

DRAFT SAMPLING PLAN

**Assessment of the Impacts of the Deep Water Horizon Oil Spill on
Blue Crab Early Life History Stages**

PHASE I: MEGALOPAE SAMPLE COLLECTION

20 September 2011

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Mississippi Canyon 252 (MC252) Incident

Approval of this work plan is for the purposes of obtaining data for the Natural Resource Damage Assessment (NRDA). Parties each reserve the 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 Deepwater Horizon (DWH) release (the "Incident"), 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.

All materials associated with the collection or analysis of samples under these protocols or pursuant to any approved work plan, except those consumed as a consequence of the applicable sampling or analytical process, must be retained unless and until approval is given for their disposal in accordance with the retention requirements set forth in paragraph 14 of Pretrial Order # 1 (issued August 10, 2010) 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).

APPROVED:

Federal Trustee Representative:

Date

09/28/2011

Mississippi Trustee Representative:

Date

9/27/2011

BP Representative:

Date

1/20/2012

Louisiana Trustee Representative

Date

This document presents a monitoring and assessment plan for organisms, specifically blue crab megalopae and ovigerous female blue crabs within Mississippi waters in the north-central Gulf of Mexico (Plan). For the purposes of this work plan, reference to “Mississippi Canyon 252 oil” or “MC 252 oil” means oil, dispersant, or oil and dispersant mixtures. The Plan specifically addresses the following topics:

- I. **Purpose.** This section describes the overall purpose of and need for blue crab megalopal settlement and ovigerous female collection plans.
- II. **Approach.** Defines the objectives of the assessment and provides an overview of the sampling approach.
- III. **Description of Metrics.** A brief synopsis of the parameters to be measured and sampling units for the various collection metrics.
- IV. **Sample and Data Handling**
- V. **Integration with Other Approved or Pending Work Plans.**
- VI. **Literature Cited**
- VII. **Detailed Standard Operating Protocols (SOPs).** This section sets forth the standard operating procedures (SOPs) proposed for use during site evaluation
- VIII. **Budget**

I. Purpose

Blue crabs, *Callinectes sapidus*, are an economically and ecologically important inhabitant of coastal waters of the Gulf of Mexico (GOM). They support valuable commercial and recreational fisheries and are considered a keystone species throughout their range. Blue crabs spawn from March through October in the northern GOM with peaks in the spring and late summer/early fall (Perry and McIlwain 1986). Blue crab life history includes an offshore marine larval stage with juvenile development taking place in estuaries Stuck and Perry (1981). In the northern GOM, recruitment success (measured as megalopal settlement) is dependent on inter-annual variations in wind stress patterns coupled with basin-scale events such as Loop current spin-off eddies generated during critical periods of larval development (Johnson and Perry 1999, Perry et al. 2003). Seasonality of spawning coincides with climatological inner shelf circulation patterns that transport larvae offshore initially, but then act to return them to shore at the appropriate stage.

Females brood their eggs in shallow waters around the barrier islands over a two-week period. Hatching of eggs occurs near the barrier islands with the zoeae immediately transported to surface waters of the open GOM (Perry et al. 2003). Toward the end of this planktotrophic phase, metamorphosis to the megalopal stage occurs and they recruit to northern GOM estuaries (Rabalais et al. 1995). Highest megalopal settlement occurs from July through September (Perry et al. 1995, Johnson and Perry 1999, Perry et al. 2003). There was high spatial and temporal overlap between blue crab larvae (Andyrszak, 1979; Stuck and Perry, 1981, SEAMAP plankton data, unpublished) and the Incident area. During the spring and early summer of 2010, a large portion of the offshore larval grounds in the northcentral GOM were impacted by surface oil. Based on the co-occurrence of oil and larvae offshore and the heavy oiling of barrier island beaches and shallows where spawning occurs, there is potential for impact to blue crab populations.

This study proposes to examine the impact of oil on early life history stages through monitoring and analysis of blue crab megalopae in the natural environment. Phase I (this study plan) involves the collection of megalopae and ovigerous female tissues and storage for subsequent examination and analysis. Phase II would involve: 1) laboratory sorting, documentation and analysis of the samples, 2) documentation of the various observational parameters in the samples, and 3) a budget for chemical analysis of the samples for the presence of MC-252. Phase III of this plan would involve the collection of ovigerous females and rearing of the larvae in the laboratory so that the entire crab life history can be studied. A copy of the Draft Integrated Plan is attached as an exhibit to this plan for evaluating the overall project.

II. Approach

2011 Megalopal Sampling

Blue crab megalopae will be sampled daily using standard settlement collectors made from air conditioner filters and PVC pipe (Perry et al., 1995; Metcalf et al., 1995). These collectors will be deployed at two sites along the Mississippi coast (East Belle Fountaine area, Jackson County, and the I-110 overpass (Loop) in Harrison County (see Figure 1). These sites have previously been utilized for megalopal collections and multi-year historic information exists for the Jackson County site. Deployment will occur from August 4 to September 30, 2011, with the collectors suspended from piers. Once each day, samplers will be removed from piers, placed in covered buckets, and replacement samplers deployed. Surface water temperature, salinity, and dissolved oxygen will be recorded daily. Samplers will be returned to GCRL and the filters removed and rinsed with freshwater through a modified plankton net to retain the organisms. Organisms will be stored in amber jars with Teflon-coated lids in a 4° C freezer until sorted. A specified amount of any rinsate (including the water used to rinse the animals from the filters) will be collected as an equipment blank. At the end of the project, a portion of an unused filter (24 hour laboratory exposure in de-ionized water) and a portion of a filter exposed to ambient water (24 hour laboratory exposure in water taken from one of the sites) will be removed and saved for chemical analysis. More detailed procedures are described in the section on SOPs.

Ovigerous Female Collection

Ovigerous female blue crabs will be collected using dip nets or traps from oiled-impacted barrier island beaches in Mississippi and from an area in south Florida (Tampa, St. Petersburg area) not directly affected by the spill. Crabs will be trapped or hand-collected and transported to the GCRL in aerated coolers. Crabs for dissection will be held in the coolers until sacrificed. For analytical testing, 30 ovigerous females from each of the two geographic areas will be collected over the late summer/fall period and again the spring. Collecting procedures are described in more detail in the section on SOPs.

III. Metrics

No metrics will be obtained in this phase of the study which is for collection only.

IV. Sample and Data Handling

A. Data Handling and Sharing

MC 252 NRDA chain-of-custody procedures will be observed at all times for all NRDA samples. All samples will be transferred with appropriate chain-of-custody forms. All field and laboratory data will be collected, managed and stored in

accordance with US EPA Good Laboratory Practice regulations (GLPs) to the extent practicable. In accordance with GLPs, all field and laboratory work, and the calibration and use of field and laboratory equipment (e.g. scales, hand held GPS devices, etc.) shall be conducted using written Standard operating Procedures (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 by the implementing entity for the duration of this project. All data (including electronically archived data), and original data sheets or electronic files, must be promptly transferred to USFWS, with copies to BP or their representative, and the Louisiana Oil Spill Coordinator's Office (LOSCO). All samples will be sent to NRDA approved laboratories.

Each laboratory shall simultaneously deliver raw data, including all necessary metadata, generated as part of this work plan as a Laboratory Analytical Data Package (LADP) to the trustee Data Management Team (DMT), the Louisiana Oil Spill Coordinator's Office (LOSCO) on behalf of the State of Louisiana, and to BP (or Cardno ENTRIX on behalf of BP). The electronic data deliverable (EDD) spreadsheet with pre-validated analytical results, which is a component of the complete LADP, will also be delivered to the secure FTP drop box maintained by the trustees' Data Management Team (DMT). Any preliminary data distributed to the DMT shall also be distributed to LOSCO and to BP (or Cardno ENTRIX on behalf of BP). Thereafter, the DMT will validate and perform quality assurance/quality control (QA/QC) procedures on the LADP consistent with the authorized Analytical Quality Assurance Plan, after which time the validated/QA/QC'd data shall be made available simultaneously to all trustees and BP (or Cardno ENTRIX on behalf of BP). Any questions raised on the validated/QA/QC results shall be handled per the procedures in the Analytical Quality Assurance Plan and the issue and results shall be distributed to all parties. In the interest of maintaining one consistent data set for use by all parties, only the validated/QA/QC'd data set released by the DMT shall be considered the consensus data set. In order to ensure reliability of the consensus data and full review by the parties, no party shall publish consensus data until 7 days after such data have been made available to the parties. Also, the LADP shall not be released by the DMT, LOSCO, BP or Cardno ENTRIX prior to validation/QA/QC absent a showing of critical operational need. Should any party show a critical operational need for data prior to validation/QA/QC, any released data will be clearly marked "preliminary/unvalidated" and will be made available equally to all trustees and to BP (or Cardno ENTRIX on behalf of BP).

B. Scheduling Field Efforts

A good faith effort will be made to conduct all study elements that fall within the BP safety policy with cooperative, integrated teams of observers and field technicians. Where study elements fall outside of BP safety policy, teams will be integrated to the extent possible. A weekly schedule describing the number of teams and their general area of operation will be prepared by the Trustees' project coordinator and provided to BP or its designated contractor, and for sampling within Louisiana, to a Louisiana representative, two weeks in advance. The Louisiana representative and BP or its designated representative will provide the Trustees' project coordinator and other responsible Trustee agencies a list of the field efforts in which it will participate at least 10 days prior to the beginning of the designated week. If these agreed-upon notification and communication procedures are followed, yet circumstances prevent Louisiana or BP or its designated representative from participating in a field effort, the field effort may be carried out without Louisiana or BP or its designated representative's participation.

Field data transfer: Prior to concluding each field day, integrated teams will share (1) all data sheets (2) all official photographs, and (3) the official GPS track log using methods developed as part of the Beached Bird Survey (Study #1) effort. Louisiana representatives will be invited to participate in any field work conducted within that state.

In the event that the data is collected without a BP representative or the Mississippi representative present, those data (data sheets, track logs, photos, any and all data collected as part of the field effort) will be e-mailed to a designated BP representative, or Mississippi representative as needed, within 3 days of its being collected. In the event that transfer of such data is delayed due to equipment malfunction or other reasons, it will be emailed to the missing representative(s) as soon as practicable.

C. Durable Equipment - All durable equipment (such as cameras, GPS, etc.) purchased by BP for this study will be returned to BP or their designated representatives at the conclusion of their use for this study, unless otherwise agreed.

D. Safety – Field teams will comply with existing training and safety protocols as applicable to operations. Prior to commencement of field activities, BP and the Trustees will agree upon a person or persons to whom study participants may report any safety concerns. Such person(s) will take action to address and resolve reported concerns.

E. Adaptive Management of Field Efforts – BPs continued participation in, and funding of this cooperative Plan, or any of its specific tasks, is contingent upon the

results of adaptive management meetings which will occur at approximately 30 day intervals. During these meetings adherence to SOPs will be reviewed and discussed.

V. Integration with Existing Plans

Results from this overall study will be integrated into existing studies of the Toxicity Technical Working Group (TWG) to determine any continued exposure of crabs to weathered MC 252 Oil and dispersants (DOSS and related compounds).

In addition, this Plan will supplement information currently proposed for the FISH TWG on collection of infaunal and epifaunal organisms in nearshore habitats and the Near Shore Benthic Prey Plan. The information collected by this sampling Plan is unique; however, and does not duplicate materials collected in either of these ongoing activities.

In addition, the megalopal stations selected under this Plan are located in proximity of stations selected under the Submerged Oil Plan Addendum for Mississippi so information on the contaminant levels in the vicinity can be ascertained.

VI. Literature Cited

- Andyrszak, B.L. 1979. Abundance, distribution and partial descriptions of reptant decapod crustacean larvae collected from neritic Louisiana waters in June, 1976. M.S. Thesis, Louisiana State University, 102 pp.
- Johnson, D.R. and H.M. Perry. 1999. Blue crab larval dispersion and retention in the Mississippi Bight. *Bulletin of Marine Science* 65: 129-149.
- Metcalf, K.S., J. van Montfrans, R.N. Lipcius, and R.J. Orth. 1995. Settlement indices for blue crab megalopae in the York River, Virginia: temporal relationships and statistical efficiency. *Bulletin of Marine Science* 57(3): 781-792.
- Perry, H.M., C.K. Eleuterius, C.B. Trigg, J.R. Warren. 1995. Settlement patterns of, *Callinectes sapidus*, megalopae in Mississippi Sound: 1991, 1992. *Bulletin of Marine Science* 57(3): 821-833.
- Perry, H.M., D.R. Johnson, K. Larsen, C. Trigg, and F. Vukovich. 2003. Blue crab larval dispersal and retention in the Mississippi Bight: testing the hypothesis. *Bulletin of Marine Science* 72(2): 331-346.
- Perry, H.M. and T. McIlwain. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Gulf of Mexico) -blue crab. U.S. Fish and Wildlife Service, Biological Report 82(11.55):1-21.
- Rabalais, N.N., F.R. Burditt, Jr., L.D. Coen, B.E. Cole, C. Eleuterius, K.L. Heck, Jr., T.A. McTigue, S.G. Morgan, H.M. Perry, F.M. Truedale, R.K. Zimmer-Faust, and R.J. Zimmerman. 1995. Settlement of *Callinectes sapidus* megalopae on artificial collectors in four Gulf of Mexico estuaries. *Bulletin of Marine Science* 57(3): 855-876.
- Stuck, K.C. and H.M. Perry. 1981. Observations on the distribution and seasonality of portunid megalopae in Mississippi coastal waters. *Gulf Research Reports* 7:93-95.
- Trigg, C., D. Dennis, D. Gibson, M. Mavar, and A. Ryan. 2010. Aquaculture Manual for the Blue Crab, *Callinectes sapidus* Rathbun. Gulf Coast Research Laboratory, Ocean Springs, MS.

VII. Standard Operating Procedures

All materials associated with the collection or analysis of samples under these protocols or pursuant to any approved work plan, except those consumed as a consequence of the applicable sampling or analytical process, must be retained unless and until approval is given for their disposal in accordance with the retention requirements set forth in paragraph 14 of Pretrial Order # 1 (issued August 10, 2010) 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). Such approval to dispose must be given in writing and by a person authorized to direct such action on behalf of the state or federal agency whose employees or contractors are in possession or control of such materials.

A unique sample code or number should be given to each sample and prominently marked in the upper right corner. The sample code should be constructed of the location ID, date, matrix, sample team number, and sample number (for details, see NOAA Field Sampling Workbooks, "Guide for FieldForms_COC_v.16.1.pdf" available on the case FTP site). Sample codes should be recorded on the **Sample Form** datasheet (to be done if plan is adopted) and also in the **NRDA Sample Collection Form – Tissue/Wrack** (available on the case FTP site).

Site Description

The site name along with the lat and long for the Site Point via a GPS should be noted. Coordinates should be recorded in Decimal Degrees with WGS84 as the datum. The time of day, date, general weather, and general site description should be noted next.

Physical/Chemical Parameters

To accurately characterize the site a range of physical/chemical parameters, including salinity, water temperature, and dissolved oxygen will be measured. These parameters will be measured just below the surface using a YSI 85 meter. A general description of the bottom type will be determined (sand, clay, etc.). The tidal state may be recorded using the GPS tide function, including the notation of the closest tidal station used. Several descriptors are given for the collector to note the relative amount of oil present within the area sampled. The list should be a range of oiled conditions from none to the most saturated (none, sheen, scattered deposits, surface substantially covered, surface completely covered and deep deposits).

2011 Megalopal Settlement Sampling

Sampling to examine the 2011 settlement will begin 4 August at two locations in Mississippi Sound; the I-110 Loop in Harrison County and Point Aux Chenes at Belle Fontaine (PAC) in Jackson County (Figure 1). The Loop is a highly elevated bridge that extends over the water in the channel between the Biloxi mainland and Deer Island. This site and the PAC site were the two most productive areas sampled during the 2010 megalopal settlement study. Standard megalopal collectors as described in Metcalf et al. (1995) will be deployed from piers with four



Figure 2. Settlement Collector

replicates per pier (Figure 2). Thus we currently propose to sample 2 sites, four replicates each for eight samples total. Samplers will be removed from piers each morning, placed in covered buckets, and replacement samplers deployed. Surface water temperature, salinity, and dissolved oxygen will be recorded daily. Samplers will be returned to GCRL and the filters removed and rinsed with freshwater through a modified plankton net to retain the organisms. Organisms will be stored in amber jars with Teflon-coated lids in a 4° C freezer until sorted. Field data sheets will contain location, date, water quality parameters, weather data, name of the field technician and notes as appropriate (Field Sheet 1).

Sampling of Ovigerous Female Crabs

Ovigerous female blue crabs will be collected from oiled-impacted barrier island beaches in Mississippi (Figure 3; Table 1 and 2) and from an area in south Florida (Tampa/St. Petersburg area) not directly affected by the spill. Crabs will be trapped, placed in aerated, clean coolers and transported to the GCRL. If use of a crab trap is not feasible, dip nets will be used to collect crabs. Surface water temperature, salinity, and dissolved oxygen will be recorded upon collection. Crabs for dissection will be held in the coolers until sacrificed. For analytical testing, 30 ovigerous females from each geographic area will be collected over the late summer/fall period and again in the spring; an attempt will be made to sample both multiparous and primiparous individuals. Twenty crabs will be dissected on glass using stainless steel instruments. The gills, gonads and hepatopancreas will be removed from each crab and a representative sample of muscle and external eggs taken. Tissues will be weighed (.01 gram), placed in labeled, trace-clean jars with Teflon lids and frozen in a secure dedicated freezer. A portion of the tissues will be fixed for potential histological processing and analysis (GCRL histology group). The remaining ten crabs will be frozen for potential analysis.

General Guidance for NRDA: Megalopal Sampling

a. Sample Size

Hydrocarbons - Analytical testing by the MEL requires a minimal amount of tissue; individual whole megalopae can be tested.

b. Sampling Equipment

Standard megalopal samplers will be utilized daily to collect postlarvae.

The megalopal collector used in collecting specimens for oil contamination will be free of gross contamination.

The collector will be placed in a clean bucket and covered with a lid to deter cross-contamination from vessel lube oils, fuel and exhaust sources.

New gloves will be worn when handling gear for each sample.

New filters will be used for each sample day.

The PVC tube of each megalopal collector will be scrubbed with Alconox detergent, rinsed thoroughly with fresh water, and air dried before re-assembly with new filters.

In general, all non-disposable sampling gear will be decontaminated before using and between sampling stations following applicable protocols as described in the Marsh Edge Sandy Shoreline Biota Plan.

c. Other Field Data

Location data and relevant photos will be obtained at all sites before sampling (see GPS and photography bullet below).

Observations of any external evidence of contamination, e.g., odors, sheens from the net or oiled debris in the catch will be recorded.

d. Labeling / Documentation / Other Considerations

On the FTP site, NOAA_NRDA.org, the NRDA Field Sampling Checklist generically summarizes pre- and post-field sampling tasks.

Prepare sample labels as presented in NRDA Data Management Protocol for Field Sampling. If using jars, record the sample number on both the label and lid. IDs on sample labels must be complete and identical to IDs on the chain of custody. Jar labels receive a protective layer of clear tape wrapped around the entire circumference of the container to secure the label and protect the writing.

See the event-specific protocol documents for shipping to designated labs (NRDA Sample Shipping Instructions) and for chain of custody and sampling documentation instructions (NRDA Data Management Protocol for Field Sampling). Tissue sampling log sheets typically record sample number; date/time, location, GPS coordinates, species and tissue type.

Documentation is critical; all field notebooks should be dated, signed and preserved. If crossing out or correcting any entries, date and initial when making the changes. Original records should be gathered and archived.

Record the presence of oil, weather conditions, etc. in field notes. Record GPS coordinates for each sample.

Take relevant photographs of the sampling locations and sample collection itself if possible. Make sure each photograph or series can be later associated with the corresponding sampling location GPS (see NRDA Field Photography Guidance). Do not delete, open or alter any photos.

All sampling, COC, shipping, GPS and photo files are submitted to [REDACTED] Sampling hotline: [REDACTED]

The labs have received instructions specifying sample processing and analytic methods.

General Guidance for NRDA: Sampling of Ovigerous Females

a. Sample Size

Hydrocarbons - Analytical testing by the MEL requires a minimal amount of tissue; however, for dissected crabs, all tissues selected for study will be removed and frozen in amber trace-clean jars with Teflon lids. This will allow for flexibility in analytical testing as sample size for most tissues would allow for traditional methodologies to be employed should MEL not be used.

b. Sampling Equipment

Traditional crab traps will be used to collect ovigerous females. If collecting crabs in traps is not successful, dip nets will be used.

The equipment used in collecting specimens will be free of gross contamination.

Crabs will be placed in clean coolers and aerated through a small hole in the lid to deter contamination from vessel lube oils, fuel and exhaust sources.

New gloves will be worn when handling gear for each sample.

Coolers will be scrubbed with Alconox detergent, rinsed thoroughly with fresh water, and air dried prior to each sampling trip. New aquarium tubing and air stones will be used in coolers for each trip.

Crabs will be dissected on glass using stainless steel instruments and individual tissues will be placed in amber trace-clean jars and frozen. A small portion of each tissue will be placed in Davidson's fixative for potential histological studies.

In general, all non-disposable sampling gear will be decontaminated before using and between sampling stations following applicable protocols as described in the Marsh Edge Sandy Shoreline Biota Plan.

c. Other Field Data

Location data and relevant photos will be obtained at all sites before sampling (see GPS and photography bullet below).

Observations of any external evidence of contamination, e.g., odors, sheens from the net or oiled debris in the catch will be recorded.

d. Labeling / Documentation / Other Considerations

On the FTP site, NOAA_NRDA.org, the NRDA Field Sampling Checklist generically summarizes pre- and post-field sampling tasks.

Prepare sample labels as presented in NRDA Data Management Protocol for Field Sampling. If using jars, record the sample number on both the label and lid. IDs on sample labels must be complete and identical to IDs on the chain of custody. Jar labels receive a protective layer of clear tape wrapped around the entire circumference of the container to secure the label and protect the writing.

Documentation is critical; all field notebooks should be dated, signed and preserved. If crossing out or correcting any entries, date and initial when making the changes. Original records should be gathered and archived.

Record the presence of oil, weather conditions, etc. in field notes. Record GPS coordinates for each sample.

Take relevant photographs of the sampling locations and sample collection itself if possible. Make sure each photograph or series can be later associated with the corresponding sampling location GPS (see NRDA Field Photography Guidance). Do not delete, open or alter any photos.

All sampling, COC, shipping, GPS and photo files are submitted to [REDACTED]. Sampling hotline: [REDACTED]

The labs have received instructions specifying sample processing and analytic methods.

VIII. BUDGET

As detailed in the budget spreadsheet attached hereto, the total field costs for this Plan is **\$119,131**. The Parties acknowledge that this budget is an estimate, and that actual costs may prove to be higher due to a number of potential factors. 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. The trustees will make a good faith effort to notify BP in advance of any such increased costs.

Darcie Graham & Harriet Perry (PI beginning 10/1/2011)
 Blue Crab Recruitment (Aug 4 - Sept 30) & Ovigerous Females (Summer/Fall & Spring) 2011 - FIELD SAMPLING ONLY
 MS DEQ - NRDA
 9/16/2011

		Months	Agency
SALARIES			
H. Perry- begin 10/01/11	PI	█	8,325
D. Graham	PI	█	8,493
R. Trigg	Meg/Ovigerous Field 2011	█	7,862
L. Collins	Meg/Ovigerous Field 2011	█	7,644
Grad Student	Meg/Ovigerous Field 2011	█	4,800
		Sub	37,124
FRINGE			
H. Perry		█	█
D. Graham		█	█
R. Trigg		█	█
L. Collins		█	█
Grad		█	█
		Sub	10,066
TOTAL PERSONNEL			47,190
TRAVEL			10,000
2011 Settlement Collection - 2 sites - 60 miles/day			1,500
Texas or Florida Travel - Collection of sponge crabs			8,000
Misc travel - supplies, etc.			500
COMMODITIES/SUPPLIES			12,700
2011 Megalopal Settlement - Field			5,500
Freezers			700
Ovigerous Female Collections/Dissections			6,500
COMMUNICATIONS			500
EQUIPMENT (\$5,000)			0
PARTICIPANT COSTS			0
PROFESSIONAL FEES			0
SUBCONTRACTS			0
CONTRACTUAL SERVICES			4,800
Collection of Sponge crabs from Clean Site in FL or TX			
TUITION			4,177
Out of State Tuition (3 months)			
TOTAL DIRECT COSTS			79,367
F&A (Indirect) █			34,964
BOAT RENTALS			4,800
Collection of Sponge crabs from MS barrier islands; \$300/day; 4 days/month			



Figure 1. Site Locations for NRDA Settlement Collectors.

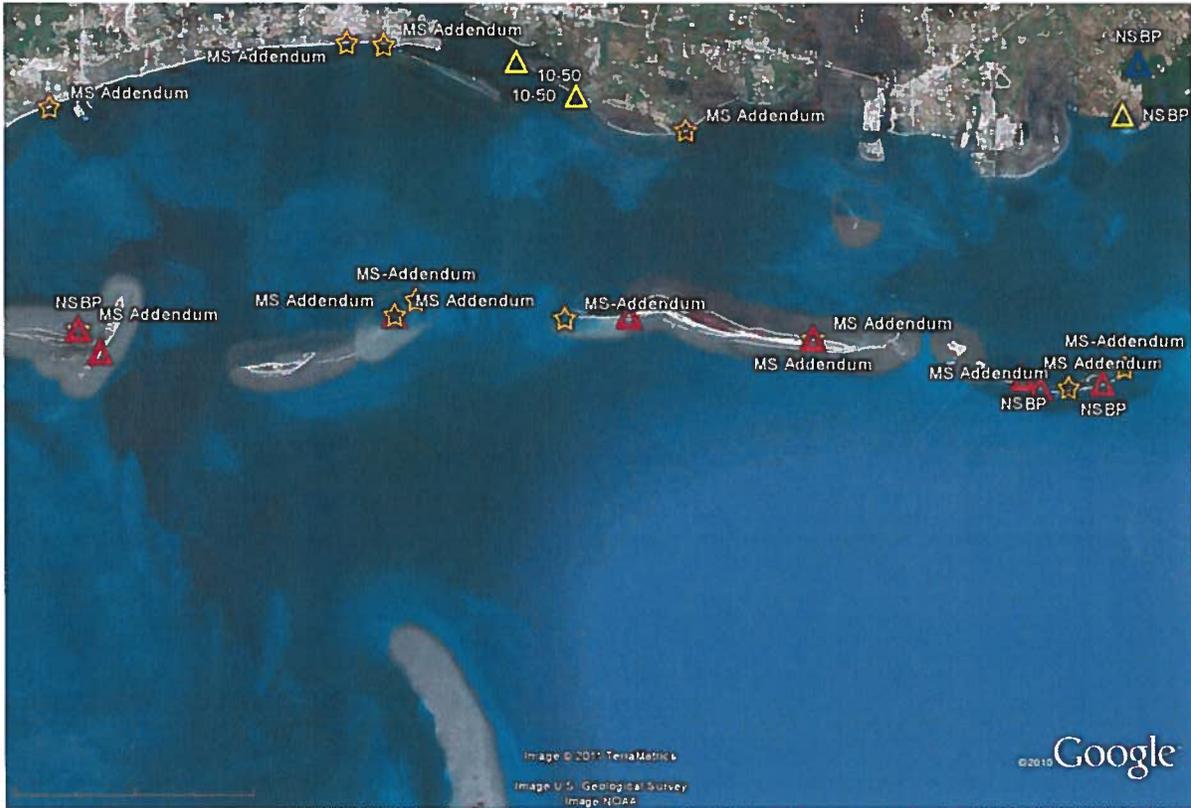


Figure 3. Potential Site Locations for NRDA Ovigerous Female Collections (Nearshore Benthic Prey Plan sites (triangles); MS Addendum Sites (stars)).

Table 1. Submerged oil sites on Mississippi barrier islands.

State	Name	Lat	Lon
MS	MS-SS-01	[REDACTED]	[REDACTED]
MS	MS-SS-02	[REDACTED]	[REDACTED]
MS	MS-SS-03	[REDACTED]	[REDACTED]
MS	MS-SS-04	[REDACTED]	[REDACTED]
MS	MS-SS-05	[REDACTED]	[REDACTED]
MS	MS-SS-06	[REDACTED]	[REDACTED]
MS	MS-SS-07	[REDACTED]	[REDACTED]
MS	MS-SS-08	[REDACTED]	[REDACTED]
MS	MS-SS-09	[REDACTED]	[REDACTED]
MS	MS-SS-10	[REDACTED]	[REDACTED]
MS	MS-SS-11	[REDACTED]	[REDACTED]
MS	MS-SS-12	[REDACTED]	[REDACTED]
MS	MS-SS-13	[REDACTED]	[REDACTED]

Table 2. Addendum for submerged oil sites on Mississippi barrier islands, which are potential locations for collection of ovigerous females.

State	Name	Lat	Lon
MS	Petit Bois 2	[REDACTED]	[REDACTED]
MS	Petit Bois 1	[REDACTED]	[REDACTED]
MS	Petit Bois 3	[REDACTED]	[REDACTED]
MS	Horn Island 1	[REDACTED]	[REDACTED]
MS	Horn Island 2	[REDACTED]	[REDACTED]
MS	Ship Island 1	[REDACTED]	[REDACTED]
MS	Ship Island 2	[REDACTED]	[REDACTED]
MS	Cat Island 1	[REDACTED]	[REDACTED]
MS	Hancock 1	[REDACTED]	[REDACTED]
MS	Hancock 2	[REDACTED]	[REDACTED]
MS	Harrison 1	[REDACTED]	[REDACTED]
MS	Harrison 2	[REDACTED]	[REDACTED]
MS	Harrison 3	[REDACTED]	[REDACTED]
MS	Jackson 1	[REDACTED]	[REDACTED]
MS	Harrison 4	[REDACTED]	[REDACTED]

Field Sheet 1.

Sampler Team Code: _____ Survey Team #: _____

2011 Megalopal Settlement: Field Data Sheet

Field Date: _____

Station (circle): PAC I-110 Loop

Station Lat: _____ Long: _____ Waypoint: _____

Sample	Retrieval Time	Re-Deployment Time	Sample ID
A			
B			
C			
D			

Hydrology: Surface Parameters

Temperature: _____ °C Dissolved O2: _____ mg/L Salinity: _____ ppt

Tide Stage: _____

Bottom Type: _____

Weather Conditions: _____

Notes: _____

Responsible Party

Rep: _____ Date: _____ Time: _____
 (name) (agency) (signature)

State
 Rep: _____ Date: _____ Time: _____
 (name) (agency) (signature)

Federal
 Rep: _____ Date: _____ Time: _____
 (name) (agency) (signature)

Data
 Rep: _____ Date: _____ Time: _____
 (name) (agency) (signature)