

**Savannah Harbor Expansion Model Review Meeting  
June 16-17, 2005  
Savannah Harbor Expansion Interagency Water Quality Team Meeting  
June 17, 2005  
Tetra Tech, Inc. – Atlanta, GA**

**Attendees:**

Roy Burke, GAEPD  
Paul Lamarre, GAEPD  
Wade Cantrell, SCDHEC  
Bill Bailey, USACE Savannah District  
Joe Hoke, USACE Savannah District  
Jim Greenfield, USEPA Region 4  
Paul Conrads, USGS (via phone)  
Larry Neal, MACTEC  
Margaret Tanner, MACTEC  
Steven Davie, Tetra Tech, Inc.  
Will Anderson, Tetra Tech, Inc.  
Yuri Plis, Tetra Tech, Inc.

**Agenda:**

1. WASP model – consistency with enhanced grid and status of TMDL process
2. Status of calibration report from Tetra Tech
  - Issues/concerns from Federal and State agencies
  - Dr. Kim's (ITR USACE) comments
  - July 1, 2005 deadline for agency position
3. Application of the models for impact simulations (inputs and outputs)
  - Comments from states and other users

**I. Status of TMDL (Jim Greenfield):**

- EPA will now use one model for the harbor – enhanced grid
- WQ standard for dissolved oxygen still being developed, EPA headquarters is going to talk to GAEPD about proposing the standard
- SCDHEC will still have to develop a site specific criteria for SC waters
- Recruitment (fish) model will be used to develop the criteria values; being used in the Escatawpa River Estuary for the dissolved oxygen criterion (3.0 g/L); using daily dissolved oxygen values and comparing to acute and chronic limits
- 2004 loads being used to update the TMDL – using July, August, and September average DMR data – Jim send to MACTEC for review
- Riverside Power Plant decommissioned
- Kerr McGee immediate oxygen demand load is now removed
- Need to check heat loads with GA Power (MACTEC to verify this with GA Power)

## **II. Issues and Concerns on Final Report on Hydrodynamic and Water Quality**

### **Models:**

1. Discussed Dr. Kim's comments and went around the table discussing issues and concerns from each agency/group represented.
2. Larry Neal summarized his organization's concerns in a handout.
3. The group then had a wide-ranging discussion of that included a number of issues. These are summarized in the next two sub-sections. The first paragraph is the group's attempt to develop categories for the comments that describe the amount of effort expected to address a concern. The second paragraph states the concern and the category of future effort (in bold) expected to address it. These issues should be considered further before using the models to identify impacts of the recommended plan.

### **Ways to address concerns with the models and the reports**

The group categorized the concerns according to the level of action that is appropriate to fully address each concern. The following four categories were developed, roughly in order of the effort expected:

- A** Explain better in the report, no modeling action needed.
- B** Keep in mind when interpreting the model results.
- C** Additional sensitivity model runs are needed.
- D** Recalibrate / revise model.

(note: a "C" action could turn into a "D" action depending on the results)

### **Summary of issues and concerns and actions to address each concern [option from above]:**

1. **[B]** Marsh water quality loads:
  - a. **[A]** Inclusion in the enhanced grid
  - b. **[A]** Equal comparison between the TMDL and enhanced grids
  - c. **[C]** Is the CBODu too high?
  - d. **[C]** Mass exchange – flows and concentration
  - e. **[C]** Surface to bottom – CBODu vertical differences are a function of how marsh areas were loaded into the enhanced model
2. **[C]** Offshore boundary:
  - a. Salinity 34 to 36 ppt versus 32.5 to 35 ppt
    - i. Mass flux surface to bottom – may need to re-distribute at FR-26
  - b. Dissolved oxygen saturation 95 to 105% versus 90%
  - c. Temperature
  - d. Larry Neal gave info "World Ocean Atlas 2001" with data
  - e. CBOD decay rate – confirmed 0.5 multiplier on ocean cells
3. **[C]** Surface salinity:
  - a. Model appears to under predict surface salinity on the Front River. How does this impact the marsh succession modeling? The EFDC will output salinity for the neural net application, which feeds the marsh succession model. Right now, the neural net is using the USGS gages located between the Talmadge Bridge and I-95, located on Front and Back Rivers. These gages are considered to be mid-depth. The EFDC model is

predicting salinity well at the bottom and at mid-depth but under predicting salinity at the surface.

4. **[A & B]** Ebb flows and currents:
  - a. Under prediction of the ebb flows and currents on the Little Back and Back Rivers
5. **[A]** Water level at SR-17 on the Upper Savannah River
  - a. Potential of adding marsh storage areas upstream of I-95 Bridge
  - b. Show comparisons at the USGS Hardeeville gage (show plot)
6. **[C & A]** Global versus source-specific BOD decay rates
  - a. Sensitivity of calibration
  - b. Sensitivity on allocation scenarios (more for TMDL)
7. **[A]** Check all point sources and heat loads, especially Plant MacIntosh (MACTEC to verify)
8. [none] BOD loads from Corps' confined dredged sediment placement sites in SC and potential impacts on dissolved oxygen (future TMDL issue)
9. **[A]** Grid convergence test:
  - a. Show results of the TMDL grid with the same depth;
  - b. Show results on TMDL grid, enhanced grid, and convergence grid on the same plots;
  - c. Show comparisons on the Middle and Little Back Rivers;
  - d. Perform moving average of results to reduce tidal noise; and
  - e. Quantification of grid convergence test results.
10. **[B & C]** Delay in EFDC model salinity results at US FWS Dock comparisons of model versus data
11. **[A]** Clearer description of 1999 versus 2002 bathymetry and why the 2002 bathymetry data is representative of 1997 through 2003 conditions in the harbor
12. UA/SA Analysis: The group concluded that the inability to run the models over a 7-year duration was the result of synthetic data that was developed to fill in a data gap around December 2000. The group concluded that the inability of the model to run over the entire 7-year period of data does not reflect on the structure of the model or its performance, and should not be a consideration of the model's usefulness for its intended purposes of predicting impacts of the Savannah Harbor Expansion Project, developing a dissolved oxygen TMDL, or permitting point source discharges.

### **III. Model Application for Identifying Impacts to Water Quality.**

The Interagency Water Quality Team then discussed application of the models for identifying impacts to water quality from the Savannah Harbor Expansion Project.

1. The impact evaluation runs should use a varying flow, rather than the uniform flow that was previously proposed by Savannah District.
2. Dissolved oxygen should be reported at increments of 0.1 mg/L, rather than the 0.5 mg/L that was proposed by Savannah District.

3. Model results in hourly outputs will be sufficient.
4. BOD loads should use the loads reported in 2004, rather than what was reported in 1999. The loads should be averaged over the entire summer. The loads should be run through both the RIV1 model and WASP.
5. Potential impacts to the assimilative capacity of the harbor would need to be identified. This should be performed with the following model inputs:
  - August 1999 tides, flows, temperature, and salinity
  - Loads from upstream sources should include CBOD and ammoniaNOTE: A. flows would be varying, rather than uniform as previously proposed  
B. flows measured at Clys are considered representative of the critical conditions and the 7Q10 flow did occur during 1999
6. Natural condition runs would need to be performed. This should be performed with the following model inputs:
  - Without point sources – no heat and BOD loads in harbor and upstream
  - Without nonpoint sources – no stormwater loads, but marshes should be included
  - Existing bathymetry (as expressed in calibrated model)
7. Further identification of potential impacts to temperature would be developed as part of the impact runs for Fisheries, which will include runs over January,
8. For water quality impact evaluation runs, the following scenarios would need to be evaluated:
  - A. Natural condition without deepening
  - B. Natural condition with deepening
  - C. 2004 point source loads with deepening
  - D. 2004 point source loads without deepening
9. The Corps expects to perform the following runs to evaluate potential effects of deepening the navigation channel:
  1. existing = 42 feet
  2. 44 feet
  3. 45 feet
  4. 46 feet
  5. 47 feet
  6. 48 feet
10. The team recognized that the various scenarios and model outputs that had been requested will require a great deal of effort and would produce a very large quantity of information. The team also recognized that some of that information may, ultimately, not be useful. To minimize the time spent developing, presenting, and interpreting model outputs, the team recommended they meet again as soon as the initial water quality model runs had been completed. The hope is that the initial outputs would show what type of information is truly needed to identify impacts from the proposed actions and

differentiate between the plans. This would allow other information to no longer be developed, presented or interpreted. The team recommended that the initial runs consist of (A) 2004 point source loadings, (B) natural conditions, and (C) maximum permitted loadings. Each of these three scenarios should be run for both the existing channel depth and the maximum deepening being considered.

Prepared by:  
Steven Davie  
Tetra Tech, Inc.