14 July 2016

Ms. Jolie Harrison, Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Dear Ms. Harrison:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the U.S. Air Force's (the Air Force) application seeking authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act (the MMPA) to take marine mammals by harassment incidental to conducting long range strike weapon systems evaluation program (LRS WSEP) activities at the Pacific Missile Range Facility (PMRF), off Kauai, Hawaii. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 7 July 2016 notice (80 Fed. Reg. 44277) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

Background

The Air Force plans to conduct its LRS WSEP activities during a one-day period, likely in September 2016 on the Barking Sands Underwater Range Expansion (BSURE) at PMRF. The purpose of those activities is to evaluate the maneuvers and performance of various munitions. Those activities involve the use of missiles and bombs[1] (ranging from a 10 kg bomb to a 136 kg missile). The Air Force would conduct all LRS WSEP activities during daylight hours in waters approximately 4,645 m in depth and at a distance of approximately 81 km from the coast.

NMFS preliminarily has determined that the proposed activities could cause both Level A and/or Level B harassment of dwarf sperm whales and pygmy sperm whales but anticipates that any impact on the affected species and stocks would be negligible. NMFS does not anticipate any take of marine mammals by serious injury or death and believes the proposed mitigation measures provide the means of effecting the least practicable impact on marine mammal species or stocks and their habitat. The proposed mitigation, monitoring, and reporting measures include—

- conducting aerial monitoring for approximately 30 minutes both 1 hour before and 30 minutes after the proposed activities;

[1] Up to one missile and 8 bombs.

- using delay and shut-down procedures;
- reporting injured and dead marine mammals immediately to NMFS's local stranding network, regional office, and Office of Protected Resources; and
- submitting a final report.

Mitigation and monitoring measures

In previous Commission letters regarding the Air Force's activities at Eglin Air Force Base (Eglin) off Florida, the Commission has recommended that NMFS require the Air Force to determine the effectiveness of its mitigation measures and to supplement those measures with the use of passive acoustic monitoring (PAM) devices, which in this case already are in place at PMRF[2]. For the proposed authorization, the mission area would be determined clear of marine mammals for at least 30 minutes, and likely longer, before the munitions are detonated. The aircraft used for monitoring then would move to the periphery of the human safety zone, which has not been specified in this authorization but was 15 km for previous Air Force WSEP activities. The Commission is not convinced that the Air Force would be able to monitor effectively for marine mammals entering the mortality and injury zone after the area has been cleared and during the timeframe prior to detonation.

In addition to the PAM supplementing mitigation, those devices also can be used to provide in-situ measurements[3] of the detonations and data on impacts they may have had on marine mammals present in the vicinity prior to, during, and after the detonations. For resident species, such data could provide insights regarding how long it takes for those species to come back onto the range after an activity, similar to the monitoring the Navy conducts at PMRF, off Southern California, and off Andros Island in the Bahamas. Fulfilling monitoring requirements under section 101(a)(5) of the MMPA will be especially important given that the Air Force plans to seek regulations governing the taking of marine mammals during future LRS WSEP at PMRF for a five-year period.

For these reasons, the Commission again recommends that NMFS and the Air Force assess practicable ways to supplement the Air Force's mitigation and monitoring measures with PAM, including obtaining access to the Navy's hydrophone array data at PMRF. In response to the Commission's recommendations for WSEP activities at Eglin, the Air Force indicated it was willing to discuss alternatives with the Commission and NMFS during the development of the upcoming rulemaking and NEPA documentation for Eglin (80 Fed. Reg. 17398, 81 Fed. Reg. 7310). The Commission would welcome such a meeting and would want to extend that discussion to activities at PMRF as well.

[2] Barking Sands Tactical Underwater Range has 42 bottom-mounted hydrophones, and BSURE has 18 hydrophones.
[3] Including sound propagation.

The Commission trusts you will find its letter helpful. Please contact me if you have questions regarding the Commission's comments and recommendation.

Sincerely,

Rebecca J. Lent

Rebecca J. Lent, Ph.D.
Executive Director

ITP McCue - NOAA Service Account <itp.mccue@noaa.gov>

Comment Re 86 FWS Military Testing near Kauai

1 message

Jay Tokuda <oceanandlandloveaffair@gmail.com> Fri, Jul 22, 2016 at 4:38 AM
To: ITP.McCue@noaa.gov

NOAA,

The administrative process in place to authorize the incidental harassment of marine mammals seems to be a sturdy and reliable one. This is my first experience in reviewing an application of this kind under the MMPA and I am impressed by the amount of information that is required of the requesting agency.

However, the issue to be discussed in this comment is in regard to the location of the military exercise. Sonar testing has seen legal challenges and experienced repeated opposition in the Pacific area.

With special regard to Hawaii, military testing has not been an unfamiliar stranger. One island in the Hawaiian chain, Kaho'olawe, is infamously known for having been battered by ordnance as a result of military exercises. That ordnance has still not been entirely removed from Kaho'olawe.

Also of important emphasis, is the amount of deference provided to the military and its readiness activities. The definition of "harassment" under the MMPA, as amended by the NDAA of 2004, adds a special provision specifically applicable to military readiness activities. Under that definition, activities that simply pose a potential for harm are not included as forms of harassment, whereas during non-military activities they are considered harassment under the MMPA.

Also, I am happy to have even found this listing on the Federal Register. It would seem that under 16 USCA 1371, it is not required to provide public notice in any forum other than the Federal Register when the requested incidental harm to marine life pertains to military readiness activities. I am confused and disappointed as to why that requirement would differ between non-military readiness and military readiness activities. As with non-military readiness activities that pose a danger to marine life, I would think that the local coastal communities in the area should be made aware through sufficient and timely notice in their local newspapers.

My request would be to post notice of this military training exercise in the Kaua'i newspaper to help generate adequate public awareness and facilitate a healthy amount of discussion on this IHA prior to commencing activities.

Thank you.

ITP McCue - NOAA Service Account <itp.mccue@noaa.gov>

Fw:public comment on federal register train our military without actual bombs bombimg america to bits plese

Jean Public <jeanpublic1@yahoo.com> Mon, Jul 11, 2016 at 5:33 PM
Reply-To: Jean Public <jeanpublic1@yahoo.com>
To: itp.mccue@noaa.gov, info@pewtrusts.org, info@peta.org
Cc: info@wdc.greenpeace.org, info@seashepherd.org, humanelines@hsus.org

most amreicans are totally opposed to American whlales and dolphins being bombed to death by this training. this training does not have to be done in Hawaii. it can be done in Syria or in Afghanistan. it wluld make more sense there. it is time to stop destroying America. it is time to respect marine mammal life. this is a horrific killing plan. it is sordid, ebvil, brutal, abusive and disgusting. shut down this plan. you can train without actually dropping bombs to kill. this cmmetn is for the public record. the military needs to be changed. they are braindead. this comment is for the public record. please receipt. jean publee jeanpublic1@uyahoo.com

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> [Federal Register Volume 81,
> Number 130 (Thursday, July 7, 2016)]
> [Notices]
> [Pages 44277-44298]
> From the Federal Register Online via the Government
> Publishing Office [www.gpo.gov]
> [FR Doc No: 2016-16114]
>
>
> ———————————————————————
>
> DEPARTMENT OF COMMERCE
>
> National Oceanic and Atmospheric Administration
>
> RIN 0648-XE675
>
>
> Takes of Marine Mammals Incidental to Specified Activities;
> Taking Marine Mammals Incidental to the U.S. Air Force 86
> Fighter
> Weapons Squadron Conducting Long Range Strike Weapon Systems
> Evaluation
> Program at the Pacific Missile Range Facility at Kauai,
> Hawaii
>
> AGENCY: National Marine Fisheries Service (NMFS), National
> Oceanic and
> Atmospheric Administration (NOAA), Commerce.
>
> ACTION: Notice; proposed incidental harassment
> authorization; request
> for comments.
>
> ———————————————————————
>
> SUMMARY: NMFS (hereinafter, ``we'' or

> ``our'') received an application
> from the U.S. Department of the Air Force, 86 Fighter
> Weapons Squadron
> (86 FWS), requesting an Incidental Harassment Authorization
> (IHA) to
> take marine mammals, by harassment, incidental to a Long
> Range Strike
> Weapon Systems Evaluation Program (LRS WSEP) in the Barking
> Sands
> Underwater Range Extension (BSURE) area of the Pacific
> Missile Range
> Facility (PMRF) at Kauai, Hawaii. 86 FWS's activities
> are military
> readiness activities per the Marine Mammal Protection Act
> (MMPA), as
> amended by the National Defense Authorization Act (NDAA) for
> Fiscal
> Year 2004. Pursuant to the MMPA, NMFS requests comments on
> its proposal
> to issue an IHA to 86 FWS to incidentally take, by Level A
> and Level B
> harassment, two species of marine mammals, the dwarf sperm
> whale (Kogia
> sima) and pygmy sperm whale (Kogia breviceps) during the
> specified
> activity.
>
> DATES: NMFS must receive comments and information no later
> than August
> 8, 2016.
>
> ADDRESSES: Comments on the application should be addressed
> to Jolie
> Harrison, Chief, Permits and Conservation Division, Office
> of Protected
> Resources, National Marine Fisheries Service, 1315 East-West
> Highway,
> Silver Spring, MD 20910. The email address for providing
> email comments
> is ITP.McCue@noaa.gov.
> Please include 0648-XE675 in the subject line.
> Comments sent via email, including all attachments, must not
> exceed a
> 25-megabyte file size. NMFS is not responsible for comments
> sent to
> addresses other than the one provided in this notice.
>
> [[Page 44278]]
>
> Instructions: All submitted comments are a part of the
> public
> record, and generally we will post them to http://www.nmfs.noaa.gov/pr/permits/incidental/military.htm
> without change. All Personal
> Identifying Information (for example, name, address, etc.)
> voluntarily
> submitted by the commenter may be publicly accessible. Do
> not submit
> confidential business information or otherwise sensitive or
> protected
> information.
> An electronic copy of the application may be obtained by
> writing to
> the address specified above, telephoning the contact listed
> below (see
> FOR FURTHER INFORMATION CONTACT), or visiting the internet

> at: http://www.nmfs.noaa.gov/pr/permits/incidental/military.htm.
> The following
> associated documents are also available at the same internet
> address:
> List of the references used in this document, and 86
> FWS's
> Environmental Assessment (EA) titled, ``Environmental
> Assessment/
> Overseas Environmental Assessment for the Long Range Strike
> Weapon
> Systems Evaluation Program Operational
> Evaluations." Documents cited
> in this notice may also be viewed, by appointment, during
> regular
> business hours, at the aforementioned address.
>
> FOR FURTHER INFORMATION CONTACT: Laura McCue, Office of
> Protected
> Resources, NMFS, (301) 427-8401.
>
> SUPPLEMENTARY INFORMATION:
>
> Background
>
> Sections 101(a)(5)(A) and (D) of the MMPA(16 U.S.C. 1361
> et seq.)
> direct the Secretary of Commerce to allow, upon request, the
>
> incidental, but not intentional, taking of small numbers of
> marine
> mammals of a species or population stock, 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 authorization is provided to the public
> for
> review.
> An authorization for incidental takings for marine
> mammals shall be
> granted if NMFS finds that the taking will have a negligible
> impact on
> the species or stock(s), will not have an unmitigable
> adverse impact on
> the availability of the species or stock(s) for subsistence
> uses (where
> relevant), and if the permissible methods of taking and
> requirements
> pertaining to the mitigation, monitoring, and reporting of
> such taking
> are set forth. NMFS has defined ``negligible
> impact" in 50 CFR 216.103
> as ``an impact resulting from the specified activity that
> cannot be
> reasonably expected to, and is not reasonably likely to,
> adversely
> affect the species or stock through effects on annual rates
> of
> recruitment or survival."
> The NDAA of 2004 (Pub. L. 108-136) removed the ``small
> numbers"
> and ``specified geographical region" limitations

> indicated earlier and
> amended the definition of harassment as it applies to a
> ``military
> readiness activity" to read as follows (Section
> 3(18)(B) of the MMPA):
> (i) Any act that injures or has the significant potential to
> injure a
> marine mammal or marine mammal stock in the wild [Level A
> Harassment];
> or (ii) any act that disturbs or is likely to disturb a
> marine mammal
> or marine mammal stock in the wild by causing disruption of
> natural
> behavioral patterns, including, but not limited to,
> migration,
> surfacing, nursing, breeding, feeding, or sheltering, to a
> point where
> such behavioral patterns are abandoned or significantly
> altered [Level
> B Harassment].
>
> Summary of Request
>
> On May 12, 2016, NMFS received an application from 86
> FWS for the
> taking of marine mammals, by harassment, incidental to the
> LRS WSEP
> within the PMRF in Kauai, Hawaii from September 1, 2016
> through August
> 31, 2017. 86 FWS submitted a revised version of the renewal
> request on
> June 9, 2016 and June 20, 2016, which we considered adequate
> and
> complete.
> The proposed LRS WSEP training activities would occur on
> September
> 1, 2016, with a backup date of September 2, 2016.
> 86 FWS proposes actions that include LRS WSEP test
> missions of the
> Joint Air-To-Surface Stand-off Missile (JASSM) and the Small
> Diameter
> Bomb-I/II (SDB-I/II) including detonations at the water
> surface. These
> activities qualify as a military readiness activities under
> the MMPA
> and NDAA.
> The following aspects of the proposed LRS WSEP training
> activities
> have the potential to take marine mammals: Munition strikes
> and
> detonation effects (overpressure and acoustic components).
> Take, by
> Level B harassment of individuals of dwarf sperm whale and
> pygmy sperm
> whale could potentially result from the specified activity.
> Additionally, although NMFS does not expect it to occur, 86
> FWS has
> also requested authorization for Level A Harassment of one
> individual
> dwarf sperm whale. Therefore, 86 FWS has requested
> authorization to
> take individuals of two cetacean species by Level A and
> Level B
> harassment.
> 86 FWS's LRS WSEP training activities may

> potentially impact marine
> mammals at or near the water surface in the absence of
> mitigation.
> Marine mammals could potentially be harassed, injured, or
> killed by
> exploding and non-exploding projectiles, falling debris, or
> ingestion
> of military expended materials. However, based on analyses
> provided in
> 86 FWS's 2016 application, 2016 Environmental Assessment
> (EA), and for
> reasons discussed later in this document, we do not
> anticipate that 86
> FWS's LRS WSEP activities would result in any serious
> injury or
> mortality to marine mammals.
>
> Description of the Specified Activity
>
> Overview
>
> 86 FWS proposes to conduct air-to-surface mission in the
> BSURE area
> of the PMRF. The LRS WSEP test objective is to conduct
> operational
> evaluations of long range strike weapons and other munitions
> as part of
> LRS WSEP operations to properly train units to execute
> requirements
> within Designed Operational Capability Statements, which
> describe
> units' real-world operational expectations in a time of
> war. Due to
> threats to national security, increased missions involving
> air-to-
> surface activities have been directed by the Department of
> Defense
> (DoD). Accordingly, the U.S. Air Force seeks the ability to
> conduct
> operational evaluations of all phases of long range strike
> weapons
> within the U.S. Navy's Hawaii Range Complex (HRC). The
> actions would
> fulfill the Air Force's requirement to evaluate
> full-scale maneuvers
> for such weapons, including scoring capabilities under
> operationally
> realistic scenarios. LRS WSEP objectives are to evaluate
> air-to-surface
> and maritime weapon employment data, evaluate tactics,
> techniques, and
> procedures in an operationally realistic environment, and to
> determine
> the impact of tactics, techniques, and procedures on combat
> Air Force
> training. The munitions associated with the proposed
> activities are not
> part of a typical unit's training allocations, and prior
> to attending a
> WSEP evaluation, most pilots and weapon systems officers
> have only
> dropped weapons in simulators or used the aircraft's
> simulation mode.
> Without WSEP operations, pilots would be using these weapons
> for the

> first time in combat. On average, half of the participants
> in each unit
> drop an actual weapon for the first time during a WSEP
> evaluation.
> Consequently, WSEP is a military readiness activity and is
> the last
> opportunity for squadrons to receive operational training
> and
> evaluations before they deploy.
>
> [[Page 44279]]
>
> Dates and Duration
>
> 86 FWS proposes to schedule the LRS WSEP training
> missions over one
> day on September 1, 2016, with a backup day the following
> day. The
> proposed missions would occur on a weekday during daytime
> hours only,
> with all missions occurring in one day. This IHA would be
> valid from
> September 1, 2016 through August 31, 2017.
>
> Specified Geographic Region
>
> The specific planned impact area is approximately 44
> nautical miles
> (nm)(81 kilometers (km)) offshore of Kauai, Hawaii, in a
> water depth of
> about 15,240 feet (ft) (4,645 meters (m)) (see Figure 2-2 of
> 86 FWS's
> application). All activities will take place within the
> PMRF, which is
> located in Hawaii off the western shores of the island of
> Kauai and
> includes broad ocean areas to the north, south, and west
> (see Figure 2-
> 1 of 86 FWS's application).
> Within the PMRF, activities would occur in the BSURE
> area, which
> lies in Warning Area 188 (W-188). The BSURE consists of
> about 900 nm\2\
> of instrumented underwater ranges, encompassing the
> deepwater portion
> of the PMRF and providing over 80 percent of PMRF's
> underwater scoring
> capability. The BSURE facilitates training, tactics,
> development, and
> test and evaluation for air, surface, and subsurface weapons
> systems in
> deep water. It provides a full spectrum of range support,
> including
> radar, underwater instrumentation, telemetry, electronic
> warfare,
> remote target command and control, communications, data
> display and
> processing, and target/weapon launching and recovery
> facilities. The
> underwater tracking system begins 9 nm (17 km) from the
> north shore of
> Kauai and extends out to 40 nm (74 km) from shore. LRS WSEP
> missions
> would employ live weapons with long flight paths requiring
> large

> amounts of airspace and conclude with weapon impact and
> surface
> detonations within the BSURE instrumented range.
>
> Detailed Description of Activities
>
> The LRS WSEP training missions, classified as military
> readiness
> activities, refer to the deployment of live (containing
> explosive
> charges) missiles from aircraft toward the water surface.
> The actions
> include air-to-surface test missions of the JASSM and the
> SDB-I/II
> including detonations at the water surface.
> Aircraft used for munition releases would include
> bombers and
> fighter aircraft. Additional airborne assets, such as the
> P-3 Orion or
> the P-8 Poseidon, would be used to relay telemetry (TM) and
> flight
> termination system (FTS) streams between the weapon and
> ground
> stations. Other support aircraft would be associated with
> range
> clearance activities before and during the mission and with
> air-to-air
> refueling operations. All weapon delivery aircraft would
> originate from
> an out base and fly into military-controlled airspace prior
> to
> employment. Due to long transit times between the out base
> and mission
> location, air-to-air refueling may be conducted in either
> W-188 or W-
> 189. Bombers, such as the B-1, would deliver the weapons,
> conduct air-
> to-air refueling, and return to their originating base as
> part of one
> sortie. However, when fighter aircraft are used, the
> distance and
> corresponding transit time to the various potential
> originating bases
> would make return flights after each mission day
> impractical. In these
> cases, the aircraft would temporarily (less than one week)
> park
> overnight at Hickam Air Force Base (HAFB) and would return
> to their
> home base at the conclusion of each mission set. Multiple
> weapon
> release aircraft would be used during some missions, each
> potentially
> releasing multiple munitions. The LRS WSEP missions
> scheduled for 2016
> are proposed to occur in one day, with the following day
> reserved as a
> back-up day. Approximately 10 Air Force personnel would be
> on temporary
> duty to support the mission.
> Aircraft flight maneuver operations and weapon release
> would be
> conducted in W-188A boundaries of PMRF. Chase aircraft may
> be used to
> evaluate weapon release and to track weapons. Flight

> operations and
> weapons delivery would be in accordance with published Air
> Force
> directives and weapon operational release parameters, as
> well as all
> applicable Navy safety regulations and criteria established
> specifically for PMRF. Aircraft supporting LSR WSEP missions
> would
> primarily operate at high altitudes–only flying below 3,000
> feet for a
> limited time as needed for escorting non-military vessels
> outside the
> hazard area or for monitoring the area for protected marine
> species
> (e.g., marine mammals, sea turtles). Protected marine
> species aerial
> surveys would be temporary and would focus on an area
> surrounding the
> weapon impact point on the water.
> Post-mission surveys would focus on the area down
> current of the
> weapon impact location. Range clearance procedures for each
> mission
> would cover a much larger area for human safety. Weapon
> release
> parameters would be conducted as approved by PMRF Range
> Safety. Daily
> mission briefs would specify planned release conditions for
> each
> mission. Aircraft and weapons would be tracked for time,
> space, and
> position information. The 86 FWS test director would
> coordinate with
> the PMRF Range Safety Officer, Operations Conductor, Range
> Facility
> Control Officer, and other applicable mission control
> personnel for
> aircraft control, range clearance, and mission safety.
>
> Joint Air-to-Surface Stand-Off Missile/Joint Air-to-Surface
> Stand-Off
> Missile-Extended Range (JASSM/JASSM-ER)
>
> The JASSM is a stealthy precision cruise missile
> designed for
> launch outside area defenses against hardened,
> medium-hardened, soft,
> and area type targets. The JASSM has a range of more than
> 200 nm (370
> km) and carries a 1,000-pound (lb) warhead with
> approximately 300 lbs
> of 2,4,6-trinitrotoluene (TNT) equivalent net explosive
> weight (NEW).
> The specific explosive used is AFX-757, a type of plastic
> bonded
> explosive (PBX). The weapon has the capability to fly a
> preprogrammed
> route from launch to a target, using Global Positioning
> System (GPS)
> technology and an internal navigation system (INS) combined
> with a
> Terminal Area Model when available. Additionally, the weapon
> has a
> Common Low Observable Auto-Routing function that gives the
> weapon the

> ability to find the route that best utilizes the low
> observable
> qualities of the JASSM. In either case, these routes can be
> modeled
> prior to weapon release. The JASSM-ER has additional fuel
> and a
> different engine for a greater range than the JASSM (500 nm
> (926 km))
> but maintains the same functionality of the JASSM.
>
> Small Diameter Bomb-I/Small Diameter Bomb-II (SDB-I/SDB-II)
>
> The SDB-I is a 250-lb air-launched GPS-INS guided weapon
> for fixed
> soft to hardened targets. SDB-II expands the SDB-I
> capability with
> network enabling and uses a tri-mode sensor infrared,
> millimeter, and
> semi-active laser to attack both fixed and movable targets.
> Both
> munitions have a range of up to 60 NM (111 km). The SDB-I
> contains 37
> lbs of TNT-equivalent NEW, and the SDB-II contains 23 lbs
> NEW. The
> explosive used in both SDB-I and SDB-II is AFX-757.
> Initial phases of the LRS WSEP operational evaluations
> are proposed
> for September 2016 and would consist of releasing only one
> live JASSM/
> JASSM-ER and up to eight SDBs in military controlled
> airspace (Table
> 1). Immediate evaluations for JASSM/JASSM-ER and SDB-I are
> needed;
> therefore, they are the only munitions being proposed for
>
> [[Page 44280]]
>
> summer 2016 missions. Weapon release parameters for 2016
> missions would
> involve a B-1 bomber releasing one live JASSM and fighter
> aircraft,
> such as F-15, F-16, or F-22, releasing live SDB-I. Up to
> four SDB-I
> munitions would be released simultaneously, similar to a
> ripple effect,
> each hitting the water surface within a few seconds of each
> other;
> however, the SDB-I releases would occur separate from the
> JASSM. All
> releases would occur on the same mission day.
>
> Table 1–Summary of Proposed
> Testing at PMRF in 2016
> ———————————————————————————————————————
>
> Annual total
> Munition Fusing option
> Net explosive Detonation scenario number of
>
> weight (lb) munitions
> ———————————————————————————————————————
> JASSM/JASSM-ER..... Live/Instantaneous...
> 300 Surface..... 1
> SDB-I..... Live/Instantaneous...
> 37 Surface..... 8

> ER = Extended Range; JASSM = Joint Air-to-Surface Stand-off
> Missile; lb = pounds; SDB = Small Diameter Bomb.
>
> A typical mission day would consist of pre-mission
> checks, safety
> review, crew briefings, weather checks, clearing airspace,
> range
> clearance, mitigations/monitoring efforts, and other
> military protocols
> prior to launch of weapons. Potential delays could be the
> result of
> multiple factors including, but not limited to; adverse
> weather
> conditions leading to unsafe take-off, landing, and aircraft
>
> operations, inability to clear the range of non-mission
> vessels or
> aircraft, mechanical issues with mission aircraft or
> munitions, or
> presence of protected species in the impact area. If the
> mission is
> cancelled due to any of these, one back-up day has also been
> scheduled
> as a contingency. These standard operating procedures are
> usually done
> in the morning, and live range time may begin in late
> morning once all
> checks are complete and approval is granted from range
> control. The
> range would be closed to the public for a maximum of four
> hours per
> mission day.
> Each long range strike weapon would be released in
> W-188A and would
> follow a given flight path with programmed GPS waypoints to
> mark its
> course in the air. Long range strike weapons would complete
> their
> maximum flight range (up to 500 nm distance for JASSM-ER) at
> an
> altitude of approximately 18,000 ft (equivalent in kms) mean
> sea level
> (MSL) and terminate at a specified location for scoring of
> the impact.
> The cruise time would vary among the munitions but would be
> about 45
> minutes for JASSM/JASSM-ER and 10 minutes for SDB-I/II. The
> time frame
> between employments of successive munitions would vary, but
> releases
> could be spaced by approximately one hour to account for the
> JASSM
> cruise time. The routes and associated safety profiles would
> be
> contained within W-188A boundaries. The objective of the
> route designs
> is to complete full-scale evasive maneuvers that avoid
> simulated
> threats and would, therefore, not consist of a standard
> ``paper clip''
> or regularly shaped route. The final impact point on the
> water surface
> would be programmed into the munitions for weapons scoring
> and

> evaluations.
> All missions would be conducted in accordance with
> applicable
> flight safety, hazard area, and launch parameter
> requirements
> established for PMRF. A weapon hazard region would be
> established, with
> the size and shape determined by the maximum distance a
> weapon could
> travel in any direction during its descent. The hazard area
> is
> typically adjusted for potential wind speed and direction,
> resulting in
> a maximum composite safety footprint for each mission (each
> footprint
> boundary is at least 10 nm from the Kauai coastline). This
> information
> is used to establish a Launch Exclusion Area and Aircraft
> Hazard Area.
> These exclusion areas must be verified to be clear of all
> non-mission
> and non-essential vessels and aircraft before live weapons
> are
> released. In addition, a buffer area must also be clear on
> the water
> surface so that vessels do not enter the exclusion area
> during the
> launch window. Prior to weapon release, a range sweep of the
> hazard
> area would be conducted by participating mission aircraft or
> other
> appropriate aircraft, potentially including S-61N
> helicopter, C-26
> aircraft, fighter aircraft (F-15E, F-16, F-22), or the Coast
> Guard's C-
> 130 aircraft.
> PMRF has used small water craft docked at the Port Allen
> public
> pier to keep nearshore areas clear of tour boats for some
> mission
> launch areas. However, for missions with large hazard areas
> that occur
> far offshore from Kauai, it would be impractical for these
> smaller
> vessels to conduct range clearance activities. The composite
> safety
> footprint weapons associated with LRS WSEP missions is
> anticipated to
> be rather large; therefore, it is likely that range clearing
> activities
> would be conducted solely by aircraft.
> The Range Facility Control Officer is responsible for
> establishing
> hazard clearance areas, directing clearance and surveillance
> assets,
> and reporting range status to the Operations Conductor. The
> Control
> Officer is also responsible for submitting all Notice to
> Airmen
> (NOTAMs) and Notice to Mariners (NOTMARs), and for
> requesting all
> Federal Aviation Administration airspace clearances.
>
> Description of Marine Mammals in the Area of the Specified
> Activity

> There are 25 marine mammal species with potential or confirmed occurrence in the proposed activity area; however, not all of these species occur in this region during the project timeframe. Table 2 lists and summarizes key information regarding stock status and abundance of these species. Please see NMFS' 2015 Stock Assessment Reports (SAR), available at www.nmfs.noaa.gov/pr/sars for more detailed accounts of these stocks' status and abundance.
>
> [[Page 44281]]
>
> Table 2–Marine Mammals That Could Occur in the BSURE Area

Species	Stock	ESA/MMPA Status; Strategic (Y/N) \1\	Stock abundance (CV, Nmin, most recent abundance survey) \2\	PBR \3\	Occurrence in BSURE Area
Order Cetartiodactyla–Cetacea–Superfamily Mysticeti (baleen whales)					
Family: Balaenopteridae					
Humpback whale (Megaptera novaeangliae).\4\	Central North Pacific.	Y; Y	10,103 (0.300; 7,890; 2006)	83	Seasonal; throughout known breeding grounds during winter and spring (most common November through April).
Blue Whale (Balaenoptera musculus).	Central North Pacific.	Y; Y	81 (1.14; 38; 2010)	0.1	Seasonal; infrequent

> winter
>
> migrant; few
>
> sightings,
>
> mainly fall
>
> and winter;
>
> considered
>
> rare.
> Fin whale (Balaenoptera Hawaii.....
> Y; Y 58 (1.12; 27; 0.1 Seasonal,
> physalus.
> 2010) mainly fall
>
> and winter;
>
> considered
>
> rare.
> Sei whale (Balaenoptera Hawaii.....
> Y; Y 178 (0.90; 93; 0.2 Rare; limited
> borealis).
> 2010) sightings of
>
> seasonal
>
> migrants that
>
> feed at higher
>
> latitudes.
> Bryde's whale (Balaenoptera Hawaii.....
> -; N 798 (0.28; 6.3 Uncommon;
> brydei/edeni).
> 633; 2010) distributed
>
> throughout the
>
> Hawaiian EEZ.
> Minke whale (Balaenoptera Hawaii.....
> -; N n/a (n/a; n/a; Undet. Regular but
> acutorostrata).
> 2010) seasonal
>
> (October-April
>
>).
> ———————————————————————————————————————
> Order Cetartiodactyla–Cetacea–Superfamily
> Odontoceti (toothed whales, dolphins, and porpoises)
> ———————————————————————————————————————
> Family: Physeteridae
> ———————————————————————————————————————
> Sperm whale (Physeter Hawaii.....
> Y; Y 3,354 (0.34; 10.2 Widely
> macrocephalus).
> 2,539; 2010) distributed
>
> year round;
>
> more likely in

> waters >1,000
>
> m depth, most
>
> often >2,000
>
> m.
> ---
> Order Cetartiodactyla–Cetacea–Superfamily Odontoceti
> (toothed whales, dolphins, and porpoises)
> ---
> Family: Kogiidae
> ---
> Pygmy sperm whale (Kogia Hawaii.....
> -; N n/a (n/a; n/a; Undet. Widely
> breviceps).
> 2010) distributed
>
> year round;
>
> more likely in
>
> waters >1,000
>
> m depth.
> Dwarf sperm whale (Kogia Hawaii.....
> -; N n/a (n/a; n/a; Undet. Widely
> sima).
> 2010) distributed
>
> year round;
>
> more likely in
>
> waters >500 m
>
> depth.
> ---
> Order Cetartiodactyla–Cetacea–Superfamily
> Odontoceti (toothed whales, dolphins, and porpoises)
> ---
> Family delphinidae
> ---
> Killer whale (Orcinus orca).. Hawaii.....
> -; N 101 (1.00; 50; 1 Uncommon;
>
> 2010) infrequent
>
> sightings.
> False killer whale (Pseudorca Hawaii Pelagic
> -; N 1,540 (0.66; 9.3 Regular.
> crassidens). NWHI Stock.
> -; N 928; 2010) 2.3 Regular.
>
> 617 (1.11;
>
> 290; 2010)
> Pygmy killer whale (Feresa Hawaii.....
> -; N 3,433 (0.52; 23 Year-round
> attenuata).
> 2,274; 2010) resident.
> Short-finned pilot whale Hawaii.....
> -; N 12,422 (0.43; 70 Commonly
> (Globicephala macrorhynchus).

> 8,872; 2010) observed
>
> around Main
>
> Hawaiian
>
> Islands and
>
> Northwestern
>
> Hawaiian
>
> Islands.
> Melon headed whale Hawaii Islands
> -; N 5,794 (0.20; 4 Regular.
> (Peponocephala electra). stock.
> 4,904; 2010)
> Bottlenose dolphin (Tursiops Hawaii pelagic..
> -; N 5,950 (0.59; 38 Common in deep
> truncatus).
> 3,755; 2010) offshore
>
> waters.
> Pantropical spotted dolphin Hawaii pelagic..
> -; N 15,917 (0.40; 115 Common; primary
> (Stenella attenuata).
> 11,508; 2010) occurrence
>
> between 100
>
> and 4,000 m
>
> depth.
>
> [[Page 44282]]
>
>
> Striped dolphin (Stenella Hawaii.....
> -; N 20,650 (0.36; 154 Occurs
> coeruleoala).
> 15,391; 2010) regularly year
>
> round but
>
> infrequent
>
> sighting
>
> during survey.
> Spinner dolphin (Stenella Hawaii pelagic..
> -; N n/a (n/a; n/a; Undet. Common year-
> longirostris).
> 2010) round in
>
> offshore
>
> waters.
> Rough-toothed dolphins (Steno Hawaii stock....
> -; N 6,288 (0.39; 46 Common
> bredanensis).
> 4,581; 2010) throughout the
>
> Main Hawaiian
>
> Islands and

> Hawaiian
> Islands EEZ.
> Fraser's dolphin Hawaii.....
> -; N 16,992 (0.66; 102 Tropical
> (Lagenodelphis hosei).
> 10,241; 2010) species only
> recently
> documented
> within
> Hawaiian
> Islands EEZ
> (2002 survey).
> Risso's dolphin (Grampus Hawaii.....
> -; N 7,256 (0.41; 42 Previously
> griseus).
> 5,207; 2010) considered
> rare but
> multiple
> sightings in
> Hawaiian
> Islands EEZ
> during various
> surveys
> conducted from
> 2002-2012.
> ---
> Order Cetartiodactyla–Cetacea–Superfamily
> Odontoceti (toothed whales, dolphins, and porpoises)
> ---
> Family: Ziphiidae
> ---
> Cuvier's beaked whale Hawaii.....
> -; N 1,941 (n/a; 11.4 Year-round
> (Ziphius cavirostris).
> 1,142; 2010) occurrence but
> difficult to
> detect due to
> diving
> behavior.
> Blainville's beaked whale Hawaii.....
> -; N 2,338 (1.13; 11 Year-round
> (Mesoplodon densirostris).
> 1,088; 2010) occurrence but

> difficult to
>
> detect due to
>
> diving
>
> behavior.
> Longman's beaked whale Hawaii.....
> -; N 4,571 (0.65; 28 Considered
> (Indopacetus pacificus).
> 2,773; 2010) rare; however,
>
> multiple
>
> sightings
>
> during
>
> 2010 survey.
> ---
> Order–Carnivora–Superfamily
> Pinnipedia (seals, sea lions)
> ---
> Family: Phocidae
> ---
> Hawaiian monk seal Hawaii.....
> Y; Y 1,112 (n/a; Undet. Predominantly
> (Neomonachus schauinsIandi).
> 1,088; 2013) occur at
>
> Northwestern
>
> Hawaiian
>
> Islands;
>
> approximately
>
> 138
>
> individuals in
>
> Main Hawaiian
>
> Islands.
> ---
> \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. Any species or stock listed
> under the ESA is automatically designated under the MMPA
> as depleted and as a strategic stock.
> \2\ CV is coefficient of variation; Nmin is the
> minimum estimate of stock abundance. In some cases, CV is
> not
> applicable. For certain stocks, abundance estimates are
> actual counts of animals and there is no associated
> CV. 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. All values presented here are from

> the 2015 Pacific SARs, except humpback whales--see comment
> 4.
> \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\ Values for humpback whales are from the 2015
> Alaska SAR.
>
> Of these 25 species, six are listed as endangered under
> the ESA and
> as depleted throughout its range under the MMPA. These are:
> humpback
> whale, blue whale, fin whale, sei whale, sperm whale, and
> the Hawaiian
> monk seal.
> Of the 25 species that may occur in Hawaiian waters,
> only certain
> stocks occur in the impact area, while others are
> island-associated or
> do not occur at the depths of the impact area (e.g. false
> killer whale
> insular stock, island-associated stocks of bottlenose,
> spinner, and
> spotted dolphins). Only two species are considered likely to
> be in the
> impact area during the one day of project activities (dwarf
> sperm whale
> and pygmy sperm whale). Other species are seasonal and only
> occur in
> these waters in the fall or winter (humpback whale, blue
> whale, fin
> whale, sei whale, minke whale, killer whale); some are rare
> in the area
> (Longman's beaked whale, Bryde's whale); and others
> are unlikely to be
> impacted due to small density estimates (False killer whale,
> pygmy
> killer whale, short-finned pilot whale, melon-headed whale,
> bottlenose
> dolphin, Pantropical spotted dolphin, striped dolphin,
> spinner dolphin,
> rough-toothed dolphin, Fraser's dolphin, Risso's
> dolphin, Cuvier's
> beaked whale, Blainville's beaked
>
> [[Page 44283]]
>
> whale, and Hawaiian monk seal). Because these 22 species are
> unlikely
> to occur within the BSURE area, 86 FWS has not requested and
> NMFS has
> not proposed the issuance of take authorizations for them.
> Thus, NMFS
> does not consider these species further in this notice.
> We have reviewed 86 FWS's species descriptions,
> including life
> history information, distribution, regional distribution,
> diving
> behavior, and acoustics and hearing, for accuracy and
> completeness. We
> refer the reader to Sections 3 and 4 of 86 FWS's
> application and to
> Chapter 3 in 86 FWS's EA rather than reprinting the

> information here.
> Below, for those species that are likely to be taken by
> the
> activities described, we offer a brief introduction to the
> species and
> relevant stock as well as available information regarding
> population
> trends and threats, and describe any information regarding
> local
> occurrence.
>
> Dwarf Sperm Whale
>
> Dwarf sperm whales are found throughout the world in
> tropical to
> warm-temperate waters (Caretta et al., 2014). They are
> usually found in
> waters deeper than 500 m, most often sighted in depths
> between 500 and
> 1,000 m, but they have been documented in depths as shallow
> as 106 m
> and as deep as 4,700 m (Baird, in press). This species is
> often alone
> or in small groups of up to two to four individuals (average
> group size
> of 2.7 individuals), with a maximum group size observed of
> eight
> individuals (Baird, in press). When there are more than two
> animals
> together, they are often loosely associated, with up to
> several hundred
> meters between pairs of individuals (Baird, in press).
> There is one stock of dwarf sperm whales in Hawaii.
> Sighting data
> suggests a small resident population off Hawaii Island
> (Baird, in
> press). There are no current abundance estimates for this
> stock. In
> 2002, a survey off Hawaii estimated the abundance at 17,159;
> however,
> this data is outdated and is no longer used. PBR cannot be
> calculated
> due to insufficient data. It has been suggested that this
> species is
> probably one of the more abundant species of cetaceans in
> Hawaiian
> waters (Baird, in press). One of their main threats is
> interactions
> with fisheries; however, dwarf sperm whales are also
> sensitive to high-
> intensity underwater sounds and navy sonar testing. This
> stock is not
> listed as endangered under the ESA and is not considered
> strategic or
> designated as depleted under the MMPA (Caretta et al.,
> 2013).
>
> Pygmy Sperm Whale
>
> Pygmy killer whales are found in tropical and
> subtropical waters
> throughout the world (Ross and Leatherwood 1994). This
> species prefers
> deeper waters, with observations of this species in greater
> than 4,000

> m depth (Baird et al., 2013); and, based on stomach contents
> from
> stranded individuals, pygmy sperm whales forage between 600
> and 1,200 m
> depth (Baird, in press). Sightings are rare of this species,
> but
> observations include lone individuals or pairs, with an
> average group
> size of 1.5 individuals (Baird, in press).
> There is a single stock of Pygmy killer whales in
> Hawaii. Current
> abundance estimates for this stock are unknown. A 2002
> survey in Hawaii
> estimated 7,138 animals; however, this data is outdated and
> is no
> longer used. PBR cannot be calculated due to insufficient
> data.
> (Caretta et al., 2014). The main threats to this species are
> fisheries
> interactions and effects from underwater sounds such as
> active sonar
> (Caretta et al., 2014). This stock is not listed as
> endangered under
> the ESA, and is not considered strategic or designated as
> depleted
> under the MMPA (Caretta et al., 2014).
>
> Potential Effects of the Specified Activity on Marine
> Mammals and Their
> Habitat
>
> This section includes a summary and discussion of the
> ways that
> components (e.g., munition strikes and detonation effects)
> of the
> specified activity, including mitigation, may impact marine
> mammals and
> their habitat. The Estimated Take by Incidental Harassment
> section
> later in this document will include a quantitative analysis
> of the
> number of individuals that we expect 86 FWS to take during
> this
> activity. The Negligible Impact Analysis section will
> include the
> analysis of how this specific activity would impact marine
> mammals, and
> will consider the content of this section, the Estimated
> Take by
> Incidental Harassment 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 or stocks. In the
> following
> discussion, we provide general background information on
> sound and
> marine mammal hearing before considering potential effects
> to marine
> mammals from sound produced by surface detonations.
>
> Description of Sound Sources and WSEP Sound Types
>

> 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 (Hz) or cycles per second. Wavelength
> is the
> distance between two peaks of a sound wave. Amplitude is the
> height of
> the sound pressure wave or the ``loudness'' of a
> sound and is typically
> measured using the decibel (dB) scale. A dB is the ratio
> between a
> measured pressure (with sound) and a reference pressure
> (sound at a
> constant pressure, established by scientific standards). It
> is a
> logarithmic unit that accounts for large variations in
> amplitude;
> therefore, relatively small changes in dB ratings correspond
> to large
> changes in sound pressure. When referring to sound pressure
> levels
> (SPLs; the sound force per unit area), sound is referenced
> in the
> context of underwater sound pressure to 1 microPascal
> ([mu]Pa). One
> pascal is the pressure resulting from a force of one newton
> exerted
> over an area of one square meter. The source level (SL)
> represents the
> sound level at a distance of 1 m from the source (referenced
> to 1
> [mu]Pa). The received level is the sound level at the
> listener's
> position. Note that we reference all underwater sound levels
> in this
> document to a pressure of 1 [micro]Pa and all airborne sound
> levels in
> this document are referenced to a pressure of 20 [micro]Pa.
> Root mean square (rms) is the quadratic mean sound
> pressure over
> the duration of an impulse. Rms is calculated by squaring
> all of the
> sound amplitudes, averaging the squares, and then taking the
> square
> root of the average (Urick, 1983). Rms accounts for both
> positive and
> negative values; squaring the pressures makes all values
> positive so
> that one can account for the values 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.
> 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 all
> directions away from the source (similar to ripples on the
> surface of a
> pond), except in cases where the source is directional. The
> compressions and decompressions associated with sound waves
> are
>
> [[Page 44284]]
>
> 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. Ambient
> sound is defined as environmental background sound levels
> lacking a
> single source or point (Richardson et al., 1995), and 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.,
> waves, earthquakes, ice, atmospheric sound), biological
> (e.g., sounds
> produced by marine mammals, fish, and invertebrates), and
> anthropogenic
> sound (e.g., vessels, dredging, aircraft, construction). A
> number of
> sources contribute to ambient sound, including the following
>
> (Richardson et al., 1995):
> Wind and waves: The complex interactions between wind
> and
> water surface, including processes such as breaking waves
> and wave-
> induced bubble oscillations and cavitation, are a main
> source of
> naturally occurring ambient noise 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. Surf noise
> becomes
> important near shore, with measurements collected at a
> distance of 8.5
> km from shore showing an increase of 10 dB in the 100 to 700
> Hz band
> during heavy surf conditions.
> Precipitation: Sound from rain and hail impacting the
> water surface can become an important component of total
> noise at
> frequencies above 500 Hz, and possibly down to 100 Hz during
> quiet
> times.
> Biological: Marine mammals can contribute significantly
> to
> ambient noise levels, as can some fish and shrimp. The
> frequency band
> for biological contributions is from approximately 12 Hz to
> over 100
> kHz.
> Anthropogenic: Sources of ambient noise related to
> human

> activity include transportation (surface vessels and
> aircraft),
> dredging and construction, oil and gas drilling and
> production, seismic
> surveys, sonar, explosions, and ocean acoustic studies.
> Shipping noise
> typically dominates the total ambient noise 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 (Richardson et al., 1995). Sound from
> identifiable
> anthropogenic sources other than the activity of interest
> (e.g., a
> passing vessel) is sometimes termed background sound, as
> opposed to
> ambient sound.
> The sum of the various natural and anthropogenic sound
> sources at
> any given location and time–which comprise
> ``ambient'' or
> ``background'' sound–depends not only on the source
> levels (as
> determined by current weather conditions and levels of
> biological and
> shipping 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 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.
> The sounds produced by the proposed WSEP activities are
> considered
> impulsive, which is one of two general sound types, the
> other being
> non-pulsed. 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.
> Impulsive sound sources (e.g., 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; Harris, 1998; NIOSH, 1998; ISO, 2003) and occur
> either as
> isolated events or repeated in some succession. These sounds
> have 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.
>
> Marine Mammal Hearing
>
> Hearing is the most important sensory modality for
> marine mammals,
> and exposure to sound can have deleterious effects. To
> appropriately
> assess these potential effects, 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
> measured or estimated hearing ranges on the basis of
> available
> behavioral data, audiograms derived using auditory evoked
> potential
> techniques, anatomical modeling, and other data. The lower
> and/or upper
> frequencies for some of these functional hearing groups have
> been
> modified from those designated by Southall et al. (2007).
> The
> functional groups and the associated frequencies are
> indicated below
> (note that these frequency ranges do not necessarily
> correspond to the
> range of best hearing, which varies by species):
> Low frequency cetaceans (13 species of mysticetes):
> functional hearing is estimated to occur between
> approximately 7 Hz and
> 25 kHz (up to 30 kHz in some species), with best hearing
> estimated to
> be from 100 Hz to 8 kHz (Watkins, 1986; Ketten, 1998; Houser
> et al.,
> 2001; Au et al., 2006; Lucifredi and Stein, 2007; Ketten et
> al., 2007;
> Parks et al., 2007a; Ketten and Mountain, 2009; Tubelli et
> al., 2012);
> Mid-frequency cetaceans (32 species of dolphins, six
> species of larger toothed whales, and 19 species of beaked
> and

> bottlenose whales): functional hearing is estimated to occur
> between
> approximately 150 Hz and 160 kHz with best hearing from 10
> to less than
> 100 kHz (Johnson, 1967; White, 1977; Richardson et al.,
> 1995; Szymanski
> et al., 1999; Kastelein et al., 2003; Finneran et al.,
> 2005a, 2009;
> Nachtigall et al., 2005, 2008; Yuen et al., 2005; Popov et
> al., 2007;
> Au and Hastings, 2008; Houser et al., 2008; Pacini et al.,
> 2010, 2011;
> Schlundt et al., 2011);
> High frequency cetaceans (eight species of true
> porpoises,
> six species of river dolphins, and members of the genera
> Kogia and
> Cephalorhynchus; now considered to include two members of
> the genus
> Lagenorhynchus on the basis of recent echolocation data and
> genetic
> data [May-Collado and Agnarsson, 2006; Kyhn et al., 2009,
> 2010;
> Tougaard et al., 2010]): functional hearing is estimated to
> occur
> between approximately 200 Hz and 180 kHz (Popov and Supin,
> 1990a,b;
> Kastelein et al., 2002; Popov et al., 2005);
> Phocid pinnipeds in Water: functional hearing is
> estimated
> to occur between approximately 75 Hz and 100 kHz with best
> hearing
> between 1-50 kHz (M[oslash]hl, 1968; Terhune and Ronald,
> 1971, 1972;
> Richardson et al., 1995; Kastak and Schusterman, 1999;
>
> [[Page 44285]]
>
> Reichmuth, 2008; Kastelein et al., 2009); and
> Otariid pinnipeds in Water: functional hearing is
> estimated to occur between approximately 100 Hz and 48 kHz,
> with best
> hearing between 2-48 kHz (Schusterman et al., 1972; Moore
> and
> Schusterman, 1987; Babushina et al., 1991; Richardson et
> al., 1995;
> Kastak and Schusterman, 1998; Kastelein et al., 2005a;
> Mulsow and
> Reichmuth, 2007; Mulsow et al., 2011a, b).
> The pinniped functional hearing group was modified from
> Southall et
> al. (2007) on the basis of data indicating that phocid
> species have
> consistently demonstrated an extended frequency range of
> hearing
> compared to otariids, especially in the higher frequency
> range
> (Hemil[auml] et al., 2006; Kastelein et al., 2009; Reichmuth
> et al.,
> 2013).
> There are two marine mammal species (both cetaceans, the
> dwarf and
> pygmy sperm whale) with expected potential to co-occur with
> 86 FWS WSEP
> military readiness activities. The Kogia species are

> classified as
> high-frequency cetaceans. A species' functional hearing
> group is a
> consideration when we analyze the effects of exposure to
> sound on
> marine mammals.
>
> Acoustic Impacts
>
> Please refer to the information given previously
> (Description of
> Sound Sources) regarding sound, characteristics of sound
> types, and
> metrics used in this document. Anthropogenic sounds cover a
> broad range
> of frequencies and sound levels and can have a range of
> highly variable
> impacts on marine life, from none or minor to potentially
> severe
> responses, depending on received levels, duration of
> exposure,
> behavioral context, and various other factors. The potential
> effects of
> underwater sound from active acoustic sources can
> potentially result in
> one or more of the following: temporary or permanent hearing
>
> impairment, non-auditory physical or physiological effects,
> behavioral
> disturbance, stress, and masking (Richardson et al., 1995;
> Gordon et
> al., 2004; Nowacek et al., 2007; Southall et al., 2007;
> G[ouml]tz et
> al., 2009). The degree of effect is intrinsically related to
> the signal
> characteristics, received level, distance from the source,
> and duration
> of the sound exposure. In general, sudden, high level sounds
> can cause
> hearing loss, as can longer exposures to lower level sounds.
> Temporary
> or permanent loss of hearing will occur almost exclusively
> for noise
> within an animal's hearing range. We first describe
> specific
> manifestations of acoustic effects before providing
> discussion specific
> to 86 FWS's activities.
> Richardson et al. (1995) described zones of increasing
> intensity of
> effect that might be expected to occur, in relation to
> distance from a
> source and assuming that the signal is within an
> animal's hearing
> range. First is the area within which the acoustic signal
> would be
> audible (potentially perceived) to the animal, but not
> strong enough to
> elicit any overt behavioral or physiological response. The
> next zone
> corresponds with the area where the signal is audible to the
> animal and
> of sufficient intensity to elicit behavioral or
> physiological
> responsiveness. Third is a zone within which, for signals of

> high
> intensity, the received level is sufficient to potentially
> cause
> discomfort or tissue damage to auditory or other systems.
> Overlaying
> these zones to a certain extent is the area within which
> masking (i.e.,
> when a sound interferes with or masks the ability of an
> animal to
> detect a signal of interest that is above the absolute
> hearing
> threshold) may occur; the masking zone may be highly
> variable in size.
> We describe the more severe effects (i.e., certain
> non-auditory
> physical or physiological effects and mortality) only
> briefly as we do
> not expect that there is a reasonable likelihood that 86
> FWS's
> activities may result in such effects (see below for further
>
> discussion). Marine mammals exposed to high-intensity sound,
> or to
> lower-intensity sound for prolonged periods, can experience
> hearing
> threshold shift (TS), which is the loss of hearing
> sensitivity at
> certain frequency ranges (Kastak et al., 1999; Schlundt et
> al., 2000;
> Finneran et al., 2002, 2005b). TS can be permanent (PTS), in
> which case
> the loss of hearing sensitivity is not fully recoverable, or
> temporary
> (TTS), in which case the animal's hearing threshold
> would recover over
> time (Southall et al., 2007). Repeated sound exposure that
> leads to TTS
> could cause PTS. In severe cases of PTS, there can be total
> or partial
> deafness, while in most cases the animal has an impaired
> ability to
> hear sounds in specific frequency ranges (Kryter, 1985).
> When PTS occurs, there is physical damage to the sound
> receptors in
> the ear (i.e., tissue damage), whereas TTS represents
> primarily tissue
> fatigue and is reversible (Southall et al., 2007). In
> addition, other
> investigators have suggested that TTS is within the normal
> bounds of
> physiological variability and tolerance and does not
> represent physical
> injury (e.g., Ward, 1997). Therefore, NMFS does not consider
> TTS to
> constitute auditory injury.
> Relationships between TTS and PTS thresholds have not
> been studied
> in marine mammals–PTS data exists only for a single harbor
> seal
> (Kastak et al., 2008)–but are assumed to be similar to
> those in humans
> and other terrestrial mammals. PTS typically occurs at
> exposure levels
> at least several decibels above (a 40-dB threshold shift
> approximates

> PTS onset; e.g., Kryter et al., 1966; Miller, 1974) that
> inducing mild
> TTS (a 6-dB threshold shift approximates TTS onset; e.g.,
> Southall et
> al., 2007). Based on data from terrestrial mammals, a
> precautionary
> assumption is that the PTS thresholds for impulse sounds
> (such as
> bombs) are at least 6 dB higher than the TTS threshold on a
> peak-
> pressure basis and PTS cumulative sound exposure level
> thresholds are
> 15 to 20 dB higher than TTS cumulative sound exposure level
> thresholds
> (Southall et al., 2007). Given the higher level of sound or
> longer
> exposure duration necessary to cause PTS as compared with
> TTS, it is
> considerably less likely that PTS could occur.
> Non-auditory physiological effects or injuries that
> theoretically
> might occur in marine mammals exposed to high level
> underwater sound or
> as a secondary effect of extreme behavioral reactions (e.g.,
> change in
> dive profile as a result of an avoidance reaction) caused by
> exposure
> to sound include neurological effects, bubble formation,
> resonance
> effects, and other types of organ or tissue damage (Cox et
> al., 2006;
> Southall et al., 2007; Zimmer and Tyack, 2007). 86 FWS's
> activities
> involve the use of devices such as explosives that are
> associated with
> these types of effects; however, severe injury to marine
> mammals is not
> anticipated from these activities.
> When a live or dead marine mammal swims or floats onto
> shore and is
> incapable of returning to sea, the event is termed a
> ``stranding'' (16
> U.S.C. 1421h(3)). Marine mammals are known to strand for a
> variety of
> reasons, such as infectious agents, biotoxicosis,
> starvation, fishery
> interaction, ship strike, unusual oceanographic or weather
> events,
> sound exposure, or combinations of these stressors sustained
>
> concurrently or in series (e.g., Geraci et al., 1999).
> However, the
> cause or causes of most strandings are unknown (e.g., Best,
> 1982).
> Combinations of dissimilar stressors may combine to kill an
> animal or
> dramatically reduce its fitness, even though one exposure
> without the
> other would not be expected to produce the same outcome
> (e.g., Sih et
> al., 2004). For further description of stranding events
>
> [[Page 44286]]
>
> see, e.g., Southall et al., 2006; Jepson et al., 2013;

> Wright et al.,
> 2013.
> 1. Temporary threshold shift–TTS is the mildest form of
> hearing
> impairment that can occur during exposure to sound (Kryter,
> 1985).
> While experiencing TTS, the hearing threshold rises, and a
> sound must
> be at a higher level in order to be heard. In terrestrial
> and marine
> mammals, TTS can last from minutes or hours to days (in
> cases of strong
> TTS). In many cases, hearing sensitivity recovers rapidly
> after
> exposure to the sound ends. Few data on sound levels and
> durations
> necessary to elicit mild TTS have been obtained for marine
> mammals, and
> none of the data published at the time of this writing
> concern TTS
> elicited by exposure to multiple pulses of sound.
> Marine mammal hearing plays a critical role in
> communication with
> conspecifics, and interpretation of environmental cues for
> purposes
> such as predator avoidance and prey capture. Depending on
> the degree
> (elevation of threshold in dB), duration (i.e., recovery
> time), and
> frequency range of TTS, and the context in which it is
> experienced, TTS
> can have effects on marine mammals ranging from discountable
> to
> serious. For example, a marine mammal may be able to readily
> compensate
> for a brief, relatively small amount of TTS in a
> non-critical frequency
> range that occurs during a time where ambient noise is lower
> and there
> are not as many competing sounds present. Alternatively, a
> larger
> amount and longer duration of TTS sustained during time when
>
> communication is critical for successful mother/calf
> interactions could
> have more serious impacts.
> Currently, TTS data only exist for four species of
> cetaceans
> (bottlenose dolphin, beluga whale [Delphinapterus leucas],
> harbor
> porpoise [Phocoena phocoena], and Yangtze finless porpoise
> [Neophocoena
> asiaeorientalis]) and three species of pinnipeds (northern
> elephant
> seal [Mirounga angustirostris], harbor seal [Phoca
> vitulina], and
> California sea lion [Zalophus californianus]) exposed to a
> limited
> number of sound sources (i.e., mostly tones and octave-band
> noise) in
> laboratory settings (e.g., Finneran et al., 2002; Nachtigall
> et al.,
> 2004; Kastak et al., 2005; Lucke et al., 2009; Popov et al.,
> 2011). In
> general, harbor seals (Kastak et al., 2005; Kastelein et

> al., 2012a)
> and harbor porpoises (Lucke et al., 2009; Kastelein et al.,
> 2012b) have
> a lower TTS onset than other measured pinniped or cetacean
> species.
> Additionally, the existing marine mammal TTS data come from
> a limited
> number of individuals within these species. There are no
> data available
> on noise-induced hearing loss for mysticetes. For summaries
> of data on
> TTS in marine mammals or for further discussion of TTS onset
>
> thresholds, please see Southall et al. (2007) and Finneran
> and Jenkins
> (2012).
> 2. Behavioral effects–Behavioral disturbance may
> include a variety
> of effects, including subtle changes in behavior (e.g.,
> minor or brief
> avoidance of an area or changes in vocalizations), more
> conspicuous
> changes in similar behavioral activities, and more sustained
> and/or
> potentially severe reactions, such as displacement from or
> abandonment
> of high-quality habitat. Behavioral responses to sound are
> highly
> variable and context-specific and any reactions depend on
> numerous
> intrinsic and extrinsic factors (e.g., species, state of
> maturity,
> experience, current activity, reproductive state, auditory
> sensitivity,
> time of day), as well as the interplay between factors
> (e.g.,
> Richardson et al., 1995; Wartzok et al., 2003; Southall et
> al., 2007;
> Weilgart, 2007; Archer et al., 2010). Behavioral reactions
> can vary not
> only among individuals but also within an individual,
> depending on
> previous experience with a sound source, context, and
> numerous other
> factors (Ellison et al., 2012), and can vary depending on
> characteristics associated with the sound source (e.g.,
> whether it is
> moving or stationary, number of sources, distance from the
> source).
> Please see Appendices B-C of Southall et al. (2007) for a
> review of
> studies involving marine mammal behavioral responses to
> sound.
> Habituation can occur when an animal's response to a
> stimulus wanes
> with repeated exposure, usually in the absence of unpleasant
> associated
> events (Wartzok et al., 2003). Animals are most likely to
> habituate to
> sounds that are predictable and unvarying. It is important
> to note that
> habituation is appropriately considered as a ``progressive
> reduction in
> response to stimuli that are perceived as neither aversive
> nor

> beneficial," rather than as, more generally,
> moderation in response to
> human disturbance (Bejder et al., 2009). The opposite
> process is
> sensitization, when an unpleasant experience leads to
> subsequent
> responses, often in the form of avoidance, at a lower level
> of
> exposure. As noted, behavioral state may affect the type of
> response.
> For example, animals that are resting may show greater
> behavioral
> change in response to disturbing sound levels than animals
> that are
> highly motivated to remain in an area for feeding
> (Richardson et al.,
> 1995; NRC, 2003; Wartzok et al., 2003). Controlled
> experiments with
> captive marine mammals have shown pronounced behavioral
> reactions,
> including avoidance of loud sound sources (Ridgway et al.,
> 1997;
> Finneran et al., 2003). Observed responses of wild marine
> mammals to
> loud pulsed sound sources (typically seismic airguns or
> acoustic
> harassment devices) have been varied but often consist of
> avoidance
> behavior or other behavioral changes suggesting discomfort
> (Morton and
> Symonds, 2002; see also Richardson et al., 1995; Nowacek et
> al., 2007).
> Available studies show wide variation in response to
> underwater
> sound; therefore, it is difficult to predict specifically
> how any given
> sound in a particular instance might affect marine mammals
> perceiving
> the signal. If a marine mammal does react briefly to an
> underwater
> sound by changing its behavior or moving a small distance,
> the impacts
> of the change are unlikely to be significant to the
> individual, let
> alone the stock or population. However, if a sound source
> displaces
> marine mammals from an important feeding or breeding area
> for a
> prolonged period, impacts on individuals and populations
> could be
> significant (e.g., Lusseau and Bejder, 2007; Weilgart, 2007;
> NRC,
> 2005). However, there are broad categories of potential
> response, which
> we describe in greater detail here, that include alteration
> of dive
> behavior, alteration of foraging behavior, effects to
> breathing,
> interference with or alteration of vocalization, avoidance,
> and flight.
> Changes in dive behavior can vary widely and may consist
> of
> increased or decreased dive times and surface intervals as
> well as
> changes in the rates of ascent and descent during a dive

> (e.g., Frankel
> and Clark, 2000; Costa et al., 2003; Ng and Leung, 2003;
> Nowacek et
> al.; 2004; Goldbogen et al., 2013a,b). Variations in dive
> behavior may
> reflect interruptions in biologically significant activities
> (e.g.,
> foraging) or they may be of little biological significance.
> The impact
> of an alteration to dive behavior resulting from an acoustic
> exposure
> depends on what the animal is doing at the time of the
> exposure and the
> type and magnitude of the response.
> Disruption of feeding behavior can be difficult to
> correlate with
> anthropogenic sound exposure, so it is usually inferred by
> observed
> displacement from known foraging areas, the appearance of
> secondary
> indicators (e.g., bubble nets or sediment plumes), or
> changes in dive
> behavior. As for other types of behavioral response, the
> frequency,
> duration, and temporal pattern of signal presentation, as
> well as
> differences in species sensitivity, are likely contributing
> factors to
> differences in response in any given circumstance
>
> [[Page 44287]]
>
> (e.g., Croll et al., 2001; Nowacek et al.; 2004; Madsen et
> al., 2006;
> Yazvenko et al., 2007). A determination of whether foraging
> disruptions
> incur fitness consequences would require information on or
> estimates of
> the energetic requirements of the affected individuals and
> the
> relationship between prey availability, foraging effort and
> success,
> and the life history stage of the animal.
> Variations in respiration naturally vary with different
> behaviors
> and alterations to breathing rate as a function of acoustic
> exposure
> can be expected to co-occur with other behavioral reactions,
> such as a
> flight response or an alteration in diving. However,
> respiration rates
> in and of themselves may be representative of annoyance or
> an acute
> stress response. Various studies have shown that respiration
> rates may
> either be unaffected or could increase, depending on the
> species and
> signal characteristics, again highlighting the importance in
>
> understanding species differences in the tolerance of
> underwater noise
> when determining the potential for impacts resulting from
> anthropogenic
> sound exposure (e.g., Kastelein et al., 2001, 2005b, 2006;
> Gailey et

> al., 2007).
> Marine mammals vocalize for different purposes and
> across multiple
> modes, such as whistling, echolocation click production,
> calling, and
> singing. Changes in vocalization behavior in response to
> anthropogenic
> noise can occur for any of these modes and may result from a
> need to
> compete with an increase in background noise or may reflect
> increased
> vigilance or a startle response. For example, in the
> presence of
> potentially masking signals, humpback whales and killer
> whales have
> been observed to increase the length of their songs (Miller
> et al.,
> 2000; Fristrup et al., 2003; Foote et al., 2004), while
> right whales
> have been observed to shift the frequency content of their
> calls upward
> while reducing the rate of calling in areas of increased
> anthropogenic
> noise (Parks et al., 2007b). In some cases, animals may
> cease sound
> production during production of aversive signals (Bowles et
> al., 1994).
> Avoidance is the displacement of an individual from an
> area or
> migration path as a result of the presence of a sound or
> other
> stressors, and is one of the most obvious manifestations of
> disturbance
> in marine mammals (Richardson et al., 1995). For example,
> gray whales
> are known to change direction–deflecting from customary
> migratory
> paths–in order to avoid noise from seismic surveys (Malme
> et al.,
> 1984). Avoidance may be short-term, with animals returning
> to the area
> once the noise has ceased (e.g., Bowles et al., 1994; Goold,
> 1996;
> Stone et al., 2000; Morton and Symonds, 2002; Gailey et al.,
> 2007).
> Longer-term displacement is possible, however, which may
> lead to
> changes in abundance or distribution patterns of the
> affected species
> in the affected region if habituation to the presence of the
> sound does
> not occur (e.g., Blackwell et al., 2004; Bejder et al.,
> 2006; Teilmann
> et al., 2006).
> A flight response is a dramatic change in normal
> movement to a
> directed and rapid movement away from the perceived location
> of a sound
> source. The flight response differs from other avoidance
> responses in
> the intensity of the response (e.g., directed movement, rate
> of
> travel). Relatively little information on flight responses
> of marine
> mammals to anthropogenic signals exist, although

> observations of flight
> responses to the presence of predators have occurred (Connor
> and
> Heithaus, 1996). The result of a flight response could range
> from
> brief, temporary exertion and displacement from the area
> where the
> signal provokes flight to, in extreme cases, marine mammal
> strandings
> (Evans and England, 2001). However, it should be noted that
> response to
> a perceived predator does not necessarily invoke flight
> (Ford and
> Reeves, 2008), and whether individuals are solitary or in
> groups may
> influence the response.
> Behavioral disturbance can also impact marine mammals in
> more
> subtle ways. Increased vigilance may result in costs related
> to
> diversion of focus and attention (i.e., when a response
> consists of
> increased vigilance, it may come at the cost of decreased
> attention to
> other critical behaviors such as foraging or resting). These
> effects
> have generally not been demonstrated for marine mammals, but
> studies
> involving fish and terrestrial animals have shown that
> increased
> vigilance may substantially reduce feeding rates (e.g.,
> Beauchamp and
> Livoreil, 1997; Fritz et al., 2002; Purser and Radford,
> 2011). In
> addition, chronic disturbance can cause population declines
> through
> reduction of fitness (e.g., decline in body condition) and
> subsequent
> reduction in reproductive success, survival, or both (e.g.,
> Harrington
> and Veitch, 1992; Daan et al., 1996; Bradshaw et al., 1998).
> However,
> Ridgway et al. (2006) reported that increased vigilance in
> bottlenose
> dolphins exposed to sound over a five-day period did not
> cause any
> sleep deprivation or stress effects.
> Many animals perform vital functions, such as feeding,
> resting,
> traveling, and socializing, on a diel cycle (24-hour cycle).
> Disruption
> of such functions resulting from reactions to stressors such
> as sound
> exposure are more likely to be significant if they last more
> than one
> diel cycle or recur on subsequent days (Southall et al.,
> 2007).
> Consequently, a behavioral response lasting less than one
> day and not
> recurring on subsequent days is not considered particularly
> severe
> unless it could directly affect reproduction or survival
> (Southall et
> al., 2007). Note that there is a difference between
> multi-day

> substantive behavioral reactions and multi-day anthropogenic
> activities. For example, just because an activity lasts for
> multiple
> days does not necessarily mean that individual animals are
> either
> exposed to activity-related stressors for multiple days or,
> further,
> exposed in a manner resulting in sustained multi-day
> substantive
> behavioral responses.
> 3. Stress responses–An animal's perception of a
> threat may be
> sufficient to trigger stress responses consisting of some
> combination
> of behavioral responses, autonomic nervous system responses,
> neuroendocrine responses, or immune responses (e.g., Seyle,
> 1950;
> Moberg, 2000). In many cases, an animal's first and
> sometimes most
> economical (in terms of energetic costs) response is
> behavioral
> avoidance of the potential stressor. Autonomic nervous
> system responses
> to stress typically involve changes in heart rate, blood
> pressure, and
> gastrointestinal activity. These responses have a relatively
> short
> duration and may or may not have a significant long-term
> effect on an
> animal's fitness.
> Neuroendocrine stress responses often involve the
> hypothalamus-
> pituitary-adrenal system. Virtually all neuroendocrine
> functions that
> are affected by stress–including immune competence,
> reproduction,
> metabolism, and behavior–are regulated by pituitary
> hormones. Stress-
> induced changes in the secretion of pituitary hormones have
> been
> implicated in failed reproduction, altered metabolism,
> reduced immune
> competence, and behavioral disturbance (e.g., Moberg, 1987;
> Blecha,
> 2000). Increases in the circulation of glucocorticoids are
> also equated
> with stress (Romano et al., 2004).
> The primary distinction between stress (which is
> adaptive and does
> not normally place an animal at risk) and
> ``distress'' is the cost of
> the response. During a stress response, an animal uses
> glycogen stores
> that can be quickly replenished once the stress is
> alleviated. In such
> circumstances, the cost of the stress response would not
> pose serious
> fitness consequences. However, when an animal does not have
> sufficient
> energy reserves to satisfy the energetic costs of a stress
> response,
> energy
>

> [[Page 44288]]
>
> resources must be diverted from other functions. This state
> of distress
> will last until the animal replenishes its energetic
> reserves
> sufficient to restore normal function.
> Relationships between these physiological mechanisms,
> animal
> behavior, and the costs of stress responses are well-studied
> through
> controlled experiments and for both laboratory and
> free-ranging animals
> (e.g., Holberton et al., 1996; Hood et al., 1998; Jessop et
> al., 2003;
> Krausman et al., 2004; Lankford et al., 2005). Stress
> responses due to
> exposure to anthropogenic sounds or other stressors and
> their effects
> on marine mammals have also been reviewed (Fair and Becker,
> 2000;
> Romano et al., 2002b) and, more rarely, studied in wild
> populations
> (e.g., Romano et al., 2002a). For example, Rolland et al.
> (2012) found
> that noise reduction from reduced ship traffic in the Bay of
> Fundy was
> associated with decreased stress in North Atlantic right
> whales. These
> and other studies lead to a reasonable expectation that some
> marine
> mammals will experience physiological stress responses upon
> exposure to
> acoustic stressors and that it is possible that some of
> these would be
> classified as ``distress.'' In addition, any animal
> experiencing TTS
> would likely also experience stress responses (NRC, 2003).
> 4. Auditory masking–Sound can disrupt behavior through
> masking, or
> interfering with, an animal's ability to detect,
> recognize, or
> discriminate between acoustic signals of interest (e.g.,
> those used for
> intraspecific communication and social interactions, prey
> detection,
> predator avoidance, navigation) (Richardson et al., 1995).
> Masking
> occurs when the receipt of a sound is interfered with by
> another
> coincident sound at similar frequencies and at similar or
> higher
> intensity, and may occur whether the sound is natural (e.g.,
> snapping
> shrimp, wind, waves, precipitation) or anthropogenic (e.g.,
> shipping,
> sonar, seismic exploration) in origin. The ability of a
> noise source to
> mask biologically important sounds depends on the
> characteristics of
> both the noise source and the signal of interest (e.g.,
> signal-to-noise
> ratio, temporal variability, direction), in relation to each
> other and
> to an animal's hearing abilities (e.g., sensitivity,

> frequency range,
> critical ratios, frequency discrimination, directional
> discrimination,
> age or TTS hearing loss), and existing ambient noise and
> propagation
> conditions.
> Under certain circumstances, marine mammals experiencing
>
> significant masking could also be impaired from maximizing
> their
> performance fitness in survival and reproduction. Therefore,
> when the
> coincident (masking) sound is man-made, it may be considered
> harassment
> when disrupting or altering critical behaviors. It is
> important to
> distinguish TTS and PTS, which persist after the sound
> exposure, from
> masking, which occurs during the sound exposure. Because
> masking
> (without resulting in TS) is not associated with abnormal
> physiological
> function, it is not considered a physiological effect, but
> rather a
> potential behavioral effect.
> The frequency range of the potentially masking sound is
> important
> in determining any potential behavioral impacts. For
> example, low-
> frequency signals may have less effect on high-frequency
> echolocation
> sounds produced by odontocetes but are more likely to affect
> detection
> of mysticete communication calls and other potentially
> important
> natural sounds such as those produced by surf and some prey
> species.
> The masking of communication signals by anthropogenic noise
> may be
> considered as a reduction in the communication space of
> animals (e.g.,
> Clark et al., 2009) and may result in energetic or other
> costs as
> animals change their vocalization behavior (e.g., Miller et
> al., 2000;
> Foote et al., 2004; Parks et al., 2007b; Di Iorio and Clark,
> 2009; Holt
> et al., 2009). Masking can be reduced in situations where
> the signal
> and noise come from different directions (Richardson et al.,
> 1995),
> through amplitude modulation of the signal, or through other
>
> compensatory behaviors (Houser and Moore, 2014). Masking can
> be tested
> directly in captive species (e.g., Erbe, 2008), but in wild
> populations
> it must be either modeled or inferred from evidence of
> masking
> compensation. There are few studies addressing real-world
> masking
> sounds likely to be experienced by marine mammals in the
> wild (e.g.,
> Branstetter et al., 2013).
> Masking affects both senders and receivers of acoustic

> signals and
> can potentially have long-term chronic effects on marine
> mammals at the
> population level as well as at the individual level.
> Low-frequency
> ambient sound levels have increased by as much as 20 dB
> (more than
> three times in terms of SPL) in the world's ocean from
> pre-industrial
> periods, with most of the increase from distant commercial
> shipping
> (Hildebrand, 2009). All anthropogenic sound sources, but
> especially
> chronic and lower-frequency signals (e.g., from vessel
> traffic),
> contribute to elevated ambient sound levels, thus
> intensifying masking.
> The LRS WSEP training exercises proposed for the
> incidental take of
> marine mammals have the potential to take marine mammals by
> exposing
> them to impulsive noise and pressure waves generated by live
> ordnance
> detonation at the surface of the water. Exposure to energy,
> pressure,
> or direct strike by ordnance has the potential to result in
> non-lethal
> injury (Level A harassment), disturbance (Level B
> harassment), serious
> injury, and/or mortality. In addition, NMFS also considered
> the
> potential for harassment from vessel and aircraft
> operations.
>
> Acoustic Effects, Underwater
>
> Explosive detonations at the water surface send a shock
> wave and
> sound energy through the water and can release gaseous
> by-products,
> create an oscillating bubble, or cause a plume of water to
> shoot up
> from the water surface. The shock wave and accompanying
> noise are of
> most concern to marine animals. Depending on the intensity
> of the shock
> wave and size, location, and depth of the animal, an animal
> can be
> injured, killed, suffer non-lethal physical effects,
> experience hearing
> related effects with or without behavioral responses, or
> exhibit
> temporary behavioral responses or tolerance from hearing the
> blast
> sound. Generally, exposures to higher levels of impulse and
> pressure
> levels would result in greater impacts to an individual
> animal.
> The effects of underwater detonations on marine mammals
> are
> dependent on several factors, including the size, type, and
> depth of
> the animal; the depth, intensity, and duration of the sound;
> the depth
> of the water column; the substrate of the habitat; the

> standoff
> distance between activities and the animal; and the sound
> propagation
> properties of the environment. Thus, we expect impacts to
> marine
> mammals from LRS WSEP activities to result primarily from
> acoustic
> pathways. As such, the degree of the effect relates to the
> received
> level and duration of the sound exposure, as influenced by
> the distance
> between the animal and the source. The further away from the
> source,
> the less intense the exposure should be.
> The potential effects of underwater detonations from the
> proposed
> LRS WSEP training activities may include one or more of the
> following:
> temporary or permanent hearing impairment, non-auditory
> physical or
> physiological effects, behavioral disturbance, and masking
> (Richardson
> et al., 1995; Gordon et al., 2004; Nowacek et al., 2007;
> Southall et
> al., 2007). However, the effects of noise on marine mammals
> are highly
> variable, often depending on
>
> [[Page 44289]]
>
> species and contextual factors (based on Richardson et al.,
> 1995).
> In the absence of mitigation, impacts to marine species
> could
> result from physiological and behavioral responses to both
> the type and
> strength of the acoustic signature (Viada et al., 2008). The
> type and
> severity of behavioral impacts are more difficult to define
> due to
> limited studies addressing the behavioral effects of
> impulsive sounds
> on marine mammals.
> Hearing Impairment and Other Physical Effects–Marine
> mammals
> exposed to high intensity sound repeatedly or for prolonged
> periods can
> experience hearing threshold shift. Given the available
> data, the
> received level of a single pulse (with no frequency
> weighting) might
> need to be approximately 186 dB re 1 [mu]Pa2-s (i.e., 186 dB
> sound
> exposure level (SEL) or approximately 221-226 dB p-p (peak))
> in order
> to produce brief, mild TTS. Exposure to several strong
> pulses that each
> have received levels near 190 dB rms (175-180 dB SEL) might
> result in
> cumulative exposure of approximately 186 dB SEL and thus
> slight TTS in
> a small odontocete, assuming the TTS threshold is (to a
> first
> approximation) a function of the total received pulse
> energy.

> Non-auditory Physiological Effects–Non-auditory
> physiological
> effects or injuries that theoretically might occur in marine
> mammals
> exposed to strong underwater sound include stress and other
> types of
> organ or tissue damage (Cox et al., 2006; Southall et al.,
> 2007).
> Serious Injury/Mortality: 86 FWS proposes to use surface
>
> detonations in its training exercises. The explosions from
> these
> weapons would send a shock wave and blast noise through the
> water,
> release gaseous by-products, create an oscillating bubble,
> and cause a
> plume of water to shoot up from the water surface. The shock
> wave and
> blast noise are of most concern to marine animals. In
> general,
> potential impacts from explosive detonations can range from
> brief
> effects (such as short term behavioral disturbance), tactile
>
> perception, physical discomfort, slight injury of the
> internal organs,
> and death of the animal (Yelverton et al., 1973;
> O'Keeffe and Young,
> 1984; DoN, 2001). The effects of an underwater explosion on
> a marine
> mammal depend on many factors, including: the size, type,
> and depth of
> both the animal and the explosive charge; the depth of the
> water
> column; the standoff distance between the charge and the
> animal, and
> the sound propagation properties of the environment.
> Physical damage of
> tissues resulting from a shock wave (from an explosive
> detonation)
> constitutes an injury. Blast effects are greatest at the
> gas-liquid
> interface (Landsberg, 2000) and gas containing organs,
> particularly the
> lungs and gastrointestinal tract, are especially susceptible
> to damage
> (Goertner, 1982; Yelverton et al., 1973). Nasal sacs,
> larynx, pharynx,
> trachea, and lungs may be damaged by compression/expansion
> caused by
> the oscillations of the blast gas bubble (Reidenberg and
> Laitman,
> 2003). Severe damage (from the shock wave) to the ears can
> include
> tympanic membrane rupture, fracture of the ossicles,
> cochlear damage,
> hemorrhage, and cerebrospinal fluid leakage into the middle
> ear.
> Non-lethal injury includes slight injury to internal
> organs and the
> auditory system; however, delayed lethality can be a result
> of
> individual or cumulative sublethal injuries (DoN, 2001).
> Immediate
> lethal injury would be a result of massive combined trauma

> to internal
> organs as a direct result of proximity to the point of
> detonation (DoN,
> 2001).
>
> Disturbance Reactions
>
> Disturbance includes a variety of effects, including
> subtle changes
> in behavior, more conspicuous changes in activities, and
> displacement.
> Numerous studies have shown that underwater sounds are often
> readily
> detectable by marine mammals in the water at distances of
> many
> kilometers. However, other studies have shown that marine
> mammals at
> distances more than a few kilometers away often show no
> apparent
> response to activities of various types (Miller et al.,
> 2005). This is
> often true even in cases when the sounds must be readily
> audible to the
> animals based on measured received levels and the hearing
> sensitivity
> of that mammal group. Although various baleen whales,
> toothed whales,
> and (less frequently) pinnipeds have been shown to react
> behaviorally
> to underwater sound from impulsive sources such as airguns,
> at other
> times, mammals of all three types have shown no overt
> reactions (e.g.,
> Malme et al., 1986; Richardson et al., 1995; Madsen and
> Mohl, 2000;
> Croll et al., 2001; Jacobs and Terhune, 2002; Madsen et al.,
> 2002;
> MacLean and Koski, 2005; Miller et al., 2005; Bain and
> Williams, 2006).
> Controlled experiments with captive marine mammals
> showed
> pronounced behavioral reactions, including avoidance of loud
> sound
> sources (Ridgway et al., 1997; Finneran et al., 2003).
> Observed
> responses of wild marine mammals to loud pulsed sound
> sources
> (typically seismic guns or acoustic harassment devices) have
> been
> varied but often consist of avoidance behavior or other
> behavioral
> changes suggesting discomfort (Morton and Symonds, 2002;
> Thorson and
> Reyff, 2006; see also Gordon et al., 2004; Wartzok et al.,
> 2003;
> Nowacek et al., 2007).
> Because the few available studies show wide variation in
> response
> to underwater sound, it is difficult to quantify exactly how
> sound from
> the LRS WSEP operational testing would affect marine
> mammals. It is
> likely that the onset of surface detonations could result in
> temporary,
> short term changes in an animal's typical behavior

> and/or avoidance of
> the affected area. These behavioral changes may include
> (Richardson et
> al., 1995): changing durations of surfacing and dives,
> number of blows
> per surfacing, or moving direction and/or speed;
> reduced/increased
> vocal activities; changing/cessation of certain behavioral
> activities
> (such as socializing or feeding); visible startle response
> or
> aggressive behavior (such as tail/fluke slapping or jaw
> clapping); or
> avoidance of areas where sound sources are located.
> The biological significance of any of these behavioral
> disturbances
> is difficult to predict, especially if the detected
> disturbances appear
> minor. However generally, one could expect the consequences
> of
> behavioral modification to be biologically significant if
> the change
> affects growth, survival, or reproduction. Significant
> behavioral
> modifications that could potentially lead to effects on
> growth,
> survival, or reproduction include:
> Drastic changes in diving/surfacing patterns (such as
> those thought to cause beaked whale stranding due to
> exposure to
> military mid-frequency tactical sonar);
> Habitat abandonment due to loss of desirable acoustic
> environment; and
> Cessation of feeding or social interaction.
> The onset of behavioral disturbance from anthropogenic
> sound
> depends on both external factors (characteristics of sound
> sources and
> their paths) and the specific characteristics of the
> receiving animals
> (hearing, motivation, experience, demography) and is
> difficult to
> predict (Southall et al., 2007).
>
> Auditory Masking
>
> Natural and artificial sounds can disrupt behavior by
> masking, or
> interfering with, a marine mammal's ability to hear
> other sounds.
> Masking occurs when the receipt of a sound interferes with
> by another
> coincident sound at similar frequencies and at similar or
> higher levels
> (Clark et al., 2009). While it may occur temporarily,
>
> [[Page 44290]]
>
> we do not expect auditory masking to result in detrimental
> impacts to
> an individual's or population's survival, fitness,
> or reproductive
> success. Dolphin movement is not restricted within the BSURE
> area,
> allowing for movement out of the area to avoid masking

> impacts and the
> sound resulting from the detonations is short in duration.
> Also,
> masking is typically of greater concern for those marine
> mammals that
> utilize low frequency communications, such as baleen whales
> and, as
> such, is not likely to occur for marine mammals in the BSURE
> area.
>
> Vessel and Aircraft Presence
>
> The marine mammals most vulnerable to vessel strikes are
> slow-
> moving and/or spend extended periods of time at the surface
> in order to
> restore oxygen levels within their tissues after deep dives
> (e.g.,
> North Atlantic right whales (Eubalaena glacialis), fin
> whales, and
> sperm whales). Smaller marine mammals are agile and move
> more quickly
> through the water, making them less susceptible to ship
> strikes. NMFS
> and 86 FWS are not aware of any vessel strikes of dwarf and
> pygmy sperm
> whales within in BSURE area during training operations, and
> both
> parties do not anticipate that potential 86 FWS vessels
> engaged in the
> specified activity would strike any marine mammals.
> Dolphins within Hawaiian waters are exposed to
> recreational,
> commercial, and military vessels. Behaviorally, marine
> mammals may or
> may not respond to the operation of vessels and associated
> noise.
> Responses to vessels vary widely among marine mammals in
> general, but
> also among different species of small cetaceans. Responses
> may include
> attraction to the vessel (Richardson et al., 1995); altering
> travel
> patterns to avoid vessels (Constantine, 2001; Nowacek et
> al., 2001;
> Lusseau, 2003, 2006); relocating to other areas (Allen and
> Read, 2000);
> cessation of feeding, resting, and social interaction (Baker
> et al.,
> 1983; Bauer and Herman, 1986; Hall, 1982; Krieger and Wing,
> 1984;
> Lusseau, 2003; Constantine et al., 2004); abandoning
> feeding, resting,
> and nursing areas (Jurasz and Jurasz 1979; Dean et al.,
> 1985; Glockner-
> Ferrari and Ferrari, 1985, 1990; Lusseau, 2005; Norris et
> al., 1985;
> Salden, 1988; Forest, 2001; Morton and Symonds, 2002;
> Courbis, 2004;
> Bejder, 2006); stress (Romano et al., 2004); and changes in
> acoustic
> behavior (Van Parijs and Corkeron, 2001). However, in some
> studies
> marine mammals display no reaction to vessels (Watkins,
> 1986; Nowacek

> et al., 2003) and many odontocetes show considerable
> tolerance to
> vessel traffic (Richardson et al., 1995). Dolphins may
> actually reduce
> the energetic cost of traveling by riding the bow or stern
> waves of
> vessels (Williams et al., 1992; Richardson et al., 1995).
> Aircraft produce noise at frequencies that are well
> within the
> frequency range of cetacean hearing and also produce visual
> signals
> such as the aircraft itself and its shadow (Richardson et
> al., 1995,
> Richardson and Wursig, 1997). A major difference between
> aircraft noise
> and noise caused by other anthropogenic sources is that the
> sound is
> generated in the air, transmitted through the water surface
> and then
> propagates underwater to the receiver, diminishing the
> received levels
> significantly below what is heard above the water's
> surface. Sound
> transmission from air to water is greatest in a sound cone
> 26 degrees
> directly under the aircraft.
> There are fewer reports of reactions of odontocetes to
> aircraft
> than those of pinnipeds. Responses to aircraft by pinnipeds
> include
> diving, slapping the water with pectoral fins or tail fluke,
> or
> swimming away from the track of the aircraft (Richardson et
> al., 1995).
> The nature and degree of the response, or the lack thereof,
> are
> dependent upon the nature of the flight (e.g., type of
> aircraft,
> altitude, straight vs. circular flight pattern). Wursig et
> al. (1998)
> assessed the responses of cetaceans to aerial surveys in the
> north
> central and western Gulf of Mexico using a DeHavilland Twin
> Otter
> fixed-wing airplane. The plane flew at an altitude of 229 m
> (751.3 ft)
> at 204 km/hr (126.7 mph) and maintained a minimum of 305 m
> (1,000 ft)
> straight line distance from the cetaceans. Water depth was
> 100 to 1,000
> m (328 to 3,281 ft). Bottlenose dolphins most commonly
> responded by
> diving (48 percent), while 14 percent responded by moving
> away. Other
> species (e.g., beluga (Delphinapterus leucas) and sperm
> whales) show
> considerable variation in reactions to aircraft but diving
> or swimming
> away from the aircraft are the most common reactions to low
> flights
> (less than 500 m; 1,640 ft).
>
> Direct Strike by Ordnance
>
> Another potential risk to marine mammals is direct

> strike by
> ordnance, in which the ordnance physically hits an animal.
> While strike
> from an item at the surface of the water while the animals
> is at the
> surface is possible, the potential risk of a direct hit to
> an animal
> within the target area would be so low because marine
> mammals spend the
> majority of their time below the surface of the water, and
> the
> potential for one bomb or missile to hit that animal at that
> specific
> time is highly unlikely since there are only a total of
> eight bombs on
> one day.
>
> Anticipated Effects on Habitat
>
> Detonations of live ordnance would result in temporary
> changes to
> the water environment. An explosion on the surface of the
> water from
> these weapons could send a shock wave and blast noise
> through the
> water, release gaseous by-products, create an oscillating
> bubble, and
> cause a plume of water to shoot up from the water surface.
> However,
> these effects would be temporary and not expected to last
> more than a
> few seconds. Similarly, 86 FWS does not expect any long-term
> impacts
> with regard to hazardous constituents to occur. 86 FWS
> considered the
> introduction of fuel, debris, ordnance, and chemical
> materials into the
> water column within its EA and determined the potential
> effects of each
> to be insignificant. We summarize 86 FWS's analyses in
> the following
> paragraphs (for a complete discussion of potential effects,
> please
> refer to section 3.0 in 86 FWS's EA).
> Metals typically used to construct bombs and missiles
> include
> aluminum, steel, and lead, among others. Aluminum is also
> present in
> some explosive materials. These materials would settle to
> the seafloor
> after munitions detonate. Metal ions would slowly leach into
> the
> substrate and the water column, causing elevated
> concentrations in a
> small area around the munitions fragments. Some of the
> metals, such as
> aluminum, occur naturally in the ocean at varying
> concentrations and
> would not necessarily impact the substrate or water column.
> Other
> metals, such as lead, could cause toxicity in microbial
> communities in
> the substrate. However, such effects would be localized to a
> very small
> distance around munitions fragments and would not

> significantly affect
> the overall habitat quality of sediments in the BSURE area.
> In
> addition, metal fragments would corrode, degrade, and become
> encrusted
> over time.
> Chemical materials include explosive byproducts and also
> fuel, oil,
> and other fluids associated with remotely controlled target
> boats.
> Explosive byproducts would be introduced into the water
> column through
> detonation of live munitions. Explosive materials would
> include 2,4,6-
> trinitrotoluene (TNT) and research department explosive
> (RDX), among
> others. Various byproducts are produced during and
> immediately after
> detonation of TNT and RDX. During the very brief time that a
> detonation
> is in progress, intermediate products may include carbon
> ions,
>
> [[Page 44291]]
>
> nitrogen ions, oxygen ions, water, hydrogen cyanide, carbon
> monoxide,
> nitrogen gas, nitrous oxide, cyanic acid, and carbon dioxide
> (Becker,
> 1995). However, reactions quickly occur between the
> intermediates, and
> the final products consist mainly of water, carbon monoxide,
> carbon
> dioxide, and nitrogen gas, although small amounts of other
> compounds
> are typically produced as well.
> Chemicals introduced into the water column would be
> quickly
> dispersed by waves, currents, and tidal action, and
> eventually become
> uniformly distributed. A portion of the carbon compounds
> such as carbon
> monoxide and carbon dioxide would likely become integrated
> into the
> carbonate system (alkalinity and pH buffering capacity of
> seawater).
> Some of the nitrogen and carbon compounds, including
> petroleum
> products, would be metabolized or assimilated by
> phytoplankton and
> bacteria. Most of the gas products that do not react with
> the water or
> become assimilated by organisms would be released into the
> atmosphere.
> Due to dilution, mixing, and transformation, none of these
> chemicals
> are expected to have significant impacts on the marine
> environment.
> Explosive material that is not consumed in a detonation
> could sink
> to the substrate and bind to sediments. However, the
> quantity of such
> materials is expected to be inconsequential. Research has
> shown that if
> munitions function properly, nearly full combustion of the

> explosive
> materials will occur, and only extremely small amounts of
> raw material
> will remain. In addition, any remaining materials would be
> naturally
> degraded. TNT decomposes when exposed to sunlight
> (ultraviolet
> radiation), and is also degraded by microbial activity
> (Becker, 1995).
> Several types of microorganisms have been shown to
> metabolize TNT.
> Similarly, RDX decomposes by hydrolysis, ultraviolet
> radiation
> exposure, and biodegradation.
> While we anticipate that the specified activity may
> result in
> marine mammals avoiding certain areas due to temporary
> ensonification,
> this impact to habitat and prey resources would be temporary
> and
> reversible. The main impact associated with the proposed
> activity would
> be temporarily elevated noise levels and the associated
> direct effects
> on marine mammals, previously discussed in this notice.
> Marine mammals
> are anticipated to temporarily vacate the area of live
> detonations.
> However, these events are usually of short duration, and
> animals are
> anticipated to return to the activity area during periods of
> non-
> activity. Thus, based on the preceding discussion, we do not
> anticipate
> that the proposed activity would have any habitat-related
> effects that
> could cause significant or long-term consequences for
> individual marine
> mammals or their populations.
>
> Proposed Mitigation
>
> In order to issue an incidental take authorization under
> section
> 101(a)(5)(D) of the MMPA, NMFS must set forth the
> permissible methods
> of taking pursuant to such activity, and other means of
> effecting the
> least practicable adverse impact on such species or stock
> and its
> habitat, paying particular attention to rookeries, mating
> grounds, and
> areas of similar significance, and the availability of such
> species or
> stock for taking for certain subsistence uses (where
> relevant).
> The NDAA of 2004 amended the MMPA as it relates to
> military-
> readiness activities and the incidental take authorization
> process such
> that ``least practicable adverse impact'' shall
> include consideration
> of personnel safety, practicality of implementation, and
> impact on the
> effectiveness of the military readiness activity.

> NMFS and 86 FWS have worked to identify potential
> practicable and
> effective mitigation measures, which include a careful
> balancing of the
> likely benefit of any particular measure to the marine
> mammals with the
> likely effect of that measure on personnel safety,
> practicality of
> implementation, and impact on the ``military-readiness
> activity.'' We
> refer the reader to Section 11 of 86 FWS's application
> for more
> detailed information on the proposed mitigation measures
> which include
> the following:
> Visual Aerial Surveys: For the LRS WSEP activities,
> mitigation
> procedures consist of visual aerial surveys of the impact
> area for the
> presence of protected marine species (including marine
> mammals). During
> aerial observation, Navy test range personnel may survey the
> area from
> an S-61N helicopter or C-62 aircraft that is based at the
> PMRF land
> facility (typically when missions are located relatively
> close to
> shore). Alternatively, when missions are located farther
> offshore,
> surveys may be conducted from mission aircraft (typically
> jet aircraft
> such as F-15E, F-16, or F-22) or a U.S. Coast Guard C-130
> aircraft.
> Protected species surveys typically begin within one
> hour of weapon
> release and as close to the impact time as feasible, given
> human safety
> requirements. Survey personnel must depart the human hazard
> zone before
> weapon release, in accordance with Navy safety standards.
> Personnel
> conduct aerial surveys within an area defined by an
> approximately 2-NM
> (3,704 m) radius around the impact point, with surveys
> typically flown
> in a star pattern. This survey distance is consistent with
> requirements
> already in place for similar actions at PMRF and encompasses
> the entire
> TTS threshold ranges (SEL) for mid-frequency cetaceans
> (Table 5). For
> species in which potential exposures have been calculated
> (dwarf sperm
> whale and pygmy sperm whale), the survey distance would
> cover over half
> of the PTS SEL range. Given operational constraints,
> surveying these
> larger areas would not be feasible.
> Observers would consist of aircrew operating the C-26,
> S-61N, and
> C-130 aircraft from PMRF and the Coast Guard. These aircrew
> are trained
> and experienced at conducting aerial marine mammal surveys
> and have
> provided similar support for other missions at PMRF. Aerial

> surveys are
> typically conducted at an altitude of about 200 feet, but
> altitude may
> vary somewhat depending on sea state and atmospheric
> conditions. If
> adverse weather conditions preclude the ability for aircraft
> to safely
> operate, missions would either be delayed until the weather
> clears or
> cancelled for the day. For 2016 Long Range Strike WSEP
> missions, one
> day has been designated as a weather back-up day. The C-26
> and other
> aircraft would generally be operated at a slightly higher
> altitude than
> the helicopter. The observers will be provided with the GPS
> location of
> the impact area. Once the aircraft reaches the impact area,
> pre-mission
> surveys typically last for 30 minutes, depending on the
> survey pattern.
> The fixed-wing aircraft are faster than the helicopter; and,
> therefore,
> protected species may be more difficult to spot. However, to
> compensate
> for the difference in speed, the aircraft may fly the survey
> pattern
> multiple times.
> If a protected species is observed in the impact area,
> weapon
> release would be delayed until one of the following
> conditions is met:
> (1) The animal is observed exiting the impact area; (2) the
> animal is
> thought to have exited the impact area based on its course
> and speed;
> or (3) the impact area has been clear of any additional
> sightings for a
> period of 30 minutes. All weapons will be tracked and their
> water entry
> points will be documented.
> Post-mission surveys would begin immediately after the
> mission is
> complete and the Range Safety Officer declares the human
> safety area is
> reopened. Approximate transit time from the perimeter of the
> human
> safety
>
> [[Page 44292]]
>
> area to the weapon impact area would depend on the size of
> the human
> safety area and vary between aircraft but is expected to be
> less than
> 30 minutes. Post-mission surveys would be conducted by the
> same
> aircraft and aircrew that conducted the pre-mission surveys
> and would
> follow the same patterns as pre-mission surveys but would
> focus on the
> area down current of the weapon impact area to determine if
> protected
> species were affected by the mission (observation of dead or
> injured

> animals). If an injury or mortality occurs to a protected
> species due
> to LRS WSEP missions, NMFS would be notified immediately.
> A typical mission day would consist of pre-mission
> checks, safety
> review, crew briefings, weather checks, clearing airspace,
> range
> clearance, mitigations/monitoring efforts, and other
> military protocols
> prior to launch of weapons. Potential delays could be the
> result of
> multiple factors including, but not limited to, adverse
> weather
> conditions leading to unsafe take-off, landing, and aircraft
>
> operations, inability to clear the range of non-mission
> vessels or
> aircraft, mechanical issues with mission aircraft or
> munitions, or
> presence of protected species in the impact area. If the
> mission is
> cancelled due to any of these, one back-up day has also been
> scheduled
> as a contingency. These standard operating procedures are
> usually done
> in the morning, and live range time may begin in late
> morning once all
> checks are complete and approval is granted from range
> control. The
> range would be closed to the public for a maximum of four
> hours per
> mission day.
> Determination of the Zone of Influence: The zone of
> influence is
> defined as the area or volume of ocean in which marine
> mammals could be
> exposed to various pressure or acoustic energy levels caused
> by
> exploding ordnance. Refer to Appendix A of the application
> for a
> description of the method used to calculate impact areas for
>
> explosives. The pressure and energy levels considered to be
> of concern
> are defined in terms of metrics, criteria, and thresholds. A
> metric is
> a technical standard of measurement that describes the
> acoustic
> environment (e.g., frequency duration, temporal pattern, and
> amplitude)
> and pressure at a given location. Criteria are the resulting
> types of
> possible impact and include mortality, injury, and
> harassment. A
> threshold is the level of pressure or noise above which the
> impact
> criteria are reached.
> Standard impulsive and acoustic metrics were used for
> the analysis
> of underwater energy and pressure waves in this document.
> Several
> different metrics are important for understanding risk
> assessment
> analysis of impacts to marine mammals: SPL is the ratio of
> the absolute

> sound pressure to a reference level, SEL is measure of sound
> intensity
> and duration, and positive impulse is the time integral of
> the pressure
> over the initial positive phase of an arrival.
> The criteria and thresholds used to estimate potential
> pressure and
> acoustic impacts to marine mammals resulting from
> detonations were
> obtained from Finneran and Jenkins (2012) and include
> mortality,
> injurious harassment (Level A), and non-injurious harassment
> (Level B).
> In some cases, separate thresholds have been developed for
> different
> species groups or functional hearing groups. Functional
> hearing groups
> included in the analysis are low-frequency cetaceans,
> mid-frequency
> cetaceans, high-frequency cetaceans, and phocids.
> Based on the ranges presented in Table 5 and factoring
> operational
> limitations associated with the mission, 86 FWS estimates
> that during
> pre-mission surveys, the proposed monitoring area would be
> approximately 2 km (3.7 miles) from the target area radius
> around the
> impact point, with surveys typically flown in a star
> pattern, which is
> consistent with requirements already in place for similar
> actions at
> PMRF and encompasses the entire TTS threshold ranges (SEL)
> for mid-
> frequency cetaceans. For species in which potential
> exposures have been
> calculated (dwarf sperm whale and pygmy sperm whale), the
> survey
> distance would cover over half of the PTS SEL range. Given
> operational
> constraints, surveying these larger areas would not be
> feasible.
>
> Post-Mission Monitoring
>
> Post-mission monitoring determines the effectiveness of
> pre-mission
> mitigation by reporting sightings of any marine mammals.
> Post-mission
> monitoring surveys will commence once the mission has ended
> or, if
> required, as soon as personnel declare the mission area
> safe. Post-
> mission monitoring will be identical to pre-mission surveys
> and will
> occur approximately 30 minutes after the munitions have been
> detonated,
> concentrating on the area down-current of the test site.
> Observers will
> document and report any marine mammal species, number,
> location, and
> behavior of any animals observed.
> We have carefully evaluated 86 FWS's proposed
> mitigation measures
> in the context of ensuring that we prescribe the means of
> effecting the

> least practicable impact on the affected marine mammal
> species and
> stocks and their habitat. Our evaluation of potential
> measures included
> consideration of the following factors in relation to one
> another:
> The manner in which, and the degree to which, the
> successful implementation of the measure is expected to
> minimize
> adverse impacts to marine mammals;
> The proven or likely efficacy of the specific measure
> to
> minimize adverse impacts as planned; and
> The practicability of the measure for applicant
> implementation.
> Any mitigation measure(s) prescribed by NMFS should be
> able to
> accomplish, have a reasonable likelihood of accomplishing
> (based on
> current science), or contribute to the accomplishment of one
> or more of
> the general goals listed here:
> 1. Avoidance or minimization of injury or death of
> marine mammals
> wherever possible (goals 2, 3, and 4 may contribute to this
> goal).
> 2. A reduction in the numbers of marine mammals (total
> number or
> number at biologically important time or location) exposed
> to stimuli
> expected to result in incidental take (this goal may
> contribute to 1,
> above, or to reducing takes by behavioral harassment only).
> 3. A reduction in the number of times (total number or
> number at
> biologically important time or location) individuals would
> be exposed
> to stimuli that we expect to result in the take of marine
> mammals (this
> goal may contribute to 1, above, or to reducing harassment
> takes only).
> 4. A reduction in the intensity of exposures (either
> total number
> or number at biologically important time or location) to
> training
> exercises that we expect to result in the take of marine
> mammals (this
> goal may contribute to 1, above, or to reducing the severity
> of
> harassment takes only).
> 5. Avoidance or minimization of adverse effects to
> marine mammal
> habitat, paying special attention to the food base,
> activities that
> block or limit passage to or from biologically important
> areas,
> permanent destruction of habitat, or temporary
> destruction/disturbance
> of habitat during a biologically important time.
> 6. For monitoring directly related to mitigation–an
> increase in
> the probability of detecting marine mammals, thus allowing
> for more
> effective implementation of the mitigation.
> Based on our evaluation of 86 FWS's proposed

> measures, as well as
> other measures that may be relevant to the specified
> activity, we have
> preliminarily
>
> [[Page 44293]]
>
> determined that the proposed mitigation measures, including
> visual
> aerial surveys and mission delays if protected species are
> observed in
> the impact area, provide the means of effecting the least
> practicable
> impact on marine mammal species or stocks and their habitat,
> paying
> particular attention to rookeries, mating grounds, and areas
> of similar
> significance (while also considering personnel safety,
> practicality of
> implementation, and the impact of effectiveness of the
> military
> readiness activity).
>
> Proposed Monitoring and Reporting
>
> In order to issue an Authorization for an activity,
> section
> 101(a)(5)(D) of the MMPA states that we 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 an authorization must include the suggested
> means of
> accomplishing the necessary monitoring and reporting that
> will result
> in increased knowledge of the species and our expectations
> of the level
> of taking or impacts on populations of marine mammals
> present in the
> proposed action area.
> 86 FWS submitted marine mammal monitoring and reporting
> measures in
> their IHA application. We may modify or supplement these
> measures based
> on comments or new information received from the public
> during the
> public comment period. Any monitoring requirement we
> prescribe should
> improve our understanding of one or more of the following:
> Occurrence of marine mammal species in action area
> (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 responses to acute stressors, or impacts of
> chronic exposures (behavioral or physiological).
> How anticipated responses to stressors impact either:
> (1)
> Long-term fitness and survival of an individual; or (2)
> Population,
> species, or stock.
> Effects on marine mammal habitat and resultant impacts
> to
> marine mammals.
> Mitigation and monitoring effectiveness.
> NMFS proposes to include the following measures in the
> LRS WSEP
> Authorization (if issued). They are:
> (1) 86 FWS will track the use of the PMRF for missions
> and
> protected species observations, through the use of mission
> reporting
> forms.
> (2) 86 FWS will submit a summary report of marine mammal
>
> observations and LRS WSEP activities to the NMFS Pacific
> Islands
> Regional Office (PIRO) and the Office of Protected Resources
> 90 days
> after expiration of the current Authorization. This report
> must include
> the following information: (i) Date and time of each LRS
> WSEP exercise;
> (ii) a complete description of the pre-exercise and
> post-exercise
> activities related to mitigating and monitoring the effects
> of LRS WSEP
> exercises on marine mammal populations; and (iii) results of
> the LRS
> WSEP exercise monitoring, including number of marine mammals
> (by
> species) that may have been harassed due to presence within
> the
> activity zone.
> (3) 86 FWS will monitor for marine mammals in the
> proposed action
> area. If 86 FWS personnel observe or detect any dead or
> injured marine
> mammals prior to testing, or detects any injured or dead
> marine mammal
> during live fire exercises, 86 FWS must cease operations and
> submit a
> report to NMFS within 24 hours.
> (4) 86 FWS must immediately report any unauthorized
> takes of marine
> mammals (i.e., serious injury or mortality) to NMFS and to
> the
> respective Pacific Islands Region stranding network
> representative. 86
> FWS must cease operations and submit a report to NMFS within
> 24 hours.
>
> Estimated Numbers of Marine Mammals Taken by Harassment
>
> The NDAA amended the definition of harassment as it
> applies to a

> ``military readiness activity'' to read as follows
> (Section 3(18)(B) of
> the MMPA): (i) Any act that injures or has the significant
> potential to
> injure a marine mammal or marine mammal stock in the wild
> [Level A
> Harassment]; or (ii) any act that disturbs or is likely to
> disturb a
> marine mammal or marine mammal stock in the wild by causing
> disruption
> of natural behavioral patterns, including, but not limited
> to,
> migration, surfacing, nursing, breeding, feeding, or
> sheltering, to a
> point where such behavioral patterns are abandoned or
> significantly
> altered [Level B Harassment].
> NMFS' analysis identified the physiological
> responses, and
> behavioral responses that could potentially result from
> exposure to
> explosive detonations. In this section, we will relate the
> potential
> effects to marine mammals from detonation of explosives to
> the MMPA
> regulatory definitions of Level A and Level B harassment.
> This section
> will also quantify the effects that might occur from the
> proposed
> military readiness activities in PMRF BSURE area.
> 86 FWS thresholds used for onset of temporary threshold
> shift (TTS;
> Level B Harassment) and onset of permanent threshold shift
> (PTS; Level
> A Harassment) are consistent with the thresholds outlined in
> the Navy's
> report titled, ``Criteria and Thresholds for U.S. Navy
> Acoustic and
> Explosive Effects Analysis Technical Report,'' which
> the Navy
> coordinated with NMFS. NMFS believes that the thresholds
> outlined in
> the Navy's report represent the best available science.
> The report is
> available on the internet at: http://nwtteis.com/Portals/NWTT/DraftEIS2014/SupportingDocs/NWTT_NMSDD_Technical_Report_23_January%202014_reduced.pdf.
>
> Level B Harassment
>
> Of the potential effects described earlier in this
> document, the
> following are the types of effects that fall into the Level
> B
> harassment category:
> Behavioral Harassment--Behavioral disturbance that rises
> to the
> level described in the above definition, when resulting from
> exposures
> to non-impulsive or impulsive sound, is Level B harassment.
> Some of the
> lower level physiological stress responses discussed earlier
> would also
> likely co-occur with the predicted harassments, although
> these
> responses are more difficult to detect and fewer data exist

> relating
> these responses to specific received levels of sound. When
> predicting
> Level B harassment based on estimated behavioral responses,
> those takes
> may have a stress-related physiological component.
> Temporary Threshold Shift–As discussed previously, TTS
> can affect
> how an animal behaves in response to the environment,
> including
> conspecifics, predators, and prey. NMFS classifies TTS (when
> resulting
> from exposure to explosives and other impulsive sources) as
> Level B
> harassment, not Level A harassment (injury).
>
> Level A Harassment
>
> Of the potential effects that were described earlier,
> the following
> are the types of effects that fall into the Level A
> Harassment
> category:
> Permanent Threshold Shift–PTS (resulting from exposure
> to
> explosive detonations) is irreversible and NMFS considers
> this to be an
> injury.
>
> [[Page 44294]]
>
> Table 4 outlines the explosive thresholds used by NMFS
> for this
> Authorization when addressing noise impacts from explosives.
> [GRAPHIC] [TIFF OMITTED] TN07JY16.000
>
> 86 FWS completed acoustic modeling to determine the
> distances to
> NMFS's explosive thresholds from their explosive
> ordnance, which was
> then used with each species' density to determine number
> of exposure
> estimates. Below is a summary of those modeling efforts.
> The maximum estimated range, or radius, from the
> detonation point
> to which the various thresholds extend for all munitions
> proposed to be
> released in a 24-hour time period was calculated based on
> explosive
> acoustic characteristics, sound propagation, and sound
> transmission
> loss in the Study Area, which incorporates water depth,
> sediment type,
> wind speed, bathymetry, and temperature/salinity profiles
> (Table 5).
> The ranges were used to calculate the total area (circle) of
> the zones
> of influence for each criterion/threshold. To eliminate
> ``double-
> counting'' of animals, impact areas from higher
> impact categories
> (e.g., mortality) were subtracted from areas associated with
> lower
> impact categories (e.g., Level A harassment). The estimated
> number of

> marine mammals potentially exposed to the various impact
> thresholds was
> then calculated as the product of the adjusted impact area,
> scaled
> animal density, and number of events. Since the model
> accumulates the
> energy from all detonations within a 24-hour timeframe, it
> is assumed
> that the same population of animals is being impacted within
> that time
> period. The population would refresh after 24 hours. In this
> case, only
> one mission day is planned for 2016, and therefore, only one
> event is
> modeled that would impact the same population of animals.
> Details of
> the acoustic modeling method are provided in Appendix A of
> the
> application.
> The resulting total number of marine mammals potentially
> exposed to
> the various levels of thresholds is shown in Table 7. An
> animal is
> considered ``exposed'' to a sound if the received
> sound level at the
> animal's location is above the background ambient
> acoustic level within
> a similar frequency band. The exposure calculations from the
> model
> output resulted in decimal values, suggesting in most cases
> that a
> fraction of an animal was exposed. To eliminate this, the
> acoustic
> model results were rounded to the nearest whole animal to
> obtain the
> exposure estimates from 2016 missions. Furthermore, to
> eliminate
> ``double-counting'' of animals, exposure results
> from higher impact
> categories (e.g., mortality) were subtracted from lower
> impact
> categories (e.g., Level A harassment). For impact categories
> with
> multiple criteria and/or thresholds (e.g., three criteria
> and four
> thresholds associated with Level A harassment), numbers in
> the table
> are based on the threshold resulting in the greatest number
> of
> exposures. These exposure estimates do not take into account
> the
> required mitigation and monitoring measures, which may
> decrease the
> potential for impacts.
>
> [[Page 44295]]
>
>
>
> Table 5--Distances (m)
> to Explosive Thresholds From 86 FWS's Explosive Ordnance
> --
>
> Level A Harassment \2\
> Level B Harassment

>
> ———————————————————————————————————
> Mortality
> GI tract PTS
> TTS Behavioral
> Species
> \1\ Slight lung injury
> ———————————————————————————————————
>
> injury ———— Applicable Applicable
> Applicable Applicable Applicable
>
> 237 dB SPL SEL* SPL*
> SEL* SPL* SEL*
> ———
> Humpback Whale.....
> 38 81 165 2,161 330
> 6,565 597 13,163
> Blue Whale.....
> 28 59 165 2,161 330
> 6,565 597 13,163
> Fin Whale.....
> 28 62 165 2,161 330
> 6,565 597 13,163
> Sei Whale.....
> 38 83 165 2,161 330
> 6,565 597 13,163
> Bryde's Whale.....
> 38 81 165 2,161 330
> 6,565 597 13,163
> Minke Whale.....
> 55 118 165 2,161 330
> 6,565 597 13,163
> Sperm Whale.....
> 33 72 165 753 330
> 3,198 597 4,206
> Pygmy Sperm Whale.....
> 105 206 165 6,565 3,450
> 20,570 6,565 57,109
> Dwarf Sperm Whale.....
> 121 232 165 6,565 3,450
> 20,570 6,565 57,109
> Killer Whale.....
> 59 126 165 753 330
> 3,198 597 4,206
> False Killer Whale.....
> 72 153 165 753 330
> 3,198 597 4,206
> Pygmy Killer Whale.....
> 147 277 165 753 330
> 3,198 597 4,206
> Short-finned Pilot Whale.....
> 91 186 165 753 330
> 3,198 597 4,206
> Melon-headed Whale.....
> 121 228 165 753 330
> 3,198 597 4,206
> Bottlenose Dolphin.....
> 121 232 165 753 330
> 3,198 597 4,206
> Pantropical Spotted Dolphin.....
> 147 277 165 753 330
> 3,198 597 4,206
> Striped Dolphin.....
> 147 277 165 753 330

> 3,198 597 4,206
> Spinner Dolphin.....
> 147 277 165 753 330
> 3,198 597 4,206
> Rough-toothed Dolphin.....
> 121 232 165 753 330
> 3,198 597 4,206
> Fraser's Dolphin.....
> 110 216 165 753 330
> 3,198 597 4,206
> Risso's Dolphin.....
> 85 175 165 753 330
> 3,198 597 4,206
> Cuvier's Beaked Whale.....
> 51 110 165 753 330
> 3,198 597 4,206
> Blainville's Beaked Whale.....
> 79 166 165 753 330
> 3,198 597 4,206
> Longman's Beaked Whale.....
> 52 113 165 753 330
> 3,198 597 4,206
> Hawaiian Monk Seal.....
> 135 256 165 1,452 1,107
> 3,871 1,881 6,565
> ———
> \1\ Based on Goertner (1982).
> \2\ Based on Richmond et al. (1973).
> *Based on the applicable Functional Hearing Group.
>
> Density Estimation
>
> Density estimates for marine mammals were derived from
> the Navy's
> 2014 Marine Species Density Database (NMSDD). NMFS refers
> the reader to
> Section 3 of 86 FWS's application for detailed
> information on all
> equations used to calculate densities presented in Table 6.
>
> Table 6–Marine Mammal Density Estimates Within 86
> FWS's PMRF
> ———————————————————————————————————————
>
> Density
> Species
> (animals/
>
> km\2\)
> ———————————————————————————————————————
> Dwarf sperm whale.....
> 0.00714
> Pygmy sperm whale.....
> 0.00291
> ———————————————————————————————————————
>
> Take Estimation
>
> Table 7 indicates the modeled potential for lethality,
> injury, and
> non-injurious harassment (including behavioral harassment)
> to marine
> mammals in the absence of mitigation measures. 86 FWS and
> NMFS estimate
> that one marine mammal species could be exposed to injurious

> Level A
> harassment noise levels (187 dB SEL) and two species could
> be exposed
> to Level B harassment (TTS and Behavioral) noise levels in
> the absence
> of mitigation measures.
>
> Table 7–Modeled Number of Marine Mammals
> Potentially Affected by LRS WSEP Operations
> ———————————————————————————————————————
>
> Level A Level B Level B
> Species
> Mortality harassment harassment harassment
>
> (PTS only) (TTS) (behavioral)
> ———————————————————————————————————————
> Dwarf sperm whale.....
> 0 1 9 64
> Pygmy sperm whale.....
> 0 0 3 26
> TOTAL.....
> 0 1 12 90
> ———————————————————————————————————————
>
> Based on the mortality exposure estimates calculated by
> the
> acoustic model, zero marine mammals are expected to be
> affected by
> pressure levels associated with mortality or serious injury.
> Zero
> marine mammals are expected to be exposed to pressure levels
> associated
> with slight lung injury or gastrointestinal tract injury.
> NMFS generally considers PTS to fall under the injury
> category
> (Level A Harassment). An animal would need to stay very
> close to the
> sound source for an extended amount of time to incur a
> serious degree
> of PTS, which could increase the probability of mortality.
> In this
> case, it would be highly unlikely for this scenario to
> unfold given the
> nature of any anticipated acoustic exposures that could
> potentially
> result from a mobile marine mammal that NMFS generally
> expects to
> exhibit avoidance behavior to loud sounds within the BSURE
> area.
> NMFS has relied on the best available scientific
> information to
> support the issuance of 86 FWS's authorization. In
>
> [[Page 44296]]
>
> the case of authorizing Level A harassment, NMFS has
> estimated that one
> dwarf sperm whale could, although unlikely, experience minor
> permanent
> threshold shifts of hearing sensitivity (PTS). The available
> data and
> analyses, as described more fully in this notice include
> extrapolation
> results of many studies on marine mammal noise-induced

> temporary
> threshold shifts of hearing sensitivities. An extensive
> review of TTS
> studies and experiments prompted NMFS to conclude that
> possibility of
> minor PTS in the form of slight upward shift of hearing
> threshold at
> certain frequency bands by one individual marine mammal is
> extremely
> low, but not unlikely.
>
> Negligible Impact Analysis and Preliminary Determinations
>
> NMFS has defined ``negligible impact'' in 50 CFR
> 216.103 as ``. . .
> an impact resulting from the specified activity that cannot
> be
> reasonably expected to, and is not reasonably likely to,
> adversely
> affect the species or stock through effects on annual rates
> of
> recruitment or survival.'' A negligible impact
> finding is based on the
> lack of likely adverse effects on annual rates of
> recruitment or
> survival (i.e., population-level effects). An estimate of
> the number of
> Level B harassment takes alone is not enough information on
> which to
> base an impact determination. In addition to considering
> estimates of
> the number of marine mammals that might be ``taken''
> through behavioral
> harassment, we consider 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
> the number and nature of estimated Level A harassment takes,
> the number
> of estimated mortalities, and effects on habitat.
> To avoid repetition, the discussion below applies to all
> the
> species listed in Table 7 for which we propose to authorize
> incidental
> take for 86 FWS's activities.
> In making a negligible impact determination, we
> consider:
> The number of anticipated injuries, serious injuries,
> or
> mortalities;
> The number, nature, and intensity, and duration of
> Level B
> harassment;
> The context in which the takes occur (e.g., impacts to
> areas of significance, impacts to local populations, and
> cumulative
> impacts when taking into account successive/contemporaneous
> actions
> when added to baseline data);
> The status of stock or species of marine mammals (i.e.,
>
> depleted, not depleted, decreasing, increasing, stable,
> impact relative

> to the size of the population);
> Impacts on habitat affecting rates of recruitment/
> survival; and
> The effectiveness of monitoring and mitigation measures
> to
> reduce the number or severity of incidental take.
> For reasons stated previously in this document and based
> on the
> following factors, 86 FWS's specified activities are not
> likely to
> cause long-term behavioral disturbance, serious injury, or
> death.
> The takes from Level B harassment would be due to
> potential
> behavioral disturbance and TTS. The takes from Level A
> harassment would
> be due to potential PTS. Activities would only occur over a
> timeframe
> of one day in September, 2016.
> Noise-induced threshold shifts (TS, which includes PTS)
> are defined
> as increases in the threshold of audibility (i.e., the sound
> has to be
> louder to be detected) of the ear at a certain frequency or
> range of
> frequencies (ANSI 1995; Yost 2007). Several important
> factors relate to
> the magnitude of TS, such as level, duration, spectral
> content
> (frequency range), and temporal pattern (continuous,
> intermittent) of
> exposure (Yost 2007; Henderson et al., 2008). TS occurs in
> terms of
> frequency range (Hz or kHz), hearing threshold level (dB),
> or both
> frequency and hearing threshold level.
> In addition, there are different degrees of PTS: Ranging
> from
> slight/mild to moderate and from severe to profound.
> Profound PTS or
> the complete loss of the ability to hear in one or both ears
> is
> commonly referred to as deafness. High-frequency PTS,
> presumably as a
> normal process of aging that occurs in humans and other
> terrestrial
> mammals, has also been demonstrated in captive cetaceans
> (Ridgway and
> Carder, 1997; Yuen et al. 2005; Finneran et al., 2005;
> Houser and
> Finneran, 2006; Finneran et al., 2007; Schlundt et al.,
> 2011) and in
> stranded individuals (Mann et al., 2010).
> In terms of what is analyzed for the potential PTS
> (Level A
> harassment) in one marine mammal as a result of 86 FWS's
> LRS WSEP
> operations, if it occurs, NMFS has determined that the
> levels would be
> slight/mild because research shows that most cetaceans show
> relatively
> high levels of avoidance. Further, it is uncommon to sight
> marine
> mammals within the target area, especially for prolonged
> durations.

> Avoidance varies among individuals and depends on their
> activities or
> reasons for being in the area.
> NMFS' predicted estimates for Level A harassment
> take (Table 7) are
> likely overestimates of the likely injury that will occur.
> NMFS expects
> that successful implementation of the required aerial-based
> mitigation
> measures could avoid Level A take. Also, NMFS expects that
> some
> individuals would avoid the source at levels expected to
> result in
> injury. Nonetheless, although NMFS expects that Level A
> harassment is
> unlikely to occur at the numbers proposed to be authorized,
> because it
> is difficult to quantify the degree to which the mitigation
> and
> avoidance will reduce the number of animals that might incur
> PTS, we
> are proposing to authorize (and analyze) the modeled number
> of Level A
> takes (one), which does not take the mitigation or avoidance
> into
> consideration. However, we anticipate that any PTS incurred
> because of
> mitigation and the likely short duration of exposures, would
> be in the
> form of only a small degree of permanent threshold shift and
> not total
> deafness.
> While animals may be impacted in the immediate vicinity
> of the
> activity, because of the short duration of the actual
> individual
> explosions themselves (versus continual sound source
> operation)
> combined with the short duration of the LRS WSEP operations,
> NMFS has
> preliminarily determined that there will not be a
> substantial impact on
> marine mammals or on the normal functioning of the nearshore
> or
> offshore waters off Kauai and its ecosystems. We do not
> expect that the
> proposed activity would impact rates of recruitment or
> survival of
> marine mammals since we do not expect mortality (which would
> remove
> individuals from the population) or serious injury to occur.
> In
> addition, the proposed activity would not occur in areas
> (and/or times)
> of significance for the marine mammal populations
> potentially affected
> by the exercises (e.g., feeding or resting areas,
> reproductive areas),
> and the activities would only occur in a small part of their
> overall
> range, so the impact of any potential temporary displacement
> would be
> negligible and animals would be expected to return to the
> area after
> the cessations of activities. Although the proposed activity

> could
> result in Level A (PTS only, not slight lung injury or
> gastrointestinal
> tract injury) and Level B (behavioral disturbance and TTS)
> harassment
> of marine mammals, the level of harassment is not
> anticipated to impact
> rates of recruitment or survival of marine mammals because
> the number
> of exposed animals is expected to be low due to the
> short-term (i.e.,
> four hours a day or less on one day) and site-specific
> nature of the
> activity. We do not anticipate that the effects would be
> detrimental to
> rates of recruitment and survival because we do not expect
>
> [[Page 44297]]
>
> serious of extended behavioral responses that would result
> in energetic
> effects at the level to impact fitness.
> Moreover, the mitigation and monitoring measures
> proposed for the
> IHA (described earlier in this document) are expected to
> further
> minimize the potential for harassment. The protected species
> surveys
> would require 86 FWS to search the area for marine mammals,
> and if any
> are found in the impact zone, then the exercise would be
> suspended
> until the animal(s) has left the area or relocated outside
> of the zone.
> Furthermore, LRS WSEP missions may be delayed or rescheduled
> for
> adverse weather conditions.
> Based on the preliminary analysis contained herein of
> the likely
> effects of the specified activity on marine mammals and
> their habitat,
> and taking into consideration the implementation of the
> mitigation and
> monitoring measures, NMFS finds that 86 FWS's LRS WSEP
> operations will
> result in the incidental take of marine mammals, by Level A
> and Level B
> harassment only, and that the taking from the LRS WSEP
> exercises will
> have a negligible impact on the affected species or stocks.
>
> Impact on Availability of Affected Species or Stock for
> Taking for
> Subsistence Uses
>
> There are no relevant subsistence uses of marine mammals
> implicated
> by this action. Therefore, NMFS has preliminarily 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, NMFS has determined
> that a
> section 7 consultation under the ESA is not required.
>
> National Environmental Policy Act (NEPA)
>
> In 2015, 86 FWS provided NMFS with an EA titled,
> Environmental
> Assessment/Overseas Environmental Assessment for the Long
> Range Strick
> Weapon Systems Evaluation Program Operational Evaluations.
> The EA
> analyzed the direct, indirect, and cumulative environmental
> impacts of
> the specified activities on marine mammals. NMFS will review
> and
> evaluate the 86 FWS EA for consistency with the regulations
> published
> by the Council of Environmental Quality (CEQ) and NOAA
> Administrative
> Order 216-6, Environmental Review Procedures for
> Implementing the
> National Environmental Policy Act, and determine whether or
> not to
> adopt it. Information in 86 FWS's application, EA, and
> this notice
> collectively provide the environmental information related
> to proposed
> issuance of the IHA for public review and comment. We will
> review all
> comments submitted in response to this notice as we complete
> the NEPA
> process, including decision of whether to sign a Finding of
> No
> Significant Impact (FONSI), prior to a final decision on the
> IHA
> request. The 2016 NEPA documents are available for review at
>
> www.nmfs.noaa.gov/pr/permits/incidental/military.html.
>
> Proposed Authorization
>
> As a result of these preliminary determinations, we
> propose to
> issue an IHA to 86 FWS for conducting LRS WSEP activities,
> for a period
> of one year from the date of issuance, provided the
> previously
> mentioned mitigation, monitoring, and reporting requirements
> are
> incorporated. The proposed Authorization language is
> provided in the
> next section. The wording contained in this section is
> proposed for
> inclusion in the Authorization (if issued).
> 1. This Authorization is valid for a period of one year
> from the
> date of issuance.
> 2. This Authorization is valid only for activities
> associated with
> the LRS WSEP operations utilizing munitions identified in

> the
> Attachment.
> 3. The incidental taking, by Level A and Level B
> harassment, is
> limited to: Dwarf sperm whale (Kogia sima) and Pygmy sperm
> whale (Kogia
> breviceps) as specified in Table 1 of this notice.
>
> Table 1–Authorized Take Numbers.
> ———————————————————————
>
> Level Level
> Species
> A B
>
> takes takes
> ———————————————————————
> Dwarf sperm whale.....
> 1 73
> Pygmy sperm whale.....
> 0 29
>
> ————
> Total.....
> 1 102
> ———————————————————————
>
> The taking by serious injury or death of these species,
> the taking
> of these species in violation of the conditions of this
> Incidental
> Harassment Authorization, or the taking by harassment,
> serious injury
> or death of any other species of marine mammal is prohibited
> and may
> result in the modification, suspension or revocation of this
>
> Authorization.
>
> 4. Mitigation
>
> When conducting this activity, the following mitigation
> measures
> must be undertaken:
> If daytime weather and/or sea conditions preclude
> adequate
> monitoring for detecting marine mammals and other marine
> life, LRS WSEP
> strike operations must be delayed until adequate sea
> conditions exist
> for monitoring to be undertaken.
> On the morning of the LRS WSEP strike mission, the test
>
> director and safety officer will confirm that there are no
> issues that
> would preclude mission execution and that the weather is
> adequate to
> support monitoring and mitigation measures.
> If post-mission surveys determine that an injury or
> lethal
> take of a marine mammal has occurred, the next mission will
> be
> suspended until the test procedure and the monitoring
> methods have been
> reviewed with NMFS and appropriate changes made.

>
> 5. Monitoring
>
> The holder of this Authorization is required to
> cooperate with the
> National Marine Fisheries Service and any other Federal,
> state or local
> agency monitoring the impacts of the activity on marine
> mammals.
> The holder of this Authorization will track their use of
> the PMRF
> BSURE area for the LRS WSEP missions and marine mammal
> observations,
> through the use of mission reporting forms.
> Aerial surveys: Pre- and post- mission will be
> conducted. Pre-
> mission surveys would begin approximately one hour prior to
> detonation.
> Post-detonation monitoring surveys will commence once the
> mission has
> ended or, if required, as soon as personnel declare the
> mission area
> safe.
> Proposed monitoring area would be approximately 2 km
> (3.7 miles)
> from the target area radius around the impact point, with
> surveys
> typically flown in a star pattern. Aerial surveys would be
> conducted at
> an altitude of about 200 feet, but altitude may vary
> somewhat depending
> on sea state and atmospheric conditions. If adverse weather
> conditions
> preclude the ability for aircraft to safely operate,
> missions would
> either be delayed until the weather clears or cancelled for
> the day.
> The observers will be provided with the GPS location of the
> impact
> area. Once the aircraft reaches the impact area, pre-mission
> surveys
> typically last for 30 minutes, depending on the survey
> pattern. The
> aircraft may fly the survey pattern multiple times.
>
> 6. Reporting
>
> The holder of this Authorization is required to:
> (a) Submit a draft report on all monitoring conducted
> under the IHA
> within 90 days of the completion of
>
> [[Page 44298]]
>
> marine mammal monitoring, or 60 days prior to the issuance
> of any
> subsequent IHA for projects at PMRF, whichever comes first.
> A final
> report shall be prepared and submitted within 30 days
> following
> resolution of comments on the draft report from NMFS. This
> report must
> contain the informational elements described in the
> Monitoring Plan, at
> minimum (see www.nmfs.noaa.gov/pr/permits/incidental/construction.htm),

> and shall also include:
> 1. Date and time of each LRS WSEP mission;
> 2. A complete description of the pre-exercise and post-exercise activities related to mitigating and monitoring the effects of LRS WSEP missions on marine mammal populations; and
> 3. Results of the monitoring program, including numbers by species/ stock of any marine mammals noted injured or killed as a result of the LRS WSEP mission and number of marine mammals (by species if possible) that may have been harassed due to presence within the zone of influence.
> The draft report will be subject to review and comment by the National Marine Fisheries Service. Any recommendations made by the National Marine Fisheries Service must be addressed in the final report prior to acceptance by the National Marine Fisheries Service. The draft report will be considered the final report for this activity under this Authorization if the National Marine Fisheries Service has not provided comments and recommendations within 90 days of receipt of the draft report.
> (b) Reporting injured or dead marine mammals:
> i. In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as an injury for species not authorized (Level A harassment), serious injury, or mortality, 86 FWS shall immediately cease the specified activities and report the incident to the Office of Protected Resources, NMFS, and the Pacific Islands Regional Stranding Coordinator, NMFS. The report must include the following information:
> A. Time and date of the incident;
> B. Description of the incident;
> C. Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
> D. Description of all marine mammal observations in the 24 hours preceding the incident;
> E. Species identification or description of the animal(s) involved;
> F. Fate of the animal(s); and
> G. Photographs or video footage of the animal(s).
>
> Activities shall not resume until NMFS is able to review the
>
> circumstances of the prohibited take. NMFS will work with 86 FWS to determine what measures are necessary to minimize the likelihood of

> further prohibited take and ensure MMPA compliance. 86 FWS
> may not
> resume their activities until notified by NMFS.
> ii. In the event that 86 FWS discovers an injured or
> dead marine
> mammal, and the lead observer determines that the cause of
> the injury
> or death is unknown and the death is relatively recent
> (e.g., in less
> than a moderate state of decomposition), 86 FWS shall
> immediately
> report the incident to the Office of Protected Resources,
> NMFS, and the
> Pacific Islands Regional Stranding Coordinator, NMFS.
> The report must include the same information identified
> in 6(b)(i)
> of this IHA. Activities may continue while NMFS reviews the
> circumstances of the incident. NMFS will work with 86 FWS to
> determine
> whether additional mitigation measures or modifications to
> the
> activities are appropriate.
> iii. In the event that 86 FWS discovers an injured or
> dead marine
> mammal, and the lead observer determines that the injury or
> death is
> not associated with or related to the activities authorized
> in the IHA
> (e.g., previously wounded animal, carcass with moderate to
> advanced
> decomposition, scavenger damage), 86 FWS shall report the
> incident to
> the Office of Protected Resources, NMFS, and the Pacific
> Islands
> Regional Stranding Coordinator, NMFS, within 24 hours of the
> discovery.
> 86 FWS shall provide photographs or video footage or other
> documentation of the stranded animal sighting to NMFS.
>
> 7. Additional Conditions
>
> The holder of this Authorization must inform the
> Director,
> Office of Protected Resources, National Marine Fisheries
> Service, (301-
> 427-8400) or designee (301-427-8401) prior to the initiation
> of any
> changes to the monitoring plan for a specified mission
> activity.
> A copy of this Authorization must be in the possession
> of
> the safety officer on duty each day that long range strike
> missions are
> conducted.
> This Authorization may be modified, suspended or
> withdrawn
> if the holder fails to abide by the conditions prescribed
> herein, or if
> NMFS determines the authorized taking is having more than a
> negligible
> impact on the species or stock of affected marine mammals.
>
> Request for Public Comments
>
> We request comment on our analysis, the draft

> authorization, and
> any other aspect of this Federal Register notice of proposed
>
> Authorization. Please include with your comments any
> supporting data or
> literature citations to help inform our final decision on 86
> FWS's
> renewal request for an MMPA authorization.
>
> Dated: July 1, 2016.
> Donna S. Wieting,
> Director, Office of Protected Resources, National Marine
> Fisheries
> Service.
> [FR Doc. 2016-16114 Filed 7-6-16; 8:45 am]
> BILLING CODE 3510-22-P
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