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FISH AND WILDLIFE SERVICE

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Rear Admiral Bette Bolivar
Department of the Navy
Joint Region Marianas
Building 200, Room 326
Halsey Drive, Nimitz Hill
Piti, Guam 96915

Subject: Mariana Islands Training and Testing Program

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) addressing the subject action as proposed by the Department of the Navy (Navy). The Navy is serving as the lead Federal agency for implementation of Department of Defense (DoD) readiness training under the Mariana Islands Training and Testing (MITT) program. At issue are the effects of the proposed action on the threatened Mariana fruit bat (*Pteropus mariannus mariannus*) and the endangered Micronesian megapode (*Megapodius laperouse*). The enclosed Opinion was prepared in accordance with the requirements of section 7 of the Endangered Species Act (ESA) of 1973 as amended (16 U.S.C. 1531 et seq.). The Service initiated formal consultation on the proposed MITT program on August 4, 2014 (Service 2014a).

This Opinion is based primarily on information provided in: (1) the Navy's Biological Assessment (BA) for the MITT program, dated August 2014, as amended (Navy 2014a,b); (2) the Service's Opinion addressing the U.S. Air Force's (USAF) Intelligence, Surveillance, Reconnaissance, and Strike Capability (ISR Strike) project (Service 2006a); (3) the Service's Opinion on the Mariana Islands Range Complex (MIRC) program (Service 2010a), as amended (Service 2013a, 2014a), on which the MITT program is based; and (4) other sources of information cited herein. A complete decision record for this consultation is on file at the Service's Pacific Islands Fish and Wildlife Office (PIFWO).

This Opinion also serves as the ESA section 7 compliance document for the proposed MITT program for the Navy, USAF, U.S. Army, U.S. Coast Guard, and the U.S. Marine Corps.

CONSULTATION HISTORY

On October 3, 2006, the Service issued an Opinion to the USAF addressing the ISR Strike action. The conservation measures included in the proposed action subsequently became a component of the MIRC program. That Opinion (Service 2006a) is herein incorporated by reference.

On February 22, 2010, the Service issued an Opinion to the Navy addressing the MIRC program. That Opinion (Service 2010a) and amendments to that Opinion dated June 27, 2013 and June 11, 2014 are herein incorporated by reference (Service 2013a, 2014a).

On April 3, 2014, the Navy transmitted a letter requesting the reinitiation of formal consultation and the BA for the MITT program, formerly identified as the MIRC program.

On May 9, 2014, the Service determined that the information in the BA was insufficient to initiate the consultation and requested additional information from the Navy on the MITT program.

On June 19, 2014, the Navy transmitted an addendum to the BA for the MITT program (Navy 2014b) in response to the Service's May 9, 2014, request.

On August 7, 2014, the Service formally advised the Navy that formal consultation had been initiated on the proposed MITT program.

On October 31, 2014, the Navy informally amended (via email) the BA for the MITT program based on discussions with the Service during October of 2014. The Navy and the Service corresponded by email on multiple occasions during November of 2014 to clarify aspects of the proposed MITT program and the findings presented in the BA.

On November 6, 2014, the Navy confirmed via an email to the Service that the Navy had made "no effect" determinations relative to the proposed MITT program for the following listed species and critical habitats: the endangered hayun lagu (*Serianthes nelsonii*), *Osmoxylon mariannense*, *Nesogenes rotensis*, Guam Micronesian kingfisher (*Todirhamphus c. cinnamominus*), Guam rail (*Gallirallus owstoni*), short-tailed albatross (*Phoebastria albatrus*), Hawaiian petrel (*Pterodroma sandwichensis*), and Rota bridled white-eye (*Zosterops rotensis*), the threatened Newell's shearwater (*Puffinus auricularis newelli*), Rota bridled white-eye critical habitat on Rota, Mariana crow critical habitat on Guam and Rota, Mariana fruit bat critical habitat on Guam, and Guam Micronesian kingfisher critical habitat on Guam.

On December 18, 2014, the Service provided a draft of this Opinion to the Navy for review and comment.

On January 9, 2015, the Service received comments from the Navy on the draft Opinion.

On January 22, 2015, the Navy provided a comprehensive list of conservation measures for the MITT program. The Navy also provided clarification regarding sea turtle conservation measures that were previously agreed to by the Navy in December 2014.

On February 20, 2015, the Navy provided a final revised list of conservation measures for the MITT program.

On February 20, 2015, the Service formally advised the Navy that we concur with the determinations in the BA that the proposed MITT program is not likely to adversely affect the threatened green sea turtle (*Chelonia mydas*), endangered hawksbill turtle (*Eretmochelys*

imbricate), endangered nightingale reed-warbler (*Acrocephalus luscinia*), endangered Mariana crow (*Corvus kubaryi*), endangered Mariana swiftlet (*Aerodramus bartschi*), and the endangered Mariana common moorhen (*Gallinula chloropus guami*).

DESCRIPTION OF THE PROPOSED ACTION

As noted above, the proposed MITT program is an amendment of the MIRC program currently being carried out by the Navy, U.S. Air Force, U.S. Army, U.S. Coast Guard, and the U.S. Marine Corps on Guam, Rota, Tinian, Saipan, and Farallon de Medinilla (FDM). The Navy continues to be the designated lead Federal action agency for purposes of conducting ESA consultation on this action. The BA for the MITT program is herein incorporated by reference and includes a detailed description of the proposed action. In general, the proposed MITT program involves strike warfare and use of FDM, amphibious warfare on Guam and Tinian, Naval special warfare on Guam, Rota, Tinian, Saipan, and FDM, and other activities described below; see also Table 1-1 in the BA.

According to the BA, the types of proposed training activities under the MITT program are the same as those being implemented under the MIRC program, but with increases in the number of training activities that would occur within the Action Area. In particular, the "...cumulative net explosive weight (NEW) for munitions use on FDM would increase..." under the proposed MITT program.

According to the addendum to the BA, as proposed, the MITT program would be implemented into the "reasonable foreseeable future", which has been interpreted by the Service to mean an indefinite period of time within the context of our analysis. In addition, the BA includes the following increases in training activities compared to levels currently being implemented under the MIRC program:

Strike Warfare and Use of FDM. The number of activities, the amount of ordnance, and the use of rockets would increase on FDM. The increase in activities pertains to bombing, gunnery, and missile exercises. The increase in activities will result in a higher NEW being expended, as measured cumulatively over the course of a year.

Amphibious Warfare on Guam and Tinian. The number of amphibious warfare training activities, amphibious assaults, amphibious raids, and urban warfare training and noncombatant evacuation actions would increase on Guam and Tinian.

Naval Special Warfare on Guam, Rota, Tinian, Saipan, and FDM. Within these four islands, there would be an increase in personnel insertion/extraction, parachute insertion, direct action (combat close quarters), direct action (breaching), and tactical (air control party) training activities as well as humanitarian assistance/disaster relief operations. Firing exercises that target the Naval Surface Fire Support targets (i.e., cliff targets on FDM) are also included under the MITT program.

Naval special warfare activities that do not change relative to those currently being implemented under the MIRC program include intelligence, surveillance, and reconnaissance activities as well as embassy reinforcement exercises. These activities primarily occur on Guam, but Rota, Tinian,

and Saipan may also be used. Military training based out of the Rota International Airport for combat search and rescue currently being implemented under the MIRC program would not change under the MITT program.

Other Activities. Under the MITT program, water purification activities are proposed. All other training activities currently being implemented under the MIRC program relative to convoy and navigation maneuvers, field training exercises, force protection, anti-terrorism, seize airfield, airfield expeditionary, and land demolitions would continue under the MITT program.

The proposed increases in the frequency of the above training activities are discussed in detail in Appendix A of this Opinion.

Conservation Measures for ESA-listed Species. In response to a request from the Service during this consultation, the Navy provided (via email) the Table in Appendix B characterizing the current conservation measures being implemented under the MIRC program and those proposed under the MITT program. Included are specific measures for brown treesnake (BTS) control and interdiction, specific measures to avoid and minimize invasive species transport and introduction, and specific measures to provide for a rapid response to such introductions. These conservation measures are incorporated into the proposed action. These measures are also detailed in the Effects of the Action section, below.

Term of the Proposed Action. As discussed above and in the addendum to the BA (Navy 2014b), and recognizing that DoD requirements change overtime in response to global or geopolitical events and other factors, the activities addressed by this consultation are expected to continue into the reasonably foreseeable future, along with associated impacts. This timeframe is generally assumed to be no less than 5 years, but for purposes of this consultation, we interpret to mean the proposed activities, and associated adverse effects to the listed species, may continue into the future for an indefinite period of time.

DESCRIPTION OF THE ACTION AREA

The term "action area" is defined in the implementing regulations for section 7 at 50 CFR 402.02 as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."

The action area for this consultation includes portions of Guam, Rota, Tinian, and Saipan, plus the entire island of FDM. The specific areas likely to be affected, directly or indirectly, by the proposed action are discussed in detail in the BA.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

The analysis in the following sections relies on four components to support the jeopardy determination for each of the listed species considered herein: (1) the *Status of the Species*, which evaluates the species' range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of

the action area to the survival and recovery of the species rangewide; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.

In accordance with the implementing regulations for section 7 and Service policy, the jeopardy determination is made in the following manner: the effects of the proposed Federal action are evaluated in the context of the aggregate effects of all factors that have contributed to the species' current status and, for non-Federal activities in the action area, those actions likely to affect the species in the future, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

STATUS OF THE SPECIES

Micronesian Megapode

The Micronesian megapode, once referred to as LaPerouse's megapode, was federally listed as endangered in 1970 (Service 1970, p. 8,496). No critical habitat has been designated for this species. The recovery plan for the Micronesian megapode was finalized in 1998 (Service 1998, pp. 62). The most recent five-year status review addressing the megapode was completed in 2010 (Service 2010b).

The Micronesian megapode is endemic to Guam, the Commonwealth of the Northern Mariana Islands (CNMI), and Palau. Populations on Guam and Rota are considered extirpated (Service 1998, p. 3; Stinson 1992, p. 220; Amidon and Kessler, 2009; pers. comm.). The megapode population on Anatahan was thought to have been extirpated after the 2003 Anatahan eruption, but have recolonized since (Kessler 2006, p. 3; Kessler 2009, pers. comm.; Amidon et al. 2011, p. 28). Currently, megapodes from Micronesia and Palau are considered different races of the same species, *M. l. laperouse* and *M. l. senex*, respectively (Service 1998, p. 4-5).

In general, the population status and rangewide trends of the Micronesian megapode are difficult to assess because population data have been collected and estimates have been made using a variety of methods at differing time periods. Increases and decreases in population numbers may be indicative of population trends or may reflect detection bias from implementing different survey and data analysis methods. Recent surveys and modeling suggest that islands with low human presence and without ungulates have the highest densities of the Micronesian megapode (Amidon et al. 2011).

In 2010, a survey for the Micronesian megapode was conducted in the Northern Mariana Islands. Based on the results of the 2010 surveys and previous surveys on FDM, Tinian, and Aguiguan, the rangewide population of the megapode is estimated to be a minimum of 10,827 individuals (Table 1; Amidon et al. 2011, p. 29; Service 2009b).

Table 1. Micronesian megapode population estimates based on 2010 surveys

Island	Estimated Population
Alamagan	529
Asuncion	5,714
Guguan	1,507
Maug	544
Pagan	147
Saipan	151
Sarigan	2,135
Total	10,727

Individual megapodes detected on Tinian are likely transients (Radley 2009, pers. comm.; Camp et al. 2009, p. 12; Service 2009b, p. 124; Service 1998, p. 19). FDM and Aguiguan have small megapode populations that are likely stable with the reported increase in these populations largely being attributed to improved survey methods and differences in data analysis (Service 2009b, p.124; Vogt 2009a, p. 3). However, it is also possible that the reported increase on FDM is due to dispersal of Micronesian megapodes from Anatahan due to recent volcanic eruptions (Vogt 2009, p. 4). At least 20 megapodes are estimated to occur on Anatahan (Amidon et al. 2011). The Micronesian megapode was incidentally observed once on the island of Uracus (Service 1998, p. 35). Uracus does not support forest habitat and is subject to volcanic activity on a sporadic basis, thus the likelihood of the island supporting a megapode population is low (Service 1998, p. 35).

The Micronesian megapode can use a variety of habitat types. Typically, native and secondary forest are considered the primary habitats for foraging while nesting may occur in forests, open fields, cinder and ash fields, and coastal strand edges with sand substrates. The Micronesian megapode is generally restricted on Saipan and Tinian to native limestone forest remnants along and below cliff lines and in secondary forest adjacent to limestone forest (Service 1998, p. 11). However, the association with cliff lines is likely an artifact of the location of the native forest as these uneven areas are generally the only native forest strands that were not disturbed during the long history of habitat removal on Saipan and Tinian (Service 1998, p. 11). Micronesian megapodes have been observed using tangantangan forests on Saipan (Glass and Aldan 1988, p. 142). On Aguiguan, megapodes typically occur in limestone and secondary forests, and have been observed in *Lantana* sp. scrub, but not in open areas of weedy vegetation (Service 1998, p. 11; Amidon and Kessler 2009, pers. comm.). On FDM there are stunted trees (about 7-13 feet tall) but no forest habitat (Vogt 2009a, p. 5). Micronesian megapodes were detected on FDM wherever tree or shrub cover was present (Vogt 2009, p. 5). Megapodes on islands north of FDM are present in forested habitats, including coconut forest and other native vegetation (Service 1998, pp. 11-12).

The Micronesian megapode is vocal and has been documented to duet (Service 1998, pp. 5-6 and references within). Duetting is correlated with year-round territoriality and prolonged monogamous pair bonds (Farabaugh 1982, p. 93). Duetting by the Micronesian megapode has been documented in each month of the year (Service 1998, p. 6 and references within; Amidon and Kessler 2009; pers. comm.). Glass and Aldan (1988, p. 141) reported that megapodes on Saipan remain together throughout the year in territories that are defended at least part of the year. Territory size was estimated between 2.47 acres and approximately 9.4 acres depending on the habitat type (Glass and Aldan 1988, pp. 141-142; Service 2009b, p. 124 and 126). Megapode dispersal between islands of the CNMI is not well documented. On Palau, megapodes are known to fly several miles between islands (Pratt et al. 1980, p. 121) and other species of megapodes are considered to be strong fliers (Dekker 1989, p. 317 and references within). We expect that the Micronesian megapode could fly between Saipan and Tinian (2.9 miles) or between Tinian and Aguiguan (5.5 miles) (Service 1998, pp. 9-10). The northern islands in the CNMI are 18 to 37 miles apart. Although no megapodes have been observed flying over the ocean in the Mariana Islands, anecdotal information regarding fluctuations in numbers on Tinian and the recolonization of Anatahan post-eruption suggests that they do fly between islands (Amidon et al. 2011, p. 5). Glass and Aldan (1988, p.135) reported that megapodes may have been transported by humans between islands within the CNMI, which may have assisted in maintaining its widespread distribution.

The Micronesian megapode is omnivorous and forages under ferns, branches, and leaf litter on the forest floor and in trees within bird's nest ferns (*Asplenium nidus*) (Glass and Aldan 1988, p. 142). Its diet includes seeds and other plant matter, beetles, ants, ant larvae, and other insects and crabs (Glass and Aldan 1988, p. 142; Pratt et al. 1980, p. 121; Stinson 1992, p. 230).

The reproductive cycle of the Micronesian megapode is not well understood. Megapodes, including the Micronesian megapode, do not incubate their eggs with their own body heat. Instead, megapodes will construct burrows or mounds at beaches and cinder fields, or at geothermal sites that provide heat for egg incubation. Micronesian megapodes also will make burrows or mounds in between the roots of trees and in soil with decomposing vegetation where heat generated from decomposing organic materials incubates the eggs (Decker et al. 2000, p. 2; Wiles and Conry 2001, p. 270; Glass and Aldan 1988, pp. 135-137). Micronesian megapodes lay large eggs (approximately 18 percent of the female body weight); however, the total number of eggs laid per female per breeding season, the interval between laying eggs, and the incubation period are unknown (Service 1998, p. 9 and references within). Other species of megapodes lay between 10 and 13 eggs per year (Service 1998, p. 9 and references within). In other species of megapode, eggs are laid one at a time, with each egg laid between 9 and 13 days apart (Service 1998, p. 9 and references within). Megapode chicks are precocial and able to fly upon emergence from the egg and nest (Service 1998, p. 9).

Breeding by the Micronesian megapode has been observed (eggs, chicks, and juveniles) on Anatahan, Sarigan, Guguan, Pagan, Agrihan, and Maug during all months except October, November, and December (Service 1998, pp. 6-7 and references within; Amidon and Kessler 2009; pers. comm.). The absence of breeding activity in October, November, and December is more likely a reflection of the lack of surveys during these months, and difficulty in finding megapodes during traditional avian surveys (Amidon and Kessler 2009, pers. comm.).

Factors Influencing the Current Rangewide Condition of the Micronesian Megapode

The Micronesian megapode is threatened by habitat loss and degradation due to agriculture, military operations, urban development, volcanic activity, wildfire, invasive vegetation species, overgrazing by feral ungulates (Service 1998, pp. 35-38); predation by dogs, cats, monitor lizards, pigs, and possibly rats (Dekker 1989, pp. 318-320; Dekker et al. 2000, p. 5 and references within; Service 1998, p. 37); and human exploitation (Dekker et al. 2000, p. 2; Service 1998, p. 37; Vogt 2009, p. 5; Amidon and Kessler 2009, pers. comm.). Threats from competition and disease are not well understood, but are possible. Competition for nesting and foraging areas is possible if introduced game birds and domestic or feral chickens (which forage on the same prey items as megapodes) become established in megapode habitats (Service 1998, p.38; Vogt 2009, p. 6). Additionally, the import of game birds or chickens and existing feral chicken colonies on Rota, Tinian, Saipan, Anatahan, Alamagan, and Pagan could expose megapodes to avian diseases (Service 1998, pp. 38-39), as many of these species are susceptible to West Nile virus (UC Davis 2009, pp. 2-3).

The possibility of avian flu or West Nile virus reaching the Mariana Islands from Asia or the U.S. mainland is a recent concern. The impact these two diseases may have on the Micronesian megapode is not known at this time, but both diseases have had deleterious impacts to many avian species elsewhere, and could negatively affect the Micronesian megapode if they reach the Mariana Islands. Another unknown is the potential impact of climate change on ecosystems in the Mariana Islands.

Conservation Needs of the Micronesian Megapode

The most recent 5-year status review for the Micronesian megapode (Service 2010b) lists the following conservation needs for this species:

- Survey, protect, and manage existing populations.
- Conduct essential research on the ecology and biology.
- Assess and control threats.
- Promote expansion of megapodes in suitable habitat.
- Monitor megapode populations.
- Continue implementation of BTS interdiction and control plans and establish new plans as needed.

The recovery plan for the Micronesian megapode (Service 1998) includes the following criteria for downlisting and delisting:

Downlisting Criteria

The following steps must be accomplished for downlisting: (1) a BTS interdiction and control plan must be in place and implemented throughout the Mariana Islands; (2) current threats to all extant megapode populations must be assessed and controlled; and (3) the comparatively large populations of the megapode on Anatahan, Sarigan, Guguan, Pagan, and Maug must remain at their current population levels or be increasing for 5 consecutive years.

Delisting Criteria

The total number of Micronesian megapodes in the Mariana Islands should be at least 2,650 birds distributed over 10 islands, including at least 2 populations of 600 birds or greater, 3 populations of 300 or greater, 2 populations of 200 or greater, and 3 populations of 50 or greater. All populations must be stable or increasing for 5 consecutive years after achieving these levels.

At this time, none of the recovery criteria in the recovery plan have been met. Of particular concern is the lack of an archipelago-wide BTS interdiction and control plan.

STATUS OF THE MARIANA FRUIT BAT

Species Description. The Mariana fruit bat or flying fox, known as "fanihi" in Chamorro, is a medium-sized fruit bat in the family *Pteropodidae* that weighs 0.66 to 1.15 pounds. Males are slightly larger than females. The underside (abdomen) is black to brown with gray hair interspersed that creates a grizzled appearance. The shoulders (mantle) and sides of the neck are bright golden brown, but may be paler in some individuals. The head varies from brown to dark brown. The well-formed, rounded ears and large eyes give the face a canine appearance.

Listing Status. The Guam population of the Mariana fruit bat was listed as endangered in 1984 (Service 1984). In 2005, the subspecies was listed as threatened throughout the Mariana archipelago and downlisted to threatened on Guam (Service 2005); that rule includes a complete five-factor analysis of the species' status, life history requirements, habitat needs, threats, and management efforts to conserve the Mariana fruit bat. On October 28, 2004, approximately 376 ac were designated as critical habitat for the Mariana fruit bat on Guam (Service 2004). All of the critical habitat for this species is designated on the fee simple portion of the Guam National Wildlife Refuge.

Distribution, Numbers, and Reproduction

Historic and Current Distribution. This subspecies of *Pteropus mariannus* is endemic to the Mariana archipelago, where it is present on most of the 15 islands. To the best of our knowledge, there are no records of fruit bats on Uracas, and only a few incidental observations of fruit bats have occurred on FDM (see Environmental Baseline section below). No known historical records exist to document the status of the Mariana fruit bat prior to the 20th century.

The total population of the Mariana fruit bat is estimated to be approximately 6,000 animals (USGS 2010, p. 36; CNMI 2011, p. 6). Surveys suggest populations are stable or declining throughout most of their range. Surveys on most or all of the islands in the archipelago were

conducted in 1983 (Wiles et al. 1989), 2000 (Cruz et al. 2000a-f), 2001 (Johnson 2001), and 2010 (USGS 2010, p. 1). The relatively isolated northern islands support the majority of the fruit bats in the archipelago, but because of their remote location, these islands have not been surveyed as frequently as the southern islands (i.e., Saipan, Tinian, Aguiguan, and Rota). Individual surveys have been conducted on several of the southernmost islands at relatively frequent intervals (e.g., USGS 2010, Kessler 2000; Worthington et al. 2001; Wiles and Johnson 2004). A comparison of survey results was excerpted from the USGS 2010 report (see Table 2 below). An interpretation of these data indicates a 41 percent decline in fruit bat numbers between 1983 and 2010 in the northern islands. The majority of this decline was recorded on two of the three largest northern islands, Anatahan and Pagan, which together harbored roughly 70 percent of the archipelago's fruit bats in the 1980s (Wiles et al. 1989).

A notable exception to the declining trend is the island of Rota, where the population has increased since 2008 (CNMI 2008, p. 11; CNMI 2011, p. 6). The population increase on Rota is due to a recent decrease in illegal hunting at roost sites of fruit bat maternity colonies, and the decrease in illegal hunting can be attributed to an increase in enforcement of wildlife regulations that began in 2009 (CNMI 2010, pp. 7-9).

The fruit bat population on Rota is estimated at approximately 2,600 (CNMI 2011; p. 6). Although comprehensive surveys have not been conducted on Saipan, there have been no confirmed observations of maternity colonies in recent years, and the island-wide population is expected to be less than 50 individuals (T. Willsey, pers. comm. 2014). On Guam, the sighting of fruit bats was considered to be "not...uncommon" in the 1920s (Crampton 1921). Woodside (1958) reported that in 1958, the Guam population was estimated to number no more than 3,000, although the method used to make this estimate is not known. This estimate had dropped to between 200 and 750 animals by 1995 (Wiles et al. 1995, Wiles 1996). The current population of fruit bats on Guam is estimated to be less than 30 bats (SWCA 2013, pp. 19-22; NAVFAC 2013, pp. 11-15). The most recent and last colony to exist on Guam was at Pati Point, but recent surveys indicate that this colony no longer exists (SWCA 2013, pp. 19-22). On July 3, 2014, a morning survey was conducted on Andersen Air Force Base which resulted in the observation of ten bats; however the data is being analyzed to determine duplicate observations and detection probability given the amount of area surveyed on the Base (Mildelstein 2014).

Ecology. During the day, Mariana fruit bats roost in colonies of a few to over 800 individuals (Wiles 1987; Pierson and Rainey 1992; Worthington and Taisacan 1995). Bats are typically grouped into harems (one male and two to 15 females) or bachelor groups (predominantly males). Some single males reside at the colony's periphery (Wiles 1987a). On Guam, the average estimated sex ratio in one colony varied from 37 .5 to 72. 7 males per 100 females (Wiles 1982a).

Table 2. Summary of the maximum number of bats counted in 2010 (USGS 2010, p. 36).

Summary of the maximum number of bats counted at Anatahan, Sarigan, Guguan, Alamagan, Pagan, Agrihan, Asuncion, and Maug from this study and minimum population estimates reported by Johnson (2001), Cruz and others (2000a-f), and the 1983 findings by Wiles and others (1989). Superscripts denote method(s) used to arrive at the maximum number of bats counted or minimum population estimate. Asterisks denote studies with some island estimates that were arrived from multiplying counts by a correction factor; adjusting counts based on size of island, amount of forest cover, plant diversity and abundance; or combination of these variables.

Island	2010	2001*	2000*	1983*
Anatahan	150[a]	1,000[g]	1,000[b,e,f]	3,000[c,f]
Sarigan	157[b]	400[a,b,d]	150-200[b,e,f]	125[e]
Guguan	226[c]	550[b]	350[b,c,e,f]	400[e]
Alamagan	86[d]	100[g]	200[e,f]	0[e]
Pagan	1,017[d]	1,500[a,b,c]	1,500[c,e,f]	2,500[c,f]
Agrihan	858[d]	1,000[a]	1,000[b,c,e,f]	1,000[c,e]
Asuncion	573[b]	800[a,e,f]	NA	400[e]
Maug	11[b]	50[g]	NA	<25[g]
TOTAL	**3,078**	**5,400**	**NA**	**7,450**

a. Visual estimate from helicopter.
b. Direct counts of bats at roosts.
c. Exit count of bats at roosts.
d. Counts of bats in photograph taken from helicopter.
e. Evening flight activity count (aka, station count).
f. Visual sightings from the ground.
g. Estimate not based on a count taken during that study.

Reproduction in Mariana fruit bats has been observed year-round on Guam (Perez 1972; Wiles 1983) and on Rota; individual females have a single offspring each year (Pierson and Rainey 1992). Wiles (1987) found no apparent peak in births on Guam, but a peak may occur in May and June on Rota (Glass and Taisacan 1988). Although specific data for the Mariana fruit bat are lacking, female bats of the family *Pteropodidae* have one offspring per year, generally are not sexually mature until at least 18 months of age, and have a gestation period of four to six months (Pierson and Rainey 1992). The average lifespan of this species is unknown; the longevity of a similar species in Australia is four to five years, with a maximum of eight years (Yardon and Tidemann 2000).

Roost sites are an important aspect of the Mariana fruit bat's biology because they are used not only for sleeping, but also for grooming, breeding, and intra-specific interactions (Service 1990). Published reports of roost sites on Guam indicate these sites occur in mature limestone forest and are found within 262 to 328 ft of tall cliff lines (Service 1990). On Guam, Mariana fruit bats prefer to roost in mature *Ficus* spp. and *Mammea odorata* trees, but will also roost in other tree species such as *Casuarina equisetifolia, Macaranga thompsonii, Guettardaspeciosa,* and *Neisosperma oppositifolia* (Wheeler and Aguon 1978; Wiles 1981, 1982b). On other islands in the Mariana archipelago, Mariana fruit bats have been observed in secondary forest and *Casuarina equisetifolia* groves (Glass and Taisacan 1988, Worthington and Taisacan 1996,

Worthington et al. 2001). Factors involved in roost site selection are not clear, but data from Guam indicate that some sites may be selected due to their inaccessibility by humans. Fruit bats may abandon roost sites if disturbed (Julia Boland, Service, pers. comm. 2015). Fruit bats have been reported to move to new locations up to six miles away in response to disturbance (Service 1990).

Several hours after sunset, bats depart their roost sites to forage for fruit and other native and non-native plant materials such as leaves and nectar (Service 1 990). This species feeds on a variety of plant material but is primarily frugivorous (Wiles and Fujita 1992). Specifically, Mariana fruit bats forage on the fruit of at least 28 plant species, the flowers of 15 species, and the leaves of two plant species (Wiles and Fujita 1992). Some of the plants used for foraging include *Artocarpus* sp., *Carica papaya, Cycas circinalis, Ficus* spp., *Pandanus tectorius, Cocosnucifera,* and *Terminalia catappa.* Many of these plant species are found in a variety of forested habitats on Guam, including limestone, ravine, coastal, and secondary forests (Stone 1970; Raulerson and Rhinehart 1991). Little is known about their nightly movements, but fruit bats have been observed foraging as far as 7 miles from roosting sites on Guam (Wiles et al. 1995).

Factors Influencing the Current Rangewide Condition of the Mariana Fruit Bat

The loss and degradation of native forest, illegal hunting of the species, and predation by the BTS are the primary threats to the survival of the Mariana fruit bat in the wild (Service 2005).

Conservation Needs of the Mariana Fruit Bat

A draft revised recovery plan for the Mariana fruit bat (Service 2009a) addressed actions needed for the survival and recovery needs of the Mariana fruit bat. Since publication of the draft revised recovery plan new information on the Mariana fruit bat has resulted in changes to how we look at recovery for the species. We now consider recovery in terms of stable or increasing subpopulations of sufficient size distributed across Guam and the Mariana Islands. To meet recovery objectives, stable or increasing fruit bat subpopulations should at a minimum be distributed on the islands that currently have extant populations. Actions to address the survival and recovery needs of the Mariana fruit bat are listed below (Service 2009a):

- Outreach, education, and enforcement programs need to be implemented to control illegal hunting of the Mariana fruit bat.

- Sufficient amounts of functional habitat need to be protected and restored to support persistent subpopulations of the Mariana fruit bat.

- Ungulates on Guam, Rota, Tinian, Aguiguan, and Saipan need to be controlled.

- Invasive plant species that limit native forest persistence and sustainability in areas supporting fruit bat subpopulations need to be controlled.

- Control of the BTS threat on Guam and prevention of the introduction of the BTS elsewhere within the Mariana Islands needs to be achieved.

- Control and management of other invasive species on the Mariana Islands and prevention of further inter-island transport and introduction of invasive species on the Mariana Islands needs to be achieved.

- Development and implementation of conservation projects is needed on Federal and non-Federal lands that are necessary to support persistent subpopulations of the Mariana fruit bat.

- Additional fruit bat monitoring and research is needed to better inform effective subpopulation management.

ENVIRONMENTAL BASELINE

The preamble to the implementing regulations for section 7 of the ESA provides good context for understanding the meaning of the term "Environmental Baseline." On page 19932 of the regulations (51 FR 19926), it states "In determining the "effects of the action," the Director first will evaluate the [rangewide] status of the species or critical habitat at issue. This will involve consideration of the present environment in which the species or critical habitat exists, as well as the environment that will exist when the action is completed, in terms of the totality of factors affecting the species or critical habitat. The evaluation [of the rangewide status of the species] will serve as the **baseline** [emphasis added] for determining the effects of the action on the species or critical habitat. The specific factors that form the environmental baseline are given in the definition of "effects of the action…"

Under the regulatory definition of "Effects of the action" at 50 CFR 402.02, it states: "…The environmental baseline **includes** [emphasis added] the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process." Use of the term "includes" referenced above acknowledges that the environmental baseline considers the present range-wide environment in which the species or critical habitat exists as well as the specific environmental conditions in the action area. The discussion of Environmental Baseline below addresses the current condition of the listed species in the action area, the factors responsible for that condition, and the role of the action area in the survival and recovery of the species. The findings presented under the *Status of the Species* and the *Environmental Baseline* sections of this Opinion for each listed species addressed herein provide essential context for interpreting the significance of any adverse or beneficial effects of the proposed action considered herein as well as for interpreting the significance of any adverse or beneficial cumulative effects reasonably certain to occur in the action area for this consultation.

Micronesian Megapode

Current Condition of the Micronesian Megapode in the Action Area

The following information supplements the *Status of the Species* discussion above regarding the status of and threats to the Micronesian megapode on the portions of Guam, Rota, Tinian, Saipan, and the FDM that are likely to be affected by the proposed action.

The Micronesian megapode was extirpated from Guam and Rota in the ninetieth and early twentieth centuries (Service 1998, p. 3 and 15). Amidon et al. (2011) reported an anecdotal observation of a megapode on Rota in 2010. If the Micronesian megapode persists on Rota, it is likely confined to limestone forested portions of the island and not collocated with potential training areas.

The few megapode detections on Tinian are likely transient individuals that do not breed there (O'Daniel and Kreuger 1999, Navy 2013a,b). Megapodes have been sighted within forested portions of the Maga area to the northwest of the Voice of America Relay Station, a small section of native forest adjacent to Cross Island Road in the Bateha area, and the Mount Lasso area south of the overlook on the ridgeline (O'Daniel and Kreuger 1999). Based on these sightings and other suitable habitat indicators, the Navy-established monitoring transects in 1999, which were surveyed on a monthly basis through 2011 using point count stations where trained observers listened for responses to recorded megapode vocalizations. The Navy re-evaluated this methodology and determined that a larger survey conducted approximately once per year would be more likely to detect megapodes (Navy 2013b). One megapode was observed on Tinian in February of 2013 using this new methodology. Prior to this detection, one megapode was observed in February 2004 and two others in June 2005 by biologists transiting between point count stations (Navy 2013b).

The action area on Tinian includes the Exclusive Military Use Area, which consists of 7,600 acres of land in the northern one-third of Tinian (Navy 2009, p. 3.11-26). The Exclusive Military Use Area is leased by DoD from the CNMI. The action area on Tinian also includes the Military Lease Back Area, which includes the central one-third of the island and consists of 7,800 acres (Navy 2009, p. 3.11-27). Habitats on Tinian pre-World War II were extensively altered for agriculture. Military actions (both bombing during World War II, reconstruction, and ongoing training), fire, and invasive vegetation species encroachment continue to shape the habitat. Currently, both military areas support lowland habitats consisting of native forest, tangantangan thickets, secondary growth forests, and open fields (Navy 2009, pp. 3.11-26, 3.11-28). Although Micronesian megapodes were not detected on Tinian during 2008 (Service 2009b, p. 124), both action areas on Tinian support foraging and roosting habitat for the Micronesian megapode (Navy 2009, pp. 3.11-26, 3.11-44). Incidental reports and regular sightings (1995 to 2005) of the Micronesian megapode on Tinian indicates that either a small but persisting population of Micronesian megapodes exists on Tinian or that Micronesian megapodes routinely use habitats on Tinian when flying between Aguiguan and Tinian or Tinian and Saipan (Service 1998, pp. 10, 18; Navy 2009, p. 3.11-44). Due to the presence of suitable habitat and the occasional but routine observations of Micronesian megapodes on Tinian, the Micronesian megapode is at least transient and reasonably certain to occur within the Military Lease Area on Tinian.

On Saipan, Amidon et al. (2011) estimated a population between 130 and 174 Micronesian megapodes. Previous studies on Saipan provide lower island-wide population estimates, but these lower estimates are likely due to a less thorough survey effort relative to the 2010 surveys on Saipan (Amidon et al. 2011). Almost all of the detections of the megapode on Saipan occurred in native limestone forest, including detections in small remnant patches of limestone forest. Amidon et al. (2011) surveyed a transect adjacent to the Marpi Maneuver Area, and verified the continued persistence of a megapode population below the Marpi cliffs (the Marpi Maneuver Area is north of and below the Marpi cliffs). Remnant patches of limestone forest occur within the Marpi Maneuver Area, and may support Micronesian megapodes (Navy 2014a, p. 57). Figure 3-5 in the BA shows the distribution of megapode detections by Saipan-based Service staff as of 2013 adjacent to the Marpi Maneuver Area.

On Saipan, the Army Reserve Center and Commonwealth Port Authority actions areas do not support habitat for the Micronesian megapode, nor have megapodes been detected within these areas. The Marpi Maneuver Area is located on the northern portion of the island approximately one mile north and below the cliff line from the Saipan Upland Mitigation Bank (Navy 2009, p. 3.11-24). Craig (1993, pp. 99-100) summarized the habitat disturbance on Saipan and noted the Marpi area, except some of the limestone escarpments, was cleared for sugarcane (*Saccharum officinarum*) cultivation and developed for military operations during World War II. In areas where vegetation was allowed to re-grow post World War II, non-native species are the dominant vegetation. Currently, the Marpi Maneuver Area is still dominated by elephant grass (*Pennistum purpureum*) meadows and tangantangan thicket (Navy 2009, p. 3.11-24 through 3.11-25) and a remnant area of limestone forest (Navy 2009, p. 14) and this area is used to support recreation and tourism, agricultural leases, and homesteads.

Between the cliff line and the Marpi Maneuver Area is a 43-acre protected area for the Micronesian megapode (USEPA 2009, pp. 2, 8). The protected area is known to support at least one Micronesian megapode (Rounds 2009, pers. comm.). Other areas, including tangantangan thickets adjacent to limestone forests and elephant grass meadows adjacent to the Marpi Maneuver Area, are known to support Micronesian megapodes as well (Mosher 2009; Service 2002, p. 8).

The Micronesian megapode may be using scattered tangantangan strands within the Marpi Maneuver Area for feeding, resting, and as a corridor between limestone forests. Because of the continued sightings of the Micronesian megapode in adjacent limestone forest, the Micronesian megapode is reasonably certain to occur within the Marpi Maneuver Area on Saipan (Shelly Kremer, Service, pers. comm. 2015).

FDM is leased by the DoD from the CNMI and is approximately 183 acres in size (Navy 2009, p. 3.11-29). Habitat used by the Micronesian megapode on FDM is characterized as predominantly dense herbaceous communities, scrubby brush, stunted trees, grasslands, and bare earth and include the following plant species: *Wollastonua biflora*, *Mariscus javanicus*, *Capparis spinosa*, *Ipomoea pes-caprae*, *Boerhavia* spp., *Portulaca lutea*, *Operculina ventricosa*, and stunted *Pisonia grandis* (Lusk et al. 2000, p. 24; Navy 2009, p. 3.11-30). The habitat is maintained in a low to mid-successional stage due to wind conditions (northern portion) and previous military readiness training (middle and southern portion) (Navy 2009, p. 3.11-61).

Surveys on FDM in 1996 documented the presence of the Micronesian megapode (Lusk et al. 2000; Service 1998). Based on this survey, a population of 10 Micronesian megapodes was estimated to occur on FDM (Lusk et al. 2000; Service 1998). However, due to an approaching typhoon, biologists conducting the survey 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 megapode pairs on the island (Navy 2008a,b). Vogt (2009, pp. 3, 5) reported the observation of a chick and a juvenile Micronesian megapode indicating that reproduction is occurring on the island. Based on the size of FDM and the potential territory size of the Micronesian megapode, Vogt (2009, p. 4) estimated that the island could likely support a population of 50 megapodes. The most recent megapode survey on FDM was completed in 2013. Navy biologists detected 11 megapodes while surveying a limited transect in the north part of the island (within impact areas 1 and 2) (Navy 2013d). Measures implemented by the Navy under the MIRC program likely minimized impacts to the megapode population on FDM. These measures included maintaining a No Drop Zone on the northern portion of the island and the use of inert ordnance in an area south of the No Drop Zone (explosive ordnance is deployed south of this area). Megapodes have persisted on FDM through various phases of intense bombardment of the island from the 1970s to the present.

Factors Influencing the Condition of the Micronesian Megapode in the Action Area

On Saipan and Tinian, ongoing implementation of the MIRC program is causing noise from aircraft and vehicles, physical disturbance caused by vehicles and people, and the potential for introduction of invasive species are factors that are or may influence the current condition of the Micronesian megapode within the Action Area (see Table 3-2 in the BA).

On FDM, ongoing implementation of the MIRC program is causing noise from aircraft, percussive force caused by explosives, direct strikes by aircraft and munitions, physical disturbance caused by vehicles and people, habitat loss and degradation, the potential for introduction of invasive species, and wildland fire are factors that are or may influence the current condition of the Micronesian megapode (see Table 4-2 in the BA). The avoidance and minimization measures currently being implemented on FDM by the DoN are designed to protect the area of the island occupied by the Micronesian megapode in the "No Drop Zone." As of 2000, Lusk et al. (2000, p. 33) reported that the vegetation and avian communities in that area had not changed substantially since 1974. While these data were not specific to the megapode, this may be an indication that the avoidance and minimization measures are providing some level of protection to the species and its habitats in this area while military training occurs on FDM. However, take of the Micronesian megapode is likely occurring on FDM due to military training activities (Service 2010a).

Role of the Action Area in the Conservation of the Micronesian Megapode

The final recovery plan for the Micronesian megapode identifies the need to maintain a stable or increasing population of 50 megapodes on Saipan or Tinian (Service 1998, p. 43).

Although FDM is not essential for recovery (Service 1998, pp. 42-42), the DoN's implementation of the avoidance and minimization measures discussed above has resulted in the persistence of a small population of Micronesian megapodes in the "No Drop Zone." That

population may provide a genetic link between the northern and southern populations of the rangewide population of the megapode, and FDM may function as a rest stop for dispersing megapodes (Lusk et al. 2000, p. 29).

Mariana Fruit Bat

The following information supplements the *Status of the Species* discussion above regarding the status of and threats to the Mariana fruit bat on the portions of Guam, Rota, Tinian, Saipan, and the FDM that are likely to be affected by the proposed action.

Current Condition of the Mariana Fruit Bat in the Action Area

The following discussion relies heavily on the findings presented in the BA for the proposed MITT program (Navy 2014a) and on the Service's draft revised recovery plan for the Mariana fruit bat (Service 2009a).

Guam

On Guam, the sightings of Mariana fruit bats were considered to be "not...uncommon" in 1920 (Crampton 1921 in Service 2009a). In 1958, the Guam population was estimated to number no more than 3,000. This estimate had dropped to between 200 and 750 animals by 1995. Over the past several decades, the population of fruit bats on Guam has continued to decline (Brooke 2008). Other than a few isolated periods of increase, fruit bats have been in long-term decline on Guam (Service 2009a). The population of fruit bats on Guam is estimated to be less than 30 bats (SWCA 2013, pp. 19-22; NAVFAC 2013, pp. 11-15). The primary threats include poaching, predation (primarily by the BTS on fruit bat pups), and low population size reducing gene flow (Service 2009a). Recently completed and ongoing ESA section 7 consultations between the DoD and the Service include habitat removal actions associated with remedial cleanup activities as part of the Andersen AFB Installation Restoration Program (Consultation # 2013-I-0392, Service 2013), ISR Strike (Consultation # 2006-F-0266, Service 2006a), Parachute Cargo Drop Training at Northwest Field (Consultation # 2001-F-0001, Service 2001), Beddown of Training and Support Initiatives at Northwest Field Project (Consultation # 2006-I-281, Service 2006b) and the missile defense system at Northwest Field (emergency consultation pending). These projects may increase the vulnerability of the Mariana fruit bat to adverse effects caused by the training activities included in the BA for the MITT program.

On Andersen AFB, individual bats and small groups have been observed roosting in both primary (mature and native-dominated) and secondary growth limestone forest cover (Janeke 2006). The majority of the bats at Andersen AFB roosted at a single site on Pati Point, and an unknown number of solitary bats use the limestone and secondary forests of Guam. Fruit bats forage in forests and coastal areas, and they are occasionally sighted at Tarague Beach (USAF 2008a, b, c, d).

The Mariana fruit bat colony on Andersen AFB has used the same roost location at Pati Point since 1994. Except for the punctuated increase in the early 1980s, the overall population trend of this species at this site has been declining. In 2006, Janeke (2006) estimated fewer than 100 fruit bats at Pati Point. A survey conducted on Andersen AFB from June 2007 until April 2008 indicated counts from 31 to 54 individuals with an average count of 40 bats (SWCA

Environmental Consultants 2008). Surveys in 2011 by SWCA observed 2 to 3 bats below Pati Point, but the colony is no longer present and surveys have not found that the colony has relocated (SWCA Environmental Consultants 2012). Northwest Field likely continues to support Mariana fruit bat foraging, and possibly solitary roosts in the intact limestone forests above the plateau at Ritidian Point and along the northeast fringe of Northwest Field.

The Mariana fruit bat is rarely observed at Naval Base Guam. The last recorded fruit bat occurrence on the Orote Peninsula was of a colony of 332 in 1967. A single bat was sighted on Naval Base Guam lands in 2008 during 90 hours of fruit bat surveys at 14 survey locations there and on nearby lands. A small number of solitary bats may persist on Naval Base Guam, however, it is possible that solitary individuals move to and from areas throughout the year.

Mariana fruit bats were seen sporadically on the Naval Base Guam Munitions Site between 1985 and 1999 (Morton and Wiles 2002). In 2010, three sightings of the same individual Mariana fruit bat were reported within the Naval Base Guam Munitions Site. Seven observations of one Mariana fruit bat in flight, each on a different day, were recorded at the Naval Base Guam Munitions Site between 10 May and 22 June, 2012 (Navy 2014a, p. 38). On August 27, 2014, two observations of a Mariana fruit bat in flight occurred at the Fena Reservoir within the Munitions Site (Leilani Takano, Service, pers. comm. 2014). It could not be determined if these observations at the Munitions Site represented one or multiple individual fruit bats.

Mariana fruit bats may forage or roost in the Finegayan area of Naval Base Guam, Telecommunication Site (Navy 2013a). Naval Base Guam Barrigada does not likely support fruit bat roosting sites, however, foraging activity possibly occurs there.

Mariana fruit bat surveys were conducted at Andersen South between 18–20 March 2013 (Vogt and Farley 2013). No bats were detected during these surveys. There are no recent records of Mariana fruit bat use of the Andersen South area.

Rota

The fruit bat population on Rota is estimated at approximately 2,600 (CNMI 2011; p. 6) and has increased since 2008 (CNMI 2008, p. 11; CNMI 2011, p. 6) due to a recent decrease in illegal hunting at roost sites of fruit bat maternity colonies. The decrease in illegal hunting can be attributed to an increase in enforcement of wildlife regulations that began in 2009 (CNMI 2010, pp. 7-9). Mariana fruit bats from Rota move episodically among the southern islands, and this island thus is considered to be important to the long-term stability of the species in the southern part of the Mariana archipelago and to the sporadic existence of the colony on Guam (Wiles and Glass 1990; Wiles et al. 1995).

Illegal hunting is the primary threat to Mariana fruit bats on Rota. Although law enforcement efforts have increased since 2009 (CNMI 2008, 2009a-b, 2010), illegal hunting continues and will likely resume to historical levels unless consistent, effective law enforcement in tandem with education and outreach programs continue. Recovery of the fruit bat on Rota and other human-inhabited islands will not likely be possible without strong education programs combined with effective control of illegal hunting. It is unlikely that the naturally low reproductive rate of this species can sustain the level of hunting pressure currently observed on Rota.

Severe storms (and associated hunting) at short intervals combined with low and fluctuating numbers could erode what resilience exists in this population. Fruit bat numbers on Rota declined following Typhoon Roy in 1988 from an estimated 2,400 animals to just under 1,000 (Stinson et al. 1992). Prior to Typhoon Pongsona in 2002, fruit bat numbers on Rota had risen to about 1,300-2,000 bats (Esselstyn et al. 2006). However, in the months following the storm, repeated surveys indicated that numbers had again declined sharply to perhaps 500 bats (Esselstyn et al. 2006). The number of fruit bats detected by surveys remained relatively low through April 2004, when about 700 bats were counted (Esselstyn et al. 2006

Saipan

Schnee (1911; cited in Service 2009a) reported that Mariana fruit bats were commonly seen and heard on Saipan, where they were heavily hunted by local residents. The Navy restricted civilian access to the northern part of Saipan until the early 1970s, effectively providing the bats with protected roost sites. Fruit bats on Saipan were observed to decline rapidly after the Navy turned over control of this area to the CNMI government, and access to the entire island became unrestricted (Wiles et al. 1989). Observations made between the late 1970s and 2007 suggest that Saipan harbored a small number of bats during that period; typically 50 bats or fewer (Wheeler 1980; Lemke 1984, cited in Service 2009a; Glass and Taisacan 1988; Wiles et al. 1989; Worthington and Taisacan 1996; Johnson 2001; Ann Marshall, Service, pers. comm. 2007).

Tinian

Fritz (1901; cited in Service 2009a) reported a "large number" of bats on Tinian in 1900. Since the late 1970s fruit bats have been seen rarely and only in small numbers, with estimates of fewer than 25 animals usually given for the island (Wheeler 1980; Glass and Taisacan 1988; Wiles et al. 1990; Marshall et al. 1995; Krueger and O'Daniel 1999; Johnson 2001). Observations during the 1990s suggested that the presence of bats on Tinian was intermittent, and their numbers were low (Worthington and Taisacan 1996). Brief surveys on Tinian conducted in 2001 found no fruit bats (Johnson 2001), and between 2002 and 2007 fruit bats have been observed only once during forest surveys conducted on Tinian each month by Navy biologists (Scott Vogt, Navy, pers. comm. 2007). A few Mariana fruit bats were observed on Tinian during surveys conducted by the Navy, and island residents reported occasionally seeing Mariana fruit bats (Navy 2008a). Mariana fruit bats also reside on Aguiguan and travel to Tinian to forage (Cruz et al. 1999, 2000, 2002). In June 2005, approximately five Mariana fruit bats were seen in the cliff-line forest during a routine forest bird survey of the Maga bird transect (Navy 2008a).

FDM

FDM may serve as a stopover location for Mariana fruit bats while transiting between islands or may support a small resident population. Incidental observations of Mariana fruit bats on FDM during recent bird surveys, along with fisherman reports from the early 1970s, suggest a small number of Mariana fruit bats use FDM. Use of the island by Mariana fruit bats may have been greater prior to the use of the island as a bombing range. A historical photograph included in the BA (p. 77) shows a more intact, forested areas on the mesic flats in the northern portion of the island than is the case today based on the photograph of the same area taken in 2013 (see BA, p. 77). This forested area likely provided foraging and roosting habitats for the Mariana fruit bat.

Factors Influencing the Condition of the Mariana Fruit Bat in the Action Area

As discussed above under the *Status of the Species*, poaching, habitat loss and degradation caused by humans (inclusive of human disturbance at roosting sites and military bombardment on FDM) and feral ungulates, and invasive plants are the primary factors influencing the condition of the Mariana fruit bat in the Action Area.

Role of the Action Area in the Conservation of the Mariana Fruit Bat

The draft revised recovery plan for the Mariana fruit bat (Service 2009a), considers federally administered lands in the Mariana Islands to be important sites for the protection and management of the Mariana fruit bat and its habitat. The maintenance and enhancement of fruit bat populations, especially through habitat preservation, restoration, and creation, on these lands, inclusive of those associated with the MITT program, is fundamental to the conservation and recovery of this species.

EFFECTS OF THE ACTION

Invasive Species Transport and Introduction

As discussed in the BA (see pp. 66 and 83), the Navy recognizes the potential for catastrophic effects to wildlife on Rota, Tinian, Saipan, and the FDM resulting from the accidental introduction of the BTS or other vertebrate predators from Guam or elsewhere. Accidental introductions of potentially invasive pests and plants could establish populations and further degrade habitats on these islands. Rota is of particular concern because of close proximity and shorter transit times from Guam and because of the high quality habitats located throughout the island. Figure 2-6 in the BA (p. 38) shows a conceptual model of potential pathways of invasive species introductions to Rota, Tinian, Saipan, and the FDM. These islands are linked together and to Guam by marine and air transportation routes that support military training activities. The Navy's strategy to avoid and minimize the adverse effects of invasive species introductions is to identify critical control points within the potential pathways depicted in Figure 2-6 of the BA, then design and implement exercise-specific invasive species interdiction plans. Such an approach is currently being implemented under the MIRC program.

Under the proposed MITT program, the Navy proposes to implement the following measures; these are described in more detail in Appendix B:

- Upon completion of the MIRC Reinitiation BO and other pending consultations, Navy will update the COMNAVMARIANASINST 3500.4A to reflect the language contained in these Biological Opinions applicable to range users. Navy will also finalize a new Joint Region COMNAVMAR Brown Treesnake instruction, which will contain the Brown Treesnake Control and Interdiction Requirements. These efforts shall be prepared in coordination with the Service and other stakeholder agencies.

- Training activities will undergo a pathway risk analysis as a tool to improve programmatic efficiency while preventing the spread or introduction of BTS.

- The Navy, in compliance with Public Law 110-417, [Division A], title III, Section 316, October 14, 2008, 122 Statute 4410 and per Department of Defense (DoD) Transportation Regulations, Chapter 505 protocols, is committed to implementing 100% inspection of all aircraft and all cargo/equipment leaving Guam via vessel or aircraft for an off-island destination with trained brown treesnake personnel and qualified canine detection teams. The skills and standards required to certify personnel, including canine inspection teams, as "qualified" will be agreed upon mutually by DoD and the Service. These teams may be supplemented with qualified personnel to meet 100 percent inspection goals for training activities.

- In the event military units, vehicles, or equipment accidentally leave Guam without inspection, as soon as possible, the Navy will notify the qualified brown treesnake interdiction program and the destination port or airport authorities. The Navy will work with the destination authority(ies) to resolve the issue. Urgency of notification is a priority so that rapid response or other actions can be implemented to reduce risk, if warranted.

- To the maximum extent practicable, the Navy will route inbound personnel and cargo for tactical approach exercises (that require an uninterrupted flow of events) directly to CNMI training locations to avoid Guam seaports and airfields to the extent possible. If Guam cannot be avoided for tactical approaches, the Navy will work with the U.S. Fish and Wildlife Service to identify and implement appropriate interdiction methods at the receiving port (Rota, Saipan or Tinian). Methods may include redundant inspections or other interdiction actions, such as multiple inspections or barrier use on Guam. In addition, tactical approach exercises will involve only cargo/equipment that has not originated from areas containing a brown treesnake population or will be 100 percent inspected by qualified brown treesnake canine detection programs.

- The Navy will establish snake-free quarantine areas (barriers) as deemed necessary by the Navy and U.S. Fish and Wildlife Service for cargo/equipment traveling from Guam to CNMI and locations outside of the MITT action area. Barriers will be used if the volume of cargo/equipment/vehicle movement out-paces the available canine inspection capacity or BTS quarantine capacity. The snake-free quarantine areas will be subject to: (1) multiple day and night searches with appropriately trained interdiction canine teams, (2) snake trapping, and (3) visual inspection for snakes. Standard operating procedures will be developed based on the barrier size needed for the training event(s). Temporary barriers will be constructed and maintained in a manner that assures the efficacy of the barrier. Staff constructing and maintaining the temporary barriers will receive training related to this activity prior to barrier construction and operation. Barrier specifications as well as the qualifications of BTS barrier maintenance and management staff will be mutually agreed upon by DoD and the Service.

- Navy will (1) coordinate closely with the Service[1] and the CNMI Department of Land and Natural Resources staff on planning for training activities in the CNMI; (2) coordinate with the other DoD action agencies implementing the MITT program and the Service to identify

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1 Currently, the Service point-of-contact (POC) for these planning activities is the CNMI Brown Tree Snake Program Coordinator (Coordinator). If the agency affiliation of that Coordinator changes, the Service shall formally designate a new Service POC and advise the DON and other DOD action agencies associated with the MITT Program within 10 working days.

the inspection and interdiction requirements for MITT program-related training activities, including the number of trained quarantine officers and canine detection teams required to ensure that the inspection and interdiction requirements for MITT program-related training activities can be met; (3) coordinate with the Service on the inspection and interdiction requirements identified by the Navy prior to the implementation of the exercise or training activity; and (4) identify the support that the Navy will need to provide for the inspections and develop plans to ensure that inspection personnel are available and all requirements are met.

- Navy will utilize ongoing adaptive management to improve methods for BTS rapid response, including detection of low-density snake populations using all technologies as they become available. The Navy will annually review BTS rapid response needs with the Service to mutually determine if refined methods need to be implemented; the Navy will support such refinement based on that mutual agreement.

- MITT action proponents will provide support for BTS rapid response associated with a BTS sighting within the JRM AOR related to a MIRC program-related training activity subject to this consultation.

- Prior to each exercise that involves the movement of equipment and troops between islands, a pathway risk analysis will be conducted and biosecurity protocols confirmed by the DoD (JRM). Implementation of biosecurity protocols will be a requirement for training. An adaptive management review of risk analyses and biosecurity protocols will be conducted periodically with the Service. Initially, this adaptive management review will include the development of Standard Operating Protocols (SOPs) for biosecurity by the DoN in support of training activities covered under the MITT program. These DoN biosecurity SOPs will be reviewed by the Service when initially developed. Once the MITT program is implemented, MITT program-related SOPs will be reviewed with the Service annually.

- In coordination with the Service, the DoD action agencies implementing MITT activities will establish a contractual agreement for adequate rapid response capabilities with appropriate agencies having invasive species rapid response expertise and technology within three months of the Service's issuance of this Biological Opinion. The contracted services will focus on control and eradication of introduced non-established, non-native invasive species sighted in the vicinity of: (1) DoD MITT training areas, and (2) DoD areas and facilities used for the staging, storage and movement of MITT personnel, cargo, and MITT-associated vehicles (e.g., planes, trucks, and vessels). Priority should be given to non-native invasive species that pose a high risk of being transported elsewhere due to MITT-related training actions. This arrangement will be in place until superseded by a regional rapid response plan[2]. Monitoring will consist of the established protocols for USDA inspections, personnel awareness during pre-event preparations, and self-inspections. As noted above, an adaptive management review of risk analyses and biosecurity protocols will be conducted periodically with the Service.

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2 The regional rapid response plan discussed refers to the full implementation of a comprehensive Emergency Response Plan for Guam and the CNMI in association with the Regional Biosecurity Plan (RBP) for Micronesia and Hawaii. The RBP is discussed further in the MIRC re-initiation / MITT Biological Opinion.

Currently, the proposed MITT program includes provisions for detecting the inter-island transport of invasive species in terms of applying established protocols for USDA inspections, military personnel awareness during pre-event preparations, and self-inspections by military personnel involved with the proposed training activities. To date, annual reports prepared by the Navy under the MIRC program that are on file at the Service's PIFWO have not reported any incidents of introduced species being transported inter-island and introduced elsewhere. However, given the proposed increase under the MITT program in the frequency of military training currently being implemented under the MIRC program (see Appendix A), it is reasonable to anticipate a higher potential for such introductions to occur under the MITT program.

Given that higher potential, the Service believes additional monitoring/response capability may be needed under the MITT program to ensure early detection and eradication of inter-island introductions of invasive species that may be caused by MITT program-related activities. During this consultation, the Service and the Navy discussed this matter and informally agreed that such capability should be provided under a multi-agency programmatic action to implement the Regional Biosecurity Plan for Micronesia and Hawaii (RBP; Navy 2015). The Navy is committed to coordinating with the Service and other stakeholders on the development and implementation of this programmatic action (D. Schregardus, Deputy Assistant Secretary of the Navy, Environment, pers. comm. to Theresa Rabot, Service, Assistant Regional Director, Ecological Services, Region 1). The Navy also requested that the Service include a conservation recommendation in this Opinion addressing this matter (see *Conservation Recommendation* section below). For purposes of this analysis, within the term of the proposed action, the Service anticipates the above programmatic action will be developed and implemented region-wide, will include an effective rapid response plan that relies on an adequate monitoring program, and will serve to supplement or replace the currently proposed biosecurity measures under the MITT program.

Micronesian Megapode

Tinian

The nature of the proposed training activities on Tinian involves noise generation by aircraft and vehicles, and the potential for transport and introduction of invasive species. No training is proposed within areas of suitable habitat for the megapode. Given that physical separation, above ambient noise levels that may disrupt the feeding or sheltering behavior of transient megapodes are considered unlikely to occur.

Saipan

On Saipan, megapodes may use the intact limestone forests located within the Marpi Maneuver Area. At least one Micronesian megapode has been detected in the limestone cliff forest across the road from and within the Marpi Maneuver Area. Under the proposed action, only pedestrian land navigation training would occur in the Marpi Maneuver Area and no training will occur in the native limestone forest. Pedestrian land navigation training is designed to facilitate navigation to a location undetected, as quietly as possible. The proposed training within the Saipan Marpi Maneuver Area would be infrequent and would avoid the limestone forest habitat used by the megapode. Further, the types of training activities that do occur within the Marpi

Maneuver Area are more likely to occur in the open, more disturbed areas away from where megapodes would likely occur. Therefore, there is little likelihood of disturbance from noise and human presence caused by the proposed military training activities.

FDM

With implementation of the proposed action, the Micronesian megapode would be exposed to noise and pressure waves from explosions on FDM from strike warfare and firing exercises. Response of the Micronesian megapode to explosive noise has not been evaluated (Service 2010a); however, Micronesian megapodes are vocal and presumably find mates and defend territories by duetting (Service 1998). Therefore, explosive noise and pressure waves generated from explosions are likely to impact the Micronesian megapode if it physically damages the ears such that the affected individual: cannot hear and locate a mate; produces abnormal calls (hearing impaired learning) and cannot attract a mate; or is unable to defend a territory.

Other concerns from noise impacts to avian species are related to nesting and impacts to eggs or chicks (e.g., mortality through kicking eggs or young out of the nest during flushing; exposing eggs or young to temperature changes during nest flushing; causing adults to not feed and care for young during nest flushing; and exposing eggs and young during nest flushing to increased predation). Micronesian megapodes generally bury their eggs in mounds in which temperature is controlled by sources other than the bird (Service 2010a). Megapode chicks are precocial, are able to fly upon emergence from the egg and do not require parental care (Service 1998). Therefore, the above behavioral responses to noise impacts typical of other avian species are not likely to be exhibited by Micronesian megapodes.

FDM supports at least 11 Micronesian megapodes, therefore, concentrations of these birds at different times of the year are likely to coincide with strike warfare training exercises. On the FDM range area where ordnance is restricted to inert munitions, vegetation is recovering in vertical structure and surface cover in contrast to range areas where high explosive ordnance is permitted (Navy 2013b). Micronesian megapodes have been observed within the inert target area, although in lower densities relative to areas north of the "special use area" where no live-fire training occurs (Navy 2013b). The potential for injury to Micronesian megapodes on FDM associated with direct strike from inert munitions is considerably lower than the potential for blast effects associated with explosive munitions. Blast effects from explosive munitions are likely to injure and kill Micronesian megapode. The Service's 2010 Opinion on the MIRC program, as amended in 2013, anticipated and authorized the incidental take by kill and injury of 5 pairs (10 individuals) of the Micronesian megapode on FDM over the 5-year term of the MIRC program in part due to the effects of strike warfare training exercises. This amount of anticipated take was derived on the basis of five pairs (ten individuals) of the Micronesian megapode being detected using the area around the inert and live-fire target areas on FDM. That level of impact on the megapode is highly likely to continue and increase under the proposed MITT program, which increases the number of bombing exercises on FDM from 1,300 per year under the MIRC program to 2,300 per year, and the number of gunnery exercises on FDM from 22 per year under the MIRC program to 96 per year (see Appendix A). On the basis of these increases in bombing, gunnery, and missile exercises, two pairs of the megapode are likely to be killed each year on FDM.

Helicopter landings and approaches, expected to occur north of the no fire line within the special use area, may expose Micronesian megapodes to aircraft strike hazards during approaches and takeoffs. More megapodes are expected to occur within this area because of higher quality habitat relative to the impact areas on FDM. The proposed action includes 18 direct action-type training activities on FDM, which is a 5-fold increase over current training operations. Micronesian megapode behavioral responses to an approaching helicopter may include flushing and flying away from the sound source, or if in air, flying away from the sound source. As a ground-nesting bird, seeking cover on the ground is also likely a reasonable response. These behavioral responses may reduce the likelihood of megapodes being struck by aircraft. Helicopter landings need to occur in open areas free of debris or woody vegetation. Although Micronesian megapodes may nest within landing areas, especially after periods of nonuse, the potential for helicopters to physically land on a nest is extremely low because of higher quality habitat in other portions of the special use area that is likely to be used for nesting by the megapode.

On FDM, Micronesian megapodes use habitats within the target areas (estimated five pairs) and within areas north of the no-fire line (estimated 16 pairs) (Navy 2009, Service 2010a). Chicks and juveniles have been observed on FDM, along with habitat manipulations suggestive of megapode burrows north of the no-fire-line (Lusk et al. 2000). Habitats within the inert and live-fire target areas south of the no-fire-line will continue to be degraded, fragmented, and possibly lost due to continued military use of the island. Strike warfare training may make habitats within the inert and live-fire areas more prone to the compounding effects of drought and typhoons, and increase fine fuel (grasses and other herbaceous vegetation) availability for wildland fires to spread into edge habitats.

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. Fire effects in habitats used by Micronesian megapodes could include a variety of direct and indirect effects. Megapodes could be exposed to smoke inhalation, resulting in mortality, nest abandonment, or injury. Direct exposure to flames would destroy nests and may kill individual megapodes. 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 (Service 2010a). Direct mortality of megapodes could result from intensive respiratory distress. Megapode eggs, even in burrows, would not likely survive a wildfire overburn. Likewise, any fledglings within a burn area would be expected to suffer intensive respiratory distress, and unable to flee smoke or burning vegetation. The likelihood of a wildland fire spreading north out of the impact zones into more intact forests on the northern portion of the island cannot be negated, however, factors such as a relatively higher fuel moisture content and mesic conditions in the higher stature vegetation may limit the spread of fires. Therefore, the northern portion of the island is likely to continue to serve as a refugium for Micronesian megapodes that either reside in this area or for megapodes able to move away from smoke and flames in the target areas. Indirect effects include a general reduction of organic matter available on FDM, such as litter and duff used by the megapode to build nests and incubate eggs.

There are three designated bombing target areas on FDM south of the no-fire zone: Impact Area 1, the northernmost of the three, is designated for inert ordnance only; Impact Areas 2 and 3 are designated for both live and inert ordnance (see Figure 4-2 in the BA). Placement of the inert-only target area farthest north provides a buffer between the live ordnance targets to the south

and the area north of the no-fire zone, providing megapodes and their more favorable habitat a degree of protection. While unintentional and not part of the proposed action, inert and live bombs may miss their intended targets and land anywhere on the island including within areas occupied by megapodes. These unintentional impacts are likely to continue and increase, with the increased bombing of FDM,

Megapodes have persisted on FDM through various phases of intense bombardment of the island from the 1970s to the present. Recent surveys in 2013 detected 11 megapodes within the limited survey area in Impact Areas 1 and 2 (Navy 2013b). Megapode densities in portions of the FDM no-fire zone are analogous to densities on other uninhabited islands considered to be refugia for this species, such as Sarigan and Guguan (Navy 2008d), suggesting that Navy measures implemented under previous actions have minimized impacts to megapodes on FDM. Although megapode numbers have increased, the frequency of explosive ordnance use on FDM will also increase under the proposed action. Coupled with the recovery of vegetation within the no-fire zone and inert ordnance zone, megapode exposure to direct mortality from munitions and potential wildfires (from increased fuel loading) will continue for the term of the proposed action (see Description of the Proposed Action above). Although a population of megapodes on FDM continues to persist on the island, military activities are likely to negatively impact all megapodes on FDM that occur inside and outside of the impact areas.

As noted above, the Service's 2010 Opinion on the MIRC program, as amended in 2013, anticipated and authorized the incidental take by kill and injury of 5 pairs (10 individuals) of the Micronesian megapode on FDM over the 5-year term of the MIRC program. Those levels of take are highly likely to continue and increase under the proposed action for the reasonably foreseeable future. Given the term of the proposed action and the proposed increases in strike warfare training on FDM as discussed above and in Appendix A, it is possible, but not reasonably certain, that the Micronesian megapode may be extirpated from FDM as a result of the MITT program. Since FDM is not considered to be essential to the recovery of the megapode (Service 1998, p. 42), that potential outcome of the proposed action is not considered to be a significant impact to the Micronesian megapode at the rangewide scale.

Mariana Fruit Bat

Guam

In addition to specific provisions for BTS interdiction and control and other biosecurity measures described above and detailed in Appendix B, the proposed MITT program also includes the following provisions (excerpted from pp. 22 and 23 of the BA; detailed in Appendix B) to avoid and minimize adverse effects to the Mariana fruit bat from training activities on Guam:

Conservation measures on Guam that limit the impacts associated with aircraft training activities include:

- Helicopter overflights as part of training activities are prohibited below 1,000 feet (305 meters) above ground level (AGL) over Northwest Field north of the South Runway. This measure is designed to minimize visual disturbance and acoustic noise impacts on foraging or roosting Mariana fruit bats in the Northwest Field area. The satellite tracking station

located at Northwest Field also has a flight restriction of 2,500 feet (760 meters) AGL within 1 nautical mile of the station.

- Overflights as part of training activities along all Andersen AFB clifflines are prohibited below 1,000 feet (305 meters) AGL.

- Helicopter overflights as part of training activities are restricted throughout the Naval Base Guam Munitions Site below 500 feet (150 meters) AGL. Fixed-wing aircraft are restricted below 1,000 feet (305 meters) AGL as part of training activities.

Conservation measures on Guam that limit the impacts associated with ground maneuvers include:

- "No Wildlife Disturbance" and "No Training Areas" are designated on Naval Base Guam Orote Point, Naval Base Guam Navy Munitions Site, and Andersen AFB Tarague Beach. Vegetation removal would be limited to maintaining existing bivouac areas. No new bivouac areas are proposed in this BA. Maneuver units will remain tactical and not establish support camps.

- All training activities that involve ground maneuvers on Guam will be consistent with the fire management plan included in COMNAVMARIANASINST 3500.4A. A description of this plan is included in BA Section 2.3.6 (Wildland Fires).

- Riparian wetlands are dispersed throughout the Southern Land Navigation. No maneuver and navigation training will occur in riparian wetlands in this area.

- The Navy will locate ground-disturbing training activities on previously disturbed sites whenever possible. Training areas, including transit routes necessary to reach training areas will be clearly marked. Vehicular activities will be restricted to designated and previously identified areas. Off-road vehicle use will only occur in designated off-road areas or on established trails.

Conservation measures on Guam that limit impacts associated with established range use include:

- The USAF implements training and operation restrictions at the Combat Arms Training and Marksmanship (CATM) range at Tarague Beach, Guam to minimize effects to sea turtles and Mariana fruit bat. Night-training occurs at the CATM range; therefore night-lighting is installed. The lighting configuration at this location is maintained with four flood lights, located below the tree canopy level that are directed inland and parallel to the coast. Lighting in this configuration will avoid impacts to nesting and hatching sea turtles and Mariana fruit bats.

- The CATM range allows for training with small arms, inert mortars to 60 millimeter, and 40 millimeter grenade launchers. These weapons do not produce percussive force and no weapons that produce percussive force can be used at this facility.

Given the above measures and considering both the current distribution and abundance of the fruit bat on Guam and the exclusion of USAF aircraft staging and takeoff and landings at Andersen AFB from the MITT program, the Service finds that implementation of the proposed MITT program on Guam:

1. Is not likely to adversely affect the roosting behavior of the fruit bat in the Action Area on Guam. Historically, the primary roosting area for the Mariana fruit bat on Guam was located at Pati Point. That roost site is not currently being used by fruit bats. Should fruit bat occupation of that site resume during the term of the proposed action, the proposed MITT program is compatible with that use.

2. Is likely to adversely affect the foraging behavior of the fruit bat as a result of noise caused by nighttime training activities particularly at Andersen AFB and the Naval Base Guam Munitions Site. However, these adverse effects are not anticipated to significantly disrupt fruit bat foraging behavior to an extent that is reasonably certain to cause injury or death of the affected bat(s) because the affected bats are likely to shift their foraging sites away from areas used for nighttime training activities.

Rota

The Service's Opinion on the MIRC program (Service 2010a) did not anticipate adverse effects to the Mariana fruit bat to be caused by proposed military training activities other than on Guam. The BA for the MITT program includes the following discussion on pages 60, 65, 66, 68, and 69 regarding the effects of the MITT program on the fruit bat on Rota:

On Rota, Mariana fruit bats are found in mature limestone forests and coconut groves on the island. Most roosting activity and colony sites occur in the Sabana region of the island (see Figure 3-1), which coincides with the Mariana fruit bat critical habitat designation. Military training activities do not occur in these areas, however, Mariana fruit bats may be exposed to noise from training activities based out of the Rota International Airport. Mariana fruit bats also reside on Aguiguan and travel to Tinian to forage (Cruz et al. 1999, 2000, 2002). In June 2005, approximately five Mariana fruit bats were seen in the cliff-line forest during a routine forest bird survey of the Maga bird transect (Navy 2008a). Because of the few numbers of bat observations and the likelihood that Mariana fruit bats observed on Tinian are not residents, the Mariana fruit bat should be considered incidental on Tinian. Noise as a stressor for Mariana fruit bats on Tinian and Saipan are considered negligible.

The Rota International Airport is adjacent to foraging habitats for the Mariana fruit bat. Combat search and rescue training occasionally occur at the airport. This training activity, however, is generally confined to the airfield where fruit bats are unlikely to occur. Trainings may also occur in open areas in coordination with local authorities. The likelihood for aircraft strike during combat search and rescue training should be considered extremely low because of the infrequent occurrence of the training activity and the locations of where these training activities are actually scheduled.

On Rota, aircraft noise would be generated by helicopters during combat search and rescue training activities and may affect the Mariana fruit bat. Typically, the Navy uses H-60 helicopters to practice day or night rescues of personnel in a simulated hostile area with the

expectation of combat resistance. Crews typically include Naval special warfare personnel or combat trained personnel with rescue swimmer and medical qualifications. This activity is mostly restricted to the Rota International Airport; however, other locations may be used in coordination with local authorities (e.g., Rota's mayor office). Helicopters may also transit out to sea for rescue swimmer training.

Mariana fruit bats are generally more active at night (a primary time for foraging when bats would fan out over Rota from roost locations in the limestone forests of the Sabana Plateau). Because suitable foraging habitat is adjacent to the Rota International Airport, helicopter noise may affect the Mariana fruit bat. With low-level helicopter flights, there is also a potential for aircraft strike of Mariana fruit bats. Adverse effects associated with this training activity are anticipated to be insignificant because of the infrequent use of the Rota International Airport and the even more infrequent low light exercises associated with this training activity. The potential for invasive species introductions into Rota's port facility and airport are addressed through exercise specific interdiction plans and standard operating procedures.

The Navy recognizes the potential for catastrophic effects on wildlife on Rota, Tinian, and Saipan resulting from the accidental introduction of brown treesnakes or other vertebrate predators. Accidental introductions of potentially invasive pests and plants could establish populations and further degrade habitats on these islands. Rota is of particular concern because of close proximity and shorter transit times from Guam and high quality habitats located throughout the island. Figure 2-6 shows a conceptual model of potential pathways of invasive species introductions to Rota, Tinian, and Saipan. These islands are linked together and to Guam by marine and air transportation routes that support military training activities.

The Navy's strategy to reduce, minimize, or eliminate species from potential introduction pathways includes the identification of critical control points. Accordingly, the Navy designs and implements exercise-specific interdiction implementation plans, in accordance with Navy policy directives and previous consultation requirements. The Navy also coordinates with local stakeholders (e.g., CNMI Division of Fish and Wildlife and U.S. Department of Agriculture Wildlife Services) to conduct redundant inspections of cargo, equipment, and material as required for specific exercises.

Based on the above information and the findings in the Environmental Baseline section for the Mariana fruit bat, the Service finds that the proposed action is likely to adversely affect the foraging and roosting behavior of the fruit bat on Rota as a result of noise caused by training activities based out of Rota International Airport. However, these adverse effects are not anticipated to significantly disrupt fruit bat foraging and roosting behavior to an extent that is reasonably certain to cause injury or death of the affected bat(s) because the affected bats are likely to shift their foraging and roosting sites away from areas used for the training activities.

FDM

The BA for the MITT program includes the following discussion on pages 81-83, and 85 regarding the effects of the MITT program on the fruit bat on FDM:

Mariana fruit bats on FDM may be transient bats from other islands, and/or the island may support a small resident population. The limited forest structure and composition currently

found on FDM may support a small number of year-round residents. Natural resource experts expressed concern that volcanic eruptions could displace fruit bats to other islands (e.g., from Anatahan to FDM), thereby exposing an increased number of bats to potential impacts of military training on FDM (Service 2006a, 2010).

Mariana fruit bats are expected to occur north of the no-fire line within the relatively more intact forests that remain on FDM. Therefore, the likelihood of munitions strike of Mariana fruit bats is considerably reduced, but not negated, because the area north of the no-fire line is not targeted. Since the 2010 Biological Opinion was issued, training impacts (e.g., bomb craters, destroyed targets) have been observed within the no targeting area proving that despite best efforts, exercises sometimes miss their targets.

Helicopter landings and approaches would occur in areas that may support Mariana fruit bats on FDM. The vegetation structure north of the no-fire line within the special use area contains higher stature foraging and roosting trees relative to the impact areas outside of the special use area. The Proposed Action includes 18 direct action-type training activities on FDM, which is an increase from 3 over previous training requirements. Mariana fruit bat behaviors in response to an approaching helicopter may include flushing and flying away from the sound source, or if in air, flying away from the sound source. Alternatively, roosting bats may not exhibit any behavioral response. These behavioral responses may reduce the likelihood of aircraft strike of Mariana fruit bats.

Mariana fruit bats transiting from other islands through FDM or resident bats on FDM are likely limited to the more intact forested portions north of the no-fire line. Therefore, bats that transit between other islands and/or resident bats will likely continue to have a foraging base on FDM. In this location, Mariana fruit bat foraging habitat may be degraded through accidental target misses and impacts north of the no targeting line.

Catastrophic events within the Mariana archipelago may temporarily cause populations of fruit bats to fluctuate on different islands, although movement between islands seems to be a natural occurrence. These events may result from typhoons, poaching, or volcanic eruptions. Catastrophic events and other factors may cause Mariana fruit bat populations on FDM to temporarily increase, thereby exposing transient or resident bats to potential harassment and harm associated with live-fire training. Mariana fruit bats can be assumed to utilize FDM as a resting point for longer inter-island movements. Because of the location of likely foraging and roosting locations (located in the northern portion of the island north of the "no fire zone"), impacts associated with wildfires occurring primarily in the central portion of the island would be unlikely. The likelihood of a wildland fire spreading north out of the impact zones into more intact forests on the northern portion of the island cannot be negated; however, factors such as a relatively higher fuel moisture content and mesic conditions in the higher stature vegetation may limit the spread of fires.

The Navy recognizes the potential for catastrophic effects on wildlife on FDM resulting from the accidental introduction of brown treesnakes or other vertebrate predators. Accidental introductions of potentially invasive pests and plants could establish populations and further degrade habitats on FDM. Figure 2-6 shows a conceptual model of potential pathways of invasive species introductions to FDM. The only military activities that could introduce invasive species to FDM are activities requiring aircraft landings. Military boats do not come

ashore at FDM. Helicopters that land on FDM typically embark from Guam or Saipan, but some helicopters may originate from Tinian.

The Navy's strategy to reduce, minimize, or eliminate species from potential introduction pathways includes the identification of critical control points. Accordingly, the Navy has designed and implemented inspection and interdiction procedures specific to FDM, in accordance with Navy policy directives and previous consultation requirements. As stated in Section 1.2.3.1 (Brown Treesnake Interdiction and Control) Section 1.4.1.2 (Conservation Measures on Farallon de Medinilla), all aircraft and equipment originating from Guam and landing on FDM must undergo brown treesnake inspection procedures prior to departing Guam. Appendix B (Brown Tree Snake Control and Interdiction Requirements) of this BA is included in COMNAVMARIANASINST 3500.4A, adherence to this instruction is mandatory for training within the Mariana Islands.

Based on the above information and the findings in the Environmental Baseline section for the Mariana fruit bat, the Service finds that the proposed action is likely to adversely affect the foraging and roosting behavior of the fruit bat on FDM as a result of noise, percussive force, and wildfires caused by training activities. There is a high potential for these effects, at times, to injure or kill affected fruit bats, especially considering the increased training activity on FDM and project duration. However, given the low number of fruit bats that occur on FDM, the proposed action is not considered a significant impact to the Mariana fruit bat at the rangewide scale.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private activities that are reasonably certain in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Recreation and tourism occur within the Military Lease Area on Tinian. In general, the tourists are bused to historical sites, while some use rental cars. These tourism activities are not anticipated to result in effects to the Micronesian megapode or Mariana fruit bat as the species are transient on Tinian and the majority of the sites are not in habitats that would be used by the megapode or fruit bat. There are no historical landmarks in the area where fruit bats or megapodes were last detected.

Homesteads, private development, tourism, and unauthorized clearings are likely to occur within the timeframe of this action within the Marpi Maneuver Area on Saipan. This clearing and development are likely to further reduce the amount and quality of megapode habitat in the area. Natural disasters, such as typhoons, also occur regularly on Saipan further damaging habitat. However, no nesting habitat is expected to be lost.

CONCLUSION

After reviewing the current status of the Mariana fruit bat and the Micronesian megapode, the environmental baseline for the action area, the effects of the proposed action and cumulative

effects, it is the Service's biological opinion that the Navy's proposed action is not likely to jeopardize the continued existence of the Mariana fruit bat and the Micronesian megapode.

The Service reached these findings based on the following reasons:

Activities under the proposed action will not remove habitat essential or important to the conservation of these species on Guam, Rota, Tinian, and Saipan. The proposed action is likely to cause the destruction and degradation of habitats utilized by small numbers of the fruit bat and the megapode on FDM. However, this island is not considered essential to the recovery of the megapode.

On Guam, proposed training areas avoid sites known to support Mariana fruit bat roosts, and proposed conservation measures related to aircraft use and ground maneuvers are likely to minimize noise, strike potential, physical disturbance, and habitat degradation impacts on the fruit bat. On Rota, the bat(s) that occur near the airport would likely shift their foraging and roosting sites away from proposed training activities at the airport. On Tinian and Saipan, proposed training activities avoid areas known or likely to be occupied by the fruit bat.

The Micronesian megapode is currently considered to be extirpated from Rota. On Tinian and Saipan, few proposed training activities are expected to occur in habitats likely to be occupied by the Micronesian megapode.

The potential for the proposed action to cause the inter-island transport and introduction of invasive species is minimized by proposed measures to develop and implement training exercise-specific interdiction plans, and to conduct redundant inspections of cargo, equipment, and other materials associated with specific training exercises. The Service is also relying on the Navy's commitment to prepare, along with other stakeholders, a program to implement the Regional Biosecurity Plan for Micronesia and Hawaii.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the action agencies for the exemption in section 7(o)(2) to apply. The action agencies have a continuing duty to regulate the activities covered by this Incidental Take Statement. If the action agencies fail to assume and implement the terms and conditions of this Incidental Take Statement, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the action agencies must report the progress of the action and its impact on the species to the Service as specified in this Incidental Take Statement in accordance with the implementing regulations for section 7 at 50 CFR §402.14(i)(3).

Amount or Extent of Take Anticipated

Two pairs of the Micronesian megapode are likely to be killed every year on FDM as a result of bombing, gunnery, and missile exercises implemented under the MITT program. One Mariana fruit bat is likely to be killed every five years on FDM as a result of bombing, gunnery, and missile exercises implemented under the MITT program.

Effect of the Take

In the accompanying Opinion, the Service determined the above level of anticipated take is not likely to result in jeopardy to the Micronesian megapode and the Mariana fruit bat.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to further minimize the effect of take on the Micronesian megapode and to monitor the impacts of take of the Micronesian megapode and Mariana fruit bat on FDM caused by the proposed action.

1. Minimize the effect of take from training and range maintenance to Micronesian megapodes.

2. The baseline condition for the Micronesian megapode and Mariana fruit bat shall be tracked to ensure that proposed minimization measures on FDM are implemented and to ensure no unauthorized take occurs.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the DoD action agencies for the MITT program must comply with the following terms and conditions that implement the above RPMs. These terms and conditions are non-discretionary and must be implemented.

1.1 The DoD action agencies for the MITT program shall complete an island-wide ungulate eradication on Aguiguan (Goat Island). This action will benefit the Micronesian megapode by increasing vegetation on the island and creating suitable habitat, and will minimize the effects of take from the proposed action. This eradication will occur within six years of the issuance date of the Biological Opinion.

2.1. The DoD action agencies for the MITT program shall establish a formal protocol for the timing and implementation of megapode surveys on FDM in coordination with and the approval of the Service within 180 days of the issuance date of the accompanying Opinion.

2.2. The DoD action agencies for the MITT program shall conduct surveys for the Micronesian megapode along trails or paths that have been established during target refurbishment and operational range clearance activities. The results of these surveys shall be used as an index of megapode population change over time due to take impacts on FDM caused by the proposed action. Mariana fruit bats observed during surveys shall be recorded.

2.3. The DoD action agencies for the MITT program shall establish an appropriate monitoring protocol for ground surveys in conjunction with range maintenance activities on FDM to monitor megapode and bat habitat changes over time on FDM, and for reporting the results of this analysis in coordination with and the approval of the Service within 180 days of the issuance date of the accompanying Opinion.

2.4. The DOD action agencies for the MITT program shall provide the results of each survey and the change in habitat on FDM and concisely discuss the successes and challenges of implementing all the avoidance, minimization and conservations measures and terms and conditions listed in the Biological Opinion in an annual report submitted to the Service. The report also shall include the changes to the no impact area as a result of the accidental bombing and destroyed targets entering this area. The report is due at the end of the calendar year, December 31st, for the life of the project.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service believes the following conservation action may facilitate further conservation of listed species within the Action Area:

1. The Navy is committed to coordinating with the Service and other stakeholders on the development of a programmatic action to implement the Regional Biosecurity Plan for Micronesia and Hawaii, inclusive of an effective rapid response plan (D. Schregardus, Deputy Assistant Secretary of the Navy, Environment, pers. comm. to Theresa Rabot, Service, Assistant Regional Director, Ecological Services, Region 1). The Service believes that effective rapid response is predicated on early detection of introduced species based on an adequate monitoring program. The Service supports and recommends that the DoD action agencies for the MITT program work aggressively with the Service and other stakeholders to develop and implement the above programmatic action region-wide in as timely a manner as possible.

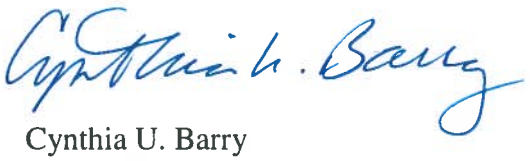
2. The Service recommends that the DoD agencies implementing the MITT program place a high priority on developing and implementing biosecurity monitoring measures in a timely manner that are adequate to detect an incipient population of the BTS that is introduced on or adjacent to lands used for training activities as a result of the proposed action. Such measures should also be part of the program discussed above for implementing the Regional Biosecurity Plan for Micronesia and Hawaii.

REINITIATION NOTICE

This concludes formal consultation on the proposed Project described in your Assessment. As provided in 50 CFR § 402.16, re-initiation of consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of exempted incidental take is exceeded; (2) new information reveals effects of the agencies' action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. When consultation is reinitiated, the provisions of section 7(d) of the ESA apply.

This concludes formal consultation on the proposed MITT program. If you have any questions regarding this Opinion, please contact Kristi Young of the Service's Pacific Islands Fish and Wildlife Office at (808) 792-9400.

Sincerely,



Cynthia U. Barry
Acting Field Supervisor

Attachments:
Appendix A – Proposed MITT Program Training Activities
Appendix B – MITT Conservation Measures

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Appendix A. Increase in proposed MITT Program training activities currently being conducted under the MIRC Program.

2 ASSESSMENT OF MILITARY TRAINING ACTIVITIES ON GUAM

2.1 DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

1.1.1 PROPOSED ACTIVITIES ON GUAM

Most of the land training activities considered in this BA are expected to occur on Guam. The land training areas are owned either by the U.S. Navy or the U.S. Air Force. Guam offers a variety of land training environments, including amphibious landing sites (within Naval Base Guam Main Base), field training exercises and land navigation training (portions of Andersen AFB, such as Northwest Field), airfield expeditionary and seizure trainings (Northwest Field and Naval Base Guam Main Base), land navigation areas (within the Naval Base Guam Munitions Site), and urban warfare, counter-terrorism, and humanitarian training areas on all military training areas on Guam.

Table 2-1 presents a list of training activities by warfare area, proposed location of the training activity, the number of training activities previously analyzed in the 2010 MIRC Biological Opinion, and the proposed increase in certain activities on Guam. Not all activities listed in Table 2-1 are proposed for increases (the activities proposed for increases are shown in bold). Most of the activities proposed for increases on Guam would occur on previously disturbed and developed areas, hardened surfaces, and urban warfare infrastructure (e.g., breacher houses and military operations on urban terrain [MOUT]) that are outside of habitat areas for ESA-listed species. Activities such as land navigation and field training exercises are not proposed for increases.

Table 2-1: Typical Training Activities in the Action Area on Guam

Activity Name	Location	Baseline Number of Activities (per year)	Proposed Number of Activities (per year)
Strike Warfare (STW)			
Combat Search and Rescue (CSAR)	**Airfields on Naval Base Guam and Andersen AFB (Northwest Field)**	**60**	**80**
Amphibious Warfare (AMW)			
Amphibious Assault	**Naval Base Guam Main Base landing sites**	**4**	**6**
Amphibious Raid	**Naval Base Guam Main Base landing sites**	**2**	**6**
Urban Warfare Training	**Naval Munitions Site, Andersen AFB, Andersen South, Naval Base Guam Barrigada, Navy Base Guam Telecommunications Site**	**17**	**36**

Table 2-1: Typical Training Activities in the Action Area on Guam (continued)

Activity Name	Location	Baseline Number of Activities (per year)	Proposed Number of Activities (per year)
Noncombatant Evacuation Operations	**Naval Munitions Site, Andersen AFB, Naval Base Guam Barrigada, Navy Base Guam Telecommunications Site**	**2**	**5**
Naval Special Warfare (NSW)			
Personnel Insertion/Extraction	**Naval Munitions Site, Andersen South, beach locations at Andersen AFB (Tarague Beach), Naval Base Guam Main Base, and Naval Base Guam Telecommunications Site**	**150**	**240**
Parachute Insertion	**Various drop zones on Navy lands**	**12**	**20**
Embassy Reinforcement	Naval Munitions Site, Andersen AFB, Andersen South, Naval Base Guam Barrigada, Navy Base Guam Telecommunications Site	50	50
Direct Action (Combat Close Quarters)	**Naval Munitions Site, Andersen AFB, Andersen South**	**40**	**72**
Direct Action (Breaching)	**Naval Munitions Site, Andersen AFB, Andersen South**	**40**	**72**
Intelligence, Surveillance, Reconnaissance (ISR)	Naval Munitions Site, Andersen AFB, Andersen South	16	16
Urban Warfare Training	**Naval Munitions Site, Andersen AFB, Andersen South**	**8**	**18**
Other Training Activities			
Maneuver (Convoy, Land Navigation)	Naval Munitions Site, Andersen AFB, Andersen South	16	16
Water Purification	**Naval Base Guam**	na	16
Field Training Exercise	Naval Munitions Site, Andersen AFB, Andersen South	100	100
Force Protection	Naval Munitions Site, Andersen AFB, Andersen South	75	75
Anti-terrorism	Naval Munitions Site, Andersen AFB, Andersen South	80	80
Seize Airfield	Airfields on Naval Base Guam and Andersen AFB (Northwest Field)	12	12
Airfield Expeditionary	Airfields on Naval Base Guam and Andersen AFB (Northwest Field)	12	12
Land Demolitions (Improvised Explosive Device Discovery/Disposal)	Hardened-surface airfields on Naval Base Guam and Andersen AFB (Northwest Field)	120	120
Land Demolitions (Unexploded Ordnance) Discovery/Disposal	**Explosive ordnance units conduct disposal of unexploded ordnance. Training is incidental to the emergency disposal of unexploded ordnance. Disposal occurs at Andersen AFB EOD Range. Emergency detonations may occur at Andersen AFB EOD Range and Naval Munitions Storage.**	**200**	**236**

Notes:
1. Activities in **bold text** are activities that are proposed to increase in the number of occurrences per year relative to the number of exercises previously analyzed in the 2010 MIRC Biological Opinion. Activities that are not in bold text will not increase in occurrences per year.
2. AFB = Air Force Base; na = not applicable, not analyzed previously in the 2010 MIRC Biological Opinion

Table 3-1: Typical Training Activities in the Action Area on Rota, Tinian, and Saipan

Activity Name	Location			Baseline Number of Activities	Proposed Number of Activities
	Rota	Tinian	Saipan		
Strike Warfare					
Combat Search and Rescue	X	X	-	60	80
Amphibious Warfare					
Amphibious Assault	-	X	-	4	6
Amphibious Raid	-	X	-	2	6
Urban Warfare Training	-	X	-	17	36
Noncombatant Evacuation Operations	X	X	-	2	5
Naval Special Warfare					
Personnel Insertion/Extraction	X	X	-	150	240
Parachute Insertion	X	X	-	12	20
Embassy Reinforcement	X	X	-	50	50
Direct Action (Combat Close Quarters)	-	X	-	40	72
Direct Action (Breaching)	-	X	-	40	72
Intelligence, Surveillance, Reconnaissance	X	X	X	16	16
Urban Warfare Training	X	X	X	8	18
Other Training Activities					
Maneuver (Convoy, Land Navigation)	-	X	X	16	16
Water Purification	X	X	X	NA	16
Field Training Exercise	X	X	X	100	100
Force Protection	X	X	-	75	75
Anti-terrorism	X	X	-	80	80
Seize Airfield	X	X	X	12	12
Airfield Expeditionary	X	X	X	12	12
Land Demolitions (Improvised Explosive Device Discovery/Disposal)	-	X	-	120	120
Land Demolitions (Unexploded Ordnance) Discovery/Disposal	-	X	-	200	236

4 ASSESSMENT OF MILITARY TRAINING ACTIVITIES ON FARALLON DE MEDINILLA

4.1 DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

4.1.1 PROPOSED ACTIVITIES DESCRIPTION

4.1.2 FDM is the DoD's only U.S.-controlled range available for live-fire training for forward deployed military forces. The air and sea space surrounding FDM provides sufficient room for the many different attack profiles necessary to replicate training opportunities in the CNMI. FDM presents a unique opportunity to maintain capability and proficiency in precision-guided weapons and specific target engagement. The range supports strike warfare exercises (air to ground bombing exercises, air to ground gunnery exercises, and missile and rocket exercises), amphibious warfare activities (fire support exercises from cruisers and destroyers), and Naval special warfare activities (direct action exercises using tactical air control).

Number of Activities

Table 4-1 lists each training activity, the baseline number of activities and ordnance amount currently approved for FDM, and the proposed changes in frequency and ordnance use of the island.

Table 4-1: Baseline and Proposed Training Activities on Farallon de Medinilla

Activity Name	Baseline Activities	Proposed Activities
	Number of Exercises (per year)	Number of Exercises (per year)
Strike Warfare		
Bombing Exercise Air-to-Ground	1,300	2,300
Gunnery Exercise Air-to-Ground	22	96
Missile Exercise	60	85
Amphibious Warfare		
Fire Support Exercise-Land Based Target (FIREX [Land])	8	10
Naval Special Warfare		
Direct Action (Tactical Air Control Party)	3	18

Ordnance Expenditures The FDM range is operated in accordance with the terms and conditions specified in the 2010 Biological Opinion (U.S. Fish and Wildlife Service 2010), for the take of Micronesian megapodes on FDM.

Appendix B. MIRC/MITT Conservation Measures

MIRC/MITT Conservation Measures
February 20, 2015

The following list of Conservation Measures (CM) serves to consolidate those CMs offered in Navy's August 2014 BA for the action, the US Fish and Wildlife Service's (Service) draft Biological Opinion (BO) transmitted to the Navy on December 18, 2014, Appendix B of that draft (the MIRC BO and MITT BA Conservation Measures comparison table, as updated December 15, 2014) and December 2014 agreements between Navy and the Service regarding the description of the action on Tinian specific to beach use and potential effects to sea turtles.

This list replaces the December 18, 2014 draft BO Appendix B. It allows participating DoD Branches and units to more efficiently reference them to ensure their implementation.

I. CONSERVATION MEASURES APPLICABLE THROUGHOUT THE ENTIRE ACTION AREA

BIOSECURITY

Brown Treesnake (BTS) Interdiction and Control

1. Upon completion of the MIRC Reinitiation BO and other pending consultations, Navy will update the COMNAVMARIANASINST 3500.4A to reflect the language contained in these Biological Opinions applicable to range users. Navy will also finalize a new Joint Region COMNAVMAR Brown Treesnake instruction, which will contain the Brown Treesnake Control and Interdiction Requirements. These efforts shall be prepared in coordination with the Service and other stakeholder agencies.

2. Training activities will undergo a pathway risk analysis as a tool to improve programmatic efficiency while preventing the spread or introduction of BTS.

3. The Navy, in compliance with Public Law 110-417, [Division A], title III, Section 316, October 14, 2008, 122 Statute 4410 and per Department of Defense (DoD) Transportation Regulations, Chapter 505 protocols, is committed to implementing 100% inspection of all aircraft and all cargo/equipment leaving Guam via vessel or aircraft for an off-island destination with trained brown treesnake personnel and qualified canine detection teams. The skills and standards required to certify personnel, including canine inspection teams, as "qualified" will be agreed upon mutually by DoD and the Service. These teams may be supplemented with qualified personnel to meet 100 percent inspection goals for training activities.

a. Missed Brown Treesnake Inspections - In the event military units, vehicles, or equipment accidentally leave Guam without inspection, as soon as possible, the Navy will notify the qualified brown treesnake interdiction program and the destination port or airport authorities. The Navy will work with the destination authority(ies) to resolve the issue. Urgency of notification is a priority so that rapid response or other actions can be implemented to reduce risk, if warranted.

b. Tactical Approach Exercises/Events - To the maximum extent practicable, the Navy will route inbound personnel and cargo for tactical approach exercises (that require an uninterrupted flow of events) directly to CNMI training locations to avoid Guam seaports and airfields to the extent possible. If Guam cannot be avoided for tactical approaches, the Navy will work with the U.S. Fish and Wildlife Service to

identify and implement appropriate interdiction methods at the receiving port (Rota, Saipan or Tinian). Methods may include redundant inspections or other interdiction actions, such as multiple inspections or barrier use on Guam. In addition, tactical approach exercises will involve only cargo/equipment that has not originated from areas containing a brown treesnake population or will be 100 percent inspected by qualified brown treesnake canine detection programs.

c. Administrative/Logistic Movements - The Navy is committed to implementing redundant inspections after discussions with appropriate stakeholders. Redundant inspections include inspections on Guam and at the receiving ports (Rota, Saipan or Tinian) for administrative and logistical movements within the MITT action area that do not require a tactical approach to complete the training requirements. It is anticipated that redundant inspections would utilize existing quarantine and inspection protocols at receiving ports in the CNMI to the extent possible. However, should inspection coverage be inadequate, the Navy will provide inspection teams to fully implement quarantine and inspection protocols. Appropriate stakeholders include, but are not limited to the U.S. Fish and Wildlife Service to ensure the inspections are adequate to reduce risks to trust resources, receiving jurisdictions and their supporting agencies with expertise in invasive species control, and other inspection authorities as needed to ensure inspection methods are current and revised as new techniques, technology, or data become available.

d. Movements Involving Farallon de Medinilla (FDM) - The Navy will consider all movements between Guam and FDM as tactical in nature and work with appropriate stakeholders to determine the appropriate interdiction methods required for aircraft, personnel, and equipment/gear movements. All aircraft and equipment/gear will be 100 percent inspected prior to departing Guam. Additional interdiction measures on Guam may be required after discussions with appropriate stakeholders. Training operations that go from Guam to Saipan and then FDM will require canine inspection on Saipan or other BTS inspection as mutually agreed upon by the DoD and the Service. For training that starts on Guam and goes directly to FDM, visual inspections for BTS will be conducted by military or UXO personnel upon arrival on FDM.

4. The Navy will establish snake-free quarantine areas (barriers) as deemed necessary by the Navy and U.S. Fish and Wildlife Service for cargo/equipment traveling from Guam to CNMI and locations outside of the MITT action area. Barriers will be used if the volume of cargo/equipment/vehicle movement out-paces the available canine inspection capacity or BTS quarantine capacity. The snake-free quarantine areas will be subject to: (1) multiple day and night searches with appropriately trained interdiction canine teams, (2) snake trapping, and (3) visual inspection for snakes. Standard operating procedures will be developed based on the barrier size needed for the training event(s). Temporary barriers will be constructed and maintained in a manner that assures the efficacy of the barrier and that staff maintaining and constructing the temporary barriers will receive training related to this activity prior to construction and operation. Barrier specifications as well as the qualifications of BTS barrier maintenance and management staff will be mutually agreed upon by DoD and the Service.

5. Navy will (1) coordinate closely with the Service1 and the CNMI Department of Land and Natural Resources staff on planning for training activities in the CNMI; (2) coordinate with the other DoD action agencies implementing the MITT program and the Service to identify the inspection and interdiction requirements for MITT program-related training activities, including the number of trained quarantine

1 Currently, the Service point-of-contact (POC) for these planning activities is the CNMI Brown Tree Snake Program Coordinator (Coordinator). If the agency affiliation of that Coordinator changes, the Service shall formally designate a new Service POC and advise the DON and other DOD action agencies associated with the MITT Program within 10 working days.

officers and canine detection teams required to ensure that the inspection and interdiction requirements for MITT program-related training activities can be met; (3) coordinate with the Service on the inspection and interdiction requirements identified by the Navy prior to the implementation of the exercise or training activity; and (4) identify the support that the Navy will need to provide for the inspections and develop plans to ensure that inspection personnel are available and all requirements are met.

6. Navy will utilize ongoing adaptive management to improve methods for BTS rapid response, including detection of low-density snake populations using all technologies as they become available. The Navy will annually review BTS rapid response needs with the Service to mutually determine if refined methods need to be implemented; the Navy will support such refinement based on that mutual agreement. Support for this adaptive management approach will include financial support subject to Congressional funding guidelines and restrictions. All parties acknowledge financial support is subject to the availability of funds, and no provision herein shall be interpreted to require obligation of payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C Section 1341

7. MITT action proponents will provide support for BTS rapid response associated with a BTS sighting with the JRM AOR related to MIRC training activities subject to this consultation.

8. The Navy will provide brown treesnake awareness briefings for all military and contractor personnel prior to all MITT training activities. Brown treesnake awareness briefings will be scaled to the type of training activity to take place. Awareness materials may consist of a brown treesnake educational video and distribution of brown treesnake information and personal inspection guidelines. Awareness briefs will emphasize that brown treesnake awareness must extend through the chain of command from the Commanding Officer to the individual military service member.

9. Joint Region Marianas (JRM) will assure that "Area Training" coordinates meetings for BTS interdiction on all training activities for the training execution phase and an after-action review phase. If a snake is found during training, the Navy policy is to kill the snake and is reported to Navy Environmental Staff.

10. The Navy will invite the Service to participate in the development of regional standard operating procedures and exercise planning to better meet BTS management needs associated with MITT training.

Other Invasive Species

11. Prior to each exercise that involves the movement of equipment and troops between islands, a pathway risk analysis will be conducted and biosecurity protocols confirmed by the DoD (JRM). Implementation of biosecurity protocols will be a requirement for training. An adaptive management review of risk analyses and biosecurity protocols will be conducted periodically with the Service. Initially, this adaptive management review will include the development of Standard Operating Protocols (SOPs) for biosecurity by the DoN in support of training activities covered under the MITT program. These DoN biosecurity SOPs will be reviewed by the Service when initially developed. Once the MITT program is implemented, MITT program-related SOPs will be reviewed with the Service annually.

12. In coordination with the Service, the DoD action agencies implementing MITT activities will establish a contractual agreement for adequate rapid response capabilities with appropriate agencies having invasive species rapid response expertise and technology within three months of the Service's issuance of this Biological Opinion. The contracted services will focus on control and eradication of introduced

non-established, non-native invasive species sighted in the vicinity of: (1) DoD MITT training areas, and (2) DoD areas and facilities used for the staging, storage and movement of MITT personnel, cargo, and MITT-associated vehicles (e.g., planes, trucks, and vessels). Priority should be given to non-native invasive species that pose a high risk of being transported elsewhere due to MITT-related training actions. This arrangement will be in place until superseded by a regional rapid response plan2. Monitoring will consist of the established protocols for USDA inspections, personnel awareness during pre-event preparations, and self-inspections. As noted above, an adaptive management review of risk analyses and biosecurity protocols will be conducted periodically with the Service.

13. All personnel involved in MIRC/MITT training will be responsible for conducting self-inspections to avoid potential introductions of invasive species to Guam and the CNMI. Troops will inspect all gear and clothing (e.g., boots, bags, weapons, and clothing) for soil accumulations, seeds, invertebrates, and vertebrates).

14. Navy will adhere to AFPMB Technical Guide 31 protocols on vehicle/equipment washdown procedures and other APHIS PPQ inspection procedures for deployments and redeployments.

EROSION CONTROL

15. The Navy will locate ground-disturbing training activities on previously disturbed sites whenever possible.
16. The Navy will ensure that all training areas, including transit routes necessary to reach training areas, are clearly identified or marked. Vehicular activities will be restricted to designated and previously identified areas.

17. The Navy will continue to control erosion through the "Site Approval Process," whereby the Navy environmental program reviews each proposed project for its erosion potential and involves the designated installation Natural Resource Specialist in the process.

18. The Navy will continue to manage erosion in accordance with the applicable storm water pollution prevention plan at each training location.

19. The Navy will prohibit off-road vehicle use except in designated off-road areas or on established trails.

20. The Navy will comply with existing policies and management activities to conserve soils, including requirements and restrictions outlined in the Marianas Training Handbook.

II. FARALLON de MEDINILLA

21. The Navy will continue to implement targeting and access restrictions, such as: (1) no targeting of the northern Special Use Area (north of the No Fire Line) and no targeting of the narrow land bridge, (2) only targeting Impact Areas 1, 2, and 3 during air-to-ground bombing exercises and air-to-ground missile

2 The regional rapid response plan discussed refers to the full implementation of a comprehensive Emergency Response Plan for Guam and the CNMI in association with the Regional Biosecurity Plan (RBP) for Micronesia and Hawaii. The RBP is discussed further in the MIRC re-initiation / MITT Biological Opinion.

and gunnery exercises; Impact Area 1 (closest to the northern Special Use Area) is for inert ordnance only, and (3) personnel are not authorized on FDM without approval from JRM Operations.

22. Live cluster weapons/scatterable munitions, fuel air explosives, incendiary munitions, depleted uranium rounds, or bombs greater than 2,000 pounds will be prohibited. It should be noted that some spotting charges use small amounts of phosphorous but are not main constituents of munitions dropped on FDM. In addition, smoke markers will be used during some direct action activities for targeting.

23. Nesting sea turtles are not expected; however, it is possible that a sea turtle may be basking on beaches or resting in holes or caves. If a sea turtle is seen on a beach by participating aircraft, training will be altered until the sea turtle leaves the beach and nearby waters.

III. SAIPAN

24. Training in the Marpi Maneuver Area is expected to be infrequent and limited to pedestrian land navigation training.

a. Training will be limited to open areas (i.e., grasslands; no forest or mixed shrub and scrub habitats) to minimize impacts to nightingale reed-warblers, Mariana fruit bat, and Micronesian megapodes.

b. There will be no digging in the soil or cutting of vegetation along the southern border of the Marpi Maneuver Area in the mixed limestone forest. No ground disturbance or vegetation removal of any kind is permitted in this area to avoid impacts to the Micronesian megapode and Mariana fruit bat. Vegetation removal would be limited to the maintenance of existing bivouac areas. No new bivouac areas are proposed. Maneuver units will remain tactical and not establish support camps. This measure is designed to minimize potential impacts associated with ground maneuvers on the Micronesian megapode No habitat will be removed for any training activity on Saipan.

c. Smoking is not permitted during training activities and fire-safe-portable receptacles for cigarette butts are used during periods of rest between training activities. No fires are permitted during bivouac activities.

d. If other areas are needed for training, the Navy will contact the Service regarding the need for reinitiation of this biological opinion.

e. All training activities that involve ground maneuvers in the Saipan Marpi Maneuver Area will be consistent with the fire management plan included in COMNAVMARIANASINST 3500.4A.

25. JRM will coordinate with CNMI-DLNR to determine the latest species locations as necessary prior to training actions. If a training exercise cannot be modified to avoid impacts on listed ESA species, the Navy will contact the Service as required by Section 7 of the ESA prior to conducting the training exercise. If CNMI-DLNR is not able to assist with best available data or surveys, Joint Region Marianas will provide in-house or contracted subject matter experts to conduct surveys if necessary.

IV. TINIAN

Training Restrictions:

26. All training activities that involve ground maneuvers on Tinian Military Lease Area will be consistent with the fire management plan included in COMNAVMARIANASINST 3500.4A.

27. The Navy will locate ground-disturbing training activities on previously disturbed sites whenever possible. Training areas, including transit routes necessary to reach training areas will be clearly marked. On Tinian, vehicular activities will be restricted to designated and previously identified areas.

28. The Navy will implement training restrictions at Unai Chulu, Unai Babui, and Unai Dankulo to avoid and minimize effects to sea turtles:

a. Unai Chulu, Unai Babui, and Unai Dankulo will not be designated as landing zones for mechanized amphibious vehicles at this time. Should mechanized amphibious vehicles (AAV and LCAC) landings on those beaches become necessary, Navy will reinitiate consultation for those activities.

b. Biologists trained in identifying sea turtle nests will survey landing beaches no more than six hours prior to the first non-mechanized craft landing or use of other beach landing equipment that is part of a training event that requires use of the beach. Any potential sea turtle nests will be flagged and avoided by landing craft and personnel, vehicles (including non-mechanized water craft) and equipment. The buffer zone will have a radius of 6 meters (20 feet) from the edge of the nesting activity (area disturbed by the turtle) to ensure complete avoidance. Use of a beach monitor during the training event and turtle-friendly lighting will avoid impacts to nesting females.

c. If an active nest has been discovered, night-training will not occur after 50 days of incubation until the nest has hatched OR a buffer (9 meters [30 feet] wide) from the active nest to the water will be in place to avoid any potential impacts to sea turtle hatchlings trying to reach the ocean. If an active nest has been discovered, night-training will not occur once a prehatch hole is detected. (A pre-hatch hole indicates that the nest will hatch that evening.) Evening training may resume five days after the pre-hatch hole is discovered.

d. For any training on beaches at night during the sea turtle nesting season, only turtle-friendly lighting will be used. No lighting will be used in the vicinity of nests that are past 50 days of incubation.

29. Improvements to any beaches to facilitate training will be coordinated with the Service if the action may affect listed species.

30. On Tinian, Hagoi and adjacent areas are designated as a "No Training Area." No ground disturbance or vegetation removal of any kind is permitted in this area. This measure is designed to avoid impacts associated with ground training activities on the Mariana common moorhen. Training also does not occur in the Bateha or Mahalang wetlands areas.

31. Aircraft overflights are restricted over Tinian wetland areas (Hagoi, Mahalang, and Bateha). If aircraft must fly over wetlands during training exercises, the aircraft must maintain a minimum altitude of 1,000 feet (305 meters) AGL. This measure is designed to minimize visual and noise disturbance for Mariana common moorhens, and to reduce the potential for aircraft strike.

32. On Tinian, training does not occur in limestone forests, found within the Tinian MLA along ridgelines associated with Mount Lasso (see COMMNAVMARIANAS 3500.4A, Figure 5-2). This measure is designed to avoid impacts associated with ground training activities on the Micronesian megapode. Vegetation

removal would be limited to the maintenance of existing bivouac areas. No new bivouac areas are proposed. Maneuver units will remain tactical and not establish support camps. This measure is designed to minimize potential impacts associated with ground maneuvers on the Micronesian megapode.

33. Aircraft overflights are restricted over limestone forest areas of Tinian, which are found within the Tinian MLA along ridgelines in the Mount Lasso area. If aircraft must fly over limestone forests during training exercises, the aircraft must maintain a minimum altitude of 1,000 feet (305 meters) AGL. This measure is designed to minimize visual and noise disturbance of Micronesian megapodes and fruit bats and to reduce the potential for aircraft strike (see COMNAVMARIANASINST 3500.4A, Figure 5-2).

Fire Prevention: (See COMNAVMARIANASINST 3500.4A Table 5-1)

34. No live-fire or tracer rounds will be used on Tinian except with the use of bullet traps. Use of pyrotechnics, flares, blank fire, and other potential fire-starting activities must be conducted on existing cleared runways and in accordance with the Fire Prevention Plan. The area authorized for open fires and pyrotechnics is restricted to the North Field and West Field on hardtop surfaces only (except for actual emergency signaling).

35. Cooking by individuals is not authorized in outdoor training areas (except for heating tabs and mechanisms in "meals ready to eat"). Large scale training exercises may include field kitchens in North Field in areas authorized for open fire.

36. North Field's existing runways and taxiways act as fire breaks and fire access roads, and the vegetation is primarily characterized by tangantangan *(Leucaena leucocephala)* thickets. Standard Operating Procedures for all exercises include fire response measures that must be implemented.

37. To date, no wildland fire has been ignited from MIRC training activities on Tinian (or on other DoD lands in the Mariana Islands). However, to further minimize risk and augment military fire response efforts, the Tinian Fire Department maintains a 300-gallon pump truck and fire crew to respond to wildland fires. The Tinian Fire Department also maintains a 750-gallon pumper truck and crew in San Jose to respond to and provide fire service for the southern Tinian and backup Crash-Fire-Rescue support to West Field. The Navy will request the use of Tinian Fire Department assets for major exercises. The request will be made through the West Field command post. The Navy will maintain airfield crash-fire-rescue equipment and crews at North Field for the duration of the exercise. Any military related fires will be controlled prior to the loss of any wetland or native limestone forest habitat is burned. Any military related fires in tangantangan will be controlled prior to the loss of five acres tangantangan habitat.

V. ROTA

38. No training activities will occur near or within critical habitat, habitat occupied by listed species, or other habitats designed for conservation use. If such activities are planned in the future, the Navy will consult with the USFWS pursuant to section 7 of the ESA. Prior to planning exercises on Rota, MIRC Operations (OPS) will coordinate with appropriate local officials on Rota to determine the latest status of species (e.g., species locations). MITT training will be planned such that ESA species will be avoided in accordance with the "areas to be avoided" map provided by USFWS. In May 2014, USFWS provided a map that represents all areas to be avoided that could be occupied by ESA-listed species at any time

throughout the year. This map was overlaid with proposed training locations, critical habitat, and other conservation areas resulting in MITT Biological Assessment Figure 3-1 (August 2014). Green shaded areas represent all areas that could be occupied by ESA-listed species at any time throughout the year. These areas are not proposed for training.

39. Aircraft overflights on Rota, with the exception of landings and takeoffs as part of training exercises (landings, takeoffs, and insertion events at the Rota International Airport), are prohibited below 1,000 feet (305 meters) AGL and within 1,000 feet of coastlines.

40. Activities that involve aircraft training primarily occur on Guam. Rota will only be used when other locations on Guam or the CNMI are not available, use of these locations is not practical, and/or the training mission requirements cannot be met without the use of Rota.

VI. GUAM

41."No Wildlife Disturbance" and "No Training Areas" are designated on Naval Base Guam Orote Point, Naval Base Guam Munitions Site, and Andersen AFB Tarague Beach. Vegetation removal would be limited to maintaining existing bivouac areas. No new bivouac areas are proposed in the MITT BA. Maneuver units will remain tactical and not establish support camps.

42. All training activities that involve ground maneuvers on Guam will be consistent with the fire management plan included in COMNAVMARIANASINST 3500.4A. DoD will continue to implement the following restrictions at all action areas on Andersen Air Force Base:

a. No vegetation clearing except: maintenance required to keep paved surfaces, landing zones, and the drop zones in a safe and useable condition and for bivouac purposes in the bivouac area. Tree species greater than 4-inches in diameter used for foraging, roosting, or nesting of bats and crows will not be removed.

b. Motorized vehicles shall be driven only on prepared surfaces, in the drop zone and landing zones as required and only rubber-tired vehicles will be allowed; no digging is allowed except in the Northwest Field bivouac area; and no harassment or killing of native wildlife is allowed.

c. Use of pyrotechnics and other incendiary devices is limited to paved surfaces, ground pits, or ceramic-lined rooms.

43. Helicopter overflights as part of training activities are prohibited below 1,000 feet (305 meters) above ground level (AGL) over Northwest Field north of the South Runway. This measure is designed to minimize visual disturbance and acoustic noise impacts on foraging or roosting Mariana fruit bats in the Northwest Field area. The satellite tracking station located at Northwest Field also has a flight restriction of 2,500 feet (760 meters) AGL within 1 nautical mile of the station.

44. Overflights as part of training activities along all Andersen AFB clifflines are prohibited below 1,000 feet (305 meters) AGL.

45. Helicopter overflights as part of training activities are restricted throughout the Naval Base Guam Munitions Site below 500 feet (150 meters) AGL. Fixed-wing aircraft are restricted below 1,000 feet (305 meters) AGL as part of training activities.

46. Riparian wetlands are dispersed throughout the Southern Land Navigation Area and recent surveys have detected moorhens in this area. No maneuver and navigation training will occur in riparian wetlands in this area, in accordance with COMNAVMARIANASINST 3500.4A (Table 3-4, pg. 38 and Fig 3-10, pg. 40).

47. Continuance of amphibious landing standard operating procedures; observation of normal harbor navigation rules, pre-exercise surveys for presence of sea turtles no more than six hours prior to an exercise, directing landing crafts to areas determined to be clear of sea turtles and sea turtle nests, restoration of beach topography using hand tools after exercises, monitoring of landing sites during night-time landing activities). These include:

a. The Navy implements restrictions on landings and launches at beach and boat ramp locations to minimize impacts to sea turtles and their habitats.

b. The Navy maintains restrictions on landings and launches, such as the use of the concrete boat ramp at Sumay Cove, which is across from potential sea turtle nesting habitat.

c. The Navy implements speed restrictions to avoid creating wakes; the use of the Sumay Cove ramp avoids and minimizes effects to sea turtle nesting sites.

d. Currently, training does not occur on other Guam beaches that support sea turtles. Should the Navy decide to use other Guam beaches for amphibious landings, the Navy will implement appropriate measures.

48. The USAF implements training and operation restrictions at the Combat Arms Training and Marksmanship (CATM) range adjacent to Tarague Beach, Andersen AFB to minimize effects to sea turtles and Mariana fruit bat.

a. Night-training occurs at the CATM range; therefore night-lighting is installed. The lighting configuration at this location is maintained with four flood lights, located below the tree canopy level that are directed inland and parallel to the coast. Lighting in this configuration will avoid impacts to nesting and hatching sea turtles and Mariana fruit bats.

b. The CATM range allows for training with small arms, inert mortars to 60 millimeter, and 40 millimeter grenade launchers. These weapons do not produce percussive force and no weapons that produce percussive force can be used at this facility.