ENVIRONMENTAL ASSESSMENT

Issuance of an Incidental Harassment Authorization to
the Office of Naval Research to Take Marine Mammals by Harassment Incidental
to Acoustic Technology Experiments in the Western North Pacific Ocean

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LEAD AGENCY: USDC National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Office of Protected Resources
1315 East West Highway
Silver Spring, MD 20910

RESPONSIBLE OFFICIAL: Helen M. Golde, Acting Director, Office of Protected Resources

FOR INFORMATION CONTACT : Office of Protected Resources
National Marine Fisheries Service
1315 East West Highway
Silver Spring, MD 20910
(301) 427-8401

LOCATION: Western North Pacific Ocean

ABSTRACT: The National Marine Fisheries Service (NMFS) proposes to issue an Incidental Harassment Authorization (IHA) to the Office of Naval Research (ONR) for the incidental taking of of marine mammals. The IHA would be valid for one year from the date of issuance and would authorize the take, by Level B harassment, of marine mammals incidental to acoustic technology experiments in one of nine provinces comprising the western North Pacific Ocean.

CONTENTS

CHAPTER 1 PURPOSE OF AND NEED FOR ACTION 3
1.1 DESCRIPTION OF ACTION 3
1.1.1 Purpose and Need 4
1.1.2 Objectives of the ATE 5
1.2 APPLICABLE LAWS AND NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS 5
1.2.1 National Environmental Policy Act (NEPA) 5
1.2.3 Endangered Species Act (ESA) 6
1.2.4 Marine Mammal Protection Act (MMPA) 6
CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION 8
2.1 ALTERNATIVE 1 – NO ACTION 8
2.2 ALTERNATIVE 2 – PROPOSED ACTION (Issuance of an IHA with Proposed Conditions) 8
2.2.1 Action Area 8
2.2.2 Specified Activity 8
2.2.3 Mitigation Measures 9
2.2.4 Monitoring Measures 10
2.2.5 Other Alternatives Considered but Eliminated 13
CHAPTER 3 AFFECTED ENVIRONMENT 14
1.1 PHYSICAL ENVIRONMENT 14
1.2 BIOLOGICAL ENVIRONMENT 15
1.2.1 Marine Mammals 16
CHAPTER 4 ENVIRONMENTAL CONSEQUENCES 18
4.1 EFFECTS OF ALTERNATIVE 1: No Action 18
4.2 EFFECTS OF ALTERNATIVE 2: Issue IHA with Proposed Conditions 18
4.2.1 Effects on the Physical Environment 18
4.2.2 Effects on Marine Mammals 18
4.2.3 Effects on Marine Mammal Habitat 25
4.3 SUMMARY OF COMPLIANCE WITH APPLICABLE LAWS, NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS 26
4.3.1 National Environmental Policy Act 26
4.3.2 Endangered Species Act 26
4.3.3 Marine Mammal Protection Act 26
4.4 MITIGATION AND MONITORING MEASURES 26
4.5 CUMULATIVE EFFECTS 27
4.5.1 Current Projects in Action Area 28
4.5.2 Reasonably Foreseeable Future Actions (RFFAs) 28
CHAPTER 5 List of Preparers and Agencies Consulted 29

CHAPTER 1 - INTRODUCTION and PURPOSE AND NEED FOR ACTION

1.1 DESCRIPTION OF ACTION

Our proposed action is triggered by the U.S. Navy's Office of Naval Research (ONR) request for an authorization to take marine mammals incidental to conducting proposed acoustic technology experiments within international waters of the Pacific Ocean. Because ONR's proposed activities have the potential to behaviorally disturb marine mammals by exposing them to elevated levels of sound, ONR is requesting an Incidental Harassment Authorization (IHA) from NMFS under section 101(a)(5)(D) of the MMPA. Our issuance of an IHA to ONR is an action requiring environmental review under the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.), the Council on Environmental Quality (CEQ) regulations in 40 CFR §§ 1500-1508, and NOAA Administrative Order (NAO) 216-6. Thus, we are required to analyze the effects on the human environment and determine whether they are significant such that preparation of an Environmental Impact Statement (EIS) is necessary.

This EA titled, *Issuance of an Incidental Harassment Authorization to the Office of Naval Research to Take Marine Mammals by Harassment Incidental to Acoustic Technology Experiments in the Western North Pacific Ocean*, focuses primarily on the environmental effects of authorizing the take of marine mammals incidental to the ONR's ATE activities. ONR's overall action to conduct acoustic technology experiments (ATE) is also subject to environmental review requirements under NEPA and it has prepared an Overseas Environmental Assessment, titled *OVERSEAS ENVIRONMENTAL ASSESSMENT FOR THE OFFICE OF NAVAL RESEARCH ACOUSTIC TECHNOLOGY EXPERIMENT (OEA; ONR 2012)* that evaluates the potential environmental impacts of the proposed activities. We do not duplicate their analysis; rather we incorporate the 2013 OEA herein by reference. To summarize ONR's proposed action, ONR is planning to conduct ATE in international waters of one of nine provinces comprising the western North Pacific Ocean in the spring or summer of 2013. The experiment's duration will not be longer than two weeks. Based upon the analysis of the potential impacts to the marine environment documented in the U.S. Navy's OEA, ONR's proposed action will not significantly harm the environment of international waters. However, the proposed action will require authorization for the incidental harassment of marine mammals under the Marine Mammal Protection Act (MMPA) and consultation with National Marine Fisheries Service (NMFS) under section 7 of the Endangered Species Act (ESA).

We have prepared this EA to assist in determining whether the direct, indirect, and cumulative impacts related to our issuance of an authorization under the MMPA for marine mammals for ONR's ATE is likely to result in significant impacts to the human or natural environment. This EA is intended to inform our decision on issuing the Authorization. While the focus of this EA is on the effects caused by the proposed issuance of an Authorization, in combining this analysis with the analyses in the previously referenced documents, we have considered all impacts associated with the underlying action. We anticipate the issuance of an Authorization to take small numbers of marine mammals incidental to ONR's specified activities in a specific geographic region to affect marine mammals and their habitat.

Our NEPA analysis further evaluates effects to marine mammals and their habitat due to the specific scope of the decision for which we are responsible (i.e., whether or not to issue the Incidental Harassment Authorization which includes prescribed means of incidental take, mitigation measures, and monitoring requirements).

On December 20, 2012, the National Marine Fisheries Service (NMFS), Office of Protected Resources received a request from ONR to take[1], by Level B harassment[2] only, marine mammals incidental to ONR's Acoustic Technology Experiments (ATE) in the western North Pacific Ocean. After receipt of supplemental information, the application was determined complete on March 7, 2013. As such, NMFS proposes to issue an Incidental Harassment Authorization (IHA) pursuant to Section 101(a)(5)(A) and (D) of the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1371 *et seq*.), and the regulations governing the taking and importing of marine mammals (50 CFR Part 216).

1.1.1 Purpose and Need

The ONR proposes to collect data and demonstrate underwater acoustic technology in a realistic at-sea environment. The primary purpose of our proposed action—the issuance of an IHA to ONR—is to authorize (pursuant to the MMPA) take of marine mammals incidental to the ATE. The need for this action is therefore established and framed by the MMPA sections 101(a)(5)(D) of the MMPA which directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) if certain findings are made and regulations are issued or, if the taking is limited to harassment, notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings may be granted for up to five years if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for certain subsistence uses, and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring, and reporting of such taking are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 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."

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1 Under the MMPA, "take" is defined as to "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." [16 U.S.C. 1362(18)(A)].

2 "Harass" is defined by regulation (50 CFR §216.3) 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 a disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but does not have the potential to injure a marine mammal or marine mammal stock in the wild (Level B harassment)."
The NDAA (Public Law 108–136) removed the ''small numbers'' and "specified geographical region'' limitations and amended the definition of ''harassment'' as it applies to a ''military readiness activity'' to read as follows (section 3(18)(B) of the MMPA): (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) Any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].]

NMFS' decision of whether or not to issue ONR an incidental take authorization requires an analysis of the issuance's effect on the human environment pursuant to the National Environmental Policy Act (NEPA). This Environmental Assessment (EA) contains that analysis and is intended to support NMFS' decision of whether or not to issue an IHA authorizing the incidental take of marine mammals associated with the ATE.

1.1.2 Objectives of the ATE

As described in the application, the fundamental objective of the project is to collect data and demonstrate underwater acoustic technology in a realistic at-sea environment. The ATE would fulfill a need of the Navy's for measured in situ scientific data on underwater acoustic technology from which the performance of the acoustic systems and their conceptual foundation can be assessed.

1.2 APPLICABLE LAWS AND NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

This section summarizes federal, state, and local permits, licenses, approvals, and consultation requirements necessary to implement the proposed action.

1.2.1 National Environmental Policy Act (NEPA)

NEPA was enacted in 1969 and its environmental review requirements set forth in section 102(C) are applicable to all "major" federal actions with the potential to result in significant effects on the quality of the human environment. A major federal action is an activity that is fully or partially funded, regulated, conducted, or approved by a federal agency. NMFS issuance of incidental take authorizations represents approval and regulation of activities. While NEPA does not dictate substantive requirements for permits, licenses, etc., it requires consideration of environmental issues in federal agency planning and decision making. The procedural provisions outlining federal agency responsibilities under NEPA are provided in CEQ's implementing regulations (40 CFR Parts 1500-1508).

NOAA has, through NOAA Administrative Order (NAO) 216-6, established agency procedures for complying with NEPA and the implementing regulations issued by CEQ. NAO 216-6 specifies that issuance of incidental take authorizations under the MMPA and ESA is among a category of actions that are generally exempted (categorically excluded) from further environmental review if they are tiered to a pre-existing programmatic environmental review, except under extraordinary circumstances. When a proposed action that would otherwise be categorically excluded is the subject of public controversy based on potential environmental consequences, has uncertain environmental impacts or unknown risks, establishes a precedent or decision in principle about future proposals, may result in cumulatively significant impacts, or may have an adverse effect upon endangered or threatened species or their habitats, preparation of an EA or EIS is required. NMFS has not prepared a programmatic NEPA analysis covering the proposed IHA. Since issuance of the IHA has the potential to adversely affect species protected under the MMPA, NMFS has decided to prepare an EA to evaluate the context and

intensity of such impacts to determine whether or not they have the potential to be significant. This EA is prepared in accordance with NEPA, its implementing regulations, and NOAA 216-6.

1.2.2 Public Involvement

Under 50 CFR 216.104(b) of NMFS' implementing regulations for the MMPA, NMFS must, after deeming the application adequate and complete, publish in the *Federal Register* a notice of proposed IHA or receipt of a request for the implementation or re-implementation of regulations governing the incidental taking. Information gathered during the associated comment period is considered by NMFS in ensuring adequacy of preliminary determinations and proposed mitigation measures for IHAs. In accordance, a notice of receipt of application and proposed issuance of an IHA were published in the *Federal Register* on April 2, 2013 (78 FR 19652) and made available for public review and comment for 30 days. Comments received on the proposed IHA are also used to develop the scope of this EA.

1.2.3 Endangered Species Act (ESA)

Section 7 of the ESA requires consultation with the appropriate federal agency (either NMFS or the U.S. Fish and Wildlife Service) for federal actions that "may affect" a listed species or critical habitat. NMFS' issuance of an authorization affecting ESA-listed species or designated critical habitat, directly or indirectly, is a federal action subject to these section 7 consultation requirements. Accordingly, NMFS is required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of critical habitat for such species. Section 7 requires federal agencies to use their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species. Regulations specify the procedural requirements for these consultations (50 Part CFR 402).

1.2.4 Marine Mammal Protection Act (MMPA)

The MMPA prohibits takes of all marine mammals in the U.S. (including territorial seas) with a few exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (Secretary) to allow, upon request, the incidental, but not intentional, taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) if certain findings are made and regulations are issued or, if the taking is limited to harassment, notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings may be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for certain subsistence uses, and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring, and reporting of such taking are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 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."

Under the MMPA, harassment is defined as any act of pursuit, torment, or annoyance which has the potential to: (i) injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) 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). The National Defense Authorization Act (Public Law 108–136) removed the ‘‘small numbers’’ and “specified geographical region’’ limitations and amended the definition of ‘‘harassment’’ as it applies to a ‘‘military readiness activity’’ to read as follows (section 3(18)(B) of the MMPA): (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) Any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].]

An IHA may be issued, except for activities that have the potential to result in serious injury or mortality (i.e., it may only authorize Level A and B harassment), for a period of no more than 1 year, following a 30-day public review period. Alternatively, regulations may be granted for a period of 5 years and may include takes by serious injury and mortality. Upon rulemaking (i.e., defining regulations), Letters of Authorization (LOAs) will be issued each year to the authorization holder. For both an IHA and regulations, authorization shall be granted if the Secretary finds that the taking will have a negligible impact on a species or stock, and that the IHA or regulations are prescribed setting forth the permissible methods of taking, the means of effecting the least practicable adverse impact, and requirements pertaining to monitoring and reporting. For authorizations associated with activities that could impact marine mammals in Arctic waters (waters north of 60ºN), the action agency must also consider means of effecting the least practicable adverse impact on the availability of the species for subsistence uses.

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the range of potential actions (alternatives) determined reasonable with respect to achieving the stated purpose and need for the proposed action, as well as alternatives eliminated from detailed study. This chapter also summarizes the expected outputs and any related mitigation of each alternative. One alternative is the "No Action" alternative where the proposed authorization would not be issued. The No Action alternative is the baseline for the rest of the analyses. The Proposed Action alternative represents the activity proposed in the submitted application for a permit, with standard permit terms and conditions specified by NMFS.

2.1 ALTERNATIVE 1 – NO ACTION

Under the No Action alternative, NMFS would not issue an IHA to ONR authorizing the take of marine mammals incidental to the specified activity and ONR would not conduct the proposed activity, as identified in their OEA and incorporated here by reference. The OEA states that ONR's No Action Alternative is for the proposed action to not occur.

2.2 ALTERNATIVE 2 – PROPOSED ACTION (Issuance of an IHA with Proposed Conditions)

Under the Proposed Action alternative, an IHA would be issued for takes of marine mammals incidental to specified activities as proposed by the applicant, with the mitigation, monitoring, and reporting conditions contained within ONR's application and NMFS' proposed IHA *Federal Register* notice.

2.2.1 Action Area

The proposed action area for the ATE would be located in international waters in one of nine provinces that comprise the western North Pacific Ocean. The nine potential ocean regions in which the ATE may be conducted provide an optimal experimental setting as these waters of the western North Pacific area satisfy numerous scientific and logistical requirements for the Navy. The nine provinces are discrete areas identified with the following geographic titles: Sea of Japan, East China Sea, South China Sea, North Philippine Sea, West Philippine Sea, East of Japan, Offshore Guam, Northwest Pacific Ocean: 25° to 40° north latitude, or Northwest Pacific Ocean: 10° to 25° north latitude. The proposed action area would be between 360,000-800,000 square kilometers (km^2) and water could be as shallow as 100 m or as deep as 9,500 m.

2.2.2 Specified Activity

The ATE would take place during the spring or summer of 2013, and would last no longer than 2 weeks. No more than 69 hours of acoustic transmissions would occur over 6 at-sea days. The Navy is unable to define a detailed schedule of events because experimental work, such as the proposed activity, requires a degree of flexibility to respond to weather fluctuations

and hardware conditions. However, a nominal outline of a schedule, including the amount of time each source would be expected to be used, and the possibility of temporal overlap in source transmissions was provided in the application and *Federal Register* notice. At most, two of the acoustic sources would operate at the same time during specific experiment events. In all cases of concurrent source operations, there is sufficient horizontal and vertical separation between the active acoustic sources so that potential environmental effects associated with the operation of the sources is no more than the sources considered individually.

No more than four underwater acoustic sources would be used from a vessel during the experiments and none of the sources would transmit concurrently. The acoustic sources are considered non-impulsive and non-continuous and no explosives would be used. All transmission frequencies would be below 1.5 kilohertz (kHz) and sound pressure levels would be less than 220 decibels (dB) (significantly lower than tactical mid-frequency or low-frequency active sonar) for a total of no more than 69 hours of acoustic transmissions over 6 days. Despite being classified, the detailed characteristics of the active acoustic sources were made known to NMFS staff and factored into our MMPA analysis. An environmental survey of the waters of the proposed action area would also be conducted employing an oceanographic acoustic source. The vessel would be stationary during deployment and transmission of the ATE underwater active acoustic sources, except that of the oceanographic acoustic source. The vessel would move at speeds less than 5 knots when the oceanographic source is transmitting. All equipment deployed during the ATE would be recovered once data collection is complete.

2.2.3 Mitigation Measures

In order to issue an IHA under section 101(a)(5)(D) 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 taking for certain subsistence uses (where relevant).

The NDAA of 2004 amended the MMPA as it relates to military-readiness activities and the ITA process such that "least practicable adverse impact" shall include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the "military readiness activity." The training activities described in ONR's application are considered military readiness activities.

ONR proposed the following mitigation measures to be implemented during the ATE:

(1) Vessel Movement

ONR would maneuver the research vessel, as feasible, to avoid closing within 457 m (1,499 ft) of a marine mammal. Standard operating procedures for the research vessel would be to avoid collision with marine mammals, including maintaining a minimum safe maneuvering distance from detected animals.

(2) Mitigation Zone

ONR proposes to use a 1-km mitigation zone to avoid take by Level A harassment and reduce the potential impacts to marine mammals from ONR ATE. Mitigation zones are measured as the radius from a source and represent a distance that visual observers would monitor during daylight hours to ensure that no marine mammals enter the designated area. The mitigation zone would be monitored for 30 minutes before the active acoustic source transmissions begin and would continue until 30 minutes after the active acoustic source transmissions are terminated, or 30 minutes after sunset, whichever comes first. Visual detections of marine mammals would be communicated immediately for information dissemination and appropriate action, as described directly below.

(3) Delay and Shut-down Procedures

During daytime transmissions, ONR proposes to immediately delay or shut down active acoustic source transmissions if a marine mammal is visually detected within the 1 km exclusion zone. NMFS further proposes that transmissions would not commence/resume for 15 minutes (for small odontocetes and pinnipeds) or 30 minutes (for mysticetes and large odontocetes) after the animal has moved out of the exclusion zone or there has been no further visual detection of the animal. During nighttime transmissions, ONR proposes to immediately delay or shut down active acoustic source transmissions if a marine mammal is detected using passive acoustic monitoring. NMFS further proposes that transmissions would commence/resume 15 minutes (for small odontocetes and pinnipeds) or 30 minutes (for mysticetes and large odontocetes) after there has been no further detection of the animal.

2.2.4 Monitoring Measures

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth "requirements pertaining to the monitoring and reporting of such taking". The MMPA implementing regulations at 50 CFR § 216.104 (a)(13) indicate that requests for IHAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area.

ONR proposes to conduct marine mammal monitoring during the proposed activity for the purpose of implementing required mitigation and to provide information on species presence and abundance in the action area. ONR proposes that protected species observers (both visual and acoustic) would maintain a log that includes duration of time spent searching/listening for marine mammals; numbers and species of marine mammals detected; any unusual marine mammal behavior; and the date, time, and location of the animal and any sonobuoy deployments. ONR's proposed Monitoring Plan is described below this section.

(1) Vessel-based Visual Monitoring

ONR proposes to continuously monitor for marine mammals when active acoustic sources are being used during daylight hours. Two visual observers would be on effort during active ATE source transmissions occurring during daylight hours. One observer would be

positioned on the deck level above the bridge, about 12 m above the water line, while the second observer would be located on the bridge level, about 9.8 m above the water line. Protected species observers would be trained for visually detecting and identifying marine mammal species. Observers would begin monitoring 30 minutes before the active acoustic source transmissions are scheduled to begin and would continue until 30 minutes after the active acoustic source transmissions are terminated, or 30 minutes after sunset, whichever comes first.

(2) Passive Acoustic Monitoring

ONR proposes to conduct passive acoustic monitoring from the vessel when active acoustic sources are deployed during nighttime (i.e., no more than 35 hours total) and other periods of decreased visual observation capabilities. Passive acoustic monitoring would include listening for vocalizations and visually inspecting spectrograms of radio frequency-transmitted signals from a deployed AN/SSQ-53 DIFAR sonobuoy by personnel trained in detecting and identifying marine mammal sounds. Passive acoustic monitoring would begin 30 minutes before transmissions are scheduled to begin and continue until 30 minutes after transmissions are terminated, or 30 minutes after sunrise, whichever occurs first.

If a passively detected sound is estimated to be from a marine mammal, the acoustic observer would notify the appropriate personnel and shutdown procedures would be implemented. For any marine mammal detection, the Test Director would order the immediate delay/suspension of the active acoustic source transmissions and/or deployment. NMFS further proposes that transmissions may commence/resume 15 minutes (for small odontocetes) or 30 minutes (for mysticetes and large odontocetes) after there has been no further detection of the animal.

(3) Reporting

ONR proposes that protected species observers (both visual and acoustic) would maintain a log that includes duration of time spent searching/listening for marine mammals; numbers and species of marine mammals detected; any unusual marine mammal behavior; and the date, time, and location of the animal and any sonobuoy deployments. Data would be used to estimate numbers of animals potentially 'taken' by harassment (as defined in the MMPA). NMFS further proposes that protected species observers record the behavioral state of all marine mammals observed and the status of the active acoustic source when observers see an animal.

ONR would submit two reports to NMFS within 90 days after the end of the proposed activity: one unclassified report and one classified report. The reports would describe the operations that were conducted and sightings of marine mammals near the operations. The reports would provide full documentation of methods, results, and interpretation pertaining to all monitoring. The 90-day reports would summarize the dates and locations of active acoustic source transmissions, and all marine mammal sightings (dates, times, locations, activities, associated active acoustic transmissions). The reports would also include estimates of the number and nature of exposures that could result in 'takes' of marine mammals.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an injury (Level A harassment), serious injury, or mortality (e.g., ship-strike, gear interaction, and/or entanglement), ONR would immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS. The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hrs preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with ONR to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. ONR may not resume their activities until notified by NMFS via letter, email, or telephone.

In the event that ONR discovers an injured or dead marine mammal, and the lead protected species observer determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), ONR would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS. The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS would work with ONR to determine whether modifications in the activities are appropriate.

In the event that ONR discovers an injured or dead marine mammal, and the lead protected species observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), ONR would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS within 24 hours of the discovery. ONR would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS.

2.2.5 Other Alternatives Considered but Eliminated

ONR worked with NMFS to develop the above mitigation and monitoring measures needed to ensure their proposed action resulted in the least practicable adverse impacts to marine mammals. Only the preferred alternative adequately addresses ONR's need to collect in situ scientific data that is needed by the Navy to assess the performance of the acoustic technology systems and their underlying conceptual basis. No other alternatives were provided or analyzed.

CHAPTER 3 AFFECTED ENVIRONMENT

This chapter presents baseline information necessary for consideration of the alternatives, and describes the resources that would be affected by the alternatives, as well as environmental components that would affect the alternatives if they were to be implemented. The effects of the alternatives on the environment are discussed in Chapter 4.

1.1 PHYSICAL ENVIRONMENT

The western North Pacific is characterized by multiple water masses and oceanographic features, strong latitudinal gradients in surface temperature and salinity (i.e., high in the south and low in the north), complex and varied bathymetry and physiography, island arcs, and a roughly tropical maritime climate. This region of the North Pacific Ocean is ringed with island arcs and deep trenches and is bordered on the west by marginal seas: the South China Sea, East China Sea, Sea of Japan, and Philippine Sea. The deepest waters of any ocean on Earth, 11,034 m, are found in the western North Pacific in the Challenger Deep of the Marianas Trench.

The regional climate of the western North Pacific Ocean is relatively consistent. The regional climate is a tropical maritime regime with three seasonal components: the wet-warm monsoon season that typically lasts from June through October; the cold-dry season, which ranges from November to March; and the hot and dry spring that extends from March to May. Tropical cyclones most typically occur between May and December concurrently with the monsoonal season in the western North Pacific Ocean.

In the western North Pacific, two western boundary currents, the Kuroshio and the Oyashio Currents, dominate the oceanography (Limsakul et al., 2002). The Oyashio Current sweeps southward along the Asian continent, while the Kuroshio Current sweeps northward and marks the western boundary of the North Pacific Subtropical Gyre (NPSG), the largest circulation system on the planet (Karl, 1999). The NPSG encompasses an ocean area of 20 million km^2 that is bounded by the North Pacific Current to the north, the Northern Equatorial Current to the south, the California Current to the east, and the Kuroshio Current to the west. The surface circulation in the NPSG is wind-driven and flow is clockwise. The NPSG is comprised of warm (>24°C), oligotrophic (i.e., nutrient-depleted) surface waters with low densities of biota and a persistent deep-water chlorophyll maximum (Karl et al., 1995; Karl, 1999).

The Kuroshio Current flows northward past Taiwan and towards Japan, where it splits to sweep westward into the East China Sea and eastward around Japan. In the vicinity of latitude 35°N (about central Honshu, Japan), the bulk of the Kuroshio Current flow turns east to join the flow of the southward-flowing Oyashio Current. The convergence of the warm Kuroshio Current and the cold Oyashio Current results in a region of complex frontal systems and mixing of water masses known as the Kuroshio-Oyashio confluence region (Hanawa and Mitsudera, 1987; Limsakul et al., 2002). The combined flow of the Oyashio and Kuroshio Currents is known as the Kuroshio Extension, which eventually becomes the North Pacific Current. Meanders often followed by eddy formation typify the Kuroshio Current; anticyclonic (warm-core) eddies typically pinch off the Kuroshio and move into the South China Sea. A major

meander in the Kuroshio Current flow sometimes deflects south off the southern coast of Japan. The waters of the Kuroshio Current are characterized by temperatures and salinities ranging between 12° to 20°C (54 to 68°F) and 34.5 to 35.2 practical salinity units (psu), respectively. The Kuroshio travels at rates ranging from 50 to 300 cm/sec (0.97 to 5.8 kt) (Fairbridge, 1966; Qiu and Imasato, 1990). The Oyashio Current is a cold (4° to 5°C [39° to 41°F]), low-salinity (33.7 to 34 psu), and nutrient-rich water mass that is one of the most productive water masses in world oceans, resulting in high abundances of phytoplankton and higher trophic levels (Fairbridge, 1966; Kasai et al., 1997; Taniguchi, 1999). Flow of the Oyashio Current has a well-defined annual cycle with strong flow that spans the water column from the surface to the sea floor during winter and spring months, while during the summer and fall the Oyashio is weaker and confined to the layer shallower than 2,000 m (Qiu, 2001).

Bottom substrate in the western North Pacific Ocean is varied depending on water depth and proximity to land. Closer to land, bottom sediments are composed of terrigenous sediments or carbonate and calcareous sediments while the seafloor beneath deep ocean waters are covered by fine sediments such as silts, clays, and biogenic oozes with layers of volcanic ash and mud (Eldredge 1983; Kanamatsu and Matsuo, 2003; McGuire and Acton, 2003; Jenkins et al., 2005).

1.2 BIOLOGICAL ENVIRONMENT

Overall, little specific information is available about the biota that occurs generally in the western North Pacific Ocean. Some of the existing information on marine mammals**,** for instance, comes from whaling records (Miyashita, 1993). Few synoptic or dedicated surveys of the marine mammal or sea turtle populations in any of the seas or ocean regions of the western North Pacific Ocean have been conducted.

No ESA-listed marine/anadromous fishes, invertebrates, or seagrasses nor designated critical habitat occurs in the western North Pacific provinces. Thirty-four species of marine mammals and five species of sea turtles may potentially occur in the nine western North Pacific marine provinces during spring and/or summer. Of these potentially occurring marine species, eight marine mammal and all sea turtle species are listed under the ESA as either threatened or endangered. NMFS' proposed action of issuing an IHA would allow for the harassment of marine mammals, which is the focus of this section.

1.2.1 Marine Mammals

Although 34 species of marine mammals may potentially be found in the waters of the nine western North Pacific provinces in which ONR ATE may occur, often the two species of *Kogia* are considered together as *Kogia* spp. due to the difficulty in identifying these animals to species at sea and the sparse information that is known about the individual species. The 34 species include eight mysticetes, 25 odontocete species, and one pinniped species. Detailed information on the status, distribution, stock, abundance, diving behavior, life history, and hearing/vocalization for each of the potentially occurring marine mammal species in the nine provinces in which ONR ATE may occur during spring or summer was provided in ONR's

application and *Federal Register* notice. The species, their status, and estimated take are summarized here in Table 1 and 2.

Table 1. Marine mammals potentially occurring in the nine provinces of the western North Pacific where the ATE may be conducted and their status.

Common Name	Scientific Name	ESA and MMPA Status
Mysticetes		
Blue Whale	Balaenoptera musculus	Endangered/Depleted
Bryde's Whale	Balaenoptera edeni	-
Common Minke Whale	Balaenoptera acutorostrata	-
Fin Whale	Balaenoptera physalus	Endangered/Depleted
Gray Whale	Eschrichtius robustus	Endangered/Depleted[1]
Humpback Whale	Megaptera novaeangliae	Endangered/Depleted
North Pacific Right Whale	Eubalaena japonica	Endangered/Depleted
Sei Whale	Balaenoptera borealis	Endangered/Depleted
Odontocetes		
Baird's Beaked Whale	Berardius bairdii	-
Blainville's Beaked Whale	Mesoplodon densirostris	-
Common Bottlenose Dolphin	Tursiops truncatus	-
Cuvier's Beaked Whale	Ziphius cavirostris	-
Dall's Porpoise	Phocoenoides dalli	-
False killer whale	Pseudorca crassidens[2]	-
Fraser's Dolphin	Lagenodelphis hosei	-
Ginkgo-toothed Beaked Whale	Mesoplodon ginkgodens	-

Hubbs' Beaked Whale	Mesoplodon carhubbsi	-
Killer Whale	Orca orcinus	-
Kogia spp.		-
Longman's Beaked Whale	Indopacetus pacificus	-
Melon-headed Whale	Peponocephala electra	-
Pacific White-sided Dolphin	Lagenorhynchus obliquidens	-
Pantropical Spotted Dolphin	Stenella attenuata	-
Pygmy Killer Whale	Feresa attenuata	-
Risso's Dolphin	Grampus griseus	-
Rough-toothed Dolphin	Steno bredanensis	-
Short-beaked Common Dolphin	Delphinus delphis	-
Short-finned Pilot Whale	Globicephala macrorhynchus	-
Sperm Whale	Physeter macrocephalus	Endangered/Depleted
Spinner Dolphin	Stenella longirostris	-
Stejneger's Beaked Whale	Mesoplodon stejnegeri	-
Striped Dolphin	Stenella coeruleoalba	-
Pinnipeds		
Hawaiian Monk Seal	Monachus schauinslandi	Endangered/Depleted

[1] Only the western Pacific population is listed as endangered under the ESA.
[2] As a species, the false killer whale is not listed under the ESA; however, the insular Main Hawaiian Islands distinct population segment (DPS) of false killer whales is listed as endangered under the ESA.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter represents the scientific and analytic basis for comparison of the direct, indirect, and cumulative effects of the alternatives. Regulations for implementing the provisions of NEPA require consideration of both the context and intensity of a proposed action (40 CFR Parts 1500-1508).

4.1 EFFECTS OF ALTERNATIVE 1: No Action

Under the No Action alternative, NMFS would not issue an IHA to ONR authorizing the take of marine mammals incidental to the specified activity and ONR would not conduct the proposed activity, as identified in their Overseas Environmental Assessment (OEA) and incorporated here by reference. The No Action Alternative would result in the decreased ability of the Navy to develop these underwater technologies.

4.2 EFFECTS OF ALTERNATIVE 2: Issue IHA with Proposed Conditions

This section describes potential impacts to the human environment from issuance of an IHA allowing the harassment of marine mammals incidental to the ATE.

4.2.1 Effects on the Physical Environment

The issuance of an IHA authorizing harassment to marine mammals would not affect the physical environment. ONR is authorized to conduct the ATE under other federal permits. NMFS' authorization solely authorizes marine mammal harassment. With respect to marine mammal habitat, see section 4.3.4 below.

4.2.2 Effects on Marine Mammals

Active acoustic operations may temporarily impact marine mammals within the action area due to elevated in-water noise levels. NMFS has prepared, supplemented, or adopted numerous EAs leading to Findings of No Significant Impact (FONSIs) for similar activities. The analysis of acoustic impacts to marine mammals and their environment under NEPA have been conducted to facilitate issuance of other IHAs.

Marine mammals are continually exposed to many sources of sound. Naturally occurring sounds such as lightning, rain, sub-sea earthquakes, and biological sounds (e.g., snapping shrimp, whale songs) are ubiquitous throughout the world's oceans. Marine mammals produce sounds in various contexts and use sound for various biological functions including, but not limited to: (1) social interactions; (2) foraging; (3) orientation; and (4) predator detection. Interference with producing or receiving these sounds may result in adverse impacts. In this EA, all sound pressure levels are referenced to 1 microPascal (re: 1 µPa) unless otherwise noted. Impacts from noise exposure are expected to be both auditory and behavioral, as described in the below sections. No pinniped haul-outs would be affected; therefore, in-air noise is not a concern for marine mammals.

Auditory Impacts

Acoustic stimuli generated by underwater signals from no more than four acoustic sources have the potential to cause Level B harassment of marine mammals in the proposed action area. The impacts to marine mammals from these sources are expected to be limited to some masking effects and behavioral responses in the areas ensonified by the acoustic sources.

Permanent hearing impairment, in the unlikely event that it occurs, would constitute injury, but temporary threshold shift (TTS) is considered a type of Level B harassment (Southall et al., 2007). Although the possibility cannot be entirely excluded, it is unlikely that the proposed demonstration would result in any cases of temporary or permanent hearing impairment, or any significant non-auditory physical or physiological effects. Based on the available data and studies described here, some behavioral disturbance is possible, but NMFS expects the disturbance to be localized and short-term.

Tolerance to Sound - Studies on marine mammal tolerance to sound in the natural environment are relatively rare. Richardson et al. (1995) defines tolerance as the occurrence of marine mammals in areas where they are exposed to human activities or man-made noise. In many cases, tolerance develops by the animal habituating to the stimulus (i.e., the gradual waning of responses to a repeated or ongoing stimulus) (Richardson et al., 1995; Thorpe, 1963), but because of ecological or physiological requirements, many marine animals may need to remain in areas where they are exposed to chronic stimuli (Richardson et al., 1995).

Masking of Natural Sounds - The term masking refers to the inability of a subject to recognize the occurrence of an acoustic stimulus as a result of the interference of another acoustic stimulus (Clark et al., 2009). Marine mammals are highly dependent on sound, and their ability to recognize sound signals amid other noise is important in communication, predator and prey detection, and, in the case of toothed whales, echolocation. Introduced underwater sound may, through masking, reduce the effective communication distance of a marine mammal species if the frequency of the source is close to that used as a signal by the marine mammal, and if the anthropogenic sound is present for a significant fraction of the time (Richardson et al., 1995). Even in the absence of manmade sounds, the sea is usually noisy. Background ambient noise often interferes with or masks the ability of an animal to detect a sound signal even when that signal is above its absolute hearing threshold. Natural ambient noise includes contributions from wind, waves, precipitation, other animals, and (at frequencies above 30 kHz) thermal noise resulting from molecular agitation (Richardson et al., 1995). Background noise can also include sounds from human activities. Masking of natural sounds can result when human activities produce high levels of background noise. Conversely, if the background level of underwater noise is high, (e.g., on a day with strong wind and high waves), an anthropogenic noise source will not be detectable as far away as would be possible under quieter conditions and will itself be masked.

Acoustic masking from low-frequency ocean noise is increasingly being considered as a threat, especially to low-frequency hearing specialists such as baleen whales (Clark et al., 2009). It is not currently possible to determine with precision the potential consequences of temporary

or local background noise levels. However, Parks et al. (2007) found that right whales altered their vocalizations, possibly in response to background noise levels. For species that can hear over a relatively broad frequency range, as is presumed to be the case for mysticetes, a narrow band source may only cause partial masking. Richardson et al. (1995a) note that a bowhead whale 20 km from a human sound source might hear strong calls from other whales within approximately 20 km, and a whale 5 km from the source might hear strong calls from whales within approximately 5 km. Additionally, masking is more likely to occur closer to a sound source, and distant anthropogenic sound is less likely to mask short-distance acoustic communication (Richardson et al., 1995a).

Redundancy and context can also facilitate detection of weak signals. These phenomena may help marine mammals detect weak sounds in the presence of natural or manmade noise. Most masking studies in marine mammals present the test signal and the masking noise from the same direction. The sound localization abilities of marine mammals suggest that, if signal and noise come from different directions, masking would not be as severe as the usual types of masking studies might suggest (Richardson et al., 1995). The dominant background noise may be highly directional if it comes from a particular anthropogenic source such as a ship or industrial site. Directional hearing may significantly reduce the masking effects of these noises by improving the effective signal-to-noise ratio. In the cases of high-frequency hearing by the bottlenose dolphin, beluga whale, and killer whale, empirical evidence confirms that masking depends strongly on the relative directions of arrival of sound signals and the masking noise (Penner et al., 1986; Dubrovskiy, 1990; Bain et al., 1993; Bain and Dahlheim, 1994).

Toothed whales, and probably other marine mammals as well, have additional capabilities besides directional hearing that can facilitate detection of sounds in the presence of background noise. There is evidence that some toothed whales can shift the dominant frequencies of their echolocation signals from a frequency range with a lot of ambient noise toward frequencies with less noise (Au et al., 1974, 1985; Moore and Pawloski, 1990; Thomas and Turl, 1990; Romanenko and Kitain, 1992; Lesage et al., 1999). A few marine mammal species are known to increase the source levels or alter the frequency of their calls in the presence of elevated sound levels (Dahlheim, 1987; Au, 1993; Lesage et al., 1993, 1999; Terhune, 1999; Foote et al., 2004; Parks et al., 2007, 2009; Di Iorio and Clark, 2009; Holt et al., 2009).

These adaptations for reduced masking pertain mainly to the very high-frequency echolocation signals of toothed whales. There is less information about the existence of corresponding mechanisms at moderate or low frequencies or in other types of marine mammals. For example, Zaitseva et al. (1980) found that, for the bottlenose dolphin, the angular separation between a sound source and a masking noise source had little effect on the degree of masking when the sound frequency was 18 kHz, in contrast to the pronounced effect at higher frequencies. Directional hearing has been demonstrated at frequencies as low as 0.5-2 kHz in several marine mammals, including killer whales (Richardson et al., 1995). This ability may be useful in reducing masking at these frequencies. In summary, high levels of noise generated by anthropogenic activities may act to mask the detection of weaker biologically important sounds by some marine mammals. This masking may be more prominent for lower frequencies.

Behavioral Impacts

Type and significance of marine mammal reactions to noise are likely to be dependent on a variety of factors including, but not limited to, the behavioral state (e.g., feeding, traveling, etc.) of the animal at the time it receives the stimulus, frequency of the sound, distance from the source, and the level of the sound relative to ambient conditions (Southall et al., 2007). More detailed information on behavioral impacts are provided in the ONR application and the *Federal Register* notice and summarized here.

Behavioral disturbance includes a variety of effects, including subtle to conspicuous changes in behavior, movement, and displacement. Marine mammal reactions to sound, if any, depend on species, state of maturity, experience, current activity, reproductive state, time of day, and many other factors (Richardson et al., 1995; Wartzok et al., 2004; Southall et al., 2007; Weilgart, 2007). If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (e.g., Lusseau and Bejder, 2007; Weilgart, 2007). Given the many uncertainties in predicting the quantity and types of impacts of noise on marine mammals, it is common practice to estimate how many marine mammals would be present within a particular proximity to activities and/or exposed to a particular level of sound. In most cases, this approach likely overestimates the numbers of marine mammals that would be affected in some biologically-important manner.

It is expected that marine mammals exposed to elevated noise levels from the ATE would be using the adjacent waters around the ATE proposed action area for foraging or transiting through the area. Any impacts to marine mammal behavior are expected to be temporary. First, animals may avoid the area, thereby reducing exposure. Second, the ATE would not occur continuously throughout the day. Any disturbance to marine mammals would likely be in the form of temporary avoidance or alteration of behavior near the research vessel. Mitigation measures would also be implemented to reduce the amount of take. Any changes to marine mammal behavior are expected to be temporary and result in negligible impact to affected species and stocks.

Estimated Take by Harassment

To estimate the potential risk of physical auditory or behavioral effects due to the transmissions from the no more than four acoustic sources deployed in one of the nine provinces of the western North Pacific Ocean during the ONR ATE, the Navy performed underwater acoustical modeling and associated analyses. Historically, acoustic exposure thresholds for marine mammal behavior have been just that, fixed thresholds or step functions. However, step functions do not accurately represent most animal behavior. Accurately representing animal behavior was one of the driving factors in the creation of the behavior risk function (BRF, also known as the risk continuum function), where the probability of significant behavioral response is considered a function of received sound pressure level. This is described in more detail and illustrated in section 6 of the Navy's application. While behavioral response is almost certainly

determined by more factors than exposure level, it is also likely that in the limited situation of exposure to acoustic energy when all other contextual factors are known and held constant, received sound level can be used as a proxy for behavioral response.

To estimate the acoustic exposure an animal is likely to receive while the active sources employed in ONR ATE during spring or summer are transmitting, the movement of potentially occurring marine mammals and the acoustic field to which they may be exposed were modeled. The sound fields around the active acoustic sources were estimated based on the details of the active source transmissions and the BELLHOP underwater acoustic propagation model. These data were convolved with simulated marine mammals ("animats") in the Acoustic Integration Model©. Marine mammal species potentially occurring in the nine provinces of the western North Pacific Ocean in which ONR ATE may be conducted were assigned diving and movement behaviors, including dive depth, surfacing time, dive duration, swimming speed, and heading change. Once the animals' behavior was defined, animats were created and randomly distributed over the simulation area determined for each active source. The Acoustic Integration Model© was used to simulate the acoustic exposure for each marine mammal species over the proposed transmissions of each of the active acoustic sources.

To estimate the risk of harassment from each acoustic source, which includes behavior and TTS effects, potentially resulting from exposure to the active acoustic sources employed in ONR ATE, both the maximum received level and the cumulative energy level (sound exposure level) for each animat from each source were determined. The maximum received level for each animat was inputted into the risk continuum function to estimate Level B harassment. Note that there are two BRFs, one for mysticetes and one for odontocetes and pinnipeds. To determine the potential for TTS and PTS in the marine mammal species potentially occurring in the nine western North Pacific provinces, the modeled sound exposure level values were compared to the appropriate sound exposure level threshold (Table 3). Since TTS is recoverable and is considered to result from the temporary, non-injurious fatigue of hearing-related tissues, it represents the upper bound of the potential for Level B effects. PTS, however, is non-recoverable and, by definition, results from the irreversible impacts on auditory sensory cells, supporting tissues, or neural structures within the auditory system. PTS is thus considered within the potential for Level A effects.

Table 2. Acoustic criteria and thresholds used for predicting physiological effects on marine mammals from exposure to active acoustic sources during the ONR ATE.

Marine Mammal Species	Physiological Effects	
	Onset TTS (MMPA Level B)	Onset PTS (MMPA Level A)
Cetaceans	195 dB re 1 μPa^2-sec	215 dB re 1 μPa^2-sec
Pinnipeds	204 dB re 1 μPa^2-sec	224 dB re 1 μPa^2-sec

In determining the potential effects of the marine mammal species possibly occurring in the nine provinces during spring or summer in which ONR ATE may occur, the Navy made the following assumptions regarding modeling on the underwater acoustic sources:

- Each of the ONR ATE sources was modeled individually and its potential effects computed independent of other experiment activities;
- Acoustic propagation model BELLHOP was used to model the acoustic environment;
- Spring and summer sound velocity profiles from GDEM 2.5 database, the Navy standard database for sound velocity profiles, were used;
- Bathymetry was derived from the ETOP02 database;
- A surface wind speed of 7.7 m/sec (15 knots) was used in the Bechmann-Spezzichino model to estimate surface loss;
- Seafloor properties, including bottom loss, were derived from the Navy standard CBLUG and MGS databases;
- Animal movement parameters for the species occurring in the proposed test area were extracted from the database created by Marine Acoustics, Inc.;
- Densities for marine mammals in the nine provinces of the western North Pacific Ocean were derived using the best available data;
- Animats that encountered the geographic boundaries of the model area "reflected" back into the model area, maintaining a constant overall animat model density; and
- No mitigation was applied to the analysis results.

The precision with which environmental effects can be calculated is largely determined by the accuracy with which the marine mammal densities are estimated for the selected geographic area and season. While the marine mammal densities used in this analysis represent the best available data in spring and summer for the waters of the nine provinces in which the ONR ATE may be conducted, few dedicated marine mammal surveys for the purpose of deriving densities have been undertaken in these waters and only rarely are data available for estimating seasonal populations.

The Navy's analysis conducted on the ONR ATE activities to assess the potential for effects on marine mammals has shown that the possibility of marine mammals being exposed to Level A harassment is not likely. Any impacts to marine mammals are expected to be limited to some masking effects and behavioral responses (Level B harassment) in the areas temporarily ensonified by the active acoustic sources. For all ESA-listed species, the probability of Level B harassment occurring is low, with the highest potential for fin whales; with an estimated 1.7 fin whales potentially experiencing behavioral reactions or TTS from exposure to the active acoustic sources. For non ESA-listed species, the maximum amount of take by Level B harassment for a single species is estimated to be 87 short-beaked common dolphins. The modeled takes for each of the nine provinces are provided in section 6 of the Navy's LOA application. The maximum amount of take expected for any of the nine provinces in the western North Pacific Ocean is presented below.

Table 3. Maximum estimated take from exposure to acoustic sources employed during the ONR ATE by marine mammal species potentially occurring in the nine provinces of the western North Pacific Ocean.

Marine Mammal Species	Maximum MMPA Level B Harassment	Proposed Take by Level B Harassment
Mysticetes		
Blue Whale	0.0156	1
Bryde's Whale	1.9562	2
Common Minke Whale	7.70636	8
Fin Whale	1.70956	2
Gray Whale	0.0038	1
Humpback Whale	1.6395	2
North Pacific Right Whale	0.0214	1
Sei Whale	1.0446	2
Odontocetes		
Baird's Beaked Whale	0.6882	1
Blainville's Beaked Whale	0.5985	1
Common Bottlenose Dolphin	23.7805	24
Cuvier's Beaked Whale	2.2811	3
Dall's Porpoise	53.0706	54
Dwarf Sperm Whale	4.2209	5
False Killer Whale	7.3891	8
Fraser's Dolphin	5.7854	6
Ginkgo-toothed Beaked Whale	0.5985	1
Hubbs' Beaked Whale	0.1928	1
Killer Whale	0.1600	1
Kogia spp.	2.2840	3
Longman's Beaked Whale	0.2993	1

Melon-headed Whale	15.4891	16
Mesoplodon spp.	0.1928	1
Pacific White-sided Dolphin	7.5305	8
Pantropical Spotted Dolphin	35.8584	36
Pygmy Killer Whale	4.3103	5
Pygmy Sperm Whale	1.7203	2
Risso's Dolphin	11.3736	12
Rough-toothed Dolphin	5.8877	6
Short-beaked Common Dolphin	86.3962	87
Short-finned Pilot Whale	18.7461	19
Sperm Whale	1.6701	2
Spinner Dolphin	2.1661	3
Stejneger's Beaked Whale	0.2855	1
Striped Dolphin	23.9042	24
Pinnipeds		
Hawaiian Monk Seal	0.0067	1

4.2.3 Effects on Marine Mammal Habitat

No ESA-designated critical habitats of any marine mammal species are located in or near the waters of the nine western North Pacific Ocean provinces in which the proposed ONR ATE may be conducted. There are also no international marine mammal protected areas located within the vicinity of the experiment area. During the ONR ATE, only acoustic transducers and receivers as well as standard oceanographic equipment would be deployed. Experimental systems are planned to be retrieved after data collection has been completed. The acoustic and oceanographic instrumentation that would be deployed operates in accordance with all applicable international rules and regulations related to environmental compliance, especially for discharge of potentially hazardous materials. Therefore, no discharges of pollutants would result from the deployment and operation of the acoustic and oceanographic instruments and systems.

During the ONR ATE, deployment and operation of the sound sources would result in no physical alterations to the marine environment other than addition of elevated underwater sound levels, which may have some effect on marine mammals. Any increase in underwater sound levels would be temporary (lasting no more than 2 weeks) and limited in geographic scope. A small number of marine mammals present near the proposed activity may be temporarily displaced due to sound source transmissions. However, concentrations of marine mammals and/or marine mammal prey species are not expected to be encountered in or near the vicinity of the waters in the western North Pacific provinces in which the ONR ATE may occur. There are no critical feeding, breeding, or migrating areas for any marine mammal species that may occur in the proposed action area. No long-term impacts associated with the increase in ambient noise levels are expected.

4.3 SUMMARY OF COMPLIANCE WITH APPLICABLE LAWS, NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

As summarized below, NMFS has determined that the proposed activity is consistent with the purposes, policies, and applicable requirements of NEPA, ESA, MMPA, and NMFS regulations. NMFS' issuance of the authorization would be consistent with the MMPA and ESA.

4.3.1 National Environmental Policy Act

In compliance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq*.), NMFS has prepared this EA analyzing the effects of the proposed action (i.e., issuance of an IHA) on the human environment. The EA will serve as the basis for preparing any Finding of No Significant Impact or Notice of Intent to prepare an Environmental Impact Statement.

4.3.2 Endangered Species Act

ONR and NMFS' Office of Protected Resources requested section 7 consultation under the ESA for issuance of a IHA due to the potential presence of eight listed marine mammal species within the action area. A Biological Opinion would be finalized prior to issuance of the IHA.

4.3.3 Marine Mammal Protection Act

ONR submitted an IHA application consistent with applicable issuance criteria in the MMPA and NMFS implementing regulations. In summary, NMFS has determined that the proposed action would result in short-term behavioral changes to marine mammals in-water (e.g., avoidance, change in behavioral patterns at time of exposure) in response to the ATE. ONR's specified activities would result in the incidental take of marine mammals, by Level B harassment only, and the total taking would have a negligible impact on the affected species or stocks. The IHA would comply with all relevant MMPA requirements.

4.4 MITIGATION AND MONITORING MEASURES

As required under the MMPA, NMFS considered mitigation to effect the least practicable adverse impact on marine mammals and developed a series of mitigation measures, as well as monitoring and reporting procedures, that would be required as part of its incidental harassment authorization. NMFS assisted with the development of ONR's proposed measures identified in the IHA application in preparation of the proposed IHA and considered comments received during the public comment period. NMFS has determined that ONR's proposed mitigation and monitoring measures are adequate to ensure negligible impact on affected marine mammal species and stocks and effect the least practicable adverse impact. The mitigation measures described in Chapter 2 were designed to eliminate the potential for injury and mortality and minimize harassment. Monitoring measures also described in Chapter 2 are designed to ensure that ONR would effectively detect animals and implement the required mitigation measures.

4.5 CUMULATIVE EFFECTS

Cumulative effects are defined as those that result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time (40 CFR §1508.7).

Sources of cumulative impacts to marine mammal populations include the following: commercial whaling; altered prey base and habitat quality as a result of global warming; ship strikes; fishing gear entanglement; exposure to biotoxins and the resulting bioburden; vessel noise; competition with commercial fisheries; and killer whale predation. These activities account for cumulative impacts to regional and worldwide populations of marine mammals, many of whom are a small fraction of their former abundance and are listed as endangered or threatened under the ESA and depleted under the MMPA.

Marine mammal experts now consider acoustic masking from anthropogenic noise as the major threat to marine mammal populations, particularly low-frequency specialists such as baleen whales. Low-frequency ocean noise has increased in recent decades, often in habitats with seasonally resident populations of marine mammals, raising concerns that noise chronically influences life histories of individuals and populations (Clark *et al*., 2009). However, quantifying the biological costs for marine mammals within an ecological framework is a critical missing link to our assessment of cumulative noise impacts in the marine environment and assessing cumulative effects on marine mammals (Clark, *et al*., 2009).

Despite these regional and global anthropogenic and natural pressures, available trend information from NMFS' stock assessment reports does not list any of the earlier mentioned stocks as declining (Carretta *et al*., 2013). The proposed seismic survey would add another, albeit temporary, activity to the marine environment in the Pacific Ocean and the proposed survey would be limited to a small area in the North Pacific Ocean for a short period of time.

ONR's proposed action would take place in international waters, in one of nine provinces of the western North Pacific Ocean, miles away from land, fishing grounds (IATTC, 2012), commercial shipping ports, and other anthropogenic activities. Other activities in the area with

incidental take authorizations include: the Navy's use of mid- and high-frequency active sonar and detonation of underwater explosives in the Hawaii Range Complex; the Navy's use of mid- and high-frequency active sonar and detonation of underwater explosives in the Mariana Islands Range Complex; the Navy's operations of Surveillance Towed Array Sensor System Low-frequency Active (SURTASS LFA) sonar; and Scripps Institution of Oceanography's low-energy marine geophysical survey. The seismic survey activities would not overlap in time with ONR's proposed action. Considering the expanse of the western North Pacific Ocean and the short duration of the ATE, ONR's proposed action is not likely to add an increment of disturbance which would cumulatively, when combined with other actions, result in significant adverse impacts to marine mammals.

4.5.1 Current Projects in Action Area

Issuance of an IHA to ONR is not related to other actions with individually insignificant, but cumulatively significant impacts. There are no known potential interrelated/interdependent actions associated with the proposed project. Other actions with incidental take authorizations are listed above in section 4.5.

4.5.2 Reasonably Foreseeable Future Actions (RFFAs)

Currently, there are no reasonably foreseeable projects planned for this portion of the western North Pacific Ocean. Any other future authorizations will have to undergo the same permitting process and will take the ATE into consideration when addressing cumulative effects. Should NMFS receive an application from an applicant requesting authorization to take marine mammals incidental to specified activities in the action area, NMFS would also consider cumulative impacts to the affected species or stock, as required under NEPA.

CHAPTER 5 List of Preparers and Agencies Consulted

Michelle Magliocca
Fishery Biologist
NOAA's National Marine Fisheries Service
1315 East West Highway
Silver Spring, MD 20910

Office of Naval Research
875 N Randolph Street
Arlington, VA 22203

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