

**MC252 Deepwater Horizon Oil Spill
Northern Gulf of Mexico MARU Recovery
Mission Plan
November 3, 2011**

Originated as a requirement by:

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Background and Scope of Work

The following describes the proposed field operations to support an ongoing bioacoustic monitoring program. This program is being conducted by the Bioacoustics Research Program (BRP), Cornell University.

This portion of the BRP project involves the passive acoustic monitoring of marine mammals in the Northern Gulf utilizing marine autonomous recording units (MARUs). An *autonomous recording unit (ARU)* is a digital audio recorder that can be programmed to record on a desired daily schedule and deployed for periods of weeks or months in a remote environment. The MARUs used in this project are packaged in positively buoyant glass spheres. A MARU is deployed by being dropped to the seafloor with an anchor such that the MARU floats a few meters above the bottom. Underwater sounds are recorded through a hydrophone (underwater microphone) mounted outside the sphere. These analog sound data are conditioned, digitized, and stored in a binary digital audio format on electronic storage media. At the conclusion of the deployment, the MARU is sent an acoustic command to release itself from its anchor, and it floats to the surface for recovery. After the device is recovered, its recorded audio data are extracted and stored and then the MARU is redeployed. The overall objective of this mission is to recover the MARU, retrieve the data, and redeploy the instrument in a new location (**see figures 1 & 2 below**).

The specific scope of this mission plan covers the recovery, servicing (data download and sensor refurbishment), and redeployment (“Hot Swap”) of the 18 northern Gulf of Mexico MARU units, and the final recovery of the four MARU units located in the vicinity of the Dry Tortugas. In order to obtain higher resolution data in the Viosca Knoll area, four additional MARU units (HF 19-22) will be deployed in the vicinity of HF 9 (**See figure 3 below**). This will bring the total number of MARU units in the northern Gulf of Mexico to 22. Additionally, the four low frequency MARU units will be redeployed to optimize data collection associated with the Bryde’s whale (**See figure 3 below**).

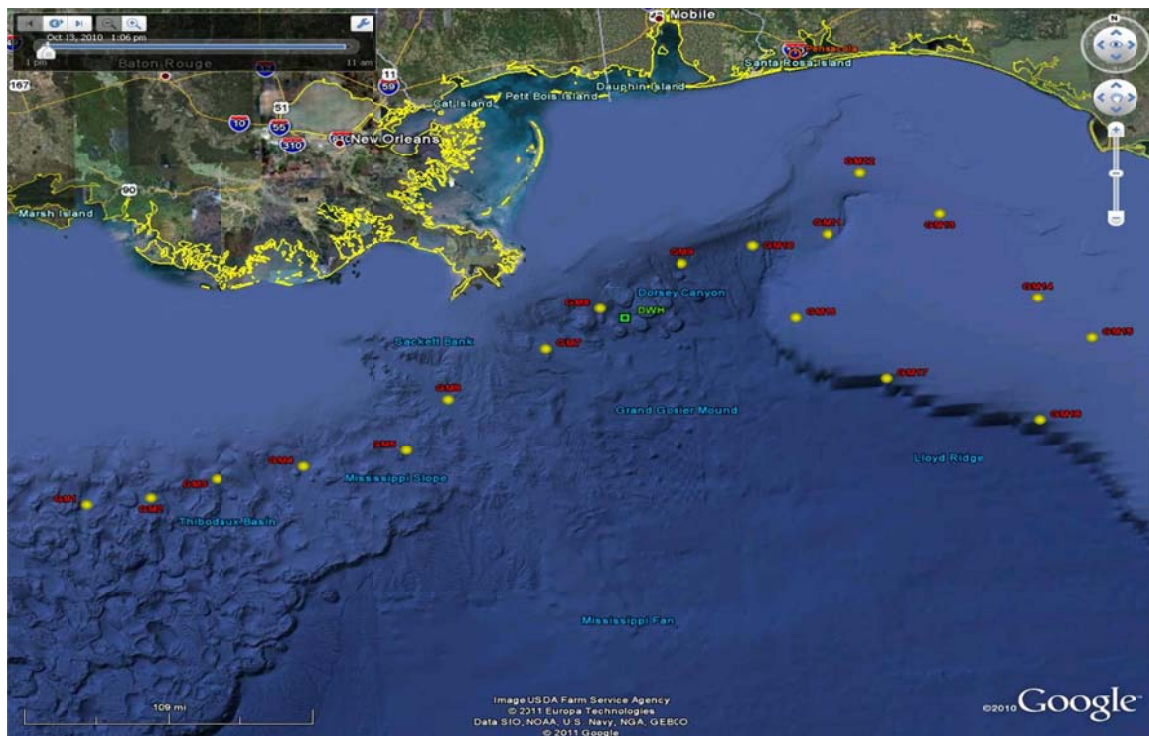


Figure 1 – Northern Gulf MARUs for this Project Mission

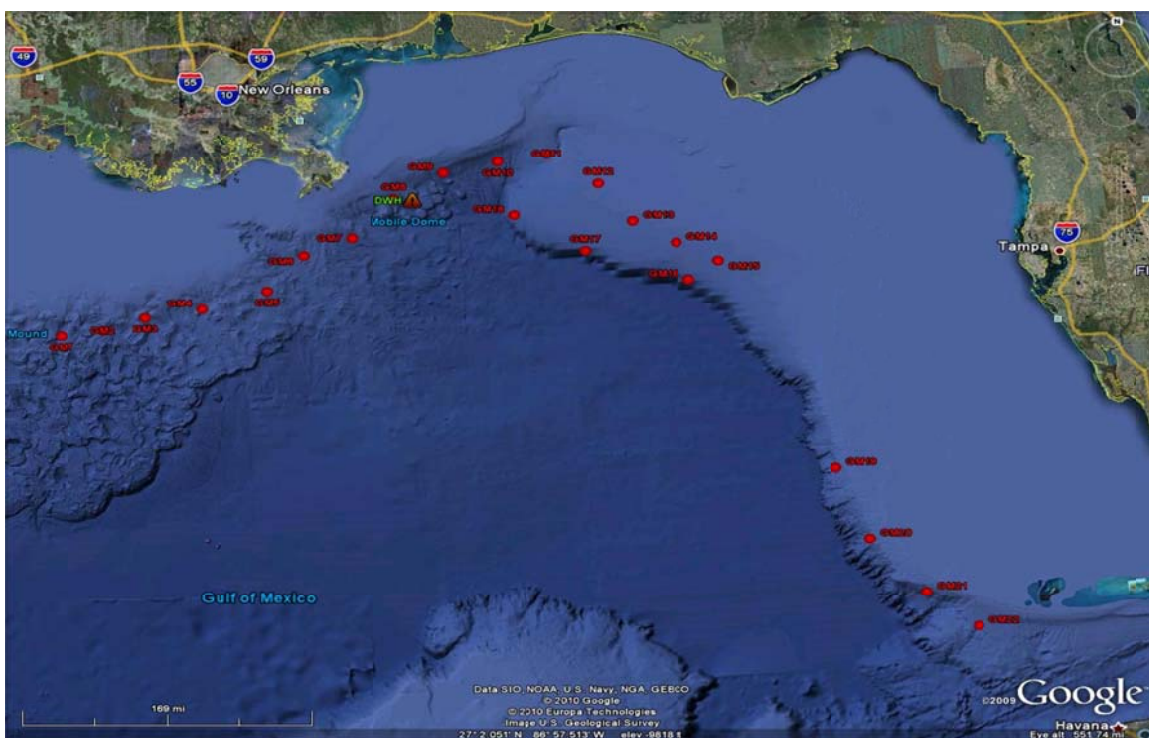


Figure 2 – Scope of Cornell's Entire Gulf Acoustic Monitoring

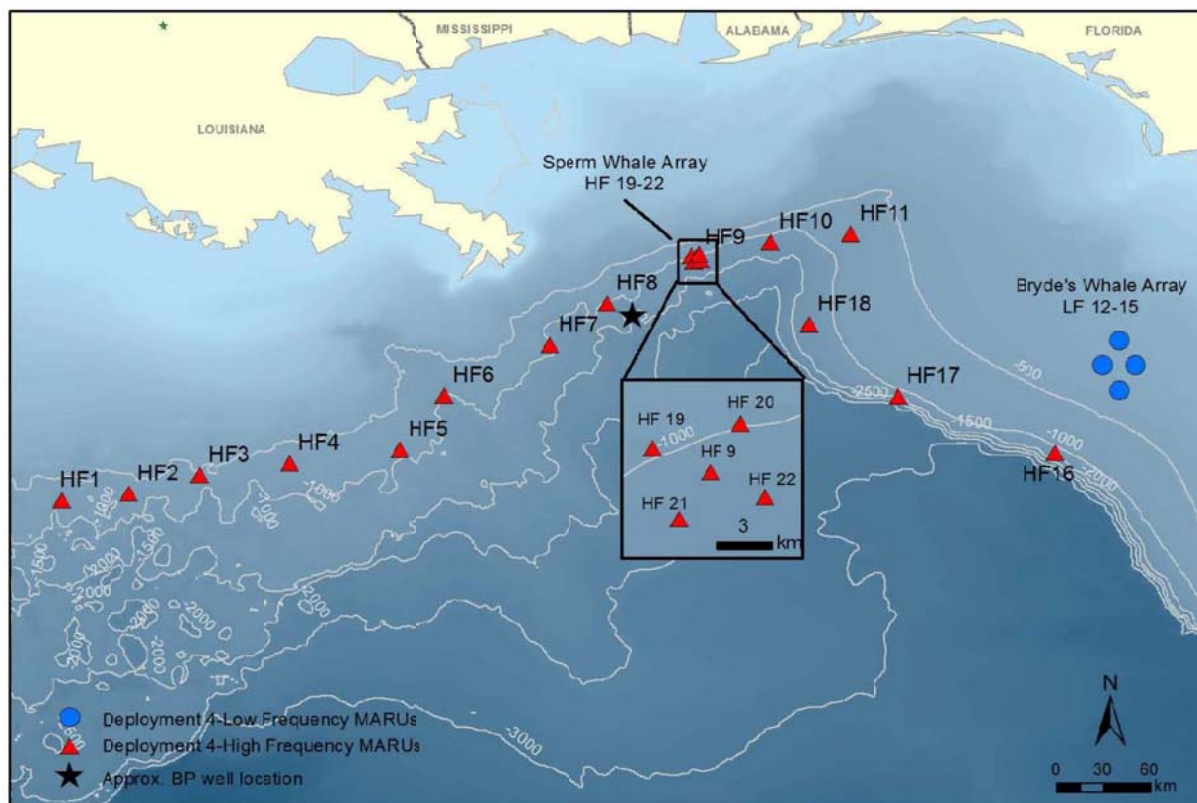


Figure 3 – Geometry for the 22 MARUs to be deployed in October 2011. These have concentrated on acoustically monitoring the shelf break along a 450 to 500 nmi region. For specific deployment locations and times, see Table 1.

Table 1 – Location and depths of MARUs in BRP deployment 4.

MARU	Latitude	Longitude	Depth (m)
HF1			972
HF2			772
HF3			673
HF4			820
HF5			919
HF6			1011
HF7			891
HF8			1082
HF9			1119
HF10			1195
HF11			803
LF12			256
LF13			296
LF14			260
LF15			198
HF16			1175
HF17			1165
HF18			1309
HF19			976
HF20			1202
HF21			1206
HF22			991

MARU Recovery

Vessel Mobilization and Mission

The M/V Wes Bordelon will be utilized to service the northern Gulf of Mexico MARU units. This vessel is well-suited for the MARU mission due to its experienced crew, favorable deck setup, ideal freeboard and ability to sustain 24-hour operations over long transit distances. Additionally, mobilization and demobilization at CSA's port facility in Houma, LA facilitates shipping, secure storage and vessel loading/unloading of valuable electronic equipment. The mission mobilization timeframe to service the northern Gulf of Mexico MARU units is late **October** or early **November 2011**.

The M/V Ultimate Getaway will be utilized to conduct the final recovery of the four MARU units currently deployed in the vicinity of the Dry Tortugas. The Ultimate Getaway was utilized successfully on two prior MARU servicing operations. It is anticipated that the final recovery of the Dry Tortugas MARU units will occur in early November.

Vessel mobilization involves arrival of Cornell personnel and equipment. Two technicians from Cornell will accompany the mission in order to provide direction and support for the MARU retrieval and return shipment to Ithaca, NY. During the vessel mobilization phase of the operation, it is anticipated the CSA senior staff will coordinate with operations personnel to establish operational parameters and communications protocols required during the recovery of the MARUs.

Recovery of the MARUs units

- 1) Vessel will arrive on site and shut propulsion down to protect submersible equipment.
- 2) From the Cornell supplied deployment kit the Cornell Field Applications Engineer (FAE) will submerge a transducer disk to communicate with the MARU, along with a hydrophone to monitor the MARU's acoustic responses. This equipment is connected to a transponder box and laptop computer.
- 3) The MARU's individual acoustic release signal will be played through the computer and into the water while the Cornell FAE listens for a response. When the unit is verified to be on location a second release signal is played and the release sequence is activated. The time of the MARU's second response to the release signal will be recorded. If no response is heard from the MARU, the vessel will remain onsite for the estimated surfacing time +30 minutes while maintaining visual watch.
- 4) The submerged equipment (transducer disk and hydrophone) will be removed from the water to facilitate the vessel's repositioning back on site if necessary during the watch process.
- 5) All available eyes will scan the surface for the MARU. At the current depths, the MARU should hit the surface in approximately 30 - 35 minutes.
- 6) While searching for the MARU the Cornell FAE will have a VHF radio tuned to the released MARU's individual radio frequency which will emit a signal upon surfacing. This is an indicator that the MARU has surfaced, even if it has not been spotted yet.

- 7) When the MARU is spotted on the surface the vessel will position for retrieval in accordance with a pre-discussed plan of action between the Cornell FAE and ship crew. The time that the MARU surfaces will be recorded. Only weighing 90 lbs. and with a 20" diameter the MARU is easily retrievable by hand using a boathook and more than one person lifting. Grappling hooks have also been utilized during retrieval. The MARU should typically be approached and retrieved from the lowest point on the vessel to minimize lifting and possible damage to the unit.
- 8) Once on board the MARU will be powered down, and that time will be recorded. The MARU will also be visually inspected by the Cornell FAE to document any overt abnormalities or damage.
- 9) The MARU will be placed in a Cornell-provided protective shipping case and stored on deck. The retrieval vessel will then proceed to the next MARU location.
- 10) Once all MARUs have been retrieved and the recovery vessel returns to port, all recovered MARUs will be shipped (FedEx) by the Cornell FAE back to Cornell University for data download and sensor refurbishment.

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Approval of this work plan 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.

BP Approval:

<u>Joyce Miley</u>	<u>Joyce Miley</u>	<u>11/9/2011</u>
Printed Name	Signature	Date

Federal Trustee Approval:

<u>Tom Moore</u>	<u>Tom Moore</u>	<u>11/7/2011</u>
Printed Name	Signature	Date

Louisiana Approval:

<u>HAROLD LON DEWISCHKA</u>	<u>HAROLD LON DEWISCHKA</u>	<u>12/3/11</u>
Printed Name	Signature	Date