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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RTID 0648-XR102

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to U.S. Marine Corps Training Exercises at Cherry Point Range Complex, North Carolina

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

ACTION: Notice; proposed incidental harassment authorization; request for comments on proposed authorization and possible renewal.

SUMMARY: NMFS has received a request from the U.S. Marine Corps (USMC) for authorization to take marine mammals incidental to training exercises at Marine Corps Air Station (MCAS) Cherry Point Range Complex, North Carolina. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on a possible one-year renewal that could be issued under certain circumstances and if all requirements are met, as described in **Request for Public Comments** at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorizations and agency responses will be summarized in the final notice of our decision. The USMC's activities are considered

military readiness activities pursuant to the MMPA, as amended by the National Defense Authorization Act for Fiscal Year 2004 (NDAA).

DATES: Comments and information must be received no later than [*insert date 30 days after date of publication in the FEDERAL REGISTER*].

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service. Physical comments should be sent to 1315 East-West Highway, Silver Spring, MD 20910 and electronic comments should be sent to *ITP.Laws@noaa.gov*.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments received electronically, including all attachments, must not exceed a 25-megabyte file size. All comments received are a part of the public record and will generally be posted online at *www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities* without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Ben Laws, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. 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 incidental take authorization may be provided to the public for review.

Authorization for 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 taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth.

The NDAA (Pub. L. 108–136) removed the "small numbers" and "specified geographical region" limitations indicated above and amended the definition of "harassment" as it applies to a "military readiness activity." The activity for which

incidental take of marine mammals is being requested addressed here qualifies as a military readiness activity. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, we must review our proposed action (*i.e.*, the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment. In 2015, NMFS developed an Environmental Assessment (EA) evaluating the impacts of authorizing take of marine mammals incidental to the USMC's training activities at MCAS Cherry Point. Following review of this analysis, NMFS determined that the activity would not have a significant effect on the quality of the human environment and issued a Finding of No Significant Impact (FONSI).

NMFS has preliminarily determined that there are no substantive changes to the evaluated action or new environmental impacts and, therefore, the previous NEPA analysis remains valid. The 2015 EA and FONSI are posted online at *www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities*. We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On September 28, 2019, NMFS received a request from the USMC for an IHA to take marine mammals incidental to training exercises conducted at MCAS Cherry Point

Range Complex in North Carolina. Following NMFS' review of the request, USMC submitted a revised application that was deemed adequate and complete on January 22, 2020. The USMC's request is for take of bottlenose dolphin (*Tursiops truncatus*) by Level A and Level B harassment. Neither the USMC nor NMFS expect serious injury or mortality to result from this activity. Therefore, an IHA is appropriate. The proposed IHA would be effective for a period of one year from the date of issuance.

NMFS previously issued incidental take authorizations to the USMC for the same activities, including three IHAs associated with training activities from 2010-2014 (75 FR 72807, November 26, 2010; 77 FR 87, January 3, 2012; and 78 FR 42042, July 15, 2013) and incidental take regulations and a subsequent Letter of Authorization issued in association with training activities conducted from 2015-2020 (80 FR 13264, March 13, 2015). The USMC complied with all the requirements (*e.g.*, mitigation, monitoring, and reporting) of the previous incidental take authorizations and information regarding their monitoring results may be found in the **Estimated Take** section.

Description of Proposed Activity

Overview

The USMC conducts training to meet its statutory responsibility to organize, train, equip, and maintain combat-ready forces. The training activities include air-to-surface and surface-to-surface weapons delivery, weapons firing, and water-based training occurring at the Brant Island Bombing Target (BT-9) and Piney Island Bombing Range (BT-11) located within the MCAS Cherry Point Range Complex in Pamlico Sound, North Carolina. The USMC training activities are military readiness activities under the

MMPA as defined by the National Defense Authorization Act for Fiscal Year 2004 (NDAA; Public Law 108–136).

Dates and Duration

The proposed activities could occur at any time during the one year period of effectiveness of the proposed IHA. Activities are typically conducted during daylight hours but may occur at night.

Specific Geographic Region

The USMC's BT-9 and BT-11 bombing targets (See Figures 1-1 and 2-1 in the USMC application) are located in inshore waters of Pamlico Sound, North Carolina in the vicinity of the convergence of the Neuse River and Pamlico River, North Carolina.

The BT-9 area is a water-based bombing target and mining exercise area located approximately 52 kilometers (km) (32.3 miles (mi)) northeast of MCAS Cherry Point. The U.S. Army Corps of Engineers, Wilmington District has defined a danger zone (prohibited area) by a 6 statute-mile (sm) diameter boundary around BT-9 (33 CFR 334.420). This restriction prohibits non-military vessels within the designated area. The BT-9 target area ranges in depth from 1.2 to 6.1 meters (m) (3.9 to 20 feet (ft)), with the shallow areas concentrated along the Brant Island Shoal. The target itself consists of three ship hulls grounded on Brant Island Shoals, located approximately 4.8 km (3.0 mi) southeast of Goose Creek Island. The BT-9 target and associated danger zone is entirely in/over water.

The BT-11 area encompasses a total of 50.6 square kilometers (km^2) (19.5 square miles (mi^2)) on Piney Island located in Carteret County, NC. The target prohibited area, at a radius of 1.8 sm, is roughly centered on Rattan Bay and includes approximately 9.3

km^2 (3.6 mi^2) of water and water depths range from 0.3 m (1.0 ft) along the shoreline to 3.1 m (10.1 ft) in the center of Rattan Bay. Water depths in the center of Rattan Bay range from approximately 2.4 to 3 m (8 to 10 ft) with bottom depths ranging from 0.3 to 1.5 m (1 to 5 ft) adjacent to the shoreline of Piney Island. The in-water stationary targets of BT-11 consist of a barge and patrol boat located in roughly the center of Rattan Bay. The USMC also use a second danger zone, also roughly centered on Rattan Bay, on an intermittent basis for strafing at water- and land-based targets, with an inner radius of 1.8 sm and outer radius of 2.5 sm. Note that at BT-11, only a portion of the associated composite danger zone is over water (36 percent). Therefore, the USMC assumes that only 36 percent of expended ordnance would potentially strike water.

The USMC conducts all inert and live-fire exercises at BT-9 and BT-11 so that all ammunition and other ordnances strike and/or fall on the land or water-based targets or within the existing danger zones or water restricted areas. Military forces close danger zones to the public on an intermittent or full-time basis for hazardous operations such as target practice and ordnance firing. They also prohibit or limit public access to water restricted areas to provide security for government property and/or to protect the public from the risks of injury or damage that could occur from the government's use of that area (33 CFR 334.2). Surface danger zones are designated areas of rocket firing, target practice, or other hazardous operations (33 CFR 334.420). The surface danger zone (prohibited area) for BT-9 is a 4.8 km (3.0 mi) radius centered on the south side of Brant Island Shoal. The surface danger zone for BT-11 is a 2.9 km (1.8 mi) radius centered on a barge target in Rattan Bay.

Detailed Description of Specific Activity

The following sections describe the training activities that have the potential to affect marine mammals present within the BT-9 and BT-11 bombing targets. These activities fall into two categories based on the ordnance delivery method: (1) surface-to-surface gunnery exercises; and (2) air-to-surface bombing exercises. Note that deployment of live ordnance is only permitted at BT-9; all munitions fired at BT-11 are inert.

Surface-to-Surface Exercises

Gunnery exercises are the only category of surface-to-surface activity currently conducted within BT-9 or BT-11. BT-9 is the most common target used for gunnery exercises. Surface-to-surface gunnery firing exercises typically involve Special Boat Team personnel firing munitions from a machine gun and 40 mm grenade launchers at a water-based target or throwing concussion grenades into the water (*e.g.*, not at a specific target) from a small boat. The number and type of boats used depend on the unit using the boat and the particular training mission. These include: small unit river craft, combat rubber raiding craft, rigid hull inflatable boats, and patrol craft. These boats may use inboard or outboard, diesel or gasoline engines with either propeller or water jet propulsion systems. Each boat would travel between 0 to 20 knots (kts) (0 to 23 miles per hour (mph)) with an average of two vessels to approach and engage the intended targets. The boats typically travel in linear paths and do not operate erratically.

Boat sorties occur in all seasons and the number of sorties conducted at each range may vary from year to year based on training needs and worldwide operational tempo. The majority of boat sorties at BT-9 originate from MCAS Cherry Point's Navy boat docks, but they may also originate from the State Port in Morehead City, NC;

Marine Corps Base Camp Lejeune; and U.S. Coast Guard Station Hobucken in Pamlico Sound. The majority of boat sorties at BT-11 originate from launch sites within the range complex.

There is no specific schedule associated with the use of BT-9 or BT-11 by the small boat teams. However, the USMC schedules the exercises for 5-day blocks with exercises at various times throughout the year. Variables such as deployment status, range availability, and completion of crew-specific training requirements influence the exercise schedules.

The direct-fire gunnery exercises (*i.e.*, all targets are within the line of sight of the military personnel) at BT-9 would typically use 7.62 millimeter (mm) or .50 caliber (cal) machine guns; 40 mm grenade machine guns; or G911 concussion hand grenades. The proposed exercises at BT-9 are usually live-fire exercises. At times USMC personnel would use blanks (inert ordnance) so that the boat crews could practice ship-handling skills during training without being concerned with the safety requirements involved with live weapons.

Air-to-Surface Exercises

Air-to-surface training exercises involve fixed-, rotary-, or tilt-wing aircraft firing munitions at targets on the water's surface or on land (in the case of BT-11). There are four types of air-to-surface activities conducted within BT-9 and BT-11. They include: mine laying, bombing, gunnery, or rocket exercises. The following sections provide more detail on each exercise type that would be conducted.

Mine Laying Exercises

Mine laying exercises are simulations only, meaning that mine detonations would not occur during training. These exercises, regularly conducted at the BT-9 bombing target, involve the use of fixed-wing aircraft flying to the target area using either a low- or high-altitude tactical flight pattern. When the aircraft reaches the target area, the pilot deploys a series of inert mine shapes in an offensive or defensive pattern into the water. The aircraft would make multiple passes along a pre-determined flight azimuth dropping one or more of the inert shapes each time.

The mine-laying exercises at BT-9 would include the use of MK-62, MK-63, MK-76, BDU-45, and BDU-48 inert training shapes. Each inert shape weighs 500, 1,000, 25, 500, and 10 pounds (lbs) (227, 454, 11, 227, and 5 kg), respectively.

Bombing Exercises

Pilots train to destroy or disable enemy ships or boats during bombing exercises. These exercises, conducted at BT-9 or BT-11, normally involve the use of two to four fixed-wing aircraft approaching the target area from an altitude of approximately 152 m (500 ft) up to 4,572 m (15,000 ft). When the aircraft reach the target area, they establish a predetermined racetrack pattern relative to the target and deliver the bombs. Participating aircraft follow the same flight path during subsequent target ingress, ordnance delivery, target egress, and downwind pattern. This type of pattern is used to ensure that only one aircraft releases ordnance at any given time.

The pilots deliver the bombs against targets at BT-9 or BT-11, day or night; the average time to complete this type of exercise is approximately one hour. There is no set level or pattern of amount of sorties conducted. There are no cluster munitions authorized for use during bombing exercises.

The bombing exercises would typically use unguided MK-76 and BDU-45 inert training bombs or precision-guided munitions consisting of laser-guided bombs (inert) and laser-guided training rounds.

Gunnery Exercises

During air-to-surface gunnery exercises with cannons, pilots train to destroy or disable enemy ships, boats, or floating/near-surface mines from aircraft with mounted cannons equal to or larger than 20 mm. The USMC would use either fixed-wing or rotary-wing, tilt-rotor, and other aircraft to conduct gunnery exercises at BT-9 or BT-11. During the exercise (*i.e.*, strafing run), two aircraft would approach the target area from an altitude of approximately 914 m (3,000 ft) and within a distance of 1,219 m (4,000 ft) from the target, begin to fire a burst of approximately 30 rounds of munitions before reaching an altitude of 305 m (1,000 ft) to break off the attack. Each aircraft would reposition for another strafing run until each aircraft expends its exercise ordnance of approximately 250 rounds (approximately 8-12 passes per aircraft per exercise). This type of gunnery exercise would typically use a 20 mm or 25 mm cannon. The USMC uses inert munitions for these exercises. The aircraft deliver the ordnance against targets at BT-9 or BT-11, day or night. The average time to complete this type of exercise is approximately 1 hour.

During air-to-surface gunnery exercises with machine guns, pilots train to destroy or disable enemy ships, boats, or floating/near-surface mines with aircraft using mounted machine guns. The USMC typically uses rotary-wing aircraft to conduct gunnery exercises at BT-9 or BT-11. During the exercise an aircraft would fly around the target area at an altitude between 15 and 30 m (50 and 100 ft) in a 91 m (300 ft) racetrack

pattern around the water-based target. Each gunner would expend approximately 800 rounds of 7.62 mm ammunition or 200 rounds of .50 cal ammunition in each exercise. The aircraft deliver the ordnance against the bombing targets at BT-9 or BT-11, day or night. The average time to complete this type of exercise is approximately 1 hour.

Rocket Exercises

Rocket exercises are similar to the bombing exercises. Fixed- and rotary-wing aircraft crews launch rockets at surface maritime targets, day and night, to train for destroying or disabling enemy ships or boats. These operations employ 2.75-inch and 5-inch (70- and 127-mm) rockets (4.8 and 15.0 lbs net explosive weight, respectively). Generally, personnel would deliver an average of approximately 14 rockets per sortie. As with the bombing exercises, there is no set level or pattern of amount of sorties conducted.

Munitions and Estimated Expenditures

There are several varieties of ordnance and net explosive weights (for live munition used at BT-9) can vary according to type. All practice bombs are inert but simulate the same ballistic properties of service type bombs. They are either solid cast metal bodies or thin sheet metal containers. Since practice bombs contain no explosive filler, a practice bomb signal cartridge (smoke) serves as a visual observation of weapon target impact. Please refer to Table 1-1 in USMC's application for a full list of all munitions authorized for use at BT-9 and BT-11.

The estimated amount of ordnance to be annually expended at BT-9 and BT-11 under the activity is 1,238,614 and 1,254,684, respectively (Tables 1 and 2). The amounts of ordnance expended at the BTs account for all uses of the targets, including use by

other services. All ordnance expended at BT-11 would be inert. There are five types of explosive sources used at BT-9: 2.75-in Rocket High Explosives (HE), 5-in Rocket HE, 30 mm HE, 40 mm HE, and G911 grenades. The estimated ordnance expenditure at BT-9 includes less than 2 percent high explosive rounds and less than 0.1 percent each of live rockets and grenades. The approximate quantities of ordnance listed in Tables 1 and 2 represent conservative figures, meaning that the volume of each type of inert and explosive ordnance proposed is the largest number that personnel could expend but is not necessarily expected. As noted previously, only 36 percent of expended ordnance at BT-11 is assumed to potentially strike water.

Table 1 -- Type of Ordnance, Net Explosive Weight, and Proposed Levels of Annual Expenditures at BT-9

Proposed Ordnance	Net Explosive Weight in Pounds (lbs)	Proposed Number of Rounds
Small arms excluding .50 cal (7.62 mm)	N/A, inert	525,610
.50 cal	N/A, inert	568,515
Large arms – live (30 mm)	0.1019	3,432
Large arms – live (40 mm)	0.1199	10,420
Large arms – inert	N/A	120,405
Rockets – live (2.75-inch)	4.8	220
Rockets – live (5-inch)	15.0	68
Rockets – inert	N/A	844
Grenades – live (G911)	0.5	144
Bombs – inert	N/A	4,460
Pyrotechnics – inert	N/A	2,500

Table 2 -- Type of Ordnance, Net Explosive Weight, and Proposed Levels of Annual Expenditures at BT-11

Proposed Ordnance	Net Explosive Weight in Pounds (lbs)	Proposed Number of Rounds
Small arms excluding .50 cal (7.62 mm)	N/A, inert	1,250,000
.50 cal	N/A, inert	425,000
Large arms – inert	N/A	240,334
Rockets – inert	N/A	6,250
Bombs and grenades – inert	N/A	22,114
Pyrotechnics – inert	N/A	8,912

Take of marine mammals is not anticipated to result from direct strike by inert ordnance or as a result of vessel strike during small boat maneuvers. The USMC has estimated that the probability of direct strike of a dolphin by inert ordnance during any

given ordnance deployment is 2.61 x 10^{-7} or 9.4 x 10^{-8} at BT-9 and BT-11, respectively. These estimated probabilities result in estimated numbers of ordnance strikes of <0.5 at both target areas and, therefore, in context of the required mitigation requirements, the USMC's conclusion is that no take is reasonably anticipated to occur as a result of direct strike from inert ordnance. Please see the USMC application for further detail on the analysis. The USMC has also determined that vessel strike is not a reasonably anticipated outcome of the specified activity, due to the limited number of small boat maneuvers and low concentrations of dolphins expected to be present. No incidents of direct strike from inert ordnance or of vessel strike have been recorded during prior years of activity monitoring. NMFS concurs with these determinations, and vessel maneuvers and inert ordnance are not discussed further in this document.

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Proposed Mitigation** and **Proposed Monitoring and Reporting**).

Summary of Previous Monitoring

During monitoring conducted over the period 2015-2019, USMC expended an annual average amount of ordnance of 818,512 and 1,535,404 at BT-9 and BT-11, respectively. During this period, no high explosive munitions were used. On 50 occasions, dolphins were observed by contracted range sweep aircraft along the pre-defined flight path of the range sweep. No marine mammals were observed during air-to-surface training activities (rotary-wing or fixed-wing aircraft), or by maintenance vessels. For additional detail, please see section 7 of the USMC's application.

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected stocks of bottlenose dolphin. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SARs; *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS's website (*www.fisheries.noaa.gov/find-species*).

Table 3 lists all species with expected potential for occurrence in the project area and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality or serious injury is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats. All managed stocks in this region are assessed in NMFS' U.S. Atlantic SARs (*e.g.*, Hayes *et al.*, 2018). All values presented in Table 3 are the most recent available at the time of publication and are available in the draft 2019 Atlantic SARs, which are available online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports*.

Table 3 -- Marine Mammal Species Potentially Present in the Project Area

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR[3]	Annual M/SI[4]
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Bottlenose dolphin	*Tursiops truncatus truncatus*	Northern Migratory Coastal	-/D; Y	6,639 (0.41, 4,759, 2016)	48	6.1-13.2
		Southern Migratory Coastal	-/D; Y	3,751 (0.06, 2,353, 2016)	23	0-14.3
		Northern North Carolina Estuarine	-/-; Y	823 (0.06, 782, 2013)	7.8	0.8-18.2
		Southern North Carolina Estuarine	-/-; Y	Unknown	Unknown	0.4-0.6

[1]ESA status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR (see footnote 3) or which is determined to be declining and likely to be listed under the ESA within the foreseeable future.

[2]CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. The most recent abundance survey that is reflected in the abundance estimate is presented; there may be more recent surveys that have not yet been incorporated into the estimate.

[3]Potential biological removal, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population size (OSP).

[4]These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, subsistence hunting, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a range.

Bottlenose dolphins range widely in temperate and tropical waters and are found from deep, offshore to coastal areas, including bays, estuaries and river mouths. In the western North Atlantic, there are two morphologically and genetically distinct bottlenose dolphin morphotypes described as the coastal and offshore forms (Duffield *et al*., 1983; Hersh and Duffield, 1990; Mead and Potter, 1995; Curry and Smith, 1997; Rosel *et al*., 2009). These forms are genetically distinct based upon both mitochondrial and nuclear markers (Hoelzel *et al*., 1998; Rosel *et al*., 2009). The offshore morphotype does not occur in waters of Pamlico Sound and is not discussed here. The coastal morphotype is continuously distributed in nearshore coastal and estuarine waters along the U.S. Atlantic

coast south of Long Island, New York, around the Florida peninsula and into the Gulf of Mexico. Primary habitat for coastal dolphins generally includes waters less than 20 m deep (*e.g.*, Garrison *et al*., 2003).

Initially, a single stock of coastal bottlenose dolphins was thought to migrate seasonally between New Jersey (summer months) and central Florida based on seasonal patterns in strandings during a large scale mortality event occurring during 1987-1988 (Scott *et al*., 1988). However, re-analysis of stranding data and extensive analysis of genetic, photo-identification, and satellite telemetry data demonstrate a complex mosaic of coastal bottlenose dolphin stocks (Zolman, 2002; McLellan *et al*., 2002; Rosel *et al*., 2009; Hayes *et al*., 2018). Integrated analysis of these multiple lines of evidence suggests that there are five coastal stocks of bottlenose dolphins, including the migratory stocks that may be present in the action area.

The coastal morphotype inhabits inshore estuarine waters in addition to coastal nearshore and continental shelf waters, with multiple lines of evidence supporting demographic separation between bottlenose dolphins residing within different estuaries along the Atlantic coast (Wells *et al*., 1987; Scott *et al*., 1990; Wells *et al*., 1996; Zolman, 2002; Speakman *et al*., 2006; Stolen *et al*., 2007; Balmer *et al*., 2008; Mazzoil *et al*., 2008). In some cases, studies have identified communities of resident dolphins that are seen within relatively restricted home ranges year-round, as well as year-round resident dolphins repeatedly observed across multiple years (Zolman, 2002; Speakman *et al*., 2006; Stolen *et al*., 2007; Mazzoil *et al*., 2008). A few published studies demonstrate that these resident animals are genetically distinct from animals in nearby coastal waters and/or from animals residing in nearby estuarine areas (Caldwell, 2001; Rosel *et al*.,

2009; Litz *et al*., 2012). However, the degree of spatial overlap between estuarine and coastal populations remains unclear, and the degree of movement of resident estuarine animals into coastal waters on seasonal or shorter time scales is poorly understood (Hayes *et al*., 2018). Bottlenose dolphins inhabiting primarily estuarine habitats are considered distinct stocks from those inhabiting coastal habitats.

The spatial extent of the coastal stocks, their potential seasonal movements, and their relationships with estuarine stocks are poorly understood (Hayes *et al*., 2018). The coastal stocks include migratory stocks that move south seasonally from mid-Atlantic coastal waters. The northern migratory stock is best defined by its distribution during warm water months (best described by July and August) when it overlaps with the fewest stocks (Hayes *et al*., 2018). During warm water months, this stock occupies coastal waters from the shoreline to approximately the 20-m isobath between Assateague, Virginia, and Long Island, New York (Garrison *et al*., 2017b). The stock migrates in late summer and fall and, during cold water months (best described by January and February), occupies coastal waters from approximately Cape Lookout, North Carolina, to the North Carolina/Virginia border (Garrison *et al*., 2017b).

The spatial distribution and migratory movements of the southern migratory stock are poorly understood and have been defined based on movement data from telemetry and photo-ID studies, and stable isotope studies. The stock is best delimited in warm water months, when it overlaps least with other stocks, as bottlenose dolphins that occupy coastal waters from Cape Lookout to Assateague, Virginia. Telemetry data provide evidence for a stock of dolphins migrating seasonally along the coast between North Carolina and northern Florida (Garrison *et al*., 2017b), and suggest that during October–

December the stock occupies waters of southern North Carolina (south of Cape Lookout). During January–March, the stock appears to move as far south as northern Florida and, during April–June, the stock moves back north to North Carolina to Cape Hatteras. During the warm water months of July–August, the stock is presumed to occupy coastal waters north of Cape Lookout, North Carolina, to Assateague, Virginia.

The northern North Carolina estuarine system (NNCES) stock is best defined as animals that occupy primarily waters of the Pamlico Sound estuarine system (which also includes Core, Roanoke, and Albemarle sounds, and the Neuse River) during warm water months (July–August). Members of this stock also use coastal waters (≤1 km from shore) of North Carolina from Beaufort north to Virginia Beach, Virginia (Garrison *et al*. 2017a). Many of these animals move out of the estuaries during colder water months and occupy coastal waters (≤3 km from shore) between the New River and Oregon Inlet, North Carolina (Garrison *et al*. 2017a). However, others continue to be present in the Pamlico Sound estuarine system during cold water months (Goodman Hall *et al*. 2013). The timing of the seasonal movements into and out of Pamlico Sound and north along the coast likely occurs with some inter-annual variability related to seasonal changes in water temperatures and/or prey availability.

The southern North Carolina estuarine system (SNCES) stock is best defined as animals occupying estuarine and nearshore coastal waters (≤3 km from shore) between the Little River Inlet estuary (33.9°N), inclusive of the estuary (near the North Carolina/South Carolina border), and the New River (34.5°N) during cold water months (best defined as January and February). Members of this stock do not undertake large-scale migratory movements. Instead, they expand their range only slightly northward

during warmer months into estuarine waters and nearshore waters (≤3 km from shore) of southern North Carolina as far as central Core Sound and southern Pamlico Sound (Garrison *et al*. 2017b). SNCES stock animals have not been observed to move north of Cape Lookout in coastal waters nor into the main portion of Pamlico Sound during warm water months (Garrison *et al*. 2017b).

The four potentially affected stocks likely exhibit seasonal spatial overlap to varying degrees. The northern and southern migratory stocks may overlap in coastal waters of northern North Carolina and Virginia during spring and fall migratory periods, but the degree of overlap is unknown and it may vary depending on annual water temperature (Garrison *et al*. 2016). When the northern migratory stock has migrated in cold water months to coastal waters from just north of Cape Hatteras, North Carolina, to just south of Cape Lookout, North Carolina, it overlaps spatially with the NNCES stock (Garrison *et al*. 2017b). Depending on the timing of the northward migration in the spring, it may overlap with the NNCES stock in coastal waters (< 1 km from shore) as far north as Virginia Beach, Virginia, and the mouth of the Chesapeake Bay. The northern migratory stock may also overlap with the SNCES stock (Garrison *et al*. 2017b) in nearshore coastal waters south of Cape Hatteras in winter, although the degree of overlap with is not well defined. The southern migratory stock may overlap with the SNCES stock in coastal waters ≤3 km from shore during October-December (Garrison *et al*. 2017b). During April-June, the southern migratory stock overlaps in coastal waters with both the SNCES and NNCES stocks and, during July-August, likely overlaps in coastal waters with the NNCES stock. During warm water months (best defined as July and August), the NNCES and SNCES stocks overlap in estuarine waters near Beaufort, North

Carolina, and in southern Pamlico Sound (Garrison *et al*. 2017b). However, SNCES stock animals were not observed to move north of Cape Lookout in coastal waters nor into the main portion of Pamlico Sound during warm water months (Garrison *et al*. 2017b) thereby limiting the amount of overlap between the two stocks. Overall, most overlap between the coastal migratory stocks and the estuarine stocks is likely to occur within nearshore coastal waters outside of Pamlico Sound. Based on the information related to seasonal distribution discussed above, we assume that animals from the various stocks could occur in the vicinity of the training areas as follows: northern migratory dolphins from August-June, southern migratory dolphins from April-December, NNCES stock animals year-round, and SNCES stock animals from June-October.

The current population size of the SNCES stock is considered unknown due to the age of existing survey data. An initial abundance estimate for common bottlenose dolphins occurring within the boundaries of the SNCES stock was based on a photo-ID mark-recapture survey of North Carolina waters inshore of the barrier islands, conducted during July 2000 (Read *et al*., 2003). This study estimated the number of animals in the inshore waters of North Carolina occupied by the SNCES stock at 141 (CV=0.15, 95 percent CI: 112–200), but the estimate did not account for the portion of the stock that may have occurred in coastal waters. Summer aerial survey data from 2002 (Garrison *et al*., 2016) were therefore used to account for the portion of the stock in coastal waters. The abundance estimate for a 3-km strip from Cape Lookout to the North Carolina-South Carolina border was 2,454 (CV=0.53), yielding a total of 2,595 (CV=0.50). This estimate is likely positively biased as some animals in coastal waters may have belonged to a coastal stock.

A photo-ID mark-recapture study was conducted by Urian *et al*. (2013) in July 2006 using similar methods to those in Read *et al*. (2003) and included estuarine waters of North Carolina from, and including, the Little River Inlet estuary (near the North Carolina/South Carolina border) to, and including, Pamlico Sound. The 2006 survey also included coastal waters up to Cape Hatteras extending up to 1 km from shore. In order to estimate abundance for the SNCES stock alone, only sightings south of 34°46' N in central Core Sound were used. The resulting abundance estimate included a correction for the proportion of dolphins with non-distinct fins in the population. The abundance estimate for the SNCES stock based upon photo-ID mark-recapture surveys in 2006 was 188 animals (CV=0.19, 95 percent CI: 118–257; Urian *et al*. 2013). This estimate is probably negatively biased as the survey covered waters only to 1 km from shore and did not include habitat in southern Pamlico Sound.

Bottlenose Dolphin Occurrence within Pamlico Sound

In Pamlico Sound, bottlenose dolphins concentrate in shallow water habitats along shorelines, and few, if any, individuals are present in the central portions of the sound (Gannon, 2003; Read *et al*., 2003a, 2003b). The dolphins utilize shallow habitats, such as tributary creeks and the edges of the Neuse River, where the bottom depth is less than 3.5 m (11.5 ft) (Gannon, 2003). Fine-scale distribution of dolphins seems to relate to the presence of topography or vertical structure, such as the steeply-sloping bottom near the shore and oyster reefs. Bottlenose dolphins may use these features to facilitate prey capture (Gannon, 2003).

In 2000, Duke University Marine Lab (Duke) conducted a boat-based mark-recapture survey throughout the estuaries, bays and sounds of North Carolina (discussed

above in context of the SNCES stock population abundance; Read *et al*., 2003). The 2000 boat-based survey produced an estimate of 919 dolphins for the northern inshore waters divided by an estimated 5,015 km² (1,936 mi²) survey area (equating to a density estimate of 0.183 dolphins per km^2). In a follow-on aerial study (July, 2002 to June, 2003) specifically in and around BT-9 and BT-11, Duke reported one sighting in the restricted area surrounding BT-9, two sightings in proximity to BT-11, and seven sightings in waters adjacent to the bombing targets (Maher, 2003). In total, the study observed 276 bottlenose dolphins ranging in group size from 2 to 70 animals.

Aerial surveys were flown in Pamlico and Core sounds from July 2004 to April 2006 (Goodman *et al*. 2007). These surveys yielded density estimates for bottlenose dolphins in the western portion of Pamlico Sound (including the MCAS Cherry Point Range Complex) ranging from 0.0272/km^2 in winter to 0.2158/km^2 in autumn. Correction factors were incorporated for both animals residing at the surface but not sighted during the aerial survey and animals below the surface that were not sighted.

Results of a passive acoustic monitoring effort conducted from 2006-2007 by Duke University researchers detected that dolphin vocalizations in the BT-11 vicinity were higher in August and September than vocalization detection at BT-9 (Read *et al*., 2007). Additionally, detected vocalizations of dolphins were more frequent at night for the BT-9 area and during early morning hours at BT-11 (Read *et al*., 2007).

Biologically Important Areas – LaBrecque *et al*. (2015) recognize multiple biologically important areas (BIA) for small and resident populations of bottlenose dolphins in the mid- and south Atlantic. Small and resident population BIAs are areas and times within which small and resident populations occupy a limited geographic extent,

and are therefore necessarily important areas for those populations. Here, these include areas defined for the SNCES and NNCES populations and correspond with the stock boundaries described above.

Unusual Mortality Events (UME) – A UME is defined under the MMPA as "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response." Beginning in July 2013, elevated strandings of bottlenose dolphins were observed along the Atlantic coast from New York to Florida. The investigation was closed in 2015, with the UME ultimately being attributed to cetacean morbillivirus (though additional contributory factors are under investigation; *www.fisheries.noaa.gov/national/marine-life-distress/2013-2015-bottlenose-dolphin-unusual-mortality-event-mid-atlantic*; accessed February 24, 2020). Dolphin strandings during 2013-15 were greater than six times higher than the annual average from 2007-12, with the most strandings reported from Virginia, North Carolina, and Florida. A total of approximately 1,650 bottlenose dolphins stranded from June 2013 to March 2015. Only one offshore ecotype dolphin has been identified, meaning that over 99 percent of affected dolphins were of the coastal ecotype. Research, to include analyses of stranding samples and post-UME monitoring and modeling of surviving populations, will continue in order to better understand the impacts of the UME on the affected stocks. Notably, an earlier major UME in 1987-88 was also caused by morbillivirus, and led to the current designation of all coastal stocks of Atlantic bottlenose dolphin as depleted under the MMPA. Over 740 stranded dolphins were recovered during that event.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans).

Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 4.

Table 4 -- Marine Mammal Hearing Groups (NMFS, 2018)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, *Kogia*, river dolphins, cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz

***** Represents the generalized hearing range for the entire group as a composite (*i.e.*, all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall et al. 2007) and PW pinniped (approximation).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information. Bottlenose dolphins are categorized as mid-frequency cetaceans.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

Sections 6, 7, and 9 of the USMC's application includes a summary of the ways that components of the specified activity may impact marine mammals and their habitat, including specific discussion of potential effects to marine mammals from noise and other stressors produced through the use of munitions in training exercises, and a summary of the results of monitoring during previous years' training exercises. We have reviewed the USMC's discussion of potential effects for accuracy and completeness in its application and refer to that information rather than repeating it here. Here, we provide a brief technical background on sound, on the characteristics of certain sound types, and on metrics used in this proposal, as well as a brief overview of the potential effects to marine mammals associated with use of explosive munitions and the associated criteria for evaluation of these potential effects.

Alternatively, NMFS has included a lengthy discussion of the potential effects of similar activities on marine mammals, including specifically from training exercises using munitions, in other **Federal Register** notices, including prior notices for the same specified activity. For full detail, we refer the reader to these notices. For previous discussion provided in context of the same specified activity, please see 79 FR 41374 (July 15, 2014). This previous discussion of potential effects remains relevant. For more recent discussion of similar effects incorporating the most current literature, please see, *e.g.*, 85 FR 5782 (January 31, 2020); 83 FR 29872 (June 26, 2018); 82 FR 61372 (December 27, 2017), or view documents available online at *www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities*.

The planned training exercises have the potential to cause take of marine mammals by exposing them to impulsive noise and pressure waves generated by live ordnance detonation at or near the surface of the water. Exposure to energy or pressure resulting from these detonations could result in non-lethal injury (Level A harassment) or disturbance (Level B harassment). Under the previous incidental take authorization issued to USMC, serious injury and/or mortality was authorized as a precaution. However, no such incidents have ever been recorded in association with USMC training activities and none are expected. As such, they are not proposed for authorization herein. In addition, NMFS also considered the potential for harassment from vessel and aircraft operations. The potential effects of impulsive sound sources (underwater detonations) from the proposed training activities may include one or more of the following: tolerance, masking, disturbance, hearing threshold shift, and stress responses.

The **Estimated Take** section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by the specified activity. The **Negligible Impact Analysis and Determination** section includes an analysis of how these activities will impact marine mammals and considers the content of this section, the **Estimated Take** section, and the **Proposed Mitigation** section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and from that on the affected marine mammal populations.

Description of Sound Sources

This section contains a brief technical background on sound, on the characteristics of certain sound types, and on metrics used in this proposal inasmuch as the information is relevant to the specified activity and to a discussion of the potential effects of the specified activity on marine mammals found later in this document. For general information on sound and its interaction with the marine environment, please see, *e.g.*, Au and Hastings (2008); Richardson *et al*. (1995); Urick (1983).

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz or cycles per second. Wavelength is the distance between two peaks or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly, except in certain cases in shallower water. Amplitude is the height of the sound pressure wave or the "loudness" of a sound and is typically described using the relative unit of the decibel (dB). A sound pressure level (SPL) in dB is described as the ratio between a measured pressure and a

reference pressure (for underwater sound, this is 1 microPascal (μPa)), and is a logarithmic unit that accounts for large variations in amplitude. Therefore, a relatively small change in dB corresponds to large changes in sound pressure. The source level (SL) represents the SPL referenced at a distance of 1 m from the source (referenced to 1 μPa), while the received level is the SPL at the listener's position (referenced to 1 μPa).

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Root mean square is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1983). Root mean square accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

Sound exposure level (SEL; represented as dB re 1 μPa^2-s) represents the total energy in a stated frequency band over a stated time interval or event and considers both intensity and duration of exposure. The per-pulse SEL is calculated over the time window containing the entire pulse (*i.e.*, 100 percent of the acoustic energy). SEL is a cumulative metric; it can be accumulated over a single pulse, or calculated over periods containing multiple pulses. Cumulative SEL represents the total energy accumulated by a receiver over a defined time window or during an event. Peak sound pressure (also referred to as zero-to-peak sound pressure or 0-pk) is the maximum instantaneous sound pressure measurable in the water at a specified distance from the source and is represented in the same units as the rms sound pressure.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in a manner similar to ripples on the surface of a pond and may be either directed in a beam or beams or may radiate in all directions (omnidirectional sources), as is the case for sound produced by the pile driving activity considered here. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound, which is defined as environmental background sound levels lacking a single source or point (Richardson *et al*., 1995). The sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.*, wind and waves, earthquakes, ice, atmospheric sound), biological (*e.g.*, sounds produced by marine mammals, fish, and invertebrates), and anthropogenic (*e.g.*, vessels, dredging, construction) sound. A number of sources contribute to ambient sound, including wind and waves, which are a main source of naturally occurring ambient sound for frequencies between 200 Hz and 50 kHz (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Precipitation can become an important component of total sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times. Marine mammals can contribute significantly to ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz. Sources of ambient sound

related to human activity include transportation (surface vessels), dredging and construction, oil and gas drilling and production, geophysical surveys, sonar, and explosions. Vessel noise typically dominates the total ambient sound for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly.

The sum of the various natural and anthropogenic sound sources that comprise ambient sound at any given location and time depends not only on the source levels (as determined by current weather conditions and levels of biological and human activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10-20 decibels (dB) from day to day (Richardson *et al*., 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals. Details of source types are described in the following text.

Sounds are often considered to fall into one of two general types: pulsed and non-pulsed (defined in the following). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.*, Ward, 1997 in Southall *et al*., 2007). Please see Southall *et al*. (2007) for an in-depth discussion of these concepts. The distinction between these two

sound types is not always obvious, as certain signals share properties of both pulsed and non-pulsed sounds. A signal near a source could be categorized as a pulse, but due to propagation effects as it moves farther from the source, the signal duration becomes longer (*e.g.*, Greene and Richardson, 1988).

Pulsed sound sources (*e.g.*, airguns, explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI, 1986, 2005; Harris, 1998; NIOSH, 1998; ISO, 2003) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

Non-pulsed sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or intermittent (ANSI, 1995; NIOSH, 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (*e.g.*, rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Mortality

Mortality risk assessment may be considered in terms of direct injury, which includes primary blast injury and barotrauma. The potential for direct injury of marine mammals has been inferred from terrestrial mammal experiments and from post-mortem

examination of marine mammals believed to have been exposed to underwater explosions (Finneran and Jenkins, 2012; Ketten *et al.*, 1993; Richmond *et al.*, 1973). Actual effects on marine mammals may differ from terrestrial animals due to anatomical and physiological differences, such as a reinforced trachea and flexible thoracic cavity, which may decrease the risk of injury (Ridgway and Dailey, 1972).

Primary blast injuries result from the initial compression of a body exposed to a blast wave, and are usually limited to gas-containing structures (*e.g.*, lung and gut) and the auditory system (U.S. Department of the Navy, 2001b). Barotrauma refers to injuries caused when large pressure changes occur across tissue interfaces, normally at the boundaries of air-filled tissues such as the lungs. Primary blast injury to the respiratory system may be fatal depending upon the severity of the trauma. Rupture of the lung may introduce air into the vascular system, producing air emboli that can restrict oxygen delivery to the brain or heart.

Thresholds for evaluation of potential for mortality are based on the level of impact that would cause extensive lung injury to one percent of exposed animals (*i.e.*, an impact level from which one percent of exposed animals would not recover) (Finneran and Jenkins, 2012). The threshold represents the expected onset of mortality, where 99 percent of exposed animals would be expected to survive. Most survivors would have moderate blast injuries. The lethal exposure level of blast noise, associated with the positive impulse pressure of the blast, is expressed as Pa·s and is determined using the Goertner (1982) modified positive impulse equation. This equation incorporates source/animal depths and the mass of a newborn calf for the affected species. The threshold is conservative because animals of greater mass can withstand greater pressure

waves, and newborn calves typically make up a very small percentage of any cetacean group.

Injury (Level A Harassment)

Potential injuries that may occur to marine mammals include blast related injury: gastrointestinal (GI) tract injury and slight lung injury, and irrecoverable auditory damage. These injury categories are all types of Level A harassment as defined in the MMPA.

Slight Lung Injury—This threshold is based on a level of lung injury from which all exposed animals are expected to survive (zero percent mortality) (Finneran and Jenkins, 2012). Similar to the mortality determination, the metric is positive impulse and the equation for determination is that of the Goertner injury model (1982), corrected for atmospheric and hydrostatic pressures and based on the cube root scaling of body mass (Richmond *et al.*, 1973; U.S. Department of the Navy, 2001b).

Gastrointestinal Tract Injuries—GI tract injuries are correlated with the peak pressure of an underwater detonation. GI tract injury thresholds are based on the results of experiments in which terrestrial mammals were exposed to small charges. The peak pressure of the shock wave was found to be the causal agent in recoverable contusions (bruises) in the GI tract (Richmond *et al.*, 1973, in Finneran and Jenkins, 2012).

Auditory Damage—Auditory injury, or permanent threshold shift (PTS), is not fully recoverable and therefore results in a permanent decrease in hearing sensitivity. As there have been no studies to determine the onset of PTS in marine mammals, this threshold is estimated from available information associated with temporary threshold shift (TTS), *i.e.*, recoverable auditory damage.

Non-Injurious Impacts (Level B Harassment)

Two categories of Level B harassment are currently recognized: TTS and behavioral impacts. Although TTS is a physiological impact, it is not considered injury because auditory structures are temporarily fatigued instead of being permanently damaged.

Behavioral Impacts

Behavioral impacts refer to disturbances that may occur at sound levels below those considered to cause TTS in marine mammals, particularly in cases of multiple detonations. During an activity with a series of explosions (not concurrent multiple explosions shown in a burst), an animal is expected to exhibit a startle reaction to the first detonation followed by a behavioral response after multiple detonations. At close ranges and high sound levels, avoidance of the area around the explosions is the assumed behavioral response in most cases. Other behavioral impacts may include decreased ability to feed, communicate, migrate, or reproduce, among others.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which will inform NMFS' negligible impact determination.

Harassment is the only type of take expected to result from these activities. For this military readiness activity, the MMPA defines *harassment* as (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) Any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral

patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where the behavioral patterns are abandoned or significantly altered (Level B harassment).

Authorized takes would primarily be by Level B harassment, in the form of disruption of behavioral patterns and temporary threshold shift, for individual marine mammals resulting from exposure to acoustic stressors. A small amount of Level A harassment, in the form of permanent threshold shift, is anticipated and proposed for authorization. No Level A harassment is anticipated to occur in the form of gastrointestinal (GI) tract or lung injury. No serious injury or mortality is anticipated or proposed to be authorized for this activity. Below we describe how the take is estimated.

Generally speaking, we estimate take from exposure to sound by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. For this proposed IHA, the U.S. Navy employed a sophisticated model known as the Navy Acoustic Effects Model (NAEMO) for assessing the impacts of underwater sound. The USMC then incorporated these results into their application.

Acoustic Thresholds

Using the best available science, NMFS applies acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to

incur PTS of some degree (equated to Level A harassment). Thresholds have also been developed to identify the pressure levels above which animals may incur different types of tissue damage from exposure to pressure waves from explosive detonation.

The criteria and thresholds used to estimate potential pressure and energy impacts to marine mammals resulting from detonations are as presented in the U.S. Navy's Phase III criteria documentation (DoN, 2017). These criteria represent the best available science. Criteria used to analyze impacts to marine mammals include mortality, harassment that causes or is likely to cause injury (Level A harassment) and harassment that disrupts or is likely to disrupt natural behavior patterns (Level B harassment).

Harassment (Auditory and Behavioral) – In order to evaluate the potential for harassment resulting from auditory damage, NMFS's "Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing" (NMFS, 2018) identifies dual criteria to assess the potential for permanent (Level A harassment) and temporary (Level B harassment) threshold shift to occur for different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise. The technical guidance identifies the received levels, or thresholds, above which individual marine mammals are predicted to experience changes in their hearing sensitivity for all underwater anthropogenic sound sources, and reflects the best available science on the potential for noise to affect auditory sensitivity by:

- Dividing sound sources into two groups (*i.e.*, impulsive and non-impulsive) based on their potential to affect hearing sensitivity;
- Choosing metrics that best address the impacts of noise on hearing sensitivity, *i.e.*, peak sound pressure level (peak SPL) (reflects the physical properties of

impulsive sound sources to affect hearing sensitivity) and cumulative sound exposure level (cSEL) (accounts for not only level of exposure but also duration of exposure); and

- Dividing marine mammals into hearing groups and developing auditory weighting functions based on the science supporting that not all marine mammals hear and use sound in the same manner.

The premise of the dual criteria approach is that, while there is no definitive answer to the question of which acoustic metric is most appropriate for assessing the potential for injury, both the received level and duration of received signals are important to an understanding of the potential for auditory injury. Therefore, peak SPL is used to define a pressure criterion above which auditory injury is predicted to occur, regardless of exposure duration (*i.e.*, any single exposure at or above this level is considered to cause auditory injury), and cSEL is used to account for the total energy received over the duration of sound exposure (*i.e.*, both received level and duration of exposure) (Southall *et al*., 2007, 2019; NMFS, 2018). As a general principle, whichever criterion is exceeded first (*i.e.*, results in the largest isopleth) would be used as the effective injury criterion (*i.e.*, the more precautionary of the criteria). Note that cSEL acoustic threshold levels incorporate marine mammal auditory weighting functions, while peak pressure thresholds do not (*i.e.*, flat or unweighted). Weighting functions for each hearing group (*e.g.*, low-, mid-, and high-frequency cetaceans) are described in NMFS (2018).

NMFS (2018) recommends 24 hours as a maximum accumulation period relative to cSEL thresholds. These thresholds were developed by compiling and synthesizing the best available science, and are provided in Table 5 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS (2018),

which is available online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

In order to evaluate the potential for Level B (behavioral) harassment resulting from multiple, successive explosive detonations (*i.e.*, detonations happening at the same location within a 24-hour period), the threshold is set 5 dB below the SEL-based TTS threshold.

Non-Auditory Impacts – As described previously, explosive detonations have the potential to cause non-serious injury (Level A harassment) or mortality/serious injury. These potential effects are assumed to occur due to the effects of pressure waves on gas-filled structures (*i.e.*, lungs, GI tract). Mortality and slight lung injury thresholds are calculated using equations incorporating the assumed mass and depth of the mammal:

Mortality threshold (50 percent risk of extensive lung injury) = $144M^{1/3}(1 + D/10.1)^{1/6}$ Pa-s

Injury threshold (50 percent risk of slight lung injury) = $65.8M^{1/3}(1 + D/10.1)^{1/6}$ Pa-s

Adult and calf mass for bottlenose dolphin are defined based on data from "Criteria and Thresholds for U.S. Navy Acoustic and Explosive Impacts to Marine Mammals and Sea Turtles." A peak SPL threshold determined through experiments on terrestrial mammals is assumed to represent the potential for GI tract injury. Relevant thresholds for bottlenose dolphins (i.e., mid-frequency cetaceans) are provided in Table 5.

Table 5 -- Explosive Criteria and Thresholds Used for Impact Analyses

Level A harassment		Level B harassment	
GI tract injury	PTS[1]	TTS[1]	Behavior
243 dB SPL (pk)[2]	185 dB SEL 230 dB SPL	170 dB SEL 224 dB SPL	165 dB SEL[3]

[1]Dual metric criteria. SEL thresholds are cumulative, referenced to 1 μPa^2-s, and weighted according to appropriate auditory weighting function. SPL thresholds are peak pressure referenced to 1 μPa and unweighted within generalized hearing range.

[2]Threshold for 50 percent risk of GI tract injury, used in modeling to assess potential for injuries due to underwater explosions. Threshold for 1 percent risk of GI tract injury (237 dB SPL pk) is used in modeling range to effect.

[3]Applicable to events with multiple explosive detonations within any given 24-hr period. For single explosions at received sound levels below hearing loss thresholds, the most likely behavioral response is a brief alerting or orienting response. Since no further sounds follow the initial brief impulses, significant behavioral reactions would not be expected to occur.

Marine Mammal Occurrence

Please see **Description of Marine Mammals in the Area of Specified Activities** for details regarding past marine mammal survey effort conducted in the Pamlico Sound region. A density of 0.183 dolphins per square kilometer was used year-round (Read *et al*., 2003). The USMC and NMFS believe that this value, which is consistent with the information used to support prior USMC requests for authorization, is most appropriate. Although the aerial survey study (Goodman *et al*., 2007) provides seasonal density values, and reports a higher density value for some seasons, the USMC believes the Read *et al*. (2003) survey data to represent the better density estimate.

In order to apportion any predicted exposures to the potentially affected stocks, USMC calculated monthly stock-specific proportions of each stock expected to be present in the vicinity of the training exercises, based on relative stock-specific abundance and available information about stock movements and seasonal occurrence in the area. Please see Table 3-2 in the USMC application.

Exposure Modeling

NAEMO is the standard model used by the Navy to estimate the potential acoustic effects of proposed Navy training and testing activities on marine mammals and was employed by the Navy in this case to evaluate the potential effects of the proposed USMC training activities. NAEMO is comprised of multiple modules that, in a stepwise process (1) define the activity, including sound source characteristics, location, and duration; (2) incorporate site-specific oceanographic and environmental data required for a scenario simulation; (3) generate acoustic propagation data; (4) distribute marine species within the modeling environment; (5) execute the simulation and record the sound received by each virtual marine mammal in the area for every time step that sound is emitted; incorporating the scenario definition, sound propagation data, and marine species distribution data, ultimately providing raw data output for each simulation; (6) provide the computation of estimated effects that exceed defined threshold criteria; and (7) generate a report of simulation results over multiple scenario runs.

In summary, source characteristics are integrated with environmental data (bathymetry, sound speed, bottom characterization, and wind speed) to calculate the three-dimensional sound field for each source. Marine species density information is then processed to develop a series of distribution files for each species present in the study area. Each distribution file varies the abundance and placement of the animals based on uncertainty defined in the density and published group size. The scenario details, three-dimensional sound field data, and marine species distributions are then combined in NAEMO to build virtual three-dimensional representations of each event and environment. This information is then processed by NAEMO to determine the number of marine species exposed in each scenario.

The NAEMO simulation process is run multiple times for each season to provide an average of potential effects on marine species. Each iteration reads in the species dive data and introduces variations to the marine species distributions in addition to the initial position and direction of each platform and ordnance within the designated area. Effects criteria and thresholds are then applied to quantify the predicted number of marine mammal effects. Results from each iteration are averaged to provide the number of marine species effects for a given period. A complete description of the NAEMO model and modeling approach used for this analysis can be found in the Navy's Phase III Quantitative Analysis Technical Report (Blackstock *et al*., 2017).

As noted previously, all ordnance expenditure at BT-11 is inert and, therefore, only ordnance use at BT-9 is considered in the effects analysis described here. The following types of ordnance were modeled: Bomb (GBU, BDU, MK), 2.75-in Rocket HE, 5-in Rocket HE, G911 Grenades, 30 mm HE, and 40 mm HE. Note that live bombs are not planned for use. Therefore, we do not provide information related to the modeling. All explosives are modeled as detonating at a 0.1-meter depth. Relevant parameters are provided in Table 6. For further detail regarding the modeling, including details concerning environmental data sources, please the USMC application. Table 7 shows the quantitative exposure modeling results.

Table 6 -- Source Characteristics

Source	Net Explosive Weight (lbs)	Peak One-Third Octave (OTO) Source Level (dB)	Center Frequency of Peak OTO (Hz)
5-in rocket	15	229	1008
2.75-in rocket	4.8	224	1270
Grenade	0.5	214	2540
40 mm	0.1199	208	4032
30 mm	0.1019	207	4032

Table 7 -- Quantitative Modeling Results

Species	Level B Harassment		Level A Harassment			Mortality
	Behavioral	TTS	PTS	GI tract injury	Lung injury	
Bottlenose dolphin	72.09	29.99	1.81	0.13	0.01	<0.01

The exposure modeling results shown in Table 7 support proposed bottlenose dolphin take authorization numbers of 102 incidents of Level B harassment and 2 incidents of Level A harassment (PTS only). No incidents of GI tract injury or lung injury are anticipated.

Proposed Mitigation

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses. NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)). The NDAA for FY 2004 amended the MMPA as it relates to military readiness activities and the incidental take authorization process such that "least practicable impact" shall include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat, as well as subsistence uses. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned); and

(2) The practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

Mitigation for Marine Mammals and their Habitat

NMFS and the USMC have worked to identify potential practicable and effective mitigation measures. These measures include the following:

Visual Monitoring – Range operators conduct or direct visual surveys to monitor the target areas for protected species before and after each exercise. Range operation and control personnel would monitor the target area through two tower-mounted safety and surveillance cameras. In addition, when small boats are part of planned exercises and already on range, visual checks by boat crew would be performed.

The remotely operated range cameras are high-resolution cameras that allow viewers to see animals at the surface and breaking the surface (though not underwater). The camera system has night vision (IR) capabilities. Lenses on the camera system have a focal length of 40 mm to 2200 mm (56x), with view angles of 18 degrees 10’ and 13

degrees 41’ respectively. The field of view when zoomed in on the Rattan Bay targets will be 23’ wide by 17’ high, and on the mouth of Rattan Bay itself 87’ wide by 66’ high. Observers using the cameras are able to clearly identify ducks floating on waters near the target.

In the event that a marine mammal is sighted within 914 m (3,000 ft) of the BT-9 target area, personnel would declare the area as fouled and cease training exercises. Personnel would commence operations in BT-9 only after the animal has moved 914 m (3,000 ft) away from the target area.

For BT-11, in the event that a marine mammal is sighted anywhere within the confines of Rattan Bay, personnel would declare the water-based targets within Rattan Bay as fouled and cease training exercises. Personnel would commence operations in BT-11 only after the animal has moved out of Rattan Bay.

Range Sweeps – MCAS Cherry Point contracts range sweeps with commercial support aircraft each weekday morning prior to the commencement of the day’s range operations. The pilot and aircrew are trained in spotting objects in the water. The primary goal of the pre-exercise sweep is to ensure that the target area is clear of unauthorized vessels or persons and protected species. Range sweeps would not occur on weekend mornings.

The sweeps are flown at at 100 to 300 ft (30-90 m) above the water surface, at airspeeds between 60 to 100 knots (69 to 115 mph). The crew communicates directly with range personnel and can provide immediate notification to range operators of a fouled target area due to the presence of protected species.

Aircraft Cold Pass – Standard operating procedures for waterborne targets require the pilot to perform a visual check prior to ordnance delivery to ensure the target area is clear of unauthorized civilian boats and personnel, and protected species. This is referred to as a "cold" or clearing pass. Pilots requesting entry onto the BT-9 and BT-11 airspace must perform a low-altitude, cold first pass (a pass without any release of ordnance) immediately prior to ordnance delivery at the bombing targets both day and night.

Pilots would conduct the cold pass with the aircraft (helicopter or fixed-winged) flying straight and level at altitudes of 61 to 914 m (200 to 3,000 ft) over the target area. The viewing angle is approximately 15 degrees. A blind spot exists to the immediate rear of the aircraft. Based upon prevailing visibility, a pilot can see more than one mile forward upon approach. If marine mammals are not present in the target area, the Range Controller may grant ordnance delivery as conditions warrant.

Delay of Exercises – The USMC would consider an active range as fouled and not available for use if a marine mammal is present within 914 m (3,000 ft) of the target area at BT-9 or anywhere within Rattan Bay (BT-11). Therefore, if USMC personnel observe a marine mammal within 914 m (3,000 ft) of the target at BT-9 or anywhere within Rattan Bay at BT-11 during the cold pass or from range camera detection, they would delay training until the marine mammal moves beyond and on a path away from 914 m (3,000 ft) from the BT-9 target or moved out of Rattan Bay at BT-11. This mitigation applies to air-to-surface and surface-to-surface exercises day or night.

Approximately 15 percent of training activities take place during nighttime hours. During these training events, monitoring procedures mirror day time operations as range operators first visually search the target area with the high-resolution camera. Pilots will

then conduct a low-altitude first cold pass and utilize night vision capabilities to visually check the target area for any surfacing mammals.

Vessel Operation – All vessels used during training operations would abide by NMFS' Southeast Regional Viewing Guidelines designed to prevent harassment to marine mammals.

Stranding Network Coordination – The USMC would coordinate with the local NMFS Stranding Coordinator to discuss any unusual marine mammal behavior and any stranding, beached live/dead, or floating marine mammals that may occur at any time during training activities or within 24 hours after completion of training.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for subsistence uses.

Proposed Monitoring and Reporting

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

compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).
- Mitigation and monitoring effectiveness.

The USMC proposes to conduct the following monitoring activities:

Protected Species Observer Training – Operators of small boats, and other personnel monitoring for marine mammals from watercraft shall be required to take the

U.S. Navy's Marine Species Awareness Training. Pilots conducting range sweeps shall be instructed on marine mammal observation techniques during routine Range Management Department briefings. This training would make personnel knowledgeable of marine mammals, protected species, and visual cues related to the presence of marine mammals and protected species.

Pre- and Post-Exercise Monitoring – The USMC would conduct pre-exercise monitoring the morning of an exercise and post-exercise monitoring the morning following an exercise, unless an exercise occurs on a Friday, in which case the post-exercise sweep would take place the following Monday. If the crew sights marine mammals during a range sweep, they would collect sighting data and immediately provide the information to range personnel who would take appropriate management action. Range staff would relay the sighting information to training Commanders scheduled on the range after the observation. Range personnel would enter the data into the USMC sighting database. Sighting data includes the following (collected to the best of the observer's ability): (1) location (either an approximate location or latitude and longitude); (2) the platform that sighted the animal; (3) date and time; (4) species; (5) number of animals; (6) the animals' direction of travel and/or behavior; and (7) weather.

Long-term Monitoring – MCAS Cherry Point has contracted Duke University to develop and test a real-time passive acoustic monitoring system that will allow automated detection of bottlenose dolphin whistles. The work has been performed in two phases. Phase I was the development of an automated signal detector (a software program) to recognize the whistles of dolphins at BT-9 and BT-11. Phase II included the assembly and deployment of a real-time monitoring unit on one of the towers on the BT-9 range.

The knowledge base gain from this effort helped direct current monitoring initiatives and activities within the MCAS Cherry Point Range Complex. The current system layout includes a pair of autonomous monitoring units at BT-9 and a single unit in Rattan Bay, BT-11. The system is not currently functional due to storm related damage and communication link issues. It may be on-line during the course of the IHA period. In that case, the Passive Acoustic Monitoring system will serve as an additional mitigation measure to reduce impacts.

Reporting – The USMC will submit a report to NMFS no later than 90 days following expiration of this IHA. This report must summarize the type and amount of training exercises conducted, all marine mammal observations made during monitoring, and if mitigation measures were implemented. The report will also address the effectiveness of the monitoring plan in detecting marine mammals.

Reporting Injured or Dead Marine Mammals

In the event that personnel involved in the training activities discover an injured or dead marine mammal, the USMC shall report the incident to the Office of Protected Resources (OPR), NMFS and to the regional stranding coordinator as soon as feasible. The report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and

- General circumstances under which the animal was discovered.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact 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 (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 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 harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

In order to evaluate the number of takes that might be expected to accrue to the different potentially affected stocks, the USMC estimated the proportion of dolphins present (based on density information from Read *et al*., 2003) that would belong to each of the potentially affected stocks. Please see Table 3-2 of the USMC's application. Based

on these assumptions, we assume that the total take proposed for authorization of 102 incidents of Level B harassment and 2 incidents of Level A harassment would proportionally impact the various stocks as shown in Table 8.

Table 8 – Proportional Effects to Stocks

Stock	Level B harassment		Level A harassment (PTS)
	Behavioral	TTS	
Northern migratory	38.68	15.19	1.23
Southern migratory	25.86	10.39	0.45
NNCES	6.74	3.70	0.06
SNCES	0.82	0.70	0.06

NMFS expects short-term effects such as stress during underwater detonations. However, the time scale of individual explosions is very limited, and the USMC disperses its training exercises in space and time. Consequently, repeated exposure of individual bottlenose dolphins to sounds from underwater explosions is not likely and most acoustic effects are expected to be short-term and localized. NMFS does not expect long-term consequences for populations because the BT-9 and BT-11 areas continue to support bottlenose dolphins in spite of ongoing missions. The best available data do not suggest that there is a decline in the Pamlico Sound population due to these exercises.

The probability that detonation events will overlap in time and space with marine mammals is low, particularly given the densities of marine mammals in the vicinity of BT-9 and BT-11 and the implementation of monitoring and mitigation measures. Moreover, NMFS does not expect animals to experience repeat exposures to the same sound source, as bottlenose dolphins would likely move away from the source after being exposed. In addition, NMFS expects that these isolated exposures, when received at distances associated with Level B harassment (behavioral), would cause brief startle reactions or short-term behavioral modification by the animals. These brief reactions and behavioral changes would likely cease when the exposures cease. The Level B

harassment takes would likely result in dolphins being temporarily affected by bombing or gunnery exercises.

Individual bottlenose dolphins may sustain some level of temporary threshold shift (TTS) from underwater detonations. TTS can last from a few minutes to days, be of varying degree, and occur across various frequency bandwidths. Although the degree of TTS depends on the received noise levels and exposure time, studies show that TTS is reversible. NMFS expects the animals' sensitivity to recover fully in minutes to hours based on the fact that the proposed underwater detonations are small in scale and isolated. In summary, we do not expect that these levels of received impulse noise from detonations would affect annual rates of recruitment or survival. The potential for permanent hearing impairment and injury is low due to the incorporation of the proposed mitigation measures specified in the proposed rulemaking.

NMFS considers if the specified activities occur during and within habitat important to vital life functions to better inform the preliminary negligible impact determination. Read *et al*. (2003) concluded that dolphins rarely occur in open waters in the middle of North Carolina sounds and large estuaries, but instead are concentrated in shallow water habitats along shorelines. However, no specific areas have been identified as vital reproduction or foraging habitat.

In summary and as described above, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or authorized;

- Impacts will be limited to Level B harassment, primarily in the form of behavioral disturbance, and only two incidents of Level A harassment in the form of PTS;
- Of the number of total takes proposed to be authorized, the expected proportions that may accrue to individual affected stocks are low relative to the estimated abundances of the affected stocks;
- There will be no loss or modification of habitat and minimal, temporary impacts on prey; and
- Mitigation requirements would minimize impacts.

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 the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Impact on Availability of Affected Species for Taking for Subsistence Uses

There are no relevant subsistence uses of marine mammals implicated by these actions. Therefore, we have 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.

Endangered Species Act (ESA)

No marine mammal species listed under the ESA are expected to be affected by these activities. Therefore, we have determined that section 7 consultation under the ESA is not required.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to the USMC for conducting training activities in Pamlico Sound for a period of one year, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHA can be found at *www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities*.

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this Notice of Proposed IHA. We also request comment on the potential renewal of this proposed IHA as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the request for this IHA or a subsequent renewal.

On a case-by-case basis, NMFS may issue a one-year IHA renewal with an additional 15 days for public comments when (1) another year of identical or nearly identical activities as described in the **Description of Proposed Activity** section of this notice is planned or (2) the activities as described in the **Description of Proposed Activity** section of this notice would not be completed by the time the IHA expires and a renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to expiration of the current IHA.
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted under the requested renewal are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take because only a subset of the initially analyzed activities remain to be completed under the Renewal); and

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

- Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: March 10, 2020.

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Donna S. Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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