ATTACHMENT 7

COMMENTS FROM COOPERATING AGENCIES AND VICKSBURG DISTRICT RESPONSES TO REVISED ENVIRONMENTAL APPENDIX REVIEW JULY 2005

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183-3435

REPLY TO
ATTENTION OF:

July 21, 2005

Planning, Programs, and
Project Management Division
Planning and Project Management
Branch

Mr. Ray Aycock
Field Supervisor
U.S. Fish and Wildlife Service
6578 Dogwood View Parkway
Jackson, Mississippi 39213

Dear Mr. Aycock:

The U.S. Army Corps of Engineers, Vicksburg District, requests you attend a meeting of cooperating agencies for the Yazoo Backwater Reformulation Project on July 29, 2005, at 9 a.m. at our District headquarters. We will brief the current status of the study and will distribute the preliminary final environmental appendixes to all agencies for a 30-day review and comment.

Thank you for your assistance in this matter. If you have any questions, please contact Mr. Gary Young (telephone (601) 631-7156).

Sincerely,

Douglas J. Kamien, P.E.
Deputy for Programs and
Project Management

Same letter sent to:

Dr. Gerald Miller
Environmental Protection Agency
Region IV
61 Forsyth Street
Atlanta, Georgia 30303

Mr. Homer Wilkes
State Conservationist
Natural Resources Conservation Service
McCoy Federal Building, Suite 1321
100 West Capitol Street
Jackson, Mississippi 39269-1602

Dr. Sam Polles
Executive Director
Mississippi Department of Wildlife,
Fisheries and Parks
P.O. Box 451
Jackson, Mississippi 39205

Mr. Charles Chisolm
Executive Director
Mississippi Department of
Environmental Quality
P.O. Box 20305
Jackson, Mississippi 39289-1305

Mr. Tony Dixon
Forest Supervisor
McCoy Federal Building, Suite 1141
100 West Capitol Street
Jackson, Mississippi 39269

Mr. Peter Nimrod
Chief Engineer
Board of Mississippi Levee Commissioners
P.O. Box 637
Greenville, Mississippi 38702-0637

Honorable Haley Barbour
ATTN: Mr. John Roundsville
P.O. Box 139
Jackson, Mississippi 39205

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183-3435

REPLY TO
ATTENTION OF:

September 7, 2005

Planning, Programs, and
Project Management Division
Planning and Project
Management Branch

Mr. Ray Aycock
Field Supervisor
U.S. Fish and Wildlife Service
6578 Dogwood View Parkway
Suite A
Jackson, Mississippi 39213

Dear Mr. Aycock:

I refer to recent requests by cooperating agencies to extend the deadline for reviewing the Yazoo Backwater Reformulation Study appendixes that you received on July 29, 2005, during our meeting at the Vicksburg District. As you know, at that meeting we requested your comments within 30 days.

On January 14-15, 2003, we briefed your agency, along with U.S. Fish and Wildlife Service; Mississippi Department of Wildlife, Fisheries and Parks; and Mississippi Department of Environmental Quality, on the revised wetland methodologies being used for the study. In that meeting, Dr. Dan Smith of the U.S. Army Engineer Research and Development Center gave a presentation on using HGM to assess impacts on wetland functions and recovery of wetland functions. In addition, Messrs. David Johnson and Charles McKinnie of our Engineering Division provided detailed presentations on the Flood Event Assessment Tool (FEAT) and the hydraulics and hydrology analysis that supports the FEAT model. Aside from the model outputs presented at our July 29, 2005, meeting, the wetland methodologies have not changed.

While the preliminary final Wetland Appendix and Analysis is voluminous, and the Water Quality Appendix has been expanded to include a discussion of total maximum daily loads, they are not complicated. Your agency has already reviewed the terrestrial, aquatic, and waterfowl methodologies as drafts in our September

2000 draft report and Supplemental Environmental Impact Statement. Only the outputs have changed because of updated land use and minor changes to the models. Since the Wetland and Water Quality Appendixes are voluminous, we will extend the review period to 60 days. Please provide your comments by September 30, 2005.

Although my staff is available to answer questions or meet with your staff any time during the review period, we have scheduled another meeting to address questions on September 15, 2005, 9 a.m. to 12 p.m. in our Executive Conference Room.

If you have any questions or would like to participate in this followup meeting, please contact Mr. Marvin Cannon of this office (telephone (601) 631-5437).

Sincerely,

Douglas J. Kamien, P.E.
Chief, Planning, Programs, and
Project Management Division

Dr. Gerald Miller
Environmental Protection Agency
Region IV
61 Forsyth Street
Atlanta, Georgia 30303

Mr. Ray Aycock
Field Supervisor
U.S. Fish and Wildlife Service
6578 Dogwood View Parkway
Suite A
Jackson, Mississippi 39213

Mr. Homer Wilkes
State Conservationist
Natural Resources
Conservation Service
McCoy Federal Building
100 West Capital Street
Suite 1321
Jackson, Mississippi 39269-1602

Mr. Tony Dixon
Forest Supervisor
U.S. Forest Service
McCoy Federal Building
100 West Capital Street
Suite 1141
Jackson, Mississippi 39269

Dr. Sam Polles
Executive Director
Mississippi Department of
Wildlife, Fisheries and Parks
1505 Eastover Drive
Jackson, Mississippi 39211-6374

Mr. Charles Chisolm
Executive Director
Mississippi Department of
Environmental Quality
P.O. Box 20305
Jackson, Mississippi 39289-1305

Mr. Peter Nimrod
Chief Engineer
Board of Mississippi
Levee Commissioners
P.O. Box 637
Greenville, Mississippi 38702-0637

MISSISSIPPI
DEPARTMENT OF WILDLIFE, FISHERIES AND PARKS

SAM POLLES, Ph.D.
Executive Director

September 15, 2005

Douglas J. Kamien, P.E.
Chief, Planning, Programs, and Project Management Division
Department of Army, Vicksburg District Corps of Engineers
4155 Clay Street
Vicksburg, MS 39183-3435

Dear Mr. Kamien,

This is in response to your September 7, 2005 letter requesting our agency's comments regarding the Yazoo Backwater Reformulation Study. Having reviewed available information on this study, our agency offers no negative comments relative to potential fish and wildlife impacts of this project. Based on our cursory review, we believe that the proposed mitigation actions will adequately mitigate impacts of this project on fish and wildlife resources. We appreciate the opportunity to provide input into this process.

Sincerely,

Sam Polles, PhD
Executive Director
Mississippi Department of Wildlife, Fisheries and Parks

UNITED STATES DEPARTMENT OF AGRICULTURE

NRCS
Natural Resources Conservation Service
Suite 1321, Federal Building
100 West Capitol Street
Jackson, MS 39269
COM: (601) 965-5205 FAX: (601) 965-4940

October 11, 2005

Mr. Douglas J. Kamien, P.E.
Chief, Planning, Programs, and
Project Management Division
Corps of Engineers
4155 Clay Street
Vicksburg, MS 39183-3435

ATTENTION: Planning, Programs, and Project Management Division
Planning and Project Management Branch

Dear Mr. Kamien:

Thank you for the opportunity to review and comment on the Yazoo Backwater Reformulation Study appendixes. The Natural Resources Conservation Service (NRCS) has reviewed your findings and has no further comments at this time. As a cooperating agency, I would like to request that you keep the NRCS apprised of any additional data as it becomes available.

Sincerely,

Homer L. Wilkes ACTING
State Conservationist

cc: Kim Harris, State Conservation Engineer, NRCS, Jackson, MS

STATE OF MISSISSIPPI
HALEY BARBOUR
GOVERNOR
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
CHARLES H. CHISOLM, EXECUTIVE DIRECTOR

Post-it® Fax Note 7671 | Date 9/30 | # of pages ▶ 13
To Mr. Douglas J. | From Eric Bass
Co./Dept. Kamien | Co. MDEQ-OPC
Phone # | Phone # 601 961 5100
Fax # 601 631 5215 | Fax #

September 30, 2005

Mr. Douglas J. Kamien, P.E.
Chief, Planning, Programs, and
Project Management Division
Department of the Army
Vicksburg District, Corps of Engineers
4155 Clay Street
Vicksburg, Mississippi 39183-3435

RE: Review Comments
Yazoo Backwater Reformulation
Study Appendices

Dear Mr. Kamien:

We have reviewed the following draft documents for the Yazoo Backwater Project:

Appendix 1: Mitigation

Appendix 10: Assessment of Wetland Resources and Evaluation of Flood Control Alternatives for the Yazoo Backwater Project. Including EPAs report

Appendix 16: Water Quality

Wakeley, James S. 2004. An Evaluation of Changes in Terrestrial Habitats Resulting from the Yazoo Backwater Project, Mississippi: 2004 Analysis of New Project Alternatives. CERDC, Corps of Engineers, Dec 2004

Evans, Darrell E, 2005. Waterfowl Technical Appendix for the Yazoo Backwater Reformulation Project Report. CERDC. Corps of Engineers. July 2005.

Kilgore, K. Jack and Hoover, Jan Jeffrey, 2005. Effects of Yazoo Backwater Reformulation Project of Fish Habitat. CERDC. Corps of Engineers, Vicksburg, MS. July 2005.

Please find attached our comments on these documents. Some general comments are first presented, followed by specific comments on each appendix reviewed.

Please feel free to contact Mr. Robert Seyfarth of our staff at (601) 961-5160 or our consultant, Dr. Dennis Ford of FTN Associates, Ltd., at (501) 225-7779 if you have any questions.

Sincerely,

Phil Bass for

Charles H. Chisolm
Executive Director

CHC/PB/RHS:jar
Attachment

GENERAL COMMENTS.

1. It would help to have a table of contents or roadmap for the entire document to know what Appendices there are and which ones will be revised. In some cases references were made to past documents that have apparently not been updated or did not include the referenced documentation. Will the 2000 Report be updated? What about the economics and engineering supplement? These documents need to be reviewed. There was no mention of Pondberry in any of the documents. It is our understanding that a separate supplement on endangered species is being prepared.

2. Much of the data used is old (early 1990s) with no comments justifying why it is still valid. Some type of justification is needed to support the use of the old data, indicate why it is still valid today, and why it represents the existing resources. The use of these old data will likely be challenged during the certification process.

3. The CERDC reports were reviewed but it is assumed that since the HEP team included representatives from the USFWS and MS Game and Fish, everyone is in agreement on the approach and results. This analysis can always be done in a number of different ways to arrive at impact numbers. Unless there is a disagreement on the HEP team, we should probably just go with their analysis. If there is disagreement,that should be described.

4. We need a better understanding of the proposed non structural alternatives. Conceptually the non structural alternatives are difficult to comprehend since one of the project objectives is to reduce flooding of ag lands. We need sufficient information, including the economic analysis, to insure that we are not comparing apples and oranges.

APPENDIX 1: MITIGATION

GENERAL COMMENTS

1. MDEQ 401 Certification regulations require MDEQ to evaluate mitigation including what the "significant and unavoidable impacts are, how they affect specific species and the ecosystem". In addition, we need to delineate the environmental toll of the project. We need specific plans to make this determination.

2. On the surface, the proposed mitigation does not seem commensurate with the environmental toll of the project. A guarantee of 13,745 ac versus impacting at least 26,263 ac of jurisdictional wetlands does not appear to be consistent It would be difficult to defend this at this time. In the 401 certification process, this environmental toll can be interpreted beyond the HGM results.

3. We know the acreages, general locations, but not specific plans. It is indicated that the conservation easements will allow the owners to use the land for many purposes including timber. Is this negotiable? Could a condition be inserted that if

they use the land for silviculture that they implement US Forest Service/MDEQ BMPs? It would address one of the certification requirements.

4. Because we are looking at ecosystem impacts, the distinction between jurisdictional and non jurisdictional wetlands is not as important except jurisdictional wetlands must be mitigated.

SPECIFIC COMMENTS

1. In the Summary it states that Vicksburg initiated wetland function monitoring in 1999 by ERDC using the hydrogeomorphic methodology and preliminary results look good but long term data are required. If data indicate a functional replacement is not occurring as projected, a mitigation reanalysis would be conducted. We need to review this data and determine what would require a reanalysis. Again, we need to be as specific as possible.

2. The Appendix rationalizes that since the number of acres of forest lands has remained stable since the early 1980s, changes will not occur in future How can we be assured of this since the hydrology will change and the 2yr flood plain will drop about 3 ft. During this period how much land was reforested? We can't predict the future very well, especially agricultural economics. We need to be able to monitor this and have plans to mitigate if changes do occur.

3. P I-45, par 78 discusses the development of a reforestation plan for the easement secured by Corps. It implies Corps will develop the plan. Will anyone review or approve the plan. What is the schedule? Within 1 year of purchase? Again, the more details, we have, the better.

4. P I-51, Table I-33. It would be helpful if dates were provided in this table so that we can see when the acres were acquired. Are there any trends indicating it is getting more difficult to purchase land?

5. P I-52, par 87. Is the 96,000 acres referenced and shown in Figure I-1 within the 2 year floodplain before the project or after? Is open land both crop and non-crop land in Figure I-1? Priorities in purchasing should be provided. Since it is implied that lands below 87 ft (1 year floodplain) will receive priority, it would be beneficial to show a figure similar to I-1 for the 1 year flood plain and indicate these lands will prioritized.

APPENDIX 10: ASSESSMENT OF WETLAND RESOURCES AND EVALUATION OF FLOOD CONTROL ALTERNATIVES FOR THE YAZOO BACKWATER PROJECT

GENERAL COMMENTS

1. The draft report reads well and the arguments logically follow from the initial review and description of how jurisdictional wetlands are determined through the comparison of the EMAP results with the FEAT results until we get to the functional assessment. The assumptions are not clearly stated and it is difficult to understand the findings that the preferred Plan 5 there would only be –25,590 FCU of impact from the project. There should be further explanation.
2. The differences between the FEAT model results and EMAP results are explainable and understandable however, the mitigation does not appear comensurate with the results.

SPECIFIC COMMENTS

1. P 10-1, Introduction - "This study was designed to delineate wetlands for planning purposes and not for regulatory purposes." Question: The project would require a regulatory delineation. How/when will it be done? Is it being used to determine mitigation?
2. P 10-1 and 10-2, Methodology - ..... this methodology uses only hydrology data to determine wetland extent." This delineation assumes vegetation and soils are present IF hydrology is present. If seasonal hydrology is determined to be absent by the model, however, there is no countercheck. One could also argue that if hydric soils and vegetation are present, there is a likelihood that hydrology is present. The argument that hydrology controls presence/absence of wetlands is solid. The limiting factor is whether the model accurately depicts locations/extent of hydrology considering the presence of micro relief that may not be evident on USGS quads and the fact that much of hydrology is of short duration but adequate to support wetland conditions.
3. P 10-8, par 18. The 10 March 89 flood is described as having a mild slope but in comparing Plates 10-3 and 10-4 it looks flat. What should we be looking for to see the slope? What's flooded in the upper portion of the basin? Reference to Holly Bluff is helpful if you know where it is located. It would be better if it was labeled.
4. P 10-9, Wetland Hydrology - It is assumed that Mississippi River backwater flooding is the sole source of water that maintains wetlands in this basin. As indicated, it would be extremely difficult to determine which are sustained by backwater flooding and which are sustained by precipitation. Some degree of onsite investigation to determine extent of headwater support of flooding, as opposed to backwater flooding, would be valuable.
5. P 10-13, paragraph 29 - The areas considered to be wetland are inundated for less than 12.5 percent but more than 5 percent. Again, can the model be trusted to ensure that those lands considered to be inundated includes all lands that are inundated 5 to 12.5 percent of the time considering the accuracy of the elevation data.

6. P 10-23, Paragraph 38 - Over 100 additional sites were visited in the fall of 2002. How did those sites compare to the 54 that were evaluated earlier?

7. P 10-23, par 39. Using the model to evaluate alternatives makes sense. However, flood scenes, particularly for Plan 5, would be desirable.

8. P 10-24, par 42. We agree that the "quality of the model output is dependent mainly on the quality of the elevation data" and in our opinion is the major limiting factor to this overall approach. What was the date of the USGS data and DEM? In addition, when you look at the main and side channels in Plate 10-13, it is reasonable to question conclusions concerning which wetlands are "connected" and which are "not connected". There are probably many more channels and man made drainages that impact whether certain land parcels are connected or not.

9. P 10-32, Paragraph 48 - The model "tends to overestimate wetland extent in areas adjacent to the main channels and underestimate wetland extent in areas distant from the main channels. Wetlands in areas isolated from channels, likely sustained by ponding.... We still are not convinced that all of the areas treated as isolated from channels are truly isolated. This is a difficult argument to accept considering how flat the delta is. The evidence provided in this document, when combined with onsite field observations, is not convincing.

10. P 10-38, paragraph 66 - This paragraph needs additional work.

11. P 10-49. p 81 We concur with the statement "The EPA-led field analysis estimated the overall wetland extent in the basin". This makes sense and it is a different measurement than the FEAT analysis.

    However, the statement "It is clear that the major area of disagreement between the three methods is with those wetlands maintained by local hydrology and outside the influence of this project." is true only if you accept the assumption that the FEAT analysis accurately identifies all areas subject to backwater flooding which is dependent on how good your elevation model is.

12. P 10-52, paragraph 87 - This paragraph is glossed over quickly and does not do an adequate job of dealing with the issue. Are there 7 subclasses? Staff understood from earlier presentations that the issue was just riverine backwater.

    "The difference between the two connected subclasses and the two disconnected ones is they are within the 5-year flood plain." What does that sentence mean?

13. P 10-60, par 96. Should the underlined sentence say "up to 62,500 ac"?

14. P 10-63, paragraph 102 - "Finally, after these 2,400 acres have survived all of the earlier forest clearing sprees and remained forested, why should they be cleared now?" One has to consider potential future changes in agriculture in answering this question. In the 1930s, who could have foreseen the extensive amount of land clearing that would take place for purpose of growing soybeans in the 1940s and 1950s?

15. P 10-64, par 103. The second sentence is very strong but lacks defensible documentation. There could be a "low probability" but the only way to guarantee it will not be cleared and converted to agriculture is to buy it and protect it.

APPENDIX 16: WATER QUALTIY

GENERAL COMMENTS

1. In general, the report is difficult to read and some reorganization would probably help. What is the project, what are the potential water quality impacts, how were these addressed. The inclusion of the TMDL analysis helps.

2. The preferred alternative for the project (Plan 5) will result in the following impacts that could impact water quality:

   - Reductions in flood elevations above the 1 year flood plain could impact wetlands, landuse, and nonpoint source contributions to the project area.
   - Increasing the ponding level behind the Steele Bayou structure will change water depths, residence times, thereby impacting water quality and aquatic habitat.

   The water quality impacts of these changes are not clearly documented.

3. Comments have previously been raised concerning data QA/QC. This needs to be addressed in the Appendix, since the question will probably be raised during the certification process. We have no information to document whether the data used is good or not.

SPECIFIC COMMENTS

1. P 16-1, par 1. The sentence "The nonstructural features include the purchase of conservation easements from willing sellers and reforestation of 62,000 acres within the project area at or below elevation 87.0 feet, NGVD" is a little misleading. Should it be up to 62,500 acres at or below the 2 year flood plain? This apparent inconsistency occurs throughout all the documents.

2. We found the discussion of TMDLs so early in the report difficult to follow without some more background information. This information is important, it just seemed to disrupt the flow of the report. The water quality data presented in the Surface Water Quality section on p 16-10 are old, 1992-93 vintage. Have conditions changed or is this data/assessment still valid? This needs to be addressed. We have to be able to defend that the old data is a current characterization of the base conditions. Significant changes in water quality could have occurred since the bulk of the data were collected. No attempt was made to link the data presented with existing conditions. This is a potential significant deficiency in the evaluation of the potential project impacts.

3. Figure 16-1 shows no sampling stations in the connecting channel or lower Steele Bayou. Is there a reason for this? It seems like the data were collected for purposes other than to address the impacts of this project. It is our understanding that some additional data are being collected in 2005 to address the DO issue. Is

this correct? What was the study plan and specifically what questions are being addressed.

4. On p 16-2, par 3 should say "pursued" rather than "enforced".

5. P 16-10, par 16. There is extensive fish community monitoring by ERDC beginning in 1990 through the present that should be considered and noted in the appendix.

6. P 16-14, par 18. Are you referring to the 305(b) Report or the 303(d) List? You should refer only to the current Water Quality Criteria adopted in 2003.

7. P 16-14, par 19. We recommend that you refer to criteria and not benchmark for those that actually have an adopted criteria. The reference to dissolved oxygen should state a criteria of 5 mg/l daily average rather than instantaneous. The turbidity criteria is stated incorrectly. It should read "not greater than 50 NTUs above background. "The benchmark used is 100 NTU rather than 150 NTU.

8. P 16-14, par 20. The sentence reading "Of the 27 samples ...." should refer to nitrate plus nitrite rather than just nitrate nitrogen. This paragraph should also refer to the 2003 Water Quality Criteria, which is the most recent. The benchmark for TKN changed in 2000 to 1.5 mg/l.

9. P 16-15, par 23. This should refer to the most recent Water Quality Criteria published in 2003 not 1995.

10. Data summarized in the section (P 16-17) and in Table 16-5 indicate that water quality criteria for copper were frequently exceeded in the BSR and Steele Bayou. Although the results may not be reliable due to the age of the data, the report did not comment on the significance of these results. No recent information (e.g., with more appropriate QA/QC) was cited to indicate what more reliable and more recent data might show. Will the proposed project make this situation worse or improve it? This needs to be addressed.

11. P 16-17, pars 24, 25, 26, 27, 28, p16-21, pars 30, 31, 32, 33, 34. We recommend that you address if "clean sampling and analytical techniques" were used or screening techniques used only.

12. P 16-18, Table 16-7 has some incorrect values. Please refer to the 2003 Water Quality Criteria and update this table.

13. Starting on p 16-21 there is long discussion of sediment quality (through p 16-47). It documents that there is a problem with contaminated sediments in the project area but will the proposed project have an impact on the contaminated sediments? Is it relevant? What impacts will the proposed project have on contaminated sediments? In our opinion, we do not currently see an issue with contaminated sediments but this conclusion is not clear in this the Appendix.

14. P 16-21, par 34. There needs to be verification that 22 detected concentrations exceed EPA and Mississippi chronic criteria.

15. P 16-21, par 35. MDEQ's Office of Geology has conducted studies of sediment quality in the Delta that should be considered.

16. The entire Mississippi Delta (including the project area) is under a fish consumption advisory for DDT and toxaphene (p16-53). Routine monitoring by MDEQ has not resulted in a change of the Delta's fish consumption advisory status, according to recent data. However, the status and trends of fish tissue concentration cannot be evaluated specifically for the BSR in the project because there are no fish tissue monitoring stations in the BSR portion of the project area. USACE studies have shown agricultural land acts as a source of DDT in sediments in the BSR. The pump project would be expected to worsen fish contamination problems in the BSR if it results in higher rates of deposition of agricultural soils into the BSR sediments. Although the possibility of increased deposition of DDT contaminated soils was not specifically addressed in the Water Quality Appendix, there does not seem to be any particular reason to expect an increase in deposition due to the project.

17. P 16-53, par 63. Please identify who did the 1993-1994 study in the BSR.

18. P 16-68, par 70. Please note when DDT use ceased in the Delta.

19. p 16-71, par 73. The second direct impact is the change in water levels will which impact wetlands, water quality, etc. This will be mitigated by the proposed reforestation which should improve water quality depending on the location of the mitigation lands. The issue is never addressed explicitly. The Appendix should clearly state the potential project impacts, the supporting analysis and the conclusions.

20. P 16-71 As described, there is a possibility that reforestation could increase fish tissue mercury levels. The old fish tissue data (Table 16-18) indicates that even though there are no current fish advisories for mercury, a potential problem is evident. Data presented in Figures 16-13 and –14 leads one to believe that the situation is worse in Delta National Forest than in Felsenthal. Since there are fish advisories for Felsenthal, then maybe more recent data from the project area would result in a listing for mercury. The analysis would suggest that fish tissue contamination can be expected to worsen in the project area. Then in Table 16-21, with the use of methyl-mercury units, it documents that the proposed project would result in a 27% increase in units (it is not clear what these units represent). This could be interpreted as a significant impact on existing uses and an adverse water quality impact under 3.1 and 3.8 which would automatically deny 401 certification. Reforestation is generally considered by the opponents of this project as being good. This analysis raises the possibility that reforestation could increase fish tissue mercury levels but it is not adequately addressed. What is the baseline methylation rate in the project area? We need a better comparison of the benefits and adverse impacts. Since the project area is currently listed for fish consumption on the State's 303d list, any increase to worsen this situation, even though it may represent only an incremental increase to an already degraded system, could be considered to be a violation of state water quality standards.

21. The document states that TSS could increase in the project waters because the pump operation will decrease the duration of flooding. The document provides measurements of TSS in several storm events and states that studies show that

most of the TSS settles out of the water column within 11 days. The document then states that "Because the average post-project pumping period will be 31 days, no change in suspended sediment or pollutant removal due to reduced duration is anticipated." The linkage between the observations and the conclusions is not clear. Therefore it is not clear why reduced flood duration will not result in reduced TSS or pollutant removal

22. The document states (paragraph 98) that there are limited *in situ* data available for Steele Bayou and the BSR. Why are there only limited *in situ* available for a project of this size? It is our understanding that additional data are being collected. The potential effect of the project on DO does not appear to have been adequately addressed.

23. p 16-87. The recommended plan would reforest up to 62,500 ac and the location of these lands will determine the reduction in TSS and nutrients to project area. This is important and the location of the lands is critical. It would be helpful if certain areas would be pinpointed and prioritized for acquisition to reduce TSS loadings.

24. P 16-89, par 87. "under the both" should read "under both".

25. P 16-92, par 92. The fish habitat report indicates that the pool does stratify with DO depletion resulting in fish kills. This basic observation conflicts with the predictions based on the stratification potential calculations. This needs to be addressed and explained even if the new data show no problem with DO. What were the numbers or data used in the stratification potential computations? We need to see the backup information and confirm the results rather than just getting the results.

26. P 16-92, pars 90-96. It would be helpful to note the actual water depth along with the gage depth.

27. P 16-92, par 92. Please refer to the 2003 Water Quality Criteria and note at what depths the dissolved oxygen criteria is applied.

28. Figure 16-21. Some of the nutrient data looks like it is <0.

29. P 16-96, par 97. Please refer to the 2003 Water Quality Criteria regarding depths that dissolved oxygen criteria is applied.

30. The document (paragraphs 100 and 101) suggests that it is not clear whether DO will decrease as a result of increasing the depth of the pooled areas behind the structure. The document gives a number of reasons why DO might drop. The answer to this is to do more modeling and monitoring once the increase in water level has occurred. This "environmental enhancement" feature would be discontinued if modeling and monitoring indicated impairment of project waters, due to the feature. However, if this were to occur, a benefit of the project, i.e. increased fish habitat would disappear.

31. P 16-100, par 111. This section should also refer to data that has been gathered in MDEQ's Ag-Chem Monitoring Program.

32. Changes due to increased agricultural intensification are based on current economic conditions. The analysis assumes that the only change would be earlier planting of soybeans. What if economic conditions change and more cotton or corn is planted?

33. P 16-101 par 115. The proposed project will reduce flooding in the delta and thereby increase agricultural production – a project benefit. Increased production would imply increased pesticide use. The two are related. There needs to be documention supporting such statements.

34. Effects of the project on project waters impaired by sediment, legacy pesticides, nutrients are based on assumptions about agricultural intensification and the effects of reforestation. Agricultural intensification is a project issue that needs to be addressed.

35. P 16-102. We don't fully understand all the non structural alternatives. We need to see a write up.

36. P 16-104, par 120 The mention of grade control structures as an effective BMP could be interpreted as they are part of the project. Should MDEQ require them or other BMPs as part of the certification process? This would address the certification criteria and some of the Court's concerns with the Big Sunflower project.

37. The use of wetland FCUs to evaluate alternatives ties wetlands to water quality quantitatively and reinforces the need to make sure mitigation is adequate.

38. P 16-108. Paragraphs 142 and 143 seem to be inconsistent.

39. P 16-113, par 170. The reference to the critical season for fecal coliform being summer and wet weather does not seem to be correct.

40. P 16-114, par 175. This should refer to the Section 303(d) "list".

COMMENTS ON FISH HABITAT REPORT

GENERAL COMMENTS

1. The conclusions of the habitat evaluation are a direct function of the underlying assumptions regarding limiting resources, habitat definition/delineation, and the relative weighting of different habitats. The assumptions used were obtained using a Delphi approach that included participation from several state and federal agencies. This approach seems valid for the purposes of this project.

2. The analysis focused on a subset (11 species) of the 57 fish species known to inhabit the project area. The subset of fish was chosen to represent a range of reproductive and habitat guilds. The purpose of this was to focus the analysis on a group of species that would represent the fish community that would be susceptible to project impacts. The authors support their choice of representative species and the approach seems valid.

3. Project data showed rearing habitat, which is not hydraulically defined, to be more extensive than spawning habitat, which is hydraulically defined (minimum depth of 1 foot with an 8-day duration.) The analysis therefore assumed that spawning habitat is limiting when compared to rearing habitat. The computations of available habitat under the various project options are therefore driven by this assumption. This assumption was supported using project data. Was there consideration given to the impact of low DO on availability of rearing habitat?

4. Although not addressed in the evaluation, there must be a large error associated with estimating the area under a minimum of 1 foot of water given the precision and accuracy of the contour information available. This error may or may not affect the conclusions regarding the ranking of the various options, but it would affect the estimates of mitigation needs.

SPECIFIC COMMENTS

1. In the Executive Summary and on p 9, it is indicated that fish kills were noted behind the structure during July due to low DO. Raising the pooling level behind the structure could aggravate this situation and degrade water quality. This could be considered problematic in evaluting a 401 certification. It is clearly stated in the report on p 5 that none of the project plans are expected to negatively impact river channels but this may not be true. Emphasis in the report was on how changes in the stage elevations in the floodplain may have a negative impact fish habitat.

2. P 8. The flood frequency analysis discussion leaves one to believe that a separate analysis was performed for this report. Are we using the same numbers as the main report and other appendices? If so, maybe it should be referenced as such to avoid confusion.

3. P 9. The baseline discussion indicates that stratification occurs with fish kills. This is inconsistent with the WQ Appendix and would tend to indicate that could be problems associated with raising the pool level behind the structure.

4. Related to raising pool level: Paragraph 101 of Water Quality Appendix states that, if additional modeling and monitoring indicate a problem with DO levels related to raised pool levels, that feature would be eliminated from the plan. Would eliminating that feature affect the evaluation?

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183-3435

REPLY TO
ATTENTION OF:

September 18, 2006

Planning, Programs, and
Project Management Division
Planning and Project
Management Branch

Mr. Charles H. Chisolm
Executive Director
Mississippi Department of
Environmental Quality
P.O. Box 20305
Jackson, Mississippi 39289-1305

Dear Mr. Chisolm:

I refer to your letter of September 30, 2005, in which your agency furnished comments to the Environmental Appendixes on the Yazoo Backwater Reformulation Project. These responses serve to document our discussion with your agency on May 24, 2006.

Our responses to your comments are enclosed (enclosure 1). Please note that references to the Flood Event Assessment Tool (FEAT) model have been changed to the Flood Event Simulation Model (FESM). The FESM model is the enhanced version of FEAT used in this study. Also, after upgrading land-use data from 1988 to 2005, the available acreages below 87.0 feet, National Geodetic Vertical Datum, the 1-year frequency flood elevation, have changed. This has impacted all alternatives. Therefore, the Plan 5 nonstructural alternative has changed from 62,500 to 55,600 acres.

Any questions concerning these comments should be directed to Messrs. Bob Petersen (telephone (601) 631-5510) or Kent Parrish (telephone (601) 631-5006) of this office.

Sincerely,

Joe D. Smith
for Dennis O. Norris, P.E.
Chief, Planning, Programs, and
Project Management Division

Enclosure

RESPONSES TO COMMENTS FROM
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY ON
DRAFT ENVIRONMENTAL APPENDIXES
OF THE YAZOO BACKWATER REFORMULATION REPORT

GENERAL COMMENTS

1. Response: The 2000 draft report will be updated to include the revised Environmental Appendixes that were reviewed by your agency, along with a revised Engineering Appendix, Environmental Impact Statement (EIS), and main report. Revised Biological Assessments on both the endangered plant pondberry and the threatened Louisiana black bear, along with the U.S. Fish and Wildlife Service (FWS) Biological Opinion on pondberry, will be included in the final report.

2. Response:

a. The Water Quality Appendix was updated to include more recent data (through 2005) and data from other agencies including the Mississippi Department of Environmental Quality (MDEQ), U.S. Geological Survey (USGS), and Natural Resources Conservation Service (NRCS).

b. The final report will be updated using the most current data available.

3. Response: During the preparation of the draft report, Habitat Evaluation Procedures (HEP) teams were formed to determine which environmental models would be utilized to measure the environmental effects. The teams agreed to utilize the same HEP models and procedures that were used on past Yazoo Basin studies. As part of the comments to the 2000 draft report, the Environmental Protection Agency (EPA) suggested that the wetland analysis be updated to utilize the hydrogeomorphic (HGM) methodology. The HGM Yazoo Basin Regional Guidebook, developed by the U.S. Army Engineer Research and Development Center (ERDC) in conjunction with EPA, was not finalized until 2002. This was the method used in the 2005 Wetland Appendix reviewed by your agency.

4. Response: Comments to the 2000 draft report recommended that additional nonstructural alternatives be evaluated. These will be included in the final report.

APPENDIX 1: MITIGATION

GENERAL COMMENTS

1. Response: The environmental effects of all the plans carried into the final array will be displayed as a part of the final report. This will include a breakdown of both positive and negative effects from both the structural and nonstructural features, as well as measures that avoid or minimize adverse effects through design.

Enclosure 1

2. Response: The U.S. Army Corps of Engineers, Vicksburg District, evaluated effects to wetland functions using the HGM methodology developed by ERDC for EPA. It is a state-of-the-art functional assessment of the quality and quantity of wetlands for both with- and without-project conditions. All wetland acres do not function equally. The ability of a wetland to perform a wetland function is determined by the physical and biological characteristics of the site. What is critical to the ecosystem is accurately estimating the sum of wetland functions being affected by the project. This, combined with the number of acres the change in function occurs on, provides a more accurate assessment. This is the purpose of performing a functional assessment. The HGM model was used in conjunction with a Vicksburg District model called Flood Event Simulation Model (FESM), which spatially estimates the areal extent of backwater flooding with and without the project. Lands with backwater flood duration of 5 percent or greater were considered potential jurisdictional wetlands. Pump operation will affect the duration of flooding, which will decrease the ability of a portion of the wetlands to perform certain functions. The wetland is not drained or destroyed. It performs some wetland functions at a different level with the project. None of the 26,263 acres of potential jurisdictional wetlands are being drained or destroyed, but rather they will perform less wetland function. Therefore, the appropriate units to mitigate are functional units.

3. Response: The Vicksburg District will include State Best Management Practices (BMP) into the conservation easements.

4. Response: The Vicksburg District has analyzed effects to a wide range of ecosystem resources, including terrestrial, waterfowl, wetland, and aquatics. This is a broad ecosystem approach to both impact and mitigation analysis. All resources will, at a minimum, achieve a no-net-loss of resource.

SPECIFIC COMMENTS

1. Response: The ERDC has been monitoring wetland function for the Vicksburg District since 2002 on mitigation lands reforested beginning in the early 1990s. Results of their analysis using HGM show that wetland functions are being replaced as projected. We plan to continue this monitoring. Copies of ERDC monitoring reports will be attached to the Mitigation Appendix.

2. Response: According to the U.S. Department of Agriculture since 1985, over 272,000 acres have been reforested in the Mississippi Delta, while only 1,105 acres have been cleared. While this shows a trend toward reforestation, we agree it is hard to predict the future. However, since the last significant clearing cycle in the late 1960s and 1970s, a number of laws have been passed that discourage clearing. This includes the Clean Water Act and Food Security Acts. A complete analysis on the probability of additional clearing is provided in the Mitigation and Wetland Appendixes. It is believed any additional clearing will be on a small scale similar to what is now occurring without the project. Monitoring can be done, but determining the causal factor for the clearing would not be possible.

3. Response: A team approach will be utilized by Vicksburg District in the development of the reforestation plan. The team will consist of representatives of landowners; USACE; EPA; FWS; MDEQ; Mississippi Department of Wildlife, Fisheries and Parks; and the Mississippi Levee Board. The purchase of conservation easements will begin once the Record of Decision is signed. Reforestation will occur during the next planting season after acquisition (January-February).

4. Response: It would be impractical to put in the table the date mitigation was acquired because numerous tracts were acquired over multiple years for each project listed.

5. Response: This reference is to the land remaining in the 2-year flood plain after the project is completed. Open land is represented by the categories crop and noncrop. A map showing the 1-year lands will be included.

APPENDIX 10: ASSESSMENT OF WETLAND RESOURCES AND EVALUATION OF FLOOD CONTROL ALTERNATIVES FOR THE YAZOO BACKWATER PROJECT

GENERAL COMMENTS

1. Response: Concur.

2. Response: See response to General Comment 2 under the Mitigation Section for a detailed explanation.

SPECIFIC COMMENTS

1. Response: The project will not require a regulatory delineation. The HGM analysis was utilized to determine adverse project effects to wetland function from pump operation and beneficial effects from reforestation associated with the nonstructural component.

2. Response: The argument that if hydric soils and hydrophytic vegetation are present, then you could assume hydrology is not valid. When one considers the area of intersection of two or more sets, the limiting factor is the set with the smallest area. Eighty-five percent of the Backwater Project Area soils are hydric, and 100 percent of the available seed source is from hydrophytic vegetation. Therefore, unless the 5 percent duration area is greater than 85 percent of the project area, it is the limiting factor in the area of intersection. The 5 percent duration area is approximately 190,000 acres which is 20.5 percent of the project area, and it is the limiting factor. The FESM model was the hydrology model utilized to determine the wetland impacts. The FESM model was calibrated using actual flood scenes. After calibration, the model could be utilized to compare pre- and postproject conditions. If microdepresssional wetlands are not connected in the preproject condition, then they are not connected in the postproject condition. The FESM model overestimates wetlands when compared to the EPA's EMAP program. Lands that experience several periods of short duration flooding and perform some wetland functions do not meet the hydrology component of the Federal definition of wetlands.

3. Response: A backwater flood slope is defined as a flood having less than 0.5 foot of fall from north to south. The March 10, 1989, flood scene has more slope than this, but as one can tell from the satellite scene, it is not a headwater event because it is primarily located in the two ponding areas. The March 10, 1989, scene is not a 2-year event as shown on Plate 10-3. The March 10, 1989, flood scene represented the flood scene that most closely approximates the 5 percent duration wetlands and in some cases, falls between the 1- and 2-year flood events while at others falls short of the 1-year flood event. One cannot compare Plates 3 and 4 to see any relationship. The major gages will be labeled on both plates with the water surface elevation.

4. Response: The Yazoo Backwater project has no effect on headwater flooding and therefore, no effect on those wetlands sustained by headwater flooding. Headwater flooding and its effects on wetlands will be addressed in the Big Sunflower River Maintenance Project. A partial discussion of the headwater effects on wetlands is included in the Wetland Appendix.

5. Response: The FESM model overestimates wetland acres when compared to the EPA's EMAP estimate. Therefore, we have erred on the side of protecting wetlands. This is well documented in the Wetland Appendix and restated in the conclusion of the document. We have taken the definition of a wetland area to be between 12.5 and 5 percent and where the wetland manual says the lands may be wetlands, we made the assumption these lands would be wetlands. The FESM model consistently overestimates flooding in areas contiguous to the channel when compared to satellite images of flood events. If there are any errors introduced due to the limitations of the DEM, they are equally applied to the base- and with-project conditions. Because FESM overestimates flooding relative to the satellite images, the model results can be trusted to be conservative estimates of wetland extent.

6. Response: The 100 sites were used to provide data for the HGM analysis, and no wetland determinations were made. The statement "over 100 additional sites were visited in the fall of 2002 as part of the functional assessment" will be deleted from the final report.

7. Response: Using a flood scene for one alternative and FESM for the others would be like comparing apples and oranges. It would add an inconsistency to the analysis. Doing it using the FESM model allows each plan to be evaluated in a consistent manner in relationship to the others when compared to the preproject conditions.

8. Response: The Digital Elevation Model (DEM) data are from the USGS National Elevation Data Set (NED). The NED has been developed by merging the highest resolution, best quality elevation data available across the United States into a seamless raster format. The NED is the result of the maturation of the USGS effort to provide 1:24,000-scale DEM data for the conterminous United States and 1:63,360-scale DEM data for Alaska. The data set provides seamless coverage of the United States, Hawaii, Alaska, and the island territories. The NED has a consistent projection (geographic), resolution (1 arc second), and elevation units (meters). The horizontal datum is NAD83, except for Alaska, which is NAD27. The vertical datum is NAVD88, except for Alaska, which is NAVD29. Sufficient main and side channels are added to calibrate the FESM model to actual flood scenes. A more thorough discussion of connected and

nonconnected wetlands will be included in the final reports. A side channel in the FESM model acts like a real channel and provides connectivity to off-channel depressions. Side channels were added to connect areas shown flooded in satellite scenes that were not being flooded by the flood models. Most of the off-channel areas from satellite scenes were flooded without the addition of side channels, thus the channels were not added because they were not needed.

9. Response: Additional discussion concerning isolated wetlands will be included in the final report.

10. Response: Included in the Wetland Appendix is a summary of the results generated when comparing the three methods of evaluating wetlands—FESM, EMAP, and flood scenes. While the concept of comparing the three methods is relatively simple, it is difficult to keep the three methods distinctly separate as one reads and understands the explanation. Therefore, we would suggest a rereview of this summary.

11. Response: You are correct that EMAP was utilized to determine the overall extent of wetlands in the study area, while FESM only measured those wetlands impacted by backwater flooding. The Vicksburg District agrees that there are other wetlands in the study area, but they are sustained by some other source of water—headwater flooding, precipitation, seep water, isolated, etc. This model is the most accurate tool available to measure impacts on a landscape scale and locate the impacts. The accuracy of the model has been previously discussed in Comment 5 above.

12. Response: The HGM Guidebook for the Yazoo Basin identifies seven regional wetland subclasses. Six are present in the study area, but only four are sustained by backwater flooding. Of the four sustained by backwater flooding, three account for 94 percent of the wetland area, and the Riverine Backswamp subclass accounts for 54 percent of the wetlands.

13. Response: Yes, but will be revised to reflect revised acreage of up to 55,600 acres.

14. Response: Yes. One does have to consider changes in agriculture. However, since the last big land clearing cycle, numerous laws have been enacted that will prevent/reduce future clearing while at the same time numerous government programs are now available that encourage reforestation. Also, the recreational value of bottom-land hardwoods in the Backwater Area may now exceed that of agricultural lands.

15. Response: You are correct that it is a low probability that the land would be cleared. Additionally, the Mississippi Levee Board has contacted the two major landowners of over 2,400 acres of this total who have stated they do not intend to clear their land, and the other tracts are of such size a landowner would not see the economic value to clear them for agriculture. The Vicksburg District does not believe these lands will be cleared. The data provided by the USDA showing that the ratio of reforested agricultural acres to cleared lands in the Delta of 247:1 (272,000:1,100) are sufficient to support the statement.

APPENDIX 16: WATER QUALITY

GENERAL COMMENTS

1. Response: The Water Quality Appendix was rewritten and reorganized for clarity as suggested.

2. Response: The appendix was revised to cover potential impacts from construction, changes in flood duration, reforestation, and increased summer water depth behind the Steele Bayou structure.

3. Response: The data collected by the Vicksburg District and included in the water quality analysis were collected between 1993 and 2005. Generally, the following Quality Assurance samples were collected and analyzed: field duplicates, field blanks, and rinseate blanks, where appropriate. Laboratory Quality Assurance samples analyzed include matrix spikes, matrix duplicates, laboratory control samples, and method blanks. The revised appendix includes a summary of Quality Assurance data for the sediment samples collected by the Vicksburg District. These data are found in Attachment 1 of the Water Quality Appendix.

SPECIFIC COMMENTS

1. Response: Concur. The appendix was revised to state "up to 55,600 acres." Land use originally used was 1988. It has been updated with 2005 data, which changed available lands below 87 feet, NGVD. Thus, the nonstructural feature is now 55,600 acres.

2. Response: The total maximum daily loads (TMDL) discussion was moved into the impact section. Additional data collected between 1993 and 2005 by the Vicksburg District, USGS, and MDEQ was added to the surface water quality analysis in order to more accurately reflect current conditions.

3. Response: Water quality in Steele Bayou and the Big Sunflower River has been well documented by USGS, NRCS, and MDEQ in reports and lists of impaired waters and TMDLs. Since these streams discharge through the lower Steele Bayou and lower Auxiliary Channel, many of the same water quality issues apply there as well. The Vicksburg District focused most of its sampling resources on collection of sediment and fish pesticides data, samples that are not routinely collected by other agencies. Figure 16-1 identified sampling stations from the original draft EIS. The environmental enhancement feature to raise the summer water level behind the Steele Bayou structure was not included in the initial project design, but was a later addition. Figure 16-1 (now Plates 16-1 and 16-3) has been revised to include recent sampling stations visited in the lower part of the Yazoo Backwater Project Area. Explanation of the most recent water quality studies is presented in the updated Appendix 16. These data were included in the revised water quality analysis. If the state determines that the environmental enhancement feature will be detrimental to water quality or harmful to fish, the feature can be removed from the proposed alternatives.

4. Response: Noted.

5. Response: Noted.

6. Response: The Section 305(b) Report. Appendix was revised to utilize the 2003 Water Quality Criteria.

7. Response: Report was revised to utilize the 2003 Water Quality Criteria. References to benchmarks were removed.

8. Response: Noted in the revised Appendix.

9. Response: Noted. Changes were made in the revised appendix.

10. Response: The revised surface water analysis includes more recent data from the Vicksburg District and USGS. Some of the copper values for the Big Sunflower River and Backwater lakes exceed the fresh water acute and fresh water chronic (FWC) aquatic life criteria. Converted to dissolved copper concentrations, the mean concentrations for copper still exceed the FWC. Like many metals, copper is associated with sediment. The reforestation project feature has the potential to reduce sediment yield into project area streams and could affect the amount of dissolved copper in the aquatic system. The high concentrations of copper found in the Backwater lake samples could be the result of floodwaters being trapped within the lakes and not flushing out of the system. For the same reason, cadmium, zinc, and mercury concentrations were also highest in the Backwater lake samples.

11. Response: The revised appendix discusses sampling and analysis techniques used by the Vicksburg District. District personnel collected water and sediment samples using sampling techniques described in EM 200-1-3. Analytical techniques used were from *Standard Methods for the Examination of Water and Wastewater* (SMEWW) and EPA methods in effect at the time of analysis. Generally, organochlorine pesticides and metals samples were analyzed according to *EPA Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods* (SW-846 Methods). Other inorganics were analyzed according to methods in EPA/600/R-93/100, *Methods for the Determination of Inorganic Substances in Environmental Samples.* In situ data were collected with YSI multiparameter data sondes calibrated according to manufacturer's guidelines the day before sampling.

12. Response: Table was revised with 2003 Water Quality Criteria.

13. Response: A discussion on contaminated sediment is relevant to the existing conditions within the project area as well as serving as a backdrop for discussions on the potential impacts of the reforestation feature. This section was revised to put the issue of contaminated sediment in perspective and context to the Yazoo Backwater Project. Since the project does not include a dredging feature beyond the inlet and outlet channels at the pump site, the discussion on deeper sediments within project area streams was removed from the document as not relevant.

14. Response: Noted. This section was revised. The data are now compared to 2003 MDEQ Water Quality Criteria.

15. Response: The data collected by MDEQ Office of Geology for the National Geochemical Survey were included in the update of Appendix 16 (Table 16-7).

16. Response: The Vicksburg District agrees there is no reason to expect an increase in rates of deposition of DDT-contaminated soils into the project area sediments once the Yazoo Backwater Project is completed. The data presented in the Water Quality Appendix show that deposition rates of sediment already suspended in out-of-bank floodwaters would not change appreciably based on completion of the project. In addition, the rates of sediment yield will be moderated by completion of the reforestation feature. Reducing erosion has the potential of reducing the amount of DDT that enters sediments in project streams.

17. Response: The ERDC collected and analyzed the fish in 1993-1994.

18. Response: The use of DDT was banned in the United States at the end of 1972.

19. Response: Noted. The Water Quality Appendix was revised to identify potential impacts to water quality and present data to address the likelihood of the impact affecting water quality within the Yazoo Backwater Project Area. Impacts were quantified, where possible.

20. Response:

a. A review of the 2004 Integrated Water Quality Monitoring and Assessment Report for the State of Arkansas shows that Felsenthal Lake has had a fish consumption advisory for mercury since 1994.

b. The Yazoo Backwater Water Quality Appendix Methyl Mercury Section has been revised to include an additional 2 years of data. Additional references have been reviewed to address possible impacts. Reforestation is not limited to the nonstructural alternatives for Corps projects. It is already occurring under the USDA Wetland Reserve Program (WRP) and other programs. Although methyl mercury production is probably occurring naturally in flooded cropland as a by-product of organic residue decomposition, it is likely that a constant supply of leaf material will increase methyl mercury production in mature reforested wetlands. Uptake in fish is controlled by concentration and exposure. During 3 years of sampling, USGS data showed the lowest concentrations of methyl mercury in rivers. Overall, the highest concentrations were found in artificially flooded forests (i.e., greentree reservoirs) where fish access is limited. Operation of the pump during backwater floods could shorten fish exposure time by moving affected water more quickly out of the system. The most recent (October 2005) mercury tissue concentrations from project area fish show an average concentration of 0.21 milligram per kilogram (mg/kg). This is 21 percent of the current advisory limit. The EPA has reported that regulations in place since 1990 to control the amount of mercury in waste combustion emissions have reduced mercury air emissions by more than 45 percent. The EPA also reported that new regulations to control mercury air emissions in coal-fired powerplants

should reduce mercury air emissions by nearly 70 percent. Mercury fish tissue concentrations in the Yazoo Backwater project area appear to have decreased by 50 percent based on fish tissue concentrations in 1993 and 1994 (0.42 mg/kg). Another 70 percent reduction would further reduce the amount of anthropogenic mercury available for methylation in the future.

21. Response:

a. This section was revised. In a 3-year study, the Vicksburg District showed a 65 percent decrease in TSS over an average of 17 days of backwater flooding in the WRP fields adjacent to the Little Sunflower River. Based on the period of record, the average postproject flood will be greater than 17 days (31 days). In addition, these WRP field samples were collected in the 5 to 7.5 percent duration range. Postproject, the number of existing acres in the 5 to 7.5 percent duration range will be approximately the same. These data suggest that the flood duration will not appreciably change the suspended sediment removal efficiencies.

b. The USGS is in the middle of a 5-year study to evaluate the impact of reforestation on sediment yield and nutrient runoff for the Vicksburg District.

22. Response: Additional DO and nutrient data were collected to address potential project on DO in the lower project area. These data were used by Mississippi State University to develop a water quality model (EPA Water Quality Analysis Simulation Program) to predict project impacts to DO. Results of the model will be included as an attachment to Appendix 16.

23. Response: The supplemental EIS will have a map showing the location of up to 55,600 acres targeted for easements and reforestation. The acreage was revised when the original 1988 land-use data was updated with 2005 data, which changed available land below 87 feet, NGVD.

24. Response: Noted. Could not locate this comment from the information given.

25. Response:

a. The Vicksburg District agrees there is a potential for the Steele Bayou structure pool to become intermittently stratified at low-flow conditions. Shallow run-of-the-river impoundments, such as the Steele Bayou structure pool, often only weakly stratify due to flow and wind mixing. However, according to Vicksburg District water control personnel, the Steele Bayou structure (which has a bottom discharge) is operated such that the gates are never closed completely for extended periods, but are regulated to maintain a minimum flow during low-flow conditions, thus minimizing the potential for stratification near the structure. The stratification calculations were intended to show that under normal summer operating conditions the potential is low. Currently, the gates are regulated to maintain a water surface elevation between 68.5 and 70.0 feet, NGVD, during the summer. Vicksburg water control personnel measured the flow through the Steele Bayou structure in 1988, a dry summer, and found that the average minimum flow was around 100 cubic feet per second. As requested, the data used in the stratification potential computations will be included in the discussion in Appendix 16.

b. In their aquatics analysis for the Yazoo Backwater Project, ERDC reported stratification and a fishkill behind the Steele Bayou structure in July 1994. The report states that "stratification was most prevalent behind the closed structure due to stagnant conditions and high water temperatures." A review of the MDEQ 1998 Section 305(b) water quality report revealed that a fishkill at the Steele Bayou structure on July 8, 1996, was also attributed to low dissolved oxygen (DO). This was the only incident at the Steele Bayou structure investigated by MDEQ between 1990 and 1998. The Vicksburg District did not find additional fishkill information for the years since 1998, but realizes that fishkills are infrequent, but natural occurrences in the Mississippi Delta. In both cases, the Backwater Area experienced spring flooding. In July 1994, the landside water elevation was continuously above 85 feet, NGVD, between February 10 and May 28 and did not lower to 70 feet, NGVD, until June 4, when the gates began regulating water between 68.5 and 70 feet, NGVD. In July 1996, the water surface elevation was above 85 feet, NGVD, for most of June. The Steele Bayou structure was still discharging floodwater (elevation 73.7 feet, NGVD) on July 8, 1996, when the fishkill was reported. A review of NOAA precipitation and climatological data for June and July 1996 showed this was a relatively cool, wet summer. In June 1996, the average precipitation between Vicksburg, Rolling Fork, and Yazoo City was 2.2 inches and average temperatures were below 90 degress°F. Similarly, the June and July 1994 NOAA data for Rolling Fork show average maximum air temperatures in the low 90s and higher than normal precipitation.

c. Field data presented in this section show that the lower backwater area relies on photosynthesis for much of its DO supply in the summer. However, the data suggest that the lowest DO concentrations are found early in the summer between May and June, not in the late summer critical period between July and October. It is also likely that phytoplankton populations are not well established or cannot be maintained at the Steele Bayou structure during flood discharge. Increased cloud cover would have reduced population recovery and photosynthesis rates. Given the flooding and climatological conditions, increased rainfall and floodwater discharge could have introduced additional organic carbon load creating an imbalance between photosynthesis and respiration rates. The result would be DO stress on susceptible fish species. It is likely that this type of climate induced oxygen depletion is responsible for many of the fishkills attributed to low DO in the Delta. The Yazoo Backwater project will not have an impact on these events.

d. If MDEQ or the Vicksburg District determines that the operational feature increasing the summer water surface elevation behind the Steele Bayou structure is detrimental to water quality or fish survival, the feature can be removed from the project alternatives.

26. Response: Noted.

27. Response: Noted.

28. Response: Yes. This is discussed in the revised figure description. The Vicksburg District uses negative numbers to represent data reported at "less than (<)" method detection limit concentrations. The numbers represent the MDL values.

29. Response: Noted.

30. Response: This section has been revised. Results of the water quality model are Attachment 2 to the revised Appendix 16. The water quality enhancement feature was never counted as a benefit to the project. After construction, the effects on DO from changing the operation of the Steele Bayou structure will be monitored. If the data show adverse impacts to water quality or fisheries, at the request of MDEQ, operation can return to a maximum of 70 feet, NGVD.

31. Response: A discussion of these data was added to the revised Appendix 16.

32. Response: Noted. The discussion on agricultural intensification has been revised to include the trend toward the use of genetically engineered seed.

33. Response: Noted. This section was revised.

34. Response: Agricultural intensification is addressed in the updated version of Appendix 16.

35. Response: All of the alternatives are presented in Volume 1 – Main Report of the Yazoo Backwater Area Reformulation supplemental EIS.

36. Response: This paragraph has been revised. While grade control structures have demonstrated their effectiveness in reducing sediment yield, they are not a major component of the Yazoo Backwater project. For those alternatives with nonstructural reforestation features, the Corps will provide landowners with materials to construct water control structures on up to 5 percent of land targeted for reforestation. Comments on requirements for the Big Sunflower Maintenance Project should be withheld until that project is presented for review.

37. Response: Noted.

38. Response: We were not able to verify this comment because the paragraph numbering for the surrounding comments does not match the document released for review.

39. Response: Noted. According to the Yazoo River TMDL for pathogens, the critical period was determined to be the summer season from May through October. Critical conditions appear to be summer and wet weather. Nonpoint source critical conditions occur after a heavy rainfall that is preceded by several days of dry weather that allows a buildup of pathogens that can be washed off the ground by a heavy rainfall. The document was revised to clarify critical season and critical conditions.

40. Response: Noted.

COMMENTS ON FISH HABITAT REPORT

GENERAL COMMENTS

1. Response: Noted. The Vicksburg District acknowledges MDEQ's acceptance of the process used to develop weighting factors (Habitat Suitability Index (HSI)) for habitat evaluation and the choice of species based on a guilding approach.

2. Response: Noted. The Vicksburg District acknowledges MDEQ's acceptance of the process used to develop weighting factors (HSI) for habitat evaluation and the choice of species based on a guilding approach.

3. Response: Low DO was not considered in determining available spawning or rearing habitat. Spawning habitat was assumed to be the limiting factor in regulating abundance of representative fish species, not low DO. Periodic sags in DO are natural phenomena in flood plains. Most flood plain spawners are tolerant of low or fluctuating DO. Larval fish are even more tolerant of low DO because of their smaller size and affinity to utilize highly oxygenated surface waters of shallow flood plains. Therefore, the evaluation team did not identify hypoxia as a factor in the delineation of flood plain habitats.

4. Response: Certain adjustments to methods are required when evaluating the environmental impacts of large area projects such as the Yazoo Backwater project. The areal extent of this project is 930,000 acres. One of the adjustments needed for this project was the utilization of existing DEM data. The DEM data were produced from USGS 1:24,000 quadrangle (Quad) maps. The Yazoo Backwater project area Quad maps have 5-foot contours. National Mapping Standards require an accuracy of <0.5 contours, or 2.5 feet in this case. Thus, the possible error in elevation is greater than the 1-foot depth required for spawning. In our experience, the accuracy of the DEMs is best tested by the calibration FESM model flood events to satellite images of those events. The FESM model consistently overestimated the flood extents. Thus, any error in the areal estimates of flooding would likely be an overestimate. Because this error is applied to the base and all alternatives, the absolute impact of the bias is diminished. In our opinion, this evaluation has provided a conservative estimate of the environmental impacts of the project to fisheries.

SPECIFIC COMMENTS

1. Response: The Corps agrees that the Steele Bayou pool can become stratified during warmer months, but the circumstances associated with low DO (warm-water temperatures, prolonged cloudiness, and stagnant water) only occur intermittently and is not the normal condition of the Backwater project area. The value of an increased pool elevation during the summer will have far more benefits in terms of fish productivity than occasional sags in DO from stratification. In addition to the rarity of the event, most fishes found in the project area tolerate low DO, even

below 2 mg/L, and some species have developed alternative modes of respiration in hypoxic waters. Their tolerance is characteristic of delta fish assemblages throughout the lower Mississippi River Basin. The Corps believes that stratification will not have a major influence on spawning and rearing success nor will it diminish the value of additional water behind the Steele Bayou structure.

2. Response: Yes, we are using the same flood frequency analysis developed in the Engineering Appendix, and these data were used in all the other appendixes and main report. A separate flood frequency analysis was not performed, and this paragraph will be revised to reflect this.

3. Response: The Corps agrees that the Steele Bayou pool can become stratified during warmer months, but the circumstances associated with low DO (warm-water temperatures, prolonged cloudiness, and stagnant water) only occur intermittently and is not the normal condition of the Backwater project area. The value of an increased pool elevation during the summer will have far more benefits in terms of fish productivity than occasional sags in DO from stratification. In addition to the rarity of the event, most fishes found in the project area tolerate low DO, even below 2 mg/L, and some species have developed alternative modes of respiration in hypoxic waters. Their tolerance is characteristic of delta fish assemblages throughout the lower Mississippi River basin. The Corps believes that stratification will not have a major influence on spawning and rearing success nor will it diminish the value of additional water behind the Steele Bayou structure.

4. Response: No.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mississippi Field Office
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

October 11, 2005

Mr. Douglas J. Kamien
Deputy for Programs and
Project Management
U.S. Army Corps of Engineers
4155 Clay Street
Vicksburg, Mississippi 39183-3435

Dear Mr. Kamien:

This is in response your letter of July 21, 2005, which requested our attendance at a meeting of resource agencies on July 29, to discuss the Yazoo Backwater Area (YBWA) Reformulation Project. Biologists from the Fish and Wildlife Service (Service) and other resource agencies attended the meeting and were briefed on seven draft environmental appendices for the Reformulation Project prepared by the Vicksburg District. The Environmental Protection Agency (EPA) briefed meeting attendees on "EMAP-An Estimate of Wetland Extent in the Lower Yazoo Basin."

Review and comments from the resources agencies on the appendices were requested by August 30, 2005. Due to the volume and complexity of the data, our letter of August 1, requested a 90-day review period for submission of our comments. Your letter of September 7, 2005, granted an additional 30 days (September 30) for review. Subsequently, two additional question and answer meetings on the appendices were held at the Vicksburg District office. As a result of Hurricane Katrina, the deadline for agency comments was extended to October 7, 2005.

For the past two years, the Service has requested involvement in the Corps/EPA reassessment of the extent of Section 404 jurisdictional wetlands in the YBWA. Service biologists participated in the field wetland inspections in the summer of 2003, and from that point forward, despite numerous written and verbal requests, were excluded from all wetland reassessment coordination conducted by the Corps and EPA. July 29, 2005, was the first time in over two years that we were afforded an opportunity to be involved in your Wetland Appendix, EPA's EMAP document, or the six other environmental appendices, and this opportunity was only to view your finished product. Therefore, we are unable to provide you the thorough types of comments that would have otherwise been constructive and beneficial toward compiling a scientifically sound document.

Our review is only of the appendices, as the main report has not been provided to us. These comments are submitted in accordance with the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e) but do not constitute our final report in accordance with Section 2(b) of the Act.

General Comments

All appendices are based on the recommended plan, the main feature of which is a 14,000 cubic feet/second (cfs) pumping plant which is intended to reduce flooding on 26,263 acres of jurisdictional wetlands. The selected plan could include reforestation of up to 62,500 acres of cleared land within the one year floodplain.

The following comments are applicable to all the appendices.

Only jurisdictional wetlands under the Clean Water Act are considered.

There is no consideration of project impacts to wetlands that are not jurisdictional pursuant to the Clean Water Act. Ponded wetlands supported by rainfall, saturated wetlands supported by groundwater, wetlands with short hydroperiods (< 5% of the growing season), and isolated wetlands are neither estimated nor evaluated. Furthermore, the National Environmental Policy Act (NEPA) requires a full analysis of all potential impacts to fish and wildlife dependent resources, not only Corps-jurisdictional wetlands. This discrepancy is carried through all the appendices and grossly underestimates the extent of adverse project impacts on this watershed and ecosystem. Furthermore, this gross underestimate of wetland impacts has resulted in inadequate and inappropriate mitigation options proposed for the project.

It is assumed that future land use in the project area will remain constant with or without the YBWA Project.

It is unrealistic to assume that future land use in the project area will remain constant with or without the Yazoo Backwater Area (YBWA) project. As stated in a Natural Resource Conservation Service letter dated June 23, 2005, to the Mississippi River Levee Board concerning farm programs in the Mississippi Delta, "Each year we enroll an additional 8 to 9,000 acres in the Wetland Reserve Program and plant that acreage in hardwood seedlings." Many of these enrollment acres are in the YBWA Project counties. With the project, this trend of reforestation of low-lying, cleared agricultural land is likely to be reversed when landowners, believing that the project will eliminate flooding, will clear forested wetlands. History has shown that flood control projects of this type throughout the Mississippi have routinely stimulated land clearing and agricultural intensification of marginally suitable lands. We believe future land use, with or with out YBWA Project, will not remain static and those changes must be considered in the project evaluation.

Mitigation for project impacts is based exclusively on obtaining voluntary conservation easements on up to 62,500 acres of cleared land within the one year floodplain for reforestation.

The premise upon which the evaluation of impacts and subsequent mitigation are based is that voluntary conservation easements on up to 62,500 acres of cleared land within the one year floodplain will be obtained and those lands will be reforested. There is considerable uncertainty as to the location of these cleared lands, the contiguousness of these lands, and the frequency and duration of flooding on them. Furthermore, planting trees on agricultural land does not necessarily result in the restoration of an area to a functioning wetland. Past trends indicate that if the pumps are installed, a false sense of complete flood control would prevail, farming would intensify, and the likelihood of obtaining this magnitude of cleared land from willing sellers would become infeasible. This potential reality is further influenced by WRP caps in several south Delta counties.

We have the following specific comments concerning each appendix:

Wetlands Appendix

Hydrologically, the basin has been overwhelmingly influenced by the Corps' Mississippi River and Tributaries Project, the largest flood control project in the world. It has fundamentally changed the way the remaining Yazoo Basin wetlands receive and cycle water. The Yazoo headwaters have been significantly altered by detention reservoirs on headwater streams, a system of levees, and channel modifications. The relationship of hydrological alterations in the basin should be brought into perspective relative to the historic declines in wetland functions and values and how the project may compound this negative trend.

We recommend the cumulative impact section of this Appendix be expanded. Cumulative impact analysis should discuss past, present, and foreseeable future impacts on specific basin functions and attributes. Historic changes in basin hydrology (disconnection of Mississippi river floodplain and loss of riverine class wetlands), conversion to agriculture, loss of old growth forest, increases in fragmentation, should all be reviewed from the perspective of specific attributes (e.g., wildlife habitat).

According to Smith and Klimas (2002), from an estimated original area of 9 to 10 million hectares, Mississippi Alluvial Valley forests were reduced by about 50 percent by 1937, and currently less than 25 percent of the original area remains forested. Much of the remaining forest is highly fragmented. Within the Yazoo Basin, only about 10 percent of the original forest area remains. It is generally understood that reduction and fragmentation of forest habitat, coupled with changes in the remaining habitat, resulted in the loss or severe declines of the ivory-billed woodpecker, Bachman's warbler, and large range species like the red wolf, black bear, and Florida panther. These types of cumulative impact losses are not addressed in your cumulative impact analysis.

There is too much emphasis throughout the document on long hydroperiod jurisdictional wetlands. Although jurisdictional wetlands may be important to Section 404 (b) (1) analyses, **total project impacts**, not just "jurisdictional" wetlands need to be accounted for and analyzed. Determination of a lack of jurisdiction is not an appropriate metric for limiting impact analysis for a Federal project. Using this metric unduly limits analysis of impacts on short hydroperiod wetlands. From an ecosystem perspective, wetlands supported

by short hydroperiods are as important, if not more important, than longer hydroperiod wetlands for certain wildlife species. Habitat values in the Yazoo Delta are boosted by the mosaic of long and short hydroperiod wetlands and uplands.

The analysis neglects wetlands that are saturated to the surface during the growing season. The project area receives, on average, 52 inches of rainfall per year, yet rainfall and ponding were not considered. These rainwater-fed wetland types are a critical component of the mosaic of habitats in the basin and are likely to be affected by the project. The elimination of the analysis of impacts to isolated wetlands is not justified.

The Corps' analysis of wetlands that are affected by the project is limited to the Riverine Backwater regional subclass. We recommend the Corps analyze the influence of the project (reduced backflooding) on groundwater which may in turn affect hydroperiod in other wetland subclasses (e.g. depressions). According to the Yazoo Regional Hydrogeomorphic Methodology (HGM) Guidebook (Smith and Klimas 2002), "(G)roundwater also is a significant component of the hydrology of the Yazoo Basin." The relationship between impacts to wetlands and effects on amount and quality of groundwater in the project area should be investigated.

Specific Comments

Page 10-3, Para. 6. It is stated that in order to be classified as a wetland, a plant community must have hydrophytic vegetation. It should be pointed out that an area with the appropriate hydroperiod could also be classified as a wetland if tillage was curtailed and natural vegetation was allowed to regrow (farmed wetlands).

Page 10-6, Para. 13. In this paragraph it is stated that areas are wetlands if they also meet hydrophytic vegetation and hydric soils requirements. Earlier in the appendix, it is stated that only hydrology will be used to determine wetland extent. This contradiction should be corrected.

Page 10-9, Para. 21. First it says that the Mississippi River is the sole source of water that maintains wetlands in the basin. Then it says that, since the area receives 52 inches of precipitation annually, the assumption of the river as sole source is likely false, and that precipitation likely sustains many of the basin's wetlands. Finally, this paragraph says that, however, it is too difficult to determine which wetlands are sustained by backwater flooding and which by precipitation. These contradictory statements lead to confusion and make the validity of the extent of wetlands described in the appendix questionable. Clarification regarding the relationship of the various hydrologic sources would be beneficial.

Page 10-12, Para. 26. There is a discussion of the development of a runoff model to estimate stage data for the period prior to the Steele Bayou and Little Sunflower structures. No error estimates on the stage data are provided. The potential range of maximum and minimum error for stage estimates is important particularly because of the flat Yazoo Basin topography.

Page 10-12, Para. 26. "...using observed rainfall data...". Earlier in the document it states that using precipitation data was too difficult. Clarification on what observed rainfall data is and how it was used should be included.

Page 10-14, Para. 30. "Observed data at these two gages were limited, and the stage data from these two gages were critical to the overall analysis of the project." Again, the validity of the delineation of wetlands sounds weak with the statement that data were limited, yet they were critical to the analysis. The statement should be clarified.

Page 10-24, Para. 42. According to your Flood Event Assessment Tool (FEAT) model, it is noted that "the quality of the model output is dependent mainly on the quality and accuracy of the elevation data." It is then stated that the elevation data were derived from the USGS 1:24000 Digital Elevation Model, but no estimates are given as to the accuracy of these figures or the contour interval delineated by the model. The contour interval delineated (two foot, five foot, or ten foot) and estimated accuracy of the delineation has a direct bearing on the accuracy and precision of derived estimates. The smaller the contour interval the more precise the ultimate areal estimates will be. In the project area, even minor differences in delineation accuracy and contour intervals considered could result in drastically different acreages of wetland estimates. More details regarding the DEM and its limitations should be included.

Page 10-38, Para. 66. The Flood Event Assessment Tool (FEAT) model was used to calculate the 5% duration elevation (Tier 2), which was then verified by delineating wetlands on the ground. According to the ground truth exercise, in Tier 2 wetlands, 34.6% (18 of 52 points) were misclassified as nonwetland when they should have been classified as wetland. If the 34.6% is added to the estimated acreage of wetlands to be impacted by this project (which is 189,600 acres), the total would be 289,908 acres. The remainder of the document attempts to discount the accuracy of the field verification and build up the accuracy of the hydrologic models and interpreted results. Field verification or ground truth acquisition is typically a key component of model calibration. Therefore the apparent disconnect between what was observed on the ground and the model outputs should be explained.

Page 10-59, Para. 96. The cumulative impacts of the YBWA and Big Sunflower Projects on wetland resources of the combined project area are explained by referring the reader to Plates 10-53 and 10-54. The paragraph goes on to state that the Big Sunflower project will reduce jurisdictional wetlands by 9,200 acres and the combined projects will reduce jurisdictional wetlands by 35,508 acres. The estimate of combined impacts of the two projects is difficult to comprehend. Additional explanation would assist in understanding the cumulative impacts.

Page 10-60, Para. 97. It is stated that the "Swamp Buster" Act prevents farmers from converting forested wetlands to row crops. This is a misstatement. "Swamp Buster" does not prevent such conversions, but by denying subsidies for such conversions, it serves as a strong inducement to not convert. Despite arguments to the contrary, if jurisdiction is removed from wetlands as a result of the project, these wetlands would be more vulnerable

to clearing and conversion. Moreover, if after project completion, NRCS also considers these areas non-jurisdictional, any protection that "Swamp Buster" does offer from conversion would be eliminated.

Impacts to Wetland Functions Appendix (HGM Analysis)

While the mechanics of the HGM exercise appear fairly sound, questionable assumptions which we identified earlier may have lead to erroneous conclusions. See our general comments on the appendices.

According to the document, project induced changes would consist solely of a shift in the percent duration of backwater flooding during the growing season (page 8 HGM draft). However, the introduction to the HGM draft states that the project is likely to have indirect effects on wetlands due to the alteration of the extent and duration of backwater flooding in portions of the lower Yazoo Basin. The study focuses mainly on change in the duration variable (V_{DUR}). There is also no analysis of potential stage (depth) changes as a result of the project.

Changes in depth are crucial, since hydrology affects species composition and richness, primary productivity, organic accumulation, and nutrient cycling in wetlands. Water depth flow patterns, and duration and frequency of flooding, which are the result of all the hydrologic inputs and outputs, influence the biochemistry of the soils and are major factors in the ultimate selection of the biota of wetlands. Hydrologic conditions can directly modify or change chemical and physical properties such as nutrient availability, degree of substrate anoxia, soil salinity, sediment properties, and pH. Hydrology is the single most important determinant of the establishment and maintenance of specific types of wetlands and wetland processes, and even small changes in hydrology can result in significant biotic changes.

Specific comments

Page 19, Para. 2. It is stated that mitigation areas would consist of agricultural lands within the two year floodplain. Other appendices state that mitigation lands are within the 87-foot elevation at Steele Bayou, which is the one year floodplain. This contradiction should be corrected.

Page 19, Para. 3. The metric values for several landscape variables (V_{TRACT}, $V_{CONNECT}$, and $V_{CORE)}$ were all set to reference conditions, because they could not be determined until actual mitigation sites had been identified. This procedure assumes that all selected mitigation tracks will be connected and unfragmented. This assumption is however unlikely and should be stated in the document.

Page 19, Para. 3. The metric value for V_{POND} was set to reflect incorporation of 40-80% microdepressional areas. However, in practice, many agriculturally converted areas have undergone some type of leveling operation. The effect of land leveling on the model results should be explained.

Page 20, Para. 1. The metric value for the V_{SOIL} and V_{CEC} variables were set to reflect no altered soils in the mitigation area. However, the potential changes in soils due to tilling and/or oxidation of hydric soils through drainage should be explored.

Page 20, Para. 1. The V_{DUR} variable for the mitigation areas was set based on the assumption that the percent duration of backwater flooding will be <5%. According to the Corps standard, a V_{DUR} of <5% is considered to be a non-jurisdictional wetland area. It appears that an impact site that has a V_{DUR} of <5% is considered a non-wetland, yet a mitigation site with a V_{DUR} of <5% is considered satisfactory for a wetland mitigation site. This discrepancy should be explained. Also, if backwater flooding for these mitigation wetlands is <5%, these wetlands may not even be in the same geomorphic class as the wetlands being altered by the project. Explanation of this inconsistency should be included.

Page 20, Para. 1. There is the lack of a clear, fundamental "future without" condition for the proposed mitigation areas. According to Smith and Klimas (2002), approximately 5,600 hectares of former bottomland forest and wetlands that had been converted to agriculture have been replanted and more than 7,000 hectares are scheduled for acquisition and reforestation in the future. Considerable reforestation is already underway on private lands, primarily under the Wetland Reserve Program of the Department of Agriculture. Additional agricultural areas would be restored through the Service's Partners and Carbon Sequestration programs. Therefore, it would seem logical to conclude that a large portion of the proposed mitigation areas, in a reasonably foreseeable "future without" projection, would be restored without the proposed mitigation action. This likelihood should be incorporated into the "future without" analysis.

Water Quality Appendix

The YBWA project is the last piece of a project to provide drainage and flood control to agriculture land in the Yazoo Basin. Drainage and flood control activities in the past have included channelization of several streams including Steele Bayou and the Big and Little Sunflower Rivers. These streams now have greatly degraded water quality, resulting in segments of these streams being designated as impaired waterbodies. We believe the document should discuss the water quality impacts of the Pumps project in light of past drainage and flood control activities in the backwater area.

Specific Comments

Page 16-15, Para. 23. The paragraph states that the EPA released national water quality criteria in 1997, and that the most recent Mississippi criteria were published in 1995. We recommend that this document reflect EPA's most recent criteria which were updated in 2002. The water quality criteria were adopted by the Mississippi Commission on Environmental Quality on October 24, 2002, and were approved by EPA on June 27, 2003.

Page 16-18, Table 16-17. The mercury concentrations in the water samples from the lower and upper Big Sunflower areas were <2 ug/l with the exception of water sample BPC-3. We recommend that the narrative for the table mention that several of these samples may have

exceeded the chronic state and national criteria if detection limits were lowered to at least 0.012 ug/l.

Page 16-21, Para 30. This document states that mercury was detected in seven of the 39 samples, and that sample HB-1 contained mercury concentrations that exceeded the state and national acute criteria. Table 16-7 shows that mercury was detected in all nine samples from the backwater lakes and in one sample from the upper Big Sunflower River (sample BPC-3). We recommend that this paragraph be rewritten to avoid contradiction with Table 16-7.

Page 16-21, Para. 33. The sentence states that zinc concentrations were elevated in sample BPC-3 because "this sample was analyzed for total metals not dissolved metals and the high reading is likely due to suspended sediment." It should be clarified in the document why Sample BPC-3 was the only sample analyzed for total metals and not dissolved metals.

Page 16-22 through 16-27, Figures 16-2a through 16-3b. These figures show total DDT detected in sediment samples, and two of the figures show effects range-low (ER-L) and effects range-medium (ER-M) for total DDT. ER-L represents a level where biological effects would rarely be observed. ER-M represents a level in which biological effects would occur. The figures should indicate whether the samples are surface sediment or core sediment samples. Also, we recommend the ER-L and the ER-M be provided on each figure.

Page 16-28, Para. 37. It is mentioned that toxaphene was one of the pesticides not detected in the sediment. It is well known that toxaphene was heavily used on agricultural lands in the project area, and fish from the project area contain elevated levels of toxaphene. We recommend reviewing the results of the toxaphene detection study to verify the results.

Page 16-29, Para 39. This paragraph presents an in depth discussion on whether or not DDT levels increase with depth. We recommend a table showing DDT concentrations at various depths for each sediment sample be provided in the document. Such information would be beneficial for the reader to understand the discussion.

Page 16-53, Para 62. The paragraph states that sediment from the Big Sunflower River is not toxic because bioaccumulation assays showed that the total DDT concentrations accumulated in test organisms were well below LR50 levels (50% mortality). It was concluded that sediments from the Big Sunflower River should not pose a threat to aquatic life. The conclusion implies that DDT levels in sediment throughout the project area are not causing problems for aquatic life. However, total DDT concentrations in the project area are at levels in fish tissue that exceed predator protection and fish consumption advisory levels. These elevated total DDT concentrations in fish tissue likely indicate that there are hot spots of sediment which were not tested. We recommend that this paragraph be revised to remove this contradiction.

Page 16-53, Para 63. It is mentioned that contaminant levels in fish are important because of the potential impacts to both fish and humans. We recommend this document also

discuss that contaminant levels in fish are also important because of impacts to fish-eating birds and mammals. Many fish collected from project area waterbodies contained total DDT concentrations that exceeded the predator protection level of 1.0 ppm (the EPA recommended level for total DDT in fish tissue for protection of fish-eating birds and mammals is 1.0 ppm). These findings indicate that total DDT concentrations in whole body fish samples pose a significant threat not only to fish and humans, but also to fish-eating birds (great blue herons, great egret, little green heron) and mammals (river otter, mink).

Page 16-64, Para. 66. The document discusses the fish samples that contained mercury concentrations above the limit of no consumption levels. We recommend that this appendix also discuss the number of samples containing mercury concentrations above the level of 0.1 (Eisler 1987) for the protection of fish-eating mammals and birds.

Page 16-64, Para. 68. It is stated that the Mississippi levels of concern for arsenic, lead, selenium, cadmium, and chromium in fish tissue are 1.0 mg/kg for each trace metal. They further state that none of the fish tissue samples collected from the backwater area contained concentrations that equaled or exceeded the state levels for arsenic, copper, lead, and selenium. We recommend that the appendix also discuss that levels of concern for trace metals in fish tissue have been developed by researchers. Walsh, et al. (1977) recommended levels for arsenic and cadmium in fish tissue for the protection of fish eating birds and mammals at 0.5 ppm. The recommended predator protection level for chromium is 0.2 ppm (Eisler [1986], Schmitt and Finger [1987]). We also recommend that this document state how many samples contained trace metal concentrations that exceeded the recommended levels for predator protection.

Pages 16-72 to 16-74. This section presents a lengthy discussion on the production of methyl mercury, the toxic form of mercury that is bioaccumulated by aquatic organisms. In general, the section states that reforestation of the backwater area will cause an increase in the production of methyl mercury because the large amount of detritus on the forest floor will provide the organic precursors for the production of the same. There are other environmental variables that affect both the availability of mercuric ions for methylation (changing elemental or inorganic mercury to methyl mercury) and the growth of the methylating microbial populations. These variables should be considered in any assessment regarding the production of methyl mercury. Methylation rates are higher in low pH environments, and sulfide can bind mercury and limit the production of methyl mercury. Methyl mercury production can vary due to seasonal changes in nutrients, oxygen, temperature, resuspension of sediment, total organic carbon, and hydrodynamics. We recommend that this section be revised to include a discussion regarding methyl mercury production and these additional environmental variables.

Page 16-93, Para. 94. This section discusses an environmental enhancement feature that would increase the water depth behind the Steele Bayou structure three feet during the low water period to provide increased wetted surface along the channel bank. As it is currently written, it is unclear to us how the environmental enhancement would occur. We recommend adding a discussion of how the removal of irrigation water from area streams would constitute an environmental enhancement feature.

Page 16-101, Para. 116. Methyl parathion is discussed as an insecticide that is moderately toxic to fish and degrades rapidly. Based on our information, methyl parathion is highly toxic to other aquatic organisms including crustaceans. Additionally, the insecticide has chronic effects on fish in low concentrations including reduction in sex hormone and inhibition of feeding behavior. This insecticide is also moderately persistent, to persistent, in the environment. We recommend that this information be included in the discussion.

Page 16-102, Para. 120. The document mentions that there would be an increase in corn acreage during the future with or without the project. The Corps should state whether or not there will be an increased pesticide runoff due to the increase in corn acreage. It is our understanding that more insecticides will be required for future corn yields than for current soybean yields.

Page 16-105, Para. 125. This paragraph discusses reforestation to prevent soil erosion and reduce sediment yield in area streams, which have been designated as impaired waterbodies due to sediment loading. It is our understanding that the sediment yields in the streams are due to both channel processes (head cutting, bank sloughing, channel scouring) and land sources (agriculture, silviculture, construction sites, gullies). These sediment yields from channel processes are caused by channelization and straightening of the project area streams by past drainage and flood control projects. The water quality appendix should discuss sediment yields from channel processes and, if appropriate, measures to reduce within-channel sediment yields.

Page 16-107, Para. 137. The DDT contamination problem and the siltation and sediment deposition problems in project area streams are discussed. The sediment deposition problems have resulted in several segments of project area streams being designated as impaired waterbodies. As a result, the Mississippi Department of Environmental Quality has developed a sediment TMDL for these impaired segments. The document further discuss that installation of BMPs under the Steele Bayou project has resulted in measured decreases in sediment and fish tissue concentrations of DDT. Completion of several channelization projects caused the sediment deposition problems and the DDT contamination problem through agricultural intensification. We recommend that the discussion for this paragraph be presented in light of the fact that past drainage and flood control projects caused the aforementioned issues to arise in the first place.

Waterfowl Appendix

Overall, the initial part of the document is a well-written and fair discussion of the role of winter habitat in waterfowl biology and some of the unique characteristics of habitats in the Mississippi Delta. This part was understandable and balanced. Our ability to judge the remainder of the document, where the analysis of impacts is addressed, is weakened by the fact that we were not involved with you in the development or assessment of the model. As written, the impact analysis is hard to understand. The hydrologic and land use changes that drove estimated changes in duck carrying capacity in your model are not fully explained to

the reader. Except for the items identified below, the Service did not find anything in the analysis that suggested serious flaws in the document.

The report would be more useful if it had a Discussion or Summary section explaining the factors that made duck use-days (DUDs) generally increase.

Example of Service-suggested text:

> "The trends in changes in DUDs among alternative scenarios primarily resulted from changes in hydrology, or resulted from changes in land use. The alternatives to baseline conditions reduced the total area affected by flooding, but the habitat types had greater value as foraging habitats and more than offset the decrease in acres flooded."

Specific comments

Page 18, Table 5. The data for rice abundance and corresponding duck use-days for harvested fields on private lands has changed as a result of recent research. Specifically, the value is much lower. We recommend amending the text to reflect recent data.

Page 18, Table 5. The value for soybeans (DUDs/ac = 253) seems high. The value in Service-published documents is lower. We recommend this value be re-examined.

Page 18, Footnote 3 at the end of Table 5. It is unclear to us why this footnote is here. We recommend reviewing this footnote for appropriateness. Also, the footnote references 'Duck-use days/ac' but not 'Duck-use days/ha.' We are unsure why the number '237' in Table 5 is the same number mentioned in item #18 on the top of page 19. We recommend reviewing this number and location for appropriateness.

Page 19, Para. 18. This paragraph does not flow from the preceding material. We recommend that this paragraph be explained more fully, so the reader can see how it relates to the preceding material.

Page 19, Para.19. The numbers of DUDs in the first paragraph of text under RESULTS are not consistent with those in Table 7. We recommend reviewing the number '44,526.90' in the far right column under TOTAL DUD in Table 7. We believe this may be a typo or the comma may be in the wrong place.

Page 36, Para.34. There is a typo in the text. The number "6664,773.2" should be 664,773.2 (see Table 22).

Terrestrial and Fish Appendices

The documents are well written and the basic premise of the Habitat Evaluation Procedures (HEP) for fish and wildlife habitat is scientifically based. However, as stated in our introductory comments, the assumptions on which both HEPs are based are not valid. To implement a project to drain wetlands and then assume that it will not intensify forested

wetland clearing, and that it will result in the reforestation of 62,500 acres is not logical or feasible.

We recommend consideration of one additional aquatic resource impact in the appendix, or the EIS; that is accounting for the potential impacts of pump operations on biota (i.e., entrainment and impingement of aquatic organisms).

Mitigation Appendix

The introduction states that "the reformulation goal was to develop a project that provides an appropriate balance between environmental sustainability and flood damage reduction." In our FWCA 2(b) report dated November 6, 2002, the Service has pointed out that the recommended plan to construct a 14,000 cfs pumping plant to drain low lying, floodplain wetlands combined with a proposal to reforest wetlands now subject to intensified drainage does not result in a balance between environmental sustainability and flood damage reduction.

The introduction also states, "the determination that compensatory mitigation was not required for the recommended plan was based on the assumption that the nonstructural reforestation component would provide, at a minimum, the acres to offset environmental effects...". However, we believe that a plan to reforest lands within the one year floodplain combined with a structural pumping plant is not a nonstructural feature or component. In our opinion, a nonstructural plan would actually restore the ecological integrity of the two year floodplain, where agriculture would remain a high-risk endeavor.

Also the introduction states that, "...the probability of additional clearing of bottom-land hardwoods as a result of changes in hydrology is low." We believe that with implementation of the large pumping plant, the probability of land clearing would become high because past trends indicate that if the pumps are installed in an area, a false sense of complete flood control would prevail and farming would intensify.

In addition, we are concerned that the viability of some 8,382 acres of "jurisdictional wetlands" on nearby National Wildlife Refuges, National Forest, and Wetland Reserve Program lands would be adversely affected by the project and that the intent of the project is contrary to the purposes of these public lands.

Summary Comments

Since the release of the DSEIS in September 2000, little has changed regarding this project; with the exception of the inclusion of a discussion in the Wetland Appendix of the impacts of the Big Sunflower River Maintenance Project combined with the YBWA Project. The Corps' recommended plan, the Corps' estimation of the extent of wetland impacts, and the Corps' evaluation of project impacts to wetland functions and values have not appreciably changed despite our repeated suggestions. We are disappointed that the Corps failed to include any of our recommendations; recommendations that would have been beneficial toward assembling a scientifically sound set of appendices. Based on our review, the

appendices underestimate project impacts and thereby preclude development of appropriate off-setting mitigation recommendations to protect fish and wildlife resources.

As an alternative to the Corps' current plan, the Service continues to recommend that the two year floodplain be designated a nonstructural flood damage reduction zone dedicated to the preservation of natural floodplain values rather than draining and subsequently clearing those lands for agricultural intensification. In order to target flood protection where it most needed in the YBWA, we further recommend local structural measures in the form of ring levees around cities such as Rolling Fork to protect valuable infrastructure and public health. This is consistent with the emerging Federal flood reduction policy which has evolved over three decades; a policy that continues to move toward nonstructural floodplain enhancement and natural floodwater storage to achieve a sustainable balance between economic development and environmental conservation.

Since these documents appear to contain information that could be considered influential or highly influential scientific information, the Service recommends that the Corps determine if subject appendices should be 1) reviewed by other agencies within their area of expertise (EPA, Natural Resources Conservation Service, U.S. Geological Survey), or 2) independently peer reviewed by members of the scientific community in accordance with the Information Quality Act.

Thank you for the opportunity to review these documents. If you have any questions, please contact me at (601) 321-1122.

Sincerely,

Curtis B. James

for Ray Aycock
Field Supervisor
Mississippi Field Office

cc: MS Dept. of Wildlife, Fisheries and Parks, Jackson, MS
MS Dept. of Environmental Quality, Jackson, MS
U.S. Environmental Protection Agency, Atlanta, GA

Literature Cited

Eisler, R. 1986. Chromium hazards to fish, wildlife, and invertebrates: a synoptic review. U.S. Fish and Wildl. Serv. Biol. Rep. 85 (1.6). 60 pp.

Eisler, R. 1987. Mercury hazards to fish, wildlife, and invertebrates: a synoptic review. U.S. Fish and Wildl. Serv. Biol. Rep. 85 (1.10). 90 pp.

Schmitt, C.J. and S.E. Finger. 1987. The effects of sample preparation on measured concentrations of eight elements in edible tissues of fish from streams contaminated by lead mining. Arch Environ. Contam. Toxicol. 16:185-207.

Smith, R.D. and C.V. Klimas. 2002. A regional guidebook for applying the hydrogeomorphic approach to assessing wetland functions of selected regional wetland subclasses, Yazoo Basin, Lower Mississippi Alluvial Valley. ERDC/EL TR-02-04. U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Walsh, D.F., B.L. Gerger and J.R. Bean. 1977. Mercury, arsenic, lead, cadmium, and selenium residues in fish. 1971-1973 national pesticide monitoring program. Pestic. Monit. J. 11:5-34.

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183-3435

REPLY TO
ATTENTION OF:

August 15, 2006

Planning, Programs, and
Project Management Division
Planning and Project
Management Branch

Mr. Ray Aycock
Field Supervisor
U.S. Fish and Wildlife Service
6578 Dogwood View Parkway
Suite A
Jackson, Mississippi 39213

Dear Mr. Aycock:

I refer to your letter of October 11, 2005, concerning the review of the seven revised draft environmental appendixes for the Yazoo Backwater Reformulation Study and subsequent meeting on April 27, 2006, in which we discussed your comments with your staff.

Your letter stated the U.S. Fish and Wildlife Service (FWS) is unable to provide the "thorough types of comments" to these appendixes because FWS was not more involved in the wetland reassessment. The wetland reassessment was conducted at the request of the Environmental Protection Agency (EPA) in order to assess wetland impacts utilizing their Hydrogeomorphic Method (HGM) model. The U.S. Army Corps of Engineers, Vicksburg District, and EPA are the agencies given responsibility for the protection of wetlands and until both agencies have resolved the issues surrounding the use of the new HGM model, there were no data to release. We thank FWS, along with the other cooperating agencies, in helping verify the wetlands in the summer of 2003, but this was only a small part of the analysis. The review of this new approach can now be accomplished by your agency since all the information was included in the reports by the Vicksburg District, EPA, and the U.S. Army Engineer Research and

Development Center that together make up the new Wetland Appendix. Upon distribution of the appendixes in July 2005, we had two workshops with your staff and the other cooperating agencies to facilitate your review. The models used in the terrestrial, waterfowl, and aquatic evaluations are the same models that were used in the draft 2000 report and in fact, are primarily FWS models. The Water Quality Appendix has been updated to reflect new water quality parameters used to measure total maximum daily loads. The Mitigation Appendix is a summary of these appendixes as it relates to impacts and offsetting features. In summary, the only appendix that was changed to utilize a new model was the Wetland Appendix, but it is still a functional assessment which is similar to the assessment utilized in the 2000 draft report. The remaining cooperating agencies indicated the Wetland Appendix was complex; however, they were able to review and provide meaningful comments.

We understand you could only review the appendixes since the Main Report and Supplemental Environmental Impact Statement (EIS) are presently being revised, but these documents only summarize what you have already seen in these environmental appendixes and you were informed that the recommended plan is not changing. In addition, this is the same coordination process used with your agency on previous feasibility level studies and EISs. Hopefully, our responses will allow FWS to provide a final report in accordance with the Fish and Wildlife Coordination Act. Our responses to your comments are enclosed (enclosure 1).

Please note that references to the Flood Event Assessment Tool (FEAT) model have been changed to the Flood Event Simulation Model (FESM). The FESM model is the enhanced version of FEAT used in this study. Also, after upgrading land-use data from 1999 to 2005, the available acreages below 87.0 feet, National Geodetic Vertical Datum, the 1-year frequency flood elevation, have changed. This has impacted all alternatives. Therefore, the Plan 5 nonstructural alternative has changed from 62,500 to 55,600 acres.

I trust this information is useful to you. If you have any questions, please contact Mr. Bob Petersen, Project Manager (telephone (601) 631-5510).

Sincerely,

Dennis O. Norris, P.E.
Chief, Planning, Programs, and
Project Management Division

Enclosure

RESPONSES TO COMMENTS FROM
U.S. FISH AND WILDLIFE SERVICE (FWS)
YAZOO BACKWATER REFORMULATION STUDY
10 AUGUST 2006

GENERAL COMMENTS

1. Only jurisdictional wetlands under the Clean Water Act are considered.

Response. The revised Wetland Appendix addresses only those wetlands potentially impacted due to a reduction in backwater flooding. We acknowledge that other wetlands are in the area and these could be sustained by rainfall, ground water, short hydroperiods, and/or headwater flooding, but these are not impacted by the project. The National Environmental Policy Act (NEPA) does not require agencies to address every potential impact to every resource in the study area. The U.S. Army Corps of Engineers, Vicksburg District, identified significant resources to evaluate through the public scoping process, a process in which your agency participated. Resource impacts to other bottom-land hardwood areas that do not meet the Federal definition of a jurisdictional wetland are accounted for in the other environmental appendixes.

The functional analysis was established by the Hydrogeomorphic Method (HGM) model which was developed by the Environmental Protection Agency (EPA). The jurisdictional wetland impacts have not been underestimated, but in fact, have been overestimated. This fact was thoroughly discussed in the Wetland Appendix and summarized in the conclusions. Your agency has not provided specific data or analysis that supports your position that impacts have been grossly underestimated. All impacts have been fully disclosed in the appendixes. The models used for the terrestrial, waterfowl, and aquatic appendixes were coordinated through the Habitat Evaluation Procedures (HEP) team, of which FWS was a member. These models have been used by the Vicksburg District on prior studies, and FWS has not raised an issue with them. There is no compensatory mitigation required on this project because the nonstructural flood damage reduction feature more than offsets the environmental impacts. The Vicksburg District, at the request of FWS, calculated the acreage of reforestation under the nonstructural feature needed to achieve no net loss of environmental resources which is displayed in the Mitigation Appendix.

While the Corps has no requirements to mitigate for those areas outside of jurisdictional wetlands, we have added an additional analysis to account for functional impacts to areas outside jurisdictional wetland bands. These data have been incorporated into the revised Wetland Appendix.

2. It is assumed that future land use in the project area will remain constant with or without the YBWA Project.

Response. Future land use in the area will remain essentially the same with or without the project. The U.S. Department of Agriculture (USDA) programs have reached their respective caps in Sharkey and Issaquena Counties. While other counties can continue to enroll, the two primary counties in the Backwater project area will not change. The nonstructural feature of this project has now become the primary option open to landowners in these counties to continue with reforestation programs, and this feature will provide an incentive to do so. We also do not see future land clearing due to the project because of the loss of agricultural program benefits to farmers under USDA rules. Prior to NEPA, Swamp Buster, and Section 404 requirements, farmers cleared land as projects were completed. However, in recent years with those laws, regulations, and penalties in force, land clearing has virtually stopped. Swamp Buster provisions of the 1985 Farm Bill will protect the bottom-land hardwoods from clearing because of the loss of program benefits. The USDA records show only 1,105 acres of land were cleared in the entire Delta since 1985. Based on further analysis of land use over the last 18 years, the primary change has been the reforestation of land under the USDA programs or the purchase and reforestation of agricultural land for mitigation for other Federal water resource projects. No additional changes will be considered in the project evaluation. Included in the Mitigation Appendix was an analysis of forestry land use over the last 30 years. The analysis shows that the baseline of mature forest acres has remained generally at approximately 200,000 acres since the 1970s, and in addition, the Conservation Reserve Program (CRP) and Wetland Restoration Program (WRP) land has to be added to get the total project area of woodlands. The Vicksburg District has evaluated the land use prior to a project being constructed to today's land use at the Tensas-Cocodrie pumping plant near Vidalia, Louisiana. Forested areas have increased approximately 10,500 acres. If you have additional data indicating that it will not remain static, please provide it for our consideration.

3. Mitigation for project impacts is based exclusively on obtaining voluntary conservation easements on up to 62,500 acres of cleared land within the one year floodplain for reforestation.

Response. There is no compensatory mitigation required for this project overall. The 55,600 acres of cleared land that you refer to is the nonstructural flood damage reduction feature of the project for those lands below the pump-on elevation. Farmers can continue to plant these acres, but at their own risk. The Vicksburg District, at the request of FWS, calculated the acreage of reforestation under the nonstructural feature needed to achieve no net loss of environmental resources. This is provided in the Mitigation Appendix and includes a statement that the Corps will guarantee this acreage of reforestation prior to operation of the pump. A map depicting the location of lands available for the nonstructural component of the project (those lands below the 2-year flood frequency elevation) is included in the report. These lands are all within the 2-year flood frequency and have an average duration of 24 days.

The Vicksburg District initiated a wetland monitoring program in 2002. This monitoring is being conducted by the U.S. Army Engineer Research and Development Center (ERDC) on mitigation lands from other projects, and preliminary data indicate these reforested areas are recovering functional value consistent with projections made by ERDC. Included in the Mitigation Appendix is a statement that the Corps will continue to solicit easements for 10 years after completion of the project. This will allow time for farmers to observe that the pump will have no benefit on those lands at or below the 1-year flood frequency elevation.

4. Wetlands Appendix - General Comments.

Response. The cumulative impacts section in the Wetlands Appendix discusses only impacts to wetlands. A full discussion of cumulative impacts will be included in the Supplemental Environmental Impact Statement (SEIS).

Total project impacts have been disclosed in the summary of all the environmental appendixes. Jurisdictional wetlands are but a part of the total environmental impacts of the project. All impacts have been properly disclosed.

Saturated wetlands, as well as ponded wetlands, have been accounted for in the analysis. There are numerous wetlands in the study area; some are sustained either by precipitation, ground water, backwater or headwater flooding, or a combination. The project will only affect those wetlands supported by backwater flooding. The Corps has used the riverine backwater regional subclass in its HGM analysis. While the project will reduce stages and subsequently the duration of flooding, this should not impact the ground water in the area. The recommended plan will raise the minimum low water level at Steele Bayou structure from 68.5 to 70.0 feet, National Geodetic Vertical Datum (NGVD), to 70.0 to 73.0 feet, NGVD, which should help the ground-water levels in the lower part of the project area.

5. Wetlands Appendix - Specific Comments.

a. Page 10-3, Para 6.

Response. Concur.

b. Page 10, Para 13.

Response. The 1987 Manual defines wetlands as "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for if in saturated soil conditions." This definition states it is the presence of water that controls the type of vegetation and the conditions in the soil (saturated). The Manual requires indicators of all three parameters to increase the accuracy of the determination. In this study, the hydrology was rigorously determined, and the other parameters were assumed to be present. This is a reasonable assumption since 85 percent of the soils in the project area are hydric, and all of the available seed sources are for hydrophytic vegetation (Kirchner, 1991).

c. Page 10-9, Para 21.

Response. Concur.

d. Page 10-12, Para 26.

Response. The Engineering Appendix addresses the interior hydrology methodology used in this study to determine stage data prior to the Yazoo Backwater (YBW) levee system's completion.

The period of record used in the analysis was 1943 to 1997. The YBW levee system was completed in 1978. The period of record routing analysis used to develop base and with-project stages at the Steele Bayou gage was compared to observed stages for this gage for 1978 to 1997. The stages developed from the period-of-record-routing model calibrated well using this analysis and, on average, for the 20-year period from 1978 to 1997. Daily computed stages were within 0.52 foot of observed stages. The maximum peak stage deviation was -2.52 feet, which occurred on December 31, 1982, which was on a rising limb of a flood event in 1983. The minimum deviation from observed stages was +0.06 foot, which occurred on June 2, 1984. Any error in the period-of-record inflows for the base condition will be carried over into the with-project analysis, which will be comparable overall.

e. Page 10-12, Para 26.

Response. Rainfall sustains wetlands, both directly and indirectly. This analysis only considers the indirect method where runoff is captured by the rivers and ponded as backwater flooding. The hydrology and hydraulic analysis used rainfall data to simulate runoff and daily river stage data. It is stated on page 10-9, paragraph 21-b, that "precipitation likely sustains many of the basin's wetlands; however, it would be extremely difficult to determine which wetlands are sustained by backwater flooding and which are sustained by precipitation." This statement is being taken out of context when comparing to the interior hydrology analysis. As stated in the Engineering Appendix, observed period-of-record rainfall was used to determine the period-of-record inflows. These inflows were used in the period-of-record-routing model to develop period-of-record stages. This is clearly stated in the draft 2000 Engineering Appendix.

f. Page 10-14, Para 30.

Response. The statement "observed data at these two gages were limited, and the stage data from these two gages were critical to the overall analysis of the project" refers to the Steele Bayou and Little Sunflower structure landside gages. These gages only have observed period-of-record stages from 1978 to the present since this is the completed period for the YBW levee. Gages in the upper part of the YBW area have 50 years of record, including all major flood events, such as the 1973 flood. Having a period of record which covers most of the major

flood events is essential in comparing to other gages in the development of the wetland elevations. As stated in the Engineering Appendix, the computed stages for the period 1943 to 1997 calibrated well when compared to observed stages. This methodology is well documented in Engineer Manual 1110-2-1413 and is standard hydrologic practice.

g. Page 10-24, Para 42.

Response. The digital elevation mapping (DEM) data utilized in this study was produced by the U.S. Geological Survey (USGS), which is responsible for verifying the accuracy of the data. All the DEMs were produced to National Mapping Standards. The Corps is not going to repeat the work performed by USGS to verify the horizontal and vertical accuracy of the DEMs. The Corps validated the results of the flood mapping by comparison to satellite images of observed flood events. The accuracy of the 30-meter (m) DEMs is appropriate for a planning study of more than 1 million acres since a 30-m DEM equates to approximately 0.2 acre per grid cell or pixel. An accuracy of 1 acre per pixel is appropriate for a planning area of approximately 1 million acres. The 30-m resolution used in this study exceeds that by five times. Additionally, the Corps conducted a sensitivity analysis with newly available 10-m resolution DEMs. The sensitivity analysis demonstrated that a finer resolution DEM (10 m) reduced base wetland acres defined by the 5 percent duration by 21 percent. Wetland acres would potentially decrease farther if the 10-m DEM surface is calibrated. As is described in the article by Kress, et al. (1998), raw DEMs require some calibration before they can be used with the Flood Event Simulation Model (FESM) to give reasonable results. The Vicksburg District does this as part of the model calibration step. For example, to ensure accuracy during this process, missing channels are added into the DEM, and top bank and levee elevation information is added as needed to achieve good results when modeling against flood scenes. In the January 13, 1983, flood simulation, the Lake George area floods, but the satellite scene did not indicate the area flooded. In the DEMs, the top bank of the Lake George area has a maximum contour elevation of 95 feet, NGVD, but the road constructed on top bank has an actual elevation of 98 feet, NGVD. When the top bank elevation on the DEM was increased to 98 feet, NGVD, the modeled flood gave results similar to the satellite scene. The accuracy of the DEM elevations is best tested by the degree of agreement between the modeled floods and their respective satellite scenes. The tabulation below gives

the results of the 30-m versus the 10-m DEM for the Base and Plan 5--5 percent duration floods. In the summer of 2003, EPA undertook a program by which they would verify wetlands in the study area. They divided the basin into three tiers. Tier 1 was areas considered by the Corps to be affected by the 5 percent duration. Tier 2 was bottom-land hardwood areas and farmed wetlands outside the 5 percent duration area. Tier 3 was all open lands above the 5 percent duration within the 100-year flood plain. They evaluated approximately 150 points in each tier. Wetlands in Tiers 2 and 3 are outside the 5 percent duration flood plain and would not be affected by the project.

Item	Outside	Tier 1	Tier 2	Tier 3	Total
Base 1, 30-m	0	189,522.2	0	0	189,522.2
Plan 5, 30-m	0	162,859.3	0	0	162,859.3
Difference	0	26,662.9	0	0	26,662.9
Base 1, 10-m	7,599.8	146,316.6	9,993.6	17,289.5	181,199.5
Plan 5, 10-m	7,530.7	130,363.8	6,376.1	9,788.1	154,058.7
Difference	69.0	15,952.8	3,617.5	7,501.4	27,140.8

The Corps finds that the comparison of the area flooded by satellite scenes and the FESM modeled flood is the best test of the accuracy of the method. This type comparison was performed as part of the calibration and validation steps. The tabulation below gives the results for three of these comparisons. The areal extent of flooding for each scene was split into four zones based on the sampling areas of the EPA's Environmental Monitoring and Assessment Program (EMAP) field testing. Those zones correspond to Tiers 1-3 and the area outside the 100-year flood plain, but within the project perimeter. The "% Shared" column provides the percentage within each zone of the area that is common to both the satellite flood and the respective FESM modeled area. The column, "% Shared + FESM," provides the total area flooded by the FESM model divided by the area flooded in the satellite scene. The last column provides the percentage of the total area within each zone that was flooded. In all cases, there is a positive correlation between the "% Total Area Flooded" and "% Shared." For all three satellite floods, there is a very high degree of "Shared Area" (>95 percent) within Tier 1. The "% Shared + FESM" column shows that the model consistently overestimates the total flooded area within Tier 1. The FESM model does not perform as well in the other zones, but the wetlands in these zones are not connected at the 5 percent

duration and are not affected by the project. The FESM model provides consistent overestimates of the areal extent of flooding within the portion of the area most likely to be affected by the project. By overestimating the areal extent of flooding and wetlands within the area most likely to be affected by the project, the FESM modeling method is protective of wetlands.

10-Mar-89	% Shared	% Shared + FESM	% Total Area Flooded
Tier 1	**96.8**	130.8	69.5
Tier 2	34.5	63.2	29.9
Tier 3	21.9	43.5	8.1
Outside 100-yr	0.9	3.5	4.6
13-Jan-83			
Tier 1	**98.8**	105.9	92.3
Tier 2	71.2	84.4	66.3
Tier 3	53.5	74.8	41.7
Outside 100-yr	0.8	1.4	15.5
30-Jan-74			
Tier 1	**99.2**	113.7	86.2
Tier 2	80.5	124.0	55.6
Tier 3	72.7	149.6	28.1
Outside 100-yr	24.0	56.6	7.5

h. Page 10-38, Para 66.

Response. The FESM model was only used to model wetlands in Tier 1. While EPA used the Environmental Monitoring and Assessment Program to determine wetlands in all three tiers, Tiers 2 and 3 are not impacted by the project, and any misclassification of EMAP points has no bearing on the number of wetlands in the study area which are impacted by the project. The District acknowledges there are other wetlands in the project area, but they are not affected by the YBW project. The FESM model is the only tool that can identify which wetlands are impacted by different type flood events and then delineate the location of the impacts on a map.

i. Page 10-59, Para 96.

Response. Concur.

j. Page 10-60, Para 97.

Response. Included in the Mitigation Appendix is a discussion of why these lands will not be converted, and Swamp Buster is only one of the reasons. We understand that it does not prevent conversions, but the loss of subsidy benefits is such a disincentive that very few, if any, farmers will consider clearing these lands. Only 6,100 of the 26,300 acres of wetlands that will lose jurisdictional status are privately owned bottom-land hardwoods. Of these, 2,450 acres are owned by two large timber corporations who are on record as not being interested in clearing them. The remaining 3,650 acres are scattered small tracts that are not conducive to today's farming practices and will not be profitable to clear. At present, there are over 70,000 acres of bottom-land hardwoods that are not classified as jurisdictional wetlands. These lands are at higher elevations than the lands identified as moving from jurisdictional to nonjurisdictional in the Wetland Appendix. These bottom-land hardwoods have survived since the last major land clearing period in the 1960s. Currently, land is being reforested throughout this area. The Natural Resources Conservation Service data indicate approximately 1,100 acres cleared, but over 250,000 acres reforested since 1985.

6. Impacts to Wetland Functions Appendix (HGM Analysis).

a. General Comments.

Response. We agree that "hydrology is the single most important . . . in significant biotic changes." The HGM model has been developed over the past 20 years by scientists from the Corps and EPA. It incorporates all variables considered critical for wetlands functional analysis.

b. Specific Comments.

(1) Page 19, Para 2.

Response. The lands targeted for the nonstructural feature are those lands below elevation 87.0 feet, NGVD, which approximates the 1-year flood event. However, easements are not purchased on the contour so the land will have to be blocked and will include some lands within the 2-year flood plain.

(2) Page 19, para 3.

Response. It is in Section 2.7, page 18. "It is unlikely that these variables will achieve reference condition in all the mitigation areas that are ultimately selected."

(3) Page 19, para 3.

Response. The metric value for Vpond was changed to reflect no incorporation of 40 to 80 percent microdepressional areas.

(4) Page 20, para 1.

Response. As with the landscape variables, V_{SOIL} and V_{CEC} were set to reference because they cannot be evaluated until the actual location of the mitigation areas are identified. Once identified, these variables will reflect soil conditions present.

(5) Page 20, para 1.

Response. The ERDC set the value of V_{DUR} to <5 percent to be conservative of wetland values. Seventy-one percent of the cleared lands in the 1-year flood plain have a duration greater than 5 percent. The average duration on the available cleared lands within the 1-year flood plain is 19 days, thus the Corps has underestimated the wetland functional value of these lands.

(6) Page 20, para 1.

Response. Both the 1999 and 2005 land-use coverages include a large amount of land which was classified as "reforested." Almost all of the WRP and CRP lands fall into this "reforested" class. As such, the conversion of these lands has already been taken into account. Enrollment of lands into WRP/CRP in the two principal counties, Sharkey and Issaquena, has reached its capacity. Therefore, the probability for significant additional reforestation in the project area is low.

7. Water Quality Appendix.

a. General Comment.

Response. The YBW project was authorized by Congress under the Flood Control Act of August 18, 1941 (House Document (HD) 359/77/1), as amended by the Acts of December 22, 1944, and

October 27, 1965 (HD 308/88/2), and the Water Resources Development Acts of 1986 and 1996.

Most authorized construction was completed by 1979, at a time when interest in environmental or water quality data collection in the Yazoo Basin was just beginning, but analytical techniques were still in their infancy. In addition, much of the channelization done by local flood control districts may have been completed well before 1979. As a result, there are no preproject data for comparison. The flood damage reduction project in Upper Steele Bayou in the 1990s provided the opportunity to evaluate project impacts. Results of this project show a dramatic improvement in water quality, fish diversity, and impairment. A discussion of pre- and postproject sediment and fish tissue quality is included in the analysis of existing conditions in the YBW project area.

b. Specific Comments.

(1) Page 16-15, Para. 23.

Response. The Water Quality Appendix was revised to utilize the 2002 Mississippi Department of Environmental Quality (MDEQ) criteria.

(2) Page 16-18, Table 16-17.

Response. The section was revised to include more current data. Mercury method detection limits greater than the FWC were noted in the discussion.

(3) Page 16-21, Para. 30.

Response. This section was rewritten to include current data.

(4) Page 16-21, Para. 33.

Response. This section was rewritten to include current data. The discussion identifies which samples were analyzed for dissolved metals and which samples were analyzed for total recoverable metals. The samples analyzed for total recoverable metals were collected during the period when the water quality criteria were for total recoverable metals.

(5) Page 16-22 through 16-27, figures 16-2a through 16-3b.

Response. The section discussing sediment was rewritten to include current data. The revised discussion uses the more appropriate EPA threshold effects concentration and probable effects concentration for the data comparison. Because there is no dredging aspect to the YBW project, the discussion of core sediments was removed. Only surface sediments were evaluated.

(6) Page 16-28, Para. 37.

Response. The revised appendix includes current sediment data, including samples with detected toxaphene from the Deer Creek and Big Sunflower River Basins. Confirming and quantifying low-level concentrations of toxaphene in freshwater sediments are problematic for analytical laboratories (commercial, MDEQ, USGS, the Corps). There are many reasons for this, but primarily because the compound is a multicomponent compound that has weathered or biologically degraded from its original chromatographic profile since application 20 or more years ago. Toxaphene was banned in 1982.

(7) Page 16-29, Para. 39.

Response. Because the YBW project does not have a dredging alternative, the discussion on pesticides concentrations with depth was removed from the analysis.

(8) Page 16-53, Para. 62.

Response. Noted. The Vicksburg District does not agree the data indicate there are hot spots of sediment which were not tested. The data do show, however, that sediment concentrations are generally lower in the Steele Bayou Basin than in the Big Sunflower Basin because of the channel cleanout that was completed in the Steele Bayou Basin. Fish tissue concentrations are as likely to be a factor of fish age and fish migration as they are of sediment "hot spot" concentrations. The bioassays show that DDT is not found in sediments at concentrations that will kill macroinvertebrates; thus, DDT is able to concentrate in these organisms and is passed up the food chain to fish. Older fish may have higher concentrations of DDT than younger fish because of opportunity. Fish may also migrate from one basin to another during high water when the Steele Bayou structure is closed and water levels overtop weirs.

(9) Page 16-53, Para 63.

Response. The Vicksburg District evaluated water quality in the YBW project area as it pertains to achieving the fishable, swimmable goal set by the Clean Water Act. The Vicksburg District evaluated existing conditions against water and sediment criteria set by the state and EPA for the protection of aquatic organisms. We were unable to find predator-specific fish tissue criteria used by the state or EPA.

(10) Page 16-64, Para. 66.

Response. The Vicksburg District used state and EPA water and sediment criteria to evaluate existing water quality in the YBW project area as it pertains to achieving the fishable, swimmable goal set by the Clean Water Act. We were unable to find predator-specific fish tissue criteria used by the state or EPA.

(11) Page 16-64, Para. 68.

Response. The Vicksburg District evaluated water quality in the YBW project area as it pertains to achieving the fishable, swimmable goal set by the Clean Water Act. The Vicksburg District used water and sediment criteria set by the state and EPA to evaluate existing conditions. We were unable to find predator-specific fish tissue criteria used by the state or EPA.

(12) Page 16-72 to 16-74.

Response. The section on methyl mercury production was revised as suggested.

(13) Page 16-93, Para. 94.

Response. The YBW project does not include a feature that provides irrigation water for removal from area streams. Use of surface water by adjacent landowners is governed by laws of the State (Mississippi Commission on Environmental Quality, Regulation LW-2, "Surface Water and Ground Water Use and Protection").

(14) Page 16-101, Para. 116.

Response. The methyl parathion discussion was revised as suggested.

(15) Page 16-102, Para. 120.

Response. The section on land use-agricultural intensification has been revised. However, the revised economic analysis does not predict an increase in corn acreage.

(16) Page 16-105, Para. 125.

Response. According to the MDEQ total maximum daily loads (TMDL) for the Big Sunflower River, surface erosion and gully erosion from agricultural lands are the most probable sources on nonpoint sediment supply. Bank erosion was determined to be a negligible contributor to TSS in the Big Sunflower River. Both the Deer Creek and Upper Steele Bayou sediment TMDLs state that the intensification of agriculture occurred in the past, causing sediment problems in the water bodies. They go on to state that the period of peak sediment production has passed and that current farming practices have improved, reducing the present sediment loads. These documents do not discuss reducing within-channel sediment yields, specifically for these basins, but predict that reforestation and continued use of farming and silviculture Best Management Practices will address the identified sediment sources. There is no channelization on the project except for the inlet and outlet channels.

(17) Page 16-107, Para. 137.

Response. This paragraph was revised to more accurately address features proposed for the YBW project, which does not specifically include sediment control structures. A discussion of drainage and flood control projects was not specifically included. Most of the Corps projects were completed by 1979 before environmental data collection began in the Yazoo Basin. For this reason, there are no preproject data to make an analysis. The YBW Water Quality Appendix presents an analysis of improvements in sediment and fish tissue concentrations for the Upper Steele Bayou channelization work completed in the 1990s. There is no channelization on the project except for the inlet and outlet channels.

8. Waterfowl Appendix.

a. General Comments.

Response. The basic duck-use-day (DUD) model was originally developed by the FWS Denver office. The model was modified for use in the Yazoo Basin by personnel in your office. The waterfowl evaluation used the same models that FWS developed and used in the draft 2000 report for the YBW Reformulation Report. These same models are also being used by the Conway, Arkansas, FWS Office for the Bayou Meto General Reevaluation Report for water resource development in another District watershed. These models were also used on the Mississippi River Levees, Upper Yazoo, and Upper Steele Bayou Projects. The FWS had no problem with them on those projects.

One can readily determine the reasons for losses and gains in DUDs by comparing the table for each alternative with the table for the existing conditions in the study area. The tables indicate effects due to hydrologic changes and reforestation measures. In addition, summary data are provided in tables in the Mitigation Appendix for the YBW project in place and both with and without the Big Sunflower River Project in place.

b. Page 18, Table 5.

Response. The data for rice abundance were determined from 2005 satellite imagery and crop-use data provided by the Farm Service Agency. The same DUDs for harvested rice fields on private lands used in the draft report for the YBW project has been used by FWS for the Bayou Meto project and has been reviewed or concurred in by other agencies and the interested public. We are using data that have been determined to error on the conservative side with the analysis. If your agency can provide a specific revised number, then the Vicksburg District will consider reducing the number. However, using the current number results in greater impacts and therefore, likely overestimates waterfowl impacts.

c. Page 18, Table 5.

Response. The DUD value for soybeans is the same one used by FWS for soybeans in the last two quantified waterfowl evaluations performed for projects in the Vicksburg District.

This value has also been reviewed by other agencies and the interested public. If your agency can provide a specific revised number, then the Vicksburg District will consider reducing the number. However, using the current number results in greater impacts and therefore, likely overestimates waterfowl impacts.

d. Page 18, Footnote 3 at the end of Table 5.

Response. Additional verbiage will be added to Footnote 3 at the end of Table 5 to address this concern.

e. Page 19, Para 18.

Response. This is the additional verbiage that will be added to Footnote 3 at the end of Table 5. It was misplaced in the Appendix.

f. Page 19, Para 34.

Response. The number "44,526.90" was a typographical error. The correct number is "445,266.9." The numbers in Table 7 have been corrected.

g. Page 36, Para 34.

Response. The typographical error in the text on page 36, paragraph 34, has been corrected.

9. Terrestrial and Fish Appendixes.

Response. The project does not drain wetlands, but it does alter the hydrology on a portion of the project area wetlands. Rationale explaining why flood damage reduction measure will not intensify forested wetland clearing is provided in the Mitigation Appendix. The HEP procedure used in the Terrestrial and Aquatic Appendixes was developed by the HEP team, of which FWS was a member. The same models and species have been used on other studies in the Yazoo Basin, and FWS had no problem with the analysis. Farming will not intensify because of the various laws and regulations in place now as compared to the 1950/1960s. This has been discussed earlier in the document. Reforestation is a logical approach to lands that will not receive flood damage reduction benefits.

The potential impacts of pump operation on biota have been added to the Aquatic Appendix and the SEIS.

10. Mitigation Appendix.

Response. If your agency has specific data and/or analyses that document the project will drain wetlands, the Vicksburg District would appreciate the opportunity to review those data or analyses. In contrast, the District has provided a state-of-the-art wetland analysis, combined with a full discussion on why there is a low probability for additional clearing in the future. To simply point out that the recommended plan does not result in a balance between environmental sustainability and flood damage reduction is not sufficient. Reforestation of lands below the 1-year frequency flood plain is a nonstructural flood damage reduction feature. Similarly, reforestation of lands below the 2-year frequency flood plain is a nonstructural flood damage reduction feature. The physical actions are the same, only the acreage involved is different. Our opinion is that our nonstructural feature would actually restore the ecological integrity of the 1-year frequency flood plain, where farming would remain a high-risk endeavor.

Our assessment that the probability of additional clearing is low is based on specific study area data and analysis. If your agency has specific data and analyses pertaining to the study area that indicate otherwise, the District would like the opportunity to review and consider that information.

11. Summary Comments.

Response. With respect to your summary comments, much additional fieldwork, modeling, and scientific review have gone into revising appendixes from the draft 2000 version. We have worked extensively with cooperating agencies, such as EPA that has responsibility for preservation of wetlands as well as FWS with interest in the preservation of terrestrial, aquatic, and waterfowl species, to further identify and resolve issues. This has included working with FWS on Biological Assessments on endangered species. We feel the added science included in the 2006 version of the appendixes has better defined impacts and, with the inclusion of the nonstructural feature of the recommended plan, actually led to overcompensation of impacts and mitigation for them.

The 2006 version addresses additional nonstructural alternatives as you suggest. These alternatives are as follows:

[NOTE: Blocking Out. The reforestation and conservation easement acquisition limits for the Yazoo Backwater Reformulation Study were established based upon the 1-year flood frequency stage elevations. However, based upon sound real estate practices and guidance as found in USACE real estate regulations, blocking out will be utilized to address such items as access, the extent of severance damages, and avoidance of an uneconomic remainder. The blocking out will result in the acquisition of some lands outside the 1-year flood event. The Vicksburg District Real Estate Division has vast experience in the acquisition of lands based upon elevation and typically uses a blocking factor of 30 percent. This figure was utilized for calculating the acreage to be acquired for the reforestation conservation easement in connection with the Yazoo Backwater Reformulation Study. The symbol "(b)" indicates a blocked acreage in the plan descriptions. Acreages are rounded to the nearest 100 acres.]

Plan 2

This plan contains nonstructural and operational measures which influence land-use patterns and activities. There is no pump feature in Plan 2. To be consistent with plans that include a pump (i.e., some level of benefit across the study area), the nonstructural easements would provide flood damage reduction through reforestation or some degree of compensation across the entire study area. Reforestation would occur up to the 2-year flood plain (elevation 91 feet, National Geodetic Vertical Datum (NGVD)) because this is considered to be the ecologically significant area. Compensation would be provided above elevation 91 feet, NGVD. Measures include:

a. Nonstructural.

(1) Acquisition and reforestation/conservation measures on 124,400 (b) acres of agricultural lands through perpetual easements from willing sellers only. Approximately 95,700 acres of cleared land are potentially available below 91 feet, NGVD (2-year flood plain), and the remaining acreage needed to reach the target of 124,400 acres would be acquired above 91 feet, NGVD (2-year flood plain). No more than 10 percent of a

property could be in conservation measures. Conservation measures are practices implemented and maintained solely for wildlife management purposes. Conservation measures include, but are not necessarily limited to, (a) water management impoundments for waterfowl, wading birds, or other wildlife purposes; (b) food plots; (c) permanent openings maintained in early successional stages; (d) access trails, roads, and firebreaks; or (e) facilities and buildings necessary for property management (constructed above the 100-year flood plain elevation). Landowners would be responsible for the cost of implementing and maintaining conservation practices. Landowners also would be responsible for maintaining ditches used for agricultural operations on remaining portions of their properties or for agricultural operations on other properties dependent on those ditches.

(2) Acquisition of 191,600 acres of agricultural lands between 91 and 100.3 feet, NGVD, through flowage easements. No agricultural intensification or other development would be allowed under the easement. Easements would be perpetual and from willing sellers only.

b. Operational. Operation of the Steele Bayou structure to maintain water elevations between 70 and 73 feet, NGVD, during low-water periods.

Plan 2A

This plan contains nonstructural measures which influence land-use patterns and activities. There is no pump feature in this plan. Measures include:

Nonstructural.

a. Acquisition and reforestation/conservation measures on 81,400 (b) acres of agricultural lands through perpetual easements from willing sellers only. Approximately 62,600 acres of cleared land are potentially available below 88.5 feet, NGVD, and the remaining acreage needed to reach the target of 81,400 acres would be acquired between 88.5 and 91 feet, NGVD (2-year flood plain). No more than 10 percent of a property could be in conservation measures. Conservation measures are practices implemented and maintained solely for wildlife management purposes. Conservation measures include, but are not necessarily limited to, (1) water management impoundments for

waterfowl, wading birds, or other wildlife purposes; (2) food plots; (3) permanent openings maintained in early successional stages; (4) access trails, roads, and firebreaks; or (5) facilities and buildings necessary for property management (constructed above the 100-year flood plain elevation). Landowners would be responsible for the cost of implementing and maintaining conservation practices. Landowners also would be responsible for maintaining ditches used for agricultural operations on remaining portions of their properties or for agricultural operations on other properties dependent on those ditches.

b. Flood proofing 1,487 structures in the 100-year flood plain.

c. Implementing an income assurance program that would be established for 234,600 acres of cropland above 88.5 feet, NGVD.

Plan 2B

This plan is a nonstructural plan with a structural component. There is no pump with this plan. Measures include:

a. Nonstructural. Acquisition and reforestation/ conservation measures on 26,400 (b) acres of agricultural lands through perpetual easements from willing sellers only. Approximately 20,300 acres of cleared land are potentially available below 91 feet, NGVD (2-year flood plain), and outside the ring-leveed areas. No more than 10 percent of a property could be in conservation measures. Conservation measures are practices implemented and maintained solely for wildlife management purposes. Conservation measures include, but are not necessarily limited to, (1) water management impoundments for waterfowl, wading birds, or other wildlife purposes; (2) food plots; (3) permanent openings maintained in early successional stages; (4) access trails, roads, and firebreaks; or (5) facilities and buildings necessary for property management (constructed above the 100-year flood plain elevation). Landowners would be responsible for the cost of implementing and maintaining conservation practices. Landowners also would be responsible for maintaining ditches used for agricultural operations on remaining portions of their properties or for agricultural operations on other properties dependent on those ditches.

b. Structural. Fourteen ring levees would be required with this plan to provide 100-year protection to some structures. Ring levees would require an accompanying infrastructure to evacuate precipitation from inside the ringed area and provide for operation of septic systems in saturated grounds. This would require water control structures, interior channels, road crossings, wastewater facilities, pumps, etc., in addition to the levees.

Plan 2C

This plan is a nonstructural plan that influences land-use patterns and activities. There is no pump feature in this plan. Measures include:

Nonstructural.

a. Acquisition and reforestation/conservation measures on 114,400 (b) acres of agricultural lands through perpetual easements from willing sellers only. Approximately 95,700 acres of cleared land are potentially available below 91 feet, NGVD (2-year flood plain), and the remaining acreage needed to reach the target of 114,400 acres would be acquired above 91 feet, NGVD (2-year flood plain). No more than 10 percent of a property could be in conservation measures. Conservation measures are practices implemented and maintained solely for wildlife management purposes. Conservation measures include, but are not necessarily limited to, (1) water management impoundments for waterfowl, wading birds, or other wildlife purposes; (2) food plots; (3) permanent openings maintained in early successional stages; (4) access trails, roads, and firebreaks; or (5) facilities and buildings necessary for property management (constructed above the 100-year flood plain elevation). Landowners would be responsible for the cost of implementing and maintaining conservation practices. Landowners also would be responsible for maintaining ditches used for agricultural operations on remaining portions of their properties or for agricultural operations on other properties dependent on those ditches.

b. Implementing an income assurance program on 201,600 acres of cropland, which is all remaining cropland in the 100-year flood plain.

c. Relocation of all 1,487 structures damaged by a 100-year flood event. This plan is based on the February 2000 Shabman and Zepp report.

These alternatives have been evaluated, along with the no action and the five structural and combination alternatives under Corps guidelines.

An Independent Technical Review is being conducted in accordance with Corps guidance. Also, models used throughout this study have been vetted within and outside the Corps, and, as noted in previous responses to FWS comments, have been accepted for use by cooperating agencies on other projects.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

DEC 6 2005

United States Army Corps of Engineers
Vicksburg District
ATTN: Kent Parrish
4155 East Clay Street
Vicksburg, MS 39183

Dear Mr. Parrish:

Thank you for the opportunity to review the revised Draft Wetland, Water Quality, and Mitigation Appendices of the Yazoo Backwater Area Supplemental Environmental Impact Statement (EIS). The revised Draft Appendices were received on July 29, 2005, and have been reviewed by staff at the U.S. Environmental Protection Agency (EPA), Region 4 and Headquarters Offices.

EPA appreciates the U.S Army Corps of Engineers' (Corps) coordination in determining the technical facts involving wetland extent, potential wetland impacts, and appropriate mitigation for these impacts. These three central issues have focused EPA's review of the Appendices. In summary, there are a number of questions we would like to work with you to address in clarifying discrepancies between Corps and EPA estimates of the issues noted above. We have also provided a more detailed discussion of each of these points in the enclosure for your consideration.

1) It is unclear why the 5% duration flood method was utilized as the basis for the estimation of the areal extent of wetlands, given this method does not incorporate duration of soil saturation, duration of inundation and soil saturation, frequency of inundation and/or soil saturation, hydrophytic vegetation, or hydric soils as components of the wetlands analysis, consistent with the technical guidelines and methods detailed in the 1987 Manual.

2) The extent of wetlands defined by the 5% flood duration is depicted spatially by the FEAT model. What limitations exist in accurately estimating acreage flooded, given the coarseness of elevation data provided by Digital Elevation Models (DEMs) with 30m postings? The Appendices should address the elevational accuracy of the DEMs and its effect on FEAT outputs.

3) The Appendices should provide further information regarding a clear basis for the assumption that wetlands within the 2-year floodplain, but outside the FEAT-modeled boundary, are not hydrologically connected, therefore, unaffected by the proposed project.

4) The 5% duration flood method appears to underestimate the area and conditions considered in the wetland impact assessment (e.g., change in flood duration and/or frequency at the 2-year floodplain elevation and below). The Appendices should explain why decreased frequency of flooding is not incorporated into the hydro-geomorphic (HGM) assessment and why wetlands which fall from jurisdiction as a result of the project are not considered a loss for mitigation purposes.

5) The current information provided regarding mitigation of the loss of 26,000 acres of jurisdictional wetlands does not comply with the level of detail that is required for compensatory mitigation plans pursuant to Corps Regulatory Guidance Letter 02-02 (e.g., baseline information, goals and objectives, site selection, mitigation work plan, performance standards, project success, site protection, contingency plan, monitoring and long-term management, and financial assurances) and should be addressed in the FEIS.

6) EPA suggests that the Corps coordinate with NRCS in determining the potential effects of the project on farmed wetlands as a result of decreased frequency and duration of flooding in light of "Swamp buster" provisions of the Farm Bill.

With regard to the Water Quality Appendix, the Corps has addressed our most significant concerns at this time. However, we note that many of the other appendices (fisheries, economics, engineering, and terrestrial) focus on the benefits and impacts of the project within the 2-year floodplain. Although these analyses were completed using the same base hydrologic data, the geo-spatial specificity and units of measurement differ from one section to the next making it difficult, at best, to compare benefits to impacts and impacts to impacts. As you complete the final EIS, we recommend that the technology used in these analyses, and their respective appendices, be up-to-date and consistent (i.e., latest models, latest technology (e.g., FEAT) throughout).

We look forward to working with you as you continue to develop the final Yazoo Backwater Area Supplemental EIS. At the time the Final EIS is submitted for public comment, EPA will conduct a complete 404(b)(1) review for consistency with the Guidelines.

If you have any questions concerning our comments you may contact me directly (404-562-9345) or Mr. Bill Ainslie (404-562-9400).

Sincerely,

James D. Giattina, Director
Water Management Division

Enclosure

This is in response to a request for comments on the revised Draft Wetland and Mitigation Appendices of the Yazoo Backwater Area Supplemental Environmental Impact Statement. The revised Draft Appendices were received on July 29, 2005 and have been reviewed by staff at the U.S. Environmental Protection Agency (EPA). EPA appreciates the U.S Army Corps of Engineers (Corps) coordination in determining the technical facts involving wetland extent, potential wetland impacts and appropriate mitigation for these impacts.

Parameters for Review

The following comments are made in light of the November 2000, EPA letter and supporting documentation regarding the: Yazoo Backwater Area Draft Reformulation Report (DRR) and draft Supplement No. 1 to the 1982 Yazoo Area Pump Project Final Environmental Impact Statement (DSEIS), and a March 3, 2003 memorandum from then EPA Assistant Administrator, G. Tracy Mehan to Region 4 Regional Administrator, Jimmy Palmer (Mehan Memo). The November 2000 letter supplied the basis for EPA's objections to the DSEIS and constitutes EPA's current position of record. The Mehan Memo directed Region 4 to evaluate the revisions to the project in two principal areas:

1) EPA should provide an objective critique of the adequacy of the science underlying the assessment of wetland acreage, values and environmental impacts.
2) EPA should continue to ensure that serious consideration is given to a non-pump alternative.

Ultimately, in EPA's role as oversight for implementation of the Section 404 (b)(1) Guidelines for projects involving the placement of dredged or fill material, an analysis of the project's compliance with the Guidelines must be completed. At the time the Final EIS is submitted for public comment, EPA will conduct a complete 404(b)(1) review for compliance with the Guidelines.

Background:

The hydrology of the Lower Yazoo Basin and the effects of the structural component of this project on the hydrology are fundamental to the context of this review. During periods of high water stages on the Mississippi and Yazoo Rivers, the floodgates (Steele Bayou and Little Sunflower) are closed, necessitating storage of interior drainage within the ponding areas. The interior areas will pond water until the riverside "tailwater" subsides when the floodgates can be opened and floodwater released. When water levels on the landside (upstream) of Steele Bayou and Little Sunflower structures are higher than the Mississippi and Yazoo River stages the gates are open. Three important factors which affect flood losses to man-made areas and augment natural area functions in the Yazoo Basin are: 1) time of year; 2) duration; and 3) frequency of flooding. Frequent or intermittent floods may occur at any time of the year, but flood records indicate that the majority of floods occur during the months of March through June. The recommended plan includes: construction of a pumping station at Steele Bayou (14,000 cubic feet per

second capacity) with a currently stated pump operation elevation of 87 feet NGVD; efforts to reestablish forest on lands above and/or below the pump elevation; and modifications to the operation of the Steele Bayou structure to maintain water levels between 70-73 ft NGVD (when practicable) during low water periods. The purpose of the project is to decrease the duration of flooding as well as lengthen the period of time between flood events (i.e., decrease the flood frequency). The purpose of the hydrologic analysis is to identify the base hydrologic conditions in the Yazoo Backwater Area and estimate the changes to those conditions resulting from various flood control alternatives. Hydrologic analysis was used as the basis for all other analyses (i.e., economics, waterfowl, fisheries, terrestrial, and wetland hydrology/identification analyses).

The Mehan Memo directs EPA Region IV to provide an objective critique of the adequacy of the science underlying the assessment of wetland acreage, values and environmental impacts. As pointed out in the November 2000 letter, the hydrologic analyses are the cornerstone of the economic and environmental evaluation. In this analysis, the Corps has linked three models: modeled data (HEC-IFH) was used as input into a model (Period of Record Routing) to provide outputs (stages) which were used in a third model (FEAT) to determine extent of and impacts to wetlands. As with any use of modeled data, a certain amount of error is associated with outputs from a model. The current draft of the appendices does not address the accumulated/compounded error associated with the use of the various models. This makes it difficult to assess the validity of results in the appendices and we recommend the Corps address this issue in the final Supplemental EIS.

Wetland Appendix

1) It is unclear why the 5% duration flood method was utilized as the basis for the estimation of the areal extent of wetlands, given this method does not incorporate duration of soil saturation, duration of inundation and soil saturation, frequency of inundation and/or soil saturation, hydrophytic vegetation, or hydric soils as components of the wetlands analysis, consistent with the technical guidelines and methods detailed in the 1987 Manual.

The basis for the Corps' determination of wetland extent is the assertion that wetlands in the Lower Yazoo Basin are defined strictly as areas which flood continuously, via backwater, for 5% (14 days) of the growing season. The District uses the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Lab 1987) (the Manual) to justify this position. However, contrary to the representation in Appendix 10 (Wetlands Appendix), the Manual warns against using only one of the three parameters to determine a wetland boundary and defines adequate wetland hydrology as a combination of inundation and saturation. Corps guidance on implementing the Manual (October 7, 1991) (Studt 1991) enforces the use of a combination of water sources in evaluating wetland hydrology. Therefore, the Vicksburg District should be clear on the interpretation of the Federal wetland definition, the Manual, and guidance issued by Corps Headquarters on the use of the Manual, as misinterpretation could lead to an inaccurate estimate of wetland extent and impacts.

The Appendix also states that the 5% duration inundation criteria used to determine areal extent of wetlands also constitutes a "delineation" of wetlands in the basin which was "verified" by the regulatory Branch of the Vicksburg District. Such a claim connotes that the regulatory Branch *approves* the delineation. This suggested approval could lead the public to depend on the maps generated by the District as a "delineation" which connotes the delimitation of exact wetland boundaries. It is our understanding that the Vicksburg District is *not* asserting any regulatory jurisdictional claim. However, the wording and subsequent interpretation of the Wetland Appendix indicates the opposite (i.e., the District is delineating jurisdictional waters). We recommend that the District carefully review the use of the term "delineation" in the final Supplemental EIS and that the regulatory ramifications of this approach also be carefully considered. We have previously recommended that the District substitute the term "determination."

2) The extent of wetlands defined by the 5% flood duration are depicted spatially by the FEAT model. What limitations exist in accurately estimating acreage flooded, given the coarseness of elevation data provided by Digital Elevation Models (DEMs) with 30m postings? The Appendices should address the elevational accuracy of the DEMs and its effect on FEAT outputs.

The FEAT model utilizes spatial analysis techniques to determine land area inundated under specific flood conditions. The accuracy of modeling results is related to the vertical and horizontal resolution and accuracy of the input elevation data (30 m Digital Elevation Model (DEM)). The authors of FEAT stress the importance of using high-resolution geospatial data of an appropriate resolution to be able to accurately represent the topography of a basin. A related paper by the authors of FEAT, entitled "Elevation Grid Enhancements to Support Flood Impact Assessments" (Kress, Ballard and Graves 1998), describes a method for generating high resolution elevation grids and the reasons these enhancements are required to model overland flow in areas of low relief. Kress *et al.* (1998) indicate that even with enhancement (field surveys and GPS locations/elevations) DEMs had an average error of 2 feet. Since, FEAT is dependent upon accurate DEMs, and even enhanced DEMs have associated error, the District should address the elevational accuracy of the DEMs and its effects on FEAT outputs.

3) The Appendices should provide further information regarding a clear basis for the assumption that wetlands within the 2-year floodplain, but outside the FEAT-modeled boundary, are not hydro-logically connected, therefore, unaffected by the proposed project.

The District has asserted that there is no basis for the use of the 2-year floodplain for determination of wetland extent. However, the Manual allows for the fulfillment of the hydrology criterion if an area is inundated and/or saturated for sufficient duration "in most years (50% probability of recurrence)" (Table 5, pg 30) (Environmental Lab 1987). Expansion of wetland extent is supported by the results of the EMAP field study which estimated additional wetland acres in the 2-year floodplain that were not originally included in the Corps' estimate of wetland extent. Hence, the District's estimate of

jurisdictional wetland extent in the Lower Basin impacted by the project appears to be underestimated using the 5% inundation criteria alone.

In addition, the Corps has asserted that if jurisdictional wetlands exist outside the 5% duration line, then they receive water only via local water sources (e.g., saturation, precipitation and/or ponding) and, as such, are unaffected by the project or are "detached." However, EMAP wetland points occur in the area depicted as being inundated on average every other year (2-year floodplain). These points are outside of the area depicted by the District's FEAT model as wetland. The Corps has stated that backwater is delivered to flooded areas via stream channels, tributaries, and connected ditches. Figure 1, shows the extent of channels in the Lower Basin as depicted by the National Hydrography Dataset (NHD) prepared by the USGS. The NHD is a comprehensive set of digital spatial data that encodes information about naturally occurring and constructed bodies of water, paths through which water flows, and related entities. Although the size of the EMAP points in Figure 1 are enlarged, the density of stream channels at this scale indicates that the backwater area has a great many conduits and the wetlands represented by EMAP points are connected or adjacent to channels. If wetlands on the 2-year floodplain are "detached" and not affected by the project, then it must be assumed that adjacent croplands would also be unaffected by the proposed project. The Corps should provide any additional data in the final Supplemental EIS that supports the contention that wetlands within the 2-year floodplain, but outside the FEAT-modeled boundary, are not hydrologically connected, therefore, unaffected by the proposed project.

Many of the other appendices (fisheries, economics, engineering, and terrestrial) focus on the benefits of and impacts to the 2-year floodplain. Although these analyses were completed using the same base hydrologic data, the geo-spatial specificity and units of measurement differ from one section to the next making it difficult, at best, to compare benefits to impacts and impacts to impacts. Technology used in these analyses should be up-to-date and consistent (i.e., latest models, latest technology (e.g., FEAT) throughout).

The EMAP estimate is the basis for EPA's position that there are 212,000 ± 14,023 acres of federal jurisdictional wetlands in the 100-year floodplain. The Corps estimated wetland extent as189,000 acres by including over 35,000 acres of "cleared" land and over 15,000 acres of "water, catfish ponds and miscellaneous" (Appendix 10, Table 10-10). Because no open water was included in the EMAP wetland estimates nor was any crop land, there exists an apparent difference of approximately 74,000 acres in the estimates of the areal extent of vegetated wetlands between the EMAP results and the FEAT results (212,000 acres versus 138,000 acres [189,000-35,000 acres of cleared land – 15,000 acres open water = 138,000 acres] Table 10-10). EMAP estimates did include farmed wetlands as determined by NRCS. The Corps should explain the apparent difference in areal estimates of the extent of vegetated wetlands between the EMAP estimate and remotely sensed/modeled FEAT estimates.

4) The 5% duration flood method appears to underestimate the area and conditions considered in the wetland impact assessment (e.g., change in flood duration and/or

frequency at the 2-year floodplain elevation and below). The Corps should explain why decreased frequency of flooding is not incorporated into the hydro-geomorphic (HGM) assessment and why wetlands which fall from jurisdiction as a result of the project are not considered a loss for mitigation purposes.

The Corps' assessment of wetland impacts is based upon the assertion that a portion of the project area, delimited by the FEAT model as flooding for 5% of the growing season, will experience only a change in duration of flooding as a result of the project. Further, the Corps contends that no secondary impacts will occur (i.e., no projected land-use changes) despite a change in jurisdictional status. Corps' hydrologic data and EMAP survey data indicate that flooded wetlands exist in the 2-year floodplain and will be impacted through a change in duration as well as a change in flood frequency. Stage-duration data indicates a decrease in duration of flooding of approximately 15 days at the 2-year floodplain elevation and below. The Corps' stage-frequency data indicates frequency of flooding will decrease from a 2-year return interval to a 9-year return interval at these elevations. This would result in greater impacts for areas on the 2-year floodplain. EPA is concerned that a forested wetland area no longer flooded for 5% of the growing season (13.5 days) and at a 2-year frequency would not be protected by Section 404 of the Clean Water Act (i.e., would no longer meet the criteria for 404 jurisdiction). To assert that an area falls from jurisdiction indicates a "loss" to the 404 program for which mitigation is required. The Corps should explain why the decreased frequency is not incorporated into the HGM assessment and why wetlands which fall from jurisdiction are not considered a loss for mitigation purposes.

Mitigation Appendix

5) The current information provided regarding mitigation of the loss of 26,000 acres of jurisdictional wetlands does not comply with the level of detail that is required for compensatory mitigation plans pursuant to Corps' Regulatory Guidance Letter (RGL) 02-02 (e.g., baseline information, goals and objectives, site selection, mitigation work plan, performance standards, project success, site protection, contingency plan, monitoring and long-term management, and financial assurances) and should be addressed in the final Supplemental EIS.

The basis for Appendix 1 (Mitigation) is that no compensatory mitigation is required due to the projected benefits of the reforestation plan. Further, the amount of required wetland mitigation has been minimized by assuming that despite the loss of jurisdictional status, those areas affected by the project remain functioning wetlands in which only the duration of flooding is affected by the project. Since the Corps assumes no change in land use, there is a minimal reduction in function and required mitigation is low. The Corps proposes to acquire easements of up to 62,500 acres of agricultural land from willing sellers at or around the 87' NGVD (1-year floodplain) elevation. The Corps would then pay for the reforestation, appropriate easement, and management of the site, but not any additional monitoring.

EPA is concerned that the Corps' scenario of minimal impacts and maximal benefits due to the reforestation is overly optimistic. For example, the reforestation acreage (62,500 acres) was applied to each of the environmental analyses (fisheries, terrestrial, wetlands, and water quality), as if each aspect of the natural resources evaluated would benefit equally from each acre reforested, regardless of the location of these reforested acres. It is difficult to reconcile the requirements of fisheries spawning habitat with terrestrial habitat, as well as, for wetlands and water quality. However, despite the level of impacts and the number of requirements for the reforestation, the level of information regarding mitigation of the loss of 26,000 acres of jurisdictional wetlands does not comply with the Corps' RGL 02-02 and 40 CFR 230.6.

We recommend that a mitigation plan meeting the substantive requirements of RGL 02-02 be addressed in the final Supplemental EIS. An appropriate mitigation plan should have baseline information describing location, size, type, functions and amount of impact to the aquatic resource as well as qualitative and quantitative information describing the mitigation site. Information on historic site conditions, land use practices, past and current hydrology and soil conditions, as well as chemical, physical and biological conditions at the mitigation sites should be included. The compensatory mitigation plans should discuss the environmental goals and objectives as well as the site selection. In addition, RGL 02-02 lays out requirements for compensatory mitigation plans to contain: mitigation work plans; performance standards; parties responsible for the success of the mitigation project; a written description of the legal means for permanent site protection; contingency plans for unanticipated site conditions or changes; monitoring and long-term management plans, and finally identification of the party for providing and managing financial assurances and contingency funds for remedial measures to ensure success.

6) EPA suggests that the Corps coordinate with the Natural Resources Conservation Service (NRCS) in determining the potential effects of the project on farmed wetlands as a result of decreased frequency and duration of flooding in light of "Swampbuster" provisions of the Farm Bill.

EPA's November 2000 letter raised concerns about the effect of the proposed project on farmed wetlands. In earlier drafts of the Wetlands Appendix, figures showing the extent and location of farmed wetlands were included. However, such figures were neither included in this draft nor was there an explicit discussion of the potential effects of the project on farmed wetlands. Discussions with NRCS indicated a similar concern about the effects of the project on farmed wetlands in relation to "Swampbuster" provisions of the Food Security Act. In particular, 7 CFR Section 12.33 indicates, for farmed wetlands, that "no action can be taken to increase effects on the water regime beyond that which existed on such lands on or before December 23, 1985, unless NRCS determines the effect on losing remaining wetland values would be minimal." Hence, it appears that agricultural intensification, as a result of removal of hydrology from a farmed wetland, would need NRCS review under the Food Security Act. EPA suggests that the Corps coordinate with the NRCS in determining the potential effects to farmed wetlands, as a result of decreased frequency and duration of flooding.

Literature Cited

Ballard, J. and Kress, R. (2004). "Flood Event Assessment Tool (FEAT) User's Manual and Technical Documentation," ERDC/EL SR-04-3, U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Environmental Laboratory. (1987). Corps of Engineer Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Kress, M.R., J.R. Ballard, and M.R. Graves. 1998. Elevation grid enhancements to support flood impact assessment. Proceedings for 18th Annual ESRI User Conference, San Diego, CA.

Regulatory Guidance Letter 02-02. 2002. Guidance on compensatory mitigation projects for aquatic resource impacts under the Corps Regulatory Program pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. U.S. Army Corps of Engineers.

Studt, J. 1991. Questions and Answers on the 1987 Manual. Memorandum to the Field. U.S. Army Corps of Engineers.

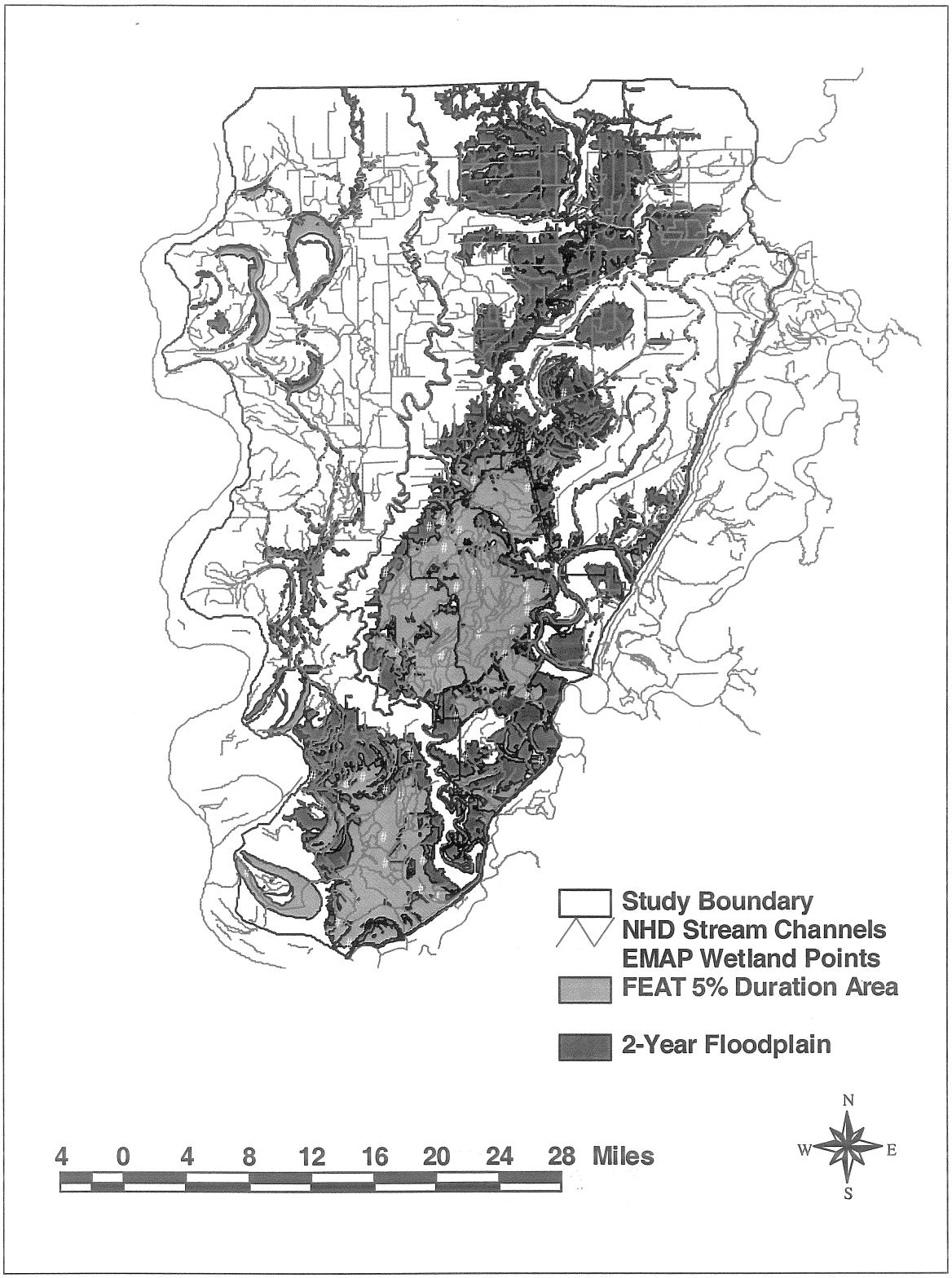


Figure 1. National Hydrography Dataset overlay onto EMAP survey points

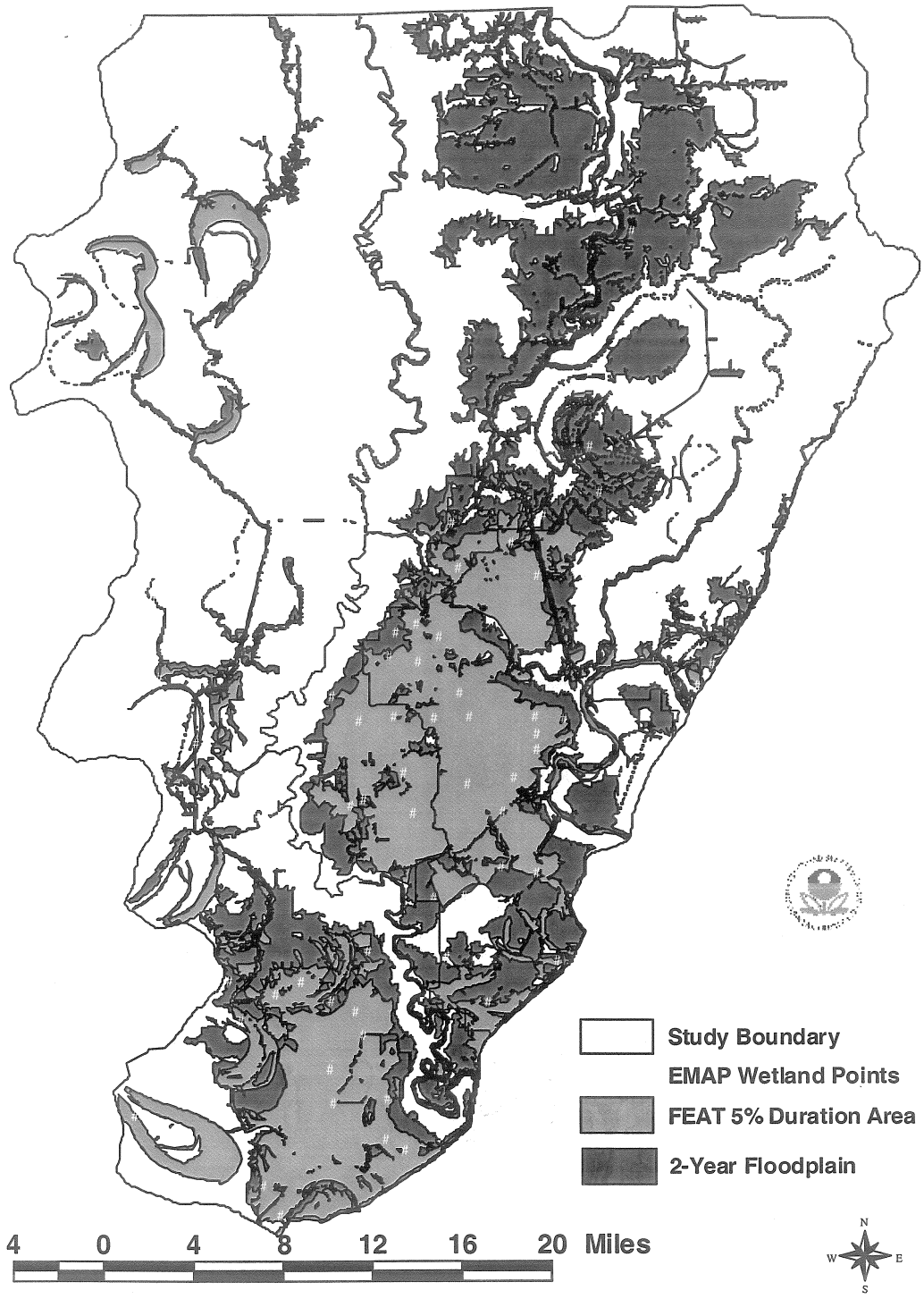


Figure 2. EMAP wetland points in relation to FEAT 5% duration depicted area and 2 year floodplain.

Table 1. EMAP estimates of wetland extent in the 2 year floodplain with- and without project.

Wetland Category	Wetland Status	NResp	Estimate %	StdError %	LCB 90 %	UCB90 %	Estimate (ac)	Std Error (ac)	LCB 90 (ac)	UCB 90 (ac)
Without Project										
2yr floodplain	Not Wet	36	46.8	3.4	41.3	52.4	157707	11368	139008	176406
2yr floodplain	Wet	55	53.2	3.4	47.6	58.7	**179120**	11368	160421	197819
2yr floodplain	Total	91	100.0				336827			
Feat Potential	Not Wet	8	16.7	4.0	10.1	23.2	25465	6093	15443	35488
Feat Potential	Wet	40	83.3	4.0	76.8	89.9	**127327**	6093	117305	137350
Feat Potential	Total	48	100.0				152793			
NLCD/WRP	Not Wet	11	45.8	7.8	33.0	58.7	31552	5385	22694	40410
NLCD/WRP	Wet	13	54.2	7.8	41.3	67.0	**37289**	5385	28431	46147
NLCD/WRP	Total	24	100.0				68842			
NonWet(3)	Not Wet	17	87.4	6.9	76.1	98.8	100689	7944	87622	113755
NonWet(3)	Wet	2	12.6	6.9	1.2	23.9	**14503**	7944	1437	27570
NonWet(3)	Total	19	100.0				115192			
With Project										
2yr floodplain	Not Wet	24	40.5	3.5	34.8	46.3	105697	9072	90775	120619
2yr floodplain	Wet	49	59.5	3.5	53.7	65.2	**155073**	9072	140151	169996
2yr floodplain	Total	73	100.0				260770			
Feat Potential	Not Wet	6	13.3	3.9	7.0	19.7	19555	5657	10250	28861
Feat Potential	Wet	39	86.7	3.9	80.3	93.0	**127109**	5657	117803	136414
Feat Potential	Total	45	100.0				146664			
NLCD/WRP	Not Wet	7	43.8	9.8	27.6	59.9	15789	3538	9968	21609
NLCD/WRP	Wet	9	56.3	9.8	40.1	72.4	**20300**	3538	14480	26120
NLCD/WRP	Total	16	100.0				36089			
NonWet(3)	Not Wet	11	90.2	7.9	77.2	100.0	70353	6146	60243	78018
NonWet(3)	Wet	1	9.8	7.9	0.0	22.8	**7665**	6146	0	17774
NonWet(3)	Total	12	100.0				78018			

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183-3435

REPLY TO
ATTENTION OF:

June 20, 2006

Planning, Programs, and
Project Management Division
Planning and Project
Management Branch

Mr. James D. Giattina
Environmental Protection Agency
Region 4
Atlanta Federal Center
61 Forsyth Street
Atlanta, Georgia 30303-8960

Dear Mr. Giattina:

I refer to your letter of December 6, 2005, concerning review of the revised Draft Wetland, Water Quality, and Mitigation Appendixes of the Yazoo Backwater Reformulation Area Supplemental Environmental Impact Statement (EIS).

We appreciate your insightful review of the above-mentioned environmental appendixes. Your comment on use of up-to-date and consistent technology in the various appendixes is noted. The Engineering Appendix addresses the application of two models--the Internal Flood Hydrology (HEC-IFH) and the Flood Event Assessment Tool (FEAT) models. The IFH model uses the period of record rainfall data to generate daily stages. The FEAT model uses statistically derived data from the IFH model to generate 2-dimensional representations of flooding. The accuracy of these models is discussed in the Engineering Appendix, but this discussion will be expanded in the Final EIS. We have considered each of the six comments, and our response to each comment is enclosed (enclosure 1).

We look forward to working further with you as we continue to finalize the EIS and submit it for public comment. If you have any questions, please contact Mr. Bob Petersen, Project Manager (telephone (601) 631-5510).

Sincerely,

Dennis O. Norris, P.E.
Chief, Planning, Programs, and
Project Management Division

Enclosure

COMMENTS/RESPONSES TO
ENVIRONMENTAL PROTECTION AGENCY'S (EPA)
2005 WETLANDS COMMENTS

1. Comment. It is unclear why the 5% duration flood method was utilized as the basis for the estimation of the areal extent of wetlands, given this method does not incorporate duration of soil saturation, duration of inundation and soil saturation, frequency of inundation and/or soil saturation, hydrophytic vegetation, or hydric soils as components of the wetlands analysis, consistent with the technical guidelines and methods detailed in the 1987 Manual.

Response: The Corps concurs with your interpretation of the WDM as it applies to jurisdictional wetland determinations for Section 404 permit applications; however, it is appropriate to use a landscape method for a water resources development project of this scope. The Corps is utilizing the definition of wetlands in the WDM (5 percent duration) to provide consistency with the Section 404 program, but as stated in the Wetland Appendix, the results will not be used to make jurisdictional wetland determinations in the project area. In order to provide spatially explicit wetland extents for the base and with-project conditions, a Geographic Information System (GIS) based, landscape scale wetland delineation procedure has been utilized. The use of the GIS model to simulate the basin's wetland hydrology requires some simplifying assumptions . The five assumptions pertaining to hydrology are:

a. If an area meets the hydrologic conditions for a wetland, then it is assumed that it meets the vegetative and soils conditions as well.

b. The 5 percent backwater flood describes the areal extent of wetlands in the project area that are likely to be affected by the project.

c. Wetlands above the 5 percent backwater flood elevation are disconnected and will not be affected by the project since they will not be sustained by backwater flooding.

d. Backwater flooding is the sole source of moisture that sustains wetlands in the project area, or precipitation does not play a significant role in maintaining wetlands within the 5 percent duration backwater flood area.

e. All areas flooded by the 5 percent backwater flood are flooded instantly.

As these assumptions are essential for the landscape wetland delineation, the rationale supporting them will be provided here.

enclosure 1

The 1987 Manual defines wetlands as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions." This definition states it is the presence of water that controls the type of vegetation and the conditions in the soil (saturated). The Manual requires indicators of all three parameters to increase the accuracy of the determination. In this study, the hydrology was rigorously determined, and the other parameters were assumed to be present. This is a reasonable assumption since 85 percent of the soils in the project area are hydric, and all of the available seed sources are for hydrophytic vegetation (Kirchner, 1991). The 85 percent hydric soil extent equates to approximately 710,000 acres and represents an area greater than the extent of the project's 100-year flood. Thus, the areal extent of the hydric soils and the vegetation parameters are much greater than the 5 percent duration extent, and, therefore, hydrology will be the controlling parameter. In mathematics, when studying set theory, the area of the intersection of two or more sets can never be greater than the area of the smallest set, thus the maximum wetland extent potentially affected by the project cannot be greater than the 5 percent duration extent. The requirement that all three parameters be present would only reduce the wetland extent.

The second assumption is that the 5 percent duration backwater flood extent represents the areal extent of wetlands that are likely to be impacted by the project. The Corps acknowledges the 5 percent method will not identify all wetlands in the project area. It does not identify perched wetlands maintained by some other source of water (ground, headwater flooding, or precipitation). The use of the 5 percent duration extent is supported by the WDM. The WDM defines wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." The WMD divides potential wetland areas into zones based on the duration of inundation or saturation (Page 30, Table 5). Areas with a period of inundation less than 100 percent, but greater than 12.5 percent, are wetlands. Areas with duration of inundation/saturation less than 5 percent are not wetlands, while areas with duration less than 12.5 percent and greater than 5 percent may be wetlands. Specifically, the table states "Many areas having these hydrologic characteristics are not wetlands." However, to account for wetlands maintained by saturation, the Corps chose to use the upper limit of 5 percent. In the study area, under base conditions, the areal extent of the 12.5 and 5 percent duration wetland zones are 79,700 and 189,700 acres, respectively. Using the upper limit of these two duration zones adds 110,000 acres to the base wetland extent, which more than doubles the base wetland extent as determined by the 12.5 percent duration flood. The actual delineation line falls somewhere between the 12.5 and 5.0 percent durations, but the Manual does not state a specific duration. Although the definition of wetlands mentions both frequency and duration, Table 5 omits any mention of frequency and the text above the table states, "Recent research indicates that duration of inundation and/or soil saturation during the

growing season is more influential on the plant community than frequency of inundation/ saturation during the growing season." The wetland delineation for this study incorporates both duration and frequency by selecting the median, or 50 percent probability, 5 percent duration. A 2-year frequency flood is determined by calculating the peak stages in each of the years of the period of record. These peak stages are sorted highest to lowest, and the 50th percentile value (median) is the 2-year flood. The 5 percent duration is also an annual value calculated for the growing season. The annual values are calculated and sorted in the same fashion as the peak stages, and the 50th percentile value is used. Thus, the 5 percent duration value could be called the 2-year frequency/5 percent duration. Finally, the 14-day duration area is a subset of the 2-year frequency area, thus all areas which meet the 14-day requirement also meet the 2-year frequency requirement. Because the definition requires that an area have both the duration and the frequency of inundation or saturation, the areal extent is that of the lesser area.

Hydrologic Zones 1 – Nontidal Areas			
Zone	Name	Duration2 (%)	Comments
I3	Permanently inundated	100	Inundation >6.6 feet mean water depth
II	Semipermanently to nearly permanently inundated or saturated	>75 - <100	Inundation defined as <=6.6 feet mean water depth
III	Regularly inundated or saturated	>25 – 75	
IV	Seasonally inundated or saturated	>12.5 – 25	
V	Irregularly inundated or saturated	>=5 – 12.5	Many areas having these hydrologic characteristics are not wetlands
VI	Intermittently or never inundated or saturated	<5	Areas with these hydrologic characteristics are not wetlands

1 Zones adapted from Clark and Benforado (1981).
2 Refers to duration of inundation and/or soil saturation during the growing season.
3 This defines an aquatic habitat zone.

The second part of Comment 1 concerns the use of the terms "delineation and determination." The word "determination" in the WDM is consistently used to mean a decision or conclusion. The word means a decision regarding whether a particular tract of land is a wetland or a non-wetland. "Delineation" is the act of drawing a line on a map. The following quotation is the stated purpose of the 1987 Manual: "The purpose of this manual is to provide users with guidelines and methods to determine whether an area is a wetland for purposes of Section 404 of the Act (Clean Water Act)" (page 1, paragraph 2). The Manual also refers to National Wetlands Inventory (NWI) maps as delineations because they provide polygons describing different (wetland) vegetation types. "Since not all delineated areas on NWI maps are wetlands under Department of Army jurisdiction, NWI maps should not be used as the sole basis for determining whether wetland vegetation is present" (page 37, paragraph 54b(1)). The Manual goes on in paragraph 54g to say, "Remote sensing is one of the most useful information sources available for wetland identification and delineation." Consistent with the Manual, this study used remote sensing to help delineate wetlands. The delineation provided by this study will not be used to make jurisdictional determinations; we will delete the reference to Regulatory Branch to avoid confusion.

2. Comment. The extent of wetlands defined by the 5% flood duration are depicted spatially by the Flood Event Assessment Tool (FEAT) model. What limitations exist in accurately estimating acreage flooded, given the coarseness of elevation data provided by Digital Elevation Models (DEMs) with 30m postings? The Appendices should address the elevational accuracy of the DEMs and its effect on FEAT outputs.

Response. The DEM data utilized in this study was produced by the U.S. Geological Survey (USGS), and they are responsible for verifying the accuracy of the data. All DEMs were produced to National Mapping Standards, and the Corps is not going to repeat the work performed by USGS to verify the horizontal and vertical accuracy of DEMs. The Corps did validate the results of the flood mapping by comparison to satellite images of observed flood events. The accuracy of the 30-meter (m) DEMs is appropriate for a planning study of more than 1 million acres since a 30-m DEM equates to approximately 0.2 acre per grid cell or pixel. An accuracy of 1 acre per pixel is appropriate for a planning area of approximately 1 million acres. The 30-m resolution used in this study exceeds that by five times. Additionally, the Corps conducted a sensitivity analysis with newly available 10-m resolution DEMs. The sensitivity analysis demonstrated that a finer resolution DEM (10-m) reduced base wetland acres defined by the 5 percent duration by 21 percent. Wetland acres would potentially decrease farther if the 10-m DEM surface is calibrated. As is described in the article by Kress, et al. (1998), raw DEM require some calibration before they can be used with the FEAT model to give reasonable results. The Vicksburg District does this as part of the model calibration step. For example, to ensure accuracy during this process, missing channels are added into the DEM, and top bank and levee elevation information is added as needed to achieve good results when modeling flood scenes. In the 13 January 1983 flood simulation, the Lake George area floods, but the satellite scene did not indicate the area flooded. In the DEMs, the top bank of the Lake George area has a maximum contour elevation of 95 feet, National Geodetic Vertical Datum (NGVD), but the road constructed on top bank has an actual elevation of 98 feet, NGVD. When the top bank elevation on the DEM was increased to 98 feet, NGVD, the modeled flood gave

results similar to the satellite scene. The accuracy of the DEM elevations is best tested by the degree of agreement between the modeled floods and their respective satellite scenes. The tabulation below gives the results of the 30-m DEM versus the 10-m DEM for the Base and Plan 5-5 percent duration floods. Wetlands in Tiers 2 and 3 are outside the 5 percent duration flood plain and would not be affected by the project.

Item	Outside	Tier 1	Tier 2	Tier 3	Total
Base 1 30-m	0	189,522.2	0	0	189,522.2
Plan 5 30-m	0	162,859.3	0	0	162,859.3
Difference	0	26,662.9	0	0	26,662.9
Base 1 10-m	7,599.8	146,316.6	9,993.6	17,289.5	181,199.5
Plan 5 10-m	7,530.7	130,363.8	6,376.1	9,788.1	154,058.7
Difference	69.0	15,952.8	3,617.5	7,501.4	27,140.8

The Corps finds that the comparison of the area flooded by satellite scenes and the FEAT modeled flood is the best test of the accuracy of the method. This type comparison was performed as parts of the calibration and validation steps. The following tabulation below gives the results for three of these comparisons. The areal extent of flooding for each scene has been split into four zones based on the sampling areas of the EMAP field testing. Those zones correspond to Tiers 1-3 and the area outside the 100-year flood plain, but within the project perimeter. The "% Shared" column provides the percentage within each zone of the area that is common to both the satellite flood and the respective FEAT modeled area. The column, "%Shared + FEAT," provides the total area flooded by the FEAT model divided by the area flooded in the satellite scene. The last column provides the percentage of the total area within each zone that was flooded. In all cases, there is a positive correlation between the "%Total Area Flooded" and "%Shared." For all three satellite floods, there is a very high degree of "Shared Area" (>95 percent) within Tier 1. The "% Shared + FEAT" column shows that the model consistently overestimates the total flooded area within Tier 1. The FEAT model does not perform as well in the other zones, but the wetlands in these zones are not connected at the 5 percent duration and are thus not likely to be affected by the project. The FEAT model provides consistent overestimates of the areal extent of flooding within the portion of the area most likely to be affected by the project. By overestimating the areal extent of flooding and wetlands within the area most likely to be affected by the project, the FEAT modeling method is protective of wetlands.

Item	% Shared	% Shared + FEAT	% Total Area Flooded
10-Mar-89			
Tier 1	96.8	130.8	69.5
Tier 2	34.5	63.2	29.9
Tier 3	21.9	43.5	8.1
Outside 100-yr	0.9	3.5	4.6
13-Jan-83			
Tier 1	98.8	105.9	92.3
Tier 2	71.2	84.4	66.3
Tier 3	53.5	74.8	41.7
Outside 100-yr	0.8	1.4	15.5
30-Jan-74			
Tier 1	99.2	113.7	86.2
Tier 2	80.5	124	55.6
Tier 3	72.7	149.6	28.1
Outside 100-yr	24	56.6	7.5

3. Comment. The Appendices should provide further information regarding a clear basis for the assumption that wetlands within the 2-year floodplain, but outside the FEAT-modeled boundary, are not hydrologically connected, therefore, unaffected by the proposed project.

Response. While keeping the response to Question 1 in mind, wetlands above the FEAT-modeled 5 percent duration, but within the 2-year flood, are sustained either in part or totally by some source of moisture other than backwater flooding. The Corps is not concerned with these wetlands for two reasons. First, this project will only affect the extent of backwater flooding, other sources of moisture to sustain wetlands (precipitation, headwater flooding, and ground water) will not be affected, and second, the areal extent of the Corps delineated wetlands within Tier 1 (potential area of effects) is greatly inflated. The FEAT model estimated 175,000 acres of wetlands in Tier 1 (189,600 acres less 14,600 acres of permanent water) versus 145,000 acres by EMAP. These 30,000 additional acres represent a 20 percent increase over the EMAP acres within Tier 1. This is a reasonable margin of error because the 30,000 acres exceed the 26,000 acres which could potentially become nonwetlands.

The Corps has incorporated a second safety factor to ensure all wetlands that could potentially be affected by the project are included in the wetland extent. This project is designed to protect the basin from water entering the basin as a result of backwater flooding. Backwater

flooding is caused by water from a downstream source rising and backing into a tributary system and/or blocking the exit of water from within the tributary. In this case, the downstream source is the Mississippi River. Because backwater flooding starts from the bottom of a basin and moves upstream, the water surface is nearly flat. The Corps defines backwater floods as floods with less than 1 foot of elevation difference from the downstream end to the upstream end. In the 2000 wetland evaluation, only the two most downstream gages were used to evaluate wetland extent. By limiting the analysis to those two gages, only backwater flooding was considered in defining wetland extent. For this analysis, gage data from all of the gages in the project area were considered. The following tabulation gives the 5 percent duration elevation for the five gages in the Big Sunflower part of the project area.

Gage	Steele Bayou	Little Sunflower	Holly Bluff	Anguilla	Little Callao
5 percent Elevation	88.6	89.3	91.0	93.3	94.4
WS Slope	0	0.7	2.4	4.7	5.8

Only the Little Sunflower gage has less than 1 foot of slope. As you move upstream from the Steele Bayou outlet, the 5 percent duration elevation increases significantly. The period of record stage data for the Anguilla and Little Callao gages must be strongly influenced by headwater flooding. The inclusion of the headwater flooding increases the base wetland area that is supposedly maintained by backwater flooding only. Figure 1 shows the water surface elevations for a classic backwater flood which occurred during the spring of 2003. The four most downstream gages are strongly influenced by the stages at the Steele Bayou gage. The Little Callao gage acts independently until the downstream water surfaces exceed 85.0 feet. The Little Callao and Anguilla gages show a minor interior storm event starting on 18 May. During the period from 2-5 June, the basin experienced a classic backwater flood. The water surface elevation at all gages for that period is around 88.7 feet, NVGD. Figure 2 shows the water surface profiles for these same five gages for another backwater flood. This flood shows a little more headwater influence with three short periods of rises at the upstream gages. Again, the flood event ends within a short period of days that typify a backwater flood. The stages during that flat pool period are just over 90 feet, NVGD, which is slightly higher than a flat 5 percent duration flood (88.6 feet). Figure 3 shows the areal extent of the FEAT modeled 5 percent duration event with slope (189,600 acres) contrasted with an approximate flat 5 percent duration flood (113,500 acres). The difference between these two events (76,100 acres) is the protective buffer provided by including slope in the 5 percent duration event. In summary, the Corps 5 percent method overestimates the extent of wetlands that could be affected by the project by 30,000 to 76,000 acres. Wetlands outside of the delineated boundary are maintained by some other source of moisture, such as the 52 average annual inches of rain, which will not be affected by the project.

Figure 1
Spring 2003

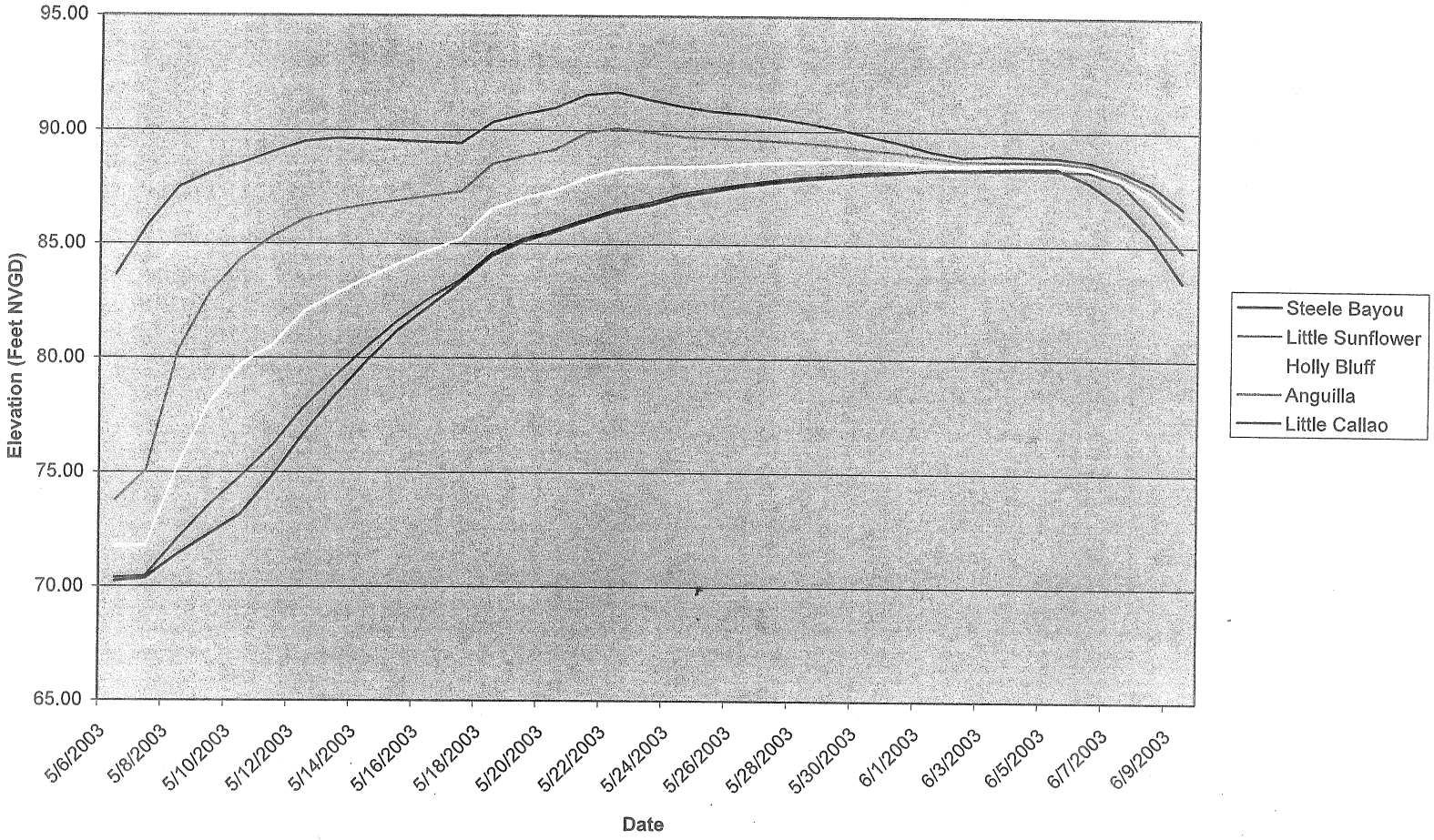
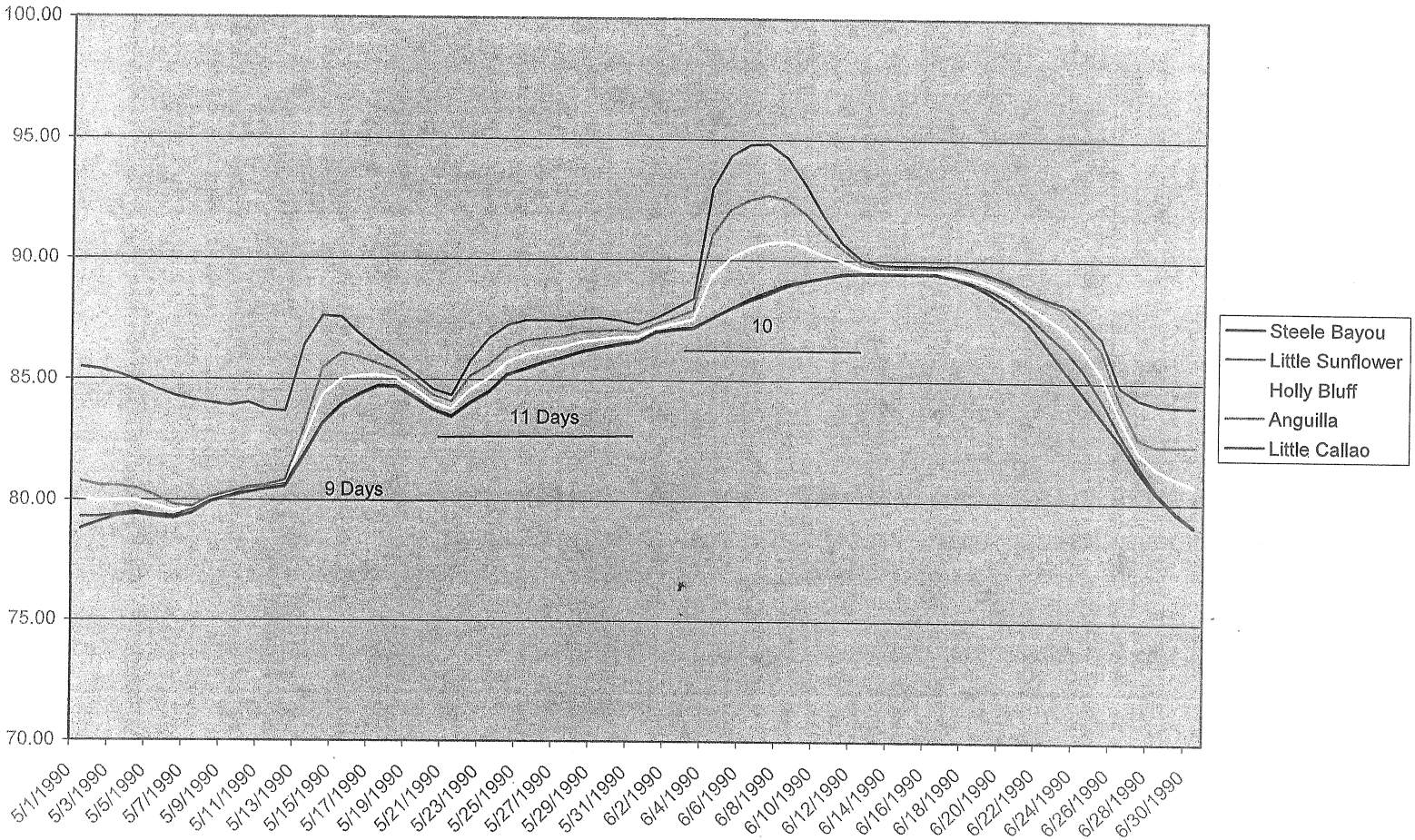


Figure 2
May_Jun_1990



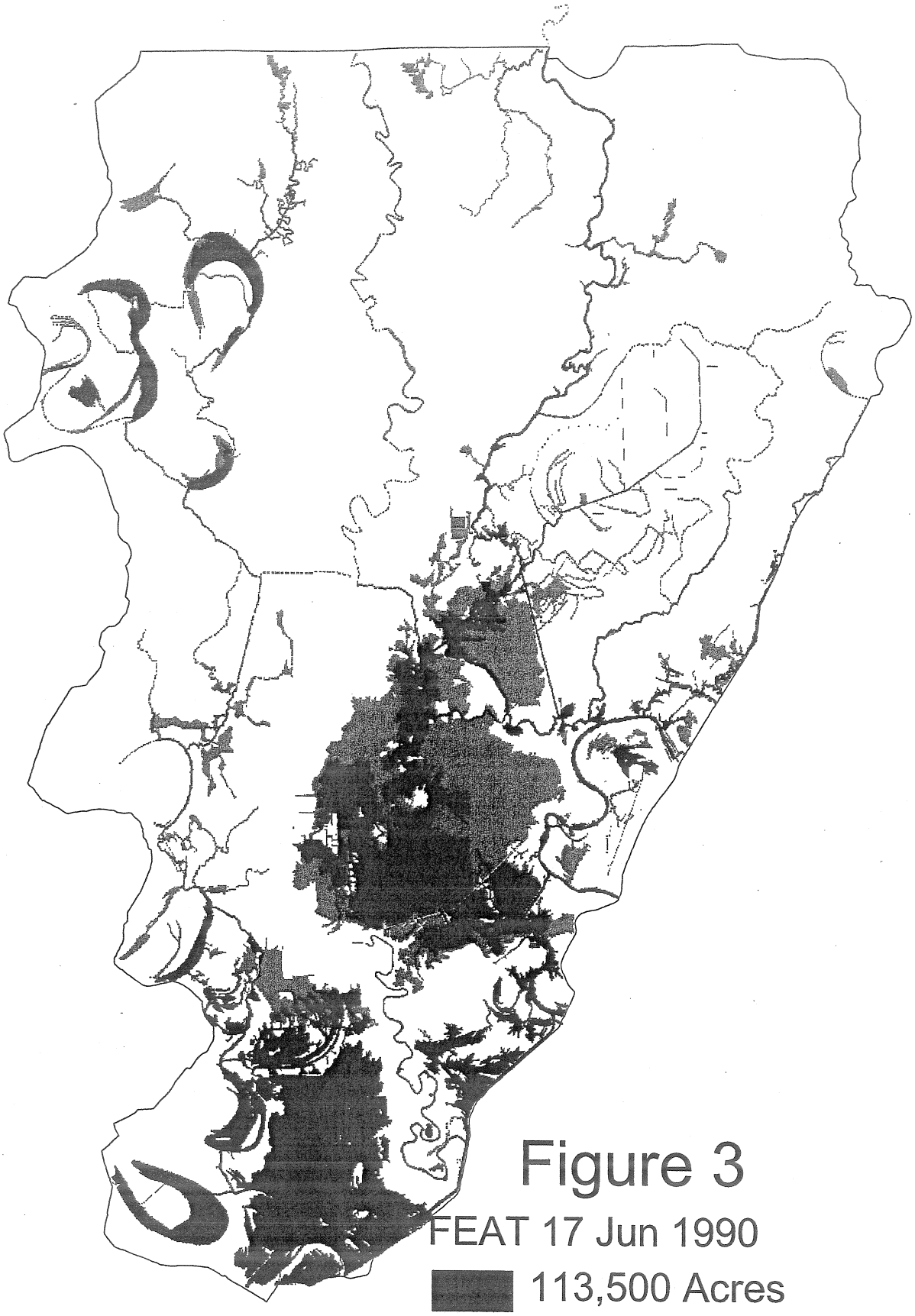


Figure 3

FEAT 17 Jun 1990

113,500 Acres

Base1_5wl

189,000 Acres

Backwater Project Area

4. Comment. The 5% duration flood method appears to underestimate the area and conditions considered in the wetland impact assessment (e.g., change in flood duration and/or frequency at the 2-year floodplain elevation and below). The Appendices should explain why decreased frequency of flooding is not incorporated into the hydro-geomorphic (HGM) assessment and why wetlands which fall from jurisdiction as a result of the project are not considered a loss for mitigation purposes.

Response. The WDM does not recognize the existence of wetlands that are not inundated or saturated for a minimum of 5 percent of the growing season (14 days). Therefore, any wetlands above the 5 percent duration backwater flood are being sustained by other sources of moisture and are disconnected depressional wetlands. Since these wetlands were previously sustained by some other source of moisture than backwater flooding, they will continue to be sustained by these other sources of moisture. This project will only have an effect on backwater flooding. It will not affect precipitation or headwater flooding.

The HGM model was modified at the request of the Vicksburg District to include duration. The HGM method incorporates both duration and frequency of flooding. There is no change in the frequency of flooding for the wetlands, thus that parameter remains constant. Where the frequency variable (VFREQ) occurs, the following substitution was made ((VDUR * 2) + VFREQ)/ 3). Because the two variables are added, the whole expression does not become zero even if VDUR becomes zero.

5. Comment. The current information provided regarding mitigation of the loss of 26,000 acres of jurisdictional wetlands does not comply with the level of detail that is required for compensatory mitigation plans pursuant to Corps Regulatory Guidance Letter 02-02 (e.g., baseline information, goals and objections, site selection, mitigation work plan, performance standards, project success, site protection, contingency plan, monitoring and long-term management, and financial assurances) and should be addressed in the FEIS.

Response. Section 1.b. of Regulatory Guidance Letter 02-02 states "This guidance applies to all compensatory mitigation proposals associated with permit applications . . . ." This is sound practice with individual permit actions where the level of uncertainty associated with implementing and sustaining appropriate mitigation is higher. This is not an action under the Corps Regulatory program. This is a landscape level analysis of a water resource project. Although all actions are covered under 40 CFR part 230, the scale and level of detail provided are different. The Mitigation Appendix does provide information documenting baseline informational and estimated environmental value of the reforested lands commensurate with this scale of analysis. There is no compensatory mitigation requirement for the recommended plan

because compensatory mitigation is based on the net effect of the plan. The recommended plan has a net gain in resource value. No attempt has been made to minimize wetland mitigation by assuming that despite the potential loss of jurisdictional status, areas affected by the project remain functional wetlands. As stated in the Mitigation Appendix, all losses and gains were based on the HGM functional methodology developed by the U.S. Army Engineer Research and Development Center (ERDC) and EPA. This analysis includes losses and gains on all lands that meet the minimum 5 percent duration criterion, not just the lands that will no longer meet the minimum duration. Further, the forested lands that no longer meet the 5 percent duration are not being converted, and, based on the HGM models, they will continue to provide wetland benefits. This approach is consistent with the 7 February 1990 Memorandum of Agreement between he EPA and the Department of the Army concerning the determination of mitigation under the Clean Water Act Section 404(b)(1) guidelines. Section III.B states ". . . Such mitigation should provide, at a minimum, one for one functional replacement (i.e., no net loss of values)."

The Mitigation Appendix does not present a scenario of minimal impacts and maximum benefits, but rather a scientifically based analysis of potential project effects. The wetland, aquatic, terrestrial, and waterfowl impacts were estimated using accepted impact methodologies and simply represent the effects of the project without descriptive qualifiers. The Mitigation Appendix estimates project effects using the full extent of the nonstructural flood damage reduction measure (i.e., reforestation), but the appendix also fully discusses the risk and uncertainty of acquiring the 62,500 acres and what portion of the nonstructural component needs to be accomplished to achieve a "no net –loss of values" for the resource. Each resource was given the appropriate value on each acre to reflect the value added from reforestation. This is consistent with the impact analyses which reflect the loss in value for each resource on each acre.

The Vicksburg District has a demonstrated record of fully implementing and monitoring mitigation in the Yazoo Basin (approximately 26,000 acres in 15 years). Wetland monitoring, initiated in 2000, is being conducted by ERDC using HGM. The Mitigation Appendix clearly describes the necessary components for site selection, reforestation, monitoring, and long-term protection.

6. Comment. EPA suggests that the Corps coordinate with NRCS in determining the potential effects of the project on farmed wetlands as a result of decreased frequency and duration of flooding in light of "Swamp buster" provisions of the Farm Bill.

Response. All agricultural lands that met the 5 percent duration criterion were included in the analysis. Farmed Wetlands are a subset of this category. The Wetland Appendix will be revised to include the acres and a discussion of potential impacts to Farmed Wetlands. The Natural Resources Conservation Service (NRCS) was provided an opportunity to review the revised Wetland Appendix, and we will do additional coordination with NRCS to ensure the impacts to farmed wetlands are fully addressed.

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183-3435

REPLY TO
ATTENTION OF:

August 30, 2006

Planning, Programs, and Project
Management Division
Planning and Project
Management Branch

Mr. Ray Aycock
Field Supervisor
U.S. Fish and Wildlife Service
6578 Dogwood View Parkway
Suite A
Jackson, Mississippi 39213

Dear Mr. Aycock:

The U.S. Army Corps of Engineers, Vicksburg District, has been in the process of revising the draft 2005 Wetland, Aquatic, Terrestrial, Waterfowl, Water Quality, and Mitigation Appendixes, Yazoo Backwater Reformulation Study, to reflect the comments received from the cooperating agencies' review. We appreciate your comments and your time to attend the follow-on meetings to discuss your comments in detail. We believe these efforts will translate into better appendixes. Responses to your agency's comments should have been received under a separate cover letter. The following paragraphs serve to document some of the major changes as a result of these comments.

During recent quality assurance and quality control work related to the analysis of wetland functions for the Yazoo Backwater project, an error in spreadsheet calculations was discovered. The error was simple, but had significant consequences on the number of functional capacity units (FCU) calculations for different alternatives. The error occurred on the following worksheets in the original spreadsheet: Plan 3 (B1), Plan 4 (B1), Plan 5 (B1), Plan 6 (B1), Plan 7 (B1), Plan 3 (B2), Plan 4 (B2), Plan 5 (B2), Plan 6 (B2), and Plan 7 (B2).

The revised spreadsheet is provided on the enclosed CD (enclosure 1). The error was the same on all worksheets in the block of cells B68-AA102 (not counting summation columns). The error was similar in each cell. Cell B68 on the Plan 3 (B1) worksheet will be used to illustrate the error. In cell B68, a calculation is made in which the total acres in the mature forest land cover class (cell B5) is multiplied by the functional capacity index of the Detain Floodwater function in the mature forest land cover class (cell B22). The error that occurred was that instead of using cell B5 for the calculation (i.e., the number of acres of the middle-aged forest land cover class), cell B4 was used (i.e., the number of acres of mature forest land cover class). The error was similar throughout the block of cells B68-AA102; i.e., cell B4 was inadvertently used as the multiplying factor instead of using the cell that corresponded to the appropriate land cover class (i.e., B5, B6, B7, and B8). The reason the calculated FCU for each alternative decreased after correcting this error was because the acreage of the mature forest land cover type usually represented the largest proportion of the project area. Thus, when this large number of acres was used as a multiplier, it resulted in greater number of FCUs in the cells in Block B68-AA102. The cumulative result of the error through the cells in Block B68-AA102 approximately doubled the calculated number of FCUs for each alternative. Revised tables from the Wetland Appendix are enclosed for your review (enclosure 2). Although the correction does reduce project impacts to wetlands, incorporation of recent land use (2005) increases aquatic spawning habitat impacts which increase the minimum number of acres of reforestation to achieve a no-net loss of environmental resources from 13,745 to 14,376 acres.

In addition, the Flood Event Assessment Tool (FEAT) model has been changed to the Flood Event Simulation Model (FESM). The FESM model is the enhanced version of FEAT used in this study. The FESM model is a stand-alone version of the FEAT model, and it uses the exact same input files as the previous FEAT model. Also, after upgrading land-use data from 1988 to 2005, the available acreages below 87.0 feet, National Geodetic

Vertical Datum, the 1-year frequency flood elevation, have changed. This has impacted all alternatives. Therefore, the Plan 5 nonstructural alternative has changed from 62,500 to 55,600 acres. This new acreage includes a blocking factor. This factor recognizes that we would have to purchase easements in blocks and not on contours.

The Vicksburg District, along with the U.S. Army Research and Development Center (ERDC), regrets the error in the wetland evaluation, but wishes to inform you prior to release of the final report. Other appendixes are undergoing minor changes as we incorporate the latest land use data (2005), newly acquired data, and clarification resulting from your comments. Any questions concerning the error in the hydrogeomorophic analysis should be directed to Mr. Dan Smith (ERDC) (telephone (601) 634-2718 or (601) 529-2536). Any other questions should be directed to either Mr. Marvin Cannon (telephone (601) 631-5437) or Mr. Bob Petersen of this office (telephone (601) 631-5510).

Sincerely,

Dennis O. Norris, P.E.
Chief, Planning, Programs, and
Project Management Division

Enclosures

Mr. Ray Aycock
Field Supervisor
U.S. Fish and Wildlife Service
6578 Dogwood View Parkway
Suite A
Jackson, Mississippi 39213

Dr. Gerald Miller
EIS Review Section
Environmental Protection Agency
Region IV
61 Forsyth Street
Atlanta, Georgia 30303

Mr. Homer Wilkes
State Conservationist
Natural Resources Conservation
Service
McCoy Federal Building, Suite 1321
100 West Capital Street
Jackson, Mississippi 39269-1602

Dr. Sam Polles
Executive Director
Mississippi Department of Wildlife,
Fisheries and Parks
P.O. Box 451
Jackson, Mississippi 39205-0451

Mr. Tony Dixon
Forest Supervisor
U.S. Forest Service
McCoy Federal Building
100 West Capital Street
Suite 1141
Jackson, Mississippi 39269

Mr. Charles Chisolm
Executive Director
Mississippi Department of
Environmental Quality
P.O. Box 20305
Jackson, Mississippi 39289-1305

Table 68. Summary of annual change in FCU for B1 Scenario

Plan	Annual Change in FCU Due to Direct Impacts	Annual Change in FCU Due to Indirect Impacts	Acres of Non-Structural (Projected)	Annual (average) Change in FCU Per Acre	Annual (average) Change in FCU for Non-Structural Acres (Product of Column 4 and 5)	Acres of Other than Non-Structural Restoration To Achieve No-Net-Loss (Projected)	Annual (average) Change in FCU Per Acre	Annual (average) Change in FCU for Other than Non-Structural Restoration Acres (Product of Column 7 and 8)	Total Annual Change in FCU (Sum of Columns 2, 3, 6, and 9)
Plan 2 (B1)	0	0	124400	3.74	464768	0	3.74	0	464768
Plan 2A (B1)	0	0	81400	3.74	304116	0	3.74	0	304116
Plan 2B (B1)	0	0	26400	3.74	98632	0	3.74	0	98632
Plan 2C (B1)	0	0	114400	3.74	427407	0	3.74	0	427407
Plan 3 (B1)	-240	-43350	0	3.74	0	20860	3.74	77935	34344
Plan 4 (B1)	-240	-27582	37200	3.74	138982	0	3.74	0	111160
Plan 5 (B1)	-240	-13911	55600	3.74	207726	0	3.74	0	193574
Plan 6 (B1)	-240	-9133	81400	3.74	304116	0	3.74	0	294743
Plan 7 (B1)	-240	-3899	124400	3.74	464768	0	3.74	0	460628

Table 69. Summary of annual change in FCU for B2 Scenario

Plan	Annual Change in FCU Due to Direct Impacts	Annual Change in FCU Due to Indirect Impacts	Acres of Non-Structural (Projected)	Annual (average) Change in FCU Per Acre	Annual (average) Change in FCU for Non-Structural Acres (Product of Column 4 and 5)	Acres of Other than Non-Structural Restoration To Achieve No-Net-Loss (Projected)	Annual (average) Change in FCU Per Acre	Annual (average) Change in FCU for Other than Non-Structural Restoration Acres (Product of Column 7 and 8)	Total Annual Change in FCU (Sum of Columns 2, 3, 6, and 9)
Plan 2 (B2)	0	0	124400	3.74	464768	0	3.74	0	464768
Plan 2A (B2)	0	0	81400	3.74	304116	0	3.74	0	304116
Plan 2B (B2)	0	0	26400	3.74	98632	0	3.74	0	98632
Plan 2C (B2)	0	0	114400	3.74	427407	0	3.74	0	427407
Plan 3 (B2)	-240	-44673	0	3.74	0	21367	3.74	79829	34915
Plan 4 (B2)	-240	-34801	37200	3.74	138982	0	3.74	0	103941
Plan 5 (B2)	-240	-17339	55600	3.74	207726	0	3.74	0	190147
Plan 6 (B2)	-240	-9811	81400	3.74	304116	0	3.74	0	294065
Plan 7 (B2)	-240	-3804	124400	3.74	464768	0	3.74	0	460723