Appendix 1-3: *2004 Everglades Consolidated Report* Authors' Responses to Comments

A panel of outside experts provided peer review of the *2004 Everglades Consolidated Report* through WebBoard comments, participation in a three-day public workshop, and a written final report (Appendix 1-4). Each of the authors revised their chapters and related appendices responsively. In this appendix are authors' written responses to major comments in the panel's final report.

With the exception of reformatting some information for better readability, the Chapter 1 appendices were not edited or spellchecked by the ECR production staff.

Chapter 2A: Reponses to Peer Review and Public Comments

PEER REVIEW PANEL COMMENTS

Comment: *Is there an effort underway to develop broad consensus on THE method(s) to be used to determine compliance for the final assessment legally required by December 31, 2006?*

Response: To provide a uniform methodology for assessing compliance with water quality criteria, the Department has developed the Impaired Waters Rule (IWR) defined in F.A.C., Chapter 62-303, which was approved by the USEPA. The assessment methodology currently utilized in Chapter 2A was developed to be consistent with the state's IWR. In the Everglades, however, two parameters, dissolved oxygen and total phosphorus are handled differently. Dissolved oxygen concentrations in the Everglades naturally exhibit wide diel fluctuations and frequent values below the existing 5.0 mg/L Class III limit. The DO SSAC was specifically developed to address these issues and also provides a methodology to assess compliance that is consistent with the development of the SSAC. Likewise, the phosphorus criterion rule for the Everglades also provides a detailed assessment methodology that is consistent with the development of the phosphorus criterion and takes into account natural spatial and temporal variability as required by the EFA. Both the DO SSAC and the phosphorus criterion, including their assessment methodologies, were developed through open processes with opportunities for public input.

Comment: *Only constituents classified as a concern or potential concern are discussed in detail in the report. By focusing detailed discussions in Chapter 2A only on problems, there is concern that the broader overview of water quality conditions in the Everglades is not communicated – i.e. placing the problem areas in proper context. The title of the Chapter is "Status of Water Quality in the Everglades Protection Area" but the information provided tends to focus on problems.*

It is recommended that the broad overview of water quality status be described in the opening 'Summary' section in order to better context the focus of Chapter 2A on problem areas – areas where water quality standards are violated.

Response: This report was developed in accordance with the Everglades Forever Act, which establishes the purpose of this chapter as the identification of water quality parameters, in addition to phosphorus, which exceed state water quality standards or are causing or contributing to adverse impacts in the Everglades Protection Area. The primary objective of this chapter is to provide a synoptic view of water quality standards compliance on a regional scale (Refuge, WCA-2, WCA-3, and Park). The final report has been revised to better context "status of water quality" in terms of standards compliance and statutory requirements.

Comment: *The excursion assessment does not include trends in water quality that could help the reader understand if the current excursions are a developing problem or a*

retreating problem. It may be useful, for those constituents that violate their standard, to present a time series plot of the past ten years of concentrations relative to standards in effect during each of the years.

Response: With the possible exception of dissolved oxygen and nutrients, the exceedances observed are generally very limited spatially and/or temporally. Therefore, any trend analyses would be of limited benefit over the current comparison of various reporting periods. Further, since the exceedances are generally very localized, any trend would likely be masked by the variability across sites within an area. The authors will continue to evaluate time series or trend analysis methods for possible inclusion in future reports where appropriate.

Comment: *Is it possible to design a more coordinated monitoring system to provide a stronger foundation for a scientifically sound compliance evaluation?*

Response: It is anticipated that this issue will be addressed through the process of developing a dedicated monitoring network for purposes of evaluating achieve of the phosphorus criterion. Development of a phosphorus network affords the District and Department the opportunity to consider a new monitoring design tied to excursion analysis methods for all water quality constituents

Topic: Pesticide Section (1 of 3), Read 32 times NEW
Conf: Chapter 2A
From: Richard Pfeuffer rpfeuff@sfwmd.gov
Date: Thursday, September 18, 2003 08:58 AM

Since several errors occurred, I would appreciate if the author(s) of this section contact me, so I can determine how the data was obtained. Hopefully measures can be implemented to prevent a reoccurrence. Specifically, the notation of diazinon at L3BRS is actually a value of below the detection limit (value is 0.059 not 0.056 also). Additionally, the aldrin values are all flagged data (J4 = matrix interference or J5 = improper lab or field protocol). The other values reported are correct/accurate.

Topic: Pesticide Section (2 of 3), Read 40 times NEW
Conf: Chapter 2A
From: Ken Weaver kenneth.weaver@dep.state.fl.us
Date: Thursday, September 18, 2003 11:48 AM

Richard,

Thank you for your feedback and review of the pesticide results. Unfortunately, these discrepancies were not caught and corrected in the earlier internal review process.

Apparently, the discrepancies you note are related to database updates and quality assurance. The data were obtained as an export of the District's DBHYRO database. The entire database was exported on June 4, 2003 and therefore does not reflect database changes after that date. Aldrin values in the June 4th database were not fatally flagged in the manner you indicated nor was the diazinon result qualified as less than the detection limit (note: the MDL in the database was reported as 0.019 ppb). I queried the data from DBHYDRO via BDHYDRO Browser. The aldrin results in question are now both flagged with "J4". The diazinon MDL is still reported as 0.019. Does this reflect a data entry error? Thank you for catching our diazinon typo. The reported value was indeed 0.059 rather than 0.056. The next draft of the report will reflect these changes; i.e., aldrin will no longer be listed as concern.

Topic: Pesticide Section (3 of 3), Read 28 times NEW
Conf: Chapter 2A
From: Richard Pfeuffer rpfeuff@sfwmd.gov
Date: Tuesday, September 23, 2003 01:49 PM

Ken,
Thanks for responding. The diazinon data reflects some of the unique nuances of DBhydro.
The diazinon value is 0.059 and the MDL is 0.019. However, the value is BDL and not a detection/positive. The lab confirmed that this can happen.
During the data loading process, certain checks were implemented to determine which values are BDL and should receive the negative sign. However, this situation was not envisioned when the checks were implemented. Hence a negative sign was not added to the value, although the remark code of "U" (indicating the value is BDL) was in place. The negative sign is something unique for the SFWMD data base and is not a common reporting format. Based on this situation and the fact that there are

water quality parameters now which have a negative value, the negative sign may have out lived its usefulness. The best method for data retrieval is obtaining the remark code along with the data value. The remark code can indicate whether the value is BDL ("U") and/or of acceptable quality.
Thanks
Richard

Post New Topic | Reply to: "Pesticide Section"
Watch this TopicStop Watching this Topic

Chapter 2C: Reponses to Peer Review and Public Comments

PEER REVIEW PANEL COMMENTS

Comment: *Devotion of a separate section of the water quality status chapter to two constituents emphasizes the special importance given to nutrient impacts on the health of the Everglades ecosystem. Before they are treated separately, they should be considered along with all water quality criteria and then noted as having special importance to the Everglades and discussed in more detail in a special section of the Chapter. TP and Hg impacts in the Everglades are not well defined, thus requiring additional research and consideration, beyond the routine standards compliance assessment.*

Response: The ecological importance of phosphorus in the Everglades along with the observed impacts resulting from phosphorus-enrichment were documented and discussed in detail in previous versions of the report. Further, a discussion of the relationship between TP and HG was presented in Chapter 2B of this year's report. With the conclusion of the phosphorus criterion derivation and anticipated application of the P criterion rule, it was decided to combine the previous chapter addressing the development of the phosphorus criterion with the discussion of nutrient water quality conditions in a separate section of Chapter 2.

Comment: *Is the reference to a new monitoring program design (top of page 2C-7), specifically tied to measuring compliance with the new TP criterion, implying that a dedicated monitoring program will be established solely for TP compliance purposes?*

Response: The phosphorus criterion rule describes the monitoring program required to support the appropriate application of the phosphorus criterion. During the development of the required phosphorus monitoring program, it is expected that the District and Department will consider a new monitoring design tied to excursion analysis methods for all water quality constituents. Further, it is not expected that the phosphorus monitoring will be conducted in isolation from other water quality monitoring.

Comment: *Is the special treatment phosphorus receives in implementing the Everglades Forever Act the reason for creating a compliance monitoring program separate from other water quality constituents?*

Response: No. The primary reason the phosphorus criterion rule specifically describes the required monitoring program and assessment methodology is to assure that the phosphorus criterion is applied in a manner consistent with its derivation. This ensures that the results from the application of the phosphorus criterion are meaningful and provide a reliable measure of the phosphorus status within the EPA. However, the EFA does provide limited guidance regarding some of the factors that are required to be addressed in the assessment methodology.

Comment: *It appears from reading Chapter 2C that the TP criterion compliance monitoring strategy is fundamentally different from the compliance 'monitoring' strategy employed in Chapter 2A where 'found' data is used to determine compliance. Will the TP and water quality monitoring program designs be coordinated?*

Response: As described above, the development of a phosphorus network affords the District and Department the opportunity to design a unified monitoring program for all water quality constituents.

Comment: *Concern develops regarding future ECR reporting to portray 'water quality status' - when each variable is treated quite differently. Has any thought been given to how the different data collection and compliance assessments will be integrated into an overall view of water quality status, as the title of Chapter 2 indicates? Everglade water quality monitoring and assessment, in its efforts to be scientifically correct in portraying each variable, must also be able to integrate information about all the variables into a more concise reporting format that carefully meshes with the policy setting and management decision making context.*

Response: As described above, the District and Department will consider a new monitoring design and assessment methodologies during the development of the required phosphorus-monitoring program. Since the water quality monitoring includes a broad suite of water quality variables ranging from conductivity and pH to toxic pesticides and heavy metals, it is extremely difficult to integrate all of the monitoring data into a more concise format that is scientifically valid and meaningful. The authors disagree with the benefit of a more concise reporting format in making informed policy and management decisions especially in a highly complex system such as the Everglades.

CHAPTER 3: PERFORMANCE AND OPTIMIZATION OF AGRICULTURAL BEST MANAGEMENT PRACTICES

An excellent summary is presented of the best management practices implemented in the Everglades Agricultural Area and the C-139 basin, as has been the case in the past.

These practices have been very effective in reducing phosphorus mass and concentration emanating from the EAA and appear to have equal potential in the C-139 basin. A description of the progress being made with the municipalities and other contributing areas would be helpful. Have similar reductions in phosphorus occurred in the municipalities and other contributing areas? **This topic is explored in great depth in other chapters, such as 8b.** With the implementation of similar programs throughout the area, much greater improvement in water quality entering the Everglades would be expected.

An attempt should be made to explain the significant drop in phosphorus mass being discharged from the EAA. As suggested in the past reviews a significant part of the decrease in phosphorus mass discharge may be attributable to the decline in the phosphorus fertilizer industry. Apparently, it is not necessary for farmers to add phosphorus annually; therefore, some of the decline in phosphorus discharges from the EAA may be attributable to economic conditions. **This entire chapter discusses the reasons for the decrease in P loads from the EAA. It is more likely that the decline in the P fertilizer industry in S Florida is a an effect of the BMPs and reduction of P going into the EAA, not a cause.**

It is realized that space is limited, but a sentence here and there explaining the results **(Which results need further explanation?)** would be helpful to the reader rather than simply stating, "here are the data." An extensive analysis is not needed, but a comment or two about obvious variations would enlighten the reader.

Questions of interest follow.

a. What impact on compliance can be expected from the results of the University of Florida/Institute of Food and Agricultural Science On-Farm Research program? Does evidence exist to show the relationship between particulate phosphorus, soluble phosphorus, organism growth, subsidence and mineralization of organic matter or from application of inorganic fertilizers? **Discussed during workshop and generally beyond scope of the chapter.**

b. A brief statement or two about the variables influencing the annual percent variations in load would be helpful. **Those statements have already been added to the chapter.** More discussion of impacts of other phosphorus contributors **(what other contributors? This comment is unclear.)** would be helpful in interpreting the impact of BMPs.

Specific Comments

Comments for various sections of the chapter are presented in the following paragraphs.

Summary

An excellent summary and the presentation of TP concentrations and loadings improved the value of the summary.

Basin-Level Monitoring Results

C-139 Basin

In Table 3-6 it would be desirable to add a footnote that the three-year Actual WY2003 loads and concentrations are for only one year. **Not correct, although this is the first year of compliance testing, the loads and concentrations are as represented and are three year averages.**

A few sentences explaining the results in Figure 3-9 would be helpful, i.e., why the significant drops in TP Loading occurred in 2001. **a sentence will be added referencing the reduced flows during the drought.**

Why is the 3-year rolling average trending upward as shown in Figure 3-10? Just a brief sentence or two will suffice. **This has already been added to the chapter and was discussed at the workshop.**

Permit-Level Monitoring Results

A brief description of how relative comparisons are used would be helpful.

For the EAA Basins

It is realized that it is extremely difficult to sort out the discrepancies in flows emanating from the EAA. What are you doing to quantify the discrepancies in flows? **What discrepancies in flow? We don't understand what is meant by this question.**

Update on Everglades BMP Research

As mentioned in the past, the update would have been improved by presenting a summary of the results from the studies in tabular form. It is realized that reports are available or are being prepared, but most readers are not going to search for additional documents. After 10 years of study, there should be many interesting results that could have been summarized in tabular or graphical format. Although much of the particulate phosphorus is in the form of biological growth, is there any indication as to how much of this growth is attached growth and transported due to turbulence or the mass that reproduces in the water body by extracting phosphorus? **This comment has been passed on to the researchers.**

Finding and Future Directions

Are future reductions in TP from the EAA to be modified, i.e., a cumulative percent reduction with some maximum reduction at which point further reduction is not expected? **This question is unclear, we don't understand what the reviewer is asking.**

Panel Conclusions

1. The BMP program has been very successful in reducing the TP mass and concentrations reaching the Everglades.
2. To improve on the present program, it appears that phosphorus budgets are needed along with reduction of particulate phosphorus from the EAA.

Recommendations

1. Continue the good work, and the efforts to involve the communities and rural areas in the BMP program. If restoration of the Everglades is to be achieved, it appears to be essential that all parties participate in the BMP program.

2. Attempt to differentiate between the various contributors to the reductions in phosphorus from the EAA.

Review of Chapter 4A: STA Performance and Compliance

Response to ECR Peer Review Panel Comments

1. The STA investigators are to be commended for collecting and analyzing significant quantities of data for the various STAs evaluated. The inclusion of summary tables helps the reader only interested in a quick overview of the STA results.
   Response: Thanks.

2. The lack of detail about the data presentations leaves the reader wanting more information to fully understand the results. Without reading Chapter 4B it is difficult to interpret the performance and compliance data. It is realized that space is limited and there are numerous results from numerous experiments that warrant the entire chapter and more, but the chapter leaves one wanting more information without having to read additional Chapters. Perhaps one reading this chapter should be expected to read additional chapters; thereby, making my comment irrelevant.
   Response: Agree, the STA chapters need to read in concert. Next year we plan to integrate chapters 4A and 4B into a single chapter.

General Comments and Questions

1. By discussing mercury, DO, and Vegetation management for all STAs in one section, considerable redundancy could be eliminated.
   Response: We selected the present format to keep all water quality discussions together for each STA. For next year's report, we will try to compile a summary table for DO and mercury for all the STAs, similar to Table 4A-1 for TP.

2. Where hydraulic loading rates (HLR) are given, it would be helpful if the hydraulic residence times (HRT) or flow rates and depths were presented, because mean depths may have had an influence on the performance.
   Response: The final chapter contains all available HRTs for the STAs.

3. How much phosphorus can the STAs retain without eventually discharging slugs of TP, or require some form of maintenance? As TP accumulates, is it possible that a new ecosystem will evolve that may be nitrogen, carbon or whatever limiting?
   Response: We also have pondered these questions for some time. In response to pulsed flows and loadings, all biological wetlands have periods of reduced removal efficiency with associated higher levels of TP releases. Based on our observations in the Everglades, the STAs theoretically should be able to retain TP indefinitely as long as the STAs are operated within their design ranges, including maintaining minimum water levels (thereby minimizing remineralization of TP), with appropriate long-term maintenance. Sediment accretion rates have been studied; and additional investigations will follow. Regarding ecosystem evolution, there will always be dynamic shifts in the vegetation communities within the STAs, but we don't anticipate radical evolution as TP accumulates.

4. When stating that fish concentrations of mercury exceeded the limit, why not report the concentration?

   Response: The requested information is contained in Appendices 2B-6, 4A-4 and 4A-7.

5. All of the STAs were overloaded hydraulically and with TP. How soon, if ever, are the loads to be reduced to the design level?

   Response: Although the STAs received greater flows and TP loads than the long-term average annual values anticipated during design, the design contemplated a wide range of inflow values – hence, the STAs were not necessarily overloaded. The exception for WY2003 was STA-1W which received about 3 times the long-term average annual design volume and TP load. Although the flow at the STA-6 inflow pump was about three times the average annual flow used in the design, three factors suggest that it may not have been significantly overloaded:

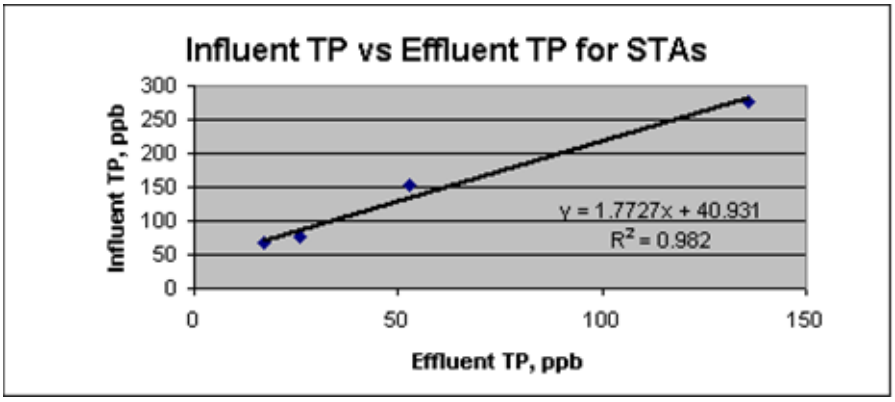
   a. *Not all of the flow measured at this pump station actually passed through the treatment area, but was re-directed for water supply deliveries out of the STA. District staff is presently installing sensors at this location to quantify the water supply deliveries.*
   b. *Due to lower than expected inflow TP concentrations, the actual TP loading was within 25% of the long-term average used during design.*
   c. *STA-6 exhibited approximately 80% reduction in TP loads, exceeding the design assumption of 76% reduction.*

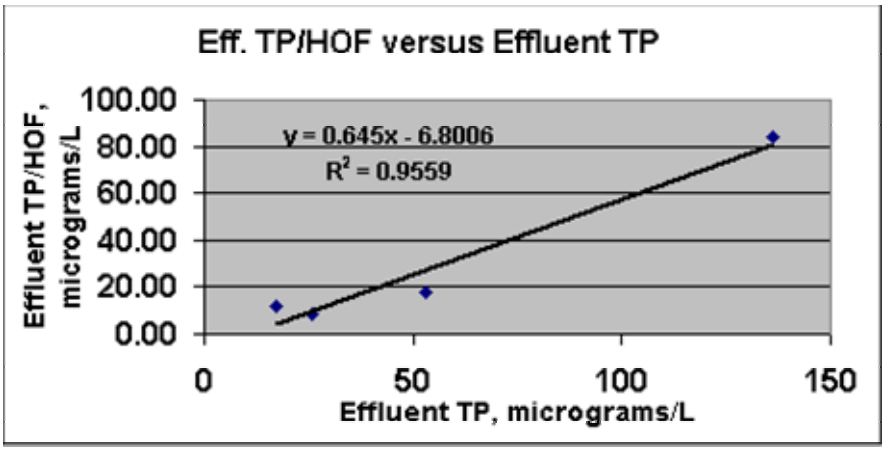
   Operations for STA-1W should be within the design ranges within the next 18 months, coinciding with the anticipated full operation of STA-1 East, scheduled for March 2005. STA-3/4 is scheduled to begin start-up operations in October 2003 with flow-through operations for Cells 1 and 3 commencing in June 2004; this should provide additional operational flexibility for STA-1W and STA-2, particularly with respect to regulatory releases from Lake Okeechobee. Operations for STA-5 and STA-6 should be within the design flow ranges within the next 3 years, coinciding with the anticipated full operation of STA-6 Section 2 (December 2006).

6. It appears that phosphorus removal in the STAs is directly related to the influent TP concentration and the hydraulic overload. The following graphs illustrate this.

Relationships Between Hydraulic Loading Rate, Effluent TP, Influent TP and the Hydraulic Overload Factor

STA	HLR cm/d	Eff TP Ppb	Inf TP Ppb	Hydraulic Overload Factor	Eff TP/HOF
1W	7.4	53	154	3	17.67
2	3.67	17	67	1.4	12.14
5	3.45	136	277	1.62	83.95
6	5.4	26	77	3	8.67





The relationship between influent and effluent TP is shown in the first plot, and the effect of hydraulic overload on the effluent TP concentration is shown in the second plot. Although purely subjective, it appears that correcting the overload would result in considerable improvement in the performance of the STAs.

Response: Thanks for the comparisons presented, and we agree that is necessary to fully optimize the TP removal performance of the STAs. An additional analysis comparing nutrient loading rates and nutrient removal rates was discussed in the final chapter.

7. If feasible, consideration should be given to operating more of the cells in the various STAs in series. This will definitely improve the hydraulic characteristics.

   Response: We agree that improving the hydraulic characteristics is integral for optimizing performance. The proposed enhancements to each STA include additional compartmentalization – in essence increasing the number of cells in

series – as well as operational refinements to better balance the flows/loads to each cell.

Section Comments

Comments and questions for each section of Chapter 4A are presented in the following paragraphs.

STA-1 EAST UPDATE

Assuming that I am reading the figure correctly, with water flowing from Cell 7 into Cell 6, there is a considerable opportunity for severe short-circuiting to the first one or two outlet structures. If feasible, it would be advisable to discharge from Cell 6 at the lower two or three outlets at the southern end of the cell. For the uninitiated, it may be desirable to identify the blue squares as inlet and outlet structures. Having multiple cells in series should improve the hydraulics of the STA considerably.

Response: Good suggestion; during flows that are less than the design peak, we can recommend operation of the lower outlet structure to minimize hydraulic short-circuits. We will modify the figure legend to identify the blue squares as inlet and outlet structures.

STA-1 WEST OPERATIONS

What is the phosphorus concentration in the Lake Okeechobee diverted water?

Response: The average TP from Lake Okeechobee into STA-1W for WY2003 was 168 ppb.

STA-2

Have economic studies been conducted comparing the costs of improving the hydraulics in the STAs with costs associated with other forms of treatment and vegetation management?

Response: Conceptual costs associated with various treatment and vegetation management were compared for STA-2 during the District's Advanced Treatment Technology investigations (see previous Everglades Consolidated Reports for details). During the Basin-Specific Feasibility Studies, an optimized alternative was designed that subdivided each treatment cell to improve hydraulic characteristics and converted emergent vegetation to submerged aquatic vegetation (SAV) in Cells 1B and 2B (Cell 3 is currently SAV).

STA-2 VEGETATION MANAGEMENT

What was the undesirable vegetation?

Response: The undesirable vegetation was torpedo grass and cattails in Cell 3. This was added to the final chapter.

STA-2 PERMIT WATER QUALITY MONITORING

The decision to move as much water as possible through STA-2 to control mercury discharges sounds like simple dilution. What am I missing?

Response: Atmospheric deposition of mercury remains the largest contributor to the STAs, hence dilution of rainfall is an important factor. However, the decision to move as much water as possible through STA-2 (Cell 1) was not so much dilution but rather
(1) Decrease the likelihood of dry-out events;
(2) Dilute the rainfall inorganic mercury most likely to be involved in MeHg production with inflow water containing much lower inorganic mercury concentrations;
(3) Dilute the excess MeHg flux produced internally, reducing the subsequent MeHg build-up in the periphyton-based food chains within and downstream of Cell 1; and
(4) Increase the rate of supply of sulfate to the sulfate-reducing bacteria, fostering the build-up of pore water sulfide concentrations in surficial soils to levels that could inhibit excess MeHg production.

Based on an analysis of the water, soil, and mosquitofish data collected in the STA-2 Mercury Special Studies to date (See Appendix 2B-7 this report), it would appear that all four objectives have been met. In fact, although outside the reporting period, for the first time since start-up began in July 2000, Cell 1 outflow THg and MeHg were less than the corresponding inflow concentrations in late June 2003. The addition of pore water monitoring to the STA-2 Mercury Special Studies beginning in September 2003 should provide direct evidence for the attainment of (4) beyond the indirect evidence already available: (a) the increase in Cell 1 soil acid volatile sulfide (AVS) concentrations with a concomitant decrease in soil MeHg concentrations over time and (b) the increase in the magnitude of the inverse correlation between AVS and soil MeHg over time.

STA-2 TOTAL PHOSPHORUS

The results indicate that the STAs receiving high concentrations of TP are overloaded or have poorly designed hydraulic characteristics. It appears that the STAs are operating at less than optimum. It is likely that significant improvement in performance would be obtained by simply reducing the loading rates.

Response: See response to comment 5 above.

A kinetic analysis of the various STAs is needed.

Response: Agree; during the Basin-Specific Feasibility Studies, a dynamic model of each STA was created using the DMSTA tool. These models will be refined and updated with full-scale operational data over the next few years.

STA-2 OTHER WATER QUALITY PARAMETERS

In the future, it may be desirable to cover the DO issue in a separate section for all STAs. This would result in reducing the repetition.

Response: We selected the present format to keep all water quality discussions together for each STA. For next year's report, we will try to compile a summary table for DO and mercury for all the STAs, similar to Table 4A-1 for TP.

STA-3/4

In the detailed design what are the enhancements referred to in the last paragraph on page 4A-31?

Response: The enhancements consist of an additional levee in Cell 3 to create two treatment cells in series, as well as conversion of emergent vegetation in Cells 1B and 3B into SAV.

How much space will be taken up by the PSTA demonstration project? *Response: The demonstration project is presently proposed to take up about 400 acres of Cell 2B (see chapter 4B for more details).* Will it be large enough to affect the performance of the STA or is a cell to be replaced?

Response: Approximately 75% of the demonstration project will consist of SAV, which is the ultimate vegetation community proposed for that cell.

STA-5

When making reference to a concentration or flow as being "considerably" lower or higher, why not show the mean and some statistical inference.

Response: The references were to monthly values and not meant to represent any statistical information; the actual values are presented in each figure.

ROTENBERGER WILDLIFE MANAGEMENT AREA

Is the wildlife area essentially the equivalent of a large STA that could be used in a kinetic analysis of TP removal?

Response: The Rotenberger Wildlife Management Area (RWMA) is not being operated in a similar manner as the STAs, but rather, it is being operated to restore a remnant Everglades habitat. Insufficient internal hydraulic, water quality, vegetative and other data exist to conduct a dynamic analysis of TP removal in the RWMA.

Department of Interior Comments on Chapter 4A

Chapter 4A

1) General: This is a very important chapter, summarizing important information from the year of continued STA experience.
Response: Noted.

2) General: Information on the individual STAs seems inconsistent. Some present average hydraulic loading (cm/day), and some do not. Flow weighted mean concentration tables (e.g., Table 4A-4) do not consistently present the same constituents. Why, for example, are chloride and sodium not reported in Table 4A-10 but are reported in Table 4A-13? Does this represent a difference in constituents monitored at these inflows and outfalls?
Response: The final report (including Table 4A-1) contains hydraulic loading rates, nutrient loading rates and hydraulic residence times for all the STAs. The difference in parameters for the STA inflow and outflow monitoring reflect the evolution of the permit requirements.

3) Statistical summaries of STA data – appendices – general: The summaries for the current year are informative. Presentation of the cumulative record and discussion of trends in performance would be much more useful.
Response: This is a very general request; Dept. of Interior staff are encouraged to contact us for specific data requests.

4) Those STAs that experienced overloading in WY2003 should be briefly discussed in the "Summary" as it is a notable component of the text of this chapter.
Response: Agree, the final report contains a discussion of the high loading experienced by the STAs in the Summary section.

5) General: The discussion of water quality at sites downstream of STA discharges is limited to dissolved oxygen and mercury. This should be amplified to include nutrients and other relevant water quality parameters.
Response: Chapter 6 discusses the ecological monitoring within the Rotenberger Wildlife Management Area downstream of the STA-5. In addition, District staff are preparing a report of the initial two years of discharge from STA-2; this should be available in 2004 and we will provide a copy to the Dept. of Interior Everglades Team.

6) General: The report indicates that inflows to STA-1W, STA-2, and STA-5 exceeded design capacities. What measures are being taken to bring the loads down to the design levels? There is limited discussion of this in STA-1W (lake releases), but this would not address excessive runoff.
Response: Although the STAs received greater flows and TP loads than the long-term average annual values anticipated during design, the design contemplated a wide range of inflow values – hence, not all of the STAs were necessarily overloaded. The exception for WY2003 was STA-1W which received about 3 times the long-term

average annual design volume and TP load. Although the flow at the STA-6 inflow pump was about three times the average annual flow used in the design, three factors suggest that it may not have been significantly overloaded:

a. *Not all of the flow measured at this pump station actually passed through the treatment area, but was re-directed for water supply deliveries out of the STA. District staff is presently installing sensors at this location to quantify the water supply deliveries.*
b. *Due to lower than expected inflow TP concentrations, the actual TP loading was within 25% of the long-term average used during design.*
c. *STA-6 exhibited approximately 80% reduction in TP loads, exceeding the design assumption of 76% reduction.*

7) General: Information on bypass loads for each STA should be presented. Reasons and remedies for bypass should be discussed. Table 4A-1 should be expanded to include a row showing bypass loads and a row showing total load to WCA (bypass + STA outflow). Bypass loads to Table 4A-1 and to the input/output figures for each STA (4A-4, 4A-11, 4A-19, 4A-30).

Response: Table 4A-2 contains the requested summary information on bypass volumes and loads. The STA-1W section discusses the causes and remedies; the final chapter will contain the total load to the Refuge (bypass + STA outflow). The final chapter contains a discussion on the potential causes and remedies for the bypasses at STA-5. The final STA P load figures include bypass loads.

8) p. 4A-1: Provide information in the Summary section about the STA inflows that exceeded design capacities.

Response: The final report contains a discussion of the high loading experienced by the STAs in the Summary section.

9) p. 4A-2, Table 4A-1: Present with information on design specs, so the reader knows what this translates to (overloading, within design parameters, etc.).

Response: District staff is developing the design ranges for each STA; this information will not be available for this year's report but will be available in time for next year's report.

10) p. 4A- 2, Table 4A-1: It would assist the reader in comparing STAs if values were also provided as area specific (per square meter) values. Area information is provided, and the reader can easily perform these calculations. However, it would make the comparison more straightforward to provide this for the reader.

Response: The final report (including Table 4A-1) contains hydraulic loading rates, nutrient loading rates and hydraulic residence times for all the STAs.

11) p. 4A-3 Table 4A-2: Table 4A-2 includes information on STA-1W bypass flows and loads. This information is a valuable addition to the *ECR*, and this addition by the authors is noted and appreciated.

Response: Noted.

12) p. 4A-4: List the amount of water going to STA-1E from Acme.
Response: The design inflow volume to STA-1E was based on basin-wide values and not broken down by sub-basin.

13) p. 4A-4: When is the G-311 structure planned on being on-line?
Response: G-311 is scheduled to be completed March 2005.

14) p. 4A-46, Fig. 4A-26 shows that a large portion of the phosphorus load from STA-5 is being retained in Rotenberger. There is no discussion of the impacts of these loads, despite the extensive monitoring of water quality, soils, and vegetation being performed downstream of the STA-5 discharge.
Response: Chapter 6 discusses the ecological monitoring within the Rotenberger Wildlife Management Area downstream of the STA-5.

15) p. 4A-13, Fig. 4A-7: The caption of Fig. 4A-7 includes a parenthetical statement "Note: the Refuge also includes the Snail Farm and Strazzulla properties." The refuge, in fact, also includes additional property including impoundments, a headquarters area, and cypress swamp. Perhaps the statement could be revised to read "Note: the refuge includes some land outside the WCA-1 boundary." The label should be "A.R.M. Loxahatchee National Wildlife Refuge (WCA-1)".
Response: Upon review, the note is irrelevant to the information displayed in the figure and will be deleted.

16) p. 4A-12: The x, y and z transects are miles from the STA-1W discharge, and are nearly totally irrelevant to a discussion of DO in the STA-1W discharge. Those transects are relevant to penetration of water and contaminants into the refuge in that vicinity.
Response: Text will be added to the chapter reflecting the fact that the x, y, and z transects in the interior marsh can be affected when the rim canal stage is greater than the interior marsh stage. Rim canal water can penetrate up to two kilometers depending on stage differential. Consequently, the STA-1W discharges do have an affect on water quality in the marsh.

17) p. 4A-17, 1st para: There is no direct (1:1) linkage between STA-1W discharge and the x, y, z transects to make this DO conclusion.
Response: Text will be added to the chapter stating "Ultimately, TP load reductions to the Refuge rim canals should improve dissolved oxygen conditions in the interior marsh fringe areas affected by rim canal water penetration".

18) See Comment #1 in Chapter 4B below.
Response: Next year's report will integrate chapters 4A and 4B.

Chapter 4B: Responses to Peer Review and Public Comments

DR. E. JOSEPH MIDDLEBROOKS AND PEER REVIEW PANEL

Comment 1: *In the fifth paragraph, it is stated that phosphorus can be stored for long periods. Do you have any idea for how long? Determining this factor would give an indication of the design life for the STAs.*
Response: The long-term P storage mechanism in wetlands involves incorporation of nutrients into the recalcitrant fraction of plant biomass and eventual burial of this material in the sediments. Assuming that the STAs are constantly flooded, and thus avoid oxidative decomposition of the sediments, P storage in recalcitrant plant biomass is essentially permanent and was not a factor in determining the design life of the STAs. Rather, the replacement time for critical infrastructure (e.g., life expectancy for pump stations and major water control structures) and loss of storage capacity as the STAs fill with sediment will determine the operational life of the STAs.

Comment 2: *It is good to see the implementation of the compartmentalization study to improve the hydraulic characteristics. It has been established for many years that one of the most influential variables associated with biological treatment systems is the hydraulic residence time.*
Response: This comment does not pose a question or make an observation that requires a response from the District.

Comment 3: *Water depths are given for the STA-1W test cells, but an estimate of the depths in the various cells of the STAs are not given. Are there differences in mean depths between the individual STAs or the Cells within an STA? If so, what effect on performance do you anticipate or have determined?*
Response: We are currently conducting detailed surveys of ground elevations throughout the footprint of the other STAs. Once these data are available, we will be able to calculate the mean ground elevation for each treatment cell. The topography of each STA is not perfectly flat, so we expect that there will be small differences in elevation among treatment cells. For example, there is approximately a 20 cm difference in mean ground elevation between the east and west flow-ways of STA-1W. We do not consider differences of this magnitude (and the depth differences that would result when the STA is at flat pool) a major determinant of treatment performance. Rather, we attribute inter-cell differences in treatment performance with each STA largely to differences in plant community composition and hydraulic/nutrient loading.

Comment 4: *Why not identify the [STA-1W] northern flow-way by Cell number?*
Response: All the flow-ways in STA-1W are composed of two distinct cells (north flow-way: Cells 5A and 5B; east flow-way: Cells 1 and 3; west flow-way: Cells 2 and 4), so it was logical to refer to Cells 5A and 5B as the north flow-way and not by cell number. Also, we elected to simplify our data presentation in the chapter and report analyses of long-term STA performance on a flow-way basis, rather than by individual treatment cells.

Comment 5: *It appears that the inflow from [STA-1W] G-303 and G-255 comes from essentially the same source. How far apart are the two inlet structures? Could this distance account for the differences in influent concentration of TP?*
Response: Yes, your assessment of flow distribution through G-303 and G255 is correct; most inflow to the east and west flow-ways enters Cell 1 through G-303 and a portion of this water then passes through G-255 into Cell 2. G-303 and G-255 are approximately 4.8 km apart. Measurable treatment effects were observed in the old Buffer Cell as water flowed from G-251 to G-255 (approximately the same linear distance between these two structures as between G-303 and

G-255). We find it plausible that differences in water quality observed at G-303 and G-255 resulted from treatment that occurred in the upper portion of Cell 1.

Comment 6: *Is it possible that the large mass of SAV improved the hydraulics of [STA-1W] Cell 4; therefore, increasing the contact time with the plants and other organisms removing phosphorus?*
Response: Correct. Tracer studies in Cell 4 have shown that it is severely short-circuited. Phosphorus treatment efficiency at stations located in the canals (characterized by sparse vegetation, higher water velocities and short residence times) was lower than at stations located in the dense weed beds (longer flow paths and longer residence times). We attribute the superior treatment performance of Cell 4 to the abundance of SAV.

Comment 7: *Rather than say "greater' why not use a percentage change or multiple factor to describe observed differences?*
Response: We have tried to be more explicit in our discussion of differences throughout the text.

Comment 8: *What is the estimated error in flow measurements? I realize that this will vary for the various methods that are used, but just a rough estimate would be useful.*
Response: In general, errors in flow measurement at District pump stations are in the range of ± 5% or less, while errors at other types of District water control structures are higher and may approach ± 15%. However, these values are only estimates. The measurement error at any particular District structure is site specific and may be higher or lower than these values.

Comment 9: *Again, rather than use vague terms such as "more pronounced", why not show ranges or values.*
Response: The sampling program in question was somewhat complex (2 species x 2 sampling dates x 6 chemical and biomass parameters). We feel that describing all these relationships is overly cumbersome and haven't found a satisfactory way to distill this information down to a meaningful number or range of values. In this particular case, we don't have a better alternative to the section as written.

Comment 10: *What would vegetation control cost if all STAs were operated as SAV based systems?*
Response: It is not possible to provide an accurate cost estimate for a vegetation management program of this magnitude at this time. The costs associated with managing the SAV community in Cell 4 of the old Everglades Nutrient Removal Project were incurred during a period when this wetland received hydraulic and nutrient loads far lower than loadings to the operational STAs. Our limited experience with the STAs suggests that long-term vegetation management under conditions of higher loads may be more expensive, but we do not have sufficient data to estimate a cost. While there are plans to convert some cells in each STA to SAV, it is not the District's intention to convert the entire STA footprint to this community type.

Comment 11: *If all of the inflow enters the [STA-6] STA from G-601, G-602 and G-603, what happens at G-604?*
Response: G604 does not convey water into Cell 3; rather it connects the STA-6 inflow canal with the adjacent L-3 Borrow Canal. The statement is correct as written; all of the flow into STA-6 enters through G-601, G-602 and G-603. The STA-6 map that will be added to this chapter will reflect these differences.

Comment 12: *Has a materials (nutrients) balance been attempted to determine if [STA-6] sawgrass took up more TP than the other plants?*

Response: The District intends to install monitoring equipment to gather the data needed to compute hydraulic and nutrient loads entering and leaving Cells 3 and 5 of STA-6. Once this equipment is installed and we have sufficient data, we intend to calculate phosphorus budgets for both cells. At this time, we do not have a projected date for completion of equipment installation.

Comment 13: *It appears that the flow was distributed to [STA-6] Cells 3 and 5 in portion to their surface area; therefore, the last sentence on page 4B-11 appears to be incorrect. Cell 5 apparently did not receive a higher hydraulic load, perhaps a larger mass of TP.*
Response: Flow into Cells 3 and 5 was not proportional to their size. For example, in WY2003 hydraulic loading to Cells 3 and 5 was approximately 4.9 and 2.5 cm/day, respectively (note that inflow water volumes to each cell were not measured directly; inflow was inferred from outflow measured at the G-393 and G-354 structures). Cell 3 was clearly more heavily loaded. However, you are correct in saying that the last sentence on page 4B-11 is incorrect in its assessment of hydraulic loading to these cells. This section has been edited to correct the error.

Comment 14: *An examination of the TP effluent concentrations and the overload factor reported (i.e., 3 times design flow, etc.) results in a significant relationship between the two factors. It is likely that the following figure is based on inadequate and incomplete data, but it does show a significant relationship between effluent TP concentrations and hydraulic overload.*
Response: This comment does not pose a question or make an observation that requires a response from the District.

Comment 15: *It is true that the chemical treatment processes would alter the water quality parameters and may adversely affect the ecosystem; however, creating a single controlling factor such as phosphorus may also alter the ecosystem in ways not yet understood. This said, it is obvious that "green" technology offers less risk and great potential to allow the recovery of the Everglades.*
Response: This comment does not pose a question or make an observation that requires a response from the District.

Comment 16: *In the second paragraph on page 4B-14, AlCl should be changed to reflect the correct chemical formula.*
Response: The chemical formula was corrected in the text.

Comment 17: *Does the infrequent production of an effluent TP of 10 micrograms/L indicate that the "green" treatment processes without some form of chemical pre-treatment cannot be expected to reach the "magic" level of 10 ppb? If this were the case, why would one expect the phosphorus concentration in the Everglades to achieve 10 μg/L uniformly over the entire area?*
Response: Total P concentrations in pristine areas of the Everglades consistently measure 10 μg/L or less, which indicates that biological systems can achieve low TP concentrations. The Process Development and Engineering component of the District's Long Term Plan for Achieving Quality Goals will continue research on the efficacy of increased compartmentalization within the STAs and sequencing different vegetation community types to reach lower outflow TP concentrations. Chemical treatment, whether pre- or post-STA, is no longer considered to be a viable option for Everglades restoration.

Comment 18: *Why not use a uniform set of Test Cell Designations? Redefining designations in the text differently than those given in Table 4B-7 makes it difficult to follow your presentation.*
Response: The text and figures have been edited so that test cell designations are consistent throughout the chapter.

Comment 19: *Were there differences in the dominant plant species in [south test cells] Cells E-1 and E-2 that may have contributed to the differences in performance?*
Response: No, the vegetation community in both test cells was dominated by *Typha*.

Comment 20: *This section is a good concise summary of the PSTA field-scale test work.*
Response: This comment does not pose a question or make an observation that requires a response from the District.

Comment 21: *Nature can be cruel! The best-laid plans are frequently distorted by the demon nature. Even with nature's fickle intrusion, useful results were obtained.*
Response: This comment does not pose a question or make an observation that requires a response from the District.

Comment 22: *It would be useful to report the thickness of the low and high application rates of the three chemicals used [in the test of soil amendments conducted in mesocosms at the field-scale PSTA site].*
Response: The application rates for each soil amendment were added to the table in this section.

Comment 23: *A summary table outlining the major components of the [STA-3/4 PSTA] demonstration project would be useful.*
Response: A summary table of the STA-3/4 PSTA Demonstration Project was added to the chapter.

Comment 24: *The sequencing of the various treatment methods will have a positive effect on the hydraulic residence times in the overall systems. Considerable attention should be given to the flow patterns and HRT in the planned [STA-3/4 PSTA] demonstration project.*
Response: The monitoring plan for the STA-3/4 PSTA demonstration project has provisions for conducting annual tracer studies in the side-by-side PSTA and SAV cells. These tests will enable us to check each cell for hydraulic short circuits and accurately calculate HRTs.

Dr. Yuch Ping Hsiech

Comment 1: *Chapter 4B of this year's report is quite exciting in that it reports the new sediment and vegetation monitoring program and the long-term performance evaluation of the STAs. This new approach of study signifies the departure from the "black box" and "snap shot" approach used in the past to a more comprehensive and in-depth understanding of the temporal and spatial function of wetlands as sinks of nutrients. I honestly think that this new study will shed important light and add new dimensions to the wetland function research not only pertaining to the EPA but all wetlands in general. Although the data is still accumulating and any result preliminary at this stage, the data presented indicate that plant biomass and floc layer accumulation probably are the main mechanism for P sink in the STAs. Different species seem have different capability to remove P from water column but the difference seem to be secondary in comparison to the biomass and floc accumulation. The biomass and floc differences between the inflow and outflow areas indicating that the STAs are not reaching a steady state after five years of operation. SAV is quite promising in the advance treatment of P to a very low level. However, maintaining SAV requires control of FAV to a minimum level. STAs seem have better efficiency to remove P when the inflow P concentration was below 150 ppb (Fig. 4B-2C in p. 4B-13). The plant community change and succession in the STAs are interesting and valuable data for understanding wetland ecology. The structure and distribution of plant community could be good indicators to changes in nutrient and hydrological status and the development stage of wetlands, if we have a good un-*

derstanding of the mechanism. Not much data are available now, however. When sufficient data of this study are collected, quantitative models that predict long-term performance of STAs probably can be developed. The authors should be commended for a job well done in their presentation of such interesting and important data for the STAs.
Response: Dr. Hsiech's comments do not pose specific questions or make observations that necessitate a response from the District.

Department of Interior

Comment 1a: *General: There is a general lack of connection between Chapters 4A, 4B and 8A. Chapter 4A discusses STA performance, but with no interpretation of whether design expectations are being met. FDEP has in the past suggested doing such an interpretation based on a design model. The flows and loads for the year would be run through the design model to see if expectations are being met. At least two models are available: the STA design model and its successor, DMSTA. As a consequence, there is no way to tell if the STAs are below, at, or above design performance.*

Chapter 4B discusses results from a loosely connected set of experiments and platforms. However, the report contains no quantitative interpretation of those results in terms of STA performance projections.

As a consequence, based on information in this ECR, the activities described in 4B have exerted no influence on decisions on STA optimization. Chapter 8A presents the outline of the Long Term Plan, but neither the LTP nor Chapter 8A describes any usage of results from Chapter 4B.
Response: We have attempted to describe, as we perceive it, the linkage between the research and monitoring efforts described in this chapter with decisions made on STA Optimization and the District's Long-term Plan. We presented similar information on the linkage between research and STA management in previous ECRs. We added an analysis of STA performance relative to design expectations using the STA design model as suggested above.

Comment 1b: *One of the most important things that needs to be communicated to the reader is that a decision has been taken to configure the STAs as a sequence of emergent vegetation followed by SAV alone or possibly followed by SAV followed by PSTA. It would seem useful to include this in the Executive Summary and Introduction.*
Response: We have communicated this information in the chapter.

Comment 2: *General: It would be valuable to the reader to have maps of the STAs, including their structures. This chapter, as all the others, should function as a stand-alone document.*
Response: Maps of the STAs have been added to the chapter.

Comment 3: *General: There are places within Chapter 4B where some places are high in detail, whereas others are lacking in detail (or supporting documentation), such as p. 4B-14, 3rd para.*
Response: The level of detail in each section of this chapter reflects the state of data analysis and evaluation. We simply haven't much to say about some of the data at this time.

Comment 4: *General: This is a very important chapter, summarizing new studies and findings from research, modeling and operational experience over the water year. Because of its importance, efforts to expand the detail of reporting and analysis within this chapter are well justified.*
Response: This comment does not pose a question or make an observation that requires a response from the District.

Comment 5: *General: A large part of the information presented here has been placed in appendices. It would help the reader if these appendices were listed and summarized in the introduction section. The authors should then attempt to place the chapter information and appended information into a context of optimization objectives, data needs and process research needs.*
Response: It makes more sense to us that each appendix should be described at the point in the text where it is first mentioned and the information it contains is relevant to the discussion. This is a standard approach for referencing appendix material has been used not only in this chapter, but also in the other chapters within the *2004 ECR* and throughout the previous *ECRs*.

Comment 6: *General: Throughout the report (for example see the last paragraph on p. 4B-5) references to a year or years (such as 2002) should explicitly state calendar year or water year.*
Response: The text was edited to alert the reader whether we are referencing a calendar or water year.

Comment 7: *p. 4B-1, 2nd para (see also p. 4B-13): The lack of correlation of outlet TP with inlet TP loading is an artifact of univariate analysis of bivariate (or multivariate) behavior. Outlet TP depends on at least the two primary variables of inlet TP concentration and hydraulic loading. The lack of correlation with the product of these two is not only not surprising, it is a predicted result from existing models. For a visualization of this effect, see Appendix 4B-11 (Kadlec and Walker, 2003. Draft Technology Review of Periphyton Stormwater Treatment) in this Report. It is recommended that these single variable statistical analyses be dropped from the report, because they are badly misleading.*
Response: Actually, our intent was to show that inlet water and TP load are not determinants of system performance. Nevertheless, we have removed these plots from the report and now only show regressions for flow-weighted inflow TP concentration and TP areal loading.

Comment 8: *p. 4B-1, 3rd para: Poor performance of some of the STAs likely resulted from factors other than vegetation management. Time sequences indicate poor performance prior to vegetation management in some instances. It seems fairly obvious that huge overloads had a great deal to do with poor performance in STA-1W.*
Response: We agree. We have added time-series plots of TP concentration and water load to the chapter, which clearly show the hydraulic overloading in some of the STAs. This paragraph has been edited accordingly.

Comment 9: *p. 4B-3, STA Optimization Monitoring: As stated in this chapter, past ECRs have provided annual water and total phosphorus budgets for the STA treatment cells. This was a valuable part of the report that provided insight not only into STA performance, but also helps to evaluate data quality and future data needs. It was therefore disappointing to find that this analysis was not included in the draft 2004 ECR. In previous comments, it has been suggested that mass balances should be extended to other constituents. At a minimum, this should include chloride and total nitrogen. For discharges to the refuge, it would also be of value to see such an analysis for calcium and alkalinity. It is recommended that these balances be incorporated in next year's ECR, and that previous mass balances for all previous years be included in appendices of that report.*
Response: Past ECRs reported water and TP budgets only for the treatment cells that comprised the old ENRP, not all the STA cells as this comments suggests. As stated in the chapter, it is our intent to calculate and report water and TP budgets for treatment cells in all the STAs in next year's ECR provided the data needed to do so are available. We will consider expanding this analysis to include other constituents as well.

Comment 10: *p. 4B-3: The spatial scale of sampling at a 16 hectare size is more of a uniform sampling distribution than a "grid" sampling, which implies a spatial scale with direct linkages among grid cells.*
Response: We now describe the sampling sites as being uniformly distributed over the entire wetland.

Comment 11: *p. 4B-6, Submerged Aquatic Vegetation: Where, how, replicates? Coontail is incorrectly implied to be a rooted member of the SAV community.*
Response: Additional details on the methods and materials for this sampling program have been added to the chapter to address the first part of this comment. We can see nothing in our description of field and laboratory methods or results that implies that coontail is rooted.

Comment 12: *p. 4B-7: "Despite differences in the vegetation community…". What were they?*
Response: The dominate plant community in each cell has been identified in the text.

Comment 13: *p. 4B-8, Treatment performance: What is the timing of the "correspondence" between the timing of herbicide application and spikes in weekly TP outflow?*
Response: We observed a "correlation" between the dates when herbicide was applied in the flow-way and the occurrence of large increases in weekly outflow TP levels shortly thereafter. The text has been reworded.

Comment 14: *p. 4B-9: In WY 2003, it was learned that TP removal performance of Hydrilla was poorer than that of native, rooted SAV. Discuss here.*
Response: We are aware of this study, although the only data that have been made available to the District are contained in a PowerPoint presentation. There is no published report that can be cited or made available for peer-review. It would be appropriate to comment on this study in a future ECR only after the data have been published in a report that can reviewed by all interested parties, including the District.

Comment 15: *p. 4B-11, Table 4B-5: n = ?*
Response: The number of samples for each plant species was added to Table 4B-5.

Comment 16: *p. 4B-13, Fig. 4B-2: It appears that the regressions have better fits if the STA 5 data were removed. Please discuss.*
Response: The regression analyses were rerun using period-of-record values instead of annual data both with and without inclusion of the STA-5 data. We found that inclusion of STA-5 changed the slope of the regressions somewhat, but not enough to consider reporting separate analyses. The new data plots clearly indicate that STA-5 fits well along the data continuum of the other STAs.

Comment 17: *p. 4B-16, 4B-18: The scales on these graphs obfuscate any interpretation of relative performance.*
Response: The Y-axes on plots in Figures 4B-3 and 4B-4 were originally scaled the same for each P fraction (TP, TDP and SRP) to facilitate direct comparisons between north and south test cells. Nevertheless, each plot has been rescaled independent of the other plots.

Comment 18: *p. 4B-17, South Test Cells: What were the species of SAV?*
Response: The dominant plant species in the north and south test cells are listed in Table 4B-8.

Comment 19: *p. 4B-19: Provide more detail as to the parallels between Lake Panasoffkee and the Everglades? e.g., Is Lake P- characterized by peat sediments?*

Response: Lake P has been described in greater detail.

Comment 20: *p. 4B-19/20: "… the long-term stability of this storage compartment was difficult to assess because most of the P was stored in the upper 10 cm of sediment…" Didn't you just assess the long-term stability by the subsequent comment that, the sediment is still, "subject to diagenesis and release back into the water column"?*
Response: We changed the sentence to say that the sediment is "potentially" subject to diagenesis. We do not know that there is in fact any appreciable return flux of sediment P. P bound to calcitic sediments is usually considered very stable.

Comment 21: *p. 4B-20, Florida Lake and River Study: Not enough detail present for the reader to know the parallels to the Everglades. Sand or peat based sediments? Differences among SAV species? Is there really an average 30-year period of record data on actual SAV community composition/distribution data among the sites examined?*
Response: Additional descriptive information on these systems has been added.

Response 22: *p. 4B-26. 2nd para: "This experiment failed to demonstrate that PACL …. Were effective at eliminating P flux from the sediment to the water column." This statement implies that PACL might be effective, and that the design was the problem. Is this actually the case, or was the design sufficient to change opinion as to the potential for this theory to be true?*
Response: These results indicate that the application rates used for PACL, FeCl3, and lime were not effective at eliminating P flux from the sediment to the water column. This does not rule out that these soil amendments may be effective at higher application rates. The sentence has been reworded.

Wossenu Abtew
October 9, 2003

ECR2004
Response to National Park service staff comments
Chapter 5: Hydrology of the Everglades Protection Area

Comment: *1) General: By providing information on rainfall, flows, ET for the WCA's and ENP, this chapter covers a topic of great importance to the health and restoration of the Everglades. In future years, the scope of this chapter should be expanded and the text expanded.*

Response: Agree; In the future, the chapter will be expanded.

Comment: *2) p. 5-1, last para: Does rain not county as "inflow"?*

Response: Inflow is short for surface water inflows although rainfall is part of the system inflows for water budget computations.

Comments: *3) p. 5-3, Fig. 1: Names in Figure area displaced.*

Response: Names are now correctly showing.

Comments: *4) p. 5-5, the sentence "Droughts are characterized by a significant decline in annual rainfall.": It would be preferred to use a more quantitative definition. Frederick and Ogden (Frederick and Ogden, 2001. Pulsed breeding of long-legged wading birds and the importance of infrequent severe drought conditions in the Florida Everglades. Wetlands, 21(4), 484-491), for example, defined drought years as those where "stage<1 standard deviation below the mean." The Palmer Drought Severity Index may be less well suited to defining drought. The citation, "Abtew and Huebner, 2002," should be replaced by "Abtew et al. 2002" because there are three authors in the report.*

Response: definition of "drought" with respect to Everglades is expanded using the reference provided. Citation is revised as pointed out.

Comment: *6) p. 5-8, Fig. 5-6 and others: It might be nice to plot the last couple of years' worth of data on these graphs to give the reader a better perspective of what's going on, especially in light of using 3-year averages for other sections of this chapter.*

Response: Changes will be made in next year report.

Comment: *7) p. 5-11: was there inflow from the S-6 diversion gate entering into the refuge? If not, this should be stated.*

Response: There was no inflow through the S-6 diversion, a statement to this effect is now added as suggested.

Comment: 9*) p. 5-15, Conclusion: Rainfall can be quantified by return frequency from the historic period of record.*

Response: Frequency return-period for annual rainfall for WCA 1&2 and ENP is now added in the Rainfall Section on page 5-5. WCA 3 had average rainfall.

Comment: *10) Appendix 5-1: Outflows in Table 2 of Appendix 5-1 do not include G-94A and G-94B. Even there was no flow for the year, this should be noted.*

Response: For this year report, a statement is added in the Flow Section stating that there was no flow through G-94A and G94-B.

Wossenu Abtew
October 9, 2003

ECR2004
Response to Peer Review Panel comments on
Chapter 5: Hydrology of the Everglades Protection Area

Comment: *It is appropriate that hydrology was treated as an independent chapter in this year's report. Hydrology and hydrodynamics are two fundamental drivers that shape the function and structure of a wetland. The information should be provided in a clear and user-friendly manner to maximize usage and/or reference throughout the whole report.*

Response: I agree. The south Florida hydrologic system is complex in every aspect. In my opinion, the best approach to address such issues is a peer reviewed documentation of the hydrology and hydrodynamics of the system covering issues as hydro-ecology of wetlands. Such peer reviewed technical publications can serve as benchmark reference for all disciplines. The annual ECR Report (Chapter 5 and other chapters) can cover the reporting year's data and the analysis could use published references to put the year's events in perspective. Improvements will be made for next year to make the chapter more user-friendly. This year, there was a time constraint in developing the new chapter format and contents.

Comment: *The main objective of this chapter, as stated, is to depict the hydrology of the Everglades Protection Area (EPA) in Water Year 2003 (May 1, 2002 to April 30, 2003). The monthly means of rainfall, potential evaporation and water level data of the EPA areas are clearly presented in graphic forms. Surface water inflows and outflows data of individual areas are also presented in clear graphic forms. There is a rather detailed description of the surface water inflows and outflows in all the areas. For people that are not familiar with the geographic relationship of the areas, the information does not help much. It would be much more clear and useful that the information is represented in a diagram with arrows to indicate directions and magnitudes of the flows among areas. A flow chart of water transport all the way from Lake Okeechobee to the Florida Bay with mass-balanced means of the water year 2003 would be very desirable. A map demonstrates the geographic relationship of the inflow/outflow structures is essential for users to figure out water mass transfer and balance of interested areas.*

Response: A detail map with flow chart of water will be added in the 2005 report as pointed out and the report will be expanded. Mass balance models for each sub-region and water budgets for the south water management system is a large undertaking that requires resource commitment. Initial work should be done for historical data external to the ECR. Mass balance on reporting year basis can be

provided based on the agency-wide and inter-agency wide reviewed published mass balance model and water budgets.

Comments: *While most basic hydrological observations of EPA are presented in the chapter, little interpretation or discussion of the data is presented. Important hydrological information such as flow directions, hydraulic water residence times and rainfall/evapotranspiration vs. flow, distribution and storage of water mass in various areas is lacking. Also lacking is the description of how the data are collected and analyzed and the statistics. As a scientific database, users need to know methods of data collection and analysis, the confidence level, variation and extremes. To help potential users, simple tools of calculation, e.g., simple models or equations for water transfer and mass-balance calculations among areas using rainfall and evapotranspiration as independent variables could be provided in the chapter. More interpretation and discussion of the data certainly would enhance the importance and usefulness of the chapter.*

Response: Please see response to the previous comment. On page 5-2, par. 4: The statement "Details of hydrometeorologic monitoring by the District are presented in Crowell and Mtundu (2000)" is provided. This reference has details of data gathering, instrumentation, resolution and data quality issues. Efforts will be made to expand data interpretation and discussion.

Comments: *Summary: This chapter contains very important basic hydrologic data that are critical to the interpretation of other studies in the EPA. Hydrodynamics interpretation and discussion of the data, such as flow rates, water mean residence times, and rainfall/evapotranspiration control of the hydrology, and statistics area lacking.*

Response: Please see response to the previous comment. Efforts will be made to expand data interpretation and discussion.

Comments: *Recommendations:*

Comment: *1. Include more discussion and interpretation of the data, especially rainfall/ET vs. the hydrology.*

Response: more discussion will be added in the 2005 report.

Comment: *2. Include simple models or equations for water transfer and mass balance calculations using rainfall and ET as independent variables.*

Response: we will consult modeling staff and water quality staff if such models or equations are developed otherwise this could be part of the overall hydrology documentation external to ECR.

Comment: *3. Add methods for data collection and analysis and statistics.*

Response: On page 5-2, par. 4: The statement “Details of hydrometeorologic monitoring by the District are presented in Crowell and Mtundu (2000)” is provided. This reference has details of data gathering, instrumentation, resolution and data quality issues. For the next report, a section will be added on data sources and collection. Analysis and statistics will be addressed where ever it becomes relevant to a section.

Comment: 4*. Use metric systems in the main text (may include a conversion table for the convenience of non-metric system users).*

Response: the metric system will be used for the next report and conversions will be provided.

Chapter 6 Reviewer Comments and Replies

Fred H. Sklar
11-19-2003

Wildlife Ecology
1. (A) "There was a general decline in the number of waders nesting in the Everglades, and an increase in asynchrony of nesting. While the Report notes that water level reversals may have been the cause, it is more likely that heavy rains and food supply differences were the proximate cause." --- What about food supply and rain as the cause, rather than water level reversals?
1.A) Reply-- We agree that changes in food supply due to the variable seasonal rainfall in the Everglades are the likely proximate cause for nesting asynchrony in the Everglades. We will add this sentence to the ECR:
"Nesting asynchrony is likely a response to reduced food availability due to periodic rainfall events during the dry season. Rainfall events increase water levels, which allow prey to disperse (i.e., lower density) and reduce their vulnerability to being captured."

1. (B) "Since most of the waders breeding in the Everglades are not long-distance migrants, late fledging chicks may still be recruited into the breeding population. While the running year averages for number of nesting birds is useful because it dampens out large shifts from year to year, it might be useful to actually see the data."
1. (B) Reply --Raw nesting data are reported on a yearly basis in the South Florida Wading Bird Report
_www.sfwmd.gov/org/wrp/wrp_evg/projects /2_wrp_evg_projects.htl
The three-year running averages are reported because Ogden et al. 1997 recommends this measure as a way to smooth the effects of large interannual variation and make trends in the numbers of wading bird nests among years more obvious.

1. (C) "The institution of a non-invasive camera trapping technique to monitor wildlife on tree islands is an important step in understanding how wildlife use these islands. The only drawback is that it cannot be used at night. Is the tripping mechanism sensitive enough for amphibians or lizards?"
1. (C) Reply: The camera can be used 24 hours a day. We have nighttime shots of several rodents, deer, and nocturnal herpetofauna. The text will be clarified.
Yes, it is sensitive enough for some amphibians and lizards. However, lizards, snakes, and amphibian species have a tendency to travel beneath the leaf litter, thus avoiding the infra-red trigger. Also, very small amphibian species such as the Eastern Narrowmouth Toad (*Gastrophryne carolinensis*) are most likely too small to trigger the camera.

Food-webs
2. (A) "The use of stable isotopes is promising and will be useful, both in understanding the Everglades food web generally, and in examining different parts of the system. You need a bit more information on the stable isotope approach for the general public."

2. (A) Reply -- Clarification of the stable isotope approach will be made including a sentence(s) that an organisms isotopic signature reflects what it consumes (you are what you eat) and by providing an example and how the signature is altered along the food chain.

2. (B&C) "A food web diagram of the hypotheses you wish to test might be useful for the public, particularly since the mid-trophic level fish are often the prey fish for the wading birds. Seasonal studies are required as well, since food webs will vary both spatially and seasonally."
2. (B&C) Reply -- A diagram will be added to the final version of the ECR
Two experiments will be conducted in LILA to test hypotheses about mid-trophic level fish. Both experiments will test the hypothesis that periphyton structure and function are regulated, in part, by top-down forces (i.e., grazing by fish) and each has seasonal patterns incorporated into the experimental design.
The first hypothesis is that small fish directly influence the structure and function of periphyton assemblages and that the effects differ between deep and shallow sloughs.
The second hypothesis is that higher trophic levels (predatory fish) regulate intermediate trophic levels which in turn influence periphyton structure and function.

Plant Ecology-- "Understanding ecosystem structure and function of tree islands will be complex, time-consuming and will require many years. Setting up islands to study for a period of time will help understand both succession and the effect of varying hydrology."

3. (a) Are the tree islands for the belowground studies otherwise the same? Could you determine whether the root sizes and types differed, and did their placement relative to the surface differ?
3. (a) Reply --
--The three tree islands are basically the same. However, they differ in terms of their community composition and their hydrologic regimes.
--Yes, roots were separated into different size categories, and separate layers below the surface were also identified. This is the first reporting of these data. A more extensive analysis of these data is needed and will be included in the 2005 ECR (if conclusions can be drawn).

3. (b) What is the r2 for fig. 6.6? -What is the relationship between biomass and carbon? any differences?
3. (b) Reply --
--The biomass was measured as dry weight. A carbon -- biomass conversion has not been done.
-- The $r^2 = 0.53$

Ecosystem Ecology -- "The focus of this project completes the examination of tree islands, and involves examination of tree island vegetation and succession. It forms the basis for understanding the ecology and ecosystem structure and function of the tree islands, and as such, is extremely important and long overdue."
4. (a) Isn't there a relationship between basal area and stem densities (inverse)?

4. (a) Reply -- On some islands yes, there is an inverse relationship between basal area (BA) and stem densities. Specifically on 3AS5 we see a lower BA along with relatively high numbers of trees. This island possesses a very low elevation and is dominated by *Salix caroliniana* (Willow). The high stem densities in conjunction with low BA indicates that the trees on this island are relatively young, leading us to believe that this is a recent colonization by willow. However, this may not be the case on some old, high elevation islands. These cann have very large trees, high BA and low total number of trees (e.g., heads of 3AS1 and 3AS4). In general, there is a positive correlation between BA and stem densities. This suggests a community of cohorts.

4. (b) "Is Brazilian pepper being removed from any islands as another kind of treatment?"
4. (b) Reply -- Yes. Currently we are awaiting the removal of Brazilian pepper from 3AN1 in northern 3A. Florida Fish and Wildlife is slated to do the removal. This island has been totally overrun with Brazilian pepper on some sections. We are going to continue our vegetation surveys on this island to monitor the success of the removal and the succession of new species.

4. (c) "What hypotheses (related to community structure) are you testing, and how will this affect management?"
4. (c) Reply -- We hypothesize that there exists a hydroperiod and depth envelop within which tree island stability, diversity and productive are maximized. Those islands with very short or long hydroperiods are susceptible to destruction due to fire or drowning, respectively. With their sensitivity to water levels and hydroperiods, the health of tree islands are a good indicator for restoration and success of hydrological management of the Everglades. CERP has identified tree islands as a key habitat for monitoring and research. Our work will help establish current conditions and performance measures for RECOVER and Decompartmentalization.

4. (d) "The overall statistical methodology (CCA) might need some additional explanation in terms of hypotheses to be tested, what the data will mean, and what the implications are for management."
4. (d) Reply -- We will address this question in the next version of the ECR. However, to answer your question, The main purpose of CCA is to statistically quantify the trends we observe in the data and statistically identifying major environmental factors that determine the composition of tree island . The major question to be answered using CCA is: Does hydrology play a role in determining the distribution and abundance of tree species on tree islands? And specifically, which factors are most important for specific species?

Landscape Ecology -- "Examining tree island changes from 1945 to 1995 completes the overall study of tree islands, giving a temporal perspective. This is a massive project, when human activities are added to the ecology of the tree islands, yet it is essential to do this."
5. (A) --- "What happened between the 1950s and the 1970s - a brief description would help understand Table 6-6."

5. (A) Reply -- We have just begun analyzing the potential contributing metrics on why tree islands have changed for this time period. As stated in the chapter: Preliminary research has led to an understanding of why there was an increase in tree/shrub habitat from 1940 to 1950 and then a sudden loss of this habitat from 1950 to 1995. A timeline graphic is being developed to help guide the process of understanding this data, which will include such details as when canals, levees, pump stations, and roadways were completed within the study area. All available hydrological, rainfall, and fire history data will also be included. This work has just begun and will be reported in future Everglades Consolidated Reports.

5. (B) --- "Understanding the invasion of exotics into the Everglades is a key indicator of ecosystem health. While IKONOS will be very useful, the District should consider ground-truthing, especially for parts of the Everglades where the understory cannot be assessed."
5. (B) Reply -- Agreed. A tree island program, which includes assessing the health of tree islands within the Everglades is in place. Many tree islands are visited on the ground and any observances of Lygodium are noted. However, this method will only be good for the tree islands that are visited. It would be impossible to do an all inclusive tree island surveillance for the early detection of Lygodium when you consider that in the total remaining Everglades that there are tens of thousands of islands.

5. (C) --- "The methodology (for ridge & slough pattern analysis) is appropriate to the problem, but the specific questions being addressed should be more clearly stated. Why are you doing it and how will it help restoration?"
5. (C) Reply -- We agree that the problem needs to be clearly stated. We will incorporate the following objectives into the text.

- Define baseline conditions of current R&S
- Differentiate strong from weak or degraded patterns
- Quantify spatial patterning and arrangement
- Track trends in pattern changes over time
- Measure responses to restoration
- Define measurable targets for restoration of the Ridge and Slough landscape

5. (D) --- "The chapter should make the methodology of monitoring during the operations much clearer, both in scope and details."
5. (D) – Reply The ECR outlines the scope of each experiment but does not go into to much detail. This is due to the fact that, as you shall see later, we are still in the process of building LILA. We will present more detailed methodologies in the next ECR.

5. (E) -- "Although the plan calls for establishment of a public kiosk for dissemination of information during the project, it seems that public involvement should start immediately, both to prepare the public and to get their comments and suggestions."

5. (E) – Reply: You are absolutely right. And, we shall discuss this later, as part of the LILA presentation.

Peer Review Comments 2004 ECR

Chapter 7: RECOVER Activities

Peer Review Panel

The authors appreciate the positive comments on this year's chapter and take note of suggestions for future consideration as CERP implementation and the development of the Adaptive Management Program progresses. We especially value the comments regarding the need for consensus building and the need for joint "ownership" between the public and the agencies.

Specific language was added to the Planning and Integration section that states we will be evaluating, over time, forces outside of CERP that may influence project planning and implementation. Language was also added to the section on the CERP Annual Report Card clarifying that the report card format is not sufficient to provide information to decision-makers on the progress towards restoration, and offers other venues to fulfill this requirement.

US Department of the Interior/Everglades Program Team

In general, the authors concur with the comments provided and appreciate the time taken by the commenter. For the most part, either additional or clarifying language was added to the text and its appendix. In two instances, the comments were already addressed later in the chapter.

The authors do not concur with adding specific information regarding the status of the ELM peer review, as this is no longer RECOVER's responsibility. As the agency review of NSM and the SFWMM is still ongoing, and the state of MRT being in flux, we did not see a great deal of added value to state this in the chapter.

While the authors did not address the comment regarding MAP implementation status, we do agree that more detail should be included in the 2005 ECR.

RESPONSE TO COMMENTS ON CHAPTER 8A

Comments from Joanna Burger

1. The overall long-term plans described in this chapter seem reasonable and protective of the Everglades Ecosystem. The challenges section is extremely important, but I wonder if there should be a stakeholder input section.

District response: The final Ch. 8A includes a description of stakeholder input in the development of the Long-Term Plan, including a process for stakeholder involvement in future revisions.

2. Page 8A-l: is there any way to put the 1,400 tons in some perspective?

District response: 1,400 tons of phosphorus is approximately equal to 1.5 million 20-pound bags of yard fertilizer containing 10% phosphorus.

3. Page 8A-4: What are the plans for widespread public and interagency review?

District response: The final Long-Term Plan (October 2003) includes a description of process for continued stakeholder involvement. The final chapter 8A was revised to describe this process.

4. Page 8A-5: might state what the long term phosphorus criterion is:

District response: The final Ch. 8A includes description of the phosphorus criterion.

Page 8A-11: should there be a stakeholder section to this "challenges" document?

District response: The final Ch. 8A includes a description of stakeholder input in the development of the Long-Term Plan, including a process for stakeholder involvement in future revisions.

Comments from Richard Meganck

1. Page 8A-2 notes that the Long-Term Plan is the “most appropriate approach…and that is supportable by the current scientific and technical knowledge base”. Has the District made a decision as to the level of confidence in the projects of 35 ppb of TP discharges from the ECP (long-term, flow-weighted mean) once all STAs are operational? My understanding is that if these levels are achievable the District will not be required to submit a request to implement further changes in the ECP, but rather simply include a plan for maintaining levels of TP 50ppb.

District response: The long-term goal is to achieve 10 ppb within the EPA, not 50 ppb for STA discharges; therefore all projects in the Plan are considered necessary and will be part of the District’s long-term compliance permit application.

2. It is not clear that the proposed expenditure of $451 million to complete the BMPs and STAs will permit maintenance of TP levels at 50ppb of all discharges into the EPA for the 2007-2016 period. The “adaptive management” discussion (pages 8A 4-5) seems to indicate that additional investments may be required. Can you clarify this issue as it will be important to the public?

District response: Yes, the final chapter 8A clarifies that the $444 million includes $36 million for adaptive implementation. If additional funding is needed, future Long-Term Plan updates will need to address.

3. The District is undoubtedly correct in stating that "Presently many scientific, engineering, regulatory, and other uncertainties remain and will significantly influence long-term discharges to the EPA" (page 8A-2). Last year the Panel noted the importance of trees as a P control BMP (either in combination with other BMPs or as a stand-alone technology). Has any project been initiated to test the impact to discharge water quality from EAAs or STAs prior to water being discharged into the WCA using trees as a BMP? From the EAAs and the C-139 basin prior to discharge to the CPA using trees as a BMP?

District response: No tree BMP projects have been initiated because the scientific literature is clear that trees provide relatively insignificant TP removal in treatment wetlands. The District wholeheartedly supports increasing the number of trees as a means of increasing habitat diversity, and with the support of the Arthur R. Marshall Foundation, planted over 3,000 trees in STA-5.

4. Comparing tables 8A-3 and 8A-4 it is not clear why TP loads are reduced in STA -1E after ACME Basin discharge is diverted into STA - 1E (considering that there is an additional 2.75 metric tones TP load from ACME Basin B into STA – 1E)? Are the totals for 2007-2056 assuming that all pre-2006 improvements will be fully operational by 2007?

District response: Yes, that is the assumption for all STA Enhancements in the Pre-2006 projects.

5. The authors seem to indicate that time will be required for full implementation in the discussion on "adaptive management" in the post 2006 section of this chapter.

District response: The Post-2006 projects are only "if needed". The Pre-2006 projects are assumed to be fully implemented by the end of 2006.

Responses to Dept. of Interior Comments on Chapter 8A

1. See Comment #1 in Chapter 4B above.

District response: Next year's report will integrate chapters 4A and 4B.

2. p. 8A-4: Remove reference here (and elsewhere) to DOI technical representatives' involvement in the "consensus approach" of the Long-Term Plan.

District response: DOI technical representatives were involved throughout the development of the Conceptual Plan; however, we removed references to their participation at your request.

3. p. 8A-12, Phosphorus loads to the EPA: The section is good but should be amplified to provide comparisons with historical loads. See comment #1 in Chapter 4A above.

District response: A comparison to historical loads was added to the final chapter.

4. p. 8A-12, Phosphorus loads to the EPA: There should be an accounting and discussion of the cumulative P loads to the refuge and WCAs relative to 1978-1988 conditions and evaluation of

compliance with the consent decree's load reduction requirements. From previous TOC discussions, the District agreed to include this in their annual report.

District response: The final chapter contains the requested discussion.

5. p. 8A-14, Table 8A-7: Please list the areal deposition rates (mg m^{-2} yr^{-1}) assumed here, not just the reference.

District response: The final chapter includes the areal deposition rates (20 mg m^{-2} yr^{-1} for the ENP, 25 mg m^{-2} yr^{-1} for WCA-3, and 35 mg m^{-2} yr^{-1} for WCA-2 and WCA-1).

6. p. 8A-15, Table 8A-8: Add mass balance on Rotenberger, impacted by STA-5. While not in EPA, it is still relevant to the regional P balance, especially since outflows from Rotenberger enter the EPA.

District response: Table 8A contains the Rotenberger output (543 kg). Chapter 4A contains the inflow/outflow comparison.

7. p. 8A-15, Table 8A-8, Loads into WCA-3A. The L3 input includes G88. Flows through G88 pass through S8. Therefore, the G88 flows & loads may be double counted here.

District response: The loads were not double counted; C-139 Basin loads also enter the S8 drainage basin from the north through G-136 and show up in the S-8 loads (4291 kg).

8. p. 8A-15, Table 8A-8: Where are the bypass loads from STA-5?

District response: The bypass loads are included in the L3 load (8481 kg).

Meganck Review

1. This chapter indicates that basic research in controlling exotic plants has been underway for sometime. However, is there sufficient funding included in the Long-Term plan ($451 million) to begin to address some of the more complex questions included in the management of exotics such as animal exotics, interactions of plant and animal species with an evolving hydrologic regime, the relationship between initial control of exotics and long-term management needs and funding, continued expansion of urban areas and the intensity of agricultural management and invasive plants and animals?

Response: Policymakers are beginning to delve into the problems associated with exotic animals and it is hoped that as this issue becomes more mainstream, it will be met with sufficient resources.

2. It seems logical that a substantial increase in the research effort is also warranted in the STAs given the changing water regime in these areas and the fact that they discharge directly into the EPA. What priority has been assigned to this issue?

Response: The STA program is addressing biological change issues through new and ongoing vegetation monitoring programs. The District is also beginning to assess faunal threats in the region through the Working Group/NEATT process. This information will help to target problem animal species as they occur in the STAs.

3. Public education and support in the control of exotics will be vital. Is the Governing Board of the District supportive of this need?

Response: The District Governing Board is supportive of this program.

4. Exotic species are obviously spread during hurricanes and flooding as well as by fires. Is there any research being conducted on these issue currently? Are there measures that can be taken after such an event to minimize long-term impacts and reduce loosing ground each time a flood or other disaster occurs?

Response: Physical movement of plant material during events such as hurricanes and fires is virtually impossible to prevent. In general, resource managers strive for maintenance control of problematic species to minimize their spread during such unpredictable events.

5. The NEWTT Assessment will provide a platform of data to assist managers in the control of exotic plants. Is there any similar effort planned for animals?

Response: The Noxious Exotic Animal Task Team (NEATT) has been established and meetings to date have focused on a strategy for the development of a similar document.

Ping Review

This chapter deals with a broad topic of invasive exotic species. It is quite informative in my opinion. I have very limited professional knowledge on the subject matter. However, this is an important issue of the Everglades restoration that we can not afford to overlook. Biological control of weeds or invasive exotic species is cost-effective, environmentally safe (if conducted properly) and self-sustaining. Based on my colleague Dr. O'Brien, the use of weevils as biological control agents against aquatic and terrestrial weeds has been demonstrated to be highly successful in many instances in North America and throughout the world. (O'Brein, C. W. 1995, Curculionidae, premiere bio-control agents (Coleoptera: Curulionodae). Memoir Entomol. Soc. Wash. Pp. 119-128). The increased diversity of introduced and native species also increases the complexity and difficulty of environmental impact assessment on introduced species. In other words, the tasks of exotic species control in Everglades require dedicated effort and expertise. Followings are my specific editorial comments:

8E-2, Pa1, L3. What do you meant by "species .. can be prohibited by law"?
L7 add "knowledge"
8E-2, Pa 3, L16. Add "s" to "effect"
L 17 on "the ecosystems" of South Florida.
8E-2, Pa 4, L8 replace "fishes" with "fish"
L 9 replace "and this" with "which", and "during" with "under"
8E-3, Pa 1, L1 some "of the" CERP.
L 3 replace "should" with "could"; "fishes" with "fish"
8E-4, Pa 3, L11 replace "in" with "throughout"
8E-6, Pa 1, L 2 Biological control not controls; replace "herbicides" with "chemical control"
8E-7, Pa 2, L1 Melaleuca "weevils" not "snout beetles"; replace "damaging" with "considered a useful biological control agent against"
8E-8, Pa 6, L3 Start a new sentence: They have…;
L4 (0.87 ppm) should move following triclopyr ester.
L7 replace "are" with "but"
L8 add "to fish" after "exposure"
8E-11 Melaleuca quinquenervia should be italics.
8E-12, Pa 2 L5 "threat" not "thread"
8E-13, Pa 2, change all "snout beetle" to "weevil"
8E-13, Pa 3, L2 add "insects" after the species name.
L3 replace "agent" with "species"
8E-14 use italics for Lygodium microphyllum.
8E-14, Pa 4, L2 insert species name for the old world fern.
8E-15, Pa. 2, L1 and L2 add parentheses to the year 1968 and 1978.
8E-16, use ilatics for Schinus terebinthifolius
8E-18, -19, -21, -22, use italics for the species names.
8-E-27, L5 replace "control" with "management".
L6, replace "monies" with "funding"
L7 add "biological" in front of "control"

Response: All editorial comments were made as appropriate.