APPENDIX M: AGENCY COORDINATION

Appendix M-2: U.S. Fish and Wildlife Coordination Act Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mississippi Ecological Services Field Office
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213
Phone: (601)965-4900 Fax: (601)965-4340

1 December 2020

IN REPLY REFER TO:
2021-CPA-001

Colonel Robert A. Hilliard, P.E.
U.S. Army Corps of Engineers, Vicksburg District
ATTN: CEMVK-PPMD
4155 Clay Street, Room 248
Vicksburg, Mississippi 39180

Dear Colonel Hilliard:

The U. S. Fish and Wildlife Service (Service) has prepared the following draft supplemental Fish and Wildlife Coordination Act (FWCA) Report for the Vicksburg District, U.S. Army Corps of Engineers, which addresses the proposed Yazoo Backwater Project's impact to fish and wildlife resources. The Service submits the draft report in compliance with the FWCA (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) which supplements our previous report, dated October 23, 2006. When finalized this report will represent the Secretary of Interior's report in accordance with Section 2(b) of that act. The draft report will also be coordinated with the Mississippi Department of Wildlife, Fisheries, and Parks, and any written comments they provide to the Service will be forwarded to your agency.

If your staff has any questions regarding our report, please have them contact David Felder at (601) 321-1131.

Sincerely,

Stephen Ricks
Stephen M. Ricks
Field Supervisor
Mississippi Field Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mississippi Ecological Services Field Office
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213
Phone: (601)965-4900 Fax: (601)965-4340

1 December 2020

IN REPLY REFER TO:
2021-CPA-001

Colonel Robert A. Hilliard, P.E.
U.S. Army Corps of Engineers, Vicksburg District
ATTN: CEMVK-PPMD
4155 Clay Street, Room 248
Vicksburg, Mississippi 39180

Dear Colonel Hilliard:

The U. S. Fish and Wildlife Service (Service) has prepared the following draft supplemental Fish and Wildlife Coordination Act (FWCA) Report for the Vicksburg District, U.S. Army Corps of Engineers (Corps), which addresses the proposed Yazoo Backwater Project's impact to fish and wildlife resources. The Service submits the draft report in compliance with the FWCA (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) which supplements our previous report, dated October 23, 2006. When finalized this report will represent the Secretary of Interior's report in accordance with Section 2(b) of that act. The draft report will also be coordinated with the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP), and any written comments they provide to the Service will be forwarded to your agency.

While the Service appreciates the recent coordination undertaken by the Corps, the Service believes the Corps has been procedurally remiss in complying with the spirit of the FWCA, the 2003 Transfer Funding Agreement, and Engineering Regulation 1105-2-100 that directs coordination to be undertaken at the onset of planning. Service involvement was initiated once the preliminary draft Supplemental #2 to the 1982 Yazoo Area Pump Project Final Environmental Impact Statement and accompanying appendices were almost fully completed, thus precluding the Service and the Corps from undertaking necessary coordination during the planning process to ensure adequate time for Service review of Corps-relied upon models and assumptions, as well as compliance with the FWCA. The abbreviated timeframe has restricted the Service's ability to undertake a more thorough analysis and fully develop recommendations to reduce damages to fish and wildlife resources.

The primary purpose of this Service report is to document our position and recommendations to achieve "equal consideration" of fish and wildlife resources with the authorized project purpose of flood damage reduction, as mandated by the FWCA. "Equal Consideration" under the FWCA

requires that wildlife conservation be given equal consideration to other features of water-resource development programs through planning, development, maintenance and coordination of wildlife conservation and rehabilitation. Wildlife and wildlife resources are defined by the FWCA to include: birds, fish, mammals and all other classes of wild animals and all types of aquatic and land vegetation upon which wildlife is dependent. Our position and recommendations have been developed on the basis of previous biological, hydrological, and spatial surveys and analysis of the study area, the Corps' Recommended Plan, and, including the no-action plan (Draft Supplement No. 2 to the 1982 Yazoo Area Pump Project, October 2020).

The Yazoo Backwater Project has a long history dating back to its authorization under the Flood Control Act of 1941. The current 2020 proposal includes both structural and nonstructural features. The structural feature consists of a 14,000 cubic-feet-per-second (cfs) pumping station with a year-round pumping elevation of 87.0 feet (ft.), National Geodetic Vertical Datum (NGVD), which is the one-year floodplain elevation. The nonstructural features include voluntary perpetual easements and establishment of forests/conservation features on up to 2,700 acres of open agricultural land primarily below 87.0 ft. (2,100 acres below 87.0 ft., 600 acres at or above 87.0 ft.). In addition, a new mitigation feature to the project, referred to as environmental flows, includes the installation of up to 34 low-flow groundwater wells adjacent to the Mississippi River levee and upstream of the Yazoo Study Area) to enhance water quantity and quality during stream low-flow periods. Finally, the Steele Bayou control structure would be closed during low-flow periods to maintain water elevations between 68.5 and 70.0 ft.

The Service continues to advocate for a plan that would balance natural floodplain values and sustained economic development for the Yazoo Study Area. The Corps' currently proposed plan, outlined in the DSEIS (October 2020) does not represent a balanced approach in the planning process.

The Service believes the currently formulated plan can meet the fish and wildlife resource planning goals and objectives provided our recommendations, especially if the six primary recommendations outlined below, are adopted.

1. Improve floodplain values by restoring the natural flood frequency to the one-year floodplain (i.e. 60,321 acres; Table 5.4 DSEIS). Specifically, modify the timing of the Steele Bayou control structure closure from the current elevation of 75.0 ft. to the one-year floodplain elevation (pump-on elevation) of 87.0 ft.
2. Keep the Steele Bayou control structure open during low-flow conditions.
3. Concurrent with construction of the pumping station, build enough groundwater wells to provide and maintain a minimum of 100 cfs of flow at the Sunflower river gauge for the environmental flows component of the project.
4. Conduct a full assessment of fish and wildlife impacts associated with the loss or alteration of all functional wetlands, including shorter hydroperiod wetlands. Specifically, the acreage of wetlands flooded less than 14 consecutive days and wetlands outside (i.e. above) the two-year floodplain should be included in the DSEIS and impacts compensated concurrent with construction.
5. Support the ongoing trend underway in the Yazoo Study Area of reforestation of marginal agricultural lands below 90.0 ft. NGVD.

6. Offer perpetual conservation easements for all unprotected forested wetlands that will exhibit a shift in flood duration (i.e., decrease).

We believe these six recommendations will significantly conserve important fish and wildlife resources without affecting the mandate to alleviate flooding in the Yazoo Study Area. Our recommendations are presented in greater detail under the **Recommendations** section, below.

Yazoo Backwater Project DSEIS Updates - 2020

The currently proposed project has a number of changes from that proposed in the 2007 Yazoo Study Area Reformulation Report and FEIS. One change includes the relocation of the proposed pumping station from the Steele Bayou sump area to the Big Sunflower sump area; however, pumping rates and elevations remain the same. Also, the Corps is now proposing to reforest up to 2,700 acres of cleared land from willing landowners at or near 87.0 ft. NGVD (as opposed to 55,600 acres in the 2007 report). Also, the current project no longer proposes to raise the level at which the Steele Bayou control structure would close during low-water periods. The 2007 plan proposed a gate closure between 70.0 and 73.0 ft. to improve wildlife and fisheries habitat during low-flow conditions; however, the current plan proposes to continue the current operations which closes the control structure between 68.5 and 70.0 ft. Finally, the current project proposes a new environmental feature, referred to as environmental flows. This feature includes the installation of up to 34 groundwater wells within strategic locations throughout the Mississippi Delta to enhance water quality and quantity during stream low-flow periods. This feature is designed to improve low-flow conditions for up to 9,321 acres of stream channels within the Mississippi Delta region. Current low-flow conditions, driven primarily by increased surface and groundwater withdrawal for agricultural irrigation are negatively impacting fish and wildlife resources, notably fish and mussel populations (Bryant, 2010).

The Yazoo Study Area is 926,000 acres. However, wetland assessments were only conducted on areas within the two-year floodplain exhibiting a minimum flood duration of 5% of the growing season (corresponding to a 14-day flood hydroperiod) (Appendix F-5, page 2). Consequently, the Corps has limited their assessment of potential wetland impacts to only 97,677 acres (Appendix F, page 32) of the total 926,000 acre Yazoo Study Area. The acreage of functional wetlands (i.e. naturally flooded bottomland hardwoods) within the Yazoo Study Area, but outside the two-year floodplain are not included or evaluated in the DSEIS.

According to the DSEIS, 74,211 acres of forested wetlands are within the two-year floodplain and ≥5 % flood duration within the Yazoo Study Area. 32,215 of these acres will see a shift in flood duration, with 20,131 (14,901 + 5,230) acres shifting below the 5% flood duration (i.e. would fail to meet the Corps own wetland hydrology criteria). The Corps proposes to mitigate lost wetland functions by acquiring and subsequent reforestation of 2,405 acres of frequently flooded agricultural lands.

The DSEIS also limits its analysis of potential impacts to fish spawning and rearing habitats to only those acres within the two-year flood floodplain, thereby excluding from analysis significant portions of the Yazoo Study Area that currently provide important riverine floodplain habitat to fish and other aquatic species. For the small portion of the Yazoo Study Area that was

considered, the Corps determined that 3,232 habitat units were required to fully offset impacts to fish spawning and rearing habitats. Accordingly, reforesting 2,405 acres of agricultural lands would generate 1,708 habitat units, and improving environmental flows via groundwater wells to 9,321 acres of streams would generate 1,678 habitat units. Included in these calculations was a newly created relative value index weighting factor that decreased required mitigation reforestation requirements by 40% due to perceived flood induced hypoxia in the Yazoo Study Area and its potential adverse effect on existing spawning and rearing habitats.

The updated DSEIS also highlights the difference between headwater and backwater flooding that is occurring in the Yazoo Study Area (Appendix G, page 144). According to the report, headwater flooding results from precipitation events within the Yazoo Study Area and will not be affected by the pump station (Appendix G, page 30). An analysis of headwater verses backwater flooding events for the Period of Record (POR) of 1978-2019 shows that from 58 to 75% of flood peaks at river gauges were the result of headwater peaks, therefore suggesting that some wetlands will continue to receive flood pulses due to headwater flooding events.

Finally, the updated DSEIS calculated how often the pump would have turned on during the POR had it been in operation. The Corps determined that the pump station would have been pumping for 812 days over the 41-year period (5.4% of time), with the majority of pumping during the months of March-June (663 days) (Appendix G, page 136).

Existing Fish and Wildlife Resources

Fish and wildlife resources within the Yazoo Study Area (including Federal lands legally dedicated to conservation) include Fish and Wildlife Service National Wildlife Refuges (NWR) (i.e. Holt Collier, Panther Swamp, Theodore Roosevelt and Yazoo National Wildlife Refuges), Department of Agriculture National Forests (Delta National Forest), migratory birds, interjurisdictional fishes, endangered and threatened species, and the backwater floodplain habitats on which they depend. See our 2006 FWCA report (https://www.fws.gov/GISdownloads/R4/Louisiana%20ESO/Walther/Yazoo%20FWCA/) for a detailed description of these resources. That report and its description of natural resources is incorporated into this report by reference, and all concerns and recommendations identified in that report remain valid.

Provided below is newer information about existing fish and wildlife resources in the project area that were not previously considered.

Several species of bats can be found within the Yazoo Study Area, including the Northern long-eared (*Myotis septentrionalis*), tri-color (*Perimyotis subflavus*), Brazilian free-tailed (*Tadarida brasiliensis*), Rafinesque's big-eared (*Corynorhinus rafinesquii*), Big Brown (*Eptesicus fuscus*), Hoary (*Aeorestes cinereus*), Northern yellow (*Dasypterus intermedius*), Eastern red (*Lasiurus borealis*), Seminole (*Lasiurus seminolus*), Southeastern myotis (*Myotis austroriparius*), Little brown (*Myotis lucifugus*), and Evening bat (*Nycticeius humeralis*) (Mississippi Bat conservation Strategy, 2020). The Mississippi Bat Conservation Strategy outlines a number of priority management actions for bats in Mississippi, including emphasis on 1) prioritizing management of riparian, wetland, and open area foraging sites and improving availability and quality of

wetland and riparian foraging areas; and 2) prioritizing conservation of mature bald cypress/tupelo stands, which are disappearing from the landscape in Mississippi. The expansion of White-nosed Syndrome and habitat loss cause these species to be of conservation concern.

The newly proposed environmental flows feature expands the original project footprint to include 9,230 acres of streams in the Big Sunflower and Steele Bayou watersheds, including streams above the defined Yazoo Study Area. These streams support a diverse ichthyofauna characteristic of Mississippi Delta fish assemblages, including important game and commercial fish species such as white crappie, bluegill, largemouth bass, channel catfish, blue catfish, flathead catfish, smallmouth buffalo, common carp, freshwater drum, and several gar species. Field collections for the Fishery Appendix (F-8) documented 56 species of fish in the Yazoo Study Area. These streams also support a diverse population of state and federally listed mussels. The federally endangered sheepnose and threatened rabbitfoot mussels can be found in the Big Sunflower River between Indianola and Ruleville in Sunflower County, Mississippi, with portions designated as critical habitat for the sheepnose. Failure to implement aquatic restoration could result in the continued decline of these species.

Since our 2006 FWCA report, the Louisiana black bear was delisted. There are currently three breeding sub-populations of black bears in Mississippi, including one within the Yazoo Study Area. The average home range for an adult male bear is roughly 20,000 acres while the average home range for an adult female is roughly 5,000 acres. Since 2005, the MDWFP has documented the births of over 30 cubs in the state. Additionally, general sightings of bears have increased dramatically all over the state, likely due to dispersing bears from populations in neighboring states (MDWFP website, 2020). MDWFP biologists currently estimate the Mississippi bear population to be about 150 bears, a major improvement over the estimated 40 individuals in 2002. Bottomland hardwood forests with a high tree species diversity and age class appear to be the preferred habitat type of Louisiana black bears throughout their current range (Gosselink and Lee, 1987, USFWS, 2009). Large cavity trees, typically bald cypress (*Taxodium distichum*) and tupelo gum (*Nyssa aquatica),* commonly found along water courses, swamps, and bottomland hardwood forests, are the most selected for tree dens (Neal, 1992 Weaver et al., 1994). Continued restoration of bottomland hardwoods would help ensure the continued conservation of this species.

Currently, Mississippi ranks third in the nation for total acres enrolled into the Natural Resource Conservation Service's (NRCS) Wetland Reserve Program (WRP), a voluntary program that offers landowners the opportunity to protect, restore, and enhance wetlands on their property. Approximately 150,000 acres across the state have been enrolled, with the majority located within the Lower Mississippi River Valley portion of the state. Pending 2019 applications for WRP in the Lower Mississippi River Valley would indicate the popularity and demand for this program. In Mississippi alone, there were 309 applications representing 60,172 acres. However, only 18 applicants received funding, representing 3,801 acres enrolled into the WRP program for 2019 (NRCS, personal communication, May 14, 2020).

The fact that over 40,000 acres of agricultural land within or near the one-year floodplain (87.0 ft.) of the Yazoo Study Area have been converted to forests since the Corps' 2007 report is clear evidence of the gradual and long-term movement away from agriculture to forest-based land uses

within the poorly drained, frequently flooded portions of the Yazoo Study Area.

At-Risk Species

The Service's Southeast Region has defined "at-risk species" as those that are:

1) proposed for listing under the Endangered Species Act (ESA) by the Service;
2) candidates for listing under the ESA, which means the species has a "warranted but precluded 12-month finding"; or
3) petitioned for listing under the ESA, which means a citizen or group has requested that the Service add them to the list of protected species.

As the Service develops proactive conservation strategies with partners for at-risk species, the states' Species of Greatest Conservation Need (defined as species with low or declining populations) will also be considered and included in our conservation recommendations under the FWCA.

The Service's goal is to work with private and public entities on proactive conservation to conserve these species, thereby precluding the need to federally list as many at-risk species as possible. While not all species identified as at-risk will become ESA listed species, their potentially reduced populations warrant their identification and attention in project and mitigation planning.

Discussed below are species currently designated as "at-risk" that may occur within the project area.

Alligator Snapping Turtle

The alligator snapping turtle may be found in large rivers, canals, lakes, oxbows, and swamps adjacent to large rivers. It is most common in freshwater lakes and bayous, but also found in coastal marshes and sometimes in brackish waters near river mouths. Typical habitat is mud bottomed waterbodies having some aquatic vegetation. The alligator snapping turtle is slow growing and long lived. Sexual maturity is reached at 11 to 13 year of age. Because of this and its low fecundity, loss of breeding females is thought to be the primary threat to the species.

Golden-Winged Warbler

The golden-winged warbler breeds in higher elevations of the Appalachian Mountains and northeastern and north-central U.S. with a disjunct population occurring from southeastern Ontario and adjacent Quebec northwest to Minnesota and Manitoba. Wintering populations occur in Central and South America. The loss of wintering habitat in Central and South America and migratory habitat may also contribute to its decline. The golden-winged warbler is also known to hybridize with the blue-winged warbler.

This species may be found in forested habitats throughout the Yazoo Study Area during spring and fall migrations. This imperiled songbird depends on forested habitats to provide food and

water resources before and after trans-Gulf and circum-Gulf migration. Population declines correlate with both loss of habitat owing to succession and reforestation and with expansion of the blue- winged warbler into the breeding range of the golden-winged warbler. Nonstructural features such as reforestation efforts and mitigation would provide the opportunity to actively address this species habitat needs in the Yazoo Study Area.

Monarch Butterfly

On June 20, 2014, President Obama signed a Presidential Memorandum, "Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators," outlining an expedited agenda to address the devastating declines in honey bees and native pollinators, including the monarch butterfly. Recent research has shown dramatic declines in monarchs and their habitats leading conservation groups to petition the Service to list the species under ESA. Ensuring adequate and sustainable habitats, meeting all the life history needs of these species is of paramount importance. The Service and its partners are taking immediate actions to replace and restore monarch and pollinator habitat on both public and private lands across the U.S. landscape. Therefore, we recommend revegetation of disturbed grassland areas (e.g., levees) with native plant species, including species of nectar-producing plants and milkweed endemic to the area.

Mussels

Several state-listed and at-risk mussels can be found within the Yazoo Study Area, including the Western fanshell (*Cyprogenia aberti*), pyramid pigtoe (*Pleurobema rubrum*), and spike (*Eurynia dilatata*) (Mississippi Natural Heritage Program, 2018). These species can be found in the Big Sunflower River, including areas outside the Yazoo Study Area that may be affected by the environmental flows mitigation feature. Mussel populations in general continue to decline in the Mississippi Delta due to poor water quality, elevated water temperature, and low-flow conditions, which also adversely affects host fish that mussels rely on for reproductive success.

Yazoo Backwater Project Fish and Wildlife Resource Planning Goals and Objectives

The Service's planning goal for the Yazoo backwater project continues to be the implementation of a Federal resource development project that will support ecologically and economically sustainable development. The project should continue the ongoing realignment of land use with land capability; and, in terms of policy, purpose, and result, reflect "new direction" in the Mississippi Rivers and Tributaries (MR&T) approach to floodplain management, wetland conservation, and air and water quality improvements. This direction would be in keeping with the principles of Section 1149 of the Water Resources Development Act (WRDA) of 2018 directing nature-based alternatives (i.e., Engineering with Nature) to be considered.

To achieve this planning goal, the Service in 2006 formulated three planning objectives and several corresponding evaluation criteria upon which our evaluation and assessment of the Corps' Recommended Plan were based; those criteria and evaluation criteria remain valid and are presented below.

Objective 1: Continue the ongoing realignment of land use and land capability to address the imbalance between agricultural development and wetland conservation in the Yazoo Study Area

Evaluation Criterion 1A: Existing wetlands are protected
Evaluation Criterion 1B: Further intensification of agriculture in wetlands is avoided
Evaluation Criterion 1C: A transition from agriculture to forest within the two-year floodplain

Objective 2: Achieve "new directions" in floodplain management for the MR&T project

Evaluation Criterion 2A: A specific nonstructural flood damage reduction zone is dedicated
Evaluation Criterion 2B: Impacts of a project design flood on environmental and economic sustainability are reduced

Objective 3: Restore natural floodplain values and functions

Evaluation Criterion 3A: Backwater floodplain hydrology is restored
Evaluation Criterion 3B: Flood-compatible land uses are protected and restored
Evaluation Criterion 3C: The carbon storage and nutrient assimilation functions of the floodplain ecosystem are increased over that level expected to occur without the project

Service Recommendations

In order to achieve these objectives and criteria, the Service recommends the following:

1. Restore existing one-year floodplain

According to the DSEIS (page 44), any time the stage on the landside of the Steele Bayou Control Structure is higher than the riverside and above 70.0 ft, NGVD, the floodgates are open. With a rising river, the interior ponding areas are normally allowed to rise to an elevation of 75.0 ft. The floodgates are then closed when the river elevation is higher than the interior ponding levels. For the POR of 1978-2019, the Steele Bayou control structure floodgates were closed for 3,485 days (23% of time), with most closures occurring during the months of March-June (2,203 days).

Floodplains are an integral part of large-river ecosystems, where high flows that provide connectivity between the floodplain and the main-stem river (Welcomme 1979) drive ecosystem productivity (Junk et al., 1989). Floodplains with open or partial river connections provide breeding habitats for fish, increase sediment deposition and nutrient processing in floodplain lakes and wetlands, and reduce downstream flood potential via attenuation (Opperman et al., 2010); with the annual flood pulse being the most biologically productive feature of a river's ecosystem (Thorp, J.H and Lelong, M.D. 1994). This backwater flood pulse is the primary factor defining the ecological attributes of the Yazoo Study Area. It not only fuels the processes essential to fish and wildlife productivity within the Yazoo Study Area, it provides the biochemical link to the larger Lower Mississippi Valley ecosystem. Consequently, the current operations of the Steele Bayou control structure may be disrupting the natural seasonality of annual river flood pulses, restricting nutrient and dissolved oxygen exchanges, and impeding the

reproductive efforts of plants and wildlife that are adapted to floodplains.

In addition, the current operations may be impacting fish communities by altering water quality and restricting fish passage. Floodgates are associated with hypoxia dead zones due to eutrophication in the stagnant upstream habitats (Gordon et al., 2015), which has been well documented in the Yazoo Study Area (Appendix F-8). The closed floodgates are also restricting fish passage, thereby adversely impacting important fisheries resources in the project area. During the course of a lifespan, fish may travel considerable distances between distinct habitats for feeding and growth (feeding migration), refuge from harsh environmental conditions (refuge migration) and/or for spawning purposes (reproductive migration). Such movements may occur regularly within an individual's lifetime, may involve a large proportion of the population of a species and may occur at different life stages (Lucas and Baras, 2001). Anthropogenic barriers that block or obstruct migration routes, may strongly affect populations and even the persistence of a species (Radinger and Wolter, 2014). Therefore, modifying the current operations of the Steele Bayou control structure to allow for greater connectivity could reduce negative impacts on fish while maintaining flood protection capacity.

Installation of the pumping station creates a new opportunity to not only maintain floodplain connectivity that currently exists (up to 75.0 ft. when control structure is open), but to increase connectivity to 60,321 acres of primarily forested wetlands in the one-year floodplain by keeping the control structure open until Steele Bayou landside is at or near 87.0 ft. NGVD.

At the time of the Corps' 2007 report, 42,800 acres of cleared land (i.e. agriculture) were below 87.0 ft. NGVD. Since the 2007 report was released, significant reforestation of cleared agriculture land below 87.0 ft. has occurred, with a reported 2,700 acres of cleared lands at or near this elevation currently remaining. Since the Corps has proposed to reforest these cleared acres from willing landowners, and the new pumping station is offering no flood protection benefits to lands below 87.0 ft., we see no negative flood control consequences with allowing a natural flood pulse to exist up to the 87.0 ft. elevation. Our 2006 FWCA Report (page16) indicated that the Corps had analyzed the hydrologic effects of this change in operation, and concluded that such a change would have no significant adverse impacts upon flood control above 91.0 ft.

Therefore, the Service proposes changing the operation of the Steele Bayou Control Structure in order to reestablish the natural flood pulse between the Yazoo Study Area and the Mississippi/Yazoo Rivers up to 87.0 ft. NGVD (i.e. one-year floodplain). This would provide wildlife and fisheries benefits to an estimated 60,321 acres of mostly forested floodplain habitat.

2. Keep Steele Bayou Control Structure Open during Low-Flow Conditions

Another feature of the current plan that is designed to provide wildlife and fisheries benefits is the closing of the Steele Bayou control structure during Steele Bayou and Big Sunflower River low-flow periods. Currently, the control structure closes between 68.5 and 70.0 ft. NGVD. The Corps' 2007 report proposed to modify closure to between 70.0 and 73.0 ft. so that 1,200 additional in-channel acres would be available during low-flow conditions. The Corps' 2007 Report went on to conclude that the extent of minimum ponding at elevation 73.0 ft. would

extend 30 miles up Steele Bayou and 63 miles up the Big Sunflower (2007 FEIS, Appendices 11 and 12). The current DSEIS does not explain why this feature is no longer being considered.

Although closing of the Steele Bayou control structure during low-flow conditions can have wildlife benefits, notably to waterfowl, closure can also create adverse impacts to important fishery resources in the Yazoo Study Area. As stated in the DSEIS, "Unobstructed backwaters also provide horizontal and lateral avenues of escape from hypoxic waters. Once Steele Bayou water control structure is closed, the only avenue of escape is to move upstream or laterally into shallower water or smaller tributaries" and "the spatial extent of hypoxia in the backwater area and the limited avenues of escape in regulated floodplains become a death trap for unwary fish" (Jones and Stuart, 2008). Just as control structure closure too soon can act as a barrier for upstream backwater fish passage, closure during low-flow conditions may also act as a barrier for downstream backwater fish fleeing low-flow and hypoxic conditions.

Another consideration regarding low-flow conditions is the new addition of the "environmental flows" mitigation feature. This feature is being designed to improve existing low-flow river conditions by restoring perennial flows in the Big Sunflower-Steele Bayou drainage upstream of the Yazoo Study Area. Up to 34 groundwater wells will pump up to 170 cfs of water collectively into Mississippi Delta streams to supplement annual low-flow conditions. Therefore, if these additional environmental flows work as designed, then stream water levels should rarely fall to such low-flow conditions where the closure of the Steele Bayou control structure is required.

Leaving the control structure open during low-flow conditions may reduce winter foraging habitat for waterfowl and other wildlife using shallow water impoundment areas; however, we anticipate a net increase in fisheries resources due to improved water quality and fish passage, and increased shorebird use due to increased mudflat habitats during low-water periods.

Therefore, we no longer see the value of closing the Steele Bayou control structure during low-flow periods for fish and wildlife resource purposes since closure could result in trapping fish in backwater ponded areas with extended periods of stagnation and stratification. We anticipate the benefits of restoring the natural flood pulse to lands below 87.0 ft. will greatly outweigh the benefits of closing the structure during low-water conditions for wintering waterfowl.

3. Provide Minimum Environmental Flows Concurrent with Pump Startup

The new environmental flows mitigation feature includes the construction and operation of up to 34 groundwater wells adjacent to the Mississippi river mainline levee. During periods of low flow, each well would provide up to 5 cfs (maximum of 170 cfs for all 34 wells) into streams upstream of the Yazoo Study Area. Environmental flows are expected to benefit a total of 9,321 acres of streams within the Mississippi Delta.

Prior to the 1980's, low-flow discharge of the Big Sunflower River at Sunflower, Mississippi was approximately 100 cfs. Since the 1990's into the 2000's, low-flow fall discharge has fallen to less than 10 cfs, and lower reaches of the Big Sunflower River usually cease flowing under these conditions (Appendix F-8, page 17). These low-flow conditions have resulted in multiple impairments to mussel and fish communities. "Low dissolved oxygen along with other major

impairments to aquatic habitat in the Big Sunflower-Steele Bayou drainage has resulted in a fish community dominated by habitat and water quality tolerant species" (Appendix F-8, page 9).

Therefore, the objectives of this new feature are to provide sufficient water flow to keep existing mussel beds inundated, improve fisheries, and increase the cumulative total flow of multiple stream systems within the Big Sunflower-Steele Bayou watershed. The environmental flows are also being designed to ensure fish passage flows over existing weirs (i.e. Old Lock and Dam on the Sunflower River) for spawning movements and recolonizations; as well as to help alleviate the low dissolved oxygen conditions currently occurring during the fall low-flow period. This feature also complies with section 7(a)(1) requirements of the ESA to conserve endangered mussels and designated critical habitat located above the Yazoo Study Area.

As indicated in your DSEIS and noted above, stream and groundwater levels throughout the Mississippi Delta have shown declines over several decades due to increases in irrigation to support agricultural production; creating conditions with detrimental effects to fish, mussels, and other riverine species. Extensive pumping from the Mississippi Delta Alluvial Aquifer with an apparent overdraft of about 100,000 ac-ft. per year has caused the groundwater table to fall below the elevation of the Sunflower River thalweg in its upper reaches. This has resulted in the loss of base flow that threatens natural resources in the channel confines (USDA MS Delta Comprehensive, multipurpose Water Resource Plan, 1998). It is our understanding that the mitigation groundwater wells will be close to the Mississippi River where groundwater levels remain high. Therefore, this feature will not contribute to the groundwater deficit in the Sunflower River/Steele Bayou drainage, but rather will contribute to its recharge.

Assuming the environmental flows mitigation feature is successful, and additional demands for surface water withdrawal do not increase, then we anticipate this feature will have beneficial effects to aquatic resources within the Yazoo Study Area. However, we recommend that in order to ensure benefits, the Corps commit to monitoring and maintaining a minimum level of stream flow within the Big Sunflower River channel during late summer and fall low-flow stream conditions. From 1937 through 1975, the annual minimum flow at Sunflower, Mississippi, fell below 100 cfs only six times. Therefore, the Service recommends that a 100 cfs minimum flow should be maintained in the Big Sunflower River at Sunflower, Mississippi, and that the wells needed to maintain this flow should be installed and operational before or concurrent with pumping station completion. We also recommend that the Corps work with the State of Mississippi to ensure that irrigation water is not withdrawn from the Big Sunflower River when the river at Sunflower, Mississippi, falls below 100 cfs.

4. Compensate for all wetland impacts, including impacts to shorter hydroperiod wetlands and wetlands outside the two-year floodplain.

As in previous FWCA reports, the Service continues to have concerns with the Corps' use of inaccurate assumptions to determine the extent of wetlands within the Yazoo Study Area potentially impacted by pump operations.

The Yazoo Study Area is 926,000 acres. However, wetland assessments were only conducted on areas within the two-year floodplain exhibiting a minimum flood duration of 5% of the growing

season (corresponding to a 14-day or greater flood hydroperiod) (Appendix F-5, page 2). Therefore, the Corps has limited their assessment of potential wetland impacts to only 97,677 acres (Appendix F, page 32) of the total 926,000 acre Yazoo Study Area.

The Service disagrees with this assessment, and consequently, believes functional wetland impacts are being significantly underestimated. The National Environmental Policy Act requires the evaluation of all impacts to the environment, not just on wetlands in which flooding "substantially" contributes to wetland hydrology (i.e. >14 day flood duration). The failure to consider shorter hydroperiod wetlands that flood less than 14 days and/or wetlands in the Yazoo Study Area that are outside the two-year floodplain (i.e. 2-5 year floodplain) means an estimated 24,000 acres of functional wetlands are not being accurately considered (EPA 404(c) final determination, 2008).

The Service also believes the current DSEIS fails to recognize the importance of riverine flooding to functioning wetland habitats, instead focusing on precipitation as the primary driver for wetland hydrology, with flooding providing "supplemental water sources in some areas during some years". The DSEIS relies on the findings of a recent publication (Berkowitz et al., 2019) to conclude that flooding influences wetland hydrology in the Yazoo Study Area to a lesser extent than previously thought, and therefore focuses the "current analysis on those wetlands in which flooding substantially contributes to or sustains wetland hydrology".

Hydrology from river or backwater flooding plays an important role in wetland functions and is not simply replaced by existing precipitation sources of hydrology. Flood water can affect the physiochemistry of wetlands in various way, including introducing and removing sediment, salt, nutrients or other materials from wetlands, thereby influencing its soils and water chemistry (Cherry, 2011). Also, the varying array of hydrology sources and amounts each contribute, from precipitation driven only wetlands to wetlands with >35 day of flood inundation, are in part what provide for the rich diversity of habitats and biodiversity present in the Yazoo Study Area.

Therefore, the Service recommends that the DSEIS more accurately address how shifts in flood duration will impact the functions and values of different wetland types. Palustrine, open water wetlands do not have the same wildlife values as precipitation driven, saturated soil wetlands, therefore, changes in wetland type may have a detrimental effect on some classes of animals that the Service has jurisdiction to protect. We recommend these effects on fish and wildlife resources be included in the DSEIS and compensated for accordingly.

The DSEIS does however assess wetland impacts within the two-year floodplain (97,677 acres), and concludes that there would only be a 2.2% decrease in wetland functions as a result of the pumping project (Appendix F-5, page 33). Using HGM models incorporating 19 wetland function variables, the Corps determined that many of the wetland function variables will remain unchanged after the pumps are in place, even though the same report shows that 43% of forested wetlands (32,215 acres) within the two-year floodplain will exhibit a shift in flood duration.

The Service disagrees that there will only be a 2.2% decrease in wetland functions as a result of the pumping project. Specifically, we have concerns on how the functional values of wetlands

were determined, thereby underestimating the amount of wetland acreage required to offset these impacts. The Corps determined that 32,215 acres of forested wetlands will have some form of hydrological alteration due to the project, and that replanting 2,312 acres of cleared agricultural land would fully offset these losses. As noted in previous FWCA reports and planning aid letters, we continue to disagree with the how the wetland methodologies were applied to result in such low mitigation offsets. In addition, the Service believes that not mitigating impacts to all naturally flooded hardwood bottomlands does not comply with the FWCA and Section 2036a of the Water Resources Development Act (WRDA) of 2007, both of which identify the need to mitigate terrestrial impacts. Section 906(b) of the WRDA of 1986, specifically requires the mitigation of bottomland hardwoods; it does not distinguish between jurisdictional or non-jurisdictional bottomland hardwoods because it was written to ensure that the loss of bottomland hardwoods, including their functions and values, were mitigated.

5. Reforestation of the two-year floodplain.

We recommend that the Corps support the ongoing trend underway in the Yazoo Study Area of reforestation of marginal agricultural lands below 91.0 ft. NGVD. The NRCS currently has more applicants/acreage signed up for WRP enrollment than funding provided by Congress. Therefore, the Corps should expand the currently proposed nonstructural reforestation feature to include all agricultural land below 90.0 ft. exhibiting a ≥5.0% flood duration, which the DSEIS estimates at less than 8,770 acres (Appendix F-5, page 32). This recommendation would also support President Trump's One Trillion Trees Initiative (EO 13955), which in part was created to develop, coordinate and promote Federal Government interactions with respect to tree growing, restoration, and conservation.

6. Perpetual Easements on Existing Forested Wetlands

The Service is also concerned about existing forested wetlands within the Yazoo Study Area that may lose protections under the Clean Water Act (CWA) as a result of the pumping project. Specifically, we are concerned about unprotected forested wetlands that could be cleared for agriculture and other purposes should they become non-jurisdictional wetlands under the CWA. Such lands currently provide critically important fish and wildlife resource values as previously discussed.

The DSEIS reports that 43% of the forested wetlands (i.e. 32,215 acres) within the two-year floodplain will exhibit a shift in flood duration due to the pumping project, with 29% (21,592 acres) falling below the 5% hydrologic threshold which the Corps considers essential for establishing hydric soils and hydric vegetation. Since these acres will fall below the Corps' own threshold for what constitutes a wetland, we anticipate that many of these 21,592 acres of existing forested wetlands could lose CWA protections as a result of the pumping project. It's unclear how many of these acres are in federal or state ownership, or are permanently protected by existing federal programs (i.e. WRP). For the remaining acreage not protected by such programs, we recommend that the Corps offer perpetual easements from willing sellers for all forested wetlands that will exhibit a shift in flood duration as an indirect result of the pumps project. We would also encourage and strongly support sustainable forestry practices on such lands that maintain economic activity while creating, improving, and maintaining the array of

vegetation types, successional stages, and structural attributes desired for forest-dependent fish and wildlife resources.

The Service also recommends that any lands acquired as nonstructural features or mitigation be prioritized for purchase using the Southeast Conservation Blueprint (http://secassoutheast.org/blueprint). This blueprint is a living, spatial plan that identifies the most important areas for conservation and restoration across the southeast region. In addition, the Service's Lower Mississippi Valley Joint Venture Office (LMVJV), with other federal and state agencies and the private sector through the Partners in Flight initiative (PIF) have developed management objectives to conserve forest breeding birds and their habitat in the Mississippi Alluvial Valley. Among the top priorities of this effort are building and maintaining forest blocks that provide habitat for self-sustaining populations of forest breeding birds (Twedt et al., 2006, LMVJV, 2020). Spatially explicit priorities for both projection (Elliott et al., 2019) and restoration (Twedt & Mini, 2020 *in press*: https://www.lmvjv.org/conservation-tools-summary) provide guidance regarding forest conservation actions. Therefore, the Service recommends that these prioritization tools be utilized in the consideration of the location of nonstructural features and mitigation areas and in prioritizing the avoidance of impacts. Finally, priority should also be given to purchase of lands from willing sellers within NWR acquisition boundaries or conducting joint management mitigation projects such as on the Twist mitigation area on Panther Swamp NWR.

Additional Service recommendations:

7. Appendix F-3 (Recreation). Theodore Roosevelt NWR (including the Brown Tracts) is located within the Yazoo Study Area and should be included in the effects analysis. Although Hillside NWR and the eastern side of Panther Swamp NWR are outside the Yazoo Study Area, these refuges could be impacted by greater Yazoo River backwater flooding events due to pumping station operations. We recommend these potential impacts be assessed in the FEIS and mitigated accordingly. Impact analysis should include whether the project will alter the refuges' abilities to fulfill their establishing purposes and meet their management goals and objectives. Finally, impacts to public lands should be mitigated on the impacted public lands.

8. Appendix F-8 (Aquatics). Acreage analysis used for aquatic impacts (i.e. EnviroFish) should include all lands within the five-year flood frequency, not just the two-year flood frequency. Using acreage from within the two-year floodplain underestimates the amount of existing spawning and rearing habitat being used within the Yazoo Study Area. We also recommend greater clarification regarding the use of a relative value index weighting factor to lower mitigation requirements due to reported hypoxic conditions in the Yazoo Study Area. Based on that information the Service may further recommend changes to that value for use in the analysis.

9. If the environmental flows mitigation feature fails to restore perennial flow or improve survival rates of juveniles and adults during autumn, then the acreage needed to offset lost aquatic functions via reforestation should be reassessed and mitigated accordingly.

10. Update or fund new water resource plans for the Mississippi Delta to address ways to recharge the aquafer and increase water table levels in the study area. Updating or providing a water use plan that includes agricultural use may help reduce further dewatering or reverse this trend and address the source of the problem.

11. Appendix F-7 (Waterfowl). Because predicting duck use days (DUDs) values of specific sites requires modelling that is underpinned by perfect knowledge of the identity of these sites (which is not possible at this stage in the process), it is recommended that mitigation targets roughly mirror the distribution of waterfowl habitat loss depicted in Table 7 (-1,888ac [90%]forest, -217ac [10%] non-forest). This approach has the advantages of (1) more closely replacing what is lost, and (2) ensuring that DUDs lost due to the Action Alternative are supported through mitigation actions in the face of dynamic hydrological conditions.

12. Appendix H (Migratory Bird Treaty Act), Figure 4. Figure caption references Elliott et al., (2020) regarding reforestation priorities. The Elliott et al., (2020) publication addresses protection priorities for existing forest (with a minimal amount of reforestable land immediately adjacent to existing forest). Hence, this citation is not used properly in the Appendix. Further, the figure depicts the Appendix authors' Focused Mitigation and Easement Lands site priorities (in black outline) with notation (in color code) of river gauge data, but no indication of priority level from Elliott et al. (2020). As a result, nothing in the figure relates to Elliott et al., (2020) or any other LMVJV priorities.

13. Appendix H (Migratory Bird Treaty Act), Page 5. Although eBird does provide an indication of bird presence/absence in the project area, the LMVJV has occupancy models that would provide an alternative or supplemental method to assess probability of occupancy in the project area. These models are based on Breeding Bird Survey (BBS) data. There are two BBS routes that cross the project area (Eagle Lake and Delta National Forest routes). Occupancy models can be accessed at the link below: https://www.sciencebase.gov/catalog/item/5e4183cae4b0edb47be639cc (Twedt and Mini, 2020).

14. All mitigation for previous Corps project impacts in the Mississippi Delta should be completed before additional impacts occur. The Corps' most recent status report on construction projects requiring mitigation under Section 906 of WRDA of 1986 shows the Vicksburg District needing to acquire 8,071 acres of frequently flooded agricultural lands for the Yazoo Backwater Maintenance and Upper Yazoo Projects in Mississippi (12th Annual Mitigation Report, Feb. 2020). Commitments made for current and future projects are undermined when the Corps fails to honor or complete past commitments in a timely manner.

15. Wetland mitigation lands should be purchased prior to the end of pump construction. Delays in mitigation implementation should result in the reassessment of impacts to account for the temporal delay. This reassessment should be coordinated with the Service and other natural resource agencies.

16. Under Sec 7(a)1 of the ESA, the Service recommends that mitigation areas should include adaptive management to provide habitat for listed bats, and adequate flows to maintain endangered mussel habitat. Management actions should be frequently updated in coordination with the Service and other natural resource agencies as habitat needs become better understood.

17. To help minimize impacts to migratory birds and bats, forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds and breeding bats, when practicable. State specific time frames should be obtained from the local Service office and state conservation agency.

18. If a bald eagle nest occurs or is discovered within 660 ft. of the proposed work location, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary.

    The Division of Migratory Birds for the South Atlantic - Gulf Region and the Mississippi Basin Region of the Service (phone: 404/679-7051, e-mail: SEmigratorybirds@fws.gov) has the lead role in conducting consultations and issuance of permits. Should you need further assistance interpreting the guidelines, avoidance measures, or performing an on-line project evaluation, please contact Ulgonda Kirkpatrick (phone: 321/972- 9089, e-mail: Ulgonda_kirkpatrick@fws.gov).

19. Coordinate further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) with the Service, the respective state wildlife agencies and the Environmental Protection Agency. The Service should be provided an opportunity to review and submit recommendations on those reports. Coordination regarding wetland mitigation site selection should occur with the Service and other resource agencies as well.

20. As part of the adaptive monitoring program, wetlands in the project area should be monitored for a minimum of 10 years to validate the assumption that rainfall driven events are the critical source of hydrology.

In conclusion, the Service does not believe the currently formulated plan represents a balanced approach to addressing the flood damage reduction and environmental opportunities in the Yazoo Study Area. The fish and wildlife resource planning goals must be addressed to at least a satisfactory level. The Service looks forward to resolving our concerns in a timely manner to preclude a delay in flood protection.

This draft report when finalized will fulfill the requirements of Section 2(b) of the FWCA and is a supplement the position of the Department and the Service that was previously established in our October 23, 2006 FWCA report on the Yazoo Backwater Project. As required by the FWCA, this report should therefore be fully integrated and addressed in the Corps' reformulation report.

Sincerely,

Stephen Ricks
Stephen M. Ricks
Field Supervisor
Mississippi Field Office

References

Bryant, M.D. 2010. Past and present aquatic habitats and fish populations of the Yazoo-Mississippi Delta. https://www.fs.fed.us/research/people/profile.php?alias=mdbryant

Cherry, Julia A. 2011. Ecology of Wetland Ecosystems: Water, Substrate, and Life. Nature Education Knowledge 3(10): 16.

Elliott, B.A, A.E. Mini, S.K. McKnight, and D.J. Twedt. 2020. Conservation-protection of forests for wildlife in the Mississippi Alluvial Valley. Forests 11:75-89.

Environmental Protection Agency. 2008. Final Determination of the Assistant Administrator for Water Pursuant to Section 404(c) of the Clean Water Act Concerning the Proposed Yazoo Backwater Area Pumps Project in Issaquena County, MS. Federal Register 73(183): 54398-54400.

Gordon, J., M. Arbeider, D. Scott, S.M. Wilson, and J.W. Moore. 2015. When the tides don't turn: floodgates and hypoxic zones in the lower Fraser River, British Columbia, Canada. Estuaries and Coasts 38 (6): 2337-2344.

Gosselink, J.G., and L.C. Lee. 1987. Cumulative impact assessment in bottomland hardwood forests. Center for Wetland Resources, Louisiana State University, Baton Rouge, Louisiana, USA.

Jones, M. J. & Stuart, I. G. 2008. Regulated floodplains - a trap for unwary fish. Fisheries Management and Ecology 15: 71–79.

Junk, W.J., P.B. Bayley, and R.E. Sparks. 1989. The flood pulse concept in river-floodplain systems. Canadian Special Publication of Fisheries and Aquatic Sciences 106:110-127.

Lower Mississippi Valley Joint Venture. 2020. Mississippi Alluvial Valley forest-breeding landbird population goals and quantitative habitat objectives. Jackson, MS. 14 pp.

Lucas, M. C. & E. Baras. 2001. Migration of freshwater fishes. Oxford: Blackwell Science, 420p Radinger, J. and Wolter C. (2014) Patterns and predictors of fish dispersal in rivers. Fish and Fisheries. 15:456-473.

MDWFP, 2020. https://www.mdwfp.com/wildlife-hunting/black-bear-program/mississippi-black-bear-ecology/range-movements-and-sightings/

Mississippi Natural Heritage Program, 2018. Listed Species of Mississippi. Museum of Natural Science, Mississippi Dept. of Wildlife Fisheries, and Parks, Jackson, MS. 6pp.

Neal, W. M. 1992. Endangered and Threatened Wildlife and Plants; Threatened Status for the Louisiana Black Bear and Related Rules. U.S. Fish and Wildlife Service. Federal Register 57:588-595.

Opperman JJ, Luster R, McKenney BA, Roberts M, Meadows AW. 2010. Ecologically functional floodplains: connectivity, flow regime, and scale. Journal of the American Water Resources Association 46: 211–226.

Thorp J.H. & Delong M.D. 1994. The riverine productivity model: An heuristic view of carbon sources and organic-processing in large river ecosystems. *Oikos*, 70: 305-308.

Twedt, D.J., and A. Mini. 2020. Forest area to support landbird population goals for the Mississippi Alluvial Valley. United States Geological Survey Open File Report (in press), Patuxent Wildlife Research Center, Ecosystems, Wildlife Programs. 105 pp

Twedt, Daniel J, William B. Uihlein III, and A. Blaine Elliott. 2006. A Spatially Explicit Decision Support Model for Restoration of Forest Bird Habitat, Conservation Biology. 20(1): 100-110.

USDA, NRCS. 1998. Mississippi Delta Comprehensive, Multipurpose, Water Resource Plan, Study Phase Report. https://www.ymd.org/publications

USFWS. 2009. Endangered and threatened wildlife and plants; designation of critical habitat for the Louisiana black bear (*Ursus americanus luteolus*). U.S. Fish and Wildlife Service, Lafayette, Louisiana, USA.

Weaver, K.M., and M.R. Pelton. 1994. Denning ecology of black bears in the Tensas River Basin. Proc. International Conference on Bear Research and Management 9:427-432.

Welcomme, R. L. 1979. Fisheries Ecology of Floodplain Rivers. Longman, London.

USFWS Fish and Wildlife Coordination Act Report Responses

1. Restore existing one-year floodplain

USFWS: The Service proposed changing the operation of the Steele Bayou Control Structure in order to reestablish the natural flood pulse between the Yazoo Study Area and the Mississippi/Yazoo rivers up to 87.0 feet, NGVD (i.e. one-year floodplain). This would provide wildlife and fisheries benefits to an estimated 60,321 acres of mostly forested floodplain habitat.

USACE response: In the 2007 Main Report a plan was evaluated in the fourth array of alterations that allowed for the reintroduction of flow from the MS River up to an elevation of 87.0 NGVD along with a 14,000 cfs pump with a pump on elevation of 91.0 NGVD. It also included conservation easements and reforestation from willing sellers on open lands below elevation 91.0 NGVD and on existing woodlands below elevation 91.0 NGVD. This plan was not economically justified then and even though a large portion of the open lands have been reforested since 2007 the price/acre to acquire conservation easements has gone up by approximately four fold, this plan would likely remain not economically justified.

In addition, the USFWS proposal would not be engineering feasible due to the Steele Bayou Structure being designed primarily to allow water to flow out toward the MS River. Some minor flow could possibly be allowed to enter from the MS River with less than 1ft of head between the landside and riverside water elevations but could not be utilized to allow the 19,000 cfs flow out of the Mississippi River into the Yazoo Backwater Area with 1ft of head. The current operation of the Steele Bayou Structure flows are maintained between 68.5 and 70.0 NGVD with approximately 100cfs allowed to flow out during the low flow periods, helps to maintain a tailwater environment which is very important to recreational fishing.

If the Steele Bayou Structure was modified to allow increased flows to enter the Yazoo Backwater Area, this would drive up the annual cost of operating the pump since the 135,000 acres sump area below elevation 87.0 NGVD would already be full of water prior to initiation of pumping and not available for storage.
In addition, flowage easements would have to be secured on private lands on the 135,000 acres below elevation 87.0 NGVD, since flooding would be induced on these lands. Flooding the lands below elevation 87.0 NGVD would likely induce hypoxic conditions. The hypoxic conditions would develop sooner and last for a longer period of time which would be detrimental to aquatic resources.

Finally, the project sponsor has indicated that they would not support this recommendation. They endorsed the deviation from the NED plan in the 2007 report which recommended pumping to be initiated at elevation 85.0 NGVD to a plan that was

more protective of the environment with a pump on elevation of 87.0 NGVD. They are not willing to consider a plan to flood lands intentionally prior to any pump operations. While the Vicksburg District does not believe the project should be modified to accommodate a plan that would allow waters to pond to elevation 87, there could be opportunities whereby the Steele Bayou and Little Sunflower structures could be utilized to allow for circulation of water to increase dissolved oxygen and slight increases in water depths during the summer and fall low-flow seasons. The Vicksburg District would be willing to evaluate minor operational changes to these structures with the pump station in place.

2. Keep Steele Bayou Control Structure Open during Low-Flow Conditions

USFWS: We no longer see the value of closing the Steele Bayou control structure during low-flow periods for fish and wildlife resource purposes since closure could result in trapping fish in backwater ponded areas with extended periods of stagnation and stratification. We anticipate the benefits of restoring the natural flood pulse to lands below 87.0 NGVD feet will greatly outweigh the benefits of closing the structure during low-water conditions for wintering waterfowl.

USACE response: The current operation of the Steele Bayou Structure is for the stages behind the structure to remain between 68.5 and 70 NGVD. The District has no difficulty maintaining the 70 foot water surface from December through August, and the Steele Bayou Structure gates are always open. From September through November during the fall low flow, the District allows the water surface to slowly drop to 68.5 or below, in order to maintain a minimum flow out of the Structure. The Structure is actually only closed when the riverside elevation exceeds the landside elevation. During the fall low flow period the riverside elevations are seldom greater than the landside elevations. Minimum fall riverside water surface elevations can fall below 55 feet NGVD. There have only been four days since 1978, when the riverside elevation exceeded the landside elevation, and the landside was less than 68.5 feet. None of these occurred during the fall low flow period. The Corps could modify the Water Control Plan and allow the interior pool to drop to 65 feet. This would allow greater flows out and improve reaeration. Allowing the water surface to drop below 65 would likely stress the fish populations, and could dry up some tributary streams.

Prior to any recommendation to change the operation of the Steele Bayou Structure, the Vicksburg District would recommend hydraulic studies over the period of record, and aquatic studies, to review the potential benefits of lowering of operations of the structure below 68.5 NGVD. Should this evaluation show positive benefits then this operation could be adjusted under the Adoptive Management Plan for the project.

Flood pulsing will continue with the installation of the project. This is discussed in the Engineering Report Appendix.

3. Provide Minimum Environmental Flows Concurrent with Pump Startup

USFWS: Assuming the environmental flows mitigation features is successful, and additional demands for surface water withdrawal do not increase, then we anticipate this feature will have beneficial effects to aquatic resources within the Yazoo Study Area. However, we recommend that in order to ensure benefits, the Corps commit to monitoring and maintaining a minimum level of stream flow within the Big Sunflower River channel during late summer and fall low-flow stream conditions. From 1937 through 1975, the annual minimum flow at Sunflower, Mississippi, fell below 100 cfs only six times. Therefore, the Service recommends that a 100 cfs minimum flow should be maintained in the Big Sunflower River at Sunflower, Mississippi, and that the wells needed to maintain this flow should be installed and operational before or concurrent with pumping station completion. We also recommend that the Corps work with the State of Mississippi to ensure that irrigation water is not withdrawn from the Big Sunflower River when the river at Sunflower, Mississippi, falls below 100 cfs.

USACE response: The Vicksburg District agrees that the use of the 34 supplemental low flow groundwater wells for out of kind mitigation for aquatic impacts is most appropriate. The District with the assistance of the Environmental Lab at ERDC, has continued to gather data over the last two decades on fish species abundance and species richness during flood events. In addition water quality sampling has occurred that generally shows no increase in species abundance and richness. Dissolved oxygen levels often have been so extremely low that larval fish cannot survive. While the wells would not be utilized during flood events, they would provide flows into the streams during the late summer and fall when flows are at the lowest. This could help enhance survival of those species that were able to survive spring floods. The reforestation of many thousands of acres of agricultural lands in the basin has not brought any significant changes to the aquatic resources over the last several decades.

The Vicksburg District will be responsible for the construction and Operations and Maintenance of the wells. The District will monitor the flows from the various streams to ascertain that sufficient flow is available to benefit both fish and mussel species. While the District has established target flows, there currently is no method to identify degree of aquifer recharge or the amount of water that would evaporate from the stream. The District will work with MDEQ on the issuance of any surface water permits in this area. The Adaptive Management Plan for the project will be implemented to adjust as necessary, groundwater well inflows to streams if and when hydrology changes due to these variables.

This mitigation features is an integral part of the Yazoo Backwater Project and the District intends to fulfill these mitigation requirements concurrent with the construction of the pump project.

4. Compensate for all wetland impacts, including impacts to shorter hydroperiod wetlands and wetlands outside the 2 year floodplain.

USFWS: The Service recommends that the DSEIS more accurately address how shifts in flood duration will impact the functions and values of different wetland types. Palustrine, open water wetlands do not have the same wildlife values as precipitation driven, saturated soil wetlands, therefore, changes in wetland type may have a detrimental effect on some classes of plants and animals that the Service has jurisdiction to protect. We recommend these effects on fish and wildlife resources be included in the DSEIS and compensated for accordingly.

USACE response: Additional text has been added to the Engineering Appendix and cross-referenced with the Wetlands Appendix to provide more details on the rationale used to select the areas included in the assessment of wetland resources. The text discusses why the five year floodplain was not incorporated into the assessment, highlighting that the available data demonstrates the limited effect of flooding on wetland hydrology in the five year floodplain. For example, all ground water monitoring wells above the two year floodplain, but within the 5-year floodplain either failed to exhibit wetland hydrology or precipitation provided the sole source of wetland hydrology.

5. Reforestation of the 2 year floodplain.

USFWS: We recommend that the Corps support the ongoing trend underway in the Yazoo Study Area of reforestation of marginal agricultural lands below 91.0 feet, NGVD. The NRCS currently has more applicants/acreage signed up for WRP enrollment than funding provided by Congress. Therefore, the Corps should expand the currently proposed nonstructural reforestation feature to include all agricultural land below 90.0 feet exhibiting a ≥5.0% flood duration, which the DSEIS estimates at less than 8,770 acres (Appendix F-5, page 32). This recommendation would also support President Trump's One Trillion Trees Initiative (EO 13955), which in part was created to develop, coordinate and promote Federal Government interactions with respect to tree growing, restoration, and conservation.

USACE response: Since the 2007 Main report and 2007 FSEIS was finalized, a number of agricultural acres below elevation 91.0 NGVD have been reforested. According to the latest land use map approximately 20,000 acres of open land remain below elevation 91.0 NGVD. The Vicksburg District has indicated that approximately

2,700 acres under the nonstructural component of the proposed plan would be targeted from willing sellers below elevation 87.0 NGVD for reforestation. In addition, the purchase of the 2,405 acres of compensatory mitigation would be purchased from willing sellers on cleared lands below elevation 91.0 NGVD and subsequently reforested. In the event that the Corps is unable to acquire suitable lands for mitigation within the one-year floodplain, the Corps will try to acquire suitable lands within the two-year floodplain.

6. Perpetual Easements on Existing Forested Wetlands.

USFWS: For the remaining acreage not protected by such programs, we recommend that the Corps offer perpetual easements from willing sellers for all forested wetlands that will exhibit a shift in flood duration as an indirect result of the pumps project. We would also encourage and strongly support sustainable forestry practices on such lands that maintain economic activity while creating, improving, and maintaining the array of vegetation types, successional stages, and structural attributes desired for forest-dependent fish and wildlife resources.

The Service also recommends that any lands acquired as nonstructural features or mitigation be prioritized for purchase using the Southeast Conservation Blueprint (http://secassoutheast.org/blueprint). This blueprint is a living, spatial plan that identifies the most important areas for conservation and restoration across the southeast region. In addition, the Service's Lower Mississippi Valley Joint Venture Office (LMVJV), with other federal and state agencies and the private sector through the Partners in Flight initiative (PIF) have developed management objectives to conserve forest breeding birds and their habitat in the Mississippi Alluvial Valley. Among the top priorities of this effort are building and maintaining forest blocks that provide habitat for self-sustaining populations of forest breeding birds (Twedt et al., 2006, LMVJV, 2020). Spatially explicit priorities for both projection (Elliott et al., 2019) and restoration (Twedt & Mini, 2020 *in press*: https://www.lmvjv.org/conservation-tools-summary) provide guidance regarding forest conservation actions. Therefore, the Service recommends that these prioritization tools be utilized in the consideration of the location of nonstructural features and mitigation areas and in prioritizing the avoidance of impacts. Finally, priority should also be given to purchase of lands from willing sellers within NWR acquisition boundaries or conducting joint management mitigation projects such as on the Twist mitigation area on Panther Swamp NWR.

USACE response: When identifying specific mitigation sites, during development of a more robust mitigation plan (during the preconstruction, engineering and design phase), these tools will be considered and utilized to the best possible capacity**.** Also included in the migratory bird appendix are recommendations for the acquisition of lands of highest value for wildlife within the Delta.

Additional Service recommendations:

USFWS 7: Appendix F-3 (Recreation). Theodore Roosevelt NWR (including the Brown Tracts) is located within the Yazoo Study Area and should be included in the effects analysis. Although Hillside NWR and the eastern side of Panther Swamp NWR are outside the Yazoo Study Area, these refuges could be impacted by greater Yazoo River backwater flooding events due to pumping station operations. We recommend these potential impacts be assessed in the FEIS and mitigated accordingly. Impact analysis should include whether the project will alter the refuges' abilities to fulfill their establishing purposes and meet their management goals and objectives. Finally, impacts to public lands should be mitigated on the impacted public lands.

USACE response: Theodore Roosevelt NWR has been added to the appendix and is now included in the effects analysis. While not currently accessible to the public, future goals of the Service include an interpretation center with potential recreation resources. Portions of the Theodore Roosevelt NWR Complex that are located outside of the Yazoo Study Area will continue to be assessed in coordination with the appropriate resource agencies as data and design further develop. Final mitigation designs will be coordinated with appropriate resource agencies to ensure impacts due to the proposed plan would be mitigated on or adjacent to public lands to the extent practicable. Although the pump will cause a slight increase in the water surface of the Yazoo River adjacent to and downstream from the pump location, the water surface will increase about 3.6 inches. This increase will diminish as you move both downstream and upstream of the pump location. The Corps does not believe an increase of a few inches will have any significant impact on either Hillside or Panther Swamp NWRs.

USFWS 8: Appendix F-8 (Aquatics). Acreage analysis used for aquatic impacts (i.e. EnviroFish) should include all lands within the five-year flood frequency, not just the two-year flood frequency. Using acreage from within the two-year floodplain underestimates the amount of existing spawning and rearing habitat being used within the Yazoo Study Area. We also recommend greater clarification regarding the use of a relative value index weighting factor to lower mitigation requirements due to reported hypoxic conditions in the Yazoo Study Area. Based on that information the Service may further recommend changes to that value for use in the analysis.

USACE response: USACE determined that flooded bottomland hardwoods in the 2-year flood frequency are the preferred spawning and rearing habitat based on the following rationale:

a. Most fish species reach sexual maturity at age one or two years. Thus, a flood that typically occurs once every two years is considered necessary to maintain

reproductive populations in the basin. The more extreme hydrologic events may result in higher fish abundance, but do not represent flooding regimes that maintain baseline population levels over the life of the project (i.e., 50 year project life).

b. The life span of small-sized species is 2-3 years and some may only reproduce once. Thus, a flood frequency less than 2 years may result in successive reproductive failures by species with short life spans. Flood frequencies greater than two years are an overestimate of the usable floodplain utilized by species with short life spans. Larger-sized species can live up to 10 years, but those that utilize floodplains to reproduce on an annual basis require regular flooding to maintain population integrity.

c. The floodplain closest to rivers provides immediate access to reproductive fishes undergoing spawning migrations. Fish may have to travel miles from the mainstem rivers to reach lands corresponding to a 3-year or greater flood frequency. Therefore, fish are less likely to use the sub-optimal areas at greater distances from rivers due to the long distance required.

d. Even if adults do move great distances to spawn, eggs deposited in cleared lands far removed from the main stem river have a greater risk of becoming trapped and/or desiccated. Rapid declines in water level are more pronounced in the 3-5 year floodplain and increase the proportion of young fish stranded on the floodplain.

e. Forested lands predominate through the 50 year floodplain, and these are the preferred location for fish spanning.

The relative value index (i.e. weighting factor) determines the ecological worth of the reforestation feature of compensatory mitigation and takes into account the true value of this effort on the aquatic environment. Reforestation has been the primary method of mitigating impacted floodplains habitat, however monitoring studies have documented extensive hypoxia (low dissolved oxygen) in the Yazoo Study Area during inundation questioning the value of reforestation to fully address aquatic impacts. Additionally, long-term trends in fish species composition indicate little change in diversity despite previous reforestation and repeated flood events. Additional reforestation is not expected to benefit aquatic resources since extensive hypoxia will continue to occur in the floodplain and channels. The 0.6 relative value index was determined by the percent difference in total abundance of larval and juveniles fishes in hypoxic (<3.0 mg/l) versus normoxic water collected with larval light traps within the Yazoo Study Area between 1990 and 2008. In other words, out of 100% of all individuals collected, 60% were collected in normoxic water and 40% were collected in hypoxic water. Those individuals collected in hypoxic water were mostly dead. The assumption was that the 40% reduction in the abundance of larval and juvenile fishes indicates that reforestation will only partially compensate for impacts. Therefore, the RVI of 0.6 was used to decrease the functional value of reforestation due to hypoxia. However, environmental flow establishment with the groundwater wells were assumed to offset negative impacts of hypoxia in the forested floodplain. These assumptions will be addressed in the Monitoring and Adaptive Management Plan.

USFWS 9: If the environmental flows mitigation feature fails to restore perennial flow or improve survival rates of juveniles and adults during autumn, then the acreage needed to offset lost aquatic functions via reforestation should be reassessed and mitigated accordingly.

USACE response: Concur; however, no analysis leads us to believe that the environmental flows mitigation would fail to sufficiently mitigate for aquatic impacts. The adaptive management plan will monitor the success of the environmental flows mitigation and operational changes will be made accordingly.

USFWS 10: Update or fund new water resource plans for the Mississippi Delta to address ways to recharge the aquifer and increase water table levels in the study area. Updating or providing a water use plan that includes agricultural use may help reduce further dewatering or reverse this trend and address the source of the problem.

USACE response: The Corps will undertake any new water resources study to evaluate recharging the aquifer or increasing the water tables should a local sponsor come forth requesting such a study.

USFWS 11: Appendix F-7 (Waterfowl). Because predicting duck use days (DUDs) values of specific sites requires modelling that is underpinned by perfect knowledge of the identity of these sites (which is not possible at this stage in the process), it is recommended that mitigation targets roughly mirror the distribution of waterfowl habitat loss depicted in Table 7 (-1,888ac [90%]forest, -217ac [10%] non-forest). This approach has the advantages of (1) more closely replacing what is lost, and (2) ensuring that DUDs lost due to the Action Alternative are supported through mitigation actions in the face of dynamic hydrological conditions.

USACE response: The acreages referenced in Table 7 of the Waterfowl Appendix (Appendix F-7) are a cumulative sum of acres impacted over a four-month period (November through February) for the winter waterfowl season. Months were broken out separately for analyses to account for differences in resource availability and deterioration rates of food sources. Therefore, mitigation acres calculated for this appendix follow the same approach as that of impacted acres, with both reflecting DUDs as the comparative unit. The maximum forested acres impacted between the two alternatives occurs during the month of January (904 acres). The 217 cumulative acres that are non-forested reflect some habitats that do not result in any DUDS (e.g. cotton, “other” category which includes urbanized areas); therefore, mitigation should only reflect lost DUDs during the winter season. It is acknowledged that different acres may be impacted on the landscape for the other months (Nov, Dec, and Feb), but to properly

account for these differences, the base unit of DUDs should be the deciding factor for calculation of mitigation acres which will depend on the restoration habitat that is selected (e.g., bottomland hardwood forest, moist-soil unit).

The Corps has determined that 545 acres will be reforested in Zone 1 and 1,860 acres in Zone 2 for a total of 2,405 acres (Appendix J: Mitigation). The two main criteria for successfully mitigating impacts to winter waterfowl habitat are (a) the presence of suitable habitat types with available food resources (e.g., acorns from oak production in BLH forest or herbaceous seeds in moist-soil units), and (b) the occurrence of proper hydrology on the landscape, which requires inundation less than 18 inches in depth. The Corps will work in communication with the USFWS to discuss any proposed mitigation sites to ensure that sufficient acres with proper hydrology are present to achieve the proper mitigation. In the event that the initial mitigation acres do not receive the proper hydrology to achieve successful mitigation for winter waterfowl, the Corps will communicate with the USFWS in order to determine how to meet the necessary standards required to offset the total loss of 1,349,228 DUDs annually or 67,461,400 DUDs from the loss of foraging habitats during November through February over the 50-year project life.

USFWS 12: Appendix H (Migratory Bird Treaty Act), Figure 4. Figure caption references Elliott et al., (2020) regarding reforestation priorities. The Elliott et al., (2020) publication addresses protection priorities for existing forest (with a minimal amount of reforestable land immediately adjacent to existing forest). Hence, this citation is not used properly in the Appendix. Further, the figure depicts the Appendix authors' Focused Mitigation and Easement Lands site priorities (in black outline) with notation (in color code) of river gauge data, but no indication of priority level from Elliott et al. (2020). As a result, nothing in the figure relates to Elliott et al., (2020) or any other LMVJV priorities.

USACE response: Figure 5 was omitted by mistake from Appendix H and has been reinserted to properly reference the spatial analysis for reforestation priorities in the MAV by Elliott et al. (2020). The caption in Figure 4 has been modified to only reference river gauge data with Figure 5 referencing data from Elliott et al. (2020). While Elliott et al. (2020) does focus primarily on protection of existing forest, it also provides data on reforestation priorities (brown shading in Figure 1 of Elliott et al. 2020). ERDC-EL acquired these data and incorporated into a GIS to construct the map in Figure 5 of Appendix H to reflect similarities between the two independent assessments for reforestation priorities within the project area.

USFWS 13: Appendix H (Migratory Bird Treaty Act), Page 5. Although eBird does provide an indication of bird presence/absence in the project area, the LMVJV has

occupancy models that would provide an alternative or supplemental method to assess probability of occupancy in the project area. These models are based on Breeding Bird Survey (BBS) data. There are two BBS routes that cross the project area (Eagle Lake and Delta National Forest routes). Occupancy models can be accessed at the link below: https://www.sciencebase.gov/catalog/item/5e4183cae4b0edb47be639cc (Twedt and Mini, 2020).

USACE response: The USACE acknowledges this new resource published in September 2020. The occupancy models cover some of our focal species and could be used to complete more detailed analyses of potential with and without-project effects of hydroperiod, especially on those species that breed, nest, and/or forage on and near the ground. We did download and view several of the occupancy model outputs, and most predict high occupancy rates wherever suitable forested habitat exists within the backwater area. However, they do not account for extended duration flood events. For example during our 2020 fieldwork in the Study Area, we did not detect a single Wood Thrush or Hooded Warble, and only one Kentucky Warbler. We did detect singing Wood Thrush outside backwater area during the same timeframe. The extended flooding into spring and summer 2020 within backwater effectively eliminated available breeding habitat for these ground-and-shrub-nesting species where floodwaters persisted. We note this in appendix H and also discussed potential positive effects of the pump project. We will consider these models in future analyses, as appropriate, to enhance our ability to assess effects, and to make recommendations for mitigation lands that are part of the FSEIS No. 2.

USFWS 14: All mitigation for previous Corps project impacts in the Mississippi Delta should be completed before additional impacts occur. The Corps' most recent status report on construction projects requiring mitigation under Section 906 of WRDA of 1986 shows the Vicksburg District needing to acquire 8,071 acres of frequently flooded agricultural lands for the Yazoo Backwater Maintenance and Upper Yazoo Projects in Mississippi (12th Annual Mitigation Report, Feb. 2020). Commitments made for current and future projects are undermined when the Corps fails to honor or complete past commitments in a timely manner.

USACE response: The Vicksburg District is current with mitigation on all projects other than that mitigation required to fully offset the impacts from the construction of the Yazoo Backwater and Sartaria area levees. While the District had mitigated for a portion of these projects by 1991, the remaining mitigation for these projects was made a part of the 2007 Yazoo Backwater Main Report. After the project was vetoed by the EPA in 2008, the District started requesting funds to fulfill this mitigation. In recent years the District has received funding to implement this mitigation and anticipates this mitigation to be completed in the next 2 years.

USFWS 15: Wetland mitigation lands should be purchased prior to the end of pump construction. Delays in mitigation implementation should result in the reassessment of impacts to account for the temporal delay. This reassessment should be coordinated with the Service and other natural resource agencies.

USACE response: Mitigation implementation would occur prior to or concurrent with the project construction. If for some reason this is not possible, further habitat assessment models would be completed to account for temporal delay. Any further project development will be coordinated with the resource agencies.

USFWS 16: Under Sec 7(a)1 of the ESA, the Service recommends that mitigation areas should include adaptive management to provide habitat for listed bats, and adequate flows to maintain endangered mussel habitat. Management actions should be frequently updated in coordination with the Service and other natural resource agencies as habitat needs become better understood.

USACE response: Concur. During development of the project specific mitigation plan and adaptive management plan, USACE will coordinate with the Service and consider including measures to provide habitat for listed species to the extent practicable.

USFWS 17: To help minimize impacts to migratory birds and bats, forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds and breeding bats, when practicable. State specific time frames should be obtained from the local Service office and state conservation agency.

USACE response: The Threatened and Endangered Species and Migratory Birds Appendix (Appendix H) already states, “To minimize impacts to migratory birds, especially those that require large intact forests, efforts should be made to minimize to the extent practicable the footprint of forest habitat removal. In addition, construction should take place, to the extent practicable, between approximately 1 August and 28 February to minimize impacts to nesting migratory birds.” We did add the following statement to this paragraph: “State-specific time frames should be obtained from the local Service office and state conservation agency.”

USFWS 18: If a bald eagle nest occurs or is discovered within 660 ft. of the proposed work location, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at:

http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary.

The Division of Migratory Birds for the South Atlantic - Gulf Region and the Mississippi Basin Region of the Service (phone: 404/679-7051, e-mail: SEmigratorybirds@fws.gov) has the lead role in conducting consultations and issuance of permits. Should you need further assistance interpreting the guidelines, avoidance measures, or performing an on-line project evaluation, please contact Ulgonda Kirkpatrick (phone: 321/972- 9089, e-mail: Ulgonda_kirkpatrick@fws.gov).

USACE response: Though we did include some of this information in Appendix H (TES/Migratory Bird), we have modified to read as follows:
"USFWS guidelines suggest construction should not occur within 0.5 mile (2,640 ft.) of any eagle nests during the time of egg-laying, incubation, and the first month after hatching (01 October to 15 May). If a Bald Eagle nest occurs or is discovered within 660 ft. of the proposed work location, then an evaluation must be performed to determine whether the project is likely to disturb nesting Bald Eagles. That evaluation may be conducted on-line at: http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. Verification of the absence of nesting Bald Eagles could ensure construction would not directly, indirectly, or cumulatively have adverse impacts on Bald Eagles."

USFWS: The Service's Southeast Region has defined "at-risk species" as those that are:
1) proposed for listing under the Endangered Species Act (ESA) by the Service;
2) candidates for listing under the ESA, which means the species has a "warranted but precluded 12-month finding"; or
3) petitioned for listing under the ESA, which means a citizen or group has requested that the Service add them to the list of protected species.

As the Service develops proactive conservation strategies with partners for at-risk species, the states' Species of Greatest Conservation Need (defined as species with low or declining populations) will also be considered and included in our conservation recommendations under the FWCA. Species currently designated as "at-risk" that may occur within the project area are: Alligator Snapping Turtle, Golden-Winged Warbler, Monarch Butterfly, and several state-listed and at-risk mussels (Western fanshell (*Cyprogenia aberti*), pyramid pigtoe (*Pleurobema rubrum*), and spike (*Eurynia dilatata*) (Mississippi Natural Heritage Program, 2018).

USACE response: It is anticipated that additional NEPA document(s) would be developed, in coordination with the resource agencies, as the project enters the pre-

construction engineering and design (PED) phase. Any at-risk species present at the time of PED would be included as part of this analysis along with any state-listed species.

USFWS 19: Coordinate further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) with the Service, the respective state wildlife agencies and the Environmental Protection Agency. The Service should be provided an opportunity to review and submit recommendations on those reports. Coordination regarding wetland mitigation site selection should occur with the Service and other resource agencies as well.

USACE response: Coordination with the Service and other resource agencies will continue throughout the development of the project.

USFWS 20: As part of the adaptive monitoring program, wetlands in the project area should be monitored for a minimum of 10 years to validate the assumption that rainfall driven events are the critical source of hydrology.

USACE response:
Concur. The adaptive management plan has outlined the proposed monitoring plan for the project.