Deepwater Horizon

Louisiana Trustee Implementation Group

MONITORING AND ADAPTIVE MANAGEMENT ACTIVITY IMPLEMENTATION PLAN:

Monitoring Approaches for Bottlenose Dolphin Restoration in Louisiana

June 2022

Implementing Trustee: NOAA

Introduction

The Louisiana Trustee Implementation Group (LA TIG) Monitoring and Adaptive Management (MAM) Strategy provides guidance to support the LA TIG in identification of MAM activities that will maximize resource benefits as well as assess and report on collective outcomes from restoration actions taken through Natural Resource Damage Assessment investments (Deepwater Horizon Louisiana Trustee Implementation Group 2021). SMART Objectives were developed for seven of the Restoration Types identified for restoration funding in Louisiana. The strategy refers to MAM needs as "key knowledge gaps or information needs relevant to planning, implementing, and/or evaluating restoration (operating at multiple spatial or temporal scales) that would help the Trustees achieve the restoration goals established in the PDARP/PEIS" (DWH NRDA Trustees, 2017).

In many instances, including for the Marine Mammal Restoration Type, the current state of knowledge was not sufficient to establish SMART Objectives. As a result, a MAM need to develop a SMART Objective was identified and a MAM activity to address that need was also detailed. The activities in this MAIP develop study plans and other activities that when executed will fill many of the dolphin MAM needs outlined in the LA TIG MAM strategy as well as inform further development of the LA MM SMART Objectives.

Document Purpose

This Monitoring and Adaptive Management Activity Implementation Plan (MAIP) describes the Monitoring and Adaptive Management (MAM) Activity "Monitoring Approaches for Bottlenose Dolphin Restoration in Louisiana," which will support six of the LA TIG Marine Mammal MAM Fundamental Objectives. This MAIP describes MAM activities that will synthesize existing data, design inventory plans and a monitoring program to fill critical Marine Mammal MAM data needs in Louisiana, and support development of the LA TIG Marine Mammal MAM SMART Objectives.

LA TIG MAM Strategy Goals Addressed by this MAM Activity

This MAM activity aligns with the LA TIG MAM Strategy (DWH LA TIG 2021) by addressing Marine Mammal Restoration Type Fundamental Objectives and MAM Needs to develop SMART objectives. As noted in the LA TIG MAM Strategy, baseline data was not available to establish a "quantifiable and time-sensitive threshold or target to justify a SMART Objective" for many fundamental objectives. All of the Marine Mammal SMART Objectives are in the "Metric and Target to be Developed" category. The project will address the design, synthesis, and development portions of the following "MAM needs to develop SMART Objectives":

1. Within 5 years, design and implement a long-term (15 year) monitoring program for dolphin populations in the nine stock areas of LA that capture stock status and trends (abundance/ density/ distribution/ population genetics/ fecundity/ survival/ health).

2. Develop and implement a plan to quantify bottlenose dolphin habitat use in LA.
3. Synthesize available data (including NOAA stock assessment reports) and identify opportunities to quantify and monitor direct and indirect threats in LA.
4. Develop and implement a plan for quantifying and better characterizing freshwater exposure and effects on bottlenose dolphins in the nine LA stock areas.
5. Develop and implement a common framework for assessing risk to dolphins from environmental contaminants and apply it to the nine LA stock areas.
6. Design and implement a study to assess risk to bottlenose dolphins of infectious and non-infectious diseases of concern in the nine stock areas in LA.

This project is intended to begin to address the LA Marine Mammal Fundamental MAM Objectives listed below.

1. Quantify and assess bottlenose dolphin stocks across LA basins and nearshore coastal waters,
2. Understand bottlenose dolphin utilization of foraging habitat,
3. Decrease threats from vessel strikes, fishing, and indirect threats,
4. Document and investigate freshwater exposure effects, and apply the knowledge to decrease, mitigate, or treat future impacts to bottlenose dolphins
5. Characterize and decrease environmental contaminants and their cumulative effects, and
6. Detect infectious and non-infections sources of disease.

MAM Activity Overview

Background

Lessons learned developing previous restoration and monitoring plans indicate that appropriate study design and threat characterization is a critical first component of bottlenose dolphin monitoring and development of effective restoration projects, as indicated in the LA MAM SMART objectives work.

Each suggested MAM activity to address a MAM need has its own significant project design, expert opinion gathering, and/or data discovery and compilation need that is necessary before SMART objectives can be set for LA bottlenose dolphins (see LA MAM SMART Objectives MAM needs). The project will fill those initial data needs in a comprehensive and systematic way, providing a foundation to execute marine mammal MAM activities in Louisiana.

This MAM activity will characterize threats/stressors and develop specific study designs to meet key MAM data needs in order to set SMART objectives for bottlenose dolphin restoration in the LA bays, sounds, estuaries, and nearshore waters (generally separated into 9 stocks of bottlenose dolphins). These activities include having state-wide consistency in assessing stocks and their threats across Louisiana coastal waters to allow for comparisons between stocks to improve our threat assessments and population trend analyses for restoration planning as well as monitoring restoration effectiveness.

Additionally, the study designs developed through this MAM activity will assess and characterize freshwater exposure effects and risk from contaminants across the nine stocks in order to inform future efforts to decrease the impacts of these threats to bottlenose dolphins.

Tasks

This MAM activity will develop four study designs, which will form the basis for future bottlenose dolphin monitoring activities in Louisiana and provide information on where to focus restoration efforts based on the frequency, geographic scope, and impacts of stressors overlaid with information on abundance, distribution, stock structure, and habitat use.

Task 1: Develop a detailed plan that identifies methods, timing, and approach for determining bottlenose dolphin abundance, distribution, and stock structure as well as habitat use in Louisiana, with an emphasis on foraging and prey.

Overview: Neither bottlenose dolphins nor their feeding/breeding areas are uniformly distributed in Louisiana, and therefore, accurate understanding of population demography, ecology, and habitat use is critical for effective restoration planning, implementation and evaluation of restoration. Baseline assessment of demography and habitat use are essential for evaluating the current status of the populations and ongoing monitoring will help quantify the effects of restoration and inform the need for adaptive management of restoration activities. Study plans for determining abundance, density, and habitat use in stock areas of coastal LA will be developed primarily through workshops with subject matter experts. These study plans, when implemented, will provide the data needed to establish several MM MAM SMART Objectives and measurements of success. This task is data-based only and does not involve fieldwork.

Task 1 addresses LA Marine Mammal Fundamental MAM Objective #1: Quantify and assess bottlenose dolphin stocks across LA basins and nearshore coastal waters.

<u>Methods:</u>

- A 2-day in person, scoping meeting will be held where attendees (bottlenose dolphin SMEs) will provide collective expertise including, but not limited to: bottlenose dolphin ecology and population studies, field survey techniques, abundance estimation and density modeling, population genetics, next generation sequencing, eDNA, bottlenose dolphin stock assessments, feeding ecology and studies.
    - During the 2-day scoping meeting, the team will discuss each LA Bay, sound and Estuary (BSE) and nearshore area to discuss the appropriate field methods to obtain the necessary abundance, distribution, and habitat use data. This includes identifying the best survey technique for a given area (e.g. small boat capture-mark-recapture surveys or aerial surveys), frequency of surveys, trackline/survey design, etc.
    - The team will also identify the data and analytical needs for assessing stock structure (e.g. are biopsies needed? If so, from where? how many? how would they be

analyzed?) and for understanding foraging and prey (do we need to run stable isotopes, prey sampling, behavioral observations, eDNA?). Lastly, the team will decide on a project/area prioritization process to be incorporated into the study design plan.

- The study plan will be written up based on information gathered from the meeting and will include equipment and staffing needs and budgets. The draft plan will be circulated back to the meeting attendees for input and editing.

Outputs/Deliverable: Study plan including equipment, staffing needs, and budgets to determine bottlenose dolphin abundance, distribution, and stock structure as well as habitat use in Louisiana.

Task 2: Synthesize existing information to better and more fully characterize individually and cumulatively direct human caused threats (e.g., fishery bycatch, illegal feeding, gunshots, entrapment, marine debris, etc.), and other threats such as environmental contaminants and disease.

Overview: Certain habitat types support varying densities of bottlenose dolphin and may have varying exposure to different anthropogenic and natural stressors. Characterizing the relative frequency, geographic scope, and/or impacts of stressors will help determine where to focus and prioritize restoration efforts, establish pre-restoration baseline of stressors, the cumulative impacts, and assess the effectiveness of future restoration efforts. This effort to develop a comprehensive, coast-wide characterization of human caused threats will include analyzing and synthesizing existing literature and developing the appropriate framework for the characterization. This objective is data-based only and does not involve fieldwork.

Task 2 addresses LA Marine Mammal Fundamental MAM Objective #4: Decrease threats from vessel strikes, fishing, and indirect threats

Methods: In order to develop the comprehensive, coast-wide characterization of human caused threats the following activities will be undertaken:

- ∉ Examine the existing literature (published papers and reports, tech memos, gray literature, etc).
- ∉ Evaluate evidence of human interactions from the strandings data, reviewing any human interaction information from Louisiana health assessment data, and reviewing other, unpublished sources (observer data, recreational fishing intercepts, etc) in order to characterize these threats in the stock areas.
- ∉ Review different methods and/or frameworks for assessing and characterizing human caused impacts (see Phillips and Rosel, 2014 for an example) and determine, in collaboration with NOAA personnel, the appropriate framework for characterization of the frequency, scope, and impact of human-caused threats.

Outputs/Deliverable: Report that characterizes human caused threats to bottlenose dolphins in Louisiana, and identifies opportunities to quantify and monitor these threats in LA.

Task 3: Develop a plan for quantifying and better characterizing freshwater exposure and effects on bottlenose dolphins in coastal Louisiana.

Overview: Freshwater exposure, or low salinity exposure events include flooding from intense precipitation events (such as the 2019 northern Gulf Unusual Mortality Event) or animals that are out-of-habitat (e.g., washed inland due to storm surge, wandering up rivers, getting trapped due to tides or construction). More extreme weather events are expected in the future leading to more frequent dolphin displacements and interventions. Since 2016, the GEBF, LA TIG, and NOAA have provided funding to improve our understanding of the impacts of low salinity exposure on dolphins. These projects have provided an in-depth literature review, a synthesis of freshwater impacts from rescues, observational, and Navy Marine Mammal Program studies, and an expert elicitation that resulted in a dose response for continuous exposure. These data were used to inform the DEIS for the MBSD project and form the foundation for this current project. Numerous data gaps remain on the pathophysiology, timing and progression of freshwater or low salinity exposure disease, thereby hampering effective decision making, timing of, and treatment of interventions across coastal Louisiana waters. In order to begin to address these data gaps and develop better intervention and restoration strategies in Louisiana, a study plan for consistently quantifying and characterizing freshwater exposure and effects in dolphins is necessary.

This planning exercise will allow subject matter experts and responders to work collaboratively to review current protocols, develop consistent diagnostic, assessment, intervention, and treatment strategies, and to develop a process for periodic review of these cases as an evaluation of the effectiveness of the strategies. The project will develop a Response and Scientific Assessment Plan for consistently quantifying and characterizing freshwater exposure and effects in dolphins in Louisiana waters. This plan will also provide decision points and triggers for assessment and response.

This effort will improve actual responses, increase the likelihood of successful intervention, and inform restoration planning and coastal management, thereby benefiting dolphins throughout Louisiana coastal waters. Implementation of these strategies will have an immediate effect on the stranding network emergency response and rescue protocols throughout the state for dolphins affected by low salinity exposure. This task is data-based only and does not involve fieldwork.

Task 3 addresses LA Marine Mammal Fundamental MAM Objective #5: Document and investigate freshwater exposure effects, and apply the knowledge to decrease, mitigate, or treat future impacts to bottlenose dolphins

Methods: In order to develop the plan for assessment and quantifying and better characterizing freshwater exposure and effects on bottlenose dolphins in coastal Louisiana the following activities will be undertaken:

- Develop a web-based collaborative environment to communicate, connect and conduct freshwater collaborative activities with SME team (including, but not limited to individuals at Audubon, LSU, NOAA, University of Illinois and USGS) as follows:

- Workshop or virtual meetings to synthesize data collected in the last few years, identify data gaps, and develop response activities.
- Develop protocols (e.g., to standardize sampling, perform visual/physiological assessment, evaluate freshwater impacts using photo identification). Develop datasheets, diagnostic plans, and a process for periodic review. Provide a data dictionary for the protocols, datasheets, and diagnostics.
- Incorporate these into a Response, Decision making strategy, and Scientific Assessment Plan for consistently quantifying and characterizing freshwater exposure and effects in dolphin populations in Louisiana waters. This plan will also provide decision points and triggers for assessment and response.
- Hold an in-person training workshop with responders and decision makers across the state.
- Coordinate with ongoing work, data collection, responses on low salinity exposure in neighboring states (MS, TX).
- Share information obtained with the research and response community; including a process for debriefing on cases to discuss how well protocols worked, what were the diagnostic assessment results, outcomes, and process for updating the protocols and procedures if needed.
- Identify fields or additions needed for GulfMAP or CETACEAN
- Establish a process for periodic review and updates to the Response and Scientific Assessment Plan for Low Salinity Exposure.

Outputs/Deliverable: Protocols, datasheets, and diagnostic plans and a process for periodic review to be incorporated into Response, Decision making strategy, and Scientific Assessment Plan for consistently quantifying and characterizing freshwater exposure and effects in dolphins in Louisiana waters.

Task 4: Synthesize available information on infectious, non infectious and contaminant hazards (including oil spill hazards) and develop a common framework for assessing risk to bottlenose dolphins in coastal Louisiana.

Overview: To determine whether sources or contributing factors of morbidity and mortality are decreasing in Louisiana as a marker of restoration success or for adaptive management, it is critical to establish bottlenose dolphin health parameters and stressor evaluations that will be monitored over time. It is expected that not all stocks (and habitats) will have the same stressor type or risk. It will be necessary to ensure that the Marine Mammal Stranding Network, academic researchers, and other authorized entities using strandings and other sampling opportunities, are collecting and analyzing the appropriate tissues, data, and samples from a representative number of bottlenose dolphins in each of the stock areas in Louisiana. Ultimately, this project would develop a climate informed hazard assessment and baseline sampling framework, with a focus on anthropogenic contaminants, infectious diseases, and non-infectious diseases (such as HABS), a synthesis of available information on food web or dolphin stressor studies/sources in the stock habitats, and a conceptual model framework of the potential impact and pathways and sources that will inform restoration This task is data-based only and does not involve fieldwork.

Task 4 addresses LA Marine Mammal Fundamental MAM Objectives #6 and #7: Characterize and decrease environmental contaminants and their cumulative effects; and Detect infectious and non-infectious sources of disease.

Methods: In order to synthesize available information on infectious, non infectious and contaminant hazards and develop a common framework for assessing risk to bottlenose dolphins in coastal Louisiana the following activities will be undertaken:

- Synthesize the following types of data for each BSE habitat and coastal dolphin habitat as well near upstream and with an assessment of how climate change would impact the following hazard/stressor:
    - Contaminants including sediment, National Status and Trends (NS&T) data, oil/chemical spills, EPA superfund sites, state hazard sites, EPA EMAP (EPA Environmental Monitoring and Assessment Program), scientific published studies, and reports on environmental hazards and studies on dolphin and prey contaminant levels
    - Non-infectious disease: Low salinity exposure (see above); HABs including marine and freshwater HABs for coastal Louisiana, what HAB monitoring programs are in place; identify the bloom species, drivers, and impacts on HAB type and toxicity in the future with climate change
    - Infectious diseases: Synthesize data on vibrios and other environmental pathogens; viruses (Morbillivirus, coronaviruses, herpes virus and others); fungal; and bacteria (including cetacean brucella).
    - Stranding and health assessment data for each stock including cause of death/lesions, seasonal trends, etc.
    - Forecast of climate drivers and potential outcomes for each geographic area
- Evaluate potential pathways for injury/impacts of priority non-human interaction stressors; Develop consistent health parameters that may be tailored to specific areas or state wide; Identify data gaps that may need further research or expert elicitation.
- Develop conceptual model(s) and climate informed hazard assessment, health status, and monitoring plan framework for potential use for each stock or across Louisiana stocks based on existing data or informed by Gulf-wide biosurveillance plans.
- Through a workshop or series of virtual meetings develop, evaluate and modify protocols, procedures and studies that could be used to monitor the health and stressor impacts that would be used to inform restoration planning and the effectiveness of management action.
- Provide a training plan for partners in preparation for potential implementation.

Outputs/Deliverable:

- A report that synthesizes the data, describes pathways for injury and impacts, establishes consistent health parameters, illustrates a conceptual model, identifies data gaps, and includes citations for data sources used.
- A monitoring plan and assessment frameworks including protocols, procedures, and studies to monitor health and stressor impacts and to evaluate management actions.

- An implementation training plan.

Budget

Cost Category	Objective / Deliverable	Cost
Implementation (development of study designs)	Task 1 - Study plan to identify methods, timing, and approach for determining bottlenose dolphin abundance, distribution, stock structure, and habitat use in Louisiana including foraging areas and prey (plan will include equipment, staffing needs, and budget	**$135,348**
	Task 2 - Characterization of human caused threats, includes synthesizing existing information to better and more fully characterize individually and cumulatively direct human caused threats (e.g., fishery bycatch, illegal feeding, gunshots, entrapment, marine debris, etc.), and other threats such as environmental contaminants and disease.	**$89,112**
	Task 3 - Plan for quantifying and better characterizing freshwater exposure and effects on bottlenose dolphins in coastal Louisiana.	**$105,560**
	Task 4 - Synthesis of available information on infectious, non infectious and contaminant hazards (including oil spill hazards) and development of a common framework for assessing risk to bottlenose dolphins in coastal Louisiana.	**$135,230**
	Project costs total	**$465,250**
MAM Activity Management, Oversight, and Reporting	Oversight, Project Management, FPO/COR, Cost Doc	**$95,628**
Subtotal		$560,878
Contingency (10%)		$56,088
CPRA	Review/Coordination	**$25,000**
Total Project Cost		**$641,966**

Schedule

All of these elements have similar methods and milestones and will proceed on the schedule described below. Generally, we expect 2 months of planning, 3 months for contracting, 6 months of contractor work, 2 months for report review and editing, and 2 months for finalizing reports, submitting information to DIVER, and reporting out to the TIG.

	FY 23			FY 24	
	Oct 2022 - Feb 2023	**Mar - June 2023**	**July – Sept 2023**	**Oct– Feb 2023**	**Mar – May 2024**
Project initiated	**X**				
Planning		**X**			
SMEs contracted		**X**			
Project implementation/ coordination with NOAA			**X**	**X**	
Report review and editing					**X**
Finalizing reports/ submitting info to DIVER/reporting to TIG					**X**

Implementation Roles

NOAA will be the Implementing Trustee responsible for implementing all tasks associated with this MAM activity. NOAA will also be responsible for coordinating with the LA TIG and providing overall direction and oversight for this MAM activity, including administration of any contracts or cooperative agreements, completing compliance requirements, financial tracking, annual reporting, and DIVER data management.

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 and documents created as part of this MAM activity, including a NOAA final summary report synthesizing the findings by objective, 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.

Consistency of MAM Activity with the PDARP/PEIS

The PDARP/PEIS establishes goals to implement an integrated portfolio of restoration approaches to restore injured marine mammals across habitats and geographic ranges by reducing key stressors and supporting the ecological needs of the stocks. This project is consistent with the PDARP goals as it is intended to meet key MAM data needs, which will inform the development of SMART objectives and restoration planning for bottlenose dolphin in the LA bays, sounds, estuaries, and nearshore waters. Information gained from this MAM Activity will directly benefit the Trustees' ability to effectively restore bottlenose dolphin. Therefore, this MAM activity is consistent with the PDARP/PEIS, including the Monitoring and Adaptive Management Framework, as described in Section 5.5.11.4, and the *Strategic Framework for Marine Mammal Restoration Activities*, Module 1 which includes considerations for monitoring. It is also consistent with the LA TIG MAM Strategy (DWH LA TIG 2021), supporting six of the Marine Mammal Restoration Type Fundamental Objectives established, as described earlier in this MAIP.

National Environmental Policy Act Review

Introduction

Section 6.4.14 of the PDARP/PEIS considers the environmental consequences associated with activities including, but not limited to planning, feasibility studies, design, engineering, and permitting of conceptual projects. These activities can include a mixture of data collection into historical conditions, modeling of ecological response to the project, conducting surveys, and creating maps and scale drawings of potential project sites. These activities may also include minimally intrusive field activities. The MAM activities described in this MAIP fall within the scope described in the PDARP/PEIS. Upon review, the federal trustees of the LA TIG find the environmental conditions and NEPA analysis in the PDARP/PEIS current and valid. Therefore, this review relies on the analysis in Section 6.4.14 of the PDARP/PEIS, which is incorporated herein by reference and summarized below.

Summary NEPA Review

For purposes of this NEPA review, activities to be performed are categorized as data-based actions. In this review, workshops, virtual meetings, analysis and synthesis of existing data, expert elicitation, and drafting project deliverables are considered data-based actions. These activities are consistent with the previous evaluation in the PDARP/PEIS Section 6.4.14 and would not cause adverse impacts to any resource category, and require no additional environmental review.

Conclusion

No short-term, negligible to moderate, or long-term moderate adverse impacts would occur as a result of performing these MAM activities. Therefore, no further NEPA analysis for these MAM activities is required.

Compliance with Other Environmental Laws and Regulations

There will be no fieldwork as part of this MAM activity, thus further compliance reviews are not necessary because there will be no effects to species or habitats. No consultations, permits or authorizations are needed to complete this MAM activity.

Literature Cited

Deepwater Horizon Louisiana Trustee Implementation Group. 2021. Louisiana Trustee Implementation Group Monitoring and Adaptive Management Strategy (LA TIG MAM Strategy). Baton Rouge, 55 p. Available: https://la-dwh.com/wp-content/uploads/2021/09/MAMstrategy.pdf

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