Developing a Plan to Assess Lower Trophic Levels of the Barataria Estuary

A Monitoring and Adaptive Management Activities Implementation Plan

May 12, 2021

Introduction

Wetlands in the Barataria Basin and along the Louisiana coast were among the most heavily oiled parts of the Gulf Coast shoreline in the aftermath of the 2010 Deepwater Horizon (DWH) oil spill (Figure 1). Louisiana's coastal wetlands provide foundational habitat and support resources for the entire coastal nearshore ecosystem of the broader Gulf of Mexico. Extensive oiling of coast and wetlands in the basin directly impacted many species that rely on its shorelines. Oiling and associated response activities significantly exacerbated the ongoing loss of these wetlands. The DWH oil spill also severely impacted benthic species, including amphipods, fiddler crabs, and marsh periwinkles along oiled marsh shorelines, including those within the Barataria Basin (DWH NRDA Trustees 2016).

The DWH oil spill settlement in 2016 provides the Natural Resource Damage Assessment (NRDA) Trustees (Trustees) up to $8.8 billion, distributed over 15 years, to restore natural resources and services injured by the spill. As described in the DWH oil spill Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement (PDARP/PEIS; DWH NRDA Trustees 2016), the Trustees selected a comprehensive, integrated ecosystem approach to restoration. The Final PDARP/PEIS considers programmatic alternatives, composed of Restoration Types, to restore natural resources, ecological services, and recreational use services injured or lost as a result of the DWH oil spill incident. As shown in the PDARP/PEIS, the injuries caused by the DWH oil spill affected such a wide array of linked resources over such an enormous area that the effects must be described as constituting an ecosystem-level injury. The PDARP/PEIS and information on the settlement with BP Exploration and Production Inc. (called the Consent Decree) are available at the Gulf Spill Restoration website.

The combination of restoration techniques and approaches to build and maintain habitat across large areas of coastal Louisiana will address injuries to the Gulf ecosystems that depend on its productive wetlands.

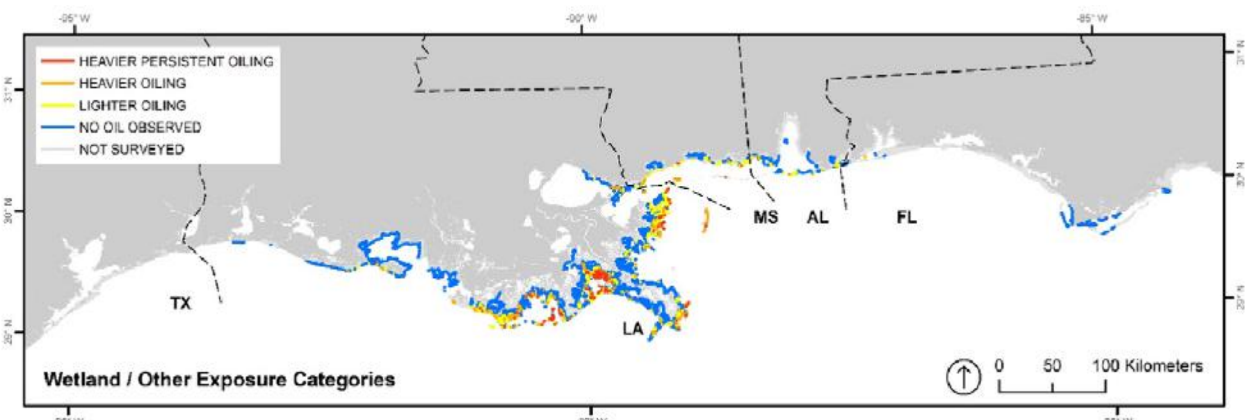

Figure 1. Observed oiling in coastal wetland and other shoreline habitats along the northern Gulf of Mexico (Nixon et al., 2016).

The Lower Trophic Level Plays a Key Role in Providing Ecosystem Benefits

Coastal and nearshore habitats integrate and form a continuum within the nearshore ecosystem and contribute to an integrated, connected food web (Baillie et al. 2015; Boesch & Turner 1984; Boström et al. 2011; Deegan 1993; Deegan et al. 2000; Nelson et al. 2013; Nelson et al. 2015). The PDARP recognizes the interconnected nature of habitats, organisms, and ecosystem benefits of habitat restoration, and that restoration approaches can be implemented in combination to increase overall benefits to other injured resources, such as fish and shallow benthic communities.

Lower trophic level organisms provide a critical link between wetland restoration and ecological benefits to injured fish and water column invertebrates. Lower trophic level organisms include phytoplankton and zooplankton taxa in the water column and microphytobenthos, benthic infauna (e.g., amphipods, polychaetes, nematodes, and oligochaetes), and benthic epifauna (e.g., small clams, snails, and marsh periwinkles). In conjunction with detritus, they form the base of the estuarine food web; this prey base is especially important during the fish juvenile stages that inhabit nearshore areas.

Lower trophic level organisms play an important role in the production of commercially important species at higher trophic levels in the state of Louisiana. Figure 2 and Figure 3 illustrate the flow of energy from phytoplankton, detritus, and bottom sediments up through trophic levels, finally converging upon top carnivores (e.g., fish) that are generalist feeders on various organisms.

Lower trophic level organisms also assist in the breakdown of detritus; increase microbial activity and productivity; oxygenate sediments; and help maintain healthy levels of nutrients in sediments (Carman et al. 1997; Meysman et al., 2006; Boudreau & Jørgensen, 2001; Middelburg, 2019). They are also a fundamental structuring element of the estuarine ecosystem, just as emergent plants are a fundamental structuring element of the Mississippi Delta ecosystem.

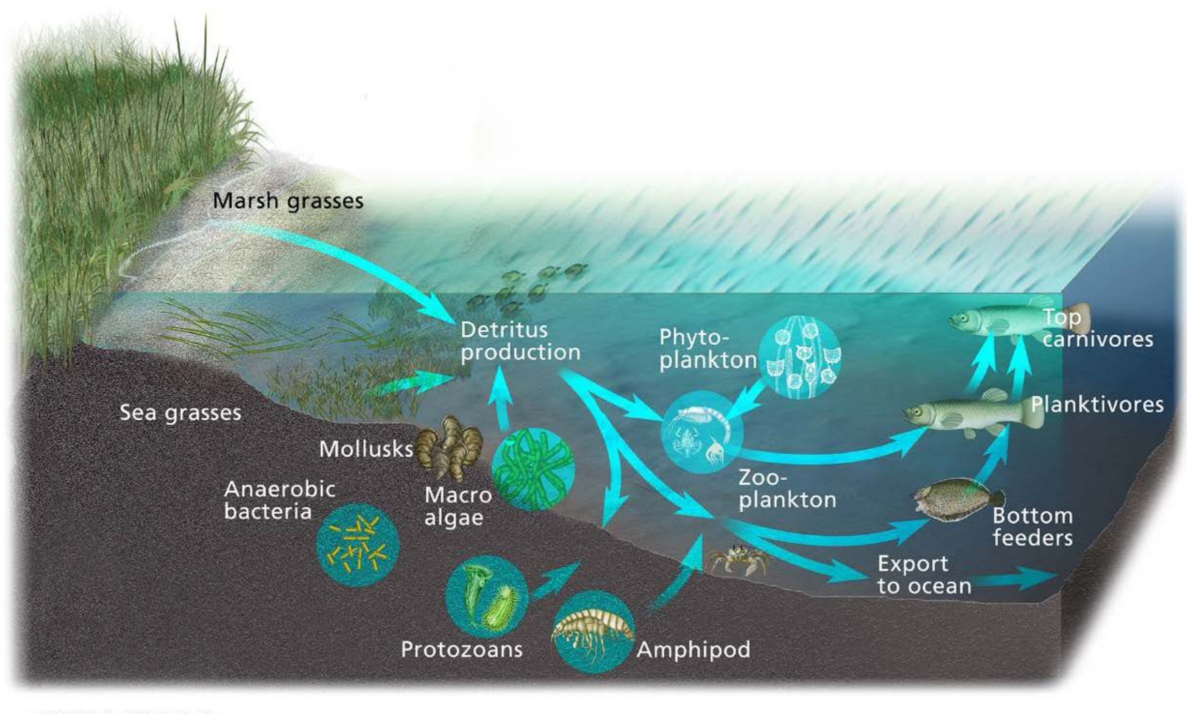

Figure 2. Food web diagram for a typical estuarine ecosystem showing feeding linkages among some of the major trophic groupings. Blue lines and arrows indicate flow of food from source to consumer (DWH NRDA Trustees 2016 PDARP).

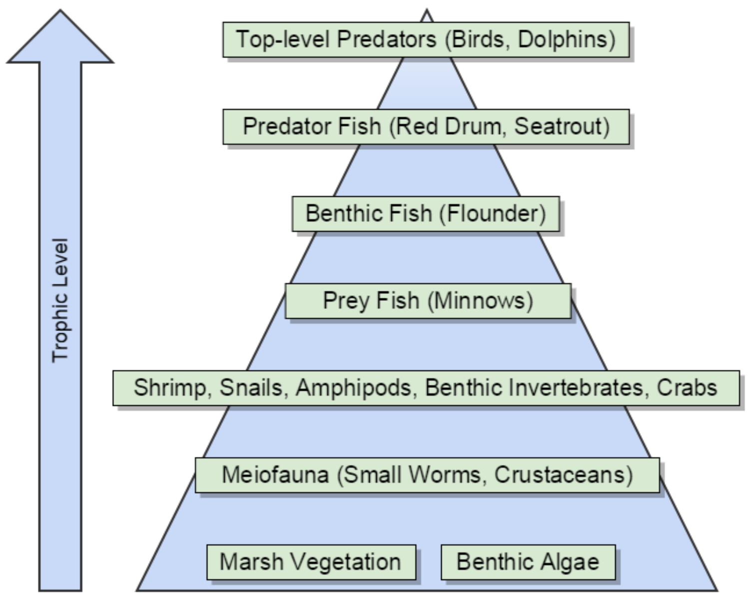

Figure 3. Simplified trophic pyramid for salt marsh species in the northern Gulf of Mexico. The lower trophic level organisms form the base of the nearshore food web, providing nutrients to other organisms, as well as habitat (DWH NRDA Trustees 2016 PDARP).

The Need for a Baseline Inventory of Lower Trophic Level Communities in Barataria Basin

Information related to the spatial and temporal composition of lower trophic level consumer communities is notably deficient for Louisiana's estuaries. In Barataria Basin, there are insufficient lower trophic level data to establish pre-restoration baseline conditions as a basis for identifying change. Although monitoring programs collecting hydrologic, water quality, vegetation, and fish and shellfish population data in Barataria Basin exist, the key impacts of restoration of coastal habitats on lower trophic level communities—and potential trophic cascade effects on the food web and top consumers (e.g., fish population responses)—are not well understood, in large part because the critical data to link them does not exist (NMFS 2017).

Establishing a baseline scientific understanding of lower trophic level communities in Barataria Basin is essential prior to implementing the Deepwater Horizon restoration projects anticipated over the next few decades and will inform evaluation of the effects of restoration activities and other management actions in the Basin. The status of the lower trophic level provides a window into the function and health of the estuarine ecosystem and can help measure progress towards restoration goals. Additionally, changes in community composition can suggest if, and if so when, adaptive management actions should be considered. The baseline information will also provide data to improve the capability of numerical models to predict ecosystem responses (trophic transfers, food web characteristics) to various scenarios including future environmental conditions and restoration actions.

The Lower Trophic Level Serves as an Indicator of Environmental Change

Because of the interconnected nature of the estuarine ecosystem, quantification of fish, shellfish, and their available prey is important for detecting ecosystem change and shifts in the food web likely to result from variations in environmental drivers (salinity, temperature, nutrients, suspended sediments, sediment grain size composition, chlorophyll a, light levels, dissolved oxygen, contaminants, water level and flow). Salinity and sediment composition, both components subject to anthropogenically-driven and naturogenic habitat disturbance in Louisiana, have been identified as major factors regulating the local distribution of lower trophic level assemblages in estuarine systems (Montague & Ley, 1993; Van Diggelen & Montagna, 2016; Kennish et al., 2004).

Benthic infauna, by virtue of their low mobility and sedentary habits, serve as excellent biological indicators of environmental conditions. Because they are particularly susceptible to ongoing impacts of buried DWH oil, they can serve as an indicator of continued ecological recovery or, conversely, provide evidence of slower than expected recovery (Fleeger et al. 2015; Baumann et al. 2018). The responses of benthic communities to environmental disturbances (e.g., oil spills [Montagna & Harper, 1996]; physical disturbance [Dernie et al., 2003]) can be varied, highlighting the critical need for first establishing baseline conditions in anticipation of significant environmental shifts. Multiple studies have shown that the DWH oil spill adversely impacted heavily oiled Barataria Bay marsh benthic fauna including amphipods (Powers & Scyphers, 2016) and meiofauna (Brunner et al., 2013; Fleeger et al., 2015). Changes in the distribution and composition of benthic organisms have been linked to shifts in food web structure, increases in invasive species, and declines in the abundance of historical fish populations in other major U.S. estuaries (Winder & Jassby, 2011; Kimmerer & Thompson, 2014; Dynamic Solutions, 2016; Tango & Batiuk, 2016).

Document Purpose

This MAM Activities Implementation Plan (MAIP) describes the MAM activity, "*Developing a Plan to Assess Lower Trophic Levels of the Barataria Estuary Food Web*." This activity will design a pre-restoration baseline inventory of lower trophic level organisms in Barataria Basin that will provide a basis for evaluating future changes in lower trophic level communities. This activity will also provide a foundation for future opportunities described later in this document.

MAM Activity Overview:
Developing a Plan for Assessing Lower Trophic Levels of the Barataria Estuary

Background

The proposed activity will develop a targeted and efficient protocol to inventory lower trophic level organisms in Barataria Basin that will complement existing monitoring programs for physical parameters (hydrology and water quality) and higher-level trophic data (fish and shellfish) in Barataria Basin. The Louisiana Department of Wildlife and Fisheries (LDWF) conducts long-term coastwide fisheries-independent and fisheries-dependent monitoring programs across coastal Louisiana. The LDWF Fisheries-Independent Monitoring Program (FIMP) monitors fish and shellfish species assemblages, relative abundance, size distribution, and mass (LDWF 2019). Environmental conditions (i.e., salinity, temperature, turbidity, dissolved oxygen) are sampled concurrently with the fish and shellfish catch data (Figure 4). The Coastwide Reference Monitoring System (CRMS) of Louisiana also monitors station characteristics such as marsh elevation, accretion, vegetation, and soil composition.

The System Wide Assessment Monitoring Program (SWAMP, Hijuelos et al., 2013; The Water Institute of the Gulf 2019) has been designed to complement the existing continuous gauge stations maintained by USGS, NOAA, or CRMS. SWAMP collects discrete and continuous data on water level, salinity, temperature, DO, turbidity, and chlorophyll a at marsh and open water sites throughout Barataria Basin. After restoration actions are implemented, existing datasets (e.g, SWAMP/CRMS data) could be used to detect changes in hydrology, water quality, elevation and inundation, and vegetation and potentially relate these habitat changes to changes in fish, shellfish, and invertebrate communities.

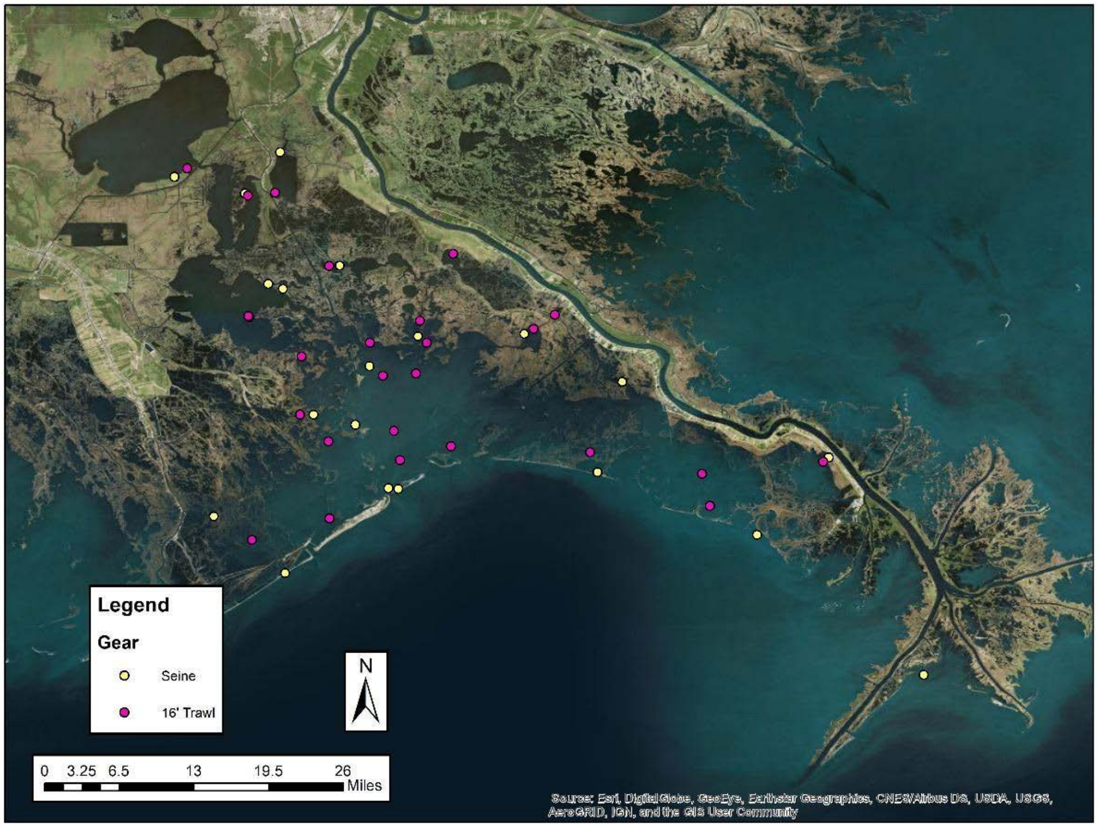

Figure 4. LDWF trawl and seine sampling sites within Coastal Study Area (CSA) 3, Barataria Basin.

The lower trophic level sampling protocol will be designed to collect data that could improve the parameterization of Barataria Basin ecosystem models (e.g., EwE, CASM) that have been used to date to evaluate historical food web structure, and may be used in the future to project the outcomes of restoration and/or adaptive management options relative to a future without action (FWOA). Existing studies that characterize conditions of healthy benthic and pelagic ecosystems (e.g., Weisberg et al. 1997, Llansó et al. 2002a, b) will be identified during Activity 1 described below.

Objectives & Tasks

This MAIP proposes three activities:

1. **Identify sources and extent of existing data.** Identify available lower trophic level and associated environmental data collected in the Barataria Basin area, through review of published literature and unpublished data (e.g., academic colleagues). Produce summary report and lists of repositories/sources for obtaining data.
2. **Query and synthesize existing data.** Identify the specific lower trophic level data gaps, quantify variability, and perform related power analysis to inform sampling design.
3. **Establish Lower Trophic Level baseline inventory sampling and analysis protocol and sampling design.** Ensure that sampling design and data analysis will capture the baseline conditions of the Barataria Basin sufficient to describe the spatial and temporal variation within the Barataria Basin; to evaluate future changes in the lower trophic level community; and to be compatible with and complementary to existing databases (e.g., CRMS, FIMP, ecosystem model input). Produce baseline inventory protocol, timeline, and budget.

Activity Implementation

The three activities will be completed within a one-year period. The deliverables are intended to provide a foundation for further work, described in the section "Future Opportunities," that are not included in this budget because they would be contingent on future LA TIG review and approval of an additional MAIP.

Activity 1: Identify sources and extent of existing data.

Activity 1 ensures that existing data are known and leveraged to improve sampling design, and that any new data collection will minimize unnecessary duplication of past effort. The cooperator will perform a literature review of available lower trophic level data collected in the Barataria Basin area. The cooperator will also endeavor to identify any ongoing and/or unpublished sampling efforts that may be relevant. This activity may engage TIG agency scientists and technical subject matter experts (e.g., modelers, NOAA SE Fisheries Science Center field staff), and external scientists who have developed, but not yet published, relevant data. This activity does not involve data analysis. Identification of available datasets and data gaps will inform a sampling protocol as described in Activity 2.

The cooperator will produce a summary report or database that includes the following:

- Citation or source for each dataset (e.g., journal article or personal communication)
- Repositories or sources of the identified datasets (e.g., public database or scientist name)
- Study location (e.g., which area or waterbody within Barataria Basin) and sub-habitat type (e.g., marsh edge)
- General description of samples collected (e.g., "species-level identification within 5-cm cores")
- Date range of sample collection (including season, if known)

The document will be subject to one 10-business-day review by the LA TIG agency staff that participated in its development before being revised in response to that review and finalized by the cooperator.

Activity 2: Query and Synthesize existing data.

Activity 2 ensures that the baseline inventory protocol will leverage, and will be complementary to, existing datasets while meeting baseline data needs. The cooperator will query the data identified in Activity 1 and will produce a summary report that describes the following:

- Specific needs (e.g., spatial variability) for using data to address known management questions and ecosystem model projections;
- Feasibility for use of, and gaps in, existing data for addressing the known needs, such as spatial and temporal distribution, sub-habitat types, species/guilds, and food web trophic transfers (e.g., as identified in Expert Panel 2018 report to the LA TIG).
- Seasonal and temporal variability based on variability of existing data, and related power analysis of data to improve efficiencies in sampling design including number and locations.

This activity may engage TIG agency scientists and technical subject matter experts. The document will be subject to one 10 business-day review by the LA TIG agency staff that participated in its development before being revised in response to that review and finalized by the cooperator.

Activity 3: Establish Lower Trophic Level baseline inventory sampling and analysis protocol and sampling design.

Activity 3 describes the main goal of this proposed activity: to design a sampling and analysis protocol for the LA TIG's consideration that will characterize conditions in Barataria Basin before the majority of DWH habitat restoration projects are implemented and will be compatible with existing and planned datasets. The resulting draft protocol will incorporate information derived from the preceding activities, to establish appropriate sites, replication, habitat types, abiotic/biotic metrics, and sampling frequency.

The cooperator will coordinate plan development including

- leading the design and writing of a protocol that incorporates the deliverables from Activities 1 and 2 in addition to the expertise of scientists and ecosystem modelers (Trustees and other experts); and
- soliciting, coordinating, and synthesizing experts' input via conference calls and document reviews.

The resulting sampling protocol, written in the DWH MAIP format, will be designed to characterize the lower trophic level composition, abundance, distribution and production within the estuary in relation to seasonal variability across the natural and anticipated gradients of habitat conditions (e.g., salinity) within the Barataria Basin. The inventory protocol will be reviewed by ecosystem modelers to ensure compatibility of the collected data for use in refining ecosystem models of the Barataria Basin food web. This step may also include TIG agency scientists and technical subject matter experts, and external scientists who provide unpublished data to Activity 1 and/or have expertise in relevant sample collection and analysis.

NOAA will develop the associated budget and timeline for fieldwork, analysis, data development and synthesis reporting.

The sample design will be provided to the LA TIG for one 10-business-day review before being finalized by the cooperator. After incorporation of TIG comments, the revised sample design will be presented to the TIG along with a draft funding resolution to fund the baseline inventory.

Future Opportunities

This proposal describes a baseline planning effort that will provide a foundation for future opportunities to improve restoration planning, assessment, and adaptive management in Barataria Basin. Those future opportunities are described here to provide context for the value of the proposed work, but they are not part of the proposal's budget below.

> ***Baseline inventory (field work)***. Implement the Lower Trophic Level inventory sampling design. Characterize the structure of the lower trophic level community of the water column and the benthos and its temporal and spatial variability in Barataria Basin before the majority of DWH restoration projects are implemented. This will inform the development of a longer-term, refined monitoring protocol to periodically assess the lower trophic level health in the Barataria Basin.
>
> ***Ecosystem model development***. Use the characterized lower trophic community information (the results of the baseline inventory) to inform the ecosystem models of the basin-level food web by refining calibration, validation, sensitivity analyses, and ground-truthing in order to improve utility of the models to assess the potential successes and impacts of proposed and future restoration projects. This effort would also build on the LA TIG work with the Ecosystem Modeling Expert Panel to address questions related to changes over time in the Barataria Basin food web (biodiversity and linkages); benthic:pelagic ratios and productivity; community assemblage; energy transfers; and uncertainty ranges of these ecosystem functions.

Budget

The total budget (Table 1) for this activity accounts for participation by a cooperator; the ecosystem modelers and academic scientists; NOAA's implementation role, and LA TIG Trustee agency participation in development and review of deliverables.

NOAA will be responsible for overall work direction and contract administration including TIG coordination, DIVER annual reporting, compliance, and financial tracking. NOAA will also develop the sampling protocol budget and timeline, and will provide technical input into sample design, data inventory, and development and review of deliverables.

A cooperator will coordinate and complete all three activities, and may subcontract academic experts and ecosystem modelers to provide input into sampling design and data needs.

Table 1. Summary budget for the proposed MAM activity.

Organization	Role	Cost
NOAA	Lead Implementing Trustee. Overall management of MAM activity, including direction and oversight, TIG coordination, compliance, contract administration. Technical input into development and review of deliverables.	$220,000
CPRA	Technical input into development and review of deliverables.	$45,000
Cooperator	Coordinates MAM activity. Engages TIG SMEs and external scientists to provide input and to review drafts. Leads development of all deliverables including data inventory and analysis, sampling design, and protocol design.	$520,000
External Scientists / Ecosystem Modelers (sub-awards through Cooperator)	Technical input into development and review of deliverables.	(included in Cooperator budget)

Implementation Roles

NOAA will be the Implementing Trustee. The NOAA Restoration Center will be responsible for coordinating with the LA TIG, providing overall direction and oversight for the MAM activity, including contract administration, compliance, financial tracking, annual reporting, DIVER data management, and approval of deliverables.

The Water Institute of the Gulf will be responsible for implementing the contracted work under the direction of NOAA as the Implementing Trustee. This will include coordinating input and developing reports for Activities 1 and 2; coordinating input and developing the Activity 3 deliverable (inventory sampling design); and submitting deliverables to NOAA.

LA TIG agencies will have the opportunity to join a small working group to provide technical input into development and review of the deliverables for all three activities. Additionally, the Activity 3 deliverable (inventory sampling design) will be sent to the full LA TIG for a 10-business-day review period.

Data Management and Reporting

The DWH Trustees, as stewards of public resources under OPA, will inform the public on the MAM activity's progress and performance. Therefore, NOAA will report the status of the proposed activity via the Data Integration, Visualization, Exploration, and Reporting (DIVER) Restoration Portal annually, as outlined in Chapter 7 of the PDARP/PEIS (*DWH* Trustees, 2016). All reports compiled as part of this activity will also be stored on the DIVER Restoration Portal. Data storage and accessibility will be consistent with the guidelines in Section 3.1.3 of the MAM Manual (DWH NRDA Trustees 2019). In the event of a public records request related to data and information that are not already publicly available, the Trustee to whom the request is addressed would provide notice to the other Louisiana TIG members prior to releasing any data that are the subject of the request. Some of the data collected may be protected from public disclosure under federal and state law (e.g., personally identifiable information under the Privacy Act) and therefore would not be publicly distributed.

TIG MAM Strategy Goals Addressed by this MAM Activity

Given the unprecedented temporal, spatial, and funding scales associated with the DWH oil spill restoration effort, the Trustees recognized the need for robust Monitoring and Adaptive Management (MAM) to support restoration planning, implementation and performance. As such, one of the programmatic goals established in the PDARP/PEIS is to “Provide for Monitoring, Adaptive Management, and Administrative Oversight to Support Restoration Implementation” to ensure that the portfolio of restoration projects provides long-term benefits to natural resources and services injured by the spill (Appendix 5.E of the PDARP/PEIS). This framework allows the Trustees to evaluate restoration effectiveness, address potential uncertainties related to restoration planning and implementation, and provide feedback to inform future restoration decisions.

The DWH restoration projects constructed and planned in Barataria Basin create significant changes to the Basin, such as changes in hydrology and conversion of shallow open water to constructed marsh. Adaptive management requires more than simply documenting a high-level change (e.g., change in fish abundance or species composition); it requires understanding the causes and mechanisms of change (e.g., changes in prey). For example, the ability to demonstrate the relationship between wetland restoration and fish productivity depends on sampling prey organisms to provide evidence for trophic linkages. The deliverables developed through this MAM activity will provide the foundation for developing the information needed to describe ecosystem-level effects of DWH restoration projects, such as quantifying changes in community structure, population, estuarine nekton productivity.

Therefore, this MAM activity will support the LA TIG commitment to report on progress towards meeting stated restoration goals and objectives at the project level and ecosystem level; and to inform future ecosystem-level project designs, implementation, and evaluation. Collectively, information gained from this MAM activity will directly benefit the LA TIG’s ability to effectively predict and assess Louisiana’s estuarine food web within the broader context of future DWH *Wetlands, Coastal and Nearshore Habitats* restoration projects.

This MAM activity, combined with subsequent monitoring to periodically assess the condition of lower trophic level resources will support both planning and evaluation of the comprehensive, integrated ecosystem restoration approach described in the LA TIG’s Strategic Restoration Plan and Environmental Assessment #3: Restoration of Wetlands, Coastal, and Nearshore Habitats in the Barataria Basin, Louisiana (LA TIG 2018).

Consistency of MAM Activity with the PDARP/PEIS

This MAM activity is consistent with the DWH Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement (PDARP/PEIS) (DWH NRDA Trustees 2016). For injuries to coastal habitats in the northern Gulf of Mexico and resources that use these habitats (e.g., fish, invertebrates, and birds), the PDARP states this goal (PDARP 5.5.2.1):

> *Restore a variety of interspersed and ecologically connected coastal habitats in each of the five Gulf states to maintain ecosystem diversity, with particular focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities* (PDARP 5.5.2.1, Goals of the Restoration Type).

The PDARP emphasizes the complex and interconnected food webs of nearshore habitats, stating, "Coastal and nearshore habitats integrate and form a continuum within the nearshore ecosystem and contribute to an integrated, connected food web." This complexity is a result of the interactions that occur among the different subsystems (e.g., salt marsh, oyster reef) and series of food webs. It also confirms that exposure of benthic fauna to sediments contaminated with DWH oil resulted in a series of adverse effects including death, reduced growth, and reduced reproductive success (PDARP 4.3.3.3).

As described in the PDARP (4.6.1.1.2), benthic organisms are a significant part of the estuarine food web and ecosystem:

- Various plants grow in the shallow water sediments (e.g., emergent and submerged aquatic vegetation, including benthic algae). Decomposing plant material is an important food in estuaries.
- Food and inorganic nutrients flow from the water column to the bottom and in the opposite direction.
- Benthic organisms filter water for food, and some move over and through sediments and take food from the sediment itself.
- Numerous other organisms also feed on the bottom, including many invertebrates (e.g., shrimp, crab), fish, and birds.
- The flow of energy from phytoplankton, detritus, and bottom sediments converges upon top carnivores that are generalist feeders on various organisms. These top carnivores include many species of fish (e.g., sea trout, red drum, and flounder), birds (e.g., sea gulls, wading birds), and mammals (e.g., dolphins). The flow of energy from primary producers to top predators is exemplified for marsh species in the trophic pyramid in Figure 3.

Recognizing this complexity, the PDARP emphasizes the potential for multiple restoration approaches to be implemented in combination to increase overall habitat benefits to other injured resources, such as fish and shallow benthic communities. For example, a goal of the Wetlands, Coastal, and Nearshore Habitats restoration type is to restore a variety of interspersed and ecologically connected coastal habitats[...] to maintain ecosystem diversity, with particular focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities (PDARP 5.5.2.1). As such, this MAM activity is consistent with the PDARP/PEIS, including the Monitoring and Adaptive Management Framework, as described in Section 5.5.15.2.

In summary, this proposed MAM activity will support restoration planning, and evaluation of restoration actions and associated benefits to fish, estuarine habitats, and increased ecosystem services in Barataria Basin by supplying information on a critical portion of the complex estuarine food web.

Evaluation of NEPA Requirements

The Trustees' approach to compliance with NEPA summarized in this section is consistent with, and tiers where applicable from, the PDARP/PEIS Section 6.4.14. Resources considered and impact definitions (minor, moderate, major) align with the PDARP/PEIS. Relevant analyses from the PDARP/PEIS are incorporated by reference. Such incorporation by reference of information from existing plans, studies or other material is used in this analysis to streamline the NEPA process and to present a concise document that briefly provides sufficient evidence and analysis to address the Louisiana TIG's compliance with NEPA (40 CFR 1506.3, 40 CFR § 1508.9). All source documents relied upon are available to the public and links are provided in the discussion where applicable.

As discussed in Chapter 6 of the PDARP/PEIS, a TIG may propose funding a planning phase (e.g., initial engineering, design, and compliance) in one plan for a conceptual project, or for studies needed to maximize restoration planning efforts. This would allow the TIG to develop information needed leading to sufficient project information to develop a more detailed analysis in a subsequent restoration plan, or for use in the restoration planning process. Where these conditions apply and activities are consistent with those described in the PDARP/PEIS, NEPA evaluation is complete and no additional evaluation of individual activities is necessary at this time.

a. NEPA Review of MAM Activity

The MAM activity would be limited to planning and data management activities for the development of a monitoring protocol. None of the actions would negatively impact resources or have environmental consequences.

b. NEPA Conclusion

After review of the proposed activities against those actions previously evaluated in the PDARP/PEIS, the Louisiana TIG determined that these activities are consistent with the PDARP/PEIS evaluation of preliminary phases of restoration (planning, feasibility studies, design engineering, and permitting activities) provided in Section 6.4.14 of the PDARP/PEIS. Therefore, no further NEPA analysis is required at this time.

Compliance with Environmental Laws and Regulations

The Louisiana TIG has completed technical assistance with the appropriate regulatory agencies for this MAM activity based on the description in the MAIP. Because all proposed activities are desktop activities, NOAA and DOI, on behalf of the LA TIG, determined that no effects to ESA-listed species and habitats, designated EFH and marine mammals protected under MMPA are expected. Thus, consultations and permits from NMFS and USFWS are not required.

Additionally, the proposed project was evaluated under the following statutes through a BE form review and it was determined that the following statutes do not apply based on the nature of the work (desktop analysis only):

- Migratory Bird Treaty Act (USFWS)
- Bald and Golden Eagle Protection Act (USFWS)
- Coastal Zone Management Act
- Coastal Barrier Resources Act (USFWS)
- Rivers and Harbors Act/Clean Water Act
- National Historic Preservation Act (Section 106)

Federal environmental compliance responsibilities and procedures follow the Trustee Council Standard Operating Procedures (SOP), which are laid out in Section 9.4.6 of that document. Following the SOP, the

Implementing Trustees for each activity will ensure that the status of environmental compliance (e.g., completed vs. in progress) is tracked through the Restoration Portal.

Documentation of regulatory compliance will be available in the Administrative Record that can be found at the DOI's Online Administrative Record repository for the DWH NRDA (https://www.doi.gov/deepwaterhorizon/adminrecord). The current status of environmental compliance can be viewed at any time on the Trustee Council's website: http://www.gulfspillrestoration.noaa.gov/environmental-compliance/.

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