

**Status Report of the  
Modeling Technical Review Group (MTRG)  
For the Savannah Harbor Expansion Project  
June 2, 1999**

The MTRG held a meeting on May 25, 1999 at the EPA office in Atlanta with the following attendees:

Steven Davie	ATM	770-850-4960	sdavie@atm-s2Li.com
Wade Seyle	COE	912-652-5508	wade.f.seyle@sas02.army.mil
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Steven Peene	ATM	770-850-4960	speene@atm-s2Li.com
Jim Greenfield	EPA	404-562-9238	greenfield.jim@epa.gov
Larry Neal	Harbor Committee	770-499-6791	lneal@lawco.com
Bill Bailey	COE	912-652-5781	william.g.bailey@sas02.army.mil
Brittany Robinson	Harbor Committee	912-238-6426	brittany.robinson@ipaper.com
Mark Dortch	USERDC-WES	601-634-3517	dortchm@ex1.wes.army.mil

The goal of the meeting was to discuss the Modeling Task Statements (SEGCL1, SEGDO1, SEGDO2) posted on April 28, 1999, and to provide comments and revisions to those task statements. Additional verbal and written comments on the draft task statements were provided by the following individuals not in attendance at the meeting:

Roy Burke	GAEPD	404-675-1665	roy_burke@mail.dnr.ga.us
Keith Parsons	GAEPD	404-675-1631	keith_parsons@mail.dnr.state.ga.us
Nancy Sullins	SCDHEC	803-898-4244	sullinnr@columb32.dhec.state.us
James Martin	Harbor Committee	601-634-3517	martinj@ex1.wes.army.mil
Harvey Seim	Skidaway Inst.	912-598-2361	seim@skio.peachnet.edu
Jack Blanton	Skidaway Inst.	912-598-2457	jack@skio.peachnet.edu

At the meeting, the attendees agreed on the following schedule for the review of the Modeling Task Statements. The purpose of the schedule was to identify milestones for the review process to assure a timely and complete evaluation.

- Comments from MTRG on Modeling Task Statements – May 28, 1999
- Post MTRG Status Report and revised Modeling Task Statements – June 2, 1999
- MTRG members provide final technical comments on outstanding issues of Modeling Task Statements – June 14, 1999
- MTRG meeting to finalize Modeling Task Statements – June 23, 1999
- Post final Modeling Task Statements as recommended by the MTRG – June 25, 1999
- Final deadline to clarify the wording of MTRG recommendations (comments at this point to be editorial and not to alter the scope of technical work defined in June 23 meeting) – June 30, 1999
- MTRG Status Report to SEG and submittal of final Modeling Task Statements as recommended by MTRG – July 6, 1999

The MTRG agreed that the revisions of the Modeling Task Statements would be identified by strikethrough for wording that is removed and underline for wording that is added. The modifications to the task statements will then be clearly visible to all MTRG members. The group also recommended

removing the previous versions of the Data Collection Task Statements on the web site and keeping the final approved versions.

As a result of reviewing the comments received, and discussions in the MTRG meeting, a summary of recommended revisions for each task was developed. These revisions reflect specific recommendations made by the reviewers rather than a summary of all items discussed in the comments. For each task statement, the recommendations are broken down as either resolved or unresolved issues. Following the format developed through the evaluation of the field data collection tasks, the following define resolved and unresolved issues:

- Resolved Issues: those receiving general agreement by the MTRG at the May 25<sup>th</sup> meeting, or those issues deemed to not significantly alter the scope of work and consistent with the general goals.
- Unresolved Issues: those not receiving general agreement by the MTRG members at the May 25<sup>th</sup> meeting, or issues that have not received sufficient review under the MTRG process.

The goal of listing unresolved issues is to solicit additional comments by the MTRG members to determine if these should be included in the draft task statements, and to allow comments from MTRG members not in attendance at specified meetings.

Specific recommendations made by MTRG members that do not relate to the three draft task statements up for review are listed at the end of the status report as general comments.

### **SEGCL1: Develop Salinity/Chloride Correlation Model (title to change see note below)**

Resolved Issues:

- Place the Task Goal that is in SEGP311 in the Task Goals of SEPCL1. It states, “Estimate the change in magnitude and temporal distribution of chloride levels at the City’s raw water intake due to the proposed harbor deepening.”
- Develop chloride sub-model above I-95 Bridge and force with elevation boundary condition at I-95 and chloride flux at I-95 to project changes in chloride concentrations at the City of Savannah Intake.  
Note: Based upon the recommendation to develop a chloride sub-model, the draft task Statement title will be changed to “Evaluate Salinity/Chloride Relationship and Develop Chloride Sub-Model.”
- As with the data collection effort, the multiple model task statements reflect the development of a system of models for use in evaluating hydrodynamic and water quality impacts of the proposed deepening. Therefore, there is significant overlap in the three tasks. The individual tasks need to describe the overall model development steps to be taken, understanding that this global model development applies to each task.
- Utilize an elevation boundary condition at I-95 Bridge to force the chloride sub model.
- Reword sentence in Section 3.0, 2<sup>nd</sup> paragraph that states “Additionally, under this task, the hydrodynamic/salinity model will be expanded, refined, and recalibrated between the I-95 Bridge and Ebenezer Creek”. Revise to state, “...will be expanded and refined between”, to avoid confusion of statement including recalibrated.
- Add sentence to Section 3.1, 3<sup>rd</sup> paragraph that states “The database will be made available as an appendix to the completion report for this task.”
- Section 3.3, last paragraph. Revise the beginning of this paragraph to state, “Congress has authorized but not yet provided funding to the USACOE for modifications...”

- Identify that for the model calibration the existing bathymetric and geometric conditions will be utilized and not those proposed under the USACOE restoration project.

Unresolved Issues:

- None to date

### **SEGDO1: Develop Dissolved Oxygen Model**

Resolved Issues:

- Add the following model to data comparison methods to the task statement:
  1. Vertical profiles of water quality constituents where data are available
  2. Longitudinal transect plots (surface, bottom, and/or mid-depth) taken as a snap shot in time (if data collection methods permit) or averaged over time, e.g. simulation period average.
  3. Longitudinal profiles of Mean Absolute Error (MAE)
- Move calibration of thermal model to SEGDO2.
- Utilize simulated temperatures in all water quality model simulations.
- Simulate temperature and salinity in both the hydrodynamic and water quality models to assure that the transport schemes in each model are working in a similar manner.
- Revise title of Section 3.5 to “Determination of Input Conditions for 1999 Dissolved Oxygen Model Calibration” and the first sentence of this section to state, “For the 1999 dissolved oxygen model calibration...”
- As with the data collection effort, the multiple model task statements reflect the development of a system of models for use in evaluating hydrodynamic and water quality impacts of the proposed deepening. Therefore, there is significant overlap in the three tasks. The individual tasks need to describe the overall model development steps to be taken, understanding that this global model development applies to each task.
- Add language to this task statement that says, “sufficiency of the data set to be based on the ability to calibrate the dissolved oxygen model” to appropriately address various causes of oxygen demand, e.g., navigation, point sources, non-point sources, SOD, marsh input, upstream loading, agitation dredging, etc.
- Add description of the sensitivity tests to be performed.
- Identify methods for determination of range of model coefficients.

Unresolved Issues:

- Extend calibration period of water quality model to 2 months (the data collection program presently outlined and agreed upon will allow a maximum of 6 weeks of comparison).

### **SEGDO2: Refine and Verify Hydrodynamic/Salinity Model**

Resolved Issues:

- Perform a test of the hydrodynamic model to ensure that artificial mixing is not occurring within the sigma grid. The test consists of setting up a stably stratified “dead sea” situation in the system and

run with all forcing turned off. The goal is to show that under this condition the model will not produce any artificial flows or transport of salinity.

- Add the following model to data comparison methods to the task statement:
  1. Explicitly form the vertical salinity difference as a function of time for as many monitoring stations as is possible, and compare this with the model predictions.
  2. Form the horizontal salinity difference between adjacent monitoring stations at the surface and bottom as a function of time for as many stations as possible, and compare this with the model output.
  3. Compare measured and simulated low frequency salinity variations.
  4. Compare observations of vertical shear of the horizontal currents with those predicted with the model. Show this as a contour plot as a function of time and vertical height.
  5. Show some vertical profiles of salinity and velocity, from the model and from observations.
  6. Show all plots on time scales where the tidal signal can be clearly seen (i.e. maximum of two weeks of data per plot).
  7. Plots of simulated and measured salt flux.
  8. Plots of horizontal and vertical salinity gradients.
- Eliminate percentile frequency of occurrence as a direct model to data comparison methodology; utilize this solely for ecologic evaluation purposes.
- Utilize consistent turbulence scheme between the hydrodynamic and water quality model (this was the case in the first modeling effort, but was not clearly stated in the reports).
- Revisit the turbulence closure scheme to determine if it can be used to accurately project salinity intrusion and provide a more generally applicable model.
- Move calibration of temperature model to task statement SEGDO2
- In Section 3.2, 2<sup>nd</sup> paragraph, revise to state that although the marsh subroutine will be developed using field data from within the SNWR, the algorithm will be used to predict salinity levels in all marshes in the upper estuary, including those located outside of the SNWR.
- As with the data collection effort, the multiple model task statements reflect the development of a system of models for use in evaluating hydrodynamic and water quality impacts of the proposed deepening. Therefore, there is significant overlap in the three tasks. The individual tasks need to describe the overall model development steps to be taken, understanding that this global model development applies to each task.
- Add additional sensitivity tests:
  1. Vertical diffusivity variations greater than 10 percent.
  2. Variations in the offshore salinity concentration
  3. Time lag on river discharge.

#### Unresolved Issues:

- Try to use the standard turbulence closure scheme available within the existing model with enhanced vertical resolution to test whether better agreement with observations can be achieved.

#### **General Comments:**

- Recommendation to consider different decay rates for loadings from CBOD sources and subsequent CBOD load allocations. This recommendation does not identify the use of different decay rates in the modeling but consider it under evaluations and load allocations.
- Develop a separate task statement for development of critical conditions.