-9 and LWL-11, and the C-51 canal (pp. 12-92 to 12-93) should be shown on a map or reference should be made to an existing map where these structures are shown.*

Response #75: Concur. The report will be revised accordingly.

Comment #76: *Table 12-16 – Gaps in the data collection should also be indicated.*

Response #76: Concur. The report will be revised accordingly.

Comment #77: *Lines 1934-1935: Are the past sampling locations and methods well documented so future use of the data from discontinued sites is possible in a sound science manner?*

Response #77: Yes, sampling locations are well defined spatially and methods are documented by Palm Beach County Environmental Resources Management.

Comment #78: *Lines 1968-1969: Similar question as above for Lines 529-541.*

Response #78: See response to Lines 529-541.

Comment #79: *Lines 1971-1973 – Should be altered unless bottom-water DO data were available for consideration.*

Response #79: Concur. Bottom-water DO data were not collected for the time period in question; the report will be revised accordingly.

Comment #80: *Lines 1980-1990 – The point should be made that trends are difficult to infer from datasets shorter than a decade.*

Response #80: Concur. The report will be revised accordingly.

Comment #81: *Lines 1998-2002 – Brief clarification should be added as to whether there were exceedances for cadmium and lead.*

Response #81: Concur. The report will be revised accordingly.

Comment #82: *Line 2058 – Similar to the comment for Lines 1934-1935, is the water quality monitoring expansion discussed in line 2058 coordinated with other monitoring efforts in South Florida?*

Response #82: Yes, the expanded water quality monitoring is being coordinated with other monitoring efforts in South Florida including District CERP & RECOVER and FDEP efforts.

Other Comments and Questions Related to Accountability and Technical Character for Biscayne Bay

Response #83: We concur with the comments. The 2009 report will be modified as appropriate.

Other Comments and Questions Related to Accountability and Technical Character for Naples Bay

Response #84: We concur with the comments. The 2009 report will be modified as appropriate.

Other Comments and Questions Related to Accountability and Technical Character for Estero Bay

Response #85: We concur with the comments. The 2009 report will be modified as appropriate.

Other Comments and Questions Related to Accountability and Technical Character for Florida Bay

Comment #86: *In describing roseate spoonbills in Florida Bay (lines 2801-2810), no attempt is made to link to the excellent information provided in Chapter 6.*

Response #86: Concur. A cross-reference to Chapter 6 information will be added.

Comment #87: *p.12-133, Florida Bay – SAV typically refers to submersed vascular plants (see Day et al., 1989, Estuarine Ecology; Wetzel, 2001, Limnology). The "lumping together" of seagrasses and macroalgae can be a problem because macroalgae (including some species of Caulerpa – see p.12-22) are not considered good indicators of ecosystem health (see Burkholder et al. 2007, Journal of Experimental Marine Biology and Ecology, 'Seagrasses and eutrophication'). Instead, macroalgae can be indicators of excessive nutrient pollution; under such conditions they commonly overgrow and kill seagrass meadows.*

Response #87: We agree with this cautionary note regarding interpretation of lumped SAV when macroalgae are included. Florida Bay surveys include macroalgae in the metric of total cover, but cover by individual seagrass species and macroalgae are also estimated separately (in part to provide insight of potential nutrient enrichment). Florida Bay performance measures and expectations refer to SAV components and not the lumped total.

Comment #88: *Summary – Although the title of this section indicates that major issues are to be considered, water quality other than salinity is barely mentioned (line 2542). For example, lines 2530-2533 describe a major hypothesis about salinity, but should also mention another major hypothesis about interactions between nutrient enrichment and salinity in causing algal blooms, seagrass decline, and other ecosystem impacts. Even lines 2534-2536, describing hurricane disturbance, water management, and highway construction as interactive causes of a major cyanobacterial bloom, mention nothing about the pivotal role of phosphorus enrichment that is known to have been a key factor. The writing should be altered.*

Response #88: A summary of water quality conditions, including information on chlorophyll a and phosphorus, is presented on pages 12-128 to 12-132. An extensive discussion of the potential causes of recent algal blooms in eastern Florida Bay (including consideration of phosphorus and a P budget) was presented in the last two years' Chapter 12 text on Florida Bay (2007 SFER – Volume I and updated in the 2008 SFER – Volume I).

Comment #89: *Figure 12-47 – Needs also to show the locations of Mud Creek, West Highway Creek, Manatee Bay, Twin Key Basin, the eastern boundary of Florida Bay, and Peterson Key (line 2577, pp. 132-135), or these locations should be shown on another map. (Should Taylor River be Taylor Creek? – line 2564).*

Response #89: Concur. We will add these labels to the map.

Comment #90: *Lines 2548-2553 – As mentioned, a supporting table of this information would be very helpful.*

Response #91: We agree, but presentation of this information is not suitable for a simple table format because there are many performance measures, encompassing multiple parameters, sub-regions, and projects. The Florida Bay and Florida Keys Feasibility Study alone has 16 regions and about 20 performance measures. RECOVER has adopted and modified many of these. There are also operational (CSOP) performance measures and we will soon be developing a new set of C111 Spreader Canal performance measures. We will attempt to summarize this complex set of metrics (especially regarding the Spreader Canal) in future reports.

Comment #92: *Figures 12-54, 12-61 – Error bars should be added.*

Response #92: Error bars are not possible for 12-61 (which shows a complete inventory of results). We agree that error bars would provide richer information in Figure 12-54, but two problems would then be encountered. First, this would clutter the figures and make them more difficult to see. Second, the type of error associated with each line per panel would be quite different and not readily comparable. Error bars for lines with WY07-08 data would represent spatial variance per time point (n of about 4), while error bars for lines with long-term monthly averages would either represent the temporal variability of spatial averages (much higher n) or the spatial variability of long-term temporal averages. We can add these bars, but for this broad overview, prefer to leave this panel figure as is.

Comment #93: *Line 2743 – Brief explanation should be added to explain this statement.*

Response #93: Concur. Published experimental results showing that Halodule can out-compete Thalassia under long-term increased nutrient (P) loading will be cited.

Comment #94: *Line 2753 – Thalassia recovery, in fact, is not evident (writing should be altered).*

Response #94: Concur. We will clarify the wording.

Comment #95: *Lines 2849-2850 – Explanation should be added as to why the most important documentation is diel DO dynamics.*

Response #95: Concur. A brief explanation will be added.

Comment #96: *Line 2867 – The sources of the P increase should be mentioned.*

Response #96: This is only a modeling exercise with a hypothetical situation not dissimilar to that observed in the field in October 2005 (and potential sources of that real P peak was extensively discussed in last year's Chapter 12, SFER V. 1)

Comment #97: *Figure 12-62 – Last box under Current Status mentions nothing about the decline in Thalassia; the "green light" should also be altered accordingly. Box for abundance, 2-year prospects – again, the major algal bloom of most concern has been strongly linked to nutrient (P) enrichment; the area is not only prone to hypersalinity. The writing should be altered.*

Response #97: We will clarify that this figure refers to an example from central bay data, not to eastern or western Florida Bay (areas discussed in the SAV monitoring section). There was not a Thalassia decline in central Florida Bay. Furthermore, a moderate decline in Thalassia is considered beneficial to the extent that greater community diversity is increased. This is reflected in the second box with an increase in "Target Species" (either Halodule or Ruppia, depending on

location). Note the text under "2-year prospects" cites the importance of hypersalinity and algal blooms.

Comment #98: *Line 2931 – Information should be added about when the water quality components of the hydrodynamic model will be fully completed.*

Response #98: Concur. A forecast will be added.