

**Application for Letter of Authorization
for the Non-Lethal Taking of Marine Mammals:**

Nearshore Geophysical Site Survey

**BOEM G&G Permit: Pending
Gulf of Mexico**

Prepared by:



CSA Ocean Sciences Inc.

Prepared for:

ExxonMobil Corporation – Management Support Services

April 2023



Application for Letter of Authorization for the Non-Lethal Taking of Marine Mammals

DOCUMENT NO. CSA-ExxonMobil-FL-23-82127-3891-01-REP-01-VER02

Suggested citation: CSA Ocean Sciences Inc. 2023. Application for Letter of Authorization for the Non-Lethal Taking of Marine Mammals: Nearshore Well Appraisal Survey Gulf of Mexico. April 2023. 17 pp

Contact information: info@csaocean.com

Internal review process					
Version	Date	Description	Prepared by:	Reviewed by:	Approved by:
01	3/24/2023	Initial draft for science review and TE review	M.J. Barkaszi	K. Olsen	K. Olsen
Client deliverable					
Version	Date	Description	Project Manager Approval		
01	03/27/2023	Client deliverable	K. Olsen		
02	04/12/2023	Client deliverable	K. Olsen		

The electronic PDF version of this document is the Controlled Master Copy at all times. A printed copy is considered to be uncontrolled and it is the holder's responsibility to ensure that they have the current version. Controlled copies are available upon request from the CSA Document Production Department.

Contents

	Page
List of Tables	iv
List of Figures.....	iv
List of Acronyms and Abbreviations	v
1.0 Description of Proposed Activities.....	1
1.1 Project Description.....	1
1.1.1 Activities Considered in Application.....	3
2.0 Species and Numbers of Marine Mammals	4
3.0 Take Estimates for Marine Mammals.....	5
3.1 Level B Harassment of Marine Mammals.....	5
4.0 Effects Summary	8
5.0 Mitigation and Reporting Measures.....	9
6.0 List of Preparers.....	10
7.0 References	11

List of Tables

Table		Page
1	Survey specifications for the sparker and Sercel G-Source II airgun sources to be used during the proposed surveys in the U.S. GOM included in this Application.	3
2	Summary of marine mammals of the northern GOM.	4
3	Approximate locations, durations, and seasons within which the proposed survey activities will occur during the 5-year period of this Application.	5
4	Estimated and requested annual Level B exposures for the proposed well assessment survey estimated using the NMFS draft exposure estimation tool (NMFS, 2023).	6

List of Figures

Figure		Page
1	Location of ExxonMobil geophysical site survey area within BOEM's Gulf of Mexico Western Planning Area in relation to the assessment zones identified in the ITR (86 FR 5322)	2
2	Calculator tool results for well appraisal surveys conducted in zone 3	7

List of Acronyms and Abbreviations

μPa	micropascal
2D	two-dimensional
3D	three-dimensional
BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
dB	decibel
EBS	Environmental Baseline Survey
EG	Engineering Geophysical
ESA	Endangered Species Act
EWG	expert working group
FR	Federal Register
G&G	geological and geophysical
GOM	Gulf of Mexico
HR	High Resolution
ITR	incidental take regulation
JASCO	JASCO Applied Sciences
LOA	Letter of Authorization
MBES	multibeam echosounder
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
PK	zero-to-peak sound pressure level
PSO	protected species observer
re	referenced to
SL	source level
SPL	root-mean-square sound pressure level
SSS	side scan sonar
XOM	ExxonMobil Corporation – Management Support Services

1.0 Description of Proposed Activities

In accordance with the final incidental take regulation (ITR) published 19 January 2021 ([86 Federal Register \[FR\] 5322](#)), ExxonMobil Corporation – Management Support Services (XOM), hereinafter referred to as the “Applicant”, submits this request for a Letter of Authorization (LOA) for the non-lethal, unintentional taking of small numbers of marine mammals resulting from a shallow penetration seismic survey (seismic survey) for well appraisal that will utilize a small (<1,500 in³) airgun source during a portion of the survey activities within federal and state waters in the Gulf of Mexico (GOM). The project will also include high resolution (HR) engineering geophysical (EG) surveys, geotechnical surveys, and environmental baseline surveys (EBS).

The information provided in this document is submitted in accordance with the final ITR published 19 January 2021 ([86 FR 5322](#)) and the requirements of [50 Code of Federal Regulations \(CFR\) § 216.104](#) to allow for take by incidental harassment of small numbers of marine mammals resulting from geophysical surveys for oil and gas exploration activities. This rule was updated with new modeling and assessments and a proposed rule, published on 5 January 2023. Public comment on the new rule closed on 6 February 2023, and publication of the final rule is still pending at the time of this Application. The proposed rule does not change the timing or the processes required under the final 2021 rule, but presents new modeling (Jasco, 2022) and new “negligible impact” analyses.

The Applicant will be applying for a Bureau of Ocean Energy Management (BOEM) Geological and Geophysical (G&G) permit that will be submitted to BOEM in April/May 2023. The applicant will forward the permit record to National Marine Fisheries Service (NMFS) upon receipt.

1.1 Project Description

The Applicant proposes to conduct an EG and 3DHR seismic survey within BOEM’s Western Planning Area of the northern GOM (**Figure 1**). The entire survey will be conducted within ITR assessment zone 3 and adjacent state waters. The survey is expected to begin no earlier than 1 June 2023 and is expected to be completed by 1 April 2026. The total survey considered under this application will comprise a total of approximately 338 days of seismic surveying that includes EG sparker and 3D HR airgun array (total size not expected to exceed 300 cu in) sources. At this time, it is expected that approximately 30% of the survey will take place in federal waters and 70% will take place in state waters; however, these ratios may change during finalization of survey scope. Up to three vessels may be used concurrently during the seismic survey; however, the daily contingent of vessels will vary from 1 to 3 vessels depending on the survey stage and ongoing survey requirements. Surveys may be conducted 24 hours per day, but in some instances in shallow water areas will only be conducted for 12 hours per day. All survey vessels in state and federal waters will use protected species observers (PSOs) and will implement mitigation measures outlined in **Section 5.0**.

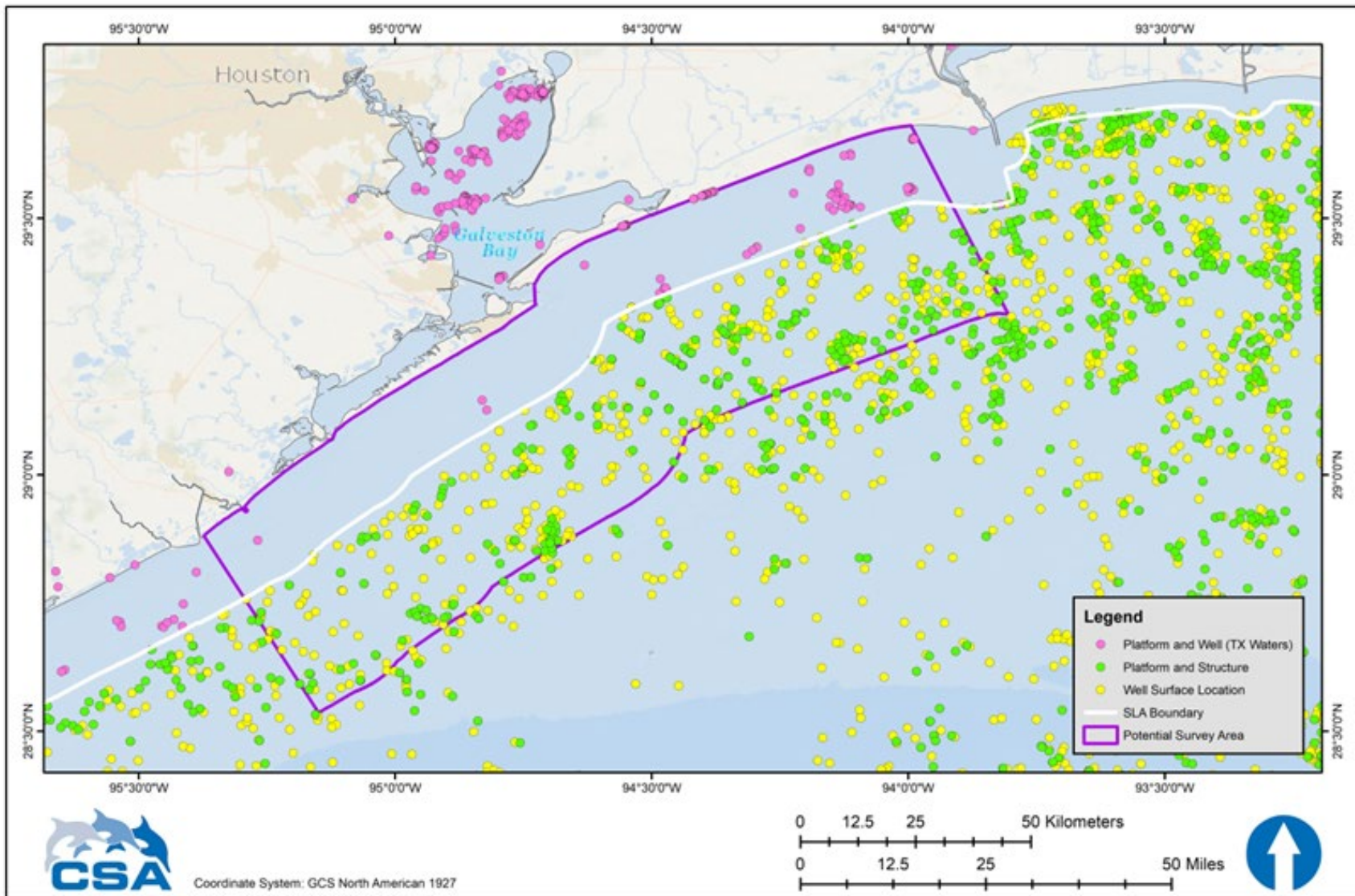


Figure 1. Location of ExxonMobil geophysical site survey area within BOEM’s Gulf of Mexico Western Planning Area in relation to the assessment zones identified in the ITR ([86 FR 5322](#)).

1.1.1 Activities Considered in Application

The activities considered under this application are a 2D/3D shallow penetration seismic survey. A shallow penetration seismic survey is defined as a survey with less than 1,500 in³ total airgun array volume. In this case, the survey intends to use a Sercel G-Source II dual airgun array of 80 to 150 cu. in., and will not exceed 300 cu. in. as determined by start-up testing results. Activities will be conducted in both Federal and State waters.

EG surveys, geotechnical surveys, and environmental baseline surveys will also be conducted as part of the project. Geotechnical and environmental baseline surveys are not considered further in this Application. EG surveys will be interspersed with seismic surveys and will include:

- Multibeam echosounder (MBES),
- Side scan sonar (SSS),
- Magnetic gradiometer or magnetometer, as appropriate,
- Sub-tow multichannel sparker system, and
- One or more subbottom profilers suited to the conditions and sediment type in the survey area.

Only EG surveys using a sparker source or airguns are included in the take analysis as these surveys represent the maximum output for EG surveys using a suite of other sources. Source parameters known at the time of application are provided in **Table 1**.

Table 1. Survey specifications for the sparker and Sercel G-Source II airgun sources to be used during the proposed surveys in the U.S. GOM included in this Application.

Source Information	Well Appraisal Survey
Mean vessel survey speed (kn)	<4
Maximum survey area (km ²)	700-1,400
Source tow depth (m)	1-2
Maximum airgun volume (in ³)	80-150
SL (PK) in dB re 1 μPa m	236
SL (SEL) in dB re 1 μPa ² s	204
Frequency range (Hz)	0-512
Maximum airgun volume (in ³) ¹	300
Estimated SL (PK) in dB re 1 μPa m	239
Estimated SL (SEL) in dB re 1 μPa ² s	219
Frequency range (Hz)	0-512
Sparker source	Geo-Source 200-400
Source output (J)	200-400
Frequency range (Hz)	750 - 3000

μPa = micropascal; dB = decibel; PK = zero-to-peak sound pressure level; re = referenced to; SL = source level; SPL = root-mean-square sound pressure level.

¹The estimated source level for a representative 300 cu in airgun was used to estimate the combined source level of the two smaller airguns.

2.0 Species and Numbers of Marine Mammals

Marine mammal species occurring in the U.S. GOM were identified and provided in the published ITR ([86 FR 5322](#)). Information about each species distribution, abundance, and status can be found in that document. A summary of the GOM species with modeled abundance estimates from the ITR ([86 FR 5322](#)) are provided in **Table 2**. The abundance estimates provided in **Table 2** may differ from the NMFS stock assessment reports (Hayes et al., 2022). Bolded animals are those that are reasonably likely to occur within the proposed survey area. The bolded species are those for which take is requested.

Affected species status and distribution of species were examined by NMFS within the scope of the proposed regulation, and more information can be found in the published ITR ([86 FR 5322](#)).

Table 2. Summary of marine mammals of the northern GOM.

Common Name	Scientific Name	Stock	ESA/MMPA Stock Status	Modeled Abundance Estimates ¹
Rice's whale	<i>Balaenoptera ricei</i>	Northern GOM	E/S	44
Sperm whale	<i>Physeter macrocephalus</i>	Northern GOM	E/S	2,128
Atlantic spotted dolphin	<i>Stenella frontalis</i>	Northern GOM	NS	47,488
Beaked whale ²	<i>Ziphius cavirostris</i> and <i>Mesoplodon</i> spp.	Northern GOM	NS	2,910
Common bottlenose dolphin	<i>Tursiops truncatus</i>	Northern GOM Gulf of Mexico	NS	138,602
Clymene dolphin	<i>Stenella clymene</i>	GOM	NS	11,000
False killer whale	<i>Pseudorca crassidens</i>	Northern GOM	NS	3,204
Fraser's dolphin	<i>Lagenodelphis hosei</i>	Northern GOM	NS	1,665
Killer whale	<i>Orcinus orca</i>	Northern GOM	NS	185
Melon-headed whale	<i>Peponocephala electra</i>	Northern GOM	NS	6,733
Pantropical spotted dolphin	<i>Stenella attenuata</i>	Northern GOM	NS	84,014
Pygmy killer whale	<i>Feresa attenuata</i>	Northern GOM	NS	2,126
Risso's dolphin	<i>Grampus griseus</i>	Northern GOM	NS	3,137
Rough-toothed dolphin	<i>Steno bredanensis</i>	Northern GOM	NS	4,853
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	Northern GOM	NS	1,981
Spinner dolphin	<i>Stenella longirostris</i>	Northern GOM	NS	13,485
Striped dolphin	<i>Stenella coeruleoalba</i>	Northern GOM	NS	4,914
<i>Kogia</i> spp. ²	<i>Kogia breviceps</i> and <i>Kogia sima</i>	Northern GOM	NS	2,234

ESA = Endangered Species Act; E = endangered; GOM = Gulf of Mexico; MMPA = Marine Mammal Protection Act; NS = non-strategic stock; S = strategic stock.

¹Abundance estimates from modeled estimates in the incidental take regulation ([86 FR 5322](#)).

²Due to difficulty in identifying to species level during visual surveys, *Kogia* spp. and beaked whale species are grouped into guilds and abundance estimates are provided for these guilds rather than each species.

3.0 Take Estimates for Marine Mammals

The Applicant requests an LOA pursuant to Section 101 (a)(5)(D) of the Marine Mammal Protection Act (MMPA) for incidental take of small numbers of marine mammals during geophysical surveys conducted as part of oil and gas exploration and production activities within the U.S. GOM. Proposed activities, as outlined in **Section 1.0**, have the potential to impact marine mammals from sounds generated by the vessel and survey equipment.

Level A harassment is not expected to result from the proposed activities due to the expected source levels, species likely to occur in the area, and the implementation of mitigation measures; therefore, no Level A takes are requested. Level B harassment may occur as a result of proposed activities; therefore, the Applicant is requesting authorization for small numbers of Level B takes of marine mammals. The species potentially taken are described fully in the published ITR and listed above in **Table 2** for reference. The parameters used as input into the NMFS exposure estimation tool to estimate takes which may result activities are provided in **Table 3**.

Table 3. Approximate locations, durations, and seasons within which the proposed survey activities will occur during the 5-year period of this Application.

Category	Well Appraisal Survey
BOEM Planning Area	Western
ITR assessment zone	3
BOEM Lease Areas	High Island; Galveston
Season in which surveys would occur ¹	Summer (66%) and winter (33%)
2D/3D/Sparker total number of vessel survey days ¹	338
Total number of days during summer months	224
Total number of days during winter months	114
Survey type used for analysis tool ²	Single airgun ³

¹The modeling used in the take assessment of the ITR reflects only two seasons, winter (December–March) and summer (April–November). The survey is planned to occur year round but not on a continuous basis. The assumption was applied that the survey activities had equal probability to occur in any single month; therefore, the proportional winter months (33%) and summer months (66%) applied across the entire survey.

²In the most recent calculator tool, HRG source modeling does not include sparkers; therefore, sparker days are calculated using the single airgun survey type.

³Although an array of 2 airguns may be used during the survey, the combined volume is not expected to exceed 300 cu in; therefore, the single airgun survey type was used for analysis.

Although the calculator tool provides results for Level A exposures, no level A exposures are expected to result from any of the described survey activities due to a combination of mitigation measures (**Section 5.0**) that prevent Level A exposures; and animal movement and behavior that would serve to avoid Level A exposures.

3.1 Level B Harassment of Marine Mammals

Level B exposures were calculated using the NMFS exposure estimation tool using the parameters provided in **Table 3**. Exposures in **Table 4** assume the HR seismic survey will have a duration of 338 days and will be completed within an approximate 2.5-year period with commencement of the survey no earlier than 1 June 2023. The calculator tool results are presented in **Figure 2**.

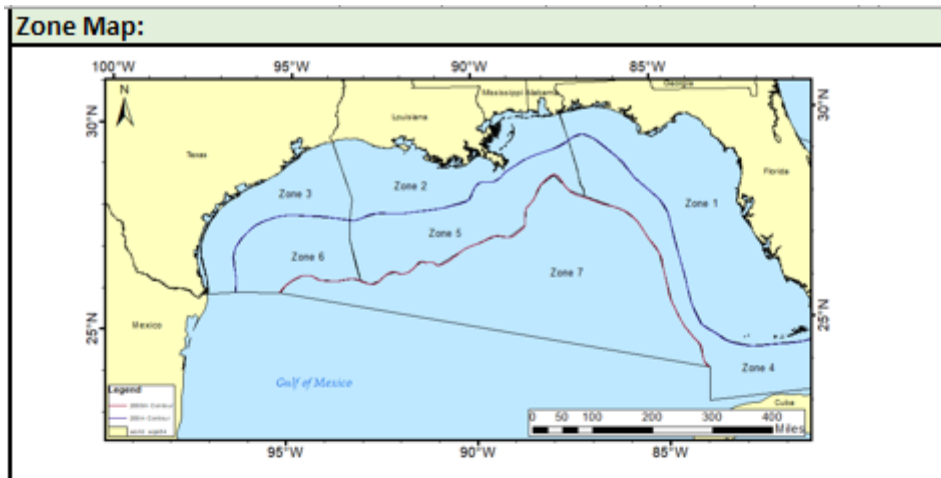
Table 4. Estimated and requested annual Level B exposures for the proposed well assessment survey estimated using the NMFS draft exposure estimation tool (NMFS, 2023).

Common Name	Abundance ¹	Zone 3 Exposures	Requested Takes	Percent Population Affected
Atlantic spotted dolphin	47,488	440	440	0.92
Common bottlenose dolphin	138,602	1,259	1,259	0.90
False killer whale ²	3,204	1	9	0.28
Fraser's dolphin ²	1,665	<1	27	1.62
Pantropical spotted dolphin ²	84,014	<1	21	0.03
Risso's dolphin ²	3,137	<1	8	0.26
Rough-toothed dolphin	4,853	37	37	0.76

¹Best abundance estimate. For most taxa, the best abundance estimate for purposes of comparison with take estimates is considered here to be the model-predicted abundance (Roberts et al., 2016).

²Because these species tend to occur in groups, the mean group size from Barkaszi and Kelly, 2019 were used for the requested takes:

- False killer whale = 9.14
- Fraser's dolphin = 26.99
- Pantropical spotted dolphin = 20.88
- Risso's dolphin = 7.7.



Parameters	
Survey Type	Single Airgun
Zone Number	3

Schedule	
Season	#
Summer	223
Winter	115

Exposures by Metric			
	Summer	Winter	Total
Level A			
Low-Frequency Hearing Group			
Bryde's whale	< 0.01	< 0.01	< 0.01
High-Frequency Hearing Group			
Kogia (dwarf, pygmy sperm whale)	< 0.01	< 0.01	< 0.01
Level B			
Low-Frequency Hearing Group			
Bryde's whale	< 0.01	< 0.01	< 0.01
Mid-Frequency Functional Hearing Group			
Beaked whales (Cuvier/Blainville/Ge)	< 0.01	< 0.01	< 0.01
Bottlenose dolphin	2,768.46	1,618.04	4,386.50
Short-finned pilot whale	< 0.01	< 0.01	< 0.01
Sperm whale	< 0.01	< 0.01	< 0.01
Atlantic spotted dolphin	960.80	573.20	1,534.00
Clymene dolphin	< 0.01	< 0.01	< 0.01
False killer whale	2.71	1.55	4.26
Fraser's dolphin	0.30	0.19	0.49
Killer whale	0.03	0.01	0.04
Melon-headed whale	< 0.01	< 0.01	< 0.01
Pantropical spotted dolphin	0.07	0.04	0.10
Pygmy killer whale	< 0.01	< 0.01	< 0.01
Risso's dolphin	0.03	0.02	0.05
Rough-toothed dolphin	81.11	46.53	127.64
Spinner dolphin	< 0.01	< 0.01	< 0.01
Striped dolphin	< 0.01	< 0.01	< 0.01
High-Frequency Hearing Group			
Kogia (dwarf, pygmy sperm whale)	< 0.01	< 0.01	< 0.01

Level A Color Legend:	
	Level A SEL
	Level A Peak

*If no color highlight, both Level A peak and SEL are < 0.01

Total take, including Level B Scaling (where)			
	Summer	Winter	Total
Bryde's whale	< 0.01	< 0.01	< 0.01
Kogia (dwarf, pygmy sperm whale)	< 0.01	< 0.01	< 0.01
Beaked whales (Cuvier/Blainville/Ge)	< 0.01	< 0.01	< 0.01
Bottlenose dolphin	794.55	464.38	1258.93
Short-finned pilot whale	< 0.01	< 0.01	< 0.01
Sperm whale	< 0.01	< 0.01	< 0.01
Atlantic spotted dolphin	275.75	164.51	440.26
Clymene dolphin	< 0.01	< 0.01	< 0.01
False killer whale	0.80	0.46	1.26
Fraser's dolphin	0.09	0.05	0.14
Killer whale	< 0.01	< 0.01	< 0.01
Melon-headed whale	< 0.01	< 0.01	< 0.01
Pantropical spotted dolphin	0.02	0.01	0.03
Pygmy killer whale	< 0.01	< 0.01	< 0.01
Risso's dolphin	< 0.01	< 0.01	< 0.01
Rough-toothed dolphin	23.28	13.35	36.63
Spinner dolphin	< 0.01	< 0.01	< 0.01
Striped dolphin	< 0.01	< 0.01	< 0.01
Kogia (dwarf, pygmy sperm whale)	< 0.01	< 0.01	< 0.01

Figure 2. Calculator tool results for well appraisal surveys conducted in zone 3.

4.0 Effects Summary

Anticipated effects on marine mammal species, stocks, subsistence uses, and marine mammal habitat were examined by NMFS within the scope of the proposed regulation, and more information can be found in the published ITR ([86 FR 5322](#)) and updated proposed rule ([88 FR 916](#)).

Effects of proposed seismic survey activities for a period of up to 10 years throughout the U.S. GOM were assessed in the ITR, following the expert working group (EWG) framework developed by Southall et al. (2014). This framework considers the context within which acoustic exposures will occur, along with the vulnerability of individual marine mammal stocks, to determine the likelihood of stock-related population-level impacts. The results of this analysis found that the total take from proposed activities will have only negligible impacts on all affected GOM marine mammal stocks. Given that the scope of activities proposed in this Application are within the analysis conducted for ITR, both in terms of spatial and temporal extent, the activities in this Application are expected to remain within this finding of only negligible impacts.

There are no current subsistence hunting areas in the vicinity of any of the proposed lease blocks and there are no activities related to the proposed surveys that may affect the availability of a species or stock of marine mammal for subsistence uses. Consequently, there are no available methods to minimize potentially adverse effects to subsistence uses.

5.0 Mitigation and Reporting Measures

This section addresses NMFS' LOA requirement to assess the availability and feasibility (economic and technological) of methods and manner of conducting these proposed survey activities that have the least practicable impact upon affected species or stock, their habitat, and their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.

The Applicant has demonstrated a strong commitment to minimizing impacts to marine mammal species through a comprehensive and progressive mitigation and monitoring program. The Applicant will follow all monitoring and mitigation measures set forth in the ITR ([86 FR 5322](#)) that are applicable to air gun surveys with total source volumes below 1,500 in³.

Mitigation measures defined under § 217.184 of the final rule ([86 FR 5322](#)) will be followed for shallow penetration seismic surveys and HRG surveys as applicable.

The Applicant will comply with all monitoring and reporting guidelines provided in the published ITR ([86 FR 5322](#)) as they pertain to PSO and passive acoustic monitoring data, and reporting injured or dead marine mammal species.

6.0 List of Preparers

CSA Ocean Sciences Inc.

- Mary Jo Barkaszi, Marine Mammal Programs Manager
- Kayla Hartigan, Project Scientist
- Kim Olsen, Project Manager

ExxonMobil

- Laanu Adeyeye, Environmental & Regulatory Advisor
- Osama Safaqah, Principal Civil Engineer - Geotechnical
- Anne Rutledge, Site Investigation Lead
- Vladimir Nechayuk, Geophysical Operations Lead
- Wes Harris, Select Stage Manager

7.0 References

- 50 Code of Federal Regulations (CFR) § 216.104. 2009. Submission of Requests.
- 86 Federal Register (*FR*) 5322. 2018. Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Geophysical Surveys Related to Oil and Gas Activities in the Gulf of Mexico. 19 January 2021.
- 88 Federal Register (*FR*) 916. 2023. Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Geophysical Surveys Related to Oil and Gas Activities in the Gulf of Mexico. 5 January 2023.
- Barkaszi MJ, Kelly CJ. 2019. Seismic Survey Mitigation Measures and Protected Species Observer Reports: Synthesis Report. U.S. Department of the Interior, Bureau Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. Contract No.: M17PD00004. OCS Study BOEM 2019-012. 220 pp.
- Hayes SH, Josephson E, Maze-Foley K, Rosel PE, Wallace J (eds). 2022. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments 2021. U.S. Department of Commerce, National Marine Fisheries Service, Woodshole, MA. NOAA Technical Memorandum NMFS-NE-288. 387 pp.
- Jasco, 2022. Memorandum: Gulf of Mexico Exposure Estimation. Dated 26 September 2022. 16 pp.
- National Marine Fisheries Service (NMFS). 2023. Gulf of Mexico exposure estimation tool. Unpublished tool received with permission for use; accessed 21 March 2023.
- Roberts JJ, Best BD, Mannocci L, Fukioka, E, Halpin PN, Palka DL, Garrison LP, Mullin KD, Cole TVN, Khan CB, McLellan WA, Pabst DA, Lockhart GG. 2016. Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico. *Scientific Reports* 6(22615).
- Southall BL, Ellison WT, Clark CW, Tollit D. 2014. Analytical Framework for Assessment Potential Effects of Seismic Airgun Surveys on Marine Mammals in the Gulf of Mexico (GOMEX). Expert Working Group (EWG) Final Report. 55 pp.