RESTORE Council Proposal Document

General Information

Proposal Sponsor: Alabama Department of Conservation and Natural Resources (ADCNR)

Title:
Perdido Watershed Water Quality Improvements and Restoration Assessment Program

Project Abstract:
Alabama, through the Alabama Department of Conservation and Natural Resources (ADCNR), is requesting $1.5M in Council-Selected Restoration Component funding for the proposed Perdido Watershed Water Quality Improvements and Restoration Assessment Program. This would include planning funds as FPL Category 1. The program will support the primary RESTORE Comprehensive Plan goal to restore water quality and quantity through activities to coordinate the location and sequencing of selected restoration projects in the Perdido Watershed that could be expected to improve water quality and habitat, as well as restoration assessment program to monitor the potential collective impacts to water quality of the co-located projects and other restoration projects within the watershed.

Located in Southern Alabama and Northwest Florida, the Perdido Watershed covers approximately 1,100 square miles and is dominated by the 63 mile-long Perdido River. This watershed plays a critical role in the health of the ecosystem of Southeast Alabama and Northwest Florida. The components of the watershed, including the tributaries, floodplains, bayous, and wetlands of the Perdido provide water quality and quantity protection through healthy floodplains, which store and disperse runoff from storms and recharge aquifers. In addition to the anticipated benefits of improved water quality and habitats, this program could also serve as a model for future restoration assessment efforts on the Gulf Coast. Program duration is 3 years.

FPL Category: Cat1: Planning Only

Activity Type: Program

Program: Perdido Watershed Water Quality Improvements and Restoration Assessment Program

Co-sponsoring Agency(ies): N/A

Is this a construction project?:
No

RESTORE Act Priority Criteria:
(I) Projects that are projected to make the greatest contribution to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region, without regard to geographic location within the Gulf Coast region.

Priority Criteria Justification:
#1 Projects that are projected to make the greatest contribution. This program proposes to coordinate and subsequently assess the potential cumulative benefits of restoration activities in a chosen watershed/subwatershed in order to maximize water quality benefits in a way that is potentially measurable outside of an individual project footprint. Habitat loss as well as potential

changes in water quality are two stressors associated with changes in land use as watersheds like the Perdido develop into more urbanized areas. Projects that address existing and potential water quality impacts would provide significant benefits, especially when considered in the context of the size of the watershed.

Project Duration (in years): 3

Goals

Primary Comprehensive Plan Goal:
Restore Water Quality and Quantity

Primary Comprehensive Plan Objective:
Restore, Improve, and Protect Water Resources

Secondary Comprehensive Plan Objectives:
Improve Science-Based Decision Making Process

Secondary Comprehensive Plan Goals:
N/A

PF Restoration Technique(s):
Improve science-based decision-making processes: Comprehensive planning
Reduce excess nutrients and other pollutants to watersheds: Agriculture and forest management
Reduce excess nutrients and other pollutants to watersheds: Stormwater management
Reduce excess nutrients and other pollutants to watersheds: Wastewater system improvements

Location

Location:
Proposed activities would be located within the Perdido Watershed near the Perdido River in Baldwin County, Alabama, and potentially Escambia County, FL.

HUC8 Watershed(s):
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Florida Panhandle Coastal(Perdido)

State(s):
Alabama
Florida

County/Parish(es):
AL - Baldwin
FL - Escambia

Congressional District(s):
AL - 1
FL - 2

Narratives

Introduction and Overview:

Located in Southern Alabama (70 percent of the watershed) and Northwest Florida (30 percent of the watershed), the Perdido Watershed covers approximately 1,100 square miles and is dominated by the 63 mile-long Perdido River, which provides most of Perdido Bay's freshwater (NWFWMD 2017b). The watershed includes floodplain forests, hydric pine forests, longleaf pine forests, and freshwater wetlands. The major land uses for the Perdido Watershed are diverse, with evergreen and deciduous forests making up most of the central and Upper Perdido, crop lands dominating in the southwest and northern portions, and developed land centered primarily in the southeast. The Alabama portion of the Perdido consists of forested uplands (59.9%), agricultural lands (25.1%), wetlands and open water (8.8%), other (6.2%), with Perdido Bay land use consisting of 27.3% forested uplands, 30.6% agricultural lands, 33.2% wetlands and open waters, with 8.9% other (including urbanized, transitional and barren uplands) (ADCNR 2016).

Driven by the diversity of habitats present in the watershed, including riparian and freshwater wetland habitats, estuarine habitats and marine/coastal habitats the Perdido is home to thirty threatened, endangered and/or protected plant species including the White-top pitcher plants (Sarracenia leucophylla) and a number of animals including the Perdido Key Beach Mouse (Peromyscus polionotus trissyllepsis) the Reticulated Flatwoods Salamander (Ambystoma bishop) and the West Indian Manatee (Trichechus manatus latirostris) (NWFWMD 2017).

Proposed activities: This proposal contemplates a multi-member program to coordinate the location and sequencing of all or a subset of individual member projects (and other restoration projects) in the Perdido Watershed that could be expected to improve water quality and habitats. It also proposes a restoration assessment program to monitor the potential collective impacts to water quality and habitats of the co-located projects, and/or other funded restoration projects in the watershed.

Proposed activities include:

1. Identification of one or more subwatersheds in the Perdido area to support coordination of restoration actions in the watershed as well as the development of watershed scale indicators to track restoration progress. This work will be coordinated by ADCNR and will be open to participation from other Council members and potentially to select stakeholders in the watershed. Given the relatively small scale of the watershed, the entire Perdido watershed may be selected in lieu of one or more subwatersheds.
2. Identification of individual member projects within the subwatershed, that have been or will be implemented in the Perdido watershed, with an emphasis on the selected subwatershed(s). Project type include but are not limited to: agriculture and silviculture BMPs, riparian buffer restoration, habitat acquisition and enhancement, wastewater and stormwater improvements, living shorelines, etc. Projects funded by other restoration funding sources will also be identified and utilized in the development of the restoration progress tracker, discussed in Item 3.
3. Development of a restoration assessment/restoration progress tracker to better understand the potentially collective impacts of restoration projects in the watershed/subwatershed. Outputs potentially include the development of one or more conceptual models, short-term and long-term indicators and a restoration progress tracker/monitoring framework.

There are five goals within the RESTORE Councils comprehensive plan. This Program addresses one of those goals, Goal #2: Restore Water Quality and Quantity. The Program ties in with RESTORE Councils primary objective of Restore, Improve, and Protect Water Resources as well as Science to Support Decision-making. This goal is applicable to the proposed activities because a number of the

projects being implemented or proposed for implementation in the watershed are expected to provide water quality benefits. This program will support the identification of benefits at a scale larger than the individual project level. The Perdido watershed was identified as a priority geographic area in the Council Planning Framework and supports the Restoration Approach to Reduce excess nutrients and other pollutants to watersheds

Under the 2016 Comprehensive Plan update the Council advanced the following commitments:

- Regional ecosystem-based approach to restoration: Through extensive collaboration engagement opportunities as a result of the CPS support funds, it is clear that water quality is a priority goal for the Restore Council members from Florida to Texas. Addressing water quality degradation and impairment is a foundational component of restoring/enhancing a host of living and coastal marine resources.
- Leveraging resources and partnerships: FPL3a included a project to purchase and conduct habitat restoration on 10000-12,000 acres in the watershed. That project serves as an anchor for a watershed-scale effort to conduct water quality and habitat improvements in the Perdido Watershed. Finally, Alabama is proposing a water quality improvements program via another proposal, and one or more projects could be selected via that program, if funded, in the Perdido Watershed.
- Engagement, Inclusion, and Transparency: Since 2010, ADCNR and the State of Alabama have provided multiple opportunities for the public to identify restoration funding priorities. Water quality improvement and science-based decision-making have been consistent themes of public input. Within the MBNEP stakeholder engagement efforts for the CCMP development, water quality, its assessment and improvement, are identified as a priority restoration activity.
- Science-based decision-making: The proposed activities will provide a science-based framework to evaluate the impacts of projects outside of their implementation footprint.
- Delivering results and measuring impacts: Monitoring the pervasive water quality degradation and the indirect impacts on living coastal and marine resources is challenging. This project would develop a framework to assess progress towards restoration goals at the subwatershed or watershed level.

<u>Environmental Stressors</u>:
Because of its relatively small size, the Perdido Watershed can experience rapid changes in water quality due to wind, tides and rainfall. Dominating influences in the watershed include human use, silviculture, agriculture and the Intercoastal Waterway, which was constructed in the early 1900s. Stressors in the watershed include water quality issues emanating from nonpoint source pollution, including the use of onsite septic systems and runoff associated with agriculture and silviculture activities (NWFWMD 2017). Land use conversion and urbanization have contributed to the loss of habitats, including 80% of historic sea grass habitats (Kirschenfeld et al. 2007) , and have impaired water quality of several waterbodies. Low Dissolved Oxygen, turbidity and bacteria are a few of the impairments in the watershed. Dissolved oxygen levels vary seasonally and also change rapidly as a result of tidal and wind influence (Xia et. al., 2011).

Projected increases in population predict a near doubling of urban areas within the Wolf Bay portion of the Perdido Watershed (Wand and Kalin 2018) and a 10% growth by 2030 estimate for the Florida areas of the watershed (NWFWMD 2017), which will further exacerbate these environmental challenges. Balancing continued coastal development with the need to restore and enhance coastal ecosystem is a complex challenge (Thom et. al., 2005). In the absence of management, degradation associated with nonpoint source pollution and land use changes could threaten habitats and water quality as human populations increase. Climate change also threatens the health of the watershed, potentially impacting precipitation patterns, increasing flooding and inundation risks and impacting groundwater quality via saltwater intrusion (Pendleton et al., 2010).

Consideration of these trends and stressors is critical to the development of indicators that will be sufficiently robust to be detected amidst the "noise" of the system as a result of current environmental conditions. This will occur throughout the project, and specifically as an initial activity under task 3, as part of the restoration assessment development.

Environmental Benefits:
The Perdido Watershed plays a critical role in the health of the ecosystem of Southeast Alabama and Northwest Florida. The components of the watershed, including the tributaries, floodplains, bayous, and wetlands of the Perdido provide water quality and quantity protection through healthy floodplains; healthy floodplains store and disperse runoff from storms and recharge aquifers. Undeveloped areas act as natural filters, protecting water quality of coastal waters that sustain wildlife such as recreationally and commercially important fish and oyster resources. The wetlands of the Perdido Watershed and coastal barrier islands also provide resiliency and protection against climate risks, hurricanes, and other storm events (NWFWMD 2017b).

The Perdido Watershed is still relatively undeveloped—there is a significant opportunity to proactively manage urbanization in the watershed, potentially preserving water quality and proactively addressing anticipated future conditions. This watershed is an ideal location to conduct an assessment of restoration progress given the relatively small size of the watershed and the prevalent stressors. In addition to assessing progress within the Perdido watershed, this project could serve as a pilot/model for similar efforts in other watersheds.

Total Cost: $1,500,000

Timeline: 3 years

Partners: The program activities would be open to all interested RESTORE Council members.

Proposed Methods :

This proposal contemplates a multi-member program to support the coordination of restoration implementation in the Perdido watershed or subwatershed(s), and to develop a framework to assess restoration progress of projects collectively achieving habitat and water quality improvement goals.

Broadly, proposed activities include:

1. Identification of one or more subwatersheds in the Perdido area to support coordination of restoration actions in the watershed as well as the development of watershed scale indicators to track restoration progress. This work will be coordinated by ADCNR and will be open to participation from other Council members and potentially to select stakeholders in the watershed. If the project is approved for funding, ADCNR will reach out to potential stakeholders to form a project technical team. ADCNR will utilize the CMAP gap analysis results in the Perdido Watershed and other resources to identify areas likely to benefit from water quality and habitat restoration activities based on existing conditions and potential future trends (CMAP 2019). Given the relatively small scale of the watershed, the entire Perdido watershed may be selected in lieu of one or more subwatersheds.
2. Identification of individual member projects within the subwatershed, that have been or will be implemented in the Perdido watershed, with an emphasis on the selected subwatershed(s). Project type include but are not limited to: agriculture and silviculture BMPs, riparian buffer restoration, habitat acquisition and enhancement, wastewater and stormwater improvements, living shorelines, etc. Projects funded by other restoration funding sources will also be identified and utilized in the development of the restoration progress tracker, discussed in Item 3. Identification of

focal areas and current gaps are critical considerations when assessing restoration activities (Menz et. a., 2005). The results of these tasks will be used to inform future activities for the program, including the development of conceptual models and indicators, described below. This step-wise approach will increase the likelihood of identifying a program area where changes as a result of restoration efforts could be detected in the broader ecosystem, discussed more below in the risk section.

3. Development of a restoration assessment/restoration progress tracker to better understand the potentially collective impacts of restoration projects in the watershed/subwatershed. Outputs potentially include the development of one or more conceptual models, short-term and long-term indicators and a restoration progress tracker/monitoring framework. Flexibility to apply monitoring and adaptive management at different scales is a key element of a successful restoration assessment effort (McKay et. al., 2012). Potential approaches to a program or resource level monitoring could include the development of resource-specific and/or geographically-based conceptual models to facilitate the understanding of potential impacts of restoration projects relative to the "noise" of the system (e.g., pollution, climate change that could be impacting the ecosystem). The specific outputs will be refined based on the completion of Tasks 1 and 2. One primary goal of Task 3 will be to incorporate existing monitoring programs within the watershed (CMAP will be a primary source of information) and maximizing project level monitoring.

The specific details regarding the development of a restoration progress assessment/tracker will be determined based on the results of activities discussed in Items 1 and 2, above (e.g., an understanding of current data available and gaps will inform the selection of indicators and the level of resolution that can be achieved). Given that implementation of specific restoration activities are outside of the scope of this program, the methods discussion below will focus on the specific tasks that will take place as part of this program, namely the identification of projects within the watershed and the completion of a framework for the restoration progress tracker, and not on the methods utilized to implement specific restoration activities.

As restoration associated with DWH funds proceeds, it will become increasingly difficult to monitor the impacts of all projects for all species and all habitats where restoration is occurring. Additionally, ongoing changes in ecosystem form and function as a result of multiple stressors can make quantifying the impacts of restoration activities difficult. Tools such as conceptual models and ecosystem indicators can assist in the tracking of impacts while maximizing the use of available data. Restoration progress tracking is also important in telling the public story of how restoration is progressing and how projects being implemented are collectively benefiting the coastal ecosystem.

Understanding the ecosystem impacts of a single restoration project and developing an effective monitoring plan and adaptive management approach is a complex task (Ralph & Poole, 2003; Murphy & Weiland, 2014). Evaluating the potential impacts of a suite of restoration activities in a given geographic area (e.g., watershed) is even more difficult due to potential synergistic effects of projects as well as a project's relative impact in relation to the stressors acting upon it. Understanding these potential relationships and then adapting a restoration program in response to maximize benefits is more complex still (Diefenderfer et al., 2011).

As the scale for evaluating restoration progress expands beyond the individual footprint of a project, it is increasingly difficult to 'separate the restoration signal from the noise.' For example, year-to-year fluctuations in freshwater inputs have the potential to cause variability in oyster populations, which might mask underlying improvements in productivity resulting from oyster reef restoration.

As part of Task 3, ADCNR will identify potential major gaps in the availability of information to support watershed-level assessments for the types of projects being implemented. Under this task,

ADCNR may additionally identify priorities for filling critical information needs. Any gaps identified would articulate why such information is important to the design of ongoing restoration programs, how the information could be made available in a timely manner, and why collection of such information can be accomplished cost-effectively, all important considerations given the relatively limited funding for restoration and associated monitoring activities (Baldera et. al., 2018). ADCNR may also identify potential project-level metrics for monitoring to support consistency and facilitate the ability to aggregate and synthesize data across projects.

If restoration progress is to be successfully assessed, careful thought must be given to both the types of projects implemented, their potential co-benefits, and the selection of indicators/monitoring parameters that are capable of informing our understanding of progress beyond the project scale, taking into account the potential influence of other contributing or confounding factors that could be driving changes in the watershed (McKay et. al., 2012). These indicators must also be measurable in some way and detectable within a reasonable timeframe relevant to the work of restoration managers. There is a significant body of work that is available to help inform these considerations, including Zedler, 2016; Diefenderfer et. al., 2016; Simenstad et. al.,2006; Doren et. al., 2008.

Any indicators/metrics identified would be aligned with and inform potential metrics used for project-level monitoring but would focus on methods that go beyond simple additive approaches. Ideally, DWH restoration program impacts would be assessed at broad scales in coastal Alabama, with the potential to recognize cumulative and potential synergistic effects of restoration. But perhaps more realistically, given the magnitude and complexity of the underlying ecosystems and the scale of restoration funded with DWH funds, this evaluation may need to occur at scales somewhere between the project level and the full resource scale. Development of potential indicators/metrics could be framed in the context of conceptual models and take into account the specific types of restoration methods that have been or are likely to be adopted to address stressors in the Perdido Watershed.

ADCNR anticipates that the development of a conceptual model and identification and selection of indicators/metrics could involve the following types of considerations:

What might be considered reasonable definitions of 'progress' for specific restoration activities?
What is the broadest spatial (and/or shortest temporal?) scale at which we are likely to be able to discern the impacts of restoration efforts given the available funding and potential spatial and temporal distribution of projects for a restoration type? Is it the sub-watershed? Watershed? Areas of concentrated restoration activity?
At the relevant scale, what are the ideal indicators that would best allow monitoring the impacts of restoration within the selected geographic area?
Are indicator data of this type and of reasonable quality currently collected at the relevant scale, and if not, what are the closest currently collected data that might serve as potential surrogates?
How robust are the indicators with respect to other potentially contributing or confounding independent factors that affect restoration progress? Are other data available to simultaneously evaluate the potential impacts of the most important contributing or confounding factors?
If no data are currently available to support a needed resource-level indicator (or critical contributing or confounding factors), how significant an effort would be involved in collecting it?
Are there broader measures of coastal ecosystem health that are worth considering in addition to restoration-specific indicators?
How will the potential suite of indicators be refined and prioritized for the purposes of potential

future implementation?

Environmental Benefits:

The benefits of the project include not only the improvements to water quality that could result from individual project implementation, but the program could also provide a case study for how to assess restoration impacts at the program level while maximizing collaboration and cost efficiencies.

The Perdido Watershed plays a critical role in the health of the ecosystem of Southeast Alabama and Northwest Florida. The components of the watershed, including the tributaries, floodplains, bayous, and wetlands of the Perdido provide water quality and quantity protection through healthy floodplains; healthy floodplains store and disperse runoff from storms and recharge aquifers. Undeveloped areas act as natural filters, protecting water quality of coastal waters that sustain wildlife such as recreationally and commercially important fish and oyster resources. The wetlands of the Perdido Watershed and coastal barrier islands also provide resiliency and protection against climate risks, hurricanes, and other storm events (NWFWMD 2017b).

The Perdido Watershed is still relatively undeveloped—there is a significant opportunity to proactively manage urbanization in the watershed, potentially preserving water quality and proactively addressing anticipated future conditions. This watershed is an ideal location to conduct an assessment of restoration progress given the relatively small size of the watershed and the prevalent stressors. In addition to assessing progress within the Perdido watershed, this project could serve as a pilot/model for similar efforts in other watersheds.

Metrics:

Metric Title: PRM003 : Management or Governance Planning - # plans developed
Target: 1
Narrative: The number of plans completed whose findings are used to adapt management/ inform management or governance.

Metric Title: PRM009 : Research - # studies reported to mgmt.
Target: 2
Narrative: The number of studies completed whose findings are used to adapt management/ inform management decisions.

Risk and Uncertainties:

This is a planning project, so implementation risks are relatively low. Risks to the project include the inability to detect a change in ecosystem condition as a result of project implementation, or the inability to identify a suitable subwatershed for the program (Dorward-King et. al., 2005). Monitoring and adaptive management is challenging at the project scale, and becomes more challenging when attempting to assess the collective impacts of multiple, co-located projects because of the potential for synergies that can result in impacts greater than the additive effects of any one individual project (Bernhardt et. al., 2005; Diefenderfer et. al., 2009; Thom, 2000). Other risks associated with the difficulty of sequencing and implementing projects across multiple states and federal agencies can be mitigated by robust yet flexible planning on the front end to maximize the changes of targets being met (e.g., take into account specific types of projects that are our could be implemented when developing indicators, work to identify indicators that are readily measured and cost-effective). Risks can be mitigated by learning from program level assessment programs like those in the Everglades or Pacific Northwest (May and Horner 1999; Loschiavo, 2013). Additionally, the questions posed for consideration of the development of the conceptual model are designed to help mitigate the risks of being unable to detect a change in ecosystem condition as a result of

restoration efforts. Key to this consideration is this question: what is the broadest spatial (and/or shortest temporal) scale at which we are likely to be able to discern the impacts of restoration efforts given the available funding and potential spatial and temporal distribution of projects for a restoration type?

Monitoring and Adaptive Management:

As this is a planning project, no monitoring will be conducted. However, monitoring parameters for future implementation efforts could be identified. Project outcomes including conceptual model(s) and restoration tracker/framework will be tracked through the program's observational data plan and data management plan.

Data Management:

To the extent practicable, all data generated will be documented using standardized field datasheets. If standardized datasheets are unavailable or not readily amendable to record project-specific data, then project-specific datasheets will be drafted prior to conducting any project monitoring activities. Original hardcopy datasheets, notebooks, and photographs will be retained by the ADCNR. Relevant project data that are handwritten on hardcopy datasheets or notebooks will be transcribed (entered) into standard digital format. All data will have properly documented FGDC/ISO metadata, a data dictionary (defines codes and fields used in the dataset), and/or a Readme file as appropriate (e.g., how data was collected, QA/QC procedures, other information about data such as meaning, relationships to other data, origin, usage, and format – can reference different documents). Electronic data files will be named with the date on which the file was created and will include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy will be made and the original preserved. Data will be made publicly available and accessible on a website that is still to be determined.

Collaboration:

The basis of a successful program is the participation from multiple members who coordinate to select project locations within the watershed that provide the greatest opportunity for water quality benefits that can be measured outside of a project's footprint. This proposed program builds on Alabama's commitment to a programmatic approach to ecological restoration in the Perdido Watershed and leverages The Perdido River Land Conservation and Habitat Enhancements project in FPL3a.

Additionally, Alabama has proposed a Water Quality Improvements Program in the FPL3b proposal process to identify and construct water quality improvements across coastal Alabama. It is possible that one or more of the selected projects could be implemented in the Perdido Watershed and be included in this proposed restoration assessment.

Public Engagement, Outreach, and Education:

The State of Alabama's prioritization of the Project is based on multiple public and stakeholder engagement activities. Throughout Alabama's restoration public engagement and planning efforts, stakeholders have consistently identified the restoration and protection of coastal habitats as a top priority. The following are examples of public engagement, outreach and education activities which were considered in the selection of this proposal:

<u>Alabama Restoration Summit</u>: ADCNR hosted the Alabama Restoration Summit in 2018. The public was invited to learn about restoration projects and programs and to provide input on current and future priorities for restoration. Based on the public input received, investing in coastal habitat restoration and protection and science-based decision-making continues to be a top priority of stakeholders.

Alabama Watershed Management Plans (NFWF-GEBF; RESTORE): Starting in 2013, the Mobile Bay National Estuary Program (MBNEP) has published several coastal watershed management plans (WMPs) that provide guidance for restoration. These plans depend upon public involvement and "stakeholders" who know the area, recognize its problems, and are invested in its health and resilience. Each plan includes a watershed description that educates communities about the geography, geology, biology, ecology, and hydrology of the drainage area's land and water. Although stakeholder engagement and education strategies are unique across WMPs, all of the plans have included stakeholder community meeting to gather feedback from the public

RESTORE Act Alabama State Expenditure Plan: ADCNR has solicited stakeholder input to support planning and development of the Alabama State Expenditure Plan (MSEP). Engagement with a wide range of stakeholders, including private citizens, non-governmental organizations, business owners, elected officials, and other community leaders, has informed the priorities for restoration.

Leveraging:

Funds: $26,800,000.00
Type: Bldg on Others
Status: Committed
Source Type: Other
Description: The Perdido River Land Conservation and Habitat Enhancements project consists of the acquisition and management of approximately 10,000-12,000 acres in the Perdido Watershed, located in Baldwin County, AL. Upon acquisition, the Alabama Department of Conservation and Natural Resources (ADCNR) will conduct habitat management and stewardship on the tract, which could include prescribed burning, invasive species removal, longleaf pine restoration, and protection and habitat enhancements for species including the gopher tortoise.

Funds: $26,800,000.00
Type: Bldg on Others
Status: Committed
Source Type: Other
Description: The Perdido River Land Conservation and Habitat Enhancements project consists of the acquisition and management of approximately 10,000-12,000 acres in the Perdido Watershed, located in Baldwin County, AL. Upon acquisition, the Alabama Department of Conservation and Natural Resources (ADCNR) will conduct habitat management and stewardship on the tract, which could include prescribed burning, invasive species removal, longleaf pine restoration, and protection and habitat enhancements for species including the gopher tortoise.

Funds: $2,200,000.00
Type: Bldg on Others
Status: Committed
Source Type: Other
Description: Key project components: establishing the host organizations and hiring of key staff, determining stressors and then developing and approving a Comprehensive Plan. Specific actions: implementing BMPs for nonpoint source water quality improvement; protecting shoreline and upland habitat through easement or purchase; implementing green infrastructure measures; designing and constructing storm water parks; completing and implementing watershed management plans; protecting, restoring and managing critical aquatic, shoreline and upland habitat through a variety of hydrologic, landscape, vegetation

and wildlife management actions; establishing living shoreline habitat; and implementing other water quality and habitat restoration techniques.

Environmental Compliance:

Council approval of funding for this activity would not involve or lead directly to ground-disturbing activities that may have significant effects on the environment individually or cumulatively, nor does it commit the Council to a particular course of action affecting the environment. These planning activities would be expected to be covered by the Council's NEPA Categorical Exclusion for planning, research or design activities (Section 4 (d)(3) of the Council's NEPA Procedures).

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Budget

Project Budget Narrative:
A total of $1,500,000 is being requested from FPL 3a to fund planning, development of a restoration progress tracking framework and data management. This project is categorized as Category 1, Planning. Activities will include, but will not limited to: project management and administration, including administrative programmatic functions, coordination, and contractual support for project implementation; identification of study areas and potential projects for inclusion; coordination with project leaders and information gathering and development of one or more conceptual models and the development of short-term and long-term indicators and the elements of the restoration progress tracker/monitoring framework. Additional activities will include public outreach and engagement as well as the development of the final framework/restoration tracker report and evaluations and any related publications. An estimated 0.5% of this request is for data management. No funds are being requested for contingency or monitoring and adaptive management activities.

Total FPL 3 Project/Program Budget Request:
$ 1,500,000.00

Estimated Percent Monitoring and Adaptive Management: 0 %
Estimated Percent Planning: 100 %
Estimated Percent Implementation: 0 %
Estimated Percent Project Management: 0 %
Estimated Percent Data Management: 0 %
Estimated Percent Contingency: 0 %

Is the Project Scalable?:
No

If yes, provide a short description regarding scalability.:
N/A

Environmental Compliance[1]

Environmental Requirement	Has the Requirement Been Addressed?	Compliance Notes (e.g.,title and date of document, permit number, weblink etc.)
National Environmental Policy Act	Yes	These planning activities are covered by the Council's NEPA Categorical Exclusion for planning, research or design activities (Section 4(d)(3) of the Council's NEPA Procedures).
Endangered Species Act	N/A	Note not provided.
National Historic Preservation Act	N/A	Note not provided.
Magnuson-Stevens Act	N/A	Note not provided.
Fish and Wildlife Conservation Act	N/A	Note not provided.
Coastal Zone Management Act	N/A	Note not provided.
Coastal Barrier Resources Act	N/A	Note not provided.
Farmland Protection Policy Act	N/A	Note not provided.
Clean Water Act (Section 404)	N/A	Note not provided.
River and Harbors Act (Section 10)	N/A	Note not provided.
Marine Protection, Research and Sanctuaries Act	N/A	Note not provided.
Marine Mammal Protection Act	N/A	Note not provided.
National Marine Sanctuaries Act	N/A	Note not provided.
Migratory Bird Treaty Act	N/A	Note not provided.
Bald and Golden Eagle Protection Act	N/A	Note not provided.
Clean Air Act	N/A	Note not provided.
Other Applicable Environmental Compliance Laws or Regulations	N/A	Note not provided.

[1] Environmental Compliance documents available by request (restorecouncil@restorethegulf.gov).

Maps, Charts, Figures

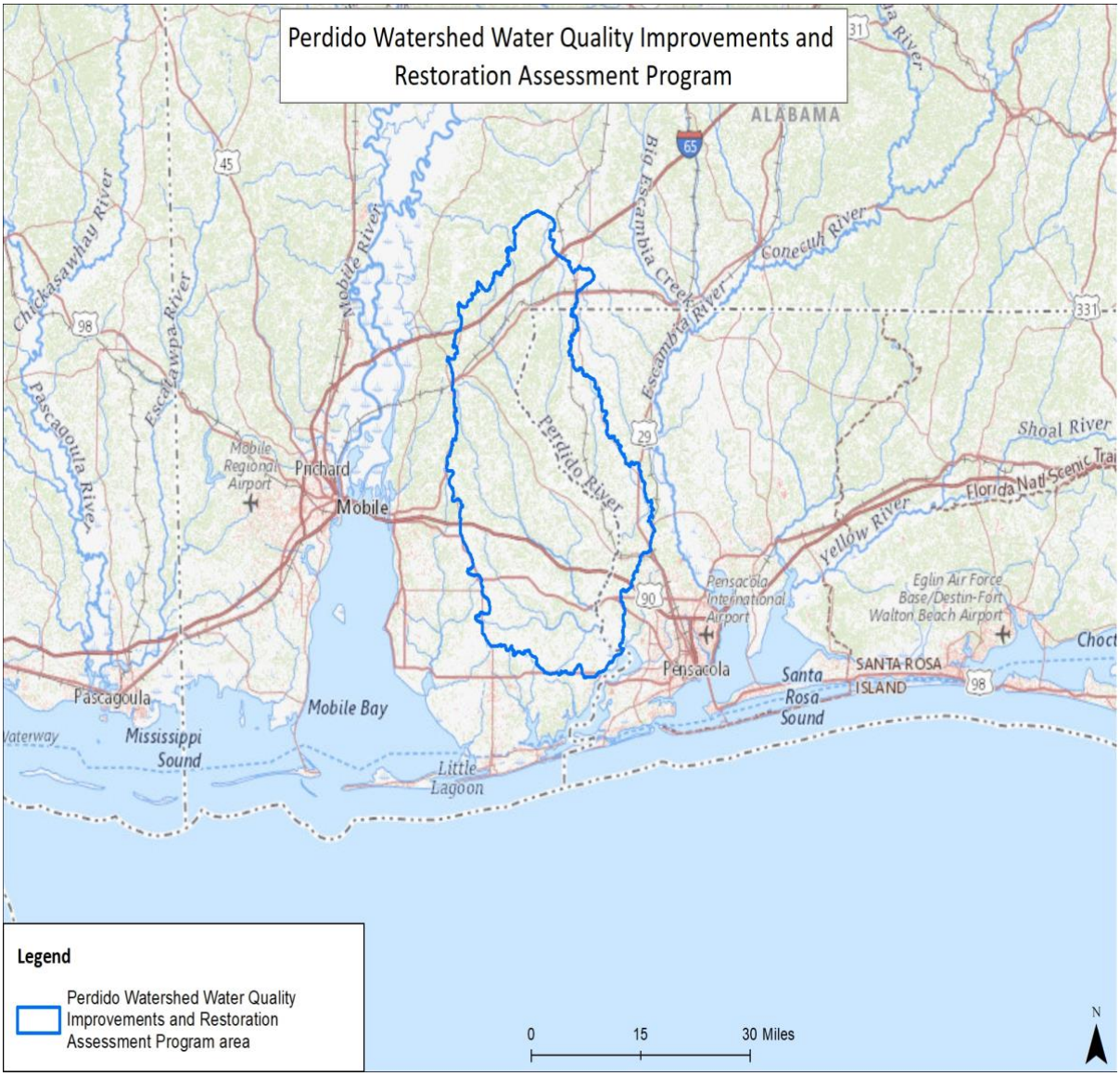

Figure 1: Map of Program Area

RESTORE Council FPL 3 Proposal Document

General Information

Proposal Sponsor:
Alabama Department of Conservation and Natural Resources

Title:
Perdido Watershed Water Quality Improvements and Restoration Assessment Program

Project Abstract:
Located in Southern Alabama (70 percent of the watershed) and Northwest Florida (30 percent of the watershed), the Perdido Watershed covers approximately 1,100 square miles and is dominated by the 63 mile-long Perdido River. The Perdido Watershed plays a critical role in the health of the ecosystem of Southeast Alabama and Northwest Florida. The components of the watershed, including the tributaries, floodplains, bayous, and wetlands of the Perdido provide water quality and quantity protection through healthy floodplains; healthy floodplains store and disperse runoff from storms and recharge aquifers. This proposal contemplates a 3 year, $1,500,000 project to coordinate the location and sequencing of all or a subset restoration projects in the Perdido Watershed that could be expected to improve water quality and habitats. It also proposes a restoration assessment program to monitor the potential collective impacts to water quality of the co-located projects and other restoration projects within the watershed. This project could serve as a model for future restoration assessment efforts on the Gulf Coast.

FPL Category: Cat1: Planning/ Cat1: Implementation

Activity Type: Program

Program: Perdido Watershed Water Quality Improvements and Restoration Assessment Program

Co-sponsoring Agency(ies): N/A

Is this a construction project?: No

RESTORE Act Priority Criteria:
(I) Projects that are projected to make the greatest contribution to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region, without regard to geographic location within the Gulf Coast region.

Priority Criteria Justification:
#1 Projects that are projected to make the greatest contribution. This program proposes to coordinate and subsequently assess the potential cumulative benefits of restoration activities in a chosen watershed/subwatershed in order to maximize water quality benefits in a way that is potentially measurable outside of an individual project footprint. Habitat loss as well as potential changes in water quality are two stressors associated with changes in land use as watersheds like the Perdido develop into more urbanized areas. Projects that address existing and potential water quality impacts would provide significant benefits, especially when considered in the context of the size of the watershed.

Project Duration (in years): 3

Goals

Primary Comprehensive Plan Goal:
Restore Water Quality and Quantity

Primary Comprehensive Plan Objective:
Restore, Improve, and Protect Water Resources

Secondary Comprehensive Plan Objectives:
Improve Science-Based Decision Making Process

Secondary Comprehensive Plan Goals:
N/A

PF Restoration Technique(s):
Improve science-based decision-making processes: Comprehensive planning
Reduce excess nutrients and other pollutants to watersheds: Agriculture and forest management
Reduce excess nutrients and other pollutants to watersheds: Stormwater management
Reduce excess nutrients and other pollutants to watersheds: Wastewater system improvements

Location

Location:
Proposed activities would be located within the Perdido Watershed near the Perdido River in Baldwin County, Alabama, and potentially Escambia County, FL.

HUC8 Watershed(s):
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Florida Panhandle Coastal(Perdido)

State(s):
Alabama

County/Parish(es):
AL - Baldwin

Congressional District(s):
AL - 1

Narratives

Introduction and Overview:

Located in Southern Alabama (70 percent of the watershed) and Northwest Florida (30 percent of the watershed), the Perdido Watershed covers approximately 1,100 square miles and is dominated by the 63 mile-long Perdido River, which provides most of Perdido Bay's freshwater (NWFWMD 2017b). The watershed includes floodplain forests, hydric pine forests, longleaf pine forests, and freshwater wetlands. The major land uses for the Perdido Watershed are diverse, with evergreen and deciduous forests making up most of the central and Upper Perdido, crop lands dominating in the southwest and northern portions, and developed land centered primarily in the southeast. The Alabama portion of the Perdido consists of forested uplands (59.9%), agricultural lands (25.1%), wetlands and open water (8.8%), other (6.2%), with Perdido Bay land use consisting of 27.3% forested uplands, 30.6% agricultural lands, 33.2% wetlands and open waters, with 8.9% other (including urbanized, transitional and barren uplands) (ADCNR 2016).

Driven by the diversity of habitats present in the watershed, including riparian and freshwater wetland habitats, estuarine habitats and marine/coastal habitats the Perdido is home to thirty threatened, endangered and/or protected plant species including the White-top pitcher plants (Sarracenia leucophylla) and a number of animals including the Perdido Key Beach Mouse (Peromyscus polionotus trissyllepsis) the Reticulated Flatwoods Salamander (Ambystoma bishop) and the West Indian Manatee (Trichechus manatus latirostris) (NWFWMD 2017).

Proposed activities: This proposal contemplates a multi-member program to coordinate the location and sequencing of all or a subset of individual member projects (and other restoration projects) in the Perdido Watershed that could be expected to improve water quality and habitats. It also proposes a restoration assessment program to monitor the potential collective impacts to water quality and habitats of the co-located projects, and/or other funded restoration projects in the watershed.

Proposed activities include:

1. Identification of one or more subwatersheds in the Perdido area to support coordination of restoration actions in the watershed as well as the development of watershed scale indicators to track restoration progress. This work will be coordinated by ADCNR and will be open to participation from other Council members and potentially to select stakeholders in the watershed. Given the relatively small scale of the watershed, the entire Perdido watershed may be selected in lieu of one or more subwatersheds.

2. Identification of individual member projects within the subwatershed, that have been or will be implemented in the Perdido watershed, with an emphasis on the selected subwatershed(s). Project type include but are not limited to: agriculture and silviculture BMPs, riparian buffer restoration, habitat acquisition and enhancement, wastewater and stormwater improvements, living shorelines, etc. Projects funded by other restoration funding sources will also be identified and utilized in the development of the restoration progress tracker, discussed in Item 3.

3. Development of a restoration assessment/restoration progress tracker to better understand the potentially collective impacts of restoration projects in the watershed/subwatershed. Outputs potentially include the development of one or more conceptual models, short-term and long-term indicators and a restoration progress tracker/monitoring framework.

There are five goals within the RESTORE Councils comprehensive plan. This Program addresses one of those goals, Goal #2: Restore Water Quality and Quantity. The Program ties in with RESTORE

Councils primary objective of Restore, Improve, and Protect Water Resources as well as Science to Support Decision-making. This goal is applicable to the proposed activities because a number of the projects being implemented or proposed for implementation in the watershed are expected to provide water quality benefits. This program will support the identification of benefits at a scale larger than the individual project level. The Perdido watershed was identified as a priority geographic area in the Council Planning Framework and supports the Restoration Approach to Reduce excess nutrients and other pollutants to watersheds

Under the 2016 Comprehensive Plan update the Council advanced the following commitments:

- Regional ecosystem-based approach to restoration: Through extensive collaboration engagement opportunities as a result of the CPS support funds, it is clear that water quality is a priority goal for the Restore Council members from Florida to Texas. Addressing water quality degradation and impairment is a foundational component of restoring/enhancing a host of living and coastal marine resources.

- Leveraging resources and partnerships: FPL3a included a project to purchase and conduct habitat restoration on 10000-12,000 acres in the watershed. That project serves as an anchor for a watershed-scale effort to conduct water quality and habitat improvements in the Perdido Watershed. Finally, Alabama is proposing a water quality improvements program via another proposal, and one or more projects could be selected via that program, if funded, in the Perdido Watershed.

- Engagement, Inclusion, and Transparency: Since 2010, ADCNR and the State of Alabama have provided multiple opportunities for the public to identify restoration funding priorities. Water quality improvement and science-based decision-making have been consistent themes of public input. Within the MBNEP stakeholder engagement efforts for the CCMP development, water quality, its assessment and improvement, are identified as a priority restoration activity.

- Science-based decision-making: The proposed activities will provide a science-based framework to evaluate the impacts of projects outside of their implementation footprint.

- Delivering results and measuring impacts: Monitoring the pervasive water quality degradation and the indirect impacts on living coastal and marine resources is challenging. This project would develop a framework to assess progress towards restoration goals at the subwatershed or watershed level.

<u>Environmental Stressors</u>:
Because of its relatively small size, the Perdido Watershed can experience rapid changes in water quality due to wind, tides and rainfall. Dominating influences in the watershed include human use, silviculture, agriculture and the Intercoastal Waterway, which was constructed in the early 1900s. Stressors in the watershed include water quality issues emanating from nonpoint source pollution, including the use of onsite septic systems and runoff associated with agriculture and silviculture activities (NWFWMD 2017). Land use conversion and urbanization have contributed to the loss of habitats, including 80% of historic sea grass habitats (Kirschenfeld et al. 2007) , and have impaired water quality of several waterbodies. Low Dissolved Oxygen, turbidity and bacteria are a few of the impairments in the watershed. Dissolved oxygen levels vary seasonally and also change rapidly as a result of tidal and wind influence (Xia et. al., 2011).

Projected increases in population predict a near doubling of urban areas within the Wolf Bay portion

of the Perdido Watershed (Wand and Kalin 2018) and a 10% growth by 2030 estimate for the Florida areas of the watershed (NWFWMD 2017), which will further exacerbate these environmental challenges. In the absence of management, degradation associated with nonpoint source pollution and land use changes could threaten habitats and water quality as human populations increase. Climate change also threatens the health of the watershed, potentially impacting precipitation patterns, increasing flooding and inundation risks and impacting groundwater quality via saltwater intrusion (Pendleton et al., 2010).

Environmental Benefits:
The Perdido Watershed plays a critical role in the health of the ecosystem of Southeast Alabama and Northwest Florida. The components of the watershed, including the tributaries, floodplains, bayous, and wetlands of the Perdido provide water quality and quantity protection through healthy floodplains; healthy floodplains store and disperse runoff from storms and recharge aquifers. Undeveloped areas act as natural filters, protecting water quality of coastal waters that sustain wildlife such as recreationally and commercially important fish and oyster resources. The wetlands of the Perdido Watershed and coastal barrier islands also provide resiliency and protection against climate risks, hurricanes, and other storm events (NWFWMD 2017b).

The Perdido Watershed is still relatively undeveloped—there is a significant opportunity to proactively manage urbanization in the watershed, potentially preserving water quality and proactively addressing anticipated future conditions. This watershed is an ideal location to conduct an assessment of restoration progress given the relatively small size of the watershed and the prevalent stressors. In addition to assessing progress within the Perdido watershed, this project could serve as a pilot/model for similar efforts in other watersheds.

Total Cost: $1,500,000

Timeline: 3 years

Partners: The program activities would be open to all interested RESTORE Council members.

Proposed Methods:

This proposal contemplates a multi-member program to support the coordination of restoration implementation in the Perdido watershed or subwatershed(s), and to develop a framework to assess restoration progress of projects collectively achieving habitat and water quality improvement goals.

Broadly, proposed activities include:

1. Identification of one or more subwatersheds in the Perdido area to support coordination of restoration actions in the watershed as well as the development of watershed scale indicators to track restoration progress. This work will be coordinated by ADCNR and will be open to participation from other Council members and potentially to select stakeholders in the watershed. ADCNR will utilize the CMAP gap analysis results in the Perdido Watershed and other resources to identify areas likely to benefit from water quality and habitat restoration activities based on existing conditions and potential future trends (CMAP 2019). Given the relatively small scale of the watershed, the entire Perdido watershed may be selected in lieu of one or more subwatersheds.

2.Identification of individual member projects within the subwatershed, that have been or will be implemented in the Perdido watershed, with an emphasis on the selected subwatershed(s). Project type include but are not limited to: agriculture and silviculture BMPs, riparian buffer

restoration, habitat acquisition and enhancement, wastewater and stormwater improvements, living shorelines, etc. Projects funded by other restoration funding sources will also be identified and utilized in the development of the restoration progress tracker, discussed in Item 3.

3. Development of a restoration assessment/restoration progress tracker to better understand the potentially collective impacts of restoration projects in the watershed/subwatershed. Outputs potentially include the development of one or more conceptual models, short-term and long-term indicators and a restoration progress tracker/monitoring framework. Flexibility to apply monitoring and adaptive management at different scales is a key element of a successful restoration assessment effort (McKay et. al., 2012). Potential approaches to a program or resource level monitoring could include the development of resource-specific and/or geographically-based conceptual models to facilitate the understanding of potential impacts of restoration projects relative to the "noise" of the system (e.g., pollution, climate change that could be impacting the ecosystem). The specific outputs will be refined based on the completion of Tasks 1 and 2. One primary goal of Task 3 will be to incorporate existing monitoring programs within the watershed (CMAP will be a primary source of information) and maximizing project level monitoring.

The specific details regarding the development of a restoration progress assessment/tracker will be determined based on the results of activities discussed in Items 1 and 2, above (e.g., an understanding of current data available and gaps will inform the selection of indicators and the level of resolution that can be achieved). Given that implementation of specific restoration activities are outside of the scope of this program, the methods discussion below will focus on the specific tasks that will take place as part of this program, namely the identification of projects within the watershed and the completion of a framework for the restoration progress tracker, and not on the methods utilized to implement specific restoration activities.

As restoration associated with DWH funds proceeds, it will become increasingly difficult to monitor the impacts of all projects for all species and all habitats where restoration is occurring. Tools such as conceptual models and ecosystem indicators can assist in the tracking of impacts while maximizing the use of available data. Restoration progress tracking is also important in telling the public story of how restoration is progressing and how projects being implemented are collectively benefiting the coastal ecosystem.

Understanding the ecosystem impacts of a single restoration project and developing an effective monitoring plan and adaptive management approach is a complex task (Ralph & Poole, 2003; Murphy & Weiland, 2014). Evaluating the potential impacts of a suite of restoration activities in a given geographic area (e.g., watershed) is even more difficult due to potential synergistic effects of projects as well as a project's relative impact in relation to the stressors acting upon it. Understanding these potential relationships and then adapting a restoration program in response to maximize benefits is more complex still (Diefenderfer et al., 2011).

As the scale for evaluating restoration progress expands beyond the individual footprint of a project, it is increasingly difficult to 'separate the restoration signal from the noise.' For example, year-to-year fluctuations in freshwater inputs have the potential to cause variability in oyster populations, which might mask underlying improvements in productivity resulting from oyster reef restoration.

As part of Task 3, ADCNR will identify potential major gaps in the availability of information to to support watershed-level assessments for the types of projects being implemented. Under this task, ADCNR may additionally identify priorities for filling critical information needs. Any gaps identified would articulate why such information is important to the design of ongoing restoration

programs, how the information could be made available in a timely manner, and why collection of such information can be accomplished cost-effectively, all important considerations given the relatively limited funding for restoration and associated monitoring activities (Baldera et. al., 2018). ADCNR may also identify potential project-level metrics for monitoring to support consistency and facilitate the ability to aggregate and synthesize data across projects.

If restoration progress is to be successfully assessed, careful thought must be given to both the types of projects implemented, their potential co-benefits, and the selection of indicators/monitoring parameters that are capable of informing our understanding of progress beyond the project scale, taking into account the potential influence of other contributing or confounding factors that could be driving changes in the watershed (McKay et. al., 2012). These indicators must also be measurable in some way and detectable within a reasonable timeframe relevant to the work of restoration managers. There is a significant body of work that is available to help inform these considerations, including Zedler, 2016; Diefenderfer et. al., 2016; Simenstad et. al.,2006.

Any indicators/metrics identified would be aligned with and inform potential metrics used for project-level monitoring but would focus on methods that go beyond simple additive approaches. Ideally, DWH restoration program impacts would be assessed at broad scales in coastal Alabama, with the potential to recognize cumulative and potential synergistic effects of restoration. But perhaps more realistically, given the magnitude and complexity of the underlying ecosystems and the scale of restoration funded with DWH funds, this evaluation may need to occur at scales somewhere between the project level and the full resource scale. Development of potential indicators/metrics could be framed in the context of conceptual models and take into account the specific types of restoration methods that have been or are likely to be adopted to address stressors in the Perdido Watershed.

ADCNR anticipates that the development of a conceptual model and identification and selection of indicators/metrics could involve the following types of considerations:

- What might be considered reasonable definitions of 'progress' for specific restoration activities?
- What is the broadest spatial (and/or shortest temporal?) scale at which we are likely to be able to discern the impacts of restoration efforts given the available funding and potential spatial and temporal distribution of projects for a restoration type? Is it the sub-watershed? Watershed?
- Areas of concentrated restoration activity?
- At the relevant scale, what are the ideal indicators that would best allow monitoring the impacts of restoration within the selected geographic area?
- Are indicator data of this type and of reasonable quality currently collected at the relevant scale, and if not, what are the closest currently collected data that might serve as potential surrogates?
- How robust are the indicators with respect to other potentially contributing or confounding independent factors that affect restoration progress? Are other data available to simultaneously evaluate the potential impacts of the most important contributing or confounding factors?
- If no data are currently available to support a needed resource-level indicator (or critical contributing or confounding factors), how significant an effort would be involved in collecting it?
- Are there broader measures of coastal ecosystem health that are worth considering in addition to restoration-specific indicators?
- How will the potential suite of indicators be refined and prioritized for the purposes of potential future implementation?

Environmental Benefits:
The benefits of the project include not only the improvements to water quality that could result from individual project implementation, but the program could also provide a case study for how to assess restoration impacts at the program level while maximizing collaboration and cost efficiencies.

The Perdido Watershed plays a critical role in the health of the ecosystem of Southeast Alabama and Northwest Florida. The components of the watershed, including the tributaries, floodplains, bayous, and wetlands of the Perdido provide water quality and quantity protection through healthy floodplains; healthy floodplains store and disperse runoff from storms and recharge aquifers. Undeveloped areas act as natural filters, protecting water quality of coastal waters that sustain wildlife such as recreationally and commercially important fish and oyster resources. The wetlands of the Perdido Watershed and coastal barrier islands also provide resiliency and protection against climate risks, hurricanes, and other storm events (NWFWMD 2017b).

The Perdido Watershed is still relatively undeveloped—there is a significant opportunity to proactively manage urbanization in the watershed, potentially preserving water quality and proactively addressing anticipated future conditions. This watershed is an ideal location to conduct an assessment of restoration progress given the relatively small size of the watershed and the prevalent stressors. In addition to assessing progress within the Perdido watershed, this project could serve as a pilot/model for similar efforts in other watersheds.

Metrics:

Metric Title: PRM003 : Management or Governance Planning - # plans developed : Planning, Research, Monitoring
Target: 1
Narrative: The number of plans completed whose findings are used to adapt management/ inform management. or governance.

Metric Title: PRM009 : Research - # studies reported to mgmt. : Planning, Research, Monitoring
Target: 1
Narrative: The number of studies completed whose findings are used to adapt management/ inform management. decisions.

Metric Title: PRM014 : Restoration planning/design/permitting - Increased Capacity - % increase in analytical capacity : Planning, Research, Monitoring
Target: 30
Narrative: Developing indicators to better understand the potential cumulative benefits of multiple projects can inform future project selection on a watershed level.

Risk and Uncertainties:
This is a planning project, so implementation risks are relatively low. Risks to the project include the inability to detect a change in ecosystem condition as a result of project implementation, or the inability to identify a suitable subwatershed for the program. Monitoring and adaptive management is challenging at the project scale, and becomes more challenging when attempting to assess the collective impacts of multiple, co-located projects because of the potential for synergies that can result in impacts greater than the additive effects of any one individual project Diefenderfer et. al., 2009; Thom, 2000). Other risks associated with the difficulty of sequencing and implementing projects across multiple states and federal agencies can be mitigated by robust yet flexible planning on the front end to maximize the changes of targets being met (e.g., take into account specific types of projects that are our could be implemented when developing indicators, work to identify

indicators that are readily measured and cost-effective). Risks can be mitigated by learning from program level assessment programs like those in the Everglades or Pacific Northwest (Loschiavo 2013).

Monitoring and Adaptive Management:

As this is a planning project, no monitoring will be conducted. However, monitoring parameters for future implementation efforts could be identified. Project outcomes including conceptual model(s) and restoration tracker/framework will be tracked through the program's observational data plan and data management plan.

Data Management:

To the extent practicable, all data generated will be documented using standardized field datasheets. If standardized datasheets are unavailable or not readily amendable to record project-specific data, then project-specific datasheets will be drafted prior to conducting any project monitoring activities. Original hardcopy datasheets, notebooks, and photographs will be retained by the ADCNR. Relevant project data that are handwritten on hardcopy datasheets or notebooks will be transcribed (entered) into standard digital format. All data will have properly documented FGDC/ISO metadata, a data dictionary (defines codes and fields used in the dataset), and/or a Readme file as appropriate (e.g., how data was collected, QA/QC procedures, other information about data such as meaning, relationships to other data, origin, usage, and format – can reference different documents). Electronic data files will be named with the date on which the file was created and will include a ReadMe file that describes when the file was created and by whom, and any explanatory notes on the file contents. If a data file is revised, a new copy will be made and the original preserved. Data will be made publicly available and accessible on a website that is still to be determined.

Collaboration:

The basis of a successful program is the participation from multiple members who coordinate to select project locations within the watershed that provide the greatest opportunity for water quality benefits that can be measured outside of a project's footprint. This proposed program builds on Alabama's commitment to a programmatic approach to ecological restoration in the Perdido Watershed and leverages The Perdido River Land Conservation and Habitat Enhancements project in FPL3a.

Additionally, Alabama has proposed a Water Quality Improvements Program in the FPL3b proposal process to identify and construct water quality improvements across coastal Alabama. It is possible that one or more of the selected projects could be implemented in the Perdido Watershed and be included in this proposed restoration assessment.

Public Engagement, Outreach, and Education:

The State of Alabama's prioritization of the Project is based on multiple public and stakeholder engagement activities. Throughout Alabama's restoration public engagement and planning efforts, stakeholders have consistently identified the restoration and protection of coastal habitats as a top priority. The following are examples of public engagement, outreach and education activities which were considered in the selection of this proposal:

Alabama Restoration Summit: ADCNR hosted the Alabama Restoration Summit in 2018. The public was invited to learn about restoration projects and programs and to provide input on current and

future priorities for restoration. Based on the public input received, investing in coastal habitat restoration and protection and science-based decision-making continues to be a top priority of stakeholders.

Alabama Watershed Management Plans (NFWF-GEBF; RESTORE): Starting in 2013, the Mobile Bay National Estuary Program (MBNEP) has published several coastal watershed management plans (WMPs) that provide guidance for restoration. These plans depend upon public involvement and "stakeholders" who know the area, recognize its problems, and are invested in its health and resilience. Each plan includes a watershed description that educates communities about the geography, geology, biology, ecology, and hydrology of the drainage area's land and water. Although stakeholder engagement and education strategies are unique across WMPs, all of the plans have included stakeholder community meeting to gather feedback from the public

RESTORE Act Alabama State Expenditure Plan: ADCNR has solicited stakeholder input to support planning and development of the Alabama State Expenditure Plan (MSEP). Engagement with a wide range of stakeholders, including private citizens, non-governmental organizations, business owners, elected officials, and other community leaders, has informed the priorities for restoration.

Leveraging:

Funds: $26,800,000.00
Type: Bldg on Others
Status: Committed
Source Type: Other
Description: The Perdido River Land Conservation and Habitat Enhancements project consists of the acquisition and management of approximately 10,000-12,000 acres in the Perdido Watershed, located in Baldwin County, AL. Upon acquisition, the Alabama Department of Conservation and Natural Resources (ADCNR) will conduct habitat management and stewardship on the tract, which could include prescribed burning, invasive species removal, longleaf pine restoration, and protection and habitat enhancements for species including the gopher tortoise.

Environmental Compliance:
Council approval of funding for this activity would not involve or lead directly to ground-disturbing activities that may have significant effects on the environment individually or cumulatively, nor does it commit the Council to a particular course of action affecting the environment. In the environmental compliance review, the Council would consider potential extraordinary circumstances, including potential negative effects to threatened and endangered species, essential fish habitat, Tribal interests, and/or historic properties, where applicable, and could determine that no such circumstances apply. Accordingly, the Council could also determine that this activity is covered by the Council's National Environmental Policy Act (NEPA) Categorical Exclusion (CE) for planning, research or design activities (Section 4(d)(3) of the Council's NEPA Procedures).

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Budget

Project Budget Narrative:
A total of $1,500,000 is being requested from FPL 3a to fund planning, development of a restoration progress tracking framework and data management. An estimated 95.5% of this request is for project planning. Project planning will include, but will not limited to: project management and administration, including administrative programmatic functions, coordination, and contractual support for project implementation; identification of study areas and potential projects for inclusion; coordination with project leaders and information gathering and development of one or more conceptual models and the development of short-term and long-term indicators and the elements of the restoration progress tracker/monitoring framework. An estimated 4% of this request is for implementation, which includes public outreach and engagement as well as the development of the final framework/restoration tracker report and evaluations and any related publications. An estimated 0.5% of this request is for data management. No funds are being requested for contingency or monitoring and adaptive management activities.

Total FPL 3 Project/Program Budget Request:
$ 1,500,000.00

Estimated Percent Monitoring and Adaptive Management: 0 %
Estimated Percent Planning: 95.5 %
Estimated Percent Implementation: 4 %
Estimated Percent Project Management: 0 %
Estimated Percent Data Management: 0.5 %
Estimated Percent Contingency: 0 %

Is the Project Scalable?
No

If yes, provide a short description regarding scalability.:
N/A

Environmental Compliance[1]

Environmental Requirement	Has the Requirement Been Addressed?	Compliance Notes (e.g.,title and date of document, permit number, weblink etc.)
National Environmental Policy Act	N/A	Note not provided.
Endangered Species Act	N/A	Note not provided.
National Historic Preservation Act	N/A	Note not provided.
Magnuson-Stevens Act	N/A	Note not provided.
Fish and Wildlife Conservation Act	N/A	Note not provided.
Coastal Zone Management Act	N/A	Note not provided.
Coastal Barrier Resources Act	N/A	Note not provided.
Farmland Protection Policy Act	N/A	Note not provided.
Clean Water Act (Section 404)	N/A	Note not provided.
River and Harbors Act (Section 10)	N/A	Note not provided.
Marine Protection, Research and Sanctuaries Act	N/A	Note not provided.
Marine Mammal Protection Act	N/A	Note not provided.
National Marine Sanctuaries Act	N/A	Note not provided.
Migratory Bird Treaty Act	N/A	Note not provided.
Bald and Golden Eagle Protection Act	N/A	Note not provided.
Clean Air Act	N/A	Note not provided.
Other Applicable Environmental Compliance Laws or Regulations	N/A	Note not provided.

[1] [1] 1 Environmental Compliance document uploads available by request (restorecouncil@restorethegulf.gov).

Maps, Charts, Figures

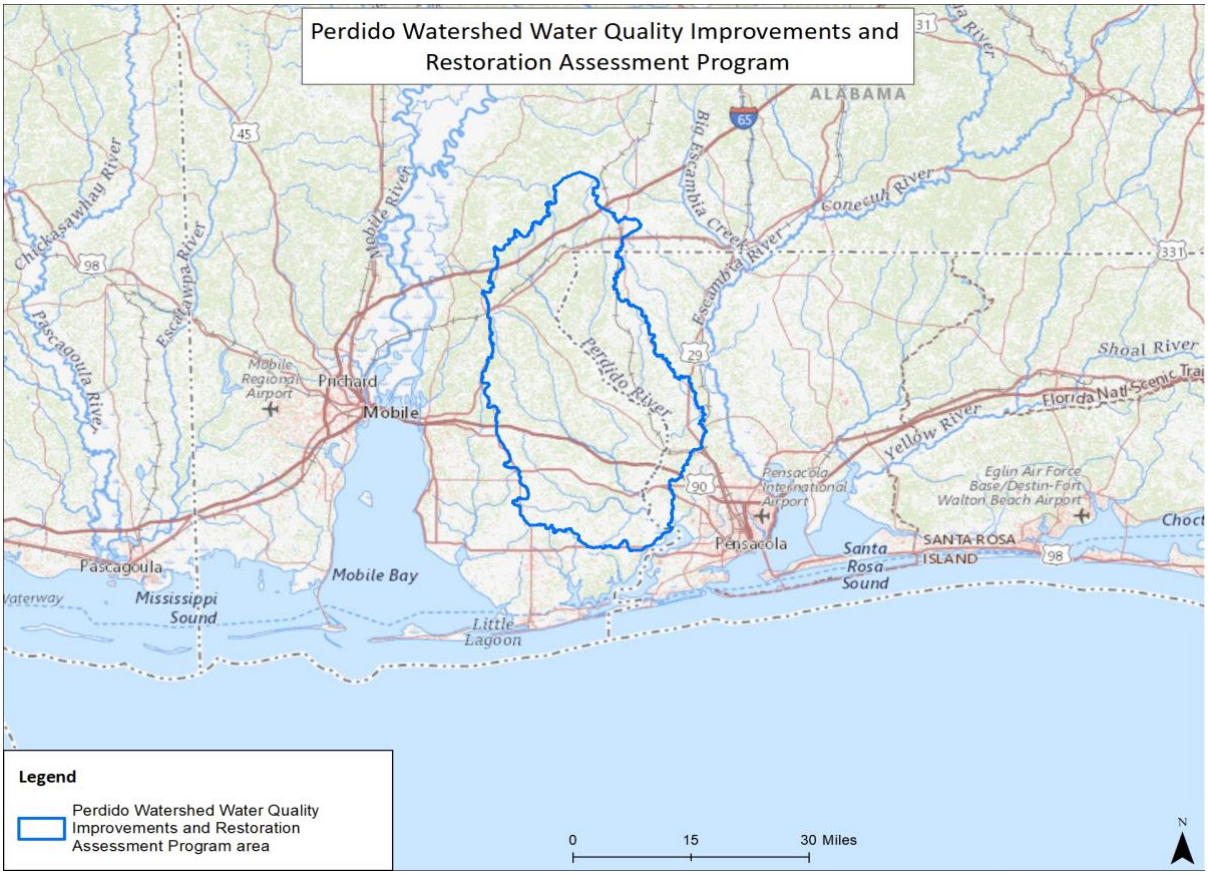

Figure 1: Map of Program Area

FPL 3b Internal Staff Review of Proposal Submitted 4/24/2020

Project/Program	Perdido Watershed Water Quality Improvements and Restoration Assessment Program		
Primary Reviewer	Matt Love	Sponsor	Alabama
EC Reviewer	Heather Young	Co-Sponsor	

1. Is/Are the selected Priority Criteria supported by information in the proposal?	Yes
Notes	

2. Does the proposal meet the RESTORE Act geographic eligibility requirement?	Yes
Notes	

3. Are the Comprehensive Plan primary goal and primary objective supported by information in the proposal?	Yes
Notes	

4. Planning Framework: If the proposal is designed to align with the Planning Framework, does the proposal support the selected priority approaches, priority techniques, and/or geographic area?	Yes
Notes	

5. Does the proposal align with the applicable RESTORE Council definition of project or program?	Yes
Notes	

6. Does the budget narrative adequately describe the costs associated with the proposed activity?	No
Notes	The budget includes a small amount of funding for "implementation" activities, which are described as public outreach and engagement, development of a final framework/restoration tracker report and evaluation of any related publications. As noted in the Environmental Compliance section below, Council staff recommend that the sponsor include all of these activities as part of Cat 1 Planning and adjust the budget information accordingly.

7. Are there any recommended revisions to			No

the selected leveraged funding categories?			
	Council staff recommends the sponsor consider leveraging the Pensacola and Perdido Bay Estuary Program as "Adjoining" leveraged funding.		

8. Have three external BAS reviews been completed?	More information needed
Notes	Please see the external BAS review comments, and external reviews summary attached with these review comments.

9. Have appropriate metrics been proposed to support all primary and secondary goals?	More information needed
Notes	The primary and secondary goals could be sufficiently supported by the selected metrics. However, it may be difficult for the sponsor to capture the successful development of a suite of indicators using the selected metric PRM014 - % increase in analytical capacity. Instead, Council staff recommend the development of indicators be included as a component of one of the other selected metrics, such as PRM009 - # studies reported to management.

10. Environmental compliance: If FPL Category 1 has been selected for the implementation component of the project or program, does the proposal include environmental compliance documentation that fully supports the selection of Category 1?	More information needed
Notes	The sponsor is seeking funding approval (FPL Category 1) for Planning and Implementation. Council staff recommends revising the program to be classified as Cat1: Planning only. Council staff then recommends revising the environmental compliance checklist to indicate "Yes" for NEPA and to add a corresponding NEPA compliance note: "These planning activities are covered by the Council's NEPA Categorical Exclusion for planning, research or design activities (Section 4(d)(3) of the Council's NEPA Procedures)."

11. Geospatial Compliance: Have the appropriate geospatial files and associated metadata been submitted along with a map of the proposed project/program area?	More information needed
Notes	The submitted GIS project boundary crosses the AL/FL border. Council staff suggests adding FL to state selection, FL-02 to congressional district selection, and AL - Escambia County and FL - Escambia County to county selection.

FPL 3b BAS Review Summary –Perdido Watershed Water Quality Improvements and Restoration Assessment Program

May, 2020

The Best Available Science reviews of the *Perdido Watershed Water Quality Improvement and Restoration Assessment Program* proposal are generally positive and supportive of this novel approach to assessing the cumulative benefits of restoration. Reviewers, however, note areas of the proposal that could be improved to bolster communication of the scientific basis for the project. While two reviewers agree the goals and project methods are clearly defined, one reviewer feels sufficient detail is not provided for the approach to the overall project implementation plan. Additional references and the use of data illustrating trends are also identified as areas for improvement. While reviewers note limited evaluation of similar, past efforts, it is recognized that this is a novel approach and there may be limited examples to compare successes and failures of analogous projects.

While Reviewers 1 and 3 agree reasonable justification is provided that the proposal is based on peer reviewed and publicly available information, Reviewer 2 feels the number of references is limited, heavily reliant on agency reports, and notes there is additional literature related to project evaluation and assessment that is not utilized in this proposal.

Reviewers 1 and 3 also agree that this proposal uses science that maximizes the quality and objectivity of information supporting this proposal, acknowledging this project would be a scientific exercise to evaluate the cumulative efficacy of restoration projects to guide future restoration projects. Reviewer 3 notes that “there is a growing scientific literature, appropriately cited here, that addresses the evaluation of watershed restoration projects and their relative impact on improving coastal water quality. Reviewer 2, conversely, is dissatisfied with the number of references used to support the proposal and the level of project details provided.

Reviewers agree the risks of this planning project are low, while Reviewer 2 feels the inclusion of relevant projects to be assessed and preliminary data would have helped communicate potential risks more thoroughly. A risk specific to this type of project raised by two reviewers is the inability to detect change as a result of complexity with scale and other mitigating factors influencing the indicators to be assessed by the study. Reviewer 1 also highlights the opportunity to strengthen the consideration of risks and uncertainties by incorporating them within the conceptual model and restoration assessment. Since this project plan is to assess long-term benefits, two reviewers feel consideration of long-term environmental risks should be explicitly stated and supported by data illustrating trends over time.

Reviewers 1 and 3 feel the program sponsor demonstrates experience implementing similar projects, while Reviewer 2 comments that the inclusion of more details on the assessment techniques, preliminary data and existing monitoring programs that will be connected in the assessment would provide more information to better assess the ability of the sponsor to successfully implement this project. Reviewer 1 recognizes the overlap with the existing Mobile

Bay National Estuary Program watershed management plan process and recommends better integrating the complimentary planning processes.

The primary comprehensive plan goal for this project is clearly listed as “Restore Water Quality and Quantity,” however, Reviewer 1 notes a discrepancy in the goals of the project. The abstract states the project will coordinate the location and sequencing of restoration projects that could be expected to improve water quality and habitats but there is no further mention of habitat goals throughout the rest of the proposal.

Lastly, in communication of the environmental benefits of this project, while Reviewer 2 raises concern that no information about current water quality in the watershed is described, Reviewers 1 and 3 recognize the approach of prioritizing stressors that impact water quality and habitat while tracking improvements of those stressors through watershed restoration projects will provide benefits in future watershed planning. Reviewer 3 states “there is considerable impairment in water quality and habitat value in the lower Perdido system, such as low DO and significant loss of seagrass habitat, the project coordination, guidance and evaluations proposed in this project suggest a high likelihood of success, in terms of demonstrating positive benefits.”

Perdido Water Quality Improvements and Restoration Assessment Program

Response to BAS Reviewer Comments

BAS External Review Comments and Responses

1. The Best Available Science reviews of the *Perdido Watershed Water Quality Improvement and Restoration Assessment Program* proposal are generally positive and supportive of this novel approach to assessing the cumulative benefits of restoration. Reviewers, however, note areas of the proposal that could be improved to bolster communication of the scientific basis for the project. While two reviewers agree the goals and project methods are clearly defined, one reviewer feels sufficient detail is not provided for the approach to the overall project implementation plan. Additional references and the use of data illustrating trends are also identified as areas for improvement. While reviewers note limited evaluation of similar, past efforts, it is recognized that this is a novel approach and there may be limited examples to compare successes and failures of analogous projects.

Response:
Additional references have been included in the proposal that bolsters the scientific basis for the project. Given the planning nature of this project and the unknowns to project implementation additional details to the overall approach are unknown and thus are included as a part of the SOW of this project.

2. While Reviewers 1 and 3 agree reasonable justification is provided that the proposal is based on peer reviewed and publicly available information, Reviewer 2 feels the number of references is limited, heavily reliant on agency reports, and notes there is additional literature related to project evaluation and assessment that is not utilized in this proposal.

Response:
Additional references have been included in the proposal, where appropriate. This proposal does not seek to evaluate and assess progress at the project level, but at larger scales. The primary literature cited explores the assessment of cumulative impacts of multiple projects. Project level monitoring could likely inform the selection of indicators for the restoration assessment, and thus will be identified during Task Two.

3. Reviewers 1 and 3 also agree that this proposal uses science that maximizes the quality and objectivity of information supporting this proposal, acknowledging this project would be a scientific exercise to evaluate the cumulative efficacy of restoration projects to guide future restoration projects. Reviewer 3 notes that "there is a growing scientific literature, appropriately cited here, that addresses the evaluation of watershed restoration projects and their relative impact on improving coastal water quality. Reviewer 2, conversely, is dissatisfied with the number of references used to support the proposal and the level of project details provided.

Response:
Additional references have been included in the proposal, where appropriate.

4. Reviewers agree the risks of this planning project are low, while Reviewer 2 feels the inclusion of relevant projects to be assessed and preliminary data would have helped communicate potential risks more thoroughly. A risk specific to this type of project raised by two reviewers is the inability to detect change as a result of complexity with scale and other mitigating factors influencing the indicators to be assessed by the study. Reviewer 1 also highlights the opportunity to strengthen the consideration of risks and uncertainties by incorporating them within the conceptual model and restoration assessment. Since this project plan is to assess long-term benefits, two reviewers feel consideration of long-term environmental risks should be explicitly stated and supported by data illustrating trends over time.

Response:
The identification of projects that will be evaluated is expected to occur in Task 2 of the program, as stated in the narrative. The first task will be to select the study area from within the Perdido Watershed based on member input, the areas with highest concentrations of projects and areas that are expected to be of continued future interest for implementation. Additionally, during this task, existing monitoring activities, whether stand-alone or part of a restoration project's performance monitoring will be identified and analyzed. The results of these tasks will be used to inform future activities for the program, including the development of conceptual models and indicators. This work is beyond the scope of the background information that can be included in this proposal. This step-wise approach will increase the likelihood of identifying a program area where changes as a result of restoration efforts could be detected in the broader ecosystem. Edits have been made to the proposal to more clearly describe the basis for this step-wise approach.

Risks to the project include the inability to detect a change in ecosystem condition as a result of project implementation. The questions posed for consideration of the development of the conceptual model (Task 3) are designed to help mitigate the risks of being unable to detect a change in ecosystem condition as a result of restoration efforts. Key to this consideration is this question: what is the broadest spatial (and/or shortest temporal) scale at which we are likely to be able to discern the impacts of restoration efforts given the available funding and potential spatial and temporal distribution of projects for a restoration type? Risks can be mitigated by learning from program level assessment programs like those in the Everglades or Pacific Northwest. Additional information regarding the mitigation of risk as discussed in Task 3 has been included and expanded on in the risk section of the proposal.

A broad overview of the environmental trends in the watershed is discussed in the environmental stressors section of the proposal. Specific data relating to the stressors and trends discussed above can be found in the included references and will be considered throughout the program, as the ability to detect the "signal" of restoration amid the "noise" of the ecosystem is critical to success of the effort. Detail has been added in the environmental stressors section to link the assessment of stressors to the development of robust indicators.

Dominating influences in the watershed include human use, silviculture, agriculture and the Intercoastal Waterway, which was constructed in the early 1900s. Stressors in the watershed include water quality issues emanating from nonpoint source pollution, including the use of onsite septic systems and runoff associated with agriculture and silviculture activities (NWFWMD 2017). Land use conversion and urbanization have contributed to the loss of habitats, including 80% of historic sea grass habitats (Kirschenfeld et al. 2007), and have impaired water quality of several waterbodies. Low Dissolved

Oxygen, turbidity and bacteria are a few of the impairments in the watershed. Dissolved oxygen levels vary seasonally and also change rapidly as a result of tidal and wind influence (Xia et. al., 2011).

Projected increases in population predict a near doubling of urban areas within the Wolf Bay portion of the Perdido Watershed (Wand and Kalin 2018) and a 10% growth by 2030 estimate for the Florida areas of the watershed (NWFWMD 2017), which will further exacerbate these environmental challenges. In the absence of management, degradation associated with nonpoint source pollution and land use changes could threaten habitats and water quality as human populations increase. Climate change also threatens the health of the watershed, potentially impacting precipitation patterns, increasing flooding and inundation risks and impacting groundwater quality via saltwater intrusion (Pendleton et al., 2010).

5. Reviewers 1 and 3 feel the program sponsor demonstrates experience implementing similar projects, <u>while Reviewer 2 comments that the inclusion of more details on the assessment techniques, preliminary data and existing monitoring programs that will be connected in the assessment would provide more information to better assess the ability of the sponsor to successfully implement this project.</u> Reviewer 1 recognizes the overlap with the existing Mobile Bay National Estuary Program watershed management plan process a<u>nd recommends better integrating the complimentary planning processes.</u>

Response:
There is not currently a completed a Mobile Bay NEP watershed plan for the Perdido Watershed (it will be included in the Gulf Frontal WMP, which is underway). The Perdido River and Bay Surface Water Improvement and Management Plan completed by the Northwest Florida Water Management District has been referenced in the document. As other plans come online, they will be considered as well. Additionally, stakeholder involvement in this program is expected, and could include partners such as the Mobile Bay National Estuary Program and the Pensacola and Perdido Bay Estuary Program. However, no stakeholders have been explicitly named in the proposal because of the chance of leaving important stakeholders off the list. No edits have been made to the proposal.

6. The primary comprehensive plan goal for this project is clearly listed as “Restore Water Quality and Quantity,” however, Reviewer 1 notes a discrepancy in the goals of the project. The abstract states the project will coordinate the location and sequencing of restoration projects that could be expected to improve water quality and habitats but there is no further mention of habitat goals throughout the rest of the proposal.

Response:
Additional references to habitat quality have been added to the proposal.

7. Lastly, in communication of the environmental benefits of this project, while Reviewer 2 raises concern that no information about current water quality in the watershed is described, Reviewers 1 and 3 recognize the approach of prioritizing stressors that impact water quality and habitat while tracking improvements of those stressors through watershed restoration projects will provide benefits in future watershed planning. Reviewer 3 states “there is considerable impairment in water quality and habitat value in the lower Perdido system, such as low DO and significant loss of seagrass habitat, the project coordination, guidance and evaluations proposed in this project suggest a high likelihood of success, in terms of demonstrating positive benefits.”

Comments from RESTORE Council Staff

Comment:
The budget includes a small amount of funding for "implementation" activities, which are described as public outreach and engagement, development of a final framework/restoration tracker report and evaluation of any related publications. As noted in the Environmental Compliance section below, Council staff recommend that the sponsor include all of these activities as part of Cat 1 Planning and adjust the budget information accordingly.

Response:
Edits have been made to the proposal to reflect the inclusion of all proposed activities as Category 1 planning

Comment:
Council staff recommends the sponsor consider leveraging the Pensacola and Perdido Bay Estuary Program as "Adjoining" leveraged funding.

Response:
Edits have been made to the proposal to include the Pensacola and Perdido Bay Estuary Program as "Adjoining" leveraged funding.

Comment:
The primary and secondary goals could be sufficiently supported by the selected metrics. However, it may be difficult for the sponsor to capture the successful development of a suite of indicators using the selected metric PRM014 - % increase in analytical capacity. Instead, Council staff recommend the development of indicators be included as a component of one of the other selected metrics, such as PRM009 - # studies reported to management.

Response:
Edits have been made to the proposal to remove metric PRM014 and increase the target of metric PRM009 to “2”.

Comment:
The sponsor is seeking funding approval (FPL Category 1) for Planning and Implementation. Council staff recommends revising the program to be classified as Cat1: Planning only. Council staff then recommends revising the environmental compliance checklist to indicate "Yes" for NEPA and to add a corresponding NEPA compliance note: "These planning activities are covered by the Council's NEPA Categorical Exclusion for planning, research or design activities (Section 4 (d)(3) of the Council’s NEPA Procedures)."

Response:
Edits have been made to the environmental compliance section of the narrative to reflect these comments and changes will be made in PIPER when the proposal is resubmitted.

Comment:
The submitted GIS project boundary crosses the AL/FL border. Council staff suggests adding FL to state selection, FL02 to congressional district selection, and AL - Escambia County and FL - Escambia County to county selection.

Response:
Edits have been made to reflect these comments.

BAS Panel Review Comments and Responses

No comments were received that required response or adjustments to the proposal.

Gulf Coast Ecosystem Restoration Council

FPL 3b Internal Best Available Science Review Panel Summary

July 2020

Introduction

On Tuesday, June 30, and Wednesday July 1, 2020 the RESTORE Council convened the Funded Priorities List (FPL) 3b Internal Best Available Science (BAS) Review Panel. The purpose of this internal panel was to use Council member-agency expertise to address external BAS review comments provided for FPL 3b submitted project/program proposals, and potentially identify project/program synergies not identified prior to proposal submission. The ultimate goal of the panel was to provide Council members with substantive best available science content to inform their decision-making.

The internal panel was convened via webinar with representatives from each of the Council's eleven member agencies present. Each BAS Panel member was provided the following:

1) Full FPL 3b proposals
2) 3 external BAS reviews for each proposal
3) Summary of external BAS reviews for each proposal
4) Proposal Sponsor's response to the BAS reviews summary
5) Any proposed revisions to the proposal

Proposal sponsors provided a brief synopsis of their proposal to the panel, a summary of comments made in external reviews, and discussed their proposed response to the external reviews. Council staff then solicited feedback from the panel on the proposal sponsor's presentation of comments and responses to those comments, and any additional BAS concerns. Council staff also solicited feedback on any existing or future synergies with other Gulf restoration activities. The proceedings of the meeting for this proposal are summarized below.

Sponsor: Alabama

Perdido Watershed Water Quality Improvements and Restoration Assessment Program

References: There is additional literature related to project evaluation and assessment that is not utilized in this proposal.

- The BAS Panel agrees that Alabama has appropriately addressed this comment.

Justification: Include more data on environmental trends in the proposal.

- The BAS Panel agrees that Alabama has appropriately addressed this comment.

Risks: Including projects that will be evaluated and preliminary data will allow for a better assessment of risk.

- The BAS Panel agrees that Alabama has appropriately addressed this comment.

Statistical methods: Discuss risk of being unable to detect change in ecosystem due to complexity of ecosystem/stressors, etc.

- The BAS Panel agrees that Alabama has appropriately addressed this comment.

Coordination: Discuss integration with NEP watershed management plan.

- The BAS Panel agrees that Alabama has appropriately addressed this comment.

Methodological details: Details on participants/scientific team would provide more clarity to the process.

- Panelists appreciate that composition of the team will include cross-state and federal membership, allowing partners to benefit from this work.
- The BAS Panel agrees that Alabama has appropriately addressed this comment.

Other: A panelist requests clarification as to how the objectives of this proposal differ from those of the Coastal Alabama Regional Water Quality Program.

- Alabama response: The Coastal Alabama Regional Water Quality Program identifies specific water quality techniques that can be applied to attain project-level water quality benefits through "dirt-turning" projects. This proposal focuses on a combination of water quality and habitat benefits that can be attained at the watershed scale, and includes development of conceptual models, a restoration assessment framework, and a suite of indicators that could be used for decision-making and evaluation of watershed benefits.

Panel comments on existing or future synergies with proposed activity:
Implementation of this proposal would assist an EPA-sponsored estuary program through synergy with that work. There are also synergies with the EPA Baseflow project. In addition, participation on the proposed scientific team would allow partner agencies to benefit from this work.

SCIENCE EVALUATION

Bucket 2: Comprehensive Plan Component

Proposal Title: Perdido Watershed Water Quality Improvements and Restoration Assessment Program
Location (If Applicable): Alabama
Council Member Bureau or Agency: Alabama Department of Conservation and Natural Resources
Type of Funding Requested: Planning / Implementation

Reviewed by: Reviewer 1
Date of Review: 05/07/2020

Best Available Science:

These 4 factors/elements help frame the reviewer's answers to A, B and C found in next section:

Question 1.	
Have the proposal objectives, including proposed methods, been justified using peer reviewed and/or publicly available information?	Yes
Comments:	
The proposal objective to develop a restoration plan and assessment strategy for water quality and habitat improvements is clear.	

Question 2.	
If information supporting the proposal does not directly pertain to the Gulf Coast region, are the proposal's methods reasonably supported and adaptable to that geographic area?	Yes
Comments:	
n/a. The project pertains to the Gulf Coast region.	

Question 3.	
Are the literature sources used to support the proposal accurately and completely cited? Are the literature sources represented in a fair and unbiased manner?	Yes
Comments:	
The literature sources used to support the proposal are accurate, location appropriate, and support the needs and focus identified in the proposal.	

Question 4.	
Does the proposal evaluate uncertainties and risks in achieving its objectives over time? (e.g., is there an uncertainty or risk in the near- and/or long-term that the project/program will be obsolete or not function as planned?)	Yes
Comments:	
As a planning process, this proposal has a low level of risk. There is a great opportunity for risks and incertainties to be incorporated into the plan, conceptual model, and restoration assessment development.	

Based on the answers to the previous 4 questions, and *giving deference to the sponsor to provide within reason the use of best available science,* the following three questions can be answered:

Question A	
Has the applicant provided reasonable justification that the proposal is based on science that uses peer- reviewed and publicly available data?	Yes
Comments:	
The proposal is supported by sound science, research and reports that expound on the current status of the Perdido watershed. In addition, future land use projections are used to identify potential future issues that could arise without implementation of this project and those issues are identified in publicly available reports and peer-reviewed papers.	

Question B	
Has the applicant provided reasonable justification that the proposal is based on science that maximizes the quality, objectivity, and integrity of information (including, as applicable, statistical information)?	Yes
Comments:	
The proposal is for a planning effort and has identified areas where science can be incorporated. By establishing a science team as part of the project, this will help strengthen the science-basis and will provide a great foundation for future implementation of the program.	

Question C	
Has the applicant provided reasonable justification that the proposal is based on science that clearly documents and communicates risks and uncertainties in the scientific basis for such projects/programs?	Yes
Comments:	
As a planning process, this proposal has low risk. However, the risks and uncertainities could be incorporated within the plan, conceptual model, and restoration assessment to strengthen those components.	

Science Context Evaluation:

Question A	
Has the project/program sponsor or project partners demonstrated experience in implementing a project/program similar to the one being proposed?	Yes
Comments:	
The sponsor has experience implementing projects like this through past efforts with CIAP, GOMESA, and ACAMP prgrams. This does sound like a component that is part of the MBNEP watershed management plan development process. The development of watershed management plans for tidally influenced watersheds has largely been funded by NFWF GEBF and RESTORE FPL1. It is essential that this restoration effort be a part of or incorporated within the watershed management plan, a process well understood and embraced by local communities across Alabama's coast.	

Question B	
Does the project/program have clearly defined goals objectives?	Yes
Comments:	
The goals defined in the proposal are clear. As stated above, habitat improvements were included in the abstract, but not the goals. Identification of habitat goals as well would help strengthen the proposal.	

Question C	
Has the proposal provided a clear description of the methods proposed, and appropriate justification for why the method is being selected (e.g., scientifically sound; cost-effectiveness)?	Yes
Comments:	
While the proposal discusses and overall approach to the plan, details on participants, scientific team, and specific processes for planning would strengthen the proposal and provide more clarity to the process.	

Question D	
Does the project/program identify the likely environmental benefits of the proposed activity? Where applicable, does the application discuss those benefits in reference to one or more underlying environmental stressors identified by best available science and/or regional plans?	Yes
Comments:	
The proposal does a good job of identifying envrironmental benefits and stressors. It discusses potential inclusion of these into the plan, conceptual model, and restoration assessment, as well as determining a prioritization of stressors for evaluation. The proposal made a good point that everything cannot be monitored, so the focus on determining the triggers within and across systems that can be monitored is a solid approach.	

Question E	
Does the project/program have measures of success (i.e., metrics) that align with the primary Comprehensive Plan goal(s)/objectives? (Captures the statistical information requirement as defined by RESTORE Act)	Yes
Comments:	
The project aligns with the primary Comprehensive Plan goal identified. The abstract clearly defines goals of improving water quality and habitat. However in the Goals section, only the water quality goals are mentioned. Habitat goals have not been included and would strengthen the proposal and project.	

Question F	
Does the proposal discuss the project/program's vulnerability to potential long-term environmental risks (i.e., climate, pollution, changing land use)? (Captures risk measures as defined under best available science by the RESTORE Act)	Yes
Comments:	
As a planning project and as stated, the risks are low. Given that it is a planning and assessment framework development process, it should be explicitly stated that long term environmental risks (climate, pollution, land use) will be included in the development process. There was reference to changes in water flo patterns with increasing rain events and the potential for saltwater intrusion. Building further upon these will strengthen the program.	

Question G	
Does the project/program consider other applicable short-term implementation risks and scientific uncertainties? Such risks may include the potential for unanticipated adverse environmental and/or socio-economic impacts from project implementation. Is there a mitigation plan in place to address these risks? Any relevant scientific uncertainties and/or data gaps should also be discussed. (Captures risk measures as defined under best available science by the RESTORE Act)	Yes
Comments:	
Since this is a planning process, risks are low. However inclusion of this information, especially the inclusion of social science to restoration assessment conceptual model, metrics, and monitoring would strengthen the program.	

Question H	
Does the project/program consider recent and/or relevant information in discussing the elements above?	No
Comments:	
The proposal does not include this information, as it is a planning proposal. However, this information should be included as part of the planning, conceptual model, and restoration assessment process.	

Question I	
Has the project/program evaluated past successes and failures of similar efforts? (Captures the communication of risks and uncertainties in the scientific basis for such projects as defined by the RESTORE Act)	No
Comments:	
This proposal has not evaluated past successes or failures of similar efforts. As it is planning and a novel approach there are likely few examples of development. The proposal did highlight several questions to be addresses that will contribute to the success of the planning efftort and it appears that much thought has gone into trouble-shooting those considerations.	

Question J	
Has the project/program identified a monitoring and data management strategy that will support project measures of success (i.e., metrics). If so, is appropriate best available science justification provided? If applicable, how is adaptive management informed by the performance criteria? (Captures statistical information requirement a defined by the RESTORE Act)	Yes

Comments:

The proposal identifies an assessment process for monitoring habtat and water quality at the project-specific and programmatic levels. This could be approached by contracting with a team of scientists and practitioners that can develop the conceptual model, assessment, and monitoring needs at both at the project-specific and programmatic levels. At the top of page 7, the proposal states that 'ADCNR MAY also indentify project-specific metrics for monitoring". This should be a product and with input/development by the scientific team, it provides science-based backing for inclusion in future projects. The team can identify the most important cross-project paramenters to monitor that help tell the story of restoration in the watershed. The questions identified at the bottom of page 7 for consideration are a great jumping off point for the science team. These parameters could be included in the restoration assessment template for application in other watersheds. This team could also be retained to monitor all projects associated with this program to ensure consistency and ease of rolling the information up for a more comprehensive annual summary throughout the life of the program.

The metrics identified are applicable.

Data collection and management was covered adequately. This data should be made publicly available in a reasonable time frame and incorporated into existing data management sites, such as MyMobileBay or DISL, as the state's Center of Excellence.

Adaptive management activities or potential adjustments will arise based on monitoring. This is a solid approach to use monitoring to identify further needs.

Please summarize any additional information needed below:

Click here to enter text.

SCIENCE EVALUATION

Bucket 2: Comprehensive Plan Component

Proposal Title: Perdido Watershed Water Quality Improvements and Restoration Assessment Program
Location (If Applicable): Alabama
Council Member Bureau or Agency: Alabama Department of Conservation and Natural Resources
Type of Funding Requested: Planning / Implementation

Reviewed by: Reviewer 2
Date of Review: 5 May 2020

Best Available Science:

These 4 factors/elements help frame the reviewer's answers to A, B and C found in next section:

Question 1.	
Have the proposal objectives, including proposed methods, been justified using peer reviewed and/or publicly available information?	No
Comments:	
This is a 3-year planning proposal ($1,432,500) with a bit of funds allocated to outreach ($60,000) and data management ($7,500). There is almost no information about what will be done except to vaguely (1) identify focal watersheds, (2) identify projects to assess, and (3) develop an assessment tool. The PIs include only 14 references. Several of the references are potentially peer-reviewed agency reports.	

Question 2.	
If information supporting the proposal does not directly pertain to the Gulf Coast region, are the proposal's methods reasonably supported and adaptable to that geographic area?	No
Comments:	
This project focuses on the Perdido Watershed, which is located in southern Alabama and northwest Florida. Although the work will be done in the Gulf Coast region, it contains almost no information about plans and methods.	

Question 3.	
Are the literature sources used to support the proposal accurately and completely cited? Are the literature sources represented in a fair and unbiased manner?	No
Comments:	
The PIs include only 14 references. Several of the references are potentially peer-reviewed agency reports. I am not aware of any conflicts with the citations but also don't know what individuals are behind the proposal so it is hard to make a complete assessment. One reference is incomplete – Murphy and Weiland 2003. Some have DOI. Others don't.	

Question 4.	
Does the proposal evaluate uncertainties and risks in achieving its objectives over time? (e.g., is there an uncertainty or risk in the near- and/or long-term that the project/program will be obsolete or not function as planned?)	Yes
Comments:	
On pages 8-9, the PIs discuss risk and uncertainties related to their proposed plan. Since this is primarily a planning project, risk is low and could have been avoided had the PIs identified focal watersheds and relevant projects to assess before submitting their proposal (i.e., preliminary data). The major risk that the PIs could affect their study is that of complexity associated with scale. With that said, the PIs argue that the focal watershed (Perdido) is small and relatively simple to study.	

Based on the answers to the previous 4 questions, and *giving deference to the sponsor to provide within reason the use of best available science,* the following three questions can be answered:

Question A	
Has the applicant provided reasonable justification that the proposal is based on science that uses peer- reviewed and publicly available data?	No
Comments:	
The proposal is poorly motivated with ideas supported by past and current research and data. A handful of references relate to project evaluation and assessment but there is a broad literature that could be utilized to support this project.	

Question B	
Has the applicant provided reasonable justification that the proposal is based on science that maximizes the quality, objectivity, and integrity of information (including, as applicable, statistical information)?	No
Comments:	
Again, the proposal only includes 14 references. That ~$110k per reference which I find egregious. Given the dearth of information about what the PIs plan to do, it is impossible to evaluate the "quality, objectivity, and integrity of information" gleaned from this project, if funded.	

Question C	
Has the applicant provided reasonable justification that the proposal is based on science that clearly documents and communicates risks and uncertainties in the scientific basis for such projects/programs?	No
Comments:	
Three references are provided related to risks and uncertainties and these relate to assessment challenges related to scale complexity. One reference appears to be a past similar study focused in the Everglades or Pacific northwest.	

Science Context Evaluation:

Question A	
Has the project/program sponsor or project partners demonstrated experience in implementing a project/program similar to the one being proposed?	No
Comments:	
The PIs fail to provide details about their plans or preliminary data showing that they can complete the proposed activities. The PIs plan to work with various groups to identify watersheds and member projects to assess but fail to provide details about members that have either agreed to participate or would be contacted to participate. For example, task 3 will connect existing monitoring programs but the PIs don't provide details about those programs or their interest in being connected.	

Question B	
Does the project/program have clearly defined goals objectives?	Yes
Comments:	
On page 2, the PIs list one goal (restore water quality and quantity) and two objectives (restore, improve, and protect water resources; improve science-based decision making process).	

Question C	
Has the proposal provided a clear description of the methods proposed, and appropriate justification for why the method is being selected (e.g., scientifically sound; cost-effectiveness)?	No
Comments:	
Again, no details are provided about what will be done and who will be involved.	

Question D	
Does the project/program identify the likely environmental benefits of the proposed activity? Where applicable, does the application discuss those benefits in reference to one or more underlying environmental stressors identified by best available science and/or regional plans?	Need more information
Comments:	
On pages 1, 5, and 8, the PIs use the exact same language to discuss the environmental benefits of this project. Considering how short this proposal is, I find it very lazy to reuse entire paragraphs 3x. Moreover, I am not convinced that the PIs expectations related to benefits associated with this project will be realized since they provide no information (data) about current water quality in the watershed and that it needs to be improved.	

Question E	
Does the project/program have measures of success (i.e., metrics) that align with the primary Comprehensive Plan goal(s)/objectives? (Captures the statistical information requirement as defined by RESTORE Act)	Need more information
Comments:	
On page 8, the PIs list three metrics that will be used to measure the success of this project. All are vague and provide no context for success (i.e., no threshold). Instead they simply list the number of plans, studies, or relevant indicators that result from this project. There are no details about statistics that will be used to evaluate this project.	

Question F	
Does the proposal discuss the project/program's vulnerability to potential long-term environmental risks (i.e., climate, pollution, changing land use)? (Captures risk measures as defined under best available science by the RESTORE Act)	Need more information
Comments:	
The PIs vaguely talk about environmental challenges in the focal watershed that could be long-term risks without providing any strong supporting data describing trends over time.	

Question G	
Does the project/program consider other applicable short-term implementation risks and scientific uncertainties? Such risks may include the potential for unanticipated adverse environmental and/or socio-economic impacts from project implementation. Is there a mitigation plan in place to address these risks? Any relevant scientific uncertainties and/or data gaps should also be discussed. (Captures risk measures as defined under best available science by the RESTORE Act)	No
Comments:	
Risks and uncertainties are mentioned in the proposal but poorly explored. With that said, I agree with the PIs that given the proposed plans, risks should be minor. This is a planning project. The biggest risk is that the PIs fail to identify partners to work with.	

Question H	
Does the project/program consider recent and/or relevant information in discussing the elements above?	Yes
Comments:	
There are roughly 3 handfuls of citations in this proposal. Many are recent and relevant. More supporting references would strengthen this project.	

Question I	
Has the project/program evaluated past successes and failures of similar efforts? (Captures the communication of risks and uncertainties in the scientific basis for such projects as defined by the RESTORE Act)	No
Comments:	
The PIs provide no information about past relevant studies that they have been involved with but do mention some past outreach efforts that could inform some aspects of this project.	

Question J	
Has the project/program identified a monitoring and data management strategy that will support project measures of success (i.e., metrics). If so, is appropriate best available science justification provided? If applicable, how is adaptive management informed by the performance criteria? (Captures statistical information requirement a defined by the RESTORE Act)	Choose an item.
Comments:	
Data management accounts for 0.5% of the $1.5M budget ($7,500). On page 9, the PIs acknowledge that little data will be collected as part of this project. The data management plan seems more associated with primary field research. Nothing in the data management plan seems to be connected with the metrics that will define the success of this project.	

Please summarize any additional information needed below:

SCIENCE EVALUATION

Bucket 2: Comprehensive Plan Component

Proposal Title: Perdido Watershed Water Quality Improvements and Restoration Assessment Program
Location (If Applicable): Alabama
Council Member Bureau or Agency: Alabama Department of Conservation and Natural Resources
Type of Funding Requested: Planning / Implementation

Reviewed by: Reviewer 3
Date of Review: 5/8/2020

Best Available Science:

These 4 factors/elements help frame the reviewer's answers to A, B and C found in next section:

Question 1.	
Have the proposal objectives, including proposed methods, been justified using peer reviewed and/or publicly available information?	Yes
Comments:	
Yes, with the goal of achieving restoration of water quality and quantity, it is clear that identification of nutrient load mitigation projects within watersheds and their efficacy in contributing to water quality improvements dovetails with the need for monitoring and assessment to guide future projects. This was justified well in the proposal with existing peer-reviewed literature.	

Question 2.	
If information supporting the proposal does not directly pertain to the Gulf Coast region, are the proposal's methods reasonably supported and adaptable to that geographic area?	Yes
Comments:	
The issue of nutrient mitigation strategies to improve water quality is an issue in all coastal systems in the US, and there is ample information provided in the proposal that there is impairment of water quality and habitat impacts in the Perdido estuary and restoration projects within the watershed that appear to need coordination and evaluation.	

Question 3.	
Are the literature sources used to support the proposal accurately and completely cited? Are the literature sources represented in a fair and unbiased manner?	Yes
Comments:	
Yes, there is a growing scientific literature, appropriately cited here, that addresses the evaluation of watershed restoration projects and their relative impact on improving oastal water quality.	

Question 4.	
Does the proposal evaluate uncertainties and risks in achieving its objectives over time? (e.g., is there an uncertainty or risk in the near- and/or long-term that the project/program will be obsolete or not function as planned?)	Yes
Comments:	
The proposal states that the risks are low. One risk may be the inability to detect change in ecosystems as a result of project implementation as the result of other mitigating factors.	

Based on the answers to the previous 4 questions, and *giving deference to the sponsor to provide within reason the use of best available science,* the following three questions can be answered:

Question A	
Has the applicant provided reasonable justification that the proposal is based on science that uses peer- reviewed and publicly available data?	Yes
Comments:	
Yes, it is clear that there is significant water quality impairment and habitat decline in the lower Perdido River system, and that watershed-based nutrient mitigation strategies are being implemented, as a result. Evaluation of the restoration projects as they relate to water quality and quantity is a reasonable justification for the proposal.	

Question B	
Has the applicant provided reasonable justification that the proposal is based on science that maximizes the quality, objectivity, and integrity of information (including, as applicable, statistical information)?	Yes
Comments:	
Yes, there are many examples where project success evaluations, such as the one proposed here, are necessary to inform and guide the funding and implementation of future restoration projects.	

Question C	
Has the applicant provided reasonable justification that the proposal is based on science that clearly documents and communicates risks and uncertainties in the scientific basis for such projects/programs?	Yes
Comments:	
Yes, there was discussion in the proposal on the efficacy of existing and future watershed restoration projects in producing positive water quality and quantity benefits. However, it is highly probable that monitoring activites, at the appropriate scales, will provide guidance on the efficacy and choice of future restoration projects.	

Science Context Evaluation:

Question A	
Has the project/program sponsor or project partners demonstrated experience in implementing a project/program similar to the one being proposed?	Yes
Comments:	
The Alabama Department of Conservation and Natural Resources is active with these type of projects in other coastal watersheds and adjacent surface waters in other areas along the Gulf coast in Alabama.	

Question B	
Does the project/program have clearly defined goals objectives?	Yes
Comments:	
Yes, the goals are explicit and consistent with the RESTORE program. The project objectives are clearly iterated.	

Question C	
Has the proposal provided a clear description of the methods proposed, and appropriate justification for why the method is being selected (e.g., scientifically sound; cost-effectiveness)?	Yes
Comments:	
Yes, the proposed project is essential to the investments that ADCNR is making in watershed restoration projects.	

Question D	
Does the project/program identify the likely environmental benefits of the proposed activity? Where applicable, does the application discuss those benefits in reference to one or more underlying environmental stressors identified by best available science and/or regional plans?	Yes
Comments:	
Yes, the project proposal clearly indicated specific metrics of how water quality and habitat in the study area are impared. As such, improvements in water quality and habitat are benefits that can be readily measured as a result of mitigation of stressors through watershed restoration projects.	

Question E	
Does the project/program have measures of success (i.e., metrics) that align with the primary Comprehensive Plan goal(s)/objectives? (Captures the statistical information requirement as defined by RESTORE Act)	Yes
Comments:	
Yes, water quality and habitat quality monitoring metrics as outlined in the proposal narrative are a straightforward method of assessing watershed restoration project success.	

Question F	
Does the proposal discuss the project/program's vulnerability to potential long-term environmental risks (i.e., climate, pollution, changing land use)? (Captures risk measures as defined under best available science by the RESTORE Act)	Yes
Comments:	
Yes, although the nutrient mitigation benefits resulting from the projects that will be assessed in the proposal are readily quantifiable, there is some question as to whether restoration project gains may be lost in the “noise” of climate change impacts, for example. Effort was made in the proposal to indicate that data will be assessed carefully to resolve project benefits through the noise of other mitigating processes.	

Question G	
Does the project/program consider other applicable short-term implementation risks and scientific uncertainties? Such risks may include the potential for unanticipated adverse environmental and/or socio-economic impacts from project implementation. Is there a mitigation plan in place to address these risks? Any relevant scientific uncertainties and/or data gaps should also be discussed. (Captures risk measures as defined under best available science by the RESTORE Act)	Yes
Comments:	
As this project deals less with direct implementation of restoration projects, where short term risks may occur, this project plan is to assess long-term benefits, where the collective implementation of a suite of projects are likely to reduce the risk that benefits will be minimal or non-existant.	

Question H	
Does the project/program consider recent and/or relevant information in discussing the elements above?	Yes
Comments:	
Yes, as there is considerable impairment in water quality and habitat value in the lower Perdido system, such as low DO and significant loss of seagrass habitat, the project coordination, guidance and evaluations proposed in this project suggest a high likelihood of success, in terms of demonstrating positive benefits.	

Question I	
Has the project/program evaluated past successes and failures of similar efforts? (Captures the communication of risks and uncertainties in the scientific basis for such projects as defined by the RESTORE Act)	Yes
Comments:	
Yes, it is clear that the ADCNR has been active with institutional partners in watershed restoration projects along the Gulf. As such, their involvement in coordination and evaluation of similar projects, elsewhere, suggests a positive outcome of the the proposed project.	

Question J	
Has the project/program identified a monitoring and data management strategy that will support project measures of success (i.e., metrics). If so, is appropriate best available science justification provided? If applicable, how is adaptive management informed by the performance criteria? (Captures statistical information requirement a defined by the RESTORE Act)	Yes
Comments:	
Yes, there is a description of monitoring procedure in the proposal, but direct monitoring will not be conducted in this project. However, it is likely that the ADCNR will be active providing monitoring information resulting from work that is not included in this proposal.	

Please summarize any additional information needed below:
Click here to enter text.