

**Mississippi Canyon 252**

**ADDENDUM: ASSESSMENT PLAN TO DETERMINE POTENTIAL EXPOSURE AND INJURIES OF NESTING AND HATCHLING LOGGERHEAD SEA TURTLES AND  
LOGGERHEAD SEA TURTLE NESTS – 2012 FIELD SEASON**

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Approval of this Loggerhead Sea Turtle Plan Addendum 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.

Kevin D. Reynolds  
Department of the Interior Trustee Representative

8/24/2012  
Date

[Signature]  
Louisiana Trustee Representative

9/13/12  
Date

[Signature]  
Florida Trustee Representative

8/28/12  
Date

## **Mississippi Canyon 252**

### **ADDENDUM: ASSESSMENT PLAN TO DETERMINE POTENTIAL EXPOSURE AND INJURIES OF NESTING AND HATCHLING LOGGERHEAD SEA TURTLES AND LOGGERHEAD SEA TURTLE NESTS – 2012 FIELD SEASON**

#### **Introduction:**

Potential impacts of oil and dispersants from the *Deepwater Horizon*/Mississippi Canyon 252 (MC 252) Oil Spill on Gulf coast loggerhead sea turtles (*Caretta caretta*) may range from mortality to sub-lethal stress and chronic impairment, including potential deleterious effects on reproduction and recruitment. Response and cleanup efforts may also cause impacts to nesting turtles, their nests, and hatchlings. Sub-lethal or latent effects, such as harm to the reproductive system, would not be detectable by physical examination. Nesting turtles and post-hatchlings may also be subject to continued exposure and adverse effects if oil, dispersant, and associated chemicals persist in the marine environment, including the marine food web. Indirect impacts from potential habitat degradation and loss of prey resources may reduce survival and reproduction.

A Technical Working Group (TWG) composed of technical experts and trustee agency representatives has been assembled to draft a work plan to assess potential injuries to loggerhead sea turtles along the coastline of the Gulf of Mexico in support of the ongoing Natural Resource Damage Assessment (NRDA) for the MC 252 Oil Spill. This *Addendum: Assessment Plan to Determine Potential Exposure and Injuries of Nesting and Hatchling Loggerhead Sea Turtles and Loggerhead Sea Turtle Nests* (Plan) is a component of the NRDA for the MC 252 Oil Spill. Additionally, BP Exploration and Production Inc. (BP) has participated in a review capacity; however, the trustees and BP were unable to reach consensus on the assessment activities in a seasonally timely manner so the trustees pursued this Assessment Plan independently.

Pursuant to OPA regulations, 15 C.F.R. §990.44, the Trustees issued their Notice of Intent to Conduct Restoration Planning in the case of Discharge of Oil from Deepwater Horizon/Macondo Well, Gulf of Mexico. (75 Fed. Reg. 60800 (Oct. 1, 2010)). This Plan provides for data collection to document potential injuries to loggerhead sea turtles consistent with the standard operating protocols (SOPs) referred to in this document.

**Purpose:**

The purpose of this Plan is to document potential exposure to MC 252 oil and dispersants (hereafter referred to as MC 252 oil) and associated impacts to the adult, hatchling and egg life stages of loggerhead sea turtles.

**Objectives:**

1. Assess nesting female physical condition, conduct satellite tracking of inter-nesting and post-nesting movements, and collect blood samples.
2. Collect samples to assess possible toxicological and physiological effects and impairments in nesting females, eggs, and hatchlings along specific Florida and Alabama beaches in the Gulf of Mexico.

The intent is to achieve these objectives by conducting nesting female physical evaluations; satellite tracking of nesting female inter-nesting and post-nesting movements; collecting blood samples; collecting residual tissue samples from eggshells, non-viable eggs, and hatchlings. Nesting materials (sand) will be collected at natural nesting sites to identify potential impacts from MC 252 oil.

Post-collection sample analyses to be conducted will be described in a separate addendum. The 2012 Analytical Addendum for the 2012 field season will be similar in nature and scope to the 2010-2011 Turtle Analytical Plan and will include similar analyses for Polycyclic Aromatic Hydrocarbons (PAHs) and fingerprinting for MC252 oil, where technically practicable.

**Background:**

Five species of sea turtles nest on sandy beaches along the U.S. Gulf of Mexico coast from the Dry Tortugas, Florida, to the Texas/Mexico border: loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*). Nearly the entire Gulf coast supports regular sea turtle nesting except for the Big Bend area of Florida (Pasco County north through Wakulla County), which is largely composed of salt marsh. Satellite tracking indicates turtles may travel and forage within the entire Gulf of Mexico, both during (inter-nesting movements) and between (migratory movements) nesting seasons, making nesting turtles, and the eggs and hatchlings they produce, potentially susceptible to impacts and injury from the MC 252 oil spill. Due to logistical differences in management between loggerhead and Kemp's ridley turtles, this Plan addresses adult nesting loggerhead turtles, eggs, and hatchlings. A separate plan addresses Kemp's ridley turtles.

In the Gulf of Mexico, loggerhead turtles nest from the Dry Tortugas, Florida, to the southern coast of Texas and can extend to the beaches in Mexico. The greatest density of loggerhead nesting in the Gulf occurs along the southwestern coast of Florida in Sarasota County (range of 11 to 50 nests per kilometer documented from 2005 to 2009). Loggerhead nesting densities

decrease along the northern and western Gulf of Mexico coasts with Alabama and western Florida Panhandle beaches documented as supporting a range of 0 to 5 nests per kilometer from 2005 to 2009 (Alabama Share the Beach Nesting Season Statistics <http://www.alabamaseaturtles.com/nesting-season-statistics/>; Florida Fish and Wildlife Conservation Commission (FWC) Marine Turtle Statewide Nesting Totals [http://research.myfwc.com/features/view\\_article.asp?id=11812](http://research.myfwc.com/features/view_article.asp?id=11812)) and likely very few nests (less than 50 per year) being deposited in Mississippi, Louisiana, and Texas (G. Hopkins, Gulf Island National Seashore - Mississippi District, personal communication, 2010; Fuller and Lohofener 1990; Padre Island National Seashore 2010 nesting season website; <http://www.nps.gov/pais/naturescience/current-season.htm>) [note that recent nesting surveys have not been conducted in Mississippi and Louisiana due to the difficulty of access to the beaches]. Three of five recovery units identified for the Northwest Atlantic population of the loggerhead occur in the Gulf of Mexico:

- **Northern Gulf of Mexico Recovery Unit** -- defined as loggerheads originating from nesting beaches from Franklin County on the northwest Gulf coast of Florida through Texas,
- **Peninsular Florida Recovery Unit** -- defined as loggerheads originating from nesting beaches from the Florida-Georgia border through Pinellas County on the west coast of Florida, excluding the islands west of Key West, Florida, and
- **Dry Tortugas Recovery Unit** -- defined as loggerheads originating from nesting beaches throughout the islands located west of Key West, Florida (National Marine Fisheries Service [NMFS] and U.S. Fish and Wildlife Service [FWS] 2008).

Female loggerheads nest every 2-5 years in the vicinity of their natal beach. During the nesting season, female turtles deposit multiple (2-6) clutches of 75-120 eggs on the beach at approximately 2-week intervals (Addison 1996, Sato et al. 1998, Hays et al. 2002, Schroeder et al. 2003, Tucker 2009, Hart et al. 2010). They then travel back to their foraging sites, to which they also show a high level of fidelity (Limpus et al. 1992, Plotkin 2003, Schroeder et al. 2003, Broderick et al. 2007, Girard et al. 2009, Hart et al. 2012). Natal beaches and foraging sites can be nearby or hundreds to thousands of kilometers away from each other. Although nesting turtles typically remain within the vicinity of a nesting beach during the inter-nesting period (Hart et al. 2010), they have also been observed making movements of greater than 100 km (Lamont 2002).

The possibility of oil exposure in nesting loggerheads is supported by pre-oil release tracking studies indicating that many loggerhead turtles in the Gulf of Mexico remain within the Gulf during the inter-nesting interval and between nesting seasons (Girard et al. 2009, Hart et al. 2010, Hart et al. 2012). Exposure to crude oil and its derivatives caused lethal and sub-lethal effects to adults, impacted egg production, and caused embryo mortality and hatchling deformities (Fritts and McGehee 1982, Hall et al. 1983, Lutcavage et al. 1995). In addition, eggs exchange water and gases from the external environment possibly making them susceptible to physical and chemical effects of oil from oil-contaminated sand (Carthy 1996).

## **Study Area:**

The study area includes all loggerhead nesting beaches from Alabama to the Dry Tortugas, Florida (study area). The Plan includes a study site in Baldwin County, Alabama, which includes the Perdue Unit of the Bon Secour National Wildlife Refuge and adjacent private lands and a study site encompassing approximately 17-km of beach along the St. Joseph Peninsula in Northwest Florida (Figure 1A and B; study site).

This Plan represents the third year in what is proposed to be a multi-year effort to assess the potential impacts of the MC 252 incident on nesting and hatchling loggerhead turtles and loggerhead turtle nests.

The study approach for this Plan is similar to that used in the previously approved 2010 and 2011 work plans.

## **Sampling Design:**

### *Nesting Loggerhead Assessments*

Intensive nighttime surveys for nesting loggerhead turtles will be conducted at the study site in Baldwin County, Alabama (Perdue Unit of the Bon Secour National Wildlife Refuge and adjacent private lands) (Figure 1) and along the St. Joseph Peninsula, FL. The study site in Alabama hosts about 7 to 20 nests per year while the Florida site hosts approximately 80-200 nests per year.

Satellite transmitters will be attached on up to 10 nesting turtles in Alabama and up to 10 nesting turtles in Florida in 2012. Five turtles at each site will be fitted with Wildlife Computers SPOT5 satellite tags and up to five others at each site will be fitted with Wildlife Computer Mk10 Fastlock GPS satellite tags (for a total of up to 20 satellite transmitters deployed), using established methods for sea turtle satellite telemetry (Hart et al. 2012). The Fastlock tags will be programmed to provide dive data, as well as to obtain GPS locations once per week. Turtles will also be outfitted with acceleration data-logging tags (ADLs) that will log depth, acceleration, and position of animals within the water column.

Each nesting turtle encountered at the Alabama and Florida study sites will be given a complete physical examination, including examination of eyes and nostrils. Any lesions and abnormalities will be photographed and described on the data sheet. Field personnel will also collect 10 milliliters of blood from the cervical sinus using Vacutainer® needles and tubes (Becton, Dickinson and Company, Franklin Lakes, and New Jersey). The examination and blood collection will occur only after the turtle has completed laying eggs and is covering her nest or returning to the water; turtles that have not nested will not be disturbed as they return to the water. Blood samples will be partitioned for clinical chemistry, hematology and chemical analyses to be described in a separate analytical addendum. At the time of blood collection, subsamples will be processed for hematological endpoints requiring fresh blood.

The nests used by these females will be marked and monitored throughout incubation. Three days after first signs of hatchling emergence, the nests will be excavated and up to 10 randomly selected unhatched eggs will be collected per nest and sent to the lab for processing and analysis.

The purpose of these collections is to assess the nesting turtle physical condition and blood chemistry, and the possible transfer of MC 252 oil and constituents [e.g., polycyclic aromatic hydrocarbons (PAHs)] to the eggs.

During nest inventories after hatchlings have emerged, a sand core will be collected from the inside of the nest cavity. Cores will extend to a 50-cm depth and will be immediately examined for signs of oil distributed throughout the core. The entire sample will then be placed into a stainless steel container, mixed to produce a homogeneous sample, and transferred to a chemically clean, sterile, glass jar for temporary storage on ice or in a refrigerator as per the SOP until shipment to the appropriate laboratory.

*Extent of potential exposure in nests in Alabama, Florida Panhandle, Southwest Florida, and Dry Tortugas*

In 2012 a total of 50 nests will be selected randomly from the study area beaches in Alabama, the Florida Panhandle, Southwest Florida, and the Dry Tortugas. Following hatchling emergence, up to 10 random unhatched eggs per nest will be collected from each of those randomly selected nests and sent to the lab for processing and analysis.

**Permitting:**

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

**Sample and Data Handling:**

MC 252 NRDA chain-of-custody procedures will be observed for all samples. All samples will be transferred with appropriate chain-of-custody forms and all samples that will undergo chemical analysis will be shipped to the appropriate laboratories for storage, processing and analysis. Camera and GPS memory cards will be handled under Chain-of-Custody after a card is full or after the study is completed pursuant to the National Ocean and Atmospheric Administration's DWH NRDA protocol for transferring and uploading digital photos.

All field and laboratory data will be collected, managed, and stored in accordance with written SOPs. The appropriate training on particular equipment or in the conduct of specific field studies for all personnel involved with the project shall be documented and those records kept on file for the duration of this project. All data (including electronically archived data and satellite transmitter data), and original data sheets or electronic files, will be transferred to the U.S. Fish and Wildlife Service and made available to other Trustees in a timely fashion.

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.

***Data Sharing:***

Copies of all data collected in accordance with this Plan, including raw data, field sheets, and field notes, will be provided the Louisiana Oil Spill Coordinator's Office (LOSCO) within a reasonable timeframe once data collection, QA analyses and data entry procedures are complete, and no later than 45 days after the non-analytical data are collected. *Non-analytical* data includes field sheets, photos, photologger forms and GPS files. For non-analytical data collected before the Plan is signed, such data shall be shared not later than 45 days after the Plan is signed. Telemetry data will be made publicly available on [www.seaturtle.org](http://www.seaturtle.org) after a 7 day delay for QA/QC review and will be provided until such time as the telemetry devices cease to operate.

All samples collected pursuant to this plan will be submitted to laboratories that are operated in a manner that is consistent with the guidelines of the Analytical Quality Assurance Plan for the Mississippi Canyon (Deepwater Horizon) Natural Resource Damage Assessment (version 3.0 or later).

**Budget:**

The total field cost for this 2012 Addendum is \$178,090. The Parties acknowledge that this budget is an estimate, and that actual costs may prove to be higher.

**Coordinators:**

<b>Name and Affiliation</b>	<b>Role</b>	<b>Contact Information</b>
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Dr. Margaret M. Lamont U.S. Geological Survey/	Co-Lead Investigator for FL	[REDACTED]
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**Data Collection Summary Outline:**

*Turtles*

- Collect blood from nesting turtles in Alabama and NW Florida
- Collect hematological data
- Satellite track movements of nesting turtles in Alabama and NW Florida
- Collect swipes of nesting turtles in Alabama and NW Florida with visible signs of oil
- Conduct a health assessment on nesting turtles in Alabama that will include a complete physical examination including examination of eyes and nostrils; note any lesions and abnormalities

*Nests*

- Collect unhatched eggs: up to 10 random samples per randomly selected nest (up to a total of 50 nests from the study area of Southwest Florida, Florida Panhandle, Dry Tortugas, and Alabama)
- After hatchling emergence, collect one sand sample from the inside of the nest cavity where unhatched eggs are collected.

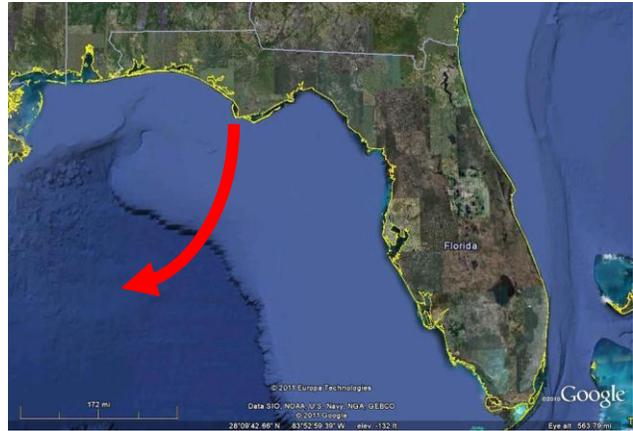
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Figure 1B. Primary loggerhead nesting study site in St. Joseph Peninsula, Florida.



Study site along 17-km of beach on the St. Joseph Peninsula, Florida (area between the red lines).