

I. PROJECT INFORMATION

Project Title*	Exploring Innovative Nature-Based Approaches to Regional Stormwater Management in Ocean Springs, MS
Project Director*	Nina Woodard
Project Location*	Ocean Springs, Mississippi & unincorporated Jackson County, Mississippi
Project Summary*	<p>Like many other cities, Ocean Springs, MS has a large need for housing that is accessible and affordable for working class and lower middle-class families. As the pressure for housing increases, developers are developing tracts of land that are low lying with very little elevation change, increasing pressure on existing stormwater conveyances – green and gray. Meeting the need for more housing in this area is putting existing and future homeowners at greater risk of flooding, which is being further exacerbated by climate change. This project will work to assess the physical environment, resident perspectives and needs, and municipal planning and outlook to determine the feasibility of proactively enhancing and expanding stormwater management in Ocean Springs using innovative nature-based solutions. The focus area is in Ocean Springs and unincorporated Jackson County around large residential subdivisions that have either recently developed or are in various phases of planning and face substantial increases in flood threats exacerbated by climate change if regional stormwater capacity is not considered and addressed. In conducting the project, we will combine physical assessments of the landscape with local resident knowledge on flood patterns and hazards for a holistic understanding of the current challenges and opportunities. Additionally, residents from Jackson County and Ocean Springs will be asked to provide input on desired recreational activities and nature access that can further inform the nature-based solutions considered for addressing stormwater management. This information will be used to generate a feasible, resident-supported plan for addressing stormwater challenges in this area.</p>

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.*

We were successful at meeting the goals and objectives of this effort and were able to outline productive next steps to continue progress towards the overarching goal of proactively reducing current and future stormwater flooding. See below for the Project Goal, Summary, and Activities Description subsection that outline the measures of success.

Project Goal

Explore nature-based approaches for proactively managing regional stormwater to reduce current and future flooding in Ocean Springs, MS.

Project Summary

As the need for more housing in Ocean Springs, MS and Jackson County, MS continues, the pressure for enhanced stormwater management systems increases. The remaining uplands available for development are often flat and have poor drainage. The overarching goal is to integrate nature-based solutions in a regional stormwater management system in Ocean Springs to meet the challenges of future flood and development conditions, while increasing access to green space for residents. In Phase One of this project we sought to assess the feasibility of using nature-based solutions (NBS) to mitigate flooding through attenuation of stormwater and increase the capacity for existing and new stormwater pressures. The feasibility assessments were informed through biological and physical measurements, as well as community and municipal stakeholder input. After the assessments were conducted and stakeholder perspectives were collected the information was used to create an optimization tool to assess different infrastructure options under a variety of future development and flood conditions. The potential outputs were presented during a final meeting with our municipal leaders to determine if any were to their liking. Upon reaching consensus and deeming the project feasible, the final approach and strategy for Phase Two funding was outlined.

Project Activities:

Municipal Participation

A series of meetings with the City of Ocean Springs and Jackson County staff and other officials were held throughout the project. The target area for this project spanned jurisdictions and our project team sought to engage relevant municipal staff during all stages of the feasibility study.

The first meeting was held on November 16, 2022 with the City and County planners and project managers. At this meeting we reviewed the purpose and goals of the feasibility assessment, defined priorities, outlined standards for successful regional stormwater management systems, and reviewed current and future land use expectations. During this meeting, we also refined the study area to target an area in Ocean Springs bounded by Highway 90 (south), Highway 57 (east) and Ocean Springs Rd. (northwest). Additionally, we reviewed the plan for obtaining and integrating community feedback. We also collectively defined relevant project stakeholders such as residents in targeted neighborhoods

The second meeting was held on December 5, 2022 with the City and the County elected officials and a broader array of staff. At this meeting we reviewed the purpose and goals of the feasibility assessment and informed them of our plans to conduct community engagement activities (detailed below) in the surrounding area. Additionally, we discussed expanding our conversations to include the US Army Corps of Engineers, the Mississippi Department of Marine Resources, and the Mississippi Department of Environmental Quality.

The third and final meeting was held on April 20, 2023 following all public outreach activities. The information collected through community engagement and field data collections was used to inform an optimization tool, assessing the different possible NBS enhancement scenarios under future development and climate conditions. The Project Team worked to then summarize and present this information to the City and the County. The results from the presentation and subsequent discussion were used to shape the Phase 2 design of the NBS and inform what type of partnerships we should focus on building.

In addition to above meetings, regular emails and calls occurred with each POC for the City and the County to ensure regular flow of communication and collaboration.

Community Engagement: Community Listening Session and Digital Survey

We worked with local residents within the area and in surrounding Ocean Springs and Jackson County to understand local perspectives across a variety of issues to inform the feasibility of utilizing NBS. There were two main stakeholder engagement activities to gather these perspectives: a community listening session and an online survey. Each had different audiences and purposes; however, across the two efforts we learned about local stormwater flooding, recreational activities of interest, opinions on different types of NBS, and barriers to accessing green space, particularly among target demographics including people of color, low-income residents, the elderly, and people with disabilities. See below for details on each activity.

Residents were engaged at an in-person public listening session held on January 9, 2023 that was advertised through social media and organizational websites. Additionally, postcards were mailed to residents that are

currently facing substantial increases in flood threats exacerbated by climate change if regional stormwater capacity is not considered

The objectives of the first stakeholder engagement were to work with existing neighborhoods to understand where current stormwater flooding is occurring. Local community insight aided in identifying how and where NBS-based regional stormwater management could feasibly and sufficiently address flooding issues. The second objective was to provide insight on types of NBS and recreational activities. The session was facilitated by PI-Nina Woodard and her team. The session started out with a brief presentation on the background and purpose of the project in addition to a brief explanation of what NBS's are and how they perform. After the presentation, residents were split into 6 groups for a Q/A session where facilitators asked questions related to flooding, recreational activities, and nature-based features. Those who participated in this session provided important feedback that was needed in order to further inform the feasibility assessment, providing us with details on where we should focus on conducting our field data assessments, what recreational elements to explore and what natural features to avoid in the design and construction of the NBS types. Many of the areas residents identified for flooding said that these areas would flood every time there was an extreme rainfall, which helped the Project Team determine where field data assessments might be the most important. Residents enjoyed walking and biking the most, stating that there was a greater need for walking and biking spaces, with a lack of connectivity between the spaces noted as a barrier to enjoying these recreational activities. As for NBS types, residents greatly enjoyed constructed wetlands and greenways, stating habitat for wildlife and connectivity as their reasons for enjoying these NBS types. The final results from this listening session will be compiled into a broader report that will be shared with the city, county, and residents. Following the listening session, postcards were mailed to residents that were invited but unable to attend so that they could submit their comments online in the form of a digital survey.

The second style of stakeholder engagement focused on reaching a broad array of Ocean Springs and Jackson County residents to understand current perspectives on opportunities to engage with the outdoors, desire for additional opportunities, and any barriers to using current outdoor spaces. One goal of designing a NBS-based regional stormwater system is that we raise the equity of access to and the benefits from the designed infrastructure. This information was collected through a digital survey instrument called SurveyMonkey™. The survey was advertised through social media and organizational websites.

Additionally, using the Environmental Justice Screening and Mapping Tool, postcards advertising the survey were targeted to residents in the neighborhoods that have higher proportions of families in poverty, elderly people, people of color, and people with disabilities to ensure that we include members of the community who are underserved. The purpose of this focus was to make sure that the proposed project outputs were inclusive of the residents who historically have less access to green and natural spaces. This would ensure that during the design of the NBS during the next project phase we equitably consider barriers and gaps to green space access. The postcards included a link to go online and fill out the survey questions. Preliminary results from the in-person event helped in designing the digital survey questions, where the multiple choice responses were determined based on

the responses that we obtained during the listening session. The survey was released on February 8, 2023 and remained open until March 6, 2023. Results from the survey showed that 60% of survey participants felt that accessibility and connectivity were two key barriers to residents when attempting to utilize green spaces. Additionally, residents identified walking (85%) and biking spaces (60%) as their top recreational activities, stating that more walking and biking trails were needed with better connectivity between them. The final results from this listening session will be compiled into a broad report that will be shared with the city, county, and residents. This information was used to further inform the feasibility assessment, helping us determine what elements might need to be added to an NBS type in order to ensure that accessibility and connectivity are addressed in the design and construction of the proposed NBS.

Field Data Assessments and Optimization

Field data collections were conducted by Dr. Eric Sparks and Ms. Sara Martin to inform the feasibility and subsequent design of the NBS. Four sites were determined for data collection based on the responses from the in-person public listening session concerning where residents' were seeing flooding and the extent of flooding. Due to increased rainfall surrounding the times for data collection, only three sites were visited. At each site, two infiltration rates and soil samples were collected. Soil samples were analyzed by Dr. Virginia Smith at Villanova University. Dr. Smith was able to determine the feasible NBS types based on soil type, soil drainage, and topography. Additionally, she determined the construct cost, maintenance level, safety concerns, community acceptance, and wildlife habitat for each NBS to further inform decision making.

After the field data assessments were conducted and stakeholder perspectives were collected, the information was combined and structured to reflect the nexus of the feasibility assessment. The resulting body of knowledge was used as a base case scenario for a simulation optimization tool created by Dr. Nazanin Tajik and Dr. Alireza Ermagun to assess different possible enhancement scenarios on the existing green and gray drainage systems under a variety of future development and climate conditions. The outcomes identified the feasibility of different NBS-based system enhancement scenarios alongside a reliable estimation of its corresponding efficiency and expenses. The outcomes were summarized and presented to the City and County on April 20, 2023. Three different feasible NBS types were found and were suggested in three different locations in Ocean Springs and Jackson County. The municipal leaders reached consensus on two of the three NBS types for pursuing design and implementation funding.

Optional File Upload

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

The Program for Local Adaptation to Climate Effects: Sea Level Rise (PLACE:SLR) and the Mississippi Coastal Research and Extension Center (MSU CREC)

The outcomes of this project proved beneficial to PLACE:SLR and the MSU CREC by expanding our partnerships and understanding of the local community's perspectives on NBS. We gained new partners through this effort such as the Land Trust for the Mississippi Coastal Plain working locally and by having the opportunity to discuss this kind of work at regional and national meetings. Also, by directly asking residents we now have locally specific perspectives on flooding, NBS, and barriers to accessing green space. We also learned important lessons on the effectiveness of specific approaches when attempting to reach members of the community that are traditionally underserved or marginalized. This information will help us better serve our partners across the region.

The Communities of Ocean Springs, MS and Jackson County, MS

This effort fostered increased awareness of local stormwater flooding issues, solutions to those issues including NBS, and opportunities for participation in the decision-making process. The in-person events directly increased salience around NBS and provided residents with a sense of a voice in the process. This is directly evidenced by the evaluations participants filled out as they were leaving the event with 90% stating that the evening was a good use of their time. Residents noted that it provided them with the opportunity to give their input and that they felt they were involved in community action. Additionally, both the listening session and the digital survey provided residents with an opportunity to voice their concerns on future development and flooding impacts and barriers to enjoying outdoor spaces so that these issues could be included in the design of the NBS. Continuing to engage with the community in the future will be important to continue to foster a culture of community-driven problem solving.

From the perspective of our municipal partners this provided an opportunity to educate residents on their own roles for reducing flooding and increased an understanding of resident activities of interest and barriers to accessing green space. Additionally, the outputs of this effort will enable them to pursue funding to implement these projects that will reduce flooding now and in the future.

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

This grant has been instrumental in attracting additional resources in the form of increased public attention and partnerships. The community listening session was advertised via social media and postcards, capturing the additional attention of WLOX, a television news station serving the Mississippi Gulf Coast. This positive publicity helped to spread our message to larger audiences outside of those who attended the listening session. After the community listening session we were also able to meet with the Land Trust for the Mississippi Coastal Plain for the first time, keeping in touch with them as we completed our assessments and asking them to join our team for the design and implementation phase. Working with the Land Trust will be instrumental for gaining insight on how a framework of stewardship and land management is set.

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?*

Building Partnerships and Trust

One of our objectives for this project was to improve the accuracy and quality of our feasibility assessment by adding in community knowledge. Engaging with the community early on helped inform our feasibility assessment by adding in local expertise of flooding while providing residents with the opportunity for their voice to be heard within their community. Involving the community in our early decision-making process helped with the reception of new ideas by adding trust and opportunities for co-production, versus asking for feedback after the decision has been made. By remaining inclusive and transparent during the listening session we ensured that the residents were involved and onboard with our approach to stormwater management solutions. At the session, residents seemed incredibly receptive to using NBS instead of the traditional/gray infrastructure in a regional stormwater management system. During the next phase we will expand engagement with residents to enable participation and awareness throughout all stages of the design and implementation process.

Reaching Underserved Residents of Ocean Springs and Jackson County

During the Phase One feasibility assessment, a priority of our team was to consider perspectives of residents that traditionally have less access to natural spaces. As a result, we created a digital survey that was made available to all residents, but efforts were made to explicitly target underserved residents. This included our populations of elderly, people of color, low-income and people with disabilities to make sure that we are working with those that are not just able-bodied, upper, and upper-middle class. We did not reach as many of our target underserved audience as we would have liked when releasing the digital survey. The digital survey may not have been the best way to reach our underserved populations as digital divides remain between the served and underserved. During the next phase we will address these tools/resources inequities, making sure to reach underserved populations through other channels other than the internet.

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

The relationship between the GRP and the Project Team could be characterized as a strong professional working relationship. The GRP was very communicative throughout the entirety of the project and very accommodating during moments of change for Project Team, helping them navigate budget issues/modifications and personnel changes. Additionally, GRP was vigilant in changing outdated application elements, updating where needed to ensure that the application was as straightforward as it could be while setting realistic expectations for a successful project. Further, the GRP staff was receptive to recommendations on timing for Phase Two proposals to accommodate for the realities of co-production proposals.

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

Consider holidays and weekends when setting deadlines. Universities and other organizations have internal deadlines and processes which can be severely hampered by weekends and holidays. So while it may seem like there are four weeks to turn around a proposal, in reality, it may be much shorter.

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 City and County staff provided their time as in-kind match. This was close to 40 hours total combined. Additionally, the City provided a venue for free with an estimated value of \$400.

We anticipate a great deal more leveraging if Phase Two is successfully funded. The Land Trust has already indicated some of their funding that could be leveraged along with additional time from municipal partners and other non-profit programs in the region such as the Master Naturalists to help with implementation.