I. PROJECT INFORMATION

Project Title*	Planning for a nature-based solutions approach to the Pointe-au-Chien Indian Tribe's climate change adaptation efforts
Project Director*	Matthew Bethel
Project Location*	Pointe-au-Chien, Lower Terrebonne & Lafourche Parishes
Project Summary*	The Pointe-au-Chien Indian Community is one of oldest inhabited communities in the United States and is a historical Chitimacha community. The Pointe-au-Chien Indian Tribe ("PACIT" or "Tribe") territory is in Terrebonne and Lafourche Parishes in South Louisiana and includes diverse resources, including birds, plants, animals, fish, cemeteries, sacred sites, and village sites. Historically, Tribal members were fishermen, hunters, and farmers. While Pointe-au-Chien continues to be a fishing community, climate-related hazards threaten its continued existence and ability to thrive. Adaptation measures taken by Tribal members have not been sufficient to withstand increased tropical storm impacts because of the loss of much of their traditional lands to open water, exposing the community to greater storm surge and more frequent flooding. Following Hurricane Ida's devastating impacts in August 2021, the Tribe is developing a comprehensive community-based strategy to become more resilient to future storms. Living shorelines are a nature-based solution (NBS) option that can support the PACIT in achieving critical aspects of its vision to rebuild in a more sustainable way. This project presents an opportunity to consider a 'network of living shorelines' concept as a key strategy in protecting the community from future storm impacts while also providing ecosystem-based co-benefits. The overall goal is to leverage the climate hazard-reducing potential of NBS in a way that also honors the cultural heritage and priorities of the PACIT community, and through this process inform the design and implementation of similar measures in other coastal communities most at-risk.

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.*

Phase I Planning Project Goal and Objectives

The overall goal of our Phase I Planning project was to collaborate with the Pointe-au-Chien Indian Tribe (PACIT) to increase understanding of how to leverage the climate hazard-reducing potential of nature-based solutions (NBS) in a way that also honors the cultural heritage and priorities of the PACIT community, and through this process inform the design and implementation of similar measures in other coastal communities most at-risk. Our objectives were to engage with the PACIT community and connect with external subject matter experts (SMEs) on a strategy for the design and investment in NBS. The aim was to utilize the information and understanding gained in Phase I to inform a Phase II Design full proposal for this opportunity. Identifying suitable locations for living shoreline projects is a complex exercise that involves an understanding of local knowledge, community-based priorities, projected ecosystem impacts through science-based modeling, and the changing exposures to climate-related coastal hazards.

Project Activities and Results in Achieving the Goal and Objectives

To meet these objectives, the project team leveraged existing, robust partnerships among the PACIT, Louisiana Sea Grant, Stanford University, the University of Southern Mississippi, and Louisiana State University. The project's integrative team represented a variety of disciplines, with two PACIT members serving as key personnel and additional members employed as staff in the PACIT's newly formed office of Cultural Heritage & Resilience working to implement the Tribe's Rebuilding Resiliency Plan. To ensure the inclusive practices in our process, a Tribal Leadership Committee was intricately involved in the project to foster Tribal engagement, collaborate with investigators in the identification and solution of tribal concerns, and fully facilitate the incorporation of tribal views into the
planning process. Members of this committee participated in all full-team virtual and in-person meetings. Also, an External Advisory Board, consisting of researchers, neighboring Tribe leadership, Parish officials, and practitioners with living shorelines and ecosystem services expertise provided advice and guidance on aspects of the project and participated in a focus group meeting with team members and a field-site visit.

We used a combination of a series of Tribe member and external partner focus group meetings, full team and sub-group committee 'virtual' meetings, and a SME field site visit with the Tribe and project team to bring our network together and to facilitate convergent engagement, research, and planning.

Focus group meeting series (Tribe member focused on 10/8/2022 and 10/10/2022; external partner focused on 3/3/2023)

Three focus group meetings were conducted with Tribal members and external stakeholders with direct experiences with climate hazards and knowledge related to the selection, design, and siting of NBS, with a focus on living shorelines. Focus groups consisted of between 5-8 individuals with two focus groups held with Tribal members and one with external partners and experts on coastal hazard risk reduction with an emphasis on NBS.

In designing the protocol for focus groups, we drew from previous data collection efforts including semi-structured interviews conducted with Tribal members during their recovery from Ida. Additionally focus groups investigated Tribal member a) experiences with the existing living shoreline project in the community, b) familiarity with NBS and perceived barriers to implementation and c) perspectives on design and siting of potential future NBS projects. These focus group meetings were organized to recognize the Tribe's intergenerational and foundational shared values, as well as educational and policy needs related to NBS for climate-related hazards. The focus group of external partners and subject matter experts focused on how NBS, such as living shorelines, might be designed while fully incorporating community input and TEK. Considerations by this group included leveraging related projects in the area and how to best estimate and evaluate any NBS project ecosystem co-benefits.

In the Tribal focus group meetings, several participants discussed the relentless, rapid change of the coastal environment in their community. They talked in detail about land loss, coastal erosion, and how they observe "more water everywhere." When prompted to identify areas that most need protection, one individual talked about how it was "sad" because "it's everything." Tribal members also spoke at length about the specific impacts they have experienced from recent catastrophic storms, like Hurricane Ida. Although Ida notably caused damage from high winds, Tribal members also recounted the many other storms of record that have caused flooding in their community.

Of particular relevance to this project, in 2019, the PACIT, in collaboration with the Coalition to Restore Coastal Louisiana (CRCL), completed a living shoreline project to protect a culturally significant and sacred ancient earthen mound from coastal erosion and sea-level rise (NOAA, 2019). This project, named the Pointe-au-Chien Cultural Heritage Protection Reef in Coastal Louisiana ("Cultural Heritage Protection Reef"), is an oyster reef constructed from recycled oyster shells that Tribe members installed on one side of the mound. Analysis of the Phase I focus groups conducted with Tribal members revealed that in addition to protecting the mound from further erosion, the Tribe hopes this project will provide suitable habitat for baby oysters and other fish in the area. Although this living shoreline took a direct hit by Hurricane Ida, in the focus groups Tribe members discussed how it withstood the storm with very little additional erosion and successfully stabilized an important cultural resource. The Tribe aims to assess the long-term ecosystem co-benefits of the project as well. Given the success of this pilot project, the Tribe

seeks to implement more living shoreline projects to reduce its risk to future storm impacts and contribute to ecosystem restoration, whether as more oyster-focused or vegetation-based efforts as determined by modeling outcomes as proposed with the Phase II Design project.

Analyses of Phase I Tribal member focus group information reveal broad support for and positive associations with existing projects in the community that utilize NBS. In particular, focus group participants described the Pointe-au-Chien Community Reef Cultural Heritage Protection Reef project as “a good place to start” that should “most definitely” be expanded on and invested in. Focus group participants thought expanding such living shorelines in the community could “really help” to halt and combat coastal erosion. Focus group participants were also very supportive of how NBS could protect cultural features, like mounds. In Phase II, to support the full participation of PACIT members and their ability to provide informed input, we plan to discuss the Cultural Heritage Protection Reef project with Tribal members who are less familiar with the living shorelines concept.

A summary of the NBS themes that emerged through analyses and synthesis of the data collected during the two Tribe member and one external partner focus group meetings categorized into Opportunities and Challenges/Barriers included related quotes follows:

Opportunities

1. Leverage Pointe-au-Chien Tribal member local ecological knowledge and experiences related to areas that most often flood and are eroding rapidly.

Tribal members in all three focus groups identified areas that are low spots that frequently flood as well as areas that are susceptible to ongoing erosion. External stakeholder/experts (e.g., from CRCL) agree that Tribal members are best positioned to identify what specific areas would best to site additional NBS projects like a living shoreline or oyster reef project.

The NBS project we propose would facilitate structured conversations between Tribal members and subject matter experts on living shoreline design, possibly with maps and other spatial aids, to more precisely identify these areas and if they could be feasible sites for living shorelines. The NBS project could leverage local ecological knowledge that has previously been untapped.

Example quotes:
• Tribal member: Yes. There's a lot of places. Like I told y'all, in the Cutoff Canal, they went and showed where we need some really bad before it goes across into the pond.
• Tribal member: But another place if they don't hurry up and do something is from the floodgate coming to where I

live there. That is eating up like crazy since they made the floodgate, a lot worse than what it did before. And it's eating up fast.
• External partner: Whereas the Tribe is able to say, to actually know where that project is needed. We can't say clearly, we're not there watching the erosion for us, it's a good partnership.

2. Advance support for and positive associations with projects leveraging NBS among Pointe-au-Chien Tribal members and neighboring communities.

In both Tribal focus groups, Tribal members were broadly supportive of and had positive associations with nature-based solutions projects and living shorelines that they were familiar with. They said it was “a good place to start,” should “most definitely” be expanded/invested in and would “really help.” The oyster shell project that protects a burial mound is a good example to point to, and will be an important example when introducing folks to the features and benefits of expanding living shorelines in the community. There was also strong support for protection of cultural features like mounds.

Example quotes:
• Tribal member 1: I think that where they're putting that down by the cemetery thing.
Tribal member 2: Yeah, the Mound, the cemetery.
Tribal member 1: I think that's something like the culture from down about it. So I think they should try to save it, yeah.
• Tribal member: I think it's a good place to start, though. Because there was nothing there before at all. So at least now, it's something that could start growing.
• Tribal member: If they would add on to it and put it in other places that would need it to help protect more land, to help protect the land. Especially places with a lot of current that gets eaten up quicker. If they would put stuff like that there, it would really do stuff to really help.
• Tribal member: The oyster shells go a little past the mound this way, then it comes this way and it turns into the Pointe-au-Chien bayou… where the oyster shells stop…at the other side, away from the oyster shells. Big difference. The oyster shell, no more land loss. Where the oyster shells stop, in three years, there's a big difference. So, the oyster shells are doing what they're supposed to be doing. They're stopping land loss.

3. Increase a sense of efficacy and empowerment and build technical expertise/capacity among Tribal members in the face of ongoing loss and environmental change (this could be two separate themes, but they are somewhat linked. The psychological empowerment + the material/technical capacity building go hand in hand).

Several focus group participants discussed the relentless, and rapid change of the coastal environment (e.g., land

loss, erosion, and more water everywhere). When prompted to identify areas that most need protection, one individual talked about how it was “sad” because “it’s everything.” But there were also some individuals who expressed a sense of uplift to see how the oyster shell project protecting the burial mound is “expanding.” The process of engaging the Tribal community in the planning and design of a local NBS project may be an opportunity to increase Tribal members' sense of efficacy and empowerment in the face of loss and ongoing coastal environmental change in the community. Also, the project could be an opportunity for training and supporting capacity building expertise among Tribal members who could lead additional projects in the future.

Example quotes:
External partner: But comes up a lot in the conversation of the people capacity of a community, of how many staff do you have to do all of the different jobs pre-disaster on a normal day. And some communities have a few people who are doing a lot of things. Some communities are better resourced so that they have more capacity.

Challenges/Barriers

1. Overcome frustration with past levee construction and mistrust of government and powerful institutions/companies (e.g., oil companies, landowners).

In all three focus groups, Tribal members and external partners commented on frustrations with government institutions (local, state, and federal) and private companies that have a lot of power, usually landowners like oil companies. Concerns related to a) the long time frame for completing coastal restoration/protection projects, placement/location of projects, and sense that the construction is not done well. From the Tribal perspective, this points to the legacy of infrastructure project design and implementation going forward without Tribal consultation and engagement. Therefore a challenge for this project will be to overcome those feelings of reticence and mistrust enough to effectively engage with community members on the design and siting of NBS projects in Pointe-au-Chien. Specific agencies/companies called out several times: FEMA, Army Corps, Entergy.

Example quotes:
• Tribal member 1: They're supposed to have finished the Morganza, but I don't know how their progress is going on that.
Tribal member 2: That's years and years. That's the Army Corp of Engineers that's doing that.
• External partner 1: Is there a way to, if we could work with Corps for example, to where they could fast track permits, if you could document that it's a nature based solution?
External partner 2: That's one thing that I found very, they didn't know how to classify the project and so there... they fitted in somewhere but there's no permitting for the actual restoration.

2. Expand Tribal member familiarity with features and benefits of NBS/living shorelines projects as compared to other shoreline hardening measures through education.

In both Tribal focus groups, there was some misunderstanding of and unfamiliarity with nature-based solutions projects. One person talked about how they could make money off a project. Although he was joking, the comment also revealed an only partial understanding the purpose of the oyster shell project already implemented in Pointe-au-Chien. Another person cited how the Chinese often build land. A challenge to overcome will be to ensure that enough Pointe-au-Chien Tribal members understand the aspects of living shorelines that differ from other types of coastal protection or shoreline hardening projects. We would want to make sure to spend time to develop a shared vocabulary and agreement of what we mean when using technical words. Also, as part of the design process, it will be important to share technical details with the Tribe, to ensure that folks have a sense of the range of possible options between different types of living shoreline projects.

Example quotes:
• Facilitator: And so, the Oyster Shell Project is an example of what some people call a living shoreline. Have y'all heard of that term before? So, it's sort of like when... So, it's a stabilized part of the coastal edge and it's making a natural environment. A community of rocks, or sand, or plants.
• Tribal member: They can do like the Chinese. Bring in a boat, maybe a ship, put big bags in it and start setting from the bottom and rebuilding like that.

3. Navigate permitting and legal requirements for NBS/living shorelines that are place-specific and relevant to SE Louisiana.

Finally, a key challenge will be navigating the myriad regulatory and legal requirements related to permitting and siting a project. An important first step of the project will be to identify the barriers that exist to actual implementation of such a project. In the external stakeholder group, several individuals described other examples of NBS projects that are bogged down in permitting, or that have been removed/ripped out after a certain timeframe because of liability issues. One external partner discussed how it may actually be easier to work with a single, large oil company as compared to several smaller individual landowners. A large company will be able to see the overall benefits of building and protecting land and will see a “free” project as a bonus, whereas individual smaller landowners may perceive it as an opportunity to make money or leverage control over the project design or outcomes. However, one individual did stress that he believed most landowners in this area of Terrebonne Parish are receptive and supportive of these types of projects.

Example quotes:

• External partner: We're currently working on a project with partners across the five Gulf states and it's specific to installation of living shorelines for private property owners…the first part is barriers, identifying the barriers to the permitting process. That's the phase that they're in right now. Then there's going to be a series of workshops in each of the five states later this year for homeowners and property owners to get better educated about the process and how it works and how they can apply for a permit for a living shoreline for their property.

• Facilitator: We've seen these projects have actually been physically ripped out because of this issue of liability. Is that something that you guys have come across? Liability, not just during the construction, but through the life of the project? Which in a living shoreline, the idea is for them to grow and get bigger and better and all of that. External partner: We have some concern about that and we've been looking to conservation easements, which would actually prevent any further tampering with that property forever.

• External partner: I mean ConocoPhillips, all things considered has been pretty receptive, but they only granted us temporary access for 30 days. Now when we want to go back to finish off the project, we need to apply again. And then also if we want to do monitoring, I think technically we'd have to ask them about that as well.

• External partner: My organization has [gone] to the Tribe to ask where and what type of projects are needed and then we can help actually provide the materials and conduct the permitting, which is a big chunk of time that it can be really hard to find time to do that thing.

SME site visit with the PACIT (1/23/2023)

The SME field-site visit brought together PACIT community members, SMEs, and project team members at the community and surrounding areas to investigate potential living shoreline sites and opportunity for the SMEs to gain an ‘on the ground’ perspective of the issues, needs, and community-based priorities related to NBS. This visit helped elicit ideas and inform discussion that followed in the external partner focus group meeting, as well as an activity that helped promote shared knowledge and understanding among project participants to better facilitate cooperation in developing the Phase II proposal.

The Tribe also scheduled to host a small group of representatives from faith-based organizations the day of the SME site visit so that participants could gain perspective on how they may be able to leverage related activities to assist with community-based resilience efforts. The PACIT guides took the site visit participants on a boat tour to survey the landscape and view and learn about previous and ongoing shoreline protection and other restoration projects (about 15 people total). This was a good opportunity for the project team and SMEs to learn of other related resilience efforts and external partners the Tribe is involved with.

We met at the PACIT Tribal building that morning for introductions and overview. Afterwards, the PACIT took participants on a guided boat tour down Bayou Pointe-au-Chien and surrounding areas before returning to the

Tribal building for lunch with other Tribe members. After lunch, we met in the building to debrief from the tour and further discuss the Tribe's priorities for protection and enhancing their resilience to coastal hazards. The SMEs took this opportunity to share the living shoreline tool they developed and how it has been used in other areas with the Tribe and project team. This exercise was helpful in eliciting informed feedback among the participants on ways that the tool may be adapted for applicability in Pointe-au-Chien.

Phase II Design Project Proposal

The emergent themes from analyses of focus group data and the perspectives and information gained from the SME field site visit and other Phase I project activities directly informed the project goal, objectives, and related tasks in our Phase II Design proposal. The project goal, objectives, and tasks with related Phase I activities are listed as follows:

Phase II Design project goal - Design a Living Shorelines Network to mitigate the impacts of coastal erosion, flooding, and storm surge on the PACIT community and its traditional lands.

To pursue the project goal, we will engage in a design process consisting of three objectives:
1. Identify suitable living shoreline types and strategic locations that will protect the PACIT community from increasingly frequent and severe climate-related hazards of coastal erosion, flooding, and storm surge.
2. Engage Tribal partners and SMEs in an iterative, participatory process that informs the identification of living shoreline site suitability and design of the Living Shorelines Network by drawing on Tribal member TEK and priorities, partner expertise, and co-benefits to ecosystem services, human health, community capacity, and other related projects.
3. Produce an analysis of relevant legal and regulatory requirements and measures of success that will support the design and implementation of the Living Shorelines Network and similar NBS projects in coastal communities across the region.

Tasks supporting Objective 1: Identify suitable living shoreline types and locations that will protect the PACIT community from the increasingly frequent and severe climate-related hazards of coastal erosion, flooding, and storm surge.

During the Phase I planning process, the project team conducted a field-site visit to bring PACIT members, SMEs, and external partners to see and learn about existing and potential living shoreline sites and gain an 'on the ground' perspective of the needs and priorities of the community related to NBS. This field-site visit elicited ideas from SMEs, such as the need for LiDAR and drone imagery datasets for use in the LSSM. The site visit also informed discussion in the subsequent external partner focus group meeting and promoted a shared

understanding among project participants of the current conditions in the PACIT community.

Tasks supporting Objective 2: Engage Tribal partners and SMEs in an iterative, participatory process that informs the identification of living shoreline site suitability and design of the Living Shorelines Network by drawing on Tribal member TEK and priorities, external partner expertise, and co-benefits to ecosystem services, human health, community capacity and other related projects.

During the Phase I planning process, the project team conducted two focus groups with Tribal members and one focus group with external partners and stakeholders with relevant climate-hazard and NBS expertise. Tribal focus groups captured perspectives on the ongoing efforts of the PACIT to rebuild and recover from Hurricane Ida, experience and familiarity with the existing Cultural Heritage Protection Reef, familiarity with NBS broadly and in other locations in Louisiana, perceived barriers to implementation, and perspectives on design and siting of potential NBS projects.

Through thematic analysis of the Phase I focus groups, we identified several opportunities that will guide ongoing engagement activities with the PACIT community, external partners, and SMEs during the Phase II design project. First, the focus groups identified extensive Tribal member TEK and experiences related to areas that most often flood and are eroding rapidly in the community. Thus, in the tasks described in support of this objective, we will aim to leverage PACIT members TEK and priorities to inform both the initial LSSM analysis and the full design of the Living Shorelines Network. We also uncovered broad support for NBS projects among PACIT members, including support for the idea of expanding the existing Cultural Heritage Protection Reef. Ongoing engagement will continue to advance support for living shorelines, by conducting community-wide, inclusive, interactive learning opportunities where PACIT can learn from NBS SMEs. Lastly, Tribal focus groups' analyses found that many members felt disempowered and unable to take effective action either at the individual- or community-level to reduce the harms created by land loss and flooding. To address this, we will aim to build capacity and expertise among Tribal members on NBS topics, which may increase a sense of efficacy and empowerment within the Tribe, supporting future efforts to install or gain funding for NBS projects.

In all three Phase I focus groups, Tribal members and external partners commented on frustrations with government institutions (local, state, and federal) and private companies that have a lot of power, usually landowners like oil companies. Concerns related to a) the long time frame for completing coastal restoration/protection projects, placement/location of projects, and sense that the construction is not done well. From the Tribal perspective, this points to the legacy of infrastructure project design and implementation going forward without Tribal consultation and engagement. Therefore, a challenge for this project will be to overcome those feelings of reticence and mistrust enough to effectively engage with community members on the design and siting of living shorelines in and around the PACIT community.

Additionally in the Phase I focus groups, there was some misunderstanding of, and unfamiliarity with, nature-based solutions projects. One Tribal member wondered aloud if there were opportunities to make money personally from a project. Although partially expressed in jest, the comment revealed a partial understanding of the purpose of Cultural Heritage Protection reef already implemented. Thus, through Task 1 (kick-off event) and Task 2 (participatory mapping) it will be essential to provide information to Tribal members on the ways that living shorelines differ from other types of coastal protection or shoreline hardening projects. It will be critical to develop a shared vocabulary and agreement on the goal of the project design.

Tasks supporting Objective 3: Provide an analysis of relevant legal and regulatory requirements and measures of success supporting the design and implementation of the Living Shorelines Network, and similar NBS projects in Gulf Coast communities.

During the Phase I planning process, Louisiana Sea Grant began identifying sources and available templates for living shoreline designs from across the region necessary to create a living shoreline permitting guide as well as associated outreach materials.

Key to developing a successful design in Phase II that can be implemented given the permitting and other regulatory requirements was to identify the Coalition to Restore Louisiana (CRCL) as a key partner with subject matter expertise navigating these issues successfully in implementing the Pointe-au-Chien Community Reef project to protect a mound. During Phase I, members of the Tribe's leadership committee connected Dr. Bethel with Darrah Bach at CRCL with the expressed intent that we work together moving forward in Phase II. They indicated that Ms. Bach is a trusted partner with relevant experience and contacts in implementing the project to protect the mound, and that we should leverage our efforts to expand on that project.

Project Outcomes and Success

Our project team was successful in involving PACIT leadership and staff in all aspects of the collaborative process developed to achieve the goal and objectives of the Phase I Planning award. This process included active community involvement, collaboration, and meaningful input in facilitating better understanding of traditional ecological knowledge and community-based priorities related to climate adaptation and resilience. Through this project we connected the Tribe and its external partners with SMEs to better understand projected ecosystem impacts through science-based modeling and the changing exposures to climate-related coastal hazards while developing a strategy for the design and investment in NBS in a way that also honors the cultural heritage and priorities of the PACIT community. Together, we articulated that strategy into a Phase II Design proposal that was

successfully submitted to this opportunity.

While advancing the locally driven vision for a more resilient community and the Tribe's recovery efforts from Hurricane Ida, the Phase II proposal developed as a project outcome leverages other local and state initiatives which aim to build resilience across the coast through increased partnerships between state agencies and advance a holistic vision of resilience through adaptation actions. Therefore, this project may serve as a model for Louisiana state agencies to replicate in other coastal communities that may be well-suited and in need of similar living shoreline protection and restoration measures. Importantly, the PACIT considers this project as a great opportunity to invest in a traditional community and create a model for resilient coastal living that can inform climate adaptation efforts in other coastal communities most at-risk.

See letters of support included for the Phase II Design proposal from the PACIT, Terrebonne Parish Government, and the Jean Charles Choctaw Nation that corroborates this assessment of project success in meeting our goal and objectives.

Optional File Upload

ALL SUPPORT LETTERS.pdf

Filename: ALL SUPPORT LETTERS.pdf **Size:** 865.0 kB

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

This project has resulted in expanded collaboration among the PACIT's external partners – such as Louisiana Sea Grant and CRCL on related efforts. Better coordination among its partners on projects helps in addressing the limited capacity the community has in engaging outside experts in pursuing the Tribe's climate adaptation and resilience goals. Additionally, this project has connected the Tribe with SMEs (Troy University researchers) not known to them before to help achieve the community's goals, while at the same time providing the SMEs an opportunity to further refine their NBS decision support tools to be appropriate for application in Coastal Louisiana and inclusion of TEK and community-based priorities.

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

The community engagement activities planned to expand knowledge of NBS and inform the living shorelines network design will utilize inclusive and equitable processes that have shown to increase a sense of agency and empowerment among participants which would be a crucial human health/sociological co-benefit to this work that would have an impact psychologically and socially as an avenue to regain and reclaim agency and control in the face of loss and ongoing environmental change. Framed within the context of the rapid changes Tribe members have experienced, the research team will offer meaningful engagement opportunities to access and include their priorities and TEK into the modeling and design efforts. Having a sense of agency to create change may initiate a wider, more active investment among Tribe members and support for similar resilience efforts in the future.

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?*

Many decision-makers, communities, and experts lack awareness of NBS and the ways they can help address climate-related challenges. As a result, these mitigation options are often overlooked. Some people are unsure of where to apply living shorelines, and how to measure and account for their benefits. Relevant forms of knowledge, including local knowledge and TEK, often are not considered in design processes and evaluations, leading to missed opportunities for local community buy-in to projects and less robust solutions. Current policies and regulations create unintended hurdles for using these options. However, involving community members at each step, affirming the power of their place-based, multi-generational planning methods, and engaging with them towards long-term working relationships around local issues are important pillars of the collaborative that can be adopted, adapted, and applied by researchers working with other communities on related issues to help overcome these challenges.

It was eye-opening for me to learn more about the permitting processes and experiences of our SMEs and external partners in navigating these processes when designing and implementing NBS projects. Permitting living shorelines under state and federal laws is often far more cumbersome than permitting traditional hard structures for erosion control like breakwaters and bulkheads. Various factors contribute to this including existing clear permitting guidelines for traditional hard structures and familiarity with those design types. To ease the permitting burden, this Phase II project will build upon existing work by Louisiana Sea Grant to create a living shoreline permitting guide as well as associated outreach materials funded by the Gulf of Mexico Alliance. Specifically, the project will include the development of specific engineered living shoreline designs that can be used in the Louisiana permitting process as required attachments to permitting applications (designs specific to Louisiana permit conditions). These templates will provide a range of examples of living shoreline designs that potential applicants throughout Louisiana can use in their permitting applications, something that is currently lacking in Louisiana.

Land ownership in Lower Terrebonne/Lafourche parishes, especially in remote wetland areas, is often fraught with conflict and therefore access permissions require special attention and careful navigating. A history of conflict between Indigenous peoples, colonizers, and later the oil and gas industry has created a complicated dynamic. Much of the wetlands that protect the Pointe-au-Chien community have been divided into a puzzle of different landowners all of whom must give permission for a given project. Restoration project managers must take care to work with Indigenous landowners who may be hesitant to sign off on projects because they have watched their land be cut up and compromised by development.

Much of the wetlands surrounding the Pointe-au-Chien community are owned by various oil and gas corporations who require project details and at least 6 months to issue land access permissions. It is recommended that restoration project managers request a meeting with said landowners well in advance of requesting land access

permissions.

A minimum permit application process of 6-8 months prior to project implementation date is recommended as permits are tailored to the unique specifications of each project. Louisiana does not have a specific permit process for restoration projects, rather they must fit within existing permit processes. This may result in unexpected steps before receiving permissions.

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

I appreciate the support provided by the GRP to be able to conduct this project, and my program officer was very helpful and prompt in answering questions and providing guidance on expectations for project reporting and deliverables.

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

I have none at this time.

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 Tribe has partnered with Louisiana Sea Grant and received funding for several resilience-based projects from NOAA's Gulf of Mexico Regional Collaboration Team and the Gulf of Mexico Alliance. Collaborators on these projects were identified and recruited as external partners included in Phase I Planning project engagement activities. The Tribe and Louisiana Sea Grant are also funded by the U.S. Environmental Protection Agency (EPA) to co-develop a Tribal Coastal Resilience Index (T-CRI), a workshop-based tool that allows communities to self-assess resilience needs and strengths, such as critical infrastructure and community plans and agreements. The development of the T-CRI is currently underway and will culminate in a facilitated workshop with the Tribe and invited local decision-makers in the fall of 2023. When complete, the PACIT and other Tribal communities will be able to use the T-CRI with localized applications of NOAA data, products, and tools to provide information about how to increase their resilience. The original intent was to leverage the T-CRI workshop to inform Phase I project results, but we were unable to align the timelines of the two projects to facilitate the opportunity. However, we were able to structure the focus group meetings in such a way that informed the T-CRI workshop development as well as the Phase I Planning project objectives – therefore leveraging the two projects. In addition, we can now add a focus on NBS to the T-CRI based on the information obtained in the focus group meetings and SME field site visit.

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May 10, 2023,

Gabriela Lingren
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Washington, DC 20001

Dear Ms. Lingren:

Re: Letter of support for Phase 2: Project Design Grant proposal titled "A living shoreline design approach that supports the Pointe-au-Chien Indian Tribe's climate change adaptation efforts"

The Jean Charles Choctaw Nation supports the Pointe Au Chien Indian Tribe (PACIT) in Nature Based Solutions (NBS) projects. We have experienced firsthand the benefits of nature-based solutions that aid coastal communities adapting to changing environments related to manmade and natural occurrences. We believe in helping vulnerable communities cultivate resilient and sustainable solutions to the ever-changing environment on the coast of Louisiana and beyond. Sustainable coastal living is at the core of preserving coastal communities and the unique cultures represented in those places around the world.

We are pleased to see the PACIT working with external partners and subject matter experts on this effort to leverage the climate hazard-reducing potential of living shorelines in a way that also honors the cultural heritage and priorities of the PACIT community, and through this process inform the design and implementation of these measures in other coastal communities most at-risk like our own. Our people are intricately tied to their ancestral lands and waters in Coastal Louisiana, and thus our Tribe is very engaged in efforts to mitigate risk from coastal hazards such as storm surge and land loss. Comprehensive and effective hazard resilience and mitigation planning is best achieved when informed with local and traditional ecological knowledge that can only be attained through active community involvement, collaboration, and meaningful input in such efforts – which are key aspects of this proposed work.

The Jean Charles Choctaw Nation is happy to share our perspective and feedback on the NBS design approach with the project team to help provide a better understanding of how the outputs and outcomes of this project could be useful to other communities. If you need any further information regarding our support, please feel free to contact our Tribal Office.

Sincerely,
Deme M. Naquin Jr.

Chief Deme "JR" Naquin

TERREBONNE PARISH
CONSOLIDATED GOVERNMENT
P.O. BOX 2768 • HOUMA, LOUISIANA 70361
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Department of Planning & Zoning

May 18, 2023

Ms. Gabriela Lingren
Associate Program Officer, Gulf Health and Resilience
Gulf Research Program
The National Academies of Sciences, Engineering, and Medicine
500 Fifth Street, NW
Washington, DC 20001

Re: Engaging Communities to Design Nature-Based Solutions to Mitigate Climate-Related Hazards Phase II Project Design Proposal Letter of Support

Dear Ms. Lingren:

Please accept this letter of support for the Phase II Project Design proposal titled "*A living shoreline design approach supporting the Pointe-au-Chien Indian Tribe's climate adaptation efforts*" that aims to address identified resilience-based priorities for the Pointe-au-Chien community. Terrebonne Parish is situated on Louisiana's coast where sea level rise and subsidence are contributing to land loss, habitat change, and increasing levels of community risk from hurricanes and other flood events like those from intense rainfall. This area has experienced multiple, successive natural disasters in the form of hurricanes and other extreme weather, increasing threats to personal safety and health, homes, livelihoods, and way of life. Among the many impacts of Hurricane Ida in 2021, coastal communities in Terrebonne Parish lost access to many essential services, such as drinking water and power, for an entire month. This area is of particular significance as it is home to communities choosing to adapt in place to coastal hazards, such as the Pointe-au-Chien Indian Tribe, a tribe recognized by the State of Louisiana since 2004. In addition to being treasured ancestral lands, the bayous and working coasts of Terrebonne Parish provide for 20% of Louisiana's seafood production. Commercial fishers, who depend on the coast for their livelihoods and have most of their financial resources invested in their boats and equipment, are at particular risk from changing climate and extreme weather.

Having a vetted design for a living shorelines network would provide the framework for needed protection from storms and flooding for one of our most vulnerable communities and would help create multiple community benefits that will increase the overall resilience of the Parish. The planning process that led to this Phase II Project Design proposal not only considered adaptations to current and future environmental risk, but also included extensive community engagement and involvement. While advancing the locally driven vision for a more resilient community and the Tribe's recovery efforts from Hurricane Ida, this project also supports the work of the Adaptive Governance Initiative, which aims to build resilience across the coast through increased partnerships between state agencies and advance a holistic vision of resilience through adaptation actions. Therefore, this project may serve as a model for

Louisiana state agencies to replicate in other coastal communities that may be well-suited and in need of similar living shoreline protection and restoration measures.

Our offices will help advise the research team in developing a design and investment in living shorelines for the Pointe-au-Chien area that will have potential to mitigate future storm impacts, erosion, and flooding for the community. We will provide input as needed related to permitting, relevant regulatory requirements, and how to best leverage other efforts and projects in the Parish that may complement this project.

Please feel free to contact me at (985) 873-6569 if you have any questions. We look forward to working with the research team and the Tribe on this project.

Best Regards,

Christopher M. Pulaski, PLA
Director, Planning & Zoning Department

Cc: Hon. Gordon E. Dove, Parish President
Mike Toups, Parish Manager
Mart Black, Director of Coastal Restoration & Preservation Dept
Jennifer Gerbasi, Recovery Planner
Council Reading File

POINTE-AU-CHIEN INDIAN TRIBE
Chairman Charles "Chuckie" Verdin
Second Chairman Donald Dardar
PO Box 416
Montegut, LA 70377
(985) 466-3129

18 May 2023

Gabriela Lingren
Associate Program Officer, Gulf Health and Resilience
Gulf Research Program
The National Academies of Sciences, Engineering, and Medicine
500 Fifth Street, NW
Washington, DC 20001

Re: Phase II Nature Based Solutions Proposal

Dear Ms. Lingren:

On behalf of the Pointe-au-Chien Indian Tribe, we express our support for, and intent to collaborate on, the research proposal submitted to The National Academies of Sciences Engineering & Medicine Gulf Research Program's Engaging Communities to Design Nature-Based Solutions to Mitigate Climate-Related Hazards Phase II Project Design opportunity titled "*A living shoreline design approach supporting the Pointe-au-Chien Indian Tribe's climate adaptation efforts*."

We are committed to promoting community and economic development efforts related to restoration and protection of our coastal homelands, and to create a sense of environmental stewardship for the natural resources of the local area. Our people are intricately tied to their surrounding ecosystem, and thus are very engaged in issues such as projected sea level rise, habitat restoration, water quality, and economic development to mitigate risk from climate hazards, as well as to effect change and understanding of this dynamic place and our interrelated cultural identity.

The Pointe-au-Chien Indian Tribe is a state-recognized tribe located along Bayou Pointe-au-Chien in the southern part of Terrebonne and Lafourche Parishes. We have lived in the Terrebonne Basin since time immemorial. We have always stewarded the land along bayou Pointe-au-Chien and within our Tribal territory. Historically, the Tribe benefitted from the abundance of the rich and fertile land that the Terrebonne Basin offered. The Mississippi river carried topsoil to our lands, replenishing it, and barrier islands protected us from flood waters. Tribal members were fishermen, hunters, and farmers. We have lived a subsistence lifestyle along with our land, and never at the expense of it.

After the leveeing of the Mississippi River and damming of Lafourche des Chitimachas (Bayou Lafourche) in 1904, and since oil and gas were discovered in the Tribal territory in the 1930s, the Tribal community has suffered from coastal erosion, land loss, increased salinization, hurricane winds, flooding, subsidence and sea level rise. The Pointe-au-Chien territory includes diverse resources, including birds, plants, animals, fish, cemeteries, sacred sites, and village sites. While the Tribal community continues to be a fishing community, environmental problems threaten the continued existence of the community. As a frontline community located in the fastest eroding basin in the United States, the Terrebonne Basin serves as the last line of defense for coastal Louisiana.

The Tribe and its members have been forced to adapt to the changing conditions while continuing to advocate for restoration of our land, so that we can continue our lifeways and culture. The cultural heritage and lifeways of the Pointe-au-Chien people are threatened by the changing environment.

On August 29, 2021, Hurricane Ida passed directly over our historic community leaving 90% of the village's buildings uninhabitable and the majority destroyed. Since then, the Tribe has supported the development of the PAC Rebuilding Resiliency Plan that not only focuses on building resilient and sustainable homes that will withstand the changing climate but will include adaptation measures to support long-term restoration and protection for the surrounding territory that is so critical to the community's sustainability in this place. This proposal aims to aid the redevelopment of our community in a sustainable manner that honors our cultural heritage and supports self-determination and self-sufficiency, while creating a workable model that can be replicated in other coastal communities.

Priorities identified in the Plan relevant to this project proposal include:

- Investment in mitigation measures to slow down flooding and storm surge and winds. This could be done through additional oyster stabilization projects to protect additional mounds.
- Implementation of restoration projects using the traditional ecological knowledge of Tribe members.
- Implementation strategies that will stop the erosion of the current community, sacred sites, and fishing areas.

We are excited about the opportunity to work on a project that will invest in our community for future generations. Our Tribe's leadership and staff have been involved in all aspects of the collaboration with Dr. Bethel and the research team during the Phase I: Planning stage of this effort and we look forward to building on the relationships and momentum established during that time to developing a Project Design with this team in the Phase II opportunity. We see this project as a great opportunity to invest in a traditional community and create a model for resilient coastal living that can inform climate adaptation efforts across the region.

We intend to work with Dr. Bethel and the research team in Phase II to develop a design and investment in living shorelines for the Pointe-au-Chien area that will have potential to mitigate future storm impacts, erosion, and flooding for our community. We will collaborate with the investigators in the identification and solution of Tribal concerns, and fully facilitate the inclusion of Tribal views into the design process. These efforts will include facilitating connections with our Tribe members for associated focus group and workshop input, as well as any field data collection and site investigation needed on the project.

We ask that you and your review team give this critically important project proposal your full consideration during the review process.

Sincerely,

Chuckie Verdin

Chairman Charles "Chuckie" Verdin

(985) 856-5336

Donald Dardar

Second Chairman Donald Dardar

(985) 852-0659