



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

INCIDENTAL HARASSMENT AUTHORIZATION

The United States Geological Survey (USGS) is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(D)) to harass marine mammals incidental to a marine geophysical survey in the Atlantic Ocean, when adhering to the following terms and conditions.

1. This IHA is valid for a period of one year from the date of issuance.
2. This IHA is valid only for marine geophysical survey activity, as specified in the USGS IHA application and using an airgun array aboard the *R/V Hugh R. Sharp* with characteristics specified in the application.
3. General Conditions
 - (a) A copy of this IHA must be in the possession of USGS, the vessel operator (The University of Delaware) and other relevant personnel, the lead Protected Species Observer (PSO), and any other relevant designees of USGS operating under the authority of this IHA.
 - (b) The species authorized for taking are listed in Table 1. The taking, by Level B harassment only, is limited to the species and numbers listed in Table 1. Any taking exceeding the authorized amounts listed in Table 1 is prohibited and may result in the modification, suspension, or revocation of this IHA.
 - (c) The taking by serious injury or death of any species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA.
 - (d) During use of the airgun(s), if marine mammal species other than those listed in Table 1 are detected by PSOs, the acoustic source must be shut down to avoid unauthorized take.
 - (e) The USGS scientist-in-charge or his/her designee shall ensure that the vessel operator and other relevant vessel personnel are briefed on all responsibilities, communication procedures, marine mammal monitoring protocol, operational procedures, and IHA requirements prior to the start of survey activity, and when relevant new personnel join the survey operations.

4. Mitigation Requirements

The holder of this Authorization is required to implement the following mitigation measures:

- (a) USGS must use at least three (3) dedicated, trained, NMFS-approved PSOs. The PSOs must have no tasks other than to conduct observational effort, record observational data, and communicate with and instruct relevant vessel crew with



regard to the presence of marine mammals and mitigation requirements. PSO resumes shall be provided to NMFS for approval.

- (b) At least one PSO must have a minimum of 90 days at-sea experience working as a PSO during a seismic survey, with no more than eighteen months elapsed since the conclusion of the at-sea experience. One experienced PSO shall be designated as the lead for the entire protected species observation team. The lead PSO shall serve as primary point of contact for the USGS scientist-in-charge or his/her designee.
- (c) Visual Observation:
 - (i) During survey operations (*e.g.*, any day on which use of the acoustic source is planned to occur; whenever the acoustic source is in the water, whether activated or not), at least one PSO must be on duty and conducting visual observations at all times during daylight hours (*i.e.*, from 30 minutes prior to sunrise through 30 minutes following sunset).
 - (ii) Visual monitoring must begin not less than 30 minutes prior to ramp-up, including for nighttime ramp-ups of the airgun array, and must continue until one hour after use of the acoustic source ceases or until 30 minutes past sunset.
 - (iii) PSOs shall coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts and shall conduct visual observations using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.
 - (iv) PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours observation per 24-hour period.
 - (v) During good conditions (*e.g.*, daylight hours; Beaufort sea state 3 or less), visual PSOs shall conduct observations when the acoustic source is not operating (except during transits across the shelf where no seismic activity shall occur during the survey) for comparison of sighting rates and behavior with and without use of the acoustic source and between acquisition periods, to the maximum extent practicable.
- (d) Exclusion Zone(EZ) and Buffer Zone – PSOs shall establish and monitor a 100 m EZ and an additional 100 m buffer zone beginning from the outside extent of the 100 m EZ. The zones shall be based upon radial distance from any element of the airgun array (rather than being based on the center of the array or around the vessel itself). During use of the acoustic source, occurrence of marine mammals outside the EZ but within the 100 m buffer zone from any element of the airgun

array shall be communicated to the USGS scientist-in-charge or his/her designee to prepare for potential further mitigation measures as described below. During use of the acoustic source, occurrence of marine mammals within the EZ shall trigger further mitigation measures as described below.

- (i) Ramp-up – A ramp-up procedure is required at all times as part of the activation of the acoustic source. Ramp-up shall begin with starting one airgun with an additional airgun being activated every 5 minutes until all four airguns are in operation.
- (ii) If the airgun array has been shut down due to a marine mammal detection, ramp-up shall not occur until all marine mammals have cleared the EZ. A marine mammal is considered to have cleared the EZ if:
 - 1. It has been visually observed to have left the EZ; or
 - 2. It has not been observed within the EZ, for 15 minutes (in the case of small odontocetes) or for 30 minutes (in the case of mysticetes and large odontocetes including sperm, pygmy and dwarf sperm, beaked whales, and large delphinids)
- (iii) Thirty minutes of pre-clearance observation of the 100 m EZ and 100 m buffer zone are required prior to ramp-up. This pre-clearance period may occur during any vessel activity. If any marine mammal (including delphinids) is observed within or approaching the EZ or 100 m buffer zone during the 30 minute pre-clearance period, ramp-up may not begin until the animal(s) has been observed exiting the EZ or 100 m buffer zone or until an additional time period has elapsed with no further sightings (*i.e.*, 15 minutes for small odontocetes and 30 minutes for mysticetes and large odontocetes including sperm, pygmy and dwarf sperm, beaked whales, and large delphinids).
- (iv) During ramp-up, at least two PSOs shall conduct monitoring. If a marine mammal is observed within or approaching the 100 m EZ during ramp-up, a shutdown shall be implemented as though the full array were operational. Ramp-up may not begin again until the animal(s) has been observed exiting the 100 m EZ or until an additional time period has elapsed with no further sightings in the 100 m EZ (*i.e.*, 15 minutes for small odontocetes and 30 minutes for mysticetes and large odontocetes including sperm, pygmy and dwarf sperm, beaked whales, and large delphinids).
- (v) If the airgun array has been shut down for reasons other than mitigation (*e.g.*, mechanical difficulty) for a period of less than 30 minutes, it may be activated again without ramp-up if PSOs have maintained constant visual observation and no visual detections of any marine mammal have occurred within the 100 m EZ or 100 m buffer zone.

- (vi) Ramp-up at night and at times of poor visibility shall only occur where operational planning cannot reasonably avoid such circumstances. Ramp-up may occur at night and during poor visibility if the 100 m EZ and 100 m buffer zone have been continually monitored by visual PSOs for 30 minutes prior to ramp-up with no marine mammal detections.
 - (vii) The USGS scientist-in-charge or his/her designee must notify a designated PSO of the planned start of ramp-up. The designated PSO must be notified again immediately prior to initiating ramp-up procedures and the USGS scientist-in-charge or his/her designee must receive confirmation from the PSO to proceed.
- (e) Shutdown requirements – A 100 m EZ shall be established and monitored by PSOs. If a marine mammal is observed within or entering the 100 m exclusion zone all airguns shall be shut down.
- (i) The USGS scientist-in-charge or his/her designee must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the airgun array to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch.
 - (ii) When a shutdown is called for by a PSO, the shutdown must occur and any dispute resolved only following shutdown.
 - (iii) The shutdown requirement is waived for dolphins of the following genera: *Tursiops*, *Steno*, *Stenella*, *Lagenorhynchus* and *Delphinus*. Instead of shutdown, the acoustic source must be powered down to the smallest single element of the array if a dolphin of the indicated genera appears within or enters the 100-m exclusion zone. If there is uncertainty regarding identification (*i.e.*, whether the observed animal(s) belongs to the group described above), shutdown must be implemented. Power-down conditions shall be maintained until the animal(s) are no longer observed within the exclusion zone, following which full-power operations may be resumed without ramp-up. PSOs may elect to waive the power-down requirement if the animal(s) appear to be voluntarily approaching the vessel for the purpose of interacting with the vessel or towed gear, and may use best professional judgment in making this decision.
 - (iv) Upon implementation of a shutdown, the source may be reactivated under the conditions described above. Where there is no relevant zone (*e.g.*, shutdown due to observation of a calf), a 30-minute clearance period must be observed following the last observation of the animal(s).
 - (v) Shutdown of the array is required upon observation of a whale (*i.e.*, sperm whale or any baleen whale) with calf, with “calf” defined as an animal less

than two-thirds the body size of an adult observed to be in close association with an adult, at any distance.

- (vi) Shutdown of the array is required upon observation of an aggregation (*i.e.*, six or more animals) of large whales of any species (*i.e.*, sperm whale or any baleen whale) at any distance.
 - (vii) Shutdown of the array is required upon observations of a marine mammal species not authorized for take that is entering or approaching the Level B harassment zone shown in Table 2.
 - (viii) Shutdown of the array is required upon observations of an authorized marine mammal species that has reached its total allotted Level B harassment (Table 1) that is entering or approaching the vessel's respective Level B harassment zone (See Table 2).
- (f) Vessel Strike Avoidance – The USGS, PSOs, vessel operator, and crew must maintain a vigilant watch for all marine mammals and the vessel operator must slow down or stop the vessel or alter course, as appropriate, to avoid striking any marine mammal. These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel according to the parameters stated below. Visual observers monitoring the vessel strike avoidance zone can be either third-party observers or crew members, but crew members responsible for these duties must be provided sufficient training to distinguish marine mammals from other phenomena.
- (i) The vessel must, to the maximum extent practicable, maintain a minimum separation distance of 100 m from large whales except for north Atlantic right whales which the vessel must maintain a minimum separation distance of 500 m. The following avoidance measures must be taken if a large whale is within 100 m of the vessel or a north Atlantic right whale is 500 m from the vessel:
 1. The vessel must reduce speed and shift the engine to neutral, when feasible, and must not engage the engines until the whale has moved outside of the vessel's path and the minimum separation distance has been established.
 2. If the vessel is stationary, the vessel must not engage engines until the whale(s) has moved out of the vessel's path and beyond 100 m.
 - (ii) The vessel must attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an exception made for animals described in 4(e)(iv) that approach the vessel. If an animal is encountered

during transit, the vessel shall attempt to remain parallel to the animal's course, avoiding excessive speed or abrupt changes in course.

- (iii) Vessel speeds must be reduced to 10 knots or less when mother/calf pairs or large assemblages of cetaceans are observed within 500 m of the vessel. Mariners may use professional judgment as to when such circumstances warranting additional caution are present.

(g) Stranding Measures

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

1. If at any time, the marine mammal(s) die or are euthanized, or if herding/intervention efforts are stopped, the Director of OPR, NMFS (or designee) will advise the IHA-holder that the shutdown is no longer needed.
2. Otherwise, shutdown procedures will remain in effect until the Director of OPR, NMFS (or designee) determines and advises the IHA-holder that all live animals involved have left the area (either of their own volition or following an intervention).
3. If further observations of the marine mammals indicate the potential for re-stranding, additional coordination with the IHA-holder will be required to determine what measures are necessary to minimize that likelihood (e.g., extending the shutdown or moving operations farther away) and to implement those measures as appropriate.

(h) Miscellaneous Protocols

- (i) The airgun array must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Unnecessary use of the acoustic source shall be avoided. Operational capacity of 840 in³ (not including redundant backup airguns) must not be exceeded during the survey, except where unavoidable for source testing and calibration purposes. All occasions where activated source volume exceeds notified operational capacity must be noticed to the PSO(s) on duty and fully documented. The lead PSO must be granted access to relevant instrumentation documenting acoustic source power and/or operational volume.

- (ii) Testing of the acoustic source involving all elements requires normal mitigation protocols (*e.g.*, ramp-up). Testing limited to individual source elements or strings does not require ramp-up but does require pre-clearance.

5. Monitoring Requirements

The holder of this Authorization is required to conduct marine mammal monitoring during survey activity. Monitoring shall be conducted in accordance with the following requirements:

- (a) The USGS scientist-in-charge or his/her designee must provide a night-vision device suited for the marine environment for use during nighttime ramp-up pre-clearance, at the discretion of the PSOs. At minimum, the device should feature automatic brightness and gain control, bright light protection, infrared illumination, and optics suited for low-light situations.
- (b) PSOs must also be equipped with reticle binoculars (*e.g.*, 7 x 50) of appropriate quality (*e.g.*, Fujinon or equivalent), Big Eye binoculars, GPS, compass, and any other tools necessary to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals.
- (c) PSO Qualifications
 - (i) PSOs must have successfully completed relevant training, including completion of all required coursework and passing a written and/or oral examination developed for the training program.
 - (ii) PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences and a minimum of 30 semester hours or equivalent in the biological sciences and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver must include written justification. Alternate experience that may be considered includes, but is not limited to (1) secondary education and/or experience comparable to PSO duties; (2) previous work experience conducting academic, commercial, or government-sponsored marine mammal surveys; or (3) previous work experience as a PSO; the PSO should demonstrate good standing and consistently good performance of PSO duties.
- (d) Data Collection – PSOs must use standardized data forms, whether hard copy or electronic. PSOs shall record detailed information about any implementation of mitigation requirements, including the distance of animals to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source to resume survey. If required mitigation was not

implemented, PSOs should submit a description of the circumstances. We require that, at a minimum, the following information be reported:

- (i) PSO names and affiliations;
- (ii) Dates of departures and returns to port with port name;
- (iii) Dates and times (Greenwich Mean Time) of survey effort and times corresponding with PSO effort;
- (iv) Vessel location (latitude/longitude) when survey effort begins and ends; vessel location at beginning and end of visual PSO duty shifts;
- (v) Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change;
- (vi) Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including wind speed and direction, Beaufort sea state, Beaufort wind force, swell height, weather conditions, cloud cover, sun glare, and overall visibility to the horizon.
- (vii) Factors that may be contributing to impaired observations during each PSO shift change or as needed as environmental conditions change (*e.g.*, vessel traffic, equipment malfunctions);
- (viii) Survey activity information, such as acoustic source power output while in operation, number and volume of airguns operating in the array, tow depth of the array, and any other notes of significance (*i.e.*, pre-ramp-up survey, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.); and
- (ix) If a marine mammal is sighted, the following information should be recorded:
 1. Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
 2. PSO who sighted the animal;
 3. Time of sighting;
 4. Vessel location at time of sighting;
 5. Water depth;
 6. Direction of vessel's travel (compass direction);
 7. Direction of animal's travel relative to the vessel;

8. Pace of the animal;
9. Estimated distance to the animal and its heading relative to vessel at initial sighting;
10. Identification of the animal (*e.g.*, genus/species, lowest possible taxonomic level, or unidentified); also note the composition of the group if there is a mix of species.
11. Estimated number of animals (high/low/best);
12. Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);
13. Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);
14. Detailed behavior observations (*e.g.*, number of blows, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior);
15. Animal's closest point of approach and/or closest distance from the center point of the acoustic source;
16. Platform activity at time of sighting (*e.g.*, deploying, recovering, testing, shooting, data acquisition, other); and
17. Description of any actions implemented in response to the sighting (*e.g.*, delays, shutdown, ramp-up, speed or course alteration, etc.) and time and location of the action.

6. Reporting

- (a) USGS shall submit a draft comprehensive report on all activities and monitoring results within 90 days of the completion of the survey or expiration of the IHA, whichever comes sooner. The report must describe all activities conducted and sightings of marine mammals near the activities, must provide full documentation of methods, results, and interpretation pertaining to all monitoring, and must summarize the dates and locations of survey operations and all marine mammal sightings (dates, times, locations, activities, associated survey activities). Geospatial data regarding locations where the acoustic source was used must be provided as an ESRI shapefile with all necessary files and appropriate metadata. In addition to the report, all raw observational data shall be made available to NMFS. The report must summarize the data collected as required under condition 5(d) of this IHA. The draft report must be accompanied by a certification from the lead PSO as to the accuracy of the report, and the lead PSO may submit directly

to NMFS a statement concerning implementation and effectiveness of the required mitigation and monitoring. A final report must be submitted within 30 days following resolution of any comments from NMFS on the draft report.

(b) Reporting injured or dead marine mammals:

(i) In the event that the specified activity clearly causes the take of a marine mammal in a manner not prohibited by this IHA (if issued), such as serious injury or mortality, USGS shall immediately cease the specified activities and immediately report the incident to the NMFS Office of Protected Resources (301-427-8401) and to the Greater Atlantic Regional (978-282-8478) and Southeastern Regional (877-433-8299) stranding coordinators as soon as feasible. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the incident;
2. Species identification (if known) or description of the animal(s) involved;
3. Condition of the animal(s) (including carcass condition if the animal is dead);
4. Observed behaviors of the animal(s), if alive;
5. If available, photographs or video footage of the animal(s); and
6. General circumstances under which the animal was discovered.

(ii) In the event of a ship strike of a marine mammal by any vessel involved in the activities covered by the authorization, the IHA-holder shall report the incident to OPR, NMFS and to regional stranding coordinators as soon as feasible. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the incident;
2. Species identification (if known) or description of the animal(s) involved;
3. Vessel's speed during and leading up to the incident;
4. Vessel's course/heading and what operations were being conducted (if applicable);
5. Status of all sound sources in use;
6. Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;

7. Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;
 8. Estimated size and length of animal that was struck;
 9. Description of the behavior of the marine mammal immediately preceding and following the strike;
 10. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
 11. Estimated fate of the animal (*e.g.*, dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
 12. To the extent practicable, photographs or video footage of the animal(s).
- (iii) If NMFS determines that the circumstances of any marine mammal stranding found in the vicinity of the activity suggest investigation of the association with survey activities is warranted (example circumstances noted below), and an investigation into the stranding is being pursued, NMFS will submit a written request to the IHA-holder indicating that the following initial available information must be provided as soon as possible, but no later than 7 business days after the request for information.
1. Status of all sound source use in the 48 hours preceding the estimated time of stranding and within 50 km of the discovery/notification of the stranding by NMFS; and
 2. If available, description of the behavior of any marine mammal(s) observed preceding (*i.e.*, within 48 hours and 50 km) and immediately after the discovery of the stranding.


In the event that the investigation is still inconclusive, the investigation of the association of the survey activities is still warranted, and the investigation is still being pursued, NMFS may provide additional information requests, in writing, regarding the nature and location of survey operations prior to the time period above.

- (iv) Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with USGS to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. USGS may not resume their activities until notified by NMFS;
- (v) In the event that USGS discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is

unknown and the death is relatively recent (*e.g.*, in less than a moderate state of decomposition), USGS shall immediately report the incident to the NMFS Office of Protected Resources. The report must include the same information identified in condition 6(b)(i) of this IHA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with USGS to determine whether additional mitigation measures or modifications to the activities are appropriate.

(vi) In the event that USGS discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the specified activities (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), USGS shall report the incident to the NMFS Office of Protected Resources within 24 hours of the discovery. USGS shall provide photographs or video footage or other documentation of the sighting to NMFS.

7. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein, or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.



Donna S. Wieting,
Director, Office of Protected Resources,
National Marine Fisheries Service.

AUG 06 2018

Date

Attachments

Table 1 Numbers of Incidental Take Authorized

Species	Level B take **	Level A take
Humpback whale	3	0
Sei whale	3	0
Fin whale	5	0
Sperm whale	161	0
<i>Kogia</i> spp.	9	0
Beaked whales	128	0
Northern bottlenose whale*	4*	0
Rough-toothed dolphin	10	0
Common bottlenose dolphin	757	0
Clymene dolphin	122	0
Atlantic spotted dolphin	1598	0
Pantropical spotted dolphin	50	0
Spinner dolphin*	91*	0
Striped dolphin	1459	0
Short-beaked common dolphin	1620	0
Fraser's dolphin*	204*	0
Atlantic white-sided dolphin*	48*	0
Risso's dolphin	237	0
Melon-headed whale*	50*	0
Pygmy killer whale*	6*	0
False killer whale*	28*	0
Killer whale*	7*	0
Pilot whales	288	0

*Number represents Level B take of a single group for rare species in the action area.

Table 2 Modeled radial distances [m] to Level B harassment thresholds.

Source and Volume	Tow Depth (m)	Water Depth (m)	Predicted RMS Radii (m)
			160 dB
Base Configuration (Configuration 1) Four 105 in³ GI-guns	3	>1000 m	1091m
		100–1000 m	1637m
GG Configuration (Configuration 2) Four 210 in³ GI-guns	3	>1000 m	1244m
		100–1000 m	1866m

