Comments on Pearl River Basin Flood Risk Management Project DEIS in Jackson Mississippi

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Our overall recommendation: Focus on the tributaries

We strongly encourage the Corps to address tributary flooding as the top priority in flood risk management for the Pearl River. None of the alternatives C, D, or E reduce tributary flooding, and by raising the level of the main river, C and D would induce tributary flooding. They would also cause a host of other highly significant impacts, as acknowledged in the DEIS. Alternative A1 considered in the document would reduce flooding impacts through non-structural measures and has the best cost-benefit ratio of the alternatives considered. But there is no reason such non-structural measures could not be combined with upstream detention storage on the tributaries, along with removing bottlenecks and improving the hydraulic efficiency of downstream tributary channels as they traverse urban areas. A meaningful solution to flooding in Jackson and its inequities must reduce tributary flooding in a substantive way.

Tributary flooding

Tributaries to the Pearl River flowing through Jackson frequently overflow, causing flooding especially of disadvantaged neighborhoods. Their channels are poorly maintained for flood conveyance, with multiple points of blockage that induce backwater flooding upstream. Tributary flooding disproportionately impacts disadvantaged communities, some of whom are affected by flooding multiple times each year. Solving this problem is not 'rocket science', but requires solid on-the-ground studies and modeling of the benefits of removing bottlenecks and clearing channels of debris. Tributaries could be amenities for surrounding communities, by restoring channels and banks, and setting aside areas of floodplain that can flood frequently, safely accommodate floodwaters, provide recreation and open space to urban areas, and support biodiverse floodplain habitats. Restoring human access and ecological function can be accomplished in conjunction with improvements in channel conveyance, levee setbacks, and managed retreat of structures now subject to repetitive flooding.

Tributary flooding is a dominant flood issue in Jackson. A project that does not solve tributary flooding is not genuinely responsive to the flooding problem and its environmental justice dimensions. The lake project (Alternatives C/D) will provide economic returns from land development, which will benefit the local tax base and provide profits for local investors and landowners. However, this will not benefit the underserved communities that now suffer the burden of tributary flooding, and in fact the backwater from the proposed new impoundment will cause induced flooding on tributaries (DEIS pp.223-224). Likewise Alternative E will cause many of the same impacts as Alternatives C and D, because extensive dredging will destroy valuable habitat and disturb HTRW sites. Alternative E does not include a weir, so it does not induce backwater flooding as induced by Alternatives C and D, but it will significantly widen a long reach of river (affecting downstream reaches of tributaries), and it will not reduce tributary flooding.

Tributaries are the problem, but they are not modeled nor solutions proposed

Although hydraulic modeling is usually considered to be a strong capability of the Corps, in this project the Corps defined the problem in a way that excluded substantive analysis of tributary flooding. It appears that the Corps did not model the hydraulics of flows through tributaries, with the possible exception of the Town Creek tunnel (AppE-p.77). Given the significant flooding risks posed by Town Creek and other tributaries, it is baffling that the Corps did not

model flow through these tributaries assuming *existing* tributary conditions (with constrictions and blockages), nor test potential effects of channel clearing and removing bottlenecks.

Moreover, there are multiple places within the tributary watersheds where upstream detention may be possible. While the lower reaches of tributaries such as Town Creek pass through densely urbanized Jackson, their upper reaches drain more rural landscapes where detention basins could plausibly be sited. Upstream detention could offer multiple benefits, including flood peak reduction for both the tributaries and mainstem downstream. In App E (p.50-51), the DEIS acknowledged tributary storage as an "*Item not included within Alternative CTO*", saying, "*These options could have limited benefit due to the downstream channel constraints, which are already restricting flow and lack of available land for side channel storage, as the tributaries are urban drainages*." While the lower reaches are urban, more rural upper reaches include pasture land that could potentially be developed for detention basins, but the DEIS did not consider potential detention sites upstream. The "downstream channel constraints" are bottlenecks and blockages that should be improved as part of a systematic flood risk reduction project encompassing the tributaries.

In some cases, structures occupy low-lying lands where flooding would be difficult to prevent, and in these cases elements of the non-structural alternative can be utilized, such as elevation of structures, floodproofing, and managed retreat (voluntary buyouts).

A systematic approach to flood risk management must include tributary flooding and interior drainage, as well as flooding due to elevated flows in the main stem of the Pearl. Without such a systematic approach, the DEIS and the underlying flood risk reduction project fall short of sound engineering.

A Laundry List of Projects, but No Analysis

The DEIS Section 1.5.2. "Ongoing Projects" states, "*Various local government entities are conducting work within the Pearl River Tributaries. In addition, the City of Jackson has committed funding for channel cleanout work, and coordination is ongoing to determine the scope of those efforts. Table 1-1 provides a listing of on-going projects by others and the status*." Table 1-1 "Ongoing projects by others" lists projects by county and specifies lead agency, source of funding, and stage of project. The table lists six projects in Hinds County, four in Rankin County, and four in Madison County. Immediately after the table, the text states, "*A description of ongoing projects by others is provided below*" followed by Subheading "Rankin County Projects". 29 projects are listed, designated R1, R2, R3, etc. to R29, with a short description (1-5 lines) of each project. The alpha-numeric designation would seem to correspond to these projects' locations within Rankin County, but there is no comparable text for projects in Hinds or Madison Counties. Moreover, most of the 29 projects are not listed in Table 1-1. The overlaps are two: Richland Creek, listed once in the text (R5, Richland Creek Bank Stabilization near Tara Road) and which appears twice in Table 1-1 as "Richland Creek watershed improvements" (lead agency Rankin County, funded by USACE and NRCS) and "Richland Creek Section 219 Environmental Infrastructure Watershed Improvements" (lead agency USACE, funded by USACE and Rankin County). "Mill Creek and Pelahatchie Watershed Improvements" are a single entry in Table 1-1, and appear separately in the text as R8 "Mill Creek Bank Stabilization"

and R10 "UT Pelahatchie Creek Flood Mitigation – Pinebrook". The discrepancy between the projects listed in Table 1-1 and those listed in the text is nowhere explained.

Moreover, critical tributary flooding problems have been well documented in the tributaries within the city of Jackson. Despite the statement that "*the City of Jackson has committed funding for channel cleanout work, and coordination is ongoing to determine the scope of those efforts*" (p.14), there is no listing of flood control projects in Hinds County outside of the six projects shown in Table 1-1. Clearly these six projects are not sufficient to solve the tributary flooding issues in Jackson. The DEIS undercuts its assertions.

The lists of "ongoing projects by others" are simply that: lists. They are unorganized, non-prioritized laundry lists. The current status of the projects and the likelihood of being funded is not given. The DEIS does not analyze the potential flood control benefits of these individual projects nor their cumulative effects. The obvious need here is for the cumulative effects of all the projects to be modeled, to determine what could be the actual benefits of different combinations of tributary projects. What are key interventions needed to better manage flood risk in the impacted neighborhoods? What would be optimal sets of projects that would yield the most cost-efficient solutions to the real problems of tributary flooding in disadvantaged neighborhoods? These are questions for which the Corps' modeling expertise is ideally suited, and it is a missed opportunity that the Corps did not perform this sort of analysis.

Evading Responsibility

The DEIS seems to imply that tributary improvements are ongoing by the City of Jackson and other local entities, and that these projects are somehow the responsibility of agencies other than the Corps. Section 3.2 "Formulation and evaluation of alternatives," states:
"*Additional H&H analysis and evaluations of the proposed features resulted in the following features being removed from further evaluation as part of the CTO Alternative:*
•Clean out and sustained maintenance of tributaries: This feature was removed from further consideration in the CTO alternative upon identifying that this work is being undertaken by the NRCS, State and other local entities through the Mississippi Watershed projects."

The assertion here is that the tributary flooding is being addressed by other agencies, so the Corps has no responsibility for that issue. Yet tributary flooding, in many cases of underserved of communities, is a key problem in the project area. The DEIS presents no analysis to demonstrate that the problem will be solved by other agencies. The DEIS hydraulic modeling does not simulate interaction of tributary projects with main channel hydraulics.

Developing a project to reduce flood risk is the fundamental responsibility of the Corps. The project is designated as a "Flood Risk Reduction Project." If the Corps does not directly and competently address tributary flooding, it has failed in its obligation, and the public funds allocated to solve flooding problems in Jackson have not been used responsibly. Environmental justice issues will be slighted or exacerbated.

Tributaries will require a multi-prong approach

To solve the overriding problem of flooding poor and vulnerable communities along the tributaries, a combination of measures will be needed. These likely include upstream detention (taking advantage of open space in headwaters and thereby reducing flood peaks downstream in

urban reaches), cleaning out and removing bottlenecks from channels (allowing floodwaters to pass), localized levee construction (similar to that proposed for Canton Club), limited flood-proofing of structures, and managed retreat from low-lying sites whose flood risk cannot practically be reduced through other measures. No single measure will solve the problem, but a combination of approaches probably can. The individual and combined effects of these measures can all be reliably modeled by the skilled modeling team of the Corps, but the scope of the H&H modeling must include the tributary channels and floodplains, not only the mainstem river. This is not an obscure art form. The Corps has the expertise and experience to undertake such an analysis. However, it must proactively model the tributaries and propose alternatives that include multiple approaches to reduce flooding of disadvantaged communities along tributaries.

Mainstem impoundment will exacerbate flooding in tributaries

The DEIS acknowledges that the permanently raised level of the Pearl River will induce backwater flooding on tributaries draining to the Pearl. However, because flow hydraulics are not modeled in the tributaries, this effect is poorly quantified. For example, descriptions of the ongoing projects in Hanging Moss Creek and Lynch Creek on the Hinds County website both acknowledge the problem of backwater flooding: "Tailwater is introduced by the Pearl River during large flood events, and this negatively affects the discharge of flood waters. This has become a perpetual condition… as reflected by past catastrophic floods, particularly the 1979 Easter flood." Building a weir that raises the level of the Pearl River will exacerbate tributary flooding under certain combinations of tributary and mainstem discharge.

Mitigation, CBA, and studies needed "before construction"

Under current regulations, mitigation must be provided in advance of projects, and mitigation costs used in cost benefit analyses (CBA) must be realistic. Given that the project will disturb HTRW (hazardous, toxic, radioactive waste) sites and affect sensitive habitats, the potential mitigation costs could be enormous. The costs could easily throw the benefit-cost ratio below 1.0. Yet these costs remain to be determined in future analyses. Is the Secretary expected to make a decision on this project without adequate information on the true costs and thus the level uncertainty surrounding the presented values of benefit cost ratio?

As per usual for USACE flood control projects, much of the analysis hinges on the CBA. Results of CBA are presented at various points in the DEIS, but remarkably, the CBA itself is not presented so that assumptions and calculations can be independently evaluated. The CBA should be included as an appendix to the DEIS. The failure to include the actual CBA raises questions about the analysis.

The DEIS identifies studies that must be completed in the future, before going ahead with project construction. These include detailed analyses of HTRW sites and potential cleanup costs, costs of bridge retrofits, costs of mitigating lost habitat, a watershed study, a water quality study, a sediment study, a downstream gaging study, and a study of existing levees, all not yet done, and all with potentially profound implications for the viability of the project. For example, the DEIS reports preliminary estimates of mitigation for forest and palustrine habitat may exceed $1 billion (not including mitigation for riverine habitat), a figure that would severely undermine the barely favorable BCR currently assigned to Alt D (weir). Similarly, a table of anticipated costs

for “Alt C with Weir” indicates costs between $487M and $655M. The DEIS indicates that these critical studies will be undertaken and costs finalized in the Pre-Construction, Engineering, and Design (PED) phase, *after* the ASA has reached a decision. It is unclear how the ASA can be expected to make a good decision in selecting an alternative when the BC ratio remains in doubt. Once the alternative is selected and thus commitment to a specific project is made, it will be difficult for federal and local governments to change course even if subsequent data and analyses indicate that should be done.

Conclusion

Flooding of tributaries to the Pearl River is a dominant flood issue in Jackson and environs. As is clear from socio-economic data and testimony from local residents, this tributary flooding disproportionately affects poor, disadvantaged neighborhoods. To address tributary flooding will require some combination of upstream storage, channel clearing, and managed retreat (e.g., buyouts of properties on low-lying land which are difficult or impossible to protect). The current flooding problem and potential benefits of measures to reduce tributary flood risk can be analyzed by a hydraulic model encompassing the tributary channels and floodplains at a suitable scale. However, the DEIS fails to analyze tributary flooding and potential solutions to it, instead ‘punting’ with an unconvincing argument that other agencies will take care of this problem via channel clearing. This is a flood risk management project, and flood risk management is a core competency of the Corps. It is the Corps’ responsibility to deal with the real problem of flooding on the tributaries, especially in light of the profound environmental justice issues. Instead, the DEIS evades responsibility for solving this problem and proposes an alternative (D), which will make tributary flooding worse by raising the level of the Pearl River, thereby inducing backwater flooding.

The DEIS creates an impossible situation for the ASA – to choose among Alternatives C1, D, or E, all of which will entail massive costs for mitigating habitat losses and cleanup of HTRW sites, without knowing those costs and thus the true cost-benefit ratios. These costs have not been adequately quantified, but habitat mitigation could exceed $1 billion. These costs are left to be determined at the PED stage – after the Secretary’s decision. With these costs considered, the cost-benefit ratio will likely fall below 1.0, but at that point it would be very difficult to change course. And none of these alternatives would address the fundamental problem: flooding of poor neighborhoods by tributaries.

Bios

Berneece Herbert is the chair of the Department of Urban & Regional Planning at Jackson State University in Jackson, Mississippi. She has a doctoral degree in natural resource management and a master's in urban & regional Planning. Dr. Herbert is a results-oriented and people-centered professional with over 20 years of practice, academic, and research experience in higher education and training with a specific focus on vulnerable and disadvantaged communities. Her research areas include urban health indicators, sustainable development, and social equity. Her technical skills include spatial analysis, vulnerability analyses, and resiliency mapping. Her recent grants have focused on advancing solar energy, green infrastructure, heat mitigation, energy burdens, and community empowerment in underserved and under-represented communities. She has led major projects sponsored by agencies such as FEMA, USDA,

INROADS, Clean Energy States Alliance, and Jobs to Move America. Her ultimate goal at JSU is to educate and train students to be highly knowledgeable, competent, and innovative thinkers and leaders who will utilize and leverage their knowledge and skills to build healthy, resilient, and sustainable communities.

G. Mathias (Matt) Kondolf is a fluvial geomorphologist and Professor of Environmental Planning in UC Berkeley's College of Environmental Design. He teaches courses in environmental planning, environmental science, and river restoration. His research concerns human-river interactions, including managing flood-prone lands, urban rivers, sediment in rivers and reservoirs, and river restoration. His more than 200 scientific articles and books have received over 22,000 citations as recorded on google scholar. Prof Kondolf has served on two National Academy of Science panels, the Calfed Ecosystem Restoration Science Board, the Environmental Advisory Board to the Chief of the US Army Corps of Engineers, and as Clarke Scholar at the USACE Institute for Water Resources. He has provided expert testimony before the US Supreme Court, US Congress, California legislature, California Water Resources Control Board, International Court of Justice (the Hague), Permanent Court of Arbitration (the Hague), and other legal proceedings in the US.

The comments of Professors Herbert and Kondolf are based on a multi-year collaboration between Jackson State and Berkeley on urban rivers, public access, and flood risk management, involving research by students and faculty, community meetings, and synthesis work by graduate students in the Environmental Planning Studio in 2023 (Kondolf et al 2023).

References Cited

Kondolf, GM et al. 2023. The Green Heart of the Pearl River: A Proposal for Flood Mitigation and Public Access for the Pearl River at Jackson, Mississippi. Department of Landscape Architecture & Environmental Planning, University of California, Berkeley, July 2023. Online at http://berkeleyriverlab.org/wp-content/uploads/Green_Heart_of_the_Pearl_River-July2023.pdf

Cover illustration*: Town Creek in Jackson. Photo by Kondolf, January 2024.*