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ECHO OFFSHORE- BYRON OFFSHORE INC 2DHR SURVEY 2024 PROTECTED SPECIES OBSERVER REPORT

Final Report

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Final Report

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Acronyms and Abbreviations

BO	Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the GOM
BOEM	Bureau for Ocean Energy Management
BZ	Buffer Zone
dB	Decibel
dB re 1 µPa (rms)	Decibel related to 1 micropascal (root mean square)
EOL	End of Line
ESA	Endangered Species Act
EZ	Exclusion Zone
GOM	Gulf of Mexico
HF	High Frequency
Hz	hertz
kHz	Kilohertz
km	Kilometer
LF	Low Frequency
m	Meters
min	Minute/s
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
PSO	Protected Species Observer
R/V	Research Vessel
S	Second/s
SBP	Sub-bottom Profiler
SOL	Start of Line
USFWS	United States Fish and Wildlife Service
UTC	Coordinated Universal Time

1 EXECUTIVE SUMMARY

The Byron Energy Inc geophysical investigation was conducted by Echo Offshore, LLC., in federal waters of the Gulf of Mexico (GOM). Operations were conducted in Block 61 and 66 of the South Marsh Island Area. This report is the final protected species report and covers the protected species monitoring and mitigation efforts on the source vessel utilized by Echo Offshore for this scope of work.

The source vessel, (M/V) *Elliot Cheramie,* deployed a seismic source array, sidescan sonar, subbottom profiler, magnetometer, and multibeam echo sounder while conducting geophysical operations from 28 June 2024 to 01 July 2024.

Protected Species Observers (PSOs), provided through RPS, were assigned to the vessel conducting source operations to undertake visual observations and implement mitigation protocols, in accordance with the NMFS Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico (BO). Mitigation protocols for this survey included establishment of buffer zones (BZ) and exclusion zones (EZ) for marine mammals and other protected species including sea turtles, visual monitoring, and strike avoidance mitigation measures. The *M/V Elliot Cheramie* had three PSOs monitoring from the vessel.

The acoustic sources on this vessel remained on throughout the entirety of operations except for an instance on 28 June when the airgun was disabled due to rough sea conditions which obscured the data that was being collected.

R/V Elliot Cheramie was active for a total of 54 hours and 20 minutes. PSOs conducted visual observations for a total of 51 hours and 23 minutes.

A total of one (1) detection event of protected species occurred during the survey.

The visual detection consisted of bottlenose dolphins (*Tursiops truncates)*.

There were no observations of dead or injured protected species during the survey.

There was one (1) strike avoidance maneuver required during the survey.

There were no mitigation actions required during the survey.

2 INTRODUCTION

Byron Energy geophysical investigation was conducted by Echo Offshore LLC in federal waters of the Gulf of Mexico (GOM). The survey was conducted in Blocks 61 and 66 of the South Marsh Island Area. This report is the final protected species report for the 2DHR survey covers the protected species monitoring and mitigation efforts on the survey vessel M/V *Elliot Cheramie.*

National Marine Fisheries Service (NMFS) has advised that sound-producing survey equipment operating in the hearing range of marine species has the potential to cause acoustic harassment, particularly to marine mammals. Protected species monitoring for the program was conducted in accordance with NMFS standards outlined in the 2020 Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico (BO).

The survey company conducting operations was responsible for contracting Protected Species Observers (PSOs) through a provider to conduct monitoring and mitigation for protected species, including marine mammals, sea turtles, Gulf sturgeon, oceanic white-tipped shark and giant manta rays during their activities. Monitoring and mitigation procedures that were implemented during the 2024 survey are described in Section 4 of this report.

2.1 Reporting Requirements

This report summarizes the information required by the BO, identified in Table 1. A copy of the applicable BO appendicle (Appendix A), documenting reporting requirements from the NMFS BO.

Table 1: Reporting Requirements

Required Content	Source Reference	Location Addressed in Technical Report
PSOs must use a standardized data collection form, whether hard copy or electronic. PSOs shall record detailed information about any implementation of mitigation requirements, including the distance of animals to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source. If required mitigation was not implemented, PSOs should record a description of the circumstances.	NMFS BO Appendix A	Appendix A
The MMPA authorization (as applicable) and BOEM Permit/Plan holder shall submit a draft comprehensive report to BOEM/BSEE (protectedspecies@boem.gov and protectedspecies@bsee.gov) and NMFS (nmfs.psoreview@noaa.gov) on all activities and monitoring results within 90 days of the completion of the survey or expiration of the MMPA authorization (as applicable) or BOEM Permit/Plan, whichever comes sooner, or if an issued MMPA authorization is valid for greater than one year, the summary report must be submitted on an annual basis,. The report must describe all activities conducted and sightings of protected species near the activities, must provide full documentation of methods, results, and interpretation pertaining to all monitoring, and must summarize the dates and locations of survey operations and all protected species sightings (dates, times, locations, activities, associated survey activities, and information regarding locations where the acoustic source was used). A final report must be submitted within 30 days following resolution of any comments on the draft report.	NMFS BO Appendix A	This technical report
The MMPA authorization (as applicable) and BOEM Permit/Plan holder must report sightings of any injured or dead aquatic protected species immediately, regardless of the cause of injury or death. For injured or dead non-marine mammal aquatic protected species, report incidents to the hotlines listed at https://www.fisheries.noaa.gov/report (phone numbers vary by state). For reporting dead or injured marine mammals, refer to the reporting requirements specified in the MMPA authorization (as applicable), associated with the activity being conducted.	NMFS BO Appendix A	7.2 Protected species incident reporting

3 PROJECT OVERVIEW

The objectives of this investigation were to produce seafloor and subsurface data at a proposed well site in South Marsh 66 in compliance with BOEM NTLs 2005-G07 regarding archaeological resources and NTL 2022-G01 regarding shallow hazards.

The study area centered on Block 61 and 66 of the South Marsh Island Area is located 178 kilometers (96 nautical miles) west of the M/V *Elliot Cheramie's* primary port of Port Fourchon dock. Water depths across the study area averaged 38 meters (Table 2).

Table 2: General Program Parameters

Area Parameters	
General Location:	Gulf of Mexico
Water depth	30 m – 44 m
Port location	Port Fourchon, Louisiana
Source Vessel	*Elliot Cheramie*

3.1 Vessel Summary

The survey was undertaken by the source vessel M/V *Elliot Cheramie* deploying a seismic array, sidescan sonar, subbottom profiler, magnetometer, and multibeam echo sounder.

The M/V *Elliot Cheramie* conducted data acquisition for this portion of the survey from 28 June 2024 to 01 July 2024. The vessel mobilized out of Port Fourchon, Louisiana.

Specifications of the vessel are provided in Table 3 and photos of the vessel are included in Figure 1.

Figure 1: M/V *Elliot Cheramie*

Table 3: Summary of Project Vessel Specifications

Vessel Name	Vessel Owner	Length meters (m)	Width meters (m)	Production Speed knots (kts)	Max Speed knots (kts)
Elliot Cheramie	Cheramie Marine, LLC	45.7	7.9	4.0 – 4.5	12

3.2 Summary of LF Survey Equipment Used

The M/V *Elliot Cheramie* deployed a low frequency (LF) source configuration that is described in Table 4. The seismic array was activated in succession by ramping up the sub bottom first at predominantly 20 percent intervals per every five minutes and then activating the seismic array. The entire rampup procedure took roughly 30 minutes. The total operating source volume of the airgun is 20 cubic inches. The design while in acquisition was a shot pattern from a single source, with the shot point interval of every 12.5 meters at survey speeds of no more than 4 - 4.8 knots.

Table 4: Survey Equipment Operated By The Survey Vessel

Source specification	***Elliot Cheramie***
Total source volume (in^3)	20
Number of source arrays	1
Total number of source elements In full volume source	2
Source depth (m)	3m for both the SBP and Airgun
Source distance from vessel (m)	3m (SBP), 30m (Airgun)
Source frequency (Hz)	2-10 kHz (SBP), 10 kHz (Airgun)
Source intensity (dB re 1µPa or bar meters)	2000 (Seismic Array) 137.9 (SBP)
Shot point interval (s)	12.5 (Seismic Array)

4 MONITORING AND MITIGATION PROGRAM

This section describes the protected species monitoring and mitigation measures established to meet the requirements of the NMFS BO. Program mitigation measures were designed to minimize potential impacts of the survey activities on marine mammals, sea turtles, and other protected species of interest.

The following monitoring protocols were implemented to meet these objectives, and each are described in detail in a sub-section below:

M/V Elliot Cheramie

- Visual observations were required to be conducted from port to port during daytime hours, to provide real-time sighting data, allowing for the implementation of mitigation procedures as necessary.
- Protected species buffer and exclusion zones (EZs) were established around the regulated sound source, with delays to initiation and shutdowns of the active source implemented when protected species were detected within these zones.

4.1 Monitoring: PSOs

Trained and experienced PSOs, were assigned to the vessel during survey activities to conduct the monitoring for protected species, record and report detections, and request mitigation actions in accordance with the established regulatory requirements and monitoring plan.

RPS was responsible for ensuring that each PSO met the minimum requirements set forth by BOEM and by NMFS. BOEM and NMFS PSO requirements include training in protected species identification and behavior, in addition to field experience in protected species observation in the Atlantic Ocean or the Gulf of Mexico.

RPS was responsible for the provision of training certifications and resumes to be reviewed and approved by BOEM prior to deployment on the vessel.

RPS was responsible for providing the PSOs, with vessel-specific and survey contractor-specific training and Environmental Project Inductions were provided by RPS and Echo Offshore during project kick-off meetings, conducted prior to the start of survey operations and prior to scheduled crew changes.

All certified PSOs who were deployed during the survey operations are listed in Appendix C.

4.2 Visual Monitoring: Protocols and Methods

A team of PSOs were deployed in sufficient numbers to meet the monitoring requirements, as outlined in Table 5. PSOs monitored while the vessel was in transit and prior to and during all 2DHR sound source operations conducted by the vessel. Visual monitoring was also conducted during all periods between sound source activities to collect additional protected species data. Two PSO monitored at a time and PSOs rotated monitoring shifts as needed to maximize concentration and to meet the watch requirements of the Lease Area (watch periods not to exceed two hours without a minimum one-hour break, and a maximum duration or 12 hours in a 24-hour period).

Visual monitoring locations on each vessel were selected in consideration of the following factors:

1. To afford PSOs a 360-degree viewpoint around the vessel and acoustic sources, such that the exclusion zones (EZ) around the sound sources and the strike avoidance separation distances could be simultaneously monitored,
2. Provide the highest vantage point possible to allow for monitoring out to the greatest distances ahead of, and around, the vessel,

3. Provide shelter from inclement weather, as needed,
4. Provide real-time communication with vessel, and equipment operators.

PSOs conducted their visual monitoring by actively scanning with the naked eye out to the furthest observation points visible, methodically sweeping areas closer to the vessel and focusing on the EZs and ahead of the vessel. PSOs conducted regular sweeps of the surrounding areas using magnification devices as described below. PSOs monitored for cues that might indicate the presence of protected species including but not limited to splashing, footprints, blows, and presence of other marine species (diving seabirds, fish feeding activity, etc.).

Table 5: Visual Monitoring Methodology

	Elliot Cheramie
Total Number of PSOs	3
Number of PSOs on Watch - Day	2
Visual monitoring equipment- Day	Reticle Binoculars, Big eye Lens
Visual monitoring conducted	30 minutes before sunrise, 30 minutes after sunset

Displays inside the bridge showed current information about the vessel (e.g. position, speed, heading, etc.), sea conditions (e.g. water depth, sea temperature, etc.), and weather (e.g. wind speed and direction, air temperature, etc.). Environmental conditions, along with vessel and acoustic source activity, were recorded at least once an hour, or every time there was a change of one or more of the variables (for example, visibility, sea state, etc.).

4.2.1 Daylight Visual

The PSOs on board were equipped with hand-held reticle binoculars, range sticks, big eyes binoculars, and digital single lens reflex (DSLR) cameras with zoom lens to aid in visual watches conducted during the day. PSO teams used field notebooks to record data while on watch and laptops were used to enter data.

Range estimates were made by comparison to object of known distance, as well as with reticle binoculars. Reticle binoculars were calibrated whenever possible to ensure accuracy of distance data. These reticle calibration tables are provided in Appendix D.

4.3 Monitoring: Data Collection

During or immediately after the single Bottlenose dolphin detection event, the PSOs recorded the detection details in a standardized datasheet provided to them by RPS. Excel data forms included tabs for project data, monitoring effort data, source operations data, and protected species detection data. RPS supplied a set of standardized variables for specific data fields that were on the data form provided to their PSOs.

The single detection event of Bottlenose dolphins observed on this project was linked to an entry on an effort datasheet where specific environmental conditions and vessel activity were logged.

Species identifications were made for visual detections whenever the distance of the animal(s), length of the sighting, and visual observation conditions allowed. Whenever possible during detection, photographs were taken with DSLR cameras that had telephoto lenses. All three PSO's were equipped with 300 – 500 mm lens for their cameras. Marine mammal identification manuals were consulted, and photos were examined during observation breaks to confirm identifications.

4.3.1 Data Collection Requirements & Methods

Data was collected to meet the requirements of NMFS as summarized in Table 1 of this report.

PSOs collected data in handwritten notepads and/or on portable tablet devices during watches. During watch breaks and at the end of daylight hours, data was compiled in proprietary data forms on laptop computers and backed up on portable hard drives.

4.4 Mitigation Measures

The following mitigation actions were intended for visual detections of marine mammals and sea turtles:

- Establishment of Buffer Zone (BZ) around acoustic array
  - 500-meters for all true whales (Rice's whale, sperm whales, Kogia species and all beaked whales)
  - 200-meters for all other marine mammals and sea turtles
- Establishment of Exclusion Zone (EZ) around energy Vessel with operating frequencies below 200 kHz for operations
  - 500-meter for all true whales (Rice's whale, sperm whales, Kogia species and all beaked whales)
  - 100-meters for all other marine mammals
- Search periods of 30 minutes, conducted visually prior to the initiation of the acoustic array from silence.
- If marine mammals or sea turtles were detected inside their respective BZ during the search period prior to the initiation of the source, delays to the initiation of the sound sources were implemented until all animals had been observed exiting the BZ, or when the animals were not observed exiting, 15 minutes for small odontocetes and 30 minutes for all other marine mammals and sea turtles were implemented.
- Shutdown of the active source upon detection of marine mammals inside their respective EZ. Shutdown was not required for dolphins of the genera *Steno, Tursiops, Stenella, and Lagenodelphis*. In the event of an acoustic detection of dolphins inside the EZ, unless a visual observer or PAM Operator could confirm that the animals detected were not of one of the four shutdown-exempted genera listed above, the detection was assumed to have been of one of those genera, and no shutdown was required.
- Once the sound source had been shut down for a protected species detection, operations would resume with ramp up following at least either all animals were observed exiting the exclusion zone, or when they were not observed exiting, 30 minutes had passed.

4.4.1 Strike Avoidance and Vessel Separation Distances

The following strike avoidance procedures were implemented for detections of protected species in the survey area.

- Vessel operators must maintain a vigilant watch for all aquatic protected species. The vessel must slow down, stop their vessel, or alter course, as appropriate and regardless of vessel

size, to avoid striking any protected species, including marine mammals, sea turtles, and Endangered Species Act (ESA) listed fish species such as Gulf sturgeon, oceanic white-tipped shark and giant manta ray.

- When protected species are sighted while a vessel is underway, the vessel should take act avoid violating the relevant minimum separation distances listed below. If protected species are sighted within their relevant separation distance, the vessel should reduce speed and/or shift the engine to neutral, not engaging the engines until animals are clear of the area. The vessel was not required to shift into neutral for animals that voluntarily approach. For vessels limited in maneuverability, maintaining separation distances were not required if doing so would put the safety of crew or vessel at risk.
- Vessel speeds must be reduced to 10 knots or less when mother/calf pairs, pods, or large assemblages of any marine mammal are observed near a vessel. The M/V Elliot Cheramie maintained this speed restriction throughout the survey .

4.5 Reporting

Reporting requirements are outlined in Table 1. NMFS requires a final survey report be prepared, detailing source operations, PSO effort, detection of protected species and any mitigation measures taken.

4.5.1 Injured or Dead Protected Species

Any injured or dead marine mammal or sea turtle observed either by a PSO on watch or by a crew member was required be reported to BOEM and NMFS as described in Table 1. Reporting requirements included a phone notification to the NMFS Regional Stranding hotline as soon as practicably possible, made by either the Lead PSO or RPS project manager, as communications permitted from the vessel.

In the event of an injured or dead protected species detection, the Lead PSO would also prepare a written report in accordance with NMFS standard reporting guidelines, using the template provided by BOEM in the lease, which would be submitted to the agencies.

4.5.2 Final Report

RPS has prepared this technical report to meet the NMFS BO final report requirements outlined in Table 1 of this report. Each of the elements of the required final PSO report is provided in Table 1, referencing the section in this technical report where the element is addressed.

5 DATA RECORDS AND ANALYSIS METHODS

5.1 Operation Activity

PSOs collected the operational status of regulated equipment each day that the equipment was deployed on the vessel.

The vessel recorded the start of line (SOL) times and the end of line (EOL) times for the equipment during acquisition. The vessel also recorded the status of the equipment while acquisition occurred by noting full power or shutdowns due to mitigation actions. Throughout this survey, the acoustic equipment was firing continuously through the day and nighttime periods.

5.2 Monitoring Effort

PSOs recorded monitoring effort by entering start of watch and end of watch times into data sheets where the vessel position and environmental data was also documented for that duration.

Total monitoring effort was calculated by summing the durations of each watch period. Where the monitoring effort entry did not also indicate the source status for that monitoring period, source data was cross referenced during analysis to calculate the duration of monitoring conducted while regulated sources were on and off.

Visual monitoring while the acoustic source was silent included monitoring conducted during transit to/from survey sites and any other recorded silent periods (extended line changes, brief sequence changes, mitigation action, equipment downtime, or weather standby time).

5.2.1 Summary of Environmental Conditions

Each PSO monitoring effort data form included environmental conditions present during that watch period. Environmental variables were recorded every 60 minutes, or when conditions changed.

Beaufort Sea state was recorded for each monitoring period using the universally accepted scale (Table 6).

Table 6: Beaufort Sea State Scale

Beaufort number	Description	Wave height	Sea conditions
0	Calm	0 m	Sea like a mirror
1	Light air	0–0.3 m	Ripples with appearance of scales are formed, without foam crests
2	Light breeze	0.3–0.6 m	Small wavelets still short but more pronounced; crests have a glassy appearance but do not break
3	Gentle breeze	0.6–1.2 m	Large wavelets; crests begin to break; foam of glassy appearance; perhaps scattered white horses
4	Moderate breeze	1–2 m	Small waves becoming longer; fairly frequent white horses
5	Fresh breeze	2–3 m	Moderate waves taking a more pronounced long form; many white horses are formed; chance of some spray
6	Strong breeze	3–4 m	Large waves begin to form; the white foam crests are more extensive everywhere; probably some spray
7	High wind,	4–5.5 m	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind; spindrift begins to be seen
8	Gale	5.5–7.5 m	Moderately high waves of greater length; edges of crests break into spindrift; foam is blown in well-marked streaks along the direction of the wind

9	Severe gale	7–10 m	High waves; dense streaks of foam along the direction of the wind; sea begins to roll; spray affects visibility
10	Storm	9–12.5 m	Very high waves with long overhanging crests; resulting foam in great patches is blown in dense white streaks along the direction of the wind; on the whole the surface of the sea takes on a white appearance; rolling of the sea becomes heavy; visibility affected
11	Violent storm	11.5–16 m	Exceptionally high waves; small- and medium-sized ships might be for a long time lost to view behind the waves; sea is covered with long white patches of foam; everywhere the edges of the wave crests are blown into foam; visibility affected
12	Hurricane force	>14 m	The air is filled with foam and spray; sea is completely white with driving spray; visibility very seriously affected

Sea swell heights observed during visual monitoring were gauged by PSOs in meters, assigned to one of three swell height categories (<2, 2-4, >4) and recorded for each hour that prior mentioned environmental data was taken. PSOs also recorded visibility during monitoring effort, in kilometers, where recorded values were selected from categories (>5, 2-5, 1-2, 0.5-1, 0.3-0.5, 0.1-0.3, 0.05-0.1, <0.05). Windspeed, wind direction, percentage of cloud cover, glare intensity and presence of/type of precipitation were other environmental conditions recorded during visual monitoring effort and were determined by the PSO based on observation and using informed judgement.

5.3 Visual Sightings of Protected Species

PSOs used standardized reporting forms provided by RPS to record all detections of marine mammals and sea turtles made during survey operations. These records were completed any time a sighting was made, regardless of distance, not just for detections where mitigation was implemented.

Sighting identification or detection event numbers were assigned chronologically for all protected species observed on a vessel throughout that vessel's survey activity. A new detection number was assigned for a new species sighting or when enough time had passed between observations of animals of the same species such that PSOs could not be certain that they were observing the same animals previously documented. A standard duration of time was to be applied between observations: 15 minutes for delphinid and pinniped detections and 30 minutes for large whales. If there were multiple species in a single detection, the same sighting identification or detection event was used.

Protected species movement relative to the vessel, pace, and initial and subsequent behavior states were recorded for each protected species sighting where standardized categories for each were provided as controlled fields in the provided data form.

5.3.1 Closest point of approach

All PSOs recorded closest point of approach (CPA) and the source status at the closest point of approach. In the detection reporting datasheets, the CPA was in relation to the source and not the vessel.

5.3.2 Detection rate

Detection rate was calculated using the number of protected species events per hour of monitoring effort. During this project, there was only one detection therefore, calculating a detection rate was not feasible.

5.3.3 Behavior and behavior change

The PSO protected species detection template included an initial behavior and initial pace field for the detection. It included the direction of travel relative to the vessel at initial detection, pace, and direction of travel at final detection and other behaviors documented throughout the event. Where these data points

were not included as specific entries in the data form, the information was sometimes available in a detection summary.

5.4 Monitoring Tools Efficacy and Comparisons Assessment

Visual monitoring was mostly conducted by unaided eye, where handheld reticle binoculars, big eye binoculars and DSLR cameras with 300 mm to 500 mm zoom lenses were also used to confirm a sighting or assist in making a species identification.

5.5 Mitigation Measures Implemented

There were no mitigation measures required throughout this project as we detected no protected species while out in the survey area with equipment deployed.

5.6 Data Quality Control

The RPS data analysts reviewed all of the PSO data sets received from the vessel and conducted quality control as described in Table 7.

Table 7: Quality Control Editing Performed By RPS On PSO Datasets By Data Field

Data type	Data field	Corrections made
Monitoring effort	Start of watch / End of watch	• Times were corrected or added where error was evident, typically by inconsistency with adjacent times
Protected species detections	Position	• Positions that plotted out of place were corrected using effort positions of corresponding times, where available • When positions could not be corrected and the position was on land, detection was removed from detection plots

6 RESULTS

This section of the report details sound source operations, protected species monitoring effort, environmental conditions during monitoring effort, detection data and distribution inside and outside the project area during source operation and source silence.

The monitoring effort, source operations and protected species detections for the vessel are also provided in excel datasets in Appendix E.

6.1 Operation Activity

Survey operations initiated with conducting source calibrations and running recon lines in the survey area before proceeding to acquisition, according to the survey crew. Survey operations utilizing the airgun was briefly suspended on 29 June 2024 due to weather conditions and the seas being too unstable to retrieve viable data.

The dates of operation, total days of regulated source activity and hours of regulated source operations (shown in decimal hours (hh.hh) by survey vessel are provided in Table 8.

Table 8: Summary of Regulated Sound Source Operations

Vessel	Dates of Operation	Total Days of Regulated Source Activity	Total Hours of Regulated Source Operations (hh.hh)
Elliot Cheramie	28 June 2024 to 01 July 2024	4	54.33

6.2 Monitoring Effort

Visual monitoring during the survey is summarized in Table 9, shown by survey vessel and by activity of the regulated source and by the type of source utilized.

Table 9: Summary of Monitoring Effort, Visual, By Source Activity Status

Vessel and type of source utilized	Source Equipment Active	Source Equipment Inactive
	Duration (hh.hh)	Duration (hh.hh)
	Visual	Visual
Elliot Cheramie *Seismic & Geophysical*	34.33	17.05

6.3 Environmental Conditions

Environmental conditions can have an impact on the probability of detecting protected species. The environmental conditions present during visual observations undertaken during the survey were moderate.

Visibility was indicated in kilometers and recorded in one of eight categories (>5, 2-5, 1-2, 0.5-1, 0.3-0.5, 0.1-0.3, 0.05 to 0.1, and <0.05). Majority of monitoring effort (93%) was conducted in conditions where visibility extended to greater than 5 kilometers. The duration of monitoring conducted at each visibility classification is provided in Table 10.

Table 10: Summary of Visibility During Visual Monitoring Effort

Visibility (km)	Visual Monitoring (hh.hh)	Percentage (%)
>5 km	47.97	93%
2 to 5 km	00.00	0%
1 to 2 km	03.42	7%
Total	**51.38**	**100%**

Monitoring effort was conducted in Beaufort Sea states ranging from Level 2 to Level 3 (Table 11), which is generally considered to be favorable conditions for most protected species monitoring. Visual observations at Level 3 Beaufort Sea states or below accounted for 62% of the total visual monitoring effort.

Table 11 Summary of Beaufort Sea State During Visual Monitoring During The Survey.

Beaufort Sea State	Visual Monitoring (hh.hh)	Percentage (%)
B2	19.48	38%
B3	31.90	62%
Total	**51.38**	**100%**

Swell heights during a majority of the visual observations were <2 meters, accounting for 86% of the total. (Table 12).

Table 12: Summary of Swell Height During Visual Monitoring During The Survey

Swell Height	Visibility (hh.hh)	Percentage (%)
<2 m	44.38	86%
2-4 m	7.00	14%
Total	**51.38**	**100%**

7 PROTECTED SPECIES OBSERVATION RESULTS

7.1 Visual Sightings

This section of the report summarizes the visual sighting of protected species made during the survey. There was one (1) protected species detection which was a delphinid species.

The detection was identified to the species level.

A table of the protected species sighting is provided as part of an excel datasheet attachment in Appendix E. Photographs of the identified protected species visually detected during the survey are provided in Appendix F.

Table 13 shows the total number of detection records and the number of individuals detected for each protected species during the survey.

Table 13: Detection Records Collected For Each Protected Species Visually Detected During The Survey

Common Name	Total Number of Visual Detection Records	Total Number of Animals
Bottlenose dolphin	1	26
Total protected species	**1**	**26**

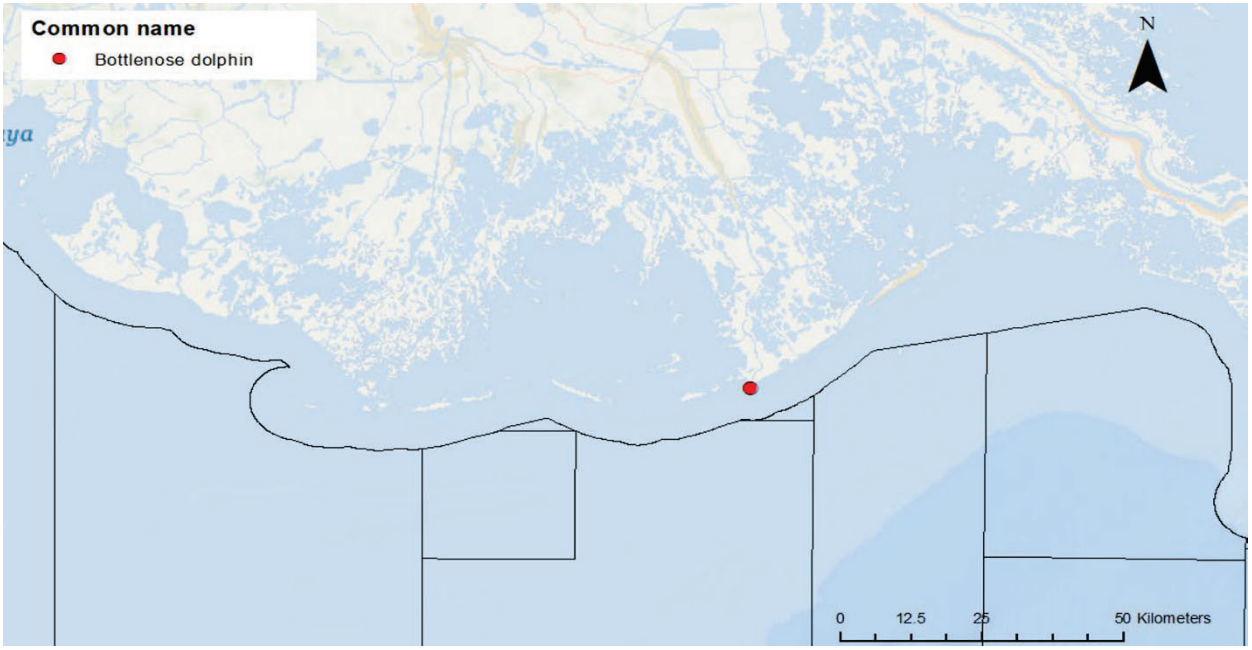

Figure 2: Map of Protected Species Detection

7.1.1 Detection and Distance Summaries

The only detected species throughout this survey was the bottlenose dolphin. The number of detection events, the approximate number of animals observed and the range of distance from the vessel at first detection, over the course of the survey is provided in Table 14.

Table 14: Detection Summary of Dolphins Observed During The Survey

Dolphins	Bottlenose dolphin
Number of detection records	1
Detection rates	0.019
Estimated number of individuals detected	26
Range of distances (m) at first detection	50-60

Table 15: Average distance of protected species to regulated sources while active and inactive at initial detection

Species Detected	Regulated Sources Active		Regulated Sources Inactive	
	Number of detections	Mean distance to source (m)	Number of detections	Mean distance to source (m)
Bottlenose dolphin	0	N/A	1	N/A
All dolphin species	**0**	**N/A**	**1**	**N/A**

7.2 Protected species incident reporting

There were no observations of dead or injured protected species during the survey.

7.3 Summary of Mitigation Measures Implemented

7.3.1 Mitigation for sound exposure from survey equipment

There were no mitigation actions required during the survey.

7.3.2 Maneuvers for strike avoidance.

There was one detection event for protected species during the survey. The mitigation action is summarized in Table 16

Table 16: Summary of protected species detections occurring inside the species/species group specific separation distances for M/V *Elliot Cheramie*

Date	Visual Detection Number	Species	Number of Animals	CPA to Vessel (m)	Strike Avoidance Maneuver
01 July 2024	1	Bottlenose dolphin	26	1.00	Maintained speed and course

8 SUMMARY

8.1 Interpretation of the Results

The marine mammal species (bottlenose dolphins) that was detected during the transit was a species that occur commonly in the Gulf of Mexico and that are regularly observed by PSOs during transit and survey activities. Each species detected was observed within its predicted range with no species encounters occurring outside of that species normal range.

For the one detection during transit, the sample size was too small to be statistically significant. No behaviors were documented that suggested adverse impacts had occurred to any protected species encountered as a result of the survey activities undertaken.

8.2 Effectiveness of Monitoring and Mitigation

In order to minimize the potential impacts to marine mammals and sea turtles, PSOs assigned to all the survey vessel were prepared to implement mitigation measures whenever protected species were detected approaching, entering, or within the designated exclusion/buffer zones. Mitigation actions were not required during this survey program. PSOs searched the exclusion zones prior to activation of sound sources and survey crew confirmed that exclusion zones were clear prior to initiating operations. Sources were initiated gradually, in ramp-up format whenever multiple sources would be active simultaneously. The PSO's did not anticipate much marine mammal activity in the area based on past data along with other environmental parameters.

There was one strike avoidance maneuver required during the transit back to Fourchon dock in Louisiana. This was required as the animals entered their respective 50m separation distance.

There were no sightings of injured or dead protected at any point during the survey.

Visual observations yielded a total of one protected species detection. PSOs likely did not detect all animals present; however, it is highly unlikely that protected species were not detected inside the exclusion and buffer zones while the sources were active, especially since zones were relatively small and PSOs were equipped with multiple tools to augment visual monitoring throughout the daytime period. The environmental conditions present during monitoring were generally good for detecting protected species, especially inside the exclusion and buffer zones.

The monitoring and mitigation measures GOM Biological Opinion appear to have been an effective means to protecting the marine species encountered during survey operations.

9 LITERATURE CITED

United States Fish and Wildlife Service (USFWS). 2019. Marine Mammal Protection Act (MMPA). 16 U.S.C.

National Marine Fisheries Service (NMFS) Endangered Species Act Section 7 Biological Opinion. Biological Opinion of the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico. 2020. Appendix A & C.

Appendix A: LOA, and NMFS Biological Opinion

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910

LETTER OF AUTHORIZATION

Echo Offshore, LLC and its designees are hereby authorized under section 101(a)(5)(A) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(A)) to take marine mammals incidental to geophysical survey activities in the Gulf of Mexico, subject to the provisions of the MMPA and the Regulations Governing Taking Marine Mammals Incidental to Geophysical Survey Activities in the Gulf of Mexico (50 CFR Part 217, Subpart S) (Regulations).

1. This Letter of Authorization (LOA) is valid from the date of issuance through December 31, 2024.

2. This LOA authorizes take incidental to the specified geophysical survey activities (2D high resolution seismic survey in the South Marsh Island Area, lease blocks 61 and 66) described in the LOA request.

3. General Conditions

   (a) A copy of this LOA must be in the possession of the Holder of the Authorization (Holder), vessel operator, other relevant personnel, the lead protected species observer (PSO), and any other relevant designees operating under the authority of the LOA.

   (b) The species and/or stocks authorized for taking are listed in Table 1. Authorized take, by Level A and Level B harassment only, is limited to the species and numbers listed in Table 1.

   (c) The taking by serious injury or death of any of the species listed in Table 1 or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this LOA. Any taking exceeding the authorized amounts listed in Table 1 is prohibited and may result in the modification, suspension, or revocation of this LOA.

   (d) The Holder must instruct relevant vessel personnel with regard to the authority of the protected species monitoring team (PSO team), and must ensure that relevant vessel personnel and PSO team participate in a joint onboard briefing, led by the vessel operator and lead PSO, prior to beginning work to ensure that responsibilities, communication procedures, protected species monitoring protocols, operational procedures, and LOA requirements are clearly understood. This briefing must be repeated when relevant new personnel join the survey operations before work involving those personnel commences.

   (e) The acoustic source must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Unnecessary use of the acoustic source must be avoided. Notified operational capacity (i.e., total array volume or

airgun size) (not including redundant backup airguns) must not be exceeded during the survey, except where unavoidable for source testing and calibration purposes. All occasions where activated source volume exceeds notified operational capacity must be communicated to the PSO(s) on duty and fully documented. The lead PSO must be granted access to relevant instrumentation documenting acoustic source power and/or operational volume.

(f) PSO requirements:

i. LOA-holders must use independent, dedicated, qualified PSOs, meaning that the PSOs must be employed by a third-party observer provider, must have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of protected species and mitigation requirements (including brief alerts regarding maritime hazards), and must be qualified pursuant to section 5(a) of this LOA.

ii. The Holder must submit PSO resumes for NMFS review and approval prior to commencement of the survey. Resumes should include dates of training and any prior NMFS approval, as well as dates and description of last experience, and must be accompanied by information documenting successful completion of an acceptable training course. NMFS is allowed one week to approve PSOs from the time that the necessary information is received by NMFS, after which PSOs meeting the minimum requirements will automatically be considered approved.

iii. At least one PSO aboard each acoustic source vessel must have a minimum of 90 days at-sea experience working in the role, with no more than eighteen months elapsed since the conclusion of the at-sea experience. One PSO with such experience must be designated as the lead for the entire PSO team. The lead must coordinate duty schedules and roles for the PSO team and serve as the primary point of contact for the vessel operator. (Note that the responsibility of coordinating duty schedules and roles may instead be assigned to a shore-based, third-party monitoring coordinator.) To the maximum extent practicable, the lead PSO must devise the duty schedule such that experienced PSOs are on duty with those PSOs with appropriate training but who have not yet gained relevant experience.

4. Mitigation Requirements

(a) Visual monitoring requirements:

i. During survey operations (i.e., any day on which use of the acoustic source is planned to occur, and whenever the acoustic source is in the water, whether activated or not) using an airgun as the acoustic source, a

minimum of two PSOs must be on duty and conducting visual observations at all times during daylight hours (i.e., from 30 minutes prior to sunrise through 30 minutes following sunset).

ii. During survey operations using a sub-bottom profiler as the acoustic source, a minimum of one PSO must be on duty and conducting visual observations at all times during daylight hours, unless the active acoustic source is deployed on an autonomous underwater vehicle (AUV), in which case PSOs are not required.

iii. Visual monitoring must begin not less than 30 minutes prior to source activation and must continue until one hour after use of the acoustic source ceases or until 30 minutes past sunset.

iv. When two PSOs are required, the PSOs must coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts. PSOs must conduct visual observations using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.

v. Any observations of marine mammals by crew members aboard any vessel associated with the survey must be relayed to the PSO team.

vi. During good conditions (e.g., daylight hours; Beaufort sea state (BSS) 3 or less), PSOs must conduct observations when the acoustic source is not operating for comparison of sighting rates and behavior with and without use of the acoustic source and between acquisition periods, to the maximum extent practicable.

vii. PSOs may be on watch for a maximum of two consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hour period. NMFS may grant an exception for LOA applicants that demonstrate such a "two hours on/one hour off" duty cycle is not practicable, in which case PSOs will be subject to a maximum of four consecutive hours on watch followed by a break of at least two hours between watches.

(b) During use of the airgun, PSOs must establish and monitor applicable exclusion and buffer zones. During use of the acoustic source (i.e., anytime the acoustic source is active), occurrence of marine mammals within the relevant buffer zone (but outside the exclusion zone) should be communicated to the operator to prepare for the potential shutdown of the acoustic source.

i. Two exclusion zones are defined, depending on the species and context. A standard exclusion zone encompassing the area at and below the sea surface out to a radius of 100 meters from the sound source (0-100 m) is

defined. For special circumstances (defined at 4(d)(iv) of this LOA), the exclusion zone encompasses an extended distance of 500 meters (0-500 m).

ii. During pre-start clearance monitoring (i.e., before activation of the acoustic source), the buffer zone acts as an extension of the exclusion zone in that observations of marine mammals within the buffer zone would also preclude airgun operations from beginning. For all marine mammals (except where superseded by the extended 500-m exclusion zone), the buffer zone encompasses the area at and below the sea surface from the edge of the 0-100 meter exclusion zone out to a radius of 200 meters from the sound source (100-200 m). The buffer zone is not applicable when the exclusion zone is greater than 100 meters, i.e., the observational focal zone is not increased beyond 500 meters.

(c) A 30-minute pre-start clearance observation period must occur prior to activation of the sound source. This requirement applies to use of both the airgun and the sub-bottom profiler. During use of the sub-bottom profiler, pre-start clearance observation must occur over the 200-m zone defined at 4(b)(ii) of this LOA. The Holder must adhere to the following pre-start clearance requirements:

i. When PSOs are required, the operator must notify a designated PSO of the planned activation of the sound source as agreed upon with the lead PSO; the notification time should not be less than 60 minutes prior to the planned activation.

ii. When PSOs are required, a designated PSO must be notified again immediately prior to activating the sound source and the operator must receive confirmation from the PSO to proceed.

iii. Activation must not occur if any marine mammal is within the applicable exclusion or buffer zone. If a marine mammal is observed within the exclusion zone or the buffer zone during the 30-minute pre-start clearance period, activation must not occur until the animal(s) has been observed exiting the zones or until an additional time period has elapsed with no further sightings (15 minutes for small delphinids and 30 minutes for all other species).

iv. During use of the sub-bottom profiler, ramp-up procedure must be implemented following conclusion of the pre-start clearance observation period, when technically feasible. When technically feasible, power should be increased to the source in order to create a ramp-up effect.

v. Activation may occur at times of poor visibility, including nighttime. Acoustic source activation may only occur at night where operational planning cannot reasonably avoid such circumstances.

vi. If the acoustic source is shut down for brief periods (i.e., less than 30 minutes) for reasons other than implementation of prescribed mitigation (e.g., mechanical difficulty), it may be activated again without pre-start clearance watch if PSOs have maintained constant visual observation and no detections of any marine mammal have occurred within the applicable exclusion zone. For any longer shutdown, pre-start clearance observation is required.

(d) Shutdown requirements apply to use of airguns only. These requirements are as follows:

i. Any PSO on duty has the authority to delay the start of survey operations or to call for shutdown of the acoustic source pursuant to the requirements of this subpart.

ii. The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch.

iii. When the airgun is active and a marine mammal appears within or enters the applicable exclusion zone, the acoustic source must be shut down. When shutdown is called for by a PSO, the acoustic source must be immediately deactivated and any dispute resolved only following deactivation.

iv. The extended 500-m exclusion zone must be applied upon detection of a baleen whale, sperm whale, beaked whale, or *Kogia* spp. within the zone.

v. Shutdown requirements are waived for dolphins of the following genera: *Tursiops*, *Stenella*, *Steno*, and *Lagenodelphis*. If a delphinid is visually detected within the exclusion zone, no shutdown is required unless the PSO confirms the individual to be of a genus other than those listed above, in which case a shutdown is required.

vi. If there is uncertainty regarding identification or localization, PSOs may use best professional judgment in making the decision to call for a shutdown.

vii. Upon implementation of shutdown, the source may be reactivated after the marine mammal(s) has been observed exiting the applicable exclusion zone or following a 30-minute clearance period with no further detection of the marine mammal(s).

(e) *Vessel strike avoidance*. The Holder must adhere to the following requirements:

i. Vessel operators and crews must maintain a vigilant watch for all marine mammals and must slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammal. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel, which shall be defined according to the parameters stated in this subsection. Visual observers monitoring the vessel strike avoidance zone may be third-party observers (i.e., PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training to distinguish marine mammals from other phenomena and broadly to identify a marine mammal as a baleen whale, sperm whale, or other marine mammal;

ii. Vessel speeds must be reduced to 10 kn or less when mother/calf pairs, pods, or large assemblages of marine mammals are observed near a vessel;

iii. All vessels must maintain a minimum separation distance of 500 m from baleen whales;

iv. All vessels must maintain a minimum separation distance of 100 m from sperm whales;

v. All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an exception made for those animals that approach the vessel; and

vi. When marine mammals are sighted while a vessel is underway, the vessel must take action as necessary to avoid violating the relevant separation distance, e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area. If marine mammals are sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear or any vessel that is navigationally constrained.

vii. These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply.

5. Monitoring Requirements

(a) PSO qualifications:

i. PSOs must successfully complete relevant, acceptable training, including

completion of all required coursework and passing (80 percent or greater) a written and/or oral examination developed for the training program.

ii. PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver must be submitted to NMFS and shall include written justification. Requests will be granted or denied (with justification) by NMFS within one week of receipt of submitted information. Alternate experience that may be considered includes, but is not limited to:

(A) secondary education and/or experience comparable to PSO duties;

(B) previous work experience conducting academic, commercial, or government-sponsored marine mammal surveys; or

(C) previous work experience as a PSO; the PSO should demonstrate good standing and consistently good performance of PSO duties.

(b) *Equipment*. The Holder is required to:

i. Work with the selected third-party observer provider to ensure PSOs have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals. (Equipment specified in A. through G. below may be provided by an individual PSO, the third-party observer provider, or the LOA-holder, but the LOA-holder is responsible for ensuring PSOs have the proper equipment required to perform the duties specified herein.) Such equipment, at a minimum, must include:

(A) Reticle binoculars (e.g., 7 x 50) of appropriate quality (at least one per PSO, plus backups);

(B) Global Positioning Unit (GPS) (plus backup);

(C) Digital camera with a telephoto lens (the camera or lens should also have an image stabilization system) that is at least 300 mm or equivalent on a full-frame single lens reflex (SLR) (plus backup);

(D) Compass (plus backup);

(E) Radios for communication among vessel crew and PSOs (at least one per PSO, plus backups); and

(F) Any other tools necessary to adequately perform necessary PSO tasks.

(c) *Data collection*. PSOs must use standardized electronic data forms. PSOs must record detailed information about any implementation of mitigation requirements, including the distance of marine mammals to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up or activation of the acoustic source. If required mitigation was not implemented, PSOs must record a description of the circumstances. At a minimum, the following information should be recorded:

i. Vessel names (source vessel and other vessels associated with survey), vessel size and type, maximum speed capability of vessel, port of origin, and call signs;

ii. PSO names and affiliations;

iii. Dates of departures and returns to port with port name;

iv. Dates of and participants in PSO briefings;

v. Dates and times (Greenwich Mean Time) of survey effort and times corresponding with PSO effort;

vi. Vessel location (latitude/longitude) when survey effort began and ended and vessel location at beginning and end of visual PSO duty shifts;

vii. Vessel location at 30-second intervals (if software capability allows) or 5-minute intervals (if location must be manually recorded);

viii. Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change;

ix. Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions changed significantly), including Beaufort sea state and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon;

x. Vessel location when environmental conditions change significantly;

xi. Factors that may have contributed to impaired observations during each PSO shift change or as needed as environmental conditions change (e.g., vessel traffic, equipment malfunctions);

xii. Survey activity information, such as acoustic source power output while in operation, number and volume of airguns operating in an array, tow depth of an acoustic source, and any other notes of significance (i.e., pre-start clearance, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.); and

xiii. Upon visual observation of a marine mammal, the following information:

(A) Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);

(B) PSO who sighted the animal and PSO location (including height above water) at time of sighting;

(C) Time of sighting;

(D) Vessel coordinates at time of sighting;

(E) Water depth;

(F) Direction of vessel's travel (compass direction);

(G) Speed of the vessel(s) from which the observation was made;

(H) Direction of animal's travel relative to the vessel;

(I) Pace of the animal;

(J) Estimated distance to the animal (and method of estimating distance) and its heading relative to vessel at initial sighting;

(K) Identification of the animal (e.g., genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;

(L) Estimated number of animals (high/low/best);

(M) Estimated number of animals by cohort (adults, juveniles, group composition, etc.);

(N) Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);

(O) Detailed behavior observations (e.g., number of blows/breaths, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior), including an assessment of behavioral responses to survey activity;

(P) Animal's closest point of approach (CPA) and/or closest distance from any element of the acoustic source;

(Q) Platform activity at time of sighting (e.g., deploying, recovering, testing, shooting, data acquisition, other); and

(R) Description of any actions implemented in response to the sighting (e.g., delays, shutdown, ramp-up) and time and location of the action.

6. Reporting Requirements

(a) Annual reporting:

i. The Holder must submit a summary report to NMFS on all activities and monitoring results within 90 days of the completion of the survey or expiration of the LOA, whichever comes sooner, and must include all information described above under section 5(c) of this LOA. If an issued LOA is valid for greater than one year, the summary report must be submitted on an annual basis.

ii. The report must describe activities conducted and sightings of marine mammals, must provide full documentation of methods, results, and interpretation pertaining to all monitoring, and must summarize the dates and locations of survey operations and all marine mammal sightings (dates, times, locations, activities, associated survey activities, and information regarding locations where the acoustic source was used). In addition to the report, all raw observational data must be made available to NMFS.

iii. The Holder must provide geo-referenced time-stamped vessel tracklines for all time periods in which airguns (full array or single) were operating. Tracklines must include points recording any change in airgun status (e.g., when the airguns began operating, when they were turned off). GIS files must be provided in ESRI shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates must be referenced to the WGS84 geographic coordinate system.

iv. The draft report must be accompanied by a certification from the lead PSO

as to the accuracy of the report, and the lead PSO may submit directly to NMFS a statement concerning implementation and effectiveness of the required mitigation and monitoring.

v. A final report must be submitted within 30 days following resolution of any comments on the draft report.

(b) *Comprehensive reporting*. The Holder must contribute to the compilation and analysis of data for inclusion in an annual synthesis report addressing all data collected and reported through annual reporting in each calendar year. The synthesis period shall include all annual reports deemed to be final by NMFS in a given one-year reporting period. The report must be submitted to NMFS within 90 days following the end of a given one-year reporting period.

(c) Reporting of injured or dead marine mammals:

i. In the event that personnel involved in the survey activities discover an injured or dead marine mammal, the Holder must report the incident to the Office of Protected Resources (OPR), NMFS and to the Southeast Regional Stranding Network as soon as feasible. The report must include the following information:

(A) Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);

(B) Species identification (if known) or description of the animal(s) involved;

(C) Condition of the animal(s) (including carcass condition if the animal is dead);

(D) Observed behaviors of the animal(s), if alive;

(E) If available, photographs or video footage of the animal(s); and

(F) General circumstances under which the animal was discovered.

ii. In the event of a ship strike of a marine mammal by any vessel involved in the survey activities, the LOA-holder must report the incident to OPR, NMFS and to the Southeast Regional Stranding Network as soon as feasible. The report must include the following information:

(A) Time, date, and location (latitude/longitude) of the incident;

(B) Species identification (if known) or description of the animal(s) involved;

(C) Vessel's speed during and leading up to the incident;

(D) Vessel's course/heading and what operations were being conducted (if applicable);

(E) Status of all sound sources in use;

(F) Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;

(G) Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;

(H) Estimated size and length of animal that was struck;

(I) Description of the behavior of the marine mammal immediately preceding and following the strike;

(J) If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;

(K) Estimated fate of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and

(L) To the extent practicable, photographs or video footage of the animal(s).

7. Actions to Minimize Additional Harm to Live-Stranded (or Milling) Marine Mammals

(a) In the event of a live stranding (or near-shore atypical milling) event within 50 km of the survey operations, where the NMFS stranding network is engaged in herding or other interventions to return animals to the water, the Director of OPR, NMFS (or designee) will advise the Holder of the need to implement shutdown procedures for all active acoustic sources operating within 50 km of the stranding. Shutdown procedures for live stranding or milling marine mammals include the following:

i. If at any time, the marine mammal(s) die or are euthanized, or if herding/intervention efforts are stopped, the Director of OPR, NMFS (or designee) will advise the LOA-holder that the shutdown around the animals' location is no longer needed.

ii. Otherwise, shutdown procedures will remain in effect until the Director of

OPR, NMFS (or designee) determines and advises the LOA-holder that all live animals involved have left the area (either of their own volition or following an intervention).

iii. If further observations of the marine mammals indicate the potential for re-stranding, additional coordination with the LOA-holder will be required to determine what measures are necessary to minimize that likelihood (e.g., extending the shutdown or moving operations farther away) and to implement those measures as appropriate.

(b) If NMFS determines that the circumstances of any marine mammal stranding found in the vicinity of the activity suggest investigation of the association with survey activities is warranted, and an investigation into the stranding is being pursued, NMFS will submit a written request to the LOA-holder indicating that the following initial available information must be provided as soon as possible, but no later than 7 business days after the request for information. In the event that the investigation is still inconclusive, the investigation of the association of the survey activities is still warranted, and the investigation is still being pursued, NMFS may provide additional information requests, in writing, regarding the nature and location of survey operations prior to the time period above.

i. Status of all sound source use in the 48 hours preceding the estimated time of stranding and within 50 km of the discovery/notification of the stranding by NMFS; and

ii. If available, description of the behavior of any marine mammal(s) observed preceding (i.e., within 48 hours and 50 km) and immediately after the discovery of the stranding.

8. This Authorization may be modified, suspended or revoked if the Holder fails to abide by the conditions prescribed herein (including, but not limited to, failure to comply with monitoring or reporting requirements), or if NMFS determines: (1) the authorized taking is likely to have or is having more than a negligible impact on the species or stocks of affected marine mammals, or (2) the prescribed measures are likely not or are not effecting the least practicable adverse impact on the affected species or stocks and their habitat.

_____

Kimberly Damon-Randall
Director,
Office of Protected Resources,
National Marine Fisheries Service.

Table 1. Authorized Incidental Take.

Common name	Scientific name	Level A harassment	Level B harassment
Bottlenose dolphin	*Tursiops truncatus*	0	62
Atlantic spotted dolphin	*Stenella frontalis*	0	26

Appendix A: Seismic Survey Mitigation and Protected Species Observer Protocols

This Appendix has been revised as of April 26, 2021, and replaces the original Appendix C (dated March 13, 2020). These protocols will be implemented by the Bureau of Ocean Energy Management (BOEM), the Bureau of Safety and Environmental Enforcement (BSEE), and provide guidelines to operators in complying with the Endangered Species Act (ESA; 16 U.S.C. §§ 1531-1544) and Marine Mammal Protection Act (MMPA; 16 U.S.C. §§1361-1423h). The measures contained herein apply to all seismic surveys approved by BOEM and associated with the federally regulated oil and gas program in the Gulf of Mexico.

Background

Geophysical surveys, including the use of airguns and airgun arrays may have an impact on marine wildlife. Many marine species are protected under the Endangered Species Act (ESA) and all marine mammals (including manatees) are protected under the Marine Mammal Protection Act (MMPA). The following Gulf of Mexico species are listed under the ESA:

ESA-listed Species common to the Gulf of Mexico
Gulf of Mexico Bryde's Whale (*Balaenoptera edeni*)
Sperm Whale (*Physeter macrocephalus*)
Green Turtle (*Chelonia mydas*) – North Atlantic DPS and South Atlantic DPS
Hawksbill Turtle (*Eretmochelys imbricata)*
Kemp's Ridley Turtle (*Lepidochelys kempii*)
Leatherback Turtle (*Dermochelys coriacea*) - Northwest Atlantic DPS
Loggerhead Turtle (*Caretta caretta*) – Northwest Atlantic Ocean DPS
Gulf Sturgeon (*Acipenser oxyrinchus desotoi*)
Oceanic Whitetip Shark (*Carcharhinus longimanus*)
Giant Manta Ray (*Manta birostris*)
West Indian Manatee (*Trichechus manatus*)*

**Managed by the US Fish and Wildlife Service*

Note that this list can change as other species are listed/delisted, and this protocol shall be applied to any ESA-listed protected species (and all marine mammals) that occur in the Gulf of Mexico, including rare and extralimital species.

BSEE and BOEM consult jointly with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) under Section 7 of the ESA to ensure that BOEM- or BSEE-authorized activities do not jeopardize the continued existence of ESA-listed species nor result in destruction or adverse modification of designated critical habitat. Incidental take of ESA-listed species is prohibited except as authorized pursuant to an Incidental Take Statement in the attached Biological Opinion. Incidental take of ESA-listed marine mammals cannot be exempted under the ESA unless also authorized under the MMPA. In this case, NMFS is

developing an incidental take regulation (ITR) to facilitate subsequent issuance of MMPA authorization (as applicable) to operators to authorize take incidental to seismic surveys. The proposed regulations would establish a framework for authorization of incidental take by Level A and Level B harassment through MMPA authorization (as applicable). Once an ITR and subsequent LOA is complete, the Biological Opinion and associated Incidental Take Statement may be amended to exempt take for Gulf of Mexico Bryde's whale and sperm whale, which are listed under the ESA. Following development of the ITRs, implementation could occur via issuance of MMPA authorization (as applicable and as Letters of Authorization [LOAs]) upon request from individual industry applicants planning specific seismic survey activities.

These protocols are the result of coordination between BOEM, BSEE, and NMFS and are based on: past and present mitigation measures; terms and conditions and reasonable and prudent measures identified in the attached Biological Opinion issued to the Bureaus; conditions, mitigation, monitoring, and reporting requirements identified in the MMPA ITR (50 CFR part 217 Subpart S); and NMFS' technical memorandum on standards for a protected species observer and data management program (Baker et al. 2013). BSEE is tasked as the lead agency for compiling lessee or operator reporting data required under current Biological Opinions applicable to both Bureaus. Therefore, while BOEM is issuing these protocols, all observer reports described herein must be submitted to BSEE as well as to NMFS where specified.

In order to protect ESA-listed species and marine mammals during seismic operations, seismic operators will be required to use protected species observers (PSOs) and follow specific seismic survey protocols when operating. These measures contained herein apply to all on-lease ancillary activity surveys conducted under 30 CFR Part 550 and all off-lease surveys conducted under 30 CFR Part 551, regardless of water depth. Operators must demonstrate your compliance with these requirements by submitting to BSEE and NMFS reports asdetailed below.

Definitions

Terms used in these protocols have the following meanings:

1. Protected species means any species listed under the ESA and/or protected by the MMPA. The requirements discussed herein focus on marine mammals and sea turtles since these species are the most likely to be observed during seismic surveys. However, other ESA-listed species (e.g., giant manta rays) are also protected and observations of them should be reported as detailed below.
2. Airgun means a device that releases compressed air into the water column, creating an acoustical energy pulse with the purpose of penetrating the seafloor.
3. Deep penetration surveys are defined as surveys using airgun arrays with total volume greater than 1,500 in^3.These surveys may in some cases collect return signals using sensors incorporated into ocean-bottom cables (OBC) or autonomous

ocean-bottom nodes (OBN) placed on the seafloor. These surveys are also referred to as high energy surveys.

4. Shallow penetration surveys are defined as surveys using airgun arrays with total volume equal to or less than 1,500 in^3, single airguns, boomers, or equivalent sources. These surveys are also referred to as low energy surveys.
5. Ramp-up (sometimes referred to as "soft start") means the gradual and systematic increase of emitted sound levels from an airgun array. Ramp-up begins by first activating a single airgun of the smallest volume, followed by doubling the number of active elements in stages until the full complement of an array's airguns are active. Each stage should be approximately the same duration, and the total duration should not be less than approximately 20 minutes for deep penetration surveys.
6. Shutdown of an airgun array means the immediate de-activation of all individual airgun elements of the array.
7. Exclusion zone means the area to be monitored for possible shutdown in order to reduce or eliminate the potential for injury of protected species. Two exclusion zonesare defined, depending on the species and context.
8. Buffer zone means an area beyond the exclusion zone to be monitored for the presence of protected species that may enter the exclusion zone. During pre-clearance monitoring (i.e., before ramp-up begins), the buffer zone also acts as an extension of the exclusion zone in that observations of marine mammals and sea turtles within the buffer zone would also prevent airgun operations from beginning (i.e. ramp-up). The buffer zone is not applicable for contexts that require an exclusion zone beyond 500 meters. The buffer zone encompasses the area at and below the sea surface from the edge of the 0– 500 meter exclusion zone, out to a radius of 1000 meters from the edges of the airgun array (500–1,000 meters) The buffer zone is not applicable when the exclusion zone is greater than 500 meters, *i.e.*, the observational focal zone is not increased beyond 1,500 meters.
9. Visual monitoring means the use of trained protected species observers (herein referred to as visual PSOs) to scan the ocean surface visually for the presence of protected species. These observers must have successfully completed a visual observer training program as described below. The area to be scanned visually includes primarily the exclusion zone, but also the buffer zone. Visual monitoring of the exclusion zones and adjacent waters is intended to establish and, when visual conditions allow, maintain zones around the sound source that are clear of marine mammals and sea turtles, thereby reducing or eliminating the potential for injury. Visual monitoring of the buffer zone is intended to (1) provide additional protection to marine mammals and sea turtles and awareness and potential protection of other visual protected species that may be in the area during pre-clearance, and (2) during airgun use, aid in establishing and maintaining the exclusion zone by alerting the visual observer and crew of marine mammals and sea turtles that are outside of, but may approach and enter, the exclusion zone.
10. Acoustic monitoring means the use of trained personnel (sometimes referred to as

passive acoustic monitoring (PAM) operators, herein referred to as acoustic PSOs) to operate PAM equipment to acoustically detect the presence of marine mammals. These observers must have successfully completed a passive acoustic observer training program as described below. Acoustic monitoring is intended to further support visual monitoring in maintaining an exclusion zone around the sound source that is clear of marine mammals, in part for the purpose of reducing or eliminating the potential for injury. In cases where visual monitoring is not effective (e.g., due to weather, nighttime), acoustic monitoring may be used to allow certain activities to occur, as further detailed below.

General Requirements

1. A copy of a MMPA incidental take authorization (as applicable) and BOEM-approved Permit/Plan must be in the possession of the vessel operator, other relevant personnel, the lead PSO (see description below), and any other relevant designees operating under the authority of the MMPA authorization (as applicable) and BOEM Permit/Plan.
2. The MMPA authorization holder (as applicable) and BOEM-approved Permit/Plan holder shall instruct relevant vessel personnel with regard to the authority of the protected species monitoring team (PSO team), and shall ensure that relevant vessel personnel and the PSO team participate in a joint onboard briefing (hereafter PSO briefing) led by the vessel operator and lead PSO to ensure that responsibilities, communication procedures, protected species monitoring protocols, operational procedures, and MMPA authorization (as applicable) and BOEM Permit/Plan requirements are clearly understood. This PSO briefing must be repeated when relevant new personnel join the survey operations before work commences.
3. The acoustic source must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Unnecessary use of the acoustic source must be avoided. For surveys using airgun arrays as the acoustic source notified operational capacity (not including redundant backup airguns) must not be exceeded during the survey, except where unavoidable for source testing and calibration purposes. All occasions where activated source volume exceeds notified operational capacity must be communicated to the PSO(s) on duty and fully documented. The lead PSO must be granted access to relevant instrumentation documenting acoustic source power and/or operational volume.

Protected Species Observers (PSOs, Visual and Acoustic)

Qualifications

1. The MMPA authorization (as applicable) and BOEM-approved Permit/Plan holder must use independent, dedicated, trained visual and acoustic PSOs, meaning that the PSOs must be employed by a third-party observer provider, may have no tasks other than to conduct observational effort (visual or acoustic), collect data, and communicate

with and instruct relevant vessel crew with regard to the presence of protected species and mitigation requirements (including brief alerts regarding maritime hazards), and must have successfully completed an approved PSO training course appropriate for their designated task (visual or acoustic). Acoustic PSOs are required to complete specialized training for operating PAM systems and are encouraged to have familiarity with the vessel with which they will be working. PSOs can act as acoustic or visual observers (but not at the same time) as long as they demonstrate to NMFS (nmfs.psoreview@noaa.gov) that their training and experience are sufficient to perform necessary tasks. NMFS must review and approve PSO resumes accompanied by a relevant training course information packet that includes the name and qualifications (i.e., experience, training completed, or educational background) of the instructor(s), the course outline or syllabus, and course reference material as well as a document stating successful completion of the course. NMFS shall have one week to approve PSOs from the time that the necessary information is submitted by the BOEM-approved Permit/Plan holder, after which PSOs meeting the minimum requirements shall automatically be considered approved.

2. At least one visual and two acoustic PSOs (when required) aboard the vessel must have a minimum of 90 days at-sea experience working in those roles, respectively, with no more than 18 months elapsed since the conclusion of the at-sea experience. One visual PSO with such experience shall be designated as the lead for the entire protected species observation team. The lead shall coordinate duty schedules and roles for the PSO team and serve as primary point of contact for the vessel operator (the responsibility of coordinating duty schedules and roles may instead be assigned to a shore-based, third-party monitoring coordinator). To the maximum extent practicable, the lead PSO shall devise the duty schedule such that experienced PSOs are on duty with those PSOs with appropriate training but who have not yet gained relevant experience.
    a. PSOs must successfully complete relevant training, including completion of all required coursework and passing (80 percent or greater) a written and/or oral examination developed for the training program. PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or

equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver shall be submitted by the BOEM-approved Permit/Plan holder to NMFS (nmfs.psoreview@noaa.gov) and must include written justification. Requests shall be granted or denied (with justification) by NMFS within one week of receipt of submitted information. Alternate experience that may be considered includes, but is not limited to: (1) secondary education and/or experience comparable to PSO duties; (2) previous work experience conducting academic, commercial, or government-sponsored protected species surveys; or (3) previous work experience as a PSO; the PSO should demonstrate good standing and consistently good performance of PSO duties.

Equipment

The MMPA incidental take authorization (as applicable) and BOEM-approved Permit/Plan holder is required to:

1. Provide PSOs with bigeye binoculars (e.g., 25 x 150; 2.7 view angle; individual ocular focus; height control) of appropriate quality solely for PSO use. These shall be pedestal-mounted on the deck at the most appropriate vantage point that provides for optimal sea surface observation, PSO safety, and safe operation of the vessel.
2. Work with the selected third-party observer provider to ensure PSOs have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed protected species. Such equipment, at a minimum, shall include:
    a. Each vessel requiring PAM will include a passive acoustic monitoring system that has been verified and tested by an experienced acoustic PSO that will be using it during the trip for which monitoring is required.
    b. Reticle binoculars (e.g., 7 x 50) of appropriate quality (at least one per PSO, plus backups)
    c. Global Positioning Units (GPS) (plus backup)
    d. Digital camera with a telephoto lens (the camera or lens should also have an image stabilization system) that is at least 300 mm or equivalent on a full-frame single lens reflex (SLR) (plus backup)
    e. Radios for communication among vessel crewand PSOs (at least one per PSO, plus backups)
    f. Any other tools necessary to adequately perform necessary PSO tasks.

    Equipment specified in (a) through (g) above may be provided by an individual PSO, the third-party observer provider, or the MMPA authorization (as applicable) and BOEM-approved Permit/Plan holder but the latter is responsible for ensuring PSOs have the proper equipment required to perform the duties specified within these protocols.

Data Collection

PSOs must use standardized data collection forms. PSOsshall record detailed information about any implementation of mitigation requirements, including the distance of animals to the acoustic source and description of specific actions thatensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source. If required mitigation was not implemented, PSOs should record a description of the circumstances. At a minimum, the following information must be recorded:

1. BOEM Permit/Plan number;
2. Vessel names (source vessel and other vessels associated with survey), vessel size and type, maximum speed capability of vessel, port of origin, and call signs;
3. PSO names and affiliations;
4. Dates of departures and returns to port with port name;
5. Date and participants of PSO briefings (as discussed in General Requirements. 2);
6. Dates and times (Greenwich Mean Time) of survey effort and times corresponding with PSO effort;
7. Vessel location (latitude/longitude) when survey effort began and ended and vessel location at beginning and end of visual PSO duty shifts;
8. Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change;
9. Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions changed significantly), including BSS and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon;
10. Factors that may have contributed to impaired observations during each PSO shift change or as needed as environmental conditions changed (e.g., vessel traffic, equipment malfunctions);
11. Survey activity information, such as acoustic source power output while in operation, number and volume of airguns operating in the array, tow depth of the array, and any other notes of significance (i.e., pre-clearance, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.); and
12. Upon visual observation of any protected species, the following information:
    a. Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
    b. PSO who sighted the animal;
    c. Time of sighting;
    d. Vessel location (coordinates) at time of sighting;
    e. Water depth;
    f. Direction of vessel's travel (compass direction);
    g. Direction of animal's travel relative to the vessel;
    h. Pace of the animal;

i. Estimated distance to the animal and its heading relative to vessel at initial sighting;

j. Identification of the animal (e.g., genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix ofspecies;

k. Estimated number of animals (high/low/best);

l. Estimated number of animals by cohort (adults, juveniles, group composition, etc.);

m. Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);

n. Detailed behavior observations (e.g., number of blows/breaths, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior), including an assessment of behavioral responses to survey activity;

o. Animal's closest point of approach (CPA) and/or closest distance from any element of the acoustic source;

p. Platform activity at time of sighting (e.g., deploying, recovering, testing, shooting, data acquisition, other); and

q. Description of any actions implemented in response to the sighting (e.g., delays, shutdown, ramp-up) and time and location of the action.

13. If a marine mammal is detected while using the PAM system, the following information should be recorded:
    a. An acoustic encounter identification number, and whether the detection was linked with a visual sighting;
    b. Date and time when first and last heard;
    c. Types and nature of sounds heard (e.g., clicks, whistles, creaks, burst pulses, continuous, sporadic, strength of signal);
    d. Any additional information recorded such as water depth of the hydrophone array, bearing of the animal to the vessel (if determinable), species or taxonomic group (if determinable), spectrogram screenshot, and any other notable information.

Deep Penetration Seismic Survey Protocols

Visual Monitoring

1. During survey operations (e.g., any day on which use of the acoustic source is planned to occur, and whenever the acoustic source is in the water, whether activated or not), a minimum of two visual PSOs must be on duty and conducting visual observations at all times during daylight hours (i.e., from 30 minutes prior to sunrise through 30 minutes following sunset).
2. Visual monitoring must begin no less than 30 minutes prior to ramp-up and must

continue until one hour after use of the acousticsource ceases or until 30 minutes past sunset.

3. Visual PSOs shall coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts, and shall conduct visual observations using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.
4. PSOs shall establish and monitor applicable exclusion and buffer zones. These zones shall be based upon the radial distance from the edges of the airgun array (rather than being based on the center of the array or around the vessel itself). During use of the acoustic source (i.e., anytime the acoustic source is active, including ramp-up), occurrences of protected species within the buffer zone (but outside the exclusion zone) should be communicated to the operator to prepare for the potential shutdown for marine mammals (or voluntary pause for other non-marine mammal protected species [e.g., sea turtles] if being employed) of the acoustic source.
5. Visual PSOs shall immediately communicate all observations to the on duty acoustic PSO(s), including any determination by the PSO regarding species identification, distance, and bearing and the degree of confidence in the determination.
6. Any observations of protected species by crew members aboard any vessel associated with the survey shall be relayed to the PSO team.
7. During good conditions (e.g., daylight hours; Beaufort sea state (BSS) 3 or less), visual PSOs shall conduct observations when the acoustic source is not operating for comparison of sighting rates and behavior with and without use of the acoustic source and between acquisition periods, to the maximum extent practicable.
8. Visual PSOs may be on watch for a maximum of two consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hour period. Combined observational duties (visual and acoustic but not at same time) may not exceed 12 hours per 24-hour period for any individual PSO. NMFS may grant an exception for LOA applications that demonstrate such a "two hours on/one hour off" duty cycle is not practicable, in which case visual PSOs will be subject to a maximum of four consecutive hours on watch followed by a break of at least two hours between watches. Combined observational duties (visual and acousticbut not at the same time) must not exceed 12 hours per 24-hour period for any individual PSO

Acoustic Monitoring

1. Applicants must provide a PAM plan to NMFS according to the MMPA authorization including description of the hardware and software proposed for use prior to proceeding with any survey where PAM is required. The source vessel must use a towed PAM system at all times when operating in waters deeper than 100 m, which

must be monitored by at a minimum one on duty acoustic PSO beginning at least 30 minutes prior to ramp-up, at all times during use of the acoustic source, and until one hour after use of the acoustic source ceases. "PAM system" refers to calibrated hydrophone arrays with full system redundancy to detect,identify, and estimate distance and bearing to vocalizing cetaceans, coupled with appropriate software to aid monitoring and listening by a PAM operator skilled in bioacoustics analysis and computer system specifications capable of running appropriate software. The PAM system must have at least one calibrated hydrophone (per each deployed hydrophone type and/or set) sufficient for determining whether background noise levels on the towed PAM system are sufficiently low to meet performance expectations).

2. Acoustic PSOs shall immediately communicate all detections to visual PSOs, when visual PSOs are on duty, including any determination by the PSO regarding species identification, distance, and bearing and the degree of confidence in the determination.
3. Acoustic PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least two hours between watches and may conduct a maximum of 12 hours of observation per 24-hour period. Combined observational duties (acoustic and visual but not at same time) may not exceed 12 hours per 24-hour period for any individual PSO.
4. Survey activity may continue for 30 minutes when the PAM system malfunctions or is damaged, while the PAM operator diagnoses the issue. If the diagnosis indicates that the PAM system must be repaired to solve the problem, operations may continue for an additional two hours without acoustic monitoring during daylight hours only under the following conditions:
    a. Sea state is less than or equal to BSS 4;
    b. No marine mammals (excluding delphinids) detected solely by PAM in the applicable exclusion zone in the previous two hours;
    c. NMFS and BSEE are notified via email (nmfs.psoreview@noaa.gov and protectedspecies@bsee.gov, respectively) as soon as practicable with the time and location in which operations began occurring without an active PAM system; and
    d. Operations with an active acoustic source, but without an operating PAM system, do not exceed a cumulative total of four hours in any 24-hour period.

Pre-clearance and Ramp-up

The intent of pre-clearance observation (30 minutes) is to ensure no protected species are observed within the exclusion zones, and buffer zone if applicable (i.e., only when the exclusion zone is equal to 500 meters, see Definitions section for details on when the buffer

zone is not applicable), prior to the beginning of ramp-up. During pre-clearance is the only time observations of protected species in the buffer zone would prevent operations (i.e., the beginning of ramp-up). The intent of ramp-up is to warn protected species of pending seismic operations and to allow sufficient time for those animals to leave the immediate vicinity. A ramp-up procedure, involving a step-wise increase in the number of airguns firing and total array volume until all operational airguns are activated and the full volume is achieved, is required at all times as part of the activation of the acoustic source. All operators must adhere to the following pre-clearance and ramp-up requirements, which are applicable to both marine mammals and sea turtles:

1. The operator must notify a designated PSO of the planned start of ramp-up as agreed upon with the lead PSO; the notification time should not be less than 60 minutes prior to the planned ramp-up.
2. Ramp-ups shall be scheduled so as to minimize the time spent with the source activated prior to reaching the designated run-in.
3. A designated PSO must be notified againimmediately prior to initiating ramp-up procedures and the operator must receive confirmation from the PSO to proceed.
4. Ramp-up may not be initiated if any marine mammal or sea turtle is within the applicable exclusion or buffer zone. If a marine mammal or sea turtle is observed within the applicable exclusion zone or the buffer zone during the 30 minute pre-clearance period, ramp-up may not begin until the animal(s) has been observed exiting the zones or until an additional time period has elapsed with no further sightings (15 minutes for small odontocetes and 30 minutes for all other species including sea turtles).
5. Ramp-up shall begin by activating a single airgun of the smallest volume in the array and shall continue in stages by doubling the number of active elements at the commencement of each stage, with each stage of approximately the same duration. Duration shall not be less than 20 minutes. The operator must provide information to the PSO documenting that appropriate procedures were followed.
6. PSOs must monitor the exclusion and buffer zones during ramp-up, and ramp-up must cease and the source must be shut down upon observation of a marine mammal or sea turtle within the applicable exclusion zone. Once ramp-up has begun, observations of marine mammals and sea turtles within the buffer zone do not require shutdown, or voluntarily pause for other non-marine mammal protected species (e.g., sea turtles) if being employed, but such observation shall be communicated to the operator to prepare for the potential shutdown, or voluntarily pause if being employed.
7. Ramp-up may occur at times of poor visibility, including nighttime, if appropriate acoustic monitoring has occurred with no detections in the 30 minutes prior to beginning ramp-up. Acoustic source activation may only occur at times of poor

visibility where operational planning cannot reasonably avoid such circumstances.

8. If the acoustic source is shut down for brief periods (i.e., less than 30 minutes) for reasons other than implementation of prescribed mitigation (*e.g.*, mechanical difficulty), it may be activated again without ramp-up if PSOs have maintained constant visual and/or acoustic observation and no visual detections of marine mammals or sea turtleshave occurred within the applicable exclusion zone and no acoustic detections of marine mammals have occurred. For any longer shutdown, pre-clearance observation and ramp-up are required. For any shutdown at night or in periods of poor visibility (e.g., BSS 4 or greater), ramp-up is required, but if the shutdown period was brief andconstant observation was maintained, pre-clearance watch of 30 min is not required.
9. Testing of the acoustic source involving all elements requires ramp-up. Testing limited to individual source elements or strings does not require ramp-up but does require pre-clearance observation period.

Shutdown

For non-marine mammal protected species (e.g., sea turtles), shutdowns are not required. However, the BOEM Permit or authorized Plan and MMPA authorization (as applicable) holder may employ a voluntary pause during which the visual PSO would request that the operator voluntarily pause the airgun array for six shots if a non-marine mammal protected species is observed within the exclusion zone (within 500 meters) during active airgun use, to let the animal float past the array while it is inactive. For marine mammals, all operators must adhere to the following shutdown requirements:

1. Any PSO on duty has the authority to delay the start of survey operations or to call for shutdown of the acoustic source if a marine mammal is detected within the applicable exclusion zone.
2. The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that shutdown, and voluntary pause commands (optional for other protected species) are conveyed swiftly while allowing PSOs to maintain watch.
3. When both visual and acoustic PSOs are on duty, all detections must be immediately communicated to the remainder of the on-duty PSO team for potential verification of visual observations by the acoustic PSO or of acoustic detections by visual PSOs.
4. Two exclusion zones are defined, depending on the species and context. A standard exclusion zone encompassing the area at and below the sea surface out to a radius of 500 meters from the edges of the airgun array (0-500 m) is defined. An extended 1,500-m exclusion zone must be applied upon detection (visual or acoustic) of a baleen whale, sperm whale, beaked whale or *Kogia* spp. within the zone.
5. When the airgun array is active (i.e., any time one or more airguns is active, including during ramp-up) and (1) a marine mammal appears within or enters the applicable exclusion zone and/or (2) a marine mammal (excluding delphinids) is detected acoustically and localized within the applicable exclusion zone, the acoustic source must be shut down. When shutdown is called for by a PSO, the acoustic source must be

immediately deactivated and any dispute resolved only following deactivation.

6. The shutdown requirement is waived for dolphins of the following genera: *Steno*, *Tursiops*, *Stenella*, and *Lagenodelphis*.
    a. If a small delphinid (individual of the Family Delphinidae, which includes the aforementioned dolphin genera), is acoustically detected and localized within the exclusion zone, no shutdown is required unless the acoustic PSO or a visual PSO confirms the individual to be of a genera other than those listed above, in which case a shutdown is required.
7. If there is uncertainty regarding identification (i.e., whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived or one of the species with a larger exclusion zone), visual PSOs may use best professional judgment in making the decision to call for a shutdown.
8. Upon implementation of shutdown, the source may be reactivated after the marine mammal(s) has been observed exiting the applicable exclusion zone (i.e., animal is not required to fully exit the buffer zone where applicable) or following a 30-minute clearance period with no further observation of the marine mammal(s).

Time-area closure

From January 1 through May 31, no use of airguns may occur shoreward of the 20-m isobaths and between 90-84º W

Shallow penetration protocols

1. The requirements defined for deep penetration surveys shall be followed, with the following exceptions:
    a. PAM is not required for shallow penetration surveys.
    b. Ramp-up for small airgun arrays must follow the procedure described above for large airgun arrays, but may occur over an abbreviated period of time. Ramp-up is not required for surveys using only a single airgun. For sub-bottom profilers, power should be increased as feasible to effect a ramp-up.
    c. Two exclusion zones are defined, depending on the species and context. A standard exclusion zone encompassing the area at and below the sea surface out to a radius of 100 meters from the edges of the airgun array (if used) or from the acoustic source (0-100 m) is defined. An extended 500-m exclusion zone must be applied upon detection (visual or acoustic) of a baleen whale, sperm whale, beaked whale or *Kogia* spp. within the zone.
    d. The buffer zone encompasses the area at and below the sea surface from the edge of the 0-100 meter exclusion zone out to a radius of 200 meters from the edges of the airgun array (if used) or from the acoustic source (100-200 meters). The buffer zone is not applicable when the exclusion zone is greater than 100 meters.

Non-Airgun High-Resolution Geophysical (HRG) Protocol

Non-airgun HRG surveys are conducted in leases and along pipeline routes to evaluate the potential for geohazards, archaeological resources, and certain types of benthic communities. Non-airgun HRG sources include but are not limited to side-scan sonars, boomers, sparkers (in limited situations) and compressed high-intensity radiated pulse (CHIRP) sub bottom profilers (in limited situations), and single-beam or multibeam depth sounders.

Non-Airgun HRG Surveys with Frequencies ≥180 kHz

Acoustic sources do not require detailed analyses because the frequency is outside the general hearing range of marine mammals.

Non-Airgun HRG Surveys with Frequencies <180 kHz

For all non-airgun HRG surveys in which one or more active acoustic sound sources are operating at <180 kHz, the requirements defined for shallow penetration surveys shall be followed, with the following exceptions:

1. Pre-clearance watch is required for a period of 30 minutes and over a 200-m radius from the acoustic source.
2. When operating in waters deeper than 100-m, during survey operations (*e.g.*, any day on which use of the acoustic source is planned to occur, and whenever the acoustic source is in the water, whether activated or not), a minimum of one trained and experienced independent PSO must be on duty and conducting visual observations at all times during daylight hours (*i.e.*, from 30 minutes prior to sunrise through 30 minutes following sunset).
3. When operating in waters shallower than 100-m, a minimum of one trained visual PSO, which may be a crew member, must be employed. PSOs employed during shallow-water HRG surveys are only required during the pre-clearance period.
4. PSOs are not required during survey operations in which the active acousticsource(s) are deployed on an autonomous underwater vehicle.
5. PAM is not required for HRG surveys. Shutdowns are not required for HRG surveys.

Entanglement and Entrainment Risk Reduction

Nodal Survey Requirements

To avoid the risk of entanglement, lessees and operators conducting surveys using ocean-bottom nodes or similar gear must:

1. Use negatively buoyant coated wire-core tether cable;
2. Ensure any cables/lines are designed to be rigid;

3. Retrieve all lines immediately following completion of the survey; and
4. Attach acoustic pingers directly to the coated tether cable; acoustic releases should not be used.

Reporting

1. The BOEM Permit/Plan holder shall submit interim reports (see Data Collection section for details) on the 1st of each month to BSEE (protectedspecies@bsee.gov) detailing all protected species observations with closest approach distance. The MMPA authorization (as applicable) and BOEM Permit/Plan holder shall submit a draft comprehensive report to BOEM/BSEE (protectedspecies@boem.gov and protectedspecies@bsee.gov) and NMFS (nmfs.psoreview@noaa.gov) on all activities and monitoring results within 90 days of the completion of the survey or expiration of the MMPA authorization (as applicable) or BOEM Permit/Plan, whichever comes sooner, or if an issued MMPA authorization is valid for greater than one year, the summary report must be submitted on an annual basis. The report must describe all activities conducted and sightings of protected species near the activities, must provide full documentation of methods, results, and interpretation pertaining to all monitoring, and must summarize the dates and locations of survey operations and all protected species sightings (dates, times, locations, activities, associated survey activities, and information regarding locations where the acoustic source was used). For operations requiring the use of PAM, the report must include a validation document concerning the use of PAM, which should include necessary noise validation diagramsand demonstrate whether background noise levels on the PAM deployment limited achievement. The draft report shall also include geo-referenced time-stamped vessel track lines for all time periods during which airguns were operating. Track lines should include points recording any change in airgun status (e.g., when the airguns began operating, when they were turned off, or when they changed from full array to single gun or vice versa). GIS files shall beprovided in ESRI shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates shall be referenced to the WGS84 geographic coordinate system. In addition to the report, all raw observational data shall be made available to BOEM/BSEE and NMFS. The report must summarize the information submitted in interim monthly reports as well as additional data collected as described above in *Data Collection* and the MMPA authorization (as applicable). The draft report must be accompanied by a certification from the lead PSO as to the accuracy of the report, and the lead PSO may submit directly to BOEM/BSEE and NMFS a statement concerning implementation and effectiveness of the required mitigation and monitoring. A final report must be submitted within 30 days following resolution of any comments on the draft report.
2. Reporting injured or dead protected species:
   The MMPA authorization (as applicable) and BOEM Permit/Plan holder must report

sightings of any injured or dead aquatic protected species immediately, regardless of the cause of injury or death. For reporting dead or injured marine mammals, refer to the reporting requirements specified in the MMPA authorization (as applicable), associated with the activity being conducted, and Appendix C

References

Baker, K., D. Epperson, G. Gitschlag, H. Goldstein, J. Lewandowski, K. Skrupky, B. Smith, and T. Turk. 2013. National standards for a protected species observer and data management program: A model using geological and geophysical surveys. Technical Memorandum NMFS-OPR-49, Office of Protected Resources, National Marine Fisheries Service, National Oceanic and Atmospheric Administration; Bureau of Ocean Energy Management, U.S. Department of the Interior; Bureau of Safety and Environmental Enforcement, U.S. Department of the Interior, Silver Spring, Maryland.

Appendix C. Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols

This Appendix has been revised as of April 26, 2021 and replaces the original Appendix C (dated March 13, 2020). These protocols will be implemented by the Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE) through non-discretionary conditions of approval (COA) applied programmatically to BOEM/BSEE permitted activities (see Attachment 1 to the amended Incidental Take Statement), and provide guidelines to operators in complying with the Endangered Species Act (ESA; 16 U.S.C. §§ 1531-1544) and Marine Mammal Protection Act (MMPA; 16 U.S.C. §§1361- 1423h). The measures contained herein apply to all seismic surveys approved by BOEM and associated with the federally regulated oil and gas program in the Gulf of Mexico.

Aquatic Protected Species Identification

Crew and supply vessel personnel should use a Gulf of Mexico reference guide that includes identifying information on marine mammals, sea turtles, and other marine protected species (i.e., Endangered Species Act listed species such as Gulf sturgeon, giant manta ray, or oceanic whitetip shark; hereafter collectively termed "other aquatic protected species") that may be encountered in the Gulf of Mexico Outer Continental Shelf (OCS). Vessel operators must comply with the below measures except under extraordinary circumstances when the **safety of the vessel or crew is in doubt or the safety of life at sea is in question**.

Vessel Strike Avoidance

1. Vessel operators and crews must maintain a vigilant watch for all aquatic protected species and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any protected species. A single aquatic protected species at the surface may indicate the presence of submerged animals in the vicinity of the vessel; therefore, precautionary measures should always be exercised. A visual observer aboard the vessel must monitor a vessel strike avoidance zone (species-specific distances detailed below) around the vessel according to the parameters stated below, to ensure the potential for strike is minimized. Visual observers monitoring the vessel strike avoidance zone can be either third-party observers or crew members (e.g., captain), but crew members responsible for these duties must be provided sufficient training to distinguish aquatic protected species to broad taxonomic groups, as well as those specific species detailed further below.
2. Vessel speeds must also be reduced to 10 knots or less when mother/calf pairs, pods, or large assemblages (greater than three) of any marine mammal are observed near a vessel.

3. All vessels must maintain a minimum separation distance of 100 meters (m) from sperm whales, and 500 m from any baleen whale to specifically protect the Gulf of Mexico Bryde's whale.
4. All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 meters from all "other aquatic protected species" including sea turtles, with an exception made for those animals that approach the vessel.
5. When aquatic protected species are sighted while a vessel is underway, the vessel should take action as necessary to avoid violating the relevant separation distance (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If aquatic protected species are sighted within the relevant separation distance, the vessel should reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear (e.g., source towed array and site clearance trawling).
6. Any BOEM/BSEE-authorized or -permitted activity occurring within the Eastern Planning Area will be subject to a step-down review with NMFS under the attached 2020 biological opinion on BOEM Oil and Gas Program Activities in the Gulf of Mexico.

The above requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of that restriction, is unable to comply.

Injured/Dead Protected Species Reporting

The measures below have been revised from the original measures (contained in the Appendices to the biological opinion dated March 13, 2020) in accordance with the revised proposed action (see Attachments 1 and 2 to the amended ITS).

At all times, vessel operators must report sightings of any injured or dead aquatic protected species immediately, regardless of whether the injury or death was caused by the operator's vessel. If the injury or death was caused by a collision with the operator's vessel, the operator must immediately report the incident to NMFS by email at nmfs.psoreview@noaa.gov and must also immediately report the incident to the appropriate NMFS contact below for 24 hour response. The operator must further notify BOEM and BSEE within 24 hours of the strike by email to protectedspecies@boem.gov and protectedspecies@bsee.gov. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the incident;
2. Species identification (if known) or description of the animal(s) involved;
3. Vessel's speed during and leading up to the incident;
4. Vessel's course/heading and what operations were being conducted (if applicable);
5. Status of all sound sources in use;

6. Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;
7. Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;
8. Estimated size and length of animal that was struck;
9. Description of the behavior of the marine mammal immediately preceding and following the strike;
10. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
11. Estimated fate of the animal (*e.g.*, dead, injured but alive, injured and moving, bloodor tissue observed in the water, status unknown, disappeared); and
12. To the extent practicable, photographs or video footage of the animal(s).

In the event that any of the following occur at any time, immediate reporting of the incident is required, after personnel and/or diver safety is ensured:

- Entanglement or entrapment of a protected species (i.e., an animal is entangled in a line or cannot or does not leave a moon pool of its own volition).
- Injury of a protected species (e.g., the animal appears injured or lethargic).
- Interaction or contact with equipment by a protected species.
- Any observation of a leatherback sea turtle within a moon pool (regardless of whether it appears injured, or an interaction with equipment or entanglement/entrapment is observed).

As soon as personnel and/or diver safety is ensured, any of the incidents listed above must be reported to NMFS by contacting the appropriate expert for 24-hr response. If an immediate response is not received, the operator must keep trying until contact is made. Any failed attempts should be documented. Contact information for reporting is as follows:

- Marine mammals: contact Southeast Region's Marine Mammal Stranding Hotline at 1-877-433-8299.
- Sea turtles: contact NMFS Veterinary Medical Officer at 352-283-3370. If no answer, contact (301) 301-3061. This includes the immediate reporting of any observation of a leatherback sea turtle within a moon pool.
- Other protected species (e.g., giant manta ray, oceanic whitetip shark, or Gulf sturgeon): contact the ESA Section 7 biologist at 301-427-8413.

The report must include the following information:

1. Time, date, water depth and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
2. Name, type, and call sign of the vessel in which the event occurred;
3. Equipment being utilized at time of observation;
4. Species identification (if known) or description of the animal(s) involved;
5. Approximate size of animal;
6. Condition of the animal(s) during the event and any observed injury / behavior;
7. photographs or video footage of the animal(s), if able; and
8. General narrative and timeline describing events that took place.

After the appropriate contact(s) have been made for guidance/assistance as described above, the operator may call BSEE at 985-722-7902 (24 hours/day) for questions or additional guidance on recovery assistance needs (if still required) and continued monitoring requirements. The operator may also contact this number if a timely response from the appropriate contact(s) listed above were not received.

Appendix B: Environmental Management Plan

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ECHO OFFSHORE 2DHR

Environmental Management Plan: Marine Mammal and Sea Turtle Monitoring, Mitigation, and Reporting

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ECHO OFFSHORE 2DHR

Environmental Management Plan: Marine Mammal and Sea Turtle Monitoring, Mitigation, and Reporting

With reference to the Biological Opinion (BO) issued by the National Marine Fisheries Service on March 13, 2020

Approval for issue
Stephanie Milne

Contents

Appendices

1 INTRODUCTION

Byron Energy, Inc. has contracted Echo Offshore, LLC to conduct a 2DHR survey within the Gulf of Mexico, South Marsh Island Area, lease blocks 61 and 66. The details of the survey activities are provided in the survey plan application.

In an effort to minimize the potential impacts of sound producing operations on certain protected species, including marine mammals and sea turtles, the Bureau of Ocean Energy Management (BOEM), the National Marine Fisheries Service (NMFS), and the Bureau of Safety and Environmental Enforcement (BSEE), have outlined monitoring, mitigation, and reporting procedures that survey operators and permit holders are expected to implement during their survey operations.

1.1 Applicable Regulatory Documents and Permits

Protected species monitoring, mitigation and reporting procedures that are applicable to the 2DHR survey are contained in the following regulatory documents:

1. The Biological Opinion (BO) issued by the NMFS on March 13, 2020, where Protected Species Observer (PSO) procedures are outlined in detail in Appendix A
2. BOEM Lease
3. A Letter of Authorization (LOA), extension issued by NMFS 22 May 2024

This document, the Environmental Management Plan (EMP), prepared by RPS on behalf of Echo Offshore, LLC describes how monitoring, mitigation, and reporting measures for protected species will be executed during the 2DHR program to maintain compliance with the regulatory requirements in the 2020 Gulf of Mexico Biological Opinion and its appendices, revised 26 April 2021, and the NMFS LOA.

2 MARINE PROTECTED SPECIES

Marine protected species or protected species refers to any marine species for which dedicated monitoring and mitigation procedures will be implemented, including:

- All marine mammals
- All sea turtles
- Gulf sturgeon, oceanic whitetip shark, giant manta ray*

*Note that strike avoidance procedures apply to these ESA listed species, but monitoring and sound source mitigation procedures do not need to be implemented for non-mammal species.

3 PROTECTED SPECIES OBSERVERS

3.1 Staffing Plan

A team of three Protected Species Observers (PSOs), supplied by RPS, will be onboard the source vessel *Elliot Cheramie* to undertake day-time visual watches, implement mitigations, and conduct data collection and reporting in accordance with the BO and the survey permit.

3.2 Roles and Responsibilities

Lead PSO

- Coordinate and oversee PSO Operations and ensure compliance with monitoring requirements.

- Visually monitor, detect, and identify protected species, as well as determine distance from source.
- Record and report protected species sightings, survey activities, and environmental conditions, per regulations.
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the survey.
- Communicate with the crew to implement mitigation actions as required by environmental protocols.
- Participate in daily operation meeting with crew when appropriate.

PSO

- Visually monitor, detect, and identify protected species.
- Record and report according to survey plan.
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the survey plan.
- Communicate with the crew to implement mitigation actions as required by environmental protocols.
- Participate in daily operation meeting with crew when appropriate.

3.3 PSO Requirements

All Protected Species Observers (PSOs) will have completed a protected species observer training program as described in the BO.

PSOs' CVs will be submitted to NMFS for approval prior to deployment on the project.

PSOs will have completed HUET / Sea Survival training.

PSOs will be equipped with Personal Protective Equipment (PPE), including hard hat, steel-toe boots, fire-retardant coveralls, work gloves, and safety glasses.

4 MONITORING EQUIPMENT

4.1 Visual Monitoring Equipment

The PSOs on duty will monitor for marine protected species using the naked eye, hand-held reticle binoculars, and big-eye binoculars as described in BO.

Digital single-lens reflex camera equipment, including zoom lens, will be used to record sightings and verify species identification.

5 VISUAL MONITORING PROCEDURES

5.1 Visual Monitoring Watches

There will be two PSOs on visual watch during:

- All mitigatable source activity in daylight hours, including testing.
- During search periods prior to activating the mitigatable sources.

For the duration of any day when there is planned mitigatable source activity, from 30 minutes prior to sunrise until 30 minutes after sunset, regardless of whether or not the source is deployed.

For the duration of any period during which the acoustic source is deployed, regardless of whether or not shooting is planned.

When regulations do not require a two-person what, at least one PSO will remain on watch while offshore, from dock to dock.

The following guidelines will apply to these watch periods:

- No additional duties may be assigned to the PSO during his/her visual observation watch.
- No PSO will be allowed more than **two consecutive hours on watch** before being allocated a one-hour break from visual monitoring.
- No PSO will be assigned a combined watch schedule of more than 12 hours in a 24-hour period.

The PSOs will stand watch in a suitable location that will not interfere with the navigation or operation of the vessel and affords an optimal view of the sea surface. PSOs will maintain 360° coverage surrounding the vessel and the seismic source.

If a protected species is observed, the PSO should first take care of any necessary mitigation actions, or if no mitigation actions are required, they will note and monitor the position (including latitude/longitude of the vessel and relative bearing and estimated range to the animal) until the animal dives or moves out of visual range of the observer.

6 ACOUSTIC MONITORING PROCEDURES

Per Biological Opinion, Appendix A, shallow penetration airgun surveys do not require PAM.

PAM will not be used on this shallow penetration airgun survey.

7 PROJECT BRIEFING

The vessel crew and PSO team should participate in a project briefing that includes communication procedures, monitoring requirements and operating protocols.

The briefing should be repeated every time relevant new personnel join the vessel before operations begins.

8 MITIGATION PROCEDURES: STRIKE AVOIDANCE

8.1 Strike Avoidance Monitoring and Vessel Maneuvering

Vessel operators must maintain a vigilant watch for all aquatic protected species.

Vessels must slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any protected species:

- All marine mammals
- All sea turtles
- Gulf sturgeon, oceanic whitetip shark, giant manta ray

These procedures apply to physical interactions involving vessels and the towed equipment.

8.2 Vessel Speed Restrictions

Vessel speeds must be reduced to 10 knots or less **when mother/calf pairs, pods, or large assemblages (greater than three) of any marine mammal** are observed near a vessel.

8.3 Separation Distances

When protected species are sighted while a vessel is underway, the vessel should take action as necessary to avoid violating the relevant separation distance (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area).

If marine protected species are sighted within the relevant separation distance, the vessel should reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. While Appendix C of the BO states that this does not apply to any vessel that is towing gear, an effort should still be made by the vessel, as is operationally feasible to maintain a separation distance. PSOs should always provide the suggestion for VSA and allow the vessel crew to make determination on whether that procedure can be executed without risk to the safety of the vessel and crew.

NOTE: Vessels are not required to shift into neutral for animals that approach the vessel voluntarily.

- **500 m**: All baleen whales including the Rice's whale (formerly known as the Bryde's whale)
- **100 m**: Sperm whales
- **50 m**: All other marine mammals (including manatees), and sea turtles, and the ESA-listed fish species referenced in Section 7.1.

NOTE: Any large whale for which species can't be identified should be mitigated for as a baleen whale.

9 MITIGATION PROCEDURES: SOUND SOURCES

9.1 Mitigatable Sounds Sources

Source Type	Frequency Range	Mitigatable Source?
Sidescan Sonar	120 - 410kHz	Yes
Single 20 cu in airgun	0 - 1500 kHz	Yes
Sub-bottom profiler	4 - 16 kHz	Yes
Multibeam	200 - 400 kHz	No

9.2 Sound Source Exclusion Zones and Buffer Zones

Two types of zones will be established around the mitigatable sources, both radii that extend from the outer edge of the airgun array.

Buffer Zones (BZ): Applicable during the pre-clearance search periods conducted prior to initiating the sound source from silence, where detections of a protected species inside it's applicable BZ during the search will result in a delay to activating the source

- **500 meters:** All true whale species (Rice's whale, sperm whales, Kogia species and all beaked whales)
- **200 meters**: All other marine mammals and sea turtles

Exclusion Zones (EZ): Applicable once the source has been activated, where detections of a protected species inside it's applicable EZ will result in a shutdown of the sound source.

- **500 meters:** All true whale species (sperm whales, Kogia species and all beaked whales)
- **100 meters**: All other marine mammals

To activate the mitigatable sources, a minimum of a 30-minute search period must be conducted.

During the daytime, the search will be conducted visually by the PSOs.

9.3 Delays to Initiation of the Mitigatable Sources

If any marine mammal or sea turtle was detected inside its respective Buffer Zone during the 30-minute search period, initiation of the mitigatable sources must be delayed until:

- When all marine protected species that were observed inside the relevant Buffer Zone have been confirmed by the visual observer to have exited the relevant Buffer Zone.
- 15 minutes from last detection for small odontocetes if not observed exiting the BZ
- 30 minutes from last detection for all other protected species, including sea turtles, if not observed exiting the BZ

NOTE: Both the 30-minute pre-clearance search period and the mandatory delay for animals not seen exiting the buffer zone must be completed before source initiation, but the pre-clearance search and delays can be implemented concurrently (they overlap). For a delay period that ends BEFORE the clearance search period is completed, the BZ will be cleared when the clearance search is completed. For a delay period that ends AFTER the standard clearance search period is completed, the source can be turned on when the delay period is completed.

9.4 Ramp Up Procedure

Ramp-up is not required or possible for a single airgun.

Power of the sub-bottom profiler should be increased to simulate a ramp-up but no minimum or maximum timeframe is stipulated.

9.5 Protected Species Shutdown Procedures

If any **marine mammal** is detected visually within its EZ, an immediate shutdown of the mitigatable sources is required.

The shutdown requirement is waived under the following circumstances:

1. Shut down is not required for dolphins of the following genera: *Steno, Tursiops, Stenella,* and *Lagenodelphis.*

If there is uncertainty regarding identification (i.e., whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived or one of the species with a larger exclusion zone), visual PSOs should use best professional judgment in making the decision to call for a shutdown.

The vessel operator must comply immediately with any shut-down request made by a PSO. Any discussion can occur only after the shutdown has been implemented.

Subsequent restart of mitigatable sourcse may only occur following clearance of the EZ of all marine protected species under the following conditions:

- When all other marine mammals have been confirmed by the visual observer to have been seen exiting the relevant EZ (not BZ)
  OR
  When a marine mammal was not observed exiting the EZ, an additional 30 minutes has elapsed following the last detection inside the EZ.

9.6 Short Breaks in Source Operations

9.6.1 Daytime

In recognition of occasional short periods of silence for a variety of reasons other than for mitigation, the airguns may be silenced for periods of time not exceeding 30 minutes in duration and may be restarted without a ramp-up if:

1. Visual monitoring is continued diligently through the silent period

   AND

2. No marine protected species are visually observed in their respective EZ during the silent period.

9.6.2 Night-time

Visual monitoring will not be conducted at night, so any breaks in source activity of the airguns shall be followed by PSO clearance and ramp-up when PSOs are able.

9.7 Source testing

All source tests should be preceded by a 30-minute visual clearance search.

9.8 Non-acquisition and Non-Testing Source Activity

The acoustic source should be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Unnecessary use of the acoustic source shall be avoided.

10 REPORTING

10.1 Incident Reporting

10.1.1 Potential Non-Compliance Incidents

The Lead PSO verbally informs Echo Offshore., LLC Party Manager and on-board Client Representative of any potential compliance related issues immediately. The Lead PSO also informs the RPS Project Manager immediately of all potential non-compliance events.

If the issue can be resolved between the Lead PSO, Client Representative and Party Manager, the lead PSO will document in writing the compliance issue and the agreed-upon practices for minimizing future non-compliance incidents of the same nature. The party manager and QC Representative review and approve, and the statement is submitted to the following distribution list:

Islam Ibrahim Islam.Ibrahim@tetratech.com
Matt Keith KeithM@echo-offshore.net
C.D Schempf Schempfc@echo-offshore.net
Donald Spicer SpicerD@echo-offshore.net

The representatives listed above will distribute any pertinent information resulting from the incident to their respective crews as deemed necessary and appropriate.

If the issue cannot be resolved at the vessel level, Echo Offshore., LLC and RPS will discuss and determine the appropriate future actions to be taken. When a common position is reached, notification of the agreed procedures will be distributed by Echo Offshore., LLC to vessel crew and by RPS to the PSOs.

If an agreement cannot be reached at the office level, an Echo Offshore., LLC representative will contact BOEM/NMFS/BSEE for clarification. Results from the clarification will be distributed by Echo Offshore., LLC.

10.1.2 Injured or Dead Protected Species Reporting

1. The PSO on watch will report the sightings of a dead and/or injured marine species to the Lead PSO, the RPS project manager, on board client representative and vessel Party Chief as soon as possible after the sighting.
2. A PSO, either the Lead or the PSO that observed the dead/injured animal, will report the sighting to the NMFS stranding hotline. This will occur as soon as practicably possible but no more than 24 hours of the detection. The shore-based RPS Project Manager may collect the data and assist with the initial phone report.
3. A written report will be prepared including any photos taken of the animal and sent to RPS as soon as possible.
4. The RPS office will submit the written report to the following distribution list within 12 hours of the detection for review:

   On-board:
   - Onboard Party Chief
   - Client Representative

   On-shore:
   - Echo Offshore., LLC Project Manager

RPS will provide the written report, once the draft has been reviewed and approved per above, to NOAA, NMFS, and BOEM with Echo Offshore., LLC included in copy.

Unless otherwise directed by BOEM, NOAA Fisheries, or NOAA, the dead or injured marine mammal or sea turtle SHOULD NOT be touched. Dead and injured marine mammals and sea turtles are still protected by the ESA and the MMPA and touching the animals in any manner is considered harassment and is punishable by law.

10.2 Daily Progress, Interim and Final Reporting

10.2.1 Interim Reports

RPS will submit interim reports in the format of an excel spreadsheet for each vessel containing the required information listed in the BO.

RPS will submit interim reports (a dataset in a format approved by NMFS and BSEE) on the 1st of each month to BSEE (protectedspecies@bsee.gov).

10.2.2 Final Report

RPS will develop a final report summarizing the survey activities and all PSO observations. The report will contain all the data required to meet the requirements of the BO.

The RPS Project Manager will provide the draft final report to the Echo Offshore., LLC Project Manager within 45 days of project completion.

APPENDIX A: REGULATORY REFERENCE DOCUMENTS

Appendix C: Names of PSOs

Approved RPS PSO Names
Britney Roberts
Pamela Parnell-Ewing
Hana Northrup

Appendix D: Reticle Binocular Calibration Table

Reticle Binocular Calibration Tables

Week #	Date	Observer Name	Reticle Binocular Magnification (7x,10x, etc.)	Reticle Binocular Estimated Distance (m)	True Distance from Radar (m)	Sea State (Beaufort)	Wind Force (knots)	Swell (m)	Comments
1	6/29/2024	Britney Roberts	7x50	2110	2198	3	9	<2	Platform
1	6/29/2024	Hana Northrup	10x50	503	463	2	2	<2	Platform
1	6/29/2024	Pamela Parnell	7x50	1200	1209	3	4	<2	Platform

Appendix E: Excel Data Sheets of Monitoring Effort, Source Operations and Detections of Protected Species During the Survey

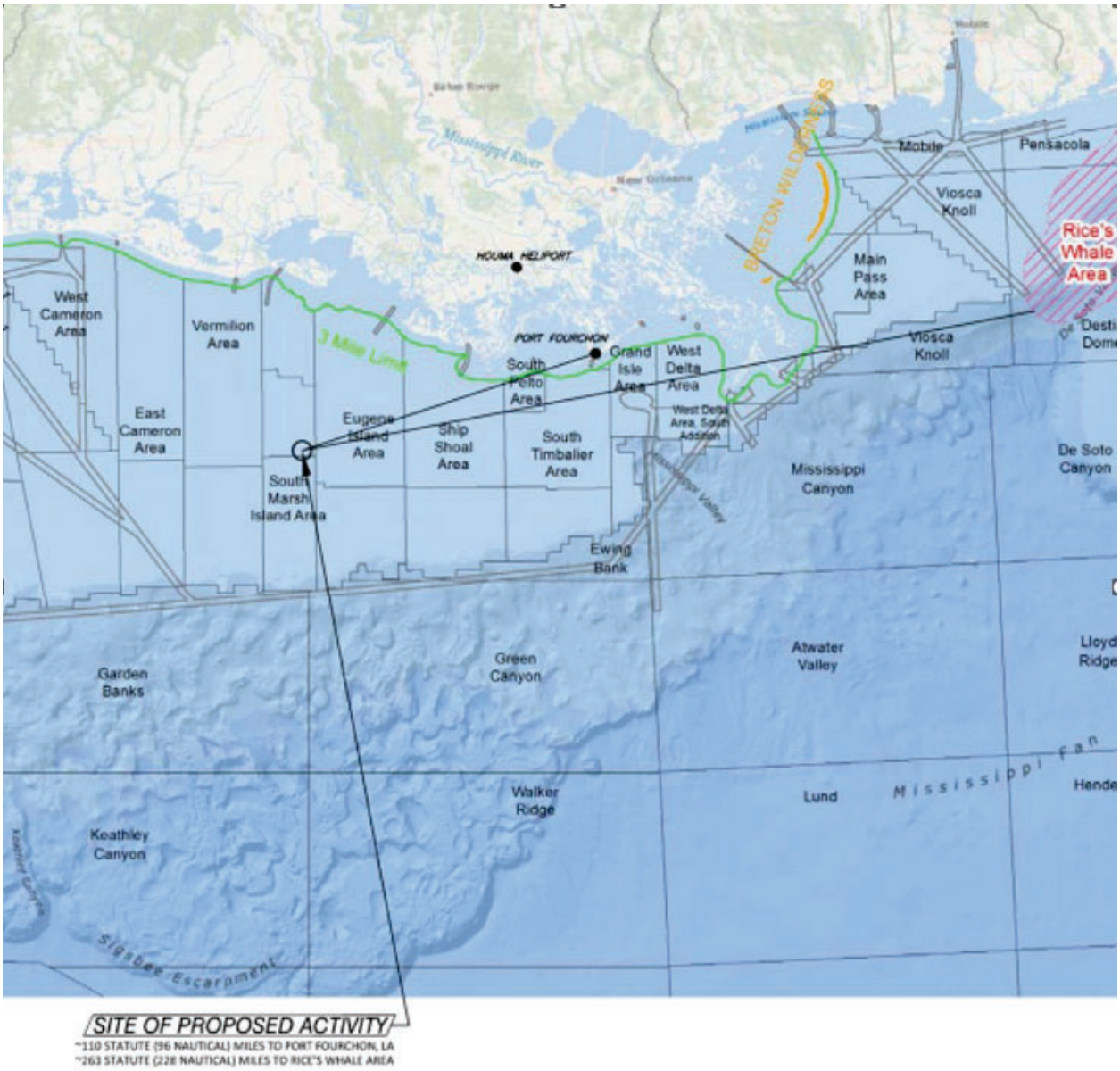
Appendix F: Visual Detection Photos

Visual Detections From Elliot Cheramie

Figure 1.Visual Detection #1: Bottlenose dolphin

Appendix G: Pre-Plot Line Shooting Plan

Map of Survey Area



Appendix H: Lead PSO Data Certification

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REPORT CERTIFICATION STATEMENT

I, Britney Roberts , am familiar with the protocols outlined in Appendix A: Seismic Survey Mitigation and Protected Species Observer Protocols, implemented by the Bureau of Ocean Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE), which provide guidelines to operators in complying with the Endangered Species Act (ESA; 16 U.S.C. §§ 1531-1544) and Marine Mammal Protection Act (MMPA; 16 U.S.C. §§1361- 1423h).

I hereby certify that, to the best of my knowledge, the data collected by the Protected Species Observer (PSOs) offshore and the information that was provided to RPS by the PSO team for our vessel to compile this report is accurate.

Name:Britney Roberts

Position: Lead Protected Species Observer

Date:Aug 12, 2024

Signed DocuSigned by: Britney Roberts 6284623658094F3... _____

I, Islam Ibrahim, am familiar with the protocols outlined in Appendix A: Seismic Survey Mitigation and Protected Species Observer Protocols, implemented by the Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE), which provide guidelines to operators in complying with the Endangered Species Act (ESA; 16 U.S.C. §§ 1531-1544) and Marine Mammal Protection Act (MMPA; 16 U.S.C. §§1361- 1423h).

I hereby certify that, to the best of my knowledge, the information provided in this report that was compiled by the RPS Project Support Manager is accurate.

Name: Islam Ibrahim

Position: RPS Environmental Project Manager

Date:Aug 12, 2024

Signed DocuSigned by: islam ibrahim 0FEA342399E8440... _____