DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 217

[Docket No. 221221–0280]

RIN 0648–BL68

Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Geophysical Surveys in the Gulf of Mexico

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS is reassessing the statutorily mandated findings supporting its January 19, 2021, final rule and Regulations Governing Taking Marine Mammals Incidental to Geophysical Survey Activities in the Gulf of Mexico issued pursuant to the Marine Mammal Protection Act (MMPA), in light of updated information following the discovery that the estimates of incidental take of marine mammals anticipated from the activities analyzed for the 2021 regulations were erroneous. The correction of this error, as well as other newly available and pertinent information, has bearing on the analyses supporting some of the prior findings in the 2021 final rule and the taking allowable under the regulations. There are no changes to the specified activities or the specified geographical region in which those activities would be conducted, nor to the original 5-year period of effectiveness. Here, in light of the new information, NMFS presents new ''negligible impact'' analyses supporting our preliminary affirmance of the negligible impact determinations for all species, and proposes to affirm that the existing regulations, which contain mitigation, monitoring, and reporting requirements, are consistent with the ''least practicable adverse impact standard'' of the MMPA. Pursuant to the MMPA, NMFS is requesting comments on its revised negligible impact analyses and proposed findings and proposed retention of the existing regulations as consistent with the MMPA's least practicable adverse impact standard and will consider public comments relevant to this proposed rule prior to issuing any final rule. Agency responses will be included in the notice of the final decision.

DATES: Comments and information must be received no later than February 6, 2023.

ADDRESSES: Submit all electronic public comments via the Federal e-Rulemaking Portal. Go to *www.regulations.gov* and enter NOAA–NMFS–2022–0090 in the Search box. Click on the ''Comment'' icon, complete the required fields, and enter or attach your comments.

Instructions: Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered by NMFS. All comments received are a part of the public record and will generally be posted for public viewing on *www.regulations.gov* without change. All personal identifying information (*e.g.,* name, address), confidential business information, or otherwise sensitive information submitted voluntarily by the sender will be publicly accessible. NMFS will accept anonymous comments (enter ''N/A'' in the required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word, Excel, or Adobe PDF file formats only.

FOR FURTHER INFORMATION CONTACT: Ben Laws, Office of Protected Resources, NMFS, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Purpose and Need for Regulatory Action

On January 19, 2021 (86 FR 5322), in response to a petition request from the Bureau of Ocean Energy Management (BOEM), NMFS issued a final rule under the MMPA, 16 U.S.C. 1361 *et seq.,* for regulations governing the take of marine mammals incidental to the conduct of geophysical survey activities in the Gulf of Mexico (GOM). This incidental take regulation (ITR), which became effective on April 19, 2021, established a framework to allow for the issuance of Letters of Authorization (LOAs) to authorize take by individual survey operators (50 CFR 216.106; 86 FR 5322 (January 19, 2021)). Take is expected to occur by Level A and/or Level B harassment incidental to use of active sound sources as described below.

Errors discovered in the maximum annual and 5-year take numbers during implementation of the ITR preclude NMFS from issuing LOAs for the full amount of activity described by BOEM in the petition (as revised) and intended to be covered under the ITR. As a result, the utility of the rule has been limited. NMFS has produced corrected take estimates, including updates to the best available science incorporated to the take estimation process (*i.e.,* new marine mammal density information), with the result that allowable take numbers are changed through this rule. Changes to the take numbers require additional analysis to ensure that the necessary statutory findings can still be made. This proposed rule revises NMFS' analysis and affirms the statutory findings that underlie its January 19, 2021, final rule (86 FR 5322), based on consideration of information that corrects errors in the take estimates that were considered for the final rule. NMFS solicits public comment on this proposed rule, including but not limited to NMFS' proposed or preliminary findings, determinations or conclusions regarding the MMPA standards, and the information NMFS relies on in support of those findings, determinations, or conclusions; and NMFS' preliminary decisions to reaffirm or not make changes to the 2021 final rule, and the information NMFS relies on in support of those preliminary decisions.

Legal Authority for the Action

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A)) directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region for up to 5 years if, after notice and public comment, the agency makes certain findings and issues regulations that set forth permissible methods of taking pursuant to that activity and other means of effecting the ''least practicable adverse impact'' on the affected species or stocks and their habitat (see the discussion below in the Proposed Mitigation section), as well as monitoring and reporting requirements. Under NMFS' implementing regulations for section 101(a)(5)(A), NMFS issues LOAs to individuals (including entities) seeking authorization for take under the activity-specific incidental take regulations (50 CFR 216.106).

Summary of Major Provisions Within the Regulations

Following is a summary of the major provisions of the current regulations regarding geophysical survey activities, which NMFS proposes to reaffirm. The regulations contain requirements for mitigation, monitoring, and reporting, including:

- Standard detection-based mitigation measures, including use of visual and acoustic observation to detect marine mammals and shut down acoustic sources in certain circumstances;

• A time-area restriction designed to avoid effects to bottlenose dolphins in times and places believed to be of particular importance;

• Vessel strike avoidance measures; and

• Monitoring and reporting requirements.

The ITR would continue to govern and allow for the issuance of LOAs for the take of marine mammals incidental to the specified activity (which is unchanged from what was described in the 2021 final rule), within the upper bounds of take evaluated herein.

Background

The MMPA prohibits the ''take'' of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed incidental take authorization may be provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other ''means of effecting the least practicable adverse impact'' on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to as ''mitigation''); and set forth requirements pertaining to the monitoring and reporting of the takings. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

On October 17, 2016, BOEM submitted a revised petition [1] to NMFS for rulemaking under section 101(a)(5)(A) of the MMPA to authorize take of marine mammals incidental to conducting geophysical surveys during oil and gas industry exploration and development activities in the GOM. This revised petition was deemed adequate and complete based on NMFS' implementing regulations at 50 CFR 216.104.

NMFS published a notice of proposed rulemaking in the **Federal Register** for a 60-day public review on June 22, 2018 (83 FR 29212) (''2018 proposed rule''). All comments received are available online at *www.fisheries.noaa.gov/action/incidental-take-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico.*

On February 24, 2020, BOEM submitted a notice to NMFS of its ''updated proposed action and action area for the ongoing [ITR] process[.]'' This update consisted of removal of the area then under a Congressional leasing moratorium under the Gulf of Mexico Energy Security Act (GOMESA) (Sec. 104, Pub. L. 109–432) [2] from consideration in the ITR. BOEM stated in its notice that survey activities are not likely to be proposed within the area subject to the leasing moratorium during the 5-year period of effectiveness for the ITR and, therefore, that the ''number, type, and effects of any such proposed [survey] activities are simply too speculative and uncertain for BOEM to predict or meaningfully analyze.'' Based on this updated scope, BOEM on March 26, 2020, submitted revised projections of expected activity levels and corresponding changes to modeled acoustic exposure numbers (*i.e.,* take estimates). BOEM's notice and updated information are available online at: *www.fisheries.noaa.gov/action/incidental-take-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico.* NMFS incorporated this change in scope and issued a final rule and ITR on January 19, 2021 (86 FR 5322) (''2021 final rule'' or ''2021 ITR''), which became effective on April 19, 2021. Consistent with section 101(a)(5)(A), NMFS may issue LOAs under the 2021 ITR for a period of 5 years.

While processing requests for individual LOAs under the ITR using the methodology for developing LOA-specific take numbers presented in the rule, NMFS discovered that the estimated maximum annual incidental take and estimated total 5-year take from all survey activities that BOEM projected for its revised scope appeared to be in error, in that maximum annual incidental take was likely to be reached much sooner than was anticipated for some species based on the level of activity described in BOEM's petition (as revised in 2020). NMFS contacted BOEM regarding this, and BOEM determined that, when it reduced its scope of specified activity in March 2020 by removing the GOMESA moratorium area from its proposed action, it underestimated the level of take by inadvertently factoring species density estimates into its revised exposure estimates twice. Generally, this miscalculation caused BOEM to underestimate the total predicted exposures of species from all survey activities in its revision to the petition, most pronouncedly for those species with the lowest densities (*e.g.,* killer whales).

BOEM provided NMFS with an explanation of the miscalculation with regard to its incidental take estimate and revised take estimates. See the Estimated Take section for additional discussion. NMFS then determined it would conduct a rulemaking to analyze the revised take estimates and, if appropriate, to revise its incidental take rule accordingly.

Since issuance of the 2021 final rule (at time this proposed rule was submitted to the **Federal Register**), NMFS has issued 34 LOAs (*www.fisheries.noaa.gov/issued-letters-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico*). Of these 34 LOAs, 17 have included authorization of take for killer whales. An additional 7 requests for authorization remain pending as a result of limitations on NMFS' ability to authorize additional take of killer whales under the rule.

National Environmental Policy Act (NEPA)

In 2017, BOEM produced a final Programmatic Environmental Impact Statement (PEIS) to evaluate the direct, indirect, and cumulative impacts of geological and geophysical survey activities in the GOM, pursuant to requirements of NEPA. These activities include geophysical surveys, as are described in the MMPA petition submitted by BOEM to NMFS. The PEIS is available online at: *www.boem.gov/Gulf-of-Mexico-Geological-and-Geophysical-Activities-Programmatic-EIS/.* NOAA, through NMFS, participated in preparation of the PEIS as a cooperating agency due to its legal jurisdiction and special expertise in conservation and management of marine mammals, including its responsibility to authorize incidental take of marine mammals under the MMPA.

[1] In the 2018 notice of proposed rulemaking (83 FR 29212, June 22, 2018), NMFS provided a brief history of prior petitions received from BOEM's predecessor agencies.

[2] The Congressional moratorium in GOMESA was in place until June 30, 2022. On September 8, 2020, the President withdrew, under section 12 of the Outer Continental Shelf Lands Act, the same area covered by the prior GOMESA moratorium from disposition by leasing for 10 years, beginning on July 1, 2022, and ending on June 30, 2032.

In 2020, NMFS prepared a Record of Decision (ROD) for the following purposes: (1) to adopt BOEM's Final PEIS to support NMFS' analysis associated with issuance of incidental take authorizations pursuant to section 101(a)(5)(A) or (D) of the MMPA and the regulations governing the taking and importing of marine mammals (50 CFR part 216); and (2) in accordance with 40 CFR 1505.2, to announce and explain the basis for NMFS' decision to review and potentially issue incidental take authorizations under the MMPA on a case-by-case basis, if appropriate.

The Council on Environmental Quality (CEQ) regulations state that ''[a]gencies shall prepare supplements to either draft or final environmental impact statements if: (i) the agency makes substantial changes in the proposed action that are relevant to environmental concerns; or (ii) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.'' (40 CFR 1502.09(c)). In addition, NMFS has considered CEQ's ''significance'' criteria at 40 CFR 1508.27 and the criteria relied upon for the 2020 ROD to determine whether any new circumstances or information are ''significant,'' thereby requiring supplementation of the 2017 PEIS.

For this proposed action, NMFS has reevaluated its findings related to the MMPA negligible impact standard and the least practicable adverse impact standard governing its regulations in light of the corrected take estimates and other relevant new information. Based on that evaluation, NMFS preliminarily reaffirms its negligible impact determinations and preliminarily finds that the corrected and additional data do not result in the need for revised mitigation and monitoring measures under the least practicable adverse impact standard.

NMFS also considered whether there are any significant new circumstances or information that are relevant to environmental concerns and have a bearing on this proposed action or its impacts. For our consideration of new circumstances and information, we consulted scientific publications from 2021–22, data that were collected by the agency and other entities after the PEIS was completed, field reports, and other sources (*e.g.,* updated NMFS Stock Assessment Reports (SAR), reports produced under the BOEM-funded Gulf of Mexico Marine Assessment Program for Protected Species (GoMMAPPS) project (see *www.boem.gov/gommapps*)). The new circumstances and information are related to updated information on Rice's whales in the action area (population abundance, mortality and sources of mortality, distribution and occurrence) and any new data, analysis, or information on the effects of geophysical survey activity on marine mammals and relating to the effectiveness and practicability of measures to reduce the risk associated with impacts of such survey activity. Based on this review, NMFS has preliminarily determined that supplementation of the 2017 PEIS is not warranted.

Summary of the Proposed Action

This proposed rule provides analysis of the same activities and activity levels considered for the 2021 final rule for the same original five-year period of time and utilizes the same modeling methodology described in the 2021 final rule. We incorporate the best available information, including consideration of specific new information that has become available since the 2021 rule was published and updates to currently available marine mammal density information. This proposed rule also incorporates expanded modeling results that estimate take utilizing the existing methodology but also consider the effects of using smaller (relative to the proxy source originally defined by BOEM) airgun arrays currently prevalent, as evidenced by LOA applications received by NMFS to date (see *www.fisheries.noaa.gov/issued-letters-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico*).

There are no changes to the nature or level of the specified activities within or across years or to the geographic scope of the activity. Based on our preliminary assessment of the specified activity in light of the revised take estimates and other new information, we have determined that the 2021 regulations at 50 CFR 217.180, including the required mitigation and associated monitoring measures, satisfy the MMPA requirement to prescribe the means of effecting the least practicable adverse impact on the affected species or stocks and their habitat, and therefore, do not propose to change those regulations, nor do we propose to change the requirements pertaining to monitoring and reporting. This rulemaking supplements the information supporting the 2021 incidental take rule. This proposed rule would not change the existing expiration date of the 2021 regulations (April 19, 2026). In addition, NMFS' demarcation of ''years'' under the 2021 final rule for purposes of accounting for authorized take (*e.g.,* Year 1 under the rule extended from April 19, 2021, through April 18, 2022) would remain unchanged under this proposed rule.

As to the negligible impact findings, the revised take numbers remain within those previously analyzed for most species. (Take numbers increased compared with the 2021 final rule for four species: Rice's whale, Fraser's dolphin, rough-toothed dolphin, and striped dolphin. See Tables 5 and 6. Because of the new category of blackfish, there is uncertainty on any change in the take numbers for the individual species that comprise that category, though collectively the take numbers for all species in the blackfish category remain within the levels previously analyzed.) However, we revisited the risk assessment framework used in the 2021 analyses for all species, as elements of the framework are dependent on information related to stock abundance, which has been updated. For most species, we provide updated negligible impact analyses and determinations. For those species for which take numbers decreased and associated evaluated risk remained static or declined, we incorporate (by either repeating, summarizing, or referencing) applicable information and analyses in the prior rulemaking and supporting documents. For those species, there is no other new information suggesting that the effect of the anticipated take might exceed what was considered in the 2021 final rule. Therefore, the analyses and findings included in the documents provided and produced in support of the 2021 final rule remain current and applicable. Please see the Negligible Impact Analysis and Determinations section for further information. As to the small numbers standard, we do not propose to change the interpretation and implementation as laid out in the 2021 final rule.

Description of the Specified Activity

Overview

The specified activity for this proposed action is unchanged from the specified activity considered for the 2021 ITR, consisting of geophysical surveys conducted for a variety of reasons. BOEM's 2016 petition described a 10-year period of geophysical survey activity and provided estimates of the amount of effort by survey type and location. BOEM's 2020 update to the scope of activity included revisions to these level-of-effort projections, including limiting the projections to 5 years and removing activity assumed to occur within the areas removed from the

scope of activity. Actual total amounts of effort (including by survey type and location) are not known in advance of receiving LOA requests, but take in excess of what is analyzed in this rule would not be authorized. Applicants seeking authorization for take of marine mammals incidental to survey activities outside the geographic scope of the rule (*i.e.,* within the former GOMESA moratorium area) would need to pursue a separate MMPA incidental take authorization. See Figures 1 and 2.

Geophysical surveys in the GOM are typically conducted in support of hydrocarbon exploration, development, and production by companies that provide such services to the oil and gas industry. Broadly, these surveys include deep penetration surveys using large airgun arrays as the acoustic source; shallow penetration surveys using a small airgun array, single airgun, or other systems that may achieve similar objectives (here considered broadly as including boomers and sparkers) as the acoustic source; or high-resolution surveys, which may use a variety of acoustic sources. Geophysical surveys and associated acoustic sources were described in detail in NMFS' 2018 notice of proposed rulemaking and in the notice of issuance for the 2021 final rule. Please see those notices for detailed discussion of geophysical survey operations, associated acoustic sources, and the specific sources and survey types that were the subject of acoustic exposure modeling. Information provided therein remains accurate and relevant and is not repeated here. The use of these acoustic sources produces underwater sound at levels that have the potential to result in harassment of marine mammals. Marine mammal species with the potential to be present in the GOM are described below (see Table 2).

Generally speaking, survey activity projected by BOEM may occur within Federal territorial waters and waters of the U.S. Exclusive Economic Zone (EEZ) (*i.e.,* to 200 nautical miles (nmi)) within the GOM, and/or corresponding with BOEM's GOM Outer Continental Shelf planning areas (*i.e.,* Western Planning Area (WPA), Central Planning Area (CPA), Eastern Planning Area (EPA)).

Dates and Duration

The dates and duration of the specified activities considered for this proposed rule are unchanged from the dates and duration for the 2021 final rule, which may occur at any time during the period of validity of the regulations (April 19, 2021, through April 18, 2026).

Specified Geographical Region

The specified geographical region for this proposed action is unchanged from the one considered for the 2021 final rule. The OCS planning areas are depicted in Figure 1, and the overlap of the former GOMESA moratorium area, which is now withdrawn from leasing consideration, with the geographical region (as well as with the modeling zones) is depicted in Figure 2. NMFS provided a detailed discussion of the specified geographical region in the 2018 notice of proposed rulemaking.

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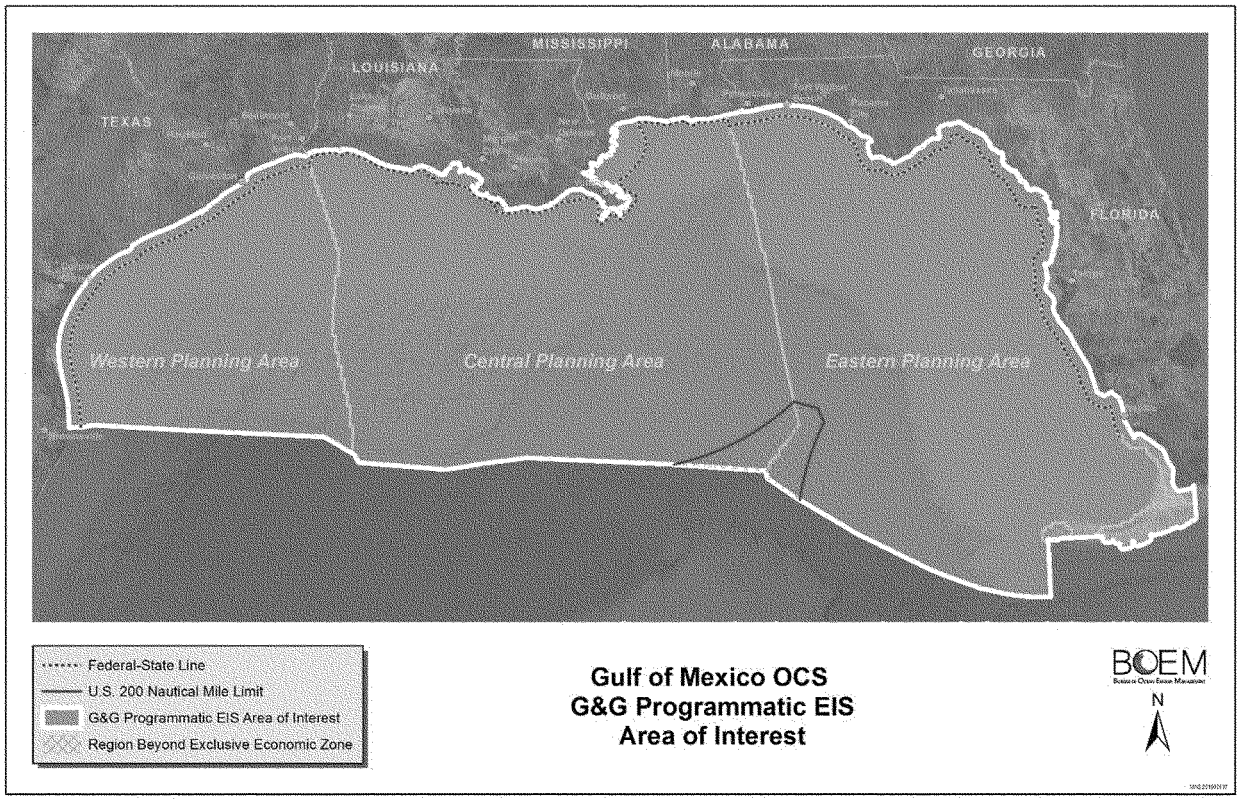

Figure 1 -- BOEM Planning Areas

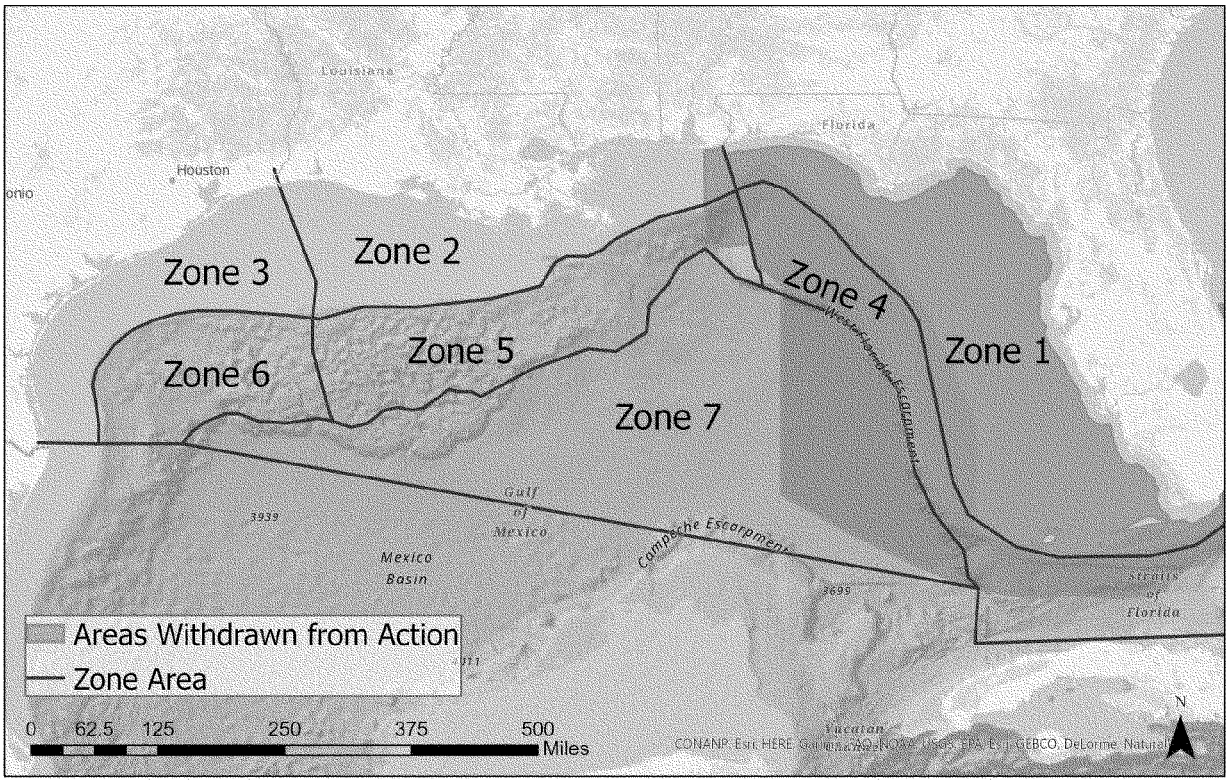

Figure 2 -- Specified Geographical Region

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Summary of Representative Sound Sources

The 2021 final rule allows for the authorization of take, through LOAs, incidental to airguns of different sizes and configurations. The supporting modeling considered two specific airgun array sizes/configurations (as well as a single airgun). For this proposed rule, modeling of a third representative airgun size is also specifically considered. Acoustic exposure modeling performed in support of the 2021 rule was described in detail in ''Acoustic Propagation and Marine Mammal Exposure Modeling of Geological and Geophysical Sources in the Gulf of Mexico'' and ''Addendum to Acoustic Propagation and Marine Mammal Exposure Modeling of Geological and Geophysical Sources in the Gulf of Mexico'' (Zeddies *et al.,* 2015, 2017a), as well as in ''Gulf of Mexico Acoustic Exposure Model Variable Analysis'' (Zeddies *et al.,* 2017b), which evaluated a smaller, alternative airgun array. Modeling of a smaller, more representative, airgun array considered in this proposed rule is described in a 2022 memorandum (Weirathmueller *et al.,* 2022). These reports provide full detail regarding the modeled acoustic sources and survey types and are available online at: *www.fisheries.noaa.gov/action/incidental-take-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico.*

Representative sources for the modeling include three different airgun arrays, a single airgun, and an acoustic source package including a CHIRP sub-bottom profiler in combination with multibeam echosounder and side-scan sonar. Two major survey types were considered: large-area (including 2D, 3D narrow azimuth (NAZ), 3D wide azimuth (WAZ), and coil surveys) and small-area (including single airgun surveys and high-resolution surveys; the single airgun was used as a conservative proxy for surveys using a boomer or sparker). The nominal airgun sources used for analysis of the specified activity include a single airgun (90-in^3 airgun) and a large airgun array (8,000 in^3). In addition, the Model Variable Analysis (Zeddies *et al.,* 2017b) provides analysis of an alternative 4,130-in^3 array, and the most recent modeling effort using the same methodology provides analysis of a 5,110-in^3 array (Weirathmueller *et al.,* 2022), with specifications defined by NMFS in consultation with industry operators to provide exposure modeling results more relevant to arrays commonly in use (see Letters of Authorization section). Additional discussion is provided in the Estimated Take section.

While it was necessary to identify representative sources for the purposes of modeling take estimates for the analysis for the 2021 rule, the analysis is intended to be, and is appropriately, applicable to takes resulting from the use of other sizes or configurations of airguns (*e.g.,* the smaller, 5,110-in^3 airgun array currently prevalent in GOM survey effort and described in Weirathmueller *et al.* (2022), and the alternative 4,130-in^3 array initially modeled by Zeddies *et al.* (2017b)). Although the analysis herein is based on the worst-case modeling results (for most species, those resulting from use of the 8,000-in^3 array), actual take numbers for authorization through LOAs are generated based on the results most applicable to the array planned for use.

While these descriptions reflect existing technologies and current practice, new technologies and/or uses of existing technologies may come into practice during the remaining period of validity of these regulations. As stated in the 2021 final rule, NMFS will evaluate any such developments on a case-specific basis to determine whether

expected impacts on marine mammals are consistent with those described or referenced in this document and, therefore, whether any anticipated take incidental to use of those new technologies or practices may appropriately be authorized under the existing regulatory framework. See Letters of Authorization for additional information.

Estimated Levels of Effort

As noted above, estimated levels of effort are unchanged from those considered in the 2021 final rule. Please see the 2021 final rule notice for additional detailed discussion of those estimates and of the approach to delineating modeling zones (shown in Figure 2).

In support of its 2020 revision of the scope of the rule, BOEM provided NMFS with revised 5-year level of effort predictions and associated acoustic exposure estimates. Table 1 provides those effort projections for the 5-year period, which are unchanged.

TABLE 1—PROJECTED LEVELS OF EFFORT IN 24-HR SURVEY DAYS FOR FIVE YEARS, BY ZONE AND SURVEY TYPE [1]

Year	Zone [2]	2D [3]	3D NAZ [3]	3D WAZ [3]	Coil [3]	VSP [3]	Total (deep) [3]	Shallow hazards [4]	Boomer [4]	HRG [4]	Total (shallow) [4]
1	1	0	0	0	0	0	0	0	0	0	0
	2	0	236	0	0	0	236	2	0	18	20
	3	0	30	0	0	0	30	0	0	4	4
	4	0	0	0	0	0	0	0	0	0	0
	5	54	373	184	79	2	692	0	0	25	25
	6	0	186	49	21	0	256	0	0	10	10
	7	46	346	166	71	1	630	0	0	23	23
Total		100	1,171	399	171	3	1,844	2	0	80	82
2	1	0	0	0	0	0	0	0	0	0	0
	2	0	354	42	19	0	415	2	0	18	20
	3	0	0	0	0	0	0	0	0	4	4
	4	6	0	0	0	0	6	0	0	0	0
	5	0	373	184	79	2	638	0	0	25	25
	6	0	99	0	0	0	99	0	0	11	11
	7	20	336	162	69	1	588	0	0	23	23
Total		26	1,162	388	167	3	1,746	2	0	81	83
3	1	0	0	0	0	0	0	0	0	0	0
	2	0	236	0	0	0	236	2	0	18	20
	3	0	0	0	0	0	0	0	0	4	4
	4	0	0	0	0	0	0	0	0	0	0
	5	0	328	154	66	2	550	0	0	26	26
	6	0	186	49	21	0	256	0	0	12	12
	7	0	306	139	60	1	506	0	0	24	24
Total		0	1,056	342	147	3	1,548	2	0	84	86
4	1	0	0	0	0	0	0	0	0	0	0
	2	0	354	42	19	0	415	2	1	16	19
	3	0	30	0	0	0	30	0	0	3	3
	4	12	11	0	0	0	23	0	0	0	0
	5	27	237	92	40	2	398	0	0	26	26
	6	0	99	0	0	0	99	0	0	12	12
	7	63	255	94	40	1	453	0	0	24	24
Total		102	986	228	99	3	1,418	2	1	81	84
5	1	0	0	0	0	0	0	0	0	0	0
	2	0	236	0	0	0	236	0	0	19	19
	3	0	0	0	0	0	0	0	0	3	3
	4	0	17	0	0	0	17	0	0	0	0
	5	0	283	184	79	2	548	2	1	24	27
	6	0	99	0	0	0	99	0	0	13	13
	7	0	313	162	69	2	546	2	1	23	26
Total		0	948	346	148	4	1,446	4	2	82	88

[1] Projected levels of effort in 24-hr survey days. This table corrects Table 2 in NMFS' notice of issuance of the 2021 ITR, which erroneously presented the difference in activity levels between the 2018 proposed ITR and the revised levels after GOMESA removal. The correct information was concurrently made available to the public via BOEM's 2020 notice to NMFS of its updated scope.

[2] Zones follow the zones depicted in Figure 2.

[3] Deep penetration survey types include 2D, which uses one source vessel with one source array; 3D NAZ, which uses two source vessels using one source array each; 3D WAZ and coil, each of which uses four source vessels using one source array each (but with differing survey design); and VSP, which uses one source vessel with one source array. ''Deep'' refers to survey type, not to water depth. Assumptions related to modeled source and survey types were made by BOEM in its petition for rulemaking.

[4] Shallow penetration/HRG survey types include shallow hazards surveys, assumed to use a single 90-in^3 airgun or boomer, and high-resolution surveys using the multibeam echosounder, side-scan sonar, and CHIRP sub-bottom profiler systems concurrently. ''Shallow'' refers to survey type, not to water depth.

The preceding description of the specified activity is a summary of critical information. The interested reader should refer to the 2018 notice of proposed rulemaking (83 FR 29212, June 22, 2018), as well as BOEM's petition (with recent addenda) and PEIS, for additional detail regarding these activities and the region. Required mitigation, monitoring, and reporting measures are described later in this document (see Proposed Mitigation and Proposed Monitoring and Reporting).

Description of Marine Mammals in the Area of the Specified Activities

Table 2 lists all species with expected potential for occurrence in the GOM and summarizes information related to the population or stock, including potential biological removal (PBR). PBR, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population, is considered in concert with known sources of ongoing anthropogenic mortality (as described in NMFS' SARs). For status of species, we provide information regarding U.S. regulatory status under the MMPA and Endangered Species Act (ESA). The affected species and stocks have not changed from those described in the notice of issuance of the 2021 rule. We incorporate information newly available since that rule, including updated information from NMFS' SARs, but do not otherwise repeat discussion provided in either the 2018 notice of proposed rulemaking or 2021 notice of issuance of the final rule.

In some cases, species are treated as guilds (as was the case for the analysis conducted in support of the 2021 ITR). In general ecological terms, a guild is a group of species that have similar requirements and play a similar role within a community. However, for purposes of stock assessment or abundance prediction, certain species may be treated together as a guild because they are difficult to distinguish visually and many observations are ambiguous. For example, NMFS' GOM SARs assess stocks of *Mesoplodon* spp. and *Kogia* spp. as guilds. As was the case for the 2021 rule, we consider beaked whales and *Kogia* spp. as guilds. In this proposed rule, reference to ''beaked whales'' includes the Cuvier's, Blainville's, and Gervais beaked whales, and reference to ''*Kogia* spp.'' includes both the dwarf and pygmy sperm whale.

The use of guilds in the 2021 final rule followed the best available density information at the time (*i.e.,* Roberts *et al.,* 2016). Subsequently, updated density information became available for all species except for Fraser's dolphin and rough-toothed dolphin (Garrison *et al.,* 2022). The updated density models retain the treatment of beaked whales and *Kogia* spp. as guilds and have additionally consolidated four species into an undifferentiated ''blackfish'' guild. These species include the melon-headed whale, false killer whale, pygmy killer whale, and killer whale. The model authors determined that, for this group of species, there were insufficient sightings of any individual species to generate a species-specific model. Therefore, reference to ''blackfish'' hereafter includes the melon-headed whale, false killer whale, pygmy killer whale, and killer whale.[3] NMFS requests comment regarding whether there is additional data that it should consider in this rulemaking related to the aforementioned species, in light of NMFS' preliminary determination that Garrison *et al.* (2022) reflects the best available scientific information.

Twenty-one species (with 24 managed stocks) have the potential to co-occur with the prospective survey activities. For detailed discussion of these species, please see the 2018 notice of proposed rulemaking. In addition, the West Indian manatee (*Trichechus manatus latirostris*) may be found in coastal waters of the GOM. However, manatees are managed by the U.S. Fish and Wildlife Service and are not considered further in this document. All managed stocks in this region are assessed in NMFS' U.S. Atlantic SARs.

All values presented in Table 2 are the most recent available at the time the analyses for this notice were completed, including information presented in NMFS' 2021 SARs (the most recent SARs available at the time of publication) (Hayes *et al.,* 2022).

TABLE 2—MARINE MAMMALS POTENTIALLY PRESENT IN THE SPECIFIED GEOGRAPHICAL REGION

Common name	Scientific name	Stock	ESA/MMPA status; strategic (Y/N)[1]	NMFS stock abundance (CV, N_{min}, most recent abundance survey)[2]	Predicted mean (CV)/maximum abundance[3]	PBR	Annual M/SI[4]
Order Cetartiodactyla—Cetacea—Superfamily Mysticeti (baleen whales)							
Family Balaenopteridae (rorquals):							
Rice's whale[5]	*Balaenoptera ricei*	Gulf of Mexico	E/D; Y	51 (0.50; 34; 2017–18).	37 (0.52)	0.1	0.5
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)							
Family Physeteridae:							
Sperm whale	*Physeter macrocephalus*	GOM	E/D; Y	1,180 (0.22; 983; 2017–18).	3,007 (0.15)	2.0	9.6
Family Kogiidae:							
Pygmy sperm whale	*Kogia breviceps*	GOM	-; N	336 (0.35; 253; 2017–18)[6 7].	980 (0.16)	2.5	31
Dwarf sperm whale	*K. sima*	GOM	-; N				
Family Ziphiidae (beaked whales):							
Cuvier's beaked whale	*Ziphius cavirostris*	GOM	-; N	See Footnotes 7–8	803 (0.18)	0.1	5.2
Gervais beaked whale	*Mesoplodon europaeus*	GOM	-; N				

[3] NMFS' 2021 final rule provided take estimates separately for the melon-headed whale, false killer whale, pygmy killer whale, and killer whale. This proposed rule provides a single take estimate for those four species grouped together as the ''blackfish.'' This change in approach reflects the best available scientific information, *i.e.,* updated density information (Garrison *et al.,* 2022). These species are encountered only occasionally during any given vessel survey, and these relatively infrequent encounters make it difficult to fit species-specific detection and habitat models. Roberts *et al.* (2016) fit species-specific models based on survey data from 1992–2009, including 29, 19, 27, and 16 sightings, respectively, of these species. For each of these models, the authors detail analyses and decisions relevant to model development, as well as notes of caution regarding use of the models given the associated uncertainty resulting from development of a model based on few sightings. The Garrison *et al.* (2022) models are based on survey data from 2003–2018. Notably, surveys conducted after 2009 were conducted in ''passing'' mode, where the ship did not deviate from the trackline to approach and verify species identifications for detected marine mammal groups, resulting in an increase in observed marine mammal groups that could not be identified to species. As a result of these factors, the model authors determined it appropriate to develop a single spatial model based on sightings of unidentified blackfish, in addition to the relatively few sightings where species identification could be confirmed.

TABLE 2—MARINE MAMMALS POTENTIALLY PRESENT IN THE SPECIFIED GEOGRAPHICAL REGION—Continued

Common name	Scientific name	Stock	ESA/ MMPA status; strategic (Y/N) [1]	NMFS stock abundance (CV, N_{min}, most recent abundance survey) [2]	Predicted mean (CV)/maximum abundance [3]	PBR	Annual M/SI [4]
Blainville's beaked whale.	*M. densirostris*	GOM	-; N			0.7	
Family Delphinidae:							
Rough-toothed dolphin	*Steno bredanensis*	GOM	-; N	3,509 (0.67; Unk.; 2009).	4,853 (0.19)	Undet.	39
Common bottlenose dolphin [7].	*Tursiops truncatus truncatus.*	GOM Oceanic	-; N	7,462 (0.31; 5,769; 2017–18).	155,453 (0.13) (Shelf) 9,672 (0.15) (Oceanic).	58	32
		GOM Continental Shelf.	-; N	63,280 (0.11; 57,917; 2017–18).		556	65
		GOM Coastal, Northern.	-; N	11,543 (0.19; 9,881; 2017–18).		89	28
		GOM Coastal, Western.	-; N	20,759 (0.13; 18,585; 2017–18).		167	36
Clymene dolphin	*Stenella clymene*	GOM	-; N	513 (1.03; 250; 2017–18).	4,619 (0.35)	2.5	8.4
Atlantic spotted dolphin	*S. frontalis*	GOM	-; N	21,506 (0.26; 17,339; 2017–18).	6,187 (0.33) (Shelf) 1,782 (0.19) (Oceanic).	166	36
Pantropical spotted dolphin.	*S. attenuata attenuata*	GOM	-; N	37,195 (0.24; 30,377; 2017–18).	67,225 (0.27)	304	241
Spinner dolphin	*S. longirostris longirostris*	GOM	-; N	2,991 (0.54; 1,954; 2017–18).	5,548 (0.40)	20	113
Striped dolphin	*S. coeruleoalba*	GOM	-; N	1,817 (0.56; 1,172; 2017–18).	5,634 (0.18)	12	13
Fraser's dolphin	*Lagenodelphis hosei*	GOM	-; N	213 (1.03; 104; 2017–18).	1,665 (0.73)	1	Unk.
Risso's dolphin	*Grampus griseus*	GOM	-; N	1,974 (0.46; 1,368; 2017–18).	1,501 (0.27)	14	5.3
Melon-headed whale	*Peponocephala electra*	GOM	-; N	1,749 (0.68; 1,039; 2017–18).	6,113 (0.20)	10	9.5
Pygmy killer whale	*Feresa attenuata*	GOM	-; N	613 (1.15; 283; 2017–18).		2.8	1.6
False killer whale	*Pseudorca crassidens*	GOM	-; N	494 (0.79; 276; 2017–18).		2.8	2.2
Killer whale	*Orcinus orca*	GOM	-; N	267 (0.75; 152; 2017–18).		1.5	Unk.
Short-finned pilot whale	*Globicephala macrorhynchus.*	GOM	-; N	1,321 (0.43; 934; 2017–18).	2,741 (0.18)	7.5	3.9

[1] ESA status: Endangered (E)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2] NMFS marine mammal stock assessment reports online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments.* CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance.

[3] This information represents species- or guild-specific abundance predicted by habitat-based cetacean density models (Roberts *et al.,* 2016; Garrison *et al.,* 2022). These models provide the best available scientific information regarding predicted density patterns of cetaceans in the U.S. Gulf of Mexico, and we provide the corresponding abundance predictions as a point of reference. Total abundance estimates were produced by computing the mean density of all pixels in the modeled area and multiplying by its area. Abundance predictions for Fraser's dolphin and rough-toothed dolphin from Roberts *et al.* (2016); abundance predictions for other taxa represent the maximum predicted abundance from Garrison *et al.* (2022).

[4] These values, found in NMFS' SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.,* commercial fisheries, ship strike). These values are generally considered minimums because, among other reasons, not all fisheries that could interact with a particular stock are observed and/or observer coverage is very low, and, for some stocks (such as the Atlantic spotted dolphin and continental shelf stock of bottlenose dolphin), no estimate for injury due to the *Deepwater Horizon* oil spill has been included. See SARs for further discussion.

[5] The 2021 final rule refers to the GOM Bryde's whale (*Balaenoptera edeni*). These whales were subsequently described as a new species, Rice's whale (*Balaenoptera ricei*) (Rosel *et al.,* 2021).

[6] NMFS' 2020 SARs state that the abundance estimate provided for *Kogia* spp. is likely a severe underestimate because it was not corrected for the probability of detection on the trackline, and because *Kogia* spp. are often difficult to see, present little of themselves at the surface, do not fluke when they dive, and have long dive times. In addition, they exhibit avoidance behavior towards ships and changes in behavior towards approaching survey aircraft. See Hayes *et al.* (2021).

[7] Abundance estimates are in some cases reported for a guild or group of species when those species are difficult to differentiate at sea. Similarly, habitat-based cetacean density models are based in part on available observational data which, in some cases, is limited to genus or guild in terms of taxonomic definition. NMFS' SARs present pooled abundance estimates for *Kogia* spp. and *Mesoplodon* spp., while Garrison *et al.* (2022) produced density models to genus level for *Kogia* spp. and as a guild for beaked whales (*Ziphius cavirostris* and *Mesoplodon* spp.) and ''blackfish'' (pygmy killer whale, false killer whale, melon-headed whale, and killer whale). Finally, Garrison *et al.* (2022) produced density models for bottlenose dolphins that do not differentiate between stocks, but between oceanic and shelf dolphins.

[8] NMFS' 2020 SARs provide various abundance estimates for beaked whales: Cuvier's beaked whale, 18 (CV = 0.75); Gervais' beaked whale, 20 (CV=0.98); unidentified Mesoplodont species, 98 (CV = 0.46); and unidentified Ziphiids, 181 (CV = 0.31). The SARs state that these estimates likely represent severe underestimates, as they were not corrected for the probability of detection on the trackline, and due to the long dive times of these species. See Hayes *et al.* (2021).

In Table 2 above, we report two sets of abundance estimates: those from NMFS' SARs and those predicted by habitat-based cetacean density models. Please see footnote 3 of Table 2 for more detail. NMFS' SAR estimates are typically generated from the most recent shipboard and/or aerial surveys conducted. GOM oceanography is dynamic, and the spatial scale of the GOM is small relative to the ability of most cetacean species to travel. U.S. waters only comprise about 40 percent of the entire GOM, and 65 percent of GOM oceanic waters are south of the U.S. EEZ. Studies based on abundance and distribution surveys restricted to U.S. waters are unable to detect temporal shifts in distribution beyond U.S. waters that might account for any changes in abundance within U.S. waters. NMFS' SAR estimates also in some cases do not incorporate correction for detection bias. Therefore,

for cryptic or long-diving species (*e.g.,* beaked whales, *Kogia* spp., sperm whales), they should generally be considered underestimates (see footnotes 6 and 8 of Table 2).

The model-based abundance estimates represent the output of predictive models derived from multi-year observations and associated environmental parameters and which incorporate corrections for detection bias (the same models and data from which the density estimates are derived). Incorporating more data over multiple years of observation can yield different results in either direction, as the result is not as readily influenced by fine-scale shifts in species habitat preferences or by the absence of a species in the study area during a given year. NMFS' SAR abundance estimates show substantial year-to-year variability in some cases. Incorporation of correction for detection bias should systematically result in greater abundance predictions. For these reasons, the model-based estimates are generally more realistic and, for these purposes, represent the best available information. Specifically, for assessing estimated exposures relative to abundance—used in this case to understand the scale of the predicted takes compared to the population—NMFS generally believes that the model-based abundance predictions are most appropriate because they were used to generate the exposure estimates and therefore, provide the most relevant comparison.

As discussed in footnote 3 of Table 2, NMFS' 2021 final rule provided take estimates separately for the melon-headed whale, false killer whale, pygmy killer whale, and killer whale. This proposed rule provides a single take estimate for those four species grouped together as the ''blackfish.'' This approach was dictated by the best available science. The model authors determined it necessary to aggregate the few sightings data available for each of the four species with sightings data that could not be resolved to the species level in order to develop a density model, as there were not sufficient confirmed sightings of individual species to create individual spatial models. Further, the model authors advised that any attempt to parse the results to species would be fraught with complicated assumptions and limited data, and that there is no readily available way to do so in a scientifically defensible manner. Previous estimates (Roberts *et al.,* 2016) were based on older data (data range 1992–2009 versus 2003–2018), and the updated models notably include post-*Deepwater Horizon* (DWH) oil spill survey data and, for the first time, winter survey data. Nonetheless, interested members of the public may review the 2018 proposed rule and supporting documentation, which assumed slightly greater activity levels and larger take numbers, and still found a negligible impact on all four blackfish species.

NMFS does not have sufficient information to support apportioning those blackfish takes to species, but we note that the sum of annual average evaluated take for the four species in the 2021 final rule is 64,742, while the new annual average take estimate for blackfish (using the updated density information) is 55,441. While some may speculate that estimated take of killer whales (as part of the blackfish group) has increased relative to that evaluated in the 2021 final rule (annual average take of 52), NMFS has no specific information to support such an assumption.

NMFS' ability to issue LOAs under the 2021 rule to date has been limited specifically with regard to killer whales, because BOEM's error most severely affected killer whale take numbers. (Evaluated Rice's whale takes were similarly affected, but were generally not implicated in LOA requests based on the location of planned surveys.) Effects to killer whales from the specified activity have not presented serious concern in a negligible impact context, even considering the original take numbers evaluated in NMFS' 2018 proposed rule (annual average take of 1,160) which produced overall scenario-specific risk ratings of low to moderate. Evaluated risk is similar across the 2018 proposed rule and this proposed rule.

Further, we note that we make a conservative assumption in this rule in the application of the risk assessment framework to blackfish. Risk is a product of severity and vulnerability. While severity is based on density and abundance and is, therefore, reflective of the new density information, vulnerability is based on species-specific factors and is different for the four species. We applied the highest vulnerability score of the four to combine with the severity to get the overall risk rating for the group. Please see Negligible Impact Analysis and Determinations for additional discussion.

As part of our evaluation of the environmental baseline, which is considered as part of the negligible impact analysis, we consider any known areas of importance as marine mammal habitat (*e.g.,* recognized Biologically Important Areas (BIA)). We also consider other relevant events, such as unusual mortality events (UME) and the 2010 DWH oil spill. The 2018 notice of proposed rulemaking provided detailed discussion of important marine mammal habitat, relevant UMEs, and of the DWH oil spill. The 2021 notice of issuance of the final rule updated those discussions as necessary. That information is incorporated by reference here and updated where necessary. There have been no new UMEs, or new information regarding the UMEs discussed in the prior notices. Similarly, there is no new information regarding the DWH oil spill that impacts our consideration of that event as part of the environmental baseline. We do note that estimates of annual mortality for many stocks over the period 2014–2018 now include mortality attributed to the effects of the DWH oil spill (see Table 2).

Areas of important marine mammal habitat may include designated critical habitat for ESA-listed species (as defined by section 3 of the ESA) or other known areas not formally designated pursuant to any statute or other law. Important areas may include areas of known importance for reproduction, feeding, or migration, or areas where small and resident populations are known to occur.

As noted above in Table 2, the former GOM Bryde's whale has been described as a new species, Rice's whale (Rosel *et al.,* 2021). No critical habitat has yet been designated for the species. However, a Rice's whale BIA is recognized (LaBrecque *et al.,* 2015). This year-round BIA was discussed in the aforementioned notices, and we do not repeat the description of the 2015 BIA.

NOAA conducted a status review of the former GOM Bryde's whale (Rosel *et al.,* 2016). The review expanded the BIA description by stating that, due to the depth of some sightings, the area is more appropriately defined to the 400-m isobath and westward to Mobile Bay, Alabama, in order to provide some buffer around the deeper sightings and to include all sightings in the northeastern GOM. Following the description provided by Rosel *et al.* (2016), the 2018 proposed rulemaking considered a Rice's whale ''core habitat area'' that was designated as between the 100- and 400-m isobaths, from 87.5° W to 27.5° N (83 FR 29212, August 21, 2018), in order to appropriately encompass Rice's whale sightings at the time. In addition, the area largely covered the home range (*i.e.,* 95 percent of predicted abundance) predicted by Roberts *et al.* (2016).

NMFS subsequently developed an updated description of a ''core distribution area''

(*www.fisheries.noaa.gov/resource/map/rices-whale-core-distribution-area-map-gis-data*), which we refer to herein (Figure 3) while retaining the previous terminology for continuity with the 2021 rule (''core habitat area''). The updated description is based on visual sightings and tag data, and does not imply knowledge of habitat preferences. The map was created by first drawing a convex hull polygon around all recorded Rice's whale sighting locations (including those recorded as Bryde's whale, Bryde's/sei, and Bryde's/sei/fin) from NMFS surveys in the northeast GOM, telemetry tag locations from a single whale tagged in 2010 (Soldevilla *et al.,* 2017), and acousonde tag locations for one whale tagged in 2015 (Soldevilla *et al.,* 2017), comprising a total of 212 data points collected between 1989 and 2018. It should be noted that, other than the positions obtained from the two individually tagged whales, it is unknown how many individual whales these sightings represent as individuals may have been sighted more than once during a cruise or across years. The polygon was trimmed on the western side to the 410 m isobath, based on the deepest known sighting (408 m).

In context of the sparse data from which to accurately define the distribution and because many of the sightings fall on the boundary of the convex hull polygon, a buffer was added to avoid underestimating the potential range of the species. A 10-km buffer was applied to the polygon to capture the uncertainty in position and the strip width of the visual surveys. This buffer ensures that no sightings are on a boundary of the area. An additional 20-km buffer was added to account for the possible movement whales could make in any one direction from an observed sighting. This buffer was identified by examining the daily movement data from a whale tagged for 33 days in 2010 with a satellite-linked telemetry tag. Two alternative methods were used to identify the best indicator of possible daily distance traveled by a whale. First, a ''daily range'' of movement was estimated by calculating swim speeds (km/hr) based upon the distances (and times) between successive satellite-tag returns and multiplying that by 24 hr. These daily ranges were highly skewed, with most in the 10–30 km range when the whale remained in a relatively small area and a few large ranges when the whale was traveling northeast to southeast through the habitat. The mean of this daily range was 46 km and the median was 21 km. To reduce the influence of differences in the number of satellite positions returned on any given day, the total distance moved within each 24-hr period was summed using all satellite positions in that day. The median of this daily range was 17 km and the mean was 30 km. As the median is a better measure of central tendency than the mean of highly skewed distributions such as those seen here, 20 km was chosen as the most likely distance a given observed whale could move within a day of the detection. In combination with the 10-km buffer to account for uncertainty in whale location during the sighting, this results in the placement of a total of a 30-km buffer around the convex hull polygon based on sighting locations, producing the area depicted in Figure 3 (see Proposed Mitigation).

Potential Effects of the Specified Activities on Marine Mammals and Their Habitat

In NMFS' 2018 notice of proposed rulemaking (83 FR 29212, June 22, 2018), this section included a comprehensive summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat, including general background information on sound and specific discussion of potential effects to marine mammals from noise produced through use of airgun arrays. NMFS provided a description of the ways marine mammals may be affected by the same activities considered herein, including sensory impairment (permanent and temporary threshold shifts and acoustic masking), physiological responses (particularly stress responses), behavioral disturbance, or habitat effects, as well as of the potential for serious injury or mortality. The notice of issuance for the final rule (86 FR 5322, January 19, 2021) provided updates to the discussion of potential impacts, as well as significantly expanded discussion of certain issues (*e.g.,* potential effects to habitat, including prey, and the potential for stranding events to occur) in the ''Comments and Responses'' section of that notice. These prior notices also provided discussion of marine mammal hearing and detailed background discussion of active acoustic sources and related acoustic terminology used herein. We have reviewed new information available since the 2021 rule was issued. Having considered this information, we have determined that there is no new information that substantively affects our analysis of potential impacts on marine mammals and their habitat that appeared in the 2018 proposed and 2021 final rules, all of which remains applicable and valid for our assessment of the effects of the specified activities during the original 5-year period that is the subject of this rule. We incorporate by reference that information and do not repeat the information here, instead referring the reader to the 2018 notice of proposed rulemaking and 2021 notice of issuance of the final rule.

The Estimated Take section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by the specified activity. The Negligible Impact Analysis and Determinations section includes an analysis of how these activities will impact marine mammals and considers the content of this section, the Estimated Take section, and the Proposed Mitigation section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and from that on the affected marine mammal populations.

Estimated Take

This section provides an estimate of the numbers and type of incidental takes that may be expected to occur under the specified activity, which informs NMFS' preliminary negligible impact determinations. Realized incidental takes would be determined by the actual levels of activity at specific times and places that occur under any issued LOAs and by the actual acoustic source used. While the methodology and modeling for estimating take remains identical to that originally described in the 2018 proposed and 2021 final rules, updated species density values have been used, and take estimates are available for three different airgun array configurations. The highest modeled value for each species is analyzed for the negligible impact analysis.

Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines ''harassment'' as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment). As with the 2021 final rule, harassment is the only type of take expected to result from these activities. It is unlikely that lethal takes would occur even in the absence of the mitigation and monitoring measures, and no such takes are anticipated or will be authorized.

Anticipated takes would primarily be by Level B harassment, as use of the described acoustic sources, particularly airgun arrays, is likely to disrupt behavioral patterns of marine mammals upon exposure to sound at certain levels. There is also some potential for auditory injury (Level A harassment) to result for low- and high-frequency species due to the size of the predicted auditory injury zones for those species, though none is predicted to occur for Rice's whales (the only low-frequency cetacean in the GOM). NMFS does not expect auditory injury to occur for mid-frequency species. See discussion provided in the 2018 notice of proposed rulemaking (83 FR 29212, June 22, 2018) and in responses to public comments provided in the notice of issuance for the 2021 final rule (86 FR 5322, January 19, 2021).

Below, we summarize how the take that may be authorized was estimated using acoustic thresholds, sound field modeling, and marine mammal density data. Detailed discussion of all facets of the take estimation process was provided in the 2018 notice of proposed rulemaking (83 FR 29212, June 22, 2018), which is incorporated by reference here, as it was into the 2021 final rule, as most aspects of the modeling have not changed; any aspects of the modeling that have changed are noted below and in Weirathmueller *et al.* (2022). Please see that notice, and associated companion documents available online, for additional detail. A summary overview of the take estimation process, as well as full discussion of new information related to the development of estimated take numbers, is provided below.

Acoustic Thresholds

NMFS uses acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals generally would be reasonably expected to exhibit disruption of behavioral patterns (Level B harassment) or to incur permanent threshold shift (PTS) of some degree (Level A harassment). Acoustic criteria used herein were described in detail in the preceding notices associated with this ITR; that discussion is not repeated as no changes have been made to the relevant acoustic criteria. See Tables 3 and 4.

TABLE 3—BEHAVIORAL EXPOSURE CRITERIA

Group	Probability of response to frequency-weighted rms SPL			
	120 (%)	140 (%)	160 (%)	180 (%)
Beaked whales	50	90	n/a	n/a
All other species	n/a	10	50	90

TABLE 4—EXPOSURE CRITERIA FOR AUDITORY INJURY

Hearing group	Peak pressure [1] (dB)	Cumulative sound exposure level [2]	
		Impulsive (dB)	Non-impulsive (dB)
Low-frequency cetaceans	219	183	199
Mid-frequency cetaceans	230	185	198
High-frequency cetaceans	202	155	173

[1] Referenced to 1 μPa; unweighted within generalized hearing range.
[2] Referenced to 1 μPa^2-s; weighted according to appropriate auditory weighting function. Airguns and the boomer are treated as impulsive sources; other HRG sources are treated as non-impulsive.

Acoustic Exposure Modeling

Zeddies *et al.* (2015, 2017a) provided estimates of the annual marine mammal acoustic exposure caused by sounds from geophysical survey activity in the GOM for 10 years of notional activity levels, as well as full detail regarding the original acoustic exposure modeling conducted in support of BOEM's 2016 petition and NMFS' subsequent analysis in support of the 2021 final ITR. Zeddies *et al.* (2017b) provided information regarding source and propagation modeling related to the 4,130-in^3 airgun array, and Weirathmueller *et al.* (2022) provide detail regarding the new modeling performed for the 5,110-in^3 airgun array. Detailed discussion of the original modeling effort was provided in the notice of proposed rulemaking (83 FR 29212, June 22, 2018), and through responses to public comments provided in the notice of issuance for the final rule (86 FR 5322, January 19, 2021). For full details of the modeling effort, the interested reader should see the reports (available online at: *www.fisheries.noaa.gov/action/incidental-take-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico*) and review discussion provided in prior **Federal Register** notices.

All acoustic exposure modeling, including source and propagation modeling, was redone in support of the action described herein for the reasons described below. However, all aspects of the modeling (including source, propagation, and animal movement modeling) are the same as described in Zeddies *et al.* (2015, 2017a, 2017b) and discussed in previous **Federal Register** notices associated with the ITR. We do not repeat discussion of those aspects of the modeling, but refer the reader to those documents.

Differences from the modeling and modeling products described in previous notices associated with this ITR are limited to source and propagation modeling of the new 5,110-in^3 array configuration, which was performed using the same procedures as were used for the previous 8,000- and 4,130-in^3 array configurations, and two new data inputs: (1) updated marine mammal density information (Garrison *et al.,* 2022) and (2) revised species definition files. The latter information consists of behavioral parameters (*e.g.,* depth, travel rate, dive profile) for each species that govern simulated animal (animat) movement within the movement model (Weirathmueller *et al.,*

2022). These files are reviewed at the start of all new and reopened modeling efforts, and are updated as necessary according to the most recent literature. NMFS previously evaluated full acoustic exposure modeling results only for the 8,000-in ^{3} airgun array (only demonstration results for six species were provided in Zeddies *et al.* (2017b) for the 4,130-in ^{3} array configuration), but is now able to evaluate full results for all three array configurations; thereby, providing for greater flexibility and utility in representing actual acoustic sources planned for use during consideration of LOA requests.

Marine Mammal Density Information—Since the 2021 final rule went into effect, new habitat-based cetacean density models have been produced by NMFS' Southeast Fisheries Science Center (Garrison *et al.,* 2022). These models incorporate newer survey data from 2017–18 including, notably, data from survey effort conducted during winter. Inclusion of winter data allows for increased temporal resolution of model predictions. These are the first density models that incorporate survey data collected after the DWH oil spill. New models were produced for all taxa other than Fraser's dolphin and rough-toothed dolphin, as the model authors determined that there were too few detections of these species to support model development. Therefore, we continue to rely on the Roberts *et al.* (2016) models for these two species.

For species occurring in oceanic waters, the updated density models are based upon data collected during vessel surveys conducted in 2003–04, 2009, and 2017–18. Survey effort was generally conducted in a survey region bounded by the shelf break (approximately the 200-m isobath) to the north and the boundary of the U.S. EEZ to the south. Separate models were created for species occurring in shelf waters (Atlantic spotted dolphin and bottlenose dolphin) based on seasonal aerial surveys conducted in 2011–12 and 2017–18. Based on water depth, the shelf models were used to predict acoustic exposures for these two species in Zones 2 and 3, and the oceanic models were used to predict exposures in Zones 4–7.

As discussed above, the updated density modeling effort retains the previous approach of treating beaked whales and *Kogia* spp. as guilds, as sightings of these species are typically difficult to resolve to the species level. In addition, the model authors determined there to be too few sightings and/or too few sightings resolved to species level for the melon-headed whale, false killer whale, pygmy killer whale, and killer whale to produce individual species models. Instead, a single ''blackfish'' model was developed to produce guild-level predictions for these species (Garrison *et al.,* 2022).

Take Estimates

Exposure estimates above Level A and Level B harassment criteria, originally developed by Zeddies *et al.* (2015, 2017a, 2017b) and updated by Weirathmueller *et al.* (2022) in association with the activity projections for the various annual effort scenarios, were generated based on the specific modeling scenarios (including source and survey geometry), *i.e.,* 2D survey (1 × source array), 3D NAZ survey (2 × source array), 3D WAZ survey (4 × source array), coil survey (4 × source array).

Level A Harassment—Here, we summarize acoustic exposure modeling results related to Level A harassment. For more detailed discussion, please see the 2018 **Federal Register** notice for the proposed rule and responses to public comment provided in the 2021 **Federal Register** notice for the final rule. Overall, there is a low likelihood of take by Level A harassment for any species, though the degree of this low likelihood is primarily influenced by the specific hearing group. For mid- and high-frequency cetaceans, potential auditory injury would be expected to occur on the basis of instantaneous exposure to peak pressure output from an airgun array while for low-frequency cetaceans, potential auditory injury would occur on the basis of the accumulation of energy output over time by an airgun array. For additional discussion, please see NMFS (2018) and discussion provided in the 2018 notice of proposed rulemaking (83 FR 29212, June 22, 2018) and in the notice of issuance for the 2021 final rule (86 FR 5322; January 19, 2021), *e.g.,* 83 FR 29262; 86 FR 5354; 86 FR 5397. Importantly, the modeled exposure estimates do not account for either aversion or the beneficial impacts of the required mitigation measures.

Of even greater import for mid-frequency cetaceans is that the small calculated Level A harassment zone size in conjunction with the properties of sound fields produced by arrays in the near field versus far field leads to a logical conclusion that Level A harassment is so unlikely for species in this hearing group as to be discountable. For all mid-frequency cetaceans, following evaluation of the available scientific literature regarding the auditory sensitivity of mid-frequency cetaceans and the properties of airgun array sound fields, NMFS does not expect any reasonable potential for Level A harassment to occur. This issue was addressed in detail in the response to public comments provided in NMFS' notice of issuance for the rule (86 FR 5322, January 19, 2021; see 86 FR 5354). NMFS expects the potential for Level A harassment of mid-frequency cetaceans to be discountable, even before the likely moderating effects of aversion and mitigation are considered, and NMFS does not believe that Level A harassment is a likely outcome for any mid-frequency cetacean. Therefore, the updated modeling results provided by Weirathmueller *et al.* (2022) account for this by assuming that any estimated exposures above Level A harassment thresholds for mid-frequency cetaceans resulted instead in Level B harassment (as reflected in Table 6).

As discussed in greater detail in the 2018 notice of proposed rulemaking (83 FR 29212, June 22, 2018), NMFS considered the possibility of incorporating quantitative adjustments within the modeling process to account for the effects of mitigation and/or aversion, as these factors would lead to a reduction in likely injurious exposure. However, these factors were ultimately not quantified in the modeling. In summary, there is too much inherent uncertainty regarding the effectiveness of detection-based mitigation to support any reasonable quantification of its effect in reducing injurious exposure, and there is too little information regarding the likely level of onset and degree of aversion to quantify this behavior in the modeling process. This does not mean that mitigation is not effective (to some degree) in avoiding incidents of Level A harassment, nor does it mean that aversion is not a meaningful real-world effect of noise exposure that should be expected to reduce the number of incidents of Level A harassment. As discussed in greater detail in responses to public comments provided in the 2021 notice of issuance for the final rule (86 FR 5322, January 19, 2021; see 86 FR 5353), there is ample evidence in the literature that aversion is one of the most common responses to noise exposure across varied species, though the onset and degree may be expected to vary across individuals and in different contexts. Therefore, NMFS incorporated a reasonable adjustment to modeled Level A harassment exposure estimates to account for aversion for low- and high-frequency species. That approach, which is retained here, assumes that an 80 percent reduction in modeled exposure estimates for Level A harassment for low- and high-frequency cetaceans is reasonable (Ellison *et al.,*

2016) and likely conservative in terms of the overall numbers of actual incidents of Level A harassment for these species, as the adjustment does not explicitly account for the effects of mitigation. This adjustment was incorporated into the updated modeling results provided by Weirathmueller *et al.* (2022) and reflected in Table 6.

Take Estimation Error—As discussed previously, in 2020 BOEM provided an update to the scope of their proposed action through removal of the area subject to leasing moratorium under GOMESA from consideration in the rule. In support of this revision, BOEM provided revised 5-year level of effort predictions and associated acoustic exposure estimates. BOEM's process for developing this information, described in detail in ''Revised Modeled Exposure Estimates,'' available online, was straightforward. Rather than using the PEIS's 10-year period, BOEM provided revised levels of effort for a 5-year period, using Years 1–5 of the original level of effort projections. BOEM stated that the first 5 years were selected to be carried forward ''because they were contiguous, they included the three years with the most activity, and they were the best understood in relation to the historical data upon which they are based.'' Levels of effort, shown in Table 1, were revised based on the basic assumption that if portions of areas are removed from consideration, then the corresponding effort previously presumed to occur in those areas also is removed from consideration. Projected levels of effort were reduced in each zone by the same proportion as was removed from each zone when BOEM reduced the scope of its proposed action, *i.e.,* the levels of effort were reduced by the same zone-specific proportions shown in Table 1 in the notice of issuance for the final rule (86 FR 5322, January 19, 2021). Associated revised take estimates were provided by BOEM and evaluated in the final rule.

While processing requests for individual LOAs under the rule using the methodology for developing LOA-specific take numbers presented in the rule, NMFS discovered discrepancies between the revised total take numbers provided by BOEM when addressing its revision to the scope of activity through removal of the GOMESA area and the underlying modeling results. (Note that the underlying modeling results are in the form of 24-hr exposure estimates, specific to each species, zone, survey type, and season. These 24-hr exposure estimates can then be scaled to generate take numbers appropriate to the specific activity or, in the case of BOEM's petition for rulemaking, to the total levels of activity projected to occur across a number of years.)

NMFS contacted BOEM regarding the issue in June 2021. Following an initial discussion, BOEM determined that when it reduced its scope of specified activity by removing the GOMESA moratorium area from the proposed action, it underestimated the level of take by inadvertently factoring species density estimates into its revised exposure estimates twice. Generally, this miscalculation caused BOEM to underestimate the total predicted exposures of species from all survey activities in its revision to the incidental take rule application, most pronouncedly for those species with the lowest densities. The practical effect of this miscalculation is that the full amount of activity for which BOEM sought incidental take coverage in its application cannot be authorized under the existing incidental take rule.

In September 2021, BOEM provided corrected exposure estimates. These are available in BOEM's September 2021 ''Corrected Exposure Estimates'' letter, available online at: *www.fisheries.noaa.gov/action/incidental-take-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico.* Following receipt of BOEM's letter containing corrected exposure estimates, NMFS requested additional information from BOEM, including a detailed written description of the process involved in producing the revised take numbers submitted in 2020, the error(s) in that process, and the process involved in correcting those numbers. BOEM provided the requested information in October 2021, including the following explanation.

When calculating estimated takes for the 2020 revision to the scope of activity, BOEM multiplied the modeled number of animals above threshold per day of survey ($N_{z,s,t}$),[4] for each type of survey in each zone, by the habitat-based density of the species in each zone ($\rho_{z,t}$)[5] and the number of days of effort for each survey and zone by year ($LoE_{z,s,y}$)[6]. However, the species' habitat-based density had already been included in the modeled number of animals above threshold ($N_{z,s,t}$). The species' habitat-based density had therefore been factored in twice.

$$N_{z,s,t} \times LoE_{z,s,y} \times \rho_{z,t} \qquad \text{Eq 1}$$

Observing that the resultant numbers did not make sense, BOEM attempted to rectify the issue, by applying approximated species-specific scaling factors (C_t).

$$N_{z,s,t} \times LoE_{z,s,y} \times \rho_{z,t}/C_t \qquad \text{Eq 2}$$

The result of this approach was that errors of varying degrees were introduced to the BOEM-derived take numbers evaluated in the final rule. Although NMFS was unable to replicate the derivation of the species-specific scaling factors, or to adequately compare the erroneous BOEM-derived values to the values evaluated in NMFS' 2018 proposed rule or to other published values, it remained clear that the take estimates were significantly underestimated for multiple species. Because of this, recalculation of appropriate take numbers was necessary.

New Modeling—Once it became clear that NMFS would need to recalculate the take numbers in order to support the necessary correction and reanalysis under the rule, we recognized that two other primary pieces of new information should be considered.

[4] $N_{z,s,t}$ is the number of individuals of a species, *t,* expected above threshold for a given survey, *s,* in each zone, *z.* The number of individuals already includes the species' habitat-based density (*z,t*) for each species and zone.

[5] *z,t* is the habitat-based density for each species or taxonomic group, *t,* in each zone, *z.*

[6] $LoE_{z,s,y}$ is the level of effort in days per year, *y,* for each survey type, *s,* in each zone, *z.*

As discussed previously, through NMFS' experience in implementing the 2021 final rule, it has become evident that operators are not currently using airgun arrays as large as the proxy array specified by BOEM for the original exposure modeling effort, and that the use of that 72-element, 8,000-in^3 array as the proxy for generating LOA-specific take estimates is unnecessarily conservative. As a result, operators applying 8,000-in^3 modeled results to operations conducted with smaller airgun arrays have been inappropriately limited in the number of planned days of data acquisition when NMFS' small numbers limit has been reached. Therefore, independently of and prior to the above-described discovery and evaluation of BOEM's error, NMFS had already determined that it would be useful and appropriate to produce new modeling results associated with a more representative airgun array. In consultation with industry operators, NMFS identified specifications associated with a 32-element, 5,110 in^3 array and contracted with the same modelers that produced the original acoustic exposure modeling (JASCO Applied Sciences) to conduct new modeling following the same approach and methodologies described in detail in Zeddies *et al.* (2015, 2017a) and provided for public review through NMFS' proposed rule (83 FR 29212, June 22, 2018). Specifically, JASCO has now produced new comprehensive modeling results for all evaluated survey types for the three different arrays described previously: (1) 4,130-in^3 array, described in detail in Zeddies *et al.* (2017b) (acoustic exposure results were provided for only six species in Zeddies *et al.* (2017b); full results are now available); (2) 5,110-in^3 array specified by NMFS and described in Weirathmueller *et al.* (2022); and (3) 8,000-in^3 array described in detail by Zeddies *et al.* (2015, 2017a).

Since the time of the original acoustic exposure modeling, JASCO has reviewed all species definition files and applied extensive updates for many species. These files define the species-specific parameters that control animat behavior during animal movement modeling. In particular, changes in the minimum and maximum depth preferences affected the coverage area for several species, which resulted in significant changes to some estimated exposures for some species.

In addition, at the time NMFS determined it would conduct a rulemaking to address the corrected take estimates, NMFS was aware that new cetacean density modeling (including incorporation of new Rice's whale data) was nearing completion, in association with the BOEM-funded GoMMAPPS effort (see: *www.boem.gov/gommapps*). As a result, NMFS determined that this new information (updated acoustic exposure modeling and new cetacean density models) should be used in revising the 2021 final rule and is the basis for the analysis conducted herein. For purposes of the negligible impact analyses, NMFS uses the ''worst-case'' (*i.e.,* the maximum of the estimates from the three airgun array configurations/sizes) species-specific exposure modeling results. Specifically, for all species other than Rice's whale, these results are associated with the 8,000-in^3 array. For the Rice's whale, modeling associated with the 5,110-in^3 array produced larger exposure estimates (discussed below).

Estimated instances of take, *i.e.,* scenario-specific acoustic exposure estimates incorporating the adjustments to Level A harassment exposure estimates discussed here, are shown in Table 6. For comparison, Table 5 shows the estimated instances of take evaluated in the 2021 final rule. This information regarding total number of takes (with Level A harassment takes based on assumptions relating to mid-frequency cetaceans in general as well as aversion), on an annual basis for 5 years, provides the bounds within which incidental take authorizations—LOAs—may be issued in association with this regulatory framework. Importantly, modeled results showed increases in total take estimates for four species, while the others decreased from those analyzed in the final rule.[7]

Typically, and especially in cases where PTS is predicted, NMFS anticipates that some number of individuals may incur temporary threshold shift (TTS). However, it is not necessary to separately quantify those takes, as it is unlikely that an individual marine mammal would be exposed at the levels and duration necessary to incur TTS without also being exposed to the levels associated with behavioral disruption. As such, NMFS expects any potential TTS takes to be captured by the estimated takes by behavioral disruption (discussed below).

TABLE 5—SCENARIO-SPECIFIC INSTANCES OF TAKE (BY LEVEL A AND LEVEL B HARASSMENT) AND MEAN ANNUAL TAKE LEVELS EVALUATED IN THE 2021 FINAL RULE [1]

Species	Year 1		Year 2		Year 3		Year 4		Year 5		Mean annual take	
	A	B	A	B	A	B	A	B	A	B	A	B
Rice's whale	0	10	0	8	0	8	0	6	0	7	0	8
Sperm whale	0	16,405	0	14,205	0	13,603	0	9,496	0	12,388	0	13,219
Kogia spp [2]	371	10,383	337	9,313	310	8,542	209	6,238	314	8,318	308	8,559
Beaked whale [2]	0	191,566	0	162,301	0	158,328	0	111,415	0	142,929	0	153,308
Rough-toothed dolphin	0	30,640	0	27,024	0	25,880	0	19,620	0	23,219	0	25,277
Bottlenose dolphin	0	603,649	0	973,371	0	567,962	0	1,001,256	0	567,446	0	742,737
Clymene dolphin	0	85,828	0	67,915	0	73,522	0	47,332	0	60,379	0	66,995
Atlantic spotted dolphin	0	128,299	0	183,717	0	112,120	0	191,495	0	111,305	0	145,387
Pantropical spotted dolphin	0	478,490	0	436,047	0	391,363	0	311,316	0	395,987	0	402,641
Spinner dolphin	0	75,953	0	71,873	0	61,098	0	48,775	0	64,357	0	64,411
Striped dolphin	0	33,573	0	29,275	0	27,837	0	20,136	0	26,056	0	27,375
Fraser's dolphin	0	4,522	0	3,843	0	3,792	0	2,726	0	3,455	0	3,668
Risso's dolphin	0	21,859	0	18,767	0	18,218	0	12,738	0	16,634	0	17,643
Melon-headed whale (Blackfish)	0	55,813	0	47,784	0	46,584	0	32,581	0	42,224	0	44,997
Pygmy killer whale (Blackfish)	0	8,079	0	6,964	0	6,764	0	4,970	0	6,277	0	6,611
False killer whale (Blackfish)	0	16,165	0	13,710	0	13,604	0	9,664	0	12,269	0	13,082
Killer whale (Blackfish)	0	60	0	56	0	50	0	42	0	52	0	52
Blackfish totals	0	80,117	0	68,514	0	67,002	0	47,257	0	60,822	0	64,742

[7] Note that because of the new category of blackfish, there is uncertainty on any change in the take numbers for the individual species that comprise that category, though collectively the take numbers for all the blackfish remain within the levels previously analyzed.

TABLE 5—SCENARIO-SPECIFIC INSTANCES OF TAKE (BY LEVEL A AND LEVEL B HARASSMENT) AND MEAN ANNUAL TAKE LEVELS EVALUATED IN THE 2021 FINAL RULE [1]—Continued

Species	Year 1		Year 2		Year 3		Year 4		Year 5		Mean annual take	
	A	B	A	B	A	B	A	B	A	B	A	B
Short-finned pilot whale	0	15,045	0	9,824	0	13,645	0	7,459	0	8,959	0	10,986

[1] A and B refer to expected instances of take by Level A and Level B harassment, respectively, for Years 1–5. For *Kogia* spp., expected takes by Level A harassment represent modeled exposures adjusted to account for aversion. For the Rice's whale, no takes by Level A harassment are predicted to occur. Therefore, no adjustment to modeled exposures to account for aversion was necessary. For *Kogia* spp., exposures above Level A harassment criteria were predicted by the peak sound pressure level (SPL) metric. For the Rice's whale, the cumulative sound exposure level (SEL) metric is used to evaluate the potential for Level A harassment.
[2] *Kogia* spp. includes dwarf and pygmy sperm whales. Beaked whales include Blainville's, Gervais', and Cuvier's beaked whales.

TABLE 6—UPDATED SCENARIO-SPECIFIC INSTANCES OF TAKE (BY LEVEL A AND LEVEL B HARASSMENT) AND MEAN ANNUAL TAKE LEVELS [1]

Species	Year 1		Year 2		Year 3		Year 4		Year 5		Mean annual take	
	A	B	A	B	A	B	A	B	A	B	A	B
Rice's whale	0	27	0	26	0	23	0	25	0	30	0	26
Sperm whale	0	13,198	0	11,208	0	11,063	0	8,126	0	10,127	0	10,744
Kogia spp [2]	192	7,272	172	6,301	165	6,104	118	4,581	164	5,776	162	6,007
Beaked whale [2]	0	29,415	0	26,955	0	23,551	0	17,307	0	23,060	0	24,058
Rough-toothed dolphin	0	38,535	0	33,878	0	32,241	0	25,290	0	29,373	0	31,863
Bottlenose dolphin	0	284,366	0	418,676	0	251,807	0	439,366	0	248,863	0	328,616
Clymene dolphin	0	29,919	0	23,248	0	25,893	0	17,378	0	21,209	0	23,529
Atlantic spotted dolphin	0	37,080	0	34,140	0	33,126	0	34,343	0	23,906	0	32,519
Pantropical spotted dolphin	0	293,390	0	259,831	0	243,888	0	189,147	0	236,651	0	244,581
Spinner dolphin	0	4,618	0	4,456	0	3,704	0	3,147	0	4,101	0	4,006
Striped dolphin	0	56,797	0	51,623	0	46,820	0	37,449	0	47,084	0	47,955
Fraser's dolphin	0	14,499	0	12,343	0	12,181	0	8,833	0	11,118	0	11,795
Risso's dolphin	0	8,146	0	6,939	0	6,787	0	4,834	0	6,176	0	6,576
Blackfish [2]	0	67,509	0	57,010	0	56,860	0	40,787	0	51,138	0	54,661
Short-finned pilot whale	0	14,330	0	9,694	0	12,836	0	7,232	0	8,734	0	10,565

[1] A and B refer to expected instances of take by Level A and Level B harassment, respectively, for Years 1–5. Expected takes by Level A harassment represent modeled exposures adjusted to account for aversion. For the Rice's whale, this adjustment means that no takes by Level A harassment are predicted to occur. For *Kogia* spp., exposures above Level A harassment criteria were predicted by the peak SPL metric. For the Rice's whale, the cumulative SEL metric is used to evaluate the potential for Level A harassment.
[2] *Kogia* spp. includes dwarf and pygmy sperm whales. Beaked whales include Blainville's, Gervais', and Cuvier's beaked whales. Blackfish includes melon-headed whale, false killer whale, pygmy killer whale, and killer whale.

Discussion of Estimated Take

Differences between the estimated instances of take evaluated in the 2021 final rule (Table 5) and those evaluated herein (Table 6) may be attributed to multiple factors. Due to the confounding nature of these factors, it is challenging to attribute species-specific differences by degree to any particular factor. These factors include: (1) BOEM errors in calculating estimated take in support of its revision of scope for the 2021 final rule, which are related to species-specific density values by zone, as well as to species-specific ''correction factors'' developed by BOEM; (2) JASCO revisions to species definition files governing animat behavior during animal movement modeling; and (3) new density information for all species other than Fraser's dolphin and rough-toothed dolphin. In addition, for the Rice's whale, propagation modeling of a new array specification produced the greatest values for estimated instances of take. While it is difficult to attribute species-specific changes to specific factors, we do know that the correction of the BOEM error could only result in take number increases from the 2021 final rule, while density changes and species definition file changes could result in either increases or decreases in take estimates. NMFS has addressed BOEM's error to the extent possible in the discussion provided previously (see *Take Estimation Error,* wherein we relate BOEM's explanation of that error).

Regarding the species characteristics used in the new modeling, as discussed above, all species behavior files were reviewed by JASCO prior to the new modeling, and many had extensive updates. In particular, changes in the minimum and maximum depth preferences affected the coverage area for several species, which resulted in changes to some species exposures.

New modeling for the smaller, 5,110-in^3 array illustrated that the larger array is not necessarily always more impactful. Free-field beam patterns are different for the arrays as are the tow depths. The 5,110-in^3 array was specified as being towed at 12 m depth (following typical usage observed by NMFS through review of LOA applications), while the other arrays are assumed to use an 8-m tow depth (assumptions regarding source specifications were made by BOEM as part of its original petition for rulemaking). The depth at which a source is placed influences the interference pattern caused by the direct and sea-surface reflected paths (the ''Lloyd's mirror'' effect). The destructive interference from the sea-surface reflection is generally greater for shallow tow depths compared to deeper tow depths. In addition, interactions between source depth, beam pattern geometry, source frequency content, the environment (*e.g.,* bathymetry and sound velocity profile), and different seeding depths and behaviors can give unexpected results. For example, while the larger array may have the longest range for a particular isopleth (sound contour), the overall sound field coverage area was found to have greater asymmetry as a result of the above-mentioned interactions.

While the larger array did produce greater predicted exposures for all species, with the exception of Rice's whales, the differences between predicted exposure estimates for the two larger arrays was not as great as may have been expected on the basis of total

array volume alone. The 5,110- and 8,000-in^3 arrays were often similar in terms of predicted exposures, although the beam patterns were quite different. For arrays of airgun sources, the chamber volume or the total array volume is not the only meaningful variable. Although it is true that a source with a larger volume is generally louder, in practice this only applies largely to single sources or small arrays of sources and was not the case for the considered arrays. As discussed above, array configuration, tow depth, and bathymetry were significant factors. For example, the 8,000-in^3 array generally had a more directional beam pattern than the 4,130- or 5,110-in^3 arrays. The vertical structure of the sound field combined with different species' dive depth and surface intervals was important as well. Differences in estimated take numbers for the 2021 final rule and this proposed rule, *i.e.,* differences between Tables 5 and 6, are shown in Table 7.

TABLE 7—DIFFERENCES IN ESTIMATED TAKE NUMBERS, 2021 FINAL RULE TO 2022 PROPOSED RULE [1]

Species	Year 1	Year 2	Year 3	Year 4	Year 5	Mean annual take
Rice's whale	17	18	15	19	23	18
Sperm whale	(3,207)	(2,997)	(2,540)	(1,370)	(2,261)	(2,475)
Kogia spp.[2] (Level A)	(179)	(165)	(145)	(91)	(150)	(146)
Kogia spp. (Level B)	(3,111)	(3,012)	(2,438)	(1,657)	(2,542)	(2,552)
Beaked whale	(162,151)	(135,346)	(134,777)	(94,108)	(119,869)	(129,250)
Rough-toothed dolphin	7,895	6,854	6,361	5,670	6,154	6,586
Bottlenose dolphin	(319,283)	(554,695)	(316,155)	(561,890)	(318,583)	(414,121)
Clymene dolphin	(55,909)	(44,667)	(47,629)	(29,954)	(39,170)	(43,466)
Atlantic spotted dolphin	(91,219)	(149,577)	(78,994)	(157,152)	(87,399)	(112,868)
Pantropical spotted dolphin	(185,100)	(176,216)	(147,475)	(122,169)	(159,336)	(158,060)
Spinner dolphin	(71,335)	(67,417)	(57,394)	(45,628)	(60,256)	(60,405)
Striped dolphin	23,224	22,348	18,983	17,313	21,028	20,580
Fraser's dolphin	9,977	8,500	8,389	6,107	7,663	8,127
Risso's dolphin	(13,713)	(11,828)	(11,431)	(7,904)	(10,458)	(11,067)
Blackfish [3]	(12,608)	(11,504)	(10,142)	(6,470)	(9,684)	(10,081)
Short-finned pilot whale	(715)	(130)	(809)	(227)	(225)	(421

[1] Parentheses indicate negative values.
[2] Level A harassment is not predicted to occur for any species other than the *Kogia* spp.
[3] Values presented for blackfish represent the difference between the estimated take number presented in this rule for this group generically and the sum of the species-specific values evaluated in the 2021 final rule.

NMFS cautions against interpretation of the changes presented in Table 7 at face value for a variety of reasons. First, reasons for the differences are difficult to interpret, as discussed in detail in the foregoing. Second, the meaning of the differences in terms of impacts to the affected species or stocks is similarly not as straightforward as may be indicated by the magnitude and direction of the differences. Differences in estimated take are, in part, the result of the introduction of new density data, which also provides new model-predicted abundance estimates. Our evaluation under the MMPA of the expected impacts of the predicted take events is substantially reliant on comparisons of the expected take to the predicted abundance. See discussion of our evaluation of severity of impact (one prong of analysis) in Negligible Impact Analysis and Determinations. The severity of the predicted taking is understood through the estimates' relationship to predicted zone-specific abundance values, and so the absolute differences presented in Table 7 are not alone informative in that regard.

Overall, NMFS has determined, to the extent possible, that aside from the confounding effect of BOEM's calculation errors, differences between the current and prior results for the 8,000-in^3 array are primarily attributable to differences in species density along with changes in the species behavior files, in particular minimum and maximum animat seeding depths.

Level B Harassment

NMFS has determined the values shown in Table 6 are a reasonable estimate of the maximum potential instances of take that may occur in each year of the regulations (more specifically, each of these ''takes'' representing a day in which one individual is exposed above the Level B harassment criteria, even if only for minutes). However, these take numbers do not represent the number of individuals expected to be taken, as they do not consider the fact that certain individuals may be exposed above harassment thresholds on multiple days. Accordingly, as described in the 2018 notice of proposed rulemaking, NMFS developed an approach to inform two important parts of the analyses, both better understanding a closer approximation of the number of individuals of each species or stock that may be taken within a survey, and understanding the degree to which individuals of each species or stock may be more likely to be repeatedly taken across multiple days within a year.

In summary, comparing the results of modeling simulations that more closely match longer survey durations (30 days) to the results of 24-hour take estimates scaled up to 30 days (as the instances of take in Table 6 were calculated) provides the comparative ratios of the numbers of individuals taken/calculated (within a 30-day survey) to instances of take, in order to better understand the comparative distribution of exposures across individuals of different species. These products are used to inform a better understanding of the nature in which individuals are taken across the multiple days of a longer duration survey given the different behaviors that are represented in the animat modeling and may appropriately be used in combination with the calculated instances of take to predict the number of individuals taken for surveys of similar duration, in order to support evaluation of take estimates in requests for Letters of Authorization under the ''small numbers'' standard, which is based on the number of individuals taken. A detailed discussion of this approach was provided in the 2018 notice of proposed rulemaking. As NMFS retains without change this ''scalar ratio'' approach to approximating the number of individuals taken, both here (see

Negligible Impact Analysis and Determinations) and in support of the necessary small numbers determination on an LOA-specific basis, we do not repeat the discussion but refer the reader to previous **Federal Register** notices. Application of the re-scaling method reduced the overall magnitude of modeled takes for all species by a range of slightly more than double up to ten-fold (Table 8).

These adjusted take numbers, representing a closer approximation of the number of individuals taken (shown in Table 8), provide a more realistic basis upon which to evaluate severity of the expected taking. Please see the Negligible Impact Analysis and Determinations section, later in this document, for additional detail. It is important to recognize that while these scaled numbers better reflect the number of individuals likely to be taken within a single 30-day survey than the number of instances in Table 6, they will still overestimate the number of individuals taken across the aggregated GOM activities, because they do not correct for (*i.e.,* further reduce take to account for) individuals exposed to multiple surveys or fully correct for individuals exposed to surveys significantly longer than 30 days.

As noted in the beginning of this section and in the Small Numbers section, using modeled instances of take (Table 6) and the method used here to scale those numbers allows one to more accurately predict the number of individuals that will be taken as a result of exposure to one survey and, therefore, these scaled predictions should be considered in requests for LOAs to assess whether a resulting LOA would meet the small numbers standard. However, for the purposes of ensuring that the take authorized pursuant to all issued LOAs is within the scope of the analysis conducted to support the negligible impact finding in this rule, authorized instances of take (which are the building blocks of the analysis) also must be assessed. Specifically, reflecting Table 6 and what has been analyzed, the total take authorized for any given species or stock over the course of the five years covered under these regulations should not exceed the sum of the five years of take indicated for the five years in that table. Additionally, in any given year, the take of any species should not exceed the highest annual take listed for any of the five years.

TABLE 8—EXPECTED TOTAL TAKE NUMBERS, SCALED [1]

Species	Year 1	Year 2	Year 3	Year 4	Year 5
Rice's whale	5	5	4	5	6
Sperm whale	5,583	4,741	4,679	3,437	4,284
Kogia spp	2,334	2,022	1,959	1,470	1,854
Beaked whale	2,971	2,722	2,379	1,748	2,329
Rough-toothed dolphin	11,060	9,723	9,253	7,258	8,430
Bottlenose dolphin	81,613	120,160	72,269	126,098	71,424
Clymene dolphin	8,587	6,672	7,431	4,987	6,087
Atlantic spotted dolphin	10,642	9,798	9,507	9,856	6,861
Pantropical spotted dolphin	84,203	74,571	69,996	54,285	67,919
Spinner dolphin	1,325	1,279	1,063	903	1,177
Striped dolphin	16,301	14,816	13,437	10,748	13,513
Fraser's dolphin	4,161	3,543	3,496	2,535	3,191
Risso's dolphin	2,403	2,047	2,002	1,426	1,822
Blackfish	19,915	16,818	16,774	12,032	15,086
Short-finned pilot whale	4,227	2,860	3,787	2,134	2,576

[1] Scalar ratios were applied to values in Table 6 as described in the 2018 notice of proposed rulemaking to derive scaled take numbers shown here.

Proposed Mitigation

''*Least Practicable Adverse Impact*'' *Standard*

Under section 101(a)(5)(A) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for subsistence uses (hereinafter referred to as ''LPAI'' or ''least practicable adverse impact''). NMFS does not have a regulatory definition for least practicable adverse impact. However, NMFS' implementing regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)). We note that in some cases, certain mitigation may be necessary in order to make a ''negligible impact'' finding for an affected species or stock, which is a fundamental requirement of issuing an authorization—in these cases, consideration of practicability may be a lower priority for decision-making if impacts to marine mammal species or stocks would not be negligible in the measure's absence. In the Mitigation section of the 2021 final rule, NMFS included a detailed description of our interpretation of the LPAI standard and how it should be applied, and we refer readers to that discussion.

In summary, in evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors:

(1) The manner in which, and the degree to which, implementation of the potential measure(s) is expected to reduce adverse impacts to marine mammal species or stocks, their habitat, and their availability for subsistence uses (where relevant). This analysis considers such things as the nature of the potential adverse impact (such as likelihood, scope, and range), the likelihood that the measure will be effective if implemented, and the likelihood of successful implementation.

(2) The practicability of the measures for applicant implementation. Practicability of implementation may consider such things as cost, impact on

activities, personnel safety, and practicality of implementation.

Application of the Least Practicable Adverse Impact Standard in This Action

In carrying out the MMPA's mandate for this action, NMFS applies the previously described context-specific balance between the manner in which and the degree to which measures are expected to reduce impacts to the affected species or stocks and their habitat and practicability for operators. The effects of concern (*i.e.,* those with the potential to adversely impact species or stocks and their habitat), addressed previously in the Potential Effects of the Specified Activity on Marine Mammals and Their Habitat section of the 2018 notice of proposed rulemaking, include auditory injury, severe behavioral reactions, disruptions of critical behaviors, and to a lesser degree, masking and impacts on acoustic habitat (see discussion of this concept in the ''Anticipated Effects on Marine Mammal Habitat'' section in the 2018 notice of proposed rulemaking).

Our prior rulemaking for the 2021 final rule focused on measures with proven or reasonably presumed ability to avoid or reduce the intensity of acute exposures that have potential to result in these anticipated effects with an understanding of the drawbacks or costs of these requirements. In addition, we evaluated time-area restrictions that would avoid or reduce both acute and chronic impacts, including potential restrictions that were removed from consideration in the final rule as a result of BOEM's change to the scope of the action. To the extent of the information available to NMFS, we considered practicability concerns, as well as potential undesired consequences of the measures, *e.g.,* extended periods using the acoustic source due to the need to reshoot lines. NMFS also recognized that instantaneous protocols, such as shutdown requirements, are not capable of avoiding all acute effects, are not suitable for avoiding many cumulative or chronic effects, and do not provide targeted protection in areas of greatest importance for marine mammals. Therefore, in addition to a basic suite of seismic mitigation protocols, we also considered measures that may or may not be appropriate for other activities (*e.g.,* time-area restrictions specific to the surveys discussed herein).

In order to satisfy the MMPA's least practicable adverse impact standard, NMFS' 2021 rule evaluated a suite of basic mitigation protocols that are required regardless of the status of a stock. Additional or enhanced protections were required for species whose stocks are in particularly poor health and/or are subject to some significant additional stressor that lessens that stock's ability to weather the effects of the specified activities without worsening its status. NMFS' evaluation process was described in detail in the original proposed rule (83 FR 29212, June 22, 2018), and mitigation requirements included in the incidental take regulations were fully described in the notice of issuance for the final rule (86 FR 5322, January 19, 2021).

For this proposed rule, NMFS considered additional mitigation for this action in light of the updated take estimates. Based on that evaluation, we have preliminarily determined that the current regulations promulgated under the 2021 final rule satisfy the least practicable adverse impact standard, and therefore, we do not propose changes to those regulations. Because the proposed mitigation requirements for this action are the same as those described in the notice of issuance for the final rule (86 FR 5322, January 19, 2021), we do not repeat the description of the required mitigation.

Below, we include additional discussion supporting the least practical adverse impact finding as it relates to Rice's whales, given the increase in estimated take relative to the 2021 final rule and other new information. For other species, despite slight increases in estimated take (for three species) and increases in evaluated risk (for other species) since the 2021 final rule (see Negligible Impact Analysis and Determinations), there are no known specific areas of particular importance to consider for time-area restrictions, and no changes to our prior analysis for the sufficiency of the existing standard operational mitigation requirements to effect the least practicable adverse impact on the affected species or stocks and their habitat. (We also note that NMFS' 2018 proposed rule made this determination even in the context of significantly higher takes, as well as evaluated risk.)

Rice's Whale—As discussed previously in this document, the Rice's whale ''core habitat area'' considered in the 2018 notice of proposed rulemaking was designated as between the 100- and 400-m isobaths, from 87.5° W to 27.5° N (Figure 3). That core habitat area was considered in the 2018 notice of proposed rulemaking as a potential restriction area, but because the area was entirely located in the GOMESA moratorium area removed from consideration for the rule, the core habitat area was no longer relevant for consideration as mitigation in the 2021 final rule.

As described previously, NMFS has developed an updated description of Rice's whale core habitat area (Figure 3). The updated process for describing ''core habitat'' incorporated a more precautionary approach to addressing uncertainty associated with both the location of observed whales as well as to account for the possible movement whales could make in any one direction from an observed sighting, *i.e.,* inclusion of the 30-km total buffer discussed previously. As a result of the addition of this buffer to the newly defined polygon encompassing all whale observations and tag locations in the core habitat region, the updated core habitat area now overlaps slightly within the area covered through the scope of the rule. Approximately 5 percent of the updated core habitat area now overlaps the geographic scope of the rule (as defined by the petitioner, BOEM). In addition, new information regarding potential Rice's whale occurrence outside of the core habitat area, based on passive acoustic detections (Soldevilla *et al.,* 2022), is now available. Information supporting the importance of a core habitat area for Rice's whales has not changed from the 2021 final rule. We provide discussion of this information in the following paragraphs.

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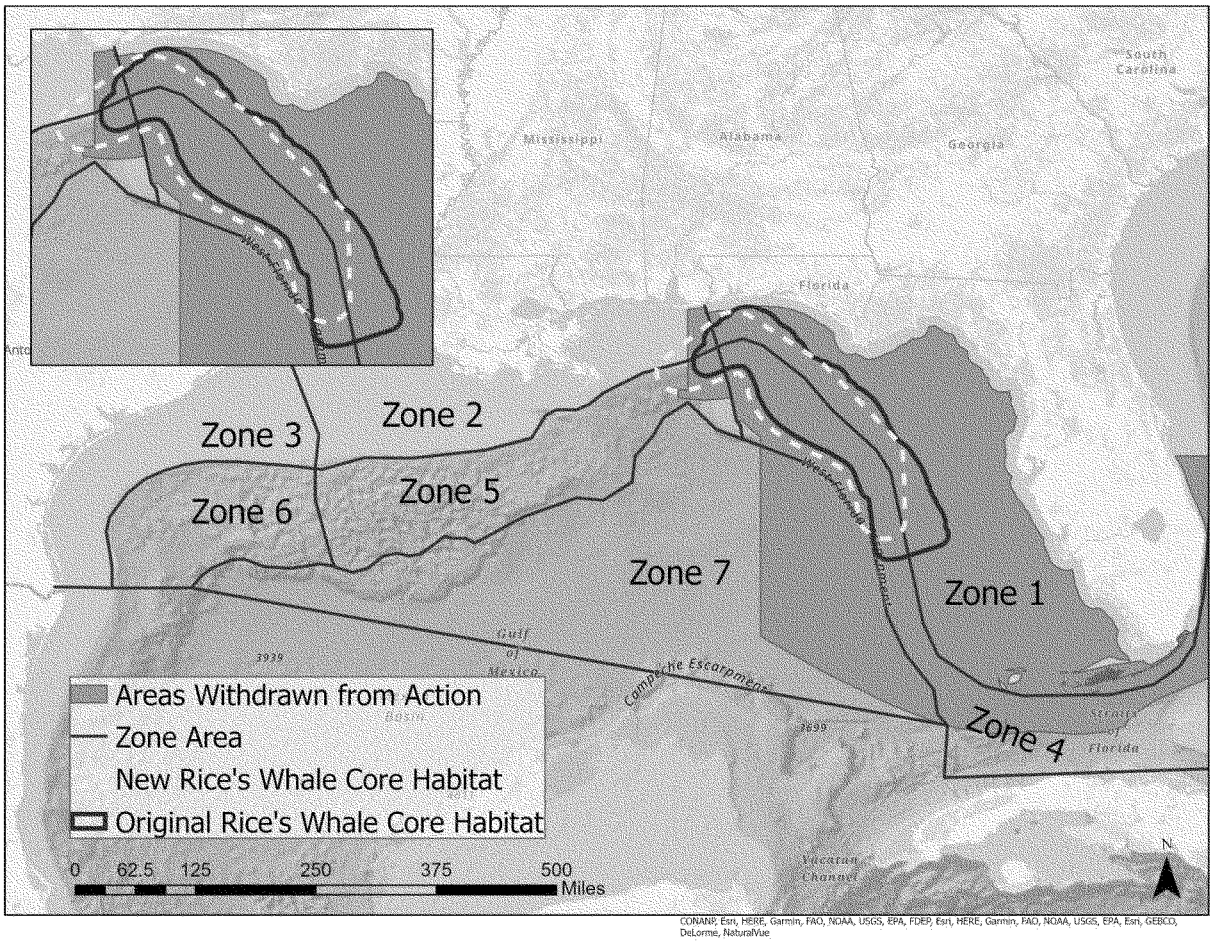

Figure 3 -- Rice's Whale Core Habitat Areas

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Rice's whales form a small and resident population in the northeastern GOM, with a highly restricted geographic range and a very small population abundance—determined by the status review team to be ''at or below the near-extinction population level'' (Rosel *et al.,* 2016). Aside from the restricted distribution and small population, the whales face a significant suite of anthropogenic threats, one of which is noise produced by airgun surveys.

While various population abundance estimates are available (*e.g.,* Garrison *et al.,* 2022; Hayes *et al.,* 2020; Roberts *et al.,* 2016; Dias and Garrison, 2016), the population abundance was almost certainly less than 100 prior to the DWH oil spill. NOAA estimated that, as a result of that event, 48 percent of the population may have been exposed to DWH oil, with 17 percent killed and 22 percent of females experiencing reproductive failure. The best estimate for maximum population reduction was 22 percent, with an estimated 69 years to recovery (to the precarious status prior to the DWH oil spill) (DWH MMIQT, 2015). It is considered likely that Rice's whale habitat previously extended to shelf and slope areas of the western and central GOM similar to where they are found now in the eastern GOM, and that anthropogenic activity—largely energy exploration and production—concentrated in those areas could have resulted in habitat abandonment (Reeves *et al.,* 2011; Rosel and Wilcox, 2014). Further, the population exhibits very low levels of genetic diversity, and based on significant genetic mitochondrial DNA divergence from Bryde's whales worldwide, the former GOM Bryde's whale was recognized as a separate species (Rosel and Wilcox, 2014; Rosel *et al.,* 2021).

The small population size, restricted range, and low genetic diversity alone place these whales at significant risk of extinction (IWC, 2017), which has been exacerbated by the effects of the DWH oil spill. Additionally, Rice's whale dive and foraging behavior places them at heightened risk of being struck by vessels and/or entangled in fishing gear (Soldevilla *et al.,* 2017). NMFS considered a restriction within core habitat (as previously defined) to protect Rice's whales because of their hearing sensitivity in the lower frequency range (which makes them generally more susceptible to incurring effects from airgun noise than other taxa in the GOM); the potential impacts to important behavioral functions such as feeding, breeding, and raising young; their dangerously low population size; and other issues discussed previously.

NMFS' 2018 proposed rule proposed a seasonal restriction on survey activity in the core habitat area considered therein, but also requested comment on a range of alternatives (including a year-round restriction). That proposal, and associated alternatives, were offered for public comment in context of the significantly greater predicted take numbers evaluated in the 2018 proposed rule and the complete overlap of the original project area with the core habitat area prior to the removal of the

GOMESA area. While the take numbers presented here are greater than those evaluated in the 2021 final rule, they are significantly lower in relation to those in the 2018 proposed rule. Predicted take numbers across the three analyses are shown in Table 9. In addition, the 2018 proposed rule analysis included up to several instances of Level A harassment per year, in the form of permanent threshold shift. In contrast, neither the 2021 final rule nor this proposed rule include predicted instances of Level A harassment.

TABLE 9—COMPARISON OF ANALYZED RICE'S WHALE TAKE

	2018 proposed rule	2021 final rule	2022 proposed rule
5-year total	2,310	39	132
Annual maximum	572	10	30

As noted above, the proposed restriction, and alternatives thereto, were no longer relevant due to the changed geographic scope of the 2021 final rule. We now consider the effectiveness and practicability of a potential restriction covering the approximately 5 percent of core habitat (updated) that overlaps with the geographic scope of this rule, as well as of other areas that could be considered important habitat for Rice's whales.

As discussed in the 2018 proposed rule, a restriction on (or absence of) survey activity in core habitat would be expected to protect Rice's whales and their habitat through the alleviation or minimization of a range of airgun effects, both acute and chronic, that could otherwise accrue to impact the reproduction or survival of individuals in the core habitat area. The absence of survey activity in the area would not only largely avoid Level B harassment of Rice's whales, but also very importantly minimize other acoustic effects such as masking and loss of communication space.

However, the significant concern that led NMFS to consider such a restriction through the 2018 proposed rule has largely been alleviated through the reduction in predicted take numbers. Although predicted take numbers have increased relative to the 2021 final rule (annual average Level B harassment events of 26 versus 8), expected takes remain significantly less than those considered in that 2018 analysis (annual average of 462, plus some expected potential for Level A harassment to occur)—an almost 18-fold reduction. Moreover, the functional absence of survey activity in the eastern GOM, and within Rice's whale core habitat, means that the anticipated protection afforded by the previously proposed restriction has been substantively achieved by virtue of the change in scope for the 2021 final rule (which is unchanged for this proposed action). Although the updated core habitat area now slightly overlaps with the geographic scope of the rule (5 percent of defined core habitat overlaps the area considered as part of this rule), we note that the update to the core habitat description is not the result of additional Rice's whale sightings necessitating the expanded description, but rather through the incorporation of additional precaution in defining the area within which existing Rice's whale sightings and tag locations suggest that whales could occur (*i.e.,* a 30-km buffer has been added, as discussed in the Description of Marine Mammals in the Area of the Specified Activities section). As a result of these considerations, NMFS has determined that a restriction on survey activity within the portion of the updated core habitat area that occurs within scope of the rule is not warranted. NMFS requests comment on this determination.

Although the core habitat area is largely no longer relevant under the updated geographic scope of the specified activity and this rule, the discussion above is still important to describe NMFS' work to identify appropriate mitigation in this rulemaking. In addition, we acknowledge that some whales are likely to be present at locations other than within the core habitat area, and we considered additional information in order to evaluate whether a different closure area may be warranted, including central and western GOM areas within the same general 100–400 m depth range known to be occupied by Rice's whales in the northeastern GOM.

Outside of the core habitat area, a NOAA survey reported observation of a Rice's whale in the western GOM in 2017 (NMFS, 2018). There had not previously been a verified sighting of a Rice's whale in the western GOM, and given the importance of this observation, additional survey effort was conducted in an attempt to increase effort in the area. However, no additional sightings were recorded. (Note that there were two sightings of unidentified large baleen whales in 1992 in the western GOM, recorded as *Balaenoptera* sp. or Bryde's/sei whale. Prior to the 2017 sighting, which was confirmed as a Rice's whale, it was considered unlikely that the 1992 sightings were of Rice's whales.) In addition, there are occasional sightings by protected species observers (PSOs) of baleen whales in the GOM. These sightings are typically of other, vagrant species, are in habitat considered unsuitable for Rice's whale (*e.g.,* deep water), and/or are unresolved taxonomically. Of 13 unconfirmed Bryde's-like whale PSO sightings that occurred along the northwestern GOM shelf-break from 2010–2014, Rosel *et al.* (2021) found that there were 4 potential Rice's whale observations (*i.e.,* that could neither be verified nor ruled out as Rice's whale sightings), all within the 200–400 m isobaths.

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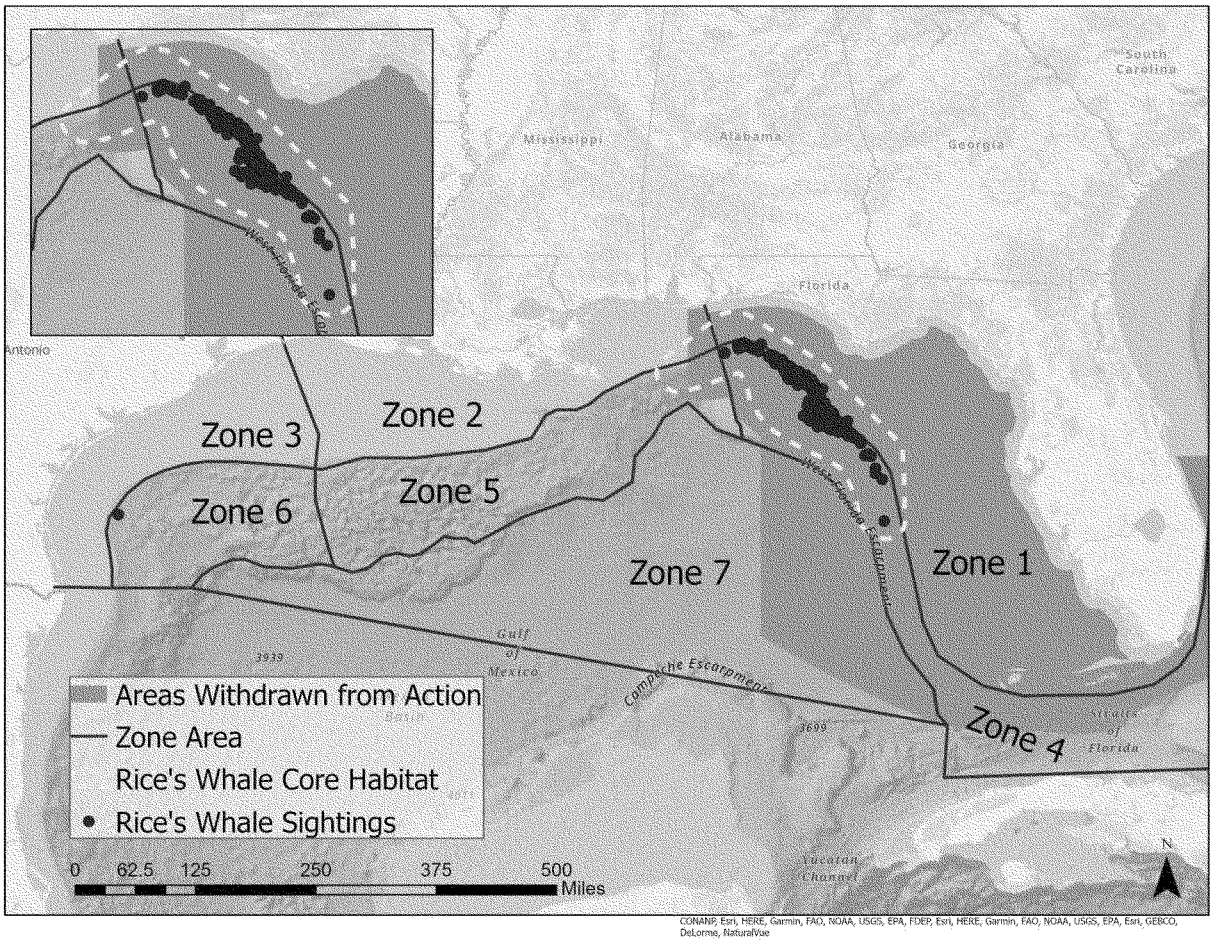

Figure 4 -- Confirmed Rice's Whale Sightings

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In addition, Soldevilla *et al.* (2022) deployed autonomous passive acoustic recorders at five sites along the northwestern GOM shelf break in predicted Rice's whale habitat (Roberts *et al.,* 2016) for 1 year (2016–2017) to (1) determine if Rice's whales occur in waters beyond the northeastern GOM and, if so, (2) evaluate their seasonal occurrence and site fidelity at the five northwestern GOM sites. Over the course of the 1-year study, sporadic, year-round recordings of calls assessed as belonging to Rice's whales were made south of Louisiana within approximately the same depth range (200–400 m), indicating that some Rice's whales occurred regularly in waters beyond their known core habitat in the northeastern GOM during the study period. Based on the detection range of the sonobuoys and acoustic monitors used in the study, actual occurrence could be in water depths up to 500 m (M. Soldevilla, pers. comm.) (though the deepest confirmed Rice's whale sighting was in 408 m water depth). Data were successfully collected at four of the five sites; of these four sites, Rice's whale calls were detected at three. Detection of calls ranged from 1 to 16 percent of total days at the three sites. Calls were present in all seasons at two sites, with no obvious seasonality, and it remains unknown whether animals are moving between the northwestern and northeastern sites or whether these represent different groups of animals (Soldevilla *et al.,* 2022). The rate of call detections throughout the year is considerably higher in the eastern GOM than at the western GOM site where calls were most commonly detected, with at least 8.3 calls/hour among four eastern GOM sites over 110 deployment days (Rice *et al.,* 2014) compared to 0.27 calls/hour over the 299-day deployment at the western GOM site where calls were detected most frequently. Approximately 2,000 total calls were detected at the site over 10 months, compared to more than 66,000 total detections at the eastern GOM deployment site over 11 months (approximately 30 times more calls detected at the eastern GOM site) (Soldevilla *et al.,* 2022). Although it should be noted that ambient noise conditions were higher at the western GOM site, influencing maximum detection range, this difference in conditions would be expected to result in only 4–8 times as many call detections if all other factors (including presence and number of whales) were consistent (versus 30 times as many detections). Overall, the study authors assess that there seem to be fewer whales or more sparsely spaced whales in the western GOM compared to the eastern GOM, with calls present on fewer days, lower call detection rates, and far fewer call detections in the western GOM.

The passive acoustic data discussed above provide evidence for the persistent occurrence of at least some individual Rice's whales over a broader distribution in the GOM than previously understood. However, overall, Rice's whale observations remain consistently located within the eastern GOM core habitat area, with few whales sighted

elsewhere despite a large amount of dedicated cetacean survey effort that covered both continental shelf and oceanic waters. Whales have been sighted in the core habitat area in all seasons, and all indications are that the whales inhabit this area year-round as a resident population. A tagged whale remained within the area for the entire time the tag was active (38 days). Therefore, while we expect that some individual Rice's whales occur outside the core habitat area and/or that whales from the eastern GOM occasionally travel outside the area, the currently available data support NMFS' determination that the area currently considered core habitat is an adequate representation.

NMFS produced a regulatory impact analysis (RIA) in support of the 2018 proposed rule, which evaluated potential costs associated with a range of area-based activity restrictions (available online at: *www.fisheries.noaa.gov/action/incidental-take-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico*). Although that analysis did not directly evaluate a potential closure of the area that might be considered here as a Rice's whale protected area, *i.e.,* potentially suitable habitat in the central and western GOM outside of known Rice's whale core habitat, it provided a useful framework for considering practicability in an assessment of potential restrictions in the northeastern GOM. That analysis concluded that the direct compliance costs of the rule would represent a small increase in oil and gas development costs overall and, therefore, would be unlikely to result in materially reduced oil and gas activities in the GOM. However, the analysis suggested that the analyzed seasonal and year-round area closures would have the potential to generate reductions in leasing, exploration, and subsequent development activity. Although the report cautioned that its conclusions were subject to substantial uncertainty, it provided several factors that the likelihood of ultimate impacts to oil and gas production as a result of delays in data collection could be expected to depend upon: (1) oil and gas market conditions; (2) the relative importance of the closure area to oil and gas production; (3) the state of existing data covering the area; and (4) the duration of the closure. NMFS cannot predict factor (1) and does not have complete information regarding factor (3) (though the analysis provides that new surveys are expected to be required to facilitate efficient exploration and development decisions). We can, however, more adequately predict the effects of factors (2) and (4) on the impact of any closure.

Historical Rice's whale habitat, which is also generally modeled as being suitable habitat (Roberts *et al.,* 2016; Garrison *et al.* 2022), generally consists of the aforementioned strip of continental shelf waters within the 100–400 m isobaths. Salinity and surface water velocity are also likely predictive of potential Rice's whale occurrence (Garrison *et al.,* 2022), but these more dynamic variables are less useful in delineating a potential area of importance than the static depth variable. Within this GOM-wide depth range, we focus on the area where Soldevilla *et al.* (2022) recorded Rice's whale calls as being of interest for a potential restriction. This area lies within the central GOM, where the vast majority of survey effort during NMFS' experience in implementing this rule has occurred. The 2018 proposed rule RIA considered the economic impacts of a prospective closure area in deeper waters of the central GOM. The evaluated area was designed to be of benefit to sperm whales and beaked whales, which are found in deep water, and more activity is projected to occur in deep water than in the shelf-break waters where Rice's whales are expected to be found. As such, the RIA analysis likely overestimates the potential impacts of a central GOM closure within a portion of the shelf waters favored by Rice's whales in their known habitat. However, the analysis of deep-water closures in the central GOM suggested the possibility that the closure could affect the broader contribution of the GOM to U.S. oil and gas activity, with shifts in effort potentially reducing domestic oil and gas production, industry income, and employment, ultimately concluding that the economic impact on the regional economy could be significant. A key consideration in this finding relates to factor (4), as the analyzed closure was year-round. Similarly, there is no information to support a temporal component to design of a potential Rice's whale closure and, therefore, a closure would appropriately be year-round. As operators have no ability to plan around a year-round closure, this aspect exacerbates the potential for effects on oil and gas productivity in the GOM.

In summary, the foregoing preliminarily supports (1) that there is no clearly defined important habitat with known occupation and usage patterns outside the existing core habitat area that would appropriately be subject to a restriction on survey activity; and (2) the potential that a central GOM closure would have significant economic impacts. During implementation of the existing rule, NMFS has issued three LOAs in association with surveys occurring roughly within this area of the central GOM (87 FR 55790, October 1, 2022; 87 FR 43243, July 20, 2022; 87 FR 42999, July 19, 2022). Based on these surveys, there is a possibility that the closure could affect the broader contribution of the GOM to future U.S. oil and gas activity. Given the relatively low level of take predicted to occur for Rice's whales in context of the de facto protection afforded through the circumscribed scope of the rule (*i.e.,* the rule does not cover the bulk of Rice's whale core habitat, where whales are generally anticipated to occur, and no survey activity is expected to occur in the eastern GOM), NMFS has preliminarily determined that no additional mitigation is necessary or appropriate in order to effect the least practicable adverse impact on the species.

NMFS has reevaluated the suite of mitigation measures required through the 2021 final regulations and considered other measures in light of the new information considered in this proposed rule. Based on our evaluation of these measures, we have preliminarily affirmed that the required mitigation measures contained in the current regulations provide the means of effecting the least practicable adverse impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an LOA for an activity, section 101(a)(5)(A) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of the authorized taking. NMFS' MMPA implementing regulations further describe the information that an applicant should provide when requesting an authorization (50 CFR 216.104(a)(13)), including the means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and the level of taking or impacts on populations of marine mammals. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

We do not propose changes to the current LOA reporting requirements, which have been sufficient to date. Accordingly, the monitoring and

reporting requirements for this proposed rule remain identical to the 2021 final rule and ITR, and we refer readers back to that document (86 FR 5322, January 19, 2021) for the discussion.

Negligible Impact Analysis and Determinations

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.,* population-level effects). An estimate of the number of takes alone is not enough information on which to base a negligible impact determination. In addition to considering estimates of the number of marine mammals that might be ''taken'' by mortality, serious injury, and Level A or Level B harassment, we consider other factors, such as the type of take, the likely nature of any behavioral responses (*e.g.,* intensity, duration), the context of any such responses (*e.g.,* critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338, September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into these analyses via their impacts on the baseline (*e.g.,* as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality).

For each potential activity-related stressor, NMFS considers the potential effects to marine mammals and the likely significance of those effects to the species or stock as a whole. Potential risk due to vessel collision and related mitigation measures, as well as potential risk due to entanglement and contaminant spills, was addressed in the Proposed Mitigation and Potential Effects of the Specified Activity on Marine Mammals sections of the 2018 and 2021 notices of proposed and final rulemaking and are not discussed further, as there are minimal risks expected from these potential stressors.

The ''specified activity'' for this proposed rule continues to be a broad program of geophysical survey activity that could occur at any time of year in U.S. waters of the GOM, within the same specified geographical region as the 2021 final rule (*i.e.,* updated from the 2018 proposed rule to exclude the former GOMESA leasing moratorium area) and for the same 5-year period. The acoustic exposure modeling used for the 2021 rulemaking and for this proposed rule provides marine mammal noise exposure estimates based on BOEM-provided projections of future survey effort and best available modeling of sound propagation, animal distribution, and animal movement. This provides a conservative but reasonable best estimate of potential acute noise exposure events that may result from the described suite of activities.

In recognition of the broad geographic and temporal scale of this activity, in support of the issuance of the 2021 rule, we applied an explicit, systematic risk assessment framework (discussed in detail in the 2018 notice of proposed rulemaking) to evaluate potential effects of aggregated discrete acoustic exposure events (*i.e.,* proposed geophysical survey activities) on marine mammals. This risk assessment framework, which is one component of the overall negligible impact analysis, was described by Southall *et al.* (2017) (available online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-oil-and-gas*), and discussed in detail in the 2018 notice of proposed rulemaking. That framework, which was subsequently refined in response to public comment and in consideration of the updated scope of the activity (as discussed in the notice of issuance of the 2021 final rule), has not changed and is not described in detail in this notice. Please review the 2018 proposed and 2021 final rule notices, as well as Southall *et al.* (2017), for further detail. This framework continues to represent the best available methodology for assessing relative risk, and we incorporate the framework and its results into this analysis.

In summary, the systematic risk assessment framework uses the modeling results to put into biologically-relevant context the level of potential risk of injury and/or disturbance to marine mammals. The framework considers both the aggregation of acute effects and the broad temporal and spatial scales over which chronic effects may occur. Generally, this approach is a relativistic risk assessment that provides an interpretation of the exposure estimates within the context of key biological and population parameters (*e.g.,* population size, life history factors, compensatory ability of the species, animal behavioral state, aversion), as well as other biological, environmental, and anthropogenic factors. This analysis was performed on a species-specific basis within each modeling zone (Figure 2), and the end result provides an indication of the biological significance of the evaluated exposure numbers for each affected marine mammal stock (*i.e.,* yielding the severity of impact and vulnerability of stock/population information), and forecasts the likelihood of any such impact. This result is expressed as relative impact ratings of overall risk that couple potential severity of effect on a stock and likely vulnerability of the population to the consequences of those effects, given biologically relevant information (*e.g.,* compensatory ability).

Spectral, temporal, and spatial overlaps between survey activities and animal distribution are the primary factors that drive the type, magnitude, and severity of potential effects on marine mammals, and these considerations are integrated into both the severity and vulnerability assessments. The framework utilizes a strategic approach to balance the weight of these considerations between the two assessments, specifying and clarifying where and how the interactions between potential disturbance and species within these dimensions are evaluated. Overall ratings are then considered in conjunction with the required mitigation (and any additional relevant contextual information) to ultimately inform our determinations. Elements of this approach are subjective and relative within the context of this program of projected actions and, overall, the analysis necessarily requires the application of professional judgment.

As shown in Tables 5 and 6, estimated take numbers for most species have decreased relative to those evaluated in the notice of issuance for the 2021 final rule. We note that this includes the ''blackfish'' guild (consisting of the false killer whale, pygmy killer whale, melon-headed whale, and killer whale), for which species-specific take information is not available. Both the annual maximum and 5-year total take numbers for the group have decreased relative to the sum of the previous species-specific values (annual maxima and 5-year totals) evaluated in the 2021 final rule.

As elements of the risk assessment framework are dependent on information related to stock abundance, we have revisited the risk assessment methodology for all species, and present updated information below. Specifically, as discussed below, severity ratings are the product of

comparison between estimated take numbers and modeled population abundance, on a zone-specific basis. As the zone-specific modeled population abundance values have been updated through new density modeling (Garrison *et al.,* 2022), we revisit all severity ratings. The vulnerability assessment component is less directly dependent on population abundance information, but does incorporate certain species population information, including a trend rating and population size, as well as a factor related to species habitat use. With publication of new SARs information for all species, we revisit the former components of the vulnerability assessment, whereas the aforementioned updated density modeling effort provides new zone-specific abundance values that inform the assessment of habitat use in each zone (*i.e.,* proportion of GOM-wide estimated population in each zone).

Estimated take numbers increased (relative to the 2021 final rule) for only four species: Rice's whale, Fraser's dolphin, rough-toothed dolphin, and striped dolphin (though it should be noted that overall relative risk ratings remained static for Rice's whale and Fraser's dolphin). Whether estimated take numbers increased for each of the four species within the ''blackfish'' category is unknown under NMFS' proposed approach to estimating take numbers. However, overall relative risk ratings increased slightly for most species. Of the species for which evaluated take decreased, relative risk ratings remained static (or declined) for the sperm whale, beaked whales, bottlenose dolphin, and spinner dolphin. No new information is available for these four taxa that would suggest that the existing negligible impact analyses should be revisited. Therefore, we rely on the existing negligible impact analyses for the sperm whale, all beaked whale species, bottlenose dolphin, and spinner dolphin. Please see the notice of issuance for the current rule (86 FR 5322, January 19, 2021) for analysis related to these species, which we incorporate by reference to this proposed rule. We revisit here the negligible impact analyses for those species for which evaluated take numbers increased and/or for which the assessed relative risk rating increased.

The risk assessment framework comprehensively considers the aggregate impacts to marine mammal populations from the specified activities in the context of both the severity of the impacts and the vulnerability of the affected species. However, it does not consider the effects of the mitigation required through these regulations in identifying risk ratings for the affected species. In addition, while the risk assessment framework comprehensively considers the spatial and temporal overlay of the activities and the marine mammals in the GOM, as well as the number of predicted takes, there are details about the nature of any ''take'' anticipated to result from these activities that were not considered directly in the framework analysis that warrant explicit consideration in the negligible impact determination. Accordingly, following the description of the framework analysis presented below, NMFS highlights a few factors regarding the nature of the predicted ''takes'' and then brings together the results of implementation of the framework, these additional factors, and the anticipated effects of the mitigation to summarize the negligible impact analysis for each of the species considered here. The risk assessment analysis below is performed for 2 representative years, with Year 1 representing a relatively high-effort scenario and Year 4 representing a moderate-effort scenario. Please see Table 2 for details regarding BOEM's level of effort projections.

Severity of Effect

As described above in Estimated Take, a significant model assumption was that populations of animals were reset for each 24-hr period. Exposure estimates for the 24-hr period were then aggregated across all assumed survey days as completely independent events, assuming populations turn over completely within each large zone on a daily basis. In order to evaluate modeled daily exposures and determine more realistic exposure probabilities for individuals across multiple days, we used information on species-typical movement behavior to determine a species-typical offset of modeled daily exposures, summarized under Estimated Take (and discussed in further detail in the 2021 notice of issuance for the final rule). Given that many of the evaluated survey activities occur for 30-day or longer periods, particularly some of the larger surveys for which the majority of the modeled exposures occur, using such a scaling process is appropriate in order to evaluate the likely severity of the predicted exposures and to estimate take for the purposes of LOA applications and predicting the number of individual marine mammals taken during the course of a single survey (although, for surveys significantly longer than 30 days, the take numbers with this scaling applied would still be expected to overestimate the number of individuals, given the greater degree of repeat exposures that would be expected the longer the survey goes on). This output was used in a severity assessment. This approach is also discussed in more detail in the Southall *et al.* (2017) report.

The scaled Level B harassment takes were then rated through a population-dependent binning system, used to evaluate risk associated with behavioral disruption across species—a simple, logical means of evaluating relative risk across species and areas. See the notice of issuance for the 2021 final rule for more detail regarding the definition of relative risk ratings. Results of the reassessed severity ratings are shown in Table 10.

Level A harassment (including PTS) is not expected to occur for any of the species evaluated here, with the exception of *Kogia* spp. Estimated takes by Level A harassment for *Kogia* spp., which are discussed in further detail below, declined relative to what was evaluated in the 2021 final rule. See Tables 5 and 6.

TABLE 10—SEVERITY ASSESSMENT

Species	Zone 1 [1]		Zone 2		Zone 3		Zone 4 [1]		Zone 5		Zone 6		Zone 7	
	H	M	H	M	H	M	H	M	H	M	H	M	H	M
Rice's whale	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	n/a	n/a
Sperm whale	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	M	L	L	L
Kogia spp	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	M	M	L	L	VL
Beaked whales	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	VH	VH	VL	VL	VL	VL
Rough-toothed dolphin	VL	VL	L	M	VL	VL	VL	VL	H	H	M	L	L	L
Bottlenose dolphin	VL	VL	L	M	VL	VL	VL	VL	M	M	L	VL	n/a	n/a
Clymene dolphin	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	M	L	L	VL
Atlantic spotted dolphin	VL	VL	M	H	VL	VL	VL	VL	H	M	M	L	n/a	n/a

TABLE 10—SEVERITY ASSESSMENT—Continued

Species	Zone 1 [1]		Zone 2		Zone 3		Zone 4 [1]		Zone 5		Zone 6		Zone 7	
	H	M	H	M	H	M	H	M	H	M	H	M	H	M
Pantropical spotted dolphin.	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	M	L	L	VL
Spinner dolphin	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	n/a	n/a	VL	VL
Striped dolphin	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	M	L	L	VL
Fraser's dolphin	VL	VL	VL	VL	VL	VL	VL	VL	H	H	M	L	L	L
Risso's dolphin	n/a	n/a	VL	VL	n/a	n/a	VL	VL	H	M	M	L	L	VL
Short-finned pilot whale	n/a	n/a	VL	VL	VL	VL	VL	VL	H	M	M	L	VL	VL
Blackfish	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	M	L	L	L

H = Year 1 (representative high effort scenario); M = Year 4 (representative moderate effort scenario).
n/a = less than 0.05 percent of GOM-wide population predicted in zone.
VL = very low; L = low; M = moderate; H = high; VH = very high.
[1] No activity would occur in Zone 1, and no activity is projected in Zone 4 under the high effort scenario. With no activity in a zone, severity is assumed to be very low.

Vulnerability of Affected Population

Vulnerability rating seeks to evaluate the relative risk of a predicted effect given species-typical and population-specific parameters (*e.g.,* species-specific life history, population factors) and other relevant interacting factors (*e.g.,* human or other environmental stressors). The assessment includes consideration of four categories within two overarching risk factors (species-specific biological and environmental risk factors). These values were selected to capture key aspects of the importance of spatial (geographic), spectral (frequency content of noise in relation to species-typical hearing and sound communications), and temporal relationships between sound and receivers. Explicit numerical criteria for identifying scores were specified where possible, but in some cases qualitative judgments based on a reasonable interpretation of given aspects of the proposed activity and how it relates to the species in question and the environment within the specified area were required. Factors considered in the vulnerability assessment were detailed in Southall *et al.* (2017) and discussed in further detail in the notice of issuance for the 2021 final rule. Please see that notice for further detail regarding these aspects of the framework and for definitions of vulnerability ratings. Note that the effects of the DWH oil spill are accounted for through a non-noise chronic anthropogenic risk factor, while the effects to acoustic habitat and on individual animal behavior via masking are accounted for through the masking and chronic anthropogenic noise risk factors. The results of reassessed species-specific vulnerability scoring are shown in Table 11. Note that, as there are certain species-specific elements of the vulnerability assessment, we evaluated and present results for each of the four species contained within the ''blackfish'' group. For purposes of evaluating relative risk, we assume that the greatest vulnerability (assessed for melon-headed whale) applies to the blackfish group as a whole.

TABLE 11—VULNERABILITY ASSESSMENT

Species	Zone						
	1	2	3	4	5	6	7
Rice's whale	H	H	M	H	H	H	n/a
Sperm whale	n/a	n/a	n/a	M	H	M	M
Kogia spp	n/a	n/a	n/a	L	L	L	L
Beaked whale	n/a	n/a	n/a	L	L	L	L
Rough-toothed dolphin	L	L	L	L	L	L	L
Bottlenose dolphin	L	L	L	VL	L	VL	n/a
Clymene dolphin	n/a	n/a	n/a	L	L	L	L
Atlantic spotted dolphin	M	M	L	L	L	L	n/a
Pantropical spotted dolphin	n/a	n/a	n/a	L	L	L	L
Spinner dolphin	n/a	n/a	n/a	L	L	n/a	L
Striped dolphin	n/a	n/a	n/a	L	L	L	L
Fraser's dolphin	L	L	VL	L	L	L	L
Risso's dolphin	n/a	L	n/a	M	M	M	L
Melon-headed whale	n/a	n/a	n/a	L	M	L	L
Pygmy killer whale	n/a	n/a	n/a	L	L	L	L
False killer whale	n/a	n/a	n/a	L	L	L	L
Killer whale	n/a	n/a	n/a	L	L	L	L
Short-finned pilot whale	n/a	M	L	M	M	M	L

n/a = less than 0.05% of GOM-wide population predicted in zone.
VL = very low; L = low; M = moderate; H = high; VH = very high.

Risk

In the final step of the framework, severity and vulnerability ratings are integrated to provide relative impact ratings of overall risk. Severity and vulnerability assessments each produce a numerical rating (1–5) corresponding with the qualitative rating (*i.e.,* very low, low, moderate, high, very high). A matrix is then used to integrate these two scores to provide an overall risk assessment. The matrix is shown in Table 2 of Southall *et al.* (2017).

Table 12 provides relative impact ratings by zone, and Table 13 provides GOM-wide relative impact ratings, for overall risk associated with predicted takes, for representative high and moderate effort scenarios.

TABLE 12—OVERALL EVALUATED RISK BY ZONE AND ACTIVITY SCENARIO

Species	Zone 1 [1]		Zone 2		Zone 3		Zone 4 [1]		Zone 5		Zone 6		Zone 7	
	H	M	H	M	H	M	H	M	H	M	H	M	H	M
Rice's whale	L	L	L	L	L	L	L	L	L	L	L	L	n/a	n/a
Sperm whale	n/a	n/a	n/a	n/a	n/a	n/a	L	L	VH	VH	M	L	L	L
Kogia spp	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	M	M	L	L	VL
Beaked whale	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	VH	VH	VL	VL	VL	VL
Rough-toothed dolphin	VL	VL	L	M	VL	VL	VL	VL	H	H	M	L	L	L
Bottlenose dolphin	VL	VL	L	M	VL	VL	VL	VL	H	M	M	VL	n/a	n/a
Clymene dolphin	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	M	L	L	VL
Atlantic spotted dolphin	L	L	M	H	VL	VL	VL	VL	H	M	M	L	n/a	n/a
Pantropical spotted dolphin.	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	M	L	L	VL
Spinner dolphin	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	n/a	n/a	VL	VL
Striped dolphin	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	M	L	L	L
Fraser's dolphin	VL	VL	VL	VL	VL	VL	VL	VL	H	H	M	L	L	L
Risso's dolphin	n/a	n/a	VL	VL	n/a	n/a	L	L	H	H	M	L	L	VL
Short-finned pilot whale	n/a	n/a	L	L	VL	VL	L	L	H	M	M	L	VL	VL
Blackfish	n/a	n/a	n/a	n/a	n/a	n/a	VL	VL	H	H	M	L	L	L

H = Year 1 (representative high effort scenario); M = Year 4 (representative moderate effort scenario).
n/a = less than 0.05 percent of GOM-wide population predicted in zone.
VL = very low; L = low; M = moderate; H = high; VH = very high.
[1] No activity would occur in Zone 1, and no activity is projected in Zone 4 under the high effort scenario. With no activity in a zone, severity is assumed to be very low.

TABLE 13—OVERALL EVALUATED RISK BY PROJECTED ACTIVITY SCENARIO, GOM-WIDE

Species	High effort scenario (year 1)	Moderate effort scenario (year 4)
Rice's whale	Low (0)	Low (0).
Sperm whale	Low/Moderate [1] (0)	Low (0).
Kogia spp	Low/Moderate [1] (+0.5)	Very Low/Low [1] (+0.5).
Beaked whales	Very Low (−2.5)	Very Low (−1.5).
Rough-toothed dolphin	Low (+1)	Low (+1).
Bottlenose dolphin (shelf/coastal)	Very low (0)	Very low (0).
Bottlenose dolphin (oceanic)	Very low (0)	Very low (0).
Clymene dolphin	Low/Moderate [1] (+0.5)	Very Low/Low [1] (0).
Atlantic spotted dolphin	Low/Moderate [1] (+0.5)	Low (0).
Pantropical spotted dolphin	Low/Moderate [1] (+0.5)	Very Low/Low [1] (+0.5).
Spinner dolphin	Very low (0)	Very low (0).
Striped dolphin	Low/Moderate [1] (+0.5)	Low (+1).
Fraser's dolphin	Very low (0)	Very low (0).
Risso's dolphin	Low (+1)	Low (+1).
Short-finned pilot whale	Low (0)	Low (+0.5).
Blackfish	Low/Moderate (+1.5)	Low (+1).

[1] For these ratings, the median value across zones for the scenario fell between two ratings.
[2] In the 2021 final rule, the four "blackfish" species were each independently evaluated as having "very low" relative risk.

In order to characterize the relative risk for each species across their entire range in the GOM, we used the median of the seven zone-specific risk ratings for each activity scenario (high and moderate effort), not counting those in which less than 0.05 percent of the GOM-wide abundance occurred ("n/a" in Table 12), to describe a GOM-wide risk rating for each of the representative activity scenarios (Table 13).

As noted above, for sperm whale, beaked whales, bottlenose dolphin, and spinner dolphin, estimated take numbers decreased and relative risk ratings remained static (or decreased) compared with the 2021 final rule. Therefore, we rely on the analysis provided in the notice of issuance for the 2021 final rule for those species, which are not discussed further here.

Overall, the results of the risk assessment show that (as expected), risk is highly correlated with effort and density. Areas where little or no survey activity is predicted to occur or areas within which few or no animals of a particular species are believed to occur generally have very low or no potential risk of negatively affecting marine mammals, as seen across activity scenarios in Zones 1–4 (no activity will occur in Zone 1, which was entirely removed from scope of the rule, and less than 2 percent of Zone 4 remains within scope of the rule). Fewer species are expected to be present in Zones 1–3, where only bottlenose and Atlantic spotted dolphins occur in meaningful numbers. (Rice's whale core habitat largely overlaps Zone 1, which is not within scope of this rule.) Areas with consistently high levels of effort (Zones 5–7) are generally predicted to have higher overall evaluated risk across all species. In Zone 7, animals are expected to be subject to less other chronic noise and non-noise stressors, which is reflected in the vulnerability scoring for that zone. Therefore, despite consistently high levels of projected effort, overall rankings for that zone are lower than for Zones 5 and 6.

A "high" level of relative risk due to behavioral disturbance was identified in Zone 5 under both scenarios for most of the species evaluated further in the following (excepting Rice's whale (both scenarios) as well as *Kogia* spp., Atlantic spotted dolphin, and short-finned pilot whale (moderate effort scenario only)). "High" relative risk was not identified under either scenario in any other zone for any species (and "very high" relative risk was not identified under either

scenario in any zone for any of the species evaluated further in the following). Overall, the greatest relative risk across species is generally seen in Zone 5 (both scenarios) and in Zone 6 (under the high effort scenario).

Changes to relative risk ratings may be seen by comparing Table 13 above with Table 15 from the 2021 final rule, and changes (in numerical terms) are indicated in parentheses for each scenario. All increases to assessed relative risk represent minor changes, *i.e.,* if considered as a numerical scale (with ''very low'' = 1 and ''very high'' = 5), with one exception, there was no risk rating increase greater than one point. As noted above, despite increases in estimated take numbers, relative risk ratings for Rice's whale and Fraser's dolphin remained static. In the 2021 final rule, all four species comprising the ''blackfish'' group were individually assessed as having ''very low'' relative risk under both scenarios. In this analysis, the blackfish as a group are assessed as having relative risk between ''low'' and ''moderate'' under the high effort scenario (representing the lone example of a 1.5 point increase) and ''low'' under the moderate effort scenario.

Although the scores generated by the risk assessment framework and further aggregated across zones (as described above) are species-specific, additional stock-specific information is also considered in our analysis, where appropriate, as indicated in the Description of Marine Mammals in the Area of the Specified Activity, Potential Effects of the Specified Activity on Marine Mammals and Their Habitat, and Proposed Mitigation sections of the 2018 notice of proposed rulemaking, 2021 notice of issuance of the final rule, and this proposed action.

Duration of Level B Harassment Exposures

In order to more fully place the predicted amount of take into meaningful context, it is useful to understand the duration of exposure at or above a given level of received sound, as well as the likely number of repeated exposures across days. While a momentary exposure above the criteria for Level B harassment counts as an instance of take, that accounting does not make any distinction between fleeting exposures and more severe encounters in which an animal may be exposed to that received level of sound for a longer period of time. Yet, this information is meaningful to an understanding of the likely severity of the exposure, which is relevant to the negligible impact evaluation and not directly incorporated into the risk assessment framework described above. Each animat modeled has a record or time history of received levels of sound over the course of the modeled 24-hr period. For example, for the four ''blackfish'' species exposed to noise from 3D WAZ surveys, the 50th percentile of the cumulative distribution function indicates that the time spent exposed to levels of sound above 160 dB rms SPL (*i.e.,* the 50 percent midpoint for Level B harassment) would range from only 1.4 to 3.3 minutes—a minimal amount of exposure carrying little potential for significant disruption of behavioral activity. We provide summary information for the species evaluated here regarding the total average time in a 24-hr period that an animal would spend with received levels above 160 dB and between 140 and 160 dB in Table 14. This information considered is unchanged from the 2021 notice of issuance for the final rule.

Additionally, as we discussed in the Estimated Take section of the 2018 notice of proposed rulemaking for Test Scenario 1 (and summarized above), by comparing exposure estimates generated by multiplying 24-hr exposure estimates by the total number of survey days versus modeling for a full 30-day survey duration for six representative species, we were able to refine the exposure estimates to better reflect the number of individuals exposed above threshold within a single survey. Using this same comparison and scalar ratios described above, we are able to predict an average number of days each of the representative species modeled in the test scenario were exposed above the Level B harassment thresholds within a single survey. As with the duration of exposures discussed above, the number of repeated exposures is important to an understanding of the severity of effects. For example, the ratio for dolphins indicates that the 30-day modeling showed that approximately 29 percent as many individual dolphins (compared to the results produced by multiplying average 24-hr exposure results by the 30-day survey duration) could be expected to be exposed above harassment thresholds. However, the approach of scaling up the 24-hour exposure estimates appropriately reflects the instances of exposure above threshold (which cannot be more than 1 in 24 hours), so the inverse of the scalar ratio suggests the average number of days in the 30-day modeling period that dolphins are exposed above threshold is approximately 3.5. It is important to remember that this is an average and that it is more likely some individuals would be exposed on fewer days and some on more. Table 14 reflects the average days exposed above threshold for the indicated species having applied the scalar ratios described previously.

TABLE 14—TIME IN MINUTES (PER DAY) SPENT ABOVE THRESHOLDS (50TH PERCENTILE) AND AVERAGE NUMBER OF DAYS INDIVIDUALS TAKEN DURING 30-DAY SURVEY

Species	Survey type and time (min/day) above 160 dB rms (50% take)				Survey type and time (min/day) above 140 dB rms (10% take)				Average number of days ''taken'' during 30-day survey
	2D	3D NAZ	3D WAZ	Coil	2D	3D NAZ	3D WAZ	Coil	
Rice's whale	7.6	18.2	6.8	21.4	61.7	163.5	55.4	401.1	5.3
Sperm whale	5.2	10.3	4.0	20.7	12.0	31.8	10.7	25.2	2.4
Kogia spp	3.2	7.9	2.8	15.3	7.6	19.0	6.7	13.9	3.1
Beaked whale	6.0	12.4	4.4	24.0	16.2	39.7	14.1	31.1	9.9
Rough-toothed dolphin	3.0	6.3	2.5	11.4	11.2	27.6	10.2	20.9	3.5
Bottlenose dolphin	4.5	11.7	4.0	16.8	22.0	54.6	19.7	53.2	3.5
Clymene dolphin	1.8	3.9	1.6	8.7	8.0	21.1	7.2	20.4	3.5
Atlantic spotted dolphin	7.0	16.0	6.5	25.7	23.4	58.1	20.9	49.3	3.5
Pantropical spotted dolphin	1.8	4.1	1.6	8.7	8.1	21.0	7.1	22.2	3.5
Spinner dolphin	3.2	8.5	2.7	16.4	12.4	31.0	10.8	22.8	3.5
Striped dolphin	1.8	4.0	1.6	8.5	8.0	21.0	7.2	21.3	3.5
Fraser's dolphin	2.8	6.4	2.4	13.8	9.4	24.2	8.4	24.0	3.5
Risso's dolphin	3.4	8.4	2.9	15.3	13.8	37.7	12.2	31.5	3.5
Melon-headed whale	2.6	5.9	2.2	13.1	9.3	24.2	8.3	24.0	3.4

TABLE 14—TIME IN MINUTES (PER DAY) SPENT ABOVE THRESHOLDS (50TH PERCENTILE) AND AVERAGE NUMBER OF DAYS INDIVIDUALS TAKEN DURING 30-DAY SURVEY—Continued

Species	Survey type and time (min/day) above 160 dB rms (50% take)				Survey type and time (min/day) above 140 dB rms (10% take)				Average number of days "taken" during 30-day survey
	2D	3D NAZ	3D WAZ	Coil	2D	3D NAZ	3D WAZ	Coil	
Pygmy killer whale	1.8	3.6	1.4	7.1	7.3	18.5	6.6	17.3	3.4
False killer whale	2.4	4.9	1.9	9.3	8.8	22.0	8.0	17.8	3.4
Killer whale	2.7	6.1	3.3	12.0	16.8	46.1	14.9	73.6	3.4
Short-finned pilot whale	3.3	8.1	2.9	17.5	10.9	27.4	9.8	20.8	3.4

Loss of Hearing Sensitivity

In general, NMFS expects that noise-induced hearing loss as a result of airgun survey activity, whether temporary (temporary threshold shift, equivalent to Level B harassment) or permanent (PTS, equivalent to Level A harassment), is only possible for low-frequency and high-frequency cetaceans. The best available scientific information indicates that low-frequency cetacean species (*i.e.,* mysticete whales, including the Rice's whale) have heightened sensitivity to frequencies in the range output by airguns, as shown by their auditory weighting function, whereas high-frequency cetacean species (including *Kogia* spp.) have heightened sensitivity to noise in general (as shown by their lower threshold for the onset of PTS) (NMFS, 2018). However, no instances of Level A harassment are predicted to occur for Rice's whales, and none would be authorized under this rule.

Level A harassment is predicted to occur for *Kogia* spp. (as indicated in Table 6). However, the degree of injury (hearing impairment) is expected to be mild. If permanent hearing impairment occurs, it is most likely that the affected animal would lose a few dB in its hearing sensitivity, which in most cases would not be expected to affect its ability to survive and reproduce. Hearing impairment that occurs for these individual animals would be limited to at or slightly above the dominant frequency of the noise sources. In particular, the predicted PTS resulting from airgun exposure is not likely to affect their echolocation performance or communication, as *Kogia* spp. likely produce acoustic signals at frequencies above 100 kHz (Merkens *et al.,* 2018), well above the frequency range of airgun noise. Further, modeled exceedance of Level A harassment criteria typically resulted from being near an individual source once, rather than accumulating energy from multiple sources. Overall, the modeling indicated that exceeding the SEL threshold is a rare event, and having four vessels close to each other (350 m between tracks) did not cause appreciable accumulation of energy at the ranges relevant for injury exposures. Accumulation of energy from independent surveys is expected to be negligible. This is relevant for *Kogia* spp. because based on their expected sensitivity, we expect that aversion may play a stronger role in avoiding exposures above the peak pressure PTS threshold than for which we have accounted.

However, some subset of the individual marine mammals predicted to be taken by Level B harassment may incur some TTS. For Rice's whales, TTS may occur at frequencies important for communication. However, any TTS incurred would be expected to be of a relatively small degree and short duration. This is due to the low likelihood of sound source approaches of the proximity or duration necessary to cause more severe TTS, given the fact that both sound source and marine mammals are continuously moving, the anticipated effectiveness of shutdowns, and general avoidance by marine mammals of louder sources.

For these reasons, and in conjunction with the required mitigation, NMFS does not believe that Level A harassment (here, PTS) or Level B harassment in the form of TTS will play a meaningful role in the overall degree of impact experienced by marine mammal populations as a result of the projected survey activity. Further, the impacts of any TTS incurred are addressed through the broader analysis of Level B harassment.

Impacts to Habitat

Potential impacts to marine mammal habitat, including to marine mammal prey, were discussed in detail in the 2018 notice of proposed rulemaking as well as in the 2021 notice of issuance for the final rule, including in responses to comments concerning these issues. There is no new information that changes that assessment, and we rely on the assessment provided in those documents and reiterated below.

Regarding impacts to prey species such as fish and invertebrates, NMFS' review of the available information leads to a conclusion that the most likely impact of survey activity would be temporary avoidance of an area, with a rapid return to pre-survey distribution and behavior, and minimal impacts to recruitment or survival anticipated. Therefore, the specified activities are not likely to have more than short-term adverse effects on any prey habitat or populations of prey species. Further, any impacts to prey species are not expected to result in significant or long-term consequences for individual marine mammals, or to contribute to adverse impacts on their populations.

Regarding potential impacts to acoustic habitat, NMFS provided a detailed analysis of potential cumulative and chronic effects to marine mammals (found in the Cumulative and Chronic Effects report, available online at *www.fisheries.noaa.gov/action/incidental-take-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico*). That analysis focused on potential effects to sperm whales and Rice's whales. The analysis performed for sperm whales (which provides a useful proxy for other mid- and high-frequency cetaceans evaluated here) shows that the survey activities do not significantly contribute to the soundscape in the frequency band relevant for their lower-frequency slow-clicks and that there will be no significant change in communication space for sperm whales. Similar conclusions may be assumed for other mid- and high-frequency cetacean species.

Implications for acoustic masking and reduced communication space resulting from noise produced by airgun surveys in the GOM are expected to be particularly heightened for animals that actively produce low-frequency sounds or whose hearing is attuned to lower frequencies (*i.e.,* Rice's whales). The strength of the communication space approach used here is that it evaluates potential contractions in the availability

of a signal of documented importance to a population of animals of key management interest in the region. In this case, losses of communication space for Rice's whales were estimated to be higher in eastern and central GOM canyons and shelf break areas. In contrast, relative maintenance of listening area and communication space was seen within the Rice's whale core habitat area in the eastern GOM. The result was heavily influenced by the projected lack of survey activity in that region, which underscores the importance of maintaining this important habitat for the Rice's whale. Following BOEM's 2020 update to the scope of the specified activity, no survey activity will occur under this rule within the majority of Rice's whale core habitat (95 percent of the updated core habitat area lies outside the geographic scope of this rule, including all confirmed Rice's whale sightings within the area) or within the broader eastern GOM. See Figures 3–4. In areas where larger amounts of survey activity were projected, significant loss of low-frequency listening area and communication space for Rice's whale calls was estimated. However, these are areas where Rice's whales are unlikely to occur (*i.e.,* deeper waters of the central and western GOM).

Species-Specific Negligible Impact Analysis Summaries

In this section, for the species evaluated herein (*i.e.,* all but sperm whale, beaked whales, bottlenose dolphin, and spinner dolphin, for which, as described previously, we incorporate by reference the analysis conducted in the 2018 rule), we consider the relative impact ratings described above in conjunction with the required mitigation and other relevant contextual information in order to produce a final assessment of impact to the stock or species, *i.e.,* the negligible impact determinations. The effects of the DWH oil spill are accounted for through the vulnerability scoring (Table 11).

Although the Rice's whale core habitat area is not the subject of restrictions on survey activity, as the scope of the specified activity does not functionally include the area (95 percent of the updated core habitat area remains out of scope of the rule, with all confirmed sightings of Rice's whales within the core habitat area occurring in the portion outside the scope of this rule; see Figure 4), the beneficial effect for animals in the area described in the 2018 proposed rule remains the same. The absence of survey activity in the eastern GOM (see Figure 2) benefits GOM marine mammals by reducing the portion of a stock likely exposed to survey noise and avoiding impacts to certain species in areas of importance for them. Habitat areas of importance in the eastern GOM are discussed in detail in the Proposed Mitigation section of the 2018 notice of proposed rulemaking.

Rice's Whale

The risk assessment analysis, which evaluated the relative significance of the aggregated impacts of the survey activities across seven GOM zones in the context of the vulnerability of each species, concluded that the GOM-wide risk ratings for Rice's whales are low, regardless of activity scenario. We note that, although the evaluated severity of take for Rice's whales is very low in all zones where take could occur, vulnerability for the species is assessed as high in five of the six zones where the species occurs (vulnerability is assessed as moderate in Zone 3, where less than 1 percent of GOM-wide abundance is predicted to occur). When integrated through the risk framework described above, overall risk for the species is therefore assessed as low for both the high and moderate effort scenarios. The evaluated risk rating is the same as what was considered in the 2021 notice of issuance of the final rule, despite increased take numbers (see Tables 5–6). In the context of what remain relatively low predicted take numbers, the relative risk ratings for the species remain driven by the assessed vulnerability.

We further consider the likely severity of any predicted behavioral disruption of Rice's whales in the context of the likely duration of exposure above Level B harassment thresholds. Specifically, the average modeled time per day spent at received levels above 160 dB rms (where 50 percent of the exposed population is considered taken) ranges from 6.8–21.4 minutes for deep penetration survey types. The average time spent exposed to received levels between 140 and 160 dB rms (where 10 percent of the exposed population is considered taken) ranges from 55–164 minutes for 2D, 3D NAZ, and 3D WAZ surveys, and 401 minutes for coil surveys (which comprise approximately 10 percent of the total activity days).

Importantly, no survey activity will occur within the eastern GOM pursuant to this rule. Although there is new evidence of Rice's whale occurrence outside the eastern GOM from passive acoustic detections (Soldevilla *et al.,* 2022), all but one confirmed Rice's whale sighting are within the historically considered eastern GOM core area (see Figure 4). The nature of Rice's whale habitat use outside of the eastern GOM core area is poorly understood, including information about the number of individuals that may occur outside the eastern GOM. (Soldevilla *et al.* (2022) suggest that more than one individual was present on at least one occasion, as overlapping calls of different call subtypes were recorded in that instance, but also state that call production rates suggest that either multiple individuals are typically calling or that individual whales are producing calls at higher rates in the western GOM.)

This new information does not affect the prior conclusion that the absence of survey activity in the eastern GOM is expected to benefit Rice's whales and their habitat by minimizing a range of potential effects of airgun noise, both acute and chronic, that could otherwise accrue to impact the reproduction or survival of individuals in this area, and that the absence of survey activity in the eastern GOM will minimize disturbance of the species in the place most important to them for critical behaviors such as foraging and socialization. The Roberts *et al.* (2016) density model indicated that the core habitat area evaluated in the 2018 proposed rule encompassed approximately 92 percent of the predicted abundance of Rice's whales in the GOM. The updated Rice's whale density model (Garrison *et al.,* 2022), which incorporates newer survey data, as well as winter survey data for the first time, indicates that the updated core habitat area contains approximately 57 percent of predicted Rice's whale abundance.[8] As noted previously, intensive survey effort in the region has not resulted in any confirmed Rice's whale sightings outside the core habitat area (aside from a single anomalous sighting in the western GOM). Although it is possible that some surveys could occur within the small portion of the updated core habitat area within scope of the rule (approximately 5 percent; see Figures 3–4), or that some sound from airguns may still propagate into the Rice's whale core habitat area from surveys that may occur outside of the area, exposure of Rice's whales to sound

[8] The percent of abundance predicted to occur in the eastern GOM has declined as a result of expanded density predictions into the western GOM. The Roberts *et al.* (2016) model included a bivariate smooth of XY, with the effect that predicted density was concentrated where sightings were reported (*i.e.,* the eastern GOM; see Figure 4). The updated model does not include this and, importantly, is informed by the confirmed 2017 sighting of a Rice's whale in the western GOM. The result is an increase in predicted density within shelf break waters throughout the GOM that are within the depth ranges where Rice's whales have historically been observed within the eastern GOM.

levels that may be expected to result in Level B harassment will be eliminated or reduced for animals within the Rice's whale core area. (We note that, in NMFS' experience implementing the rule to date, no survey has occurred within the updated Rice's whale core habitat area, nor has any survey occurred at sufficiently close proximity to the core habitat area that sound reasonably expected to result in harassment would have entered.) The absence of survey activity in this area and significant reduction in associated exposure of Rice's whales to seismic airgun noise is expected to eliminate the likelihood of auditory injury of Rice's whales. Finally, the absence of survey activity in the eastern GOM will reduce chronic exposure of Rice's whales to higher levels of anthropogenic sound and the associated effects including masking, disruption of acoustic habitat, long-term changes in behavior such as vocalization, and stress.

As described in the preceding *Loss of Hearing Sensitivity* section, we have analyzed the likely impacts of potential temporary hearing impairment and do not expect that they would result in impacts on reproduction or survival of any individuals. The extended shutdown zone for Rice's whales (1,500 m)—to be implemented in the unlikely event that a Rice's whale is encountered outside of the core habitat area—is expected to further minimize the severity of any hearing impairment incurred as well as reducing the likelihood of more severe behavioral responses. Similarly, application of this extended distance shutdown requirement when calves are present will minimize the potential for and degree of disturbance during this sensitive life stage.

NMFS has corrected the take estimates in the 2021 final rule generated by BOEM's errors, which appear to have caused a particularly large reduction in estimated take for Rice's whale. As a result, and in consideration of updated density information and other factors, the estimated take numbers for Rice's whale are increased from those considered in the 2021 final rule (see Tables 5–6). Accordingly, NMFS has re-evaluated the relative risk rating for Rice's whale (Tables 12–13), and considered other relevant information for the species. The risk ratings did not change from those assessed in the 2021 final rule, and new information considered herein does not affect the determinations previously made in that analysis.

No mortality of Rice's whales is anticipated or authorized. It is possible that Rice's whale individuals, if encountered in areas not typically considered to be Rice's whale habitat, will be impacted briefly on one or more days during a year of activity by one type of survey or another and some subset of those exposures above thresholds may be of comparatively long duration within a day. However, the significant and critical protection afforded through the absence of survey activity in the core habitat area ensures that the impacts of the expected takes from these activities are not likely to adversely affect Rice's whales through impacts on annual rates of recruitment or survival. *Kogia* spp.

The risk assessment analysis, which evaluated the relative significance of the aggregated impacts of the survey activities across seven GOM zones in the context of the vulnerability of each species, concluded that the GOM-wide risk ratings for *Kogia* spp. were between low and moderate (for the high effort scenario) and between very low and low (for the moderate effort scenario). Evaluated risk is slightly increased from the 2021 final rule, with modeled decreases in zone-specific population abundance offsetting decreases in estimated take. We further consider the likely severity of any predicted behavioral disruption of *Kogia* spp. in the context of the likely duration of exposure above Level B harassment thresholds. Specifically, the average modeled time per day spent at received levels above 160 dB rms (where 50 percent of the exposed population is considered taken) ranges from 2.8–7.9 minutes for 2D, 3D NAZ, and 3D WAZ surveys and up to 15.3 minutes for coil surveys (which comprise less than 10 percent of the total projected activity days), and the average time spent between 140 and 160 dB rms (where 10 percent of the exposed population is considered taken) is 6.7–19 minutes.

Odontocetes echolocate to find prey, and while there are many different strategies for hunting, one common pattern, especially for deeper diving species, is to conduct multiple repeated deep dives within a feeding bout, and multiple bouts within a day, to find and catch prey. While exposures of the short durations noted above could potentially interrupt a dive or cause an individual to relocate to feed, such a short-duration interruption would be unlikely to have significant impacts on an individual's energy budget and, further, for these species and this open-ocean area, there are no specific known reasons (*i.e.,* these species range GOM-wide beyond the continental slope and there are no known biologically important areas) to expect that there would not be adequate alternate feeding areas relatively nearby, especially considering the anticipated absence of survey activity in the eastern GOM.

As described above, no survey activity is expected within the eastern GOM. Importantly, the absence of survey activity in the area will reduce disturbance of *Kogia* spp. in places of importance to them for critical behaviors such as foraging and socialization and, overall, help to reduce impacts to the stocks as a whole.

NMFS has analyzed the likely impacts of potential hearing impairment, including the estimated upper bounds of permanent threshold shift (Level A harassment) that could be authorized under the rule and do not expect that they would result in impacts on reproduction or survival of any individuals. As described in the previous section, the degree of injury for individuals would be expected to be mild, and the predicted PTS resulting from airgun exposure is not likely to affect echolocation performance or communication for *Kogia* spp. Additionally, the extended distance shutdown zone for *Kogia* spp. (1,500 m) is expected to further minimize the severity of any hearing impairment incurred and also to further reduce the likelihood of, and minimize the severity of, more severe behavioral responses.

Of note, due to their pelagic distribution, small size, and cryptic behavior, pygmy sperm whales and dwarf sperm whales are rarely sighted during at-sea surveys and difficult to distinguish between when visually observed in the field. Accordingly, abundance estimates in NMFS SARs are recorded for *Kogia* spp. only, density and take estimates in this rule are similarly lumped for the two species, and there is no additional information by which NMFS could appropriately apportion impacts other than equally/proportionally across the two species.

No mortality of *Kogia* spp. is anticipated or authorized. While it is likely that the majority of the individuals of these two species will be impacted briefly on one or more days during a year of activity by one type of survey or another, based on the nature of the individual exposures and takes, as well as the aggregated scale of the impacts across the GOM, and in consideration of the mitigation discussed here, the impacts of the expected takes from these activities are not likely to adversely impact the GOM stocks of dwarf or pygmy sperm whales through adverse impacts on annual rates of recruitment or survival.

Other Stocks

In consideration of the similarities in the nature and scale of impacts, we consider the GOM stocks of the following species together in this section: rough-toothed dolphin, Clymene dolphin, Atlantic spotted dolphin, pantropical spotted dolphin, striped dolphin, Fraser's dolphin, Risso's dolphin, melon-headed whale, pygmy killer whale, false killer whale, killer whale, and short-finned pilot whale. With the exception of Fraser's dolphin, rough-toothed dolphin, and striped dolphin, estimated (and allowable) take of these stocks (including both the maximum annual take and the total take over 5 years) has been reduced as compared to the 2021 final rule.

The risk assessment analysis, which evaluated the relative significance of the aggregated impacts of the survey activities across seven GOM zones in the context of the vulnerability of each species, concluded that the GOM-wide risk ratings for high and moderate effort scenarios ranged from very low to between low and moderate for these species. For the Fraser's dolphin, evaluated risk is the same as what was considered in the 2021 notice of issuance of the final rule, despite increased take numbers (see Tables 5–6).

We further considered the likely severity of any predicted behavioral disruption of the individuals of these species in the context of the likely duration of exposure above Level B harassment thresholds. Specifically, the average modeled time per day spent at received levels above 160 dB rms (where 50 percent of the exposed population is considered taken) ranges from 1.4–11.7 minutes for 2D, 3D NAZ, and 3D WAZ surveys and up to 25.7 minutes for coil surveys (which comprise less than 10 percent of the total projected activity days). The average time per day spent between 140 and 160 dB rms for individuals that are taken is from 8–58.1 minutes, with the one exception of killer whales exposed to noise from coil surveys, which average 73.6 minutes (though we note that the overall risk rating for the blackfish group, including killer whales, is low).

Odontocetes echolocate to find prey, and there are many different strategies for hunting. One common pattern for deeper-diving species is to conduct multiple repeated deep dives within a feeding bout, and multiple bouts within a day, to find and catch prey. While exposures of the shorter durations noted above could potentially interrupt a dive or cause an individual to relocate to feed, such a short-duration interruption would be unlikely to have significant impacts on an individual's energy budget and, further, for these species and this open-ocean area, there are no specific known reasons (*i.e.,* these species range GOM-wide beyond the continental slope and there are no known biologically important areas) to expect that there would not be adequate alternate feeding areas relatively nearby, especially considering the anticipated absence of survey activity in the eastern GOM. For those species that are more shallow feeding species, it is unlikely that the noise exposure considered herein would result in minimal significant disruption of foraging behavior and, therefore, the corresponding energetic effects would similarly be minimal.

Of note, the Atlantic spotted dolphin can be expected to benefit (via lessening of both number and severity of takes) from the coastal waters time-area restriction developed to benefit bottlenose dolphins and several additional species can be expected to benefit from the absence of survey activity in important eastern GOM habitat.

No mortality or Level A harassment of these species is anticipated or authorized. It is likely that the majority of the individuals of these species will be impacted briefly on one or more days during a year of activity by one type of survey or another. Based on the nature of the individual exposures and takes, as well as the very low to low aggregated scale of the impacts across the GOM and considering the mitigation discussed here, the impacts of the expected takes from these activities are not likely to adversely impact the GOM stocks of any of these 12 GOM stocks of these species through adverse impacts on annual rates of recruitment or survival.

Determination

Based on the analysis contained herein, and the analysis incorporated by reference from the 2021 final rule for the other species and stocks for which take is authorized (Table 6), of the likely effects of the specified activities on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the specified activities for the 5-year period of the regulations will have a negligible impact on all affected marine mammal species and stocks.

Small Numbers

Below for reference, we summarize how NMFS interprets and applies the small numbers standard, which is substantively unchanged from the full discussion provided in the 2018 notice of proposed rulemaking. Additional discussion was provided in the Comments and Responses section of the notice of issuance for the 2021 final rule to address specific comments, questions, or recommendations received from the public.

In summary, when quantitative take estimates of individual marine mammals are available or inferable through consideration of additional factors, and the number of animals taken is one-third or less of the best available abundance estimate for the species or stock, NMFS considers it to be of small numbers. For additional discussion, please see NMFS' notice of issuance for the 2021 final rule (86 FR 5322, January 19, 2021; see 86 FR 5363, 86 FR 5438). NMFS may also appropriately find that one or two predicted group encounters will result in small numbers of take relative to the range and distribution of a species, regardless of the estimated proportion of the abundance.

Further, our 2021 final rule also concluded that NMFS can appropriately elect to make a ''small numbers'' finding based on the estimated annual take in individual LOAs issued under the rule. This approach does not affect the negligible impact analysis for a rule, which is the biologically relevant inquiry and based on the total annual estimated taking for all activities the regulations will govern. NMFS determined this approach is a permissible interpretation of the relevant MMPA provisions. Making the small numbers finding based on the estimated annual take in individual LOAs allows NMFS to take advantage of the associated administrative and environmental benefits of utilizing section 101(a)(5)(A) that would be precluded in many cases if small numbers were required to be applied to the total annual taking under the regulations.

Regarding how small numbers will be evaluated under this rule, as in the 2021 final rule, up-to-date species information is available, and sophisticated models have been used to estimate take in a manner that will allow for quantitative comparison of the take of individuals versus the best available abundance estimates for the species or guilds. Specifically, while the modeling effort utilized in the rule enumerates the estimated instances of

takes that will occur across days as the result of the operation of certain survey types in certain areas, the modeling report also includes the evaluation of a test scenario that allows for a reasonable modification of those generalized take estimates to better estimate the number of individuals that will be taken within one survey (as discussed under Estimated Take). Use of modeling results from the rule allows one to reasonably estimate the number of marine mammal individuals taken in association with survey activities. The estimated take of marine mammals for each species or guild will then be compared against the best available abundance estimate as determined, and estimates that do not exceed one-third of that estimate will be considered small numbers.

Our 2021 final rule contained a fuller explanation of this interpretation and application of ''small numbers'' and explained how small numbers would be evaluated under the rule. We do not propose any changes to our treatment of the small numbers standard in this proposed rule, as the new information considered herein has no bearing on those discussions. See the ''Small Numbers'' section of the 2021 final rule at 86 FR 5438–5440 and responses to comments on small numbers at 86 FR 5363–5368 (January 19, 2021).

Adaptive Management

The regulations governing the take of marine mammals incidental to geophysical survey activities contain an adaptive management component. We do not propose any changes here. The comprehensive reporting requirements (see the Proposed Monitoring and Reporting section) are designed to provide NMFS with monitoring data from the previous year to allow consideration of whether any changes are appropriate. The use of adaptive management allows NMFS to consider new information from different sources to determine (with input from the LOA-holders regarding practicability) on a regular (*e.g.,* annual or biennial) basis if mitigation or monitoring measures should be modified (including additions or deletions). Mitigation measures could be modified if new data suggest that such modifications would have a reasonable likelihood of reducing adverse effects to marine mammal species or stocks or their habitat and if the measures are practicable. The adaptive management process and associated reporting requirements would serve as the basis for evaluating performance and compliance. As no changes to the existing adaptive management process are proposed, we do not repeat discussion provided in the notice of issuance of the final rule. Please see that document for further detail.

Under this rule, NMFS plans to implement an annual adaptive management process including BOEM, the Bureau of Safety and Environmental Enforcement (BSEE), industry operators (including geophysical companies as well as exploration and production companies), and others as appropriate. Industry operators may elect to be represented in this process by their respective trade associations. NMFS, BOEM, and BSEE (*i.e.,* the regulatory agencies) and industry operators who have conducted or contracted for survey operations in the GOM in the prior year (or their representatives) will provide an agreed-upon description of roles and responsibilities, as well as points of contact, in advance of each year's adaptive management process. The foundation of the adaptive management process will be the annual comprehensive reports produced by LOA-holders (or their representatives), as well as the results of any relevant research activities, including research supported voluntarily by the oil and gas industry and research supported by the Federal government.

All reporting requirements have been complied with under the rule to date. NMFS has received a report compiled by industry trade associations in order to comply with the comprehensive reporting requirements. The report, which considers LOA-specific reports received during the first year of implementation of the rule, is available online at: *www.fisheries.noaa.gov/action/incidental-take-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico.*

Monitoring Contribution Through Other Research

NMFS' MMPA implementing regulations require that applicants for incidental take authorizations describe the suggested means of coordinating research opportunities, plans, and activities relating to reducing incidental taking and evaluating its effects (50 CFR 216.104(a)(14)). Such coordination can serve as an effective supplement to the monitoring and reporting required pursuant to issued LOAs and/or incidental take regulations. NMFS expects that relevant research efforts will inform the annual adaptive management process described above, and that levels and types of research efforts will change from year to year in response to identified needs and evolutions in knowledge, emerging trends in the economy and available funding, and available scientific and technological resources. In the 2018 notice of proposed rulemaking, NMFS described examples of relevant research efforts (83 FR 29300–29301, June 22, 2018). We do not repeat that information here, but refer the reader to that notice for more information. The described efforts may not be predictive of any future levels and types of research efforts. Research occurring in locations other than the GOM may be relevant to understanding the effects of geophysical surveys on marine mammals or marine mammal populations or the effectiveness of mitigation. NMFS also refers the reader to the industry Joint Industry Program (JIP) website (*www.soundandmarinelife.org*), which hosts a database of available products funded partially or fully through the JIP, and to BOEM's Environmental Studies Program (ESP), which develops, funds, and manages scientific research to inform policy decisions regarding outer continental shelf resource development (*www.boem.gov/studies).*

Impact on Availability of Affected Species for Taking for Subsistence Uses

There are no relevant subsistence uses of marine mammals implicated by these actions. Therefore, as with the 2021 final rule, NMFS has determined that the total taking of affected species or stocks will not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act (ESA)

Section 7 of the ESA requires Federal agencies to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. Federal agencies must consult with NMFS for actions that may affect such species under NMFS' jurisdiction or critical habitat designated for such species. At the conclusion of consultation, the consulting agency provides an opinion stating whether the Federal agency's action is likely to jeopardize the continued existence of ESA-listed species or destroy or adversely modify designated critical habitat.

On March 13, 2020, NMFS' Office of Protected Resources, ESA Interagency Cooperation Division, issued a Biological Opinion (BiOp) on federally regulated oil and gas program activities in the Gulf of Mexico, including NMFS' issuance of the ITR and subsequent LOAs (as well as all BOEM and Bureau of Safety and Environmental Enforcement approvals of activities

associated with the OCS oil and gas program in the GOM). The 2020 BiOp concluded that NMFS' proposed action was not likely to jeopardize the continued existence of sperm whales or Rice's whales. Of note, that BiOp evaluated the larger scope of survey activity originally contemplated for the rule, before BOEM revised the scope of its activity to remove the GOMESA area in the eastern GOM. The take estimates being considered for this proposed rule are, therefore, within the scope of take considered in the BiOp and do not reveal effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered. Thus, for this proposed rule to consider corrected take estimates and other newly available information, NMFS has preliminarily determined that re-initiation of consultation is not triggered under 50 CFR 402.16, although NMFS does anticipate amending the incidental take statement to reflect the corrected take estimates.

Letters of Authorization

Under the incidental take regulations in effect for this specified activity, industry operators may apply for LOAs (50 CFR 217.186). We do not propose any changes to the regulations for obtaining an LOA. LOAs may be issued for any time period that does not exceed the effective period of the regulations, provided that NMFS is able to make the relevant determinations (50 CFR 217.183). Because the specified activity does not provide actual specifics of the timing, location, and survey design for activities that would be the subject of issued LOAs, such requests must include, at minimum, the information described at 50 CFR 216.104(a)(1) and (2), and should include an affirmation of intent to adhere to the mitigation, monitoring, and reporting requirements described in the regulations. The level of effort proposed by an operator would be used to develop an LOA-specific take estimate based on the results of Weirathmueller *et al.* (2022). These results would be based on the appropriate source proxy (*i.e.,* either 90-in^3 single airgun or 4,130-, 5,110-, or 8,000-in^3 airgun array).

As is the case now under the 2021 ITR, if applicants do not use the modeling provided by the rule, NMFS may publish a notice in the **Federal Register** soliciting public comment, if the model or inputs differ substantively from those that have been reviewed by NMFS and the public previously. Additional public review is not needed unless the model or inputs differ substantively from those that have been reviewed by NMFS and the public previously.

Technologies continue to evolve to meet the technical, environmental, and economic challenges of oil and gas development. The use of ''new and unusual technologies'' (NUT), *i.e.,* technologies other than those described herein, will be evaluated on a case-by-case basis and may require public review. Some seemingly new technologies proposed for use by operators are often extended applications of existing technologies and interface with the environment in essentially the same way as well-known or conventional technologies. For such evaluations, NMFS will follow the existing NUT process described in the notice of issuance for the 2021 final rule. Please see that document for further detail.

Classification

Pursuant to the procedures established to implement Executive Order 12866, the Office of Management and Budget (OMB) determined that the 2021 final rule was economically significant. Accordingly, a regulatory impact analysis (RIA) was prepared and made available for review by the public. Following review of public comments, a final RIA was prepared and made available online at: *www.fisheries.noaa.gov/action/incidental-take-authorization-oil-and-gas-industry-geophysical-survey-activity-gulf-mexico.* Appendix B of the RIA provided a final regulatory flexibility analysis (FRFA, discussed below), while Appendix C addressed other compliance requirements. The RIA demonstrated that the rule would not be economically significant and, in fact, that the rule would provide cost benefits to the regulated industry when evaluated against the settlement baseline. Please see the RIA for additional detail.

OMB has determined that this proposed rule is significant under section 3(f)(1) of E.O. 12866.

NMFS prepared a FRFA, as required by section 603 of the Regulatory Flexibility Act (RFA), for the regulations issued under the 2021 final rule, which we do not propose to change in this proposed rule. The FRFA described the economic effects on small entities. A copy of the full FRFA is available as Appendix B to the RIA. No changes are proposed here that would affect the findings of the FRFA, which were summarized in the notice of issuance for the 2021 final rule (86 FR 5443, January 19, 2021).

Pursuant to section 605(b) of the Regulatory Flexibility Act (RFA), the Chief Counsel for Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. As discussed above, no changes are proposed through this rule that would result in additional economic effects to small entities. Because of this certification, a regulatory flexibility analysis is not required, and none has been prepared.

This proposed rule does not contain a change to a collection of information requirement for purposes of the Paperwork Reduction Act of 1995. The existing collection of information requirements would continue to apply under the following OMB Control Number(s): 0648–0151.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid OMB Control Number.

List of Subjects in 50 CFR Part 217

Exports, Fish, Imports, Indians, Labeling, Marine mammals, Penalties, Reporting and recordkeeping requirements, Seafood, Transportation.

As described above, because NMFS does not find that new mitigation measures are required, this proposed rule would not amend the current applicable regulations at 50 CFR part 217 subpart S (§§ 217.180 through 217.189). Thus, no amendatory instructions are necessary.

Samuel D. Rauch, III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

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