Everglades Agricultural Area Storage Reservoirs, Phase I
Internal Technical Review Responses
May 2004

Document: FINAL MODEL EVALUATION REPORT
Reviewer: Maged Hussein, Ph.D., P.E. Interagency Modeling Center, USACE-SAJ, EN-H

1. The report was very effective in documenting the project objective and the role of the anticipated modeling in predicting specific aspects of the project benefits.

Response:

2. The consultant team included DHI. Their contribution to this report is obvious. As a result the report is heavily weighted towards the Mike-She/Mike-11. The bias towards DHI software is discussed in the specific comments below.

Response:

3. This modeling code selection is for the "sub-regional model". Will the PDT consider secondary basins in more detailed "site specific" models? Is this type of modeling (site specific) considered in the Project Management Plan in terms of schedule and budget? There might be a need for such modeling effort to address some of the project objectives (e.g. farm scale flooding, reservoir-groundwater interaction and seepage collection systems, … etc.)

Response:

4. Some evaluation criteria where more important than others. Binary score weigh all the evaluation criteria equally. A numerical score would have been helpful to highlight important criterion. Also some of the modeling codes were superior over the selected model. For example, some of the modeling codes utilize more efficient numerical algorithms that allow them to model complex hydrologic systems (e.g. 3-d unsaturated zone flow) more accurately than the selected modeling code. Also, fully coupled modeling codes are more efficient in representing ground water/surface water interaction (reasonable run times). Such advantages were not emphasized in the binary scoring approach used.

Response:

5. After having the benefit of reviewing the modeling reports, it is obvious that the data evaluation section (table 6) was too optimistic. Available data and its quality turn out to be limiting the applicability of the code.

Response:

6. Page 2: Criterion 5 (Section B.2.1.2) was used to eliminate modeling codes that utilize unstructured mesh (such as finite element and finite volume). Modeling codes based on

unstructured mesh are more flexible in representing the EAA complex system and can be designed in such a way to be compatible with the SFWMM (the 2x2). Also, was the water quality model for this study already selected? Does it utilize uniform grid?

Response:

7. Page 3: Reference will be helpful to support the claim that the SFWMM is accepted by all stake holders. Is this SFWMM version 3.x or 5.x?

Response:

8. Page 4: The statement “Able to model canal geometry versus grid simulation only” is vague. What does that criterion mean? The consultant uses this criterion to eliminate a lot of models.

Response:

9. Page 4: DSS stands for Data Storage System not “Decision Support Systems”.

Response:

10. Page 9: HSPF does have a graphical user interface GenScn.

Response:

11. Page 9: HSPF/FEQ can use DSS files as indicated in page 8.

Response:

12. Page 11: InHM is the most numerically sophisticated model that should be considered for site specific scale modeling if needed (seepage around reservoir, farm scale flooding, … etc.) I agree it is not suitable for large sub-regional application.

Response:

13. Page 12: If FEQ is combined with ISGW most of the limitations of ISGW can be eliminated.

Response:

14. Page 14: To the best of my knowledge (and according to FEMA web site) Mike-She is not FEMA approved. Mike-11 is FEMA approved. To use Mike-11 in FEMA flood studies, flow through flood planes has to be simulated by the quasi 2-D method of Mike-11. In the EAA Model the consultant built, overland flow is modeled using either the kinematic wave or diffusive wave approximation (it is not clear which one) in 2-d provided by Mike-She (which is not FEMA approved). As a result FEMA approval of Mike-11 should not have been considered an advantage of Mike-She/Mike-11.

Response:

15. Page 17: The flow and transport equations in InHM and MODHSM are not assembled in the same matrix. The ground water and the surface water flow equations are assembled in the same matrix in both models. This provides considerable advantages over loosely coupled models like Mike-She and MODNET in terms or numerical stability and solution efficiency.

Response:

16. Page 17: MODHMS does have a graphical user interface and does have hydraulic structure operation (to the best of my knowledge).

Response:

17. Page 18: MODNET coupled with the Wetland Package is capable of simulating overland flow in wetlands.

Response:

18. Page 18: SFRSM including HSE utilize the same formulation of the diffusive wave equation as in InHM and MODHMS. The same "advanced implementation of the 2D diffusive wave equation" is available in all three modeling codes.

Response:

19. Page 19: SFRSM-HSE is capable of exchanging data with DSS and the SFWMM (Gridio, HEC-DSS) and does have a GIS based graphical user interface.

Response:

20. Page 21: WASH123D like other unstructured mesh based modeling codes can exchange data with the 2x2.

Response:

21. Page 22: Numerical scores in the Model Selection Matrix are more appropriate.

Response:

22. Editorial: A limited number of typographical and grammatical errors were observed in the documents. However, these minor errors do not affect the readability of the report.

Response:

Document: BASIN AND SUB-BASIN DELINEATION
Reviewer: Phil Sylvester, USACE-SAJ, EN-HI

23. EAA_ITR-PTS-1 The document TASK 2-EAA BASIN MODELING, TASK 2.2.1-BASIN AND SUB-BASIN DELINEATION discusses past attempts to define large hydrologic/hydraulic units and sub-units in the managed EAA watershed. The document also discusses the dynamic nature of basin and sub-basin alignments due to land ownership changes, construction activities, and other reasons. The document title implies that the numerical model basins and sub-basins are to be described and discussed within. They are not. There are 20 sub-basins in the MIKE SHE/MIKE 11 sub-regional conceptualization of the EAA. They are not mentioned in this document. This document would be a reasonable place to introduce and describe the 20 sub-basins that are included in the EAA sub-regional numerical model.

Response:

24. EAA_ITR-PTS-2. The modeled EAA system contains approximately 1,000 square miles. The conceptualization of 1,000 square miles through the definition of 20 sub-basins for modeling purposes is necessary for modeling calculation reasonableness. The combining of all sub-basin internal canal storage into a single large storage area that is linked to the major EAA canal network through a single stub canal is another necessary conceptualization, if the model numerical solution is to remain reasonable. Another look at the quantification of the internal canal storage capacity may contribute to the continuing refinement of overall model calibration.

Response:

Document: RAINFALL FREQUENCY ANALYSIS FOR STORM EVENTS
Reviewer: Phil Sylvester

25. EAA_ITR-PTS-1. Generalized flooding in the EAA is a rainfall/runoff volume problem rather than a rainfall/runoff peak discharge problem. Understanding of the generalized flooding problem requires engineering analysis of conceptualized (modeled), watershed response to hypothetical storms containing large volumes of rainfall. Experience has shown that short duration rainfall within storms (even rainfall with rare intensity), does not reveal the true flooding potential of large watersheds. Storm rainfall durations of 5 days are not adequate to define the flooding potential in the EAA. The hydrologic/hydraulic investigation of flooding in the EAA should be done with storm rainfall of rare intensity and durations longer than 10 days.

Response:

26. EAA_ITR-PTS-2. The domain of the EAA sub-regional model is approximately 1,000 square miles. Storm rainfall spatial distribution over 1,000 square miles would not likely be uniform. Targeted storms with moving centroids are often used to analyze watershed response in basins covering very large areas. Often, watershed flooding potential can be better understood through the application of targeted storms to the conceptualized watershed model. And, model calibration can be affected and improved through the application of targeted storms.

Response:

Document: CALIBRATION DATA FOR WESTERN BOUNDARY OF GROUNDWATER MODEL
Reviewer: Maged Hussein, Ph.D., P.E. Interagency Modeling Center, USACE-SAJ, EN-H

27. The Appendix B.2.6 Preliminary Seepage Consideration report was not available for review. However, the results in Table 1 seem reasonable.

Response:

28. The northern boundary with Lake Okeechobee is treated as a specified head in Mike-She. The SFWMM treats this boundary as a no flow boundary. It is expected that seepage does occur from the lake to the EAA and specified heads are more "realistic". The SFWMM accounts for this seepage through the "modified delta storage" approach in Lake Okeechobee budget. Just wanted to point out the discrepancies between the two models.

Response:

29. Throughout the reports (this memo and other reports), the consultant refers to the upper and lower part of the "Water Table" aquifer, upper and lower Fort Thompson formation, upper and lower Okeechobee formation, model layer 2 and 3, and the surficial aquifer. There should be a consistent naming convention for the geologic model of the site and the formation of hydrogeologic layering for the model. For these reports to be included in the PIR, this issue needs to be resolved.

Response:

30. SFWMM consider the ground water as one layer and use a constant transmissivity. The discussion assumes that the SFWMM ground water head reflects head in the upper most layer (layer 1) which combine the mock, caprock and the upper Thompson formation (or upper Okeechobee in other parts of the reports). A different alternative would be to consider the SFWMM ground water heads as the average heads in the surficial aquifer (the combination of the water table aquifer and the Tamiami). It is not clear which was intended in the SFWMM.

Response:

31. It is apparent throughout the different documents that data were not available to support such a spatially distributed model.

Response:

32. The well PB-506_G is used to estimate the northern boundary conditions and then used in the model calibration as a calibration target (See Hydrologic Model Calibration and Verification).

Response:

33. It might be helpful to indicate which model layer correspond to which ground water well used to estimate the time series at the boundary.

Response:

34. In general, the approach is adequate if there were no additional data available.

Response:

35. Page 3: My understanding is that layer 3 is the Tamiami Aquifer not the lower part of the Water Table Aquifer.

Response:

36. Page 3: Is the head difference is between the Water Table Aquifer and the Tamiami or between different parts of the water table aquifer? I am not aware that there exists a confining layer between the upper and lower Fort Thompson formations.

Response:

37. Page 3: Was the potentiometeric surface of the Tamiami aquifer used throughout the simulation to fix the boundary condition in that aquifer to constant head (not time varying)? If so, that does not seem reasonable.

Response:

38. Page 8: I tried to pull the records for some of the wells from DBHydro. I got a different period of records and could not find the period of record the consultant use in the report. That is consistent with their indication that the HODI data is not yet available in DBHydro.

Response:

39. Editorial. A limited number of typographical and grammatical errors were observed in the documents. However, these minor errors do not affect the readability of the Technical Memorandum.

Response:

40. Editorial. The quality of the figures is not excellent but sufficient to illustrate the objective. Are these figures going to be used in the PIR?

Response:

Document: CALIBRATION DATA FOR WESTERN BOUNDARY OF GROUNDWATER MODEL
Reviewer: Manjiang "Margie". Zhang, Ph.D., P.G., USACE-SAJ, EN-GG

41. In the second paragraph of page 4, it states: "No flow boundary conditions were used for Model Layers 2 and 3 along the northern boundary of the model along Lake Okeechobee". I don't think **no-flow boundary** is appropriate there. I think the northern boundary needs to be selected based on the depth of the Lake O:

> a. If both Layer 2 and 3 (or one layer) are not penetrated by the Lake O, a **head-dependent flow boundary** should be used for the northern boundary of the layer(s). The leakage to the cell below the lake can be calculated by using the lake stage, the vertical K and the thickness of the sediments between the cell and the bottom of the lake, etc.
>
> b. For the layer(s) penetrated by the Lake O, **a specified head boundary** should be used for the northern boundary of the layer(s). That is, the heads of the layer(s) are given based on the Lake stages.

Response:

42. In bullets 1, 2, and 3 on page 5, most likely those problems stated here are caused by the no-flow boundary that used for both layers of 2 and 3 were unsuitable for the conditions. When the boundary condition is corrected, the results may be improved.

Response:

43. In Table 2 on page 8, are the feet of Min. and Max. observed below grand surface, or above mean sea level?

Response:

Document: HYDROLOGIC MODELING METHODOLOGY REPORT
Reviewer: Maged Hussein, Ph.D., P.E. Interagency Modeling Center, USACE-SAJ, EN-H

General Comments:
44. The report is well written and reflects considerable effort. The volume of data involved and analysis required is staggering and the effort should be commended.

Response:

45. This review is limited to the reports. There were no attempts made to review the model input files, run time, or output. It may be helpful for a peer reviewer to review the numerical model itself.

Response:

46. The available data was very limited and does not support such a spatially distributed model. However, the use of such complex model allows for future model refinement when the data is made available (start simple and build complexity as the data become available).

Response:

47. In general, the data collection phase should be given adequate time and budget. Every model study now starts with data collection and may result in finding (or missing) data. In this study, despite the fact that the EAA has been included in the SFWMM, the consultant utilized different sources of data than the SFWMM (e.g. rainfall from frequency analysis study by Pathak 2001, rather than the rainfall GRID-IO data used in the 2x2).

Response:

48. Detailed modeling of the unsaturated zone requires accurate conductivity and retention curves. The available data does not warrant the use of such sophisticated model.

Response:

49. Some of the geologic model figures show a legend with negative values for hydraulic conductivity and thickness.

Response:

50. A number of assumptions were made during the construction of the geologic model which raises the question of whether the available data is adequate for such a complex and spatially distributed model.

Response:

51. A comprehensive geologic model like the one developed for the South West Florida Feasibility Study might be of considerable value for this and other projects.

Response:

52. Was the Tamiami Aquifer considered part of the Water Table Aquifer or the Surficial Aquifer? The terminology used in the report is quite confusing. Also, does the SFWMM include the Tamiami Aquifer as part of the groundwater system? Differences in conceptual model setup between the regional and subregional model is important for future comparison.

Response:

53. The irrigation model is empirical and might be adequate for the scale of the subregional model. It is also reasonable taking the scarcity of the data. However, this limits the ability of the model to address farm level flooding and/or seepage from reservoir. The PDT members need to consider more detailed "site" model to address the impact of the reservoir and the collection of the data needed to support such detailed modeling.

Response:

54. The only justification for simulating the unsaturated zone is to be able to simulate Hortonian overland flow during intense storm. Since the ability of the model to simulate farm scale flooding is limited. It might be more efficient to limit the need for the unsaturated zone simulation. Detailed "site" models can utilize more sophisticated 3-dimentional unsaturated zone representation. The discussion in the memorandum supports such approach as it shows the 2-layer method capable of reproducing most of the observed hydrographs.

Response:

55. The use of Kristenson and Jensen Model is not consistent of the method used in the US and South Florida (Penman-Monteith).

Response:

56. Utilizing high hydraulic conductivity of 10,000 ft/day transition zone is somewhat arbitrary.

Response:

57. Page 1: References should be provided to support the claim that the SFWMM is accepted by stakeholders.

Response:

58. Page 2: It will be helpful to indicate the source of the data (agency and point of contact and/or reference document).

Response:

59. Page 3: Soil water retention and LAI and RDF were obtained from the Mike-She C-43 model. Were these measured in the field or adjusted during calibration?

Response:

60. Page 4: Is the method used to synthesize rainfall consistent with the method used by the SFWMD in developing the rainfall binary file?

Response:

61. Page 7: How was the overland flow simulated in this model (kinematic or diffusive wave)? What was the time step size for channel, overland, and groundwater flow?

Response:

62. Page 8: The DEM generated for this study seems to be approximate at best. For this study to address farm scale flooding issues and 30% design of the reservoir, a more accurate DEM need to be established. The report states that the DEM does not confirm to the USACE standards.

Response:

63. Page 8 and 9: Draft and revised DEMs shown in Figures B.2.2.4a and b seems to be different. The horizontal and vertical datum used in the DEM (as well as river hydraulic) should be indicated. I believe it is NAD27 and NGVD29. CERP standards are NAD83 and NAVD88.

Response:

64. Page 10: Was any of the bridges simulated in the hydraulic structures shown in Figure B.2.2.5?

Response:

65. Page 11: Various typos made the discussion hard to follow.

Response:

66. Page 12: Is there an iterative scheme to ensure that that the canal and surrounding ground water are in equilibrium or is the exchange based on the head distribution in the previous time step?

Response:

67. Page 16: Figure B.2.2.6 and the discussion use the Fort Thompson formations but Figure B.2.2.8 uses Okeechobee formations. The discussion need to be consistent.

Response:

68. Page 16: The wetland soil is Histosols (not Histsols).

Response:

69. Page 18: How was the vertical conductivity of the mock and the caprock estimated?

Response:

70. Page 25: Was the Tamiami Aquifer considered part of the Water Table Aquifer or the Surficial Aquifer? The terminology used in the report is quite confusing. Also, does the SFWMM include the Tamiami Aquifer as part of the groundwater system?

Response:

71. Page 26: Which version of the SFWMM was used in estimating the boundary conditions? Version 3.x does not include the most updated elevation data.

Response:

72. Page 27: The assumption of thin layer of high transmissivity does not seem to be physically based. The only justification is the improvement of the farm scale models.

Response:

73. Attachment B.2.2.4 Page 3: Here the consultant uses Okeechobee formation rather than Fort Thompson.

Response:

74. Attachment B.2.2.4 Page 4: Was the boundary condition for the saturated zone set as "constant" head or specified head?

Response:

75. Attachment B.2.2.4 Page 5: It is not clear how the transition zone affect the flow system. The horizontal hydraulic conductivity does not affect the model if the water table is below the transition zone. Only when the water table reaches the transition zone that the lateral flow occurs resulting in rapid drainage of the soil. However, the saturated zone hydraulic conductivity is constant and does not depend on the location of the water table. The unsaturated zone formulation does not allow lateral flow to occur between adjacent soil columns. Then how does the transition zone affect the flow?

Response:

76. Attachment B.2.2.4 Page 15: Section 7.2 is missing.

Response:

77. Editorial. A limited number of typographical and grammatical errors were observed in the documents. However, these minor errors do not affect the readability of the report.

Response:

78. Editorial. The figures are not of excellent quality. In fact they are very hard to read in this report. Figures will need to be revised before inclusion in the PIR.

Response:

Document: INVENTORY OF SUB-BASIN DATA
Reviewer: Phil Sylvester, USACE-SAJ, EN-HI

79. EAA_ITR-PTS-1. Irrigation capacities, drainage capacities, land use, and Water Management BMP strategies are clearly sub-basin characteristics that would reasonably be expected to appear in an inventory of sub-basin data. This format embraces a mix of structures, land use, and land management. The internal canal network of each sub-basin also represents a physical structure. The combined storage attributable to the internal canal network is an important sub-unit of the overall EAA storage capacity. These sub-units of storage are rigorous to view, understand, and quantify. But, they represent an important component of the numerical model conceptualization, and must be reasonably represented in the model to achieve calibration. The methodology for quantification and conceptualization of internal sub-basin canal storage should also appear in an inventory of sub-basin data.

Response:

80. EAA_ITR-PTS-2. An inventory of sub-basin irrigation and drainage capacities is essential for a reasonable conceptualization (model development, model calibration, scenario simulation, …), of the EAA. These capacities (pumping capabilities), are understood in terms of permitted quantities. Individuals familiar with farming practices in the EAA have stated that routine pump maintenance often includes general mechanical overhaul of the pumps and the engines (many are driven by diesel motors), that drive the pumps. This method of routine maintenance can result in increased engine operating strength (horsepower), with an associated increase in pumping strength. This increased pumping strength often does not become part of the permitted pump capacity inventory. It would be reasonable to examine this item during model calibration.

Response:

Document: HYDROLOGIC MODEL CALIBRATION and VERIFICATION REPORT
Reviewer: Maged Hussein, Ph.D., P.E. Interagency Modeling Center, USACE-SAJ, EN-H

81. The report reflects considerable effort to calibrate and verify the model. The calibration can be improved in some region of the model. More work is needed to improve the model representation of the calibration and verification periods which can be done with some effort. However, limitation of the model for farm scale flooding and seepage issues in the vicinity of the reservoir should be taken in consideration when trying to meet project objective (e.g. more detailed site model).

Response:

82. It would have been also helpful to have the scope of work available during the Independent Technical Review.

Response:

83. The agriculture drainage and farm canal storage approaches can represent the system on the basin scale (or sub-regional scale). However, the approach is somewhat lumped and cannot predict flooding, seepage, and spatial variation in the water table elevation on the small scale.

Response:

84. The rational behind the estimated values for the parameters used in the farm canal storage are not clear.

Response:

85. Mike-She is limited to uniform grid (structured grid with equal grid size). A variable grid model or a model using unstructured mesh would have been more flexible in representing the spatial variation in surface and subsurface conditions.

Response:

86. The unsaturated zone treatment is too detailed (Richard Equation) considering the lack of available data and the lumped parameter nature of the farm drainage aspect of the model.

Response:

87. Stub canal concept may have some impact on the hydraulics of the major canals. Flow from agriculture farms is distributed along the length of the canals. Stub canals will lump the distributed flow into a point load which may introduce some error in the wave propagation through the canal network.

Response:

88. The boundary conditions used for the hydrogeologic model reflect considerable lack of data within the study region. The use of no flow boundary in layer 2 and 3 does not seem to be appropriate. These layers are connected to a regional flow system that the study failed to characterize.

Response:

89. Water balance analysis in Section B.2.3.6 needs to be compared to the regional model (SFWMM) to insure consistent treatment of the different components of the water budget.

Response:

90. Spatial distribution of calibration and verification targets (Figure B.2.3.24 and B.2.3.25) is not uniform and more targets were selected near the boundary conditions. Calibration target near a boundary are not good measure of the model performance. They are a measure of how good the boundary conditions were estimated but not the model.

Response:

91. The uncertainty discussion is qualitative and not sufficient as a formal uncertainty analysis as required by CERP projects. However, due to the lack of data, the discussion should be sufficient for the sub-regional model.

Response:

92. A brief description about the model setup would be helpful (time step for each used for each component, closure tolerance and maximum number of iterations used for ground water/surface water interaction, discretization of the canal network, the parameters used in the unsaturated zone, … etc.)

Response:

93. The report "Preliminary Seepage Consideration Report" was not available during the ITR.

Response:

94. Overland flow during flooding of farms cannot be simulated using the overland flow module (which presumably is based on the diffusive wave approximation) because of the existence of drainage ditches, tertiary and secondary canals.

Response:

95. Simulated stages in the calibration and verification periods did not compare well with observed stages while the discharge comparison was more favorable. This is due to the fact that discharge was used as boundary conditions. In general, better calibration as well as verification was observed close to the boundary of the model while internal targets were net with the same success.

Response:

96. In general, considerable effort has been spent in the model development, calibration and verification. If and when structure operation is added to the model, the final product would be a sub-regional model. However, the sub-regional model provides very little advantages over the existing regional model SFWMM. The only difference between the two models is the addition of a few minor details. As a result the sub-regional model ended up being another hydrologic model with hydrologic processing lumped at a more refined scale. Both models will be able answer the same questions. And unless feedback between the two modeling groups is considered, the two

models can give different answers. The main obstacle to the enhancement of the sub-regional model is the lack of available data. The effort needs to be examined in light of the project objective.

Response:

97. Page 1: This is the only report that indicates the datum used. Other reports refer to MSL and/or no reference to datum. That needs to be addressed for inclusion in the PIR.

Response:

98. Page 1: The description of the model as “full-distributed” and “physically-based” is somewhat inaccurate considering the approach used for farm canals and agriculture drainage.

Response:

99. Page 5: It is not clear how scale dependency or the lack thereof is related to availability of calibration targets. This scale effect discussion is very confusing.

Response:

100. Page 9: Where did the numbers 11, 11.5 and 10 feet came from? This page also discusses an overflow weir while in page 16 an underflow gate is used. Is there tow structures in each stub canal. When and how interactions happen with SFWM? Figure B.2.3.10 is not consistent with the discussion in page 9 and page 16 and 17.

Response:

101. Page 9: In table 2.2.1, a constant length/area and width are a used in all basins. Was actual quantitative measurement made or were a representative area examined and the resulting numbers used throughout the EAA. This is also the case of other parameters where parameters were obtained from the C-43 model.

Response:

102. Page 10-12: It is not clear if the drainage module parameters varied by basin or by farm. Ware the drain elevation and the drainage time constant varied from basin to basin or from farm to farm? Also, was the farm irrigation module parameters varied from farm to farm?

Response:

103. Page 14: Is the field capacity used for the “upper water content reference point”?

Response:

104. Page 16-17: What is the "defined level" in the stub canal? Is it the same as h_c? If so, then condition C in Figure B.2.3.10 will not allow for flow to occur from SFWMD canals to the stub canals. What is conditions I on top of page 17? In page 17 the condition is set for SFWMD canals ($h_{sfwmd} > h_c$). That is different from the discussion in Page 16.

Response:

105. Page 17: What was the rational behind h_c of 11 and 11.5?

Response:

106. Page 19: What is meant by the upper and lower parts of the Water Table Aquifer? The terminology used to describe aquifer is inconsistent throughout the different reports and also inconsistent with known hydrogeology of the region.

Response:

107. Page 20: The justification of no flow boundary conditions in layer 2 and 3 along the northern boundary is not convincing. Interaction between these layers and Lake Okeechobee need to be defined more realistically. Lack of data might prevent accurate depiction of such interaction though. However, prescribed head might be more appropriate in any case.

Response:

108. Page 22 and 23 I tried to pull HODI data from DBHydro. The period of record available in DBHydro is different from that used by the consultant. This can be attributed to the new data not included in DBHydro.

Response:

109. Page 22-26: This discussion is a repeat of the technical memo. Again the discussion use naming for the aquifer as upper and lower and deep and shallow water table aquifers. The naming needs to be consistent.

Response:

110. Page 26-29: This discussion is very important. The approach needs to be examined against the approach used in the SFWMM to verify any discrepancy.

Response:

111. Page 28: Again this discussion is hard to flow. Why a large change is needed to bring the seepage and irrigation to 23 in?

Response:

112. Figure B.2.3.22: The numbers in the table and the figure are not consistent. For example, the inflow in August is 1.02 in/month while it shows as close to 0.2 in the figure. Bar chart values or table values need to be consistent.

Response:

113. Page 33: What is meant by the surficial aquifer here? Does it include the water table and the lower Tamiami?

Response:

114. Page 38 & 39: Horizontal to vertical anisotropy of 1 is rather small. Is this estimate based on field or lab tests?

Response:

115. Page 44: What are the vertical leakance and the storativity used for the aquitard between the two aquifers?

Response:

116. Page 46: The statement " … specific conductance data suggests that there is little vertical exchange between the Tamiami aquifer and overlying aquifers." suggests that there was no reason to include the Tamiami in the model. Was the Tamiami aquifer considered in the SFWMM.

Response:

117. Page 47: The vertical hydraulic of an aquifer is not related in near or far to the confining unit thickness and the leakance of the confining unit thickness. Was the vertical conductance between the Tamiami and the Water Table aquifer is meant in this discussion or was the consultant referring to the method used to analyze the aquifer tests?

Response:

118. Table 3.3.2: What is "full contact" and "Reduced (a) Mike-11 Mike-She exchange types"? These terms may have been defined in the seepage report which was not available during this ITR.

Response:

119. Page 54: ET parameters were based on other Mike-She models (most probably C43 model) and not on the existing SFWMM model. The modeling approach should have been more consistent with the SFWMM in this regards (using the same ET method and parameters).

Response:

120. Page 55: Was the irrigation start and stop criteria time dependent?

Response:

121. Page 58 Equation 6 is not correct. The equation should be:
Nash-Sutcliffe Coefficient = $R^2 = 1 - (RMSE/RMS)^2$. Using the wrong equation, the numbers in the table for the Nash-Sutcliffe statistic are under estimated making the calibration to look much better than they really are.

Response:

122. Page 59: The model clearly contains a large number of parameters and over-parameterization is a concern in this application. From the discussion, it was clear that trial-and-error calibration was performed. Automatic calibration may have helped in identifying model sensitivity (or over sensitivity) to selected parameters.

Response:

123. Page 61: The "revised method of applying observed discharge" seems to be ad-hoc. The same data is used in the SFWMM. Feedback between the two modeling teams should resolve such observed discrepancy in the data.

Response:

124. Page 62: Is the term "dynamic" used here to represent wave propagation in the SFWMD canal network? The discussion needs to be simplified or explained in more consistent terms.

Response:

125. Page 63: Topography is a very important data for this project. Are there any plans to obtain more accurate topography? Was historical land subsidence considered in the calibration and verification periods?

Response:

126. Page 64: It was hard to assess model performance from the time series plots. The discussion that followed provided a qualitative assessment.

Response:

127. Page 79: The reason behind the discrepancy between observed and simulated ground water elevation in figures B.2.3.61 and 61 was not clear. Why was the average simulated head higher before 1999? There seem to be something in the model that forces the average head to drop from around 13.75 to 12.

Response:

128. Page 80: This well PB-506_G is the same well used in estimating the boundary conditions. It should not have been used in the calibration.

Response:

129. Page 88: Why was the 28-day average used here?

Response:

130. Figure B.2.3.1.89: The structure flow seems unrealistic.

Response:

131. Page 97: Adjusting the model parameters during validation defeats the purpose of model validation.

Response:

132. Page 97: The water budget calculation should be compared to the SFWMM.

Response:

133. Section 2.3.10: This is a very important section and highlights some of the important issues with the model and its application.

Response:

134. Editorial. A limited number of typographical and grammatical errors were observed in the documents. However, these minor errors do not affect the readability of the report.

Response:

135. Editorial. The figures are not of excellent quality. In fact they are very hard to read in this report. Figures will need to be revised before inclusion in the PIR.

Response:

136. Editorial. This report is particularly hard to read. Some of the simple ideas were lost in the details and the wording. The report needs to be simplified for inclusion in the PIR

Response:

Document: FINAL WATER MANAGEMENT EXISTING CONDITIONS

Reviewer: Adam C. Stuart, USACE-SAJ, EN-HW

137. EAA_ITR-ACS-1. On page 1 of the Final Water Management Existing Conditions document, the last line of the first paragraph is: "Also, for conveyance of water supply to the lower east coast via the EAA canals." This sentence is not a complete sentence; it is recommended that it be revised so as to make it a complete sentence.

Response: Concur. Changed to the following: " In addition, the WMS of EAA is operated for the conveyance of water supply to the lower east coast via the EAA canals. "

138. EAA_ITR-ACS-2**.** It is suggested that this existing conditions document include a more detailed map than those on pages 2 and 3, or that it refer to a more detailed map elsewhere in the report.

Response: Concur. Will try to include a map with all of the structures; however, this will probably be broken down to basins and STAs.

139. EAA_ITR-ACS-3. On page 4, the first paragraph contains a sentence which reads: "The EAA has resulted in major changes in the timing and quantity of water entering the WCAs, the ENP, and bays." Should the text "The EAA" be replaced by "Water management operations for the EAA"?

Response: Concur. Changed to the following: Water management operations for the EAA has resulted in major changes in the timing and quantity of water entering the WCAs, the ENP, and bays. Compared to pre-drainage system, damaging flows to estuaries, higher stages in the WCAs during wet periods, and lower stages in the WCAs during dry times have resulted from water management operations for the EAA.

140. EAA_ITR-ACS-4. Should the existing conditions document indicate that additional information on many of the structures of the EAA can be found in the 2000 Water Control Plan for Lake Okeechobee and Everglades Agricultural Area, and in the 1996 Master Water Control Manual for Lake Okeechobee and Everglades Agricultural Area?

Response: Concur. Added a statement in the second paragraph in the introduction.

141. EAA_ITR-ACS-5. Page 1 mentions that 15 project canals and 25 control structures serve the EAA. I counted over 40 structure descriptions in this report; I suggest that the above numbers be checked for accuracy and corrected if necessary.

Response: Concur. Changed statement to "…15 project canals and over 40 control structures…"

142. EAA_ITR-ACS-6. On page 7, should the text "G-409 is to supplies irrigation water" be replaced by "G-409 supplies irrigation water"?

Response: Concur. Corrected to G-409 supplies irrigation water.

143. EAA_ITR-ACS-7. On page 10, in the description under L-5 Canal, the word “drains” should be replaced by “drain”.

Response: Concur. Changed to the following: This canal drains the S-8 and S-7 surface water management basins.

144. EAA_ITR-ACS-8. On page 10, under S-3, in the **Primary Function** sentence, should the text “C-3 removes excess water” be replaced by “S-3 removes excess water”?

Response: Concur. Changed to S-3 removes excess water…

145. EAA_ITR-ACS-9. On page 7, should G-150 be included in the table?

Response: Concur. Added G-150 to the table.

146. EAA_ITR-ACS-10. On page 13, structure G-200B is discussed. However, in a SFWMD structure description, there appears to be an indication that this structure has been removed. Has it been removed? If so, should it be discussed in this report?

Response: Concur. Added a note in the description that the structure was removed in Feb 21, 2002.

147. EAA_ITR-ACS-11. On page 13, the report indicates that G-204 has four barrels. Is this correct? A SFWMD structure description indicates that G-204 has five barrels.

Response: Concur. Description changed from “four barrels” to five.

148. EAA_ITR-ACS-12. It is recommended that in Table H.6.2.2 on page 11, the S-354 entries be reviewed for accuracy.

Response: Concur. Changed S-354 regulatory releases tailwater stage from 24.8 to 13.2 and S-3 pump station units were changed from 890 cfs to 860 cfs.

149. EAA_ITR-ACS-13. Is S-5AX discussed in this report? Should it be discussed?

Response: Concur. Added a couple of sentences for a brief description and location. A note was added explaining that the structure was removed September 1999.

150. EAA_ITR-ACS-14. Is S-337 discussed in this report? Should it be discussed?

Response: Concur, but presume the reviewer meant G-337, because S-337 is considered part of the East Coast Conveyance System and should not be included with EAA Existing Conditions. Added a description and primary function paragraphs for G-337.

151. EAA_ITR-ACS-15. Is there a structure G-328? Is it discussed in this report? Should it be discussed?

Response: Concur. This structure is currently not listed with SFWMD's structure descriptions. However, will find more info and include that in the document.

152. EAA_ITR-ACS-16. For S-8 in the table on page 15, is the 11.0 ft NGVD design tailwater stage correct? A SFWMD structure description seems to indicate that the design tailwater stage is 11.9 ft NGVD.

Response: Concur. Changed 11.0 to 11.9'.

153. EAA_ITR-ACS-17. It is suggested that the values for S-351, S-2, and Gated Box Culvert 1 in the table on pages 20-21, be reviewed for accuracy and corrected if necessary. Also, in the same table, should entries be included for C-4A and S- 7W?

Response: Concur. Changed S-351 tailwater from 24.8' to 13.5'.

154. EAA_ITR-ACS-18. The description of C-12A on page 23 appears to be, to some extent, inconsistent with the description of Culvert 12A on page A-C12A-1 of the Master Water Control Manual for Lake Okeechobee and the Everglades Agricultural Area. Is this culvert 10' or 7' in diameter? It is recommended that the description of C-12A be reviewed for accuracy and corrected if necessary.

Response: Concur. Changed "10' diameter culvert to 7' as described on page A-C12A-1 of the Master Water Control Manual for Lake Okeechobee and Everglades Agricultural Area.

155. EAA_ITR-ACS-19. It is suggested that the Table of Contents be expanded so as to show the page number of each structure or canal description (not just the major canals).

Response: Concur. Table of Contents will be expanded.

156. EAA_ITR-ACS-20. S-338 is mentioned on page 24. Should it be further discussed in the document?

Response: Do you mean G-338? S-338 is part of the South Dade Conveyance system and will not be included with the EAA existing conditions document. Further discussion of G-338 has been included in the document.

157. EAA_ITR-ACS-21. G-328 (STA-2) is mentioned on page 24. Should it be further discussed in the document?

Response: This structure is currently not listed on SFWMD's structure descriptions. However, will find more info and include that in the document.

158. EAA_ITR-ACS-22. On page 24 the text “Inflows are from sources of S-6, S-2 basins, diversion runoff…” seems awkward. Does the grammar of this sentence need to be corrected?

Response: Concur to a certain degree. Changed to the following: Inflows are from sources in the S 6, S-2 basins, S-5A Basin diversion runoff via Ocean and Hillsboro canals, Chapter 298 Drainage Districts, and supplemental water needed to prevent STA-2 dryout, and water supply releases from Lake Okeechobee.

159. EAA_ITR-ACS-23. This comment concerns Table H.6.2.4 on page 25. It is recommended that the data in the table be reviewed for accuracy and that corrections be made if needed.

Response: Concur. Changed to “Inflows are from the S-6, S-2 diversion runoffs…”

160. EAA_ITR-ACS-24. The Hillsboro Canal Flow Diagram on page 26 refers to G-339. Should more information on G-339 be added to the document?

Response: Concur. Additional information on G-339 has been added to the document.

161. EAA_ITR-ACS-25. The Hillsboro Canal Flow Diagram on page 26 refers to G-329A-D. Should more information on G-329A-D be added to the document?

Response: Concur. Additional information on G-329A-D has been added to the document.

162. EAA_ITR-ACS-26. The Hillsboro Canal Flow Diagram on page 26 refers to G-331A-G. Should more information on G-331A-G be added to the document?

Response: Concur. Additional information on G-331A-G has been added to the document.

163. EAA_ITR-ACS-27. The Hillsboro Canal Flow Diagram on page 26 refers to G-333A-E. Should more information on G-333A-E be added to the document?

Response: Concur. Additional information on G-333A-E has been added to the document.

164. EAA_ITR-ACS-28. The Hillsboro Canal Flow Diagram on page 26 refers to G-336A-F and G-336G. Should more information on these structures be added to the document?

Response: S-336A-F is a passive water control structure. Therefore, additional information is not required.

165. EAA_ITR-ACS-29. On page 27, the heading “S 352 (HG-5)” should be changed to “S-352 (HGS-5)”.

Response: Concur. This was changed to S-352(HGS-5).

166. EAA_ITR-ACS-30. On page 28, the first paragraph of the C-10A description contains an incomplete sentence. This grammatical problem should be fixed.

Response: Concur. Corrected to the following: C-10A is located at the north…

167. EAA_ITR-ACS-31. On page 28, in the **Secondary Function** sentence, the word "measurement" should be changed to "measure".

Response: Concur. Changed to the following: "…affords some measure…"

168. EAA_ITR-ACS-32. Culvert C-13 is mentioned on page 28. Should it be described separately in the report?

Response: Concur. Added additional description and function paragraphs.

169. EAA_ITR-ACS-33. G-250 is described on page 31. Should information concerning G-250S be added to the report?

Response: Concur. Added additional description and function paragraphs.

170. EAA_ITR-ACS-34. In the **Post ECP** paragraph on page 31, should "S-5 Basin" be replaced by "S-5A Basin"?

Response: Concur. Changed "S-5 Basin" to S-5A Basin.

171. EAA_ITR-ACS-35. In the L-7 Canal description on page 32, it appears that the words "is to" should be deleted.

Response: Concur. Removed "is to".

172. EAA_ITR-ACS-36. In the L-8 Canal description on page 32, should the text "by way of C-10" be replaced by "by way of C-10A"? Also, the text "l-10/L-12" should be replaced by "L-10/L-12".

Response: Concur. Changed to "by way of C-10A" and I-10/L-12 to L-10/L-12.

173. EAA_ITR-ACS-37. It is recommended that the primary and secondary functions of the L-8 Canal that are provided on page 32 be checked for correctness and modified if necessary.

Response: Concur. Corrected the primary and secondary functions.

174. EAA_ITR-ACS-38. In the last paragraph on page 32, it appears that the word "form" should be replaced by "from".

Response: Concur. Changed "form" to from.

175. EAA_ITR-ACS-39. In the table entitled "Perimeter Structures – West Palm Beach and L-8 Canal" on page 33, should C-10A and S-76 be included in this table?

Response: Concur. C-10A and S-76 have been added to the table.

176. EAA_ITR-ACS-40. In the table on page 33, it is recommended that the information on S-352 be reviewed for accuracy and modified if needed.

Response: Concur. Added design and SPF conditions for S-352. For headwater, this includes the interim and ultimate values.

177. EAA_ITR-ACS-41. In the table on page 33, the invert elevation information for S-5AW should be reviewed for accuracy and modified if needed.

Response: Concur. Changed to “flow line elevation = -1.75 to 0.3 ft NGVD”.

178. EAA_ITR-ACS-42. In the table on page 33, the design information for G-251 and G-310 should be reviewed for accuracy and modified if needed.

Response: Concur. Information for G-251 and G310 were added to the table.

179. EAA_ITR-ACS-43. In the table on page 33, the optimum stage data for S-5A should be reviewed for accuracy and modified if needed.

Response: Concur. Added a note stating optimum stages between 11.5 and 10.5 ft. are maintained during irrigation and drainage phases, respectively.

Document: PRELIMINARY SEEPAGE CONSIDERATIONS REPORT
Reviewer: Randy Rabb, P.E., USACE-SAJ, EN-GS

180. B.2.6.4. This report documents a level of effort that is appropriate for the PIR phase, for the project areas that were examined in detail. However, due to the range of seepage rates that were determined, and variation between the historical data and the results of this study, the noted gaps in the data for the central and northern parts of the EAA need to be addressed in the current, PIR phase.

Response: Additional data was collected in the central and northern parts of the EAA project during the three efforts of geotechnical exploration performed by the Corps.

182. Pages 17 - 21. Information on theses pages is either missing or incomplete, and is apparently associated with the electronic format. Since much project documentation is distributed electronically, these problems need to be corrected.

Response: The pages will be checked and the problem will be corrected. Pages 17 (continuation of conclusion), 18 (Seepage Map) and 19 (continuation of seepage values), will be corrected.

Document: VARIOUS GEOTECHNICAL PRODUCTS
Reviewer: Randy Rabb, P.E., USACE-SAJ, EN-GS

General Project Comments:

183. Geotechnical and hydrogeologic explorations for the PIR phase include a literature search of existing data, identification of additional data needs, and a data collection work plan. The results from these efforts need to be documented. A compilation of the existing data is particularly significant because of the extremely large project area.

Response: Most of the existing data for the EAA project that the PDT team is aware of the data collected and gathered in one location. This data consists of several volumes of information collected by SFWMD and by the Corps. In addition, the data collected was compiled in a single database using the GMS computer program.

184. Results from the PIR phase subsurface explorations and instrumentation need to be summarized in a single report.

Response: This is definitely a great idea, however, this cannot be easily done because of the amount and format of data available. The data available is mostly in thick reports that are not available in electronic format, so it is difficult to compile the data in a single report without spending significant amount of time and money. All the available information has been collected in a one location at the Corps.

185. PIR phase geotechnical design and analyses need to be documented. These efforts should include preliminary embankment design, seepage control measures, structure foundation design parameters, borrow and fill relationships, erosion protection, and instrumentation requirements.

Response: This will be done as soon as the selection of the final alternative is completed. At this time, the PDT is working on selecting and evaluating alternatives. Preliminary geotechnical designs will be performed after reaching the tentatively selected plan.

Document: REVISED CONCEPTUAL REPORT of GEOTECHNICAL EXPLORATION (GEOTECHNICAL CORE BORING REPORT - EFFORT 1)
Reviewer: Manjiang "Margie" Zhang, Ph.D., P.G., USACE-SAJ, EN-GG

186. In the title "Conceptual Report of ….", what does the **conceptual report** mean?

Response: The term conceptual primarily refers to the phase of the project at the time of data collection. We are in the PIR phase and at this time we are still in the "Conceptual Design" phase.

187. Each section of the report needs to be numbered.

Response: The report was prepared by an A/E contractor who is no longer under contract. This task was closed out and, at this point, it is unfeasible to request that the contractor perform the revision.

188. On pages 9 and 10, in the "Analysis of Recharge Test Data" Section, a map needs to be used to show the locations of recharge tests.

Response: The recharge tests were performed at the existing well locations (CP02-EAARS-0001, 0002, 0004, and 0005) as presented on page 1 of the report.

189. On pages 9 and 10, in the "Analysis of Recharge Test Data" Section, the test data needs to be interpreted in more detail, such as the variation of permeability in vertical and horizontal directions, and the variation in different compartments.

Response: The recharge data collected and presented in this conceptual report is relatively limited, however, the table on page 10 of the report shows the relative variations in the vertical and horizontal permeabilities at the tested locations.

190. In Table 5 of the Core Boring Profiles Section, the directions of the profiles need to be indicated. The horizontal scale for these profiles need to be indicated.

Response: These profiles are located under Tab 5 and not Table 5. The profiles are showing the subsurface conditions encountered at each boring location. The distances between the borings as shown on these profiles do not reflect the correct distances. The horizontal scale cannot be added to reflect the correct horizontal distances. In addition, it is not necessary to indicate the

direction of the profiles. Keeping in mind that if this to be accomplished, it will require time and money especially the task has been closed out.

Document: GEOPHYSICAL REPORT - EFFORT 2
Reviewer: Manjiang "Margie" Zhang, Ph.D., P.G., USACE-SAJ, EN-GG

191. No Comments

Document: GEOTECHNICAL REPORT - EFFORT 3
Reviewer: M. K. Irfan, PG, USACE-SAJ, EN-GG

192. No Comments

Document: FINAL SOCIOECONOMICS EXISTING CONDITIONS
Reviewer: Danny Peck, USACE-SAJ, PD-D

193. The Environmental Justice section of the report does a good job describing what needs to be addressed for environmental justice but the final report will need to include site-specific information.

Response: Concur that the report does not include site-specific information for environmental justice issues. Site specific information will be collected during the evaluation phase after the final array of alternatives are defined.

Document: SOIL SUBSIDENCE AND LAND USE PROJECTIONS
Reviewer: Danny Peck, USACE-SAJ, PD-D

194. No Comments

Document: SOIL SUBSIDENCE AND LAND USE PROJECTIONS
Reviewer: Randy Rabb, P.E., USACE-SAJ, EN-GS

195. General. The soil subsidence condition within the EAA region is well documented in this report. A potential relationship between the proposed project and the soil subsidence condition is briefly noted on page 13 of this document, however, the effect (beneficial or adverse) that the proposed EAA Project will have on the regional soil subsidence needs to be fully described in this, or another project document.

Response: The impacts of land use changes upon subsidence will be documented in the future without project condition report and will be considered for alternative project conditions if land use changes result from implementation of an alternative plan.

196. General. Based on the findings documented in this report, soil subsidence within the EAA region is a significant long-term problem. It is unclear if reduction in soil subsidence within the EAA region is one objective of the EAA Project.

Response: Reduction of soil subsidence within the EAA region is not an objective of the EAA project. However any increases or reductions in subsidence caused by land use changes may impact future land use development options. These options and their impacts will be explained in the PIR.

Document: FINAL EXISTING LAND USE CLASSIFICATIONS
Reviewer: Danny Peck, USACE-SAJ, PD-D

197. Could not find this document.

Response: Concur. There is no formal existing land use classifications document. The land use classifications currently being used in the study are embedded in the GIS existing land use file. These classifications are currently being reviewed and expanded where necessary by the Charleston District to accommodate a flood control study which will be conducted during CY-04. The final classifications will be delivered for review in a technical memorandum due this summer.

Document: FINAL ALTERNATIVE PLAN SCREENING CRITERIA
Reviewer: Phil Sylvester, USACE-SAJ, EN-HI

198. EAA_ITR-PTS-1. The goals and objectives of the project management plan are ambitious and they will require our best work if we are to achieve them. The best way to begin the effort is to clearly articulate those goals – articulate them consistently. In the Introduction on page one the project goals are presented within the overall framework of an environmental delivery timing improvement. The same project goals are presented differently in the Introduction to the document, B.2 HYDRAULICS, B.2.3 HYDROLOGIC MODEL CALIBRATION AND VERIFICATION . In the latter document, the goals are not presented within the framework of a timing issue. In the latter document, the implication is that water delivery volume (not timing), is the issue. I believe that the latter document presents the project goals correctly. The point is, the project goals need to be stated clearly and consistently in all of the documents that list them.

Response: Concur that there is inconsistency that needs to be corrected among documents. The goal should be reflective of "the performance this volume produced during modeling within the Restudy." This performance, relative to the EAA Storage Reservoirs Project, is due to both the volume and timing water deliveries. This will be clarified document and will be corrected in as these documents are merged and/or utilized in the PIR.

199. EAA_ITR-PTS-2. The Everglades Construction Project (ECP), is an important effort that will change sub-basin alignments, canal conveyances, structure inventory, and other aspects of the physical EAA configuration. Those changes must be understood by anyone who endeavors to know the system and how it functions. The ECP is mentioned, but not defined. The physical components of the ECP should be provided in this document. It should not be assumed that the ECP is understood by the reader.

Response: Physical features of the ECP will be described elsewhere in the Project Implementation Report.

Document: FINAL ALTERNATIVE PLAN SCREENING CRITERIA
Reviewer: Fred McAuley, USACE-SAJ, EN

General Comments

200. Reservoir configurations may be developed to consider several bottom depths ranging from 4-Ft depth to 15-Ft depth (possibly ~6-Ft below existing grade). The following observations are offered:

a. More use of deeper pool reservoir area results in less land and levee - Screening Criterion 1.0: Storage Capacity and Criterion addressing relative costs may consider this too.

b. Incorporation of compartmental reservoir plans offers more (to maximum) flexibility, but adds levee and structures – possibly pumps (this should be held to

a minimum and loss of value points may be considered for extensive and costly cellular construction). Screening Criterion addressing relative costs may consider this too.

c. Should Reservoirs A and B be connected (inverted siphon or pumps may be needed for this), or can an evaluation value be giver for the lower cost independent operating Reservoir A and B? Screening Criterion addressing relative costs may consider this.

d. The variable depth reservoir bottom may offer seasonal or permanent vegetation development and capture additional species habitat (seasonal may capture annual habitat benefits for specific grasses and migratory critters). This may be recognized in Screening Criterion 7.0: in addition to Wetland habitat units captured.

e. The range of minimum pool (depth) may sustain an acceptable level of vegetation and habitat within the reservoir even at low pool conditions. This may be recognized in Screening Criterion 7.0: in addition to Wetland habitat units captured.

f. Deeper reservoir results in more pumping head – more energy use and larger pumps (More O&M cost). Screening Criterion addressing relative costs may consider this.

g. Ground water infiltration may influence storage capacity (displace available storage volume) for deeper below grade reservoirs. Screening Criterion 1.0: Storage Capacity value.

h. Reservoir lining may consider LDPE, HDPE or clay – deeper reservoir may require lining. Screening Criterion addressing relative costs may consider and Cultural Resources may be affected.

i. Screening Criterion 1.0: Storage Capacity – CONTINUED; states, . . . Although the increments in storage capacity may not be equivalent between screening values; each value above (0) represents an increase in storage capacity from the value below it. This statement is unclear to me – may be confusing to others.

Response: We are considering a, d, e, f, and g. Although we have removed Screening Criteria 1, we are capturing an aspect of volume by including a cost effectiveness (effective storage volume versus cost). We do not plan to have the detail and rational developed required to screen based on comments b and c at the screening level.

201. Screening Criterion 3.0: STA's and Rationale:

a. STA's configurations should be considered with varied depths and weigh benefits resulting - less acreage footprint and levee reductions.

b. STA levee berm crown width may be under consideration to be 12' per reference EM1110-2-1913. These are low-level containment berms that could serve well with less than 12-top-width – adding to efficiency and at less cost.

c. STA's should be considered for development of a variable reservoir bottom and acquire seasonal or permanent vegetation development and capture additional species habitat.

d. STA'S with low pool maintained with a minimal wet level pool may sustain vegetation used for uptake of phosphorus and residual agricultural nutrients.

e. Screening Criterion 1.0: Storage Capacity - The range of storage capacity seems too varied – why are lower capacity values even being considered? Fewer ranges may simplify evaluations – see screening values based on relative costs of improvements.

Response: Regarding comment a, b, c, and d - all conceptual alternatives formulated were adjacent to the STAs. Therefore, this feature simply became a design criteria and this screening criteria was deleted. The range of storage capacities was included to identify breakpoints in the incremental cost effectiveness analysis.

202. Screening Criterion addressing relative costs - Pumps should consider vertical or horizontal pumps and may consider simple pipe intake vs. complex intake configurations, formed suction intake and major structural applications. A broad range of first cost and long-term ownership cost will be affected.

Response: Concur, a cost effectiveness screening criteria has been developed but this level of detail will not be available at the initial screening. Also, these design considerations will be applied to all alternatives and therefore will not vary at this level of screening.

203. Screening Criterion addressing relative costs - Screening (trash racks) for pump intake may be a major cost item – automated-mechanical cleaning trash racks are a high cost specialty system. A broad range of first cost and long-term ownership cost will be affected.

Response: Concur, a cost effectiveness screening criteria has been developed but this level of detail will not be available at the initial screening. Also, these design considerations will be applied to all alternatives and therefore will not vary at this level of screening.

204. Screening Criterion 8.9: Cultural Resources, . . . note that when an area is cleared for construction (no impact to cultural resources) the more functioning project features and capacity should be placed within the cleared areas. Higher and deeper will capture more capacity, and reduce levees and real estate.

Response: Noted.

Document: FINAL ALTERNATIVE PLAN SCREENING CRITERIA
Reviewer: Adam C. Stuart, USACE-SAJ, EN-HW

205. EAA_ITR-ACS-1. In the Final Alternative Plan Screening Criteria document, on page 2 of Attachment 1, should the text "estimate the combined capacity" be changed to "estimate the combined storage capacity"?

Response: Noted. Although this screening criterion has been deleted, the volume of storage was utilized in a new cost effectiveness of storage criterion. This criterion utilized a variable called "effective storage capacity" which incorporated considerations of seepage and evaporation.

Document: FINAL ALTERNATIVE PLAN SCREENING CRITERIA
Reviewer: Rafael Velez, USACE-SAJ, EN-T

206. EAA_ITR-RV-1. For the screening criteria, would seepage and soil conditions be factors to consider? Shouldn't this be added to information needed?

Response: Concur. Although this screening criterion has been deleted, the volume of storage was utilized in a new cost effectiveness of storage criterion. This criterion utilized a variable called "effective storage capacity" which incorporated considerations of seepage and evaporation.

Document: FINAL ALTERNATIVE PLAN SCREENING CRITERIA
Reviewer: Maged Hussein, Ph.D., P.E. Interagency Modeling Center, USACE-SAJ, EN-H

207. Is the flood protection "improvement" in the EAA an objective to be achieved by Federal funding?

Response: Yes, it is a project purpose stated in the Restudy. However improving flood protection has been removed from the project goals and will be considered as incidental.

208. Should the alternative be measured against 1-, 5-, 10- year flood protection criteria rather than on capacity only?

Response: Improving flood protection has been removed from the project goals and will be considered as incidental.

209. Will the criteria by measured against basin wide flood protection or farm level flood protection?

Response: Improving flood protection has been removed from the project goals and will be considered as incidental.

Document: FINAL ALTERNATIVE PLAN EVALUATION CRITERIA DOCUMENT
Reviewer: Danny Peck, USACE-SAJ, PD-D

210. No Comments

Document: ALTERNATIVE PLAN EVALUATION CRITERIA HIERARCHY
Reviewer: Stephen Biemiller, USACE-SAJ, PD-PF

211. Several minor typographical errors were noted; suggested amendments and corrections will be forwarded to the PDT in an informal manner.

Response: Noted.

212. Evaluation Criteria Fact Sheet: 1.2.1 Terrestrial Habitat. In 'rationale' section for this evaluation criterion, it claims that upland habitat functional gains include improved water quality. Please provide a brief explanation of how improved upland habitat will improve water quality.

Response:

213. Evaluation Criteria Fact Sheet: 1.2.2 Aquatic Deep Water Refugia. In the 'rationale' section, it states: " Deep-water refugia may also provide temporary feeding grounds for avian species such as wading birds and enhance nutrient removal from the water column by allowing uninterrupted SAV growth." Please provide an example or two of the SAV species that would be able to survive in these deep-water areas during the long periods of normal high water levels. Expected water clarity and actual water depths might be issues to consider.

Response:

214. Evaluation Criteria Fact Sheet: 1.2.2 Aquatic Deep Water Refugia. Descriptions of certain other evaluation criteria state that frequencies and durations of 'dry-outs' in the reservoirs will be minimized as much as possible. In the alternatives that are shown to have few or no expected 'dry-outs', will the importance or significance of the deep-water refugia evaluation criteria be reduced accordingly? (In the plans whose reservoirs are not expected to have 'dry-outs', will having deep-water refugia be considered advantageous?)

Response:

215. Evaluation Criteria Fact Sheet: 1.2.2 Aquatic Deep Water Refugia. It seems possible that the deep water refugia areas might act as sediment traps, requiring more frequent maintenance dredging than may otherwise be necessary. If this is the case, it should be mentioned that along with the benefit of having deep water refugia comes some extra O&M cost.

Response: Noted.

Document: ENVIRONMENTAL ASSESSMENT SUMMARY by URS
Reviewer: Lisa R. Gued, Ph.D., USACE-SAJ, EN-GE

216. For the project area, at a minimum, follow the Recommendations of the URS Report as outlined on page 40:
a. Evaluate Tract # 100-102, Rotenberger and Holey Lands Wildlife Management Areas, particularly former cultivated areas on the Rotenberger Wildlife Management Area.

b. Complete corrective actions at Talisman Sugar Mill and obtain regulatory concurrence for the other remaining areas of the farm.
c. Obtain access to the Woerner Farms #2 and 3, Tracts 100-001 and 100-039 to initiate additional assessments and corrective actions.
d. Closure of remaining pump stations and above ground storage tanks subsequent to cessation of farming operations.
e. Confirm closure of 4 pump stations, solid waste, and arsenic impacted groundwater at U.S. Sugar Tract # 100-101.
f. Closure of septic tank, conduct asbestos survey and abandon 4 wells at Griffin Tract #100-004.

Response: Duly noted. Per current Corps Office of Counsel directive, CESAJ would not be authorized to directly participate in remediation actions.

217. For the project area, task a PDT representative to ensure that the Recommendations of URS are tracked, scheduled and completed.

Response: Duly noted.

218. If the project area is presently 500,000 acres, then it is recommended that Phase 1 Risk Assessment activities be conducted for areas not covered in the report for 148,160 acres.

Response: Though the project area is 500,000 acres, standard operating procedure for CERP has been that only the approximate area encompassed by the project features requires assessment for HTRW/soil contamination. Therefore, not all of the project area would require additional assessments unless preliminary surveys indicated that contamination might be present.

219. Prior to acquiring the properties that make up the project area, with the exception of the Holey Land and Rotenberger Wildlife Management Areas and Tract #100-102, the South Florida Water Management District (SFWMD) executed Phase I and Phase II Environmental Site Assessments of the projects. This was in accordance with established professional procedures.

Response: Noted.

220. The review encompassed 148,160 acres of the “project area”. The Project Management Plan (PMP) says that the EAA is 500,000 acres. If 350,000 acres have not been investigated, Phase I Environmental Risk Assessment is recommended. Note that many of the sites in this area required extensive remediation and corrective action. Examples include the following. Tract

100-101, 104-002-US Sugar Corporation had remediation and Tract #100-009, Hadley Farms had 36 tons of petroleum-impacted soil removed. Tract #100-106, 100-107, 100-108-WPM Farms had 23 tons of zinc-impacted soil and rock removed. Tract #100-020-Farm 21 had 5000 tons of toxaphene-impacted soil, arsenic-impacted groundwater, 100 tons of DDE, DDD and toxaphene-impacted soil removed. Tract #100-104, 100-034 had 3700 tons of petroleum-impacted soil, arsenic-impacted soil and 5000 tons of trash, and Multi-Turf Farm 1 required soil and groundwater remediation, including 190 tons of petroleum-impacted soil removed. Tract 101-106 has had remedial action and still requires action. Several sites did not have HTRW concerns.

Response: Though the project area is 500,000 acres, standard operating procedure for CERP has been that only the approximate area encompassed by the project features requires assessment for HTRW/soil contamination. Therefore, not all of the project area would require additional assessments unless preliminary surveys indicated that contamination might be present. Per current Corps Office of Counsel directive, CESAJ would not be authorized to directly participate in remediation actions.

221. The report provided an excellent compilation of historical and most recent / current land use per tract.

Response: Noted.

222. URS Corporation was tasked to review and compile the work of environmental assessments performed in the past. Per Table 2, it is noteworthy that URS Corporation performed approximately 20% of the assessments in the past. Note that URS Corporation is formerly Dames & Moore and this corporation accounts for another 15% of the assessments. A company reviewing its own work provides an opportunity for not “reinventing the wheel” on many issues. Ideally, URS should have a thorough understanding of the project, given that it worked on it so extensively. On the other hand, the opinion of URS might not be entirely unbiased in evaluating its prior performance.

Response: Noted.

223. The contractor did an excellent job of explaining that there were significant changes in the procedures by which Phase I and II Risk Assessments were performed after 1999. The contactor reviewed reports first conducted in 1989. URS rightfully indicates that there may be serious limitations in the pre-1999 assessments.

Response: Noted. USFWS has expressed concerns regarding the earlier assessments. We are awaiting related comments that will be part of its HTRW review of Phase I/II activities pertaining to another project (Winsberg).

Document: FINAL ENVIRONMENTAL EXISTING CONDITIONS
Reviewer: Jon Moulding, USACE-SAJ, PD-ES

224. No Comments

Document: CULTURAL RESOURCES REPORT, COMPARTMENT B
Reviewer: Jon Moulding, USACE-SAJ, PD-ES

225. No Comments