
3.10 Terrestrial Species and Habitats

**Supplemental Environmental Impact Statement/
Overseas Environmental Impact Statement
Mariana Islands Training and Testing**

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3.10 Terrestrial Species and Habitats

3.10.1 Affected Environment

The purpose of this section is to supplement the analysis of impacts on terrestrial species and habitats presented in the 2015 Mariana Islands Training and Testing (MITT) Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) with new information relevant to proposed changes in training activities conducted at Farallon de Medinilla (FDM). Information presented in the 2015 MITT Final EIS/OEIS that remains valid is noted as such and referenced in the appropriate sections. Any new or updated information describing the affected environment and analysis of impacts on terrestrial species and habitats associated with the Proposed Action is provided in this section. Comments received from the public during scoping related to terrestrial species and habitats are addressed in Section 3.10.3 (Public Scoping Comments).

Section 3.10 in the 2015 MITT Final EIS/OEIS analyzed the potential impacts of training activities on three Endangered Species Act (ESA)-listed plant species (*Serianthes nelsonii*, *Osmoxylon mariannense*, and *Nesogenes rotensis*), eight bird species typically found in terrestrial habitats¹ (Mariana swiftlet [*Aerodramus bartschi*], Mariana crow [*Corvus kubaryi*], Mariana common moorhen, [*Gallinula chloropus guami*], Guam Micronesian kingfisher [*Todiramphus cinnamomina*], Micronesian megapode [*Megapodius laperouse*], Guam rail [*Rallus owstoni*], Nightingale reed-warbler [*Acrocephalus luscini*], and Rota bridled white-eye [*Zosterops rotensis*]), and one mammal species (Mariana fruit bat [*Pteropus mariannus*]). Of these species, only the Micronesian megapode and Mariana fruit bat are found on FDM; therefore, only these ESA-listed species are included in the Navy's Supplemental EIS (SEIS)/OEIS (Table 3.10-1). FDM has no critical habitat designations on the island; therefore, critical habitat is not addressed in this SEIS/OEIS.

In addition to the analysis completed for ESA-listed species, the Navy's 2015 MITT Final EIS/OEIS also considered species that at the time were candidates for ESA listing status. Since the publication of the 2015 MITT Final EIS/OEIS, the United States Fish and Wildlife Service (USFWS) has published its Final Rule determining ESA listing status for 23 additional species in the Mariana Islands (80 Federal Register 59423). Because some of these newly listed species were known to occur within the land training areas analyzed in the 2015 MITT Final EIS/OEIS, the Navy and the USFWS reinitiated consultation to include 14 plant species (*Bulbophyllum guamense*, *Cycas micronesica*, *Dendrobium guamense*, *Eugenia bryanii*, *Heritiera longipetiolata*, *Maesa walker*, *Nervilia jacksoniae*, *Psychotria malaspinae*, *Solanum guamense*, *Tabernaemontana rotensis*, *Tinospora homosepala*, *Tuberolabium guamense*, *Hedyotis megalantha*, *Phyllanthus saffordii*) and four terrestrial invertebrates (Mariana eight-spot butterfly [*Hypolimnas octocula marianensis*], Guam tree snail [*Partula radiolata*], fragile tree snail [*Samoana fragilis*], and humped tree snail [*Partula gibba*]). The USFWS concurred with the Navy's determination that the activities originally proposed in the Navy's 2015 MITT Final EIS/OEIS would not adversely affect these newly listed species and that species and habitat protections described in the 2015 MITT Final EIS/OEIS

¹ The 2015 MITT Final EIS/OEIS analyzed bird species in two different sections. In the 2015 MITT Final EIS/OEIS, birds that typically depend on non-marine habitats were analyzed together with other terrestrial plant and animal species (see Section 3.10 of the 2015 MITT Final EIS/OEIS). Marine birds were analyzed separately in Section 3.6 (Marine Birds) of the 2015 MITT Final EIS/OEIS. These species include birds that occur only in pelagic habitats within the Study Area, as well as marine birds that nest within the Study Area. This SEIS/OEIS follows this organization.

would also protect newly listed species (U.S. Fish and Wildlife Service, 2016). FDM is not included in the range for any of these species (80 Federal Register 59423) and, based on the structure and composition of the remnant forest on the island, it is extremely unlikely that there is habitat for any of these species on FDM. Therefore, none of these species are included in this SEIS/OEIS. Review of the 2015 MITT Final EIS/OEIS confirms the analysis for these species in that document is accurate and represents the best available science.

Table 3.10-1: Endangered Species Act Listed Species on Farallon de Medinilla

Species Name and Regulatory Status			Presence in Study Area ¹	
Common Name	Scientific Name	Endangered Species Act Status	Open Ocean	Visitor/Breeding on FDM
Micronesian megapode (Sasangat)	<i>Megapodius laperouse</i>	Endangered	Yes	Yes
Mariana fruit bat (Fanihi)	<i>Pteropus mariannus</i>	Threatened	Yes	Yes, possible breeding

¹Study Area = Mariana Islands Training and Testing Study Area
Note: FDM = Farallon de Medinilla

3.10.1.1 Vegetation Communities on Farallon de Medinilla

The United States (U.S.) military has used the island of FDM as a bombing range since 1971 (U.S. Department of the Navy, 1975), and the agreement between the U.S. Government and the Commonwealth of the Northern Mariana Islands was formalized in a 50-year lease agreement (United States of America and Commonwealth of the Northern Mariana Islands, 1983). FDM’s vegetation appears to have undergone significant changes since the island was leased by the Department of Defense and the subsequent bombardment for military training. The most intensive bombardment to date of FDM occurred during the Vietnam era, when as much as 22 tons of ordnance per month were dropped on the island (Lusk et al., 2000). Based on early 20th century descriptions of FDM vegetation and aerial photographs of the island prior to military bombardment activities, island tree height and canopy cover have been greatly reduced (Lusk et al., 2000; Mueller-Dombois & Fosberg, 1998; Mueller-Dombois & Fosberg, 2013).

The island’s vegetation may be grouped into the following vegetation communities: coastal vegetation, cliff-line vegetation, upland shrubland and herbaceous vegetation, and bare ground exposed within impact zones. A brief botanical survey of the northern portion of the island carried out in 1996 identified 43 plant species, 32 of which were native (Mueller-Dombois & Fosberg, 1998; Mueller-Dombois & Fosberg, 2013). Periodic helicopter-based surveys have occurred since 1998 (monthly up to 2009, and quarterly thereafter through September 2016) for marine birds nesting on the island. Although the primary goal of these surveys is to count marine birds, observations of other species observed, condition of vegetation communities, and general structure are made during the surveys. Because of continued access constraints associated with the unexploded ordnance risk, no formal plant surveys have been completed on FDM since the publication of the 2015 MITT Final EIS/OEIS. Because of a lack of commercial helicopter transit services, surveys have not been conducted since 2016. The most recent surveys have not provided any indications that the vegetation communities have changed since the 2015 MITT Final EIS/OEIS.

3.10.1.2 Wildlife Communities on Farallon de Medinilla

3.10.1.2.1 Birds

FDM is recognized by regional ornithologists as an important bird area for many species of marine birds and migrant shorebirds, and supports a limited number of terrestrial bird species (Lusk et al., 2000; U.S. Department of the Navy, 2013a; U.S. Fish and Wildlife Service, 1998). Seabird and shorebird species are discussed in Section 3.6 (Marine Birds) of this SEIS/OEIS. No new information is available since the publication of the 2015 MITT Final EIS/OEIS regarding FDM's terrestrial avifauna; therefore, the description of the avian portion of FDM's wildlife community in the 2015 MITT Final EIS/OEIS remains valid. (Lusk et al., 2000; U.S. Department of the Navy, 2013a, 2013b).

3.10.1.2.2 Mammals

Incidental observations of fruit bats during bird surveys described in the 2015 MITT Final EIS/OEIS, along with fishermen reports from the early 1970s, suggest a small number of fruit bats use FDM, possibly as a stopover location while transiting between islands. Fruit bats are discussed in more detail below. The only other mammalian species known to occur on the island are introduced small-sized rats, believed to be *Rattus exulans*. Commonly observed during past natural resource surveys (U.S. Department of the Navy, 2008a, 2013b), it is believed that rats negatively impact breeding activities for seabirds, and upland terrestrial birds on the island. There is no new information available that would inform the impact analysis on FDM's mammals since the publication of the 2015 MITT Final EIS/OEIS; therefore, the description of the mammalian portion of FDM's wildlife community in the 2015 MITT Final EIS/OEIS remains valid.

3.10.1.2.3 Reptiles and Amphibians

Only two species of reptiles are reported on FDM—the Pacific blue-tailed skink (*Emoia caeruleocauda*) and the oceanic snake-eyed skink (*Cryptoblepharus poecilopleurus*) (U.S. Department of the Navy 2008a). No observations of brown treesnakes have been reported on the island. No new information has become available since the publication of the 2015 MITT Final EIS/OEIS that expands upon the known list of reptiles on FDM; therefore, the description of FDM's reptiles and amphibians in the 2015 MITT Final EIS/OEIS remains valid.

3.10.1.2.4 Invertebrates

Since the publication of the 2015 MITT Final EIS/OEIS, no new inventories for invertebrate species have been conducted on FDM. Prior to the 2015 MITT Final EIS/OEIS, no formal surveys for invertebrates were conducted; accounts of invertebrates have been provided as incidental observations during other natural resource survey efforts. For instance, coconut crabs, including one female with eggs, were observed on FDM in August 2008 (U.S. Department of the Navy, 2013b).

3.10.1.3 Endangered Species Act Listed Species

3.10.1.3.1 Micronesian Megapode/Sasangat (*Megapodius laperouse laperouse*)

The Micronesian megapode was first listed as endangered in 1970 (under the Endangered Species Conservation Act, 35 Federal Register 8491-8498). No critical habitat is designated for this species. Threats to this species include habitat loss from typhoons and volcanic activity, damage by feral herbivores, hunting and illegal egg collection, increased tourism, and predation by introduced predators (U.S. Fish and Wildlife Service, 1998). Small remnant populations are known to exist on the southern Mariana Islands of Aguiguan, Saipan, and FDM; larger populations are reported on uninhabited northern islands of Anatahan, Guguan, Sarigan, Alamagan, Pagan, Asuncion, Maug, and possibly Agrihan (Amidon

et al., 2011; U.S. Department of the Navy, 2013a). Recent surveys and modeling suggests that islands with low human presence and without ungulates have the highest densities of megapodes (i.e., Maug, Asuncion, Guguan, and Sarigan) (Amidon et al., 2011).

Surveys on FDM in 1996 documented the presence of the Micronesian megapode (Lusk et al., 2000; U.S. Fish and Wildlife Service, 1998). From this survey, a population of 10 Micronesian megapodes was estimated on FDM (Kessler & Amidon, 2009; Lusk et al., 2000; U.S. Fish and Wildlife Service, 1998). However, due to an approaching typhoon, biologists were only on the island for about 5.5 hours, so this estimate was based on limited data. FDM was surveyed more thoroughly in December 2007 by Navy biologists, who estimated 21 adult pairs (U.S. Department of the Navy, 2008b, 2008c). The most recent survey for megapodes on FDM was completed in 2013, when Navy biologists detected 11 megapodes while surveying a limited transect in the north part of the island (Impact Areas 1 and 2) (U.S. Department of the Navy, 2013b).

Poaching has been identified as a potential threat to megapodes in the northern Mariana Islands (Reichel, 1991; U.S. Fish and Wildlife Service, 1998). Mitigation measures specified in previous consultations coupled with the restricted access preventing poaching activities may have benefited megapodes on FDM. The mitigation measures included maintaining a no-fire zone on the northern portion of the island and the use of inert ordnance in an area south of the no-fire zone (explosive ordnance is deployed south of this area). These measures were included as non-discretionary terms and conditions in the USFWS's biological opinion for activities consulted on in 2015.

Since the publication of the 2015 MITT Final EIS/OEIS, there is no new information available to further expand the life history and status of the Micronesian megapodes on FDM. Therefore, the information in the 2015 MITT Final EIS/OEIS is valid for analyzing potential impacts on the Micronesian megapode.

3.10.1.3.2 Mariana Fruit Bat/Fanihi (*Pteropus mariannus mariannus*)

The Guam population of the Mariana fruit bat (Mariana flying fox) was federally listed as endangered in 1984 (U.S. Fish and Wildlife Service, 2009). However, in 2005, the Mariana fruit bat was listed as threatened throughout the Mariana archipelago and downlisted to threatened on Guam. The recovery plan for the Mariana fruit bat was first finalized in 1990; however, a draft revised recovery plan for the Mariana fruit bat was released in March 2010. Critical habitat is designated on Guam and Rota, but there is no critical habitat designated on FDM.

Since the publication of the 2015 MITT Final EIS/OEIS, no new information on the Mariana fruit bat life history or status on FDM is available. Therefore, the information in the 2015 MITT Final EIS/OEIS is valid for analyzing potential impacts on the Mariana fruit bat.

3.10.1.4 Major Terrestrial Species Taxonomic Group Descriptions

There have been no updates to the status and life history descriptions for the major taxonomic groups that occur within Mariana Island terrestrial environments since the publication of the 2015 MITT Final EIS/OEIS.

3.10.2 Environmental Consequences

The 2015 MITT Final EIS/OEIS analyzed training and testing activities currently occurring in the MITT Study Area and considered all potential stressors related to terrestrial biological resources. Stressors applicable to terrestrial biological resources on FDM are the same stressors analyzed in the 2015 MITT Final EIS/OEIS. For this supplemental analysis, explosives, which were analyzed under acoustic stressors in 2015, are now analyzed as a separate stressor.

In addition, the 2015 MITT Final EIS/OEIS assessed potential impacts on training locations on Guam, Rota, Tinian, Saipan, and FDM, whereas this SEIS/OEIS only updates the analysis on FDM.

The following stressors are analyzed for terrestrial biological resources; the analyses include stressor description updates from the 2015 MITT Final EIS/OEIS:

- Acoustic (weapons noise)
- Explosives (explosions on land at FDM)
- Physical Disturbance and Strike (aircraft and aerial targets, military expended materials, ground disturbance, and wildfires)
- Secondary stressors (impacts on habitat, impacts on prey availability, introduction of potential invasive species)

This section evaluates how and to what degree potential impacts on terrestrial biological resources from stressors described in Section 3.0 (General Approach to Analysis) may have changed since the analysis presented in the 2015 MITT Final EIS/OEIS was published. Table 2.5-1 in Chapter 2 (Description of Proposed Action and Alternatives) lists the proposed training activities that would occur on FDM and includes the number of times each activity would be conducted annually under each alternative. The tables also present the same information for activities described in the 2015 MITT Final EIS/OEIS so that the proposed levels of training and testing under this SEIS/OEIS can be easily compared.

The analysis presented in this section also considers measures that the Navy would implement to avoid or reduce potential impacts on terrestrial biological resources on FDM from stressors associated with the proposed training activities. As with the 2015 MITT Final EIS/OEIS, no testing activities would occur on FDM.

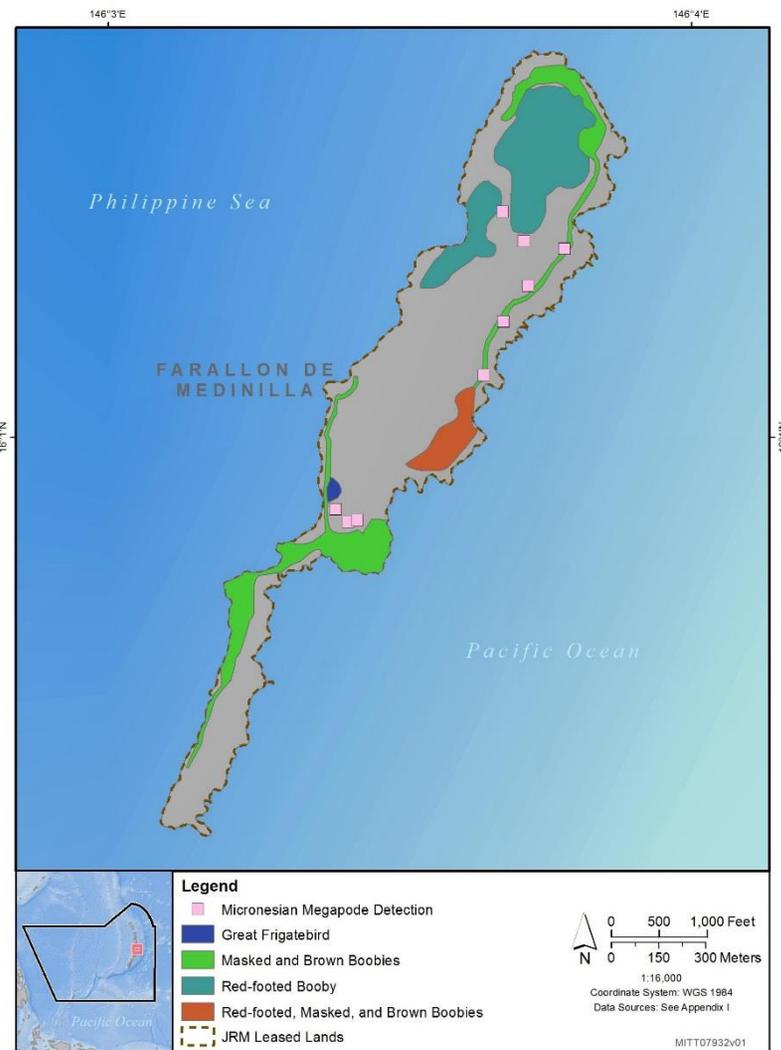
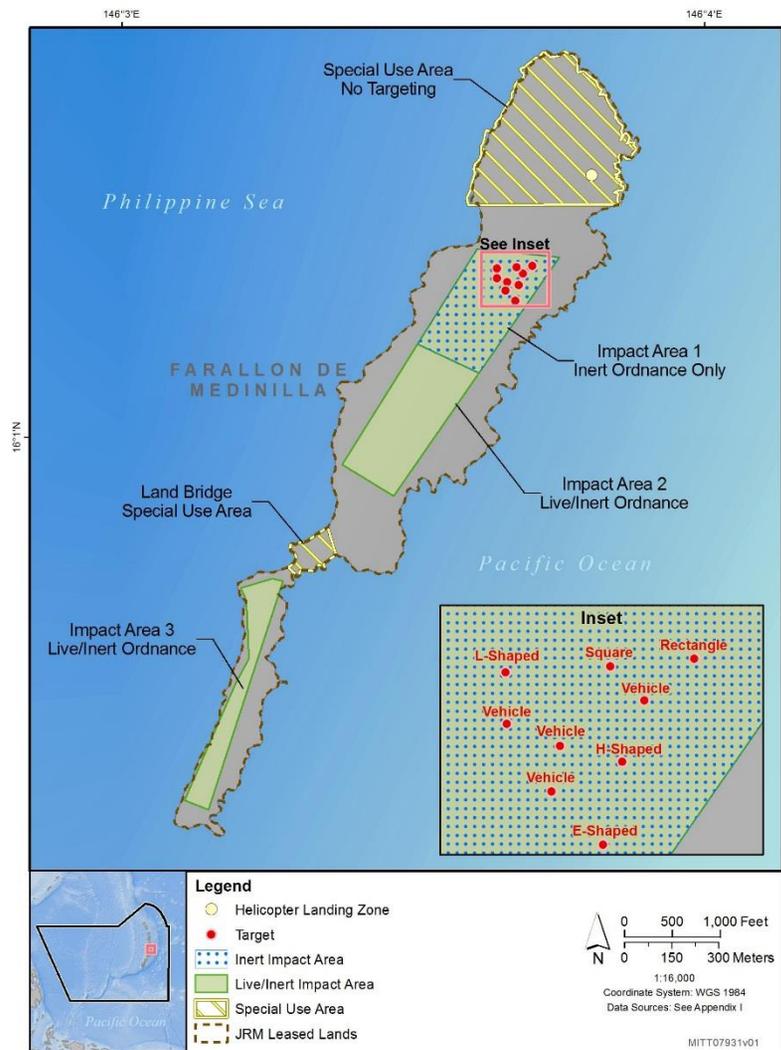
3.10.2.1 Acoustic Stressors

The potential impacts of explosives noise and weapons firing noise on FDM's wildlife are discussed in Section 3.10.3.1.1 (Impacts from Explosives and Weapons Firing Noise) in the 2015 MITT Final EIS/OEIS. Impacts from aircraft noise are discussed in Section 3.10.3.1.2 (Impacts from Aircraft Noise) in the 2015 MITT Final EIS/OEIS. These sections discuss the different types of sounds, frequency ranges, and intensity generated from munitions use on FDM. Noise can result from direct munitions impacts (one object striking another), blasts (explosions that result in shock waves), bow shock waves (pressure waves from projectiles flying through the air), and substrate vibrations (combinations of explosion, recoil, or vehicle motion with the ground). Noise may be continuous, lasting for a long time without interruption, or impulsive, lasting for only a short duration. Continuous impulses (e.g., helicopter rotor noise, bursts from rapid-fire weapons) represent an intermediate type of sound and, when repeated rapidly, may resemble continuous noise. These types of sounds are distinguished here as they differ in their effects. Continuous and impulsive sounds can result in hearing damage, while shorter duration, less frequent, or lower sound levels typically elicit physiological or behavioral responses. Some birds

may be killed or injured during these activities, or expend energy stores needed for migration to avoid or reduce perturbations generated by explosions.

FDM has three impact areas, a special use area on the northern portion of the island, and a special use area on the land bridge. Targeting of areas inside of the special use areas and other areas outside of impact areas are prohibited. In other words, all areas outside of the impact areas are considered “no-fire areas.” Any ordnance that inadvertently lands outside of impact areas, including special use areas and in water, must be reported to MIRC Operations, in accordance with Commander, U.S. Naval Forces Marianas Instruction 3500.4A (U.S. Department of the Navy, 2011). The impact areas and special use areas are shown on Figure 3.10-1 and described below:

- **Northern Special Use Area.** Reserved for direct action (tactical air control party) type exercises and personnel recovery. This area is about 41 acres (ac.) (17 hectares [ha]) and includes a landing zone. Weapons may be fired from the special use area into impact areas, such as small-caliber rounds, grenades, and mortars.
- **Impact Area 1.** This area contains high-fidelity target structures and is comprised of vehicle shells and cargo containers. This area is authorized for inert ordnance only, and operators are required to report any live ordnance inadvertently dropped into Impact Area 1 to MIRC Operations. Impact Area 1 contains 10 targets of varying shapes and sizes, including 4 vehicles and 6 targets comprised of shipping containers.
- **Impact Area 2.** Impact Area 2 may be used for both live and inert ordnance. Strafing is permitted in this area. Impact Area 2 is about 22 ac. (9 ha).
- **Land Bridge.** The land bridge is designated as a “no target zone.” Operators are required to report ordnance observed impacting the land bridge.
- **Impact Area 3.** This area is south of the land bridge and authorized for inert ordnance, although live ordnance may be used only with prior approval from Joint Region Marianas. Strafing is permitted in this area. Impact Area 3 is about 11 ac. (4.5 ha).



Note: Target locations in Impact Area 1 may change depending on target maintenance and training requirements.

Figure 3.10-1: Farallon de Medinilla Impact Zones and Micronesian Megapode Occurrences

3.10.2.1.1 Impacts from Acoustic Stressors Under Alternative 1

Under Alternative 1, there would be an overall increase in the number of training events and munitions used on the island, which would increase the number of exposures to explosives noise, weapons firing noise, and aircraft overflights to deliver munitions to the impact zones on FDM. The types of explosive munitions used on FDM include explosive bombs (less than or equal to 2,000 pounds [lb.]), missiles, rockets, explosive grenades and mortars, medium-caliber projectiles, and large-caliber projectiles. The calculations for the increases in the number of events proposed on FDM are shown on Table 3.6-1. Table 3.6-2 shows the calculations for the proposed increases in the number of explosive and non-explosive munitions expended on FDM. These increases in events and munitions would result in an increase in net explosive weight (NEW) of explosives over the course of a training year. The calculations for NEW expended on FDM resulting from proposed training activities are shown in Table 3.6-3. The NEW for each ordnance type may vary within each class. Based on these NEW ranges within each explosives bin, the Navy calculated the range of total munitions' NEW under each alternative proposed in this SEIS/OEIS by multiplying the number of munitions used by the low and high NEW ranges for each ordnance type. Based on these calculations, the following assumptions are presented as additional analysis for this SEIS/OEIS:

- In terms of the number of events, there would be an increase of less than 2 percent over what was analyzed previously in the 2015 MITT Final EIS/OEIS. No new activity types are proposed in this SEIS/OEIS from what were previously analyzed in the 2015 MITT Final EIS/OEIS. Some activity types, however, would increase in the number of events per year and/or the number of ordnance items expended. Other activities would not change compared to what was analyzed previously in the 2015 MITT Final EIS/OEIS, and therefore would not contribute to an increase in NEW or the number of munitions expended on FDM. For example, Bombing Exercise (Air-to-Ground) is the most impactful in terms of explosive power released on FDM and would not increase compared to what was analyzed in the 2015 MITT Final EIS/OEIS. Table 3.6-1 shows the number of events that would occur under each alternative compared to what was analyzed in the 2015 MITT Final EIS/OEIS.
- In terms of munitions item numbers, there would be an increase of approximately 9 percent over what was analyzed previously in the 2015 MITT Final EIS/OEIS in the total number of munitions used on FDM. Most of these increases are associated with small-caliber rounds, which do not contribute to increases in NEW. Table 3.6-2 shows the number of munitions proposed under each alternative compared to what was analyzed in the 2015 MITT Final EIS/OEIS.
- In terms of NEW, explosives used on FDM would increase by less than 1 percent compared to what was analyzed in the 2015 MITT Final EIS/OEIS (see calculations in Table 3.6-3).

Sources of noise from weapons firing that may be heard by wildlife on FDM (including the ESA-listed Micronesian megapode and Mariana fruit bat, bird species protected under the MBTA, and other native terrestrial wildlife assessed in the 2015 MITT Final EIS/OEIS) include close-in weapons firing from vessels, helicopters, close-combat surface firing from fixed-wing aircraft, and surface firing, with the largest increase in munitions use resulting from small arms, medium-caliber explosives, and mortar and grenade use during Direct Action training activities. As shown in Table 3.6-1, the number of training events (that involve weapon firing on or proximate to FDM) would stay the same compared to what was previously analyzed in the 2015 MITT Final EIS/OEIS; however, the number of munitions used would increase during each training event (see Table 3.6-2). These training events would occur within the Northern Special Use Area and fire into the impact areas towards the south; therefore, more

megapodes and bats (along with other wildlife species) would be exposed to more weapons firing noise under Alternative 1 because of the increased number of small-caliber rounds, medium-caliber explosives, and grenades and mortars fired into impact areas from the Northern Special Use Area. The weapons-firing noise would likely be masked somewhat by natural sounds on FDM, such as waves and winds. The impulsive sound caused by weapon firings would have limited potential to mask any important biological sound simply because the duration of the impulse is brief, even when multiple shots are fired in series.

Although more ordnance may be used on FDM under Alternative 1 compared to what was analyzed previously in the 2015 MITT Final EIS/OEIS, all of the ordnance would be targeted at impact zones, with the same mitigation measures in place (discussed above in Section 3.10.2.1, Acoustic Stressors and Chapter 5, Mitigation), and there would be no changes in how activities are performed compared to the previous analysis in 2015. For FDM's terrestrial biological resources, including ESA-listed species (the Micronesian megapode and Mariana fruit bat), bird species protected under the MBTA, and other native terrestrial plants and wildlife assessed in the 2015 MITT Final EIS/OEIS, the relatively small increase in annual NEW, numbers of ordnance expended, and the number of activities on FDM would not result in an appreciable change in the impact conclusions presented in the 2015 MITT Final EIS/OEIS for the following two reasons: (1) the increase in the amount of NEW (less than 1 percent increase), number of items expended (less than 10 percent increase), and the number of activities (less than 2 percent increase) would be minor when comparing Alternative 1 to NEW amounts analyzed in the 2015 MITT Final EIS/OEIS; and (2) the Navy would continue to implement the same avoidance and minimization measures in place as with the 2015 MITT Final EIS/OEIS (see Section 5.5, Terrestrial Mitigation Measures to be Implemented, and Table 5.5-1).

The USFWS's 2015 Biological Opinion provided the Navy with an incidental take statement for the Mariana fruit bat and the Micronesian megapode (U.S. Fish and Wildlife Service, 2015). The Mariana fruit bat would not likely occur in impact zones and, if present on FDM, would likely be confined to the remnant tree cover at the northern end of the island. In the USFWS's 2015 Biological Opinion, one Mariana fruit bat was estimated to be killed over the course of five years as a result of bombing, gunnery, and missile exercises proposed in the 2015 MITT Final EIS/OEIS. The likelihood of increased exposure is negligible because of the small increases in the number of events, munitions, and NEW expended on FDM compared to what was analyzed in the 2015 MITT Final EIS/OEIS and 2015 USFWS Biological Opinion. In addition, the same avoidance and minimization measures in place included in the 2015 MITT Final EIS/OEIS and 2015 USFWS Biological Opinion would continue under Alternative 1 (see Section 5.5, Terrestrial Mitigation Measures to be Implemented, and Table 5.5-1).

In the USFWS's 2015 Biological Opinion, four Micronesian megapodes per year were estimated to be killed as a result of bombing, gunnery, and missile exercises proposed in the 2015 MITT Final EIS/OEIS. Based on the habitat conditions that persist within the impact zones, it is unlikely that additional megapodes would be exposed to additional ordnance use when used in the same locations previously analyzed. In summary, as the neither the Mariana fruit bat nor the Micronesian megapode will face increased exposure from the proposed additional ordnance to be expended, the incidental take statement provided to the Navy in 2015 as part of the USFWS's Biological Opinion is sufficient to cover potential impacts on ESA-listed species from activities proposed under Alternative 1 of this SEIS/OEIS.

Pursuant to the ESA, acoustic stressors during training activities on FDM, as described under Alternative 1, may affect the Micronesian megapode and the Mariana fruit bat. This determination is consistent with the previous consultation between the Navy and USFWS for activities described in the 2015 MITT Final EIS/OEIS. Because of the small increases in the amount of NEW used on FDM, the number of ordnance items expended, and the number of events that would occur on FDM under Alternative 1 compared to what was analyzed in the 2015 MITT Final EIS/OEIS, the activities proposed under Alternative 1 do not constitute a modification of the original proposed activities that causes new or additional effects on ESA-listed species on FDM; therefore, reinitiation of Section 7 consultation between the USFWS and Navy is not necessary.

Under the MBTA regulations applicable to military readiness activities (50 Code of Federal Regulations [CFR] Part 21), acoustic stressors on land during training activities under Alternative 1 would not result in significant adverse effects on terrestrial bird populations.

3.10.2.1.2 Impacts from Acoustic Stressors Under Alternative 2

Under Alternative 2, the number of proposed training activities using explosive munitions would be the similar as compared to Alternative 1, with an increase in the number of Direct Action events under Alternative 2 (compared to Alternative 1, see Table 3.6-1). The number of training events for this activity type would stay the same compared to what was previously analyzed in the 2015 MITT Final EIS/OEIS and under Alternative 1; however, the number of munitions used would increase during each training event under Alternative 2 (see Table 3.6-2). As with Alternative 1, these training events would occur within the Northern Special Use Area and fire into the impact areas towards the south; therefore, more megapodes and bats (along with other wildlife species) would be exposed to more weapons firing noise under Alternative 2 because of the increased number of small-caliber rounds, medium-caliber explosives, and grenades and mortars fired into impact areas from the Northern Special Use Area. The weapons-firing noise would likely be masked somewhat by natural sounds on FDM, such as waves and winds. The impulsive sound caused by weapon firings would have limited potential to mask any important biological sound simply because the duration of the impulse is brief, even when multiple shots are fired in series. In addition, the same avoidance and minimization measures in place included in the 2015 MITT Final EIS/OEIS would continue under Alternative 2 (see Section 5.5, Terrestrial Mitigation Measures to be Implemented, and Table 5.5-1).

Therefore, the same conclusions for Alternative 1 for terrestrial biological resources, including the Micronesian megapode, Mariana fruit bat, and MBTA-protected terrestrial bird species, are applicable to Alternative 2.

Pursuant to the ESA, acoustic stressors during training activities on FDM, as described under Alternative 2, may affect the Micronesian megapode and the Mariana fruit bat. This determination is consistent with the previous consultation between the Navy and USFWS for activities described in the 2015 MITT Final EIS/OEIS. Because of the small increases in the amount of NEW used on FDM, the number of ordnance items expended, and the number of events that would occur on FDM under Alternative 2 compared to what was analyzed in the 2015 MITT Final EIS/OEIS, the activities proposed under Alternative 2 do not constitute a modification of the original proposed activities that causes new or additional effects on ESA-listed species on FDM; therefore, reinitiation of Section 7 consultation between the USFWS and Navy is not necessary.

Under the MBTA regulations applicable to military readiness activities (50 CFR Part 21), acoustic stressors on land during training activities under Alternative 2 would not result in significant adverse effects on terrestrial bird populations.

3.10.2.1.3 Impacts from Acoustic Stressors Under the No Action Alternative

Under the No Action Alternative, proposed training and testing activities would not occur. Other military activities not associated with this Proposed Action would continue to occur. For FDM, the lease agreement between the U.S. government and the Commonwealth of the Northern Mariana Islands would remain in place, and the island would continue to be maintained as a Navy range, although strike warfare would no longer continue on the island.

Acoustic stressors associated with Navy training activities would no longer be introduced to the island, which would minimize adverse noise impacts on FDM, such as disturbance of nesting and roosting birds and bats, sound pressure waves that may induce injury to wildlife, and adverse impacts associated with military noise on wildlife species at various life stages.

3.10.2.2 Explosives Stressors

The training activities that have the greatest impact on vegetation and wildlife communities within the impact areas on FDM are those that result in percussive force from the use of explosive munitions. The potential impacts of activities with these types of disturbances are discussed in Section 3.10.3.1.1 (Impacts from Explosives and Weapons Firing Noise) of the 2015 MITT Final EIS/OEIS.

3.10.2.2.1 Impacts from Explosive Stressors Under Alternative 1

As stated above in Section 3.10.2.1.1 (Impacts from Acoustic Stressors Under Alternative 1), there would be a small increase in the number of explosions on FDM, which would increase the number of exposures to percussive force. The types of explosive munitions used on FDM include explosive bombs (less than or equal to 2,000 lb.), missiles, rockets, explosive grenades and mortars, medium-caliber projectiles, and large-caliber projectiles. The number of explosive bombs (less than or equal to 2,000 lb.) would not change compared to what was analyzed in the 2015 MITT Final EIS/OEIS, while the increases in NEW would be from the increased number of smaller NEW munitions (see Table 3.6-2). The total change in explosives use on FDM, in terms of NEW, would increase by less than 1 percent under Alternative 1 compared to what was analyzed in the 2015 MITT Final EIS/OEIS. Although more ordnance would be used on FDM under Alternative 1, all of the ordnance would target impact zones, with the same avoidance and minimization measures in place (see Section 5.5, Terrestrial Mitigation Measures to be Implemented, and Table 5.5-1).

As discussed in Section 3.10.2.1.1 (Impacts from Acoustic Stressors Under Alternative 1), the USFWS's 2015 Biological Opinion provided the Navy with an incidental take statement for the Mariana fruit bat and the Micronesian megapode (U.S. Fish and Wildlife Service, 2015). The Mariana fruit bat would not likely occur in impact zones and, if present on FDM, would likely be confined to the remnant tree cover at the northern end of the island. In the USFWS's 2015 Biological Opinion, one Mariana fruit bat was estimated to be killed over the course of five years as a result of bombing, gunnery, and missile exercises proposed in the 2015 MITT Final EIS/OEIS. The likelihood of increased exposure is negligible because of the small increases in the number of events, munitions, and NEW expended on FDM compared to what was analyzed in the 2015 MITT Final EIS/OEIS and 2015 USFWS Biological Opinion. In addition, the same avoidance and minimization measures in place included in the 2015 MITT Final EIS/OEIS and 2015 USFWS Biological Opinion would continue under Alternative 1 (see Section 5.5,

Terrestrial Mitigation Measures to be Implemented, and Table 5.5-1). In the USFWS's 2015 Biological Opinion, four Micronesian megapodes per year were estimated to be killed as a result of bombing, gunnery, and missile exercises proposed in the 2015 MITT Final EIS/OEIS. Based on the habitat conditions that persist within the impact zones, it is unlikely that additional megapodes would be exposed to additional ordnance use when used in the same locations previously analyzed. In summary, as neither the Mariana fruit bat, nor the Micronesian megapode would face increased exposure from the proposed use of explosive ordnance, the incidental take statement provided to the Navy in 2015 as part of the USFWS's Biological Opinion is sufficient to cover potential impacts on ESA-listed species from activities proposed under Alternative 1 of this SEIS/OEIS.

Pursuant to the ESA, explosives stressors during training activities on FDM, as described under Alternative 1, may affect the Micronesian megapode and the Mariana fruit bat. This determination is consistent with the previous consultation between the Navy and USFWS for activities described in the 2015 MITT Final EIS/OEIS. Because of the small increases in the amount of NEW used on FDM, the number of ordnance items expended, and the number of events that would occur on FDM under Alternative 1 compared to what was analyzed in the 2015 MITT Final EIS/OEIS, the activities proposed under Alternative 1 do not constitute a modification of the original proposed activities that causes new or additional effects on ESA-listed species on FDM; therefore, reinitiation of Section 7 consultation between the USFWS and Navy is not necessary.

Under the MBTA regulations applicable to military readiness activities (50 CFR Part 21), explosions and weapons firing on land during training activities under Alternative 1 would not result in significant adverse effects on terrestrial bird populations.

3.10.2.2.2 Impacts from Explosive Stressors Under Alternative 2

Under Alternative 2, there would be an increase in the number of events using FDM as a training location or target (see Table 3.6-1), with an increase in the number of munitions items expended on FDM (see Table 3.6-2) compared to what was analyzed previously in the 2015 MITT Final EIS/OEIS and under Alternative 1.

Taken together, the increase in the number of events per year or the amount of ordnance used during events would result in an increase in the amount of NEW expended on FDM each year (see Table 3.6-3). Under Alternative 2, Naval Surface Firing Exercise events would expend more large-caliber projectiles, thereby slightly increasing the NEW expended under Alternative 2 compared to Alternative 1. Factors that limit the potential for additional adverse impacts, however, include maintaining the same ordnance type and targeting restrictions included as part of the 2015 MITT Final EIS/OEIS. All ordnance expended on FDM would target existing impact zones, with the same ordnance restrictions imposed on all FDM activities and with the same avoidance and minimization measures in place (see Section 5.5, Terrestrial Mitigation Measures to be Implemented, and Table 5.5-1). As with Alternative 1, the likelihood of increased exposure under Alternative 2 is negligible because of the small increases in the number of events, munitions, and NEW expended on FDM compared to what was analyzed in the 2015 MITT Final EIS/OEIS and 2015 USFWS Biological Opinion. Therefore, the conclusions for terrestrial biological resources (including ESA-listed species and species protected by the MBTA) included in the 2015 MITT Final EIS/OEIS remain valid.

Pursuant to the ESA, explosive stressors during training activities on FDM, as described under Alternative 2, may affect the Micronesian megapode and the Mariana fruit bat. This determination is consistent with the previous consultation between the Navy and USFWS for activities described in the 2015 MITT Final EIS/OEIS. Because of the small increases in the amount of NEW used on FDM, the number of ordnance items expended, and the number of events that would occur on FDM under Alternative 2 compared to what was analyzed in the 2015 MITT Final EIS/OEIS, the activities proposed under Alternative 2 do not constitute a modification of the original proposed activities that causes new or additional effects on ESA-listed species on FDM; therefore, reinitiation of Section 7 consultation between the USFWS and Navy is not necessary.

Under the MBTA regulations applicable to military readiness activities (50 CFR Part 21), explosions and weapons firing on land during training activities under Alternative 2 would not result in significant adverse effects on terrestrial bird populations.

3.10.2.2.3 Impacts from Explosive Stressors Under the No Action Alternative

Under the No Action Alternative, proposed training and testing activities would not occur. Other military activities not associated with this Proposed Action would continue to occur. For FDM, the lease agreement between the U.S. government and the Commonwealth of the Northern Mariana Islands would remain in place, and the island would continue to be maintained as a Navy range, although strike warfare would no longer continue on the island.

Explosions associated with Navy training activities would no longer occur on the island, which would minimize adverse impacts associated with blast effects.

3.10.2.3 Physical Disturbance and Strike Stressors

The 2015 MITT Final EIS/OEIS analyzed the potential for physical disturbance and strike stressors, defined as including (1) direct strike, (2) habitat disturbance, (3) and the potential for wildfires. As discussed in Section 3.10.3.2 (Physical Stressors) in the 2015 MITT Final EIS/OEIS, the potential for impacts on vegetation communities and wildlife resources, including the Micronesian megapode, Mariana fruit bats that may occur on the island, and land bird species, associated with direct strike from inert munitions is considerably lower than the potential for blast effects associated with explosive munitions.

Direct Action training activities require helicopter landings on FDM at a landing zone within the “no target area” (see Appendix A for a description of Direct Action training events). Marines and special warfare personnel would then disembark and conduct Direct Action training activities, where vegetation may be trampled. Because of unexploded ordnance clearance requirements, only marked trails (laid out by explosive ordnance disposal specialists prior to range clearance activities) are used, which reduces the potential for vegetation trampling (as well as nest trampling) in areas away from access trails.

Training activities that involve high explosive detonations on FDM introduce the potential for wildfires on the island. Cluster bombs, live cluster weapons, live scatterable munitions, fuel-air explosives, incendiary devices, and bombs greater than 2,000 lb. are prohibited on FDM. It should be noted that some munitions contain a small amount of phosphorous for spotting charges, and smoke markers are used in some direct action training activities. Phosphorous is not a main constituent to any munitions used on FDM. The live-fire weapons allowed are only targeted at impact areas authorized for live and inert ordnance. The areas for target placement support only low-growing vegetation because of long-term training with explosives. Dense vegetation grows on the northern portion of the island within the

special use area, which could create a wildfire if weapons are misfired. Explosions may ignite fires in impact areas, which may spread to higher stature fine fuels outside of impact areas, endangering the remnant forest portions on the northern side of the island. However, the dense vegetation and shaded canopy of trees in the northern portion of the island likely increases the moisture content of vegetation, which should decrease the ability of fires to spread into the special use area.

3.10.2.3.1 Impacts from Physical Disturbance and Strike Stressors Under Alternative 1

Under Alternative 1, direct strike of individual birds and bats on FDM is unlikely because the increased activities (missile exercises and direct-action training activities) would occur within the impact zones already established on the island. These areas are highly degraded and do not support sufficient cover and forage resources to be considered high-value habitat on FDM. Therefore, the impact areas are not likely to attract terrestrial wildlife resources, and would attract few (if any) Micronesian megapodes and likely no Mariana fruit bats.

The small increase in explosions under Alternative 1 (see Table 3.6-3) compared to the amount analyzed in the 2015 MITT Final EIS/OEIS, as measured in terms of NEW, would unlikely be additive to wildfire risk on FDM. As described above, munitions use on FDM can ignite wildfires. Wildfire intensity may vary based on the amount and type of munitions, wind speed, levels of humidity, seasonal variation in vegetation thickness and composition, and successional state of vegetation. Micronesian megapodes on FDM would be expected to fly away from smoke, but exposure to smoke inhalation would result in some form of respiratory distress. Direct mortality of megapodes could result from intensive respiratory distress or encirclement of burning vegetation. Megapode eggs, even in burrows, would not likely survive a wildfire overburn on FDM. Likewise, any fledglings within a burn area would be expected to suffer intensive respiratory distress, as they would be unable to flee smoke or burning vegetation. As stated above, fires are unlikely to spread to the northern portion of FDM; the northern portion of the island would continue to serve as refugia for Micronesian megapodes that either reside in this area or for megapodes able to flee smoke and flames from target areas. Therefore, despite more explosions on FDM, they would occur within the same impact zones, which reduces the potential for overburns in new previously unburned areas.

Pursuant to the ESA, physical disturbance and strike stressors during training activities on FDM, as described under Alternative 1, may affect the Micronesian megapode and the Mariana fruit bat. This determination is consistent with the previous consultation between the Navy and USFWS for activities described in the 2015 MITT Final EIS/OEIS. Because of the small increases in the amount of NEW used on FDM, the number of ordnance items expended, and the number of events that would occur on FDM under Alternative 1 compared to what was analyzed in the 2015 MITT Final EIS/OEIS, the activities proposed under Alternative 1 do not constitute a modification of the original proposed activities that causes new or additional effects on ESA-listed species on FDM; therefore, reinitiation of Section 7 consultation between the USFWS and Navy is not necessary.

Under the MBTA regulations applicable to military readiness activities (50 CFR Part 21), physical disturbance and strike stressors during training activities under Alternative 1 would not result in significant adverse effects on terrestrial bird populations.

3.10.2.3.2 Impacts from Physical Disturbance and Strike Stressors Under Alternative 2

Under Alternative 2, there would be an increase in the number of events using FDM as a training location or target (see Table 3.6-1), with an increase in the number of munitions items expended on

FDM (see Table 3.6-2) compared to what was analyzed previously in the 2015 MITT Final EIS/OEIS and under Alternative 1.

Taken together, the increase in the number of events per year or the amount of ordnance used during events would result in an increase in the amount of NEW expended on FDM each year (see Table 3.6-3). Although the amount of increased NEW is negligible, the potential exposure to stressors associated with ordnance use would increase under Alternative 2 compared to what was analyzed previously in the 2015 MITT Final EIS/OEIS. Under Alternative 2, Naval Surface Firing Exercise events would expend more large-caliber projectiles, thereby slightly increasing the NEW expended under Alternative 2 compared to Alternative 1. Factors that limit the potential for additional adverse impacts associated with physical disturbance and strike, however, include maintaining the same ordnance type and targeting restrictions included as part of the 2015 MITT Final EIS/OEIS. All ordnance expended on FDM would target existing impact zones, with the same ordnance restrictions imposed on all FDM activities and with the same avoidance and minimization measures in place (see Section 5.5, Terrestrial Mitigation Measures to be Implemented, and Table 5.5-1). Therefore, the increases in ordnance use on FDM shown in Tables 2.5-1 and 2.5-2 do not appreciably change the impact conclusions presented in the 2015 MITT Final EIS/OEIS. The conclusions for terrestrial biological resources (including ESA-listed species and species protected by the MBTA) included in the 2015 MITT Final EIS/OEIS remain valid.

Pursuant to the ESA, physical disturbance and strike stressors during training activities on FDM, as described under Alternative 2, may affect the Micronesian megapode and the Mariana fruit bat. This determination is consistent with the previous consultation between the Navy and USFWS for activities described in the 2015 MITT Final EIS/OEIS. Because of the small increases in the amount of NEW used on FDM, the number of ordnance items expended, and the number of activities that would occur on FDM under Alternative 2 compared to what was analyzed in the 2015 MITT Final EIS/OEIS, the activities proposed under Alternative 2 do not constitute a modification of the original proposed activities that causes new or additional effects on ESA-listed species on FDM; therefore, reinitiation of Section 7 consultation between the USFWS and Navy is not necessary.

Under the MBTA regulations applicable to military readiness activities (50 CFR Part 21), physical disturbance and strike stressors during training activities under Alternative 2 would not result in significant adverse effects on terrestrial bird populations.

3.10.2.3.3 Impacts from Physical Disturbance and Strike Stressors Under No Action Alternative

Under the No Action Alternative, proposed training and testing activities would not occur. Other military activities not associated with this Proposed Action would continue to occur. For FDM, the lease agreement between the U.S. government and the Commonwealth of the Northern Mariana Islands would remain in place, and the island would continue to be maintained as a Navy range, although strike warfare would no longer continue on the island.

Explosions associated with Navy training activities would no longer occur on the island, which would minimize adverse impacts associated with physical disturbance and strike stressors.

3.10.2.4 Secondary Stressors

The 2015 MITT Final EIS/OEIS included an analysis of the potential impacts of secondary stressors on terrestrial species and habitats. Specifically, this section addresses the potential introduction of invasive species. Section 3.10.3.3.1 (Impacts from Invasive Species Introductions) in the 2015 MITT Final EIS/OEIS

discusses potential introduction pathways of invasive species associated with training activities described in this SEIS/OEIS.

The 2015 MITT Final EIS/OEIS included a conceptual model of invasive species pathways (Figure 3.10-10 in the 2015 MITT Final EIS/OEIS) resulting from training activities, and specific invasive species interdiction measures that avoid or minimize risk of specific pathways (see Table 3.10-7 in the 2015 MITT Final EIS/OEIS). Of the two training activity types that would increase on FDM under Alternative 1, only Direct Action training activities present potential introduction pathways for invasive species. Introduction pathways that originate on Guam and end on FDM present a potential hazard for brown treesnake dispersal. For activities described in this SEIS/OEIS, potential introduction pathways would be associated with helicopter transports to FDM. The Brown Tree Snake Control and Interdiction Requirements are included in the Commander, U.S. Naval Forces Marianas Instruction 3500.4A (dated October 8, 2013). This document describes roles and responsibilities for exercise planners to interdict and control brown treesnakes and to disseminate information to participants throughout the chain of command. Other policies and instructions associated with military training activities and potential invasive species introductions include Office of the Chief of Naval Operations Instruction 5090.1D (updated in 2013) and Armed Forces Pest Management Board Technical Guide 31 (Armed Forces Pest Management Board, 2012). For instance, any personnel involved in training activities on FDM conduct self inspections to avoid or reduce potential introductions of invasive species from points of origin to FDM. Points of origin include Guam and Saipan, and possibly Tinian. Personnel inspect all gear and clothing (e.g., boots, bags, weapons, and pants) for soil accumulations, seeds, invertebrates, and possible inconspicuous stowaway brown treesnakes).

The Direct Action training activities, which are proposed to increase, would still be subject to biosecurity measures. The potential introduction of invasive species to FDM from additional transits to FDM during Direct Action training activities is unlikely; therefore, there would be no appreciable increase in risk from activities analyzed in the 2015 MITT Final EIS/OEIS.

With the small increase (less than 1 percent) in the amount of NEW used on FDM under Alternative 1 and Alternative 2 compared to what was analyzed in the 2015 MITT Final EIS/OEIS, the activities proposed in this SEIS do not constitute a modification of the original proposed activities that causes new or additional effects from secondary stressors on ESA-listed species on FDM; therefore, reinitiation of Section 7 consultation between the USFWS and Navy is not necessary.

3.10.3 Public Scoping Comments

The public raised a number of issues during the scoping period in regard to terrestrial species and habitats. The issues are summarized in the list below.

- **Public comments concerning a lack of studies on FDM** – Some commenters noted a lack of studies documenting the condition of terrestrial biological resources on FDM. Complete natural resource inventories on the island are subject to a number of constraints, such as safety concerns regarding unexploded ordnance and scheduling surveys to avoid both training activities and weather. Surveys are conducted on a periodic basis on FDM. On-the-ground surveys are conducted primarily to monitor Micronesian megapodes on the island. These surveys are described in more detail in Section 3.10.2.3.8.4 (Status within the Mariana Islands Training and Testing Study Area) in the 2015 MITT Final EIS/OEIS. Aerial surveys are conducted more frequently over FDM, with the primary focus on monitoring seabird rookeries (primarily brown boobies, masked boobies, and red-footed boobies). These surveys are described in more

detail, along with quantitative trend analysis of populations, in Section 3.6.2 (Farallon de Medinilla) of the 2015 MITT Final EIS/OEIS. All of these studies are summarized and included in updates to the Joint Region Marianas Integrated Natural Resources Management Plan for Joint Region Marianas-administered and Leased Lands On Guam, Tinian, and FDM (U.S. Department of the Navy, 2018), which is shared with cooperating agencies (e.g., Guam Department of Agriculture Division of Aquatic and Wildlife Resources, Commonwealth of Northern Mariana Islands Department of Land and Natural Resources Division of Fish and Wildlife, and USFWS Pacific Islands Fish and Wildlife Office).

- **Potential impacts on vegetation communities on FDM** – One comment raised the concern of vegetation loss resulting from bombing activities at FDM. Vegetation loss over the long term is described in Section 3.10.2.1.5 (Farallon de Medinilla) in the 2015 MITT Final EIS/OEIS. Few vegetation surveys have been conducted on FDM. The first published flora record in 1902, described the island as a plateau covered by brush approximately 13 feet (4.0 meters) high (Mueller-Dombois & Fosberg, 1998); however, aerial photographs from 1944 show large canopy trees on FDM (see Figure 3.10-4 in the 2015 MITT Final EIS/OEIS). FDM’s vegetation appears to have undergone significant changes since the island was leased by the Department of Defense and the subsequent bombardment for military training. The most intensive bombardment to date of FDM occurred during the Vietnam era, when as much as 22 tons of ordnance per month was dropped on the island (Lusk et al., 2000). Based on early 20th century descriptions of FDM vegetation and aerial photographs of the island prior to military bombardment activities, island tree height and canopy cover have been greatly reduced (Lusk et al., 2000; Mueller-Dombois & Fosberg, 1998). The avoidance and minimization measures currently implemented on FDM, as described in the 2015 MITT Final EIS/OEIS and Chapter 5 (Mitigation) of this SEIS/OEIS, are designed to protect the area of the island occupied by the Micronesian megapode in the “No Drop Zone.” According to Lusk et al. (2000), vegetation in this area has not substantially changed since 1974. The USFWS, in their Biological Opinion signed in 2015 for activities described in the 2015 MITT Final EIS/OEIS, suggests that the avoidance and minimization measures have protected species and habitats in the northern portion of the island (U.S. Fish and Wildlife Service, 2015), while the reductions in vegetation structure and composition have occurred in designated impact zones to the south of the “No Drop Zone.” In summary, the Navy concurs that there have been significant losses of vegetation on FDM resulting from military training activities. Mitigation measures that have been designed in cooperation with USFWS personnel provide a level of protection for the northern end of the island, while ordnance use is only allowed in designated impact zones. Increases in ordnance use on FDM would only occur in existing impact zones, causing no new additional vegetation losses on the island.

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