ATTACHMENT 5

EPA COMMENTS TO
2000 DRAFT REPORT AND DSEIS

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

November 3, 2000

Colonel Robert Crear
U.S. Army Corps of Engineers
Vicksburg District
Attention: CEMVK-PP-PQ (King)
4155 Clay Street
Vicksburg, Mississippi 39183-3435

Subject: Yazoo Backwater Area Draft Reformulation Report (DRR) and Draft Supplement No. 1 to the 1982 Yazoo Area Pump Project Final Environmental Impact Statement (DSEIS), Mississippi and Alabama; CEQ #000317

Dear Colonel Crear:

In accordance with our responsibilities under Section 309 of the Clean Air Act and Section 102 (2)(C) of the National Environmental Policy Act (NEPA), as well as Section 404 of the Clean Water Act (CWA), the Environmental Protection Agency (EPA), Region 4, has reviewed the subject document. This DRR/DSEIS is an evaluation of the environmental consequences of implementing a plan with the project purpose of flood damage reduction for row crop agricultural lands and for rural and urban structures in the Yazoo Backwater Area (Lower Yazoo Basin). Specifically, 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 bottomland hardwood forests on lands below the pump elevation, and modifications to the operation of Steele Bayou structure to maintain water levels between 70 - 73 feet NGVD (when practicable) during low water periods.

EPA understands the need to address flooding issues in the Yazoo Backwater Area, and is fully committed to working with the Corps of Engineers (Corps) and the local sponsors to develop a project that addresses local needs and protects environmental resources. During the reformulation planning process, EPA repeatedly met to discuss the complex water quality and quantity management issues of the Lower Yazoo Basin with the Corps' Vicksburg District and Mississippi Valley Division, as well as the regional and headquarters offices of the U.S. Fish and Wildlife Service, Natural Resources Conservation Service, and the Federal Emergency Management Agency. Additionally, EPA provided grants to researchers at Virginia Tech University and the U.S. Geological Survey to develop a non-structural reforestation alternative which would meet project objectives. The results of these grants are described in a technical report ("An Approach for Evaluating Non-structural Actions with Application to the Yazoo

Backwater Area," Leonard Shabman and Laura Zepp, Virginia Tech University, February, 2000). This non-structural alternative provides for a more sustainable and more diversified approach to floodplain management in the Lower Yazoo River Basin. Our staffs met on February 11, 2000, to discuss the results of this technical report and to provide the Corps with an opportunity to ask questions of the principal authors. Despite these efforts at inter-agency coordination with the Corps, this non-structural alternative was not considered in detail in the DRR/DSEIS as a practicable alternative. We believe strongly that a comprehensive non-structural alternative for the Lower Yazoo River Basin, whether it is one described in the referenced report or another variation, needs to be given full consideration and not summarily rejected by the Corps.

In addition to a description of the Shabman and Zepp technical evaluation of a non-structural alternative, EPA has included in the attached review an outline of a conceptual plan for alternative investments in the Lower Yazoo River Basin, called the "Lower Yazoo River Basin Economic and Environmental Restoration Initiative" (also called an alternative investment proposal). This alternative investment proposal was developed recognizing the very real needs of the local people for flood protection and economic opportunity. The alternative investment proposal incorporates nonstructural measures along with some additional needs and priorities of the region as identified in the President's "Delta Initiative." As the Shabman and Zepp research demonstrated, reforestation is an economically superior approach for the very frequently flooded lands of the Yazoo Backwater area, as compared with enhancing row crop production. This alternative investment proposal would provide the "infrastructure" needed for local people to get the greatest economic advantage from this land use conversion by providing financial assistance (conservation easement payments) and technical assistance for landowners wishing to reforest. Additionally, this approach would support expanding recreational use of this land, promotional advertising about these reforestation opportunities, and addressing transportation needs. Flood damage reduction would be focused specifically on at-risk structures, roads and other infrastructure. Importantly, public health and environmental improvements are included in the proposal, such as, water and sewer infrastructure improvement projects, and investments in children's health efforts.

EPA has made considerable effort to talk to knowledgeable people in the area to develop an appropriate alternative investment proposal for the Yazoo Backwater Area. This dialogue is an on-going process, and we will seek out additional recommendations and opportunities for making refinements to this proposal. EPA acknowledges that the proposed actions will require a multi-agency approach. This alternative investment proposal clearly demonstrates the viability of an alternative investment strategy similar in magnitude and investment to that of the pump project, that also achieves the project purpose of flood damage reduction. Of critical importance to the EPA, this alternative investment proposal goes further by providing important environmental and water quality benefits consistent with the requirements of the Clean Water Act. By increasing the acreage of forested wetlands, suspended sediments and nutrients will be trapped and removed from the water column, flood storage will be provided and the base flows of the rivers will be augmented. This will improve the water quality of the impaired waterways in the Basin, and enhance downstream water quality (e.g. reducing the hypoxia problem in the Gulf of Mexico). Moreover it will contribute to the reduction of nonpoint source pollution and foster habitat

restoration programs. In addition, the proposal will also provide for superior economic and public health benefits to the local citizens. The heart of this approach is the reforestation of wetland areas, which is clearly in the Corps' mission. As demonstrated by the Wetland Reserve Program, there is significant interest by landowners in committing their lands to reforestation if the economic return is favorable. The alternative investment proposal builds on the momentum of such existing programs to further accomplish multiple benefits throughout this Basin.

With regard to EPA's review of the Corps' recommended plan as described in the DRR/DSEIS, we are concerned that large-scale environmental impacts would result from construction of the recommended plan. Given the extensive anticipated impacts to wetlands and other waters of the United States, a fundamental objective of the DRR/DSEIS is to determine whether the recommended plan is in compliance with Section 404 of the CWA, including the requirements of Section 404(b)(1). The DRR/DSEIS does not adequately assess those impacts or examine alternatives, such as the Shabman and Zepp non-structural technical evaluation, that would avoid and minimize impacts to wetlands in the project area. From the evidence presented, EPA is convinced that implementation of the recommended plan will result in substantial and unacceptable adverse environmental consequences. We are also concerned that the Corps has greatly underestimated and discounted the extent of adverse wetland impacts. The sheer size of the resources impacted by the project-more than 200,000 acres of wetlands, including some of the most valuable bottomland hardwoods in the region-raises concerns about significant degradation of the aquatic ecosystem. This action could undermine the Administration's goal of achieving an annual net gain of 100,000 acres of wetlands per year by 2005.

Moreover, we believe that the proposed mitigation for wetland impacts is inadequate, and there is legitimate concern that mitigation may not be carried out. Both the failure to identify specific mitigation lands in the project area and the current backlog of unmet mitigation for other Corps projects in the Lower Mississippi River Basin (totaling in the thousands of acres) cast doubt on the entire mitigation process. Based on our review, the information in the DRR/DSEIS with regards to mitigation is insufficient to demonstrate Section 404 compliance and does not meet the informational requirements of Section 404(b)(1). Notwithstanding the insufficient amount of information presented, the limited available data has lead us to the conclusion that the proposed alternative, even if fully discussed, would not satisfy the substantive requirements of Section 404(b)(1). These concerns are further heightened by the fact that the anticipated aquatic impacts would be largely avoidable with the implementation of the non-structural approach discussed above.

In addition, we have serious technical concerns about the methods used in the DRR/DSEIS to estimate the benefits and costs of the recommended alternative. Specifically, an independent evaluation of the Corps' economics analysis found that the Corps' values on agricultural benefits have been overestimated by $144 million. Finally, there are inadequate information, confusing documentation, and a number of inconsistencies throughout the DRR/DSEIS, which do not provide the public and decision-makers with sufficient information to meet the purposes of NEPA.

Based upon our review, we have rated the DRR/DSEIS as "EU-3" (Environmentally Unsatisfactory - Inadequate), in accordance with EPA's national rating system (an explanation of which is enclosed). The "EU" rating is based primarily on our conclusion that the proposed alternative, will result in adverse impacts to over 200,000 acres of wetlands in the Mississippi River floodplain, cause water quality impairment, and further degrade already impaired waters. These potential adverse environmental impacts are of sufficient magnitude that we believe the action must not proceed as currently described. The "3" portion of the rating means that the DRR/DSEIS should be formally revised and resubmitted for public comment to address the lack of information regarding potential alternatives, the scope of environmental impacts, and the potential wetlands mitigation measures.

We are committed to working with the Corps to resolve our concerns and assist in developing a project which provides appropriate flood damage reduction measures and minimizes adverse environmental impacts. Please be advised, however, that we consider this matter a candidate for referral to the Council on Environmental Quality if EPA's concerns are not adequately resolved. Furthermore, given the potential magnitude and severity of environmental impacts that could result from the recommended plan, we also consider this matter a candidate for further action under Section 404(c) of the Clean Water Act to restrict the discharge of fill material.

Detailed comments on these concerns, and other aspects of the project are provided as an enclosure to this letter. EPA is committed to working with you and the local sponsors to resolve our concerns, and we are hopeful that you will agree to address those concerns so that further action on our part will not be required. If you have any questions or comments, please contact me at (404) 562-8357.

Sincerely,

John H. Hankinson, Jr.
Regional Administrator

Enclosures

cc: Brigadier General Edwin J. Arnold, Jr., Commander MS Valley Division; J. Charles Fox, Assistant Administrator, EPA; Sam Hamilton, Regional Director, FWS; George Frampton, CEQ

YAZOO Backwater Area

Technical Review of the Draft Reformulation Report

U.S Environmental Protection Agency

November 2, 2000

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Attachments

Cumulative Impacts in the Yazoo Basin

There is broad recognition of the significant cumulative losses of natural resources and their associated functions in the Yazoo River Basin and the Lower Mississippi River Basin. The incremental installation of the massive complex of flood control features called the Mississippi River and Tributaries Project (MR & T) throughout the Lower Mississippi Valley has altered the overflow from the Mississippi River, the backwater flooding due to high stages on the Mississippi River, and the direct overflow of the Yazoo River and its tributaries. The cumulative effect of these multiple flood control projects has been to greatly alter the historic hydrologic regime in portions of the basin. Extensive areas of bottomland hardwood forest that had historically received periodic floodwaters, now only receive water from rainfall events. Channelization and water control structures have severed or reduced the connectivity between stream channels and their floodplains. In all, there has been a 90 percent reduction in the active floodplain for the mainstem lower Mississippi River, a 75 percent reduction in the extent of tributaries flooding in the Lower Mississippi Valley, and a 90 percent loss of the backwater area outside of the mainline levee.

The massive flood control works that have been constructed (or are still under construction) in the Yazoo Basin and the Lower Mississippi River Basin have also dramatically affected nearly all of the wetlands, altering both the hydrology and certain physical features that influence wetland conditions. Approximately, 80 percent of the Lower Mississippi Valley that had once consisted of floodplain forest has been cleared and converted to mostly agricultural production. Along with this huge loss of forested wetland acreages, is the loss of functions they once had served, including the trapping and removal of suspended sediments and nutrients from the water, providing for flood storage, and augmenting the base flows of the river.

Impacts caused by these flood control alterations and the irrigation needs that the resulting agricultural land requires include groundwater level declines and decreased base flows of some of the interior Yazoo Delta streams and rivers. For example, within the last twenty years, there has been an approximately 80 percent decline in the seven-day low flow discharge of the Big Sunflower River within the Yazoo Basin. Low base flows pose a threat to aquatic life and to human health, for example, if there is insufficient water to dilute permitted effluent loadings from wastewater treatment plants and industries. Ironically, in what is one of the world's largest river basins, there are now insufficient in-channel flows, as well as an increasingly "overtaxed" groundwater supply for agricultural land use.

The consequences of these impacts are now apparent in the Yazoo River Basin. Many of the waterbodies there have been identified on the State 303(d) listing of impaired waters. Impairments include excess nutrients, sediments, organic enrichment, pathogens, pesticides, and other toxic pollutants (MDEQ, 1999). Of the river miles assessed in the Yazoo, 75 percent are impaired by siltation, 78 percent by pesticides, 83 percent by nutrients, and 52 percent by organics and low dissolved oxygen. Additionally, in the Yazoo Basin, concentrations of DDT and toxaphene have persisted in the aquatic environment at levels considerably higher than those

found elsewhere in the nation. This is evidenced by fish tissue contaminant data (Kleiss and Justus, 1997).[1] The public health implications of the contaminated fish tissue findings have lead researchers to investigate consumption patterns of locally caught fish out of concern for consequences of exposures to these toxins. Additionally, the MS Department of Environmental Quality (MDEQ) is currently planning the posting of waters to help prevent or lessen these exposures.

At its mouth, the Yazoo River contributes its flow and pollutant load (sediments, nutrients and toxics) to the flow and load of the Mississippi River. There are concerns that the nutrients leaving the Yazoo Basin and all other major tributary basins of the Mississippi contribute to a hypoxia zone in the Gulf of Mexico, resulting in serious consequences for the health of the Gulf ecosystem and the dependent human culture and economy.

It is within the context of these current conditions in this basin, that we are submitting this review identifying our concerns and recommendations regarding the proposed Yazoo Backwater Area Draft Reformulation Report/Draft Supplement #1 to Final Environmental Impact Statement (referred to as Draft EIS).

Environmental Impacts of the Pump are Underestimated

A. Hydrology Analysis

The hydrology/hydraulic analyses are the foundation of all other analyses in this evaluation, including wetlands extent; environmental (aquatics, threatened and endangered species, waterfowl), economics, and impacts assessments; and determinations of the stage reduction from pumping. The Corps hydrological/hydraulics analyses have been developed at a coarse landscape level, and are based on the use of satellite imagery and recorded stage data. The use of this coarse level procedure for assigning environmental impacts is an approach best used for conceptual planning, but not for design application. This procedure has resulted in an underestimation of impacts.

The following are issues of concern regarding the hydrology analyses in the DEIS:

- The keystone of the Corps hydrology analyses is the elevation area curves depicted on Plates 4-7 to 4-10. The text (page 6-30) implies that data points from ten satellite images were used to generate these Plates. The Corps has not, however, documented any of the data points on these elevation-area curves. Additionally, the method used for "fitting" the data points to the curves was not given (page 6-31 only states that "a best fit curve routine was used"). While we assume that a composite elevation-area curve for the four reaches was developed and used in the analyses, this was not stated in the Draft EIS. This information is needed in order for the technical reviewer to verify the shape of the curve

[1]Kleiss, B. and B. Justus. 1997. "Preliminary results of fish tissue analysis in the Mississippi Embayment NAWQA Program," in Proceedings of the 27th Water Resources Conference, March, 1997.

as currently assigned. Since all other analyses depend on the data generated from these curves, its documentation is important. These ten data points and the curves generated by these data points are the basis for the hydrological analyses, including the stage-frequency and stage area data (Table 6-9), stage-frequency curves (Plate 4-22- 4-23), elevation-area curves (Plates 4-7-4-10, elevation storage curves (Plate 4-11), and elevation-duration curves (Plates 4-24 - 4-25), as well as the hydrology analysis done for the economics evaluation. Minor differences in the shape of the curve, particularly given the total number of points (10) and the cluster of data points (nine are at 91.9 feet or below, one is at 100.3 feet), could result in significant differences in the reported number of flooded acres.

- It is stated that the "satellite scenes were classified with an unsupervised classifier," (page 6-30). This apparently means that there was no validation of the GIS technique used by either photo-interpretation or ground-truthing.

- There is a gap in data points from the satellite imagery between 91.9 feet (nine points at 91.9 feet and below) and 100.3 feet (one point at 100.3 feet). This gap results in lower confidence in assessing the less frequent flood stage events.

- Ten satellite images were used, five of which were outside of the growing season when many of the wetland impacts and claimed cropland flood reduction are considered to be most critical to project assessment.

- Accurate flood profiles can only be established by basinwide channel cross-section data. The Corps has only two cross-sections in the connecting channel between Steele Bayou and Little Sunflower), and no basinwide cross-section data.

- The land use classification data used are out-dated (over ten years old).

- Additionally, spatially explicit data were apparently not used in the environmental assessments; therefore, specific geographic locations of impacts cannot be determined.

- There is insufficient detail about how the pump will be operated (see discussion in section B below).

- The only hydrograph presented is for the l00-year flood (Plate 4-21). However, the pumping project will have more impacts on the more frequent flood events (such as the 2-year flood). Therefore, including the hydrographs for the more frequent events would allow for more confidence in results interpretation.

- The Corps' analysis apparently assumes a static channel system throughout the project area with no changes due to channel filling by sedimentation. This would affect the analysis of storage curves and rate of delivery of water.

A more accurate level of analysis would have included channel cross-section data throughout the 100 year floodplain. This protocol would provide for a better assessment of channel hydraulics and the impacts of flood routing. This information would be important for a determination of flooding duration (days of inundation), spatial extent of flooding, and flood routing to determine the influence of channel and floodplain hydraulics on rates of dewatering. These are techniques commonly used in analyses for large- and small-scale water management projects. In addition, a spatial representation of pre- and post-project conditions should have been evaluated to provide a more realistic extent of impacts across elevation gradients. This type of work has been performed by the U.S. Geological Survey in a study developed for prioritizing wetland restoration in the Lower Yazoo.[2] (Attachment A and B)

Although the Corps did conduct modeled spatially-explicit hydrology (page 6-44), the results were apparently primarily used for illustrative purposes.[3] The procedures used and application of the modeled hydrology were not documented, nor were the resulting estimations of flooded acres (pre- and post-project) provided. It was stated, however, that the Corps modeled hydrology was used in identifying the location of the proposed reforestation component (page 6-44)-- a major element of the DEIS. For this reason, it would be very important to include a description of the model; a clear documentation of how the procedures were or were not combined; and the resulting flooded acres during specific flood frequency events, comparing the modeled hydrology and the satellite/gage based methods. EPA has determined that there are very significant differences in the Corps' modeled hydrology acreage figures, as compared to the Corps' satellite image/stage area method acreage figures. For example, there is a difference of over 100,000 flooded acres when comparing the total acres flooded in the 2-year flood event with the two methods.

The hydrological information based on satellite and stage data was apparently a major element in the determination of wetland extent and impact. Although this type of information can be useful for a landscape-level planning project, it cannot substitute for a detailed analysis in combination with field inspection necessary for regulatory decisions. Information that is standardly used by private and public entities in the context of the Section 404 regulatory program includes: field-level assessments of soil saturation and inundation; infrared imagery; site-specific soils information; appropriate scale digital elevation model data; up-to-date crop surveys; up-to-date National Wetlands Inventory (or other inventory) mapping; and information on other features, including streams, channels, and ponds. A sampling and survey process could have been implemented to "ground-truth" the database, particularly for wetlands and other

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[2]"A Decision Support System for Prioritizing Forested Wetland Restoration in the Yazoo Backwater Area, Mississippi," prepared in cooperation with the EPA, USGS Water Resources Investigations Report 00-4199, Sept. 2000; and "The Development of a Decision Support System for Prioritizing Forested Wetland Restoration Areas in the Lower Yazoo River Basin," in proceedings from Sustainability of Wetlands and Water Resources, University of Mississippi, Oxford Conference, May, 2000.

[3]Based on personal communication with Larry Banks, Lead Hydrologist for Yazoo Backwater Project, September, 2000.

critically impacted resources. Additional comments related to the wetland analyses are discussed in more detail in the subsequent sections.

B. Pump Operation - Indefinite Operation Schedule and Compliance Concerns

The Corps has stated (page 6-39) that the pump on/off elevation for the recommended plan is 87.0 feet, NGVD, however "some pumps [may be] turned on before landside stages reach elevation 87.0 feet. Specific refinements to the pump operation sequence will be developed as part of the water control plan for the project."

How the pumps are to be operated is the foundation of all analyses in the Draft EIS, and has significant implications for environmental impacts. Providing an indefinite operation schedule is therefore a great concern. To accurately assess the impacts from the pump, a definitive schedule of pump operation is necessary. These statements by the Corps offer no firm commitments about the pump operation. Should the pumps be operated before the stages reached 87 feet, acreages below 87 feet would be dewatered an unspecified amount, presumably to make room for water storage and to accommodate inflows greater than the pumping rate. Given the huge number of variables involved (e.g. location and amounts of rainfall in the project area), determining compliance would be extremely difficult or impossible. In addition, we are concerned about open-ended pump operation proposals that essentially provide no assurances for future operations.

C. Wetlands Extent and Impacts Analysis

The functioning of the wetland communities in the project area will be impacted primarily because of the hydrologic changes caused by the proposed pumping. The most severe of the hydrologic impacts will result in an elimination of wetland hydrology. Other disruptions to the hydrologic patterns may substantially alter the ecological processes in the project area, including deposition of sediments and nutrients, soil moisture recharge, wildlife and fisheries habitat suitability, and flood-pulse conditions.

Changed hydrologic conditions will likely have significant impacts on habitat and species composition in the Yazoo Backwater area. Hydrologic change would cause a shift to favor less hydrophytic species, and affect regeneration by impacting germination and survival of seedlings. Vegetative species, including the Federally listed endangered species of pondberry, that are adapted to the flood pulses of this lower Basin may be impacted by alterations of the timing, duration and magnitude of flooding. Shifts in the complexity, diversity and productivity of floras because of the hydroperiod alterations can, in turn, impact the wildlife communities that these vegetative communities support. Wildlife habitat functions can be substantially diminished by eliminating the wetland hydrology, or modifying the hydrologic regime. Characteristics of bottomland hardwood wildlife habitat functions, for example, production of invertebrates, production of vertebrates and a diversity of ground-level vegetation, can be impacted by hydrological changes, and affect species or groups including passerine birds, amphibians, raptors,

wading birds, furbearers, small mammals, and reptiles.[4]

The reproduction of wetland fishes, including spawning, egg hatching, larval and juvenile development, is closely related to the timing, extent and duration of flooding. The proposed pumping plant recommended plan will result in reducing flood stage elevations on the floodplain. For example, the flood frequency on the current two-year floodplain, will be reduced to a flood frequency of about a ten-year frequency, (Table 6-9, Vol. 2). These changes in hydrology can have substantial impacts on the fisheries habitat, and combined with the cumulative impacts from other flood reduction projects in the basin, will result in significant impacts to fisheries' populations. If flooding does not occur at the appropriate time or is not of sufficient duration, bottomland hardwood wetland sites will have a lowered value for finfish and shellfish. Water depth is also an important criterion for fish habitat. Hall and Lambou state that "higher areas that are flooded infrequently may be extremely important at the times they are flooded, because they may provide the only habitats with suitable water depth for finfish spawning."[5] The proposed plan will result in extensive changes to the extent, duration and depth of flooding for both the lower frequency and higher frequency flood events.

Water quality parameters, including presence of toxicants, oxygen levels, and sedimentation, are also important determinants for the quality of spawning and nursery habitat for fishes. The anticipated degradation of water quality because of the hydrological impacts to wetlands resulting from the Corps' recommended plan is another expected impact to fish habitat.

With regards to wetlands extent and impacts, the Corps has used in the Draft EIS at least four assessment methods. It is never clearly documented how these methods are, or are not, combined to yield a final estimate of wetland impact and wetland mitigation. Key steps in the analysis are not clearly stated. Key pieces of information, such as total actual acreage of hydrological impact, are not provided. The following is a review of our concerns with various components of the Corps' wetland-related work.

1. Average Daily Flooded Acres Method:

A method for determining the average daily flooded acres was used to account for the baseline and changed wetland hydrology because of the proposed pumping. "Average daily flooded acres were determined by summing the number of acres flooded each day over the period of record (1943-1997) in the 2-year frequency and dividing the total by the number of days." To determine the number of acres, presumably the satellite image/stage data method (elevation area curves, page 6-36) was used; however, this step in the procedure was not stated or explained.

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[4]From Forsthye and Roelle, "The Relationship of Human Activities to the Wildlife Function of Bottomland Hardwood Forests," in *Ecological Processes and Cumulative Impacts: Illustrated by Bottomland Hardwood Wetland Ecosystems*, Gosselink, Lee, and Muir, 1990.

[5]From Hall and Lambou, "Ecological Significance to Fisheries of Bottomland Hardwood Systems: Values, Detrimental Impacts and Assessment," in *Ecological Processes and Cumulative Impacts: Illustrated by Bottomland Hardwood Wetland Ecosystems*, by Gosselink, Lee, and Muir, Lewis Publishers, 1990.

The average daily flooded acres method is an unorthodox procedure in wetlands' evaluation, and the concept behind its use has not been documented. The resulting data from this procedure underestimate the extent of wetlands. Flood records indicate that the majority of floods occur during the months of March through June (page 6-17), with all but one year of record reaching the maximum peak stages sustained for 5% of the growing season during these months. The average daily flooded acres method, however, averages acres flooded over the entire calendar year (for 55 years), including the summer, fall and early winter drier seasons. This results in "weighing down" the average value rather than had the method evaluated only the "flood" season, the season critical to determining jurisdictional wetlands.

2. *Jurisdictional Wetlands Elevation Cut-Off*

It is stated in the DEIS that the "maximum elevation at which backwater flooding influences the jurisdictional delineation of wetlands in the study area is 88.5 feet" (p. DSEIS-53). "Plate 4-39 shows the Jurisdictional Wetlands"(p. 6-48). The Corps estimates 23,200 acres of jurisdictional wetlands based on this elevation cut-off. The justification for the elevation cut-off was not documented, and no explanation was provided as to how the plate illustrating jurisdictional wetlands was developed. We learned by personal communication with the Project Manager (Sept. 27, 2000), that the 88.5 foot elevation was derived by the WETSORT computer program.

The WETSORT method underestimates the extent of wetland acres because it examines only the duration of inundation. This method is a landscape-level, remote assessment, and not a site-specific level assessment. It does not capture acres that remain ponded for periods of time after an inundation event; nor does it capture all acres that pond or are saturated within a foot of the surface because of rainfall or groundwater seepage. It also does not capture the interaction between backwater flooding, rainfall and groundwater as described in the 1987 Corps of Engineers Manual. This method does not account for saturation at all; it is based only on inundation. The Corps' 1987 Manual requires inclusion of wetland acreage that meets saturation criteria. The low permeability of soil types in the Yazoo Basin makes this a very important consideration. These soils can remain saturated after inundation and ponding for long periods of time.

On Page 85 in the Main Report, it is stated that the "pumping plant would affect 23,200 acres of jurisdictional wetlands between the pump operation elevation of 87 feet and 88.5 feet – the elevation at which lands in the project area are inundated or saturated for at least 5 percent of the growing season in most years." There is no explanation for how the acreage between these two elevations was quantified, or how this figure is related to the average daily flooded acres method, the functional assessment procedure, and the compensatory mitigation acreage amount. Also, there is an important, unexplained discrepancy in the reported total flooded acres in the 2-year floodplain which is used as a basis for the wetland evaluation. Table SEIS-17 indicates 192,223 total flooded acres in the 2-year floodplain, as compared with the Stage Area data in Table 6-9 which indicates 317,535 total flooded acres in the 2-year floodplain.

The Corps has greatly underestimated the extent of wetlands impact due to the recommended plan of a pumping plant operating to 87 feet. Three additional elevational areas of impact apparently not considered by the Corps include acreages that are: below 87 feet; within the 2-year floodplain to 91 feet; and topographic depression/hydric soil areas above the 2-year floodplain throughout the project area.

Importantly, the wetland areas below 87 feet, including the cleared lands targeted for the Corps' reforestation plan, will be hydrologically impacted by the pumping plant because the depth of inundation will be changed. The pumping will "cut off the top" of the hydrograph for flood events, and, therefore, lower the peak periods of inundation. On the ground, this translates into a lower depth of water during flood events, which can shorten the duration of inundation as well.

Also, because the Corps has indicated that the pumps will be operated below 87 feet (conditions not specified), additional hydrologic impacts to the wetlands below this elevation can be anticipated (discussed in previous section). Additionally, the Corps has included a base conditions vs. recommended plan hydrograph for the 100-year flood (Plate 4-21) which shows that the rising limb of the hydrograph will be delayed with the recommended plan, meaning that the pump would result in a shorter time that the area is inundated. However, the gross scale of the curves does not allow the reader to fully interpret these predicted changes with pumping. Also, the hydrographs for the more frequent flood events were not provided.

The Corps has underestimated the impacts to wetlands within the 2 year floodplain (to 91 feet) by not including all these lands in their identification of 23,200 acres of jurisdictional wetlands. Although the Corps has stated that they "included all wetlands up to the 91 foot elevation," (page SEIS-53) in their evaluation, they state elsewhere (page 85, Vol. 1) that the pumping plant would affect 23,200 acres of jurisdictional wetlands between 87 feet and 88.5 feet. This is an important discrepancy.

EPA has provided a separate estimate of wetland impacts within the 2-year floodplain, which was prepared using Corps imagery and land use classification data. The procedures used, limitations of the landscape-level, GIS based procedures, and a discussion of acreages and type of impacts are described in Attachment C. Our assessment of wetland extent and impacts greatly exceed the Corps' estimates. Specifically, EPA estimates that there may be as many as 96,518 acres of forested wetland impacts and 76,827 acres of cropped wetland impacts <u>within</u> the two-year floodplain.

The Corps has also not accounted for wetland extent and impacts <u>above</u> the 2-year floodplain. In Attachment C (described above), EPA has also provided an analysis of wetlands above the 2-year floodplain, in which a GIS-based methodology was used to identify areas of topographic depressions with hydric soils. Based on this landscape-level analysis, there are extensive acreages of wetland areas above the 2-year floodplain that have not been considered in the Corps' wetland analysis. Specifically, EPA estimates that there may be as many as 96,180 acres of wetland impacts above the two-year floodplain.

3. Farmed Wetlands Inventory Mapping

In the Reformulation Report, the Corps includes a map of farmed wetlands (Plate 4-41). The report, however, fails to sufficiently describe the use and application of the data. We are assuming that Plate 4-41 is the Natural Resources Conservation Service (NRCS) GIS coverage of farmed wetlands, and that the Corps used this information to assess wetland extent and impacts on farmed wetlands.

An analysis done by USGS (contracted by EPA) has determined that within the Yazoo Backwater Project area there are 57,940 acres of farmed wetlands (using the GIS coverage provided by NRCS). EPA considers this to be a very conservative estimate of farmed wetlands in the area– only capturing the wettest of the farmed wetlands. The methodology that NRCS used to develop this coverage is based on the use of stream gage data and satellite imagery from March, 1989 (a 2-year flood stage according to NRCS; also additional satellite dates were used to locate permanent water and wooded areas).

This method underestimates farmed wetland extent for several reasons. It does not comprehensively assess ponding, and it does not account for wetland areas above the 2-year flood frequency area. Additionally, the particular date of imagery used showed the reading at Steele Bayou gage to be just below 90 feet, therefore below the two year flood stage (according to the Corps of Engineers, the 2-year flood is 91 feet). The peak stage for the NRCS imagery used was 89.7 feet, and the flood remained at that peak stage for approximately 4 days. More appropriate imagery for assessing farmed wetlands within the 2-year flood would have been from a gage reading at 91 feet, where the flood peak lasted for 15 days or more (duration criteria under the Food and Security Act). Other methodologies would have to be employed to assess farmed wetlands resulting from ponded areas above the 2-year flood frequency stage (for example, see attachment C). Additionally, NRCS indicated that in classifying farmed wetlands, classification (satellite image processing) of certain areas were "backed off" to better correlate with field investigations from "Procedure Used to Develop Mississippi Natural Resources Conservation Service Farmed Wetland Inventory Maps," provided by Dr. Paul Rodrigue, NRCS to EPA on Sept. 27, 2000. The methodology of the field investigations and criteria used were not, however, described in the NRCS document.

We also have concerns with the Corps' Plate 4-39, Wetland Land Classification map. When comparing this Plate with the Farmed Wetland Plate (4-41), it is clear that not all farmed wetland acreage is included in the Wetland Land Classification map. There a significant discrepancy here.

4. Functional Assessment Procedure

The wetlands functional assessment procedure used in the Corps' analysis is a coarse, landscape-level procedure. This is not an appropriate method for assessing wetland impacts from a pumping plant at a site-specific scale. We have previously documented our concerns about this procedure and its application to large-scale flood control projects in a letter to the Corps Vicksburg District, dated October 12, 1999 (Attachment D). The key concerns stated in that letter were: no data are provided that would help support the assumptions made for the methodology; it is unlikely that the methodology used is sensitive to changes in hydrology, (given that the greatest impact of the proposed pumping plant is hydrologic change, this

assessment methodology is inappropriate); and there is no documentation of assumptions involved in the choice of indicators, indices, and in the assignment of subindex values.

Given the overall failings of this functional assessment procedure in this application, the final results which were presumably used as a basis for determining compensatory mitigation (coined "minimum threshold for no-net-loss") are inaccurate.

5. *Impacts to Wetlands on Public Lands, WRP/CRP, and Mitigation Lands*

The proposed project appears to undermine the goals of ongoing federal investments and programs in the basin. In the past decade, the federal government has invested more than $30 million in the Yazoo Backwater area through landowner incentive programs, especially the Wetlands Reserve Program (WRP) and the Conservation Reserve Program (CRP). To date, there are approximately 22,500 acres of WRP and 9,000 acres of CRP in the project area. The Corps' recommended plan may jeopardize the success of areas that have been newly restored and managed for wetland functions under these programs. Additionally, the Corps' recommended plan will impact mitigation lands -- wetlands that have been restored for mitigation for other previously constructed flood control projects. The recommended plan will also impact tens of thousands of forested wetland acres on public recreational lands, including the national wildlife refuge, national forest, and state lands.

6. *Agricultural Intensification*

EPA is concerned that the proposed project will encourage increased conversion of wetlands to agricultural uses. The Corps indicates that agricultural intensification will not occur as a result of this proposed project, stating for example that "current economic conditions are not conducive for any conversion of bottom-land hardwoods to agricultural lands; [and that] Section 404 also serves as a deterrent to land-clearing."(page 40, Vol. 1). Given that the proposed project is intended to improve conditions for agriculture, we are very concerned that it would encourage increased agriculture intensification. Also, it is important to note that if the pumping plant alters the hydrology to remove the jurisdictional status of existing forested wetlands, then landowners could convert that newly non-jurisdictional forest into agricultural lands.

7. *Big Sunflower Dredging Project – Cumulative Impacts*

The proposed pumping plant project overlaps in project and drainage area with the Big Sunflower Maintenance Project, a proposed 130 mile channel dredging and clearing project. The massive scale of these two proposed projects within the Yazoo River Basin raises significant concerns regarding cumulative impacts. The Corps has failed to adequately address the cumulative impacts of these projects within the Draft EIS. Also, because the Corps used the same methodologies for the Big Sunflower Maintenance Project EIS and the Yazoo Backwater Draft EIS, we can conclude that the wetland extent, impacts, and mitigation acreage are likely underestimated for the Big Sunflower project as well. This has significant implications for understanding the combined cumulative impacts of these two large flood control projects. Further, the overall limitations that we have described in this technical review regarding the hydrology/hydraulics methodology give cause for questioning the conclusions regarding the

hydrologic connections between these two large scale flood control projects. Additionally, the anticipated impacts of these pending projects should also be comprehensively addressed in regards to the cumulative impacts from the many previously constructed or currently under-construction projects throughout the Yazoo River Basin, including Steele Bayou; Yazoo Backwater levees, cut-offs, floodgates; Upper Steele Bayou; Upper Yazoo Projects; Mainline Mississippi Levee; and others. Additionally, previous 404 permitted activity in the basin should be considered in evaluating cumulative impacts.

In reference to the Big Sunflower Maintenance Project, the Corps has stated that with the modified conveyance capacity (i.e., 130 miles of dredging and clearing) that the rate of flow from the Steele Bayou and Sunflower River basins "may be changed slightly," however, the same volume of flow from storm events will arrive in the Backwater area (page 47, Vol. 1). The presumed objective of the dredging project is to move water downstream more quickly and reduce the height of the flood peak. Given what is known about the extensive environmental damage caused by channel dredging, we question that if the rate of flow is only "slightly changed" by this extensive dredging project, then the environmental impacts are probably greater than the flood control benefits.

D. Water Quality Impairment

The Corps has summarized findings about the existing water quality conditions in the project area and concludes that there are extensive water quality impairments, (Appendix 16, Vol. 3). An extensive number of streams and rivers in the project area are listed for impairment under Section 303(d) of the Clean Water Act. The Corps does not, however, provide a comprehensive description of the anticipated water quality impacts from the pumping plant. The Corps makes the apparent assumption that the nonstructural component will have a positive influence on water quality, however, this is discussed broadly in the context of the full array of alternatives rather than the specific recommended plan.

Many water quality functions, including chemical transformations and physical settling processes are dependent upon duration of flooding. For example, in the Cache River in Arkansas, the maximum sedimentation rates in bottomland hardwoods were found in cypress sloughs that were flooded in excess of several weeks (Kleiss, 1996). Compounds such as phosphorus and pesticides are commonly sorbed onto the surface of suspended sediments in the water column. Therefore, the removal of suspended sediments in the water column both decreases the turbidity of the water and the load of contaminants and others materials associated with suspended sediments. Denitrification (the conversion of nitrate to atmospheric nitrogen) occurs in wetland soils, after all available oxygen has been utilized. The utilization of oxygen is dependent upon many factors including microbial community, carbon availability and temperature, but is primarily driven but the duration of floodwaters. Therefore, a pumping project that would serve to decrease the duration, depth and extent of flooding would also impact these known wetland functions.

Because the extent of wetland impact has not been adequately determined in the Draft EIS, the impacts to water quality cannot be accurately described in a manner that compares impacts caused by the loss of wetland function to the improvements gained by compensatory

mitigation lands, and the proposed reforestation component. Also, because the amount of mitigation and nonstructural reforestation is indefinite in this plan, the resulting benefits to water quality cannot be concluded.

Based on EPA's estimates of wetland impact, it can be concluded that the proposed pumping activity will cause impairment and contribute to the degradation of already impaired waters; many waters in the project area are currently listed under Section 303(d). Decreased residence times for surface waters in the Basin would result, given the extensive hydrological impacts. As well, increases in nonpoint source pollutants, such as pesticides and sediments, can be expected from the increased intensity of agricultural use with the proposed recommended plan. These impacts would have significant implications for the development of total maximum daily loads (TMDLs). EPA and MS Department of Environmental Quality are currently developing TMDLs for the impaired waters in the state. With the recommended plan, the significant shifts in the hydrologic regime and resulting loss of wetland function, would increase the pollutant loadings to these waters, and therefore delay and counteract efforts to reduce the causes of impairment.

E. Groundwater/Surface Water Interactions

The impacts of the pumping plant as related to groundwater-surface water quality and quantity have not been addressed in the Draft EIS. Previous studies have indicated that a decrease in stage in streams in the Yazoo Backwater project area due to backwater pumping during high water periods may influence the ground water levels in the Mississippi River alluvial aquifer. In a study published in 1984, the USGS in cooperation with the Corps of Engineers, Vicksburg District (Lamonds and Kernodle, 1984) studied the potential ground-water level changes in the Mississippi River alluvial aquifer in response to proposed navigation improvements on the Yazoo River. Although the main focus area of this study was to the east of the Backwater Study area, some of the observation wells measured during the study are located in the Backwater area. Generally, their conclusions stated that although the degree of hydraulic connection between the streams and the alluvial aquifer varies in the study area, water levels in the alluvial aquifer adjacent to streams fluctuate in response to changes in stream stage. Specifically, it was noted "during the wet season a ground-water mound developed beneath the Deer Creek meander belt." The higher water levels in the alluvial aquifer beneath the meander belt indicate a hydraulic connection between water in Deer Creek and the alluvial aquifer. Adjacent drainages such as Steele Bayou and the Sunflower River system may also be in hydraulic connection with the alluvial aquifer, and, therefore, changes in their stage would impact alluvial aquifer levels.

Some rivers in the Yazoo Basin have shown significant decreases in the 7-day low flow during the past decade. Low flows in the Big Sunflower River have been below the published 7Q10 for the stream every year since 1978. The levels of the alluvial aquifer have been affected by the hydrologic alterations to the basin, and by ground water withdrawal for irrigation. These low base flow conditions are resulting in problems for waste load allocations, water quality, habitat for aquatics, and irrigation supply demands. For example, regarding irrigation supplies, the expected increases in irrigation demands for cropped lands and catfish farms has lead to discussions of proposals for an engineering "fix" by piping water from the MS River to

supplement flows in the tributary channels. Other engineering fixes proposed or already implemented include building in-channel weirs to help pond water for irrigation and aquatics habitat, and dredging in-channel holes to provide for aquatics habitat. In the EIS, the Corps' plan to maintain water elevations between 70 and 73 feet during low-water periods will improve ponding from the current practice (and perhaps lessen fish kills), however, it should be noted that this is a proposed change in operation of an existing structural feature–the Steele Bayou gates.

With the proposed Backwater Pumping Plant plan, the pumping of surface waters would exacerbate these existing low base flow conditions by having a direct impact to the alluvial aquifer. Impacts to the alluvial aquifer will change the dynamics of recharge and discharge which can also result in indirect impacts to wetlands hydrology, including saturation, ponding and/or inundation, duration and extent. The resulting changes could reduce the hydroperiod of the wetland sufficiently to eliminate wetland hydrology, or to impact the hydrology enough that wetland form and function are changed.

Alternatives are not Adequately Addressed

A. Flawed Analysis of Economic Benefits

In evaluating alternatives for addressing flooding issues in the Yazoo Backwater area, the Corps did not adequately or accurately assess the economic benefits and costs of project alternatives. Flaws in the Corps economic benefit analysis have resulted in the Corps failing to fully evaluate other non-structural alternatives to construction of a pump.

EPA worked with Dr. Leonard Shabman and Laura Zepp of Virginia Tech University, and Drs. Barb Kleiss and Chuck O'Hara at the U.S. Geological Survey to develop an analysis of a nonstructural alternative to the proposed flood control projects in the Lower Yazoo Backwater Area. Additionally, we worked with Shabman and Zepp to evaluate the economics evaluation component of the Corps' DRR/DEIS for the Yazoo Backwater area. The USGS lower Yazoo wetlands restoration prioritization study, the Shabman and Zepp non-structural alternative analysis report, and Dr. Shabman's evaluation of the Economics Appendix in the Yazoo Backwater Draft EIS are attached to this document (Attachments A, E and F respectively).

Major concerns regarding the Corps economics evaluation for the Yazoo Backwater Pumping Plant project are summarized below. The attached reports by Dr. Shabman and Laura Zepp provide more detailed discussion of many of these points.

1. The Corps Overestimates Agriculture Benefits of the Project

While there are strong implications in the DEIS that the proposed project is motivated by the need to protect homes and businesses in the project area, 67% of the total project benefits are for agricultural crop benefits, and an additional 16.5% of the total benefits are related to agricultural crop production and reforestation. Only 15.6 % of the benefits are for protection of structures, roads and bridges, and related items. Given the high percentage of agricultural crop benefits, any flaws with the estimation of these benefits, therefore, have significant impacts on the overall assessment of project benefits.

The agricultural benefits estimated by the Corps are inaccurate because they are based on a projection approach that is technically flawed and does not rely on the best information. The Corps' projections of agriculture benefits are based on a method which uses crop sales to predict future net returns. Projections based on historical crop sales do not provide any information about future changes in costs of production, which may diminish the future growth rate of net returns. A more appropriate approach for this evaluation would be to project future prices, yields and costs based on a model such as the one the Food and Policy Research Institute (FAPRI) produces which is based on assumptions about future economic and policy conditions.[6]

Agricultural benefits by net return estimates cannot be reconciled with land market prices based on the most current, net returns data released by the Corps. These 1997 net returns estimates, which are more current than the 1994 net returns reported in the EIS, imply land prices that are many times greater than the actual market value of lower elevation, agricultural lands in the Yazoo Basin.

In summary, the Corps analysis projects $168.6 million of agricultural crop benefits in net present value, whereas Shabman's analysis finds the benefits to be only $25 million in net present value.

2. *Lack of Justification for Intensification Benefits*

The Corps estimates benefits using an "intensification" factor on non-wetland crops by assuming that flood-free net returns would be higher with the pump project than they would be without a pump, even when the pump is not operating. In essence, this theory is based on the notion that benefits will be accrued from the pump before the forgone flood damages are taken into account because landowners will employ better management practices. This rationale is not consistent with agricultural practices in the region.

3. *Errors in the Calculation of Benefits for Reforested Land*

Benefits for reforested land below the 87' elevation inappropriately double count the reduced flood damages. The costs for reforestation include the cost of purchase for easements on the lands below 87'. The prices of easements for these lands already accounts for the reduced land value because of flooding. Therefore, lower project costs capture flood impacts on those properties.

However, the Corps also includes $2.96 million in "non-structural agricultural crop" benefits from flood damages eliminated on those lands below 87' (reduced insurable flood losses). As Dr. Shabman points out in his analysis, the *Principles and Guidelines* does not even allow reduced flood damages as a benefit from a change in agricultural flood plain land use.

By including reduced easement prices in the costs of the project, and reduced flood

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[6] Staff from USDA's Economic Research Service provided a brief analysis on this method used by the Corps in the DEIS Economics Appendix, and agreed with Dr. Shabman's assertion that this approach used by the Corps is not structurally sound.

damages due to reforestation as a benefit, the Corps is double counting this activity. This overestimates the benefits of the proposed plan.

4. *Lack of Disclosure Regarding Economic Justification Issues for the Project*

- The Corps has failed to fully disclose the up-dated data used in their economics evaluation of the proposed project, specifically a non-disclosure of the 1999 crop prices, production costs, number of acres affected by the project by reach and stratum, per acre flood damage estimates, cropping mix, days of planting delay associated with the different flooding regimes with and without project, and replanting costs for flooding.

- The Corps has failed to clearly describe and document information about the number of days it will take water to drain from structures and agricultural lands with their recommended pumping operation. This information would be important for all landowners. There will be significant lag times in drainage of property, depending on the flood event, even with the pumps operating at maximum capacity. It is important for the Corps to describe this, because there is a common misconception among landowners that the pumps will provide nearly instantaneous drainage.

  As one example, we have calculated from the Corps elevation storage curves (Plates 4-11), that it will take the pumps, working at maximum capacity, 7 days to lower the flood level by just one foot, from 95 feet (about five year frequency event) to 94 feet. This length of time for drainage will have significant implications for residential and commercial structures. In another example, we have calculated that it will take 22 days (pumps operating at maximum capacity) for the 10-year flood to achieve the maximum stage reduction claimed by the Corps. At incrementally higher elevations, it will take increasingly longer periods of time for the pump to drain the water off of the land and structures.

- Landowners in the project area have *already* been compensated for flowage easement payments on 19,400 acres of land as a result of previously constructed flood control projects.[7] The Corps does not indicate the specific areas of overlap between these existing flowage easements and the reforestation easements targeted for this new project. Specifically, what reductions in cost to the federal government will there be for these reforestation easements that overlap with existing flowage easement lands?

- In their Future Without-Project Conditions section (page 38, Vol. 1), the Corps has stated that land use will not change significantly. The U.S. Fish and Wildlife Service has provided an analysis that contradicts the Corps position, based on a comprehensive assessment of recent land use changes and projections for future without-project conditions (in Fish and Wildlife Coordination Act Planning Aid Report, 1999.) EPA concurs with assumptions and conclusions made by the U.S. Fish and Wildlife Service that the trends of reforestation on marginally productive agricultural lands will continue

[7]Based on information provided by the Corps Vicksburg District to the EPA in a letter dated December 3, 1998.

in this project area.

- In justifying the need for this project, the DEIS does not adequately address the issue that within the five Yazoo Delta counties (Sharkey, Issaquena, Washington, Yazoo, and Humphreys), including the entire project area, only about 200 structures are identified by FEMA as repetitively flooded structures in the National Flood Insurance Program (and most of these structures are outside of the project area in the "unprotected" lands outside of the main levees.)

- Using gage data, EPA has calculated that since 1978 (post-levee construction), had the proposed pump been in place and operating under the proposed plan (assuming operation when the stage exceeds 87 feet), the pump would have only been operated about six out of every ten years over that time period. Also, according to the Corps, there will be some years when the pump would not be operated even when the stage exceeds 87 feet, in cases when the Mississippi River is lower than the interior ponded area. A more detailed discussion of this point is warranted in evaluating the economic justification and intent of this project.

- Wetlands impacts and mitigation acreage are incorrect; therefore, the costs associated with this mitigation are incorrect. Additionally, it is inappropriate to claim silvicultural economics benefits on compensatory mitigation land.

B. Alternatives Analysis Based on an Ecological and Economic Evaluation of the Lower Yazoo Basin - EPA, Virginia Tech University, and U.S. Geological Survey

Federal and state programs and policies have been steadily advanced in the past two decades to encourage non-structural alternatives for floodplain management; remove marginally productive agricultural lands from production; protect and restore wetlands; increase incentives to reduce flood risks; and to improve floodplain management and flood loss reduction activities. Examples include: the Water Resources Development Act of 1990 that authorized the Secretary of the Army to include environmental protection as a primary mission of the Corps, setting out a specific goal of increasing the quantity and quality of the nation's wetlands. Programs such as the Wetlands Reserve Program, the Clean Water Act's Section 319 Nonpoint Source Program, and the Federal Emergency and Management Agency (FEMA) programs, including the Hazard Mitigation Grant and the Flood Mitigation Assistance Programs, are working to implement natural resource restoration, pollution abatement, and appropriate floodplain management.

It is within this context that EPA collaborated with scientists from Virginia Tech University and the U.S. Geological Survey to produce an economic and ecological evaluation of a non-structural reforestation alternative for the Lower Yazoo River Basin. This alternative plan is in keeping with the national and state policies and programs, as described, and is recommended with an understanding of the important human uses of this ecosystem, especially the multiple agricultural uses of this basin. A non-structural alternative for the Lower Yazoo Basin is a sound public policy recommendation that would provide for the expansion of landowner incentives encouraging reforestation on lands where row crop production is only

marginally profitable. A non-structural approach would contribute significantly to the recent reforestation efforts in the basin, and assist in shifting the region toward a more sustainable economy and ecosystem.

The complete documentation on the analysis of this alternative is given in "An Approach for Evaluating Nonstructural Actions with Application to the Yazoo River Backwater Area," by Leonard Shabman and Laura Zepp of Virginia Tech University, February, 2000 (Attachment E). The key elements of the alternative include:

- Voluntary reforestation of 88,000 acres of land within the 2-year flood frequency area;
- Expanded farmer participation in a crop income insurance program to offset agricultural flood damage losses of landowners who choose not to reforest;
- Relocation of structures subjected to frequent flood damages or construction of small-scale, localized flood control structures to address the flood risk for the limited number of structures in the backwater area.

Shabman and Zepp reported that the federal budget costs for the reforestation easements and an income assurance program would be $68 million, with the total number of 88,000 easement acres considered. The non-structural alternative was determined to be NED justified, with calculated net benefits of over $20 million. The key economic opportunities offered by the non-structural alternative include reforestation for commercial production of pulpwood and saw timber, reforestation for wildlife habitat and the associated recreational values, income assurance for agricultural production, and residential and commercial flood hazard management. Significant ecological benefits would also result in water quality enhancements including reductions in sediments, pesticide and nutrient loadings; reduction in atmospheric carbon; floodwater storage and retention; and the restoration of habitat for both aquatic and terrestrial species.

C. EPA Economic and Environmental Restoration Initiative: Recommendations on Investment Alternatives for the Lower Yazoo River Basin

In addition to the technical evaluation of a non-structural alternative, as described above, EPA has developed a conceptual plan for alternative investments in the Lower Yazoo River Basin. The Lower Yazoo River Basin Economic and Environmental Restoration Initiative, also called the "Alternative Investments Proposal" describes a new strategy for public investments in the Lower Yazoo Basin (Attachment G). This strategy was developed in response to some of the goals and recommendations established by an interagency task force and broad group of stakeholders in the report, *Delta Vision, Delta Voices: The Mississippi Delta Beyond 2000*. In addition, EPA has worked with local government officials, stakeholders and federal government representatives from this region to introduce the concepts presented here. We offer this strategy as an example of a more sustainable and more diversified approach to floodplain management in the Lower Yazoo River Basin, and will seek opportunities for making refinements to these proposals.

An important goal set forth by the proposal is to direct federal investments in the Lower Yazoo Basin toward a broad range of Delta and Mississippi residents. This proposal describes new approaches for environmental restoration, as well as for strengthening the economy through expanding markets. The strategy combines components for public health and safety, community economic development and floodplain reforestation. Implementing this strategy for the Lower Yazoo Basin could be a critical step toward ensuring the protection of public health, and providing opportunities for cleaner, safer, and more economically viable communities. The major components of the proposal are outlined in Attachment G, and include flood protection of structures; sewer and water infrastructure improvements; environmental health and children's health initiatives; reforestation, conservation easement and landowner assistance programs; establishing a Delta Interpretative Center and community assistance and ecotourism development offices; as well as other components. This strategy highlights proposals for an alternative vision for floodplain management in this region.

Proposed Mitigation is Inadequate

A. Wetland Mitigation

The Corps states in the Draft EIS that the "combination of structural/nonstructural flood control eliminates the need for traditional measures of mitigation that have been used in previous projects," (Page 1-29); and "implementation of the recommended plan would not require compensatory mitigation," (Page SEIS-40). We disagree with these statements and contend that there should be a clear distinction between compensatory mitigation for wetlands impacts, as compared to a reforestation component as part of the structural flood control project. For this reason, we have included a separate discussion about the reforesation component in the next section.

The Corps includes a "minimum threshold" of 12,980 acres that would be required to achieve a no-net-loss of environmental resources on the recommended plan, (page SEIS-40). However, because the degree of impact has not been adequately determined in the DEIS this amount of compensatory mitigation is inaccurate. Determination of the actual acreage of impact is critical in order to assess appropriate levels of mitigation. The issue of extent of impact is discussed in the previous sections, and in subsequent attachments. It should be noted, however, that a minimum ratio of 2:1 (replacement acres:impacted acres) is typically used for restoration, and would be appropriate in this case, given the problems we have identified with the functional assessment procedure used by the Corps in this application.

There are additional significant concerns about other aspects of the mitigation proposal. These include issues related to location, acquisition and management of the mitigation lands; compensatory mitigation replacement ratios; monitoring for mitigation lands; and unfulfilled mitigation commitments from previous projects.

The *targeted* location of mitigation sites is identified as cropland below 87 feet (shown on an undocumented modeled hydrology map). However, the Corps has indicated that the District would "look elsewhere in the Mississippi Alluvial Valley," (page 1-48) should

acquisition of targeted sites not become possible. Considered within the context of the Clean Water Act Section 404 regulatory program, the issue of mitigation site identification is essential. The large-scale nature of the mitigation proposal in this project makes it less likely to be successfully implemented, and, therefore, the specific location of mitigation sites is critical.

There is another important concern regarding the targeted location (cleared lands below 87 feet) of the mitigation sites and the reforestation plan. As we indicated in the Wetlands Extent and Impacts Analysis section, pumping will lower the peak periods of inundation, and lower the depth of water on wetlands below 87 feet during flood events. Therefore the proposed pumping plant will result in hydrologic impacts to the Corps' targeted mitigation and reforestation lands. If the recommended plan impacts the wetland hydrology on the mitigation lands, then the restoration will likely not succeed. Mitigation cannot be successful unless all elements of restoration are addressed, including hydrology, vegetation, and monitoring.

The hydrological changes to the targeted mitigation lands also has significant implications for aquatic resources. So for example, although the value of fisheries habitat is enhanced by reforestation, the hydrologic alterations of the pumping plant (such as reducing the flood frequency on the current 2-year floodplain to instead a 10-year flood frequency) will result in impacting critically important floodplain habitat functions.

Additionally, because the Corps has incorporated the compensatory mitigation acreage into their reforestation component, their plans are to compensate impacts with conservation easements. The use of conservation easements is not an appropriate form of mitigation for wetland impacts in this case. Management of easements would be significantly more complex on private land versus fee title land in public ownership, and the management rights of these easements is not specified. Also, the Corps is not only allowing for silviculture on compensatory mitigation lands, but claiming the economic benefits for that activity as well. It is inappropriate to claim economic benefits for timber income on lands that are to be set aside for the purpose of compensating for wetland losses.

The Corps states that "mitigation monitoring will not be a part of the recommended plan," (page 1-50). However, this is contradicted in the Wetlands Appendix which documents the importance of long-term monitoring. In order to demonstrate compliance with Section 404 (b)(1) Guidelines, and CEQ guidance on mitigation in NEPA documents, the Corps must provide adequate documentation for success criteria and monitoring plans, and site restoration and management plans.

Additionally, EPA has concerns regarding the issue of mitigation owed for the Yazoo Backwater levee system. The Corps indicated that 3,617 acres is the balance owed for the Yazoo Backwater levee (page 91 and 1-25, Vol. 1). It is stated that the original amount of mitigation acreage for the Yazoo area levees had been 33,000 acres of woodland acquisition (page 12, Vol. 1), and later only 8,807 acres of agricultural land acquisition was accomplished (Lake George project, page 1-23, Vol. 1). These discrepancies in light of the now promised additional 3,617 acres are not explained. The DEIS documents this and other examples of significant shifts in mitigation plans that have occurred in the past. This fact, in combination with the extensive

amount of mitigation owed from Corps Vicksburg District projects (12,600 acres) further reduces our confidence that successful mitigation for any new projects will be fully achieved.

The Corps has stated that the reforestation component (which includes their compensatory mitigation) will be done concurrently with the construction of the project (p. 1-47, or the Mitigaton Appendix in Vol. 1). The DEIS also states that the Corps will have a cut-off date for acquiring easements, after which they will only commit to meeting the "minimum threshold" of 12,980 acres. Given our concerns regarding the Corps' mitigation backlog, we would recommend that a significant portion of the total mitigation/reforestation be completed before construction of the proposed pump would begin.

B. Reforestation Component

It is stated in the Draft EIS that the recommended plan will "commit to the purchase of conservation easements from willing sellers on 62,500 acres of agricultural lands below elevation 87.0 feet." This component has been described as a "compromise plan," because it includes a nonstructural element along with the traditional flood control structure. This point-of-view, however, discounts the multitude of large-scale flood control works that have been or are being constructed in the Yazoo Basin, which have resulted in the existing impaired condition of water quality, floodplain function and habitat loss.

The recommended plan's reforestation component may not be fully implemented, and those portions that are implemented may not succeed, and, therefore, overall has a great potential for failure. In actuality, there is only a final commitment of 17,078 acres, coined the "minimum threshold" or compensatory mitigation acreage (page SEIS-88), should not enough willing sellers come forward to sell the 62,500 acres of conservation easement. The reforestation component is dependent on the Corps acquiring easements from willing sellers on 100% of the stated acreage of available cropland below 87 feet. A 100% level of participation seems highly unlikely. Also, the derivation of this acreage figure, 62,500, is apparently based on the Corps' modeled hydrology. No documentation on this model has been provided; and major discrepancies in flooded acreage values from this model as compared with the satellite/gage method have been identified.

The lands below 87 feet that are targeted for this reforestation component will be also be hydrologically impacted by the proposed pumping plant (see Wetlands Extent and Impacts Analysis section above). Also, the management allowances on these reforestation acreages are open-ended, with little detail about their management rights provided.

It is also stated that "the Corps is committed to the fee title acquisition and reforestation of lands...should this minimum number of acres [17,078 acres] not be achieved." The basis of this "fall back" plan is illogical, because if there are not enough willing sellers of conservation easements, there will likely be even less number of willing sellers for fee-title acquisition. This assumption is based on years of working with community members and county officials who have expressed concerns about selling additional acreages for fee title ownership to the federal government. There has been a push toward use of conservation easements for compensatory

mitigation, rather than fee-title acquisition, for that reason. Because landowner assistance programs, such as the Wetlands Reserve Program, sell conservation easements to landowners, the acquisition of fee-title lands has become difficult for the Corps in this basin (personal communication with MS Valley Division representatives, Sept. 8, 2000).

Failure to Demonstrate Compliance with Clean Water Act Section 404

Civil Works projects must comply with all applicable laws and regulations, including Section 404 of the Clean Water Act. Based on the information provided in the DEIS, the proposed project does not comply with Section 404. Specifically, EPA is concerned with the inadequate analysis of alternatives, serious shortcomings in the proposed compensatory mitigation, and the potential for the project to cause or contribute to significant degradation to waters of the United States. Moreover, these concerns are heightened by weaknesses in the information and analysis of wetlands impacts provided in the DEIS.

The Section 404(b)(1) Guidelines (Guidelines) are the substantive criteria used to determine compliance with Section 404. Pursuant to the Guidelines, a permit cannot be issued if there is a less environmentally damaging practicable alternative. While the Corps is not responsible for issuing itself a permit in this case, it is critical that this central component of the Section 404 program be complied with in full. Accordingly, the Corps must perform a thorough analysis of less damaging alternatives. As discussed above, EPA has serious concerns with the alternatives analysis provided in the DEIS. We are particularly concerned with the inadequacies in the analysis of the preferred alternative (particularly the inaccuracies in the economic evaluation), as well as the failure to adequately assess a non-structural alternative similar to that discussed in the Shabman/Zepp report. Moreover, given the shortcomings in the DEIS' evaluation of potential wetlands impacts under the proposed pump project, it is extremely difficult to adequately compare the environmental consequences of different alternatives.

Once environmental impacts have been avoided and minimized to the maximum extent practicable, compensatory mitigation is required to offset any remaining impacts. On this subject, the DEIS is confusing. While on the one hand, the document indicates that "no compensatory mitigation is required with the recommended plan," the DEIS describes reforestation efforts which are intended to offset impacts to wetlands from the proposed project. For the purposes of compliance with Section 404, EPA can only assume that such reforestation efforts are intended to serve as compensatory mitigation. As discussed earlier, EPA has significant concerns with the mitigation proposal. These include: concerns with the amount of proposed mitigation; a failure to adequately identify mitigation lands; inadequate assurances that the proposed mitigation will be implemented in the Yazoo Basin; and concerns that the mitigation might not succeed. Here again, the underlying inadequacies with respect to information on potential wetlands impacts preclude the development of an effective and complete mitigation plan.

The Guidelines also require that no project can be permitted if it will cause or contribute to significant degradation of aquatic resources, after considering mitigation efforts. Given the aforementioned concerns with the magnitude of the potential impacts to wetlands, the associated

adverse impacts to water quality, and the shortcomings of the proposed mitigation plan, EPA believes that the proposed project will cause or contribute to significant degradation of waters of the United States.

Throughout our review of the DEIS, EPA has noted serious deficiencies with respect to the information and analysis used to describe and justify the proposed project. These shortcomings are particularly troubling in light of Section 404 policy which requires that such analysis be commensurate with the magnitude of the potential environmental impacts. Specifically, the Guidelines state that the level of documentation should reflect the significance and complexity of the discharge activity. Given that the proposed project could potentially result in adverse impacts to over 200,000 acres of wetlands, the level of information provided in the DEIS regarding key issues such as the extent of wetlands in the study area, less damaging alternatives, and compensatory mitigation clearly fail to meet the intent of this important aspect of Section 404 policy.

Other Issues

A. Authorization Issues

In the original authorization language for the Yazoo flood control projects (Flood Control Act of 1941), the lands below 90 feet were designated to serve as a sump area for floodwater storage. Specifically, it was stated that projects will "prevent the sump level from exceeding 90 feet, mean Gulf level, at average intervals of less than 5 years" and lands below the 90 foot elevation are to be "dedicated to sump storage." The question of whether the proposed Yazoo Backwater Pump exceeds the original authorization was raised by Earthjustice Legal Defense Fund in a letter to Secretary of Army Louis Caldera (copied to EPA John Hankinson, March 20, 2000). The Corps has not sufficiently addressed this issue in the Draft EIS. This is of significant importance, especially in light of a review of the hydrology and economics which shows that the originally proposed "sump area" would benefit from flood reduction the most from the proposed pumping plant, as compared to the higher elevation areas.

Based on the Corps' elevation storage curves (Plate 4-11), the lands at and below 90-91 feet will be dewatered the most rapidly, given the steepness of the curve up to this elevation. Therefore, in terms of the effectiveness of the pumping to reduce the flood stage, these lower, more frequently flooded lands will be dewatered the most effectively, as compared to lands above those elevations. Given that a large percent of the total wetland acres are also below 91 feet, the greater effectiveness of the pumping on these more frequently flooded lands is a significant environmental concern. Additionally, the large majority of the economic benefits that the Corps claims for this project are for the lands below 91 feet.

B. Consensus Committee

In several locations within the Draft EIS, statements are given regarding the Consensus Committee, sponsored by the Mississippi Levee Board and composed of project area residents, local and state elected officials, and state and federal agencies (including EPA). We would like

to clarify that while we participated in these meetings, we consistently stated our concerns with the process and decisions which were made by this Committee. In particular, EPA objected to the effort to select a project plan without the benefit of review of sufficient documentation on hydrology and environmental assessments.

C. Documentation Issues

The DEIS report is written in a manner which does not clearly present some very key elements related to hydrology, environmental assessments and economics. There are failures in demonstrating how calculations were done, in clearly showing how one analysis is used in subsequent analyses, and how assumptions were carried through to arrive at the results or interpretations. We have specified instances of this in our review. Also, discrepancies in information and errors noted are described in more detail throughout this review.

D. Noted Discrepancies

- Table 1-1 - acreages of public lands are grouped under the Adjusted acres column, which is supposed to exclude acreages of public lands.
- Jurisdictional Wetlands Plate 4-39, does not include the same coverage of farmed wetlands as shown on the farmed wetland plate (Plate 4-41)
- Acreages for flooded areas differ in total when comparing Table SEIS-17 and the Stage Area Data, Table 6-9. Why is there a discrepancy of about 30,000 acres for total flooded acres?
- Plate 4-34 and 4-38 - why does recommended plan show less developed land than does the base conditions plan?
- Page 79, Vol. 1, the Functional Capacity Units (FCUs) for wetlands for Plan 5, structural component is a negative 19,042, and for the nonstructural component a positive 51,520. The difference is 32,478, which does not agree with the listed NEQ benefit on Table 12 of 28,225. Why is there this discrepancy?
- The elevation-area curves (Plates 4-7 to 4-10) extend beyond the highest data point; this extrapolation should either stop at the uppermost data point, or be indicated with a dotted line.

E. Absences of Documentation

- No description of how the Jurisdictional Wetlands plate 4-39 was derived.

- Page 7-151 states that a new structures inventory was done, but the data (except some isolated examples) are not presented. It states that the new inventory shows 1,642 structures estimated to be damaged with the "existing hydraulic conditions." Does that mean the 100-year flood, or is that the number of structures in the entire project area?

- In discussion of costs - mention pg. 6-79 in 35 years another estimated $21,083,000 would have to be spent on engines and pumps for "major replacement costs." Why was the life of the project set at 50 years if this major replacement cost is at 35 years?

- Page 85, Vol. 1 states that the pumping plant would affect 23,200 acres of jurisdictional wetlands between 87 feet and 88.5 feet. The acreage of the land classes of forested and cropped for that 23,200 acres is not documented.

F. Unclear Information

- Page 1-2 - what is meant by the reference to a nonhydric wetland, table 1-1?

- There are apparent discrepancies in flooded acreages between 1-year base conditions map (Plate 4-26), as compared to the 2-year nominal floodplain image. Also, there is an apparent discrepancy in flooded acreages between the 2-year base conditions map (Plate 4-27), as compared to the 2-year nominal floodplain image.

- Opening paragraphs in the main report of the DEIS state annual acres flooded is 499,000 acres. This figure accounts for flooding that occurs on one spot of land multiple times over the year. It leads readers to believe that ~ 500,000 of the 630,000 acres in the 100 year floodplain are flooded each year.