

DEPARTMENT OF ENERGY
Office of Fossil Energy, National Energy Technology Laboratory

Finding of No Significant Impact (FONSI) Pursuant to the National Environmental Policy Act (NEPA) and based on adoption of U.S. Geological Survey's Environmental Assessment

Proposed Activity: Funding and participation in the Marine Geophysical Survey in the Northwest Atlantic (MATRIX), August 2018

AGENCY: U.S. Department of Energy

ACTION: Finding of No Significant Impact

SUMMARY: In accordance with the National Environmental Policy Act of 1969, as amended, the U.S. Department of Energy (DOE) adopted an environmental assessment prepared by U.S. Geological Survey (USGS). DOE is issuing this Finding of No Significant Impact (FONSI) for its share of the cost for a marine geophysical survey in the Northwest Atlantic in August 2018 aboard the *R/V Hugh R. Sharp*.

Introduction

An environmental assessment (EA) was prepared by the US Geological Survey (USGS), U.S. Department of the Interior, for a marine seismic survey to be conducted on board the *R/V Hugh R. Sharp* on the U.S. Mid-Atlantic margin between 35 nautical miles (nm) south of Hudson Canyon and Cape Hatteras in August 2018. The Final EA is entitled "Final Environmental Assessment for a Marine Geophysical Survey (MATRIX) by the U.S. Geological Survey in the Northwest Atlantic, August 2018." MATRIX is the Mid-Atlantic Resource Imaging Experiment (MATRIX), whose purpose is described later in this document. The Final EA was based on a Draft EA prepared in March 2018. The USGS used the Draft EA during consultations with federal regulatory agencies between March and August 2018 and for obtaining public input on the proposed action. As described in the Draft and Final EA, the USGS is the lead action agency whose scientists and technical personnel would conduct all aspects of the seismic survey at sea. MATRIX is also partially sponsored by the U.S. Department of Energy's Methane Hydrates Research and Development (R&D) Program and by the Bureau of Ocean Energy Management (BOEM), which is another agency in the U.S. Department of Interior.

The conclusions from the Final EA were used to inform managers of other federal agencies of the potential environmental impacts of the proposed action. The Final EA addressed potential impacts of the seismic survey on marine mammals, endangered species, and other species of concern in and near the study area, including turtles, seabirds, fish, and invertebrates (and their habitats).

The Final EA was prepared to fulfill federal agency responsibilities under the National Environmental Policy Act and Executive Order 12114. The Final EA tiers to the Final Programmatic Environmental Impact Statement (PEIS)/Overseas Environmental Impact Statement (OEIS) for Marine Seismic Research funded by the National Science Foundation

Statement (OEIS) for Marine Seismic Research funded by the National Science Foundation (NSF) or conducted by the U.S. Geological Survey (June 2011), henceforth referred to as the NSF-USGS PEIS, and the USGS Record of Decision (Feb 2013), henceforth referred to as the USGS Record of Decision (ROD).

Technical revisions to the Draft EA were made as a result of interactions and discussions between the USGS and National Marine Fisheries Service (NMFS) during consultation on compliance with the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). These changes did not alter the overall findings of the Draft EA or USGS's concurrence with the conclusions of the Final EA. The Final EA remains consistent with the NSF-USGS PEIS and the ROD with slight adaptations to take into account revised acoustic guidance for Level A MMPA determinations based on guidance documents released by NMFS in 2016 and updated in 2018. The Final EA (Attachment 1) is incorporated into this Finding of No Significant Impact (FONSI) by reference as if fully set forth herein.

Public Involvement and Coordination with Other Agencies and Processes

The Draft EA was posted on the USGS website for a 30-day public comment period from March 19 to April 19, 2018. No public comments or inquiries were received on the Draft EA during that period. The Draft EA supported requests to NMFS and U.S. Fish and Wildlife Service (USFWS) for the Section 7(a) consultation under the ESA and for consideration of Essential Fish Habitat (EFH) under the Magnuson-Stevens Act. The Draft EA also provided information in support of the application submitted by the USGS to NMFS for an Incidental Harassment Authorization (IHA) under the MMPA. As noted below, one public comment (from the Marine Mammal Commission or MMC) was received during the NMFS IHA process (Attachment 1, Appendix G). Although this comment was not received as part of the USGS NEPA process, the USGS considered the response to the MMC with respect to the information included in the Draft EA. After consideration of the one public comment received during the NMFS IHA public comment period and of the discussions during MMPA and ESA consultations with NMFS, refinements to the information presented in the Draft EA were made in the Final EA. Some of these refinements included updating the table of maximum expected takes for marine mammals and fixing errors in the Draft EA.

Marine Mammal Protection Act (MMPA)

In March 2018, the USGS submitted to NMFS an IHA Application pursuant to the Marine Mammal Protection Act (MMPA). The USGS communicated regularly by phone and email with NMFS as part of the consultation. As noted above, one public comment was received by NMFS on the Notice of Intent to Issue and IHA (Attachment 1, Appendix F). NMFS will respond to the public comments in a Notice in the Federal Register in August 2018. The terms of the IHA issued by NMFS will serve as a condition for conducting the proposed seismic surveys.

Endangered Species Act (ESA)

USGS engaged in formal consultation with NMFS and informal consultation with U.S. Fish and Wildlife Service (USFWS), pursuant to Section 7(a) of the ESA. The USGS also met with NMFS approximately every two weeks and sometimes more frequently during the consultation process. The NMFS Biological Opinion and an Incidental Take Statement for the proposed activities will be issued in August 2018 and serve as a condition for conducting the proposed seismic activities. On June 7 and June 22, the USGS received formal notification from regional

offices of the USFWS that the proposed action would not adversely affect endangered birds that have previously been seen in the survey area (Attachment 1, Appendix E).

Magnuson Stevens Act - Essential Fish Habitat (EFH)

The Magnuson-Stevens Act requires that a Federal Action agency consult with NMFS for actions that "may adversely affect" EFH. Although adverse effects on EFH, including a reduction in quantity or quality of EFH, were not anticipated to result from the proposed activities, the USGS included a discussion of EFH in the Draft and Final EA documents.

Coastal Zone Management Act (CZMA)

As the lead federal action agency for the proposed survey, the USGS considered whether the activities would have effects on coastal resources of any state along the U.S. Mid-Atlantic margin. As concluded in the Final EA, any potential impacts from the proposed activities would mainly be to marine species in close proximity to the vessel and would be of short duration and temporary in nature. The proposed survey would occur at 100 to 3500 m water depth within the U.S. Exclusive Economic Zone (200 nm), and the closest approach to land during seismic data acquisition would be 70 km. Because of the proposed survey location in deep water and long distances from the U.S. coast, the USGS concluded the survey would have no effect on coastal zone resources. The USGS reviewed the Federal Consistency Listings for the states along the mid-Atlantic margin and determined that the proposed activity is not listed, nor is the USGS named as an agency that is routinely required to conduct CZMA consultations. USGS also did not receive a request from any state for a consistency review of the unlisted activity nor did the NOAA Office of Coast and Ocean Resource Management highlight a need for a CZMA review. Therefore, it was concluded that the USGS met its responsibilities under CZMA.

Project Objectives and Context

The goal of the MATRIX survey would be to delineate the distribution of deepwater gas hydrates and shallow seafloor gas in ocean sediments, particularly across areas earlier identified by BOEM as having a strong likelihood of hosting significant concentrations of gas hydrates. The MATRIX survey would fill a spatial gap in modern multichannel seismic data coverage on the U.S. Atlantic margin and yield data that are expected to be used for decades by the U.S. government, academic scientists, and the private sector. MATRIX data would also serve other mission goals of the USGS Coastal/Marine Hazards and Resources Program, including providing constraints on fluid migration beneath seafloor methane seeps and information about submarine geohazards (e.g., landslides), sedimentary relationships, and margin and canyon evolution.

Summary of Proposed Action

The DOE proposes to participate in the USGS-led MATRIX marine geophysical scientific research survey on the U.S. Mid-Atlantic margin from the shelf-break to approximately 3500 m water depth between 35 nm south of Hudson Canyon and Cape Hatteras. DOE's cost share for this survey is \$365,000 for ship time and some related labor costs. The maximum duration of the research cruise in August 2018 is 21 days (including refueling and transit days), with additional days in port for mobilization and demobilization. The activities are proposed to be conducted on

the *R/V Hugh R. Sharp*, a federal fleet vessel built by the U.S. Navy, owned and operated by the University of Delaware, and scheduled as part of the University-National Oceanographic Laboratory System (UNOLS) of research vessels.

The area of seismic operations during the proposed survey would be bound by:

Northernmost point: (39° 1' N; 72° 50.7' W)
Southernmost point: (34° 49' N; 74° 18.8' W)
Westernmost point: (35° 53.1' N; 74° 51' W)
Easternmost point: (37° 42.2' N; 71° 1.6' W)

The specific survey method proposed is two-dimensional (2D) seismic reflection profiling, using up to 4 GI-guns operated at 105 to 210 cubic inches each (total of 420 to 840 in³) as the active acoustic source. The largest air volumes would only be used at water depths greater than 1000 m. The GI-guns (seismic source) will be towed approximately 3 meters below the sea surface, and a streamer up to 1.3-km-long and containing as many as 120 hydrophones will record the seismic signals. The airgun array would create a seismic pulse approximately every 12 s (or 25 m) intervals during the survey.

Water depths in the survey area would be no shallower than 100 meters, and the closest approaches of the survey to the Atlantic coastline would be at least 100 nm (185 km) offshore New York, and approximately 70 nm (130 km) off New Jersey, 65 nm (120 km) offshore Delaware, 50 nm (93 km) offshore Maryland, 55 nm (102 km) offshore Virginia, and 38 nm (70 km) offshore North Carolina. The MATRIX survey is permitted for up to 2,350 kilometers (1,270 nautical miles) of data acquisition but expects to acquire only about 2000 km of the survey path during the cruise. The proposed survey design consists of six dip lines oriented sub-perpendicular to the coastline and acquiring data from the shelf-break to 3500 m water depth and three strike lines parallel to the margin's orientation at water depths greater than 2000 m. In addition, data will be acquired along some interseismic/connecting lines between these primary survey lines. The airgun array would operate continuously during the survey, except for power/shut downs, equipment repair, weather issues, and some turns. In addition to the operations of the airgun array, the USGS would deploy disposable passive receivers (sonobuoys) along some seismic lines at water depths greater than 1000 m to acquire data at larger distances from the source. The USGS would also operate a split-beam EK80 echosounder with a 38 kHz transducer ("fisheries sonar") at water depths less than about 1800 m to detect methane seepage from the seafloor.

The MATRIX survey is proposed to commence on August 8 and be completed on August 28, 2018. Mobilization would occur on August 6 and 7, and the ship would be demobilized on August 29. The ship expects to return to port at least once for refueling, and additional port calls may be required depending on weather conditions.

The consideration of the impacts of the MATRIX survey in the EA was based on the magnitude, geographic extent, and duration of the use of acoustic sources during the proposed action, as well as on an analysis of the ship's noise profile and air emissions, other ship traffic, and ocean-based commercial and recreational activities (e.g., fishing). Impact zones, particularly for marine mammals, are defined as the areas within which specific sound level thresholds established by NMFS could occur. For cetaceans (no pinnipeds occur in the survey area), the exclusion zones

(i.e., where the airguns would be partially or fully shut down if an animal were to enter) are based on auditory thresholds defined by NMFS for three hearing groups and range from 183 dB SEL_{cum} for low-frequency cetaceans (maximum 31 m from the source) to 230 dB Peak SPL_{flat} for mid-frequency cetaceans (maximum 70.426 m from the source). Modeling of the various NMFS-suggested measures of acoustic thresholds for the three cetacean functional hearing groups all yielded radial distances well within 100 m of the source for even the largest volume GI-gun discharge. A set exclusion zone (Level A zone) of 100 m was therefore agreed to after consultation with NMFS. An additional buffer zone of 100 m outside the Exclusion Zone would be established to provide warning of a marine mammal potentially getting ready to enter the Exclusion Zone. The Level B zones corresponding to the 160 dB re 1 μ Pa_{rms} isopleth for cetaceans were also calculated in the EA and are 1244 m and 1637 m radius around the source for greater than 1000 m water depth and 100 to 1000 m water depth, respectively, for the sources that will primarily be used within these depth ranges. For turtles, the Level A Exclusion Zone criterion is 195 re dB re 1 μ Pa_{rms}, and the EA provides a maximum range of 21 m from the source for this sound level. However, the 100 m Exclusion Zone adopted for cetaceans would also be used for turtles.

Monitoring and mitigation measures would be an integral part of the proposed activity. The observance of mitigation measures would minimize the potential adverse effects on the environment, including marine species, populations, and habitat. Mitigation proposed in the Draft EA and in the USGS IHA application was consistent with measures specified in the NSF-USGS PEIS and USGS ROD. The final mitigation and monitoring measures as articulated in the IHA reflects updated practices being implemented by NMFS for marine seismic surveys with airguns. Proposed mitigation is described further below and in the Final EA. All conditions specified in the IHA and Biological Opinion would be implemented during the Survey. All observations and detailed reporting of animals sighted during the survey would be recorded and submitted to NMFS under the terms of the IHA.

Alternatives to proposed activity considered

One alternative to the proposed action would be to conduct the survey at a different time. The proposed dates for the survey (August 2018) are those when the ship, the personnel, and the equipment essential to meet the overall project objectives are available. Marine mammals and sea turtles are expected to be found throughout the proposed project area and throughout the time period during which the project would occur. Except for some baleen whales, most marine mammal species probably occur in the project area year-round, so altering the timing of the proposed project likely would result in no net benefits for most species. Conducting the action at an alternative time of year could result in more time lost due to weather events, leading to the need to conduct a second large cruise in the area using the same acoustic sources in the future. Another limitation on scheduling is the vessel's schedule (which is usually decided a year or more in advance) and the cascading impact on other U.S. research activities if the cruise were to take place at another time.

Another alternative to conducting the proposed activities would be the "No Action" alternative, i.e. do not issue an IHA and do not conduct the operations. If the planned activity were not conducted, the "No Action" alternative would result in no disturbance to marine species attributable to the proposed activities; however, data related to U.S. gas hydrate resources and

shallow gas distributions would not be acquired.

Alternative technologies to conduct marine geophysical surveys were considered in the NSF-USGS PEIS (Chapter 2.6). Even seven years after completion of the PEIS, alternate technologies are still in the testing phase. They are not feasible for regional surveys such as MATRIX, nor viable for routine data acquisition. Such technologies also do not meet the Purpose and Need associated with the MATRIX cruise.

Summary of environmental consequences

The potential effects of sounds from airguns on marine species, mammals and sea turtles of particular concern, are described in detail in Attachment 1 (Chapter IV of the EA) and the NSF-USGS PEIS (Chapters 3 & 4). These effects might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, and at least in theory, temporary or permanent hearing impairment, or non-auditory physical or physiological effects. It is unlikely that the proposed action would result in any cases of temporary or especially permanent hearing impairment or any significant non-auditory physical or physiological effects. Some behavioral disturbance is expected if animals are in the general area during seismic operations, but this would be localized and short-term and involve limited numbers of animals. The potential effects from the other proposed acoustic source (EK80) were also considered. However, this fisheries sonar would not be likely to have a significant effect on the environment (Attachment 1, Chapter IV of the EA).

As noted previously, the proposed action would include an extensive monitoring and mitigation program to further minimize potential impacts on the environment. Mitigation efforts include pre-cruise planning activities and operational actions during the survey (Attachment 1, Chapters II and IV). Pre-cruise planning activities included consideration of the seismic source size relative to the survey targets; survey timing (i.e. environmental conditions: seasonal presence of animals and weather); and calculation of mitigation zones. The operational mitigation program includes observing for marine mammals and turtles in and near Level A, buffer, and Level B zones and ramp-up and shutdown procedures that would further minimize potential impacts to marine species. As detailed in Attachment 1 (Chapters II and IV) and in the IHA, operational monitoring and mitigation measures would include: ramp ups; a minimum of one, but typically two trained dedicated observers maintaining a visual watch with specialized equipment during all daytime airgun operations; two observers for 30 minutes before and during ramp-ups during the day and at night; shutdowns when marine mammals or sea turtles are detected in or about to enter designated Exclusion Zone, and increased vigilance when the animals are within the buffer zone around the Exclusion Zone. The fact that the airgun array directs most energy downward and less energy laterally would also be an inherent mitigation measure.

With the planned monitoring and mitigation measures, unavoidable impacts to marine species that could be encountered would be expected to be minimal and limited to short-term, localized changes in behavior and distribution near the seismic vessel. At most, effects on marine mammals may be interpreted as falling within the MMPA definition of "Level B Harassment" for those species managed by NMFS. No long-term or significant effects would be expected on individual marine mammals, sea turtles, seabirds, fish or the populations to which they belong or on their habitats.

Fisheries activities would not be precluded in the survey area; recreational fishing in the survey area would be likely only on the landward side of the survey area. Commercial fishing activities could be encountered, and the crew of the *R/V Hugh R. Sharp* would be prepared to notify vessels of the survey ship's reduced maneuverability and slow speed. Given the location of the survey, its short duration, and the temporary nature of potential environmental impacts, significant impacts on fisheries activities would not be anticipated.

The project is also expected to have minimal impact on fish resources. No detrimental effects on EFH are expected. Impacts of seismic sounds on birds at rest or foraging in the water are possible, although none are expected to significantly affect any bird populations. Sea turtles may be encountered and would be afforded the same protective measures as marine mammals.

Cumulative effects, such as from commercial vessel traffic and other sources of underwater sound were assessed in the Final EA. Cumulative environmental effects resulting from any of the proposed MATRIX activities would be negligible and not additive because the project activities would be transitory and temporary, moving about 100 km a day. With the implementation of mitigation measures and the limited spatial overlap with other activities, any potential for cumulative effects would be negligible and therefore not significant for the environment.

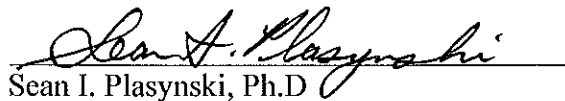
The Action Alternative, to conduct the survey at a different time, would not alter the possible effects of the proposed action. This Alternative could result in fewer authorized takes of some marine species and greater authorized takes of other marine species. Weather conditions in the Atlantic and ship schedules constrained the possible survey time window to late spring or summer 2018. In addition, scheduling the survey in mid-summer when daylight hours are maximized facilitates observations of marine wildlife in accordance with MMPA and ESA considerations and increases the efficiency of data acquisition to reduce the potential need for future similar surveys in the same area.

A survey at an alternative time would also result in few if any net benefits. Marine mammals and sea turtles are expected to be found throughout the proposed survey area year-round. At least one highly-endangered species (North Atlantic right whale) has habitat north of the survey area during the August timeframe, meaning that the proposed timing is beneficial for that species.

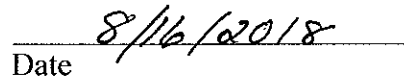
The "No Action" alternative, i.e., not conducting the operations, would result in no impacts to the environment, including marine species. However, the seismic data necessary to delineate high-saturation gas hydrate deposits and the overall distribution of gas hydrates and shallow subseafloor gas would not be acquired, leaving the U.S. without clear data on the distribution of this potential resource. The "No Action" alternative would also result in a lost opportunity to obtain important scientific data and knowledge relevant and necessary for understanding marine resources and aspects of marine geohazards and margin evolution within the mission of DOE's Methane Hydrates R&D Program and the USGS's Coastal and Marine Hazards and Resources Program.

Conclusions and Decision

DOE reviewed the USGS Draft and Final EAs and concurs with the conclusions of the Final EA (Attachment 1) that implementation of the proposed activity, with mitigation and monitoring measures, will not have a significant impact on the environment, including marine species of concern. Consequently, implementation of the proposed activity will not have a significant direct, indirect, or cumulative impact on the environment within the context of the National Environmental Policy Act (NEPA). Because no significant environmental impacts will result from the proposed action, an environmental impact statement is not required and will not be prepared. Therefore, no further study under NEPA is required. DOE concurs that USGS's compliance with the Marine Mammal Protection Act, Endangered Species Act, and Coastal Zone Management Act, and its consideration of Essential Fish Habitat under the Magnuson Stevens Act have been completed. Therefore, on behalf of DOE, I authorize the issuance of this Finding of No Significant Impact for DOE's participation in the USGS-led marine seismic surveys along the mid-Atlantic U.S. margin to be conducted on board the *R/V Hugh R. Sharp*, and I hereby approve DOE's Proposed Action to commence.


Sean I. Plasynski, Ph.D

Director (Acting), National Energy Technology Laboratory


Date

Attachments:

1. USGS Final Environmental Assessment with Appendices