BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XD188

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Conductor Pipe Installation Activities at Harmony Platform in Santa Barbara Channel offshore of California

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

ACTION: Notice; proposed Incidental Harassment Authorization; request for comments.

SUMMARY: NMFS has received an application from ExxonMobil Production Company (ExxonMobil), a Division of ExxonMobil Corporation, for an Incidental Harassment Authorization (IHA) to take marine mammals, by harassment, incidental to installing six conductor pipes via hydraulic hammer driving at the Harmony Platform, Santa Ynez Production Unit, located in the Santa Barbara Channel offshore of California. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an IHA to ExxonMobil to incidentally harass, by Level B harassment only, 30 species of marine mammals during the specified activity.

DATES: Comments and information must be received no later than [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Comments on the application should be addressed to Jolie Harrison, Supervisor, Incidental Take Program, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910. The mailbox address for providing email comments is ITP.Goldstein@noaa.gov. Comments sent via e-mail, including all attachments, must not exceed a 25-megabyte file size. NMFS is not responsible for comments sent to addresses other than the one provided here.

Instructions: All comments received are a part of the public record and will generally be posted to http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications without change. All Personal Identifying Information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

An electronic copy of the application may be obtained by writing to the address specified above, telephoning the contact listed below (see FOR FURTHER INFORMATION CONTACT) or visiting the internet at: http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications. Documents cited in this notice may also be viewed, by appointment, during regular business hours, at the aforementioned address.

NMFS is also preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) and will consider comments submitted in response to this notice as part of that process. The EA will be posted at the foregoing internet site once it is finalized.

FOR FURTHER INFORMATION CONTACT: Howard Goldstein or Jolie Harrison, Office of Protected Resources, NMFS, 301-427-8401.

SUPPLEMENTARY INFORMATION:

Background

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 small numbers of marine mammals, by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

An authorization for the incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking requirements pertaining to the mitigation, monitoring and reporting of such takings 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."

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

Summary of Request

On March 3, 2014, NMFS received an application from ExxonMobil for the taking of marine mammals incidental to installing six conductor pipes by hydraulic hammering at the Harmony Platform, Santa Ynez Production Unit, in the Santa Barbara Channel offshore of California. Along with the IHA application, NMFS received an addendum titled "Assessment of Airborne and Underwater Noise from Pile Driving Activities at the Harmony Platform." NMFS determined that the application was adequate and complete on April 28, 2014.

The proposed project's estimates dates are from mid-August to mid-November 2014, but the proposed action could occur anytime within a 12-month period from the effective date of the proposed IHA. Acoustic stimuli (i.e., increased underwater and airborne sound) generated during the conductor pipe installation activities are likely to result in the take of marine mammals. Take, by Level B harassment only, of 30 species is anticipated to result from the proposed activities.

Description of the Proposed Specified Activity

Overview

ExxonMobil proposes to install six conductor pipes by hydraulic hammering at the Harmony Platform, Santa Ynez Production Unit, in the Santa Barbara Channel offshore of California.

Dates and Duration

ExxonMobil estimates that the proposed conductor pipe installation activities would occur from mid-August to mid-November 2014, but the proposed activities could occur anytime within a 12-month period from the effective date of the proposed IHA. Precise scheduling is not presently available due to logistical and regulatory uncertainties. ExxonMobil has requested the IHA for an August start date to allow for flexibility in scheduling operations, equipment, and personnel, as well as to ensure sufficient time to arrange for monitoring field services. The estimated duration of the proposed project is 91 days. Under normal working conditions, the proposed project is expected to include approximately 84 days of installation activity on the Harmony Platform bounded by 7 days of project mobilization/demobilization activities. It would take approximately 14 days to install each conductor pipe (6 conductors x 14 days = 84 days). Figure 2-1 of the IHA application includes a timeline of proposed activities over the approximate three month duration. Of the estimated 84 days, hammer driving would occur over 30 intermittent intervals of 2.5 to 3.3 hours each for a combined total of 4.125 days, or 5% of the entire proposed project (3.3 hours x 5 joints x 6 conductors = 99 hours or 4.125 days).

Specified Geographic Region

Harmony Platform is located in the Santa Barbara Channel, which is approximately 100 km (54 nmi) long and 40 km (21.6 nmi) wide, situated between the Channel Islands and the east-west trending coastline of California. The Santa Barbara Channel is the site of several other producing oil fields, including Ellwood, Summerland, Carpinteria offshore, and Dos Cuadras. The Santa Barbara basin is the prominent feature of the Santa Barbara Channel, with sill depths of approximately 250 m (820.2 ft) and 450 m (1,467.4 ft) at eastern and western entrances, respectively, with shallow (60 m or 196.9 ft) inter-island passages to the south. Harmony Platform's geographical position is 34º 22' 35.906" North, 120º 10' 04.486" West, at a water depth of 366 m (1,200.8 ft) on the continental slope below a relatively steep (7.5%) descent. The Harmony Platform is 43.5 km (27 miles) southwest of Santa Barbara, California (see Figure 1 of the IHA application). It is 4.7 km (2.5 nmi) from the shelf break, which is typically defined at the 100 m (328.1 ft) isobaths (USGS, 2009). It is 3.3 km (1.8 nmi) from the nearest buffered 200 m (656.2 ft) contour, which has been noted for its association with higher recorded densities of cetacean species (Redfern et al., 2013). It is also located 10 to 15 km (5.4 to 8.1 nmi) north of a common traffic route used by vessels to access the ports of Long Beach and Los Angeles. Figure 1-1 of the IHA application includes the location of the Harmony Platform, general site bathymetry, and Santa Barbara area boundaries.

Site Bathymetry and Sediment Physical Characteristics – Harmony Platform is located below a relatively steep (7.5%) descent from the shelf margin, which is defined by the 100 m contour in this area (USGS, 2009). It sits at a water depth of 366 m, just above the northern rim of the Santa Barbara Basin which is roughly confined by the 400 m (1,312.3 ft) contour, descending to depths exceeding 600 m (1,968.5 ft). Depths below the Harmony Platform are defined by a gentle slope (ca. 1%), which extends to the 600 m contour at the basin maximum. To the west of the platform, the slope attenuates to about 3% grade between 100 m and 400 m contours, near the western sill of the basin. To the east, the slope becomes steeper, approaching 15% grade between 100 m and 400 m contours, at 20 km (10.8 nmi) east of the platform.

Harmony Platform is located on unconsolidated fine-grained silty-clay and clayey-silt sediments. Table 2-1 of the IHA application describes the sediment physical characteristics and geoacoustical profile in the vicinity of the Harmony Platform. These sediments are typical of slope depths proceeding into the basin where sediments may be 2,000 m (6,561.7 ft) thick. Stein (1995) reported similar sediment grain characteristics from core segments penetrating 196 m (643.1 ft) below the sediment surface at a basin depth of 565 m (1,853.7 ft). Sediments were primarily of terrigeneous origin, dominated by quartz and clay minerals montmorillonite and illite. These sediments are similar in quartz content and clay-mineral composition to suspended sediment introduced by the Santa Clara River, which has an average annual sediment load of about 600,000 m^3 (2.1×10^7 ft^3) (Brownlee and Taylor, 1981). These turbid sediment plumes, arising primarily from the Santa Clara River to the east and from Santa Maria and Santa Inez Rivers north of Point Conception, may extend more than 5 km (2.7 nmi) from shore and inshore from Harmony Platform during periods of heavy runoff.

Sediments at Harmony Platform and throughout the Santa Barbara Channel slopes and basin reflect terrigeneous origins from coastal watersheds (mainly the Santa Clara River), with relatively minor inclusions of marine biogenic origin (e.g., calcareous and diatomaceous fractions). Shell fragment debris dislodged from the jacket structure during peak storm wave surges and from periodic maintenance has been observed around the periphery of the jacket in ROV surveys, but significant debris was not observed at the conductor pipe locations designated from this project. No known hard substrates have been identified by the former Minerals

Management Service and NMFS surveys within 5 km of the Harmony Platform (Keller et al., 2005). Extending from shore to the 100 m shelf break, hard substrate is common, supporting extensive kelp beds at depths less than 20 m (65.6 ft), on cobbles and boulders. Further offshore, at depths of about 65 m (213.3 ft) to the shelf break, regions of folded ridges and pinnacles up to 3 m (9.8 ft) in relief have been recorded (USGS, 2009).

Hydrodynamics and Water Column Physical Properties – Hydrodynamic and seawater properties at the Harmony Platform are complex as a result of shifting wind and current patterns that occur in the Santa Barbara Channel in response to changing coastline orientation at Point Conception (Beckenbach, 2004). The Santa Barbara Channel is a cross-roads for large scale water masses moving along the California coast. Waters from north of Point Conception are cooled by coastal upwelling as they move southward. Most of these waters pass outside the Channel Islands but some enter the Santa Barbara Channel at its west end. Warmer waters from the south are driven poleward by the Southern California Countercurrent. Mean nearshore circulation in the entire Southern California Bight is dominated by this current (Hickey, 1993), which enters the Santa Barbara Channel from the east. Water mass properties are determined by relative inputs to the Santa Barbara Channel from eastern and western entrances.

Hydrodynamics – Aud et al. (1999) determined that transport from the east accounted for 60% of the water entering the Santa Barbara Channel with 33% originating from the southern portion of the western entrance and the remaining 7% from southern inter-island passages. These contrasting source waters mix in the Santa Barbara Channel, often forming complex patterns visible in satellite images of sea surface temperature. They represent the more persistent large scale movement of water masses, which are driven by dynamic processes on scales much larger than the Santa Barbara Channel. Current speed fluctuations exhibit significant variation, typically ranging from 10 to 40 cm s^{-1} (Hickey, 1992), extending to a depth of 200 m (656.2 ft), and tending to follow longshore isobaths. Seasonal mean currents over the continental slope are 20 to 30 cm s^{-1}. However, surface circulation may be driven by winds that create rapidly developing high energy surface flows that vary in direction over scales of several kilometers. In the Santa Barbara Channel, wind stress from the northwest creates surface flows characterized by cyclonic, and occasionally anti-cyclonic, flow vortices which propagate westward. These occur intermittently throughout the year, and may last for months (Beckenbach, 2004; Oey, 2001). Vertical upwelling along the coast is also a feature of the water mass, occurring primarily from spring through fall (Harms and Winant, 1998). Inlet water mass movement in the vicinity of Harmony Platform is from west to east, extending to basin sill depth, with highly variable patterns of flow at the surface under the periodic influence of gyre vortices lasting from days to months, meandering from east to west, typically from spring to fall.

Water Column Physical Properties – Seasonal changes in water column stability (density structure) result from changes in temperature and salinity that occur seasonally from air-sea surface interactions, and from periodic fluctuations in relative contributions of different source waters (e.g., eastern and western flows). The water column is density stratified as temperatures decline and salinity increases with depth. Seasonal effects are evident with the strongest density gradient occurring during summer months, primarily within the upper 25 m (82 ft). Water column profiles of salinity, temperature, and calculated sound speed are illustrated in Figure 2-2 of the IHA application. Temperatures range from approximately 13 to 16.5º Celsius (C) (55.4 to 61.7º Fahrenheit [F]) at the surface, become nearly isothermal (9 to 9.5º C or 48.2 to 49.1º F) at 150 m (492.1 ft) depth, likely varying little to the platform depth of 366 m (1,200.8 ft). Seasonal salinities varied little, ranging from about 33.3 to 33.7% at the surface to 34 to 34.1% to 150 m depth. Figure 2-2 of the IHA application shows salinity, temperature, and underwater sound speed profiles in the vicinity of the Harmony Platform derived from the U.S. Naval

Oceanographic Office's Generalized Digital Environmental Model (GDEM) database. The profile for sound speed correlates strongly with temperature, which is the main determinant of water density structure.

Detailed Description of the Proposed Specified Activity

ExxonMobil propose to install six conductor pipes by hydraulic hammering at Harmony Platform. The proposed conductor pipe installation activities are estimated to occur from mid-August to mid-November 2014, but the proposed action could occur anytime within a 12-month period from the effective date of the proposed IHA. Harmony Platform is located 10 kilometers (km) (5.4 nautical miles [nmi]) off the coast of California, between Point Conception and the City of Santa Barbara. Harmony Platform is one of three offshore platforms in ExxonMobil's Santa Ynez Production Unit, and is located in the Hondo field (Lease OCS-P 0190) at a water depth of 336 meters (1,200.8 ft). Harmony Platform was installed on June 21, 1989 with the sole purpose of producing crude oil and gas condensate. It began production of crude oil, gas and gas condensate on December 30, 1993. A conductor pipe is installed prior to the commencement of drilling operations for oil and gas wells. It provides protection, stability/structural integrity, and a conduit for drill cuttings and drilling fluid to the platform. It also prevents unconsolidated sediment from caving into the wellbore, and provides structural support for the well loads. Drilling activities are currently ongoing at Harmony Platform utilizing the existing conductors and wells. The platform jacket structure (see Figure 1-2 of the IHA application) currently has conductors installed in 51 out of 60 slots, as approved by the Bureau of Ocean Energy Management (BOEM, formally the Minerals Management Service [MMS]) in the original Development Production Plan. Addition of eight straight conductors at the Harmony Platform was approved by the Bureau of Safety and Environmental Enforcement (BSEE) on February 11, 2013 to maintain current production levels from the existing platform. Conductor installation with a hydraulic hammer is consistent with approved development plans, and is the same method that was used to install conductors on all three Santa Ynez Production Unit platforms from 1981 (Hondo) through 1993 (Harmony and Heritage). Pile-driving the conductors are the only proven installation method that enables management of potential interferences with the existing platform infrastructure that would also reach the target depth. Non-pile-driving conductor installation methods are not deemed feasible at this time due to increased risk to platform structural integrity, offset well collision, and shallow-hole broaching.

The total length of a single conductor pipe is approximately 505 m (1,656.8 ft). Each conductor consists of multiple sections of 66.04 centimeter (cm) (26 inch [in]) diameter steel pipe that would be sequentially welded end-to-end from an upper deck of the platform (see Figure 1-2 of the IHA application), and lowered into the 366 m water column through metal rings (conductor guides) affixed to the jacket structure that orient and guide the conductor. Once the conductor reaches the sediment surface, gravity-based penetration (i.e., the conductor would penetrate the seabed under its own weight) is expected to reach approximately 30 m (98.4 ft) below the seabed. A hydraulic hammer (S-90 IHC) with a manufacturer's specified energy range of 9 to 90 kiloJoules (kJ) would be located on the drill deck and used to drive the conductor to a target depth of approximately 90 to 100 m (295.3 to 328.1 ft) below the seabed; therefore, only roughly 60 m (196.9 ft) of each 505 m (1,656.8 ft) long conductor pipe would require hydraulic driving. The S-90 IHC hydraulic hammer would sit on the conductor throughout pile-driving operations, but a ram internal to the hammer would stroke back and forth using hydraulic pressure to impart energy to the conductor. No physical dropping of a weight would be employed to drive the conductor.

The S-90 IHC hydraulic hammer has an estimated blow rate of about 46 blows per minute. The portion of a complete conductor that must be actively driven (hammered) into the seafloor consists of 5 to 7 sections, which are sequentially welded end-to-end. Setup and welding would take 3.5 to 7.3 hours per section, mostly depending on the type of welding equipment used (e.g., automated welder). Hammer pile-driving would take an estimated 2.5 to 3.3 hours for each section, depending primarily on sediment physical properties, which affect penetration rate. Complete installation of each conductor is estimated at approximately 14 days based on 24-hour (continuous) operations. Table 1-1 of the IHA application presents a summary of driving activities and estimated number of joints [requiring welding] for each conductor pipe). Figure 1-3 of the IHA application shows the estimated time in days for each of these activities that are required to install a single conductor pipe. ExxonMobil conservatively assumes that active hammering would be 3.3 hours, followed by 7.3 hours of hammer downtime (i.e., "quiet time," a time at which other activities are performed in preparation for the next section of pile) over approximately 53 hours (2.2 days) of the approximately 14 days required to install one conductor pipe. This schedule produces 4.125 days (99 hours) of cumulated hammer driving for all six conductors over the project duration. Figure 1-4 depicts the 3.3 hour pile-drive/7.3 hour downtime cycle for an isolated 24-hour period, showing a maximum of 9.4 hours of hammer driving. In the event that efficiencies produce a 2.5 hour drive/3.5 hour downtime cycle, a maximum of 10 hours of hammer pile-driving could occur in a single 24-hour period. The complete installation of the conductor pipes is estimated at 14 days of continuous operation.

Table 1. Summary of proposed installation activities and associated characteristics of each conductor pipe at Harmony Platform.

Conductor Pipe Activity	Pipe Length (m)	Estimates Number of Joints	Pile-Driving Required	Estimated Number of Days[3]
Installation level to sea level	49 (160.8 ft)	4	No	2
Sea level to seafloor	366 (1,200.8 ft)	28	No	5.6
From 0 to ~30 m below seafloor	30[1] (98.4 ft)	3	No	0.9
From ~30 m to ~90 m below seafloor	60 (196.9 ft)	5 to 7	Yes[2]	0.69
Hammer downtime	NA	NA	No	1.52

Clean up and completion	NA	NA	No	3.6

[1] Estimated range of gravity-based penetration.
[2] See Figure 1-4 of the IHA application.
[3] See Figure 1-3 of the IHA application.

Platform Specifications

The Harmony Platform is owned and operated by ExxonMobil and has a personnel capacity of 132 people. The Harmony Platform, located in the Santa Barbara Channel, was installed on June 21, 1989 and first began production on December 30, 1993. The lease location for the Santa Ynez Production Unit is OCS-P0190. Support vessels and helicopters are used routinely as part of normal platform operations and would be utilized to provide necessary support for proposed activities during the project. There are no anticipated changes in logistics from current operations associated with the proposed project. The contractors responsible for protected species and noise monitoring during the proposed project would use existing, routine transportation vessels.

The Harmony Platform also has a minimum of two locations as likely observation stations from which Protected Species Observers (PSO) would watch for marine mammals before and during the proposed conductor pipe installation activities. The station on the upper deck has an approximately 360º view around the Harmony Platform to monitor the Level B harassment buffer zone. At least one station on the lower deck would monitor the Level A harassment exclusion zone. More details of the Harmony Platform can be found in the IHA application and online at: http://www.boem.gov/BOEM-Newsroom/Offshore-Stats-and-Facts/Pacific-Region/Pacific-Platform-Operators.aspx#Exxon.

Acoustic Source Specifications

Predicted Sound Levels for the Pile-Driving Activities

The predicted in-water sound field during proposed impact hammer pile-driving of the conductor pipes at the Harmony Platform were modeled by JASCO Applied Sciences, Ltd

(JASCO). See JASCO's "Assessment of Airborne and Underwater Noise from Pile-Driving Activities at the Harmony Platform" for a detailed description of ExxonMobil's modeling for this proposed action, which is provided as an addendum to the IHA application. NMFS refers the reviewers to that document for additional information. Sound levels emitted from the conductor pipe were estimated using underwater recordings (Illingworth and Rodkin, 2007) for impact pile-driving of 61 to 76.2 centimeter (cm) (24 to 30 inch [in]) steel piles (i.e., pipes) back calculated to 1 m from the sound source, assuming a combination of cylindrical and spherical spreading. Sound level at the source was then scaled to the anticipated energy range of 9 and 90 kJ for the impact hammer and coupled to an acoustic model of a representative steel pipe (Claerbout, 1976; Reinhall and Dahl, 2011). Only modeled results associated with the maximum hammer energy of 90 kJ were used to estimate potential impacts and calculate take.

Each 505 m (1,656.8 ft) long conductor pipe is assembled from 12 m (39.4 ft) long sections welded end-to-end, and then lowered from a top deck of the platform through 366 m (1,200.8 ft) of water until the pipe encounters the seafloor and penetrates approximately 60 m of the seabed under its own weight. Because of the extremely long length of the conductor pipe compared to those represented in the literature, the pipe was modeled as a line array of 12 sources at 30 m (98.4 ft) intervals (i.e., over 360 m [1,181.1 ft] pipe length). This procedure produced a more realistic estimates of the maximum sound SPL (rms) from impact hammer pile-driving of Harmony Platform's conductor pipes, compared with a single sound source representation (e.g., mid-pipe) that is generally used for shorter pipes (piles). At the maximum hammer energy of 90 kJ, the corresponding maximum sound pressure throughout the water column is estimated at 202 dB (rms) at 1 m from the conductor pipe (see Figure 6-1 of the IHA application). The predicted sound levels were used by ExxonMobil and NMFS to determine the buffer and exclusion zones for the proposed conductor pipe installation activities.

Table 2 (Table 6-4 of the IHA application) summarizes the modeled distances at which in-water (160, 180, and 190 dB [rms]) and in-air (90 and 100 dB [rms]) sound levels are expected to be received from the impact hammer pile-driving operating at a water depth of 366 m. For in-water noise, sound propagation and corresponding maximum distances were modeled using JASCO's model Full Waveform Range-dependent Acoustic Model (FWRAM), which is based on a modified version of the U.S. Navy's parabolic Range-dependent Acoustic Model (RAM) to account for an elastic seabed. FWRAM enhances RAM by accounting for seabed dissipation of acoustic energy and incorporates local bathymetry, seafloor geoacoustics, and underwater sound speed profiles. Physical data specific to the Harmony Platform location were used by JASCO to model sound propagation (see Table 2-1 and Figure 202 of the IHA application). Representative data include sediment grain size and density, and water column salinity/temperature, as these properties affect seafloor geoacoustic properties and in-water sound speed, respectively. Routines in FWRAM were used to model sound as SPL (rms) over water column depth and distance from the conductor pipe based on maximum hammer energy (90 kJ). Figure 6-2 of the IHA application shows water depth versus distance from the conductor pipe (sound source), where the 160 dB isopleth represents the maximum distance for in-water Level B harassment for marine mammals. The maximum distances are generally higher in the top 100 m (328.1 ft) of the water column.

To evaluate potential seasonal effects on sound propagation in the water column, year-round conditions using selected monthly averages (i.e., January, April, August, and November) of water column salinity and temperature were modeled along one azimuth, south of the Harmony Platform. Results showed no significant seasonal variations (<1 dB [rms]) up to 1 km (0.5 nmi) from the Harmony Platform. Potential differences in sound propagation with direction from the Harmony Platform also were investigated by JASCO. There were not significant differences in the sound field modeled for four equally spaced transects out to 1 km from the Harmony Platform.

For in-air noise, JASCO used in-air sound levels calculated from recordings of pipe-driving tests performed by ExxonMobil using a 90 kJ energy hammer that is planned for use on this proposed action. The tests used the S-90 hammer at 90% of its maximum energy with a steel pipe of unknown size. The estimated sound levels represent A-weighted received levels, calculated at six distances between 0 and 12 m (0 to 39.4 ft), and indicated a source level of 132.4 dB re 20 µPa (rms) (A-weighted). Calculated distances from the sound source to the Level B harassment threshold for in-air noise (SPL [rms]) using spherical spreading loss are shown below and in Table 6-4 of the IHA application. Using the JASCO model, Table 2 (below) shows the distances at which three rms underwater sound levels and two rms in-air sound levels are expected to be received from the impact hammer pile-driving activities. The 180 and 190 dB re 1 µPam (rms) distances are the safety criteria (i.e., exclusion zone) for potential Level A harassment as specified by NMFS (2000) and are applicable to cetaceans and pinnipeds, respectively. If marine mammals are detected within or about to enter the appropriate exclusion zone, the impact hammer pile-driver would be shut-down immediately.

Table 2**.** Modeled maximum distances to which in-water sound levels ≥190, 180 and 160 dB re 1 µPa (rms) and in-air sound levels ≥90 (for harbor seals) and 100 dB re 20 µPa (rms) (for all other pinnipeds) could be received during the proposed pile-driving activities (based on maximum hammer energy of 90 kJ) in the Santa Barbara Channel off the coast of California.

Source	Water Depth (m)	Predicted RMS Radii Distances (m) for In-Water Pile-Driving			Modeled RMS Radii Distances (m) for In-Air Pile-Driving	
		160 dB	180 dB	190 dB	90 dB	100 dB
90 kJ Impact Hammer Pile-Driver	366	325 (1,066.3 ft)	10 (32.8 ft)	3.5 (11.5 ft)	123 (403.5 ft)	41 (134.5 ft)

NMFS expects that acoustic stimuli resulting from the proposed impact hammer pile-driving associated with the conductor pipe installation activities has the potential to harass marine mammals.

Description of the Marine Mammals in the Area of the Proposed Specified Activity

The marine mammals that generally occur in the proposed action area belong to four taxonomic groups: mysticetes (baleen whales), odontocetes (toothed whales), pinnipeds (seals and sea lions), and fissipeds (sea otters). The marine mammal species that potentially occur within the Pacific Ocean in proximity to the proposed action area in the Santa Barbara Channel off the coast of California (ranging from Point Conception and south, including the entire Southern California Bight) include 30 species of cetaceans (whales, dolphins, and porpoises) and 6 species of pinnipeds. The southern sea otter (Enhydra lutris nereis) is listed as threatened under the ESA and is managed by the U.S. Fish and Wildlife Service and is not considered further in this proposed IHA notice.

Marine mammal species listed as threatened or endangered under the U.S. Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 et seq.), includes the North Pacific right (Eubalaena japonica), humpback (Megaptera novaeangliae), sei (Balaenoptera borealis), fin (Balaenoptera physalus), blue (Balaenoptera musculus), and sperm (Physeter macrocephalus) whale as well as the Guadalupe fur seal (Arctocephalus townsendi). Of those threatened and endangered species, the humpback, sei, fin, blue, and sperm whale are likely to be encountered in the proposed action area.

Cetaceans occur throughout the Santa Barbara Channel proposed action area, including nearby the Harmony Platform, from the surf zone to open ocean environments beyond the Channel Islands. Distribution is influenced by a number of factors, but primary among these are patterns of major ocean currents, bottom relief, and sea surface temperature. These physical oceanographic conditions affect prey abundance, which may attract marine mammals during periods of high productivity, and vice versa. Water movement is near continuous, varying seasonally, and is generally greatest from late spring to early fall in response to varying wind stress. This phenomenon is much greater in the western Santa Barbara Channel. This near continuous movement of water from the ocean bottom to the surface creates a nutrient-rich, highly productive environment for marine mammal prey (Jefferson et al., 2008). Most of the large cetaceans are migratory, but many small cetaceans do not undergo extensive migrations. Instead, they undergo local or regional dispersal, on a seasonal basis or in response to food availability. Population centers may shift on spatial scales exceeding 100 km (54 nmi) over small time scales (days or weeks) (Dailey and Bonnell, 1993).

Systematic surveys (1991 to 1993, 1996, 2001, 2005) in the southern California region have been carried out via aircraft (Carretta and Forney, 1993) and vessel (Ferguson and Barlow, 2001; Barlow, 2003) by NMFS. In addition, a vessel survey in the U.S. Exclusive Economic Zone (EEZ), and out to 556 km (300.2 nmi) offshore of California, Oregon, and Washington, was conducted in the summer and fall of 2005 by NMFS (Forney, 2007). Many other regional surveys have also been conducted (Carretta, 2003). Becker (2007) analyzed data from vessel surveys conducted since 1986, and compiled marine mammal densities. There are 30 cetacean and 6 pinniped species with ranges that are known to occur in the Eastern North Pacific Ocean waters of the project area. These include the North Pacific right whale, Bryde's whale (Balaenoptera edeni), dwarf sperm whale (Kogia sima), harbor porpoise (Phocoena phocoena), Steller sea lion (Eumatopias jubatus), and Guadalupe fur seal. However, these species are extremely rare, found in the Channel Islands, or are primarily found north or south of the Santa Barbara Channel, and are unlikely to be found in the proposed action area. The harbor porpoise occurs north of Point Conception, California. Bryde's whales are extremely rare in the Southern

California Bight, with fewer than ten confirmed sightings from August 2006 to September 2010 (Smultea et al., 2012). Guadalupe fur seals are most common at Guadalupe Island, Mexico, which is their primary breeding ground (Melin and Delong, 1999). Although adult and juvenile males have been observed at San Miguel Island, California, since the mid-1960's, and in the late 1990's a pup was born on the islands (Melin and Delong, 1999), more recent sightings are extremely rare. These species are not considered further in this document. Table 3 (below) presents information on the occurrence, abundance, distribution, population status, and conservation status of the species of marine mammals that may occur in the proposed project area during August to November 2014.

Table 3. The habitat, occurrence, range, regional abundance, and conservation status of marine mammals that may occur in or near the proposed pipe installation project area off the coast of California in the Pacific Ocean (See text and Tables 3-1 in ExxonMobil's IHA application for further details).

Species	Habitat	Occurrence	Range	Best Population Estimate (Minimum)[1]	ESA[2]	MMPA[3]
Mysticetes						
North Pacific right whale (Eubalaena japonica)	Coastal and pelagic	Rare	North Pacific Ocean between 20 to 60º North	NA (26) – Eastern North Pacific stock	EN	D
Gray whale (Eschrichtius robustus)	Coastal and shelf	Transient during seasonal migrations	North Pacific Ocean, Gulf of California to Arctic – Eastern North Pacific stock	19,126 (18,107) – Eastern North Pacific stock 155 (142) – Western North Pacific population	DL – Eastern North Pacific stock EN – Western North Pacific population	NC – Eastern North Pacific stock D – Western North Pacific population
Humpback whale (Megaptera novaeangliae)	Pelagic, nearshore waters, and banks	Seasonal, sightings near northern Channel Islands	Cosmopolitan	1,918 (1,876) – California/Oregon/Washington (CA/OR/WA) stock	EN	D
Minke whale (Balaenoptera acutorostrata)	Pelagic and coastal	Less common in summer, small number around northern Channel Islands	Tropics and sub-tropics to ice edges	478 (202) – CA/OR/WA stock	NL	NC
Bryde's whale (Balaenoptera edeni)	Pelagic and coastal	Rare, infrequent summer off California	Tropical and sub-tropical zones between 40º North and 40º South	NA	NL	NC
Sei whale (Balaenoptera borealis)	Primarily offshore, pelagic	Rare, infrequent summer off California	Tropical to polar zones, favor mid-latitude temperate areas	126 (83) – Eastern North Pacific stock	EN	D
Fin whale (Balaenoptera	Continental slope,	Year-round presence	Tropical, temperate,	3,051 (2,598) – CA/OR/WA stock	EN	D

physalus)	pelagic		and polar zones of all oceans			
Blue whale (Balaenoptera musculus)	Pelagic, shelf, coastal	Seasonal, arrive April to May, common late-summer to fall off Southern California	Tropical waters to pack ice edges	1,647 (1,551) – Eastern North Pacific stock	EN	D
Odontocetes						
Sperm whale (Physeter macrocephalus)	Pelagic, deep sea	Common year-round, more likely in waters >1,000 m	Tropical waters to pack ice edges	971 (751) – CA/OR/WA stock	EN	D
Pygmy sperm whale (Kogia breviceps)	Pelagic, slope	Seaward of 500 to 1,000 m, Limited sightings in Southern California Bight	Tropical to warm temperate zones (temperate preference)	579 (271) – CA/OR/WA stock	NL	NC
Dwarf sperm whale (Kogia sima)	Deep waters off the shelf	Rare	Tropical to warm temperate zones (warmer preference)	NA – CA/OR/WA stock	NL	NC
Baird's beaked whale (Berardius bairdii)	Pelagic	Primarily along continental slope late spring to early fall	North Pacific Ocean and adjacent seas	847 (466) – CA/OR/WA stock	NL	NC
Cuvier's beaked whale (Ziphius cavirostris)	Pelagic	Possible year-round occurrence	Cosmopolitan	6,950 (4,481) – CA/OR/WA stock	NL	NC
Blainville's beaked whale (Mesoplodon densirostris)	Pelagic	Rare, continental slope region, generally seaward of 500 to 1,000 m depth	Temperate and tropical waters worldwide	694 (389) – Mesoplodon spp. CA/OR/WA stock	NL	NC
Perrin's beaked whale (Mesoplodon perrini)	Pelagic	Rare, continental slope region,	North Pacific Ocean	694 (389) – Mesoplodon spp. CA/OR/WA stock	NL	NC

		generally seaward of 500 to 1,000 m depth				
Lesser beaked whale (Mesoplodon peruvianis)	Pelagic	Rare, continental slope region, generally seaward of 500 to 1,000 m depth	Temperate and tropical waters Eastern Pacific Ocean	694 (389) – Mesoplodon spp. CA/OR/WA stock	NL	NC
Stejneger's beaked whale (Mesoplodon stejnegeri)	Pelagic	Rare, continental slope region, generally seaward of 500 to 1,000 m depth	North Pacific Ocean	694 (389) – Mesoplodon spp. CA/OR/WA stock	NL	NC
Ginkgo-toothed beaked whale (Mesoplodon ginkgodens)	Pelagic	Rare, continental slope region, generally seaward of 500 to 1,000 m depth	Temperate and tropical waters Indo-Pacific Ocean	694 (389) – Mesoplodon spp. CA/OR/WA stock	NL	NC
Hubbs' beaked (Mesoplodon carlhubbsi)	Pelagic	Rare, continental slope region, generally seaward of 500 to 1,000 m depth	North Pacific Ocean	694 (389) – Mesoplodon spp. CA/OR/WA stock	NL	NC
Killer whale (Orcinus orca)	Pelagic, shelf, coastal, pack ice	Varies on inter-annual basis, likely in winter (January to February)	Cosmopolitan	240 (162) – Eastern North Pacific Offshore stock 346 (346) – Eastern North Pacific Transient stock 354 (354) – West Coast Transient stock	NL	NC
Short-finned pilot whale (Globicephala macrorhynchus)	Pelagic, shelf, coastal	Uncommon, more common before 1982	Warm temperate to tropical waters, ~50º North to 40º South	760 (465) – CA/OR/WA stock	NL	NC
Bottlenose dolphin (Tursiops	Offshore, inshore, coastal,	Offshore stock – Year-round	Tropical and temperate waters	1,006 (684) – CA/OR/WA Offshore stock 323 (290) – California	NL	NC

truncatus)	estuaries	presence Coastal stock – Limited, small population within 1 km of shore	between 45º North and South	Coastal stock		
Striped dolphin (Stenella coeruleoalba)	Off continental shelf	Occasional visitor	Tropical to temperate waters, 50º North to 40º South	10,908 (8,231) – CA/OR/WA stock	NL	NC
Short-beaked common dolphin (Delphinus delphis)	Shelf, pelagic, seamounts	Common, more abundant in summer	Tropical to temperate waters of Atlantic and Pacific Ocean	411,211 (343,990) – CA/OR/WA stock	NL	NC
Long-beaked common dolphin (Delphinus capensis)	Inshore	Common, more inshore distribution, year-round presence	Nearshore and tropical waters	107,016 (76,224) – California stock	NL	NC
Pacific white-sided dolphin (Lagenorhynchus obliquidens)	Offshore, slope	Common, year-round, more abundant November to April	Temperate waters of North Pacific Ocean	26,930 (21,406) – CA/OR/WA, Northern and Southern stock	NL	NC
Northern right whale dolphin (Lissodelphis borealis)	Pelagic	Common, more abundant November to April	North Pacific Ocean, 30 to 50º North	8,334 (6,019) – CA/OR/WA stock	NL	NC
Risso's dolphin (Grampus griseus)	Deep water, seamounts	Common, present in summer, more abundant November to April	Continental slope and outer shelf of tropical to temperate waters	6,272 (4,913) – CA/OR/WA stock	NL	NC
Dall's porpoise (Phocoenoides dalli)	Shelf, slope, offshore	Common, more abundant November to April	North Pacific Ocean, 30 to 62º North	42,000 (32,106) – CA/OR/WA stock	NL	NC
Harbor porpoise (Phocoena phocoena)	Coastal and inland waters	AK to Point Conception, CA	Shallow temperate to sub-polar waters of Northern Hemisphere	NA	NL	NC

Pinnipeds						
California sea lion (Zalophus californianus)	Coastal, shelf	Common, Channel Island breeding sites in summer	Eastern North Pacific Ocean – Alaska to Mexico	296,750 (153,337) – U.S. stock	NL	NC
Steller sea lion (Eumetopias jubatus)	Coastal, shelf	Rare	North Pacific Ocean – Central California to Korea	49,685 (45,916) – Western stock 58,334 to 72,223 (52,847) – Eastern stock	EN – Western stock DL – Eastern stock	D
Pacific harbor seal (Phoca vitulina richardii)	Coastal	Common, haul-outs and rookeries in Channel Islands, bulk of stock north of Point Conception	Coastal temperate to polar regions in Northern Hemisphere	30,196 (26,667) – California stock	NL	NC
Northern elephant seal (Mirounga angustirostris)	Coastal, pelagic when not migrating	Common, haul-outs and rookeries in Channel Islands, December to March and April to August, spend 8 to 10 months at sea	Eastern and Central North Pacific Ocean – Alaska to Mexico	124,000 (74,913) – California breeding stock	NL	NC
Northern fur seal (Callorhinus ursinus)	Pelagic, offshore	Common, small population breeds on San Miguel Island May to October	North Pacific Ocean – Mexico to Japan	12,844 (6,722) – California stock	NL	NC
Guadalupe fur seal (Arctocephalus townsendi)	Coastal, shelf	Rare, observed in Channel Islands	California to Baja California, Mexico	7,408 (3,028) – Mexico to California stock	T	D
Fissipeds						
Southern sea otter (Enhydra lutris nereis)	Coastal	Mainland coastline from San Mateo County to Santa Barbara County, CA	North Pacific Rim – Japan to Mexico	2,826 (2,723) – California stock	T	D

		San Nicolas Island				

NA = Not available or not assessed.
[1] NMFS Marine Mammal Stock Assessment Reports
[2] U.S. Endangered Species Act: EN = Endangered, T = Threatened, DL = Delisted, and NL = Not listed.
[3] U.S. Marine Mammal Protection Act: D = Depleted, S = Strategic, and NC = Not Classified.

Further detailed information regarding the biology, distribution, seasonality, life history, and occurrence of these marine mammal species in the proposed project area can be found in sections 3 and 4 of ExxonMobil's IHA application. NMFS has reviewed these data and determined them to be the best available scientific information for the purposes of the proposed IHA.

Potential Effects of the Specified Activity on Marine Mammals

This section includes a summary and discussion of the ways that the types of stressors associated with the specified activity (e.g., impact hammer pile-driving) have been observed to impact marine mammals. This discussion may also include reactions that we consider to rise to the level of a take and those that we do not consider to revise to the level of take (for example, with acoustics), we may include a discussion of studies that showed animals not reacting at all to sound or exhibiting barely measureable avoidance). This section is intended as a background of potential effects and does not consider either the specific manner in which this activity will be carried out or the mitigation that will be implemented, and how either of those will shape the anticipated impacts from this specific activity. The "Estimated Take by Incidental Harassment" section later in this document will include a quantitative analysis of the number of individuals that are expected to be taken by this activity. The "Negligible Impact Analysis" section will include the analysis of how this specific activity will impact marine mammals and will consider the content of this section, the "Estimated Take by Incidental Harassment" section, the "Proposed Mitigation" section, and the "Anticipated Effects on Marine Mammal Habitat" section to draw conclusions regarding the likely impacts of this activity on the reproductive success or survivorship of individuals and from that on the affected marine mammal populations or stocks.

Acoustic Impacts

When considering the influence of various kinds of sound on the marine environment, it is necessary to understand that different kinds of marine life are sensitive to different frequencies of sound. Based on available behavioral data, audiograms have been derived using auditory evoked potentials, anatomical modeling, and other data, Southall et al. (2007) designate "functional hearing groups" for marine mammals and estimate the lower and upper frequencies of functional hearing of the groups. The functional groups and the associated frequencies are indicated below (though animals are less sensitive to sounds at the outer edge of their functional range and most sensitive to sounds of frequencies within a smaller range somewhere in the middle of their functional hearing range):

- Low-frequency cetaceans (13 species of mysticetes): functional hearing is estimated to occur between approximately 7 Hz and 30 kHz;
- Mid-frequency cetaceans (32 species of dolphins, six species of larger toothed whales, and 19 species of beaked and bottlenose whales): functional hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High-frequency cetaceans (eight species of true porpoises, six species of river dolphins, Kogia spp., the franciscana (Pontoporia blainvillei), and four species of cephalorhynchids): functional hearing is estimated to occur between approximately 200 Hz and 180 kHz; and
- Phocid pinnipeds in water: functional hearing is estimated to occur between approximately 75 Hz and 100 kHz;
- Otariid pinnipeds in water: functional hearing is estimated to occur between approximately 100 Hz and 40 kHz.

As mentioned previously in this document, 30 marine mammal species managed under NMFS jurisdiction (26 cetacean and 4 pinniped species) are likely to occur in the proposed action area. Of the 26 cetacean species likely to occur in ExxonMobil's proposed action area, 6 are classified as low-frequency cetaceans (i.e., gray, humpback, minke, sei, fin, and blue whale), 18 are classified as mid-frequency cetaceans (i.e., sperm, Baird's beaked, Cuvier's beaked, Blainville's beaked, Perrin's beaked, Lesser beaked, Stejneger's beaked, Ginkgo-toothed beaked, Hubb's beaked, killer, and short-finned pilot whale, as well as bottlenose, striped, short-beaked common, long-beaked common, Pacific white-sided, northern right whale, and Risso's dolphin), 2 are classified as high-frequency cetaceans (i.e., pygmy sperm whale and Dall's porpoise), 2 are classified as phocids (i.e., harbor and northern elephant seal), and 2 are classified as otariid pinnipeds (i.e., California sea lion and northern fur seal) (Southall et al., 2007). A species' functional hearing group is a consideration when we analyze the effects of exposure to sound on marine mammals.

Current NMFS practice, regarding exposure of marine mammals to high-level underwater sounds is that cetaceans and pinnipeds exposed to impulsive sounds at or above 180 and 190 dB (rms), respectively, have the potential to be injured (i.e., Level A harassment). NMFS considers the potential for Level B (behavioral) harassment to occur when marine mammals are exposed to sounds below injury thresholds but at or above the 160 dB (rms) threshold for impulse sounds (e.g., impact pile-driving) and the 120 dB (rms) threshold for continuous noise (e.g., vibratory pile-driving). No vibratory pile-driving is planned for ExxonMobil's proposed activity in the Santa Barbara Channel. Current NMFS practice, regarding exposure of marine mammals to high-level in-air sounds, as a threshold for potential Level B harassment, is at or above 90 dB re 20 μPa for harbor seals and at or above 100 dB re 20 μPa for all other pinniped species (Lawson et al., 2002; Southall et al., 2007). NMFS has not established a threshold for Level A harassment for marine mammals exposed to in-air noise; however, Southall et al. (2007) recommends 149 dB re 20 μPa (peak) (flat) as the potential threshold for injury from in-air noise for all pinnipeds.

Acoustic stimuli generated by the conductor pipe installation activities, which introduce sound into the marine environment and in-air, may have the potential to cause Level B harassment of marine mammals in the proposed action area. The effects of sounds from impact hammer pile-driving activities might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, temporary or permanent hearing impairment, or non-auditory physical or physiological effects (Richardson et al., 1995; Gordon et al., 2004; Nowacek et al., 2007; Southall et al., 2007). Permanent hearing impairment, in the unlikely event that it occurred, would constitute injury, but temporary threshold shift (TTS) is not an injury (Southall et al., 2007). Although the possibility cannot be entirely excluded, it is unlikely that the proposed project 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 expected.

The effects of pile-driving on marine mammals depend on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile-driving sound; the depth of the water column; the substrate of the habitat; the standoff distance between the pile and the animals; and the sound propagation properties of the environment. Impacts to marine mammals from pile-driving activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The further away from the source, the less intense the exposure should be. The substrate and depth of the habitat affect the sound propagation properties of the environment. Shallow environments are typically more structurally complex, which leads to rapid sound attenuation. In addition, substrates that are soft (e.g., sand) would absorb or attenuate the sound more readily than hard substrates (e.g., rock), which may reflect the acoustic wave. Soft porous substrates would also likely require less time to drive the pipe, and possibly less forceful equipment, which would ultimately decrease the intensity of the acoustic source.

In the absence of mitigation, impacts to marine mammal species may result from physiological and behavioral responses to both the type and strength of the acoustic signature (Viada et al., 2008). The type and severity of behavioral impacts are difficult to define due to limited studies addressing the behavioral effects of impulse sounds on marine mammals. Potential effects from impulsive sound sources can range in severity, ranging from effects such as behavioral disturbance, tactile perception, physical discomfort, slight injury, of the internal organs and the auditory system, to mortality (Yelverton et al., 1973).

Tolerance

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).

Numerous studies have shown that pulsed underwater sounds from industry activities are often readily detectable in the water at distances of many kilometers. Several studies have shown that marine mammals at distances more than a few kilometers often show no apparent response (Miller et al., 2005; Bain and Williams, 2006). That is often true even in cases when the pulsed sounds must be readily audible to the animals based on measured received levels and the hearing sensitivity of the marine mammal group. Although various baleen whales and toothed whales, and (less frequently) pinnipeds have been shown to react behaviorally to airgun pulses under some conditions, at other times marine mammals of all three types have shown no overt reactions (e.g., Malme et al., 1986; Richardson et al., 1995; Madsen and Mohl, 2000; Croll et al., 2001; Jacobs and Terhune, 2002; Madsen et al., 2002; Miller et al., 2005). The relative responsiveness of baleen and toothed whales are quite variable.

Masking

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). 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).

Natural and artificial sounds can disrupt behavior by masking, or interfering with, a marine mammal's ability to hear other sounds. Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher levels. Chronic exposure to excessive, though not high-intensity, sound could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions. Masking can interfere with detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustic sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction. If the coincident (masking) sound were man-made, it could be potentially harassing if it disrupted hearing-related behavior. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in threshold shift) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect.

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. Because sound generated from in-water pile-driving is mostly concentrated at low frequency ranges, it may have less effect on high frequency echolocation sounds made by porpoises. However, lower frequency man-made sounds are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey sound. It may also affect communication signals when they occur near the sound band and thus reduce the communication space of animals (e.g., Clark et al., 2009) and cause increased stress levels (e.g., Foote et al., 2004; Holt et al., 2009).

Masking has the potential to impact species at population, community, or even ecosystem levels, as well as at individual levels. Masking affects both senders and receivers of the signals and can potentially have long-term chronic effects on marine mammal species and populations. Recent research suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's ocean from pre-industrial periods, and that most of these increases are from distant shipping (Hildebrand, 2009). All anthropogenic sound sources, such as those from vessel traffic, pile-driving, and dredging activities, contribute to the elevated ambient sound levels, thus intensifying masking. However, much of the sound generated from the proposed activities is not expected to contribute significantly to increased ocean ambient sound.

Given that the energy distribution of pile-driving covers a broad frequency spectrum, sound from these sources would likely be within the audible range of marine mammals present in the proposed action area. Impact pile-driving activity is relatively short-term, with rapid pulses occurring for the duration of the driving event. The probability that impact pile-driving resulting from this proposed action would mask acoustic signals important to the behavior and survival of marine mammal species is likely to be discountable. Any masking event that could possibly rise to Level B harassment under the MMPA would occur concurrently within the zones of behavioral harassment already estimated for impact pile-driving, and which have already been taken into account in the exposure analysis.

Behavioral Disturbance

Marine mammals may behaviorally react to sound when exposed to anthropogenic noise. Disturbance includes a variety of effects, including subtle to conspicuous changes in behavior, movement, and displacement. Behavioral responses to sound are highly variable and context-specific and reactions, 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).

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok et al., 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. Behavioral state may affect the type of response as well. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson et al., 1995; NRC, 2003; Wartzok et al., 2003).

Controlled experiments involving exposure to loud impulse sound sources with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgeway et al., 1997; Finneran et al., 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically seismic airguns or acoustic harassment devices, but also including impact pile-driving) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds, 2002; Thorson and Reyff, 2006; see also Gordon et al., 2004; Wartzok et al., 2003; Nowacek et al., 2007).

It is likely that the onset of pile-driving could result in temporary, short-term changes in an animal's typical behavior and/or avoidance of the affected action area. These behavioral reactions are often shown as: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where noise sources are located; and/or flight responses (e.g., pinnipeds flushing into the water from haul-outs or rookeries). 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).

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be expected to be biologically significant if the change affects growth, survival, and/or reproduction. Some of these significant behavioral modifications that could potentially lead to effects on growth, survival, or reproduction include:

- Change in diving/surfacing patterns (such as those thought to be causing beaked whale stranding due to exposure to military mid-frequency tactical sonar);
- Habitat abandonment due to loss of desirable acoustic environment; and
- Cessation of feeding or social interaction.

The onset of behavioral disturbance from anthropogenic noise depends on both external factors (characteristics of noise sources and their paths) and the specific characteristics of receiving animals (hearing, motivation, experience, demography) and is also difficult to predict (Richardson et al., 1995; Southall et al., 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 mammals would be present within a particular distance of industrial 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.

Hearing Impairment and Other Physical Effects

Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shift, which is the loss of hearing sensitivity at certain frequency ranges (Kastak et al., 1999; Schlundt et al., 2000; Finneran et al., 2002, 2005). Threshold shift can be permanent (PTS), in which case the loss of hearing sensitivity is not recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall et al., 2007). Marine mammals depend on acoustic cues for vital biological functions (e.g., orientation, communication, finding prey, avoiding predators); thus, TTS may result in reduced fitness in survival and reproduction. However, this depends on the frequency and duration of TTS, as well as the biological context in which it occurs. TTS of limited duration, occurring in a frequency range that does not coincide with that used for recognition of important acoustic cues, would have little to no effect on an animal's fitness. Repeated sound exposures that lead to TTS could cause PTS. PTS, in the unlikely event that it occurred, would constitute injury, but TTS is not considered injury (Southall et al., 2007). It is unlikely that the project would result in any cases of temporary or especially permanent hearing impairment or any significant non-auditory physical or physiological effects for reasons discussed later in this document. Some behavioral disturbance is expected, but it is likely that this would be localized and short-term because of the short duration of the proposed action.

Many marine mammals are likely to show some avoidance of the proposed action area where received levels of pile-driving sound high enough that hearing impairment could potentially occur. In those cases, the avoidance responses of the animals themselves would reduce or (most likely) avoid any possibility of hearing impairment. Non-auditory physical effects may also occur in marine mammals exposed to strong underwater pulsed sound.

Temporary Threshold Shift - TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises and a sound must be stronger in order to be heard. At least in terrestrial mammals, TTS can last from minutes or hours to (in cases of strong TTS) days. For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the noise ends. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals, and none of the published data concern TTS elicited by exposure to multiple pulses of sound. Available data on TTS in marine mammals are summarized in Southall et al. (2007). Table 2 (above) presents the estimated distances from the impact hammer during pile-driving activities at which the received energy level (per pulse, flat-weighted) would be expected to be greater than or equal to

180 and 190 dB re 1 μPa (rms).

To avoid the potential for injury (Level A harassment), NMFS (1995, 2000) concluded that cetaceans and pinnipeds should not be exposed to pulsed underwater noise at received levels exceeding 180 and 190 dB re 1 μPa (rms), respectively. The established 180 and 190 dB (rms) criteria are not considered to be the levels above which TTS might occur. Rather, they are the received levels above which, in the view of a panel of bioacoustics specialists convened by NMFS before TTS measurements for marine mammals started to become available, one could not be certain that there would be no injurious effects, auditory or otherwise, to marine mammals. NMFS also assumes that cetaceans and pinnipeds exposed to levels exceeding 160 dB re 1 μPa (rms) may experience Level B harassment.

For toothed whales, researchers have derived TTS information for odontocetes from studies on the bottlenose dolphin and beluga whale (Delphinapterus leucas). The experiments show that exposure to a single impulse at a received level of 207 kPa (or 30 psi, p-p), which is equivalent to 228 dB re 1 Pa (p-p), resulted in a 7 and 6 dB TTS in the beluga whale at 0.4 and 30 kHz, respectively. Thresholds returned to within 2 dB of the pre-exposure level within 4 minutes of the exposure (Finneran et al., 2002). For the one harbor porpoise tested, the received level of airgun sound that elicited onset of TTS was lower (Lucke et al., 2009). If these results from a single animal are representative, it is inappropriate to assume that onset of TTS occurs at similar received levels in all odontocetes (cf. Southall et al., 2007). Some cetaceans apparently can incur TTS at considerably lower sound exposures than are necessary to elicit TTS in the bottlenose dolphin or beluga whale.

For baleen whales, there are no data, direct or indirect, on levels or properties of sound that are required to induce TTS. The frequencies to which baleen whales are most sensitive are assumed to be lower than those to which odontocetes are most sensitive, and natural background noise levels at those low frequencies tend to be higher. As a result, auditory thresholds of baleen whales within their frequency band of best hearing are believed to be higher (less sensitive) than are those of odontocetes at their best frequencies (Clark and Ellison, 2004). From this, it is suspected that received levels causing TTS onset may also be higher in baleen whales than those of odontocetes (Southall et al., 2007).

In pinnipeds, researchers have not measured TTS thresholds associated with exposure to brief pulses (single or multiple) of underwater sound. Initial evidence from more prolonged (non-pulse) exposures suggested that some pinnipeds (harbor seals in particular) incur TTS at somewhat lower received levels than do small odontocetes exposed for similar durations (Kastak et al., 1999, 2005; Ketten et al., 2001). The TTS threshold for pulsed sounds has been indirectly estimated as being an SEL of approximately 171 dB re 1 $\mu Pa^2 \cdot s$ (Southall et al., 2007) which would be equivalent to a single pulse with a received level of approximately 181 to 186 dB re 1 µPa (rms), or a series of pulses for which the highest rms values are a few dB lower. Corresponding values for California sea lions and northern elephant seals are likely to be higher (Kastak et al., 2005).

Permanent Threshold Shift - When PTS occurs, there is physical damage to the sound receptors in the ear. In severe cases, there can be total or partial deafness, whereas in other cases, the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter, 1985). There is no specific evidence that exposure to pulses of airgun or pile-driving sound can cause PTS in any marine mammal. However, given the possibility that mammals close to an airgun array might incur at least mild TTS, there has been further speculation about the possibility that some individuals occurring very close to airguns might incur PTS (e.g., Richardson et al., 1995, p. 372ff; Gedamke et al., 2008). Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage, but repeated or (in some cases) single exposures to a level well above that causing TTS onset might elicit PTS.

Relationships between TTS and PTS thresholds have not been studied in marine mammals but are assumed to be similar to those in humans and other terrestrial mammals (Southall et al., 2007). PTS might occur at a received sound level at least several dBs above that inducing mild TTS if the animal were exposed to strong sound pulses with rapid rise times. Based on data from terrestrial mammals, a precautionary assumption is that the PTS threshold for impulse sounds (such as an impact hammer pile-driving as received close to the source) is at least 6 dB higher than the TTS threshold on a peak-pressure basis, and probably greater than 6 dB (Southall et al., 2007).

Given the higher level of sound necessary to cause PTS as compared with TTS, it is considerably less likely that PTS would occur. Baleen whales generally avoid the immediate area around operating sound sources, as do some other marine mammals.

Non-auditory Physiological Effects - Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, bubble formation, resonance, and other types of organ or tissue damage (Cox et al., 2006; Southall et al., 2007). Studies examining such effects are limited.

In general, very little is known about the potential for pile-driving sounds (or other types of strong underwater sounds) to cause non-auditory physical effects in marine mammals. Such effects, if they occur at all, would presumably be limited to short distances from the sound source and to activities that extend over a prolonged period. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected

(Southall et al., 2007), or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways. Marine mammals that show behavioral avoidance of pile-driving, including most baleen whales, some odontocetes, and some pinnipeds, are especially unlikely to incur auditory impairment or non-auditory physical effects.

Airborne Sound Effects

Marine mammals that occur in the proposed project area could be exposed to airborne sounds associated with pile-driving that have the potential to cause harassment, depending on their distance from pile-driving activities. Airborne pile-driving sound would have less impact on cetaceans than pinnipeds because sound from atmospheric sources does not transmit well underwater (Richardson et al., 1995); thus, airborne sound would only be an issue for pinnipeds in the proposed action area, whether hauled-out or in the water with their heads in the air. Most likely, a sound would cause behavioral responses similar to those discussed above in relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to temporarily abandon their habitat and move further from the source. Studies by Blackwell et al. (2004) and Moulton et al. (2005) indicate a tolerance or lack of response to unweighted airborne sounds as high as 112 dB peak and 96 dB rms.

The potential effects to marine mammals described in this section of the document do not take into consideration the proposed monitoring and mitigation measures described later in this document (see the ''Proposed Mitigation'' and ''Proposed Monitoring and Reporting'' sections) which, as noted are designed to effect the least practicable impact on affected marine mammal species and stocks.

Anticipated Effects on Marine Mammal Habitat

The proposed activities at the Harmony Platform would not result in permanent impacts to habitats used directly by marine mammals, but may have potential short-term impacts to food sources such as forage fish and invertebrates, and may affect acoustic habitat. There are no rookeries or major haul-out sites, no known foraging hot-spots, or other ocean bottom structure of significant biological importance to marine mammals present in the marine waters in the vicinity of the proposed action area. Therefore, the main impact issue associated with the proposed activity would be temporarily elevated sound levels and associated direct effects on marine mammals, as discussed previously in this document. The most likely impact to marine mammal habitat occurs from pile-driving effects on likely marine mammal prey near the Harmony Platform and minor impacts to the immediate substrate during conductor pipe installation.

Anticipated Effects on Potential Prey

Common prey for cetaceans and pinnipeds in the proposed action area include a wide variety of nekton species spanning the water column pelagic, epipelagic, benthopelagic and demersal zones. The most common prey groups found in the area are hagfish, lampreys, cartilaginous, and bony fish (including anchovies), and large free swimming invertebrates (e.g., squids). Pinnipeds could also be considered prey for large cetaceans (e.g., killer whales). Prey for baleen whales (e.g., blue whale) include large zooplankton (e.g., krill), opportunistically consumed during migration/transit through the Santa Barbara Channel. Infaunal benthic amphipods exist in the proposed action area and are common prey items for feeding gray whales, but the Santa Barbara Channel is not known as a feeding ground for this species.

Fish react to sounds which are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. Hasting and Popper (2005) and Hastings (2009) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile-driving (or other types of sounds) on fish, although several are based on studies in support of large multi-year bridge construction projects (e.g., Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Sound pulses at received levels of 160 dB re 1 μPa may cause subtle changes in fish behavior. SPLs of 180 dB may cause noticeable changes in behavior (Pearson et al., 1992; Skalski et al., 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality. The most likely impact to fish from pile-driving activities in the proposed action area would be temporary behavioral avoidance of the area. The duration of fish avoidance of this area after pile-driving stops is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary due to the short timeframe for the proposed activities. However, adverse impacts may occur to a few species of fish which may be present in the proposed action area.

Anticipated Effects on Potential Foraging Habitat

The Harmony Platform has been in place for 20 years and the addition of six conductor pipes to the existing 51 conductor pipes within the platform structure would not produce a quantifiable impact to marine mammals to their existing habitat. The additional six conductor pipes are approved (permitted) as part of the original Development Production Plan for Harmony Platform.

The area likely impacted by the project activities is relatively small compared to the available habitat in the Santa Barbara Channel waters. The likelihood for avoidance by potential prey (i.e., fish and invertebrates) of the immediate area due to the temporary loss of this foraging habitat is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of prey and marine mammal foraging habitat in the nearby vicinity.

Given the short hourly duration of sound associated with individual pile-driving activities and the relatively small areas being affected, pile-driving activities associated with the proposed action are not likely to have a permanent, adverse effect on any fish habitat, or populations of fish and invertebrate species. Therefore, pile-driving is not likely to have a permanent, adverse effect on marine mammal foraging habitat at the proposed action area. Furthermore, the area around Harmony Platform in the Santa Barbara Channel, is already altered by various shipping activities.

There would be no measureable loss of existing marine mammal water column or benthic habitat resulting from the installation of six conductor pipes at Harmony Platform. The impacts associated with the proposed project are temporary and are not expected to have long term effects on marine mammals or marine mammal habitat. The primary impact of the activity on the local environment is from sound, above and below water surface to a depth of 366 m. The transitory nature of sound would not impact the habitat of the marine mammal populations. A secondary impact from the activity would be the temporary suspension of bottom sediment, resulting from the installation via hammer driving of six 26-in diameter steel conductor pipes within the platform jacket structure. The small amount of suspended sediment would quickly disperse and resettle to the seafloor. No permanent impacts are expected to marine mammals. The impacts are temporary in nature and are associated with pile-driving and construction noise disturbance and would not require restoration. Site conditions are anticipated to be unchanged from existing conditions for marine mammals following project implementation.

There is no potential for an oil spill from operations/activities associated with this project. Potential impacts from an oil spill from existing operations are addressed in an approved Oil Spill Response Plan on file with BOEM for the Santa Ynez Production Unit, including Harmony Platform. Any potential spill from the supply boats or helicopters are already included in the approved operation and plan.

Based on the preceding discussion of potential types of impacts to marine mammal habitat, overall, NMFS anticipates that the proposed action is not expected to cause significant impacts on habitats used by the marine mammal species in the proposed action area or on the food sources that they utilize.

Proposed Mitigation

In order to issue an Incidental Take Authorization (ITA) 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 impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and the availability of such species or stock for taking for certain subsistence uses (where relevant).

ExxonMobil has incorporated a suite of appropriate mitigation measures into its project description (see Section 11 of the IHA application).

To reduce the potential for disturbance from acoustic stimuli associated with the proposed activities, ExxonMobil and/or its designees have proposed to implement the following mitigation measures for marine mammals:

(1) Proposed buffer and exclusion zones around the sound source;

(2) Hours of operation;

(3) Shut-down procedures; and

(4) Ramp-up procedures.

Proposed Exclusion Zones – ExxonMobil uses radii to designate exclusion and buffer zones and to estimate take for marine mammals. Table 2 (presented earlier in this document) shows the distances at which one would expect marine mammal exposures to three received sound levels (160, 180, and 190 dB) from the impact hammer. The 180 and 190 dB level shut-down criteria are applicable to cetaceans and pinnipeds, respectively, as specified by NMFS (2000). ExxonMobil used these levels to establish the exclusion and buffer zones.

Based on the modeling, exclusion zones (for triggering a shut-down) for Level A harassment would be established for cetaceans and pinnipeds at 3.5 m (11.5 ft) and 10 m (32.8 ft) from the conductor pipe sound source, respectively. These shut-down zones would be monitored by a dedicated PSO. If the PSO detects a marine mammal(s) within or about to enter the appropriate exclusion zone, the pile-driving activities would be shut-down immediately. If marine mammals are present within the shut-down zone before impact pile-driving activities begin, start of operations would be delayed until the exclusion zones are clear for at least 30 minutes. If marine mammals appear in the shut-down zone during proposed pile-driving activities, the PSO would instruct the hammer operator to halt all operations in a safe, but immediate manner. Pile-driving activities would only resume once the exclusion zone has been cleared for at least 30 minutes. In the unlikely event that the marine mammal enters the exclusion zone during pile-driving activities, the exposure and behaviors would be documented and reported by the PSO and NMFS would be contacted within 24 hours. A non-PSO safety spotter would also be assigned to the lower deck observation area. All personnel operating at the lower observation levels would be required to wear appropriate personal protective equipment.

Hours of Operation – The proposed activities would be conducted on a continual 24-hour basis; therefore, some of the 2.5 to 3.3 hours of active impact pile-driving periods would be expected to occur during non-daylight hours. To facilitate visual monitoring during non-daylight hours, the exclusion zones would be illuminated to permit more effective viewing by the PSO. Lighting would not be expected to attract marine mammals. The areas where the exclusion zones occur fall within the jacket structure of the platform, and therefore could be easily illuminated by lights and monitored during non-daylight hours. For the buffer zone, which would extend out to 325 m (1,066.3 ft) from the conductor pipe, PSOs would be stationed on an upper deck of the Harmony Platform to monitor for marine mammals during the proposed pile-driving activities. During non-daylight hours, PSOs would utilize night-vision devices and other appropriate equipment to monitor marine mammals. If nighttime visual aids are insufficient, ExxonMobil proposes to use daytime visual counts of marine mammals as an estimate of the number of marine mammals present during non-daylight hours (within a 24 hour period), noting that diurnal activities for most marine mammals are expected to vary somewhat.

Shut-down Procedures - ExxonMobil would shut-down the operating hammer if a marine mammal is detected outside the exclusion zone, and the sound source would be shut-down before the animal is within the exclusion zone. Likewise, if a marine mammal is already within the exclusion zone when first detected, the sound source would be shut-down immediately.

Following a shut-down, ExxonMobil would not resume pile-driving activities until the marine mammal has cleared the exclusion zone. ExxonMobil would consider the animal to have cleared the exclusion zone if:

- A PSO has visually observed the animal leave the exclusion zone, or

- A PSO has not sighted the animal within the exclusion zone for 15 minutes for species with shorter dive durations (i.e., small odontocetes and pinnipeds), or 30 minutes for species with longer dive durations (i.e., mysticetes and large odontocetes, including sperm, pygmy and dwarf sperm, killer, and beaked whales).

All visual monitoring would be conducted by qualified PSOs. Visual monitoring would be conducted continuously during active pile-driving activities. PSOs would not have any tasks other than visual monitoring and would conduct monitoring from the best vantage point(s) practicable (e.g., on the Harmony Platform or other suitable location) that provides 360º visibility of the Level A harassment exclusion zones and Level B harassment buffer zone, as far as possible. The PSO would be in radio communication with the hammer operator during pile-driving activities, and would call for a shut-down in the event a pinniped or cetacean appears to be headed toward its respective exclusion zone for cetaceans and pinnipeds.

Ramp-up Procedures – Ramp-up (sometimes referred to as a "soft-start") of the impact hammer provides a gradual increase in sound levels until the full sound level is achieved. The purpose of a ramp-up is to "warn" marine mammals in the vicinity of the impact hammer and to provide the time for them to leave the area avoiding any potential injury or impairment of their hearing abilities. A ramp-up consists of an initial set of three strikes from the impact hammer at 40% energy, followed by a 30 second waiting period, then two subsequent three strike sets.

The buffer zone would be monitored by PSOs beginning 30 minutes before pile-driving activities, during pile-driving, and for 30 minutes after pile-driving stops. During ramp-up, the PSOs would monitor the exclusion zone, and if marine mammals are sighted, a shut-down would be implemented.

If the complete exclusion zone has not been visible for at least 30 minutes prior to the start of operations in either daylight or nighttime, ExxonMobil would not commence the ramp-up. ExxonMobil would not initiate a ramp-up of the impact hammer if a marine mammal is sighted within or near the applicable exclusion zones during the day or close to the Harmony Platform at night.

Oil Spill Plan – ExxonMobil has developed an Oil Spill Response Plan and it is on file with BOEM.

Mitigation Conclusions

NMFS has carefully evaluated the applicant's proposed mitigation measures and has considered a range of other measures in the context of ensuring that NMFS prescribes the means of effecting the least practicable impact on the affected marine mammal species and stocks and their habitat. NMFS's evaluation of potential measures included consideration of the following factors in relation to one another:

(1) The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals;

(2) The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and

(3) The practicability of the measure for applicant implementation, including consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the activity.

Any mitigation measure(s) prescribed by NMFS should be able to accomplish, have a reasonable likelihood of accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

(1) Avoidance or minimization of injury or death of marine mammals wherever possible (goals 2, 3, and 4 may contribute to this goal).

(2) A reduction in the numbers of marine mammals (total number or number at biologically important time or location) exposed to received levels of hammer pile-driving, or other activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only).

(3) A reduction in the number of times (total number or number at biologically important time or location) individuals would be exposed to received levels of hammer pile-driving, or other activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only).

(4) A reduction in the intensity of exposures (either total number or number at biologically important time or location) to received levels of hammer pile-driving, or other activities expected to result in the take of marine mammals (this goal may contribute to a, above, or to reducing the severity of harassment takes only).

(5) Avoidance of minimization of adverse effects to marine mammal habitat, paying special attention to the food base, activities that block or limit passage to or from biologically important areas, permanent destruction of habitat, or temporary destruction/disturbance of habitat during a biologically important time.

(6) For monitoring directly related to mitigation – an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

Based on NMFS's evaluation of the applicant's proposed measures, as well as other measures considered by NMFS or recommended by the public, NMFS has preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an ITA 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 ITAs must include the suggested means of accomplishing the necessary monitoring and reporting that would 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. ExxonMobil submitted a marine mammal monitoring plan as part of the IHA application. It can be found in Section 13 of the IHA application. The plan may be modified or supplemented based on comments or new information received from the public during the public comment period or from the peer review panel (see the "Monitoring Plan Peer Review" section later in this document).

Monitoring measures prescribed by NMFS should accomplish one or more of the following general goals:

(1) An increase in the probability of detecting marine mammals, both within the mitigation zone (thus allowing for more effective implementation of the mitigation) and in general to generate more data to contribute to the analyses mentioned below;

(2) An increase in our understanding of how many marine mammals are likely to be exposed to levels of sound from impact hammer pile-driving activities that we associate with specific adverse effects, such as behavioral harassment, TTS or PTS;

(3) An increase in our understanding of how marine mammals respond to stimuli expected to result in take and how anticipated adverse effects on individuals (in different ways and to varying degrees) may impact the population, species, or stock (specifically through effects on annual rates of recruitment or survival) through any of the following methods:

- Behavioral observations in the presence of stimuli compared to observations in the absence of stimuli (need to be able to accurately predict received level, distance from source, and other pertinent information);
- Physiological measurements in the presence of stimuli compared to observations in the absence of stimuli (need to be able to accurately predict receive level, distance from the source, and other pertinent information);
- Distribution and/or abundance comparisons in times or areas with concentrated stimuli versus times or areas without stimuli;

(4) An increased knowledge of the affected species; and

(5) An increase in our understanding of the effectiveness of certain mitigation and monitoring measures.

Proposed Monitoring

ExxonMobil proposes to sponsor marine mammal monitoring during the proposed project, in order to implement the proposed mitigation measures that require real-time monitoring, and to satisfy the anticipated monitoring requirements of the IHA. ExxonMobil's proposed "Monitoring Plan" is described below this section. ExxonMobil understand that this monitoring plan would be subject to review by NMFS and that refinements may be required. Two main types of monitoring would be performed for this proposed project: (1) in-situ measurement of sound pressure levels; and (2) visual observations of the number and type of marine mammals that enter sound exposure zones. In-situ acoustic data would be used to validate model predictions of sound pressure levels near and with distance from the conductor pipe sound source, including the predicted maximum distances for the buffer and exclusion zones. If measured results differ from modeled results, measured data would be used to revise buffer and exclusion zone boundaries to reflect actual conditions during proposed project activities. Data from visual monitoring would be used to validate take estimate calculations.

Acoustic Monitoring

Acoustic monitoring using hydrophones and microphones would be conducted to obtain and validate modeled in-water and in-air sound levels during the proposed pile-driving activities. Each hydrophone (in-water) and microphone (in-air) would be calibrated following the manufacturer's recommendations prior to the start of the proposed project and checked for accuracy and precision at the end of the data collection for each conductor pipe or as practical during conductor pipe installation activities. Environmental data would be collected to supplement the acoustic monitoring and include: wind speed and direction, air temperature, humidity, near-surface water temperature, weather conditions, and other appropriate factors that could contribute to influencing either in-air or in-water sound transmission levels. Prior to deploying monitoring equipment, the acoustics specialist would be provided with the hammer model and size, hammer energy settings, and projected blows per minute for the conductor pipe segments requiring hammer pile-driving. Background in-air and in-water sound levels would be measured at Harmony Platform in the absence of pile-driving activities to obtain an ambient noise level, and recorded over a frequency range of 10 Hz to 20 kHz. Ambient noise level measurements would be conducted before, during, and after the project. The measured in-air and in-water sound data would be used to recalibrate and refine the sound propagation model used to determine the buffer and exclusion zones. Also, sound pressure levels associated with ramp-up techniques would be measured.

In-Water Monitoring – Acoustic monitoring would be performed at a minimum of two fixed stations located at 10 m (32.8 ft) and approximately 325 m (1,066.3 ft) from the conductor pipe sound source. These distances represent the 180 dB and 160 dB (rms) modeled sound levels. The following general approach would be used to measure in-water sound levels:

- Acoustic monitoring would be conducted over the entire pile-driving period for each conductor pipe, starting approximately 1 hour prior to pile-driving through 1 hour after impact hammering has stopped. Pre- and post-hammer pile-driving data would be used to determine ambient/background noise levels.

- A stationary hydrophone system with the ability to measure and record sound pressure levels would be deployed at a minimum of two monitoring locations (stations). SPLs would be recorded in voltage, converted to microPascals (μPa), and post-processed to decibels (dB [re 1 μPa]). For the first conductor pipe installation, hydrophones are placed at 10+/-1 m and at 325+/-33 m from the conductor pipe at depths ranging from 10 to 30 m (32.8 to 98.4 ft) below the water surface to avoid potential inferences for surface water energy, and to target the depth range of maximum occurrence of marine mammals most likely in the area during the project. The equipment would obtain data for the most likely depth range of marine mammal occurrence. Horizontal displacement of +/-10% may be expected for instrument movement due to the water depth and forces from tides, currents, and storms. Additional hydrophone mooring systems may be deployed at additional distances and/or depths. Following each successive conductor pipe installation, the water depth and geographical orientation of the hydrophone may be changed to validate modeled SPLs at varying water depths and direction.

- At a minimum, the following sound data would be analyzed (post-processed) from recorded sound levels: absolute peak overpressure and under pressure levels for each conductor pipe; average, minimum, and maximum sound pressure levels (rms), integrated from 3 Hz to 20 kHz; average duration of each hammer strike (blow), and total number of strikes per continuous hammer pile-driving period for each conductor.

In the event that field measurements indicate different sound pressure levels (rms) values than those predicted by modeling for either the maximum distances of the buffer or exclusion zones from the conductor sound source, corresponding boundaries for the buffer and appropriate exclusion zones would be increased/decreased accordingly, following NMFS notification, concurrence, and authorization.

In-Air Monitoring – Reference measurements would be made at approximately 10 to 20 m (32.8 to 65.6 ft) from the initial hammer strike position using a stationary microphone. The microphone would be placed as far away from other large sound sources as practical. The in-air buffer zone predicted for pinnipeds (non-harbor seal, 100 dB re 20 μPa) was estimated at 41 m (134.5 ft) from the hammer impact point on the conductor pipe. In-air sound levels would be recorded at several points around the base of the Harmony Platform at sea level to validate modeled sound levels. Distances closer to the sound source may be monitored for model validation purposes, but only if safety issues are not introduced. Recorded data would be recorded as dB (re 20 μPa, A-weighted and unweighted) for comparison to in-air noise thresholds for Level B harassment for pinnipeds.

Platform-based Visual Monitoring

PSOs would be based aboard the Harmony Platform and would watch for marine mammals near the platform during conductor pipe installation activities during daytime and nighttime pile-driving activities. Visual monitoring for marine mammals would be performed at a minimum during periods of active hammer pile-driving throughout the proposed project following general procedures in Baker et al. (2013). Monitoring by PSOs would begin at least 30 minutes before the start of impact hammer pile-driving, continue through an estimated 2.5 to 3.3 hours of pile-driving, and conclude 30 minutes after pile-driving stops (up to 4.3 hours of monitoring per a period of pile-driving). Five to 7 periods of impact hammer pile-driving would be required for each conductor pipe. When feasible, PSOs would conduct observations during periods when the impact hammer pile-driving is not operating for comparison of sighting rates and behavior with and without operations and between pile-driving periods. In addition to monitoring during pile-driving activities, baseline monitoring of marine mammals would be performed up to one week before and one week after conductor pipe installation, as well as selected periods in between impact hammer pile-driving activities.

The exclusion zone would be monitored to prevent injury to marine mammal species. Based on PSO observations, the impact hammer pile-driving would be shut-down when marine mammals are observed within or about to enter the designated exclusion zone. The exclusion zone is a region in which a possibility exists of adverse effects on animal hearing or physical effects. A comprehensive monitoring plan would be developed to ensure compliance with the IHA for this proposed project.

Methods – There would be a team of 3 PSOs based aboard Harmony Platform conducting monitoring during active hammer pile-driving periods. Visual observations would take place during active hammering periods which includes both daylight and nighttime operations. This monitoring would occur for approximately 4.3 hours (3.3 hour monitoring plus 0.5 hour pre- and post-hammering) during a single hammering phase followed by approximately 6.3 hours of offduty rest. A total of 5 to 7 observation periods corresponding to the driving of the pipe segments would be anticipated for each of the six conductors. It is possible that an impact hammer pile-driving session would take less than 3.3 hours and that the “rest interval” for the visual monitors separating driving segments would be less than 6.3 hours. If driving and rest intervals are reduced and additional segments are added (e.g., seven instead of five), two alternating teams of three PSOs may be required. At the conclusion of impact hammer pile-driving activities for a single conductor pipe, PSOs may be transferred to shore to await the next active pile-driving phase.

PSOs would be placed at the best practicable vantage point(s) (e.g., lower platform level, upper platform level) to monitor the applicable buffer and exclusion zones for marine mammals. The PSOs would have authority to implement shut-down/delay ramp-up procedures, if applicable, by calling the hammer operator for a shut-down via radio communication. For the buffer zone, two PSOs would be stationed on an upper platform deck where they have a clear view of the monitoring area. They would be approximately 180 degrees apart and each would monitor approximately one-half of the corresponding buffer zone and beyond with binoculars and other appropriate equipment. For exclusion zone area, one PSO would concurrently monitor the applicable radii for pinnipeds and cetaceans, respectively, from a lower level observation post that provides a clear view of the sea surface around the actively driven conductor pipe. The lower observation area would be illuminated during nighttime observations. Visual aids may be used but would not be required, providing the PSO has a clear view of the sea surface with the naked eye. A non-PSO safety spotter would also be assigned to the lower deck observation area. The safety spotter would be available to deter errant California sea lions using NMFS-recommended methods (see below) (NMFS, 2008).

All personnel operating on the Harmony Platform would be required to receive required training and wear appropriate personal protective equipment. Personal protective equipment is specific to the task, location, and environmental conditions (e.g., weather, operations risks). It includes items such as floatation vests, hard hats, steel-toed shoes, gloves, fire-resistant clothing, gear, eye protection, and other protective equipment. Details on specific personal protective equipment items required for PSO and acoustic monitoring would be determined via the regular work risk assessment process, and would be presented in the associated monitoring plans for the project.

Equipment for monitoring would include hearing protection from where observations are made from high noise areas of the platform, marine radios with headsets, time keeping device (e.g., watch or cell phone), day and night range finding binoculars (7 x 50 or greater), notebooks with standardized recording forms, species identification guides, and a project-specific monitoring plan approved by NMFS (to be submitted separately).

PSO Qualifications – Monitoring would be conducted by qualified PSOs defined in Baker et al. (2013) and approved by NMFS. PSOs dedicated to the proposed project would have no other activity-related tasks.

PSO Data and Documentation

PSOs would record data to estimate the numbers of marine mammals exposed to various received sound levels and to document apparent disturbance reactions or lack thereof. Data would be used to estimate numbers of animals potentially "taken" by harassment (as defined in the MMPA). They would also provide information needed to order a shut-down of the impact hammer when a marine mammal is within or near the exclusion zone. Visual observations would also be made during pile-driving activities as well as daytime periods from the Harmony

Platform when the regular operations would be underway without pile-driving activities to collect baseline biological data.

When a sighting is made, the following information about the sighting would be recorded:

1. Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from platform, sighting cue, apparent reaction to the sound source (e.g., none, avoidance, approach, paralleling, etc., and including responses to ramp-up), speed of travel, and duration of presence.

2. Date, time, location, heading, speed, activity of the conductor pipe installation activities, weather conditions, Beaufort sea state and wind force, visibility, and sun glare.

The data listed under (2) would also be recorded at the start and end of each observation watch, and during a watch whenever there is a change in one or more of the variables.

All observations, as well as information regarding ramp-ups or shut-downs would be recorded in a standardized format.

Results from the platform-based visual observations would provide the following information:

1. The basis for real-time mitigation (impact hammer shut-down).

2. Information needed to estimate the number of marine mammals potentially taken by harassment, which must be reported to NMFS.

3. Data on the occurrence, distribution, and activities of marine mammals in the area where the conductor pipe installation activities are conducted.

4. Information to compare the distance and distribution of marine mammals relative to the source platform at times with and without pile-driving activities.

5. Data on the behavior and movement patterns of marine mammals seen at times with and without pile-driving activities.

Proposed Reporting

ExxonMobil would submit a comprehensive report to NMFS within 90 days after the end of the conductor pipe installation activities and the expiration of the IHA (if issued). The report would describe the proposed pile-driving activities that were conducted and sightings of marine mammals near the operations. The report submitted to NMFS would provide full documentation of methods, results, and interpretation pertaining to all monitoring. The 90-day report would summarize the dates and location of impact hammer pile-driving activities and all marine mammal sightings (i.e., dates, times, locations, activities, and associated seismic survey activities). The report would minimally include:

- Summaries of monitoring effort – total hours, total distances, and distribution of marine mammals through the activity period accounting for Beaufort sea state and other factors affecting visibility and detectability of marine mammals;
- Analyses of the effects of various factors influencing detectability of marine mammals including Beaufort sea state, number of PSOs, and fog/glare;
- Species composition, occurrence, and distribution of marine mammals sightings including date, water depth, numbers, age/size/gender, and group sizes; and analyses of the effects of activities;
- Sighting rates of marine mammals during periods with and without impact hammer pile-driving activities (and other variables that could affect detectability);
- Initial sighting distances versus operational activity state;
- Closest point of approach versus operational activity state;

- Observed behaviors and types of movements versus operational activity state;
- Numbers of sightings/individuals seen versus operational activity state; and
- Distribution around the platform versus operational activity state.

The report would also include estimates of the number and nature of exposures that could result in "takes" of marine mammals by harassment or in other ways (based on presence in the buffer and/or exclusion zones). After the report is considered final, it would be publicly available on the NMFS website at: http://www.nmfs.noaa.gov/pr/permits/incidental.htm#iha**Error! Hyperlink reference not valid.**.

Reporting Prohibited Take - In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as an injury (Level A harassment), serious injury, or mortality (e.g., ship-strike, gear interaction, and/or entanglement), ExxonMobil 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 at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov and Howard.Goldstein@noaa.gov and the West Coast Regional Stranding Coordinator (Justin.Greenman@noaa.gov). The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Type of activity involved;
- Description of the circumstances during and leading up to 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 hours 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 shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with ExxonMobil to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. ExxonMobil may not resume their activities until notified by NMFS via letter or email, or telephone.

Reporting an Injured or Dead Marine Mammal with an Unknown Cause of Death - In the event that ExxonMobil discovers an injured or dead marine mammal, and the lead PSO 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), ExxonMobil would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Jolie.Harrison@noaa.gov and Howard.Goldstein@noaa.gov, and the NMFS West Coast Regional Office (1-866-767-6114) and/or by e-mail to the West Coast Regional Stranding Coordinator (Justin.Greenman@noaa.gov). 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 ExxonMobil to determine whether modifications to the activities are appropriate.

Reporting an Injured or Dead Marine Mammal Not Related to the Activities - In the event that ExxonMobil discovers an injured or dead marine mammal, and the lead PSO 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 or advanced decomposition, or scavenger damage), ExxonMobil would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Jolie.Harrison@noaa.gov and Howard.Goldstein@noaa.gov, and the NMFS West coast Regional Office (1-866-767-6114) and/or by e-mail to the West Coast Regional Stranding Coordinator (Justin.Greenman@noaa.gov), within 24 hours of discovery. ExxonMobil would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. Activities may continue while NMFS reviews the circumstances of the incident.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

Table 4. NMFS's current underwater and in-air acoustic exposure criteria:

Impulsive (Non-Explosive) Sound		
Criterion	Criterion Definition	Threshold
Level A harassment (injury)	Permanent threshold shift (PTS) (Any level above that which is known to cause TTS)	180 dB re 1 μPa-m (root means square [rms]) (cetaceans) 190 dB re 1 μPa-m (rms) (pinnipeds)
Level B harassment	Behavioral disruption (for impulsive noise)	160 dB re 1 μPa-m (rms)
Level B harassment	Behavioral disruption (for continuous noise)	120 dB re 1 μPa-m (rms)
In-Air Sound		
Level A harassment	NA	NA
Level B harassment	Behavioral disruption	90 dB re 20 μPa (harbor seals)

		100 dB re 20 μPa (all other pinniped species) NA (cetaceans)

Level B harassment is anticipated and proposed to be authorized as a result of the proposed conductor pipe installation activities at the Harmony Platform in the Santa Barbara Channel offshore of California. Acoustic stimuli (i.e., increased underwater and in-air sound) generated during the pile-driving activities are expected to result in the behavioral disturbance of some marine mammals. There is no evidence that the planned activities could result in injury, serious injury, or mortality for which ExxonMobil seeks the IHA. The required mitigation and monitoring measures would minimize any potential risk for injury, serious injury, or mortality.

The following sections describe ExxonMobil's methods to estimate take by incidental harassment and present the applicant's estimates of the numbers of marine mammals that could be affected during the proposed conductor pipe installation activities at the Harmony Platform in the Santa Barbara Channel offshore of California. The estimated takes were calculated using information on sound source levels, sound propagation, maximum distances from the sound source to Level A and Level B harassment exposure thresholds, and estimated density of marine mammals in the action area. Take estimates were calculated for in-water (cetaceans and pinnipeds) and in-air (pinnipeds only). The estimates are based on the following information:

- Thresholds for marine mammals to in-water and in-air noise;
- Sound levels at the conductor pipe from hammer strike;
- Sound propagation (transmission/spreading loss) through the environment (i.e., air, water);
- Maximum distances from the sound sources to the corresponding impact zones (based on Level A and Level B harassment thresholds) for marine mammals;

- Density estimate for each species of marine mammals (calculated as stock abundance divided by 12,592 km^2 [3,671.2 nmi^2]area [except where noted]); and
- Number of takes for each species of marine mammals within a group (calculated as density multiplied by buffer/exclusion zone multiplied by days of activity).

Sound levels for impulsive (impact) pile-driving by the hammer and propagation through water and in-air at the Harmony Platform were modeled by JASCO Applied Sciences, Ltd. The modeling results are presented in JASCO's acoustic modeling report as an addendum to the IHA application titled "Assessment of Airborne and Underwater Noise from Pile Driving Activities at the Harmony Platform." Methods used to estimate marine mammal densities and takes for the proposed action area in the Santa Barbara Channel are presented in Sections 6.1.5 and 6.1.6 of the IHA application for likely exposures to species of marine mammals.

Densities of marine mammal species likely to occur in the proposed action area of the Santa Barbara Channel were taken directly from scientific literature or calculated using corresponding abundances in NMFS Stock Assessment Reports. Density estimates for the blue, fin, and humpback whale were taken directly from Redfern et al. (2013), using the upper limit reported for the density contour that includes the Harmony Platform. Redfern et al. (2013) estimated densities for these three species using NMFS sightings collected from primarily August through November over a period from 1991 to 2009 throughout the Santa Barbara Channel. Results for blue, fin, and humpback whales are presented in Figures 6-3, 6-4, and 6-5 of the IHA application. These densities are considered more accurate than those based on reported stock abundances because even though they are for the same monthly period and geographical location, they include a correction factor to correct for non-observational periods. For calculated densities of likely affected marine mammal species, stock abundances, which generally range from the state of Washington to northern Baja California, Mexico, were assumed to be concentrated within the 12,593 km^2 (3,671.5 nmi^2) proposed action area in the Santa Barbara Channel. The proposed action area includes the Harmony Platform, and extends 18 km (9.7 nmi) to the north, 60 km (32.4 nmi) to the west, and 70 km (37.8 nmi) to the south of Point Conception, California. The eastern boundary is 35 km (18.9 nmi) east of Anacapa Island. Use of this area produces a conservative density estimate because the geographical range of each marine mammal species evaluated is much greater than 70 km (nmi) of the coastline selected to represent the proposed action area, including season-specific ranges for species that migrate (e.g., gray whale). For marine mammal species potentially exposed to in-air noise, pinniped densities were calculated by dividing the stock abundance for each marine mammal species by the 1,130 m^2 (12,163.2 ft^2) impact area of the Harmony Platform near sea level where the animals could potentially haul-out and/or have their heads out of the water. Tables 6-7 and 6-8 of the IHA application describe the calculated densities and estimated take by marine mammal species as well as associated data for the in-water and in-air sound thresholds, respectively. Although there is some uncertainty about the representativeness of the data and the assumptions used in the calculations below, the approach used here is believed to be the best available approach.

Table 5. Estimated densities and possible number of marine mammal species that might be exposed to greater than or equal to 160 dB (pile-driving activities) during ExxonMobil's proposed conductor pipe installation activities in the Santa Barbara Channel offshore of California.

Species	Density in Action Area (#/km^2)[1]	Calculated Take from Pile-Driving Activities In-Water (i.e., Estimated Number of Individuals Exposed to Sound Levels ≥ 160 dB re 1 µPa)[2]	Calculated Take from Pile-Driving Activities In-Air (i.e., Estimated Number of Individuals Exposed to Sound Levels ≥ 90 dB re 20 µPa for harbor seals and 90 dB re 20 µPa for all other pinnipeds)[3]	Total Requested Take Authorization[4]	Abundance[5]	Approximate Percentage of Population /Stock Estimate[6]	Population Trend[5]
Mysticetes							
North Pacific right whale	NA	0	0	0	NA (18 to 21) – Eastern North Pacific stock	NA	NA
Gray whale	0.5067	0.693	0	10	19,126 (18,107) – Eastern North Pacific stock 155 (142) – Western North Pacific population	0.05	Increasing over past several decades – Eastern North Pacific stock
Humpback whale	0.0055	0.007	0	1	1,918 (1,876) – CA/OR/WA stock	0.05	Increasing
Minke whale	0.04	0.055	0	1	478 (202) – CA/OR/W	0.2	NA

					A stock		
Bryde's whale	NA	0	0	0	NA	NA	NA
Sei whale	0.01	0.014	0	1	126 (83) – Eastern North Pacific stock	0.8	NA
Fin whale	0.004	0.005	0	1	3,051 (2,598) – CA/OR/WA stock	0.03	Increasing
Blue whale	0.008	0.011	0	1	1,647 (1,551) – Eastern North Pacific stock	0.06	NA
Odontocetes							
Sperm whale	0.08	0.109	0	1	971 (751) – CA/OR/WA stock	0.1	NA
Pygmy sperm whale	0.05	0.068	0	1	579 (271) – CA/OR/WA stock	0.17	NA
Dwarf sperm whale	NA	0	0	0	NA – CA/OR/WA stock	NA	NA
Baird's beaked whale	0.07	0.096	0	1	847 (466) – CA/OR/WA stock	0.12	NA
Cuvier's beaked whale	0.17	0.233	0	1	6,950 (4,481) – CA/OR/WA stock	0.01	Declining off CA/OR/WA
Mesoplodon beaked whale	0.08	0.109	0	1	694 (389) – CA/OR/WA stock	0.14	Declining off CA/OR/WA
Killer whale	0.05	0.068	0	1	240 (162) – Eastern North Pacific stock 346 (346) – Eastern North Pacific Transient stock 354 (354) – West Coast Transient stock	0.42/0.29/0.28	NA – Eastern North Pacific Offshore stock; NA – Eastern North Pacific Transient stock; Increasing – West Coast Transient stock
Short-finned pilot	0.06	0.082	0	1	760 (465) – CA/OR/W	0.13	NA

whale					A stock		
Bottlenose dolphin	0.11	0.151	0	10	1,006 (684) – CA/OR/WA stock	0.1	NA – CA/OR/WA Offshore stock; NA – CA Coastal stock
Striped dolphin	0.87	1.191	0	20	10,908 (8,231) – CA/OR/WA stock	0.18	NA
Short-beaked common dolphin	32.65	44.691	0	45	411,211 (343,990) – CA/OR/WA stock	0.01	Varies with oceanographic conditions
Long-beaked common dolphin	8.5	11.635	0	120	107,016 (76,224) – CA stock	0.11	Increasing over last 30 years
Pacific white-sided dolphin	2.14	2.929	0	30	26,930 (21,406) – CA/OR/WA stock	0.11	NA
Northern right whale dolphin	0.66	0.903	0	1	8,334 (6,019) – CA/OR/WA stock	0.01	NA
Risso's dolphin	0.5	0.684	0	10	6,272 (4,913) – CA/OR/WA stock	0.16	NA
Dall's porpoise	3.34	4.572	0	50	42,000 (32,106) – CA/OR/WA stock	0.12	NA
Harbor porpoise	0	0	0	0	NA	NA	NA
Pinnipeds							
California sea lion	23.6	32.249	0	33	296,750 (153,337) – U.S. stock	0.01	Increasing
Steller sea lion	NA	0	0	0	49,685 (42,366) – Western stock 58,334 (72,223) – Eastern stock	NA	Declining – Western stock; Increasing – Eastern stock; Declining in CA
Pacific harbor seal	2.4	3.285	0.011	4	30,196 (26,667) – CA stock	0.01	Increased 1981 to 2004
Northern elephant seal	9.85	13.483	0	14	124,000 (74,913) – CA	0.01	Increasing through 2005

					breeding stock		
Northern fur seal	0.79	1.081	0	2	12,844 (6,722) – California stock	0.02	Increasing
Guadalupe fur seal	NA	0	0	0	7,408 (3,028) – Mexico to CA stock	NA	Increasing

NA = Not available or not assessed.
[1] Proposed action area (12,593 km^2) in the Santa Barbara Channel off the coast of California.
[2] Calculated take is the estimated number of animals in the in-water ensonified buffer zone multiplied by the number of days.
[3] Calculated take is the estimated number of animals in the in-air ensonified buffer zone multiplied by the number of days.
[4] Requested Take Authorization includes calculated takes for animals in the ensonified in-water and in-air buffer zones.
[5] NMFS Marine Mammal Stock Assessment Reports
[6] Total requested (and calculated) takes expressed as percentages of the species or stock.

Numbers of marine mammals that might be present and potentially disturbed are estimated based on the available data about marine mammal distribution and densities in the proposed Santa Barbara Channel action area. ExxonMobil estimated the number of different individuals of marine mammal species that may be exposed to in-water and in-air sounds with received levels greater than or equal to 160 dB re 1 μPa (rms) and in-air sounds with received levels greater than or equal to 90 dB re 20 μPa (rms) (for harbor seals)/100 dB re 20 μPa (rms) (for all other pinniped species) for impact hammer pile-driving activities on one or more occasions by considering the total marine area that would be within the 160 dB in-water radius and 90 dB (for harbor seals)/100 dB (for all other pinniped species) in-air radius around the impact hammer pile-driving on at least one occasion and the expected density of marine mammals in the area (in the absence of the conductor pipe installation activities). The number of possible exposures can be estimated by considering the total marine area that would be within the in-water 160 dB radius and in-air 90 dB (for harbor seals)/100 dB (for all other pinniped species) radius around the impact hammer pile-driving activities. The in-water 160 dB and in-air 90dB (harbor seal)/100 dB (for all other pinniped species) radii are based on acoustic modeling data for the impact hammer pile-driving activities that may be used during the proposed action (see of the addendum to the IHA application). It is unlikely that a particular animal would stay in the area during the entire impact hammer pile-driving activities.

The number of different individuals potentially exposed to received levels greater than or equal to 160 dB re 1 μPa (rms) for in-water noise and 90 dB re 20 μPa (rms) (for harbor seals)/100 dB re 20 μPa (rms) (for all other pinniped species) for in-air noise from impact hammer pile-driving activities was calculated by multiplying:

(1) The expected species density (in number/km^2), times

(2) The anticipated area to be ensonified to that level during conductor pipe installation (buffer zone = π x [maximum distance]^2), times

(3) The number of days of the conductor pipe installation activities.

Applying the approach described above, approximately 0.3318 km^2 would be ensonified within the in-water 160 dB isopleth and approximately 0.0053 km^2 /0.0475 km^2 would be ensonified within the in-air 90 dB(harbor seals)/100 dB (for all other pinniped species) isopleths for impact hammer pile-driving activities (assuming omnidirectional spreading of sound from the conductor pipe) during the proposed conductor pipe installation activities. The take calculations within the proposed action area account for animals in the initial density snapshot and account for new (i.e., turnover) or previously exposed animals over an approximate 4 day period that approach and enter the area ensonified above or equal to the 160 dB isopleth for in-water noise and 90/100 dB isopleth for in-air noise from the impact hammer pile-driving activities; however, studies suggest that many marine mammals would avoid exposing themselves to sounds at these level, which suggests that there would not necessarily be a large number of new animals entering the proposed action area once the conductor pipe installation activities started. Also, the approach assumes that no cetaceans or pinnipeds would move away or toward the Harmony Platform. The take estimates represent the number of individuals that are expected (in absence of a conductor pipe installation activities) to occur over an approximate 4 day period of time in the waters that would be exposed to greater than or equal to 160 dB (rms) in-water and greater than or equal to 90/100 dB (rms) in-air for impact hammer pile-driving activities.

ExxonMobil's estimates of exposures to various sound levels assume that the proposed activities would be carried out in full. The estimates of the numbers of marine mammals potentially exposed to 160 dB (rms) for in-water noise and 90 dB re 20 µPa (rms) (for harbor seals)/100 dB re 20 μPa (rms) (for all other pinniped species) for in-air noise received levels are precautionary and probably overestimate the actual numbers of marine mammals that could be involved. These estimates include standard contingencies for weather, equipment, or mitigation delays in the time planned for the proposed activities.

Table 5 shows the estimates of the number of different individual marine mammals anticipated to be exposed to greater than or equal to 160 dB re 1 μPa (rms) for the conductor pipe installation activities if no animals moved away from the Harmony Platform. No takes by Level A harassment have been requested. The total requested take authorization is given in the fifth column of Table 5.

Encouraging and Coordinating Research

ExxonMobil would coordinate the planned marine mammal monitoring program associated with the proposed conductor pipe installation activities with researchers and other parties that express interest in this activity, area, and anthropogenic sound effects on marine mammals. ExxonMobil would coordinate with applicable U.S. agencies (e.g., NMFS), and would comply with their requirements.

ExxonMobil supports research on marine mammals and sound in the environment through academic, industry, and private sector collaborations. ExxonMobil is a founding member and largest contributor to the Sound and Marine Life Joint Industry Program (JIP) through the International Oil and Gas Producers (OGP), and the International Association of Geophysical Contractors (IAGC). Through JIP and other venues, ExxonMobil provides annual funding and support for fundamental and applied scientific research to better understand the effects of anthropogenic sound on marine life. ExxonMobil also conducts internal research and monitoring programs specific to sound effects from exploration and production activities. These efforts have helped produce effective mitigation strategies and techniques to reduce potential sound effects on marine mammals from their operations and those from the oil and gas industry as a whole. More information on selected examples of ExxonMobil's involvement and contributions to scientific research on marine mammals and sound can be found in section 14 of the IHA application.

Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

Section 101(a)(5)(D) of the MMPA also requires NMFS to determine that the authorization would not have an unmitigable adverse effect on the availability of marine mammal species or stocks for subsistence use. There are no relevant subsistence uses of marine mammals implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Analysis and Preliminary Determinations

Negligible Impact

Negligible impact is "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival'' (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (i.e., population-level effects). An estimate of the number of Level B harassment takes, alone, is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through behavioral harassment, NMFS must consider other factors such as the likely nature of any responses (their intensity, duration, etc.), the context of any responses (critical reproductive time or location, migration, etc.), as well as the number and nature of estimated Level A harassment takes, the number of estimated mortalities, and effects on habitat.

In making a negligible impact determination, NMFS evaluated factors such as:

(1) The number of anticipated injuries, serious injuries, or mortalities;

(2) The number, nature, and intensity, and duration of Level B harassment (all relatively limited); and

(3) The context in which the takes occur (i.e., impacts to areas of significance, impacts to local populations, and cumulative impacts when taking into account successive/contemporaneous actions when added to baseline data);

(4) The status of stock or species of marine mammals (i.e., depleted, not depleted, decreasing, increasing, stable, impact relative to the size of the population);

(5) Impacts on habitat affecting rates of recruitment/survival; and

(6) The effectiveness of monitoring and mitigation measures.

As described above and based on the following factors, the specified activities associated with the conductor pipe installation activities are not likely to cause PTS, or other non-auditory injury, serious injury, or death. The factors include:

(1) The likelihood that marine mammals are expected to move away from a noise source that is annoying prior to its becoming potentially injurious;

(2) The potential for temporary or permanent hearing impairment is relatively low and would likely be avoided through the implementation of the required monitoring and mitigation (i.e., shut-down) measures;

(3) The fact that cetaceans and pinnipeds would have to be closer than 10 m and 3.5 m, respectively, during impact hammer pile-driving activities to be exposed to levels of underwater

sound believed to have a minimal chance of causing a permanent threshold shift (PTS; i.e., Level A harassment); and

(4) The likelihood that marine mammal detection ability by trained PSOs is high at close proximity to the platform.

No injuries, serious injuries, or mortalities are anticipated to occur as a result of ExxonMobil's planned conductor pipe installation activities, and none are proposed to be authorized by NMFS. Table 5 of this document outlines the number of requested Level B harassment takes that are anticipated as a result of these activities. NMFS's practice has been to apply the 160 dB re 1 μPa (rms) received level threshold for underwater impulse sound levels to determine whether take by Level B harassment occurs. Southall et al. (2007) provide a severity scale for ranking observed behavioral responses of both free-ranging marine mammals and laboratory subjects to various types of anthropogenic sound (see Table 4 in Southall et al. [2007]). Current NMFS practice, regarding exposure of marine mammals to high-level in-air sounds, as a threshold for potential Level B harassment, is at or above 90 dB re 20 μPa for habor seals and at or above 100 dB re 20 μPa for all other pinniped species (Lawson et al., 2002; Southall et al., 2007). NMFS has not determined Level A harassment thresholds for marine mammals for in-air noise.

As mentioned previously, NMFS estimates that 30 species of marine mammals under its jurisdiction could be potentially affected by Level B harassment over the course of the IHA. The population estimates for the marine mammal species that may be taken by Level B harassment were provided in Table 3 and 5 of this document. Due to the nature, degree, and context of Level B (behavioral) harassment anticipated and described (see "Potential Effects on Marine Mammals" section above) in this notice, the proposed activity is not expected to impact rates of annual recruitment or survival for any affected species or stock, particularly given NMFS's and the applicant's proposal to implement mitigation, monitoring, and reporting measures to minimize impacts to marine mammals. Additionally, the proposed conductor pipe installation activities would not adversely impact marine mammal habitat.

For the marine mammal species that may occur within the proposed action area, there are no known designated or important feeding and/or reproductive areas. Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (i.e., 24 hr cycle). Behavioral reactions to noise exposure (such as disruption of critical life functions, displacement, or avoidance of important habitat) are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall et al., 2007). Potential impacts are not likely to be significant from the proposed pile-driving activities as the use of the impact hammer would occur over 30 intermittent intervals of 2.5 to 3.3 hours each for a combined total of about 4 days spread out over a 91-day period. Additionally, the conductor pipe installation activities would be increasing sound levels in the marine environment in a relatively small area surrounding the Harmony Platform (compared to the range of the animals), and some animals may only be exposed to and harassed by sound for less than a day.

Of the 36 marine mammal species under NMFS jurisdiction that may or are known to likely to occur in the proposed action area, seven are listed as threatened or endangered under the ESA: North Pacific right, humpback, sei, fin, blue, and sperm whale and Guadalupe fur seal. These species are also considered depleted under the MMPA. Of these ESA-listed species, incidental take has been requested to be authorized for humpback, sei, fin, blue, and sperm whales. There is generally insufficient data to determine population trends for the other depleted species in the action area. To protect these animals (and other marine mammals in the action area), ExxonMobil must cease impact hammer pile-driving activities if any marine mammal enters designated exclusion zones. No injury, serious injury, or mortality is expected to occur and due to the nature, degree, and context of the Level B harassment anticipated, and the activities are not expected to impact rates of recruitment or survival.

NMFS has preliminarily determined, provided that the aforementioned mitigation and monitoring measures are implemented, the impact of conducting pile-driving activities in the Santa Barbara Channel off the coast of California, may result, at worst, in a modification in behavior and/or low-level physiological effects (Level B harassment) of certain species of marine mammals.

Changes in diving/surfacing patterns, habitat abandonment due to loss of desirable acoustic environment, and cessation of feeding or social interaction are some of the significant behavioral modifications that could potentially occur as a result of the proposed conductor pipe installation activities. While behavioral modifications, including temporarily vacating the area during the impact hammer pile-driving activities, may be made by these marine mammal species to avoid the resultant acoustic disturbance, the availability of alternate areas within these areas for species and the short and sporadic duration of the conductor pipe installation activities, have led NMFS to preliminary determine that the taking by Level B harassment from the specified activity would have a negligible impact on the affected species in the specified geographic region. NMFS believes that the length of the conductor pipe installation activities (duration of approximately 4 days total), the requirement to implement mitigation measures (e.g., shut-down of impact hammer pile-driving activities), and the inclusion of the monitoring and reporting measures, would reduce the amount and severity of the potential impacts from the activity to the degree that it would have a negligible impact on the species or stocks in the proposed action area.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from ExxonMobil's proposed conductor pipe installation activities would have a negligible impact on the affected marine mammal species or stocks.

Small Numbers

The estimate of the number of individual cetaceans and pinnipeds that could be exposed to pile-driving sounds with received levels greater than or equal to 160 dB re 1 μPa (rms) for all marine mammals for in-water sound levels and at or above 90 dB re 20 μPa for harbor seals and at or above 100 dB re 20 μPa for all other pinniped species for in-air sound levels during the proposed conductor pipe installation activities is in Table 5 of this document.

In total, 10 gray, 1 humpback, 1 minke, 1 sei, 1 fin, 1 blue, and 1 sperm whale could be taken by Level B harassment during the proposed seismic survey, which would represent 0.05, 0.05, 0.2, 0.8, 0.03, 0.06, and 0.1 % of the stock populations, respectively. Some of the cetaceans potentially taken by Level B harassment are delphinids and porpoises with estimates of 1 pygmy sperm, 1 Baird's beaked, 1 Cuvier's beaked 1 Mesoplodon spp. Beaked, 1 killer, and 1 short-finned pilot whale, 10 bottlenose, 20 striped, 45 short-beaked common, 120 long-beaked common, 20 Pacific white-sided, 1 northern right whale, and 10 Risso's dolphin as well as 50 Dall's porpoise, which would represent 0.17, 0.12, 0.01, 0.14, 0.42/0.29/0.28, 0.13, 0.1, 0.18, 0.01, 0.11, 0.11, 0.01, 0.16, and 0.12% of the affected stock populations, respectively. The pinnipeds that could potentially be taken by Level B harassment are the California sea lion, Pacific harbor and northern elephant seal, and northern fur seal with estimates of 33, 4, 14, and 2 individuals, which would represent 0.01, 0.01, 0.01, and 0.02% of the affected stock populations, respectively.

NMFS has preliminary determined that the requested take estimates represent small numbers relative to the affected species or stocks sizes (i.e., all are less than 1%). Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, NMFS preliminarily finds that small numbers of marine mammals would be taken relative to the populations of the affected species or stocks. See Table 5 for the requested authorized take numbers of marine mammals.

Endangered Species Act

Of the species of marine mammals that may occur in the proposed action area, several are listed as threatened or endangered under the ESA, including the North Pacific right, humpback, sei, fin, blue, and sperm whale and Guadalupe fur seal. ExxonMobil did not request take of endangered North Pacific right whales or the Guadalupe fur seals due to the low likelihood of encountering this species during the proposed pile-driving activities. NMFS's Office of Protected Resources, Permits and Conservation Division, has initiated formal consultation under section 7 of the ESA with NMFS's West Coast Regional Office, Protected Resources Division, to obtain a Biological Opinion evaluating the effects of issuing the IHA to ExxonMobil under section 101(a)(5)(D) of the MMPA on threatened and endangered marine mammals and, if appropriate, authorizing incidental take. NMFS would conclude formal section 7 consultation prior to making a determination on whether or not to issue the IHA. If the IHA is issued, ExxonMobil, in addition to the mitigation and monitoring requirements included in the IHA, would be required to comply with the Terms and Conditions of the Incidental Take Statement corresponding to NMFS's Biological Opinion issued to both ExxonMobil and NMFS's Office of Protected Resources.

National Environmental Policy Act

To meet National Environmental Policy Act (NEPA; 42 U.S.C. 4321 et seq.) requirements, NMFS will conduct a NEPA analysis to evaluate the effects of authorizing the proposed take of marine mammals prior to making a final determination on the issuance of the IHA. This notice, and referenced documents, including the IHA application provide the environmental issues and information relevant to the proposed conductor pipe installation activities as well as those specific to NMFS's issuance of the IHA. NMFS's NEPA analysis will be completed prior to the issuance or denial of this proposed IHA.

Proposed Authorization

As a result of these preliminary determinations, NMFS propose to issue an IHA to ExxonMobil for conducting the pipe installation activities at the Harmony Platform in the Santa Barbara Channel offshore of California, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. The proposed IHA language is provided below:

ExxonMobil Production Company, P.O. Box 4358, Houston, Texas 77210-4358, is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1371(a)(5)(D)), to harass small numbers of marine mammals incidental to conducting conductor pipe installation activities at the Harmony Platform in the Santa Barbara Channel off the coast of California:

1. This Authorization is valid from August 15, 2014 through August 14, 2015.
2. This Authorization is valid only for ExxonMobil's activities associated with conductor

pipe installation activities that shall occur in the following specified geographic area:

In the Santa Barbara Channel offshore of California, the Harmony Platform is located at 34º 22' 35.906" North, 120º 10' 04.486" West. The water depth at the action area is 366 m on the continental slope below a relatively steep descent, and 4.7 km from the shelf break. The conductor pipe installation activities would be conducted 10 km off the California coast, between Point Conception and the city of Santa Barbara, in the U.S. Exclusive Economic Zone, as specified in ExxonMobil's Incidental Harassment Authorization application and addendum.

3. Species Authorized and Level of Takes

(a) The incidental taking of marine mammals, by Level B harassment only, is limited to the following species in the waters of the Pacific Ocean off the coast of California:

(i) Mysticetes – see Table 5 (above) for authorized species and take numbers.

(ii) Odontocetes – see Table 5 (above) for authorized species and take numbers.

(iii) Pinnipeds – see Table 5 (above) for authorized species and take numbers.

(iv) If any marine mammal species is encountered during pile-driving activities that is not listed in Table 2 (attached) for authorized taking and is likely to be exposed to sound pressure levels (SPLs) greater than or equal to 160 dB re 1 μPa (rms) for impulse underwater noise from impact hammer pile-driving and/or at or above 100 dB re 20 μPa (rms) for all pinnipeds species except harbor seals (which is at or above 90 dB re 20 μPa (rms) for in-air noise, then ExxonMobil must shut-down the operations to avoid take.

(b) The taking by injury (Level A harassment), serious injury, or death of any of the species listed in Condition 3(a) above and the taking of any kind of any other species of marine mammal is prohibited and may result in the modification, suspension or revocation of this IHA.

4. The methods authorized for taking by Level B harassment are limited to the following

acoustic sources without an amendment to this IHA:

(a) Pile-driving using impact hammer (i.e., installation);

5. The taking of any marine mammal in a manner prohibited under this Authorization must be reported immediately to the Office of Protected Resources, National Marine Fisheries Service (NMFS), at 301-427-8401.

6. <u>Mitigation and Monitoring Requirements</u>

ExxonMobil is required to implement the following mitigation and monitoring requirements when conducting the specified activities to achieve the least practicable impact on affected marine mammal species or stocks:

(a) Establish a 160 dB re 1 μPa (rms) buffer zone for cetaceans and pinnipeds and a 180 dB re 1 μPa (rms) exclusion zone for cetaceans and a 190 dB re 1 μPa (rms) exclusion zone for pinnipeds for in-water sounds before the conductor pipe installation activities begin so that underwater sounds associated with operations no longer exceed levels that are potentially harmful to marine mammals. See Table 2 (above) for distances and buffer and exclusion zones.

(b) Utilize three, NMFS-qualified, vessel-based Protected Species Observer (PSO) to visually watch for and monitor marine mammals near the impact hammer source during daytime and nighttime pile-driving activities. The Harmony Platform's crew shall also assist in detecting marine mammals, when practicable. PSOs shall be stationed at the best practicable vantage point(s) (on the lower platform level, and upper platform level) of the Harmony Platform to monitor the applicable buffer and exclusion zone for marine mammals during the conductor pipe installation activities. For the buffer zone, two PSOs shall be stationed on the upper platform level. For the exclusion zone, one PSO shall be concurrently stationed on the lower platform level. The lower platform level shall be illuminated during nighttime visual observations. PSOs shall have access to reticle binoculars (7 x 50 Fujinon) and night-vision devices. PSO shifts shall last no longer than 5 hours at a time. PSOs shall also make observations during daytime periods when the pile-driving activities are not occurring for comparison of animal abundance and behavior, when feasible. In addition to monitoring during pile-driving activities, baseline monitoring for marine mammals shall be performed up to one week before and one week after conductor pipe installation activities, as well as selected periods in between impact hammer pile-driving activities.

(c) A PSO shall record the following information when a marine mammal is sighted:

(i) Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from platform, sighting cue, apparent reaction to the conductor pipe installation activities (e.g., none, avoidance, approach, paralleling, etc., and including responses to ramp-up), speed of travel, and duration of presence; and

(ii) Date, time, location, activity of the conductor pipe installation activities (including whether in state of ramp-up or shut-down), monitoring and mitigation measures implemented (or not implemented), weather conditions, Beaufort sea state and wind force, visibility, and sun glare; and

(iii) The data listed under Condition 6(c)(ii) shall also be recorded at the start and end of each observation watch, and during a watch whenever there is a change in one or more of the variables.

(iv.) If inclement weather conditions (i.e., fog, rain, or rough Beaufort sea state) limits or impairs the PSO's visibility of the water's surface to less than 30.5 m (100 ft) within the action area, then all noise-generating conductor pipe installation activities shall be stopped until visibility improves.

(d) Visually observe the entire extent of the in-water buffer zone (160 dB re 1 μPa [rms]) for cetaceans and pinnipeds and in-water exclusion zone (180 dB re 1 μPa [rms] for cetaceans and 190 dB re 1 μPa [rms] for pinnipeds as well as the in-air buffer zone for harbor seals (90 dB re 20 μPa) and for all other pinnipeds (100 dB re 20 μPa); see Table 2 [above] for distances) using NMFS-qualified PSOs, for at least 30 minutes prior to starting the impact hammer (day or night). If the PSO finds a marine mammal within the exclusion zone, ExxonMobil must delay the pile-driving activities until the marine mammal(s) has left the area. If the PSO sees a marine mammal that surfaces, then dives below the surface, the PSO shall wait 30 minutes. If the PSO sees no marine mammals during that time, they should assume that the animal has moved beyond the exclusion zone. If for any reason the entire exclusion zone radius cannot be seen for the entire 30 minutes (i.e., rough seas, fog, darkness), or if marine mammals are near, approaching, or in the exclusion zone, the impact hammer may not be ramped-up.

(e) Implement a "ramp-up" procedure when starting up at the beginning of pile-driving activities, which means starting with an initial set of three strikes from the impact hammer at 40% energy, followed by a 30 second waiting period, then two subsequent three strike sets. During ramp-up, the PSOs shall monitor the exclusion zone, and if marine mammals are sighted, a shut-down shall be implemented. Therefore, initiation of ramp-up procedures from shut-down requires that the PSOs be able to view the full exclusion zone as described in Condition 6(a) (above).

(f) Shut-down the pile-driving activities if a marine mammal is detected approaching, about to enter, or located within the relevant exclusion zone (as defined in Table 2, above). A shut-down means all operating impact hammers are shut-down (i.e., turned off). If any marine mammal is sighted within the relevant exclusion zone prior to pile-driving activities, the hammer operator (or other authorized individual) shall delay conductor pipe installation activities until the animal has moved outside the exclusion zone or the animal is not resighted within for 15 minutes for species with shorter dive durations (small odontocetes and pinnipeds) or 30 minutes for species with longer dive durations (mysticetes and large odontocetes, including sperm, pygmy and dwarf sperm, killer, and beaked whales).

(g) Following a shut-down, the conductor pipe installation activities shall not resume until the PSO has visually observed the marine mammal(s) exiting the exclusion zone and is not likely to return, or has not been seen within the exclusion zone for 15 minutes for species with shorter dive durations (small odontocetes and pinnipeds) or 30 minutes for species with longer dive durations (mysticetes and large odontocetes, including sperm, pygmy and dwarf sperm, killer, and beaked whales).

(h) Following a shut-down and subsequent animal departure, conductor pipe installation activities may resume following ramp-up procedures described in Condition 6(e).

(i) To facilitate visual monitoring during non-daylight hours, the exclusion zones shall be illuminated by lights to allow for more effective viewing of the area by the PSO on-duty.

(j) In-Water Monitoring – Acoustic monitoring shall be performed at a minimum of two fixed stations located at 10 m and approximately 325 m from the conductor pipe sound source. The following general approach shall be used to measure in-water sound levels:

(k) Acoustic monitoring shall be conducted over the entire pile-driving period for each conductor pipe, starting approximately 1 hour prior to pile-driving through 1 hour after impact hammering has stopped. Pre- and post-hammer pile-driving data shall be used to determine ambient/background noise levels.

(i) A stationary hydrophone system with the ability to measure and record sound pressure levels (SPL) shall be deployed at a minimum of two monitoring locations. SPLs shall be recorded in voltage, converted to microPascals (μPa), and post-processed to decibels (dB [re 1 μPa]). For the first conductor pipe installation, hydrophones shall be placed at 10+/-1 m and at 325+/-33 m from the conductor pipe at depths ranging from 10 to 30 m below the water surface to avoid potential interferences for surface water energy, and to target the depth range of maximum occurrence of marine mammal most likely in the area during the project. If necessary, additional hydrophone mooring systems shall be deployed at additional distances and/or depths. Following each successive conductor pipe installation, the water depth and geographical orientation of the hydrophone may be changed to validate modeled SPLs at varying water depths and direction.

(ii) At a minimum, the following sound data shall be analyzed (post-processed) from recorded sound levels: absolute peak overpressure and under pressure levels for each conductor pipe; average, minimum, and maximum sound pressure levels (rms), integrated from 3 Hz to 20 kHz; average duration of each hammer strike, and total number of strikes per continuous hammer pile-driving period for each conductor pipe.

(iii) In the event that field measurements indicate different SPL (rms) values than those predicted by modeling for either the maximum distances of the buffer or exclusion zones from the sound source, corresponding boundaries for the buffer and exclusion zones shall be increased/decreased accordingly, following NMFS notification and concurrence.

(l) In-Air Monitoring – Reference measurements shall be made approximately 10 to 20 m from the initial hammer strike position using a stationary microphone. The microphone shall be placed as far away from other large sound sources as practical. In-air sound levels shall be recorded at several points around the base of the Harmony Platform at sea level to validate modeled sound levels. Recorded data shall be recorded as dB (re 20 μPa) for comparison to in-air noise thresholds for Level B harassment for pinnipeds.

7. Reporting Requirements

ExxonMobil is required to:

(a) Submit a draft report on all activities and monitoring results to the Office of Protected Resources, NMFS, within 90 days of the completion of ExxonMobil's conductor pipe installation activities at the Harmony Platform in the Santa Barbara Channel off the coast of California. This report must contain and summarize the following information:

(i) Dates, times, locations, weather, sea conditions (including Beaufort sea state and wind force), and associated activities during all conductor pipe installation activities and marine mammal sightings;

(ii) Species, number, location, distance from the platform, and behavior of any marine mammals, as well as associated conductor pipe installation activities (e.g., number of ramp-ups and shut-downs), observed throughout all monitoring activities.

(iii) An estimate of the number (by species) of marine mammals that: (A) are known to have been exposed to the pile-driving activities (based on visual observation) at received levels greater than or equal to 160 dB re 1 μPa (rms), and/or 180 dB re 1 μPa (rms) for cetaceans and greater than or equal to 190 dB re 1 μPa (rms) for pinnipeds with a discussion of any specific behaviors those individuals exhibited; and (B) may have been exposed (based on modeled values for the impact hammer) to the pile-driving activities at received levels greater than or equal to 160 dB re 1 μPa (rms), and/or 180 dB re 1 μPa (rms) for cetaceans and greater than or equal to 190 dB re 1 μPa (rms) for pinnipeds with a discussion of the nature of the probable consequences of that exposure on the individuals that have been exposed.

(iv) A description of the implementation and effectiveness of the: (A) Terms and Conditions of the Biological Opinion's Incidental Take Statement (ITS) (attached); and (B) mitigation measures of the Incidental Harassment Authorization. For the Biological Opinion, the report shall confirm the implementation of each Term and Condition, as well as any conservation recommendations, and describe their effectiveness for minimizing the adverse effects of the action on Endangered Species Act-listed marine mammals.

(l) Submit a final report to the Chief, Permits and Conservation Division, Office of Protected Resources, NMFS, within 30 days after receiving comments from NMFS on the draft report. If NMFS decides that the draft report needs no comments, the draft report shall be considered to be the final report.

8. Reporting Prohibited Take

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this Authorization, such as an injury (Level A harassment), serious injury or mortality (e.g., equipment interaction, and/or entanglement), ExxonMobil shall immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov and Howard.Goldstein@noaa.gov and the West Coast Regional Stranding Coordinator (Justin.Greenman@noaa.gov). The report must include the following information:

(a) Time, date, and location (latitude/longitude) of the incident; description of the circumstances during and leading up to 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 marine mammal observations in the 24 hours preceding the incident; species identification or description of the animal(s) involved; the fate of the animal(s); and photographs or video footage of the animal (if equipment is available).

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

Reporting an Injured or Dead Marine Mammal with an Unknown Cause of Death - In the event that ExxonMobil discovers an injured or dead marine mammal, and the lead PSO 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), ExxonMobil shall immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Jolie.Harrison@noaa.gov and Howard.Goldstein@noaa.gov, and the NMFS West Coast Regional Office (1-866-767-6114) and/or by e-mail to the West Coast Regional Stranding Coordinator (Justin.Greenman@noaa.gov). The report must include the same information identified in Condition 8(a) above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS shall work with ExxonMobil to determine whether modifications in the activities are appropriate.

Reporting an Injured or Dead Marine mammal Not Related to the Activities - In the event that ExxonMobil discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in Condition 2 of this Authorization (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), ExxonMobil shall report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Jolie.Harrison@noaa.gov and Howard.Goldstein@noaa.gov, and the NMFS West Coast Regional Office (1-866-767-6114) and/or by e-mail to the West Coast Regional Stranding Coordinator (Justin.Greenman@noaa.gov), within 24 hours of the discovery. ExxonMobil shall provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. Activities may continue while NMFS reviews the circumstances of the incident.

9. Endangered Species Act Biological Opinion and Incidental Take Statement ExxonMobil is required to comply with the Terms and Conditions of the ITS corresponding to NMFS's Biological Opinion issued to both ExxonMobil and NMFS's Office of Protected Resources (attached).

10. A copy of this Authorization and the ITS must be in the possession of all contractors and PSO(s) operating under the authority of this Incidental Harassment Authorization.

11. Penalties and Permit Sanctions – Any person who violates any provision of this IHA is subject to civil and criminal penalties, permit sanctions, and forfeiture as authorized under the MMPA.

12. This IHA may be modified, suspended or withdrawn if ExxonMobil fails to abide by the conditions prescribed herein or if the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals, or if there is an unmitigable adverse impact on the availability of such species or stocks for subsistence uses.

Request for Public Comments

NMFS requests comments on our analysis, the draft authorization, and any other aspect of the notice of proposed IHA for ExxonMobil's proposed installation of conductor pipes via hydraulic hammer driving at Harmony Platform, Santa Ynez Production Unit, located in the Santa Barbara Channel offshore of California. Please include with your comments any supporting data or literature citations to help inform our final decision on ExxonMobil's request for an MMPA authorization.

Concurrent with the publication of this notice in the Federal Register, NMFS is forwarding copies of this application to the Marine Mammal Commission and its Committee of Scientific Advisors.

Dated: June 25, 2014.

Perry F. Gayaldo,
Deputy Director,
Office of Protected Resources,
National Marine Fisheries Service.

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