

*Deepwater Horizon*

Regionwide Trustee Implementation Group

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**MONITORING AND ADAPTIVE  
MANAGEMENT ACTIVITY  
IMPLEMENTATION PLAN:  
COLONIAL WATERBIRD MONITORING**

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September 2020



## Document Purpose

For the Monitoring and Adaptive Management (MAM) Activity “Colonial Waterbird Monitoring”, this implementation plan (MAIP or Plan) is intended to address MAM priorities: address significant informational needs (e.g. relative abundance, distribution trends and breeding status of colonial waterbirds) and assist in restoration planning. This MAM activity and associated Plan are consistent with the Deepwater Horizon (DWH or Spill) Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement (PDARP/PEIS) as it will “Provide for Monitoring, Adaptive Management, and Administrative Oversight to Support Restoration Implementation.” The Plan is intended to detail all proposed MAM activities, identify specific project metrics as well as identify Trustee roles and responsibilities.

## Introduction

Colonial waterbirds (CWB) incurred significant injuries throughout the northern Gulf of Mexico (nGOM) as a result of the Spill. One of the principle means by which Trustees documented these injuries was through the implementation of regimented CWB aerial nest surveys and nest dotting analyses implemented in 2010 through 2013 (Colibri and Ford 2015).

The Deepwater Horizon oil spill settlement (2016) provides 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<sup>1</sup>. As described in the PDARP/PEIS; the Trustees identified a comprehensive, integrated ecosystem restoration approach as the most effective and representative means to address the broad and geographically expansive resource injuries associated with the Spill. For birds, guidance documents (e.g., Strategic Framework for Bird Restoration Activities) describe potential restoration approaches and techniques, identify potential individual / synergistic restoration benefits, and highlight the importance of monitoring and adaptive management considerations.

## MAM Activity Overview

### Background

Birds epitomize shared biological resource responsibilities, as much as any injured living marine resource. Colonial waterbirds, in particular, are well known to respond to the dynamic and ever-shifting spatio-temporal distribution of breeding sites and foraging areas in the nGOM, both within and among seasons. As future CWB restoration projects will be implemented throughout the nGOM, a cumulative monitoring approach (NAP 2017) would be beneficial in quantifying effects (e.g., benefits) of restoration at the scale of the entire northern GOM. Due to the large geographic scale of the restoration effort, the lengthy timeframe by which restoration funding is being allocated, and the capabilities of colonial waterbirds to move among different breeding localities (including across state and international lines), a Regionwide

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<sup>1</sup> 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.

monitoring effort which emphasizes the use of comparable methods and protocols would document effects of restoration to some colonial waterbird populations (NAP 2017: Chapter 17).

This MAM Activity utilizes established methods and protocols (Colibri and Ford 2015) which have been successfully implemented throughout a portion of the nGOM. These activities are intended as one means by which Trustees will document and partially evaluate CWB breeding population performance at a Regionwide scale. It is envisioned that these efforts would be fully integrated with established, ongoing, smaller-scale monitoring programs thereby providing Trustees with a more comprehensive means to characterize benefits generated from DWH bird restoration activities. Other potential benefits associated with this MAM activity include: (1) population trend data necessary to contextualize outcomes from restoration activities throughout the Gulf (see Frederick and Green 2019); (2) document outcomes of restoration projects that have already been implemented that lack a current bird monitoring component; and (3) partially inform future restoration decision-making by informing the cost-effectiveness (i.e., Restoration Evaluation) and the local and regional context of proposed projects (i.e., Restoration Planning).

## Objectives

This MAM Activity will directly benefit the Trustees' ability to effectively restore colonial waterbird populations within the broader, future DWH Birds Restoration Type projects and potentially projects of other restoration types such as Wetlands, Coastal and Nearshore Habitats.

- **Objectives:** This activity will estimate select CWB endpoints (relative abundance, distribution trends and breeding status) at a Regionwide scale.
- **Scope:** This activity involves (1) new aerial nest surveys and data comparison (2021), (2) nest dotting analysis and data comparison of newly collected data (2021), (3) nest dotting analysis of and data comparison of previously collected data (2015), and (4) multi-year summary (2010-13, 2015, 2018 and 2021) and report writing including Trustee review of reports and analyses developed as a result of this activity.
- **Target species:** Colonial-breeding seabirds and long-legged wading birds (CWBs) documented during aerial surveys and in the data comparison which include but are not limited to:
  - brown pelicans, royal terns, sandwich terns, Caspian terns, gull-billed terns, black skimmers, reddish egret, little blue heron, tricolored heron, roseate spoonbill, great blue heron, black-crowned night-heron, and secondarily, laughing gull and Forster's tern.
- **Duration:** 2 Years
- **Geographic Range:** South Texas to Big Bend of Florida
- **Implementation Team:**
  - Louisiana Coastal Protection and Restoration Authority (CPRA) is the Lead Implementing Trustee and will provide contract oversight as well as technical and administrative oversight.
  - The Department of the Interior (DOI) is the co-lead Implementing Trustee. DOI will facilitate the trustees in planning, coordination and technical review of documents and assist in coordination of all activities.

- All other federal and state trustees of the RW TIG are included in the Implementation Team. NOAA, UDSA, EPA, Alabama, Florida, Mississippi, and Texas will provide technical and other necessary review of documents, reports, analyses, etc. collected and drafted as a result of this activity before distribution in any manner to the public and will collaborate on tasks under the activity for data comparison and other purposes.

Trustee	MAIP	Authorized Budget
DOI	CWB Monitoring	\$31,000.00
EPA	CWB Monitoring	\$10,000.00
USDA	CWB Monitoring	\$0.00
NOAA	CWB Monitoring	\$0.00
Alabama	CWB Monitoring	\$30,000.00
Florida	CWB Monitoring	\$0.00
Louisiana	CWB Monitoring	\$2,387,256.95
Mississippi	CWB Monitoring	\$30,000.00
Texas	CWB Monitoring	\$6,000.00
Total	CWB Monitoring	\$2,494,256.95

## Methods

For the activities identified in this MAIP, the contractor will utilize established methods and protocols which have been shown to be accurate and repeatable towards assessing changes in CWB populations and their important habitats within individual states and the broader nGOM. These activities include:

- 1.) Aerial Photographic Nest Surveys: Implementation of fixed wing aircraft surveys (May and June 2021) intended to assess waterbird colonies and document associated nesting within select portions of the nGOM. Additional information: *Appendix A: Bird Colony Aerial Photography Protocol*;
- 2.) Nest Dotting Analyses: Review and analysis of aerial photographic nest surveys (2015 and 2021) with the intention of documenting the breeding population size and associated nesting for each species at each colony. Additional information: *Appendix B: Bird Quantification (i.e., Dotting) Protocol*

Of note, these methods were utilized within all phases of the Deepwater Horizon (DWH or the Spill) spill (response, pre-assessment and now resource restoration prioritization and performance documentation). In addition, Trustees will work with the contractor to discuss bird quantification results, compile State-level data from already existing surveys, and compare aerial survey data with State-level observational data. Data comparison methods would be developed as part of this activity. Data comparison tasks could include but are not limited to:

- Coordination with bird conservation partners throughout the GoM region to aggregate data from existing monitoring efforts;
- Compilation and data management of State-level CWB data;

- Abundance and population status estimates;
- Data comparison analyses and completing a Final Report that details all relevant results from the activity.

## Schedule

This MAM Activity will be completed within a two (2) year timeframe. The major elements are:

- Year 1: (1) establishing appropriate contracts; (2) nest dotting analysis of previously collected data (2015); (3) planning and implementing Regionwide 2021 aerial photographic nest surveys (May and June 2021); and (4) compiling, managing, and archiving new data and data-rich media (e.g., aerial survey photos) from the Regionwide 2021 aerial photographic nest surveys in a comparative framework for subsequent analysis including data comparison and Trustee Review of data. (Timeframe: November 2020 through December 2021).
- Year 2: (1) aerial nest survey data compilation, data comparison, and nest dotting of select RG Ford data (2021); (2) multi-year data summary and report writing encompassing all RG Ford nGOM data sets (2010-13, 2015, 2018 and 2021) (Timeframe: 2021-22) and (3) report writing including Trustee review of reports and analyses developed as a result of this activity.

## Roles of the Implementation Team

The team described above will implement specific tasks associated with each of the major elements. This section describes the activities associated with the major elements and the entities responsible for each activity.

Table 1. Activity Roles and Responsibilities

Activities by Major Element	LA	DOI	NOAA	EPA	USDA	AL	FL	MS	TX	Contractor
<b>Management, Administration, and Oversight</b>										
Develop, Execute and Manage Contract	X									
Facilitate Trustee Planning, Coordination, and Technical Review		X								
Manage Data and DIVER reporting	X	X								
Provide Technical Review of Documents and Reports	X	X	X	X	X	X	X	X	X	
<b>Implementation</b>										
Aerial surveys										X
<b>Data Analyses</b>										
Trustee Data Review and Development of Data Comparison Methodology	X	X	X	X	X	X	X	X	X	X
Nest dotting analysis of newly collected data										X
Nest dotting analysis of 2015 data										X
Relative abundance, distribution trends and breeding status analyses										X
Draft and Final Multi-year data summary and report writing										X
Review and Approval of Multi-year data summary and report writing	X	X	X	X	X	X	X	X	X	X

## Management, Administration and Oversight

**Roles:** LA, DOI, and Implementation Team

**Description:** Activity planning and coordination will be conducted prior to the launch of the activity and during the activity. This work will involve LA, DOI, and the Implementation Team, and will be conducted via teleconferences and webinars. LA and DOI will oversee implementation during the entire duration of the activity via regular teleconferences to ensure that the deliverables are met on schedule and in a timely fashion. LA, in coordination with DOI, will submit information to the DWH DIVER Portal for annual reporting. All RW trustees will review the draft and final annual report in DIVER.

## Implementation

**Roles:** Contractor, with oversight by LA and DOI

**Description:** LA will coordinate the activities of the Contractor. LA and DOI staff will coordinate with the Implementation Team. The Contractor will perform aerial photographic surveys according to the Methods described above and in Appendix A.

## Data Analyses

**Roles:** Contractor, with oversight by LA and DOI, Implementation Team

**Description:** LA will coordinate the activities of the Contractor. LA and DOI staff will coordinate the Implementation Team. The Contractor will perform data analyses according to the Methods described above and in Appendix B.

## Data Management and Reporting

A data management plan will be developed including data documentation standards, quality assurance and quality control procedures, and long-term maintenance and data archiving policies, that are consistent with the guidance provided in the Monitoring and Adaptive Management Procedures and Guidelines Manual (DWH NRDA Trustees 2017b) and the Trustee Standard Operating Procedures (DWH NRDA Trustees 2016b).

The RW Trustees will submit annual reports to the publicly available DWH DIVER Portal. LA and DOI, in coordination with Implementation Team, will prepare a final summary report synthesizing the findings of the Activity, including inferences and recommendations regarding priorities for CWB restoration.

## Consistency of MAM Activity with the PDARP/PEIS

The PDARP/PEIS establishes goals to restore and protect birds by facilitating additional production and/or reduced mortality of injured bird species, restoration and protection of habitats on which injured birds rely and restoring injured birds by species where actions would provide the greatest benefits within geographic ranges that include the GOM (PDARP/PEIS Section 5.5.12.1). This MAM Activity is intended to address significant informational needs (e.g., relative abundance, distribution trends and breeding performance) to facilitate future restoration planning and implementation activities for colonial waterbirds. Information gained from this MAM Activity will directly benefit the Trustees' ability to effectively restore colonial waterbird populations within the broader, future DWH Birds Restoration Type projects and potentially projects of other restoration types such as Wetlands, Coastal and Nearshore Habitats. Therefore, this MAM activity is consistent with the PDARP/PEIS, including the Monitoring and Adaptive Management Framework, as described in Section 5.5.15.2, and the *Strategic Framework for Bird Restoration Activities*, Module 4: Considerations for Restoration - Monitoring and Adaptive Management Considerations.

## National Environmental Policy Act Review

### Introduction

Section 6.4.14 of the PDARP/PEIS considers the environmental consequence 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 RW 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 (see Appendices A and B) are categorized as “office work” and “field work”. In this review, analysis of aerial photographs using counting software, compiling data, assessing colony conditions, and similar activities are considered office work and make up the preponderance of the work. These activities would not cause adverse impacts to any resource area and require no additional review.

For field work, the PDARP/PEIS states that temporary impacts on the biological and physical environment could include short-term, temporary disturbance of habitats and species, minor emissions from equipment and vehicles, and minor disturbance to terrestrial, estuarine, and marine environments. Field work in this MAIP consists entirely of photographic surveys conducted by a four-man crew aboard fixed wing aircraft, or by other means appropriate. Crews will consist of a pilot, a navigator/data recorder, and two photographers. The navigator will coordinate the sequence of colony visits and optimal aerial approach to each colony with the pilot. As the aircraft approaches a target colony, the crew will assess the spatial distribution of birds on the colony. Photographers, navigator, and pilot will confer to determine the best angle of approach and the ideal altitude for photographic census. Their decision will be based on the shape of the colony, the species present at the colony, the strength and direction of the wind, vegetation around the colony, and angle of the sun. While the approach altitude is variable, all photography will be carried out at an altitude between 600’ and 900’ ASL, adjusted so that birds present on the colony do not leave their nests. Multiple approaches from different directions or altitudes may be made if photographers feel that they are not obtaining pictures of adequate quality or if birds appear to be responding to the presence of the aircraft. After each day’s survey, a subset of photographs will be checked to ensure that the photographic quality is such that the photos are usable for counting. If better photographs are required for a particular colony and survey logistics allow, a colony may be visited a second time during a survey session.



## Conclusion

No long-term adverse impacts would occur as a result of performing these MAM activities. Short-term, negligible to minor adverse impacts could occur to nesting birds from disturbance due to the presence of the aircraft, which in most cases will consist of one or more approaches during one visit per colony. No groundwork is planned. Beneficial impacts would result from increased understanding about the distribution of nesting colonial water birds to help ensure maximum restoration benefits during project planning across the nGoM. The impacts fall within the analysis provided in Section 6.4.14 of the Final PDARP/PEIS which states that some planning activities would cause minor, direct, short-term impacts through associated fieldwork. Therefore, no further NEPA analysis for these MAM activities is required.

## Compliance with Other Environmental Laws and Regulations

The Regionwide TIG will ensure compliance with all applicable state and local laws and other applicable federal laws and regulations relevant to this MAM Activity. We anticipate there will be no impacts to threatened or endangered species. We anticipate that no permits will be needed to implement this Activity.

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 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/>.

## Literature Cited

- Colibri Ecological Consulting and R. G. Ford Consulting Company. 2015. Analysis of 2010–2013 Photographic Census Data from Waterbird Breeding Colonies in the Vicinity of the Deepwater Horizon Oil Spill. Draft Final Report. Prepared for the U.S. Fish and Wildlife Service. Retrieved from: <https://www.fws.gov/doiddata/dwh-ar-documents/790/DWH-AR0055547.pdf>.
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## Appendix A: Bird Colony Aerial Photography Protocol (Colibri)

Aerial photographic surveys will be used to census waterbird colonies based on previous and additional colony photographic surveys carried out in 2010-2013 and 2015 following the Deepwater Horizon oil spill. The list of colonies visited in 2015 will be used initially. The list will be adjusted after each survey session, adding newly discovered colonies and removing any former colonies at small islands that are found to be under water. Colonies containing only cryptic beach nesting birds, such as least terns are not included.

Colony photographic surveys will be carried out from a fixed wing aircraft configured so that two photographers can work simultaneously. Photographers will be familiar with both aerial survey protocols and colony counting methodology so that they can determine immediately whether or not photograph quality is adequate for purposes of counting. Digital SLR cameras equipped with 18-200 mm and 200-300 mm telephoto lenses will be used to acquire photographs. Aircraft waypoints and time will be recorded automatically at 5 second or smaller intervals. Photograph time (recorded as part of the JPG file) will be used to estimate the position of each photograph. The contractor would establish communications with Trustee-identified local contacts during the flyover to coordinate and confirm colony locations and movements.

Crews will consist of a pilot, a navigator/data recorder, and two photographers. The navigator will coordinate the sequence of colony visits and optimal aerial approach to each colony with the pilot. One photographer will take 'context' photographs showing a relatively wide area view of the colony, while the other photographer will concentrate on more detailed 'close-up' shots that will actually be used for counting. If time allows, the context photographer also will zoom in to obtain additional close-up photographs. The navigator will record when the aircraft is approaching a colony, when it is leaving, and the range of frame numbers shot over that colony.

As the aircraft approaches a target colony, the crew will assess the spatial distribution of birds on the colony. Photographers, navigator, and pilot will confer to determine the best angle of approach and the ideal altitude for photographic census. Their decision will be based on the shape of the colony, the species present at the colony, the strength and direction of the wind, vegetation around the colony, and angle of the sun. While the approach altitude is variable, all photography will be carried out at an altitude between 600' and 900' ASL, adjusted so that birds present on the colony do not leave their nests. Multiple approaches from different directions or altitudes may be made if photographers feel that they are not obtaining pictures of adequate quality or if birds appear to be responding to the presence of the aircraft.

Photograph files (JPGs) will be downloaded daily to an external back-up device. Flash memory cards from the cameras will be labeled and stored when they are full. After each day's survey, a subset of photographs will be checked to ensure that the photographic quality is such that the photos are usable for counting. If better photographs are required for a particular colony and survey logistics allow, a colony may be visited a second time during a survey session.

## Appendix B: Bird Quantification (i.e., Dotting) Protocol (Colibri)

Aerial photographs (Appendix A) will be analyzed using the same methods used to analyze photographs collected in the study area in 2010-2013 (Ford 2010). Photos from May and June surveys will be evaluated for their representation of peak breeding population size for each species at each colony. For most species, photos from May surveys will represent peak breeding numbers and will be selected for analysis. For some species, especially black skimmer (*Rynchops niger*), photos from June surveys will better represent peak numbers and will be used for analysis. Occasionally, especially for brown pelican (*Pelecanus occidentalis*), royal tern (*Thalasseus maximus*), and Sandwich tern (*Thalasseus sandvicensis*), well-developed colonies will be counted using May photographs, but additional large nesting groups that form after the May survey will be counted from June photographs and summed with May counts for a total number of nests.

All images of each individual colony will be inspected for clarity, location within the colony, and extent of colony coverage. Those best suited for nest counts based on those criteria and collectively comprising all areas photographed will be analyzed using counting software (Image-Pro, Media Cybernetics®). Nests and birds will be marked manually, and the software will automatically tally total counts for each category. Although the primary objective will be to determine number of nests, individual birds and chicks of each species will be counted in each photo.

For brown pelican, nests will be categorized by their stage of development. These categories will include the following:

- Well-built nest (with attending adult, and with or without chicks);
- Poorly-built nest (pre egg-laying);
- Nest with chicks, but without attending adults;
- Abandoned nest (with eggs, but unattended);
- Empty nest (early-season unattended without eggs or chicks); and
- Brood (dependent chicks away from an obvious nest and not attended by an adult).

Together, these categories will provide numbers of pelican nests and breeding pairs at each colony based usually on a single aerial photographic survey, even though egg-laying dates may span a period of months. For other species, all nests and territories will be marked more generally as “sites”. The detailed nest categories that will be used for brown pelicans are inappropriate for other species because of their small size (terns and gulls), scrape-nesting habits (terns and skimmers), or partial concealment by vegetation (waders and gulls).

Using the software, unique symbol-color combinations will be assigned to different nest and bird categories for each species. Where overlapping images are used to analyze portions of a colony, one or more lines will be drawn on the selected image to delineate the area to be counted using that image. Areas outside any such lines will then be counted using different images. This process will continue until the colony is counted completely with available photographs.

## Compiling Data

After analyzing an image with the software, a screen capture of the analyzed image will be saved as a jpeg file. The screen capture will show all data, including image number, all symbols that marked nests and birds, total counts for each category, colony name, area number, the initials of the photo analyst, the date the image was analyzed, and any other annotations the photo analyst added. All screen captures will be saved with standardized file names and archived in colony-specific folders. All data from each screen capture will be manually entered into a Microsoft® Access database.

## Comparing Data

Trustees will work with the contractor to discuss bird quantification results, compile State-level data from already existing surveys, and compare aerial survey data with State-level observational data. Data comparison methods would be developed as part of this Activity. Tasks could include but are not limited to:

- Coordination with bird conservation partners throughout the GoM region to aggregate data from existing monitoring efforts;
- Compilation and data management of State-level CWB data;
- Abundance and population status estimates;
- Data comparison analyses and completing a Final Report that details all relevant results from the Activity.

## Assessing Colony Conditions

Each analyzed image will be evaluated to characterize conditions at each colony. Factors that will be considered will include the following:

- The stage of the breeding cycle (e.g., early-, mid-, or late-incubation, early chick-rearing, etc.) for each species;
- Habitat occupancy (numerical and geographic extent to which each species occupied the habitat);
- Information specific to a particular image will be entered into a notes field in the main data table in the Access database. Information concerning the colony as a whole will be entered in a separate data table in the same database.