MISSISSIPPI CANYON 252

ADDENDUM: ASSESSMENT PLAN: BIRD COLONY AERIAL PHOTOGRAPHY AND ANALYSIS OF COLONY PHOTOGRAPHIC CENSUS DATA-2013

Approval of the *Assessment Plan for Bird Colony Aerial Photography and Analysis of Colony Census Data-2013* is for the purposes of obtaining data for the Natural Resource Damage Assessment. Each party reserves its right to produce its own independent interpretation and analysis of any data collected pursuant to this work plan.

This plan will be implemented consistent with existing trustee regulations and policies. All applicable state and federal permits must be obtained prior to conducting work.

The trustees have developed a preliminary conceptual model of the DWH release, potential pathways and routes of exposure, and potential receptors. This preliminary model has informed the trustees' decision to pursue the studies outlined in the work plan. By signing this work plan and agreeing to fund the work outlined. BP is not endorsing the model articulated in the work plan.

Department of the Interior Trustee Representative — Date: 4/30/2013

Louisiana Trustee Representative — Date: 5/3/2013

BP Representative — Date: May 1, 2013

ADDENDUM: ASSESSMENT PLAN FOR BIRD COLONY AERIAL PHOTOGRAPHY AND ANALYSIS OF COLONY PHOTOGRAPHIC CENSUS DATA-2013

INTRODUCTION

This *Assessment Plan for Bird Colony Aerial Photography and Analysis of Colony Photographic Census Data-2013* is part of the ongoing Natural Resource Damage Assessment (NRDA) for the *Deepwater Horizon*/Mississippi Canyon 252 (MC 252) Oil Spill (Oil Spill) to assess potential impacts to birds resulting from the Oil Spill. Birds will be in breeding colonies throughout the Study Area (see Methods, Colony Photography) during the months of May and June, 2013. During this period, the Trustees will conduct two photographic surveys of seabird and coastal wader colonies in Louisiana, Alabama, Mississippi, and the Florida panhandle. Because the various species present at these colonies differ in their breeding phenology, the Trustees will visit all documented colonies in the study area twice (Figure 1), once during the May survey and once during the June survey.

Colonies will be photographed in multiple frames using high resolution digital cameras equipped with telephoto lenses. Similar to 2010, 2011 and 2012 (i.e., *Work Plan for Aerial Surveys and Photographic Census for Birds in the Vicinity of the Deepwater Horizon (MC252) Oil Spill, Bird Study #2, 2010; Assessment Plan for Analysis of 2011 Colony Photographic Census Data collected under the Preassessment Plan for Bird Colony Aerial Photography-2011; and, Assessment Plan for Analysis of 2012 Colony Photographic Census Data collected under the Assessment Plan for Bird Colony Aerial Photography-2012)*, these photographs will be sufficiently detailed to allow identification of individual species and will provide a record of bird presence and behavior prior to and during the study period. Therefore, this Assessment Plan also includes the analysis of bird colony photographic census data collected during the May and June 2013 aerial surveys.

STUDY OBJECTIVES

The objectives of this assessment activity are to repeat the bird colony aerial photography in 2013 and analyze the photographic colony census data collected. Colony photographs will provide a detailed record of bird attendance and behavior for comparison with the equivalent data collected in 2010, 2011, and 2012. Data generated through the census will enable the Trustees to evaluate nesting activity of colonial nesting birds.

METHODS

Colony Photography

Colony photographs will be acquired using a small fixed wing aircraft equipped with a belly port for photography. Survey crews will consist of two photographer/observers and a navigator/data logger who will record summaries of observations and direct the pilot. The Study Area for this activity is defined as the region between Atchafalaya, Louisiana and Apalachicola, Florida. The Trustees will revisit all colonies found to be active in 2010 and subsequently revisited in 2011

and 2012. Active colonies will be photographed in multiple frames using high resolution digital cameras equipped with telephoto lenses. These photographs will be sufficiently detailed that even the postures and species of relatively small birds such as terns can usually be distinguished. Colony locations, altitude, trackline, and photographic frame numbers will be recorded on a computer/GPS system. When engaged in colony photography, the aircraft will remain at an altitude of 600' ASL or more at all times to avoid any flushing behavior or disturbance on the part of nesting or roosting birds (see Appendix A for Standard Operating Procedure (SOP) for Bird Colony Aerial Photography).

Analysis of Colony Photographic Census Data

Analysis of 2013 photographic colony census data will follow the same protocol established for the 2010, 2011, and 2012 data (see Appendix B for SOP for Analysis of Colony Photographic Census Data). Photographs will be evaluated and appropriately marked ("dotted") using image analysis software developed by Media Cybernetics®. Results will consist of screen captures of dotted images and summary statistics of those images. Results of these analyses will also include:

1) Total number of individuals of each species at each colony.

2) Total number of "sites" (nest or territorial bird or pair) of each species at each colony throughout the survey area.

3) Categorized assessment of Brown Pelican nests at each colony throughout the survey area. Categories may include: well-built nest, nest with chicks, poorly-built nest, abandoned nest, empty nest, and brood (chicks not attended by an adult and outside an obvious nest).

4) Total number of chicks of each species at each colony in the central area (Atchafalaya Bay, LA to Apalachicola, FL).

COORDINATION WITH MANAGERS OF CONSERVATION UNITS

Avoiding any disturbance to colonies is of the utmost priority. Disturbance can negatively affect the productivity of colonies, and photographic counts cannot be made if a colony is disturbed. At no time will National Park Service (NPS) lands, U.S. Fish and Wildlife Service (USFWS) refuges, or Louisiana Department of Wildlife and Fisheries (LDWF) management areas be crossed at altitudes less than 600'. If managers have concerns regarding disturbance, they may place monitors who are in direct communication with the aircraft on the ground near the colonies. If monitors have *any* concerns about the behavior of the birds, they can contact the aircraft and immediately halt the photographic survey until such time as they indicate it is safe to approach the colony again. This technique has been used on the west coast for colonies that are in the jurisdiction of both NPS and USFWS, and has been found to be an effective way of monitoring and avoiding colony disturbance.

PERMITTING

The appropriate state and federal permits, including research permits for National Park Service lands and special use permits for U.S. Fish and Wildlife Service Refuge lands, will be secured prior to any field activities.

DATA SHARING

MC 252 NRDA chain-of-custody procedures will be observed for camera memory cards after a card is full or after the study is completed pursuant to protocol for transferring and uploading digital photos.

Copies of all data collected during the colony photography phase of this Plan, including raw data, field notes, and photographs will be provided to BP and its representatives and the Louisiana Oil Spill Coordinator's Office (LOSCO) within 30 days of the completion of data collection. Copies of all data processed in accordance with the data analysis portion of this Plan, including copies of the draft results (spreadsheets, etc.) identified in items 1- 4 of the Objective Section will be provided to BP and its representatives and the LOSCO within six months from the date of the first survey. BP will be notified when the surveys begin. A draft report comparing results from the 2013 census with previous year's data is contingent upon the completion of 2011 and 2012 data analysis and will be provided within 60 days thereafter.

The Parties agree to jointly conduct quality assurance/quality control review, including data validation, on the draft results, with the goal of reaching consensus on the data set.

All materials associated with the collection or analysis of samples under these protocols or pursuant to any approved work plan, including any remains of samples and including remains of extracts created during or remaining after analytical testing, must be preserved and disposed of in accordance with the preservation and disposal requirements set forth in Pretrial Orders ("PTOs") # 1, # 30, #35, # 37, #39 and #43 and any other applicable Court Orders governing tangible items that are or may be issued in MDL No. 2179 IN RE: Oil Spill by the Oil Rig "DEEPWATER HORIZON" (E.D. LA 2010). Destructive analytical testing of oil, dispersant or sediment samples may only be conducted in accordance with PTO # 37, paragraph 11, and PTO # 39, paragraph 11. Circumstances and procedures governing preservation and disposal of sample materials by the trustees must be set forth in a written protocol that is approved by the state or federal agency whose employees or contractors are in possession or control of such materials and must comply with the provisions of PTOs # 1, # 30, # 35, 37, #39 and #43.

BUDGET

The estimated contract cost for this 2013 Plan is $521,776. The Parties acknowledge that this budget is an estimate, and that actual costs may prove to be higher. BP's commitment to fund the costs of this work includes any additional reasonable costs within the scope of this approved work plan that may arise.

APPENDIX A

SOP for Bird Colony Aerial Photography

Aerial photographic surveys will be used to census seabird and waterbird colonies between the Louisiana border and Apalachicola Bay based on previous colony photographic surveys carried out in 2010, 2011, and 2012 (Table 1 and, Figure 1). The survey area in 2010 was larger than in 2011 because the actual extent of the spill was better defined by 2011. The list of colonies to be visited in 2013 is the same as those visited in 2011 and 2012. Colonies containing *only* cryptic beach nesting birds, such as Least Terns or plover species, are not included.

Colony photographic surveys will be carried out from a fixed wing aircraft or helicopter 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. Alternatively, GPS location can be recorded directly by the camera, if so equipped.

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. Each colony will be visited once during each survey cycle unless it is determined that the photos for a particular colony need to be retaken. The sequence of colony visitations will be determined at the time of the survey, taking into account weather conditions and the proximity of colonies to each other.

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 (JPG) 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 they 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.

Figure 1. Locations and sizes of colonies to be censused during the 2013 Bird Colony Aerial Photography Assessment Plan. White squares indicate colonies within the study area for which there are historical records, but which did not appear to be active in 2010.

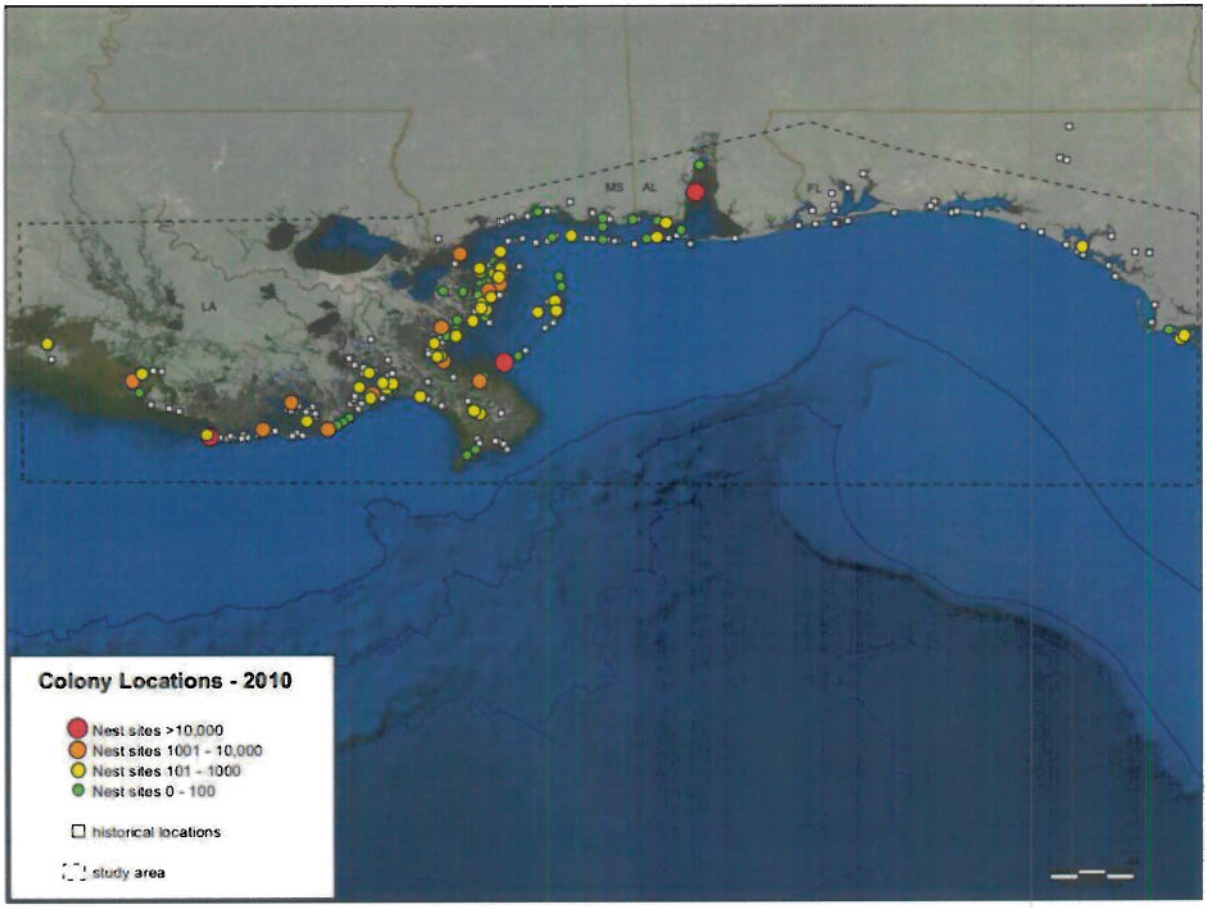

Table 1. List of colonies within the study area to be censused in 2013.

ColonyName	Latitude	Longitude
Raccoon Island	29.0505	-90.9266
Breton Island	29.4955	-89.1742
Gaillard Island	30.5063	-88.0362
Wine Island	29.0948	-90.6108
	29.2558	-90.44
Queen Bess Island	29.3043	-89.9592

Brush Island	30.034	-89.1863
	29.3856	-91.3858
Martin Island	29.959	-89.1983
	29.3474	-89.8672
	29.0941	-90.2212
	29.7017	-89.5487
	29.5021	-89.5356
	29.7988	-88.8605
	29.9197	-89.2627
Half Moon Island	30.1376	-89.4352
	29.3822	-89.32
	29.3656	-89.8646
	29.1437	-90.3475
Belle Isle	29.5758	-89.5727
	29.3631	-89.8534
Freemason Island	29.79	-88.9735
	29.8565	-88.875
	29.6523	-89.464
	30.2367	-88.2661
Bastian Island	29.2923	-89.6732
	29.3341	-89.8716
	30.0637	-89.1928
	30.0261	-89.2274
	29.3659	-89.8357
	30.0675	-89.2069
	30.0578	-89.2011
Cat Island	30.3207	-88.2099
Isle au Pitre	30.1526	-89.1968
	29.6243	-85.1519
	29.5334	-89.556
	29.5314	-89.5535
	29.1875	-89.3123
	29.7411	-89.3568
	29.5247	-89.5726
	29.2818	-89.967
Dog Island	30.2433	-88.7758
	29.6521	-89.4577
	29.8043	-89.2815
	29.2054	-89.3549
Dry Bread Island	29.8426	-89.3064
	29.3459	-90.0342
	30.067	-89.1841
	30.0485	-89.322

	29.4282	-91.3287
	29.8807	-89.2497
	29.8162	-89.3088
	29.0596	-90.9416
Manilla Island	29.4308	-89.9732
Audubon Is.	30.1765	-85.7357
	29.8004	-88.8628
	29.6055	-89.5887
	30.0525	-89.1944
	29.3727	-89.8929
	30.0038	-89.2065
	30.0324	-89.3141
	29.6069	-91.8913
	30.0516	-89.3183
	29.6471	-85.1279
	29.7808	-88.874
Terrapin Island	30.335	-88.2619
	29.8166	-89.3095
	30.2274	-88.3173
	30.6686	-88.0125
	29.5291	-89.5507
	29.407	-89.2903
	30.2289	-88.3269
	29.763	-89.2851
	29.9984	-89.2924
	29.6873	-89.4646
	29.5392	-89.5353
	30.0502	-89.3117
	29.9628	-89.3156
	29.7047	-89.5647
	30.3911	-88.9705
	29.9943	-89.2162
	30.0476	-89.3183
	29.9679	-89.2276
	30.0481	-89.3202
	29.6629	-89.4628
	29.922	-89.3156
	29.9168	-89.4183
	29.6618	-89.4672
	29.9059	-89.2954
	30.2382	-88.8867
	29.8375	-88.8388
	29.8191	-89.3101

	29.8734	-88.8793
	29.6569	-89.5145
	29.9207	-89.5374
	29.8979	-89.301
	29.9368	-89.2873
	29.7439	-89.4532
	30.0271	-89.2796
	29.9751	-89.2762
	29.9813	-89.2574
St. Vincent Is.Roost	29.6773	-85.2214
Cedar Island	30.2791	-88.1193
	30.3454	-88.4083
Round Island	30.297	-88.588
	30.3524	-88.5882
Horn Island	30.2237	-88.5912
	29.945	-88.831
	30.008	-88.8466
	29.8275	-88.8475
	29.815	-88.8567
	29.7942	-88.865
	29.5299	-89.0869
	30.0049	-89.2309
	30.0909	-89.2318
	29.9295	-89.2373
	29.8283	-89.3191
	29.892	-89.3273
	28.972	-89.3475
	28.9395	-89.3937
	29.3261	-89.8319
	29.1636	-90.0932
	29.1376	-90.1323
	29.1181	-90.165
	29.3141	-91.3429

APPENDIX B

SOP for Analysis of Colony Photographic Census data collected under the Work Plan for Aerial Surveys and Photographic Census for Birds

1. Identify breeding colony or roost site location by overlaying aircraft tracklines and aerial photographs with satellite images in Google Earth. Record the latitude and longitude at the geographic center of each location. Record Location Name, if known, and further identify the location using dotter initials and a sequential number; e.g., first colony dotted by Joe Louis Smith = JLS 001. "Dotting" refers to identification of a bird image using image analysis software developed by Media Cybernetics, which renders screen captures of dotted images and corresponding image statistics. Cross-reference location identifiers from year to year.

2. Using the ranges of photograph frame numbers recorded at each location, breeding colony, or roost site as a guide, all associated photographs per location will be reviewed, and generally the highest quality photographs for counting will be selected (i.e., photographs where the relevant birds and nests are most clearly visible). However, the selection process may be influenced by how much can be observed in each photograph. For example, a photograph documenting a larger area might be preferable to a photograph that was slightly sharper but shows less overall area. Counting (nests, sites, and birds for all species present) requires that best judgment be used, but most calls are obvious. Counts can be revisited as needed since all of the decisions are digitally recorded.

3. Using Image-Pro Plus 6.3 or Image-Pro Express software (http://www.mediacy.com published by Media Cybernetics), determine counts of nests, sites, and birds for all species present for as many images as are needed to achieve complete coverage of all locations. Annotate overlapping images with borders to delineate count areas as needed to prevent double-counting. Using the software, manually assign each nest, site, and bird with an appropriate category symbol. Typical category symbols include:

    a. Nest categories: Well-built (with attending adult); poorly-built (typically pre egg-laying); with chicks and attending adult; with chicks but without attending adult; empty; and abandoned;

    b. Site categories: Territorial site (little or no nesting material); unknown site (potential breeding site, but cannot be categorized due to photo quality);

    c. Bird categories: Adults marked as "Birds" include apparent mates adjacent to a bird attending a nest as well as other birds not associated with a breeding site. Birds in increased densities in non-breeding habitat are categorized as "roosting birds". For the central area (Atchafalaya Bay, LA to Apalachicola, FL), also count individual chicks and nestlings, whether still in a nest or wandering away from nests.

4. For bird species other than Brown Pelicans, only a generic "Site" category will be used to represent all potential nests and sites. Additional nest categories cannot be as consistently identified for other species because of: 1) smaller size; 2) scrape-nesting; and/or 3) partial concealment by vegetation. Bird categories as identified for Brown Pelicans will be similar for other species.

5. Save a screen capture of each counted image.

6. Record count data for each counted image in Access Database.

7. This effort will be conducted by personnel with expertise in aerial photographic survey and colony counting work. If additional assistance is required, experienced, primary personnel will train and oversee any needed assistants. Because all counting activity is digitally recorded, decisions regarding the classification of birds and nests can be reviewed at any time.