CHAPTER 10. TERRESTRIAL BIOLOGICAL RESOURCES

10.1 INTRODUCTION

This chapter contains a description of the potential environmental consequences to terrestrial biological resources associated with implementation of the action alternatives within the region of influence (ROI). For a description of the affected environment for all resources, refer to the respective chapter of Volume 2 (Marine Corps Relocation – Guam). The locations described in that volume include the ROI for the Army Air and Missile Defense Task Force (AMDTF) component of the proposed action, and the chapters are presented in the same order as the resource areas contained in this volume.

10.2 ENVIRONMENTAL CONSEQUENCES

10.2.1 Approach to Analysis

10.2.1.1 Methodology

Biological resource issues and concerns include the potential direct, indirect, and cumulative impacts of the proposed actions and alternatives during the construction and operation phases. Impacts may be either temporary (reversible) or permanent (irreversible). Direct and indirect impacts are distinguished as follows.

Direct impacts are associated with proposed construction activities (e.g., ground-disturbing activities) and operations (e.g., noise and lighting). Potential types of direct impacts include, but are not limited to:

- Loss of habitat due to vegetation removal during construction.
- Temporary loss of habitat during construction from noise, lighting, and human activity.
- Potential loss of habitat due to disturbance of species in areas surrounding operations from noise, lighting, and human activity.
- Injury or mortality to wildlife or special-status species caused by the action that occur at the same time and place as the action.

Indirect impacts are caused by or result from project-related activities, are usually later in time, and are reasonably foreseeable (e.g., increased likelihood of invasive species moving into the area after disturbance). Potential indirect impacts include, but are not limited to:

- All disturbances from human activity, noise, and lighting that would potentially impact unoccupied suitable habitat for special-status species.
- Introduction of new non-native species or increased dispersal of existing non-native species on Guam.
- Dispersal of existing non-native species from Guam to the CNMI, Hawaii, or other destinations.
- Adverse effects from pollutants that are released from construction or military operations.
- Increased threats from feral animals.

General principles used to evaluate impacts are:

- The extent, if any, that the action would permanently lessen ecological habitat qualities that ESA-listed species depend upon, and which partly determines the species' prospects for conservation and recovery.
- The extent, if any, that the action would diminish population sizes, distribution, or habitat of regionally important native plant or animal species.
- The extent, if any, that the action would be likely to jeopardize the continued existence of any ESA-listed species.
- The extent, if any, that the action would be inconsistent with the goals of USFWS recovery plans, Navy and Air Force INRMPs, or the Guam CWCS.

10.2.1.2 Determination of Significance

Significance of impacts to vegetation, wildlife, and special-status species were determined using guidelines in the previous section. Special-status species are defined as ESA- and Guam-listed species and species that are designated candidates for ESA listing. Specific significance criteria are discussed below. If significant impacts are determined, then mitigation may be proposed to offset the impacts. For this EIS/OEIS, a major consideration for mitigation is biosecurity. This issue is discussed under mitigation measures after the evaluation of impacts (see Section 10.2.7).

Vegetation

Impacts would be determined significant if any primary limestone forest (mature forest dominated by native species) would be cleared, unless determined to be very minor in the context of the surrounding forest areas. Any loss of this forest vegetation community would be considered significant because of the large historical and continuing losses of this forest type on Guam. Loss of wetland or mangrove vegetation would also be considered potentially significant.

Wildlife

Impacts would be determined significant if native wildlife species are present and the proposed project results in diminished population sizes or distributions of regionally important native animal species. These wildlife species include those designated as SOGCN in the Guam CWCS. Invasive species impacts that exceed the criteria specified above are evaluated. Historical impacts from non-native species have been severe, particularly from the BTS (see discussion in Volume 2). Although the proposed action would not result in additional impacts from BTS on Guam, the concern is that the BTS would be inadvertently introduced to other islands throughout the Pacific. This concern is addressed comprehensively for all actions proposed in this EIS/OEIS with mitigation measures described in Section 10.2.7.

Migratory Birds

For migratory birds, the Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, or possession of migratory birds, with an exemption for military readiness activities (as defined in federal regulations), provided they do not result in a significant adverse effect on a population of a migratory bird species. Congress defined military readiness activities as all training and operations of the Armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Military readiness activities do not include: (A) routine operation of installation support functions such as administrative offices, military exchanges, water treatment facilities, schools, housing, storage facilities, and morale, welfare, and recreation activities; (B)

the operation of industrial activities; and (C) the construction or demolition of facilities used for a purpose described in A or B (50 CFR Part 21).

The DoD must consult with the USFWS if it is determined that a military readiness activity would have a significant adverse effect on a population of a migratory bird species. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem.

Migratory bird conservation relative to non-military readiness activities is addressed separately in a Memorandum of Understanding developed in accordance with EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. The Memorandum of Understanding between the DoD and USFWS was signed in July 2006 and DoD responsibilities included, but are not limited to: (1) incorporating conservation measures addressed in regional or state bird conservation plans and INRMPs; (2) managing military lands and activities other than military readiness in a manner that supports migratory bird conservation; and (3) avoiding or minimizing impacts to migratory birds, including incidental take and the pollution or detrimental alteration of the environments used by migratory birds.

The following species that occur on Guam are considered non-migratory birds and are not covered under the MBTA: black francolin, black drongo, Eurasian tree sparrow, island-collard dove (previously known as Philippine turtle dove), common pigeon, and king quail.

Special-Status Species

The presence of special-status species in the project areas was described in Volume 2. Background information is presented in the species profiles in Appendix G. Impacts would be determined significant if special-status species are present in the project area and any project action is likely to result in harassment or harm of an individual, population or species. Impacts to ESA-listed species would include vegetation clearing of designated undeveloped Overlay Refuge habitat, or recognized essential habitat or recovery zones, unless it is determined that the removal of habitat or other affect is minor when considering all the remaining habitat and quality of habitat available to that species and considering USFWS recovery plan goals. Significant impacts would also include disturbing ESA- and Guam-listed species due to noise, lighting, or human activity. If species are currently present in a proposed project area, noise, lighting, and general human activity are considered direct impacts for the purposes of this analysis, even though it is recognized that some of the impacts from the proposed actions may be indirect, rather than direct. If unoccupied but recognized habitat is affected by noise, lighting, or human activity, impacts would be considered indirect and would be determined significant unless the area affected is considered minor when considering all the remaining habitat and quality of habitat available to that species.

For ESA-listed species, federal agencies are required to ensure that their actions do not jeopardize the continued existence of an endangered or threatened species or its critical habitat. Analyses of potential impacts are based on review of plans for the proposed action and the available current and historical distributional data for each species. In accordance with Section 7 of the ESA, a BA is being prepared by the Navy to analyze the potential impacts on ESA-listed and candidate species and critical habitat under the jurisdiction of the USFWS.

The BA and the subsequent BO issued by the USFWS after their review of the BA, will be the final determination of impacts to ESA-listed species that are being evaluated in this EIS/OEIS. Candidate species must also be evaluated in the BA. However if they are not formally listed by the time the BO is issued and the proposed action would not result in their listing, no determination for these species will be made in the BO. The BO will provide an Incidental Take Statement that will list the amount or extent of

take anticipated. Based on that take it will specify Terms and Conditions that the action proponent must comply with to be exempt from the prohibitions of Section 9 of the ESA. These are non-discretionary requirements. The BO will also specify Conservation Recommendations that are discretionary proponent 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 USFWS effects determinations from the BO will be incorporated into the Final EIS/OEIS.

10.2.1.3 Issues Identified During Public Scoping Process

Terrestrial biological resource issues identified during the public scoping process that are applicable to the proposed action include:

- Activities associated with the military expansion (i.e., construction, expansion, renovation, and military training activities) may result in habitat loss and physical disturbance of federally listed endangered species and other federal trust species.
- Potential for harm to fragile ecosystems on Guam and in the Marianas from the introduction of invasive species due to increased traffic among the islands from the movement of personnel and materials. Such species include the brown treesnake (BTS), flatworms, various insects, and some plants. The Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) should outline inspection and sanitary procedures to prevent this movement.
- Existing control and containment activities at air and sea ports for BTS are insufficient to deal with the risk associated with the increased cargo and personnel movement from Guam to other vulnerable destinations. The issue "of utmost concern" is BTS interdiction and an effective, enforceable, and fail-proof procedure for inspecting all military cargo, personnel, and equipment entering the CNMI must be instituted. The Navy must assure funding to sustain a 100% inspection rate of all cargo, vehicles, munitions, and household goods. Guam regulation protocols 505 and 506 should be incorporated into a BTS control plan to be included as part of the EIS/OEIS.
- Potential impact of placement of facilities on flora and fauna at Navy Barrigada.

10.2.2 Headquarters/Housing Alternatives

This description of environmental consequences addresses all components of the proposed actions for the Army AMDTF. This includes the headquarters/housing component and the munitions storage component, each of which has three alternatives. A full analysis of each alternative is presented beneath the individual headings of this chapter. The weapons emplacement component has four alternatives. Detailed information on the weapons emplacements is contained in a Classified Appendix (Appendix L). A summary of impacts specific to each set of alternatives (including an unclassified summary of weapons emplacement impacts) is presented at the end of this chapter.

10.2.2.1 Headquarters/Housing Alternative 1 (Preferred Alternative)

<u>North</u>

NCTS Finegayan

Construction. Under Alternative 1, the Army AMDTF and housing would be co-located with the Marine Corps Main Cantonment at NCTS Finegayan. These impacts are addressed in Volume 2, Alternative 2 as

part of the Marine Corps cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur.

Operation. Under Alternative 1, the Army AMDTF and housing would be co-located with the Marine Corps cantonment at NCTS Finegayan. These impacts are addressed in Volume 2, Alternative 2 as part of the Marine Corps cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur.

South Finegayan

Construction. Under Alternative 1, the Army AMDTF and housing would be co-located with the Marine Corps cantonment at South Finegayan. These impacts are addressed in Volume 2, Alternative 2 as part of the Marine Corps cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur.

Operation. Under Alternative 1, the Army AMDTF and housing would be co-located with the Marine Corps cantonment at South Finegayan. These impacts are addressed in Volume 2, Alternative 2 as part of the Marine Corps cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur.

Central

Navy Barrigada

Construction. Under Alternative 1, no construction activities for the AMDTF would occur at Navy Barrigada. Therefore, there would be no terrestrial biology impacts from construction.

Operation. Under Alternative 1, no operation activities for the AMDTF would occur at Navy Barrigada. Therefore, there would be no terrestrial biology impacts from operation.

Air Force Barrigada

Construction. Under Alternative 1, no construction activities for the AMDTF would occur at Air Force Barrigada. Therefore, there would be no terrestrial biology impacts from construction.

Operation. Under Alternative 1, no operation activities for the AMDTF would occur at Air Force Barrigada. Therefore, there would be no terrestrial biology impacts from operation.

Alternative 1 Potential Mitigation Measures

Alternative 1 mitigation measures would be the same as those described in Volume 2, Chapter 10 under Alternative 1.

10.2.2.2 Headquarters/Housing Alternative 2

North

NCTS Finegayan

Under Alternative 2, the Army AMDTF would be located at Navy Barrigada. These impacts are addressed in Volume 2 as part of the Marine Corps Main Cantonment analysis and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur.

South Finegayan

Under Alternative 2, the Army AMDTF would be co-located with the Marine Corps Main Cantonment at Navy Barrigada. These impacts are addressed in Volume 2 as part of the Marine Corps Main Cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur.

Central

Navy Barrigada

Construction

Vegetation. A total of 376 ac (152 ha) of three vegetation types would be removed during proposed construction activities at Navy Barrigada (Table 10.2-1 and Figure 10.2-1). Approximately 153 ac (62 ha) of what may be primary limestone forest (never completely cleared) would be removed. The limestone forest at Navy Barrigada is dominated by native species including *Neisosperma oppositifolia* (fago), *Guamia mariannae* (pai pai), *Aglaia mariannensis* (mapunyao), scattered *Cycas circinalis* (Micronesia) (federiko), and some large native breadfruit.

There is some degradation of this forest as indicated by the presence of a significant, although not dominant, non-native component including vitex, limeberry, tangantangan, and papaya. There is light to moderate ungulate damage of the understory.

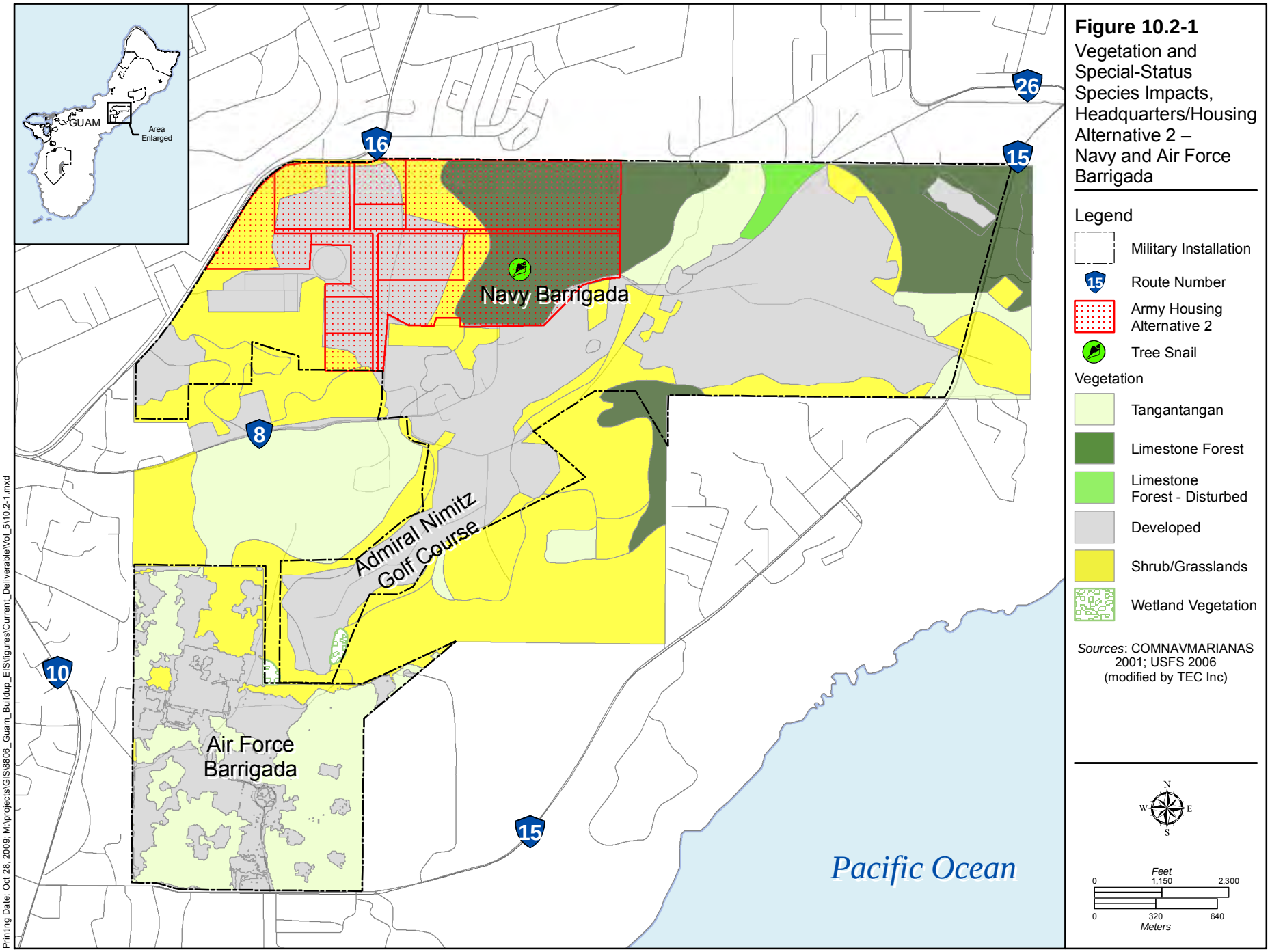
Removal of this limestone forest, assuming it is a primary limestone forest that has never been cleared, would result in a significant impact to vegetation.

Table 10.2-1. Vegetation Removed with Implementation of Alternative 2

Vegetation Type	*Primary Limestone Forest ac (ha)*	*Vitex-Closed Canopy ac (ha)*	*Shrub/ Grasslands ac (ha)*	*Developed Land ac (ha)*
Navy Barrigada	153 (62)	0	80 (32)	143 (58)

An indirect impact may occur from clearing the large forested area because of changes in evapotranspiration. Evapotranspiration would likely decrease from removal of the forest which would result in additional infiltration of rainwater and groundwater recharge and decreased moisture levels in the air. With respect to groundwater recharge, the construction of buildings and parking lots would have the opposite effect of reducing recharge. The overall effect on recharge is unclear but terrestrial biological resources in the remaining uncleared areas would be unlikely to be affected. With respect to moisture levels in the air, the impact is likely to be localized to the forested area removed and would not have a significant effect on any other area with sensitive biological resources. Overall, the impacts from changed evapotranspiration would be less than significant.

Wildlife. Wildlife species that currently occur at Barrigada include native and non-native species such as the Pacific golden plover, yellow bittern, island collared dove, western cattle egret, black francolin, Eurasian tree sparrow, blue-tailed skink, mutilating gecko, and mourning gecko. All these species are common on Guam. Proposed construction activities would displace wildlife from suitable habitat in the proposed project areas. Smaller, less mobile species, and those seeking refuge in burrows, could inadvertently be killed during construction activities; however, long-term, permanent impacts to populations of such species would not result because these species are abundant in surrounding areas and would rapidly repopulate suitable portions of the affected area. There would be no diminished population sizes or distributions of migratory birds or regionally important native animal species. Therefore, impacts to wildlife would be less than significant.


GUAM
Area Enlarged
Navy Barrigada
Admiral Nimitz Golf Course
Air Force Barrigada
Pacific Ocean
16
26
15
8
10
15
Figure 10.2-1
Vegetation and Special-Status Species Impacts, Headquarters/Housing Alternative 2 – Navy and Air Force Barrigada
Legend
Military Installation
Route Number
Army Housing Alternative 2
Tree Snail
Vegetation
Tangantangan
Limestone Forest
Limestone Forest - Disturbed
Developed
Shrub/Grasslands
Wetland Vegetation
Sources: COMNAVMARIANAS 2001; USFS 2006 (modified by TEC Inc)
N
W
E
S
Feet
0
1,150
2,300
0
320
640
Meters
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Construction activities for the operation buildings would generate noise. Only a few, widespread migratory bird species are present that would be affected. They would move away from the construction areas; however, there are other areas of suitable habitat nearby. Therefore, indirect impacts to wildlife from construction would be less than significant.

Special-Status Species. Proposed construction activities would impact the Guam tree snail. The Guam tree snail, an ESA candidate species, was documented in the limestone forest on one transect during site-specific surveys in 2008 in support of this EIS/OEIS (refer to Figure 10.2-1). The distribution and numbers of tree snails at the site is unknown. Proposed construction activities would remove primary limestone forest, the habitat of the Guam tree snail, and would result in direct mortality of individuals. Mitigation would include the relocation of snails to another suitable location. With this mitigation, impacts would be less than significant.

Other species that are potentially present at Barrigada have not been documented as present in the proposed Alternative 2 project areas and would not be impacted by construction. They will not be considered further under this alternative.

Operation

Vegetation. There would be no impacts to vegetation.

Wildlife. There would be no direct impacts to wildlife since operations would occur in previously cleared areas.

Operational activities would generate noise throughout the area. However, migratory bird species or other native wildlife that would otherwise use the area are common throughout Guam and are generalists that can utilize numerous habitats that are abundant throughout Guam. Therefore, noise and activity from operations associated with the proposed action would be less than significant.

Special-Status Species. There would be no direct impacts on special-status species. The only special-status species that might occasionally use the area and be affected indirectly is the Mariana fruit bat, however, based on historical observations this would be very infrequently. Impacts to special-status species would be less than significant.

Air Force Barrigada

Construction. Under Alternative 2, no construction activities for the AMDTF would occur at Air Force Barrigada. Therefore, there would be no terrestrial biology impacts from construction.

Operation. Under Alternative 2, no operation activities for the AMDTF would occur at Air Force Barrigada. Therefore, there would be no terrestrial biology impacts from operation.

Alternative 2 Potential Mitigation Measures

A plan to translocate Guam tree snails to another site on Department of Defense (DoD) lands would be developed and implemented after approval by the USFWS. Additional mitigation using compensatory measures described in Volume 2, Chapter 10 for Alternative 1 would be implemented to compensate for the destruction of primary limestone forest, which is habitat for the Guam tree snail. Specific BTS interdiction and control measures would be implemented as described in Volume 2, Chapter 10, Alternative 1.

10.2.2.3 Headquarters/Housing Alternative 3

North

NCTS Finegayan

Under Alternative 3, the Army AMDTF would be co-located with the Marine Corps Main Cantonment at NCTS Finegayan. These impacts are addressed in Volume 2 as part of the Marine Corps Main Cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur.

South Finegayan

Under Alternative 3, the Army AMDTF would be co-located with the Marine Corps Main Cantonment at South Finegayan. These impacts are addressed in Volume 2 as part of the Marine Corps Main Cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur.

Central

Navy Barrigada

Impacts from construction and operation of the proposed housing area at Navy Barrigada would be the same as described under Alternative 2. These impacts are addressed in Volume 2 as part of the Marine Corps Main Cantonment and are not separated.

Air Force Barrigada

Under Alternative 3, the Army housing would be co-located with the Marine Corps Main Cantonment at Air Force Barrigada. These impacts are addressed in Volume 2 as part of the Marine Corps Main Cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur.

Alternative 3 Potential Mitigation Measures

Mitigation measures under Alternative 3 would be the same as those described in Volume 2, Chapter 10 for Alternative 3.

10.2.3 Munitions Storage Alternatives

10.2.3.1 Munitions Storage Alternative 1 (Preferred Alternative)

Construction

Vegetation

A total of 2.3 ac (0.9 ha) of disturbed limestone forest (classified as Vitex-closed canopy) would be removed during proposed munitions facility construction activities (Figure 10.2-2 and Table 10.2-2). No known rare plant species would be affected. The vegetation to be removed serves as potential habitat for special-status species and is addressed below. Impacts to vegetation would be less than significant.

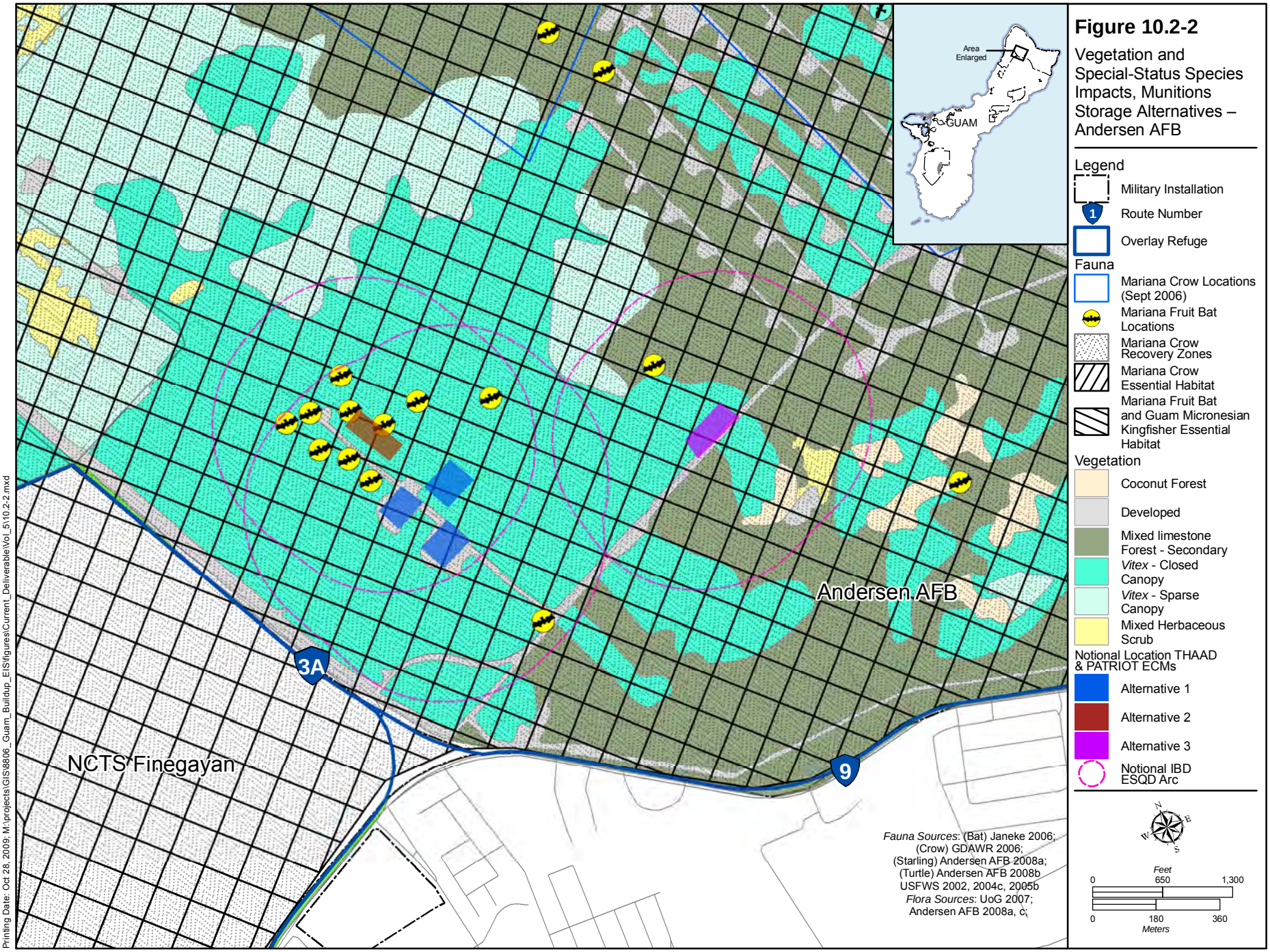
Area Enlarged
GUAM
Andersen AFB
NCTS Finegayan
3A
9
Fauna Sources: (Bat) Janeke 2006; (Crow) GDAWR 2006; (Starling) Andersen AFB 2008a; (Turtle) Andersen AFB 2008b USFWS 2002, 2004c, 2005b
Flora Sources: UoG 2007; Andersen AFB 2008a, c;
Figure 10.2-2
Vegetation and Special-Status Species Impacts, Munitions Storage Alternatives – Andersen AFB
Legend
Military Installation
Route Number
Overlay Refuge
Fauna
Mariana Crow Locations (Sept 2006)
Mariana Fruit Bat Locations
Mariana Crow Recovery Zones
Mariana Crow Essential Habitat
Mariana Fruit Bat and Guam Micronesian Kingfisher Essential Habitat
Vegetation
Coconut Forest
Developed
Mixed limestone Forest - Secondary
Vitex - Closed Canopy
Vitex - Sparse Canopy
Mixed Herbaceous Scrub
Notional Location THAAD & PATRIOT ECMs
Alternative 1
Alternative 2
Alternative 3
Notional IBD ESQD Arc
Feet
0
650
1,300
0
180
360
Meters
Printing Date: Oct 28, 2009; M:\projects\GIS\8806_Guam_Buildup_EIS\figures\Current_Deliverable\Vol_5\10.2-2.mxd

Table 10.2-1. Vegetation Removed at Andersen AFB with Implementation of Munitions Storage Alternative 1

Area	*Vitex-Closed Canopy ac (ha)*	*Developed Land ac (ha)*
Munitions Storage Area	2.3 (0.9)	3.9 (1.6)

Wildlife

Few migratory birds are present in the project area. The only native migratory bird species likely to be present in the project construction area, based on surveys conducted in support of this EIS/OEIS and other studies, are the yellow bittern and possibly the Pacific golden plover in open areas; both species are ubiquitous throughout Guam. The loss of woody vegetation would result in the loss of nesting areas for the bittern, but this loss would not result in significant effects on its population. Impacts would be less than significant.

Proposed construction activities would displace the species and other wildlife from suitable habitat in the proposed project area. Smaller, less mobile species, and those seeking refuge in burrows, could inadvertently be killed during construction activities. However, long-term, permanent impacts to populations of such species would not result because the species known to be present are abundant in surrounding areas, and would rapidly repopulate suitable portions of the affected area. There would be no diminished population sizes or distributions of migratory birds or regionally important native animal species. Therefore, there would be no significant direct impacts to wildlife due to proposed construction activities at Andersen AFB under Alternative 1.

Construction activities for the munitions storage area would generate noise. Construction would take place during daylight hours. Only a few widespread migratory bird species are present that would be affected. They would move away from the construction areas, but there are other areas of suitable habitat nearby and they could return during evenings and to some of the area when construction is complete. Effects would be short-term. There would be no diminished population sizes or distributions of migratory birds or regionally important native animal species. Therefore, indirect impacts to wildlife from construction would be less than significant.

Special-Status Species

Proposed construction activities would directly impact habitat that could be used by special-status species (Figure 10.2-2; Table 10.2-3).

Table 10.2-2. Potential Impacts to Special-Status Species Habitat with Implementation of Munitions Storage Alternative 1

Parcel and Activity	*Overlay Refuge ac (ha)*	*Essential Habitat –Bat and Kingfisher ac (ha)*	*Essential Habitat – Crow ac (ha)*	*Crow Recovery Zone ac (ha)*
Direct Impacts – Habitat Removed				
Munitions Storage Area	6.6 (2.7)	6.6 (2.7)	6.6 (2.7)	6.6 (2.7)
Total Habitat Removed				
Percentage of Habitat Type on Guam that is Affected	0.07 %	0.07 %	0.07 %	0.07 %

Notes: Each habitat category is considered independently of others and is not additive. NA – Not applicable.

Mariana Fruit Bat. Proposed construction activities would include the loss of disturbed limestone forest that is potential foraging and roosting habitat for the Mariana fruit bat population on the base. A total of 6.6 ac (2.7 ha) of essential habitat would be removed for construction of the munitions storage area. This essential habitat is also designated Overlay Refuge. However, of this only 2.3 ac (0.9 ha) is not developed land. Removal of this area due to construction would have a significant impact on the Mariana fruit bat. Impacts would be mitigated to less than significant with a suite of mitigation actions as described in Volume 2, Section 10.2.2.6. Construction would be during the day so would result in a less than significant impact from noise and activity.

Guam Micronesian Kingfisher. Proposed construction activities would include the loss of limestone forest that is potential foraging and nesting habitat for a potential future introduction of the kingfisher. A total of 6.6 ac (2.7 ha) of essential habitat would be removed for construction of the various project components on the base. This essential habitat is also designated Refuge Overlay. However, of this only 2.3 ac (0.9 ha) is not developed land. Removal of this area due to construction would have a significant impact on the kingfisher because of the removal of habitat areas designated as overlay refuge and essential habitat for the conservation and reintroduction of the species. Impacts would be mitigated to less than significant with a suite of mitigation actions as described in Volume 2, Section 10.2.2.6.

Mariana Crow. Proposed construction activities would include the loss of disturbed limestone forest that is potential foraging and nesting habitat for the crow. A total of 6.6 ac (2.7 ha) of essential habitat would be removed for construction of the various project components on the base. This essential habitat is also designated Refuge Overlay. However, of this only 2.3 ac (0.9 ha) is not developed land. Removal of these areas due to construction would have a significant impact. Impacts would be mitigated to less than significant with a suite of mitigation actions as described in Volume 2, Section 10.2.2.6. Construction noise and activity would not result in significant impacts because the crow is not currently present in this area.

Guam Rail. The rail survives only in captivity at this time. Proposed construction activities would not include loss of any shrub/grassland habitat that is potential foraging and nesting habitat for the Guam rail. No specific areas of essential habitat have been designated for this species. Impacts to the species would be less than significant. .

Mariana Eight Spot Butterfly. This species was observed in the Pati Point area (PACAF 2006). The larval stage of this species has two specific host plants not reported in the vicinity of Alternative 1 project areas, and which are generally associated with primary limestone forest in areas of pinnacle karst (karren) that is not present in the proposed project areas. Removal of this area due to construction would have no impact on the eight spot butterfly.

Other species that are potentially present on Andersen AFB, as discussed in Volume 2, Chapter 10, Terrestrial Biological Resources have not been documented as present in the proposed Alternative 1 project areas, and are unlikely to occur there based on all available information; therefore, they are not considered further.

Construction activities would generate noise. Construction would take place during daylight hours to avoid the Mariana fruit bats, which are uncommonly observed in the proposed construction area. With this mitigation measure, indirect impacts to the Mariana fruit bat from noise would be less than significant.

Operation

Vegetation

There would be no impacts to vegetation.

Wildlife

The magazine areas would be used infrequently and there would be no night lighting or shielded lighting. Impacts would be less than significant.

Special-Status Species

The magazine areas would be used infrequently and there would be no night lighting or shielded night lighting. Materials brought in to the area are highly controlled. Impacts would be less than significant.

10.2.3.2 Munitions Storage Alternative 2

Construction

Vegetation

A total of 2.7 ac (1.1 ha) of disturbed limestone forest (classified as Vitex-closed canopy) would be removed during proposed munitions facility construction activities (Figure 10.2-2). No known rare plant species would be affected. The vegetation to be removed serves as potential habitat for special-status species and is addressed below. Impacts to vegetation would be less than significant.

Wildlife

Impacts would be the same as for Alternative 1.

Special-Status Species.

Proposed construction activities would directly impact habitat that could be used by special-status species (Figure 10.2-2; Table 10.2-4).

Table 10.2-4. Potential Impacts to Special-Status Species Habitat with Implementation of Munitions Storage Alternative 2

Parcel and Activity	*Overlay Refuge ac (ha)*	*Essential Habitat –Bat and Kingfisher ac (ha)*	*Essential Habitat –Crow ac (ha)*	*Crow Recovery Zone ac (ha)*
Direct Impacts – Habitat Removed				
Munitions Storage Area	2.7 (1.1)	2.7 (1.1)	2.7 (1.1)	2.7 (1.1)
Total Habitat Removed				
Percentage of Habitat Type on Guam that is Affected	0.07 %	0.07 %	0.07 %	0.07 %

Notes: Each habitat category is considered independently of others and are not additive. NA – Not applicable.

Mariana Fruit Bat. Proposed construction activities would include the loss of disturbed limestone forest that is potential foraging and roosting habitat for the Mariana fruit bat population on the base. A total of 2.7 ac (1.1 ha) of essential habitat would be removed for construction of the munitions storage area. This essential habitat is also designated Refuge Overlay. Removal of this area due to construction would have a significant impact on the Mariana fruit bat. Impacts would be mitigated to less than significant with a suite of mitigation actions as described in Volume 2, Section 10.2.2.6. Construction would also result in the temporary impact to fruit bats in the surrounding areas from noise and disturbance. The impacts were

evaluated similarly to Alternative 1 and the area impacted is shown in Table 10.2-4. Because construction would occur at night, impacts would be less than significant.

Guam Micronesian Kingfisher. Proposed construction activities would include the loss of limestone forest that is potential foraging and nesting habitat for a potential future introduction of the kingfisher. A total of 2.7 ac (1.1 ha) of essential habitat would be removed for construction of the various project components on the base. This essential habitat is also designated Refuge Overlay. Removal of this area due to construction would have a significant impact on the kingfisher because of the removal of habitat areas designated as overlay refuge and essential habitat for the conservation and reintroduction of the species. Impacts would be mitigated to less than significant with a suite of mitigation actions as described in Volume 2, Section 10.2.2.6.

Mariana Crow. Proposed construction activities would include the loss of disturbed limestone forest that is potential foraging and nesting habitat for the crow. A total of 2.7 ac (1.1 ha) of essential habitat would be removed for construction of the various project components on the base. This essential habitat is also designated Refuge Overlay. Removal of these areas due to construction would have a significant impact. Impacts would be mitigated to less than significant with a suite of mitigation actions as described in Volume 2, Section 10.2.2.6. Construction noise and activity would not result in significant impacts because the crow is not currently present in this area.

Guam Rail. The rail survives only in captivity at this time. Proposed construction activities would not include loss of any shrub/grassland habitat that is potential foraging and nesting habitat for the Guam rail. No specific areas of essential habitat have been designated for this species. Impacts to the species would be less than significant

Mariana Eight Spot Butterfly. This species was observed in the Pati Point area (PACAF 2006). The larval stage of this species has 2 specific host plants not reported in the vicinity of Alternative 1 project areas and which are generally associated with primary limestone forest in areas of pinnacle karst (karren) that is not present in the proposed project areas. Removal of this area due to construction would have no impact on the eight spot butterfly.

Other species that are potentially present on Andersen AFB, as discussed in Volume 2, Chapter 10, Terrestrial Biological Resources have not been documented as present in the proposed Alternative 2 project areas, and are unlikely to occur there based on all available information; therefore, they are not considered further.

Operation

Impacts would be the same as for Alternative 1.

10.2.3.3 Munitions Storage Alternative 3

Construction

Vegetation

Although Alternative 3 is in a slightly different location from Alternative 2, impacts would be the same as for Alternative 2 because the vegetation type is the same.

Wildlife

Impacts would be the same as for Alternative 2.

Special-Status Species

Although Alternative 3 is in a slightly different location from Alternative 2, impacts would be the same as for Alternative 2 because the habitat in the area is similar.

Operation

Existing conditions do not vary between the three munitions storage alternatives at MSA 1. Therefore, impacts for Munitions Storage Alternative 3 are identical those described for Munitions Storage Alternative 1.

10.2.4 Weapons Emplacement Alternatives

Detailed information on the weapons emplacements is contained in a Classified Appendix (Appendix L). An unclassified summary of impacts specific to each set of alternatives is presented at the end of this chapter.

10.2.5 No-Action Alternative

Under the no-action alternative the proposed munitions storage area and the proposed Army AMDTF would not be located on Guam and baseline terrestrial biological resources would remain unchanged as presented in Volume 2, Chapter 10, Terrestrial Biological Resources. Therefore, there would be no impacts to biological resources with implementation of the no-action alternative.

10.2.6 Summary of Impacts

Tables 10.2-5, 10.2-6, 10.2-7 summarize the potential impacts of each major component – headquarters/housing, munitions storage, and weapons emplacement, respectively.

Table 10.2-5. Summary of Headquarters/Housing Impacts – Alternatives 1, 2, and 3

Alternative 1	*Alternative 2*	*Alternative 3*
Construction		
• Alternative 1 would have the Army AMDTF and housing co-located with the Marine Corps cantonment at NCTS and South Finegayan. These impacts are addressed in Volume 2, Alternatives 1 or 2 as part of the Marine Corps cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur	SI-M • Direct significant impacts to 153 ac (62 ha) of limestone forest at Navy Barrigada; direct significant impacts to the Guam tree snail known to be present in the limestone forest, mitigated to less than significant	• Alternative 3 would have the Army AMDTF and housing co-located with the Marine Corps cantonment at Barrigada. These impacts are addressed in Volume 2, Alternative 3 as part of the Marine Corps cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur
Operation		
• Alternative 1 would have the Army AMDTF and housing co-located with the Marine Corps cantonment at NCTS and South Finegayan. These impacts are addressed in Volume 2, Alternatives 1 or 2 as part of the Marine Corps cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur	LSI • Noise and activity from operations would be less than significant to wildlife and special-status species	• Alternative 3 would have the Army AMDTF and housing co-located with the Marine Corps cantonment at Barrigada. These impacts are addressed in Volume 2, Alternative 3 as part of the Marine Corps cantonment and are not separated; if that action does not occur, this Army AMDTF Alternative cannot occur

Legend: SI-M = Significant impact mitigable to less than significant, LSI = Less than significant impact.

Table 10.2-6. Summary of Munitions Storage Impacts – Alternatives 1, 2, and 3

Alternative 1	*Alternative 2*	*Alternative 3*
Construction		
LSI • Impacts to vegetation and wildlife would be less than significant SI-M • There would be significant impacts to special-status species (the endangered Mariana fruit bat, Micronesian kingfisher, and Mariana crow) from loss of essential habitat that is also Refuge Overlay land, mitigated to less than significant	LSI • Impacts to vegetation and wildlife would be less than significant SI-M • The impacts on special-status species would be the same as Alternative 1	LSI • Impacts to vegetation and wildlife would be less than significant SI-M • The impacts on special-status species would be the same as Alternative 1
Operation		
LSI • Impacts to wildlife and special-status species would be less than significant NI • There would be no impacts to vegetation	LSI • The impacts would be the same as for Alternative 1	LSI • The impacts would be the same as for Alternative 1

Legend: SI-M = Significant impact mitigable to less than significant, LSI = Less than significant impact, NI = No impact.

Table 10.2-7. Summary of Weapons Emplacement Impacts – Alternatives 1, 2, 3 and 4

Alternative 1	*Alternative 2*	*Alternative 3*	*Alternative 4*
Construction			
SI-M • There would be significant impacts to three special-status species (the endangered Mariana fruit bat, Micronesian kingfisher, and Mariana crow) from loss of essential habitat, mitigated to less than significant • Impacts to 368 ac (149 ha) of Refuge Overlay	SI-M • The impacts would be the a same as Alternative 1 except for acreage impacted • Impacts to 333 ac (135 ha) of Refuge Overlay	SI-M • The impacts would be the same as for Alternative 1 except for acreage impacted SI • Impacts to 228 ac (92 ha) of Refuge Overlay • There would be a significant impact due to the loss of forest recovery conservation areas (ungulate enclosures) that were to have been established near Ritidian Point, per previous Section 7 Consultation requirements for a previous Air Force action	SI-M • The impacts would be the a same as Alternative 1 except for acreage impacted • Impacts to 187 ac (76 ha) of Refuge Overlay
Operation			
NI • There would be no impacts from operations	NI • The impacts would be the same as Alternative 1	NI • The impacts would be the same as Alternative 1	NI • The impacts would be the same as Alternative 1

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant, NI = No impact.

10.2.7 Summary of Potential Mitigation Measures

Table 10.2-8 summarizes potential mitigation measures for each action alternative.

Table 10.2-8. Summary of Potential Mitigation Measures

Headquarters/Housing Alternatives	*Munitions Storage Alternatives*	*Weapons Emplacement Alternatives*
Vegetation		
• Mitigation for Alternatives 1 and 3 are included under the Marine Corps action described in Volume 2 (Alternatives 1 or 2); mitigation cannot be determined independently from these • Mitigation of Alternative 2 would include a suite of mitigation actions as described in Volume 2, Section 10.2.2.6.	• No mitigation required	• No mitigation required
Wildlife and Special-status Species		
• Mitigation for Alternatives 1 and 3 are included under the Marine Corps action described in Volume 2 (Alternatives 1 or 2); mitigation cannot be determined independently from these • Under Alternative 2 mitigation would also include translocation of Guam tree snails to another site on DoD lands	• Mitigation for all alternatives would be conducted with compensatory measures described in Volume 2, Section 10.22.6	• Mitigation for all alternatives would be conducted with compensatory measure described in Volume 2, Section 10.22.6

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