APPENDIX 1
Public and Peer Review Panel Comments

Appendix 1-3
Authors Responses to Comments

Appendix 1-3d
Author's Response to Comments on Chapter 4

Chapter 4: Status of Compliance with Water Quality Criteria in the Everglades Protection Area

Responses to Public and Peer Review Panel Comments

By Kenneth Weaver, Temperince Bennett, Grover Payne, Timothy Bechtel, Guy Germain, Steven Hill, and Nenad Iricanin

Peer Review Panel Comments and Authors' Responses

Comment: The chapter needed a clearer statement of purpose.

Response: The reviewer's comments relating to chapter purpose and organization were considered during the revision of the final chapter.

Comment: Additional information on the monitoring system, included data analysis methods should be included.

Response: A brief overview of the monitoring system and additional information on data analysis methods were included in the final chapter. Additionally, references to SFWMD technical publications were added to provide sources for more detailed information.

Comment: The definition of the term excursion is confusing. Are excursions violations of standards and/or guidelines?

Response: An excursion is defined as a measured value that does not meet the Class III criteria. The definition and application of the term is consistent with previous Everglades reports. An excursion does not necessarily constitute a violation of state criteria or standards. However, excursions do flag potential violations requiring further review.

Comment: The statements referring to Type I and II errors discussed on pages A4-2-25 and A4-2-37 are not clear.

Response: The statements referring to Type I and II errors were meant to relate the idea that a single point standard would likely result in both erroneous non-compliance determinations at background sites and erroneous compliance at impaired sites. Furthermore, the discussion was meant to convey that these errors would not be independent of sample collection time. The original discussion was rewritten to provide additional clarification.

Comment: Were no DO measurements taken prior to 1994 in the EPA?

Response: Dissolved oxygen measurements have been taken throughout the EPA for over three decades. This question likely relates to the use of data from 1994 to 1999 in the development of the DO SSAC. The analysis was limited to reflect the current monitoring regime within the EPA, which was initiated in 1994. Additionally, most of the ecological and biological studies, upon which site classifications were based, were conducted between 1994 and 1999. Inclusion of data collected prior to 1994 would have increased uncertainty in site designations.

Comment: In development of the DO SSAC (page A4-2-37), what data are being used?

Response: Diel dissolved oxygen and saturation deficit data, from sites E5, F5, U1, U2, U3 in WCA-2A collected between April 25, 1995 and February 27, 1998 were used to provide the least squares fit to the equations shown on page A4-2-37. The data utilized are shown in Table A4-2-3. The WCA-2 sites were selected for model development because these sites provide the largest abundance of diel dissolved oxygen data with supporting biological information.

Comment: On what basis was the final DO SSAC model chosen?

Response: As the SSAC technical support document discusses, several alternative models were evaluated in the course of the criterion development. The final proposed model was selected on the basis of statistical fit with the diel data, complexity, minimization of spatial and temporal bias, cross-validation with grab samples, and statistical error (Type I and II) associated with criterion compliance.

Comment: Why is 10% used as the breakpoint for deciding a violation has occurred on page A4-2-55 when 5% is used on page 4-9?

Response: The 10% breakpoint referred to on page A4-2-55 relates to the 90% prediction interval (P.I.) utilized to establish the DO SSAC. This interval was established after careful review of a range of intervals (*i.e.*, 90-99%). The final determination was based upon a balance between type I and II errors associated with compliance determination. A wider interval would have allowed impaired sites to be deemed in compliance too frequently, while providing only minimal improvement in the compliance rate at background sites. For example, using a 95% P.I. would have classified impaired sites as in compliance 33% of the time, while only improving the compliance frequency for background sites by 4% relative to the 90% P.I.

The 5% break referred to on page 4-9 was not used to determine violations. Rather the 5% level was selected as a breakpoint between excursion categories. The categories provide a means of ranking the relative severity of excursions. This 5% breakpoint was selected to be consistent with previous reports including the 1999 Interim Report, 2000 Consolidated Report and Gilbert and Feldman (1995).

Comment: Use of the terms ‘criteria’ and ‘standard’ need clarification to ensure clear interpretation of results of chapter 4.

Response: The terms were used as defined in Section 62.302.200, Florida Administrative Code and will be defined in the final report glossary. The authors recognize that the terms were used somewhat interchangeably in the draft chapter. In order to minimize confusion, the authors have reviewed the use of the terms throughout the chapter. Furthermore, we recognize that the terms are defined differently in the scientific literature, but have decided to remain consistent with the definitions provided in state water quality statutes.

Comment: In Table 4-9, how was the unionized ammonia concentrations calculated?

Response: The ionized ammonia values were mistakenly put in Table 4-9. These values have been replaced with the un-ionized ammonia values for the final report.

Comment: In Table 4-12 TKN is reported rather than TN as reported in Table 4-9. Were two different concentrations available?

Response: The parameter requirements in the permits aren't always the same from one STA to the next. That's why Table 4-9 has Total Nitrogen and Table 4-12 does not.

Dan Scheidt, U.S. Environmental Protection Agency, Comments and Authors' Responses

Comment: The text should make it clear that the SSAC was derived from marsh data at open water sloughs or wet prairie sites, as opposed to marsh areas dominated by dense emergent vegetation such as sawgrass or cattail. Also, the text should clarify where the proposed SSAC would be applied. Would the 5.0 mg/L standard still be applied to canals and structures (page 4-17)? Would the SSAC be applied to all marsh habitats, including unenriched sawgrass marshes and enriched cattail marshes?

Response: It is true that the SSAC was derived from marsh data in open water slough and wet prairie habitats. A review of the relevant literature shows that open water areas provide the primary source of DO to the marsh. In contrast areas dominated by dense emergent macrophytes contribute little or no DO to the water column and tend to act as DO sinks. Use of reference sites from throughout the Everglades inherently accounted for the source-sink relationship between open water and emergent macrophyte areas. In fact, reference sites were surrounded by emergent macrophytes stands of varying densities and compositions. Although it would be inappropriate to apply the SSAC to sites situated within dense emergent vegetation, it would be valid to apply it to open water sites adjacent dense emergent vegetation. Ultimately, maintenance of background DO conditions throughout the marsh will depend upon restoring a balanced spatial mix of vegetative communities. Therefore, assuming a balanced biological community, monitoring DO compliance at open water sites, where much of the marsh DO is produced, would ensure that background DO conditions are maintained in all surrounding marsh habitats, regardless of vegetative community.

Although the Department views the 5.0 mg/L standard to be inappropriate for canals, the proposed marsh DO SSAC does not address this issue. Since it would be illogical to apply a marsh standard to a canal, the Class III standard will continue to apply in the canals. However, canal discharges, to the marsh, must not cause or contribute to standards violations in the marsh. In the future, the Department intends to address the appropriateness of the Class III DO criterion to artificial canals.

Comment: The report documents elevated conductivity values in canals and at marsh sites in close proximity to discharges from the Everglades Agricultural Area into the EPA. It is presumed that this condition is solely due to groundwater influence and the conclusion is made that "this is a man-induced condition that cannot be controlled or abated". Any potential influence of EAA stormwater and land use or of water management practices outside the EPA is ignored. In addition there is a strong correlation between sulfate and conductivity. If some of the excess sulfate in the EPA is attributed to EAA fertilizer applications, then the must be true of the elevated conductivity within the EPA.

Response: We agree that the conductivity discussion in the draft chapter under-represented the potential influences of agricultural activities in the EAA. The discussion has been modified to include these potential influences. The Department intends to continue its review of conductivity in order to identify the source(s) of excursions. Once the excursion source(s) are verified the issue can be addressed appropriately.

It should be pointed out that correlation does not equate to causation. Although the north-south conductivity gradient correlates with sulfate gradients in the EPA, the same is true for every major ion. Based on primary calculations, sodium, calcium, chloride and carbonate account for the majority of the measured conductivities, while sulfate contributes only a small fraction. The most likely source of sodium, calcium, chloride, and carbonate is groundwater.

Comment: A section describing sulfate conditions throughout the EPA should be added to Chapter 4.

Response: As stated in the comment, currently there is no water quality criterion for sulfate. The concern about sulfate relates primarily to its role in mercury methylation. For these reasons, we feel that any further discussion of sulfate at this time belongs in Chapter 7. We will continue to evaluate the influence of sulfate on mercury and other process, and may include it in future analyses, as more is understood about the role of sulfur in these processes.

Comment: Additional detail about how the summary calculations were done would be helpful. Were all of the marsh surface water TP data included in the summary, or were marsh samples that were collected at very shallow water depths excluded? Were all TP data included in the summary for inflow or outflow structures, regardless of flow, or were TP data at structures excluded if there was no discharge at the time that the water sample was collected? Were any of the structure data flow-weighted? If a TP concentration was reported as below the MDL, was the 4 µg/L MDL used in the calculation or was ½ of the MDL used?

Response: All TP data that passed the laboratory qualifier screen were included in the analysis. Because the SFWMD only collects TP samples at water depths greater than 10 cm, data screening based on shallow water conditions was not an issue. Flow was not a factor incorporated into the analysis. As stated in the chapter, values reported below the MDL were replaced with the MDL. The MDL for TP is typically 4.0 µg/L.

Michael Waldon , U.S. Fish and Wildlife Service, Comments and Authors' Responses

Comment: How will TP and DO standards be used to set NPDES permit limits? Would mechanical aeration of the STA effluent ever be required to meet permit limits? The specific methodology for application of standards to permit limit calculations should be fully documented prior to proposal of a TP site specific standard.

Response: The calculation of permit limits is not a factor considered during the development of a TP criterion protective of natural flora and fauna or the DO SSAC which describes the natural DO regime in the Everglades marshes. Permit limits will be dealt with during the permitting process of individual structures.

Review of DO data at the ENR outflow (ENR012) suggested that STA effluent will likely comply with the proposed SSAC. For all years of operation (1994-1999), the ENR outflow was in compliance with the proposed DO SSAC. The most likely scenario is that the STAs will

reduce nutrient load and BOD and will thus provide an overall improvement in marsh DO. Given the volume of water to be discharged from the STAs, mechanical aeration is not likely to be a very practical method of assuring compliance with the DO SSAC. However, other things such as maintenance of open water areas incorporating submerged aquatic vegetation near STA outflows, could effectively and economically improve the DO status of the STA outflow.