I. PROJECT INFORMATION

Project Title*	Mitigating flood risks on the Mississippi Gulf Coast using equity-based and stakeholder-informed multi-scale nature-based solutions
Project Director*	Wei Wu
Project Location*	City of Moss Point
Project Summary*	Flooding is the most destructive natural hazard in the US. Nature-based solutions (NBS) provide an effective way to mitigate flood risks while maintaining integrity of ecosystem services and generating co-benefits (i.e., human health). However, research on existing urban NBS projects show that they often cause gentrification and displacement. We argue that vulnerable communities can take advantage of NBS and simultaneously promote social equity through carefully designed multi-scale projects that improve the connections between NBS and community development. The goal is to co-identify feasible NBS at multiple spatial scales (household/site, coastal area) for one underrepresented city on the Mississippi Gulf Coast (Moss Point) to mitigate flood risks and adapt to climate change while promoting discounts in flood insurance premiums to the entire community. We will co-produce a Phase II proposal that focuses on project design of NBS options identified by the resident stakeholders. We have three specific objectives: 1) Building strong partnerships with city leaders and diverse stakeholders to co-identify the candidate NBS; 2) Evaluating NBS candidates using modeling and literature survey; 3) Co-ranking NBS candidates to determine the highest overall benefit to cost project sites. We will implement a multi-disciplinary approach that involves mapping, hydrological modeling, competency group engagement, surveys, and outreach activities. We will leverage the community's capacity building in an ongoing green infrastructure project in the City of Moss Point led by CoI Posten and McGrury. We will further share the information at the regional Climate and Resilience Community of Practice meeting, facilitated by Mississippi-Alabama Sea Grant.

II. PROGRESS REPORT QUESTIONS

1. Please revisit your proposal and review your goals and the outcomes you were seeking to achieve through this grant. How successful were you in meeting your goals? Please assess your success against the criteria you set in your proposal and use any combination of anecdotes, stories, graphs, charts, visuals as well as data to explain your success. Upload supporting files if you choose.*

Please see the attached document.

Optional File Upload

Report_Q1.docx

Filename: Report_Q1.docx **Size:** 8.1 MB

2. How has your work benefited your organization, professional field, community, or other stakeholders?*

The benefits are multifold. First, this work expands the research portfolio in coastal resilience of our organization and supports our university's vision of becoming a national leader addressing issues relevant to people in coastal and maritime settings. This work fits well in two of the three foundation pillars that support the overarching goal and guide our work in academic and research programs for greater impact: 1) Understanding the ocean and coast, and 2) Improving coastal resilience (https://www.usm.edu/news/2020/release/charting-our-coastal-future.php). This work lays a solid foundation for our research in nature-based solutions and helps increase the research opportunities in this field in the future.

Secondly, this work helps develop strong partnership with the local community – City of Moss Point that is undersourced and underrepresented, and benefits the community through mitigating flooding, protecting natural environment, lowering economic damages, improving public health and livelihoods, attracting business opportunities, and increasing economic gains in the long run. This focus directly supports a value of our University – "Community participation that promotes social responsibility and citizenship". It also directly supports Moss Point's 2022 Comprehensive Plan that explicitly lists "Maintain and improve the quality of the natural resources of the City of Moss Point" as key goal (p21 in https://cityofmosspoint.org/DocumentCenter/View/1535/Moss-Point-Comp-Plan-adopted-120721?bidId=).

Thirdly, this work provides opportunities to mentor and train multidisciplinary graduate students who will excel in research and communication with stakeholders in the future. The expertise is largely lacking but urgently needed to improve coastal resilience and adapt to climate change.

3. Are there any other successes related more broadly to this project that you would like to share with us?*

One graduate student who worked on the project won a travel award to attend the 1st Annual Training and Developers Conference of the Cooperative Institute for Research to Operations in Hydrology (May, Colorado) to present her work related with the project.

We did not only build strong partnership with the diverse stakeholders of Moss Point, but also conducted outreach successfully. We have educated the city residents and leaders on NBS through the kickoff meeting, competency group meetings, community-wide outreach activity, and project conclusion meeting.

Our project complements the repairing and upgrading of the stormwater drainage networks planned by the county and city, and another NBS planned in the city. The collective efforts will generate larger benefits that exceed the sum of individual projects.

4. What did you learn (positive or negative) as a result of this grant? What lessons would you share with other organizations or the field at large?*

Recruiting the competency group took tremendous efforts. This requires emailing, phone calls and recommendations of well-respected community leaders.

When presenting the project at various meetings, we needed to clarify the timeline of the work and emphasized that our project was on the right track but required much more efforts to increase resilience of the city to flooding eventually. This helped establish reasonable expectations from the city leaders and diverse stakeholders.

Hybrid methods (traditional and technology-based) expanded the knowledge we gained from the community. In-person engagement is most effective to involve the community. Our participatory mapping on historical flooding at the first competency group meeting was a huge success. We also hung the paper map at the City Hall for three months in order to obtain the inputs from the aldermen who could not attend the competency group meetings. Furthermore, we developed a computer app that could be used to capture locations of historical flooding so people who could not join the competency group meetings could still provide their inputs. At the second competency group meeting, we developed a computer-based game that helped evaluate flooding mitigation based on different designs of NBS from the participants. The game provided in-depth understanding of NBS through the scenario analysis.

Ranking preferences with the competency group is challenging especially considering that NBS is a new concept to the group and the large uncertainties involved in evaluating NBS in flood mitigation. The evaluation depends on the designs and local geological data that are not available. On the other hand, involving the public works and city engineer provided us insights on what may work better and what may not work. This shows the importance of weighting the feedback from diverse stakeholders to make more-informed decision on NBS design in Phase II.

5. How do you characterize your relationship with GRP and what suggestions do you have for improvement?*

Ms. Gabriela Lingren, the PO, is very helpful. When we tried to seek advice, we received responses timely and clearly. We intended to involve the PO in our project, providing updates along the way, seeking feedback and advice, and giving an end-of-project presentation (Zoom) to summarize our accomplishments. We view involving the PO closely in the project is the key for success.

6. Please provide any other feedback or comments you have for the GRP.*

We hope that GRP can be a little more flexible on a short extension of this project especially considering its late start. Without half-month extension, we could not attend the regional climate resilience community of practice meeting to present our work and seek broader feedback as it was postponed from December 2022 to May 2023, right after the project ended. On the other hand, I understand the restricted requirement on the Phase I project.

7. If applicable, please identify and describe the ways you or your organization leveraged GRP's grant (e.g., other funders, volunteers who worked on the program, in-kind donations etc.) Please specify the value and/or number/hours of volunteers if possible.

The PI and CoIs at the USM and Grand Bay National Estuarine Research Reserve provided tremendous in-kind time contributions to the project. Even though PI and CoI at the USM requested one-month summer salary, they did not get paid as the updated duration of the project did not cover summer time period of performance.