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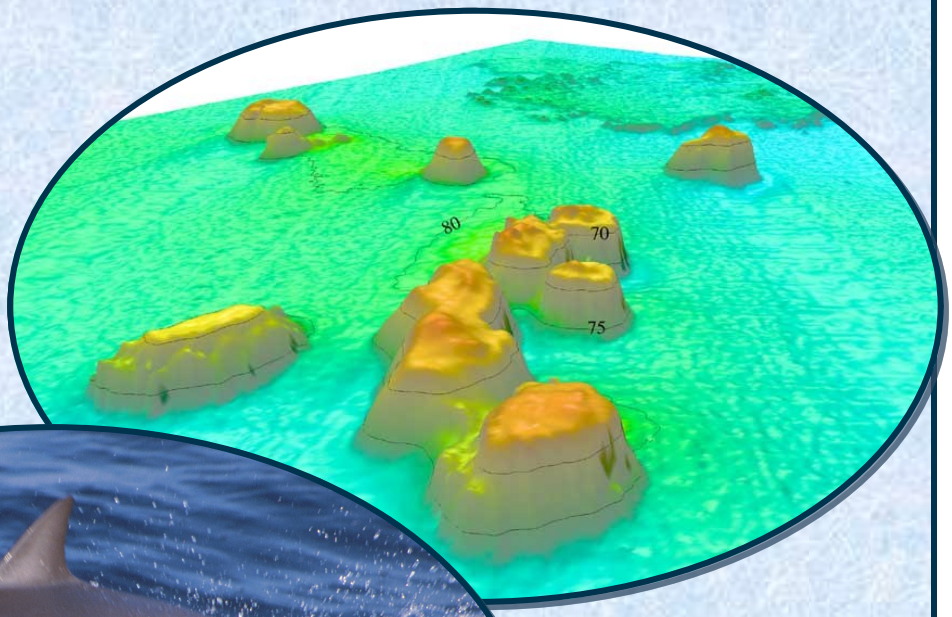
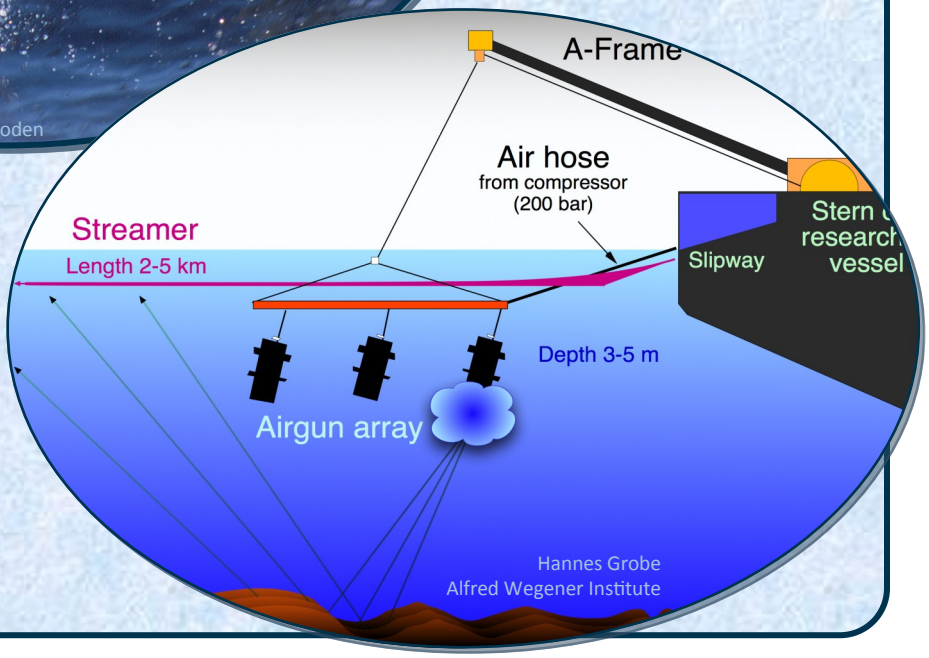
GLOSSARY of TERMS

Geological & Geophysical (G&G) Survey





Mitigation & Protective Measures

BOEM

Bureau of Ocean Energy Management

BOEM promotes energy independence, environmental protection and economic development through responsible, science-based management of offshore conventional and renewable energy and marine mineral resources.

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Geological & Geophysical (G&G) Surveys

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Mitigation & Protective Measures

Geological & Geophysical (G&G) Surveys Terminology

Acoustics: The scientific study of sound, especially of its generation, transmission, and reception.

Acoustic Backscatter Device: Instrument that uses sound waves to collect measurement data to generate images (e.g., of the seafloor).

Acoustic Integration Model (AIM©): An animal movement and acoustics model that integrates information on the estimated propagation of sound from an underwater acoustic source and on the assumed movement patterns of simulated animals (animats) to predict the exposure of animats to underwater sound propagating through space and time.

Acute: Sudden, short term, severe, critical, crucial, intense, but usually of short duration.

Airgun: A pneumatic device used as an acoustic source to acquire marine seismic data. It is submerged below the water surface and towed behind a ship, usually as part of an array consisting of a number of airguns (i.e., airgun array).

Ambient Ocean Noise: The sound profile within the ocean composed of both far and near sound sources of both natural and anthropogenic origin. Ambient ocean noise is also referred to as environmental background noise.

Amplitude: The maximum absolute value of a periodic curve measured along its vertical axis. For sound waves, it is the maximum amount that the wave's pressure differs from ambient pressure in the medium through which the sound wave is propagating.

Anthropogenic Noise: Noise related to or produced by human activities.

Array: The layout or arrangement of objects in a specific pattern, often in rows and columns.

Attenuation: Reduction; in this document, reduction of the level or intensity of sound.

Bathymetry: The water depth at various places in a body of water; the information derived from measurements to determine water depth.

Bathypelagic: Pertaining to the subzone of the pelagic zone that generally includes waters deeper than 1,000 m (3,300 ft). At this depth, there is little to no light, and photosynthesis is not possible. Consequently, there are no living plants, and most animals survive by consuming detritus falling from the pelagic zones above or by preying on other animals.

Behavioral Effect: Defined in this Programmatic EIS as a change in an animal's behavior or behavior patterns that results from exposure to some stimulus (e.g., an anthropogenic acoustic exposure) and exceeds some defined criterion (e.g., extends beyond the range of normal daily variation in behavior).

Benthic: Referring to the bottom-dwelling community of organisms that live on or in either the sea bottom.

Biological Opinion: An FWS or NMFS evaluation of the impact of a proposed action on endangered and threatened species, in response to formal consultation under Section 7 of the ESA.

Block: A geographical area portrayed on official BOEM protraction diagrams or leasing maps that contains approximately 2,331 ha (9 mi^2).

Blowout: Uncontrolled flow of fluids from a wellhead or wellbore.

Boomer: A low-energy towed device used as an acoustic source to acquire marine seismic data. The acoustic pulse is generated when an electrical signal discharges a capacitor bank causing two spring-loaded, electrically charged plates in the boomer transducer to repel, creating a precisely repeatable pressure pulse primarily directed downward to the seafloor.

Chirp System: Chirp refers to a variety of pulsed sonar systems capable of conducting high-resolution reflection profiling of the subbottom using low energy acoustic sources with a nominal frequency range of a few kilohertz up to several tens or hundreds of kilohertz. Often chirp data are collected by sweeping through a range of frequencies in a single pulse, but some systems referred to as chirp may be associated with only a single frequency.

Continental Offshore Stratigraphic Test (COST) Well: Wells that involve drilling penetration into the sea bottom of more than 152 m (500 ft) and are primarily drilled to gather geological information (defined in 30 CFR 251).

Decibel (dB): A relative unit used to describe sound intensities. It is used to express the relative difference, usually between acoustic or electrical signals, equal to 10 or 20 times the common logarithm of the ratio of the two quantities. Since the dB scale is logarithmic and not linear, a 20-dB sound is 10 times louder than a 10-dB sound, and a 30-dB sound is 100 times louder than a 10-dB sound.

Depth Sounder: An instrument that indirectly determines the ocean floor depth by transmitting acoustic pulses from the ocean surface and listening for their reflection (or echo) from the seafloor. A single-beam depth sounder calculates the depth below the ship using the time it takes a sound pulse to travel to the seafloor, reflect, and then return back to the transducer. A multibeam depth sounder transmits a broad acoustic pulse from a specially designed transducer across the full swath across track then forms a receive beam that is much narrower (around 1 degree, depending on the system) to establish a two-way travel time of the acoustic pulse. If the speed of sound in water is known for the full water column, the depth and position of the return signal can be determined from the receive angle and the two-way travel time.

Discharge: Something that is emitted; flow rate of a fluid at a given instant expressed as volume per unit of time.

Drilling Fluid (Drilling Mud): A mixture of clay, water or refined oil, and chemical additives pumped continuously downhole through the drill pipe and drill bit, and back up the annulus between the pipe and the walls of the borehole to a surface pit or tank. The mud lubricates and cools the drill bit, lubricates the drill pipe as it turns in the wellbore, carries rock cuttings to the surface, serves to keep the hole from crumbling or collapsing, and provides the weight or hydrostatic head to prevent extraneous fluids from entering the well bore and to downhole pressures; also called drilling fluid.

Electromagnetic Field: The field of energy resulting from the movement of alternating electric current along the path of a conductor, composed of both electrical and magnetic components and existing in the immediate vicinity of, and surrounding, the electric conductor. Electromagnetic fields exist both in high-voltage electric transmission power lines and in low-voltage electric conductors in homes and appliances.

Exploration Well: A well drilled in unproven or semi-proven territory to determining whether economic quantities of oil or natural gas deposit are present; exploratory well.

Extended Continental Shelf: Judicial term used in Article 76 of the UNCLOS that extends beyond 200 nmi from shore. For purpose of this Draft Programmatic EIS, the seaward limit of the AOI shall be defined as a line 350 nmi (648 km) from shore. Article 76 of UNCLOS provides two constraint lines for defining the limit of the ECS: the seaward limit of Federal jurisdiction may be set at the farthest of 200 nmi seaward of the baseline from which the breadth of the territorial sea is measured or, if the continental shelf can be shown to exceed 200 nmi, a distance not greater than a line 100 nmi from the 2,500-m isobaths, or a line 350 nmi from the baseline.

Fault: A fracture in the earth's crust accompanied by displacement of one side of the fracture with respect to the other and in a direction parallel to the fracture.

Frequency: In acoustics, a description of the rate of vibration, measured in cycles per second. One cycle per second is usually referred to as 1 Hz. Frequency is perceived by humans as pitch.

Frequency (Pitch): For sound waves, frequency is the rate at which the source-producing sound wave is vibrating or the rate at which the sound-producing body completes one vibration cycle. Frequency is expressed in units of Hertz (Hz), where 1 Hz is equal to one complete vibration cycle per second.

Gas Hydrates: Gas molecules (e.g., methane) trapped in water-ice "cages" in subsea deposits.

Geochemical: Of or relating to the science dealing with the chemical composition of and the actual or possible chemical changes in the crust of the earth.

Geology Survey: The study of the materials, processes, environments, and history of the earth, including rocks and their formation and structure.

Geophysical Survey: A method of exploration in which geophysical properties and relationships are measured remotely by one or more geophysical methods.

High-Resolution Geophysical (HRG) Survey: A survey conducted to evaluate the suitability of a specific site for oil and gas exploration and development activities, renewable energy facilities, or marine mineral uses. The surveys are conducted to assess subseafloor conditions and to detect geohazards, archaeological resources, and certain types of benthic communities. The HRG surveys for oil and gas exploration may use an airgun in addition to electromechanical sources such as side-scan sonar, boomer or chirp subbottom profiler, and single or multibeam depth sounder. The HRG surveys for renewable energy and marine minerals sites are not expected to use airguns.

Hydrocarbons: Any of a large class of organic compounds containing primarily carbon and hydrogen. Hydrocarbon compounds are divided into two broad classes: aromatic and aliphatics. They occur primarily in petroleum, natural gas, coal, and bitumens.

Hydrophone: Essentially an underwater microphone, a hydrophone is an underwater receiver used to detect the pressure change caused by sound waves propagating through the water. That pressure is converted to electrical energy which can be recorded or measured.

Intensity: For sound, intensity is the measure of the amount of energy that is transported over a given area per unit of time. Sound intensity is expressed in units of W/m^2.

Minerals: Minerals include oil, gas, sulphur, and associated resources, and all other minerals authorized by an Act of Congress to be produced from public lands as defined in Section 103 of the Federal Land Policy and Management Act of 1976.

Mitigation Measure: Measures that will minimize, avoid, rectify, reduce, eliminate, or compensate for significant environmental effects.

Noise: Unwanted sound; a subjective term reflective of societal values regarding what constitutes unwanted or undesirable intrusions of sound.

Operator: An individual, partnership, firm, or corporation having control or management of operations on a leased area or portion thereof. The operator may be a lessee, designated agent of the lessee, or holder of operating rights under an approved operating agreement.

Outer Continental Shelf (OCS): All submerged lands that comprise the continental margin adjacent to the U.S. and seaward of State offshore lands.

Outer Continental Shelf (OCS) Lands: Offshore lands located outside of State coastal waters. Generally, OCS lands begin approximately 3.3 statute mi offshore with respect to coastal States, except in the cases of Texas and the west coast of Florida, where OCS lands begin approximately 10.2 statute mi offshore.

Outer Continental Shelf Lands Act (OCSLA), as amended: An act authorizing the U.S. Department of the Interior to regulate activities related to the development of mineral resources on the OCS.

Pascal (Pa): A unit of pressure equivalent to 1 newton of force applied evenly over 1 m^2. The unit is named after Blaise Pascal, the eminent French mathematician, physicist, and philosopher.

Passive Acoustic Monitoring (PAM): A listening system that, in the marine environment, utilizes hydrophones, signal processing software, and (usually) some degree of human listening to detect and often to localize the vocalizations of marine mammals.

Physical Oceanography: The scientific study of ocean physics, including ocean currents, waves, and tides.

Physiographic: Pertaining to the physical features of the land, in particular its slope and elevation.

Physiological Effect: Defined in the Programmatic EIS as a variation in an animal's physiology that results from an anthropogenic acoustic exposure and exceeds the normal daily variation in physiological function.

Pinger: A pulse generator using underwater sound to transmit data, such as subject location.

Pitch: A property of sound; sound wave frequency as perceived by the receptor. In music, two tones whose frequencies make a 2:1 ratio are said to be separated by an octave interval; a frequency ratio of 5:4 ration defines a third; a frequency ratio of 4:3 defines a fourth; a frequency ration of 3:2 defines a fifth.

Pneumatic: Operated by pressurizing air.

Pulse: A brief, broadband, atonal, transient sound; e.g., an explosion, gun shot, airgun pulse, or pile driving strike. Pulses are characterized by a rapid rise from ambient pressure to maximal pressure, and (at least near the source) by short duration.

Ramp up (or Soft Start): Turning on airguns or other acoustic source at low power and gradually and systematically increasing the output until full power is achieved (usually over a period of minutes). The appropriate ramp up or soft-start method depends on factors such as the type of seismic survey equipment being used and vessel speed.

Received Level: The level of sound that arrives at the receiver (e.g., a marine mammal) or listening device (hydrophone). The received level is the source level minus the transmission losses from the sound traveling through the water.

Root-Mean-Square (RMS) Sound Pressure: Average sound pressure over some specified time interval. For airgun pulses, the averaging time is commonly taken to be the approximate duration of one pulse, which in turn is commonly assumed to be the time interval within which 90 percent of the pulse energy arrives. The rms sound pressure level (in dB) is typically ~10 dB less than the peak level, and ~16 dB less than the peak-to-peak level.

Sediment: Material that has been transported and deposited by water, wind, glacier, precipitation, or gravity; a mass of deposited material.

Sedimentary Basin: A geologically (but not necessarily topographically) depressed area with thick sediments (sedimentary rocks) in the interior and thinner sediments at the edges.

Seeps (Hydrocarbon): Gas or oil that reaches the surface along bedding planes, fractures, unconformities, or fault planes.

Seismic: Of, subject to, or caused by an earthquake or earth vibration.

Shallow Test Wells: Wells that involve drilling into the sea bottom to depths less than 152 m (500 ft) and are primarily drilled to gather geological information (30 CFR 251).

Sound Exposure Level (SEL): The total noise energy produced from a single noise event; the SEL is the integration of all the acoustic energy contained within the event. The SEL takes into account both the intensity and the duration of a noise event. The SEL is stated in dB re 1 μPa^2 s for underwater sound.

Sound Navigation and Ranging (Sonar): Any anthropogenic (manmade) or animal (e.g., bats, dolphins) system that uses transmitted and/or received acoustic signals for navigation, communication, and determining position and bearing of a target. There are two broad types of anthropogenic sonar: active and passive. *Active sonar* involves the production of a signal that propagates through the environment and bounces off objects (such as a prey item). That reflected sound, or echo, travels back to the receiver, which interprets the echo. Therefore, active sonar involves two-way sound transmission. *Passive sonar* involves one -way sound transmission from an acoustic source (such as conspecific) to a receiver or listener.

Sound Pressure Level (SPL): A measure of the rms, or "effective" sound pressure, converted to decibels. The SPL is expressed in dB re 1 µPa for underwater sound and dB re to 20 µPa for airborne sound.

Source Level: The received sound pressure level measured or estimated at a nominal distance of 1 m from the source. It is often expressed as dB re: 1 µPa at 1 m or in bar-m. For a distributed source, such as an airgun array, the nominal overall source level, as used in predicting received levels at long distances, exceeds the level measurable at any one point in the water near the sources.

Sparker: A low-energy acoustic source that generates a precisely timed electrical arc that momentarily vaporizes water between positive and negative leads. The collapsing bubbles produce a broad band omnidirectional pulse which can penetrate several hundred meters into the ocean bottom. Hydrophone arrays towed nearby receive the return signals.

Supply Vessel: A boat that ferries food, water, fuel, and drilling supplies and equipment to an offshore rig or platform and returns to land with refuse that cannot be disposed of at sea.

Transmission Loss: Pressure or energy losses that occur as the sound travels through the water. Losses occur because the wavefront spreads over an increasingly large volume as the sound propagates, and because of additional processes including scattering and the absorption of some of the energy by water.

Velocity: For acoustics, the speed at which a sound wave (a longitudinal wave) travels through a medium. Velocity is measured in units of distance/time. The velocity or speed of a sound wave in any medium is dependent on both the inertial and elastic properties of the medium. In air, the speed of sound is dependent on the air's pressure (a measure of its inertial property of density) and its temperature (a measure of the air's elastic property of deformation in response to an applied force – in this case, the sound wave). At 1 atmosphere of pressure and a temperature of 20°C (68°F), the speed of sound is approximately 343 m/s (750 mph).

Vibratory: Operated by causing rapid, small movement in a back and forth manner.

Wavelength: The distance from any point in the wave to the corresponding point in the next cycle of the wave. Longer wavelengths are perceived by the human ear as low tones, shorter wavelengths as high tones.

MITIGATION & PROTECTIVE MEASURES TERMINOLOGY

Acoustics: The scientific study of sound, especially of its generation, transmission, and reception.

Airgun: A pneumatic device used as an acoustic source to acquire marine seismic data. It is submerged below the water surface and towed behind a ship, usually as part of an array consisting of a number of airguns (i.e., airgun array).

Ambient Ocean Noise: The sound profile within the ocean composed of both far and near sound sources of both natural and anthropogenic origin. Ambient ocean noise is also referred to as environmental background noise.

Amplitude: The maximum absolute value of a periodic curve measured along its vertical axis. For sound waves, it is the maximum amount that the wave's pressure differs from ambient pressure in the medium through which the sound wave is propagating.

Anthropogenic: Coming from human sources, relating to the effect of humankind on nature.

Anthropogenic Noise: Noise related to or produced by human activities.

Baleen Whales: Whales with parallel rows of fibrous plates that hang from the upper jaw and are used for filter feeding. Also known as mysticetes (see *Mysticete*).

Bathypelagic: Pertaining to the subzone of the pelagic zone that generally includes waters deeper than 1,000 m (3,300 ft). At this depth, there is little to no light, and photosynthesis is not possible. Consequently, there are no living plants, and most animals survive by consuming detritus falling from the pelagic zones above or by preying on other animals.

Behavioral Effect: Defined in this Programmatic EIS as a change in an animal's behavior or behavior patterns that results from exposure to some stimulus (e.g., an anthropogenic acoustic exposure) and exceeds some defined criterion (e.g., extends beyond the range of normal daily variation in behavior).

Benthic: Referring to the bottom-dwelling community of organisms that live on or in either the sea bottom.

Biological Opinion: An FWS or NMFS evaluation of the impact of a proposed action on endangered and threatened species, in response to formal consultation under Section 7 of the ESA.

Biota: The combined flora and fauna of a region.

Candidate Species: Plants and animals for which FWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA but for which development of a listing regulation is precluded by other higher-priority listing activities.

Cetacea or Cetacean: An order of aquatic mammals including baleen whales (see *Mysticetes*) and toothed whales, dolphins, and porpoises (see *Odontocetes*).

Chemosynthetic: Organisms that obtain their energy from the oxidation of various inorganic compounds rather than from light (photosynthetic).

Critical Habitat: Defined in Section 3 of the ESA as (1) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the ESA, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Decibel (dB): A relative unit used to describe sound intensities. It is used to express the relative difference, usually between acoustic or electrical signals, equal to 10 or 20 times the common logarithm of the ratio of the two quantities. Since the dB scale is logarithmic and not linear, a 20-dB sound is 10 times louder than a 10-dB sound, and a 30-dB sound is 100 times louder than a 10-dB sound.

Demersal: Living at or near the bottom of a waterbody but having the capacity for active swimming. Term used particularly when describing various fish species.

Demersal Fishes: Those fishes that spend at least the adult portion of their life cycle in association with the ocean bottom.

Distinct Population Segment (DPS): A vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The ESA provides for listing species, subspecies, or DPSs of vertebrate species.

Dynamic Management Area (DMA): An area identified by NMFS that is designed to reduce the risk of whale-ship interactions when North Atlantic right whales are found aggregating in an area.

Echolocation: The use of reflected sound waves by some animals to gather critical information such as the location of obstructions, predators, or food, or for purposes of reproduction.

Ecosystem: A group of organisms and their physical environment interacting as an ecological unit.

Endangered Species: Under the ESA, any species that is in danger of extinction throughout all or a significant portion of its range (ESA §3[6]).

Endangered Species Act (ESA): A U.S. Federal law whose purpose is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by FWS and the NMFS. The FWS has primary responsibility for terrestrial and freshwater organisms, including manatees, polar bears, walruses, sea otters, and nesting sea turtles, while the responsibilities of NMFS are mainly marine wildlife including all cetaceans and sea turtles (in the marine stage), most pinnipeds, and anadromous fish such as salmon. Under the ESA, species may be listed as either endangered or threatened. The ESA also requires the designation of critical habitat for listed species (see *Critical habitat*).

Environmental Impact Statement (EIS): A document required of Federal agencies by NEPA for major proposals or legislation that would or could significantly affect the environment.

Epifauna: Organisms living on the surface of the sediment/sea bed.

Epifaunal: A community of marine organisms that live attached to hard substrates or move around and live on hard substrates.

Epipelagic: Pertaining to a subzone of the pelagic zone where there is enough light for photosynthesis. Generally includes waters from the surface to approximately 200 m (660 ft) in depth.

Essential Fish Habitat (EFH): As identified in the Magnuson-Stevens Fishery Conservation and Management Act, those waters and substrate that are defined within Fishery Management Plans for federally managed fish species as necessary to fish for spawning, breeding, feeding, or growth to maturity.

Estuary: Coastal semi-enclosed body of water that has a free connection with the open sea and where freshwater meets and mixes with seawater.

Extralimital: Known on the basis of only a few records that probably resulted from unusual wanderings of animals into the region.

Geology Survey: The study of the materials, processes, environments, and history of the earth, including rocks and their formation and structure.

Geophysical Survey: A method of exploration in which geophysical properties and relationships are measured remotely by one or more geophysical methods.

Harassment: Two definitions of harassment are used in this Programmatic EIS, depending on context. Under the ESA, harassment is an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Under the 1994 Amendments to the MMPA, harassment is any act of pursuit, torment, or annoyance which (a) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (b) 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 but which does not have the potential to injure a marine mammal or marine mammal stock in the wild (Level B harassment).

High-Frequency Cetaceans: Species of cetaceans having a functional hearing range between 200 Hz and 180 kHz. Refer to Southall et al. (2007) for more information.

High-Resolution Geophysical (HRG) Survey: A survey conducted to evaluate the suitability of a specific site for oil and gas exploration and development activities, renewable energy facilities, or marine mineral uses. The surveys are conducted to assess subseafloor conditions and to detect geohazards, archaeological resources, and certain types of benthic communities. The HRG surveys for oil and gas exploration may use an airgun in addition to electromechanical sources such as side-scan sonar, boomer or chirp subbottom profiler, and single or multibeam depth sounder. The HRG surveys for renewable energy and marine minerals sites are not expected to use airguns.

Hydrophone: Essentially an underwater microphone, a hydrophone is an underwater receiver used to detect the pressure change caused by sound waves propagating through the water. That pressure is converted to electrical energy which can be recorded or measured.

Incidental Harassment: An accidental taking. This does not mean that the taking is unexpected, but rather it includes those takings that are infrequent, unavoidable, or accidental.

Incidental Take: Takings that result from, but are not the purpose of, carrying out an otherwise lawful activity (e.g., fishing) conducted by a Federal agency or applicant (see *Taking*).

Incidental Take Authorization (ITA): In 1981, Congress amended the MMPA to provide for "incidental take" authorizations for maritime activities, provided NMFS found the takings would be of small numbers and have no more than a "negligible impact" on those marine mammal species not listed as depleted under the MMPA (i.e., listed under the ESA) and not having an "unmitigable adverse impact" on subsistence harvests of these species. These "incidental take" authorizations, also known as LOAs, require that regulations be promulgated and published in the *Federal Register.*

Infauna: Animals living within the sediment.

Intensity: For sound, intensity is the measure of the amount of energy that is transported over a given area per unit of time. Sound intensity is expressed in units of W/m^2.

Invertebrate: An organism lacking a backbone or spinal column. Any animal other than a fish, amphibian, reptile, bird, or mammal.

Letter of Authorization (LOA): The MMPA provides for "incidental take authorizations" for maritime activities, provided NMFS finds that the takings would be of small numbers, would have no more than a negligible impact on the affected marine mammal species or stock, and would not have an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses. These "incidental take" authorizations, or LOAs, require that regulations be promulgated and published in the *Federal Register* outlining: (a) permissible methods and the specified geographical region of taking; (b) the means of effecting the least practicable adverse impact on the species or stock and its habitat and on the availability of the species or stock for "subsistence" uses; and (c) requirements for monitoring and reporting, including requirements for the independent peer review of proposed monitoring plans where the proposed activity may affect the availability of a species or stock for taking for subsistence uses.

Level A Harassment: Under the MMPA, Level A harassment includes any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild.

Level B Harassment: Level B harassment is any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where the patterns are abandoned or significantly altered. Unlike Level A harassment, which is solely associated with physiological effects, both physiological and behavioral effects have the potential to cause Level B harassment.

Low-Frequency Cetaceans: Species of cetaceans having a functional hearing range between 7 Hz and 22 kHz. Refer to Southall et al. (2007) for more information.

Marine Mammal Protection Act (MMPA): Enacted in October 1972, the MMPA provides protection for all marine mammals. The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S.

Marine Protected Area (MPA): A marine area established under Executive Order 13158.

Masking: The obscuring of sounds of interest by interfering sounds, generally at the same or similar frequencies.

Mid-Frequency Cetaceans: Species of cetaceans having a functional hearing range between 150 Hz and 160 kHz. Refer to Southall et al. (2007) for more information.

Mitigation Measure: Measures that will minimize, avoid, rectify, reduce, eliminate, or compensate for significant environmental effects.

Mysticete: Any whale of the suborder Mysticeti having plates of whalebone (baleen plates) instead of teeth. Mysticetes are filter-feeding whales, also referred to as baleen whales, such as blue, fin, gray, and humpback whales.

Noise: Unwanted sound; a subjective term reflective of societal values regarding what constitutes unwanted or undesirable intrusions of sound.

Nonlisted Species: Species that are not listed as threatened or endangered by State or Federal agencies.

Odontocete: Any toothed whale (i.e., cetacean without baleen plates) of the suborder Odontoceti (e.g., sperm whales, killer whales, beaked whales, dolphins, and porpoises).

Passive Acoustic Monitoring (PAM): A listening system that, in the marine environment, utilizes hydrophones, signal processing software, and (usually) some degree of human listening to detect and often to localize the vocalizations of marine mammals.

Pelagic: A broad term applied to species that inhabit the open, upper portion of marine waters rather than waters adjacent to land or near the seafloor.

Pelagic fishes: Fish that spend most of their lives swimming in the water column, as opposed to on or near the bottom.

Permanent Threshold Shift (PTS): Exposure to high-intensity sound may result in auditory effects such as noise-induced threshold shift, or simply a threshold shift. If the threshold shift becomes a permanent condition, generally as a result of physical injury to the inner ear and hearing loss, it is known as PTS.

Pinniped: Any member of a suborder (Pinnipedia) of aquatic carnivorous mammals (i.e., seals and sea lions) with all four limbs modified into flippers

Plankton: Passively floating or weakly motile aquatic plants (phytoplankton) and animals (zooplankton).

Protected Species Observer (PSO): A trained, dedicated, and experienced individual responsible for conducting visual watches for protected species, such as marine mammals and sea turtles, during marine seismic surveys; previously called Marine Mammal Observer or MMO.

Ramp Up (or Soft Start): Turning on airguns or other acoustic source at low power and gradually and systematically increasing the output until full power is achieved (usually over a period of minutes). The appropriate ramp up or soft-start method depends on factors such as the type of seismic survey equipment being used and vessel speed.

Received Level: The level of sound that arrives at the receiver (e.g., a marine mammal) or listening device (hydrophone). The received level is the source level minus the transmission losses from the sound traveling through the water.

Root-Mean-Square (RMS) Sound Pressure: Average sound pressure over some specified time interval. For airgun pulses, the averaging time is commonly taken to be the approximate duration of one pulse, which in turn is commonly assumed to be the time interval within which 90 percent of the pulse energy arrives. The rms sound pressure level (in dB) is typically ~10 dB less than the peak level, and ~16 dB less than the peak-to-peak level.

Seismic: Of, subject to, or caused by an earthquake or earth vibration.

Sound Exposure Level (SEL): The total noise energy produced from a single noise event; the SEL is the integration of all the acoustic energy contained within the event. The SEL takes into account both the intensity and the duration of a noise event. The SEL is stated in dB re 1 μPa^2 s for underwater sound.

Sound Navigation and Ranging (Sonar): Any anthropogenic (manmade) or animal (e.g., bats, dolphins) system that uses transmitted and/or received acoustic signals for navigation, communication, and determining position and bearing of a target. There are two broad types of anthropogenic sonar: active and passive. *Active sonar* involves the production of a signal that propagates through the environment and bounces off objects (such as a prey item). That reflected sound, or echo, travels back to the receiver, which interprets the echo. Therefore, active sonar involves two-way sound transmission. *Passive sonar* involves one -way sound transmission from an acoustic source (such as conspecific) to a receiver or listener.

Sound Pressure Level (SPL): A measure of the rms, or "effective" sound pressure, converted to decibels. The SPL is expressed in dB re 1 µPa for underwater sound and dB re to 20 µPa for airborne sound.

Source Level: The received sound pressure level measured or estimated at a nominal distance of 1 m from the source. It is often expressed as dB re: 1 µPa at 1 m or in bar-m. For a distributed source, such as an airgun array, the nominal overall source level, as used in predicting received levels at long distances, exceeds the level measurable at any one point in the water near the sources.

Species of (Special) Concern: A species that may have a declining population, limited occurrence, or low numbers for any of a variety of reasons.

Taking: To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any endangered or threatened species, or to attempt to engage in any such conduct (including actions that induce stress, adversely impact critical habitat, or result in adverse secondary or cumulative impacts). Harassments are the most common form of taking associated with OCS Program activities.

Temporary Threshold Shift (TTS): Exposure to high-intensity sound may result in auditory effects such as noise-induced threshold shift, or simply a threshold shift. If the threshold shift recovers completely after a few minutes, hours, or days, it is known as TTS. A threshold shift represents an increase in the auditory threshold (i.e., a reduced ability to hear) at a particular frequency. By definition, TTS is recoverable and results from the temporary, non-injurious distortion of hearing -related tissues. In this Programmatic EIS, the smallest measurable amount of TTS (onset TTS) is taken as the best indicator for slight temporary sensory impairment. Because it is non-injurious, the acoustic exposure associated with onset TTS is used to define the outer limit of the portion of the Level B harassment zone attributable to physiological effects.

Threatened Species: Under the ESA, any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (ESA §3[20]).

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