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TULANE ENVIRONMENTAL LAW CLINIC

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Rankin Hinds Pearl River Flood Control & Drainage Dist.
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U.S. Army Corps of Engineers, Mississippi Valley Division
Public Affairs
Attn: Sara Robinison
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Dear Rankin Hinds Pearl River Flood Control & Drainage Dist. and U.S. Army Corps of Engineers, Mississippi Valley Division:

Introduction

The Rankin Hinds Pearl River Flood and Drainage Control District's (Drainage District) locally preferred plan, the proposed Federal Flood Risk Management Project for Rankin Hinds and Rankin Counties, MS is authorized by Section 3104 of the Water Resources Development Act of 2007:

Section 3104 of WRDA 2007 modifies the Pearl River Basin project authorized by Section 401 (e)(3) of WRDA 1986 to authorize the Secretary to implement a flood damage reduction project at a total cost of \$205,800,000, with an estimated Federal cost of \$133,770,000 and an estimated non-Federal cost of \$72,030,000. Further, section 3104 provides that the Secretary may construct the national economic development (NED) plan, the locally preferred plan (LPP) or some combination thereof, subject to a determination by the Secretary that the LPP provides the same level of flood protection as the NED plan and that the LPP is environmentally acceptable and technically feasible. A copy of section 3104 is enclosed for your information.

Implementation Guidance for Section 3104 of Water Resource Development Act of 2007 Pearl River Basin Mississippi.

Congress required that a plan for flood control be “**environmentally acceptable** and technically feasible” in Section 3104 of WRDA 2007 while at the same time giving the non-federal sponsor, the Drainage District, considerable latitude in choosing among the National Economic Development (NED) plan, the Locally Preferred Plan (LPP) plan or some combination of these. At the time of writing, the structural/non-structural alternative to dredge the Pearl River,

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build a weir, and do certain flood plain buyouts of property selected by the Drainage District is termed the Tentatively Selected Plan (TSP) and is stated to be the LPP as well as the NED plan.

Through an examination of the Draft Environmental Impact Statement (DEIS), prepared by the Drainage District, it is manifestly evident that the TSP proposal to dredge the Pearl River and its banks to widen and impound the river at 258' above sea level with a weir creating a 1900 acre lake, fill and elevate 1861 acres of functioning wetlands is **not an environmentally acceptable plan** for flood control for Jackson Mississippi for the reasons listed below and therefore must be rejected in favor of other less environmentally damaging alternatives.

Comments

I. The DEIS Fails to Comply with the National Environmental Policy Act

A. *The Purpose, Scope and Need Statement Fails to Comply with NEPA*

1. *The Purpose and Need Statement operates on a Project Scope that from the outset limited the Study Area to a small geographical region on a large river is improper given the many 2013 comments asking for the Lower Pearl River's needs to be considered.*

In the WRDA 2007 Section 3104 language authorizing the Section 211 project, the geographical scope of the project is provided as: "...that portion of Jackson, Mississippi and vicinity, located below the Ross Barnett Reservoir Dam..." In a November 6th, 2014 meeting Gulf Restoration Network requested in Vicksburg at the MVK offices with Rankin Hinds Pearl River Drainage District personnel, Vicksburg Corps personnel (Matt Mallard, Barbara Peterson), Gulf Restoration Network asked Drainage District attorney Keith Turner if the Section 3104 language quoted above dictated how big or small the study area needed to be under the statute. Turner explained that as the DEIS writing was proceeding in 2014 that the study area had not been expanded beyond Rankin and Hinds Counties.

It was clear in 2013 scoping comments from non-profit environmental organizations (Gulf Restoration Network, Mississippi River Delta Restoration Coalition, Lake Pontchartrain Basin Foundation) and from Louisiana State Agencies (LDWF, CPRA) that water quantity and estuarine ecology issues at the lower end of the Pearl River Basin needed investigation if another lake was to be constructed on the Pearl River. These scoping comments were received by the sponsors, but not heeded. Turner, at the 2014 meeting responded to a question from me, replying that the study area was not to be expanded beyond that area provided in Section 3104 and that the project area was even smaller than that of the study area. What is a NEPA scoping process for if the comments on the extent (scope) of the study area don't produce improvements in the final study? In this case the sponsors certainly did not respond to the comments to improve the project's environmental studies.

- 2. The Purpose and Need statement is inadequate and omits a discussion of the Ross Barnett Reservoir.*

A Purpose and Need Statement is to describe what a sponsor is trying to achieve by proposing an action. The Purpose and Need Statement explains to the reader why an agency action is necessary, and serves as the basis for identifying the reasonable alternatives that meet the purpose and need.¹ In the history of flood control projects in the Pearl River Basin from 1960 forward given in section 1.3, there is no mention at all of the Ross Barnett Reservoir. The flood protection need is not discussed in section 1.1. which is the Purpose and Need paragraph. Section 1.3 which does discuss need concerns itself mostly with providing a history of the local and federally sponsored actions relevant to the Pearl River drainage, but again does not describe why this action is necessary or serve as a basis for the identification of alternatives. In the project history, there is no mention of the building of the Ross Barnett Reservoir in 1963-1965. Managing the Reservoir flood-gate releases through Jackson's urban reach of the Pearl River is at the heart of the need for choosing an alternative to lessen neighborhood flooding in Jackson due to urban creeks backing up, and due to the threat of levees failing and being overtopped. Not mentioning the Reservoir, dam or its flood gates in the need statement and not listing it as one of the major projects affecting the Pearl River in Jackson is a large oversight and should be corrected.

B. The DEIS Alternatives Analysis Fails to Comply with NEPA

- 1. The Rankin Hinds Drainage District's 2013 vote, five years ago, to select the lake as the Locally Preferred Plan at the beginning of the Scoping process caused the DEIS to be written with a bias for the lake alternative.*

The Drainage District never intended to objectively compare alternatives before arriving at a Tentatively Selected Plan (TSP). The decision to pursue a lake dredging project as a flood control solution was made quite transparently by the vote of the Drainage District in 2013. The lake is described in the DEIS as the Locally Preferred Plan, the TSP and as the National Economic Development plan (NED). The basic problem with the DEIS and the process that led to its creation is that in the minds of the Rankin Hinds Drainage District's Board of Directors, the lake alternative has always been their goal for a new federally funded flood control project for the Jackson Metro area of Rankin and Hinds Counties.

- 2. The Elimination of a no-damming channel modification alternative between the 2013 scoping process and the release of the DEIS was improper.*

In the 2013 Scoping period, a no-action alternative and four action alternatives were presented. By the time the DEIS was published in 2018, only three action alternatives were described. The structural measure calling for Flood Storage and Channel Improvements was removed. The lead agency or agencies must "objectively evaluate all reasonable alternatives, and for the alternatives which were eliminated from detailed study, briefly discuss the reasons for

¹ A Citizen's Guide to the NEPA. Council on Environmental Quality. Executive Office of the President. December 2007.

their having been eliminated” (40 C.F.R. Sec. 1502 (a)) The explanation of the development of plans 6, 7, and 8 in the Plan Formulation section Appendix A gives a conclusory explanation of why the channel modification option was eliminated for further consideration.

In light of comments by the U.S. Fish and Wildlife Service submitted to the Drainage District on August 16th, it was unreasonable to remove channel modifications or other near-channel excavations from the final array of alternatives for consideration, especially since no damming or impoundment is necessary with them. Excavation of the mowed floodplain between RM 284 and RM 290 was recommended as a way to reduce water surface elevations and provide fill for levee construction:

3) Excavation of the mowed floodplain between RM 284 and RM 290 to a lower elevation would reduce water surface elevations while still allowing maintenance mowing. This should lower flood stages through this area reducing the chance of levee overtopping and reducing the height of proposed levees. Soils removed, if suited, should be used in levee construction.” Floodplain excavation could also include removal of the floodplain portion of the Gallatin Street landfill near RM 285, a site identified in the EIS that is leaching chemicals into the groundwater and potentially into the Pearl River.

USFWS Comment letter to Michael Goff, August 16, 2018, p.11.

3. The inclusion of pumps with the levee alternative doubled the levee cost and was not consistent with earlier ACOE levee plans or analyses.

The August 16th comment letter from USFWS to Michael Goff refers to the ACOE 1996 levee plan and recommends that levees be pursued as a flood control alternative rather than the environmentally damaging lake dredging plan.

It became apparent during a reading of the DEIS that the elimination of the channel modification alternative reduced the the array of action alternatives in the DEIS to a pair of costly “straw-man” alternatives (floodplain buyouts and levees) to compare with the “locally preferred” lake dredging alternative. The comparison is quite stark if cost alone is considered. In addition, the non-structural methods that did not cost as much as wholesale relocation of large parts of Jackson were not discussed in any meaningful way. Removed from serious consideration were: elevation of structures, flood proofing, flood warning planning, and more floodplain ordinances. Relocation, the most expensive and most complex non-structural alternative, was embraced, which the sponsors say would cost \$2 billion which is 5.7 times as expensive as lake dredging at \$350 million and is 2.6 times as expensive as levee construction at \$720,000,000.

In 2010 the Mississippi Legislature’s Joint Committee on Performance Evaluation and Expenditure (PEER) was directed to do a study on the Rankin Hinds Drainage District and the history of the flood control options developed for the Pearl River in Jackson, Ms. The 2010 PEER Committee Report #540 on the flood control alternatives did not calculate such a high cost for levees, and determined that a single lake project was more expensive than a levee plan for Jackson. It likely did not include the cost of pumps in its estimate.

The USFWS August 16th comment letter to Michael Goff likewise focused on the sponsor's decision to include \$312 million in their levee alternative for the cost of pumps at the mouths of the various urban creeks that would have to be closed off to the river. According to the DEIS writers, pumps are a necessary component of a levee plan. This is due, they say, to an updated interior analysis which "appeared" to justify the need for pumping stations. (Appendix A p. 34, line 16) However, the USFWS stated in its comment letter, "... previous Corps studies found that pumping facilities (i.e. plants) were not economically justified, with costs exceeding benefits by at least an 8 to 1 margin for each of the pump areas." This statement cited the 1994 USACE draft Feasibility Study.

Removal of the pumps from a \$720 million dollar levee project would lower a levee project's cost to \$408 million which is much closer to the proposed lake's cost. A revisiting of the Legislative PEER report's 2010 justifications and reasoning would be warranted to see how the State of Mississippi arrived at its conclusion that levees cost less than a single lake plan. This was a mere three years before the start of the scoping process for this DEIS and the cost and financial calculations by the State's PEER staff would not have been "stale" for comparison purposes. The State would have to put \$70 million of "match" money toward any flood control plan approved under WRDA (2007), including a levee plan, and the State should be in a much better position to monitor projected project costs and expenditures than the Rankin Hinds Drainage District which does not have the staff or resources for such an evaluation.

Removing the pumps makes the levee option much less of a "straw-man" for the Drainage District's argument about project cost. A transparent examination of the justification for using pumps in its levee alternative should be required of the Drainage District in its preparation of a new draft Environmental Impact Statement. This comment writer agrees with this recommendation of the USFWS comment letter of August 16th, 2018: Another draft of the EIS should be prepared and presented before this document goes into any ACOE final decision process.

4. The Alternatives Analysis elevates the most environmentally destructive alternative as the TSP.

While it doesn't necessarily prevent a project from being approved, elevating the most environmentally disruptive flood control alternative cannot be good for the Pearl River's physical characteristics, local ecosystem or downriver aquatic habitats. The USFWS August 16th letter describes the dredging alternative chosen as the TSP as the "**most environmental damaging plan**" after the Service's review of habitat and wildlife effects of lake dredging. They did this review in furtherance of the Agency's duties under the federal Wildlife Coordination Act. No other alternative comes close to filling 1861 acres of riparian wetlands (almost three square miles), or turning quite so much valuable floodplain forest habitat into 1900 acres of open water. Not counting comparative habitat values or their change of function from riverine (fluvial, lotic) and wetland to lacustrine (lentic), no other alternative (levees or non-structural) comes close to the total acres of alteration to the river's physical features and its associated riverside habitats as the proposed lake dredging option.

It is noteworthy that ecological impact reasons (environmental damage) were cited in a dozen (12) enacted resolutions against this project since 2013. These were enacted by the Mississippi Commission on Marine Resources at the states Marine Resources Agency (MDRM), The Louisiana Legislature (SCR5 of 2018), four Counties and one town in Mississippi and two Parishes and three towns in Louisiana. Every County or Parish downstream of Columbia, Mississippi is on record against the dredging of another lake on the Pearl River by the Rankin Hinds Pearl River Flood and Drainage Control District.

C. DEIS Fails to Properly Evaluate Project Impacts

1. The DEIS fails to examine Reasonable Foreseeable Site-Specific Impacts

a) Conversion of Uses of Park Property

In maps produced by the Drainage District in the Wetland Delineation and Determination section of Appendix D, the southeast corner of LeFleur's Bluff State Park, covering approximately twenty (20) acres is included in the river bottom and bank area to be affected by river dredging. The history of the deed granting language for the land that now comprises Lefleur's Bluff State Park demonstrates that all grants have been made for public park purposes. The State of Mississippi granted the city the Old Asylum property for "park purposes" in 1944. A subsequent grant of Riverside Park back to the State also contained a deed restriction for park purposes in 1986. A 1984 notice of "limitation of use" exists in Hinds Chancery court Deed Book 2980, page 318 that covers land in Riverside Park acquired through the use of federal funds from the Land and Water Conservation Fund. In the Notice of Limitation of Use Agreement, the language cites 16 U.S.C Section 4501-5 et seq.(1970) and provides " this property may not be converted to other than public outdoor recreation uses (whether by transfer, sale, or in any other manner) without express written approval of the Secretary of the Department of the Interior." This language and the earlier deed restrictions would need examination if State Park recreation land became dredged for flood control, or became filled and then developed into a commercial use, pushing the land into uses not contemplated by the granting language. It is reasonably foreseeable that placing the footprint of the lake alternative's profile on any amount of acreage of existing park land will cause a site-specific impact sure to raise objections by state park users.

b) Water Temperature Change due to Loss of Canopy

Discussions of impacts (alterations) to Pearl River water temperature appear in the various DEIS documents presented by the Drainage District. If the dredging and widening (Alternative C) is pursued, it is reasonably foreseeable in the work zones along the Pearl River that water temperatures on a wider river surface area (a river dredged and widened from its present 300 foot width to 1500-2000 feet wide) would respond by rising in most seasons of the year. The lake alternative calls for removing most of the riparian tree canopy (mature trees along the river's banks) that currently provides shade to the water during part of each day. Tree removal and the creation of new land using dredge spoil will result initially in denuded riverbanks over most of the ten miles of the project area. With more hours of sun exposure each

day, water temperatures can be expected to rise in river reaches with denuded bank areas in the dredging work zone. In Alternative C, the plans for the revegetation or development of the spoil areas are not specific enough to predict with any certainty whether the degree of tree shading seen pre-project (No Action) would ever be re-established or otherwise recover after dredging and wetland filling. Indeed p. 20 of HEP analysis Appendix D makes the assumption that dredge disposal areas will become urban development areas.

c) Water Temperature Change via Radiated Heat from Hardened Banks

Along a developed urban riverfront, the use of concrete walls, rock riprap, sheet piling or other engineered materials is reasonably foreseeable in order to stabilize soils along the twenty miles of newly exposed river banks and protect them from being eroded during high water events. Hardening at the toe of spoil piles (levees), and other erosion control engineering would also be necessary to prevent washing of dredge spoil back into the river during rainfall. Urban waterfronts being used for comparison to the One Lake project, like the San Antonio Riverwalk have hardened river banks. Hardened banks of lakes and rivers absorb heat from the sun during the day and radiate it back into the water both during the day and at night. It is reasonably foreseeable that as a result of lake construction, the loss of canopy and the consequent hardening of banks will cause more insolation to be absorbed by the hardened structures and bank features along the river. Radiated heat produced by these hardened/engineered features will raise water temperatures in the Pearl River within the project area - a widened urbanized riverfront.

d) Impact on Nutrient TMDL, Savanna Street Sewage Treatment Plant

There was a Total Maximum Daily Load Report (TMDL) developed in 2015 for the Pearl River from the Barnett Reservoir Dam downriver to the Strong River's confluence with the Pearl. The Reservoir and the Pearl River were both described in that report as eutrophic waterbodies. Although the TMDL set nutrient limits for Nitrogen and Phosphorous on permitted dischargers in this section of the Pearl, the statement was also made that in the absence of NPDES discharges to the Pearl, sufficient non-point sources of N and P pollution exist such that these alone would be enough to keep the Pearl River nutrient impaired. Water temperatures were measured in the existing downstream reach of the Pearl River below the Barnett Reservoir during two sampling periods in July 2014 and reported in the DEIS. In one of the measurement periods, July water temperatures below the Ross Barnett Reservoir were in excess of 90 degrees Fahrenheit (30 C) which violates state water quality standards as delineated in the MDEQ Water Quality Criteria for Intrastate, Interstate and Coastal Waters (2007). Without the widening and dredging project in urban Jackson, the Reservoir discharge water is presently capable of entering the tailwater at an elevated temperature, in violation of state temperature standards (>90° F). If the "One Lake" dredging project proceeds, after release from the Barnett Reservoir dam, river water will travel about seven miles before it enters the ten-mile long dredged and widened section, where the surface area of the river will be broader than present, unshaded, and subject to additional daytime insolation, as well as radiant heating (see: section above on hardened banks) from an urbanized, hardened, riparian area. Extra heating of water in the urbanized reach will ensure that when water leaves the weir or low head dam at Richland, it will have gained ambient heat energy. The addition of the Savanna Street Sewage Plant's effluent to the river in the mile

below the weir will cause the nutrient-rich treated sewage to mix with water of elevated temperature. In the MDEQ's Pearl River Nutrient TMDL document from 2015, modeling predicted that the "critical cell" of the Pearl for low dissolved oxygen and high algal growth (creating conditions for night-time dissolved oxygen D.O. "sags") was downriver just north of the confluence of the Strong River with the Pearl River. It is likely that an additional "critical cell" for D.O. sags will appear downstream of the point at which sun-warmed river water mixes with nutrient-rich water from the Savanna Street sewer plant, or any new sewer plant. This new "critical cell" will merit additional concern for dissolved oxygen sags, and oxygen supersaturation problems. An updated TMDL may be required by MDEQ, along with the emergent need for water treatment to address the synergistic effects of elevated temperature on an already eutrophic river. It is reasonably foreseeable that nutrient pollution conditions delineated in the 2015 Pearl River Nutrient TMDL will worsen due to the elevated water temperatures in a wider, less shaded river section if the Pearl is allowed to be transformed into a slower lacustrine environment by the One Lake project. It is foreseeable that a new "critical cell" for dissolved oxygen sags and algae growth will be created by the combination of Savanna Street sewage effluent with river water of a higher temperature than that found in current conditions. It is clear, even from the Drainage District's limited DEIS water quality study efforts, that current water temperature in the Pearl can already violate Mississippi DEQ Water Quality Standards. Modeling in the DEIS did not cover how creating a new dredged lake section on the Pearl River might predictably exacerbate these conditions.

In Appendix D (Water Quality), the only critical condition for the Pearl River identified by the DEIS' limited sampling was an instance when a localized summer storm over Jackson caused large amounts of runoff to flow into the urban creeks that drain to the Pearl River. A dissolved oxygen sag happened July 11, 2014 at the two locations (PR-1, PR-2) sampled above the Water Works low head dam (weir) and the well mixed (not stratified) river was below 5 ppm of dissolved oxygen from surface to bottom at both sampling stations. The low dissolved oxygen was blamed on stagnant water in urban creeks being flushed into to Pearl although other factors could have been at work, like elevated water temperature. Also from the discussion on Appendix D, page 47, the river flow was at 290 cfs during the storm event. It is important to note that the new low flow floor for the Savanna Street sewer plant is 227 cfs. Dissolved oxygen was apparently depressed by a rainstorm causing urban runoff to flow into the river when it was measured during a 290 cfs flow which is higher than the new critical low flow "floor" of 227 for the Savanna Street plant. The new lake project only is required to produce 227 cfs from its weir to satisfy effluent dilution at the Savannah Street sewer plant's mixing zone. The limited sampling of July 2014 (10 days total) indicates that for flows between 290 and 227 cfs, other dissolved oxygen "sags" during rain storm events should be expected. This impounded section of the river, post-dredging and widening, will move even slower and should have warmer water due to inputs of heated water > 90° F from the Ross Barnett Reservoir, a broader surface area, and the loss of shading riparian canopy once post-dredging project conditions become established. If the sampling showed dissolved oxygen deficits below 5 ppm at 290 cfs, at flows below 290 cfs, a hotter river should be able to reproduce D.O. sags reliably any time when summer storms (or possibly all storms) flush polluted water from the urban creeks into the Pearl. If dissolved oxygen levels can be expected to frequently fall below 3 ppm, oxygen stress for fish and other aquatic life must be taken into account in lake design, and mechanical aeration or

spraying may be required in the impounded reach of the Pearl to protect aquatic life. The Alternative “C” project should be subject to an NPDES permit due to the likelihood that it will cause the river to violate state water quality standards. This could require mechanical aeration.

2. The DEIS Lacks Scientific Integrity in its presentation of physical features of the Pearl River

a) Changes to Slope of the River Channel from Dredging.

Dredging the bottom of the river deeper is a reliable way to alter the slope of the river bed. Usually, dredging in an alluvial stream’s bed will cause sediment to move into the stream bed from bank and/or bed erosion upstream. This “headcutting” is a predictable process on a fluvial system after a physical disturbance to slope. The DEIS does not contemplate this type of impact to the river channel and to overlook it in a discussion of dredging in an active alluvial, coastal plain river like the Pearl is a sign of inattention to basic river science.

The stream or river tends toward recovery of a dynamic equilibrium among slope, discharge, and the amount and particle sizes of sediment able to be carried by moving water. Eroding stream banks and beds provide sediment toward re-establishment of this equilibrium. Headcutting manifests as headward, upstream movement of bank collapse as the river cuts down and out into soft bed and bank materials or alluvium. This is also known as accelerated erosion² and the process reliably moves upslope on land (gully formation) and upstream and up main channels and tributaries of the main channels of streams and rivers. The end result is the undercutting and collapse of riparian forests and vegetation along the main stream channel and up tributaries.

Digging into the channel of any river or stream can produce headcutting, and the resulting erosion process is most active at higher river stages and flood stages. Grade control structures of rock or concrete can be built completely across streams, keyed into upper banks, to harden a point on a stream that then functions to stop the upward migration of a headcut. A waterfall or cataract at a stream’s fall line serves as a defacto grade control structure. On rivers like the Pearl, in the absence of some kind of hard bed material such as a vein of hard clay, sandstone, limestone etc., headcuts can progress miles up main channels of streams and up tributaries. Dredging in the Pearl to deepen and widen it for lake creation may start headcuts on the main channel and up any of the urban creeks that meet the Pearl between Lakeland Drive (Hwy 25) and the new weir at Richland, Ms. River and stream channels become unstable when they contain active headcuts. To fail to mention headcutting in DEIS section 4.5.1 which deals with Soils, Water Bodies and Prime and Unique Lands is an oversight.

Changes in slope on any fluvial system are long-term and major in intensity whether considering direct, indirect or cumulative impacts. Cumulative impacts to slope also would necessarily include the downcutting of the Pearl River channel in the project area. One good way

² Mississippi Streamside Landowner’s Handbook. Mississippi Museum of Natural Science Technical Bulletin No. 100 (2003) p.p. 7-9.

to visualize the results of a down-cut degraded channel is to compare the elevation of the main river channel to the elevations of sloughs, oxbow lakes and other floodplain water features that are “perched” next to the Pearl at higher elevations than the river’s existing channel. The “perched” nature of many of the off-channel backwater sloughs and oxbows along the Pearl River reveals the degree of channel down-cutting that has occurred. The backwater wetlands along the river are higher than the elevation of the river channel itself, and the difference can be 8-15 feet. This is likely due to the scouring of the river bed and banks during the high flows that take place during large, channel forming, discharges from the Ross Barnett Reservoir. Changes to riverbank soils due to alterations to the slope of the river bed will be long term major changes to the Pearl River. The DEIS describes the alterations as long term and moderate. Re-working of a channel’s conformation due to headcutting is always a major change in a stream’s physical characteristics.

b) Water Temperature in a Dredged Widened section of River

Water temperature in the Pearl River below the Ross Barnett Reservoir’s floodgates was recorded over ten days in two sampling periods in July 2014. The modeling done for temperature and other water quality parameters is based on only ten days of actual measurements. During both July sampling periods, temperatures exceeded 90° F which is in excess of MDEQ’s state water quality standards for water temperature. A temperature of 92.6°F was reached on July 23rd. The stations PR-1 and PR-2 where these high temperatures were recorded are seven river miles below the Ross Barnett Reservoir’s flood gates in a section of the river that is pooled (and relatively deep) due to the existence of the low head dam at the Fewell Water Treatment Plant. Conclusions about water temperature based on the small amount of data are not robust, and at times seem to be conjecture. The lack of water quality data for the project reach is severe. A project of this magnitude requires much better resolution of existing water quality conditions for adequate impact assessment.

Based on the limited data, the model results predict that for Alternative C, (the dredged lake) temperature is predicted to have fewer diurnal swings and be more stable than the present condition of the Pearl River because of a greater depth of water for Alternative C compared to existing conditions (Appendix D, 4.3.7, p 63). Data from the July 2014 field work show that the deeper and slower section of the Pearl River can get quite hot and that it can stratify as shown by measurements of both temperature and dissolved oxygen. A wider, slower, more lacustrine section of the Pearl River envisioned by Alternative C, seemingly should do these same things: stratify and get hot.

The discussion of water temperature on DEIS pages 188-189 shows why the water temperature would go up. In the discussions of Alternative B and its direct impacts on Aquatic and Fisheries Resources on page 188, the text states, “ the removal of tree-sized vegetation would effectively eliminate much of the shading along the river channel and sloughs, which would lead to increased water temperature, especially during the summer months, and could result in indirect impacts to the aquatic fisheries resources within the open water habitats” This impact (due to clearing for levees) was listed as moderate in intensity and long-term in duration. Levee construction would **only remove some** of the forest canopy along the Pearl, while

widening and dredging the Pearl to create a 1900 acre lake would **remove nearly all** of the riparian vegetation (1861 acres - 2.9 square miles) including **the entire** shading tree canopy along the Pearl River. This is listed on page 206 of the DEIS as “major in intensity and long term in duration”

To be clear, a near total lack of tree-shading on the dredged, widened section of the Pearl River will lead to more hours of direct sunlight striking the surface of the river. Since the depth of the newly constructed lacustrine section of the Pearl River in the dredged and widened section (Alternative C) will also be designed with varying water depths to offer some fish habitat diversity (DEIS page 190 line 19), it is basically disingenuous to state that the limited modeling performed (ten days of baseline data in one month of the year) can predict that water temperatures in the dredged section of the river under Alternative C will be as stable as they are now or more stable due to greater overall depth. Did the water quality modeling take into account the lack of tree shading and the varied depths of the river section in Alternative C? We don't know this.

Water from the Ross Barnett is released from its heated upper layers, and if water temperatures on the Pearl River seven miles downstream of the Reservoir's outlet at sampling sites PR-1 and PR-2 can exceed 90 degrees Fahrenheit (which also exceeds existing MDEQ state water quality standards) then it seems plausible that a section of the river widened, slowed in velocity, and rendered completely devoid of tree canopy will gain heat. The degree that increased depth may play in moderating this effect is likely minor, but the modeling does not explain the interactions among the model effects, or the assumptions on which the model was built.

It is telling that after discussing the adverse impact that canopy removal would have in Alternative B (levee construction) on page 188, the next page which describes fish habitat affected by Alternative C completely lacks a discussion of water temperature which would be impacted to some degree by the dredging and widening of the Pearl into a slower lacustrine environment lacking any tree canopy to provide shade. The wildly uneven discussion of the effect of water temperature on fish habitat on pages 188-191 of the DEIS lacks scientific integrity. If the limited July 2014 water quality modeling has something to contribute to the post-project effects of Alternative “C” on water temperature and its effect on aquatic life in the Pearl River, this seems to be a good place to state it. It is likely that the effect of Alternative C on water temperature is long-term and major. The DEIS writers need to justify their opinions to the contrary.

c) Channel Stability (Erosion and Sedimentation)

The apparent vertical and horizontal stability of the Pearl River channel downstream from Ross Barnett Reservoir is remarkable. For a single-thread, meandering sand bed river, that experiences as wide a range of discharges as this reach does, not to respond to the reduction in bed material sediment load that likely occurred due to the closure of the Ross Barnett Dam is surprising. As stated in the DEIS, the reach must be receiving sediment from either the reservoir, tributaries or bank erosion. The preliminary assessment in Appendix C, pp. 1-17 indicates that current sediment transport capacity is more than twice the sediment supply. What prevents the channel from eroding its boundaries more than it does? The same assessment indicates that the

project will decrease the sediment transport capacity within the project by 1 to 5 orders of magnitude. It would seem more study is needed, even at this stage of project development. The lack of sediment data (to allow estimates of the quantity and sizes of sediments moving through the proposed lake) is important. The proposed lake may become a sediment trap requiring frequent maintenance in order to maintain flood management capability. Regular dredging of the Pelahatchie Bay arm of the Ross Barnett Reservoir happens so that boat channels can be maintained. Spoil islands on the side of the channel are created by the dredging there. Movement of sand through the Ross Barnett flood gates needs more investigation. It is doubtful that enough sand is going through the flood gates of the dam to maintain pre-dam levels of sediment flux and thus maintain channel stability.

In the absence of data for the tributaries to the project reach, the EIS resorts to using an average of sediment yield for northern Mississippi abandoned fields (0.141 tons/acre/year, from Dendy et al. 1979) increased by 25% to be conservative (0.176 tons/acre/year) to estimate the flux of sediment from the tributary watersheds which are characterized by urban and suburban land use and land cover. Instead of this strained use of agricultural data to approximate urban streams, the plentiful sediment data and instantaneous discharge measurements available for Mill Creek watershed in Rankin County might be used to develop a suspended sediment rating curve for Hanging Moss Creek to generate an estimate of average sediment yield more typical of the project area, despite the fact that Mill Creek is less developed than Hanging Moss Creek and other tributaries to the project reach. Mill Creek is now contributing large amounts of sediment to the Pelahatchie Bay arm of the Ross Barnett reservoir (where periodic dredging is necessary to keep boat channels open). Such a rating curve shows an annual sediment flux of 4,833 tons which equates to an annual yield of 0.45 tons/acre per year for Hanging Moss Creek. This is more than twice as great as the value presented in the DEIS.

Channel bed erosion should be studied using thalweg surveys which may be available in Flood Insurance Studies. Also in the boat and walking surveys of the river, no mention was made of the degree of difference in elevation between the river channel and the perched sloughs and oxbow lakes found along the floodplain. Both Mayes Lakes in LeFleur's Bluff State Park are "perched" up on the floodplain between 8 and 15 feet higher than the channel of the Pearl River. This would seem to indicate a degraded, downcut channel in this section of the river, which was not identified in the field surveys conducted for the EIS.

Earlier iterations of the single lake project on the Pearl River, such as drawings done during the Andres Douany charrettes featured a sediment trap dug into the river at the head of the single lake project upstream of Hwy 25. Even then, the architects and engineers must have suspected sediment problems in a lower lake and incorporated that feature to make maintenance easier if a single lake "One Lake" version was eventually chosen and constructed.

d) Bank Stability

A 2009 TNC Pearl River Geomorphic and Sediment Assessment for the Pearl River in Mississippi and Louisiana³ produced results in contrast to the conclusions of the DEIS. More sampling was done for that study than for the District's DEIS, and the study area was much larger. It provided the following description of the Pearl River Channel in the vicinity of the project area for this DEIS:

The channel type progression observed for the Pearl River suggests that the upper section of the Pearl River (reaches 1-12) have been perturbed at some time in the relatively recent past (within the past 50 to 75 years) as evidenced by development of a channel type indicative of unstable conditions. Such a channel response may result in the delivery of excessive sediment loads to the river, and in the degradation of in-stream and riparian habitats. With increasing distance downstream from Jackson MS, the progression of channel types within the Pearl River from G- and F- type channels, through alternating C>F and C-type channels, to C and C>E channels represents frequently observed upstream to downstream sequence of channel types found in rivers adjusting to one or more previous basin-scale disturbance events (Rosgen and Silvey 1996, Rosgen et al.)

The DEIS describes a stable channel, while the TNC study found in 2009 that the river was still adjusting to the disturbance caused by the construction of the Ross Barnett Reservoir 50 years earlier. A representative of Gulf Restoration Network mentioned this TNC study to the Drainage District's attorney, Keith Turner, in 2013 and his comment was that he didn't agree with TNC's data or conclusions. The Nature Conservancy study had more data collected over a much longer area of the Pearl River by reputable river scientists. The amount of channel instability and bank failure associated with Reservoir discharges still in evidence on the Pearl River and the shoaling in downstream areas tends to support the conclusions of TNC's study and calls into question the conclusions of the Drainage District's sampling and study.

For bank erosion, the DEIS provides an estimate of 14,900 cubic yards/year based on comparison of aerial photographs. The comparison of aerial photography is a weak method since the coverage does not span a very long time relative to the age of the reservoir (1996-2010) and is limited to Google Earth. Additional, earlier coverage is likely available from the USDA, NAIP, or USGS. The air photo analysis is also lacking an estimate of error and uncertainty (for example, see Micheli and Kirchner 2002)⁴ and (Legleiter 2015).⁵ It is likely that the reported bankline changes are outside the bounds of precision. Cross sectional surveys would be a more

³ Geomorphic and Sediment Assessment of the Pearl River in Mississippi and Louisiana. Louisiana Field Office of the Nature Conservancy. T.B. Kennedy and C.S. Haase. Contracted by MDEQ, LDEQ. 2009.

⁴ Micheli, E.R. and Kirchner, J.W. (2002) Effects of Wet Meadow Riparian Vegetation on Streambank Erosion. 1. Remote Sensing Measurements of Streambank Migration and Erodability. *Earth Surface Processes and Landforms* 27, 627-639.

⁵ Legleiter, C.J. (2015). Downstream Effects of Recent Reservoir Development on the Morphodynamics of a Meandering Channel: Savery Creek, Wyoming, USA. *River Research and Applications* 31,1328-1343.

reliable way to measure bank erosion, but the DEIS reports that the only available survey of this reach is from 1991. In the 1996 levee plan Feasibility Study EIS by the Corps of Engineers, the following passage belies the statements in the DEIS about the scarcity of cross sectional channel data available:

ine cross sections were obtained on the Pearl River. These sections were taken to verify the previous hydrographic surveys taken in June 1991 and were as near as possible to the sites of the original sections.

Stability of existing banks should be assessed using the BSTEM model, available from the National Sedimentation Lab in Oxford, MS.

The scientific integrity of a study such as this DEIS must be questioned and criticized for using simple methods like Google Earth photograph comparison instead of actual measurements of channel cross sections to make conclusions about stability of channels. Using farm field sediment erosion estimates instead of more localized sediment data is another scientific weakness of the DEIS study. The failure to narrow the largest source of sediment for the Pearl from among the Reservoir, the tributaries and the watershed is another weakness of this DEIS study. Leaving a more detailed and precise sediment analysis for the subsequent planning and engineering stages of the project is a failure of this DEIS because changing the Pearl River to a more lacustrine, slower flowing environment will have significant consequences for the sediment carried by the river. These questions need answers *a priori*, not later. Dredging sediment from the project area will likely be necessary to control depth and therefore to affect the project's capacity to operate efficiently – to move flood discharges through Jackson at a lower surface elevation. Sediment production and transport should have been approached more seriously and with better data and methods.

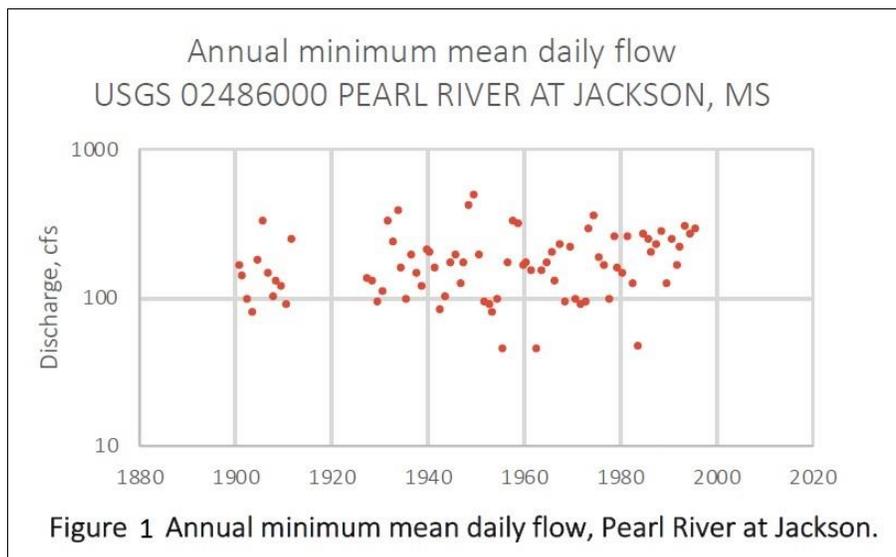
e) Fresh Water Discharge, Water Quantity and Evaporation

The amount of water that flows through the project area if Alternative “C” or any other design chosen is governed by the operation of the flood gates at the Ross Barnett Reservoir. On August 16th 2018 in Baton Rouge, La., the representatives of the Drainage District were questioned about minimum flows out of the Ross Barnett Reservoir dam by the members of the Louisiana Joint House Senate Lower Pearl River Ecosystem Task Force. It was clear from the incomplete answers provided to the Task Force members that the Drainage District has not had necessary conversations about minimum flows with the Pearl River Valley Water Supply District - the agency that manages the discharge of water from the Ross Barnett Reservoir into the tailwater reach of the Pearl River and into the Lower River downstream of Jackson, Mississippi. Not knowing detailed information about the origin of the present low-flow release agreement that controls Reservoir operations is inexcusable for a government agency - this Drainage District.

The DEIS is written to assure that flows on the Pearl River, especially low flows will not be decreased significantly by the addition of a 1900 acre lake if Alternative C, the dredging project, is pursued as a flood control measure. The assurances include the DEIS authors pointing out that 2/3 of the Pearl River basin lies downstream of Jackson, the site of the dredging and lake

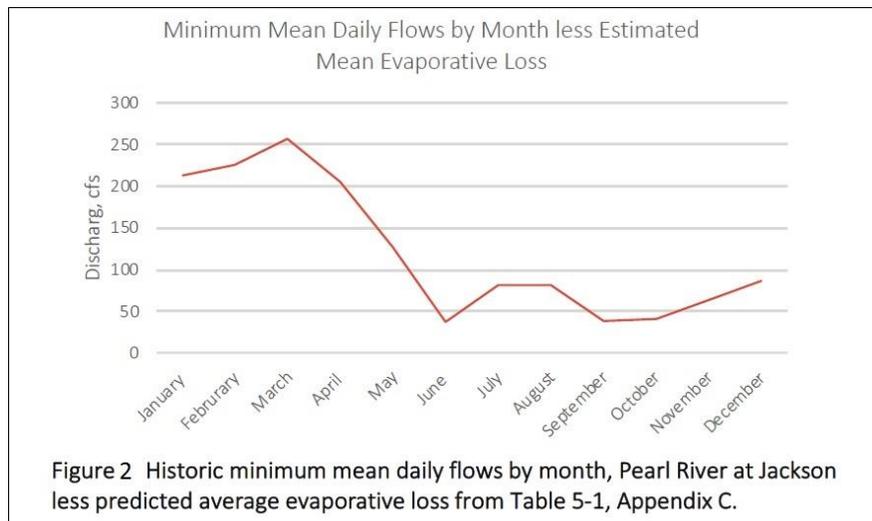
project. The assurances include an examination of evaporation from the new 1900 acre lake surface which is reported to be .047% of the total annual discharge of the River into Lake Borgne. Despite scoping comments from this organization (GRN) and others in 2013, the conclusions about evaporation were reported as total evaporation as a percentage of total annual discharge instead of monthly evaporation as a percentage of monthly discharge. Because the seasonal low flow months of June-October are the main concern for periods of critical low flow or for droughts, a thorough examination of low flow during these months should have been offered. Instead the DEIS writers presented the data on flow and evaporation in the light most favorable to the success of Alternative C, the lake dredging project.

This left an objective examination of low flow to those who read the DEIS and consequently had to re-examine the USGS data set *de novo* in order to provide a data analysis with which to contrast the DEIS writer's examination of low flow. For instance, the use of pre-Ross Barnett dam flow data is not relevant now because of the current impounded nature of the river. The critical factors for fresh water flow on the Pearl in the Jackson reach are the Ross Barnett Dam and the Savanna Street Sewage Treatment Plant because the operation of these two engineered features on the Pearl dictate the minimum flows necessary to be released through the Jackson reach of the river. Under the most recent active MDEQ NPDES permit for the Savanna Street sewage treatment plant, it is necessary that a minimum flow of 227 cubic feet per second (cfs), measured at the Jackson river gage be available for the plant's effluent mixing zone. It is necessary to examine how frequently the river goes below that minimum flow "floor". Discharges in the project area have fallen below 100 cfs repeatedly over the period of record. Figure 1.



Minimum annual mean daily discharges have fallen below 50 cfs three times since 1956, most recently in June 1984. Table 5-1 on p. 10 of Appendix C shows an average evaporation loss of 10 cfs in the month of June. No extreme value is given for evaporation loss. However, this raises the question of whether impacts of the proposed lake on environmental flow requirements

have been adequately addressed. Withdrawal of 10 cfs by evaporation would depress extreme low flows at the Jackson river gage below 40 cfs. Minimum mean daily flows by month, less predicted evaporative losses, indicate flows **will not** meet the 227 cfs required for Savannah Street POTW except during high-flow events in March. Mean daily discharge measurements at Jackson show many measurements that are lower than the 255 cfs required for Ross Barnett discharge and lower than the 227 cfs for Savannah St. treatment plant. Figure 2.



Furthermore, flow would go even lower under more extreme (not average) evaporation, and under warmer air temperatures predicted due to climate change. In addition increased population in the vicinity of the project will create pressure for elevating the current Jackson water supply withdrawals from the proposed lake above the current level of 25 cfs (p. 7, Appendix C)

When daily flow observations after 1960 are examined, and using the 10th percentile flow value of 241 cfs, there were 665 occurrences below it (3.2% of daily discharge values). Examining the smaller flow value of 227 cfs, the presumptive 7Q10 value for the Savannah St. POTW's discharge permit, there were 1631 occurrences or 7.7% of daily discharge values below this minimum flow "floor" of 227 cfs. The 7.7 percent may not seem significant, but that percentage represents individual observations during the five driest months of the year – the low flow months of June-October.

The DEIS uses average monthly discharge at Jackson as a starting point before subtracting the evaporative losses shown in Table 5-1, pg. 10 of Appendix C. A better approximation of low flow conditions is the 10th percentile value.

Using the 10th percentile monthly flow values from 1938 to 2013, and subtracting the monthly evaporative losses calculated and displayed in DEIS Appendix C Table 5-1, Pearl River flows fall below the Savannah Street presumptive 7Q10 value (227cfs) during all five months, July- November.

It is not enough to use yearly averages when looking at low flow/critical flow information about a river like the Pearl. The DEIS writers chose to present evaporation using annual totals. This approach obscures the monthly variability in evaporation, and is no doubt employed to downplay effects or impacts that occur on a shorter temporal scale. Using daily observations is a more valid approach because seasonal or monthly variability is not as easy to deliberately obscure in order to make an argument for the lake alternative (Alternative C) as is attempted throughout the DEIS. Also state discharge permit reporting operates on much shorter time scales. When the effluent mixing zone at Savanna Street operates on a river flowing at less than 227 cfs, there is no monthly or annual averaging of the adverse impacts to the river. Fish kills and low D.O. events don't reveal themselves as monthly or annual averages, they happen immediately. Accordingly, an analysis of low flow should be based on daily observations or on numerical/statistical representations that more closely approximate the minimum flow "floors", or presumptive 7Q10 values, actually at stake and operative in permits. The 5th or 10th percentiles are more accurate placeholders that better translate the acute, exigent nature of low flow conditions on a river. The analysis of low flow on the Pearl River must be reworked accordingly.

f) Street flooding in Jackson is not relieved by a lake design

In Section 4.5.1 (Soils, Water Bodies and Prime and Unique Lands p. 163 lines 20-25) it is clear that a direct impact of the lake dredging design will be permanent or semi-permanent flooding of the lower reaches of tributary creek channels. These are the lower sections of urban creeks that now function as drainage canals for the City of Jackson. As described below in the DEIS, their lower reaches would be inundated by the lake footprint.

An additional approximately 375.42 acres outside the channel improvement footprint would be impacted as a result of further inundation, including portions of Eubanks Creek, Hanging Moss Creek, Lynch Creek, Purple Creek, Three-mile Creek, Town Creek, Eastover Creek, Belhaven Creek and Conway Slough. These specific water bodies and numerous other existing water bodies will be incorporated into the footprint of the channel improvements. Additional direct impacts to water bodies would be anticipated by the filling activities within the dredge disposal areas. As a result, **moderate**, long term adverse impacts to the existing waterbodies would be anticipated as a result of the implementation of Alternative C.

Section 4.5.1 p. 163. Lines 20-25.

On Sunday August 12th, 2018 in the City of Jackson, Eubanks Creek flooded a number of houses in the Fondren Neighborhood of Jackson at the Hawthorn Drive Bridge. This is about 1.5 miles upstream from the mouth of Eubanks Creek at the Pearl River and this kind of street flooding would continue to happen whether or not Alternative C went forward with its proposed dredging and widening of the Pearl River. However, since the lower reaches of nine urban creeks would be inundated by the dredged lake's (channel improvements) footprint, the kind of street flooding that occurred on August 12th could be made worse if stormwater runoff in any of the nine creeks met a full channel and backed up, unable to move easily down to the Pearl. In other

words, transforming the lower sections of nine urban creeks into flooded coves or inlets of the lake project will not help street flooding from stormwater that would otherwise find its way to the Pearl in comparatively more empty creek channels. Having the lower sections of these creeks inundated by the lake footprint robs their capacity to conduct stormwater down to the Pearl as they are currently doing. This direct impact is long-term and is not moderate as it is described in the DEIS impact analysis, but major. A project such as this that creates more risk of flooding in an urbanized environment by reducing the capacity of a gravity drainage system is a long-term **major** adverse impact.

3. DEIS Lacks Scientific Integrity in Economic Data and Analysis

The limitations of the study area to two Counties led to the economic analysis including only Rankin and Hinds Counties, yet five Mississippi Counties and two Louisiana Parishes receive no mention in the Economic Analysis (EA). This shortcoming has its origins in the way WRDA 2007 Section 3104 defined the Study Area for this project.

A normal distribution has been assumed for variables that are non-normal data. Flood levels are functionally non-normal.

The EA states that the Pearl River drains and affects 23 Counties and two Parishes. Why does this study only conduct CBA for two Mississippi Counties? The downstream Counties and Parishes at least should have been covered in the analysis.

The CBA does not seem tailored to the Jackson, Ms. area. Much of the data comes from the Morganza-New Orleans study. If the Louisiana study is compatible then the Drainage District should state precisely why this is the case.

The discount rate being applied to this project is 2.75% which comes from public law (Section 80, P.L. 93-251) which in turn comes from the Treasury Department. This rate is calculated upon the average yield of Treasury bonds with 15+ years left to reach maturity. The Cost Benefit Analysis for this project is calculated over 50 years. There is no 50 year Treasury bond (the longest is 30 years) and there is no reason to take a 15-30 year average and extend it an additional 20-35 years. This is a duration mismatch. It is arbitrary and capricious to extend the 2.75% discount rate across the second half of the project's CBA. This artificially inflates its value. A low discount rate combined with a long project window has the overall effect of inflating the value of this project.

The economic analysis used a 50 year project life while the habitat HEP analysis used a 100 year project life, which raises another duration mismatch.

In the HEC-FDA model on page 5 and following, for each variable, the model developers assumed either a normal or triangular distribution (p.7), so where did the underlying values come from, and why did the modelers choose either a normal or triangular distribution for any given variable?

Is it at all realistic to assume that the 50-year record (p 11) provides a good model for the next 50 years? For example the two largest floods were in 1979 and 1983, 35 years ago. Were possible effects from climate change considered to any meaningful extent in the HEC-FDA model?

What was the logic behind extending a 200 foot buffer to the 1979 flood perimeter and not to the 1983 flood perimeter, (p.7)? Was this a very conservative choice, or an arbitrary choice to expand the study area?

Does the methodology used in establishing probability distributions induce an inflated benefits calculation? Major floods like the 1979 flood are likely to dominate damages and be fairly singular in nature, yet the CBA following the establishment of probability distributions extracts an expected annual damages (EAD) calculation that accrues yearly and predictably over the 50 year project period. Would more sophisticated procedures yield a different result? Does the chosen methodology inflate benefits?

Is it realistic to assume that the CSVs conducted as part of a New Orleans – Morganza study are actually applicable to the Jackson area? What are the assumed socioeconomic characteristics that make the N.O. to Morganza data applicable to the Jackson area (p. 7)?

Mississippi is the poorest state in the country and there is no reason to believe that the average vehicle replacement value for the U.S. would reflect the average replacement of a vehicle in Mississippi. (p. 7) Vehicle loss calculations seem overly simplistic and unrealistic. In the Depth-Damage Relationships, is it true that similar construction and demographic characteristics make it easy to extrapolate the N.O. - Morganza data to Jackson, Ms.?

From Table B-16 one of the largest damage reduction benefits (\$10,221,521,.06) comes from the new land use or location benefits created by the channel dredging option (Alternative C). Since intensification benefits accrue vastly more to Rankin County due to the amount of low land in the floodplain that cannot be developed unless it is filled, (p23) then **most of the difference in the benefits between alternative B (levees) \$20,947,231 and alternative C (dredged lake) \$39.873,563 come from building new land in Rankin County.** This isn't stated as such in the text, but reading the EA text and Table B-1, there is no escaping this conclusion. Take the \$10.2 million of benefit of Rankin County land building from wetland filling away from Alternative C, and the levee project is much closer in benefit valuation to the TSP plan.

Since the EA makes no attempt to assign a value to the ecological services of forested wetlands and the functioning lotic river habitat, the economics discussion in the document cannot reduce the value of the incredibly destructive lake dredging/forest and bank dredging project by the loss of value from reduced ecosystem services. But this could certainly be accomplished. One publication used contingent valuation/willingness to pay techniques to estimate that habitat

services provided by wetlands were \$30.24-71.17 per household.⁶ Such a valuation in Jackson's Metro area of 500,000 would assign wetland value at between \$15,120,000 and \$35,585,000, surely enough to put the levee alternative's cost in line with the lake dredging alternative. The task here, in any case, is to investigate the negative cost of filling 1861 wetland acres, combined with the loss of 10 miles of lotic river habitat.

Significant adverse environmental impacts are identified but not considered in the decision process; not including costs of adverse impacts to wildlife and fisheries seriously underestimates the cost of the preferred project. Methods for quantifying them exist in the current literature, and have for decades. This includes costs from loss of habitat for Gulf sturgeon, Ringed sawback turtle, Northern Long Eared Bat, Wood Stork, costs from the degradation to water quality and wetlands.

The source of the land valuation change from \$5000 per acre to \$40,000 per acre is not referenced. Why is an eight fold increase predicted? Where does this come from?

Also the statement is made that the land uses "would not significantly reduce economic rent from other areas in the region" (p.26). On the contrary, this would seem to be the sort of proposal that would simply draw people from other areas/activities in the Jackson Metro Area. The creation of shopping districts at Dogwood Festival, Renaissance, The District at Eastover, Fondren etc., already seems to be pulling customers from one place to another in Jackson.

The decline of the retail shopping districts on both the Rankin and Hinds County sides of County Line Road seems a good place to begin looking for a comparable situation. Instead of creating a bigger pie, the Jackson Metro area seems to just slice the same limited pie in new ways. Is this project based on real growth in the Jackson Metro area or merely a re-allocation of existing businesses and customers to different locations? Before the Federal government and the State of Mississippi march together off this cliff of expensive investment of public money, it would make sense to study the Jackson market much harder and in a broader scope than the "Study Area" and the Economic Analysis of this DEIS contemplates.

The cost and necessity of pumping plants in Alternative B (levees) need more investigation especially since the Mississippi Legislature's 2010 PEER Report, and the Corps 1996 levee plan did not seem to consider pumping plants were justified. Why are they necessary here? The study must justify and better explain their inclusion in Alternative B. What changed so drastically between 2010 and 2013 when the scoping for this study began?

The cost side of the economic analysis lacks consideration of ecological changes, effects that may be felt downriver, or a serious discussion of reallocation of rents. There needs to be a holistic consideration of costs. The costs from closing landfills, moving utilities and bridges, loss of carbon sequestration, loss of wetland function, loss of habitat for birds, mammals, and fish, loss of trophic connections, possible loss of permit dilution potential downstream and the costs

⁶ Shrestha, R.K., and Alavalpati, J.R. Valuing Environmental Benefits of Silvopasture Practices: A Case Study of the Lake Okeechobee Watershed in Florida. *Ecol. Econ.* 49 (2004) 349-359.

of changing (elevated) water temperature in the Pearl River all need to be investigated in the economic analysis. The conditioning of the removal/remediation of the hazardous waste problems on the selection of the TSP over levees is a false choice. These legacy pollution problems can be addressed whether or not Alternative “C” is chosen.

No uncertainty analysis is included in the EA. The DEIS on page 236 states: “ Risk and uncertainty will be further considered during the feasibility level design and analysis” It is common practice that uncertainty analyses be a part of the decision-making process; not providing such analyses can lead to regrettable decisions.

4. DEIS describes baseline conditions with scant data

The baseline conditions on the Pearl River in the Study Area are not described by an abundance of data. The 2015 TMDL published by the Mississippi Department of Environmental Quality was based on sampling in previous summers by Tetra Tech and EPA, and the Drainage District hired FTN Associates to sample for a total of ten days in 2014 to characterize and model water quality on this urban reach of the Pearl. Apparently other than the river gage at Hwy, 80, the Mississippi DEQ does not regularly monitor water quality sampling stations on the Pearl River.

Oxygen supersaturation exists on the Pearl as described in the recent Nutrient TMDL (MDEQ 2015) in part because the Reservoir and river below it are both eutrophic. The TMDL describes them as eutrophic (over-fertilized by organic and inorganic sources). Although oxygen supersaturation is generally associated with degraded fresh water systems like intensive aquaculture ponds, the DEIS writers treat it as a beneficial feature of the urban section of the Pearl River, at least with respect to levels of dissolved oxygen (D.O.). The condition of oxygen supersaturation is not usually considered a beneficial or healthy situation in an open system like a pond, lake, or river. This is especially true when excessive amounts of nutrients are found in the waterbody. The DEIS uses the following language to describe the situation which: “Low D.O. is not anticipated to be an issue within the Study Area or downstream after implementation of Alternative C because the Jackson segment of the Pearl River tends to have supersaturated DO levels, as discussed in the 2015 Nutrient TMDL for the Jackson segment of the Pearl River.” App. D. p. 63.

Supersaturation usually is accompanied by elevated pH levels, elevated chlorophyll levels and strong diurnal cycling between supersaturation and depletion – high peaks and dangerously low DO sags at night. For instance, Delta catfish aquaculture ponds typically have dissolved oxygen readings >12 ppm at the end of long sunny days, yet during the night the dissolved oxygen drops so low (below 3 ppm) that mechanical aeration must be started to avoid fish kills. Mentioning supersaturation as a benefit of Alternative C is wishful thinking and is irresponsible. Alternative C will slow the Pearl River’s flow, and its weir set at 258 feet above sea level will impound more nutrient rich stormwater from Jackson’s urban creeks carrying nonpoint source runoff, dissolved fertilizers, and untreated sewage from the continuing street manhole cover spills from sewers that occur in Jackson during heavy rains. In an already eutrophic waterbody, longer residence time and added heat to the water surface will drive the

1900 acre lake into worsening water quality. Supersaturation, as part of this deterioration will not be a benefit or a stabilizing influence for the level of dissolved oxygen in the Pearl River. On the contrary, routine mechanical aeration to avoid water quality deterioration may be necessary in the warmer months of the year. The baseline of water quality in the Pearl River is a eutrophic condition, and the alterations to the river offered by Alternative “C” cannot improve this.

5. The DEIS fails to adequately evaluate or characterize impacts to Wetlands

The impact to wetlands from the levee project Alternative B, is 386 acres of direct impacts. The impact to wetlands from the TSP project (Alternative C) to dredge the river bed and banks and further impound the Pearl River is at least 1861.24 acres of wetlands and other waters of the United States (p. 205 DEIS) or possibly as much as 1994.49 acres of jurisdictional wetlands present on the property (Appendix D p. 10 of Wetlands Delineation report). Compared to Alternative B (levees), the lake dredging project would impact 4.8 times the amount of wetlands in the 10 mile project area – and convert to open water nearly three square miles of forested bottomland wetland that exist in the middle of Jackson, Ms. within the river’s present floodway.

Section 2.5.8.2 of the DEIS states that “The historic predominant bottomland hardwood habitats and the associated jurisdictional wetlands and other waters of the United States within the project area may continue to decline as a result of ongoing urbanization, siltation, and changing river conditions.” And the section ends with this statement, “Restoration efforts would have to be implemented to replace the historic habitats and historic conditions on the Pearl River.” The discussion of wetland impacts in this section of the DEIS goes on to describe the destruction through dredging and submersion of these wetlands, but offers nothing about restoration.

The August 16th US Fish and Wildlife Service comments to Michael Goff about this project characterize the dredging and channel improvement project as the “most environmental damaging plan”. As was indicated earlier in this comment letter, after project scoping, and between 2013 and 2018 the local sponsors dropped one alternative involving channel modification work without the massive dredging, wetland destruction or further impounding of the river. As a reason for eliminating this alternative the DEIS cited conflicts with the MDOT mitigation bank lands upstream of Hwy 25. What were these conflicts? The narrowing of action alternatives to levees or the channel improvement/dredging project seem to have forced a decision to choose the most environmentally destructive alternative on the basis of cost and the ability to fill and develop land that is currently undevelopable (mostly in Rankin County) because it is too low and flood prone.

The direct impacts of Alternative C cause a conversion of 1861 acres of wetlands to open water, which is a complete change of function for a terrestrial habitat type. These impacts which are described as long-term in duration and major in intensity, are being promoted as the TSP now and were contemplated as part of the locally preferred plan five years ago when the Drainage District voted at the beginning of Project Scoping to choose dredging and lake construction . Some avoidance and minimization was said to have been conducted to keep the filling of

wetlands at 1861 acres. What avoidance and minimization could have been put in practice to reduce a major, long-term impact to a moderate or minor intensity impact? Could the eliminated alternative for channel modification have been retained and examined further? Could some kind of hybrid alternative such as described by the USFWS on page 11 of their August 16th letter to Mike Goff be put forward: setting levees back in Rankin County to open the floodplain available to the river and restricting dredging and digging only to areas along the Pearl River near interstate 20 that have already been disturbed in earlier projects, and retaining the free flowing nature of the Pearl River by refraining from building further weirs or impoundments? The indirect impacts of Alternative “C” are described as follows: “... no specific significant indirect adverse impacts to wetlands or other waters of the United States would be anticipated by the implementation of this project” (DEIS p. 206) The following are the significant adverse impacts of the loss of nearly 1861 acres (2.9 square miles) of forested or vegetated wetlands: Losses of stormwater uptake, carbon sequestration, influence on the local climate, contributions to good air quality, noise buffering, mammal and migratory bird habitat, recreation, moderation and sequestering of pollutants in floodwaters, contribution of shallow groundwater to the river, threats to the trophic health of the river and the local and downstream ecosystem. Further, these impacts are not minor in intensity (as the DEIS describes them) but major in intensity. The removal of nearly 2000 acres of terrestrial wetland habitat and replacement with open water is not a minor impact. In comments above on the Economics Appendix, it was pointed out that no costs were developed or discussed for the loss of ecological services due to removal of forested wetlands. All benefits should be summarized and given a monetary value so the loss of these ecosystem services can be entered into the economic cost benefit calculations. Long-term major impacts to such a large amount of forested wetland habitat are not “environmentally acceptable” and violate the authorizing language for this project in WRDA 2007 Section 3104.

6. The DEIS fails to adequately evaluate impacts to species listed under the Federal Endangered Species Act.

There are two species that the DEIS concentrates most of its Endangered Species Act (ESA) analysis upon: Gulf sturgeon and Ringed sawback turtle. Other species that are considered by the DEIS analysis are Northern long-eared bat, Wood Stork, Bald Eagle, Louisiana Black Bear, Pearl Darter and Frecklebelly Madtom.

The information about the distribution and abundance of the Gulf sturgeon is incomplete. No actual survey work was conducted to determine how often these migratory fish are found in the project area, and so much conjecture and anecdote is relied upon by the DEIS writers. Much is made of the presence of sills and blockages downstream that would tend to prevent fish migration: The most recent documented occurrence of the fish in the project area, cited by the DEIS writers, is from 1984. Louisiana Department of Wildlife and Fisheries biologists have used telemetry studies to document fish passage upstream of the Pearl and Bogue Chitto sills over the past 4 years. The LDWF reports this in their comments on this project. There is a report

of a capture of a juvenile (less than 24 inches long) Gulf sturgeon caught on a plastic worm by a fisherman in the project area in early fall of 2008.⁷

On August 16th 2018 after a Community Forum on the One Lake project given by Gulf Restoration Network and other members of the One River No Lake Coalition for Martha Watts, mayor of Monticello, a fisherman (who asked to keep his identity information confidential) showed the Gulf Restoration Network a photograph of a pair of adult Gulf sturgeon in the bottom of his boat prior to his releasing them from his net. He captured them in May of 2018 in his catfish hoop nets set in the Pearl River near the mouth of the Strong River. He further stated that he has caught sturgeon in his catfish nets in recent years, often in pairs within the same net. This fisherman confirmed that the sturgeon are passing the sills on the Lower Pearl River and any other downriver blockages and are migrating into the upper river. If the sturgeon can reach the mouth of the Strong River, they can reach Jackson and under the right circumstances go over the water-works low head dam.

In addition, the McComb Enterprise Journal Newspaper ran a story on July 31st 2005 about a July 14th 2005 capture of a 7 foot Gulf sturgeon in Pike County, well above and upstream of the Bogue Chitto sills on that river. A group of canoers corralled the fish into a shallow pool, and picked it up out of the water for a photograph, which was included in the newspaper story along with an interview.



For the purposes of the DEIS, the old anecdotal evidence of sturgeon occurrences on the Pearl River could have been updated with more current anecdotal evidence of the type above. The fisheries biologists who have done field collection work with the Gulf sturgeon species on the Pearl River are all easy to find and could have been contacted for the purposes of updating

⁷ MDWFP Museum Ichthyologist Dr. W.T. Slack phone call with fisherman John Black. Transcript of call in Reference list attached to comment letter.

sturgeon occurrence information, or actual field surveys for sturgeon could have been initiated over the last 5 years.

In addition to not looking very hard for reports of the Gulf sturgeon reaching the river above the sills, in general the DEIS writers go to great lengths to discount the usefulness of the river to Gulf sturgeon. On page 199 of the DEIS, the writer states: "... due to past dredging projects of the USACE and state government subdivisions, the existing conditions within much of the river channel through the Project Area would not be considered as preferred habitat by either listed species (sturgeon or Ringed sawback turtle)" The statement is made that the sturgeon "utilizes a riverine environment as their spawning habitat" then the DEIS goes on to provide that "Alternative C includes channel improvements that would alter the existing riverine environment" and further provides that moving the weir downstream would: "provide a riverine environment that the sturgeon could utilize if the historic upstream migration patterns were to resume." The historic upstream migration patterns **never ceased**, as evidenced by information in the possession of the wildlife agencies of both states.

The DEIS writers with regard to the sturgeon go to great pains to question and discount the importance of the Pearl's designated critical habitat to the fish in the Project Area, and to cast doubt on whether the species even still reaches this section of the river. If the same amount of energy had been spent interviewing fisheries professionals in Louisiana and Mississippi about their knowledge of the fish, this DEIS would have been a stronger, more trustworthy document. The Army Corps of Engineers should require the Drainage District to update all of the sturgeon data on the Pearl River upstream of the sills and force them, and perhaps assist them, in writing an objective, scientifically acceptable accounting. With their **low level of actual knowledge or information** about the fish, it is impossible to make the assumption, as they do, that: "...no overall habitat loss would be incurred with the proposed project construction; therefore direct adverse impacts to the Gulf sturgeon habitat within the Project Area would be considered **minor** in intensity and long-term in duration." The description "Minor" is pure conjecture, given the actual state of knowledge displayed about the Gulf sturgeon.

What is missing from the DEIS in its discussion of the impact of the Alternative C project on the Gulf sturgeon and its habitat is any sincere commitment to restoration for the fish, and in the discussion of mitigation for Alternative C, the removal of both blocking sills below Bogalusa on both the Pearl River and the Bogue Chitto River should be contemplated, and a budget for both sill removals should be made part of whatever other mitigation is contemplated by the sponsors for the massively destructive TSP.

The Ringed Sawback turtle and the Pearl River map turtle are two endemic species that inhabit the 10 mile section of the project area. One, the Ringed Sawback has protected status under the Endangered Species Act (ESA) as a threatened species, and the other- Pearl River map turtle was confirmed as a separate species a decade ago through DNA analysis of systematics and is a candidate for protected status under the ESA.

As stated in the Appendix D Biological Assessment, "Decline in populations of the Ringed Sawback turtle in certain areas of the Pearl River have been attributed to habitat

modifications, primarily associated with dredging...” It is a fact that the habitat requirements of this species will be lost to a great degree in a widened, dredged river channel devoid of basking logs or basking areas. Without sandbars in which to dig nests, the turtle will stop breeding in this 10 mile section of the river.

As with the Gulf sturgeon, the writers of the habitat analysis sections for impacts from Alternative C, despite being professional biologists, do what they can to discount the science that does exist describing the extent of use of this river section by the Ringed Sawback turtle. The Drainage District did not supply funds for the most recent turtle population surveys (they were funded by MDWFP and USFWS), yet they use the surveys and further question the methods of the surveys:

...the actual observation data was interpolated with estimates of 1033 to 1895 individuals within the TSP Project Area (Selman and Smith 2017). However it is important to note that the actual number of turtles present within the Project Area and based upon these surveys is significantly speculative based upon the methods employed to determine the estimates.

The methods were questioned, but no explanation of why these were speculative methods is presented by the DEIS writers. No discussion of experimental error rate is offered. What the DEIS writers did not bother to include from the Selman and Smith study was that significant numbers of juveniles were counted by surveyors, which showed reproduction is happening in the affected section of the river, and that due to the difficulty of seeing small turtles with binoculars and spotting scopes that the actual number of juveniles was probably **underestimated** by the survey team. So the 1033-1895 range of individuals was likely low. As with the attempts to downplay sturgeon numbers, the DEIS writers made the point of finding fault with recent (2017) turtles survey number estimates of individuals. The DEIS writers should be thankful they have some current information to use in writing the section on Ringed Sawback turtles in their analysis. They saw no reason to look past 1984 for sturgeon captures, but also spent no resources on new fish surveys. The turtle survey situation would have been similar but for the existence of good recent active field work in the Pearl River.

Building islands in the middle of the newly dredged lake for use as turtle habitat will be a recurring expense for the Drainage District, if, as they revealed in several of their public meeting presentations, the water levels during floods can be expected to be 10-15 feet higher than the 258' lake elevation above sea level. How unarmored sandbar islands will hold their positions in a channel during high (submerging) flows is a question that goes undiscussed in any section of the DEIS on habitat. It may be a bit like the effort on the Mississippi Coast to rebuild barrier islands after successive hurricanes wash them away. Ringed sawback turtles are not found in lentic waters of the Ross Barnett Reservoir that lack their habitat requirements, and so the turtle's utilization of any created habitats in a newly dredged lentic reach of the Pearl River is in doubt. The statement is made that for the Northern long-eared bat, roosting areas will still be available after the massive removal of forests along the banks of the Pearl under Alternative C, but no surveys have been performed to see if the bats are roosting in the existing trees. Since nearly 2000 acres of forested wetlands many acres of which are mature hardwoods between 50 and 80

years old, surveys for bats need to be undertaken to see the extent of use of these forests before they are removed and replaced with urbanized lakefront areas.

Wood storks should likewise be investigated further. Consulting the long running records kept by the Jackson Audubon group of their First Saturday bird-walks in Lefleur's Bluff State Park may help determine whether and how often these birds are seen along the Pearl River in Jackson. They are found 60 miles west along the Mississippi River in Vicksburg late each summer.

The Frecklebelly madtom was apparently dropped from consideration for further investigation in the Threatened and Endangered species section of the DEIS because DEIS writers stated it was not found in the main stem of the Pearl River. That has changed - this summer, surveys by Matt Wagner of the Mississippi Museum of Natural Science have found this miniature catfish in the main channel of the Pearl River in more than one sampling location. Surveys for this candidate species for the ESA should be initiated, or the survey data from Wagner in 2018 should be digested and presented, including an analysis of the importance of these fish in the trophic scheme of this large river. What do they eat, and what feeds upon them? These subjects should all be included in an updated version of the DEIS before finalization.

7. The DEIS fails to adequately evaluate impacts to Fisheries

The fish habitat in the Project Area is examined as part of a Habitat Evaluation Procedure (HEP) Report. While the HEP methodology is standard procedure for federal water projects it is a mechanically applied analysis of before/after habitat values (as indexes of suitability). There is a limited suite of animals for which HEP information is available and choosing the right animals or fish at the beginning of the analysis has much to say about what the HEP analysis reveals through its before/after look at a project like this one. For the fish species that it examined, it should be noted that many were lake species, or generalist species of sunfish: bass, black and white crappie, bluegill or channel catfish (which is not a river specialist either). There are fish family groups containing species that are river dependent that are present in the Pearl River, such as suckers, buffalo fishes, darters, shiners. These groups would have shown decline over time as a lotic environment transforms into a more lentic environment. For instance in the terrestrial animal habitat analysis, barred owls need mature trees, and swamp rabbits need wetland forest. Vast declines were shown for habitat suitability for these two species because the trees disappear if the banks are dredged to widen the river into a larger channel with lake characteristics. If habitat suitability indices existed for Catostomids (suckers) or the Cyprinids (shiners) that are river dependent, the more lake-like shift of river habitat would have been better captured by using them in a HEP analysis. HEP tables don't have every animal or fish found in the Southeastern U.S., so some substitution is done using professional judgement. Using common carp as a stand-in for river dependent species may have been the best the modelers could do, but the carp is more of a generalist than a river specialist. It is introduced from Europe and is a naturalized non-native exotic fish. HEP, if it could have used more river dependent fishes in its analysis would have captured more of the habitat impacts from the near total loss of riverine characteristics in Alternative "C".

The fish surveys in the river, done by ERDC staff in 2006 offers a much better representation of the fish fauna of the 10 mile section of the Pearl River in the Study Area/Project Area. Obligate river species such as those species mentioned above have their habitat suitability index drop from 577 to 188 with the construction of a lake, and the ERDC report predicts they will become rare or extirpated in the lake-like reach of the river. Some methods are suggested to improve the survival of river dependent fish species. Mitigation includes reconnecting secondary channels, reconnecting backwaters, protection of creation of gravel bars/bottoms, and construction of in-lake weirs to vary flow. The trade-off of habitat for river dependent species for more acres that suit wetland/backwater guilds of species that do well in lakes is not seen as positive. It just creates more restoration needs on an already impaired, impacted river.

8. The DEIS fails to properly evaluate Impacts to Birds and Waterfowl

The HEP analysis is an awkward tool for bird habitat analysis as well. Picking the right species at the beginning has much to account for the value of the information produced, and if the HEP library of species don't have the most relevant species to use for a habitat, then the writers pick close ones that serve as stand-ins or placeholders. Some of the bird habitat loss is well characterized due to the choice of appropriate species. Barred owls do well in riparian swamps, and on any given day along the Pearl River barred owls can be heard calling near dusk. The Barred owl habitat goes away when riverside and swamp forests are removed so that the banks can be dredged. It is an excellent model species for total forest loss. The use of the wood duck in the HEP analysis is not as precise a fit. There are large wood duck roosts along the Pearl now, including active roosting and breeding areas in LeFleur's Bluff State Park. These ducks are doing well in the wooded riparian area along the Pearl. Transformation to open water and a loss of mature timber for roosting, and the loss of cavities in older trees for nest building would not seem to help the wood duck as much as the HEP analysis states. An index of +409.86 for the wood duck needs better explanation. The sloughs, oxbows and riverside forests that the birds use will be cut down and dredged. How this helps the wood duck habitat is a puzzle. The wood duck should be nearly as affected by the loss of timber in riparian and wetland areas as the barred owl. One only has to survey the more developed areas of the Ross Barnett Reservoir to find that wood ducks are not seen often on manicured, urbanized lakefronts.

The loss of habitat value of nearly three square miles of (filled) wetlands 1861 acres, or loss of 2500 total acres of vegetated and bottomland hardwood forest areas to neo-tropical migratory birds needs to be quantified. The HEP analysis doesn't help very much with the neo-tropical migrants in general. And the species accounts for wood stork and bald eagle in the protected species accounts don't really go very far in showing the full value of mature hardwoods in riparian and backwater wetlands along a major migration corridor, which the Pearl River certainly is. Two signature species on the Pearl are the Prothonotary warbler which nests in backwater slough and along lakes in cavities over water, and the Swallow-tail kite (State species of special concern) which needs to forage over vast areas of forest. The kites inhabit the lower Pearl, while the Prothonotary warblers inhabit the narrower riparian corridor of the upper river including backwater oxbows, old channels and sloughs. Other warbler species in the woods along the Pearl include Northern parula, Red-eye vireo, White-eye vireo, Swainson's warbler;

and in marshes and swamps there are wading and marsh birds such as Reddish egret and Clapper rail and others.

Important Bird Areas (IBAs) exist along the Pearl River in the Study Area and farther downstream. These are high quality bird habitat areas named by the National Audubon Society that meet an internationally agreed-to set of criteria. IBA's are globally important for the conservation of bird populations. The Prothonotary warblers that nest along the Pearl in swamp backwaters and feed their young with the abundant insects they gather on their foraging trips are offering high calorie diets to their young and storing calories themselves, in part, so they can all be sustained on their flights down the river to the coast and across the Gulf of Mexico to the Yucatan and farther on to South America. An IBA such as LeFleur's Bluff State Park in Jackson or the Hancock County Marsh Preserve at the Pearl's mouth is a bird's grocery store that it uses to eat and store enough nutrition to make its annual international migrations. It is disturbing to note that the most recent maps of the One Lake project's dredging footprint include 20-30 acres of the IBA in LeFleur's Bluff State Park at its southeast corner between the park road and the banks of the Pearl River – an area of varied habitats, high bluffs, massive Red oaks, old channel scars and temporary pools – all offering well-used migratory bird habitat. Over 200 bird species are included in the birdwatching checklist for Lefleur's Bluff, and 70 species breed there. The economic analysis needs to put a bird habitat loss price tag on this section of IBA in the state park.

9. The DEIS fails to recognize the presence Prime and Unique lands

The section on Prime and Unique lands does not offer a definition of what qualifies a property as "Prime and Unique". It should be noted that a well-used state park, LeFleur's Bluff State Park, (formerly Jackson's Riverside Park) and the Mayes Lake Picnic and Camping Area that form the lowland park property make a complex of 490 acres of deed-protected publicly owned land in the middle of the capitol city. This should qualify the State Park as Prime and Unique. And the proposed removal by dredging of 20-30 acres of the southeast corner of the Park along the Pearl River should be treated differently than other dredging for Alternative "C" due to the fact that this is a public park. Another unique piece of land is the Fannye Cook Natural Area on the Rankin County side of the Pearl River upstream of the Lakeland Drive Bridge over the Pearl. This piece of land is a mitigation bank used by the Mississippi Department of Transportation and managed for conservation and public use by Wildlife Mississippi, a non-profit conservation organization that functions as a state-wide land trust. The DEIS writers need to provide a definition of Prime and Unique lands and/or justify their decision that no such lands exist in the Project Area or Study Area.

10. The DEIS fails to evaluate Key Information on Climate Change

There was one place in the DEIS that discussed climate change on page 109 in lines 11-13: In determining which flood events to examine, the following statement is made:

While changes to the climate were considered, the current USACE policy (Engineering and Construction Bulletin 2016-2025) states that "projections of

climate change and their associated impacts to local scale hydrology that may occur in the future can be highly uncertain” Therefore, flood events of large magnitude such as the annual 0.2% chance exceedance event, were used for analysis but no quantitative adjustments to the flood magnitudes were made.

This language gives the DEIS writers some leeway, but the DEIS writers are likely citing it to discount the importance of climate change. Nowhere in the discussions of minimum flow or evaporation, in the Engineering Appendix C discussion, was climate change introduced. The fish habitat discussion of the DEIS lacks any meaningful climate change discussion except to point out that the levee plan will make the water warmer. It seems that the DEIS writers believe this new water project will exist in a stable world without climate change. It is interesting that on the other side of the state, along the Pascagoula River, the recent proposed damming of Big and Little Cedar Creeks in Lower Pascagoula River drainage (George County Lakes Project) is being pitched as a solution to water supply deficits in the coming years primarily **due to climate change**. The company AECOM along with Pickering Engineering are writing a draft EIS and other studies for this project. When the “George County Lakes” EIS was in the project scoping stage in early 2016, much of their justification for their project was based on climate modeling done by Dr. Jonathan Pote and contractors from the Mississippi Water Resources Research Institute.

This Pearl River project needs to consider climate change, especially within the analysis of Alternative C. The temperature assumptions (as discussed above in this comment letter) made about the effect upon aquatic habitat didn’t seem to include hotter water temperatures. The flow and evaporation analysis in Engineering Appendix C did not factor in hotter air or water temperatures in the future.

It would seem that dam building project promoters on the Pearl River might be reading what the other dam building project promoters on the Pascagoula River are writing, and vice versa. Increasing river water temperature as climate becomes hotter is predictable and reasonably foreseeable.

The DEIS does not account for effects of climate change over the life of the project. Projections for the Pearl River watershed (Jayakody et al. 2014⁸) indicate sediment yield will increase 26%, and monthly maximum air temperatures will increase 2 to 3° C in years ahead, during the life of the proposed project. Similar findings regarding air temperature increases have been published for the Mississippi Delta (Parajuli et al. 2016⁹, Yasarer et al. 2017¹⁰). These shifts

⁸ Jayakody, P. Parajuli, P.B. and Cathcart, T.P. 2014. Impacts of climate variability on water quality with best management practices in sub-tropical climate of U.S.A. *Hydrological Processes*, 28(23), 5776-5790.

⁹ Parajuli, P.B., Jayakody, P., Sassenrath, G.F., and Ouyang, Y. 2016. Assessing the impacts of climate change and tillage practices on stream flow, crop and sediment yields from the Mississippi River Basin. *Agriculture Water Management*, 168, 112-124.

¹⁰ Yasarer, L.M., Bingner, R.L., Garbrecht, J.D., Locke, M.A., Lizotte R.E., Momm, H.G., and Busted P.R., 2017. Climate change impacts on runoff, sediment, and nutrient loads in an

will impact sedimentation in the proposed lake and water quality within the project area and downstream. Furthermore, impacts of warmer climate and changing precipitation patterns should be considered when assessing impacts of lake evaporation on water quantity.

11. The DEIS fails to evaluate Cumulative Impacts

The cumulative impacts analyses are conducted in a way that isolates the sources of impact from one another to a large degree. Environmental and physical factors work together in living systems and it is the interaction of impacts that need to be described together in large open systems like rivers. From the very beginning of the lake-building project's conception and during project scoping, critics of the lake dredging have always asked the sponsors to examine the additive physical (discharge, evaporation, temperature, slope, sediment, bank integrity, etc.) and biological (loss of riparian tree canopy, nutrient inputs, changing habitat for fish, birds, mammals, invertebrates etc.) impacts to the Pearl with a particular concentration on downstream freshwater, and estuarine habitats. The DEIS writers did not do this to our satisfaction and did not discuss climate change, increased populations because of this lake development project in Jackson, and the associated effects on water consumption for household or industrial applications. There is no sense of what the water budget is for the present water users along the Pearl River: the withdrawals and additions from top to bottom of the system. The discussions within the DEIS also lack a holistic view of the impaired and altered condition of the river as it presently exists.

At the very least, a modeling of this regulated river should be performed with an appropriate type of software such as the OASIS model (by Hydrologics Inc.) that is chosen by the USGS for one of its Gulf Wide flow projects funded by RESTORE Act BP funds. Accordingly, project 5815¹¹ has been submitted to the MDEQ RESTORE.MS project portal to add the Pearl River to the ongoing USGS Gulf-wide flow study.

12. The Mitigation Plan in the DEIS Fails the Corps Guidance Memo Requirements

Section 2036(a) of WRDA 2007 amends section 906 (d) of the Water Resources Development Act of 1986 (33 U.S.C. 2283 (d) to:

- a. ensure that any report, submitted to Congress for authorization , shall not select a project alternative unless such report contains (1) a specific recommendation with a specific plan to mitigate fish and wildlife losses or (2) the Secretary determines that the project will have negligible adverse impacts;
- b. ensure that other habitat types are mitigated to not less than in-kind condition, to the extent possible;

agricultural watershed in the lower Mississippi River basin. Applied Engineering in Agriculture, 33(3) 379.

¹¹ Project 5815(2018) RESTORE Gulf-wide stream flow study Mississippi Component. MDEQ Restoration portal RESTORE.MS.

- c. require mitigation plans comply with the mitigation standards and policies of the regulatory programs administered by the Secretary and require specific mitigation plan components, including 1) monitoring, 2) criteria for determining ecological success, 3) a description of available lands for mitigation and the basis for the determination of availability, 4) the development of contingency plans,(i.e. adaptive management), 5) identification of the entity responsible for monitoring; 6) establish a consultation process with appropriate Federal and State agencies in determining the success of mitigation.

The DEIS must recommend a specific plan under (a) above. This document offers vague mitigation alternatives but does not contain a specific plan. Appendix D: Habitat Evaluation Procedure Report, page 27 delineates 3 different Management Plan scenarios: 1) **Acquisition**: acquiring existing forestland which can be somewhat related to preservation of existing habitats (estimates 17,190 acres of existing forestland purchased), 2) **Restorative**: every existing habitat type within the project area would be restored at some other location in the Pearl River Basin ("would include the restoration of existing agricultural land through conversion to forestland"... "a total of approximately 9,076 acres of restoration of existing agricultural lands") and, 3) **Regenerative**: only predominant bottomland hardwood forestland would be replaced (5,850 acres of reforestation of existing agricultural lands). The project proponents should reveal which Management Plan scenario has been chosen and provide detailed plans for proposed mitigation area locations and designs. At this point, with a detailed wetland inventory the Drainage District knows exactly what they will destroy in creating the lake through dredging and channel modification. What has been presented is not a specific plan, but a choice among three not very specific plans. The description of available lands (3) is left vague as "3000 acres owned by the City of Jackson", and the development of contingency plans (4) is left quite open ended. The DEIS, as it reads so far, does not cover what the Corps requires in the WRDA 2007 Section 2036 (a) amendments listed above.

Whether the plans set out in the DEIS mitigate fish and wildlife and wetland losses well enough to satisfy (a) above is an open question at this point. The main methods offered cover terrestrial habitats lost by removing riparian forest along the Pearl River through dredging the river to a wider, straighter, and uniformly deeper channel condition. Under the HEP procedures, and as explained on pages 34-35 of the Habitat Evaluation Procedures Report of Appendix D, aquatic habitat units are increased through the number of acres of open water created, while the quality and suitability of habitat for river dependent species decreases (habitat suitability index falls). The writers of the DEIS seem content to accept this trade-off for fish habitat quality. The sponsors should have included some of the habitat quality measures recommended by the Kilgore study that they included in their habitat section: reconnection of the river with side channels, backwater habitats, and the creation of in-channel weirs so that water velocity can be increased in certain areas, also the establishment of gravel beds where there are not presently any. These measures were pointed out in comments by both the USFWS and the Louisiana Wildlife and Fisheries Department.

Sturgeon habitat losses will be compensated by the construction of a fish passage at the project area, but no habitat improvement projects are planned downstream. This project sets Gulf

sturgeon habitat recovery back, no matter if a fish passage is built or not because the dredging will change water quality and the character of the river bottom, rendering it useless as spawning habitat for these migratory fish. To mitigate this damage to ten miles of Gulf sturgeon habitat, we suggest that the project sponsors should be required to fully fund the removal of the Bogue Chitto Sill, the Pearl River Sill, and to provide funds for remediation of the Pearl River Navigational Canal Project.

Ringed sawback turtle mitigation is left vague as well and characterized as adaptive management, monitoring and possibly the building of islands with sandbars in the final lake project. There is not a specific plan to mitigate the losses of habitat or impacts to the turtle population. This doesn't satisfy section (a) above either.

The USFWS examined the DEIS and their comments suggested that: " More detailed mitigation needs and measures to offset losses to fish and wildlife resources should be determined and presented in the EIS. The USFWS provided examples:

1. Follow the no net loss of in-kind habitat value. (See (b) above for similar language in Corps guidance). Implement design modifications to enhance turbulence and water quality, solve temperature and D.O. problems, help flowing water species in the pool, tailwaters and downstream. This means installing mechanical pumps, diffusers, or air lifts to combat stratification in the dredged lake.
2. Manipulating water levels in the main pool. The lack of on operational plan/schedule was pointed out.
3. Generally more detailed mitigation for riverine impacts are needed. The DEIS was willing to discount the value of riverine habitat as evidenced by the HEP generated trade-off of river habitat for lacustrine habitat, but the Fish and Wildlife Service is not accepting this swap, and the Corps of Engineers should not either.

How the Drainage District can satisfy these mitigation needs is a large question. They are intended to undo the damage that the channel modification project inflicts. It seems to make much more sense to avoid the damage in the first place. It is better to "keep a river as a river" than turn it into a lake and then be forced to invent engineering "fixes" to offset or undo the damage or address the problems inherent in lake creation. "Damming up the river to figure out how it flows"¹² is a regressive approach, especially if mitigation is expensive, difficult and long term, which it will be.

13. The DEIS Fails to Evaluate Impacts to Ecosystem Services.

The DEIS fails to provide any assessment of the ecosystem services that will be lost as a result of the preferred alternative (TSP). Ecosystem services valuations are well recognized as providing important information for decision makers. Understanding the impacts to these services is critical for assessing the full extent of project impacts. The importance of the ecosystem services valuation is made clear in the 2013 Principles and Requirements for Federal

¹² "River of Brightness", Roddy Frame, The North Star (Album) 1998.

Investments in Water Resources and Interagency Guidelines. (Collectively, the PR&G) While Gulf Restoration Network recognizes that the Corps is not yet utilizing the PR&G, the sponsors should nevertheless evaluate the impacts on ecosystem services.

14. The Sponsors must comply with the conclusion of the USFWS comments and present a revised Draft EIS and initiate a new comment period.

In the August 16th letter to Michael Goff from Field Supervisor Joseph Ranson, it was the recommendation of the USFWS that: “Overall, greater details regarding plan formulation, design, operation, mitigation, and adaptive management should be presented in **another draft** of the EIS prior to finalizing.” This current DEIS is not in a condition ready for any decision by the Army Assistant Secretary for Civil Works, or any other decision making body with jurisdiction in the NEPA process.

The August 16th Ranson comment letter also named this Alternative C dredging and channel modification project as the “**most environmental damaging plan.**”

As GRN stated at the beginning of this comment letter, the Drainage District, in Section 3104 of WRDA 2006, was charged with creating an alternative that was “technically feasible and environmentally acceptable”. **This project’s Alternative C, for the reasons listed above and throughout this letter is not environmentally acceptable.**

The Army violated the NHPA by failing to undergo the section 106 process before it decided to eliminate hundreds of horses of varying historical origins located on properties that include historic landscapes.

I. The DEIS does not fulfill the agency’s separate responsibilities under the National Historic Preservation Act.

A. An agency must determine whether its undertaking has the potential to cause effects on historic properties before making a final decision.

The NHPA requires that “[t]he head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking . . . prior to the approval of the expenditure of any Federal funds . . . shall take into account the effect of the undertaking on any historic property.” 54 U.S.C. § 306108. The NHPA also commands that “the head of the Federal agency shall afford the Council a reasonable opportunity to comment with regard to the undertaking.” 54 U.S.C.A. § 306108.

The regulations governing the “Initiation of the section 106 process” state that “[t]he agency official shall determine whether the proposed Federal action is an undertaking as defined in § 800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects on historic properties. 36 C.F.R. § 800.3(a). An undertaking is broadly defined to include any

“project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency...” 36 C.F.R. § 800.16(y). Historic property is also broadly defined to include “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places . . .” 36 C.F.R. § 800.16(l)(1).

B. If an undertaking has the potential to cause effects on historic properties, an agency must undergo the section 106 process.

Regulations promulgated by the Advisory Council on Historic Preservation (“Advisory Council”) require agencies to involve consulting parties in findings and determinations made during the section 106 process. 36 C.F.R. § 800.2. Parties that have consultative roles in the section 106 process include the Advisory Council, State historic preservation officers (“SHPO”), Indian tribes and Native Hawaiian organizations, usually through their appointed the tribal historic preservation officer (“THPO”), representatives of local governments, applicants for Federal approvals, and additional consulting parties.¹³ 36 C.F.R. § 800.2(b)(c). In addition to consultation, the regulations also state, “the views of the public are essential to informed Federal decision.” 36 C.F.R. § 800.2(d)(1). Therefore, “[t]he agency official must . . . provide the public with information about an undertaking and its effects on historic properties and seek public comment and input.” 36 C.F.R. § 800.2(d)(2).

After establishing the consulting parties, the threshold step in the section 106 process is to delineate the area of potential effects (“APE”). 36 C.F.R. § 800.4(a)(1). The APE includes the area “within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties. . . .” *Id.* § 800.16(d). Once the APE has been delineated, an agency must identify historic properties within the APE that could potentially be affected. *Id.* § 800.4(b). The agency must evaluate the historic significance of such sites, and determine whether they are potentially eligible for listing under the National Register. *Id.* § 800.4(c). Next, the agency must “apply the criteria of adverse effect to historic properties within the area of potential effects” by considering how the proposed action “would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.” 36 C.F.R. § 800.5(a),(a)(1). Finally, the agency must resolve any adverse effects through the development of mitigation measures. *Id.* § 800.6. Agencies must remain actively engaged with the consulting parties through each step of the section 106 process. 36 C.F.R. § 800.2.

C. Agencies may coordinate compliance with section 106 and requirements of NEPA, but the agency did not do that here.

The Advisory Council has developed for agencies to coordinate compliance with section 106 and the requirements of NEPA. “An agency official may use the process and documentation

¹³ Certain individuals and organizations with a demonstrated interest in the undertaking may participate as consulting parties due to the nature of their legal or economic relation to the undertaking or affected properties, or their concern with the undertaking’s effects on historic properties.” 36 C.F.R. § 800.2(b)(5).

required for [NEPA] to comply with section 106 . . . if the agency official has notified in advance the SHPO/THPO and the Council . . .” 36 C.F.R. § 800.8. “Agencies should consider their section 106 responsibilities as early as possible in the NEPA process, and plan their public participation, analysis, and review in such a way that they can meet the purposes and requirements of both statutes in a timely and efficient manner.” 36 C.F.R. § 800.8(a)(1). Agencies should ensure that consulting parties are “prepared to consult with agencies early in the NEPA process, when the purpose of and need for the proposed action as well as the widest possible range of alternatives are under consideration.” 36 C.F.R. § 800.8(a)(2). Additionally, “[a]gency officials should ensure that preparation of an environmental assessment (EA) and finding of no significant impact (FONSI) or an EIS and record of decision (ROD) includes appropriate scoping, identification of historic properties, assessment of effects upon them, and consultation leading to resolution of any adverse effects.” 36 C.F.R. § 800.8(a)(3). During preparation of the EA the agency must “[c]onsult . . . with the SHPO/THPO . . . other consulting parties, and the Council, where appropriate, during NEPA scoping, environmental analysis, and the preparation of NEPA documents.” 36 C.F.R. § 800.8(c)(iii). But the agency did not do this.

D. The One Lake project has the potential to cause effects on historic properties.

The One Lake project has the *potential* to cause effects on historic property, because it directly and negatively affects a large swath of riverside property that is likely to have historic and prehistoric sites and properties. Historic “objects” or sites are eligible for inclusion on the National Register of Historic Places as components of cultural landscapes or themselves as a historic “objects.” An object is a “material thing of functional, aesthetic, cultural, historical or scientific value that may be, by nature or design, movable yet related to a specific setting or environment.” 36 C.F.R. § 60. The Pearl River banks and surrounding areas within the area of potential effect include prehistoric and historic archaeological sites. The agency must analyze, consult, and avoid or mitigate harm to these sites under the NHPA.

In addition to the archaeological and historic sites in the Pearl River Basin in the project’s scope, landscapes are regularly found eligible for the National Register, usually as districts. A cultural landscape is “a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.” Charles A. Birnbaum, *Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes*, U.S. Department of the Interior, National Park Service, Cultural Resources Division, Preservation Brief 36, 1 (1994).¹⁴ The project area of potential effect has the potential to include such landscapes.

E. The agency must undergo the NHPA Section 106 Process.

The agency must involve consulting parties in findings and determinations and undergo the section 106 process before committing to its any final decision. Consultation is the cornerstone of the section 106 process. The very purpose of Section 106 is to ensure that

¹⁴Available at <https://www.nps.gov/tps/how-to-preserve/preservedocs/preservationbriefs/36Preserve-Brief-Landscapes.pdf>.

“Federal agencies to take into account the effects of their undertakings on historic properties and afford the Council a reasonable opportunity to comment on such undertakings.” 36 C.F.R. § 800.1. “The section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning.” Setting the foundation for the section 106 process, “[t]he goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.” 36 C.F.R. § 800.1. This repeated call for consultation is a recognition that in order for agencies to achieve our national policy of historic preservation, they must gain assistance from outside experts and local informants. Just as a historian would not be entrusted to build our bridges, an engineer would not be entrusted to preserve our nation’s cultural identity.

Conclusion

For these reasons, the DEIS is insufficient and must be rejected. Further, the agency must complete the NHPA Section 106 process before making and final decision.

Gulf Restoration Network reserves the right to refer to and use the comments of all other comment writers including but not limited to: U.S. Fish and Wildlife Service, Audubon Mississippi, Audubon Louisiana, St. Tammany Parish Government, The U.S. Environmental Protection Agency, Louisiana Department of Wildlife and Fisheries, Louisiana Department of Environmental Quality, Louisiana Department of Natural Resources, Louisiana Coastal Protection and Restoration Agency, Louisiana Department of Transportation, All other Louisiana state departments, Parishes and agencies, Mississippi Department of Wildlife Fisheries and Parks, Mississippi Department of Marine Resources, Mississippi Department of Environmental Quality, Mississippi Department of Transportation, National Wildlife Federation, Mississippi Wildlife Federation, Lake Pontchartrain Basin Foundation, New Orleans Audubon Society, Jackson Audubon Society, Pearl Riverkeeper and all persons submitting comments on their behalf or on behalf of any organization, city town, state, or any non-profit corporation. Gulf Restoration Network relies on the river science and engineering comments of Douglas Shileds, P.E., and the economics reviews of Sharon Hayes Ph.D., and Andrew Taylor, M.S., J.D. candidate at Tulane.

Gulf Restoration Network appreciates the opportunity to provide these comments.

Best regards,



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