MC252 Deepwater Horizon Oil Spill
Dry Tortugas MARU and HARP Recovery
February Mission Plan
February 24, 2011

Originated as a requirement by:
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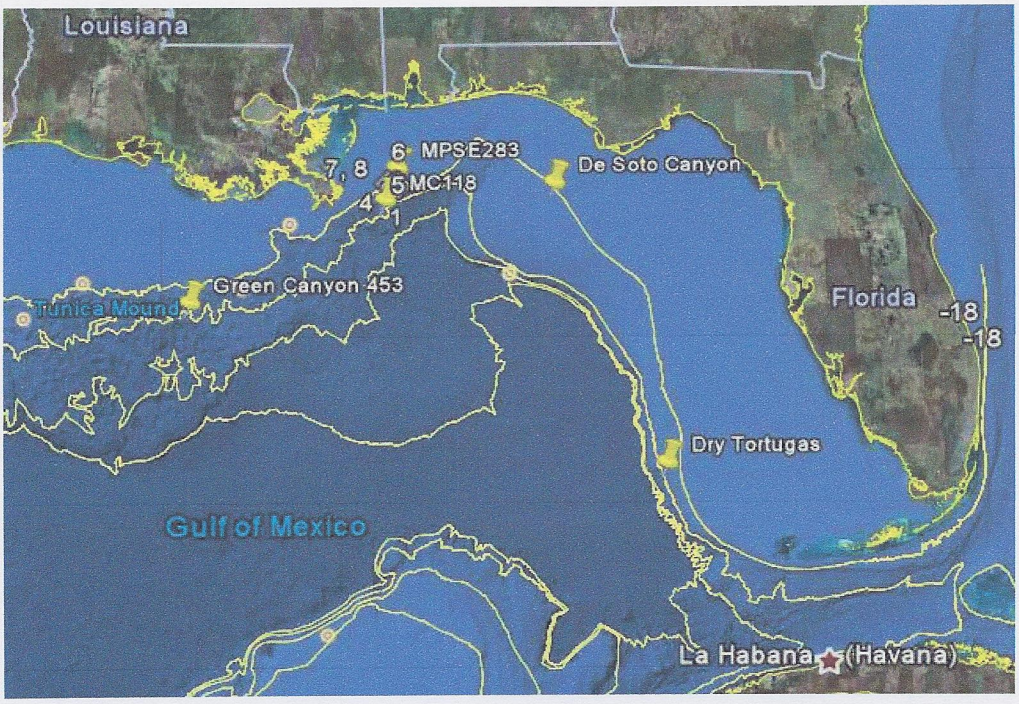
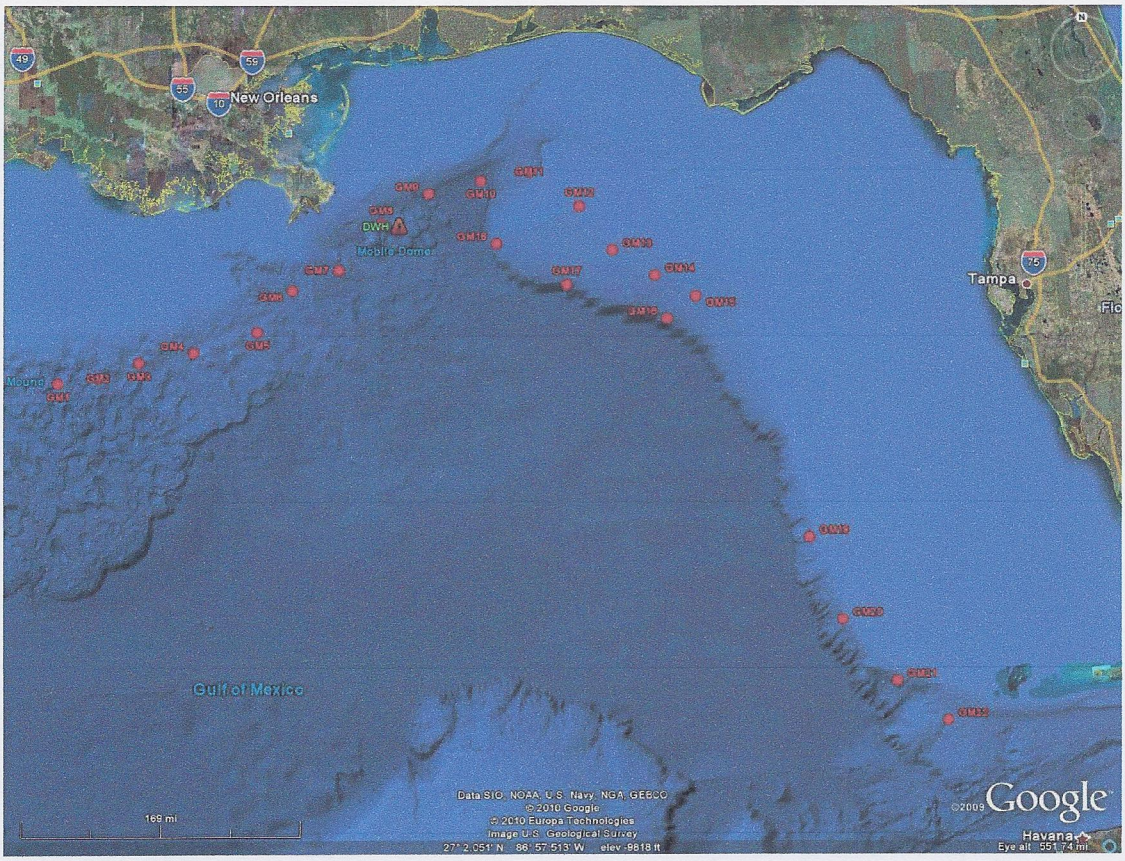
Background and Scope of Work

The following describes the proposed field operations to support two bioacoustics monitoring programs. These programs are being conducted by the Whale Acoustics Laboratory, Scripps Institution of Oceanography and the Cornell Bioacoustics Research Program, Cornell University. These acoustic instruments were placed as part of the *Workplan for the Collection of Data to Determine Impacts of the Deepwater Horizon Mississippi Canyon 252 Incident on Endangered and Protected Marine Mammals in the Northern Gulf of Mexico* which was signed on June 14, 2010. All data sharing provisions of that plan apply to this recovery plan.

To monitor marine mammals and study ambient ocean noise over long periods, the Scripps Institution of Oceanography, Whale Acoustics Laboratory has developed autonomous acoustic recording devices for marine environments. These devices are commonly referred to as HARPs (High-frequency Acoustic Recording Package). There are currently five HARPs associated with the MC252 Deepwater Horizon Incident and deployed as the Gulf of Mexico **(see figure below).** The purpose of the February effort will the recovery, refurbishment and redeployment of a recording package used for passive acoustic monitoring of marine mammals at the site north of the Dry Tortugas. A report documenting the recovery activities will be prepared within 30 days of the completion of the mission.



The Cornell Bioacoustics Research Program project involves the passive acoustic monitoring of marine mammals in the Dry Tortugas 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 redeployed. The objective of this mission is to collect a duty cycled audio sample of marine mammal activity in the area of interest.**(see figure below).**



HARP Recovery and Redeployment

Vessel Mobilization and Mission

The vessel being utilized for this project will be the M/V Ultimate Getaway. Mobilization and demobilization will be in Ft. Meyers, Florida.

Vessel mobilization involves arrival of Scripps and Cornell personnel and equipment. One to two technicians from each university will accompany the mission in order to provide direction and support for the MARU and HARP retrieval, servicing (including battery change), and redeployment. During the vessel mobilization phase of the operation, it is anticipated the CSA senior staff will communicate with SIMOPS personnel to establish operational parameters and communications protocols required during the recovery and subsequent deployment of the MARU and HARP units.

Recovery, refurbishment, and redeployment of the HARP at the Dry Tortugas site

Phase I: Establish communications with and release the HARP

1) The vessel will be taken to a position about one kilometer from where the HARP was previously deployed.
2) A transducer will be lowered into the water and connected to an acoustic transceiver. The technician will establish communications with the acoustic release on the instrument and will acquire ranges to help locate the HARP precisely. At that time, the release command will be sent.
3) Once released, the rise time for the HARP will be about 20 minutes.
4) Visual observers will be posted to help locate the HARP when it reaches the surface.

Phase II: Recover the HARP

1) Once the instrument is on the surface and has been located, the vessel will be maneuvered to bring it alongside.
2) Boat hooks or a throwable grappling hook will then be attached to the top floats in order to pull them to the large swim step on the stern of the Ultimate Getaway.
3) Two people will pull the floats on board and secure them on deck
4) Next, the hydrophone will be brought aboard, followed by the second set of floats.
5) The datalogger pressure case (92lbs in air) will then be pulled aboard by two crew members and secured on deck.
6) The next section of the mooring contains a second set of floats, followed by the battery pressure case (117lbs in air). These will be brought aboard, carried to the main deck, and secured.
7) Finally, another set of floats and two ORE PORT acoustic release transponders (apx 50lbs in air) will be brought aboard.

Phase III: Redeployment

1) Once the instrument's batteries and hard drives have been exchanged and the refurbishment is complete, the mooring will be reassembled and laid out on the swim and main deck for deployment.
2) First, three 115lb ballast weight pieces will be carried to the swim step, joined together, shackled to the rest of the mooring, and secured.
3) The vessel will be maneuvered to a location approximately 500 meters from the drop site.

4) With the vessel making one to two knots of forward motion through the water, the top floats will be deployed by two crew members.
5) Each section of the mooring will then be lowered into the water by hand until the all but the ballast weights trail slowly behind the boat.
6) When the vessel is over the drop site, the ballast weights will be pushed over the stern and the mooring will sink to the seafloor.

Recovery, refurbishment, and redeployment of the MARU at the Dry Tortugas site

1) Vessel will arrive on site and shut propulsion down to protect submersible equipment.
2) From the Cornell supplied deployment kit the Cornell field agent 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 field agent 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.
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 20 minutes.
6) While searching for the MARU the Cornell field agent will have a VHF radio tuned to the released MARU's individual radio signature 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 field agent and ship crew. The time that the MARU surfaces will be recorded. Only weighing 90 lbs. and with a 25" 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 field agent to document any overt abnormalities or damage.
9) The vessel will reposition back to the site of the released MARU, and a fresh unit will be pulled from the shipping case. The MARU that was just recovered from the site will then be placed in the now empty shipping case.
10) On deck the Cornell field agent will acoustically ping on the fresh MARU to verify audio communications. The time of the MARU's acoustic response will be recorded.
11) While the vessel repositions on site, the Cornell field agent will attach two 50lb. burlap bags of gravel to the MARU to act as anchors. These anchors are to be lifted separate from the MARU as we do not want the full dry weight of the anchors stressing the release mechanism.
12) When the vessel arrives back on site they will again shut down propulsion, and the transducer disk and hydrophone will be placed back in the water.
13) A tag line will be attached to the MARU, and a separate tag line will be attached to the anchoring system. The MARU and the anchors will be lowered in conjunction to the water via the tag lines. The MARU is positively buoyant and will be pulled away from the anchors via the tag line. The anchors will be lowered to almost their full tether length below the unit.
14) When the Cornell field agent deems the MARU and anchors are free of potential snags he will give the drop signal. One end of each tag line will be released and the unit is deployed. The time of this drop will be recorded, along with a GPS coordinate.

15) The ship's propulsion will remain off as the Cornell field agent will communicate with the deployed MARU acoustically once it reaches bottom. At the current depths a conservative estimate for sea floor strike is approximately ten minutes. The time of the MARU's acoustic response from the bottom will be recorded.

Estimated Costs

MARU and HARPS Recovery Mission Cost Table	Units	Unit Cost $	Quantity	Total
Mobilization Costs	ea	$20,000	1	$20,000
Vessel Costs (incl. estimated fuel)	ea	$6,800	3	$20,400
SCRIPPS, Cornell Support	ea	$12,000	1	$12,000
Reporting	ea	$5,000	1	$5,000
			Total Estimated Cost	**$57,000**

Approvals

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:

Joyce Miley — Joyce Miley — 2/26/11

Printed Name — Signature — Date

Federal Trustee Approval:

Jessica White — Jessica White — 2/25/11

Printed Name — Signature — Date

Louisiana Approval:

FOR ROLAND GUIDRY

KAROLIEN DEBUSSCHERE — [signature] — 3/5/11

Printed Name — Signature — Date