Appendix 1A-3: Comments on the *2006 South Florida Environmental Report – Volume I* from Outside Persons and Organizations

These comments were provided to the public on the District's WebBoard.

With the exception of reformatting some information for better readability, the Chapter 1A appendices were not edited or spellchecked by the SFER production staff. They appear as posted on the District's WebBoard.

United States Department of the Interior

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September 23, 2005

Dr. Jeffrey L. Jordan, Professor and Panel Chair
2005 South Florida Environmental Report Peer Review Panel
Dept. of Agricultural and Applied Economics
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Dear Dr. Jordan:

Please find enclosed comments on the draft *2006 South Florida Environmental Report (SFER)*. This compilation of comments were provided by technical staff of the Department of the Interior, including the DOI - Everglades Program Team, the U.S. Fish and Wildlife Service, the National Park Service, and the United States Geological Survey. These comments are technical in nature and do not necessarily represent official policy of the Department of Interior or its agencies. A lack of comments on other aspects of the document does not indicate a lack of interest, nor should it be interpreted as implied consent to the technical aspects of the document.

We appreciate all of the hard work that the authors have done to prepare their chapters, and we commend the SFWMD, FDEP, and the other agencies and entities involved for developing a comprehensive report.

Efforts were taken in the draft *2006 South Florida Environmental Report* to identify big-picture issues that are cross-cutting in South Florida. We applaud the creation of the new Chapter 1B; in the 2006 report, this chapter presented a cross-cutting summary of the 2004 hurricanes. While efforts within an individual chapter were taken to provide passing reference to other relevant chapters, efforts to synthesize information among chapters continue to be limited. For example, we identified linkages between several chapters (e.g., 2A and 2C; 4 and 6; 6 and 7B) that needed to be made more explicit.

Finally, it is of concern that we learn of the possibility of a nutrient front in Rotenberger in this report. This observation confirms a concern we expressed in previous report reviews that conducting hydropattern restoration with nutrient-enriched water will result in ecosystem changes that are difficult, if not impossible, to reverse. Huge sums of money are being expended in other portions of the Everglades to halt and reverse the

effects of decades of nutrient enrichment. These results reaffirm the need to consider delaying hydropattern restoration activities until clean water is available.

Respectfully submitted,
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Chapter 1A

1) p. 1A-4, Figure 1A-1: Arrow for Lake Worth Lagoon misplaced.

2) p. 1A-17: Mention of the Everglades lawsuit and the relevance of the Settlement Agreement would be useful under this heading.

3) p. 1A-20, Paragraph beginning on line 795: Need to make it clear that the topic of the paragraph and the numbers refer to phosphorus.

4) p. 1A-21, Paragraph beginning on L-833: Not sure what period of time the first sentence refers to, but the lake levels clearly have not been favorable for SAV for at least the last 12 months.

Chapter 2A

1) General: This chapter provides a valuable assessment of the water quality data collected during the year throughout the EPA.

2) General: What is missing from this chapter is any discussion about what will be done to address water quality parameters that have been listed as Class III water quality concerns. Examples include DO in the Refuge and other WCAs, alkalinity in the Refuge interior, conductivity in Refuge inflows and WCA-2A, ammonia in WCA-2 inflows, and atrazine and chlorphyrifos ethyl. With respect to pesticides, the report notes, "Parameters classified as concerns have a likelihood of resulting in an impairment of the designated use of the water body." Such wording begs the question of what actions will be taken to address water quality parameters listed as concerns.

3) General: Water-quality evaluations based solely on excursions from applicable water-quality criteria can be misleading. Excursions can result from natural process and/or anthropogenic inputs. Natural background water quality between the northern and southern Everglades is quite different and excursions in one area might be more significant than another area. The report should explain and cover in more detail the natural seasonal and spatial variations in water quality that occur across the Everglades Protection Area (EPA).

4) General: There is an imbalance between the great amount of detail in the chapter on phosphorus, Chapter 3, and the Chapter 2A, Status of Water Quality. Surely there are more areas of concern regarding water quality than those addressed in Chapter 2A, such as nutrients other than phosphorus, sulfur, pesticides in bottom sediment and in the food chain, toxic organics other than pesticides, algal toxins, etc. Questions remain about how some of these water-quality concerns currently affect the status of water quality (Chapter 2A) and how they will be addressed in the Long-Term Plan for Achieving Water-Quality Goals (Chapter 8). One of the big questions is how well will the Stormwater Treatment Areas remove or modify contaminants, such as sulfate or pesticides, before release of water into the EPA?

5) General: The water-quality analyses failed to consider the Park and Refuge designation of Outstanding Florida Waters. The analyses, in addition to the Class III standards, needed to consider the OWF requirement of "no degradation of water quality" (Section 62-302.700). Constituents with concentration above natural background levels needed to be designed as of "concern" or at least "potential concern". Presently, there are various publications with historical water-quality information (Rosenthal and Rose, 1979; Flora and Rosenthal, 1982; Walker, 1991) that could have been used to establish natural background conditions on the Park.

   For pesticides, the analysis was based on "known chronic toxicity values" which may present the following shortcomings:

   - the toxicity values are based on exposure to a single compound and do not account for the presence of multiple toxicants, which have the potential of being significantly more harmful;
   - the pesticide analysis does not consider acute effects, such as growth, fecundity, and survival;
   - the toxicity values may not be relevant to Park's species.

   General: The report does not mention nor address the problem that last year's discharges from Lake Okeechobee were higher than expected in nutrients, in particular of phosphorous. It is anticipated that this hurricane-related TP increase will continue for the next 5 to 10 years. Are there any plans to minimize the adverse impacts from these discharges?

6) p. 2A-1, Title: The title is problematic. It claims to speak about the status of the water quality, but the report only talks about the compliance with the water quality standards. Maybe the title should reflect that, as the reader would expect to read about the actual status of the water quality, which is much more than the portions out of compliance. Maybe the title should reflect the status of water quality compliance.

7) p. 2A-1, line 11: Can the societal goals be elaborated upon or defined here in this text? They does not seem to be clearly discussed at all after that brief statement, so I am not clear on how they were established to be enforceable.

8) p. 2A-2, line 56 and p. 2A-15, line 328: Minor point, but the use of the word "only" may inadvertently downplay the concerns associated with two widely used pesticides occurring at levels and frequencies to be classified as a concern. The statement makes it as if atrazine and chlorpyrifos ethyl are of little importance and cause little to no alteration to the biota.

9) p. 2A-2, line 68 and 72 are the same. Delete one.

10) p. 2A-4, line 120, insert comma after "…S-12 structure,…"

11) p. 2A-4, lines 126 – 131: You only speak about the L-7 with regards to overflows, why isn't the L-40 included in this discussion?

12) p. 2A- 4, line 127: There are no levees on the marsh side of either L-7 or L-40.

13) p. 2A-4, Fig 2A-1: There are no rim station presented in the canal or the image is not clear enough to identify them with the triangles they are supposed to be represented by.

14) p. 2A-6, Fig. 2A-2: The figure has the wrong caption and does not present S-5A.

15) p. 2A-10, line 145: The pesticide period of record was updated from the 2005 report, but no explanation was given. Please elaborate.

16) p. 2A-10, line 162: How did you deal with samples that were analyzed twice and both values were reported?

17) p. 2A-12, line 216: Throughout the discussion excursion and exceedance appear to be used interchangeably, but you define excursion based on exceedances. Is there anyway to make this clearer?

18) p. 2A-12, line 227: What is the logic in assuming just because there is a small sample size that all exceedances from previous years would be constant, is there no better approach that captures the dynamics of historic exceedances.

19) p. 2A- 15, line 321: Add "concern" after "potential".

20) p. 2A-15, line 322: … high excursion frequencies as (should be ***at***) sites…

21) p. 2A-19, line 379: … a sufficient levels (drop the ***s***)

22) p. 2A- 20, Paragraph beginning on line 435: More discussion would be appreciated concerning potential causes of decreased DO at two interior Refuge areas. A statement is made that nutrient enrichment does not appear to be a major factor in these areas. This statement is based on the five-year geometric means of TP concentrations being below 10 ppb. It would be informative to look at trends in those data, particularly over the water year that is the subject of this report. Also, if the cause is not nutrient enrichment, what other factors are possible?

23) p. 2A-20, line 436: Please quantify - … by the ***high*** spatial monitoring intensity…

24) p. 2A-20, line 444:… equal (add ***to***) 10 micrograms…

25) p. 2A-21, line 471: The amphibian decline, was it noted in the EPA or is this for some other remote system?

26) p. 2A-21, line 495: Please quantify …only a ***few*** kilometer… A few could mean anything, and with respect to penetration that is very sketchy at best. Also do you have a reference that you can site for this statement?

27) p. 2A- 23, line 564: We appreciate the recognition that the current specific conductance standard may not be fully protective of the Refuge.

28) p. 2A- 24, line 571: We encourage DEP staff to utilize data from the Refuge's expanded monitoring program when evaluating trends in conductivity. Although the statement is made that conductivity has not increased over baseline years, we encourage evaluation of our expanded station network in the fringe of the marsh. Preliminary evidence from our sondes show conductivity responses that are indicated of canal water intrusion into the Refuge interior.

29) p. 2A-24, line 571: How did you determine the variability in specific conductance?

30) p. 2A- 29, line 674: We disagree with the statement that canal water does not penetrate deeply into the Refuge marsh. In fact, preliminary data from our expanded monitoring network show the opposite. Canal water intrusion clearly occurs over a large area of the Refuge, including at times sites LOX3, LOX4, and LOX5 (Harwell et al. 2005), and to of over some of the XYZ-transect sites (McCormick et al. 2000). There is a clear relationship between stage rise flooding the Refuge interior and measurements of elevated TP and conductivity (Harwell et al. 2005).

31) p. 2A-29, line 675: Periphery is used in place of a few kilometers here, it still needs a definitive definition.

32) 2A- 30, Table 2A-4: We are concerned about the increased sulfate concentrations observed in 2005 in ENP's inflow and interior. This increase may suggest a southward movement of the sulfate front, leading to increased mercury methylation activity in the Park. We believe these data are alarming enough to warrant some discussion in the text.

33) p. 2A-24: There is a problem in lumping interior stations in the Water Conservation Areas to determine background and water quality trends. Some of the "interior" sites are near canals and are affected by canal waters. These effects may vary over time, depending on water levels in the canals. A better understanding of the status of water quality can be made based on an evaluation of trends for an individual site or selected group of sites.

An example of this problem is seen in water-quality data from LOX15. LOX15 is near the Hillsboro canal and at times is affected by inflow of canal water. During 2000-2003, specific conductance at LOX15 increased by about 560 µS/cm as a result of large amounts of canal water entering the Loxahatchee Refuge and flowing into peripheral marshes. The water at LOX15 was a variable mixture of canal water and natural background water from the Refuge. Because there is a relation between

specific conductance and the dissolved ions in the water, we know that major ions such as sodium, calcium, chloride, and sulfate also increased. If LOX15 is lumped with other background sites in the Refuge that are not affected by canal water intrusions, such as LOX8, then the overall concentrations reflect both background and canal waters.

Similar problems might occur in other areas if marsh sites are lumped into a single evaluation of water quality. Some ENP marsh sites have been affected more than others by upstream human activities. For example, P-33 in the Park has experienced long-term changes in water quality; chloride more than doubled between 1960 and 1990 due to increased canal water transport of high dissolved solids into Shark River Slough, whereas P-34, also in the Park, has shown little change in water quality over this time span.

34) p. 2A-11, Excursion Analysis: As commented in previous years, when uncertainty is higher we need to be more (not less) conservative and protective of the ecosystem and human health. This is particularly true for OFWs. The statistical approaches used in this chapter are troubling because it violates this principle. We understand the desire for consistency with other evaluations including the Florida Impaired Waters 303d designations and understand that it may reduce the required effort and increase efficiency. However, no justification is developed in the chapter that these methods are appropriate for the purposes of this report. From Chapter 1, the stated objective of the 2005 SFER is

> "to provide information for decisions and updates on important programs of the District. Information provided in this volume will be used by the South Florida Water Management District and the Florida Department of Environmental Protection for making decisions affecting implementation of the Everglades Construction Project (ECP), the Lake Okeechobee Construction Project (LOCP), and other restoration and management activities in South Florida."

The binomial test method is inconsistent with this objective.

The example provided on page 2A-11 clearly illustrates one problem with this excursion analysis approach. It is stated that:

> "For example, one of six measurements above the criterion is clearly a weaker case for impairment than six of 36; however, both cases result in an excursion frequency of 16.7 percent."

From an environmental quality management and protection perspective, the case of one in six is of greater potential concern because, under a binomial hypothesis, we may have a failure rate much larger than 16.7%, perhaps 33%, and with this limited number of samples we cannot reject this possibility.

The excursion analysis approach proposed in the report would lead to the result that any reduction in sampling frequency would likely reduce the number of identified sites of concern. This violates the fundamental principle of environmental management practice and common interpretation of the Clean Water Act that where

greater uncertainty exists we need to be more cautious in making environmental management decisions.

35) p. 2A-32: Why is there no mention of pesticides in sediment? I believe bottom sediment is collected and analyzed for pesticides.

36) p. 2A-6: The figure showing Loxahatchee Refuge sampling sites is mislabeled "Table 2A-5. Pesticide detections and exceedances…." This needs to be corrected.

CITATIONS:

Harwell, M. C., Surratt, D., Waldon, M. G., Walker, W. W., and Brandt, L. A. (2005). "A.R.M Loxahatchee National Wildlife Refuge Enhanced Water Quality Monitoring and Modeling: Interim Report." *available at http://sofia.usgs.gov/lox_monitor_model/reports/LNWR_interim_05.html*, US Fish and Wildlife Service, Boynton Beach, FL.

McCormick, P. V., Newman, S., Payne, G., Miao, S., and Fontaine, T. D. (2000). "Chapter 3: Ecological effects of phosphorus enrichment in the Everglades." Everglades Consolidated Report, G. Redfield, ed., South Florida Water Management District, West Palm Beach, FL, p. 3.1-3.72.

Chapter 2B

1) General: Overall, this is a concise, complete and accurate description of our state of knowledge concerning mercury cycling, fate, and toxicity in the Everglades. I congratulate the authors for provide what in my assessment is BY FAR the best chapter on mercury ever provided to the South Florida Environmental Report. I have read or reviewed the mercury chapter each year since 1995, and none of the other reports have contained this level of completeness, yet at an economy of length. This year's report accurately summarizes what we know about temporal and spatial trends of mercury in the Everglades, the controlling factors, and the recent trends of concern. Some of these trends such as the rising levels of mercury in ENP fish, rising concentrations and rates of deposition of mercury in south Florida, and what has become overwhelming evidence that sulfate contamination emanating from the EAA raise significant concerns for ongoing restoration efforts and will need the concerted and committed efforts of all those involved with the Everglades Restoration Program to overcome. However, the state of understanding of mercury cycling and fate provided by the South Florida Mercury Science Program has provided a basis that will enable resource managers to make the right decisions for the long-term health of the Everglades. Mercury cycling, fate and toxicity is an exceedingly complex issue, one that involves the convergence of both air (mercury emissions) and land management (agricultural practices, and hydrologic restoration) concerns, and as such is an excellent example of how scientific understanding can feed directly back into decision making loops, and enable the goals of the restoration program. The subject report accurately describes our current scientific understanding of the present mercury-contamination conditions in the greater Everglades region, including the strong ties between sulfate loads from runoff and mercury deposition from the

atmosphere. This conclusion is supported by years of monitoring and research by the agencies participating in the South Florida Mercury Science program. Data collected by the individual agencies are all portraying a consistent and supporting story of how this ecosystem responds in terms of mercury cycling to changes in mercury loading, sulfate loading and hydro period. The good news that was revealed a couple years ago, when it was apparent mercury levels in biota from the central Everglades declined, is now met with the disappointment that levels in the ENP are increasing over the same time period. However, that the scientific conceptual model for what drives these changes (i.e., the combined influences of sulfate and mercury loading) should be comforting to those who are asked to decide on a corrective mode of action. Clearly, this response is due to a redistribution of sulfate-rich runoff from the EAA previously to WCA3A, and now more directly routed to the ENP. The 'news' that dramatic increases numbers of wading birds in areas where methylmercury levels have dropped precipitously (page 2B-6) is comforting to those of us who have worked hard to provide an understanding around the mercury problem in the Everglades. With this understanding in hand, we can more clearly lay out a path that will result in universally low levels of this potent neurotoxin for the entire South Florida ecosystem.

2) p. 2B-1: I do not believe it is accurate to any longer describe the SFWMD as one of the members of the South Florida Mercury Science Program. From 1995-2000 that would be a fair descriptor, but since that time the District has not placed any substantial emphasis on this problem.

3) p. 2B-2: Comment on the bullet pertaining to the effect of DOC. We believe that DOC is actually promoting the bioavailability of mercury through sorption to components of the DOC that the methylating microbes target for uptake and accidentally take in mercury as a result.

4) p. 2B-4: First bullet on this page. Suggest editing to read "that impact South Florida and reduced sulfur loads to the ecosystem".

5) p. 2B-6, line 211: correct "will measured"

6) p. 2B-6, line 229: replace "plant" with plan

7) p. 2B-8, line 302: Guentzel et al. 1995 reference is not listed in the literature cited

8) p. 2B-8" Under the geochemical controls of Methylation section, suggest editing to read, "are presently scheduled through June 2006 and include an examination of iron cycling on mercury methylation."?

9) p. 2B-9, line 337: Looks like reference to Figures 2B-2 and 2B-3 should be Figure 2B-4.

10) p. 2B-9, lines 339-340: Reference Figure 2B-2 at end of sentence regarding wet deposition flux.

11) p. 2B-10, line 346: Needs work to figure caption. As it reads, Figure 2B-2 is the same as Figure 2B-2.

12) p. 2B-13: I suggest re-plotting this figure so that the Y scale ranges from 0 to 2.0 (not starting at 0.2). It is misleading to the reader to start the axis at 0.2 and then have one of the trend lines intersect the X axis, which makes it appear that it as gone to '0'. A value of 0.2 ppm Hg in fish tissue is still a substantial amount of mercury, it is just low by historical Everglades' standards.

13) p. 2B-13, line 357: Doesn't appear that bass from L35B showed a "substantial" decline in Hg, since the concentration in 1993 and 2004 were nearly identical.

14) p. 2B-15, Figure 2B-7: Define "Refuge"

15) p. 2B-15-18, Figure 2B-7-10: specify **mean** mercury concentrations in figure caption

16) p. 2B-18, lines 392 & 395: Move "(*Lepomis* spp.)" from line 395 to first sunfish reference in line 392.

17) p. 2B-19-20: Add commas between the author and year in reference citing lines 414, 419, 420, 426, 432, 454, and 455.

18) p. 2B-21: I believe some of the details of Dr. Orem's hypothesis on how excess sulfide produced from the EAA sulfate load is likely causing a toxic response to the Everglades infauna. The 'internal eutrophication' is an important aspect of just one of the possible negative influences of sulfate on this ecosystem, but quite possibly, the direct toxic effects can be even more lethal. Other studies on freshwater wetlands have shown how excess sulfide can cause deleterious effects due to reduced redox conditions, suffocation, and limiting availability of necessary micro nutrients. Combined, these factors could very well be playing a central role in the undesirable conversion of large areas of the Everglades from dominantly sawgrass stands to cattail, which are insulated from the toxic effects of sulfide.

19) p. 2B-24, lines 526-527: Define "ORD" and NOAA ARL

20) p. 2B-24, lines 538-539: The end of the sentence "in SFY in 2007-08" needs rewording.

21) p. 2B-24, line 545: The end of the sentence "Florida continue to support monitoring" needs rewording.

22) p. 2B-25, lines 546-548: Needs rewording

23) p. 2B-26, line 590: Remove "is"

24) p. 2B-26, line 597: Add comma after "data"

25) p. 2B-26, line 603: Change "had" to have

26) p. 2B-26, line 617: Replace "to" with and?

27) p. 2B-26, line 618: Add comma after "3"

28) p. 2B-27, line 636: Add comma after "0.44 mg/kg"

29) p. 2B-27, lines 642-646: Add commas after "Plan", "cycles", "recovery", "however", and "years"

30) p. 2B-28, lines 672-673: Didn't see Bates reference cited in text

31) p. 2B-28, lines 678-679: Guentzel et al. 2001 reference is out of order. Should be placed after Gilmour et al. 1998 reference

Chapter 2C

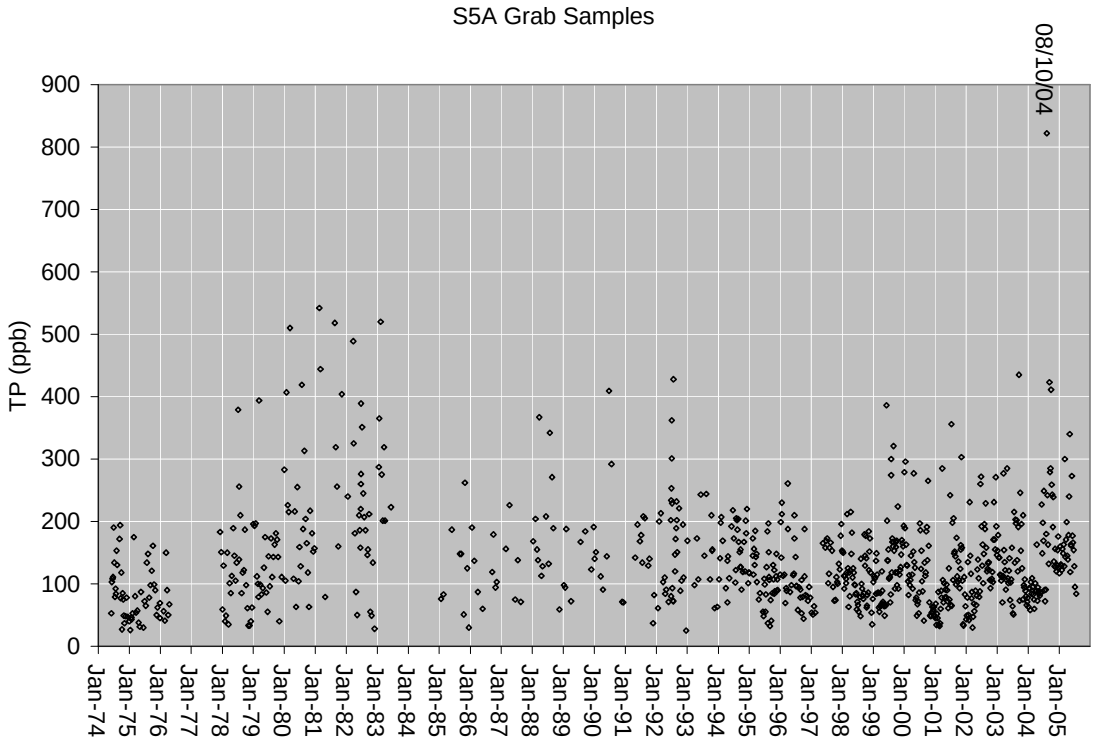
1) General: In several places, the mechanism of dry out, oxidation, and re-suspension of TP or TN is used to explain elevated nutrient concentrations. Less exotic explanations are more likely the primary cause – canal water intrusion and simple evaporation.

   Canal water intrusion clearly occurs over a large area of the Refuge, including at times sites LOX3, LOX4, and LOX5 (Harwell et al. 2005), and over some of the XYZ-transect sites (McCormick et al. 2000). There is a clear relationship between stage rise flooding the Refuge interior and measurements of elevated TP and conductivity (Harwell et al. 2005). Canal water intrusion plays a major role in most excursions above interim levels of the consent decree, including the August 2004 excursion (Walker 2004). Refuge sites listed as unimpacted (lines 477-478, page 2C-19; Figure 2C-6) are, in fact, clearly impacted.

   Evaporation is also clearly a major hydrological process occurring in the Everglades. Average annual potential evapotranspiration (ETp) is roughly equal to average annual rainfall – about 53 inches per year or an average of about an inch per week in the Refuge. Evaporation concentrates dissolved and particulate materials in the water column, and under complete dry out conditions, strands these materials near the soil surface where they are available for resolution or re-suspension. There is little evidence that chloride is significantly impacted by organic uptake or decay. The fact that concentration of chloride in the Refuge interior is elevated by a factor of 10 or more beyond that in rainfall (roughly 2 mg/L) demonstrates that evaporation and intrusion play the major roles in the Refuge.

2) General: The chapter fails to discuss some important events that occurred in the Refuge during this water year. In August 2004, an incident of extremely elevated TP concentration occurred at the S-5A (Figure 1). This event must have contributed to the overloading of STA-1W that was further exacerbated by the hurricane-related flows of September 2004. There was also an excursion of Refuge geometric mean concentration above the consent decree interim limits in August 2004. This excursion came before the hurricanes hit the Refuge, but followed a water-supply related bypass that filled the L-40 Canal with untreated water.

Figure 1. This graph shows historic TP concentrations monitored at the S-5A pump. The incident of extremely high TP, 822 ppb, measured on August 10, 2004, was also observed at site S5AD (817 ppb on August 9) and in composite S-5A samples at a somewhat reduced level. Note also, that despite large calculated reductions in loading from the EAA Basin, inflow concentrations to STA-1W have not clearly reduced.



3) p. 2C-2, line 77: … reflected in peaks… - maybe it should be reflected as peaks

4) p. 2C-3, line 83: The statement of highest TP associated with high rainfall and hurricanes is a little too general for the Refuge as high TP values were observed before the hurricanes with no large rain associated with those values.

5) p. 2C-3, line 85: During periods of low rainfall, inflow TP concentrations are generally at their lowest. Is this statement about WY2005 or the entire water record?

6) p. 2C-3, line 86: reflecting should ***reflect***

7) p. 2C-3, line 89: sentence is a fragment and problematic

8) p. 2C-3, line 105: Please define quick recovery.

9) p. 2C-3, line 106: What does OP tell us that TP didn't? Why did you just bring it up right here, what is the relevance?

10) p. 2C-3, line 120: Can you statistically support 'slightly above'

11) p. 2C-4, line 129: You brought in the gradient information for P again but you did not link it to TN, why?

12) p. 2C-4, line 139: Why don't you provide the reader with the values for WY2004 and can you tell us how disparate the values are between WY2004 and WY2005?

13) p. 2C-11, Figure 2C-1: Can you separate the canal and marsh graphs? The marsh dynamics are swamped by the canal concentration as they are presented.

14) p. 2C-11: Rainfall graphed in Figure 2C-1 is in error. Again this year, the figure captions do not give information on the site or station used in the plot. I am assuming the site WCA1ME was used here. The graph shows approximately 11 inches of rain in August 2004, and 4 inches in September 2004. This is incorrect. The station has data flagged as missing (particularly during the hurricanes in September), and some estimation method is required to fill in missing values. I used the LOXWS site when available, and filled in with the S-5A site when both were missing. This gives a total rainfall in August and September 2004 of 11.44 and 11.20 inches, respectively. I did not check other rain, stage, or concentration calculations in the report, in part, because I do not know what stations were used in the calculations. Please add this information to all captions.

    Hurricane related rain in the Refuge in September 2004 was thus high, but not outside historical levels. It appears, in fact, that rainfall in August 2004 was roughly equal to that in September 2004. Although direct rainfall to the Refuge may have been low, the Refuge received a large volume of runoff from upstream areas. Most of the damage to the Refuge from the hurricanes resulted from wind rather than rainfall (USFWS 2005). Over 85% of the Refuge tree islands sampled in a post-storm study had some damage (Ugarte et al. 2005).

15) p. 2C-17, line 414: You claim high TP for July-October 2004 was related to hurricane events that didn't start until August.

16) p. 2C-17, line 425: … resulting in releases (add ***of*** and take out ***the***) nutrients bound…

17) p. 2C-17, line 426: What do you mean by level of nutrients? Is this load or concentration?

18) p. 2C-17, line 427: Can we have a reference for exceptionally powerful statement?

19) p. 2C-17, line 433: You claim the high TP values are slightly above the 11 µg/L provision because of the abnormal climatic events. Can this same analysis be run without the August and September data to possibly support these statements?

20) p. 2C-17, lines 444-447: The statement that the "higher marsh TP levels measured during WY2005 obviously reflect the extreme climatic conditions" is not substantiated and is merely speculation.

21) p. 2C-17, line 444: This is a very powerful statement, but nothing so far (i.e., quick recovery) has actually supported the statements. Maybe a little definition of quick recovery and a comparison of historic recovery to the WY2005 'quick recovery'.

22) p. 2C-19, line 464: You speak about the impossibility of estimating the percentage of marsh exceedances. In the '2004 Work Plan: Water Quality Monitoring and Modeling for the AR< Loxahatchee National Wildlife Refuge', the EVPA water quality monitoring network for the Refuge is identified as covering 60% of the Refuge. Can the methods employed to make this estimate be used to estimate the percent of TP marsh exceedances?

23) p. 2C-19, line 477: …TP concentrations at (the ***a*** should be removed) several individual…

24) p. 2C-19, line 477: You claimed earlier that canal penetration extends 'a few km', but now you are saying it does not reach LOX4 (1.1 km away from the canal), X3 (~2 km away from the canal).

25) p. 2C-19, line 483: … are not the result (add ***of*** and remove ***the***) inflows to the EPA.

26) p. 2C-23, line 550: Could you provide a reference for this statement and a value?

27) p. 2C-24: Table 2C-3 does not include inflow and TP load from the S-362 (STA-1E). The pump station was operated during the hurricanes and discharged substantial quantities of water and TP. My estimate (Table 1) based on data provided by the SFWMD is that the S-362 discharged 16.6 thousand acre-feet of water and 8.11 metric tons of TP in September and October 2004.

Table 1. STA-1E flows, TP concentration, and load.

Date	S-362 discharge (acre-feet/day)	S-362 discharge (cfs)	ACT Measured TP (mg/L)	Estimated TP (Mt/d)
9/21/2004	0	0	0.274	0.00
9/22/2004	0	0		0.00
9/23/2004	0	0		0.00
9/24/2004	0	0		0.00
9/25/2004	0	0		0.00
9/26/2004	388	196		0.18

9/27/2004	1967	992		0.95
9/28/2004	1937	977	#N/A	0.99
9/29/2004	1871	943		1.00
9/30/2004	1664	839		0.89
10/1/2004	4055	2044		2.17
10/2/2004	1099	554		0.59
10/3/2004	1372	692		0.73
10/4/2004	1160	585		0.62
10/5/2004	0	0		0.00
10/6/2004	0	0	0.433	0.00
TOTAL discharge	**16,612**			**8.11**

28) p. 2C-28, line 671: You gave a background and uses for TP; can you do the same for the TN?

29) p. 2C-28, line 681: You are blaming high TN on hurricanes activity in June, but again the hurricanes did not happen until August.

30) p. 2C-28, line 686: Throughout the entire text up to this point we have been making comparison between WY2005 and WY2004 and WY1978-WY2003, but now you start making comparisons to WY2003, why did we lose our consistency?

31) p. 2C-28: Total Nitrogen – Can you provide us with some useful cut-off limits for nitrogen as it relates to a health or impaired marsh system? It would put the values in context.

CITATIONS:

Harwell, M. C., Surratt, D., Waldon, M. G., Walker, W. W., and Brandt, L. A. (2005). "A.R.M Loxahatchee National Wildlife Refuge Enhanced Water Quality Monitoring and Modeling: Interim Report." *available at* *http://sofia.usgs.gov/lox_monitor_model/reports/LNWR_interim_05.html*, US Fish and Wildlife Service, Boynton Beach, FL.

McCormick, P. V., Newman, S., Payne, G., Miao, S., and Fontaine, T. D. (2000). "Chapter 3: Ecological effects of phosphorus enrichment in the Everglades." Everglades Consolidated Report, G. Redfield, ed., South Florida Water Management District, West Palm Beach, FL, p. 3.1-3.72.

Ugarte, C. A., Brandt, L. A., Melvin, S., and Mazzotti, F. J. (2005). "Hurricane Impacts to tree islands in Arthur R. Marshall Loxahatchee National Wildlife Refuge, Florida." *Southeastern Naturalist*, (submitted).

USFWS. (2005). "Arthur R. Marshall National Wildlife Refuge Annual Narrative Report: Calendar Year 2004." US Fish and Wildlife Service, Boynton Beach, FL.

Walker, W. W. (2004). "Analysis of Refuge Interim P Level Excursions September 2003 & August 2004." *available at* <*http://www.sfwmd.gov/org/ema/toc/archives/2004_11_08/refuge_excursions_110804.pdf*>, prepared for the US Department of Interior.

Chapter 3

1) General: Despite large calculated reductions in loading from the EAA Basin, inflow concentrations to STA-1W have not clearly reduced (see Figure 1 above in comments on Chapter 2C).

2) p. 3-9, Fig. 3-1: missing label for Acme Basin A.

3) p. 3-30, lines 616-625: Is the reader to understand that this part of the rule will be revisited, but other aspects of the rule are not to be revisited?

4) p. 3-33, lines 714-718: The maps in the Appendices show differences at the farm-level in TP concentrations and loads. In fact, by looking at the same maps from the 2005 SFER, it is clear that there have been notable increases in loads and concentrations at the farm level in the region to the north of the Refuge. Is the research concept identified in lines 714-718 designed to address and report on these changes? At what point does studying the changes in farm-level TP concentrations and loads translate into revisions to BMPs?

5) p. 3-52, line 1208: There are 3 ¾ pages of text on Acme Basin B and their efforts to reduce phosphorus. What is missing from this section is a description of the actual BMP goals initially established and where we currently are in trying to meet them. Additionally, it would be valuable to describe here why Acme Basin B discharges envisioned in the EAA Regional Feasibility Study are well above those envisioned by the BMP program.

Chapter 4

1) General comment: The inclusion of what looks like SFWMD program or budget numbers in the text is not meaningful to readers.

2) General: We appreciate how many tons of phosphorus have been retained by the STAs. Two of them in particular are performing well right now, and remedial efforts are being made on the STAs not performing well. However, it would be informative to also include data on the phosphorus load leaving the STAs. These data are important to assess the potential impacts on downstream receiving water bodies such as the Refuge.

3) p. 4-5, line 49: It is clear that events in WY2005 affected STA performance. However, STA-1W in particular was beginning to recover from overloading that occurred in 2002 and 2003, and the effects of WY2005 need to be looked at in the context of previous impacts.

4) p. 4-7, line 123: For STA-1W, please include the percent of flow received over the design amount, as was done for the other STAs.

5) p. 4-8, lines 146-148: This description of inflows for STA-1E does not mention the planned Acme-B diversion to STA-1E. This flow will add an average of 30 to 40 thousand acre-feet of water to this facility.

6) p. 4-13, lines 239-243: It would be helpful to see this bypass flow broken down into monthly totals. Bypass in July was water supply makeup water. Bypass in September and October were related to the storms. This suggested table is shown below:

Table 2. Total monthly bypass flow at G-300 and G-301 gates.

Mon-Yr	Ac-ft
May-04	0
Jun-04	1
Jul-04	4,878
Aug-04	1
Sep-04	40,839
Oct-04	10,914
Nov-04	0
Dec-04	0
Jan-05	0
Feb-05	0
Mar-05	12,431
Apr-05	0
Grand Total	**69,064**

7) p. 4-13, line 277: there is extra 'in', "…inflow into **in** Cell 5…."

8) p. 4-13, line 265: Category 1 storms, not category 4.

9) p. 4-13, line 282: "…concentrations …was high," change to "…concentrations …**were** high,"

10) p. 4-13, line 283: "instead of discharged" change to "instead of **being** discharged"

11) p. 4-14, line 330: This statement is misleading in that it implies that once STA-1E is online, STA-1W will no longer be overloaded with water and phosphorus. Please clarify this statement to include the ongoing overloading that will be experienced by STA-1W until the L-8 Basin water can be diverted, or until other corrective measures can be taken.

12) p. 4-X, line 335: Water supply deliveries assume that bypassed water in the canal remains in the canal during low canal stages relative to marsh stages. A major concern, however, is that once nutrient-rich water is in the canal (resulting from a water supply bypass), a subsequent rainfall and discharge event can move that canal water into the Refuge interior before it is discharged out of the canal for water supply purposes.

For example, a water supply-related bypass began on July 4, 2004 and continued through July 17, 2004. This bypass totaled 4.9 thousand acre-feet (212 million cubic feet). The total volume of the L-40 Canal from the G-300 bypass gate to the G94B and G94A water supply gates (assuming 700 square foot cross-section) is 62.8 and 74.9 million cubic feet, respectively. Total bypass volume did not equal the canal volume to the G-94B gate until July 10; the first 6 days of water delivery supplied water already existing in the Refuge – water that had been already (needlessly) treated or entered the Refuge as rainfall.

Water bypassed over the final 5-days remained in the L-40 Canal. The G300 grab sample total phosphorus was 147 and 118 on July 8 and 22, respectively. Thus, the water supply bypass that remained in the L-40 Canal was above 100 ppb as the rainy season began in August. This may have contributed to the elevated phosphorus concentrations at the Consent Decree compliance sites observed in August 2004.

13) p. 4-16, line 414 and P4-322 and line 755: the TP amount from Lake Okeechobee is missing.

14) p. 4-21: It would be helpful in Table 4-6 to either show the criteria or add an extra column indicating compliance.

15) p. 4-23, Figure 4-8: Legend unreadable.

16) p. 4-24, lines 553-555 and P4-25, lines 577 to 580: More explicit explanations are needed. How does the result of the DO comparison between discharges and downstream Refuge marsh sites indicate whether the discharge affects the DO in the marsh? Is it true that if they are equal the discharge affects the marsh DO, and if they are significantly different the discharges do not affect the marsh DO? Is it normal to have a lower DO concentration at the edge and a higher DO concentration at the internal locations, as shown by the measured data in Loxahatchee Refuge and Rotenberg WMA?

17) p. 4-32, line 747: Need to update STA-1E status.

18) p. 4-35, line 784: typo in "…outflow that at the combined inflow…" change to "…outflow **than** at the combined inflow…".

19) p. 4-35, line 784-785: How does the fact that sulfate has no applicable numeric state quality standard lead to the compliance of the STA-2 with the permit? I did not see the logic. Are you referring to only sulfate? What about other parameters?

20) p. 4-41, line 883: The six-day and one-day references seem to be in conflict. How could the peak be observed after one day if it took six days for the tracer to reach the outflow structure.

21) p. 4-36, Table 4-9: The arithmetic mean concentration of the DO at the outflow of G335 is 4.8 mg/L in Table 4-9, however, it is 5.84 [mg/L] in Table 4-11. Do they refer to DO at the same location?

22) p. 4-45, line 1006: Is it really a one-mile radius?

23) p. 4-58, lines 1266-1267: Is there any additional information as where ametryn and atrazine came from? Are there any data in the inflow? What is the background value?

24) p. 4-65, Section "STA-5 ENHANCEMENTS": I was told by SFWMD personnel that the pump G507 was used sometimes. Why it is not shown in Figure 4-25 or mentioned in this section?

25) p. 4-71: Figure 4-37 is out of date. Is structure G606 still running? In Figure 4-37, G604 and G603 appear to be discharging into Cell3, while only G603 does.

Chapter 5

1) General: This chapter on Hydrology summarizes well some of the major surface water components of the hydrologic cycle (rainfall, evapotranspiration, surface- and ground-water levels, and surface-water flows) within the geographic boundaries of the South Florida Water Management District. However, the report fails to discuss the major characteristics or trends of the water-supply/water use/water withdrawals component which drives critical water management issues in the south Florida environment. If these issues on water supplies and the impact they have on the south Florida environment are discussed in other chapters of the 2006 South Florida Environmental Report, the reader should be referred to those other chapters.

2) General: I read through Chapter 5 "Hydrology of the South Florida Environment" and only have a few minor comments/suggestions. Many of them may appear to be the usual petty comments that we are trained to look for at the USGS. Overall, it is nice compilation of the hydrology of the region with sections on the hydrologic variability and the unique 2004 hurricane season.

3) General: It is important to note that despite the very dry conditions prior to August 2004, August was a wet month, at least in the Refuge. This was not hurricane-related rainfall, but this rainfall did set wet antecedent conditions for the storms in September. It should be stated explicitly that the hurricanes did not result in an exceptional rain in September for the Refuge. There is some uncertainty because of missing data that must be estimated from the central Refuge LOXWS weather site, however, rainfall in the Refuge in August was roughly 11 inches and roughly equal to rainfall in September. From Table 5.1, this rainfall is around a standard deviation above the mean – certainly not an exceptional event.

   Having said this does not imply that the hurricanes were not without impact in the Refuge, including a large amount of inflow from upstream basins. Significant wind

damage occurred, as documented in tree island damage surveyed after the storms (Ugarte et al. 2005; USFWS 2005).

4) General: Captions of tables and charts are not adequate to understand the figures without referring to the text. In most publications it is required that the figures and tables can "stand alone" without such searching in the text body for information. For example, Table 5-4 does not say that the value is the 5-day maximum, and does not identify what the value in parenthesis is (I assume this is return period in years).

5) General: It would be very helpful to the reader to mark the dates of passage of each hurricane on the time plots in the chapter. As a reader, this was the first thing I did with a pencil on each plot of interest.

6) General: This chapter clearly represents a large effort and compiles much valuable information. I do believe that somewhere in the SFER, probably in this chapter, a review of recorded hurricane wind speed and damage to trees and other ecological resources should also be summarized.

7) p. 5-1, line 39: What is an ecological drawdown? Do you mean that water levels were lower than the previous water year?

8) p. 5-2; line 98, editorial suggestion: water supply and coastal discharges to the east and the west. The major hydrologic components comprise of are the Upper Kissimmee Chain of Lakes, the Lower Kissimmee, Lake Okeechobee…

9) p. 5-3, line 95: Can you either remove environmental enhancement or define it?

10) p. 5-3; lines 102-103, technical correction: ….Gentry, Lake East Tohopekaliga, Lake Tohopekaliga, and Lake Kissimmee) are the principal sources of inflow to the Kissimmee River Lake Okeechobee. On the average, 48 percent of inflow into Lake…

11) p. 5-3, line 93: Figure 1 needs to show the geographical references of Orlando and the Florida Keys.

12) p. 5-3, lines 116-124, technical question: If 10 percent of the Lake Okeechobee outflow (equivalent to 140,000 ac-ft) flows through the EAA, how come the EAA discharges 900,000 ac-ft of water (about 6 times more) into the EPA? Where is this water coming from?

13) p. 5-3, line 136: You define emergency management but why not define obligations as well, how do they differ from agreements?

14) p. 5-4, line 142: DBHYDRO also stores data for the Fish and Wildlife Service (ARM Loxahatchee National Wildlife Refuge, particularly).

15) p. 5-6, line 154: ***impoundments*** should be ***impoundment***

16) p. 5-6, lines 155-157, editorial suggestion: Excess surface water is discharged to the coast. While surface and groundwater storage modulates short-term variations in rainfall and water supply, ~~there has been experience of droughts where wetlands dried and lake levels were significantly drawdown~~ droughts have dried wetlands and lowered lake levels significantly. On the other extreme, wet…

17) p. 5-6, lines 159-161, editorial suggestion: prevail. The dry season extends from November through May and on the average 35 percent of District rainfall occurs in this season. The percentage of dry season rainfall varies from rainfall area to rainfall area among rainfall areas (Figure 5-2) with the highest in Palm Beach rainfall area (39 percent) to the….

18) p. 5-6; lines 189-192, editorial suggestion: District area is shown in Figure 5-3 by region (rainfall area). The source of Annual rainfall statistics (Ali and Abtew, 1999a) includes for all areas except the Big Cypress Basin and WCA-3, which are obtained from the meteorological analysis section of the District's Operations Control, Engineering and Vegetation Management Department. The annual basin rainfall for the ENP was …

19) p. 5-7, line 197: Didn't know which SFWMD report was being referenced - use the "a" or "b" for similar report references in the same year.

20) p. 5-7, lines 199-200, editorial suggestion: Palm Beach rainfall area has the highest rainfall while the Lower Kissimmee and Lake Okeechobee rainfall areas have the lowest rainfall. Historically, the Palm Beach County rainfall area…

21) p. 5-9, lines 227-228, editorial suggestion: area of the South Florida Water Management District has experienced tropical systems at a rate of two every three-years period (Abtew and Huebner, 2000).

22) p. 5-9, lines 240-242, editorial suggestion (add commas): seasonal limitation to moisture have reduced evapotranspiration. Spatial variation of potential evapotranspiration or evaporation from wetlands and lakes over South Florida, as estimated by Abtew et al. (2003), is depicted in Figure 5-4. Generally evapotranspiration increases from north…

23) p. 5-11, lines 274-275, editorial suggestion (add plural form): Point and areal temporal variation of rainfall amount is an indicator of hydrologic variation. Lake water levels, groundwater levels, and stream flow rates are directly related to rainfall amounts.

24) p. 5-12, lines 284-286, editorial suggestion (replace commas by semicolons): temperature, field capacity, and weather trends to compute an index value. Near normal conditions are represented by an index value between ±0.49; severe drought

has an index value of -3 or less; and extreme drought events have -4 or less. The historical PDSI for Florida Climatic…

25) p. 5-13, line 305, editorial suggestion (missing article): 3,620,483 ac-ft during an El Niño year in 1998. The Arbuckle Creek is an unregulated inflow to Lake Istokpoga. Flow records from 1940 to 2004 depict temporal hydrologic variation in South…

26) p. 5-17, lines 353-354, editorial suggestion (add time period): hurricanes Charley, Frances, Jeanne, and Ivan on the South Florida Water Management District area during 2004. Based on available data, the spatial distribution and the magnitude of rainfall from the…

27) p. 5-17, line 362: Reference?

28) p. 5-17, line 371: Why not just state the number of hurricanes and the number of tropical storms?

29) p. 5-17, line 372: What are you trying to say about decreased interest and decreased hurricane impacts?

30) p. 5-17, line 374: It is not clear if you are counting hurricanes and/or tropical storms twice, please clear this up.

31) p. 5-27, line 438: Higher and lower point rainfall readings at single rain gauge stations were observed… Higher and lower than what?

32) p. 5-27, Figure 5-14: What is the rationale for combining WCA1 and WCA2?

33) p. 5-30, Table 5-4: Why were the same rain gauges used for same site presentation in this analysis?

34) p. 5-31, line 475: How are the return-periods calculated or estimated?

35) p. 5-32, line 489: The sentence is confusing. Was the record high a goal, was Lake Okeechobee aspiring to reach this high daily discharge? The way it is presented it sound like Lake Okeechobee had goals and objectives.

36) p. 5-32, Figure 5-18: On the y-axis are the decimal points necessary? They are not consistent with the other graphs.

37) p. 5-32, Figure 5-18: What percent of the water loaded in Lake Okeechobee was not from the S68 and S65?

38) p. 5-34, line 498: What two months are you referring to and what years?

39) p. 5-34, lines 511-512, editorial suggestion (add word season): During the hurricane season and following months, the outflows from the Everglades Agricultural Area (EAA) were very high. Outflows through structures G-370 and G-372 into Stormwater….

40) p. 5-34, line 517, same editorial suggestion (add word "season"): S3-52, and S-354) during the hurricane season and following months are shown in Figure 5-21.

41) p. 5-50, lines 712-713: editorial suggestion (add word "annual"): Central and South Florida. Regional estimates of annual ET from open water and wetlands that do not dry out, range from 48 inches in the District's northern section to 54 inches in the Everglades.

42) p. 5-34, line 524: What level did the stage reach (associated with 5.38 ft right between August and October?

43) p. 5-34, line 528: What was the magnitude of water rise in WCA1?

44) p. 5-36 – 5-39, Figures 5-22 to 5-29: To put these plots into their historical perceptive it may be helpful to plot the daily data with duration hydrographs of selected percentiles, such as the 10th, 25th, 50th, 75th and 90ths. It seems as though most of the sites have long enough period-of-record (>30 years) to compute the necessary statistics. Below is an example for Savannah River flows in 2002. By using the percentile flows, it is very easy to see that streamflows at the beginning of the year set records for minimum flows and during the summer flows were around the 95th percentile. At the end of the years, with the end of the drought, flows increased to the median range (50th-percentile).

    For figures 5-22 to 5-29, the historical range of conditions for each day of the year would help put the data from the 2004 hurricane season in its historical perspective.

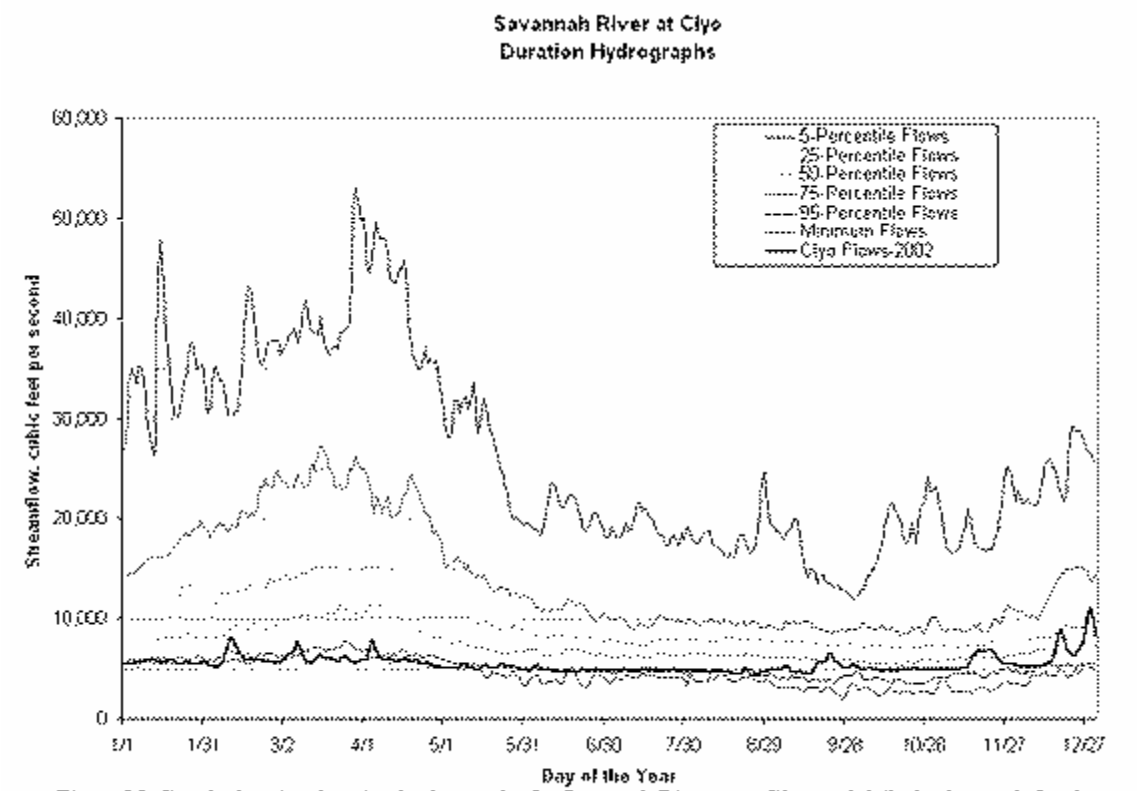


Figure 35. Graph showing duration hydrographs for Savannah River near Clyo and daily hydrograph for the calendar year 2002 streamflows. Percentile flows are based on streamflow data from 1929 to 2003.

45) p. 5-50, line 712: What is the time scale for the reported ET values?

46) p. 5-50, line 715, reminder (do not forget to include figs 5-31 through 5-45): depicted in Figures 5-31 through 5-45. The closest site to a rainfall area with available ETp data….

47) p. 5-50, Equation 1: The explanation provided for the variables in this equation do not equal mm d^{-1}. Is something missing to cancel out the kg and the other m like water density?

48) p. 5-51 – 5-58, Figures 5-46 to 5-53: Suggest improve consistency between the gage name and the reference in the figures. For example, text references "site S-57 headwaters" and the figure references "site S57_H." Using "headwater" in the caption allows the figure to stand on it own better.

49) p. 5-51, lines 728-730, editorial suggestion (merge the two sentences): The maximum daily average water level was 64.17 ft NGVD (December 20, 1999) and the minimum was 58.13 ft NGVD; the minimum stage was reached during the 2000–2001 drought in South Florida. Daily water level observations for Lake Alligator in the last 12 years.

50) p. 5-61, lines 907-926: You litter the discussion with “attain” as if the water levels are goals.

51) p. 5-66, line 1029: 3,501,889 (units need to be added)

52) p. 5-66, line 1031: What fraction of increased inflow to Lake Okeechobee was contributed from hurricane activity?

53) p. 5-67, line 1070: correct line formatting error

54) p. 5-71, line 1122: Add an **s** to the word record.

55) p. 5-74, line 1178: Is the word “width” missing? canal breach into the L-3 extension canal. The breach has a bottom width of 150 ft, at an elevation of….

CITATIONS:

Ugarte, C. A., Brandt, L. A., Melvin, S., and Mazzotti, F. J. (2005). "Hurricane Impacts to tree islands in Arthur R. Marshall Loxahatchee National Wildlife Refuge, Florida." *Southeastern Naturalist*, (submitted).

USFWS. (2005). "Arthur R. Marshall National Wildlife Refuge Annual Narrative Report: Calendar Year 2004." US Fish and Wildlife Service, Boynton Beach, FL.

Chapter 6

1) General: Refers to previous Everglades Consolidated Reports, last year’s report was the South Florida Environmental Report- may be confusing for readers who do not know the history of the name.

2) General: It would be useful to have a sentence or two at the each of the summary paragraphs relating the information and studies back to their relevance to District programs.

3) General: Is the discussion on the exotic fishes in the vicinity of L-67 incorporated in the information in Chapter 9? Is there cross interaction among the programs?

4) General: There was no discussion in this chapter on the deviation to the water regulation schedule. The pattern of dry down was partially a result of the deviation which temporarily suspended the requirement to bring water into the Refuge before water supply releases. Is that addressed in a different chapter?

5) General: Use of the indices without reference to the elevation, and therefore hydrologic gradient, in the Refuge gives a somewhat misleading picture. Since the south is much wetter than the north, tree island flooding tolerances are exceeded well before the gauge data reach 17.5 feet in the south. The same is true for the lower tolerance; the north end is dry before the indicated 15+ feet.

6) p. 6-2, line 38: The statement is confusing and makes me think that people are out allocating plant biomass, but I am sure that is not what is meant. Please clarify.

7) p. 6-2, line 42: Change ***access*** to ***assess***.

8) p. 6-2, line 46 – 50: In this hydroperiod discussion it is not clear what part of the EPA is being impacted by these downstream STA impacts.

9) p. 6-2, line 69: Can you include a table of the new Class B benchmarks.

10) p. 6-3, line 92: It is not clear what you mean by timing and duration?

11) p. 6-3, line 106: How do you define 'hydrologic conditions'? Water depths, flow rates, hydroperiods, etc.

12) p. 6-4, line 128: (the criteria for Minimum Flows and Levels in the Everglades) please add a reference.

13) p. 6-4, Table 6-1: It would be nice to have the dates used for the historic stages in Table 6-1 rather than having to refer to Chapter 5. It is critical to have reference to which gauge or gauges the data are from.

14) p. 6-5, line 141: What was below ground elevation, the water table?

15) p. 6-5, line 144: How close is almost? Please quantify.

16) p. 6-5, line 146 – Please define dramatic or remove it from the text is very dramatic and extremely subjective.

17) p. 6-6, line 151: Should be "borrow" canals.

18) p. 6-6, line 156: Nature is not the enemy and the statement is rather inflammatory.

19) p. 6-6, line 158 and 159: Do you really mean to start talking about WY2006 when you supposed to only be analyzing WY2005?

20) p. 6-7, line 162: What defines a significant extension of the dry season?

21) p. 6-7, lines 162 –173: The changes in water levels at the WCAs were lowest at WCA1 and almost the same between 2 and 3, but you say WCA2 is the more dramatic, while WCA3 had no significant change. The length of time for the observed change was 4 months in both cases, so it is not clear what you all are basing the assessment on. Also, can you give an example when foraging times were historically good?

22) p. 6-8, line 175: You claim one site to be indicative of the marsh hydrology for WCA3B, but you don't provide any rationale for such a fantastic assumption.

23) p. 6-8, line 175: revise this sentence as follows: In this region, Site 71 is most ~~indicative~~ representative of the marsh hydrology, indicating providing evidence that Water Conservation Area 3B did not experience either the extension of the dry season or the rapid flooding due to hurricanes during the wet season that affected the rest of the Everglades Protection Area (EPA) (**Figure 6-4**).

24) p. 6-9, line 218: Latin name in italics.

25) p. 6-9, Wildlife Ecology: In the start of the wildlife ecology section the statement "Wildlife within this context includes invertebrates, fish, amphibians, and birds." There are no studies on amphibians in the text.

26) p. 6-9, line 217: Why were the cattle egret and Bubulcus ibis not included in the analysis?

27) p. 6-10, line 262: Should be "imply" rather than "infer".

28) p. 6-10, line 234: Land (ENP) does not contribute bird nest.

29) p. 6-10, line 250: How much was this overestimation?

30) p. 6-12: What is the significance of the crayfish study findings in terms of water management and restoration?

31) p. 6-12, line 318: You state that understanding crayfish response to drought is essential for the successful restoration of wading bird populations. But it is not the only essential dynamic to understand and this sentence should reflect that. Maybe it is an essential addition to the knowledge base applied to restore the wading bird populations.

32) p. 6-13, line 327: Add ***population*** behind crayfish.

33) p. 6-13, line 329: What does 'water off the ridge' mean?

34) p. 6-13, line 331: Something is missing. …or alligator hole, and _____ repeated this….

35) p. 6-13, line 334: Fragment.

36) p. 6-14, line 343: Change the word whilst to while.

37) p. 6-16, line 363: Sentence seems to missing words.

38) p. 6-16, line 364 change as follows: ~~In~~ Chapter 6 of the *2005 South Florida Environmental Report– Volume I* (SFER), ~~it was~~ demonstrated that the ionic water quality contours for the Refuge ~~to highlight~~ illustrate how hardwater constituents from canals and STAs might be influencing the ecological dynamics of the Refuge.

39) p. 6-16: A potential problem with the analysis described on this page is the confounding effects of nutrient status. For example, shifts in species diversity patterns and richness are typical of nutrient-influenced aquatic ecosystems. More information needs to be presented to help the reader tease out the potential confounding effects of nutrient status, in order to discern patterns due to changes in water hardness.

40) p. 6-16: How do the differences in the macro-invertebrate assemblage between hardwater and softwater marshes compare with other freshwater aquatic systems. Some of the findings, such as higher concentrations of chironimids in higher conductivity marshes, seem consistent with studies on eutrophication. I am just wondering if the findings in general are agreement with previous results.

41) p. 6-16, line 367: Capitalize Refuge.

42) p. 6-16, line 392: What were the levels of correlation?

43) p. 6-16, line 394: Temperature down is not highly variable and generating correlation with highly variable data versus low variability data often does not work. It is also interesting to note that generally when we speak of correlation being useful for explaining something they are at the r=0.6 or greater level, here you present r values less than 0.4.

44) p. 6-19, line 465: Change place to placed.

45) p. 6-19: What are the implications for the non-indigenous fish studies? How might removal of canals help or hurt?

46) p. 6-24, line 579: The values you present 2800 seedlings, 1638 survival do not produce the 39 percent survival rate you report, I think it comes out to be 41.5%, are you using some other technique to calculate survival percentage?

47) p. 6-24, line 584: Unit is missing.

48) p. 6-27, line 607: Twelve fixed tree islands (This implies that there are other tree islands such as pop-ups, to clarify please include a definition of fixed tree island).

49) p. 6-28, line 637: …was established within (remove ***the***) each of the larger…

50) p. 6-28, line 639: Please present the rationale for selecting 33% cover as the dominate species.

51) p. 6-29, line 665: …high basal area, and (add ***are***) dominated by few tree species…

52) p. 6-30, Ecosystems: The first sentence makes it sound like the increase in hydroperiods and depths and desirable plant species are occurring downstream of ALL STAs. I don't think the previous results show that and based on later statements, I think the reference was meant for a specific STA.

53) p. 6-30, line 703: Your use of area here is somewhat confusing. I think you are talking about issues or area of concern.

54) p. 6-30, line 708: You claim that it is impossible to isolate an area from surface water run-off, but presently there is a consideration for impounding the WCA1 with levees and completely cutting off canal and other surface water sources to the Refuge, ultimately making it a completely rain driven system.

55) p. 6-30, line 714: It is a little confusing. You say tree island elevation is decreasing relative to water levels. But you said earlier that water levels dropped. So what is going on, the tree islands are not being submerged, so are you saying they are eroding because of the lower water levels? Just not clear, please elaborate?

56) p. 6-39, line 823: The text beginning here reports the possibility of a nutrient front in Rotenberger. This observation confirms a concern we expressed in previous report reviews that conducting hydropattern restoration with nutrient-enriched water will result in ecosystem changes that are difficult, if not impossible, to reverse. Huge sums of money are being expended in other portions of the Everglades to halt and reverse the effects of decades of nutrient enrichment. These results reaffirm the need to consider delaying hydropattern restoration activities until clean water is available.

57) p. 6-53, line 1021: CIS, are you referring to Coastal Information Systems?

58) p. 6-58, line 1081: Can you give us the nomenclature for the acronym NSM?

59) p. 6-46, Figure 6-23: Is the y-axis 'milligrams/kilogram'? Some of the values seem very high in that case.

Chapter 7A

1) p. 7A-1, line 18: Revise the sentence as follows; The District is partnering with the U.S. Army Corps of Engineers (USACE) to implement CERP, which is planned to be ~~implemented~~ constructed and operated over more than three decades. ~~It is~~ The plan focused largely on increasing water storage and improving the timing, quality, and distribution of water deliveries to the Everglades ecosystem.

2) p. 7A-3, lines 93-95: The wording makes it sound like the purpose of the project is to provide water to the Arthur R. Marshall Loxahatchee NWR. The primary purpose of

the project is water quality. The water that will be provided will come in the wet season, and is a very small percent of the overall refuge water budget. Add to end of last sentence, "…lost to tide in the project planning's future-without project scenario."

3) p. 7A-4, line 128: Revise the sentence as follows; The C&SF Project is a multi-purpose project, which was first authorized in 1948 to provide flood control, water control, water supply, and other services to the area that stretches from central Florida to Florida Bay.

4) p. 7A-5, lines 194-195: What were the $ amounts, acreage, number of projects spent on CERP land acquisition?

5) p. 7A-7, line259: Revise sentence as follows; During the drier winter and spring months, drought was a common problem, with geography having ~~sentenced~~ having the greatest influence on rainfall in South Florida ~~to total dependence on rainfall~~. From the mid-1800s to the mid-1900s, attempts to control the water were based upon dredging and draining.

6) p. 7A-29, line 818: Change and to an. Adaptive Assessment provides an~~d~~ organized…

7) p. 7A-31, lines 911-912: What is the status of the peer review of the ELM model before it is can be considered for CERP applications? The text here is nebulous and implies that the model is already being used. Is this the case?

8) p. 7A-34, line 978: Should the STA enhancements or another project be added to these bullets? There are only 7 bullets describing Acceler8 which should include 8 major projects.

9) p. 7A-36, line 1061: Please include an updated progress report for this project to be consistent with all the others detailed in this section.

10) p. 7A-40, line 1183: Delete these repeated sentences and replace with project specific information. The Notice to Proceed for the construction contact for the ~~Hillsboro~~ ASR Pilot Project is scheduled to be issued during August. Comprehensive Everglades Restoration Plan Regulatory Act (CERPRA) permits for the Lake Okeechobee sites are pending, and congressional appropriation is needed to facilitate construction of the Lake Okeechobee ~~and Caloosahatchee~~ sites.

11) p. 7A-40, line 1190: Delete these repeated sentences and replace with project specific information. The Notice to Proceed for the construction contact for the ~~Hillsboro~~ ASR Pilot Project is scheduled to be issued during August. ~~Comprehensive Everglades Restoration Plan Regulatory Act (CERPRA) permits for the Lake Okeechobee sites are pending, and~~ ~~c~~Congressional appropriation is needed to facilitate construction of the ~~Lake Okeechobee and~~ Caloosahatchee sites.

~~12)~~ p. 7A-41, line 1203: Delete these repeated sentences and replace with project specific information. The Notice to Proceed for the construction contact for the Hillsboro ASR Pilot Project is scheduled to be issued during August. ~~Comprehensive Everglades Restoration Plan Regulatory Act (CERPRA) permits for the Lake Okeechobee sites are pending, and congressional appropriation is needed to facilitate construction of the Lake Okeechobee and Caloosahatchee sites.~~

13) p. 7A-41, Table 7A-8: Is this milestones table a compilation of milestones achieved to date and projected milestones for the future? If so, has the one milestone in 2005 to date been reached (construction for Hillsboro ASR); it is unclear to the reader as the chapter draft is dated 24 August 2005. Many projects described in this chapter have information about current status in 2005 after the end of the water year (April 30, 2005).

Chapter 7B

1) p. 7B-2: A graphic and reference to the document would help in the discussion of the adaptive management strategy section.

2) p. 7B-3, lines 79-81: This sentence needs to cite the actual RECOVER document and not just the summary blurb in last year's SFER. Citation: RECOVER (2004) Assessing the Response of the Everglades Ecosystem to Implementation of the Comprehensive Everglades Restoration Plan. Final Draft – Preliminary Guidance Document. c/o U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL and South Florida Water Management District, West Palm Beach, FL. Available at: http://www.evergladesplan.org/pm/recover/recover_docs/aat/rec_prelim_guid_dec_2004.pdf

3) p. 7B-6, Table 7B-1. Fish sampling methods testing in forested wetlands is listed twice.

4) p. 7B-6: What is the difference between a study that is underway and one that is ongoing in Table 7B-1?

5) p. 7B-9, lines 199-200: Completion of the high-resolution vegetation map for the Refuge (referred to as WCA-1 here) has been a critical data need; however, it has not been completed yet.

6) p. 7B-10: Cross reference Greater Everglades Tree Island Characterization with Chapter 6 and make sure the information is consistent.

7) p. 7B-13: How does the wading bird nesting colony location… work match with what is presented in Chapter 6. If it is the same or linked explain how.

8) p. 7B-21, line 699: Add a parenthetical note after “Map component level” to state, “(see below)” to make it easier for reader to understand. Also, why is there expanded text for only one of the three levels? While the system-wide level has not fully been worked through yet, we understand our approach about assessment of hypotheses at the module level.

Chapter 8

1) General: My overall impression of this Chapter is not very positive. It goes into very few specifics on how water quality goals for P will be met over the long term. I believe that achieving the 10 ppb criterion over the long term will be very difficult using the existing approach. Even worse, the only water quality issue mentioned in the chapter is P. In my view, one of the major problems with restoration efforts at improving water quality in the Everglades has been the single-minded focus on the P issue in isolation. In my opinion, this has distorted the whole approach to water quality improvement in the ecosystem, and continues to be an impediment to progress. While P is certainly an important water quality issue in this ecosystem, it is certainly not the only water quality issue. Furthermore, ignoring other water quality factors and treating the P issue in isolation actually also inhibits achieving the P criterion of 10 ppb. For example, sulfate contamination entering the ecosystem (apart from its impact of mercury) causes more rapid recycling of P and N from sediments (detrital organic matter) by stimulating anaerobic microbial sulfate reduction in sediments. Since most STAs are flooded with sulfate-contaminated water, permanent sequestration of P and N in the sediments is inhibited by the presence of the sulfate. An approach to water quality control in Everglades restoration that considers all pertinent factors will be essential to achieving real restoration over the long-term.

2) General: The October 2003 LTP described STA optimization measures to be implemented before December 2006. These were forecasted to produce discharge concentrations in the 10-15 ppb range. Given new information acquired since October 2003, what is the likelihood that the performance goal and timetable will be met? What factors would account for any deviations from the expected performance and timetable?

3) General: Chapter 4 describes STA maintenance and enhancement measures that have been undertaken and are underway in the existing STAs. These measures typically require temporary shut-down of STA cells and loss of treatment capacity. Overloading other STA cells during these periods impairs performance and risks long-term damage to vegetation. Does the LTP envision that maintenance/enhancement measures requiring shutdown will occur in the future? Does the plan provide sufficient excess treatment capacity so that performance is not compromised during maintenance/enhancement periods and that the integrity of vegetation in the operating STA cells is maintained?

4) General: What is the ultimate objective of the long-term plan? Line 76 describes a 'planning goal' of 10 ppb, expressed as a long-term geometric mean STA discharge

concentration. Lines 52-54 mention compliance with water quality standards. Measuring compliance with water quality standards and LTP success at downstream marsh sites will not restore and protect marsh areas between the STA discharge points and the marsh monitoring sites. Compliance with the P Criterion at discharge points is required to restore/protect the entire downstream marsh. Now that the P criterion has been officially adopted, the LTP should adopt a firm treatment objective expressed in terms of an STA discharge concentration consistent with meeting the P criterion throughout the marsh, not just at marsh sites located at arbitrary and unspecified distances downstream.

Under the TMDL process, the USEPA routinely requires that plans to achieve water quality compliance explicitly include a "Margin of Safety" to account for uncertainty and provide assurance of success. This concept is applicable to any planning process that involves uncertainty. A margin of safety can be provided by making conservative assumptions regarding uncertain factors, as is consistent with standard engineering practice.

5) p. 8-5, line 75: Line 75 mentions that there is a "possibility" that the pre-2006 measures will achieve the treatment goals. Will a margin of safety be factored into subsequent iterations of the plan in order to provide a high probability of success (vs. just a "possibility")? If so, how?

6) p. 8-5: Authors state that the combined performance of the EAA source controls and STAs have exceeded expectations; but what were the expectations. On the same page further down, the authors state that " … it is possible that these improvements and strategies will not, in and of themselves, provide adequate assurance of an ability to consistently meet that objective" [**e.g. 10 ppb P criterion**] "on a long-term basis." So which is it? Are the controls going to achieve this or not?

7) p. 8-6: The post 2006 Long-Term plan will involve using an "adaptive management approach", with "continued investigations" to improve water quality improvement strategies. Sounds impressive but says nothing about what approaches need to be taken to achieve the 10 ppb phosphorus criterion.

8) p. 8-8, lines 181-201. How do the revised flows & loads compare with the original estimates?

9) p. 8-9, line 237: How are the long-term increasing trends in Lake Okeechobee P concentration being considered in the plan development? Is there any allowance for the possibility that lake P concentrations will continue to increase? Are the lake phosphorus concentrations being assumed in LTP development consistent with recent measured values? This is one example of where a conservative assumption seems appropriate, especially given the increased flow volumes predicted to result from implementation of CERP/ACELER8, as well as potential future changes in the lake regulation schedule.

Chapter 9

1) General: This chapter was extremely well written and appears to cover all the issues. Only thing I found was a few typos. I especially enjoyed having one or two problematic species highlighted following each module chapter - it flowed pretty well.

2) General: Good to see animals included.

3) General: Chapter 6 of the 2006 SFER has a non-indigenous fish section. It might be appropriate to include this section in Chapter 9 which addresses non-indigenous species.

4) p. 9-2, line 50: Pimentel et al., 2000 has a dollar figure of $138 billion for expenditures related to environmental damages from invading, non-indigenous species.

5) p. 9-3, line 76: Would read better if non-endemic pest was plural. To read- "non-endemic pests."

6) p. 9-4, lines 122 thru 128: Paragraph starting with "In 1998" and ending with "Everglades restoration" (line 128), is misplaced. Chronology of paragraphs on top half of this page jumps from 1993 to 1998 and then back to 1994.

7) p. 9-4, lines 129 thru 136: should be after "the spread of invasive exotic plants and animals" (line 122).

8) p. 9-5, line 174: FGFWFC 1999 is not the correct reference for the Fish and Wildlife Service Fish and Wildlife Coordination Act Report. Also, on line 173, it would be more appropriate to mention the Coordination Act report as a U.S. Fish and Wildlife Service product not a U.S. DOI report.

9) p. 9-5, line 208: Capitalize "Governor of the State of Florida."

10) p. 9-7, lines 272-273: Capitalize "Secretaries of Agriculture, Commerce, and the Interior."

11) p. 9-7, line 277: On page 9-4, line 122, it is stated the NEWTT was established in 1998. On Page 9-7, line 277, it is stated that NEWTT was established in 1997.

12) p. 9-9: One quick comment on coyotes (should apply additionally to the white-winged dove as this species is native to Cuba, Hispaniola, Mexico and parts of SW including Texas). In the document, the white-wing dove is considered non-indigenous (in one of the later modules), although it certainly could have flown of course to Florida, yet the coyote is not considered such.

There has been evidence that coyotes were released intentionally in Florida by hunters to track with dogs in lieu of foxes as that practice of chasing foxes with dogs has now been deemed illegal by the FWC and no longer is permitted. There is also evidence that white-winged doves were illegally or unintentionally released in the Miami area in 1959 (Refer to Robertson, Jr, and Woolfenden: 'An Annotated Florida Bird List') from a private aviary and in central Florida by FWC in the 1970s (Kale, II and Maehr, 1990) to establish a new huntable resource (I assume) in addition to the native morning dove. Existing populations may have been supplemented by those arriving through natural range expansion from Cuba, Hispaniola or Texas providing today's viable and established populations. Same could be said for the coyote since in the old days red wolfs and panthers kept their numbers in check.

13) p. 9-11, Where Herbicides Can Be Used: This section overall was well-written and provided clarification with regards to licensing issues or site-specific uses of herbicides. For clarification, perhaps a discussion on how herbicides may be employed to treat 'new' threats to CERP or EPA *if those species are not specifically listed or identified on the label*….What is the law or regulations concerning this issue specifically for species such as ficus microcarpa, java plum, shoebutton ardisia, earleaf acacia, bischofia, climbing cassia, etc?? At least two different opinions or view points on this issue exist. A detailed answer could be placed under this section as well.

14) p. 9-16 and 9-17, under Animal Monitoring: The maps on this page and the top of the next page are hard to see and discern animal species distribution locations. In addition, the source of this mapping data is not given.

15) p. 9-16, lines 611, 637, and 638: For personal communication citations, identify the affiliation of the person being cited and list in literature cited at the end of the chapter.

16) p. 9-20, lines 779 and 780: For personal communication citations, identify the affiliation of the person being cited and list in literature cited at the end of the chapter.

17) p. 9-20, third paragraph: A sentence or two about the mission of RECOVER would be of value such as "RECOVER is an arm of the Comprehensive Plan (CERP) responsible for linking science and the tools of science to a set of system-wide planning, evaluation and assessment tasks."

18) p. 9-20, line 792: "They" include is confusing in that it is implied the "they" is a driver or stressor. A more appropriate sentence would be - "The CEM's include the Florida Bay, etc."

19) p. 9-23, Table 9-1: In Table 9-1, does winning mean that we are winning the battle or the exotic is winning?

20) p. 9-25, Under Fish: For Rio Grande cichlid change scientific name from *Cichlasoma cyanoguttatum* to *Herichthys cyanoguttatus.* In addition, Grand is spelled incorrectly. Should be Grande.

21) p. 9-25, Under Fish: The scientific name for Pike killifish is spelled incorrectly. It should be spelled *Belonesox.*

22) p. 9-38, line 1183-1184 reference to Brandt 2005 - Today, it dominates the Refuge, infesting 70% of its habitats: I could not find this figure in the cited document; however, there is a statement that states that melaleuca and lygodium **together** occur in over 60% of the Refuge.

23) p. 9-39, line 1203: Language here incorrectly implies that the Refuge is only studying Lygodium, when in fact the Refuge is also treating Lygodium.

24) p. 9-43, Under Fishes: Other more common names or local vernacular for peacock cichlid include butterfly peacock and peacock bass.

25) p. 9-43, Under Fish: For Rio Grande cichlid change scientific name from *Cichlasoma cyanoguttatum* to *Herichthys cyanoguttatus.*

26) p. 9-44: Change the scientific name for Orinoco Sailfin Catfish from *Pterygoplichthys multiradiatus* to *Liposarcus multiradiatus*.

27) p. 9-54, Under Fishes: Change the scientific name for Orinoco Sailfin Catfish from *Pterygoplichthys multiradiatus* to *Liposarcus multiradiatus*. In addition, Orinco is spelled incorrectly. The correct spelling is Orinoco.

Chapter 10

1) General: This chapter was well written (and technically sound) and the authors should be commended for making efforts to draw linkages among all the different pieces of information presented. The chapter is informative, and clearly represents the diverse talent of the authors. The illustrations and tables used are pretty clear overall, and useful. It is also well referenced, with a good mix of peer-reviewed journal articles, and agency publications. The information was useful in understanding how the Lake Okeechobee Protection Program (LOPP) will complement work being conducted by the Lake Okeechobee Watershed Project (LOWP) of CERP.

2) p. 10-1, Line 12: should be "Everglade snail kite", not "Everglade**s** snail kite"... This error appears again on Line 153 page 10-4.

3) p. 10-1, line 34: Please add the word “volume” after “average water year inflow”.

4) p. 10-2, line 41: Please change “resuspended” to “resuspend”.

5) p. 10-2, line 44, and elsewhere in document: Please ensure that the term “significant” is used only when referring to statistical significance at a given confidence level.

6) p. 10-2, line 58: Please add the term “highly variable” or something similar before “lake stages”.

7) p. 10-2, line 62: “…that has greater environmental benefits”: Would the statement “…that has fewer negative environmental impacts” be more appropriate here?

p. 10-3, line 84: states that the CERP ". . . will provide substantial amounts of water storage and approximately 39 percent of the phosphorus load reduction needed to meet the TMDL. . ." The statement is premature. It should read, "As currently planned, the intent of the LOWP component of the CERP is to remove 39 percent of the total phosphorus load and store approximately 280,000 ac-ft of water."

8) p. 10-3, line 95: What is the WY2005 average of water column TP in relation to the 5-year average (have to find it on p. 10-25)? Please describe to the reader why a 5-year average is presented. For example, a 5-year average is used in Table 1 showing TP concentration at 77 ppb (1999-2003), and a near-doubling to 142 ppb from 2001-2005, but no discussion is provided.

9) p. 10-3, line 122: Please identify the agency who removed berms surrounding Ritta Island (I’m assuming it was SFWMD).

10) p. 10-3, line 126: Why are berms on Kreamer and Torry Islands not being removed?

11) p. 10-4, line 156, or somewhere in document: Please identify the primary exotic and nuisance plants in the study area.

12) p. 10-5, Fig. 10-1: Please give a general idea of what you mean by “Past” – is this prior to 1920s/1930s, when the dike system was constructed?

13) p. 10-6, Fig. 10-2: Please add a key or legend defining “L” and “C”.

14) p. 10-7, line 173: If possible, please add a reference for the source of the atmospheric deposition estimate. I continue to be concerned about the accuracy of this estimate. I was under the impression that data collected from atmospheric deposition stations within the lake were unreliable due to contamination of sampling media (i.e. bird excrement) and other problems. Does the TMDL allow a constant estimate for atmospheric deposition? If true atmospheric deposition is determined to be much higher than expected, would the tributary load TMDL have to be reduced to meet the in-lake phosphorus concentration goal?

15) p. 10-7, line 173: Please define mt (metric tons) somewhere in the document.

16) p. 10-8, lines 208-215: Where was the water from the dairy lagoons pumped – into a nearby ditch? Did the WMD observe any water quality impacts to nearby streams as a result of the pumping?

17) p. 10-8; Line 225: "Estimated currents velocity" . . . . Remove the "s" on "currents".

18) p. 10-9, Figure 10-3: Please add dates of each hurricane's landfall to the figure.

19) p. 10-13, line 242: Please add "post-hurricane" after the word "Direct".

20) p. 10-13, line 259: Why do you think that the results of the lake sampling showed lower concentrations of suspended solids and phosphorus in January and April? Was it due to fewer cold fronts or storms during or just prior to these months? An interesting exercise would be to try to correlate certain weather parameters (e.g. number of days in month with rainfall > 0.5 in, number of days with wind speed > 20 mph, etc.) with observed in-lake water quality concentrations.

21) p. 10-13, line 261: Add "under quiescent conditions" or a similar statement after "…completely from the lake water".

22) p. 10-13, line 267: Please replace "our" with "SFWMD".

23) p. 10-13, lines 265-272: Could some of the decline in SAV biomass over this period be attributed to seasonal effects? I would expect that SAV would naturally decline somewhat with temperature and natural weather patterns from July to April.

24) p. 10-15, Figure 10-8: Please move the R^2 value for the upper graph closer to the regression line, as shown in the lower graph. Are the regressions statistically significant? Please state the p-value of the regressions below the R^2 value.

25) p. 10-16, Figure 10-9: The scale font for each of the isopleth maps is difficult to read. I suggest enlarging the font.

26) p. 10-17, Figure 10-9b: It is interesting that the water-quality patterns in the lake for February are distinctly different from patterns in other months (there are 2 distinct mounds of high concentration). Did sampling locations vary during this sampling period? It might be helpful to state the lake's water level elevation at the time of each sampling event beside the isopleths.

27) p. 10-19, Figure 10-11: Since sampling is conducted quarterly, I suggest you show only the months sampled on the X-axis. As it is, the figure is a bit misleading – it appears that SAV biomass was 0 during the months not sampled.

28) p. 10-19, figure caption: Note in the caption that the months with no biomass presented are months where samples were not taken, not months where no biomass was found.

29) p. 10-20, line 300: Please add the word “and” after “water quality”.

30) p. 10-21, Table 10-1: Excellent table – this is very helpful!

31) p. 10-25, line 340: If atmospheric deposition is estimated, add the word “estimated” before “atmospheric deposition” to differentiate it from measured tributary loads.

32) p. 10-25, line 344: Please further define “net sedimentation coefficient”. Also, the symbol used to denote the coefficient in the text is different in Table 10-2.

33) p. 10-25, line 349: Does the WMD sample for calcium in the lake? If not, it would be a relatively inexpensive addition to the sampling program and useful to further define phosphorus assimilation dynamics.

34) p. 10-25, line 351: I’m not sure that the under-prediction of TP by the model is a “result” of the assimilation trend. I suggest using another word.

35) p. 10-28, Figure 10-16, top graph: What does the one negative sedimentation coefficient (in 1998) imply – that the outflow of sediment exceeded the inflow?

36) p. 10-32, Figure 10-19: It is very difficult to visualize the interactions depicted in this diagram. Could it be revised to look like Figure 10-38? Also, what’s the difference between the solid and dashed flux arrows?

37) p. 10-33, line 444-446: The WMD is to be commended for their efficient data collection and map development process.

38) p. 10-33: What would provide valuable information on the level of uncertainty in the assessment of the 1 x 1 km SAV sampling program would be a comparison to the 0.5 x 0.5 km grid used in the first year of the monitoring program.

39) p. 10-36, Figure 10-21: The squares representing grids with “no plants present” are shown in blue on the figure and in white on the key.

40) p. 10-39; Line 479; two misspellings.... "Everglades snail kite (Rosthrhamus sociabilis plumbeus)".... should be "Everglade" and "Rostrhamus"

41) p. 10-41, line 536: How were the torpedograss and cattail treated – chemically, burned, or physically removed? Please add a brief explanation to the text.

42) p. 10-41, line 537, “submersed”: Do you mean “submerged”?

43) p. 10-41, line 557, and Pg. 10-42, line 569: Just to satisfy my own curiosity …. Why were October and January selected for sampling of largemouth bass and black crappie, respectively?

44) p. 10-42, lines 572-588: Does the water quality of the lake (other than turbidity) have any other impacts on the health of bass and black crappie populations, other than indirect impacts through habitat loss? If so, please state.

45) p. 10-44, Figure 10-26: Please give units for the y-axis.

46) p. 10-46, Figure 10-27: I believe the LOWP (CERP) boundary now, technically, includes Nicodemus Slough.

47) p. 10-48, Table 10-3: I suggest converting the last two sentences of the table caption into a footnote. Also, add the word "Average" above "TP Concentration" in the table.

48) p.10-53, line 680: What incentives does FDACS offer to farmers who participate in the voluntary BMP program?

49) p. 10-53, line 718: I suggest removing the phrase "a certified technical service provider".

50) p. 10-54, line 772: What is the timeframe for developing stormwater master plans?

51) p. 10-55, line 786: How will the success of FDEP's public education programs be measured? Public surveys?

52) p. 10-64, line 1077: Was the STA for Taylor Creek completed in July 2005 (the draft chapter is dated 18 August 2005)?

53) p. 10-64; Line 1084**:** The report states "The Byrd Isolated Wetland Critical Project was completed in June 2002." However, no other details are provided. What is the significance of this statement?

54) p. 10-65 or elsewhere in the report: I suggest adding a couple of sentences describing the coordination among all agencies involved with the lake's restoration. With all of the projects and activities described in the report, it is apparent that there must be a high level of communication among agencies (particularly those involved with CERP and LOPP) so as to avoid redundancy and conflicts of interest, and to ensure a common goal.

55) p. 10-69, line 1162: Please replace "U.S. Geological Survey" with "USGS", as the acronym has already been defined earlier in the document.

56) p. 10-69, line 1163: Please add the phrase "for phosphorus, nitrogen, and total suspended solids loads and streamflow" after "….north of Lake Okeechobee".

57) p. 10-73, line 1275: Should a new sentence begin after the word "estuaries"?

58) p. 10-77, all lines: It may be interesting to study the effects of wave height and wave patterns on suspended sediment, deposition of sediment, and SAV location and extent. The USGS is operating a similar study in the Indian River Lagoon to examine the effects of wave height and wave patterns on sediment transport and the proliferation of sea grass beds, using acoustic Doppler wave profiling equipment. This type of study could easily be adapted to the Lake Okeechobee environment and may assist with efforts to model lake hydrodynamics. We would be interested in discussing this further with the LOPA team.

59) p. 10-83, Figure 10-38: Excellent figure.

Chapter 11

1) p. 11-23, line 516: We suggest some additional verbiage be added to clarify why BOD increases with increased flow/stage. This could be accomplished by replacing the sentence after the word "increasing" with the phrase "suspended organic solids/nutrients in the water column and resulting in higher biochemical oxygen demand in the river".

2) p. 11-54, line 1327: We do not believe that the asiatic clam (*Corbicula fluminea*) is native to Florida. This can be corrected by moving "*Corbicula fluminea*" outside of the parentheses.

Chapter 12

1) p. 12-14: Any indication as to how much of the seagrass impacts are attributed directly to the hurricanes versus indirect impacts resulting from poor water clarity and high freshwater discharges from water management operations? Biscayne Bay seagrass wasn't impacted by Hurricane Andrew as much as initially thought. Curious as to whether the difference is attributed to larger anthropogenic influences in the St. Lucie estuary.

2) p.12-1, line 29: The statement "they represent consistent features of the estuarine landscapes" is relative. How do you define consistent? Seagrass beds have definitely come and gone as have oyster beds - long before 1900. We have documentation of the movement of SAV in our BB and FB cores. Donna Surge and others have shown changes in oyster beds for SW coastal areas.

3) p. 12-2, lines 54-55: What about the SW coastal area from Ten Thousand Islands south to Cape Sable? Surely this is a critical coastal system that needs to be considered since changes in flow through Shark River Slough have impacted this area. Why is it not listed as a "priority coastal water body"?

4) p. 12-4, line 106, Owing to the pattern of glaciation, Florida's coastline is flat, with little topographic relief on: This implies Florida was glaciated - perhaps it would be

better to say something like "Patterns of sea-level change during the Pleistocene inter-glacial high-stands and the glacial low-stands created Florida's flat coastline . . . "

5) p. 12-4, line 111: Suggested insert – "that utilize the benthic habitats"

6) p. 12-5, line 123: Also, may want to add something here about the ability of the organisms themselves to filter the water. If you loose certain species (for eg. sponges), than a negative feedback system develops - fewer sponges (etc.), more turbidity, therefore less light, more die-offs, etc.

7) p. 12-5, lines 145-146: See note above on page 12-2: why is SW coastal area not included?

8) p. 12-34, line 785: Longer term perspective from cores may be valuable here to see how the estuary has evolved and what the pre-anthropogenic trends were.

9) p. 12-35: The section on Lake Worth Lagoon was very sparse compared to other sections. Was less focus placed on LWL? The description of direct of indirect damage from the 2004 hurricanes is uninformative. A discussion on the delisting of LWL from impaired water body list should be presented here.

10) p. 12-39, line 906: Text missing here? development (**Figure 12-20**). The bay is narrower in the most northerly reaches to but is over 14….

11) p. 12-43, after line 951: Somewhere in this section on Environmental Condition, may want to mention invasive species. For example USGS is working with BNP to determine the distribution of the invasive gastropod Melanoides tuberculatus, and to determine what impact it is having on the native populations (terrestrial and estuarine), and whether it is a threat to human health.

12) p. 12-47, line 966: But what is the goal here? To maintain the current species (late 20th century species), and therefore create salinities that sustain these populations? Or is the goal to "restore" the system to pre-anthropogenic state as much as possible? If the later is the case, then some of the current species may not be the historical populations.

13) p. 12-58, line 1118, "in a more natural way": Will ecosystem history data from USGS funded by the District be used here? If so, may want to mention the work.

14) p. 12-65, line 1267: Could identify references to published reports

15) p. 12-66, lines 1307-1308: "Most" may not be the best choice of words - especially if describing current conditions. Look at "Florida Bay Bottom Types" map produced by Prager and Halley, 1997, USGS OFR 97-526.

16) p. 12-66, line 1308: Insert – "Starting in the late 1980s"

17) p. 12-71, lines 1410-1411: In the other sections, ppt is used. It's preferable to be consistent, or at least provide a chart showing the relationship of psu to ppt. My recommendation would be to keep all discussions and charts in ppt.

18) p. 12-76, after line 1599: I thought performance measures also used paleosalinity data.

19) p. 12-79, lines 1685-1686: Ruppia is currently the dominant SAV, or it should be? The transition zone is relatively broad, and my own field experience says Ruppia is not currently the dominant species.

20) p. 12-79, lines 1716-1717: But sediment stability, water depth/exposure during low tides, etc. also are important variables in determining Thalassia vs Halodule distribution.

21) p. 12-80, line 1746: Halodule only? Not SAV in general, or Thalassia too?

22) p. 12-88, lines 1933-1934: I thought Surge and/or Savarese did some work on distribution of oyster reefs in SW area, including Estero Bay. (See item 1 listed below in Hydrologic History - wasn't this part of that work?)

23) p. 12-101, line 2223: Should be, “The Sanibel Causeway site was destroyed….” correct?

Topic: Additional DOI Technical Comments (1 of 1), Read 54 times
NEW
Conf: VOLUME I: THE SOUTH FLORIDA ENVIRONMENT
From: DOI Everglades Program Team matthew_harwell@fws.gov
Date: Friday, September 23, 2005 03:52 PM

The following DOI technical comments didn't make it through the initial PDF conversion - these comments are also posted in their respective chapter folders.

Additionally, to the list of DOI contributors to the original post, the following names should be added:
Paul McCormick (USGS) and Bill Loftus (USGS)

Chapter 2A:
p. 2A-6, Figure 2A-2. Caption is incorrect.

p. 2A-18: Remove caption for Table 2A-4 on this page.

p. 2A-20, last full paragraph: The statement referencing Refuge stations X3, X4, and Y4 as unimpacted is incorrect. The X and Y stations are affected by canal flows as evidenced by elevated levels of specific conductance relative to more interior stations and elevated soil concentrations of contaminants such as P and S. Long-term (5-year) geometric mean TP concentrations evidently do not reflect periodic episodes of canal-water intrusion that produce other measurable impacts at these sites. Moderate levels of impact from canal waters at these sites may be a possible cause of observed DO excursions.

p. 2A-21, last paragraph: The authors state that “canal waters penetrate only a few kilometers into the marsh and thus have little or no influence on the soft-water conditions within the Refuge interior.” This statement could be misinterpreted as meaning that canal waters influence only a very small portion of the Refuge, which does not appear to be the case. The Refuge is about 20 km across, so penetration of canal waters only a “few” kilometers along just the west side could equate to about 15% of the wetland area. A map of conductivity levels across the Refuge produced by SFWMD in 2004 shows a zone of intrusion 5 km or more in width across the northern and western sides of the Refuge and limited areas of intrusion along the eastern side. Thus, it is likely that >25% of the Refuge is affected by canal flows. This is not an insignificant influence.

p. 2A-24, first paragraph: The authors conclude that there has been no temporal trend for conductivity in the Refuge interior. However, the figure (2A-7) presented to support this conclusion lumps together all LOX sites, including those that may truly be minimally impacted (e.g., LOX8) and others that show clear signs of canal influence such as elevated levels of Ca, P, and S in the soil (e.g., LOX10). The analysis would be much more likely to detect temporal trends in conductivity levels in the Refuge if it considered each site separately. There should be sufficient data to do the analysis in this manner. At

a smaller spatial scale, conductivity trends along the XYZ transects monitored by SFWMD showed a distinct increasing trend during the late 1990s. It would be useful to analyze the current data set for these sites to determine if this trend still holds.

General: A more general comment concerning references to the “baseline” period (e.g., pg 2A-24, first paragraph). This period of 1979-1984 was certainly not a period of “no impact” on water quality in the Everglades, and this point should be made clear to readers. In essence, statements that there is no change in water quality relative to the baseline period mean that conditions have neither improved nor degraded further.

p. 2A-29, lines 676-678: The statement that “the Refuge interior has remained relatively uninfluenced by the inflow of sulfate-rich water” could be misinterpreted as meaning that sulfate concentrations in the Refuge are not at levels that can cause impact. In fact, median levels of 2.3-3.6 mg/L in various years (Table 2A-4) are more than 10-fold higher than background (which is below detection at <0.2 mg/L) and are high enough to affect biogeochemical processes such as mercury methylation.

Chapter 2C:
General: Analysis of P data for WY2005 presented here show higher P concentrations in several locations compared with previous years. In all cases, these higher P concentrations are attributed to “extreme” weather conditions including periods of very high and very low precipitation. This hypothesis concerning meteorological influences on P stated repeatedly as, for instance, on page 2C-21: “Periods of low rainfall, resulting in marsh dryout, and high rainfall from the passing of multiple hurricanes, resulting in large storm water inputs and high marsh water levels, occurred during WY2005.” While this hypothesis is certainly plausible, it is just a hypothesis and no formal data analyses are presented to support it. The authors need to either include analyses that support this hypothesis or remove from this section the repeated assertions that these events were the cause of higher P levels in WY2005.

First, were conditions in WY2005 “extreme” compared with the period of record? No attempt is made to compare conditions such as rainfall, flow, canal and marsh stage, etc. to any years prior to WY2004. Secondly, did elevated P and N concentrations supposedly associated with these events also occur in previous years when conditions were similar to those in 2005? Retrospective analysis of this sort is important to establish a relationship between, for example, high inflow TP concentrations and periods of high rainfall. Finally, with respect to the effects of marsh dry-out events on TP and TN, no data are shown to support the hypothesis that elevated nutrients are related to the reflooding of oxidized marsh soils. The strongest correlative evidence for this would be to show a repeatable pattern of elevated water-column nutrient following dry-out and rewetting among individual sites. This should be done using TP and water depth data from individual sites rather than using average TP data for an entire area and stage data from a single location.

p. 2C-4, lines 105-106: “This quick recovery to previous levels suggests that the extreme conditions experienced during WY2005 did not result in any long lasting impacts to the system.” Available information on P accumulation and impacts in the Everglades does not support the suggestion that periodic pulses of high P water cannot produce impacts in

this wetland. Quick recovery of water TP to background levels following such pulses might be due to P assimilation and accumulation by marsh soils and vegetation, which in turn would produce other ecological effects.

p. 2C-4, line 121: The hypothesis that abnormal climatic events resulted in elevated P levels during WY2005 is certainly reasonable, but no critical tests of this hypothesis are presented in the chapter to warrant it being a conclusion.

Figures 2C-1 through 2C-4 do not provide sufficient evidence to show that events such as marsh dry-out resulted in elevated TP concentrations. The location where the stage data was collected should be provided. Was this a canal site or a marsh site? If a marsh site, then what is the ground elevation, i.e., at what stage does the marsh start going dry? A line showing ground elevation should be provided on the figure. If a canal site, how reliably does it predict stages in the marsh? Most importantly, how does stage at a single location correlate with water depth at specific locations where elevated P was measured, i. e., how does one know that these sites actually dried out? Provide plots of inflow TP vs rainfall (or structure discharge) to show the shape and strength of the relationship between structure TP and intense rainfall events. If marsh dry-out resulted in elevated TP concentrations upon reflooding, why do most marsh TP spikes typically occur on the recession-limb of the stage curve and not the rising-limb? This pattern does not support the mechanistic hypothesis presented in the chapter.

p. 2C-10, lines 382-383: No data are presented to suggest that periodically elevated TP concentrations do not cause long-lasting impacts (e.g., accumulation of P in soils and plants) to the marsh. This statement should be removed here and in the summary section.

p. 2C-15: Figure 2C-5 is referenced here, but only the inflow TP data are discussed. The lower plate of this figure shows a small but steady increase in marsh TP concentration across marsh stations in the Refuge between 1994 and 2005. This trend is not simply a result of extreme climatic events in 2005.

p. 2C-17, paragraph 2: Again, the data presented here are insufficient to support the conclusions in this paragraph. See comment 3.

p. 2C-19, paragraph 3: Not all of the sites listed here are relatively uninfluenced by canal inflows. In the Refuge, for example, sites X3, X4, and Y4 are all relatively influenced by canal flows compared with more interior stations. This influence is evidenced by elevated levels of specific conductance in the water and of contaminants such as P and sulfur in the soil. Did the authors' analysis show elevated TP concentrations at these sites, but not at sites closer to the canal (e.g., X2?). If not, then the argument made here does not hold for these stations. The image of Figure 2C-6 is too fuzzy to determine what patterns for TP were observed along the XYZ gradient. In WCA-2A, site U1 does receive some influence from canal waters ponding from the southern rim canal and is probably the most impacted of the 3 "U" stations. Furthermore, while U3 is an interior site, the data in Figure 2C-6 appear to show (again, the image is very fuzzy) that F5, the next site upstream (i.e., closer to the main canal source), also had elevated TP and that sites still closer to canal flows had even higher concentrations. This suggests a canal-influenced

pattern of elevated TP in WCA-2A, not an isolated event at U3.

Figure 2C-7. This stacked bar graph is confusing. Either the shading patterns in the legend don't match those in the graph or the concentration categories are not stacked in increasing order (e.g., it appears that the 15-50 category is above the >50 category).

p. 2C-23, line 537: What is meant by the phrase "natural and environmental system requirements"? This sounds redundant.

p. 2C-28, lines 693-695: As for P data, the authors conclude that periods of high TN were the result of marsh dry-out without providing any supporting analyses. If marsh dry-out is the cause of elevated TN and there were more of these events during WY2005 -- the 2 assumptions being made here -- then why are mean and median TN values in the Refuge and WCA-2A lower than in previous years?

General comment: the terms WCA-1 and Refuge are used interchangeably in the tables and figures. The terminology should be standardized.

Chapter 6:
p. 6-3, line 83: Gunderson and Loftus citation not in Literature Cited

p. 6-3, Figure 6-6: needs a legend to explain what the gray and red colors denote.

p. 6-16, line 385: PAC should be PCA

p. 6-16, line 384: Principle should be Principal

p. 6-16, line 376: How many sweep net samples were taken that were used in the calculations? In Fig 6-8, how do you obtain density estimates using sweep nets? Are they swept within a known-area enclosure?

p. 6-19, line 451: In fish work, the abbreviation PSU stands for Practical Salinity Unit, so your usage could lead to confusion. Instead, use SU for Sampling Unit.

p. 6-20, line 408: Why couldn't the presence of a juvenile grass carp be the result of the introduction of juveniles? Do you have the specimen available to examine its karyotype?

p. 6-20, line 500: Based on the fact that black acaras and Mayan cichlids have been in south Florida, including the Everglades, for over two decades, it seems likely that they have been in the WCAs at low levels rather than, as you state, "are getting established" there. The brown hoplo is a different story; it is establishing now. Based on the low numbers of exotics caught in the WCAs, do you agree with Trexler et al's (2000) conclusion that they are not likely a major problem in the ridge and slough environment at this time?

p. 6-21, Table 6-4: Is CPUE based on the mean of catches from the two fyke nets and the eight minnow traps? Are the two methods combined? What is the meaning of the superscript letters next to the citations in the footnote?

p. 6- 26, Figure 6-11 Use meters rather than feet for depth.

p. 6-58, line 1086: 1913, not 1,913.

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Topic: One more addition to DOI Technical comments (1 of 1), Read 26 times
NEW
Conf: VOLUME I: THE SOUTH FLORIDA ENVIRONMENT
From: DOI Everglades Program Team matthew_harwell@fws.gov
Date: Monday, September 26, 2005 07:36 PM

Apologies are in order. As notable effort was made to compile and submit DOI technical comments by last Friday to allow the Review Panel (and others) the opportunity to examine comments before the workshop, I had a minor oversight.

Please add Donatto Surratt, A.R.M. Loxahatchee National Wildlife Refuge to the list of contributors.

-M

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Topic: Questions & Comments (1 of 1), Read 38 times NEW
Conf: Chapter 2B: Mercury Monitoring, Research and Environmental Assessment in South Florida
From: Donald Kent dkent@cwfund.org, donkent@mac.com
Date: Wednesday, September 21, 2005 04:07 PM

Drs. Axelrad, Atkeson, Pollman, and Lange:

Thank you for preparing Chapter 2B: Mercury monitoring, research and environmental assessment in South Florida for the 2006 South Florida Environmental Report. Your findings are interesting and valuable. As someone involved in restoration research, I would be appreciative if you could help me connect the dots regarding mercury, sulfur, and impacts to Everglades flora and fauna by addressing the following questions and comments. Thanks. D.M. Kent, Community Watershed Fund.

• Line 32 - Methylation is generally highest at 2 – 10 mg/L sulfate in surface waters, and 5 to 150 ppb porewater sulfide.

Using these criteria, and Figures 2B-11 and 2B-12, MeHg should be greatest in northern WCA-3A and an isolated area in Everglades National Park southwest of Homestead. However, recent high concentrations of mercury in sunfish and largemouth bass are not coincident with these locations.

o A third figure similar to Figures 2B-11 and 12 indicating MeHg concentrations would ease comparisons.

• Line 37 - The Everglades Agricultural Area (EAA) is an important source of sulfur to the Everglades.

Does this statement refer to sulfur in fertilizer, soil mineralization, rainfall, flow through water from Lake Okeechobee or all sources of sulfur associated with the EAA? If sulfur inputs from the EAA were terminated, would MeHg still be a concern in the Everglades?

• Line 39 - Dissolved organic carbon inhibits methylation

and limits bioavailability of MeHg.

Could you provide a figure similar to 2B-11 and 12 indicating dissolved organic carbon concentrations.

• Line 43 - Drying and re-wetting cycles exacerbate the formation of MeHg in the Everglades and the STAs.

Given the historic Everglades' drying and re-wetting cycle, does this mean that MeHg has always been an issue and simply went un-noticed until mercury studies began in earnest 15 years ago?

• Line 87- Sulfate levels in ENP are now optimal for SRB.

Could you provide a table or figure indicating temporal changes in sulfate levels in ENP?

• Line 95 – It is likely that flow changes resulting from Stormwater Treatment Areas coming on-line and/or other hydrological manipulations have caused the mercury hot spot to be relocated to the Everglades National Park.

Can you substantiate this statement by demonstrating temporal changes in Hg or S, and the correspondence of sulfate at 2 – 10 mg/L and sulfide at 5 to 150 ppb?

• Line 416 – Concentrations of sulfate in Everglades surface waters indicate that canal water draining the Everglades Agricultural Area (EAA) is the principle source of sulfate to Everglades marshes … Stable isotope date … are also consistent with agricultural sulfur and sulfate from other fertilizers and soil amendments …

Are these statements consistent or inconsistent with findings by Schueneman (2004) – Characterization of Sulfur Sources in the EAA. Soil and Crop Sciences Society Florida Proceedings?

o Is a copy of Orem et al. In Press available for review?

• Line 463 – As such, it is probable that the toxic effects of elevated sulfide in Everglades porewaters, resulting from sulfate contamination from the EAA, is causing an

“imbalance of flora and fauna”.

Do you have any evidence that Everglades’ flora and fauna has suffered from the toxic effects of porewater sulfide?

• Line 475 – Preliminary Everglades data too show that sulfate additions to surface waters result in increased liberation of phosphorus from sediments and increased sediment porewater and surface water phosphorus concentrations (Bill Orem, USGS Pers. Comm.).

The scientific community has understood for some time that phosphorus fluxes from sediments with a high phosphorus concentration relative to the overlying water. The idea that sulfur is a mechanism in phosphorus diffusion is intriguing. I urge you, or Bill Orem, to present his data so that the scientific community can examine its potential consequences on restoration efforts.

• Line 628 – The most promising remaining means of managing MeHg in the Everglades may be by controlling sulfate loading.

Do you have any specific ideas how to control sulfate loading?

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Topic: No Topic (1 of 1), Read 3 times NEW
Conf: Chapter 2B: Mercury Monitoring, Research and Environmental Assessment in South Florida
From: Donald Kent dkent@cwfund.org, donkent@mac.com
Date: Friday, October 14, 2005 11:44 AM

Drs. Axelrad, Atkeson, Pollman, and Lange:

I have communicated with Drs. Atkeson (FDEP), Orem (USGS), and Rumbold (SFWMD) since my initial comments on Chapter 2B: Mercury monitoring, research and environmental assessment in South Florida and related appendixes for the 2006 South Florida Environmental Report (SFER). In addition, I have since reviewed:

• Orem et al. In Press. Sulfur Geochemistry of the Everglades.
• Bates et al. 2002. Tracing sources of sulfur in the Florida Everglades. J. Environ. Qual. 31:287-299.
• USGS. 2004. Impacts of sulfate contamination on the Florida Everglades Ecosystem. USDOI.
• Orem. 2004. Impacts of sulfate contamination on the Florida Everglades ecosystem. Online version 1.0.
• Wang and Chapman. 2002. Biological implications of sulfide in sediment – a review focusing on sediment toxicity (abstract). Environ. Tox. Chem. 18:2526-2532.
• Lamers et al. 1998. Sulfate-induced eutrophication and phytotoxicity in freshwater wetlands (abstract). Environ. Sci. Technol. 32(2) 199-205.

My communications with Drs. Atkeson, Orem, and Rumbold, and my review of the aforementioned written materials, were helpful. Nonetheless, I am still unable to independently evaluate several of your chapter conclusions.

Sulfate Source(s)
Your statement that the Everglades Agricultural Area (EAA) is an important source of sulfur to the Everglades (line 37) appears to be accurate, but requires more discussion. Sulfate concentrations in canals do appear to decrease from north to south, beginning with EAA canals. Much of this sulfate appears to originate from within the EAA,

except during drought when much of the sulfate originates from Lake Okeechobee (Bates et al. 2002, Schueneman 2004).

Reducing sulfate from the EAA requires that we understand the relative contributions from agricultural fertilizer, soil oxidation, and groundwater. Sulfate from fertilizer and soil oxidation appear to have similar ?34S values, and so the relative contributions are indistinguishable using ?34S values alone (Bates et al. 2002). Schueneman (2004) concluded that very little sulfur-containing fertilizer is applied to the EAA fields, and that EAA soil mineralization and Lake Okeechobee are the two most significant sources of sulfate to the Everglades Protection Area (EPA).

The relative contribution of groundwater to sulfate concentrations in EAA and EPA canals seems to be poorly understood. The ?34S value of EAA groundwater was not measured, although groundwater ?34S beneath the ENR (historically part of the EAA) is similar to that of EAA fertilizer and soil oxidation ?34S values, and thus indistinguishable from the latter. A hydrological budget, including both surface water and groundwater, encompassing Lake Okeechobee, the EAA, and the EPA would help us to elucidate the relative contribution and distribution of sulfate in south Florida.

MeHg Hotspot
On line 32, you state that methylation is generally highest at 2 – 10 mg/L sulfate in surface waters, and 5 to 150 ppb porewater sulfide. Figure 4 in Appendix 2B-2 does not seem to support this statement. Furthermore, the chapter indicates that the historic hotspot (since disappeared) was located in central WCA-3A. My review of Figures 2B-11 and 2B-12 suggest that the historic hotspot should have been located in northwest WCA-3A, with a second spot in Everglades National Park (ENP) southwest of Homestead. During the recent SFER public sessions, Dr. Rumbold indicated that factors other than sulfate and sulfide concentrations (e.g., soil redox) affect MeHg production. The moderating effects of these other factors on the relationship between sulfate/sulfide/MeHg should be discussed in the chapter.

Line 95 states that it is likely that flow changes resulting from Stormwater Treatment Areas coming on-line and/or

other hydrological manipulations have caused the mercury hot spot to be relocated to ENP. My understanding is that there have been no hydrological changes to WCA3A, nor have the STAs changed the flow pattern in WCA3A. The STAs still discharge at the same historical locations.

Neither the chapter nor the appendices provide recent sulfate, sulfide, or MeHg data for ENP indicating a hotspot, nor evidence of a recent hydrological shift. If you have sulfate, sulfide, MeHg data for ENP, and evidence of recent hydrological shifts, please include it in the chapter or the appendices. Also, largemouth bass mercury levels at ENP sites (L-67A, North Prong Creek) are not elevated, as we would expect if MeHg was increasing.

Sulfate Enhances Phosphorus Release from Sediments
On line 475 you state that preliminary Everglades data show that sulfate additions to surface waters result in increased liberation of phosphorus from sediments, and increased sediment porewater and surface water phosphorus concentrations. No data to support this conclusion is provided, although you cite a personal communication from Dr. Orem of USGS. Please provide sufficient information, preferably data, so that readers can independently evaluate your conclusion.

Sulfide Causes Imbalance of Flora and Fauna
On line 463 you state that it is probable that the toxic effects of elevated sulfide in Everglades' porewaters, resulting from sulfate contamination from the EAA, is causing an "imbalance of flora and fauna". Sulfide toxicity to freshwater invertebrates and wetland plants is known, but not well understood (Lamers et al. 1998, Wang and Chapman 1999). On the other hand, the EPA has been studied extensively (e.g., periphyton, plants, macroinvertebrates, fish, wildlife), and no one has reported evidence of toxicity. If you have information about sulfide toxicity in the Everglades please include it in the chapter or appendices.

The SFER is an important source of information for many of us committed to restoring and protecting the Everglades. I encourage you to be precise in your language, and to include sufficient information in the chapter or appendices to allow independent evaluation of your conclusions.

Sincerely,

Donald M. Kent, Ph.D.

Donald M. Kent, Ph.D.
Executive Director
Community Watershed Fund

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Topic: FDEP Comments on Chapter 3 (1 of 1), Read 30 times NEW
Conf: Chapter 3: Phosphorus Controls for the Basins Tributary to the Everglades Protection Area
From: Ken Weaver kenneth.weaver@dep.state.fl.us
Date: Thursday, September 29, 2005 02:32 PM

CHAPTER 3: PHOSPHORUS CONTROLS IN BASINS TRIBUTARY TO THE EVERGLADES PROTECTION AREA

C-111 Figure 3-24, p.3-78: Why are flow volumes reported for S-332 in 2003 and 2005? We were under the impression that this structure was no longer being used.

Appendix 3-2b, p. App.3-2b-4: The descriptive legend with an explanation of lab numbers is not posted.

General comment: Are the projected TP reductions in the ESP basins the same as was predicted in 2003 (LTP, October 2003, Table 4.2)?

Post New Topic | Reply to: "FDEP Comments on Chapter 3"
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Topic: FDEP Comments on Chapter 4 (1 of 1), Read 23 times
NEW
Conf: Chapter 4: STA Performance, Compliance and Optimization
From: Ken Weaver kenneth.weaver@dep.state.fl.us
Date: Thursday, September 29, 2005 12:48 PM

Comments submitted on the behalf of Temperince Morgan and Ernie Marks

Chpt. 4 Page 4-3 – In the table, “TP Outflow to Date” gives the illusion that it is a cumulative number. An additional footnote containing an explanation on how TP Outflow to Date is calculated might be appropriate here.
Chpt. 4 Page 4-4 – Update STA-1E Operational Status (facility is now permitted).
Some clarification needed as to why STA-2 is considered “fully operational” if it is in the stabilization phase. Other facilities in the stabilization phase are considered partially operational.
STA-3/4, last sentence says 3/19/04. Previous page says ended in 02/04, please revise accordingly.

Chpt. 4 Page 4-8 – Please revise the last sentence of the second paragraph to reflect the present status of STA-1E. (facility is now permitted)

Chpt. 4 Page 4-16 – Please update place holder for metric tons of TP from Lake O releases.

Chpt. 4 Page 4-32- Please revise the last sentence of the second paragraph to reflect the present status of STA-1E. (facility is now permitted)

Chpt. 4 Page 4-32 – Please update place holder for metric tons of TP from Lake O releases.

Chpt. 4 Page 4-71 – Please revise the first sentence of the second paragraph. U.S. Sugar no longer operates the G-600 pumping station.

Chpt. 4 Page 4-83 –Please revise the second and third sentence of the second paragraph to reflect the present status of STA-1E. (facility is now permitted)

Chpt. 4 Page 4-92 – Table- Please provide an explanation for negative depths and HRT.

Chpt. 4 Page 4-97 – Table- Please provide an explanation as to how inflow TP stored in floc can exceed 100% (e.g. 123%)

Appendix 4-3 – Please provide a signed statement of authenticity concerning the sampling program and analytical program for STA-3/4.

Appendix 4-2 – Missing. Department unable to provide informal comments at this time.

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Topic: Don DeAngelis's comments (1 of 1), Read 15 times
NEW
Conf: Chapter 6: Ecology of the Everglades Protection Area
From: Donald DeAngelis don_deangelis@usgs.gov
Date: Friday, September 23, 2005 12:23 PM

The chapter is well written and informative. I have very few comments at this time.

Line 262. 'infer' should be 'imply'

Page 6-16. How do the differences in the macro-invertebrate assemblage between hardwater and softwater marshes compare with other freshwater aquatic systems. Some of the findings, such as higher concentrations of chironimids in higher conductivity marshes, seem consistent with studies on eutrophication. I am just wondering if the findings in general are agree with previous results.

Figure 6-23. Is the y-axis 'milligrams/kilogram'? Some of the values seem very high in that case.

Post New Topic | Reply to: "Don DeAngelis's comments"
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Topic: FDEP Comments on Appendix 2B-1 (1 of 1), Read 6 times NEW
Conf: App. 2B-1 Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area
From: Ken Weaver kenneth.weaver@dep.state.fl.us
Date: Thursday, September 29, 2005 12:50 PM

Appendix 2B-1-9 – Preyfish Monitoring and Predator Monitoring say “up to 20” not 20 as is stated in the permits.

Appendix 2B-1- Throughout the document, S-5A structure is referred to as a “non-Everglades Construction Project water control structure.” The S-5A Pump Station is an ECP permitted structure under FDEP Permit No.: 0226317 (503074709).

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