United States Department of the Interior

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November 18, 2013

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ER 13/0523

Colonel Jeffery A. Anderson
Commander, Memphis District
U.S. Army Corps of Engineers
167 North Main Street B-202
Memphis, Tennessee 38103-1894

Dear Colonel Anderson:

Thank you for providing the Department of the Interior (Department) with copies of the July 2013 Draft Environmental Impact Statement (DEIS) for the St. Johns Bayou and New Madrid Floodway Project in southeast Missouri. The Department has provided extensive comments on previous versions of the EIS for this project, emphasizing the need to pursue options that reduce flood risk while avoiding or minimizing environmental impacts. This need, as well as the need for the project plans to include adequate compensatory mitigation to offset unavoidable project impacts, remains a concern for the Department.

The U.S. Fish and Wildlife Service (USFWS), Missouri Ecological Services Field Office, has been actively involved throughout the planning process. The USFWS has provided a number of planning aid letters and reports to the U.S. Army Corps of Engineers (Corps) in accordance with the USFWS's responsibilities under the Fish and Wildlife Coordination Act and its expertise on fish and wildlife issues.

General Comments

Wetlands

The USFWS provided extensive comments and data (i.e., National Wetlands Inventory; Appendix Q, draft Fish and Wildlife Coordination Act) indicating a substantially larger area of functional wetlands would be affected by the proposed project. The Corps was also informed that the species-specific assessment models used to evaluate wetland impacts do not adequately quantify the importance or the effects to the wetlands evaluated.

The Department has consistently discouraged the Corps from using the Hydrogeomorphic Method (HGM) to evaluate wetlands and that the analysis did not include all of the potentially affected wetlands. HGM is a tool to make informed decisions primarily involving impacts of depositing fill material into wetlands: it is used with other technical, regulatory and policy considerations in wetlands decision-making. The HGM method is not new; however, it has significant limitations which influence its application to wetlands assessment. The Missouri Interagency Review Team (IRT) has considered a number of wetlands assessment tools to use for wetland mitigation determinations and does not use HGM. The Missouri IRT has developed an alternative assessment methodology to best reflect wetlands impacts and benefits from various management actions. HGM is cumbersome and requires a great deal of data to populate the many variables and functions in the models. In addition, users must make many assumptions to conduct a robust, thorough analysis. Some of the models/functions are insensitive to hydrologic changes and other important factors not easily measured in the field (e.g., wildlife interactions, minimum acreage requirements for species, wildlife and fish access to an area, rarity of biotic communities). Thus HGM has significant limitations as an assessment tool for this and other projects.

Mitigation

The DEIS does not adequately address the uncertainties of the proposed mitigation. Without knowing the specific locations of mitigation tracts, or even general locations, the Corps cannot assure the public that such lands are available or are available in an appropriate mix to provide the functions/compensation needed. Without identifying the true costs associated with land acquisition, restoration, operation, maintenance, and potential remediation; it is not possible to determine if the costs identified are credible or that monitoring/adaptive management of those lands will occur. There are no agreements in place to assure the proposed activities will occur. Therefore, prior to the FEIS being completed, the Corps should enter into an MOU with partners to document that mitigation shall be completed.

The Corps is proposing to use existing conservation lands acquired by the Missouri Department of Conservation (MDC) for mitigation. According to the MDC, the acres identified were acquired for fish and wildlife conservation purposes and thus do not meet the statutory criteria of lands purchased to mitigate this project. Utilizing state conservation lands as compensatory mitigation is not consistent with Corps practices and USFWS policy and holds a federal water development project to a lower mitigation standard than would be expected of the American public. The Department does not consider this an adequate form of mitigation.

It has been shown that wetland compensation has historically underperformed (Moreno-Mateos et al., 2012) and the Adaptive Management Program does not include details regarding actions that will be taken to rectify mitigation measures that do not work. This could include additional lands and changes in project operations and the effects to the resource as well as the cost and benefit of the project. Nor does it include specific decision or performance triggers or operational constraints. We recommend the Corps refer to the Department's Handbook on adaptive management for detailed guidance on developing a robust program: (http://www.doi.gov/initiatives/AdaptiveManagement/documents.html).

At this point, the Corps' proposed program is mostly a list of concepts, without specifics or commitments. In addition, the document refers to the potential to employ as yet unknown measures to successfully mitigate project effects, accompanied by additional NEPA compliance. While the Department supports a flexible mitigation strategy, the current plan has too much uncertainty to evaluate the proposal effectively and the lack of certainty does not comply with the Mitigation Rule. Therefore, prior to the FEIS being completed, the Corps should enter into an MOU with partners to develop and document mitigation performance measures.

Big Oak Tree State Park

This project will impact the entirety of Big Oak Tree State Park. Located within Big Oak Tree State Park, the Big Oak Tree site is the only sizable known tract of essentially virgin wet-mesic bottomland hardwood forest remaining in the northern Mississippi Alluvial Plain section of the Gulf Coastal Plain biophysiographic province. This site was nominated as a National Natural Landmark in 1986, as a natural area designated by the Secretary of the Interior to recognize some of the best examples of biological resources in the nation. The site is one of the "best" examples of a type of biological community in its biophysiographic province. "Best" is gauged primarily on illustrative value and condition of the resource.

The goals of the National Natural Landmark program, managed by the National Park Service, are to encourage the preservation of sites illustrating the geological and ecological character of the United States, to enhance the scientific and educational value of sites thus preserved, to strengthen public appreciation of natural history, and to foster a greater concern for the conservation of the nation's natural heritage. Besides fostering the basic program goals of natural heritage protection, some National Natural Landmarks are the best remaining examples of a type of feature in the country and sometimes in the world.

As described, the proposed mitigation appears mischaracterized in the DEIS and is likely infeasible. MDNR staff has indicated the proposed restoration project, if successful, would only offset effects to the park from construction of the Floodway closure and pumping stations and it would not compensate for resource losses outside the park. In addition, because the park sits in a depression, acquisition of a minimum of 1800 acres (the rest of the depression) immediately adjacent to the park is necessary for a functional restoration project. Without it, MDNR staff notes the project would not be implementable. As pointed out previously, and as this document notes, the desire of landowners in the project area is agricultural intensification. Given increased post-project drainage coupled with high commodity prices, purchase of these lands is unlikely. Moreover, a gravity fed culvert/water delivery system should not be characterized as mimicking natural riverine flooding.

Economics of Floodplain Services

Similar to our growing understanding of river science, the methods to evaluate the potential economic effects of changes in floodplain functions resulting from water development projects is another area that has greatly improved in the last 10 to 20 years. As noted in the March 2013 Principles and Requirements for Federal Investments in Water Resources:

"…Federal investments in water resources have been mostly based on economic performance assessment which largely focus on maximizing net economic development gained and typically involved unduly narrow cost-benefit comparison of the monetized effects….A narrow focus on monetized or monetizable effects is no longer reflective out of our national needs and from this point forward both quantified and unquantified information will form the basis for evaluating and comparing potential Federal investments…"

Thus, economic consideration of ecosystem functions must be an integral aspect of the cost and benefit analyses included in the planning process. In fact, over the last several years, a number of tools have been developed to help quantify ecosystem services relative to water development projects. FEMA's recent Mitigation Policy (FP-108-024-01) http://www.fema.gov/benefit explicitly includes quantified ecosystem services in their benefit to cost analyses for acquisition of properties as part of its Pre-Disaster and Flood Mitigation programs, as well as the Hazard Mitigation Grant Program. USFWS staff recently attended a floodplain workshop in St. Louis, Missouri. At this meeting, a number of tools were presented that could be used to identify and quantitatively evaluate effects to ecosystem USFWSs such as water and nutrient regulation, recreation, habitat and biodiversity, water supply, food, energy and raw materials and many others. The following websites are just a few of the resources available as references:

http://esvaluation.org

http://www.ebmtools.org/mimes.html

http://www.naturalcapitalproject.org/InVEST.html

http://www.eartheconomics.org/FileLibrary/file/Midwest/Earth%20Economics_Middle%20Cedar%20River_ESV_2012.pdf

We recommend the Corps include such tools in alternative evaluation for this project to better reflect the true costs and benefits of each proposed alternative.

Endangered Species

The Department recommended that the Corps include the USFWS's draft Biological Opinion (BO) in the DEIS. The Corps chose not to include it and lost an opportunity to publicly disclose additional project effects, in this case to federally-listed species. The DEIS should indicate the Tentatively Selected Plan is not consistent with the Reasonable and Prudent Measure (RPM) identified in the draft BO. If the Corps chooses to move forward with an alternative that includes the New Madrid Floodway closure and pumps, then Alternative 4.1 is the option the USFWS has determined is consistent with the Corps conservation responsibilities under the Endangered Species Act. Our draft Biological Opinion is enclosed for your convenience.

Summary

Although complete replacement of the proposed fish and wildlife habitat losses in this unique system is impossible, the USFWS and the Corps have strived to estimate measures that fully

address project-related impacts to Federal trust resources. To fully compensate for project-related impacts, fish and wildlife habitat quality and functions must also be maintained. While the proposed mitigation plan could potentially compensate for a portion of fish and wildlife habitat losses that can be quantified using current models for estimating wildlife effects of water development projects, the project area would not retain the ecological functions of a connected floodplain-river ecosystem.

Up to 53,556 acres of functional wetlands would be degraded or eliminated by the project. Those habitats provide essential breeding and migration areas for 193 species of migratory birds, including tens of thousands of migrating shorebirds and waterfowl. The fisheries impacts have been significantly underestimated and extend far beyond the 5-year floodplain used in the analysis conducted by the Corps. Frequent Mississippi River backwater flooding (2 to 5 year intervals) during the spring is extensive and the spawning, nursery and foraging habitat (15,000 to 50,000 acres) it provides for an extremely diverse fishery (114 species representing 22 families) is unique and irreplaceable. Recent scientific investigations along the Missouri and Mississippi rivers show how critical less frequent, but large, flood events are in maintaining populations of long-lived, commercially important fish such as catfish, paddlefish, drum, sturgeon, and white bass. The difference between the 5 year and 20 year flood in both basins is 40,000 acres. During flood events, connected agricultural floodplains provide expansive, slack-water fish habitats that cannot be substituted by the constricted, fast-flowing main channel and adjacent batture lands. The Floodway closure and proposed pumps would eliminate 75 percent of the spring, and 95% of the fall shorebird habitat in the Floodway. It would also result in an estimated 39% loss of Duck Use Days during critical spring migration.

The Department continues to have significant concerns regarding potential project effects to fish and wildlife resources, as detailed in our August 26, 2011, letter to Assistant Secretary Darcy (enclosed). In spite of our repeated concerns, current project plans are essentially unchanged from the original alternative. The project would essentially eliminate a unique landscape and ecological feature in southeast Missouri and result in the loss of thousands of acres of wetlands and their connection to the Mississippi River. At present, the Department does not believe these impacts can be adequately mitigated.

The Department urges the Corps to pursue the St. Johns Basin only alternative (Alternative 2.1) as a technically and economically feasible alternative that would meet the project purpose while avoiding losses to nationally significant fish and wildlife resources. Should the Corps pursue the Tentatively Selected plan, and fail to move towards a less environmentally-damaging alternative, the Department of the Interior will consider this project a candidate for referral to the Council on Environmental Quality in accordance with 40 CFR 1504.

Sincerely,

Robert F. Stewart

Robert F. Stewart
Regional Environmental Officer

cc: Joshua M. Koontz

Specific Comments on the
St. Johns Bayou and New Madrid Floodway, MO
Draft Environmental Impact Statement (DEIS)

Page ii, first paragraph – River inundation of the New Madrid Floodway also contributes to the productivity of that basin, depositing sediments and nutrients to produce sought-after floodplain soils. Jackson and Ye (2000), in a study of the Yazoo Basin and effects of flooding, noted:

"Flood regimes in the UYRB are fundamental determinants of structural and functional dynamics of the ecosystem from a regional perspective… Subsequently, if flooding does not significantly impact (as this study demonstrated), and in the long term might benefit (as this study suggests), crop production in the UYRB, the justification for large-scale, traditional flood control projects in the regions should be subject to question, particularly when that justification focuses on protection of row crop agriculture for cotton and soybeans."

Page iii, paragraph 2 – Using the most accurate and up to date information is very important, but an updated analyses does not mean previous agreements or comments are invalid. While the Corps has updated several models used to assess project impacts, the USFWS agreed to neither the models (e.g., fish species used in the fish HEP) nor the revised data used to apply them. Updated analyses should inform the collaborative process, not substitute for it. As a result, agreements on project features, particularly mitigation features, are presented without coordination with the agencies that will be responsible to implement/manage those actions/lands.

Page ix, first paragraph and Page x, paragraph 2 –The interagency team did not collaboratively develop the proposed mitigation measures and there was no agreement to the assumptions used to assess project impacts. Therefore the text should be revised to indicate that while the Corps did discuss these issues with the interagency team, the team did not reach a consensus on the assessment methods, application of those methods, or the proposed mitigation. During project planning, both the Environmental Protection Agency and the USFWS voiced concerns with the assessment techniques and proposed mitigation.

Page xii, first bullet - In conversations with Missouri Department of Natural Resources (MDNR) staff, they noted to the USFWS that the proposed plan for water management at Big Oak Tree State Park would only offset the effects of the New Madrid Floodway closure and pumps to the park itself. It would not offset project-related impacts to other resources or areas beyond the park. MRNDR's plan would rely on capturing some of the water in an adjacent ditch, rather than installing a culvert through the front line levee to the Mississippi River, as indicated in the text. In addition, without willing sellers to offer all the land needed, the project could not be implemented because the area functions as a hydrologic basin (i.e., could not build a smaller project with fewer acres).

Page xiii, bullet 6 – The Corps presents no analyses that supports this supposition. We found no comprehensive discussion of the effects of the levee closure on river stages over various flood intervals as previously requested. The document appears to include only a cursory treatment of effects of the levee closure during a project flood, i.e., when the Floodway would be connected to the river.

Page xiv, paragraph 2 – Contrary to the statement in the text, prior converted wetlands can provide significant wetland functions beyond fish and wildlife habitat, notably in the Floodway, by their ability to store floodwaters and reduce flood stages. That is the Corps' justification for design and operation of the Floodway. Unfortunately, the Corps does not evaluate impacts to all functional wetlands (i.e., functional wetlands currently farmed, regardless of jurisdictional designation).

Page xiv, S11.2 – As indicated in the USFWS's May 2013 draft Biological Opinion (BO), formal consultation on this project was initiated on January 18, 2013. The USFWS has agreed to the Corps' request of an extension of formal consultation to include the public review period of the DEIS containing the draft BO, to allow the Corps to include any resulting modifications to the TSP in the final project description and final BO. Although the Corps indicated they would include the draft BO in the DEIS, it was not.

Page xvi, first paragraph – The benefit/cost of the New Madrid alternatives are considered inaccurate because they do not include the full costs of mitigation and lost floodplain functional services.

Page 4, Section 1.2 Purpose and Need– This section fails to clearly document the need for the action. There is no description of the damages incurred due to flooding, how often they occur, and how significant they are in terms of dollars, safety, etc. Without this information it is not possible to evaluate alternatives that would meet the needs of the communities. One way to show the significance of the flooding is to compare damages to infrastructure and agriculture to the yearly local budgets, and yearly agricultural production/receipts to provide context for the need for the project. There should be data available from past flooding events to describe what is involved and why flood damage reduction is needed. This would also be in keeping with the IEPR recommendation to include actual flood damage data in the analyses, in addition to modeled information.

Page 7, Table 1.2 – We understand this work was conducted in Central Missouri. Are the planting dates the same in the Southeast Missouri project area, which is in a different growing zone? The text should indicate what level of optimization is desirable or needed to provide unspecified flood damage reduction, agricultural intensification, and reduce community isolation concerns.

Page 9, Section 1.2.1.1 – According to this section, after 15 years of project planning, reliable estimates of crop damage do not exist. While it is helpful to make the reader aware of this limitation, flood damage reduction is the major driver for plan formulation. This section should describe how the uncertainty of these estimates compares to the uncertainties of the modeled damages and the cost/benefit estimates extrapolated over the entire project area. The crop damage estimates provided later in this section would be even more informative with a citation or source listed. Please include those citations in the final draft of the document as well as those for non-agricultural flood-related damage estimates.

Page 10, Section 1.2.1.2 – Please include citations for the damages noted in this section.

Page 11, Waste Water Treatment – Please include the full reference for Chittenden (2011) in the literature cited section. Also, with this and the previous section, "Drinking Water Wells," the text should provide at least an estimate of what level of flood control is necessary to address these risks, and how often they occur (i.e., 2, 5, 10, 20-yr floods?). This allows the reader to better understand the extent to which the proposed alternatives address these project needs.

Pages 8-13, Section 1.2.1 and 1.2.2 – These sections contain a much improved description of the various levels of flooding in each basin and are very helpful to the reader. As noted above, please also include citations for the data in section 1.2.2.1 and 1.2.2.2.

Page 14, Objectives – We note that the effects of the project do not address in any meaningful way these objectives. The effects sections include only generalized statements regarding less flooding being better. There is no description of what the numbers in Table 4.9 reflect in terms of areas protected, and to what extent. This should be better described in the final document to help the reader understand comparative trade-offs among the alternatives, and better support the numbers in the tables.

Page 40, paragraph 2 – We disagree with the last sentence, "Likewise, economic damages would continue in these areas." It is quite likely that if one of the alternative levee alignments was chosen, landowners in the area subject to flooding may decide to pursue a flood-compatible use on those areas, or such areas would likely be highly desirable for compensatory mitigation lands. This would be especially likely given their proximity to existing conservation lands. In addition, as noted previously, we believe the true costs of mitigation for the Tentatively Selected Plan are significantly underestimated.

Page 41, Section 2.3 - This section should clearly describe what work has already been completed as part of the project, as well as the recent rehabilitation work by the Corps and USDA. Ideally, all project features for every alternative should be listed in a table with miles, acres, etc. to clearly describe and compare each alternative. The Gate and Pump Management should specifically identify the extent of the losses and damages it is designed to address rather than an unspecified lower crop loss due to flooding. What level of damage or reduced yield does that flooding cause (i.e., percentage of crops lost v. harvested, or 1 bushel per acre of how many total bushels per acre harvested)? Try to be as specific as possible to allow the reader to understand what is proposed by optimizing agriculture in the spring above 288 feet. For example, a previous version of the DEIS framed the difference between early and late (June) planting as one bushel per acre per week. If true, what amount of reduction is that in terms of total harvest?

This section should also describe how often the gates are expected to be open and at what river stage (i.e., percent of time during this period gates are open at lower elevations with minimal flooding, or higher elevations with greater flooding). Again, this would provide quantitative context to assess the effects of the various project alternatives and helps the reader understand what the Corps means by connectivity. In addition, this section should describe how many acres benefit (both connectivity and flood protection) for each portion of the spring operational plan.

This should also be carried forward to all alternatives, which will help provide context for the reader on the incremental costs/benefits of each. Planting higher value crops is not reducing flood damages, but is agricultural intensification and would appear to be above and beyond a goal of flood damage reduction. Also, please clarify if reduced yield is viewed as flood damage, as the two seem both to apply to agricultural benefits in the text.

Page 46 Section 2.3.2.4, Alternative 3 – This section should include two stand-alone alternatives, one for each basin, as well as the combined alternative to better understand the effects of the propose work in each basin.

Page 47, Footnote 13 – The text notes floods will still occur above the maximum flood elevation for which floods are managed. It should also describe how often that occurrence is expected and the associated effects. This will help provide context for the reader in the amount of flood risk reduction each alternative provides.

Page 49, Section 2.3.2.5.2, last paragraph – The text notes that local landowners do not support removing their land from agricultural production. This is an important consideration when discussing the feasibility of the proposed mitigation measures later in the document, and should be considered in addressing uncertainty of the various mitigation concepts.

Page 50, Table 2.11 - The table should define the categories used. It is not clear what Non-agricultural refers to. We presume the table is a list of flood damage reduction benefits, but it is not clear what is being counted. This should also be specified. The term "excess benefit" should be defined for the reader.

Page 55, first paragraph – The USFWS's Draft Fish and Wildlife Coordination Act (FWCA) report (Appendix Q) provided numerous, peer-reviewed literature documenting the importance of less frequent (> 5-year flood) flooding on commercially and recreationally important native fish species. Adequate analysis of project effects should include an evaluation of effects to those resources as well.

Page 57-58, - Please clarify the meaning of these paragraphs. They first describe examples of several bottomland hardwood communities in the project area that require various durations of inundation, and then state the river does not flood at those durations. It would be easier for the reader to understand that the entire project area reflects a combination of backwater and riverine flooding, headwater flooding, local precipitation and drainage patterns. The fact that these wetland communities persist demonstrates that in most years a combination of these factors meets those inundation patterns. In any one year it may be headwater flooding, river flooding, backwater impoundment, or any combinations thereof. River stage is a major factor not only in direct inundation of the Floodway, but also backing up drainage in both the Floodway and the St. Johns Basin during high river stages. Some years this can stretch over a period of months.

Page 59, second paragraph – The text appears to be at odds with Figure 3.10. That figure indicates a significant portion of the project area can be classified as prime farmland *with sufficient drainage*. It is not clear how much of that acreage currently has sufficient drainage. In

fact, the 2000 EIS (Page 36) for the project notes NRCS personnel indicated very little of the project area qualifies as prime (or unique) farmland due to flooding. Perhaps this has changed since 2000, however, the current DEIS argues that agricultural production in the project area is constrained by frequent flooding, thus the need for the project.

Page 62, Section 3.5 – While this section correctly notes the project area has been extensively modified, it erroneously conveys very little ecological value remaining under current land use. The fourth sentence states that the flood pulse is not a driving factor for the ecology of rivers that have been broadly manipulated. This assertion is significant, is at odds with the information presented in the USFWS's Draft FWCA report (including numerous-peer reviewed articles) and should be well-supported with citations from scientific literature. The text following that assertion lacks justification to support the statement, and is largely irrelevant to the statement subject matter. The scientific literature is rich with examples from around the globe of restored and managed functioning floodplain ecosystems in large rivers that are highly modified to eliminate channel meander and regulated for human use, exactly like the Mississippi River. Furthermore, Ward et al. (1999) warned against a "give-up attitude" where river-floodplain interactions have been severely restricted, and called for ecologically sound restoration of disturbance regimes and connectivity to restore, what the Authors called, "islands of biodiversity and endangered ecosystems." Despite flood control efforts and water management along the Mississippi River, it is clear that flows are indeed dynamic (e.g., recent extreme floods in 2010 and 2011, and extreme drought in 2012). Therefore, ecologically based theory such as the Flood Pulse Concept (FPC) and Low Flow Recruitment Hypothesis (LFRH; see Humphries et al. 1999), is directly relevant to our understanding of the importance of the remaining dynamic hydrology of the river that shapes ecosystem function. Thus, Ward and Stanford (1995) recommend the focus of restoration efforts on reestablishing dynamic connectivity between the channel and floodplain.

While terrestrial practices directly affect the terrestrial environment, Junk et al. (1989) emphasize the aquatic-terrestrial-transition-zone (ATTZ), and its dynamic nature, as a critical component to the FPC. To quickly discount the applicability of the FPC when comparatively little management attention has been given to the aquatic component of the ATTZ is not scientifically justified. Furthermore, it is not clear that these agricultural practices were the "principle driving force responsible for the existence, productivity, and interactions of major biota" during the summer flood 2011, as was implied in the third to final sentence. The example given in the second to last sentence as an attempt to support its previous statement is another example of bias; the decisions to assign parameter values to the few habitat types partitioned out for modeling purposes seem subjective and appear to lack scientific rigor.

Page 63, Section 3.5 second sentence – To suggest that the most powerful farm tractor and disk combination can mimic the same level of ecosystem disturbance-benefit regime as a Mississippi River flood event, is a gross misinterpretation and reflects a significant under appreciation for the extent of ecosystem benefits provided by a flood disturbance on a floodplain landscape. The text fails to note an alternative interpretation here that is *rooted in ecological theory from the scientific literature* on the importance of scale in ecology and ecosystem disturbance (see the seminal award winning research article on the topic of scale in ecology by Simon Levin published in Ecology in 1992; other works were published on the topic in the specific context of

rivers and streams (e.g., Schlosser 1991; Poff 1997) as noted in the USFWS's Draft FWCA report). The literature shows persuasive evidence that large floods do indeed act to reset ecological conditions on the floodplain. The relationship between degree of flooding and extent of ecological conditions that are reset are unmistakably linked by the real effect of scale.

Large floods that "destroy" crop fields are interpreted as a resetting of the ecosystem template; as such, the farmers' response to large scale flooding is a reflection of their desire to alter (generally towards homogenization) the already reset ecosystem state after flooding. Further, annual plowing of monotypic agricultural fields may maintain open habitats for shorebirds, however it does not qualify as a disturbance towards resetting ecological conditions to benefit the river-floodplain *ecosystem*; not within the project area, and most certainly not in the context of any ecological benefits that should be transferred to the ecosystem outside of the defined project area. Moreover, the floodplain habitats (i.e., conservation areas, state parks, Wetland Reserve Program (WRP) tracts, water bodies and ditches) not under agricultural production owe much of their fish and wildlife values to such floods. Finally, this section takes an erroneously narrow view of the flood pulse, addressing the effects of the pulse only in terms of floodplain interactions. It does not note that, notwithstanding current land use practices, seasonal riverine flooding of the Floodway—particularly large flood events—does reset riverine processes, including recruitment of many species of native fishes, as noted in the USFWS's Draft FWCA report (Appendix Q).

Page 73, last paragraph – As noted above, the text should provide context and significance of the effects between early and late (June) planting (i.e., one bushel per acre per week) on the overall harvest and income of the producers in the affected areas. For example, what amount of reduction is that in terms of total harvest? How significant an effect is that, and how often does it occur? We question whether public policy decisions can guarantee farmers or other businesses optimized yields every year, which is a very different purpose than protecting lives and property by reducing flood risk.

Page 74, paragraph 3 – We agree that the flood pulse still provides floodplain functions; in fact we assert that it is the primary mechanism for maintaining many of the "limited" environmental resources listed here. Therefore, please refer to our previous comments about the critical role of flood pulses and the applicability of the FPC to Mississippi River and the project area.

In addition, the wetlands analyses further underestimate impacts by not including all wetlands potentially affected by the project because the Corps limits the analyses to areas within the 5-yr floodplain. That ignores effects to thousands of acres of wetlands that will have reduced inundation as a result of the project. Those areas are not analyzed in the species models, notably the fisheries analyses which are also inappropriately limited to the 5-year floodplain. This should be rectified in the final document. We reiterate that farmland can provide significant wetland functions, in this case, critical floodwater storage. That storage is important not only as fish and wildlife habitat, but also for reducing river stages in the adjacent reaches of the Mississippi River. To be scientifically credible, the areas used to determine economic benefits of this project because of reduced flooding should be the same areas analyzed in the wetlands impact assessment. This is a significant issue in determining wetlands effects and developing appropriate compensatory mitigation. The differences between the Corps current wetlands

estimates and those of the USFWS are far too large to be discounted, and therefore must be addressed.

Page 78, Section 3.8.1.2, HGM Wetland Classification – The hydrogeomorphic (HGM) classification system is not being used in Missouri to evaluate project impacts and compensatory mitigation under Section 404 of the Clean Water Act because it involves multiple assumptions and complex computations making HGM complicated to use and difficult to interpret. The use of FCU's for each function and each alternative is complex and confusing. For example, there are 6 functions performed by the Low Gradient Riverine Overbank and Backwater flooded subclasses. In the DEIS, there are multiple alternatives and multiple categories of HGM assessments (e.g., LGRO/LGRB vs. WRP vs. Flat vs. CD, with project, without project, etc.). The document does not track and analyze how field data were used for FCI calculations, and were then incorporated into FCUs. Because flooding frequency and duration variables are not easily calculated in the models, the effect of a change in these variables is very small regardless of the ecological effect reduced flood frequency and duration have in the project. In addition, there are no protocols within the method for tradeoffs among wetland types. That, coupled with its limited application (i.e., not applied to all wetlands in the project area nor sensitive to the anticipated hydrologic changes) to this project does not provide a credible wetlands functional evaluation.

Page 85, Section 3.8.5 Fisheries - Contrary to the text, the importance of the project area to fishes is not that it supports "ubiquitous, tolerant fish species," but that 90 species have been found there, including many regionally rare species (Appendix G). While aquatic habitats in agricultural areas of the Bootheel are subjected to a number of water quality threats, the fact this area continues to support these species is extremely important to Missouri's biodiversity.

The third paragraph should be clarified as it implies the citations were based on work from the project area. The three references cited to support the claims that that the project area is of low ecological value to fisheries are at best weakly relevant to big river floodplain environments. Miranda and Lucas (2004) used fish assemblage data from lakes; Wang et al. (1997) studied watershed scale land use on small lotic systems (2nd– 5th order streams) in Wisconsin but did not account for the effect of dams (known to be a significant factor in distribution and species assemblage composition in Wisconsin); and Sullivan et al. (2004) concluded that the fish assemblages of small (upland?) streams in Indiana set within an agricultural-dominated landscape are driven by stream channelization – which the study's Authors noted results in deeper depth, higher velocity, higher gradient, and increased erosion.

Page 86, paragraph 2 – The citation for Jester et al. (1992) should be added to the 11.0 References Section. Generally, in a habitat suitability index or habitat quality assessment, the metric values and their interpretation must be considered in the context of the biota (in this case, fishes) expected to be in the study area based on a reference condition or site. The presence of some upland stream fishes in upland streams may indicate the relative health of those environments, but the presence of big river floodplain fishes should be used to indicate the relative health of big river floodplain environments; metric values derived from upland stream fishes should generally not be used to evaluate the health of big river floodplain habitats.

In contrast to the underlying tone throughout the paragraph, the biotic characteristic "tolerance" is not necessarily an indicator pointing to poor big river floodplain habitat quality. The processes of natural selection and the fluctuating nature of floodplain environments dictates that fishes using floodplains tolerate rapid and/or extreme shifts in conditions (e.g., water level, water chemistry). Such tolerance is not a signal of low "value," but instead a specialized adaptation to harsh and unstable environments (e.g., see Matthews 1987) that should be protected and conserved. Although pallid sturgeon have been shown to use floodplain habitats during floods, it is an excellent example of a species that has adapted to dramatically variable river conditions and is an indicator of riverine health. The fact that the pallid sturgeon has persisted for over 65 million years clearly demonstrates the "tolerance" or adaptability of the species (notwithstanding dams and over harvest). As the pallid sturgeon demonstrates, it is possible to have tolerant fish species that indicates high habitat value; a concept that appears to be missing from this section.

Finally, we disagree with item 3 attributing bed degradation in the New Madrid Floodway to fluctuating Mississippi River levels during floods, and recommend the item be removed unless supported through scientific citations. Bed degradation is a well-studied response to stream/river channelization and interrupted sediment dynamics (note our comment above re: Sullivan et al. (2004)). Because the ditches and water bodies in the Floodway have been extensively channelized and repeatedly dredged, bed degradation is not unexpected. In fact, the text notes that grade control structures appear to limit bed degradation in the St. Johns Bayou Basin. This would appear to suggest the Mississippi River channel is incising, the effects of which would be expected to migrate up its tributaries.

Pages 94-96, Section 122 Items – This section should define Section 122 and what is included. Noise would not appear to be a socioeconomic resource. In fact, Section 3.6.2 appears to cover much of what would be expected in a socioeconomic profile. These sections should include information relevant to the project area rather than, generic descriptions of the types of items that might fall under each category. For example, in Section 3.14.4, Displacement of People, how many people are displaced, how often, and for what reasons? How will each alternative affect those numbers? This same approach should be applied to each item identified in this section.

Page 95, Section 3.14.6 – This section should be revised to include information on the subject matter supported by citations. There is no data in this section to use in comparing effects of various alternatives. In addition, it would be informative for the reader to include, either here or the earlier socioeconomic section, a more complete economic profile, including government assistance and transfer payments, to better characterize the local economy and income base. Again, this will allow a more complete baseline against which to compare effects of the alternatives under consideration.

Page 99, Section 4.3, Land Use – The USFWS continues to disagree with the claim that there will be no conversion of forested wetlands to agriculture. We believe that project-related drainage will essentially reduce the inundation of some tracts of forested wetlands such that they will no longer meet Clean Water Act jurisdictional criteria. The Corps has provided no site specific analyses to support their assertion that water will remain in wetlands but not in adjacent agricultural lands that are included in economic benefits of reduced inundation. Although not

included in this version of the DEIS, previous project documents showed significantly lower water levels (i.e., up to 8 feet lower) in both the pools and ditches of the St Johns Bayou and New Madrid basins. Those levels can greatly influence the inundation and saturation of surrounding lands, which is the project purpose, degrade/drain existing wetlands, and constrain opportunities for future restoration/mitigation. Information on water levels of all project reaches should be included in Appendix C so that the reader can understand the effects beyond the interior pools currently depicted.

Page 100, second paragraph – The USFWS was not part of an interagency team that developed WRP projections for future conditions. While we understand the Corps' desire to realistically forecast future land use changes, we believe increases in WRP are far too uncertain to include as an underlying assumption in future conditions. As we noted above, page 49 acknowledges that local landowners do not support removing land from agricultural production. Given declining federal conservation funding, sharply increasing commodity prices, and increased drainage throughout the project area, we find the projected increase in WRP acreage unsupportable.

Page 103, Section 4.3.1 Prime Farmland – Please see above comments regarding clarification of existing acres of prime farmland. As currently written this section is confusing in that the purpose of the project is to improve drainage in the project area. While the document appears to portray most of the area as prime farmland (questionable), we fail to see how reduced flooding is not considered an impact given the project purpose. One would expect that the drainage "benefits" to farmland in the project area would be significant as portrayed in the economic analyses. Thus we recommend in addition to clarifying what is currently or will be considered prime farmland, this section also define what is considered an impact.

Page 107, Table 4.5 – Please include the percentage of time the existing structures in the St. Johns Bayou will be closed. We assume these figures have been averaged and annualized.

Page 108- 109 – The Corps presents no analysis or methods to support their claims regarding the effects of the New Madrid levee closure and both new pumping stations. That analysis should be included (i.e., as an appendix), and updated as appropriate to understand those analyses. We understand that the Corps is framing the Floodway drainage area with respect to the entire drainage area for Mississippi River to provide large-scale context. We recommend they use the same approach to frame the expected agricultural benefits of the project with respect to agricultural production and economics in the Mississippi River Basin as well.

Pages 109, Section 4.5 – The tables referenced in the text are very informative. We recommend this section include a summary or include major points of data to help the reader understand significant effects. It appears the greatly reduced connectivity of both basins would occur either during flooding events, when the river would normally be connected to floodplain habitats, and during the winter throughout the waterfowl season. Based on the footnote, we assume the gates would be closed December through January. This significantly reduces ecological interactions between the river and the floodplain, and essentially eliminates those interactions during high flow events (with the exception of Floodway operations). This should be better explained in the document as the current text does not adequately address the topic.

Page 110, Section 4.6.2 – The generalized nature of the discussion in the text is not commensurate with other resource discussions. There are no quantitative data provided for "social resources" against which to evaluate the alternatives. Table 4.6 briefly notes average days per year that roads would be overtopped, yet there is no discussion of what type of road it is, how many miles are overtopped (i.e., a quarter mile of farm roads or miles of 2-lane or Interstate highway) or how many residents would be affected by those particular roads. Finally, flooded roads is the only "social resource" identified in this section and is only one aspect of infrastructure; the text does not address effects to the local communities. Finally we believe the statement "Residents that are currently impacted as a result of flooding could, for the first time, receive the services and protection afforded the majority of the country" is misleading. The federal government, consistent with national policy and statutory authorities, has spent millions of dollars providing various levels of flood protection to both basins in the project area as well as other forms of assistance. Consistent with federal policy, most of the country does not live and work in federally-designated floodways.

Page 111, Section 4.7 Economic Resources – Please see our general comments regarding economic evaluation of floodplain functions for recommendations to adequately address evaluating existing floodplain services and impacts from each alternative. In addition, this section erroneously implies that compensatory mitigation costs are known, and can be used to distinguish among the alternatives within tens of thousands of dollars over the life of the project. As previously noted, the USFWS does not believe the costs of mitigation have been adequately addressed. Rather, the Corps *estimated* potential mitigation costs based on modeling of mitigation *concepts*. The models use a number of significant assumptions that have not been validated, and the feasibility of what is proposed is never addressed. Thus, we conclude the costs are greatly underestimated.

Page 117, Section 4.8.1, Wetlands – Please refer to the USFWS's previous comments regarding the appropriate scope of analyses for wetlands effects for each alternative and assumptions regarding WRP and land use. The current approach does not consider tens of thousands of acres of functional wetlands. The text is also confusing. The Corps is counting thousands of acres of benefit from reduced flooding for construction alternatives. Yet the second paragraph states there would be no impacts to prior converted areas or other wetlands that presumably would have enhanced drainage as a result of this project. The USFWS continues to assert that effects to habitats would occur over the same geographic extent as agricultural benefits, due to reduced flooding/inundation regardless of the source of the water and should be considered in the DEIS.

Page 119, Table 4.12 – This table is confusing and does not help the reader in understanding what acreages were used for each alternative.

Page 120 & 121, Table 4.13 and 4.14 - As noted in our previous comments regarding the inadequacy of the HGM as an assessment tool for this project, this table indicated the FCU of farmed wetlands in the Floodway is 0. This is at odds with the extensive information provided by the USFWS, the Independent External Panel Review, and described in the Corps fish and wildlife models. Given the absence of documentation on the assumptions in the models or their applications, such inconsistencies invalidate this approach.

Pages 121 and 123 – Please refer to previous comments regarding the apparent inadequacy of the HGM model to reflect hydrological changes anticipated under each alternative. Because of this limitation, the Corps' conclusions regarding changes in jurisdictional status of wetlands post-project are unsupportable and misleading.

Page 134, Section 4.8.1.8 – Please refer to our previous comments regarding the inadequacy of the wetlands analyses and the proposed mitigation measures. Not only would there be a dramatic loss of wetlands and associated aquatic resources, but the mitigation measures at best, would only offset a small portion of those losses, *if* they were implemented *and* worked as predicted. To present compensatory mitigation as a net benefit of a project is incorrect and misleading.

Page 135, paragraph 2 – Although the USFWS was intimately involved in development of the original HEP approach, we have consistently maintained that the Corps' application does not account for forested wetlands that will be lost as a result of being cleared due to post-project drainage and agricultural conversion. In essence, the Corps is restricting its evaluation to the construction footprint and does not include the reasonably foreseeable indirect effects to forested wetlands caused by changes in land use and hydrologic changes. This type of analysis is not in keeping with the spirit and intent of NEPA. This position is detailed in almost every Fish and Wildlife Coordination Act Report and Planning Aid letter we have provided for this project. Our latest input (Appendix Q) maintains this position. Therefore, please revise this section to better reflect the USFWS's input and the controversy/uncertainty surrounding this issue.

Page 138, paragraph 2& 3 – Please refer to the USFWS's previous comments regarding the adequacy of HGM as an evaluation tool for hydrological changes associated with project alternatives. Please revise this section to reflect interagency deliberations and areas of agency agreement and disagreement.

Project-related drainage and agricultural intensification will be an issue for those species which are identified as benefitting from reduced flooding (*Ambystoma sp.).* Forested habitat is just as important as the wetlands themselves because *Ambystoma* salamanders, as well as other salamanders and many frog species occupy those habitats outside the breeding season. Also, reduced flooding frequencies could create hydroperiods which provide unsuitable conditions for breeding (e.g., not enough water or water for too short of a period). In addition, amphibian breeding depends on a number of environmental triggers. If these triggers don't coincide with appropriate water levels, breeding may be affected. We agree that the number and abundance of *Nerodia* species is also likely to be negatively impacted by reduced flood frequencies. In most *Nerodia* species, fish constitutes a large part of their diet; a reduction in fish would negatively affect their forage resources. Finally it appears the last sentence should state"…overall numbers are likely to decline…" which we believe is true.

Page 139, first paragraph – The USFWS believes projected duck use days (DUDs) are likely overestimated for future project conditions because those analyses do not include clearing of forests associated with reducing inundation and includes more WRP acres than reasonably anticipated, as noted in our previous comments.

Page 143, Section 4.8.3.4 – This section should note the losses of spring DUDs which is a significant negative impact of the project. Furthermore, the timing/availability of habitat is very important in waterfowl migration which is not addressed in this section. Potentially flooded acres of habitat in December and January do not offset habitat losses in February and March as implied in that tables as "Net Change." While we understand the modeling exercise for the winter sump, until a management plan is developed and agreed to by the local sponsor, the purported DUDs for impounded water are highly speculative. In addition, closing the drainage structure in the Floodway would further limited post-construction fish access to that area.

Page 149, first paragraph – While we agree that reforesting agricultural lands is an environmental benefit to fish and wildlife, project effects should be evaluated using all relevant information for the alternative. According to the DEIS, there are approximately 13,340 acres of agricultural lands that would potentially be in the area to be reforested. That must be evaluated for shorebird habitat as it was for other resource categories.

Page 149, Section 4.8.4.6 – This section notes the innovative nature of the shorebird model and provides context for that tool. It appears, however, that this particular model has additional caveats that are true of other models, yet are not included in the write-ups. For example, the HGM models, variables, and assumptions have not been validated for this project. The economics used best professional predictions regarding production rather than actual production numbers. Furthermore, the Fisheries HEP and Access study have not been validated. As written, the reader is left with the impression that the caveats for the shorebirds model are meant to undermine the significant (and in some alternatives almost total) loss of shorebird habitat as a result of the proposed project.

Page 150, first paragraph - We recommend that the last word be revised from "theory" to "practice." There are increasingly greater project planning efforts that already explicitly incorporate best available information on climate change effects. Incorporating scenarios, while not necessarily highly predictive, help the public understand the variability of benefits/costs if climate changes lead to different precipitation and runoffs events. The science of climate change has come a long way in the last few years with multiple agencies incorporating future modeling forecasts into long-term project planning.

Page 150, paragraphs 2 & 3 – Nursery habitat not only provides foraging opportunities for age-0 fishes, but it must also provide 1) protection from predators because it is a time of high vulnerability to predation, and 2) benign environmental conditions to promote rapid growth. It is not clear why these other two critical functions of nursery habitat are not discussed in the same way as food availability; it appears the model EnviroFish does not include them. Further, it is not accurate to suggest that larvae that have exhausted their yolk-sac and have begun exogenous feeding have joined in the trophic arena as direct feeding competitors to adults. Relative to adults, age-0 fishes are typically gape limited and have considerably different locomotion capacity, thus will typically feed on different food sources than adults; immediate post yolk-sac larvae and more developed age-0 fishes should not be expected to feed on a parallel with adults. Furthermore, the text provides no support for the summary information about the model EnviroFish. It seems there is only limited and abstract relevance between the model EnviroFish output metrics and the floodplain fish nursery habitat it was used to evaluate. Please see our

previous comments regarding limitations detailed in the shorebird model and the need for similar disclosure for all modeled resource categories.

Pages 152-153, Assumptions with Fisheries HEP – The USFWS does not agree with the assumptions that flooded fallow or agricultural lands within the 2-5year flood elevations have no habitat value. In addition, we do not interpret the IEPR's recommendation to maintain a minimum of high quality habitat which cannot be offset by large amount of low quality habitat to mean that large amounts of lower quality habitat have no value. In fact, without flooded lower quality habitat, some of the higher quality habitat that we know is used by the fish would not be accessible. We believe item 6 inaccurately limits the areas the Corps is considering in their project evaluations.

Page 155, item 11 - The unsupported assumption of future WRP increases in the project area contributes to erroneously inflated estimates of fisheries habitat value under all project alternates. This assumption should be corrected, or the models run with and without that assumption to better reflect the most realistic future conditions in the project area.

Page157, Paragraph 2 – The 5-year flood frequency is too limiting and does not evaluate and characterize the fisheries habitat value of much of the project area. As the USFWS noted throughout project coordination and in our Coordination Act report, extreme floods (e.g., 50, and even 25 year) have an exponentially larger effect on fisheries than 2 and 5 year floods and should be included in impacts assessment and mitigation.

Page157, Section 4.8.5.3 Fish Access – Please refer to the USFWS's previous comments regarding critical problems with the Fish Access methods, conclusions and use as an evaluation tool (Appendix Q).

Page160, first paragraph – The suggestion in the fifth and sixth sentences that naturally functioning floodplains are unnecessary because native warm water fishes are robust and therefore they should simply choose to find another place to spawn and rear young is erroneous, scientifically invalid, and at odds with USFWS input (Appendix Q). The "flexible spawning behaviors" cited in the fourth sentence of the paragraph are rooted in temporal variation, not in physical habitat requirements; fishes can't simply shift from a nest guarding reproductive strategy (common in floodplains) to an open substrate spawning with associated downstream drift reproductive strategy (common in riverine environments). The most relevant example of a "flexible spawning behavior" adaptation to unpredictable environmental conditions (e.g., floodplain access) is protracted spawning; some fishes have the ability to hold their eggs until conditions (in this case access to floodplain) are appropriate despite other environmental cues (e.g., rising hydro- and thermograph). As currently written this paragraph indicates fish that are unwilling to access the floodplain through culverts can be expected to find another accessible suitable floodplain to spawn and rear their young. This is misleading in that there is no other accessible floodplain habitat; it is expecting floodplain fishes to survive without a floodplain. The USFWS does not agree that the mechanisms for spawning robustness demonstrated by some river-floodplain fishes that were identified in Junk et al. (1989) and Sparks (1995) should be used as supporting evidence that access to floodplains is unnecessary for floodplain fishes.

Page 170, first paragraph – Fish species diversity in water bodies is also correlated with degree and duration of connectivity (Whitledge et al. 2005). Logically, actions to mechanically limit degree and duration of connectivity will negatively impact fisheries.

Page 181, Section 4.9.2.3, Bald eagle – This section does not describe anticipated effects to bald eagles which could include reduced foraging resources and increased disturbance to nesting territories adjacent to the project area, as well as potential damage to unknown nests. Therefore, the revised document should include those effects and project plans should explicitly require surveys of all construction reaches to determine if nests are in the area. If so, the Corps should coordinate with the USFWS's Missouri Ecological Field Office. Bald eagles are still protected under the Bald and Golden Eagle Protection Act.

Page 180, Section 4.9.2.1 and 4.9.2.1 – These sections fail to address impacts to the Interior least tern and pallid sturgeon. The DEIS does not include the USFWS's draft BO in spite of discussions with the Corps that indicated they would include it in the DEIS. This section is considered inadequate because anticipated effects to the species and the USFWS's input are not disclosed. This should be corrected.

Page 187, Section 4.11.2 - The DEIS describes in alternative 2.1 that significant secondary effects are not expected, because these ditches are not natural streams. It goes on to say that agricultural ditches in the project area consist of straight, trapezoidal channels with a relatively flat, uniform bed devoid of substantial structure and that all ditches undergo routine vegetation and sediment removal. Following channel enlargement, ditches will still be morphologically similar (straight, trapezoidal channels with limited structure). Therefore, the lower 3.7 miles of St. Johns Bayou where the transverse dikes are proposed to be constructed will provide little habitat because of regular channel maintenance. These comments are similar for Mud ditch in the New Madrid Floodway. Therefore, they should be thought of reducing adverse effects to the stream and thus compensatory mitigation for the in-stream work is inappropriate and inconsistent with the Missouri Stream Mitigation Method (MSMM).

Page 188, Section 4.11.2 - The USFWS does not agree with the statement that no impacts will occur in the upper 7.8 miles of St. James Ditch because bottom widths of the channel remain unchanged. The DEIS makes this assumption, as evaluated under MSMM, even though the top width of the left descending bank will be widened. When work occurs below the ordinary high water mark of Waters of the U.S., it may be subject to Section 404 of the CWA and review under the MSMM. There are no criteria that exempts from MSMM projects that modify other aspects of a stream beyond bottom width.

Page 190, Ecosystem Services – Please refer to our general comments and the links previously provided for additional resources for tools to more comprehensively evaluate the economic implications of effects to ecosystem services. They should be incorporated into the final analyses and NEPA documents.

Page 206, Recreation – This section should note that existing conditions provide inundation that not only maintains fisheries-based recreation in the project area, but also contributes substantially to the recreational opportunities in the adjacent river reach. Under all project

alternatives, recreational opportunities associated with fish and wildlife will decline due to habitat losses that support recreationally important species. Again, this section should also contain economic information regarding recreational use and impacts of each alternative to those uses and dollars.

Page 208, first paragraph – Missouri does not have a waterfowl hunting season in February. In fact, in many years, it is over by mid-January in the project area.

Page 208, second paragraph – The text misleadingly states Alternative 3.2 "allows varying levels of flood water to naturally inundate the Floodway between November and May each year." The entire DEIS documents the dramatic effects of Alternative 3.2 which cannot be characterized as natural. In fact, the Corps notes special management of the drainage structures to modify the natural flooding patterns in December and January to benefit waterfowl. This section should be revised to provide an accurate description of the effects of this alternative on recreation in the Floodway. We do not agree with the assertion that there are fisheries benefits from low level floodwater that improve fishing stocks. Rather this alternative would dramatically lower fish stocks by closing the floodway and significantly draining it. This is contrary to the Corps own assessment models as well as the science provided by the USFWS.

Page 208, Section 4.14.8 –Rather than provide benefits to recreation, the proposed mitigation measures are uncertain and considered to be inadequate. They would, at best, offset only a small portion of the project-related recreational losses rather than provide benefits. Compensatory mitigation is not a project benefit. This section should be removed.

Page 209, Section 4.15 – Please see our previous comments regarding Section 122 items. This section should define Section 122 and what is included. These sections should include information relevant to the project area rather than, generic descriptions of the types of items that might fall under each category. We note that the text indicates that all alternatives have similar effects to Section 122 resource, including "Displacement of People, "Community Cohesion," "Local Government Finance, Tax Revenues, and Property Values," "Displacement of Businesses and Farms," "Public Services and Facilities," "Community and Regional Growth," and "Employment." Given that all alternatives have similar effects, the Department strongly recommends the St. Johns Bayou portion of Alternative 3.1 become the preferred alternative. That alternative would avoid fish and wildlife resource losses from the levee closure, and provide many of the benefits estimated for Alternative 2.1 with no substantially different impacts to Section 122 items.

Page 214, Section 4.18.2 – It is our understanding that Closure alternatives would require the purchase of additional easements in the Floodway related to Floodway operations. Those and any other requirements should be fully described and numerated in this section.

Page 214, Section 4.19 – We disagree with the characterization in the text. There will be dramatic losses of nationally significant fish and wildlife resources that cannot be mitigated. The loss of a connected floodplain will not be offset by either the proposed mitigation measures, or the loss of forested wetlands that have been drained as a result of pump operations. Since this

section references the interagency team; it should disclose the significant controversies among team members regarding the Corps assertions as described in the document.

Page 214, Section 4.20 – Given the controversy among resource agencies regarding the Corps assessment tools and application of those tools to existing conditions, we note the attempt to apply those tools to historic conditions is scientifically unsupportable and misleading. While we understand the desire to provide context, a discussion of approximate acres is far more appropriate, if necessary. The focus of the analyses should be the effects of this project on the remaining resources in the project area. The value of the fish and wildlife habitats affected by the project are, in a large part, a result of their current scarcity.

This section does not consider the cumulative effects of the project on agriculture. Similar to our previous comments, the predicted benefits should also be presented against the agricultural footprint in Missouri and the Lower Mississippi River basin. How much agriculture has been added coincident with the loss of natural habitats? What portion of existing agricultural product in the state is produced in the project area? What would be the *increment of change* under each project alternative for the project area, for the state, and the Lower Mississippi River basin? This would more fully and consistently disclose project effects across various resource categories.

Page 222, Present – Please refer to our previous comments regarding project areas resources and effects analyses. Those comments apply as well to this summary section.

Page 227, second paragraph – While we appreciate the concept of applying lessons learned to measures to improve fish and wildlife habitat, there is more than enough existing literature to support adaptive management of existing pumping stations throughout the Memphis District. In fact, with or without this project, there are opportunities to manage the existing pumping stations in the project area for wildlife habitat, should the Corps and local project sponsors choose to pursue that. This document indicates there is very little interest in those opportunities during spring shorebird or waterfowl migration because of the desire to *optimize* agricultural benefits.

Page 227, third paragraph – Insert "significantly reduced" before the word "level' to more accurately reflect project effects. In addition, please refer to the reference provided in our general comments regarding monetization of floodplain functions and economic impacts of the proposed project. Given the information in this document, the contention that this project could "significantly restore connectivity to the Mississippi River and its floodplain…" is contrary to the DEIS purpose and need, as well as the analyses and evaluations presented. This sentence should be deleted.

Page 228, MR & T Project – We continue to object to characterizing compensatory mitigation as net resource benefits to this region. Far from compensating the losses, the project will result in an unacceptable loss of nationally significant fish and wildlife resources, including important aquatic habitats for spawning and rearing aquatic species. The Corps' assertions to the contrary should be revised throughout the document. In addition, "hydrologic restoration" is clearly a misnomer. A culvert in the mainline levee is nothing like the historic overbank and sheet flow that occurred throughout the historic Mississippi River, including the area of the park. In

conversations with MDNR staff, they noted to the USFWS that their proposed plan for water management at the park would only *offset the effects to the park of the New Madrid Floodway closure and pumps*. It would not, in their opinion, offset impacts to other resources or areas beyond the park, nor to the entire Lower Mississippi Valley. Such unsupported claims should be deleted. Interests along the Lower Mississippi Valley need not wait on this project to begin to adaptively managing existing structures throughout the basin.

Page 231, Scenario 1 – The discussion in this paragraph does not seem logical. It is not clear what interior sump conditions would exist with higher precipitation events. In addition, potential fish and wildlife benefits from the no action scenario would be foregone with any of the project alternatives. The reference to site-specific impacts to shorebirds and coastal sea-level rise is without foundation. Neither is there any mention of the effect of loss of a connected floodway on river stages up and downstream of the project area given greater precipitation and runoff occurring over a short period. Rather than disclosing most likely conditions, this Scenario offers speculation that is contrary to the information in the document. While it would be impossible to investigate all potential scenarios, the Corps could include 2-3 additional, most likely scenarios based on perhaps a ±5 % (?) increase in precipitation/runoff in the River Basin during the spring. Other simple scenarios could be examined as well. It would allow the reader to understand the sensitivity of the hydrologic and assessment modeling to climatic effects and precipitation inputs. The USFWS has previously requested this analysis, and continues to recommend its inclusion in the document. This section (entire approach) should be revised to address all project resources more credibly, and should be reviewed by the IEPR.

Page 232, Loss of Connectivity – This section is misleading in that it does not acknowledge the importance of the Floodway connectivity to the river. The system is as close to natural as can be found along the Mississippi River in the state of Missouri, and few unmanaged systems in the lower river come close. The Headwater Diversion Canal does not fall into this category (heavily leveed with limited fisheries access and habitat diversity). Actually, that the Corps is proposing to affect what they calculate is more than a quarter of the available non-batture backwater areas in the region solely for the benefit of an undisclosed amount of additional bushel(s) of corn v. soybeans over a portion of the project area is not in keeping with contemporary goals described in the 2013 Principles and Requirements for water development projects. There is no scientifically credible way to offset losses of 27% of the backwater areas along the river reach. Please refer to our previous comments regarding Big Oak Tree State Park.

Page 234, second paragraph, last sentence - The text's recognition of the desire for agricultural optimization in the Lower Mississippi River is counter to the portrayal of this project and the results of the proposed adaptive management plan as all that stands in the way of other water development projects in the basin incorporating adaptive management.

Page 234, Cumulative Impacts Conclusions – Please refer to our previous comments regarding the misleading characterization of proposed compensatory mitigation measures as net benefits to environmental resources affected by this project. This entire section should be corrected in the final document to provide credibility to the decision making process.

Page 236, Section 5.0 – Please refer to our previous comments regarding the inadequacy of the proposed mitigation plan. The USFWS does not agree that the proposed mitigation complies with the Mitigation Rule. There is little or no supportive information that describes how the Corps determined the net benefit, monitoring/contingency, control/site protection, mitigation construction timing. No mitigation has been proposed by the Corps to compensate for in-stream habitat losses in the Setback Levee or St. James ditches. The proposed measures in the current plan are conceptual in nature, without validation of the underlying models, much less commitments to implement the actions on the ground.

Page 236, last paragraph – We support the "flexible mitigation strategy" as described here as the best way to fully consider and provide for the complexity of ecological interactions. Ideally, such a plan would explicitly include components to offset the loss of ecologically valuable extreme flood events (i.e., > 5 year flood; e.g., 50 year flood) on the floodplain. Unfortunately, restoration science has yet to demonstrate that those desired concepts can be successfully implemented on a small scale, much less the scale of the proposed project.

Page 237, paragraph 2 – While we agree that floodplain fisheries productivity is generally positively correlated with flood duration, fisheries science does not support the assertion that the lowest elevation areas are always the greatest benefit to floodplain fishes during periods of flooding. In the case of a more extensive flood event (i.e., high magnitude, long duration, etc.), the lowest elevation areas in the floodplain are likely to be excessively deep and swift for use as spawning and rearing habitat by floodplain fishes. The concept of the moving aquatic-terrestrial-transition-zone (ATTZ) presented by Junk et al. (1989) addresses the confounding issue of variable flood heights and how mother nature compensates for the loss" of "good" low elevation floodplain areas during extensive flood events.

The uncertainties noted in this and the preceding paragraph underscores the uncertainty in mitigation performance and adequacy on offsetting project impacts. In essence, to truly offset the loss of floodplain connectivity of the Floodway, compensatory mitigation would include reconnecting another portion of the Mississippi River Floodplain in this river reach. The Corps has provided not even a qualitative scenario (i.e., locations, timing, conditions) to demonstrate the feasibility for implementing the proposed action, regardless of performance. This is not consistent with the Mitigation Rule.

The DEIS notes that mitigation would not be complete until all impacted habitat/functional units have been compensated. Please refer to the USFWS's previous comments regarding the inadequate scope of analyses. In addition, there is no commitment to a specified output. We have previously documented our concerns with the inadequacy of the proposed mitigation package. The missing commitments and the very real caveat that all future adjustments will be subject to authority and appropriations does not provide the public with the assurances. The USFWS does not believe the proposed mitigation can compensate the loss of connection between the floodway and the river. Despite our requests, the Corps has yet to present any similar project where compensatory mitigation was demonstrated.

Page 238, last paragraph – While the Bogle tract does contain high quality habitat, we understand the previous owner made the decision not to clear the land over the last several

decades. In addition, the Corps has consistently maintained that there would be no conversion of forested wetlands to agriculture in the project area. Thus it is not clear there was any developmental pressure on the Bogle tract, which would affect determination of preservation credits.

Page 239, Section 5.1.1 - The document states "Restoring a connection can be problematic due to high costs (structures would have to be placed in the levee to allow for flooding), real estate issues (real estate would have to be acquired on all areas that would be subject to flooding), and social acceptability (the population that are afforded protection generally prefer this degree of protection and would not be in favor of doing away with this protection)." These assumptions create an unacceptable risk, and undermine the likely success of acquiring and operating mitigation lands as proposed.

Page 239, Section 5.1.1.1 – Please refer to our previous comments regarding the misnomer of hydrologic restoration for the park. DNR staff indicated the proposed restoration project would only offset effects on the park from the Floodway closure and pump. They would not compensate for losses outside the park. In addition, Appendix A, Figure 2.8 shows the location of the Corps proposed culvert. However, the park sits in a depression. To develop a functional restoration project, a minimum of 1800 acres (the rest of the depression) is necessary. Without it, DNR staff note the project would not be implementable. As previously pointed out, and as this document notes, the desire of landowners in the project area is agricultural intensification. Given increased drainage post-project coupled with high commodity, purchase of these lands is unlikely. Moreover, a gravity fed culvert/water delivery system should not be characterized as mimicking natural riverine flooding.

Page 243, Section 5.1.2.1 - The plan does not consider the temporal loss in wetland restoration. Temporal loss is a factor designed to compensate for the temporal loss of wetland or aquatic area functions due to a time lag in the ability of the enhanced, restored or created mitigation area to fully replace functions lost at the impact site. Different systems will require different time to reach levels of functional capacity level with the impact site. For example, if a mature bottomland hardwood wetland is impacted, it may take up to 60 years to replace all functions including structural habitat complexity. Compensatory mitigation estimates should include this function to correctly estimate benefits.

The DEIS states that in all cases, assumptions were made that wetland mitigation would restore microtopographic features, would restore site specific hydrology to the extent allowable, and trees would be planted by utilizing a variety of techniques that could include direct seeding/acorns, seedlings or natural regeneration. The term extent allowable appears to be a limiting factor and should be better explained. We recommend that seedlings or Root Production Method (RPM) trees be planted to assure a better success ratio.

Page 244, 5.1.2.2 Vegetated Riparian Buffer Strips – We support the proposed measures to establish forested buffer strips on one side of the channel and warm season grass buffers on the

opposite bank. Historically, the Bootheel was bottomland forested habitat, and thus we view riparian warm season grasses as a best management practice. The riparian woody buffer strip should be oriented to provide shading and vegetated detritus should be conveyed to the stream. A twenty-five foot wide woody riparian corridor, however, provides limited habitat benefits along a perennial stream. The MSMM requires a *minimum* buffer width of *50* feet on one side of the stream to earn mitigation credit. The MSMM also indicates that "Streams which are recognizably entrenched, unstable, or otherwise disconnected from their floodplains, and which require extensive stream bed and/or bank restoration are not considered good candidate streams for solely producing riparian buffer credit." As noted in our previous comments, the Missouri Interagency Review Team should review the Corps proposed mitigation framework and analyses to ensure they conform to the MSMM.

Page 245, 2nd complete paragraph – A critical component missing in these ecologically designed borrow pits intended as compensatory mitigation is establishing appropriate connectivity between the borrow pit and Mississippi River. In addition, the USFWS continues our objection to using borrow pits to compensate for connected backwater forested wetlands. They do not provide similar habitats, not only to fish but to other species. Trading one for the other is scientifically unfounded and contradicts previous assertions that the species models adequately cover the effects of habitat changes for other resources (e.g., reptiles and amphibians).

Page 246, first paragraph – Crediting existing lands managed for conservation is at odds with USFWS policy, scientific best management practices, and should not be considered. Using existing conservation lands for mitigation only further increases the inadequacy of the proposed mitigation measures. According to the MDC, those acres were acquired for fish and wildlife conservation and thus do not meet the statutory criteria of lands purchased to mitigate this project. Doing so puts the burden of mitigation acquisition on the taxpayers of Missouri rather than the federal government and project sponsors. We have a 1970s correspondence noting the MDC has previously turned down Corps offers to donate their land towards this cause. Using existing conservation lands as compensatory mitigation is unsupportable, at odds with Corps practices, and clearly holds a federal water development project to a lower standard than the American public. The Department objects to this.

Page 246, last paragraph – Floodplain lakes generally function on a longer time scale that other smaller floodplain water bodies. Floodplain-lake interactions with the river typically occur in association with higher magnitude flood events than 2-5 year floods. For floodplain lake restoration to occur, functional floodplain-river interaction mechanisms, such as those interactions that occur during high magnitude flood events (e.g., > 5 year flood), should be evaluated as a project impact and included in mitigation plans. In addition, batture lands fail to provide the backwater habitat that will be lost in the Floodway. As noted in the USFWS's Draft Fish and Wildlife Coordination Act report, areas with slower velocities and high temperatures have been shown to contribute to fish growth, especially young fish. Weirs in batture lakes cannot offset this loss.

Page 247, first paragraph – While the Department supports using the best scientific information available, the promise of using that in the future to do unspecified things is not an acceptable

mitigation plan for this project. We reiterate our concerns with the uncertainties of adequate and feasible compensatory mitigation for the Tentatively Selected Plan.

Page 248, assumptions – Our understanding of the New Madrid Floodway is that it is the area between the Mississippi River mainline levee and the Setback Levee. By definition, batture lands are those lands riverward of the mainline levee, and thus would be outside and adjacent to the Floodway proper. In addition, while we agree the current condition of much of the drainage in the project area has been significantly modified, we disagree with the editorial comment stating they only exist for agricultural drainage. Many of the larger ditches are modified natural waterways that still provide reduced habitat for aquatic species. In fact, regardless of land use, those areas are considered waters of the U.S. because of their value, and are not just a component of industrial agriculture.

Page 249, first paragraph – Please see our previous comments regarding the presentation of project alternatives and costs and benefits. Given the information in this paragraph, including the potential need for additional NEPA coverage of alternative mitigation measures, the costs and benefits of the alternatives simply cannot be determined. Nor does this indicate sufficient commitments and certainty to comply with the Mitigation Rule.

Page 250, last paragraph – We continue to disagree with the presumption that batture lands are an appropriate location to offset impacts in the Floodway, as detailed in the USFWS's Fish and Wildlife Coordination Act report (Appendix Q).

Page 251, Mitigation Zone 6: Ditches and Adjacent Riparian Areas – The benefits from establishing a riparian corridor are significantly undermined by repeated ditch cleanouts. Thus evaluation of proposed riparian compensatory mitigation credits should include consideration of periodic, repeated disturbance/loss of aquatic habitat and be appropriately discounted.

Page 255, Section 5.4.1,Wetlands, Ditches - The Corps projected that 699,685.6 credits could be achieved through mitigation, several mitigation measures would be used to fully compensate unavoidable impacts. The USFWS reviewed the Adverse Impact Factors for Riverine Systems Worksheet, the In-stream Work Stream Channel/Stream Restoration or Enhancement and Relocation Worksheet and the Riparian Buffer Creation, Enhancement, Restoration and Preservation Worksheet. There is little or no supportive information showing how numbers were put into the worksheet. The worksheet indicated that approximately 15 miles of stream would be adversely impacted and the DEIS stated channel work would occur in 23 miles of stream. If impacts will occur in 23 miles of stream, then mitigation debits required would increase to 1,045,656. Stream restoration is described as:

1. Construct nine transverse dikes in the lower 3.7 miles of St. Johns Bayou to create a low flow sinuous channel following construction.
2. Construct a bank stability structure at the confluence of St. Johns Bayou and Setback Levee Ditch to provide stability and structure.

3. Construct a bank stability structure at the confluence of Setback Levee Ditch and St. James Ditch.

4. Incorporate stable stream slopes along channel rights-of-ways.

We do not agree that the net benefits for items 1 and 2 should be 2 (rated as good). The stream enhancement activities are more accurately described as moderate (1.0). Only construction of the transverse dikes would provide an ecological lift to the stream system. Sinuosity patterns in the channel would not persist if periodic "channel cleanout," as is described in the project, would affect that feature. Restoration activities 2-4 are considered best management practices that would be required of any stream construction activity, and thus the project should not receive any restoration/enhancement credits for activities 2-4. Therefore, only the lower 3.7 miles of the project ditches should be considered for mitigation credits.

Page 258, Riparian Buffer Strips – Please refer to our previous comments regarding the proposed mitigation measures and best management practices.

Page 262, Batture Land - The Corps proposed to enhance 3,050 acres of batture lands. Mitigation in batture lands would not adequately compensate for wetland losses. Much of the batture lands are already connected to the Mississippi River and are wetlands subject to the flood pulse. The Corps' compensatory mitigation package does not demonstrate compliance with the Compensatory Mitigation Final Rule because of the uncertainties surrounding the timing, location, duration and nature of the mitigation measures in the batture lands.

Page 262, Ecologically Designed Borrow Pits – The decision to create 60 acres of borrow pit habitat because it is how much material would be needed to close the levee seems to give little consideration to the actual cost-benefit for fish and wildlife resources in the face of closing the levee. Closing the levee will eliminate access to far more than 60 acres of beneficial floodplain habitat for spawning and rearing fishes. It is not clear how the proportionally greater benefit of increasing flood magnitude during periods of high flow (e.g., > 2-5 year flood) would be expressed and realized by fish and wildlife resources in the static 60 acres of borrow pits. Junk et al. (1989) highlights the dynamic nature of floodplain habitats (e.g., the moving littoral, ATTZ, etc.) because floods are variable in magnitude and duration. Those qualities account for much of the value of those areas to fishes.

Page 264, Section 5.5, Compliance with Mitigation Rule - The mitigation rule requires that mitigation sites be sited and designed to ensure that natural hydrology and landscape position will support long-term sustainability and function as a self-sustaining system. Locational factors (e.g., hydrology, surrounding land use) are important to the success of the compensatory mitigation. The site must be ecologically suitable for providing the desired aquatic resource functions. It is important to minimize the active engineering features (e.g. pumps, water control gates). The mitigation plan must also include an active long-term management and maintenance schedule to ensure long-term sustainability (maintenance of water control structures such as levees and pumps, and provide long-term financing mechanisms. A successful mitigation site must be compatible with adjacent land uses. While this section discusses those concepts and potential options, there are no commitments or assurances that any of the lands proposed are available, much less secured. Nor are there any specifics regarding management or monitoring.

For these reasons, this proposed mitigation does not comply with the Mitigation Rule.

If a construction alternative is pursued, the Mitigation Plan should include a real estate instrument, management plan, or long-term protection mechanism used for site protection that has been approved by the IRT in advance of, or concurrent with, the impacts of the project. The IRT should be consulted to review the delineation of wetlands, use of the stream and wetlands assessment tools, specific site mitigation plans including planting lists, conduct compliance reviews, review monitoring reports, and ensure corrective measures are implemented if needed.

Page 272, Section 5.5.10 Adaptive Management Plan - Adaptive management will not ensure completeness for any alternative if there is limited authority and funding to implement remedial actions in the future. Monitoring in and of itself does not correct problems with mitigation.

Page 275, first paragraph – While this paragraph and others allude to operational changes as a potential option to align post-project resource losses with mitigation in place, nowhere in the document is there a description of what those modification might be. This gives the reader the impression that the purported options are not feasible or agreeable to the local sponsor.

Page 275, Section 5.5.11 – This section should also address the long-term funding provided to the entity managing the mitigation tracts.

Page 276, Section 6, Risk and Uncertainty – This section should also address the models/assumptions used in the economic analyses (i.e., agriculture, infrastructure).

Page 291 Section 6.2.1,– We cannot find strong support throughout the DEIS that the assumptions driving the model EnviroFish, (i.e., drive impacts and mitigation), have been scientifically validated. This section notes important uncertainties that seem to undermine the some of the key claims about floodplain value to fishes in the DEIS.

Page 292, Section 6.2.2 – The text erroneously states the proposed mitigation measures do not require long-term management/maintenance. Many of the measures, particularly water control structures and weirs, have a finite life and are subject to periodic maintenance due to floods, sedimentation, or vandalism. In fact, long-term land management requires significant funding above and beyond any proposed monitoring activities. Funding for long term land management should be included as a fundamental cost of mitigation and this project. The USFWS would be happy to help the Corps estimate those costs based on our experiences with managing our fish and wildlife refuges. MDC also has valuable expertise in that area.

Page 292 and 293, Section 6.2.3 and 6.2.4 – Please refer to our previous comments regarding Ten Mile Pond CA. In addition, please refer to our comments on the deficiencies in Appendix G (Fish Access Study) in the USFWS's Fish and Wildlife Coordination Act report (Appendix Q). A key component of fish spawning ecology that the fish passage coefficient does not address is timing. Because gates are closed when river levels are rising during spring spawning migration period, no fish can access the floodplain for spawning during the period they are in spawning behavior. Evidence of fish swimming through culverts during non-breeding periods has little relevance to closed gates that exclude access to the floodplain during the spawning period.

Therefore, it is reasonable to consider that the coefficient value was overestimated for the New Madrid Floodway based upon observations at the St. Johns Bayou Basin, and the actual value may be close to zero; that is, no passage.

The second to last sentence is concerning. It is likely that the mitigation deficiency and adaptive management derived solution will almost certainly call for adjustments to gate and pumping station management that exceed the extent authorized. For example, sixty acres of borrow pit habitat that is shut off from migrating fish during spring spawning periods (spawning migrations are generally cued by increasing river flow) are simply not near enough to qualify as floodplain spawning and rearing habitat mitigation.

Page 294, Section 7 - Adaptive management will not ensure completeness for any alternative if there is limited authority and funding to implement remedial actions in the future. Monitoring in and of itself does not correct problems with mitigation. There is little assurance that, assuming appropriate lands could be acquired, the local sponsors would have the desire or funds to support significant post-construction structural or operational actions to address mitigation debts. In addition, the Corps provides no details on the adaptive management plan such as metrics, decision triggers, remedial actions and cost estimates of those actions. Therefore it is impossible to determine the feasibility (e.g., local acceptability), certainty, or sustainability of that management.

Page 295, Section 7.1 - The adaptive management plan should include performance standards which require a description of the ecological, administrative, and adaptive management standards that will be used to determine whether the compensatory mitigation project is achieving its goals. The standards must be based on attributes that are objective and verifiable.

Page 297, Section 7.2.3 - The text states, "Forested wetlands located in the 5-year floodplain, that, after implementing the proposed action would no longer be in the 5-year floodplain are assumed to retain their jurisdictional status. Thus, there would be no reduction in the number of acres of wetlands. Likewise, wetlands at elevations above the existing five-year floodplain are also assumed to retain jurisdictional status." There is no documentation in the DEIS to support these claims.

Page 298, Section 7.2.6 – Simply documenting gravid adults or calculating richness and diversity of fish larvae tells little about the capacity of the mitigation sites to support Mississippi River-Floodplain productivity. Monitoring data must provide insight on relative abundance of the mitigation site in context of other areas; that is, other sites that serve as a control.

Page 299, Fish Passage – The last sentence is confusing. Monitoring *per se*, does nothing to achieve ecological success. The adaptive management plan must contain measures to correct performance to achieve success. Those measures, particularly operational adjustments, are wholly missing from the mitigation plan.

Page 301, Adaptive Management Thresholds – This section is purely conceptual and speculative. There are no management thresholds identified adding further uncertainty to the feasibility and adequacy of the proposed mitigation plan.

Page 302, Section 7.4 – We note this section refers to Section 5 for more information on specific restorative measures. Section 5 referred to Section 7 for specifics regarding operational adjustments to ensure necessary compensatory offsets. We could not find a description of those referenced measures/framework.

Page 302, Wetlands - Please refer to our previous comments regarding wetlands impacts and losses of forested wetlands in those areas with flooding that no longer meet jurisdictional criteria.

Page 303, last paragraph – Another important relevant factor to consider is timing of flood water retention. When, and for how long, to hold water largely will be influenced by temperature. Holding, and then releasing water after a prescribed period (21 days according the example given), too early when temperatures are low could limit growth potential of fishes using the area as nursery; not holding water for a long enough duration to achieve fish growth past a survival bottle neck will limit the fishery productivity of the mitigated site.

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ST. JOHNS BAYOU AND NEW MADRID FLOODWAY PROJECT

DRAFT BIOLOGICAL OPINION

Submitted

to the

U. S. Army Corps of Engineers
Memphis District

by

U.S. Fish and Wildlife Service
Ecological Services Office
Columbia, Missouri

May 2013

INTRODUCTION

The Fish and Wildlife Service (Service) has prepared this biological opinion in response to the Army Corps of Engineers' (Corps), Memphis District, June 21, 2012, request for formal consultation on the St. Johns Bayou New Madrid Floodway, Missouri project. Our biological opinion is based on the "*October 2011, Biological Assessment;*" the "*January 2013 IAT advance copy of the Draft Environmental Impact Statement*" for the project; telephone conversations with staff and species experts; and other sources of information. A complete administrative record of this consultation is on file in this office.

Consultation History

The St. Johns New Madrid Floodway, Missouri, project was authorized by the Water Resources Development Act of 1986. It was never built, however, because local interests could not afford to cost-share the project. On June 4, 1996, Memphis District (Corps) contacted this office indicating they had been directed to reformulate a revised project within 4 months. The new plan would involve only the East Prairie Phase of the authorized project. We expressed concern about mitigation for the revised project and the levee closure (which previous St. Johns project documents did not address). The Corps informed the Service that they were analyzing the St. Johns project as if there were a levee closure in place because that was consistent with the project authorization. Therefore, they did not intend to mitigate impacts to fish and wildlife resources resulting from the levee closure. The Corps also stated that because the project was covered by a 10-year-old Environmental Impact Statement (EIS), National Environmental Policy Act (NEPA) analysis would be limited to an environmental assessment (EA), if necessary. The Service informed the Memphis District that two federally listed species that were not addressed in the original NEPA documents now occurred in the project area and the existing NEPA documentation was outdated. The Corps acknowledged that the Fish and Wildlife Coordination Act (FWCA) report might need revision and agreed to work closely with the Service as things progressed. The Corps agreed to provide the Service with as much information on the reformulated project as possible.

On October 1, 1996, the Corps provided additional project information to the Service. Although the revised plan entailed less ditch work than the authorized project; the pumps and the levee closure would remain. We expressed concern that levee closure-related impacts to fish, wildlife and federally listed species had not been analyzed.

In November 1996, the Service faxed the Corps a list of questions/concerns about the proposed work including: the relationship between the levee closure project and the St. Johns and New Madrid Floodway project; fish and wildlife resource impact analysis; importance of backwater flooding in that area; FWCA coordination with the Service and Missouri Department of Conservation (MDC); NEPA compliance; and Endangered Species Act compliance (Biological Assessment (BA) preparation). Through additional coordination, the Service recommended that the Corps prepare a stand-alone BA rather than adding it to an EA. We noted that should an EIS

be needed, a BA would be required. We asked the Corps to provide effect determinations for all federally listed species that could occur in the project area.

In a January 23, 1997, letter to the Corps, the Service provided information on federally and state-listed species that may occur in project area. That was followed by a series of meetings with the Service, the Corps, and the MDC to further assess project impacts to fish and wildlife resources.

During an April 1998, interagency field trip to the project area, Corps, Service and MDC biologists noted the presence of two bald eagle nests along Hubbard Lake in the lower New Madrid Floodway. An April 30, 1997, aerial survey with MDC and Service biologists confirmed the presence of three nests, one of which was active, and two adult bald eagles. This information was passed on to the Corps the following Monday.

On June 16, 1998, the Corps emailed the draft BA to the Service. In a June 18, 1998, telephone conversation, the Service notified the Corps informally that after a quick review of the BA, it appeared the Corps needed to revise the BA to support the "no adverse effect" determinations for the species. The Service would submit comments on that draft in two weeks. The Service also told the Corps that it would provide a copy to MDC and forward those comments when available.

In October 1998, the Corps notified the Service of modifications to the hydrologic modeling used to determine project impacts to fisheries. The FWCA report needed revisions to reflect those changes in project effects and mitigation, and the Corps decided to hold the BA until the fisheries revisions were completed.

On December 4, 1998, the Service received the Corps' BA for the project. The BA determined that the project was not likely to adversely affect the pallid sturgeon, the bald eagle, and the Interior least tern (ILT). In a December 30, 1998, letter to the Corps, the Service acknowledged receipt of the completed BA and the Corps' request for formal consultation and we concurred with the Corps' "not likely to adversely affect" determination for the pallid sturgeon. We did not concur with the determinations for the bald eagle and ILT. The Service notified the Corps that the BO would address project effects on the bald eagle and the ILT, and that the Corps should expect the BO on or before April16. In an April 9, 1999, letter to the Corps, the Service requested a four-week extension to complete the BO to allow the Corps to review a draft BO and clarify any outstanding issues. In an April 14, 1999, letter the Corps agreed to the May 14, 1999, extension.

The Service provided the Corps an April 28, 1999, draft BO. The Corps provided comments on the draft BO to the Service in a May 28, 1999, letter. The Service revised the draft BO in consideration of the Corps comments and transmitted the final BO on June 11, 1999.

The Corps issued a Final EIS for the project in October 2000. The Service, through the Department of the Interior (DOI) and the Environmental Protection Agency (EPA) referred the project to the Council on Environmental Quality (CEQ) because of adverse effects to fish, wildlife and nationally significant aquatic resources. The Corps prepared a Supplemental EIS in

2002. The Service continued to oppose the Corps' preferred alternative and recommended an alternative that avoided closure of the Floodway. The Service informed the Corps the 1999 Biological Opinion was still applicable as the project effects to listed species were essentially unchanged. Missouri Department of Natural Resources initially denied the Section 401 certification for the project, but eventually resolved the remaining issues with Corps through modifications of the 401 cert. Environmental Defense and other conservation groups filed suit in Federal Court against the Corps because of concerns regarding NEPA and Clean Water Act violations.

In June 2005, the Corps filed a motion with the court to remove the case from consideration and correct inconsistencies in the Final EIS regarding fisheries and wetland losses. The Corps issued a revised SEIS (RSEIS 2) and ROD later that year. While the Court case was pending, the Corps began constructions of the levee closure and acquisition of mitigation lands. In June 2007, the Court ruled the Corps was arbitrary and capricious in there effects analysis and ordered the EIS vacated and all work on the project deconstructed. Corps began that work in 2009.

From 2009 through 2011, the Corps conducted a series of Independent External Peer Reviews (IEPR) on the previous NEPA documents, as well as the model/tools used for project impacts assessment, and best available science (both natural resource and economic). Based on that input, the Corps provided the Service and EPA with an July 2011 internal revised draft EIS on the project. The Corps transmitted a revised Biological Assessment (BA) in an October 2011 letter to the Service. That BA concluded that the project is not likely to adversely affect the federally listed pallid sturgeon and interior least tern. At that time, the Corps also conducted an IEPR review of the draft EIS so the Service deferred responding to the October letter pending the results of the review. In a May 1, 2012, draft Supplemental Fish and Wildlife Coordination Act (FWCA) report, the Service informed the Corps that the Corps preferred alternative appear to be essentially the same project addressed by the 1999 Biological Opinion. The Service concurred with the Corps determination for the pallid sturgeon however we noted that the project is likely to adversely affect the ILT. Should the Corps pursue their preferred alternative, they should contact the Service to discuss next steps in formal consultation.

The Corps provided the Service a June 21, 2012, request for initiation of formal consultation due to the agencies differing views on effects to the federally endangered pallid sturgeon and the ILT. (The bald eagle was officially removed from federal listing in 2007.) In a July 9, 2012, response to the Corps, the Service noted that the October 2011 BA did not include a complete project description, including effects to the species under consideration. We also noted the Corps had put the project on hold during development of a summer 2012 revised draft EIS. Thus the Service informed the Corps that we will continue to defer action on the BA pending a project document containing the information necessary to constitute a complete initiation package.

The Corps provided the Service a January 3, 2013, internal draft EIS on the project for our review and comment, with an expected January 18, 2013, public release. The Service provided the Corps a January 18, 2013, letter, with our preliminary comments on the draft and expressing our continued concern regarding the effects of the project to fish and wildlife resources. In a March 1, 2013, letter, we told the Corps the January draft EIS and October 2011 BA included sufficient information to initiate formal consultation, and we would provide the Corps our BO on

or before May 18, 2013. In subsequent conversations with the Corps, and consistent with a revised schedule for another draft version of the EIS, the Service and Corps agreed to transmittal of a final BO on or before May 31, 2013. The Service provided the Corps a draft BO in a May 21, 2013, email requesting comments be submitted no later than May 29 so that we can ensure the May 31st deadline.

BIOLOGICAL OPINION

Description of the proposed action

The purpose of the St. Johns Bayou and New Madrid Floodway Project is flood risk reduction and agricultural maximization in portions of New Madrid and Mississippi Counties in southeast Missouri (U.S. Army Corps of Engineers 2013). The Corps' preferred alternative, the Avoid and Minimize (A&M) alternative, includes vegetative clearing and channel enlargement along approximately 23 miles of rural channels in the St. Johns basin. The improved channel would be 120 feet-wide along 3.7 miles of the lower St. Johns Bayou to the Setback Levee Ditch where it would narrow to 50 feet for 8.1 miles. The material removed would be deposited on a 120-foot wide embankment and allowed to revegetate naturally and placed under a conservation easement. The lower 3.5-miles of the St. James ditch would become 45-feet wide and the top bank along northern most reach (7.8 miles) would be widened to 80 feet, with the material placed in a 100-foot wide embankment. Bank work along the St. James Ditch would be restricted to one side of the channel to minimize impacts to riparian corridors; the upper reach of the St. James ditch would be avoided. The project also includes a 1,000 cubic-foot-per second (cfs) pump station near the existing gravity drainage outlet to accommodate interior runoff. Impoundment of water in the St. Johns Bayou basin would be managed between December 1 and January 31 to an elevation of 285'.

In the New Madrid Floodway, the Corps proposes to construct a 1,500-cfs pump station in conjunction with a separately authorized project that includes four gated 10-foot by 10-foot box culverts across Mud Ditch and levee closure of the existing 1,500-foot gap at the southern end of the Floodway to a grade equivalent of 317.0'. Fourteen miles of the Setback Levee would be raised using 2.4 million cubic yards of material. Pump operations would include three periods:

	Gates (culverts) close
- Nov. 15 – Feb 28 – pump to elevation of 288.5'	288
- March 1 – April 15 – pump to elevation of 287'	286
- April 16 – May 31 – pump to elevation of 282'	284
- June 1 -14 Nov – pump to elevation of 278.5'	278.5

The Corps proposes to compensate project-related impacts to fish and wildlife resources in the St. Johns Basin by:

- Constructing nine transverse dikes in the lower 3.7 miles of St. Johns Bayou to create a low flow sinuous channel.

- Constructing a bank stability structure (*i.e.*, weir) at the confluence of St. Johns Bayou and Setback Levee Ditch to provide stability as well as structure.
- Constructing a bank stability structure at the confluence of Setback Levee Ditch and St. James Ditch.
- Creating stream bank slopes that are designed to prevent erosion and maximize fish and wildlife habitat.
- Restoring vegetated wetlands on 400 acres of agricultural land below an elevation of 285 feet.
- Restoring vegetated wetlands on 1,816 acres below the post project 5-year floodplain.
- Seasonally inundate 244 acres of farmland during the spring shorebird migration

The Corps proposes to compensate project-related impacts to fish and wildlife resources in the New Madrid Floodway and Mississippi River by:

- Providing a river connection to Big Oak Tree State Park via a gated culvert through the Mississippi River Frontline Levee.
- Restoring vegetated wetlands on a minimum of 1,800 acres of farmland surrounding
- Big Oak Tree State Park.
- Restoring vegetated wetlands on 387 acres of farmland below an elevation of 285'.
- Restore vegetated wetlands on 1,970 acres of farmland below the post project 5-year floodplain.
- Removing 3,050 acres f cropland from production in the batture to revegetate naturally to a bottomland hardwood or riverfront forest community.
- Seasonally inundating 1,286 acres of agricultural lands during spring shorebird migration period crediting 993 acres of conservation lands already owned and managed by the Missouri Department of Conservation (MDC) (i.e., Ten Mile Pond Conservation Area). The remainder would consist of 293 acres of agricultural lands in the basin.
- Restoring 432 acres of floodplain lakes (potential sites to be determined).

<u>Conservation Measures</u>

The preferred alternative has been modified from the Authorized Project to include measures to reduce project effects on listed species. The channel work along the St. James Ditch would be restricted to one bank to minimize impacts to forested riparian corridors and the work reaches would be designed with buffer strips consisting of both woody vegetation and warm season grasses with conservation easements. Combined with other Best Management Practices (i.e., by adjusting ditch slopes) these measures would help minimize future sloughing and ditch maintenance. Pump operations would not lower spring water levels in the Floodway as much as the Authorized Project, allowing marginally greater fisheries access and potentially retaining more wetlands. The project would also employ BMPs in the design of the 447 acres of borrow pits needed for the levee upgrade. The design of those areas would be to include features (i.e., low slopes, irregular edges, multiple depths, woody debris) to benefit fish and wildlife. Although the Corps has proposed mitigation for the project, it is unknown

whether that mitigation will occur in the project area and thus be considered a conservation measure.

Status of the Species

Interior least tern

Species description: Least terns (*Sternula antillarum*) are the smallest members of the tern family, measuring 24 cm long with a 51 cm wingspan. Males and females are similar, both having a black-capped crown, white forehead, grayish back and dorsal wing surfaces, snowy white undersurfaces, yellow or orange legs, and a black-tipped bill whose color varies according to the sex (U.S. Fish and Wildlife Service 1990). Immature birds have darker plumage than adults, a dark bill, and dark eye stripes on their white foreheads. The American Ornithologists' Union recognizes one species of least tern in North America (Banks et al. 2006), although three have been proposed: the Interior least tern (ILT) (*Sternula antillarum athalassos),* the Eastern or coastal least tern (*Sternula antillarum antillarum)*, and the California least tern (*Sterula antillarum browni*) (U.S. Fish and Wildlife Service 1990). While Thompson et al. (1992) found no differences between subspecies, more recent work by Johnson et al. (1998) indicates that there are three subspecies. Due to taxonomic uncertainty surrounding least tern subspecies, the ILT (*Sternula antillarum athalassos*) was treated as a distinct population of Eastern least tern (*S. antillarum antillarum*) at the time of listing in 1985. This taxonomic uncertainty persists (e.g., Draheim *et al*. 2010).

The ILT was listed as endangered on June 27, 1985, in the following states: Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana (Mississippi River and tributaries north of Baton Rouge), Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Tennessee, and Texas (except within 50 miles of the Gulf Coast)(50 *FR* 21792). No critical habitat has been designated.

The Service published the *Interior Population of the Least Tern Recovery Plan* in 1985. Recovery goals have been established for the major river systems throughout the above-mentioned range. The project area is in the Mississippi and Ohio River Systems. Major recovery steps outlined in the plan include: (1) determine population trend and habitat requirements; (2) protect, enhance, and increase populations during breeding; (3) manage reservoir and river water levels to the benefit of the species; (4) develop public awareness and implement educational programs about the ILT; (5) implement law enforcement actions at nesting areas in conflict with high public use.

Life history:

ILTs are long-lived, with records of recapture more than 20 years following banding (Thompson *et al*. 1997). The average life span, however, is probably less (Thompson and Slack 1982). They begin breeding in their second or third year, and breed annually throughout their lives (Thompson *et al*. 1997). ILTs spend between four and five months each year at their breeding sites. Depending on latitude, they can arrive at their summering grounds from late April to early June, and begin courtship. Courting behavior includes fish flight (males feeding females), nest

scraping, copulation and a variety of postures and vocalizations (U.S. Fish and Wildlife Service 1990).

ILTs are highly territorial and generally nest in colonies on open or sparsely vegetated sand and gravel bars along sediment laden rivers, or salt flats along lake shorelines. Tern nesting on isolated, in-channel sand bars are believed to be important in minimizing the threat from predation. ILTs generally nest on the ground, in open areas, and near appropriate feeding habitat (Lott and Wiley 2011). Nests are simple scrapes in the sand, and nesting sites are characterized by coarser and larger substrate materials, more debris, and shorter and less vegetation compared to surrounding areas (Smith and Renken 1991, Stucker 2012). Typical least tern clutch size is reported as 2 to 3 eggs (Thompson *et al*. 1997), however clutch size may vary by location and year (e.g., Szell and Woodrey 2003, Jones 2012).

Natural nesting habitat features are maintained and influenced by magnitude and timing of riverine flood events (Sidle *et al*. 1992, Renken and Smith 1995, Pavelka *in litt*. 2012). Vegetation free sand or gravel islands are preferred for nesting, although, sand banks, point bars, and beaches may also be utilized. ILTs prefer areas remote from trees or other vegetation that may hide or support predators. Least terns will also nest on anthropogenic sites (Jackson and Jackson 1985, Lott 2006) near water bodies with appropriate fish species and abundance, including industrial sites (Ciuzio *et al*. 2005, Mills 2012), dredge spoil (Ciuzio *et al*. 2005); sand pits (Smith 2008), created habitats (Stucker 2012), and rooftops (e.g., Boyland 2008, Watterson 2009). Reproductive success in these habitats has not been well studied.

Colony size may vary from a few breeding birds to > 1200 (e.g., Jones 2012). Some drainage populations may be limited by annual availability of nesting habitat (e.g., Missouri River; Stucker 2012), while potentially suitable nesting habitat in others (e.g., Mississippi River; U.S. Army Corps of Engineers 2008) is generally believed to be abundant and underutilized. Nesting site conditions (e.g., habitat suitability, flood cycles, forage fish abundance, predation pressure) can vary significantly year to year in all drainages, resulting in wide fluctuations in bird numbers (e.g., Jones 2012) and/or nesting success (e.g., Smith and Renken 1993, Lott and Wiley 2012). Nesting generally coincides with high spring river flows and usually occurs on the higher elevations of the sand or gravel bars, away from the water's edge (Smith and Renken 1991). The nest is generally a shallow depression that may include small stone, twigs, shells, or other debris (U.S. Fish and Wildlife Service 1990, Smith and Renken 1991). Least terns usually lay two to three eggs beginning in late May, although they will often renest if the first effort is unsuccessful. Both sexes share incubation which generally lasts 20-25 days (U.S. Fish and Wildlife Service 1990). Eggs hatch within a day of one another. The chicks are precocial and generally remain within the nesting territory, wandering further as they mature. Chicks fledge in approximately three weeks, although parental attention continues until migration (U.S. Fish and Wildlife Service 1990). Least terns generally depart nesting colonies on their fall migration to wintering grounds by early September.

ILTs are primarily opportunistic piscivores, feeding on small fish species or fingerlings of larger species (<52 mm [2 in] total length for adults and <34 mm [1.3 in] total length for young chicks) (Stucker 2012). Surveys of nesting colonies on the lower Mississippi River have identified 21 fish species dropped by foraging terns (U.S. Army Corps of Engineers 2008). These include

native species such as shad (*Dorosoma* spp.), carps and minnows (*Cyprinidae*), freshwater drum (*Aplodinotus grunniens*), largemouth bass (*Micropterus salmoides*), white bass (*Morone chrysops*), sunfish (*Lepomis* spp.) and top minnows (*Fundulus* spp.); as well as invasive species such as silver and bighead carp (*Hypophthalmichthys* spp.). On the Missouri River, prey species include emerald shiner (*Notropis atherinoides*), sand shiner (*Notropis stramineus*), spotfin shiner (*Cyprinella spiloptera*), and bigmouth buffalo (*Ictiobus cyprinellus*) of appropriate size (Stucker 2012). Least terns will also occasionally feed on aquatic or marine invertebrates (Thompson *et al*. 1997). Riverine foraging habitats and fish abundance may be influenced by stochastic hydrological conditions and events (i.e., flow, and flood timing and magnitude), and geomorphic modification (Schramm 2004).

In the Missouri River drainage, telemetered ILTs have been documented foraging for fish in shallow water habitats an average of 10 miles from their nesting sites (Stucker 2011). In the Lower Mississippi River, foraging terns have been observed feeding in a variety of habitats within 3 km (2 mi) of colony sites (Jones 2012).

The ILT's annual reproductive success varies greatly along a given river or shoreline (U.S. Fish and Wildlife 1990). Suitable nesting habitat depends to a large extent on highly variable water levels resulting in large fluctuations in population size from year to year. It has been noted that nesting on the sand islands in the Missouri and Mississippi Rivers are often delayed due to high water (Bent 1965). In addition, because terns use ephemeral habitat and are highly susceptible to frequent nest and chick loss, it has been suggested that terns have evolved reproductive behaviors that can make up for one or more poor nesting seasons (U.S. Fish and Wildlife Service 1990). The U.S. Army Corps of Engineers (1998a) noted that the number of tern fledglings per breeding pair tripled between 1997 and 1998 along the upper Missouri River because of very large increases in suitable habitat (and possibly forage fish). ILTs can be fairly long-lived birds. Although Thompson and Slack (1982) noted that band data for coastal least terns indicated 74 percent of recovered bands were birds less than five years old, seventeen percent lived past age ten.

Predation is a major threat to reproductive success of nesting ILTs throughout their range (U.S. Fish and Wildlife Service 1990). Reported predators include fish crow (*Corvus ossifragus*), American crow (*C. brachyrhynchos*), common raven (*C. corax*), boat-tailed grackle (*Quiscalus major*), gulls (*Larus* spp.), great blue heron (*Ardea herodias*), black-crowned night heron (*Nycticorax nycticorax*), ruddy turnstone (*Arenaria interpres*), sanderling (*Calidris alba*), great horned owl (*Bubo virginianus*), peregrine falcon (*Falco peregrinus*) , American kestrel (*F. sparverius*), northern harrier (*Circus cyaneus*), loggerhead shrike (*Lanius ludovicianus*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), opossum (*Didelphis virginiana*), feral hog (*Sus scrofa*), catfish (*Ictalurus* sp.), and domesticated and feral dogs and cats (Thompson *et al*. 1997). Cryptic coloration of eggs and chicks, and secretive behavior of chicks, and mobbing behavior of adult birds protect eggs and chicks from predators (Thompson *et al.* 1997).

Location and size of nesting colonies also has a significant influence on degree of predation. In several studies, ILT reproductive success has been higher on island colonies v. connected sandbar colonies, and when water levels maintained isolation of islands and nesting bars from

mammal predators (e.g., Smith and Renken 1993, Szell and Woodrey 2003). Burger (1984) found significantly higher rates of predation in larger colonies in comparison to smaller colonies.

Status and distribution:

The historical distribution of ILT is poorly documented. Hardy (1957) provided the first information on least tern distribution on large, interior rivers, documenting records of occurrence and nesting in the Mississippi, Ohio, Missouri, Arkansas, and Red river drainages. Downing (1980) published results from a rapid aerial/ground survey of a subset of the rivers, identifying additional nesting populations within the range, and estimated the interior population at ~1,250 adult birds. Ducey (1981) doubled the number of known nesting sites including areas between the scattered observations reported in Hardy (1957). He also extended the northern distribution of ILT to include the Missouri River below Garrison Dam in North Dakota and Fort Peck dam in Montana. These three publications (Hardy 1957, Downing 1980, Ducey 1981) provide the primary historical sources of information about ILT geographic range and were used to quantify a range-wide population size of 1,400 to 1,800 adults in the listing rule (50 FR 21789).

The current documented east to west distribution of summer nesting ILT encompasses >18 degrees of longitude (>1,440 km (900 mi)) from the Ohio River, Indiana/Kentucky, west to the Upper Missouri River, Montana. The north to south distribution encompasses >21 degrees of latitude (>2300 km (1,450 mi)) from Montana to southern Texas. ILT currently nest along >4,600 km (2,858 mi) of river channels across the Great Plains and the Lower Mississippi Valley (Lott *et al*. in prep. 2012).

In 2005, Lott (2006) coordinated the only simultaneous survey to date across the geographic range of ILT during a 2-week window of the breeding season. Summarized counts from this survey indicated a minimum adult population size of ~17,500, with nesting occurring in >480 colonies spread across 18 states (Lott 2006). Lott (2006) also provided counts for 21 populations or population segments unknown at the time of listing, which collectively supported over 2,000 ILTs. Lott (2006) considered that both total population size and the distribution and number of colonies from this survey were biased low, since counts lacked methods to account for imperfect detection of adults, and many areas potentially supporting ILT colonies were not surveyed.

Environmental Baseline

The project area is located in the lower Mississippi alluvial valley in the southeastern region of Missouri known as the "Bootheel." The St. Johns Bayou basin covers approximately 324,173 acres and is drained by St. Johns Bayou through the Birds Point to New Madrid Setback Levee ditch via a gravity drainage structure near the City of New Madrid. The basin has very low relief, ranging from 280 to 325 feet National Geodetic Vertical Datum (NGVD).

The New Madrid Floodway, authorized by the Flood Control Act of 1928, was constructed in the 1930s and covers approximately 132,602 acres. In the event of a Mississippi River project flood, the Corps would breach the mainline levee along the Floodway to reduce flood stages in the Mississippi and Ohio Rivers confluence in the vicinity of Cairo, Illinois and Paducah, Kentucky.

The Corps has operated the Floodway only twice: in 1937 and 2011. The Floodway is bounded on the west by the Setback Levee, on the east by the Mississippi River Frontline Levee, and on the south by the Mississippi River. The upper third of that basin drains through a culvert in the frontline line levee or via the Peafield Pumping Station during high river stages. The lower two-thirds of the basin drain through the St. Johns Diversion Canal and Wilkerson Ditch into East Bayou Ditch, then into the Mississippi River. Similar to St. Johns Bayou basin, the Floodway has little relief; elevations are between 280 and 315 feet NGVD. The New Madrid Floodway is unique in that it is the only significant portion of the historic Mississippi River floodplain in Missouri still largely connected to the river.

Historically, the project area was covered by a mosaic of river meanders, oxbows, natural levees, forested wetlands, marsh, and open water. The Mississippi River alluvial valley floodplain was the largest bottomland forest in North America covering approximately 2.5 million acres. Most of that area was subject to periodic flooding by the Mississippi River and tributaries, providing invaluable habitat for fish and wildlife. Since the early 1700s, however, channelization and levee construction have reduced the natural floodplain of the lower Mississippi River by 90 percent (Fremling et al. 1989). Of an original 2.5 million acres of forested wetlands in southeast Missouri, less than 50,000 acres remain (L.H. Fredrickson, cited in MDC 1989). Over 80% of the project area is in agricultural production, primarily soybeans (71%), corn (9.5%), grain (13.1%), sorghum (2.6%) and rice (3.3) (U.S. Army Corps of Engineers 2013). Federal flood control projects and Federal and local drainage projects have also drastically changed the hydrologic relationship between the floodplain and the river, essentially eliminating seasonal interchange in the St. Johns Bayou Basin. Baker et al. (1991) believed the reduction of seasonally inundated floodplain due to levee construction was the single most deleterious alteration to the Lower Mississippi River ecosystem. Today, drainage ditches are the principal remaining floodplain aquatic habitat in much of the Bootheel (Pflieger 1997).

Although highly altered, the project area still performs floodplain functions critical to regional fish and wildlife resources. The unique connection between the Floodway and the Mississippi River provides valuable hydrologic exchange between the riverine and adjacent terrestrial ecosystems. Spring flooding from the river can inundate up to 75,000 acres in the Floodway alone. Large portions of Mississippi and New Madrid counties, including the project area, support a wider array of diverse habitats and natural biological communities than elsewhere in the Bootheel. That high biodiversity is reflected by the large number of state-listed plant, mussel, fish, amphibian, reptile, bird, mammal, and natural biological communities reported for the those counties, and is due in part to the influence of the river's annual hydrologic regime on the lower St. Johns Bayou basin and New Madrid Floodway. Two federally listed and 58 State-listed species occur in the project area. Fisheries sampling has documented fishes representing 42 percent of those species known from Missouri, including one believed to have been extirpated from the state (Sheehan et al. 1998). The project area also provides significant habitat for 24 species of freshwater mussels; over one-third of those known to occur in Missouri. The forested wetlands in the project area are becoming increasingly scarce on a regional and national level, and serve as critical refugia for numerous fish and wildlife species that once flourished throughout the Mississippi River floodplain.

There are three tracts of publically-owned land in the project area. The MDC manages the 3,793- acre Tenmile Pond Conservation Area (CA) that includes cropland, wetlands and forest. It is located in the Floodway along an old oxbow lake formed when the Mississippi River meandered over that section of floodplain. The ditches, ponds, and lake on the CA provide significant recreational opportunities for anglers. That area also provides opportunities for small and big game hunting, as well as waterfowl hunting. The Donaldson Point CA lies largely outside the frontline levee along the Floodway. That 5,785-acre area is mostly bottomland hardwood forest where bald eagles nest. The Missouri Department of Natural Resources manages Big Oak Tree State Park which includes approximately 1,000 acres of rare cypress swamp and bottomland hardwood forest. Because it is one of the few remaining forested wetlands in southeast Missouri, it serves as refugia for many increasingly rare species and contributes significantly to the biodiversity of the region. The Park claimed two national and three state champion trees. Several State-listed rare plant and animal species have also been recorded in the Park.

Agriculture accounts for over 80 % of the land use in the project area (U.S. Army Corps of Engineers 2013). Manufacturing and agriculture and related industries are the principle components of the local economy. Private non-farm employment has declined from 2000-2009 by 10.7 percent in New Madrid County and by 5.3 percent in Mississippi County (U.S. Army Corps of Engineers 2013). There are two urban centers in or adjacent to the project area: East Prairie and New Madrid which both have populations over 2,500.

Interior Least Tern

Recovery criteria for the ILT are protection and management of essential habitat coupled with populations of 7,000 birds (U.S. Fish and Wildlife Service 1990). The ILT range-wide numerical recovery criterion has been met and exceeded for 18 years (1994 – 2012) (Kirsch and Sidle 1999, Lott 2006). Using range-wide seasonal count data from 1984 (722 ILT) thru 1995 (8,859 ILT), Kirsch and Sidle (1999) demonstrated achievement of the numerical recovery criterion, and a positive population growth trend. They noted, however, that most of the ILT increase had occurred on the Lower Mississippi River (LMR), and observed that population increases were not supported by available fledgling success estimates. They hypothesized that ILT increases were possibly due to immigration surges from a more abundant least tern population inhabiting the Gulf Coast.

Lott (2006) organized, compiled, and reported a synchronized range-wide count for ILT in 2005, finding ILT numbers had apparently doubled since 1995 (e.g., Lott 2006, 17,591 ILT range-wide). The majority of birds continue to be reported from the LMR (Lott 2006, 62% of the 2005 range-wide count from the LMR), and ILT counts now equal or exceed population estimates for least terns along the U.S. Gulf Coast (Lott 2006). Lott (2006) hypothesized a wider least tern metapopulation which includes Gulf Coast and interior subpopulations, and the possibility of a shift of birds from the Gulf Coast to inland habitats due to the presence of better nesting conditions on the LMR. However, there are no data directly supporting either the Kirsch and Sidle (1999) or Lott (2006) immigration hypotheses as a factor in the 20+ year increase in the ILT counts.

An informal management program for ILT was initiated on the Lower Mississippi River (LMR) immediately after listing by the U.S. Army Corps of Engineers, Mississippi Valley Division. Between 1985 and 2000, ILT management and protection in the LMR navigation system by the Corps primarily consisted of monitoring to quantify numbers of birds and the location of breeding colonies and prohibiting nesting season disturbance of these areas by construction, maintenance, or permitted activities (USACE 2008). During this time, ILT numbers increased from ~2000 birds in 1985 to >6000 in 2000. In 2001, a cost-effective channel design approach was incorporated into Corps channel construction and maintenance programs (USACE 2008, DuBowy 2011, U.S. Fish and Wildlife Service 2012), and ILT counts have since increased to ~10,000 birds/year since 2004.

Using population modeling methods, Dugger (1997) developed a fledgling estimate of 1.0 chick/pair required to maintain stable tern populations. That ratio was achieved in Mississippi River tern colonies only once between 1986 and 1992 (Dugger 1997). Based on a 1.0 chick/pair fledgling goal and the documented reproductive success of the colonies on the Lower Mississippi River, it does not appear that the least tern population is self-sustaining. As noted previously, this has led to speculation that LMR numbers may depend on immigration of terns from other areas, primarily the Gulf Coast.

Maintaining suitable least tern nesting habitat remains a challenge. Navigation and flood control modifications to rivers have eliminated much of the high elevation, in-stream sand bars and replaced them with lower elevation bars that eventually accrete to the bank. Proximity to the river bank increases threat from predation and vegetative encroachment. The U.S. Army Corps of Engineers (1998b) noted that least terns preferred nesting on large, sandbar islands, although similar habitats attached to the banks were available. Although the U.S. Army Corps of Engineers (2008) suggests that there is ample nesting habitat in the Lower Mississippi River for least terns, the scientific basis for that determination was not provided. In tern research along the Mississippi River, Smith and Renken (1991) noted that sites used by nesting least terns had greater than 100 consecutive days of exposure above the water. In their study they observed only one unused site along the Mississippi River that appeared suitable for nesting terns, which led them to conclude that nesting habitat was limited in that reach. The Corps 1998 least tern survey (U.S. Army Corps of Engineers 1998b) found a similar pattern; least terns used almost all available unattached large sand bars due to high water. In the upper Missouri River, recent high flow conditions have led to a great increase in suitable tern nesting habitat by forming high elevation sandbars, many of which were unoccupied in 1998. At the same time, Kruse (pers. comm.) noticed a corresponding decrease in predation of terns, which he believed was due in part to the difficulty of predators locating terns colonies in such large areas.

Human disturbance is a continuing threat to least tern nesting success along much of the terns range (U.S. Fish and Wildlife Service 1990, Kruse 1993). MDC has noted numerous instances of all-terrain vehicle use, camping, and other forms of disturbance in and around least tern colonies along the Mississippi River (Smith 1985).

Effects of the Action

Project Area Effects

The preferred alternative will eliminate spring overbank flooding that seasonally may inundate tens of thousands of acres in the St. Johns Bayou basin and the New Madrid Floodway. Upon receding, those flood waters produce thousands of acres of shallow, temporarily flooded wetlands in a variety of cover types. A wide variety of waterfowl, numerous other wetland dependent birds, amphibians, invertebrates, and mammals use those habitats during all or part of their life cycle. Based only on the 2-year flood elevations presented in the draft EIS, the Service estimates over 38,000 acres of wetlands would no longer be seasonally inundated by backwater or headwater flooding, significantly degrading wetland functions and habitat value to fish and wildlife. Approximately 4000 acres of forested wetlands would be affected, including most of the forest wetlands in the New Madrid Floodway. Some of the largest remaining forested wetland tracts in southeast Missouri are found in the project area, and the Service believes many of those would be converted to agriculture once seasonal flooding is removed and those areas no longer meet the inundation criteria under Section 404 of the Clean Water Act. In addition, in light of several court decisions on the "Tulloch Rule," the Corps will no longer regulates dredging or ditching activities in wetlands, provided those activities result in deminimus discharges. Based on recent and historical land use and modifications, project-related changes in the area hydrology, and court decisions affecting the Corps' regulatory authorities, The Service believes approximately 90 percent of privately owned forested wetlands in the project area will be cleared and converted to agriculture over the 50-year project life. This trend is underscored by recent increases in commodity prices which has driven the conversion of tens of thousands of acres across the country to agriculture.

The Corps has estimated that project-related changes in flooding due to pump operations will decrease fish spawning and rearing habitat values by approximately 50 percent in the St. Johns Bayou basin and greater than 90 percent in the New Madrid Floodway. The decrease reflects a great reduction in acres flooded, as well as the loss of seasonal connectivity between the major bayous and many of the permanent floodplain waterbodies. In addition, closing the levee to prevent natural spring flooding from the Mississippi River will virtually eliminate riverine fish access to the Floodway during the critical spawning and nursery season. The Service could not find analyses of gate operations (i.e., percent of time gates would be open) each month. However, based on information in previous Corps hydrologic modeling, the drainage structure at the mouth of the Floodway could be on average less than half of the months of March and April. During periods when the gates are open, however, water levels would be too low to allow fisheries access to the floodplain. Although the Corps conducted a preliminary study of fish passage through the existing drainage structures in the St. Johns Bayou (U.S. Army Corps of Engineers 2013), that study was not designed to compare fish passage with and without a structure. While the study documented fish able to move through the structure when it was open, the study design could not determine the relative number of fishes or biomass that moved through structure compared to an unimpeded connection with the river.

The greatest decreases in available foraging resources (i.e., fish and fish habitat) would occur during March and April. The Corps estimates fish habitat acreage in the lower Floodway would be reduced on average 3000 acres in March and 3700 acres in April under the preferred alternative. Project implementation would decrease the area inundated during the 2-year flood event by 15,000 acres in the Floodway which is approximately 8.4 percent of the 2-year floodplain along the Mississippi River between Cairo, IL and Caruthersville, MO. The lower floodway would experience the greatest reductions in floodplain habitat available to fish. While several permanent floodplain waterbodies, such as Hubbard Lake and several nearby blue holes within 1.5 miles of the nest would remain (U.S. Army Corps of Engineers 2013), the abundance and composition of the fish community in Hubbard Lake is likely to change without backwater inundation from the Mississippi River. Although lower water levels could concentrate fish in isolated pools, the drainage structure at the mouth of the Floodway would be closed during the spring significantly reducing fish access to the Floodway and the potential for high fish concentrations.

Least Tern - Direct and Indirect Effects

The proposed project is not expected to directly affect interior least terns. Project construction would not occur near (> 2.0 miles) any known nesting colonies. Although terns have not been documented using the St. Johns Bayou, foraging terns could easily avoid the reaches with ongoing channel enlargement work, which would occur over the 3-year construction period. No channel modifications would occur in the Floodway.

Implementation of the preferred alternative, however, is expected to indirectly affect the interior least tern's foraging habitat and prey base. As previously mentioned, the project would greatly reduce fisheries habitat and eliminate most fish access to the floodplain in the Floodway. Tibbs (1995) examined the relationship between river stage, forage fish, and least tern reproductive success along the Mississippi River, adjacent to the project area. He found that 80 percent of the total fish sampled were of taxa known to spawn in floodplain habitat. Many of those taxa are important forage species for least terns. Greater catches and taxa richness of small fishes occurred in shallow-water habitats rather than deep-water habitats (< 3 feet). Small-fish were at least and order of magnitude more abundant in shallow-water than deep-water habitats. His largest catch (primarily gizzard shad) occurred at the mouth of the New Madrid Floodway, as the backwaters were draining into the river. At that time he also noted intensive use of that area by foraging least terns, during a critical energetic period of nest initiation and egg-laying. Peak forage fish abundance throughout Tibbs' study area occurred during the tern nesting period. Based on the catch data and timing of fish abundance, he suggested that the coupling of forage-fish availability and tern reproduction is strongly regulated by river stage, and underscored the importance of river-floodplain connection. At high river stages, the Floodway becomes particularly important to spawning and larval fish because it provides an extensive complex of warm, shallow, slow velocity aquatic habitat scare on the main river. The importance of warmer waters that occur on the floodplain are thought to contribute to greater fisheries productivity as compared to the main river channel (Schramm 2006, and Schramm et al. 2000). The project would eliminate a significant portion of shallow, warmer, backwater habitat in the river reach adjacent to the project area. The Service believes loss of that habitat will reduce fisheries productivity both in the Floodway and within that reach of the Mississippi River.

Dugger (1997) examined the foraging ecology and nesting least tern reproductive success on the Mississippi River near the study area. Although Tibbs found the greatest fish abundances in shallow-water habitats, Dugger (1997) found that prey capture rates and dive rates were significantly higher in deep-water habitats. She suggested that prey abundance and availability to foraging terns are not equivalent on the Lower Mississippi River, perhaps because of predator avoidance behaviors of fish in shallow-water habitats. Although the BA (U.S. Army Corps of Engineers 2011) maintains that the amount of both shallow and deepwater habitats adjacent to the project area provide an "ample" supply of forage fish to support local least tern populations, it does not provide the scientific documentation to support that determination. Dugger (1997) hypothesized that differences in tern reproductive parameters, such as eggs weights, clutch size, and chick weights were related to the availability of small fish, and can influence chick survival and fledgling rates. That tern reproductive parameters vary with the availability of forage suggests that food may limit tern reproduction in some years. During her study, Dugger (unpublished) observed higher clutch sizes and egg weights in tern colonies below New Madrid Floodway when compared to sites above the New Madrid Floodway. Those differences might have been influenced by differences in food resources north and south of the project area. Based on fisheries sampling during that time (Tibbs 1995), it is likely that the fisheries productivity from the New Madrid Floodway contributed to the forage base downstream. Considering the importance of the fisheries habitat and productivity of the Floodway, as well as the influence of forage on tern reproductive parameters, the Service believes the project-related decreases in the fisheries productivity in the Floodway has the potential to adversely affect least tern forage base along that reach.

Cumulative Effects

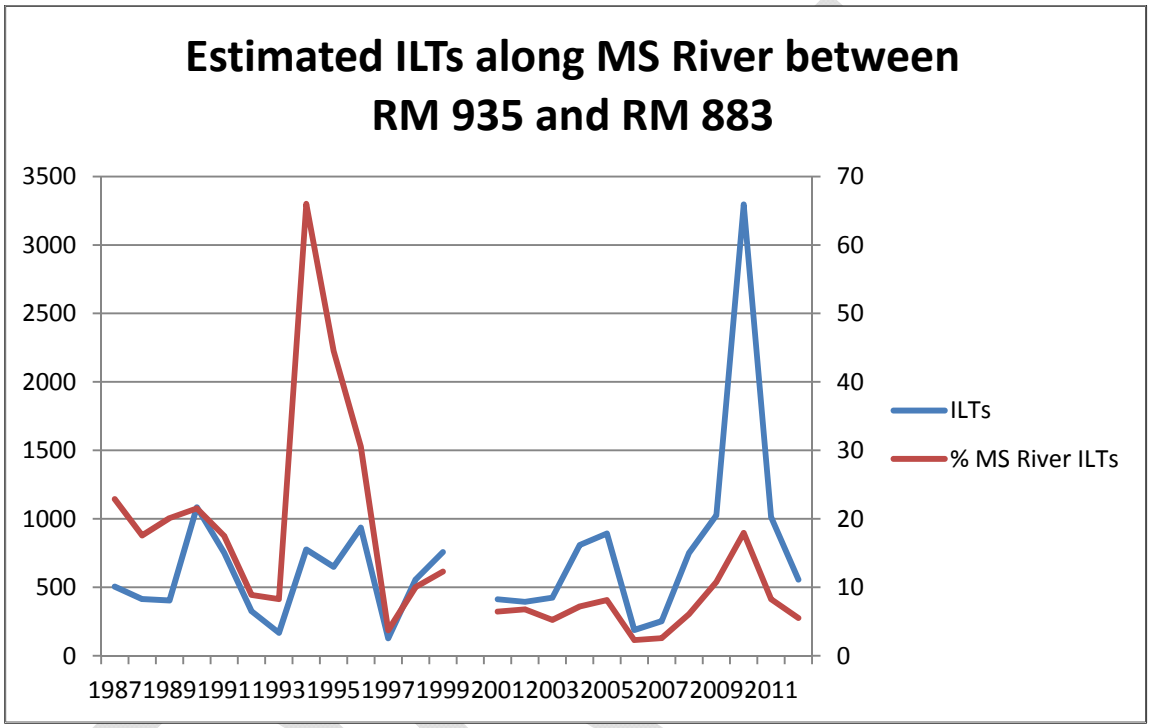
Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The Service is not aware of any specific State, local, or tribal actions which could affect interior least terns in the project area. Reasonably foreseeable clearing of forested wetlands (by private individuals) within the project area caused by changes in the hydrology in both basins will likely reduce the potential forage base for the tern. In addition, privately conducted agricultural intensification practices, such as laser-leveling fields and increased irrigation are becoming increasingly popular in the Bootheel and their use is expected to increase in the project area in the future. Those practices can reduce the amount of ephemeral wetlands formed by rainfall, further reducing the project areas' suitability for fish and waterfowl which are important bald eagle forage items.

Over the last 40 years, the human population within the project area had declined largely influenced by changes in the agricultural economy (small farms incorporated by agribusinesses). Given that trend, significant changes in residential or urban land-use are unlikely. There may be some limited future industrial development of land in or around East Prairie. The Service, however, does not expect non-agricultural land-use changes to affect the ILT.

Conclusion

After reviewing the current status of the ILT, the environmental baseline for the action area, the effects of the proposed project and the cumulative effects, it is the Service's biological opinion that the St. Johns Bayou and New Madrid Floodway project, as proposed, is not likely to jeopardize the continued existence of the ILT. No critical habitat has been designated for those species, therefore none will be affected.



(USACE survey data 1987-2012)

Numbers of ILTs along the Mississippi River have consistently been above the recovery goal since 1986. Population modeling estimates (Dugger 1997) indicate that documented tern reproductive success along the Mississippi River is not sufficient to sustain those numbers. Therefore, either the population modeling estimates are flawed, or there is considerable immigration from other least tern metapopulations. Based on surveys along the lower Mississippi River, terns in the colonies near and just downstream of the project area can vary dramatically, from approximately 5 to 65 percent of the estimated Mississippi River adult population of ILT. Therefore, project-related impacts to the tern forage base would potentially affect a small to moderate proportion of population. Based on the above information, the Service believes that losses in least tern forage will not significantly affect the recovery and survival of the species throughout its range.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior pattern which include, but are not limited to , breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms and condition of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency actions is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issues to the applicant where applicable, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant, where applicable and appropriate, to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of the incidental take, the Corps must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

Amount or extent of take anticipated

The Service anticipates that the incidental take will be in the form of harassment due to reduced forage base. Given the limited data of reproductive success at colonies adjacent and immediately downstream of the project area, take would be difficult to quantify. ILTs are wide-ranging, may change nesting colonies from year to year, and reduced reproductive success may be masked by annual variability in tern numbers. However, an unquantifiable level of take of this species can be anticipated by loss of fisheries habitat in the New Madrid Floodway (8.4 percent of the 2-year floodplain between Cairo, Illinois and Caruthersville, Missouri). The level of take is based on the permanent loss of a significant portion of the forage base for the tern colonies in and around the project area.

Effects of take

In the accompanying biological opinion, the Service determined that this level of anticipated take will result in reduced reproductive success among nesting colonies adjacent to and immediately downstream of the project areas. That would include a small to moderate portion of the Mississippi River metapopulation. The take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

Reasonable and prudent measures are those actions necessary or appropriate to minimize the amount or extent of incidental take of listed species. Those measures, however, cannot alter the basic design, location, scope duration, or timing of the actions and may involve only minor changes. While the Service continues to urge the Corps to select a project alternative that would avoid closure and pumping of the New Madrid Floodway, the Corps has indicated that it does not at this time believe such an alternative is consistent with project authorizations.

Actions to reduce impacts to least terns would need to reduce project-related impacts to fisheries and fish habitat. Project modifications for fisheries resources would require altering project location (i.e., levee alignment) and/or operational adjustments (i.e., gate closure and pump operations). While the Corps' currently identified National Economic Development (NED) plan is analyzed in this BO, there is another alternative in the draft EIS, Alternative 4, that would meet the project purpose and need, albeit with an estimated $78,000 fewer excess benefits (U.S. Army Corps of Engineers 2013). The concept underlying that alternative was recommended by the Corps' Independent Expert Review Panel to evaluate an option that focuses on flood risk management rather than agricultural maximization. According to Appendix C in the draft EIS, Alternative 4.1 would increase available fisheries habitat in the Floodway by approximately 600 acres in March and 1500 acres in April compared to the NED Alternative. That would almost double available fisheries habitat during those critical months of fish spawning and rearing. Just as important, the modified pumping operations would allow relatively greater access through the opening in the closure structure that would further reduce losses of fisheries production in the project area. Information in the draft EIS was not sufficient to quantify that difference from the NED plan. Given that alternative 4.1 meets both the project purpose and need, has a higher cost/benefit than the NED, and reduces adverse project effects to fish, wildlife, and the ILT, that alternative would appear consistent with the Corps authorities. Thus should the Corps proceed with a Floodway closure and pump option, the Service believes the following reasonable and prudent measures would minimize project-related incidental take of interior least terns.

1) Minimize project-related losses both fisheries habitat and access to the Floodway by operating the project to maximize river-floodplain connectivity and floodplain inundation consistent with project purposes. According to the January 2013 draft EIS this can be done by implementing Alternative 4.1.

Terms and Conditions

To be exempt for the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

A. Develop pump and gate operations plans consistent with the water levels described in the draft EIS (i.e., operations to manage flood risks below the elevation of roads and infrastructure (289.5)) for alternative 4.1

B. In consultation with the Service and MDC, develop an adaptive management plan that includes verification of operational benefits/costs (i.e., performance), and ensures project operational modifications (if necessary) to maintain predicted inundation of the floodplain and connectivity with the river.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit for endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effect of a proposed project on listed species or critical habitat, to help complement recovery plans, or to develop information.

1. Look for opportunities to restore native habitats on land below 289.5' in the Floodway to maximize habitat value of connected lands. This could be through fee-title acquisition or easement/agreements with landowners.

2. In coordination with the Service and MDC, continue habitat management measures to improve least tern nesting habitat along the Mississippi River. Such efforts should include working with the Service and MDC to identify channel structures that could be modified to restore, improve, or create tern nesting and foraging habitat (i.e., reconnect chutes and side channels, notch dikes to prevent accretion of sandbars to the river bank, construct chevron structures to encourage sandbar formation).

3. In coordination with the Service and state agencies, conduct and/or support monitoring of least tern nesting habitat availability and longevity in the Mississippi River. That information would be particularly important in evaluating the effect on tern habitat resulting from modifications of navigation structures.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests that the Corps notify us of implementation of any conservation recommendations.

REINITIATION OF CONSULTATION

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the

amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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TAKE PRIDE IN AMERICA

AUG 26 2011

The Honorable Jo-Ellen Darcy
Assistant Secretary
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Dear Assistant Secretary Darcy:

As you may be aware, in 2008 the Memphis District Corps of Engineers (Memphis District) began another round of planning and environmental evaluations for the St. Johns Bayou-New Madrid Floodway Project in New Madrid County, Missouri. This is a highly controversial flood control project. A 2007 ruling by Judge James Robertson of the US District Court for the District of Columbia set aside the Corps Environmental Impact Statements (EIS) and Record of Decision (ROD), enjoined the Memphis District from proceeding with the project, and ordered the deconstruction of those portions of the project that were already built. This litigation dealt with how the Memphis District presented information in the EISs and ROD on impacts to fish and wildlife and proposed measures to mitigate these impacts. The Department of the Interior (DOI) and the U.S. Fish and Wildlife Service (Service) have long-standing concerns with this project, including the ongoing re-assessment.

Two recent events have heightened our concerns and prompted the urgency for resolution: 1) the July 2011 release of the draft Agency Technical Review (ATR) EIS, which proceeds with the same plan and mitigation techniques addressed in previous EISs; and 2) the May 2011 operation of New Madrid Floodway to abate flooding on the Lower Mississippi River, which accentuates the environmental, economic, and flood management value of the river-Floodway connection. In this regard, we urge the Council on Environmental Quality (CEQ) and the Corps of Engineers (Corps) to take the lead in formulating a unified Administration position that adequately addresses the significant environmental impacts associated with the current project while reducing flood impacts to infrastructure in the area.

In September 2010, the Missouri Delegation wrote to the President; the Honorable Nancy Sutley, Chairwoman, White House Council on Environmental Quality; and the Honorable Lisa Jackson, Administrator for the U.S. Environmental Protection Agency, urging support for the St. Johns Bayou-New Madrid Floodway Project. The views of the Department on this project reflect over three decades of active environmental review by the Corps and our agencies, a review that has produced a voluminous body of scientific evidence. This review has produced six major volumes of draft or final environmental impact statements, extensive Fish and Wildlife Coordination Act reports and multiple rounds of comments by the Department and Environmental Protection Agency (EPA). The review has also generated extensive scientific reports and commentary about the project from some of this country's most prominent scientists.

It is well established that backwater flooding from the Mississippi River into its floodplain is the driving force behind the ecology of the river. However, the vast majority of this critical

connection between the Lower Mississippi River and its floodplain has been extensively levied and drained at great cost to fish, wildlife and water quality. A major component of the New Madrid Floodway project is to close a 1,500 foot gap in the Mississippi River frontline levee. This 1,500 foot levee gap is the last remaining area in the State of Missouri where the Mississippi River is connected to its historic floodplain. Closing this levee gap will eliminate up to 90,000 acres of floodplain that is seasonally connected to the river. Severing this significant river-floodplain area will have profound impact on the river's ecology and valuable fish and wildlife resources within the New Madrid Floodway. Although these seasonally flooded areas are a mixture of naturally vegetated lands and croplands, they provide exceptional value because of the important role that backwater floodplain habitat plays in the ecology of the Lower Mississippi River. Furthermore, these large river-floodplain areas are becoming increasingly scarce on the lower river.

There is ongoing disagreement regarding the total amount of wetlands to be lost with the project. The Memphis District estimates in their draft ATR EIS that there are 13, 651 acres of vegetated wetlands (7,884 acres in the New Madrid Floodway and 5,767 acres in the St. Johns Bayou Basin) within their identified impact zone (five-year flood frequency elevation). Another 17,000 acres of naturally vegetated wetlands are estimated to occur above the five-year flood frequency elevation and an unknown amount of these wetlands could be impacted by the drainage effects of the project. There is a wide disparity in the estimated amount of farmed wetlands in the two basins, with estimates ranging from 520 to 118,000 acres.

Altering the hydrologic regime of the floodway produces a suite of complex and unsolvable challenges in providing adequate mitigation for the wetland, fishery, and floodplain impacts. The primary components of the Corps' proposed plan to mitigate for these impacts involve:

- Artificially operating the new closure gates and pumps
- Planting forest areas and creating managed wetlands on a few thousand acres, a small fraction of the acres to be drained; and
- Creating small, artificially manipulated permanent water bodies.

Such plans are at odds with contemporary understanding of wetland and floodplain science and agency mitigation guidance. This science emphasizes the critical importance of natural hydrology, spatial extent, and landscape position. The science recognizes the importance to habitat values of subtle features of hydrology, including depth, velocity, and timing of flooding and the relationship of one habitat to another. The Corps wetland mitigation guidance specifically endorses these principles.

When planning on the project was reinitiated in 2008, the Corps of Engineers convened an Independent Expert Panel Review (IEPR) to review the environmental impacts and proposed mitigation for the project. The IEPR has completed Phase II of its review and will soon begin Phase III (review of the draft ATR EIS). The IEPR has stated in its reports to the Corps the importance of the river-floodplain connection and associated hydrology in maintaining the integrity of the wetlands and floodplain. In this regard, the IEPR was critical of the Corps' mitigation plan to maintain wetlands and floodplain systems after the project significantly reduces the hydrologic regime of the floodway.

The primary project purpose is to reduce flooding for the intensification and diversification of agricultural production, which comprises 90 percent of the project's economic benefits. Improving agricultural production is an important value, but it does not depend on draining wetlands and severing the river-floodplain connection. Designing a project that focuses on draining such large floodplain/wetland areas for agricultural production when there is a regional and national need to protect areas of human habitation and infrastructure from flooding could be considered an inappropriate use of limited flood management funds. The communities of East Prairie and Pinhook in the project area would benefit from a reformulated project directed more at the protection of infrastructure. The goal should be to design a project that addresses flood damage abatement while safeguarding the existing hydrology and habitat values of the floodplain.

Unless the purpose and alternatives for the New Madrid project have changed since the last evaluation, the Department does not believe it is in the public interest to engage in yet more environmental analysis of this project. If the project purpose is redefined, we believe the agencies can work together to implement a sound project. I suggest a meeting be convened in the near future to discuss a new approach for proceeding on the St. Johns Bayou – New Madrid Floodway Project.

Sincerely,

Eileen Sobeck

Acting Assistant Secretary for Fish and Wildlife and Parks

cc:

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