

#### 14. **OLD BUSINESS**

a. Water Quality Issues

ii. Staff Reports

4. Letter dated March 02, 2009 from the Florida Department of Environmental Protection in response to the City's comment letter regarding the Proposed Caloosahatchee Total Maximum Daily Load (TMDL)

# Memorandum

**To:** Judie Zimomra, City Manager  
**C.c.** Rob Loflin, Natural Resources Department Director  
**From:** James Evans, Environmental Biologist *James*  
**Subject:** Letter from the Florida Department of Environmental Protection in Response to the City's  
Comment Letter Regarding the Proposed Caloosahatchee Total Maximum Daily Load (TMDL)  
**Date:** 7/8/2009

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Attached is a letter from Mr. Jan Mandrup-Poulsen from the Florida Department of Environmental Protection (FDEP) in response to our comment letter regarding the proposed Caloosahatchee Total Maximum Daily Load (TMDL). I have also included the letter that was sent from the Natural Resources Department via e-mail on March 2, 2009. It appears that the FDEP has taken our comments into consideration and their response to our comments satisfies many of our concerns. However, there are a few technical items regarding our comments on dissolved oxygen that will need to be addressed as part of the Basin Management Plan (BMAP) process. Staff will continue to work with FDEP to get these issues resolved.

March 2, 2009

**Delivered via Electronic Mail**

Jan Mandrup-Poulsen  
Administrator, Watershed Evaluation and TMDL Section  
Florida Department of Environmental Protection  
2600 Blirstone Road, Mail Station 3555  
Tallahassee, Florida 32399-2400  
[Jan.Mandrup-Poulsen@dep.state.fl.us](mailto:Jan.Mandrup-Poulsen@dep.state.fl.us)

Re: Comments on the Draft TMDL for the Tidal Caloosahatchee Estuary

Dear Mr. Mandrup-Poulsen:

The City of Sanibel applauds your efforts in developing a nutrient TMDL for the tidal Caloosahatchee and submits the following comments for your consideration. We appreciate the opportunity to provide input throughout the TMDL process and are pleased that you incorporated the recommendations from The Clean Water Network of Florida's consultant, Dr. Victor J. Bierman.

While we support the proposed nutrient TMDL, we do have some general concerns regarding model calibration and the data used for model development. The DEP modeling effort for this TMDL faced significant challenges. Among these were the following:

1. EFDC model calibration and verification analyses revealed that the initial concentrations of a number of water quality constituents on January 1, 2004 in the model verification runs were much different than the model calculated concentrations on December 31, 2003 in the model calibration runs. Such a procedure significantly impairs the integrity of the model. It is recommended that the model be rerun for the two-year period of 2003-2004 in continuous fashion to remove this discontinuity.
2. The model calibration and verification results were compared with data at only two stations: CES04 and CES06. Data collected at additional stations (i.e. CES01-CES08) should be used for comparison with the model results.
3. Salinity results do not match the data at CES04 in the spring of 2003, indicating that hydrodynamics of the Caloosahatchee Estuary may not be fully calibrated. It is therefore not



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We realize that 24hr DO data were not available when you began development of the TMDL; however, data are now available through the Sanibel-Captiva Conservation Foundation's River, Estuary and Coastal Observing Network (RECON) <http://recon.sccf.org/> and should be used for future analyses.

We also suggest that you evaluate the role of sediment oxygen demand (SOD) on dissolved oxygen. Currently there are two studies being conducted in the Caloosahatchee that may be helpful in flushing out the relationships between DO and nutrients. Florida Gulf Coast University, along with several partners, are conducting a study looking at bioavailability of nutrients in Caloosahatchee and coastal waters of Lee County. This study incorporates a benthic flux study that will investigate benthic nutrient dynamics throughout the entire river from S-77 to the Gulf of Mexico. The South Florida Water Management District is also working on a benthic flux study and recently completed the first phase and will initiate the second phase this summer.

In an effort to not delay the Basin Management Action Plan (BMAP) process, we suggest that you move forward with implementation of the proposed nutrient TMDL, but reevaluate DO as new data become available during the next basin cycle.

We thank you for the opportunity to comment on the tidal Caloosahatchee TMDL and for considering our comments. We look forward to working with you during implementation and development of the BMAP. If you have any questions, please contact me in the City of Sanibel's Natural Resources Department at (239) 472-3700 ext. 377 or by email [james.evans@mysanibel.com](mailto:james.evans@mysanibel.com).

Sincerely,

James T. Evans III, Environmental Biologist  
City of Sanibel



# Florida Department of Environmental Protection

Bob Martinez Center  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Charlie Crist  
Governor

Jeff Kottkamp  
Lt. Governor

Michael W. Sole  
Secretary

June 25, 2009

Mr. James T. Evans, Environmental Biologist  
City of Sanibel  
800 Dunlop Road  
Sanibel, FL 33957-4096

Dear Mr. Evans:

We greatly appreciate you having taken the time to participate in the development of the nutrient TMDL for the tidal portion of the Caloosahatchee River and to present us with your written comments. Dr. Bailey and I reviewed your letter of March 2<sup>nd</sup>, 2009 and have prepared responses to your many thoughtful comments, which are included as an attachment to this letter.

In the coming months, we look forward to continuing to work with you and the other stakeholders as we continue to gather added information and data, as well as on the implementation plan for restoring the Caloosahatchee River and Estuary.

Sincerely,

A handwritten signature in black ink, appearing to read "Jan Mandrup-Poulsen".

Jan Mandrup-Poulsen, Environmental Administrator  
Watershed Evaluation and TMDL Section

Enclosure

WET/jmp/pw

cc: Nathan Bailey  
Jennifer Thera  
Jennifer Nelson

## **Responses to Comments on the Draft TMDL for the Tidal Caloosahatchee Estuary**

**(Submitted by James Evans, City of Sanibel to FDEP on March 2, 2009)**

- 1) EFDC model calibration and verification analyses revealed that the initial concentrations of a number of water quality constituents on January 1, 2004 in the model verification runs were much different than the model calculated concentrations on December 31, 2003 in the model calibration runs. Such a procedure significantly impairs the integrity of the model. It is recommended that the model be rerun for the two-year period of 2003-2004 in continuous fashion to remove this discontinuity.

**FDEP and its' contracted modelers determined that because of data insufficiencies and extended model run times made calibration/validation periods of greater than one year impractical. For the one-year validation period, it was determined that the output of the calibration period should not be fed into the input of the validation, as the purpose of doing calibration and then validation is to provide independent tests of the performance of the model under differing sets of conditions (input sets). We believe using the approach you suggested would bias the performance of the validation. In the validation and calibration runs, many initial conditions were estimated, with the understanding that time was needed for the model to reach equilibrium and for the initial state conditions to be assumed to represent the real world. However, your point is still a good one, and the new increased level of Caloosahatchee basin monitoring will provide better opportunities to do multi-year calibration and validation, which should be of much greater value. Please note, in the TMDL, all conclusions were based on 3 consecutive years' simulation.**

- 2) The model calibration and verification results were compared with data at only two stations: CES04 and CES06. Data collected at additional stations (i.e. CES01-CES08) should be used for comparison with the model results.

**We agree. The more calibration and validation points available for use, the better we are able to adequately assess and successfully modify the model. Subsequent to the calibration and validation of the model, FDEP has had an opportunity to compare model results with field data at a few other locations within the basin, with acceptable outcomes. Stations CES-04 and CES-06 were selected to illustrate the water quality model results at two locations along the seaward gradient from the upstream boundary at S-79 to San Carlos Bay. Water quality model results were also presented for Station PI-1 in San Carlos Bay. It is noted for clarification of the record that hydrodynamic model results for salinity and water temperature were presented at BR31 in the upper reaches of the estuary, CCORAL in the middle of the estuary, and CE-09 in San Carlos Bay. The recommendation for model-data comparisons at additional stations in the future is a good suggestion. When FDEP performs additional work with the Caloosahatchee EFDC model, which is expected to be used in the upcoming Basin Management Action Plan phase (as well for future Caloosahatchee TMDLs), additional CES-xx stations will be used for comparison to the EFDC hydrodynamic and water quality model results.**

- 3) Salinity results do not match the data at CES04 in the spring of 2003, indicating that hydrodynamics of the Caloosahatchee Estuary may not be fully calibrated. It is therefore not surprising that model results of other water quality constituents do not match the data well.

**In the draft technical report for Task 5 (DSLLC, 2008), salinity results for the calibration period of 2003 are presented for data collected at station locations BR31, CCORAL and CES-09. Although the salinity model results generally followed the field data, at some stations (e.g., the one at Shell Point), after consulting with members of the South Florida Water Management District, it was determined that the reported field data were not representative of the actual salinity.**

- 4) Perform a comprehensive analysis of available data in terms of spatial and temporal extents. The entire data base for the Caloosahatchee Estuary should be fully exhausted to provide sufficient support for the modeling analysis. Special attention should be paid to more recent (i.e. the past three years) data.

**During future Caloosahatchee TMDL development efforts, there will be an opportunity (and time) to test more spatially. But, all readily available data were used at the time the model was calibrated and validated. The model was tested for several scenarios of reduced nutrient loads with satisfactory results. FDEP intends to gather information about other areas within the Caloosahatchee Basin and then test the model for accuracy at those locations.**

- 5) As part of the data analysis effort, nutrient loads must be accurately quantified by comparing the HSPF model results with available data.

**In the draft technical report for Task 5 (DSLLC,2008), time series results are presented for HSPF model-data results for nitrogen (TKN, NH4) and phosphorus (PO4) at stations located at S-78, S-79 on the Caloosahatchee River and at a station located on Whiskey Creek. Since watershed derived loads delivered at the S-79 lock and dam at the upstream boundary of the estuary accounted for 83% of total nitrogen and 77% of total phosphorus loads simulated with the HSPF model for the existing/calibration and validation case (2003-2005), the availability of observed nutrient data for comparison to HSPF model results at the S-79 location provides a good check on the credibility of the HSPF results as a tool for estimating nutrient loading to the estuary.**

**As additional nutrient data are collected and become available within the upper and lower Caloosahatchee River basins, additional HSPF model-data comparisons can be developed to strengthen the credibility of the HSPF model during Phase 4 (i.e., the implementation the is designed as part of the Basin Management Action Plan (BMAP) for the Caloosahatchee estuary).**

- 6) Rerun the model for a period of 5 years starting at January 1, 2003. This should be a continuous execution of the model without resetting any initial conditions for the beginning of subsequent years.

**This is a good recommendation for future modeling efforts by FDEP as work continues on this estuary during the Basin Management Action Plan (BMAP) development for the Caloosahatchee estuary. Thus far the FDEP has continued to model the various previously mentioned scenarios run for 3 year continuous run periods (without re-setting initial conditions). The FDEP also ran the model after initial 3 or 6 years 'spin-ups' in which the years 2003 – 2005 were repeated 2 times with the output conditions fed into the input of the succeeding model to determine the time required for the sediment flux to reach equilibrium.**

- 7) Significant effort should be directed to the calibrating of the temporal and spatial salinity and temperature distributions in the Caloosahatchee, i.e. matching salinity and temperature to fully reproduce the mass transport in the estuary.

**The continuation of our calibration/validation efforts is good recommendation, and one that the FDEP plans to do. The data we've been receiving from the continuous monitoring instrumentation recently installed on the Caloosahatchee should help immensely.**

In addition to our modeling concerns, the City would also like to see a dissolved oxygen (DO) TMDL reevaluated when more data become available. The Draft TMDL Report states that there were no "observed relationships" between dissolved oxygen (DO) and "potential causative pollutants." We assume that this statement implies that low dissolved oxygen is a "natural condition" in the tidal Caloosahatchee. Although low DO is a common condition in some blackwater streams in Florida, it is unlikely that this is a "natural condition" in the mainstem of the Caloosahatchee. Since the data used for your evaluation (CES04 & CES06) were collected during the day, it is likely that these data do not capture diel variations.

We realize that 24hr DO data were not available when you began development of the TMDL; however, data are now available through the Sanibel-Captiva Conservation Foundation's River, Estuary and Coastal Observing Network (RECON) <http://recon.sccf.org/> and should be used for future analyses. The reviewer makes an excellent point that new continuous DO data is now available for incorporation into the Caloosahatchee estuary modeling efforts that was not available when the modeling study was initiated. The reviewer makes a good recommendation for continuing the data analysis and modeling efforts by FDEP as work continues on this estuary during the Phase 4 implementation of the Basin Management Action Plan (BMAP) for the Caloosahatchee estuary. This recommendation would require (a) extension of the time frame for the hydrodynamic and water quality model through 2008-2009 and (b) compilation of the additional continuous oxygen data for the new station locations for comparison to the extended hydrodynamic and water quality model results.

We also suggest that you evaluate the role of sediment oxygen demand (SOD) on dissolved oxygen. Currently there are two studies being conducted in the Caloosahatchee that may be helpful in flushing out the relationships between DO and nutrients. Florida Gulf Coast University, along with several partners, are conducting a study looking at bioavailability of nutrients in Caloosahatchee and coastal waters of Lee County. This study incorporates a benthic flux study that will investigate benthic nutrient dynamics throughout the entire river from S-77 to the Gulf of Mexico. The South Florida Water Management District is also working on a benthic flux study and recently completed the first phase and will initiate the second phase this summer.

**This also is an excellent recommendation. The FDEP intends to utilize the new data from stakeholders, including those from the Sanibel Captiva Conservation Foundation. We recently reviewed the SOD data from two recent SFWMD funded studies and determined that the values for SOD flux were in the range of values delivered by the FDEP models used in this TMDL. A complete detailed explanation of this comparison is provided in Appendix G of the TMDL document. We plan to conduct a more complete comparison, includes running the model for the year 2008 (the year for which the SOD studies were carried out) and include them in a future model run for comparison. In addition, we have evaluated DO levels in relatively unimpaired systems located near the Caloosahatchee and noted those systems also routinely do not meet the states' DO criterion. (Please refer to Appendix G.)**

In an effort to not delay the Basin Management Action Plan (BMAP) process, we suggest that you move forward with implementation of the proposed nutrient TMDL, but reevaluate DO as new data become available during the next basin cycle.

**The FDEP believes that the process of developing a TMDL should be one of adjusting to changing events, but also to the changing understanding and knowledge related to such events. Thus, the FDEP will continue collecting data, continue evaluating the response of the watershed to changes in urban and agricultural runoff management practices, and conduct the analyses needed to assess for additional impairments. It is only through continuous feedback can the FDEP hope to gain a vital understanding of the watershed. We thus concur with the excellent recommendation provided in your comment.**