Appendix 1-6: Authors' Responses to the Peer-Review Panel Report on the Draft *2009 South Florida Environmental Report – Volume I*

A panel of outside experts provided peer review of the *2009 South Florida Environmental Report* through WebBoard comments, participation in a two-and-one-half 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 final report. With the exception of reformatting some information for better readability, this appendix was not edited by the SFER production staff.[1]

[1] Chapters 1 and 4 did not receive any final panel comments/recommendations requiring responses and, therefore, are not included in this appendix.

RESPONSES TO GENERAL PEER-REVIEW PANEL COMMENTS ON THE DRAFT 2009 SFER – VOLUME I

On pages 1 and 2 of the panel's final report, there are recommendations provided by the *2009 South Florida Environmental Report* (SFER) panel on the public workshop and on future consolidated reports. On pages 21 through 25, the 2009 SFER panelists also provided recommendations on refinement to the peer-review process as a special assignment in their Scope of Work. Agency responses to these general panel recommendations are provided below.

Recommendations on Public Workshop

The South Florida Water Management District (District) appreciates the panel's continued input on the SFER peer-review and workshop process and concurs with the panel's specific suggestions on the following proposed logistics for next year's efforts:

- The SFER Workshop agenda will use the primary level of review for each chapter as the organizing principle (i.e., chapters that are primarily technical in nature will be discussed in one section of the workshop, while accountability and integrative chapters will be set together).
- The initial session of the SFER workshop will commence with an update on the current state of the entire Everglades system to provide a summary of where things stand in terms of the health of the Everglades and any policy or legal changes that may have occurred during the preceding year.
- The SFER authors will focus energy on responses to peer-review comments and eliminate detailed individual PowerPoint presentations in future workshops in order to adequately address panel comments and provide sufficient time for in-depth discussions between panelists and chapter authors on both current and projected future issues. Presentations will be limited to additional figures, tables, or other visuals required to better address reviewer comments, as needed.
- The District will continue to encourage individual SFER authors to participate in other workshop sessions that are associated with their chapter.

Recommendations on Future Reports

In future SFERs, integration among the Volume I chapters will continue to be a priority for the report authors. Nitrogen is being considered in restoration efforts and significant technical effort is being expended, particularly in coastal systems. Nitrogen may play an ecological role in the nutrient interactions in Everglades marshes, but technical effort on this is limited due to our inability to substantially alter nitrogen dynamics in an ecosystem with huge atmospheric inputs and fixation by blue-green algal communities. A summary of nitrogen fluxes across the region, including a guide to research and control efforts, is viewed as a worthwhile undertaking. The timing, nature, and extent of this review must await prioritization on staff resources in the future. Invasive exotic species, both plants and animals, will be discussed more geographically in future Volume I chapters (including Chapters 5, 6, 10, 11, and 12), while recognizing that information for various segments of the South Florida system may be limited with little incremental change in exotics information between years. Unless there is specific information generated on mercury in specific projects, most mercury information will continue be compiled and analyzed in Chapter 3B. More interaction between the authors of Chapter 3B and other Volume I chapters will be encouraged on mercury and sulfur issues.

Refinement to the Peer-Review Process

- The District greatly appreciates the detailed comments provided on refinements to the peer-review process (pages 22 -23). The panel's suggestions on chapter assignments and disciplines are helpful and will be considered fully when new panelists are selected or when panelists are being assigned to specific chapters. The difficulty with the panel's suggestions is that they offer more areas of expertise at a time when more focus is needed to keep the process straightforward and cost-effective. We will continue to seek a balance as the SFER peer-review process continues to be refined over time.

- The panel left the specific period for panel service flexible, and this recommendation is reasonable. However, for consistency and objectivity, the District suggests that panelists serve about five years in the future, with exceptions that are well-justified.

- The panel suggests that peer reviewers be used on an ad hoc basis, which is a good idea to be used in the future, as needed. The District also agrees that there is a need for more expertise on biogeochemistry, but this area is too specialized for a full-time panelist. When more technical products from the mercury or sulfur research programs require peer review, it is anticipated that a biogeochemist will be sought to deal with such material on an ad hoc basis. The need for other types of technical review can also be considered on an ad hoc basis for future reviews, as appropriate.

- As noted on page 25, the District agrees that the panel's composition has been appropriate in recent years, but technical communication as a needed area of expertise makes sense, and will be considered when new panelists are selected in the future. The panel's thoughts on broader expertise and ability to communicate in a public setting are well taken and will be considered as part of the criteria used to select new participants in the process.

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 2

Wossenu Abtew with Chapter Co-Authors

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

General Recommendations

The chapter authors appreciate the panel's general comments on hydrology-related information in Chapter 2. With regard to the panel's comments on chapter accountability, it is important to note that the objectives of the hydrology chapter in the *South Florida Environmental Report* (SFER) are to:

- Provide a stand-alone document on the water-year hydrology of the region with adequate background on the water management system and the region's hydrology;
- Provide essential details on the water-year hydrology to satisfy various external and internal customers' requests for specific hydrologic data needs (which are often resource-intensive to fulfill on a case-by-case basis);
- Provide reference material on the region's hydrology for internal use;
- Provide consistent hydrologic data and analysis to be used by authors of other SFER chapters to maintain consistency across annual reporting; and
- Fulfill external customers' needs for information on the hydrology and water management of the District.

These objectives can only be successfully achieved by providing a complete chapter on hydrology in the main report with details shown in the appendices. The hydrology is not simply drought or flooding. Each year's hydrology is unique with varying impacts on the ecology and water management of the various sub-systems. The importance of an expanded hydrologic chapter is critical to understanding the hydro-ecological system. The hydrologic detail provided in the chapter is used extensively by internal and external readers of various scientific backgrounds for many purposes.

With regard to the panel's comments on chapter integration, in next year's SFER, we will expand the water management component of the chapter by incorporating more information on operational decisions to explain changes in water conditions in the hydrologic units. How well the natural hydrology and water management satisfies the water needs of various elements, such as the ecology, stormwater treatment, water supply, and others, are better addressed in the respective chapters. The expertise on impact analysis of these elements is with the authors of the specific chapters.

Specific Recommendations

Recommendation #1: *To reduce the need to repeat the drought/flooding history in each SFER, a concise, readable, description of drought/flooding patterns in South Florida should be prepared as an appendix.*

Response #1: Regional hydrology is not simply drought or flooding. Each year's hydrology is unique with varying impacts on the ecology and water management of the various sub-systems. The importance of an expanded hydrologic chapter is critical to understanding the hydro-ecological system. The hydrologic detail provided in the chapter is used extensively by internal and external readers of various scientific backgrounds for many purposes. Given these considerations, the essential elements of the chapter will remain in the main body of the chapter.

Recommendation #2: *It is strongly recommended that this chapter have an emphasis on water flows through the system and water flows to meet water supply needs. The water year section should be a description of how well drought or flood conditions, as the case may be, were handled during the year, and how well water supply needs were met. The details of water flowing from water body A through structure B to canal C, regulation schedules with actual water levels, and so forth can be moved to an appendix.*

Response #2: The details of the hydrology of the water year are of interest to internal and external customers, as noted above.

Recommendation #3: *The District should consider developing 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 District's response to this suggestion 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. It is strongly suggested that the District look at this opportunity again.*

Response #3: Because of the complexity of both the managed system and the natural system, it has not been possible to develop a simplified "dashboard metric" to describe each water year. The multiple and often conflicting objectives prevent the development of true indices of success or failure for such a short period of time. Agency water managers rely on the scientists who are studying each aspect of the system to address the long-term trends and suggest management changes that will achieve restoration. The challenge is to mitigate weather extremes within the limitations of the managed system, and "success" may be that there were no measurable failures. However, we will continue to examine such possibilities as necessary resources become available at the District.

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 3A

Grover G. Payne[2]

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

Recommendation #1: *As the reporting of water quality standard compliance in the Everglades Protection Area in Chapter 3A becomes more routine, it should be possible to streamline EPA standard compliance accounting, thus reducing the size of Chapter 3A. The Safe Drinking Water Act's Consumer Confidence Report experience is suggested as an example of what may be possible in this regard.*

Response #1: As always, chapter authors will continue to look for opportunities to streamline the chapter. This year, Chapters 3A and 3C were combined to streamline the water quality discussion and make the single chapter more comprehensive. Completion of the monitoring program reengineering effort will allow the monitoring to become more standardized. Then, much of the methods section could be appended and removed from the chapter.

Recommendation #2: *As Chapter 3A expands its consideration of water quality standard compliance to other, closely related, areas of South Florida (e.g. the Cape Sable Seaside Sparrow that was added this year), there is a need to rethink Chapter 3A's organization of topics and develop a common reporting style.*

Response #2: Based on the peer-review comments received, the final version of the chapter was reorganized and the Cape Sable Seaside Sparrow section was revised in a manner to make the style more similar to the other portions of the chapter.

Recommendation #3: *More broadly, given the inter-related nature of water quality conditions across South Florida, assessment of water quality standard compliance in the Everglades Protection Area should be enhanced by discussing related standard compliance 'upstream' (in the Kissimmee Basin, Lake Okeechobee, the Everglades Agricultural Area, and the STAs) and 'downstream' (Everglades National Park and some coastal estuaries and bays).*

Response #3: While the assessment of water quality standard compliance in the Everglades Protection Area (EPA) could be enhanced by a discussion of standard compliance in the upstream and downstream area, there are many complicating factors that must be considered. There are different monitoring requirements and water quality standards that apply to different parts of the system. For example, the EPA is the only area in which the numeric phosphorus criterion applies with much of the ongoing monitoring being required by the Everglades Forever Act. In contrast, total phosphorus levels in Lake Okeechobee are regulated by the current TMDL which requires a different type of assessment. Also, much of the system is classified as Florida Class III waters (general class), while other portions of the system are classified as Class I (drinking water) and Class IV (agricultural canals) and, therefore, a different sets of water quality standards apply.

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It must also be noted that much of the water originating in the upstream portions of the system never reaches the EPA and, if it does, its characteristics are highly modified by its journey through a highly managed system, including a long residence time in Lake Okeechobee, flow through agricultural areas, and treatment in the Stormwater Treatment Areas.

Recommendation #4: *Beyond standard compliance and in concert with the current monitoring program reengineering effort, there is a need to consider expanding the scope of Chapter 3 to include a 'system-wide accounting of phosphorus and other contaminants' for all of South Florida (quote taken from the 2008 National Research Council's Progress Toward Restoring the Everglades: Second Biennial Review). Such an over view of water quality conditions would be consistent with the system-wide hydrologic overview presented in Chapter 2.*

Response #4: The chapter authors agree, however, this would be a major undertaking complicated by the differing monitoring schedules, frequencies, and site densities for the various parts of the system. Other limitations in performing a system-wide assessment are discussed in Response #3 above. The loading section of Chapter 3A currently provides an assessment of the total phosphorus loads to different portions of the EPA from various sources.

The reengineering of the monitoring program, when completed throughout the system, should help standardize the monitoring and make a system-wide assessment more feasible. The staff responsible for reengineering the monitoring system is continuing to work to describe and integrate the three key cogs of the monitoring framework: (1) develop monitoring objectives, (2) design monitoring program, and (3) assess and interpret data. However, this is expected to be a long-term effort that will span several iterations of the SFER.

While the SFER may benefit by performing similar types of water quality assessments in other portions of the system, the need to perform all the assessments in a single chapter is questionable and could lead to misinterpretations of the data.

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 3B

Donald M. Axelrad[3] with Chapter Co-Authors

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

Recommendation #1: *The chapter could be improved by having one map (with accompanying table) that shows overall mercury levels throughout the everglades (with EPA mercury exceedances for fish clearly indicated). A similar map for sulfur is also needed.*

Response #1: In the final report, **Figures 3B-11** through **3B-15** will be added in response to the panel's recommendation regarding fish mercury levels and exceedances throughout the EPA. The most recently developed U.S. Environmental Protection Agency Region 4 R-EMAP report shows similar data for sulfur (refer to Everglades Ecosystem Assessment: Water Management and Quality, Eutrophication, Mercury Contamination, Soil and Habit, EPA 904-R-07-001, August 2007). Rather than duplicating efforts, the reader is referred to this report for further information.

Recommendation #2: *Make clearer the objectives, time frame, and effects of developing a TMDL for the Everglades.*

Response #2: This will be addressed in the 2010 SFER.

Recommendation #3: *Clearly lay out the management and recovery goals for mercury (and sulfur) in the Everglades that are reasonable and that can be accomplished.*

Response #3: Management and recovery goals are a work in progress, and an update on this information will be provided in the 2010 SFER.

Recommendation #4: *Relate mercury and sulfur levels (generally, and for specific hot spots) to the overall management and restoration goals for the Everglades.*

Response #4: Please refer to Response #3.

Recommendation #5: *Develop a mass balance for sulfur.*

Response #5: Plans for two separate mass balance studies (large-scale and small-scale studies) are in progress. The large-scale study, Regional Sulfur Mass Balance Study for South Florida, is currently under way. The basis for the large-scale study is calculating surface water sulfur (dissolved sulfate + particulate sulfur) loading exchange between South Florida major land-use areas and providing an extensive literature review of major import and exports pathways that transport sulfur out of or into South Florida wetlands, e.g., sulfur agricultural applications, sulfur mobilization through mineralization and soil subsidence, H_2S flux, urban sulfur applications,

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atmospheric deposition. Currently, calculations for 2004, 2007 and literature reviews are being conducted.

Recommendation #6: *Convene a panel (or use some other method) to examine the relationship between sulfur and methylation using a weight of evidence approach that would be acceptable to a wide range of stakeholders.*

Response #6: This will be addressed in the 2010 SFER.

Recommendation #7: *Requisition a white paper on the biogeochemistry of mercury/sulfur interactions.*

Response #7: This recommendation will be explored.

Recommendation #8: *Identify the five major issues or problems surrounding mercury and sulfur in the Everglades, and address these major issues, using the peer-reviewed literature, as well as the studies conducted in the Everglades.*

Response #8: This recommendation will be explored.

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 5

Kathy Pietro with Chapter Co-Authors

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

General Recommendations

Chapter 5 was assigned to an Accountability Review, with Technical as the secondary review. Chapter 5 has significant accountability and technical aspects. Because discharge standards for phosphorus have been set for the STAs, it is logical to conclude that reporting in this chapter is about the success in meeting these standards and/or reasons why the standards were not met. However, none of the STAs are in the Routine Operations Phase of the new TBEL requirements, so there is still an expectation that operations will be adjusted (either by the district or by time) to meet ultimate discharge standards. Additionally, various reconditioning projects and several new research experiments were ongoing or initiated this year.

Consequently, the panel feels that the appropriate level of review is Technical and Accountability, in that order. When all STAs are operated under the Routine Operations Phase, the levels of review may reverse, but this appears to be at least several years in the future.

Response: Because the Stormwater Treatment Area (STA) chapter serves as the reporting mechanism for the operational permits (Everglades Forever Act, National Pollutant Discharge Elimination System, and Administrative Orders), it is recommended that the levels of review remain as is, with the primary level as Accountability and the secondary level as Technical.

Accountability

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. 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 TBEL requirements in WY2008. Missing from the writing, though, was a clear explanation of how accountability will be evaluated as restoration efforts continue.

Response: The state and federal permits contain the mechanism for evaluating accountability for the STAs as restoration efforts continue.

Specific Recommendations

Recommendation #1: *Add information about newly initiated studies to examine STA performance, including clear identification of the problem addressed, goals, objectives, methods, and anticipated timelines or results.*

Response #1: The suggested information was included in the final chapter; additional details about the newly initiated study evaluating the effects of water deficient conditions on cattails

were added along with anticipated timelines for the other research studies mentioned in the chapter. Additional text was incorporated to describe the cattail drought study purpose and design. Cattail is the major type of emergent plant found in the STAs and it is the goal of this research project to examine the response of this obligate wetland plant to drought conditions that may be experienced in the STA treatment cells. This experiment examines the response of the cattail species *Typha domingensis* using a series of physiological measurements coupled with survivability responses to identify measurements that could be used to evaluate the response of cattails to drought conditions in the STA treatment cells.

Recommendation #2: *For studies completed in the water year, include detailed presentation of the results and discussion of their significance, including assessment of how well the study addressed the original goals and objectives.*

Response #2: There were no research projects completed last water year, but the results from four of the on-going research studies that were listed in the chapter was added to the final text (see final chapter for details). In future chapters, the suggested information will be provided for those projects completed in the water year.

Recommendation #3: *Add a link to Chapter 3A that describes how the District determines whether an STA is contributing to violations of Class III water quality standards.*

Response #3: Chapter 5 already contained information about how the STAs are evaluated against Florida Class III standards that are mandated in the operating permits (see *Permit Compliance Requirements for Water Quality Parameters Other than Phosphorus section* of the chapter for details).

Recommendation #4: *Add explanation about future plans for operation of the demonstration periphyton STA, and about what is planned next in the sawgrass mesocosm assessment.*

Response #4: For the STA-3/4 Periphyton Stormwater Treatment Area (PSTA) Implementation Project, the following text was added to the final chapter: "The PSTA Project was referred to as a "demonstration" project in the 2003 Long-Term Plan, however, the project represents the implementation of this treatment technology in STA-3/4. The current intensive monitoring program is scheduled to continue for another year. Given the delays in project start-up and the abnormal operating conditions in WY2007 and WY2008 due to the severe regional drought, intensive monitoring may be continued for additional years. However, monitoring of the PSTA Project eventually will be scaled back to a level consistent with the monitoring program in the rest of STA-3/4. Consideration is being given to investigating TP removal in the PSTA Cell under increased surface-water hydraulic loading."

For the sawgrass mesocosm assessment, the following text was added to the final chapter: "Immediate plans are to keep the mesocosms running for one more year to see if the sawgrass plants fill in at a greater density, and whether or not this increased coverage provides additional treatment benefits. When the experiment is terminated, accrued soils in the sawgrass and PSTA mesocosms with respect to P content will be characterized and the stability of P in the deposited sediments may be evaluated. The start date of this project was 2006 and the anticipated end date is 2010. This project may be expanded to a "field-scale" study depending on initial findings but the appropriate platform has not yet been determined."

Recommendation #5: *Strengthen integration with other chapters covering District activities, for example, integration of exotic species management strategies (Chapter 9) into evaluation of STA performance, and integration of information on mercury concentrations in fish with Chapter 3B.*

Integration should include evaluation of how STA performance in reducing/ not reducing total nitrogen is affecting downstream ecosystems. For example, STA-5 had statistically higher N concentrations at the outflows for more than a third of the samples.

Response #5: For mercury/sulfur and exotic species, the STA chapter will continue to provide an overview of the status of mercury in the STAs (with detailed information regarding the mercury monitoring in the STAs (as currently presented in the STA appendix section) and a listing of the types and amounts of herbicides applied to control exotic species (found currently presented in the STA appendix section) and will refer the reader to the specific chapters dealing with those subjects for additional details. Because the STAs were created primarily to reduce phosphorus, the chapter will continue to focus on phosphorus performance instead of evaluating nitrogen reduction and the impact on downstream ecosystems. Annual concentrations of inflow and outflow nitrogen will continue to be presented in the form as it currently appears and individual treatment cell performance will be presented every three years, as was done last year (see the 2008 SFER – Volume I, Appendix 5-18: Annual Water and Constituent Mass Balance Budgets for the Flow-Ways and Treatment Cells in the STAs, Appendix 5-19: Plots of Period-of-Record Inflow versus Outflow Mass Loads and Areal Mass Loading versus Flow-Weighted Mean Outflow Concentration for Constituents Monitored in the STAs, and Appendix 5-20: Period-of-Record Inflow and Outflow Flow-Weighted Mean Concentrations, Inflow Areal Loading Rates and k Values for the STAs).

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 6

Fred Sklar with Chapter Co-Authors

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

Recommendation #1: *Chapter 6 should be more strongly integrated with other efforts by including more cross-referencing to other chapters; it should also be more internally integrated across the EPA research projects.*

Response #1: The chapter authors agree that it is important to show both relevance to the District's mission and the extent of integration. Relevance is made apparent every year in the summary table (see **Table 6-1**). Integration is a more difficult aspect to illustrate, but will be accomplished next year by using an Everglades food-web conceptual model to show how issues and hypothesis addressed at one scale or within one attribute or across one connection is supported by research and feed-back loops from other parts of the Everglades research program.

Recommendation #2: *The Summary should briefly convey how the various subsections are being integrated to examine all of the levels of biological organization being studied in the EPA.*

Response #2: See above response to Recommendation #1.

Recommendation #3: *An overall "Conclusions" section should be added to integrate the major findings and interpret how they will guide future efforts.*

Response #3: The Summary section will be re-formatted next year to include integration (see responses to Recommendation #1) and the topics of a Conclusions section.

Recommendation #4: *The Plant Ecology section should include an introductory description of the integration of the various subsections, and clearer rationale for these studies as related to management and evaluation of restoration efforts.*

Response #4: As suggested, this section has been revised in the final report.

Recommendation #5: *Chapter 6 in future SFERs should include the level of detail indicated in the panel's detailed comments to facilitate evaluation of technical merit.*

Response #5: All new studies will include a higher level of detail to facilitate evaluation of technical merit in future SFERs.

Recommendation #6: *The Algal Polysaccharides section should be strengthened by clarifying the significance of the findings, and by explaining how water levels directly affect differences in periphyton composition and structure.*

Response #6: The details and significance of this new study have been re-inserted into the final chapter and will serve as a lesson on adequate levels of detail for future SFER updates.

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 7A

Beth Williams and Agnes Ramsey

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

The authors welcomed the panel's support for our renaming of the "Everglades Restoration Update" chapter, and for our reorganization of the framework of this year's report to better clarify the individual restoration programs and projects, as well as their integrated nature.

We appreciate the panel's encouragement in the District's efforts to keep the public informed and involved as this agency and the state embrace a more holistic approach to ecosystem restoration through advancement of the Northern and Southern Everglades initiatives.

Many of the panel's earlier comments on the draft chapter have been incorporated into the final document. We were gratified to hear the panel was satisfied with our responses; and, as always, we found the Workshop interaction rewarding. Following are our responses to the two recommendations regarding Chapter 7A in the panel's final report.

Recommendation #1: *The long-term vision of interaction between environmental flows, generated as part of all CERP restoration projects, and the water flows for water supply and flood control in South Florida should be clarified.*

Response #1: Once completed, the system operating plan will be used to manage the system while providing the appropriate interaction between restoration flows, flows for water supply, and flood control. Each restoration project must identify and reserve the water made available for the environment, while protecting existing (2000) levels of water supply and flood protection. As each project is completed, the system operating plan will be updated to account for the project benefits and impacts, and operations will be adjusted accordingly. In addition, as a result of project and RECOVER-related monitoring, future projects will be refined and system operations will be adjusted to achieve improved restoration performance.

Recommendation #2: *The update for each project should include a brief explanation of the water level/flow benefits as well as related water quality and ecologic benefits. For example, the Ten Mile Creek project is completed, but it has not been put to beneficial use. Clarification of what was it designed to achieve, but has not yet achieved would help the reader understand the complexity of the problems being addressed.*

Response #2: Each project update will include water level/flow benefits in addition to the related water quality and ecologic benefits already described. Keep in mind that the information will be as detailed as possible given the phase of the project. Early planning will not be able to give more than very general information versus detailed design which will have incorporated a detailed operational plan for the project.

We look forward to another productive, progressive, and – quite probably – landmark year in the environmental restoration of South Florida, and to presenting our next report to the SFER peer-review panel in 2009.

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 7B

Kimberly Chuirazzi

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

Recommendation #1: *Clarification about how the hypothesis (the 'why' questions) will be tested should be included in the chapter.*

Response #1: This will be addressed in the 2010 SFER – Volume I, Chapter 7B, which will summarize the 2009 System Status Report.

Recommendation #2: *The concepts presented in the section on Desired Restoration Condition are important to understand 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.*

Response #2: Comment acknowledged.

Recommendation #3: *If the hypotheses underlying restoration are to be statistically tested, there is a possibility that, as the number of samples increase over time, 'n' in the statistical equations will increase to the point where the hypotheses are statistically significant, but not ecologically significant. This issue should be clarified.*

Response #3: This will be addressed in the 2010 SFER – Volume I, Chapter 7B, which will summarize the 2009 System Status Report.

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 8

Tracey Piccone

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

Recommendation #1:*.The panel notes the efforts to consolidate data collection strategies and parameters of the many mandates to which the District is responding. The panel supports development of a 'core' set of parameters that should be maintained overtime as well as opening a discussion with the regulatory agencies to revise the parameters considered fundamental to comply with any particular mandate.*

Response #1: Comment acknowledged.

Recommendation #2: *The panel concurs with the recommendation to continue the transect monitoring at sites that will augment those being incorporated into the long-term compliance permit for STA-2 as noted in lines 379-382 for a period of three years, particularly given the positive results of the first phase of this project noted to date and the neutral budget impact implicit in this recommendation.*

Response #2: Comment acknowledged.

Recommendation #3: *The panel also supports the recommendation to extend the life of the "Determine the Relationship" project. It is the understanding of the panel that many CERP projects are still in the early planning or implementation stages and therefore unclear as to how they will impact water quality. A coordinated water quality monitoring and reporting plan will obviously have to be put in place in order to be able to make specific recommendations for long-term water quality policies and to manage the expanding administrative reporting costs of so many agencies and programs.*

Response #3: Comment acknowledged.

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 9

Amy Ferriter[4] with Chapter Co-Authors

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

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: Unfortunately, this data is simply not available for the vast majority of the species. The 2008 SFER – Volume I, Chapter 9, provided more detailed information on a greater number of species, and the authors have referenced the readers to that document, where appropriate.

Recommendation #2: *Strengthen the Summary: This important section should clarify the major findings and achievements for the water year. It should also 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, control can be achieved that leads to restoration of the Everglades.*

Response #2: In the draft chapter, the authors attempted to highlight appropriate successes (i.e., melaleuca). The Summary section will be expanded in the final report.

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

Response #3: As explained in the text, the current chapter is not formatted into Modules, so this type of flow chart is ill-suited for this year's report. The authors have referenced the Environmental Law Institute's report for this type of agency information in Florida.

Recommendation #4: *Improve emphasis on exotic animal species.*

Response #4: The authors have included new and relevant information for species, where information is available, in the final report.

Recommendation #5: *Include a summary of the role of invasive species control in management of aquatic ecosystems (hydrology, VECs, PMs) within the different units.*

Response #5: The authors will include additional information on the District's aquatic plant control program in the final report.

Recommendation #6: *Relate nonindigenous species management and control to specific recovery goals, which relates to a management strategy and evaluation of the overall critical species to*

[4] Boise State University, Boise, ID

control. Integrate invasive species concerns in relevant chapters when a given invasive species affects ecosystem structure or function.

Response #6: As noted in the text, this is an important issue for regionwide restoration. Other relevant Volume I chapter authors will include information on invasive species evaluation and impacts in future SFERs, as appropriate, and will strongly cross-reference regionwide material in future chapters on nonindigenous species.

Recommendation #7: *Foster and require integration of invasive species effects into all ecology studies (Chapter 6), considering that invasive species are one independent variable affecting nearly all species involved in the overall Everglades recovery effort. This integration should include examining the effects of invasive species on performance measures.*

Response #7: As noted throughout the 2007–2009 SFERs – Volume I, Chapter 9, this is a critical step in gauging restoration success. Relevant Volume I chapters have agreed to work together in the future to integrate this type of information, and will make more explicit connections between nonindigenous species and restoration evaluations.

Recommendation #8: *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. This should be accompanied by a stoplight icon for each species where information is known and quantitative information where available.*

Response #8: This is beyond the scope of the SFER. In the 2008 SFER – Volume I, Chapter 9 included detailed accounts on a species-by-species basis, and can be referenced for this type of information.

Recommendation #9: *Integrate the presence and effects of nonindigenous species into the overall research plans, including the Everglades Research Plan and the Coastal Ecosystem Strategy (Chapter 12).*

Response #9: The authors have mentioned this information in previous SFERs including the 2007 and 2008 versions. Relevant Volume I chapters have agreed to work together in the future to integrate this type of information.

Recommendation #10: *Consider, evaluate, and discuss methods of evaluating potential impacts before species reach such critical stages of invasive effects. This may require a synthesis of the global literature.*

Response #10: This is beyond the scope of the SFER.

Recommendation #11: *Develop a permanent document that has the stoplight approach for all species. This would entail adding new species as they are found, 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 be possible to achieve.*

Response #11: While this would be a useful tool, it is beyond the scope of the SFER and the District as an agency. Available databases (i.e., Florida Fish and Wildlife Conservation Commission, U.S. Geological Survey) are listed in the chapter.

Recommendations 1 through 6 should be addressed by the SFWMD and recommendations 7 through 11 should be considered by the District and other agencies dealing with exotic species.

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 10

Joyce Zhang and R. Thomas James

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

General Recommendations

Recommendation #1: *The chapter is too long and not very readable. Shortening the overall length of the chapter by providing a summary table with all the programs may improve reader understanding. Further, the watershed research and lake research-oriented sections can be integrated more closely and also linked with the results reported on other ecosystems.*

Response #1: The chapter authors appreciate the panel's general technical comments on Chapter 10, however regarding the chapter's length and readability, we respectfully disagree. This chapter serves as the annual report to include the updated information for the seven elements specified by the Northern Everglades Protection Program (see page 10-8). Therefore, the document is formatted to meet the annual report requirement by the Florida legislature. Since more than 40 projects are implemented under the watershed phosphorus control programs, the project status and estimated load reductions are summarized in Tables 10-5 and 10-6. Given these requirements, efforts to further shorten text may be difficult to accomplish but will be considered in future SFERs.

Watershed nutrient management is primarily to meet the Total Maximum Daily Load (TMDL) of 105 metric tons through phosphorus (P) control measures. This TMDL was developed to reduce the in-lake concentration to 40 parts per billion (ppb), a value that should restore the biological balance within the lake. The watershed nutrient management 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 link between watershed management and lake management was included in a study 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 also were discussed. The Lake Okeechobee Agricultural Decision Support System (LOADSS) (Negahban et al., 1994) was used to evaluate the effectiveness of Best Management Practices (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 tons 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).

Recommendation # 2: *As this chapter matures toward accountability status, it is 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 beginning with the 2010 SFER. The management section should also 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 a range of priority uses and that goal is ultimately linked to watershed management. It is important to recognize that, although many in-lake management actions (e.g., vegetation and water-level management) are not directly related to nutrient loads or water quality, they may be indirectly related. Further, legacy sediment nutrients are likely related to historic watershed activities, and thus the long-term effects of current and future nutrient loads can be compared to historic loads and legacy nutrients in the lake.*

Response #2: Please refer to above response. Also, it is not clear how these recommendations differ significantly from the current organization. Concerning the comment that watershed and lake management activities should be combined into a single section, it is important to recognize that many in-lake management actions (e.g., vegetation and water-level management) are not directly related to nutrient loads or water quality.

Recommendation #3: *The assessments of watershed and in-lake management activities should also include costs so that in addition to performance being measured in terms of nutrient removal, it can also be measured relative to capital and operating costs per unit nutrient removed. As BMPs in the watershed and lake will eventually be assessed in terms of nutrient removal and cost effectiveness, a pilot effort should be initiated as soon as budgetary resources permit.*

Response #3: 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.

Specific Recommendations

Recommendation #4: *In this chapter, a chemical treatment study to analyze whether directly adding iron, aluminum and/or calcium to the lake will reduce the internal P load is discussed. It is mentioned that this study is focused only on source control measures and that the preliminary studies discussed on page 10-49 addressing internal loading are a separate line of investigation and not included in any formal agency management plan. The panel would like to draw attention to the fact that adding iron directly to the sediment has been a successful measure to reduce the internal P load in several lake restoration projects around the world. We think that in situ experimental studies may be useful and we suggest including these in future research programs.*

Response #4: Agree. The in situ experimental studies are part of the Lake Okeechobee Division's draft update research plan and funds are included in the FY09 budget to continue this work.

Recommendation #5: *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 #5: The relationship will be added in the text in the final report.

Recommendation #6: *Information is given about the levels of mercury in the fish populations in the lake and it is stated that this is a concern. We recommend discussing which measures should be taken to lower these levels of mercury with the panel and/or other stakeholder groups.*

Response #6: Agree.

Recommendation #7: *A lot of research is going on concerning the effects of Submerged Aquatic Vegetation (SAV) on water quality. From the text it is not clear whether the drop in the nearshore TP concentrations is mainly due to the vegetation directly or due to the associated periphyton. This issue should be clarified in the present SFER.*

Response #7: This statement will be removed in the final report.

Recommendation #8: *The authors mention in this chapter that lower light conditions are mainly responsible for the increased diatoms: cyanobacteria ratio. But low light conditions are more favorable for cyanobacteria. In the response to our comments it is, however, stated that mainly the higher turbulence brings the diatoms from the sediment to the open water. Therefore, we recommend to clarify that most probably re-suspension of the diatoms is responsible for the increased diatoms:cyanobacteria ratio.*

Response #8: The reasons for this shift are not clear and could be related to a number of changes that have been observed in the lake. This includes increased nutrients and reduced light conditions. We have no indication that turbulence has changed, but we do have information on the various phytoplankton species within the water column. We could use that information to determine if these are primarily benthic diatoms or others.

It should also be noted that the following comment provided by the panel before the workshop was addressed in the final report:

Recommendation #9: *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 #9: In the final report, the Conclusions section will be revised to include the findings from several projects discussed in the chapter.

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. Reddy, K.R., O'Conner, G.A. and Schelske, C.L., eds. In: *Phosphorus Biogeochemistry of Subtropical Ecosystems: Florida as a Case Example*, CRC/Lewis Publisher, NY.

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 PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 11

Steve Bousquin with Chapter Co-Authors

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

Recommendation #1: *Chapter 11 in future SFERs should include the level of detail indicated in the panel's detailed comments in order to facilitate evaluation of technical merit.*

Response #1: As indicated in the RTCs provided in Appendix 1-4, the authors have made adjustments in the final report to address the panel's comments. In the future, the authors will provide additional information to facilitate the panel's evaluation of technical merit.

Recommendation #2: *Invasive species should be more clearly integrated into adaptive management for restoration in the Kissimmee watershed. The Kissimmee basin is not mentioned in Chapter 9 of this year's SFER, and exotic species in the Kissimmee basin were only briefly inventoried in Chapter 9 of the 2008 SFER. Thus, consistently missing in Chapter 9 and Chapter 11 is a scientific analysis of how exotic plant and animal species are affecting the Kissimmee basin and restoration efforts. The panel suggests the inclusion of such an analysis in Chapter 11 of the 2010 SFER, if it continues not to be covered in Chapter 9, because exotic species clearly are important to restoration success in the Kissimmee basin.*

Response #2: Refer to the District's response to panel's general comment under the "Recommendations on Future Reports" section (see page App. 1-6-2).

Recommendation #3: *The mercury analyses (fish tissues) should be integrated with other South Florida ecosystems (Chapter 3B).*

Response #3: The authors have begun discussions with the authors of Chapter 3B. In future SFERs, it is hoped that a section in Chapter 3B on Kissimmee Basin mercury issues will replace the discussion in Chapter 11.

Recommendation #4: *Increased phosphorus levels at the southern end of Lake Kissimmee are as-yet unexplained and could confound management goals. The steps being taken to identify the sources of this elevated phosphorus should be clarified if hydrological conditions permit, and progress assessed in the 2010 SFER.*

Response #4: Due to staffing and resource constraints, this task was not undertaken in WY2008 but it is expected that this will be pursued in WY2009.

RESPONSES TO PEER-REVIEW PANEL FINAL REPORT ON THE DRAFT 2009 SFER – VOLUME I, CHAPTER 12

Richard Alleman and Peter Doering

RESPONSES TO PEER-REVIEW PANEL RECOMMENDATIONS

General Recommendations

Technical

Recommendation #1: *Although the findings and conclusions generally seemed to be supported by "best available information", in various places throughout the writing, it was not possible to evaluate technical merit because insufficient information was given.*

Response #1: Concur. Although chapter authors try to be thorough, it is simply not possible to provide all the supporting information about methodologies and approaches and keep the chapter as concise as possible.

Recommendation #2: *The "lumping together" of seagrasses and macroalgae, apparently done for presentation of SAV information in all of the Coastal Ecosystems except Florida Bay, conveys serious misinformation because macroalgae (including some species of Caulerpa, mentioned repeatedly in the chapter as "SAV") are not indicators of good ecosystem health.*

Response #2: Concur. The mapping approach used in many cases to detect SAV abundance and distribution does not distinguish between seagrasses and macroalgae. It was not intended to suggest that the presence of all macroalgae indicates a healthful system although the presence of many species is a normal part of the community. Where known, clarification was added to the text in the final report.

Recommendation #3: *The nutrient bioassay study for the St. Lucie Estuary (SLE) was conducted in an abnormally dry year. There was no indication given as to whether the District plans to repeat it in a more average-precipitation year, with more normal precipitation distribution among seasons.*

Response #3: Wet season benthic flux follow-up is currently scheduled for July/August, 2009, at the start of the wet season pending funds. It is not possible to predict the annual precipitation pattern from year to year, but seasonal differences are more predictable.

Recommendation #4: *Remarkably, the extremely important watershed trend data for the SLE were not shown. The trends were not interpreted, and clarification was not given for inclusion of the S-50 structure on the C-25 canal. Moreover, the data were not interpreted relative to other estuaries of similar size or watershed size. Water quality targets were not mentioned.*

Response #4: Watershed water quality loads are depicted in Figure 12-13, and concentration trends are discussed in detail in the text. Text was added to the final report that provides some interpretation. The monitoring station at S-50 is indicated in Figure 12-3, because C-25 is an

important tributary to Indian River Lagoon, although only data from tributaries to the St. Lucie Estuary (SLE) are discussed. Water quality targets for SLE in the form of total maximum daily loads were still in development at the time of the writing (explained in the text).

Recommendation #5: *One point raised by the panel last year that was not sufficiently addressed in the 2009 SFER draft or in the authors' responses to Panel comments was the use of simplified water quality models to address immediate study needs.*

Response #5: Admittedly, this has not been our approach in the past, but the point is well taken. Since we generally only have the resources to focus on just one or two water bodies within a given fiscal year, modeling work is typically concentrated on one or two water bodies at a time. We have sophisticated hydrodynamic models developed for all the priority systems, therefore we prefer to utilize these models as foundations for water quality models. The water quality models, however, are simplified initially. For example, the SLE water quality model was initially built with a greatly reduced number of parameters so that results could be used to test and verify the model, and understand system processes. We will look for opportunities, especially collaboration with partners, to build and use simplified water quality models.

Accountability

Recommendation #6: *The draft of Chapter 12 unfortunately did not present a defensible account of data and findings for the areas being addressed that is complete and appropriate.*

Response #6: By defensible account, we presume the panel means that the data and findings can be verified and used to answer fundamental questions or hypotheses about the systems. We concur that the primary questions or hypotheses for some of the estuaries were not clearly stated with a logical progression that discusses the types and certainty of data being collected. We intend on improving these linkages in the future when individual science plans are developed as previously noted. However, our strategy for the document to date has been to provide this detailed information for the highlighted water bodies [St. Lucie and Caloosahatchee River estuaries (SLE and CRE) for this year], and provide only a summarized status report for all others.

Recommendation #7: *The status of District activities and progress across the estuarine ecosystems is far from routine, indicated this year even by the format which represents, in some portions, a striking departure from the excellent structure of last year's chapter.*

Response #7: The authors are confused by this comment. Far more data and findings are presented in this year's chapter than the previous ones, and it follows the same template as last year, but much expanded. For each water body, data and findings are presented for inflows, water quality, and primary valued ecosystem components. In the 2008 SFER – Volume I, Appendix 12-1 was an outline of coastal's science plan approach. Since the science plans for the SLE and CRE were still very much in development as of May 1, they did not contain enough detail to create an appendix in this year's report. The need for appendices will be evaluated from year to year.

Recommendation #8: *For the highlighted system(s), there should be a strong section on progress in the system during the Water Year.*

Response #8: Concur. While the highlighted water bodies included subsections about progress, we intend to make these subsections more complete in the future.

Recommendation #9: *Additions and updates include a planning chart for each section that clearly presents priorities and planned milestones in the next 1-2 years; a table of major District efforts and accomplishments for the Water Year in each of the estuaries; and sufficient information included for scientific evaluation of methods for planned or in-progress studies.*

Response #9: While we agree that a planning chart would help readers get a sense of next steps, we do not want readers to misconstrue this information as policy. Much of the work activities within the coastal program support restoration, rule-making and regulatory programs of the District. These programs have there own schedules that often change as a result of funding, legislation, policies enacted by the Board, or findings. The best we can provide is the direction and intent of these programs, and report on the status. As to providing sufficient information for evaluation of methods, please see the response to item numbers 1 and 7 above. It is not our intent to describe methodology in detail. If we desire the panel review and comment on a specific methodology, we will make it clear, and it will likely be included as a special review item. We very much appreciate the opportunity to do so when needed.

Recommendation #10: *To strengthen integration among the coastal ecosystems, a section should be added that considers linkages between them such as climate change, which has not yet been addressed in this chapter.*

Response #10: Considering the large uncertainty of the direction, rate and impacts of climate change, we do not view it as a priority and will address effects as they become apparent. The primary linkages among coastal systems are regional water management, regional restoration and State policies. We agree that these types of linkages could be strengthened.

Recommendation #11: *There are significant issues with the material presented and lack of follow-up to the presentation of the Coastal Ecosystems Division (CED) Science Plan reviewed as part of the 2008 SFER.*

Response #11: As was stated in the 2008 report, our strategy in filling out the science plan is to create specific plans for each water body over time. As indicated in the 2009 report, information was included that provided many details about the science plans for the SLE and CRE, and these were tied directly to the development and planning related to total maximum daily load criteria. Specific water body plans will be developed as priorities and resources allow.

Recommendation #12: *The CED discussion is continued in the 2009 SFER draft as Figure 12-3 that is intended to describe the "relationship between applied research and modeling programs, driven by adaptive management, loads, salinity envelopes, and environmental operations." In the figure, the latter three appear to be end points, not drivers; water quality is normally considered to be the end point of modeling, not the other way around; and the role of adaptive management and alternative management systems are absent. In the end, the relationship of these three approaches is confusing.*

Response #12: Concur. We eliminated the figure from the final report.

Recommendation #12: *Integration among the Coastal Ecosystems, however, has not been attempted. There are also missed opportunities in Chapter 12 for integration with other South Florida ecosystems. Are there plans to measure in some fashion how well the coastal systems are managed relative to freshwater inflows, nutrient loads, etc.? As other examples, the chapter states that ~50% of the TN loads and ~30% of the TP loads to the Caloosahatchee River estuary are added by freshwater discharge, mainly from Lake Okeechobee. This is an opportunity to link to Chapter 10, and to recognize the importance of controlling N as well as P outputs from the*

Lake in controlling the health of downstream ecosystems. In describing roseate spoonbills in Florida Bay, no attempt is made to link to the excellent information provided in Chapter 6.

Response #13: We agree that there are some cases, where additional integration can be made among coastal systems, especially where watersheds are common such as Biscayne Bay and Florida Bay. Also, linkages between nutrients and nutrient controls for Lake Okeechobee and the northern estuaries can be improved. Additional information about spoonbills was added to the Florida Bay section.

Specific Recommendations

Recommendation #14: *Continue to develop the Coastal Ecosystems Division's Science Plan to the point that it has a coherent, scientifically-based plan that will account for constituent loading and its effects on water quality and biota, water uses and water quality criteria to support those uses, and management systems that can reduce loads and other perturbations on the system so that desired uses can be sustained.*

Response #14: Concur. In addition to water quality, freshwater inflows will continue to have a major emphasis in the Coastal Ecosystems Division's Science Plan.

Recommendation #15: *Use this Plan to determine how the basic research, management, and restoration tenets of the Plan can be incorporated into the management of the coastal ecosystems.*

Response #15: We intend to continue to develop the Science Plan for research and monitoring to support management of the coastal systems, however, it is beyond the scope of the Plan to include restoration and management strategies.

Recommendation #16: *Develop and use simplified water quality models (such as finite segment models) for all of its estuarine systems.*

Response #16: Please see Response #5 above.

Recommendation #17: *Routinely provide the following information on an annual basis to get a sense of the "state of the bay" for each of the Coastal Ecosystems:*

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 by year, average annual constituent residence times, fraction of freshwater;

Water quality characteristics such as annual average and median concentrations as well as temporal variations of key constituents (salinity, dissolved oxygen, organics, and nutrients) bay-wide and spatially that convey general information about water quality conditions throughout the estuary;

Biological data such as general concentrations (volumetric, areal, etc. as appropriate) of primary producers (phytoplankton, submerged aquatic vegetation) and secondary producers (zooplankton, benthic organisms, key species/VECs), and associated organisms.

Response #18: Please see Response #4 in Appendix 1-4, page App. 1-4-124.

Recommendation #18: *Add an additional table that lists major District efforts and accomplishments for the WY in each of the estuaries.*

Response #19: Please see Response #3 in Appendix 1-4, page App. 1-4-124.

Recommendation #19: *Add a table of Performance Measures for each system.*

Response #19: Please see Response #5 in Appendix 1-4, page App. 1-4-124.

Recommendation #20: *Develop a realistic plan for restoration of each of the Coastal Ecosystems (establishment of MFLs, water reservations, necessary models, etc.) and for integration of their data.*

Response #20: Please see Response #9 in Appendix 1-4, page App. 1-4-125.

Recommendation #21: *Interact with the authors of Chapter 2 to develop measures that reflect the management effectiveness of providing the amounts of water needed to sustain the Caloosahatchee River and St. Lucie River estuaries.*

Response #21: Please see Response #10 in Appendix 1-4, page App. 1-4-124.

Recommendation #22: *Strengthen integration among the Coastal Ecosystems through common linkages which affect all of the estuaries beyond hydrology and water quality such as climate change. That is, what are the anticipated impacts of climate change on the estuaries?*

Response #22: Please see Response #10 above.

Recommendation #23: *Strengthen integration of the Coastal Ecosystems with inland systems such as Lake Okeechobee. In this case, it is linking Lake Okeechobee operations (aka water releases) with the freshwater inflow needs of the estuaries. In essence, what happens in the upper part of the river basins (i.e., Lake Okeechobee) needs to be integrated more strongly with what happens in the coastal systems.*

Response #23: Please see Responses #10 and #12 in Appendix 1-4, page App. 1-4-125.

Recommendation #24: *Provide adequate information for each estuarine system to permit evaluation of technical merit throughout the chapter.*

Response #24: Please see Response #1 above.

Recommendation #25: *Present information on SAV distribution and status separately from data on macroalgae, and provide interpretations as to whether the macroalgal growth is beneficial or potentially undesirable.*

Response #25: Please see Response #2 above.

Recommendation #26: *Clarify whether the nutrient bioassay studies described in the chapter, which were conducted in an abnormally dry year, will be repeated in a more average-precipitation year, since phytoplankton responses would be expected to differ markedly in drought versus average-precipitation years.*

Response #26: Please see Response #3 above.

Recommendation #27: *Add data and interpretations in the revised chapter on watershed trends in water quality, including water quality targets and comparisons with other estuaries of similar size/watershed area.*

Response #27: Please see Response #4 above. Our strategy is to provide some detailed information about water quality trends for the highlighted water bodies in the report, but only provide overviews for the others. We will consider indicating Florida water quality criteria where appropriate, but formal targets such as Total Maximum Daily Loads have not been established for the estuaries to date. It would not be meaningful to compare watershed loadings among estuaries in some cases because of fundamental differences that affect the fate of pollutants. For example, where carbonate soils dominate in the southern part of the District, phosphorus and many metals tend to be retained within the watershed. In addition, the limiting factors such as color, nitrogen, and phosphorus vary among the estuaries.