

CHAPTER 10.

TERRESTRIAL BIOLOGICAL RESOURCES

10.1 INTRODUCTION

This chapter contains the discussion of the potential environmental consequences associated with implementation of the alternatives within the region of influence (ROI) for terrestrial biological resources. For a description of the affected environment, refer to the respective chapter of Volume 2 (Marine Corps Relocation – Guam). The locations described in that Volume include the ROI for the aircraft carrier berthing component of the proposed action (Apra Harbor), and the chapters are presented in the same order as the resource areas contained in this Volume. Potential impacts to marine species from proposed offshore activities are addressed in Chapter 11, Marine Biological Resources.

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 action 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.

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 Commonwealth of the Northern Mariana Islands (CNMI), Hawaii, or other destinations.
- Adverse effects from pollutants that are released from construction or military operations.

General principles used to evaluate impacts are:

- The extent, if any, that the action would permanently lessen ecological habitat qualities that Endangered Species Act (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 U.S. Fish and Wildlife Service (USFWS) recovery plans, Navy and Air Force Integrated Natural Resources Management Plans (INRMPs), or the Guam Comprehensive Wildlife Conservation Strategy (CWCS).

10.2.1.2 Determination of Significance

Significance of impacts to vegetation, wildlife, and special-status species were determined using guidelines as described 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 Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS), a major consideration is biosecurity. This issue is discussed under *Best Management Practices* in this chapter (see Section 10.2.2.1).

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 would result in diminished population sizes or distributions of regionally important native animal species. These wildlife species include those designated as Species of Greatest Conservation Need in the Guam CWCS. Invasive species that have the potential for direct or indirect impacts were evaluated. Historical impacts from non-native species have been severe, particularly from the brown treesnake (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 potential mitigation measures described in Section 10.2.2.3.

Migratory Birds

For migratory birds, the Migratory Bird Treaty Act 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 Migratory Bird Treaty Act: 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 action 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 were 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 Biological Assessment (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 Biological Opinion (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, including by regulatory stakeholders, that are applicable to the proposed action include:

- Activities associated with the military expansion (i.e., construction, expansion, and renovation projects 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 BTS, flatworms, various insects, and some plants. The 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. 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.
- Discuss streams and wetlands, including acreage and habitat type for mitigation areas, size and location of mitigation zones, and contingency plans.
- Concern that development along the shoreline has the potential to require removal of coastal marine and terrestrial habitat.

10.2.2 Alternative 1 Polaris Point (Preferred Alternative)

10.2.2.1 Onshore and Offshore

Construction

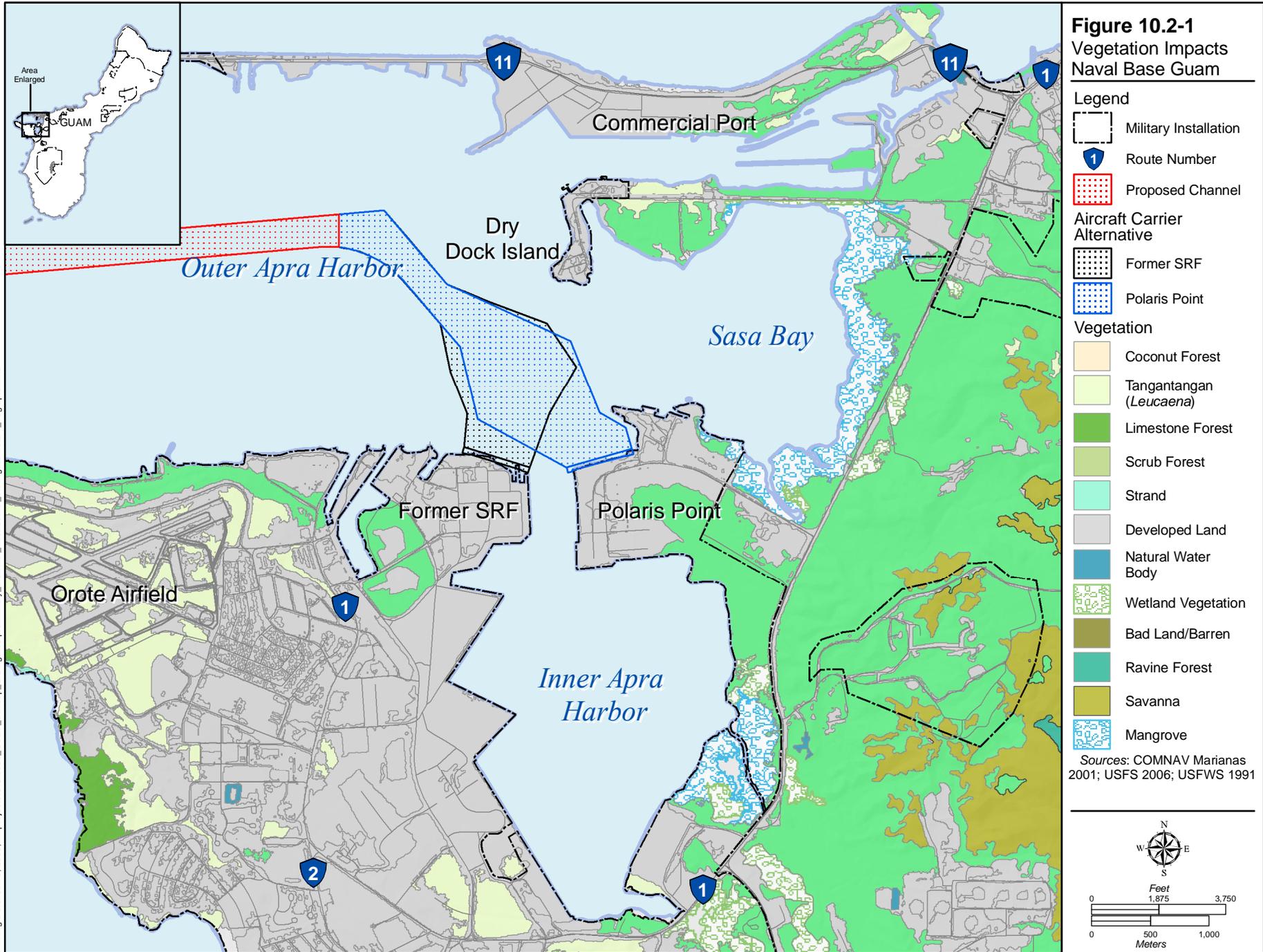
Vegetation

Alternative 1 Polaris Point (referred to as Alternative 1) is in a location of developed land (Figure 10.2-1). There would be no significant impacts to vegetation.

Wildlife

Terrestrial project areas are developed areas of the base with minimal bird habitat, particularly for the shorebirds that are some of the most common bird species in the general area. The Pacific golden plover, whimbrel, ruddy turnstone, and brown noddies were documented in the Polaris Point shoreline areas in 2008 and 2009 (Eggleston 2009; Vogt 2009). Approximately 1,200 ft (366 m) of shoreline would be used for the aircraft carrier berth. The shoreline in this developed portion of the base can be described as semi-natural, consisting of mixed sand and gravel beach (NOAA 2005). This is a small amount of shoreline habitat in relation to the total amount available in the Apra Harbor area of several kilometers according to NOAA (2005) mapping.

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Similar areas of habitat are common in the area and any individuals affected would move to these other areas. There would be no diminished population sizes or distributions of migratory birds or regionally important native animal species. Therefore, impacts to wildlife due to proposed removal of habitat from construction activities would be less than significant.

Potential direct impacts include noise and general construction activity, and indirect impacts include pollutants and dredging sedimentation. Noise and activity from construction would force shorebird species to move but there are other areas of suitable habitat nearby so that impacts would be less than significant. Noise and lighting from night-time dredging would impact migratory birds using or potentially using Sasa Bay and its extensive mangroves. The temporary dredging operation would adversely affect bird feeding, roosting, and nesting. In order to minimize impacts, BMPs would be implemented, including measures to limit nighttime lighting and noise from the dredging operations would be implemented (see Chapter 11, Marine Biological Resources in this Volume). Before the start of construction, all personnel involved would receive a briefing on special-status species potentially present and avoidance measures. In addition, during nighttime no vessels or any activity would be allowed within Sasa Bay, the limits of which are defined by the Government of Guam Sasa Bay preserve boundary. With implementation of these measures, impacts would be less than significant.

Fueling of project-related construction or operations vehicles, watercraft, and equipment could result in accidental releases of petroleum products that would migrate within Apra Harbor. The Sasa Bay mangrove area is over 4,000 ft (1,220 m) distant from the aircraft carrier dredging location (Figure 10.2-1). Required BMPs during construction would make it unlikely for a major spill to occur (see Chapter 4 on water resources and Chapter 11 on marine biological resources for further information). Fueling of project-related construction vehicles and equipment would take place away from the water when feasible. In addition, a spill prevention, control, and countermeasure plan would be in place. There would be time for small spills to be cleaned up before reaching the mangrove area. BMPs that are applicable during construction and operation would be detailed in required stormwater and spill contingency plans. These would prevent or control discharges and spills that may potentially occur during Navy activities within and adjacent to Apra Harbor. Absorbent materials and containment booms would be stored on-site to facilitate the clean-up of potential petroleum spills. Various booms, skimmers and sorbents are available to response agencies and the Navy has a waste oil barge (ITOPF 2000). Additional BMPs are listed in Volume 7. These procedures would result in less than significant impacts.

Proposed dredging, as well as shoreline activities, would result in suspension of sediments that could migrate to shorelines. However, modeling results show that sediments would largely be contained within silt curtains employed for the dredging, which are stipulated in a U.S. Army Corps of Engineers permit as required for construction and dredging; any sediment plume would not migrate into Sasa Bay or only a very short distance into the bay under all scenarios modeled (Ericksen 2009) and would not reach shoreline areas. Therefore, BMPs would include appropriate silt curtains and/or other silt containment measures would be used to enclose project areas where in-water activities would occur. In addition, there would be frequent monitoring of the effectiveness of the silt curtains. The sedimentation controls would minimize or eliminate the potential for impacts to the mangrove community and the associated species it supports and sea turtle nesting beaches. Therefore, there would be no impacts to wetlands from sedimentation.

Special-Status Species

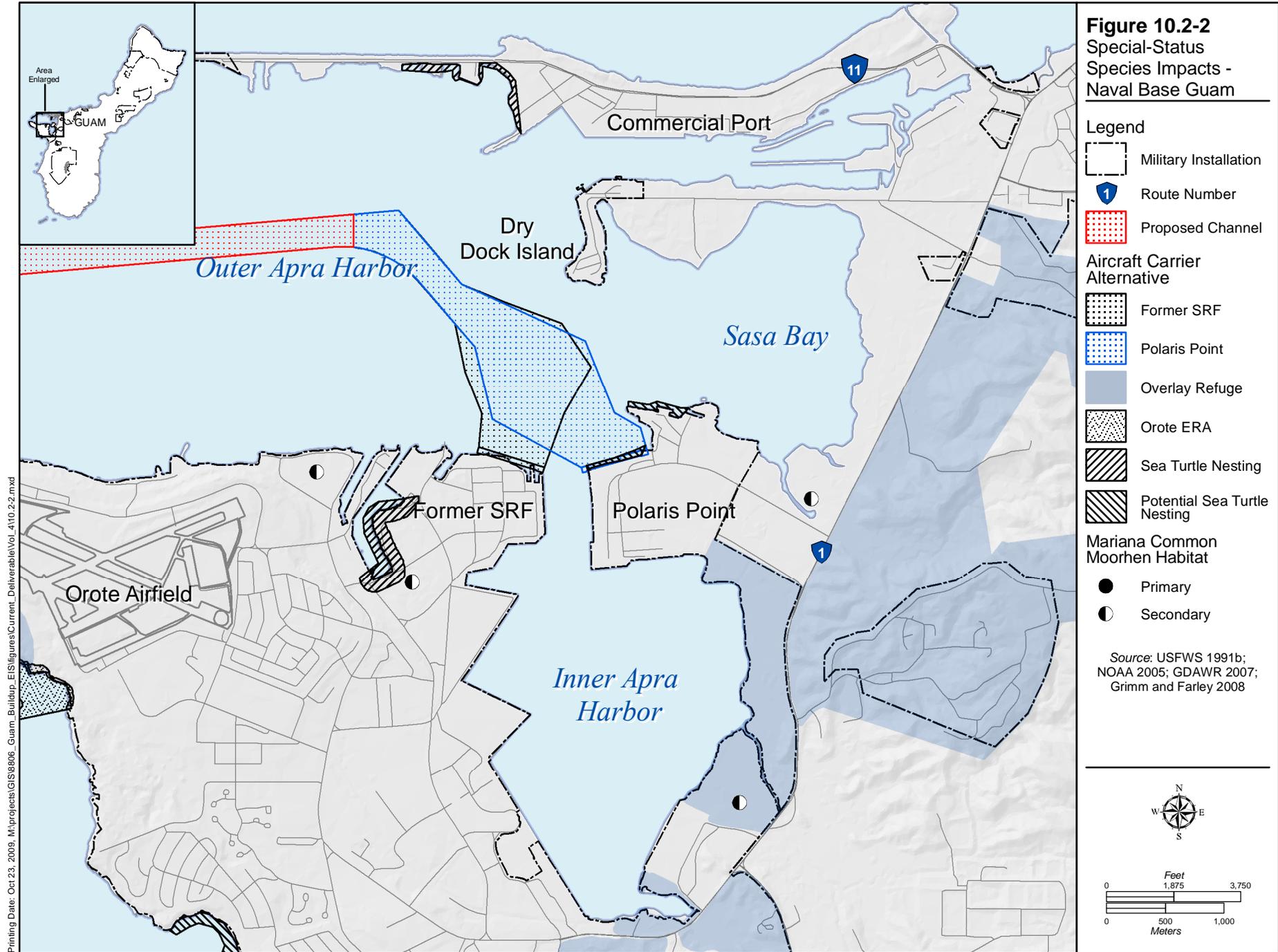
Species present in the area are discussed below.

Mariana Common Moorhen. The ESA- and Guam-listed Mariana common moorhen is likely to use the wetland communities that are designated secondary moorhen habitat in the USFWS recovery plan. These areas are located northwest and southeast of the Sumay inlet (see Figure 10.2-2) (USFWS 1991) and at the Atantano wetlands east of the inner harbor. These wetland habitats (not mangroves) are not directly adjacent to the harbor and would be unlikely to be affected by suspended sediments or small petroleum spills that might result from the proposed action. Sasa wetlands behind the mangroves are also unlikely to be adversely impacted because the mangroves are 98 ft (30 m) to 574 ft (175 m) wide (Wiles and Ritter 1993). Furthermore, there are no records of moorhens in the freshwater emergent portions of Sasa wetland behind the mangroves (Wiles and Ritter 1993). Impacts would be less than significant. Potential direct impacts to the moorhen from construction include noise and activity. The moorhen may use the freshwater wetland area of the Sasa Bay wetlands well over a half-mile from where the dredging and construction would take place. Noise and activity from construction would be very unlikely to affect these areas. Potential impacts from project construction pollutants, if any, would be to the mangroves that are adjacent to the harbor waters and not the freshwater wetlands that are further inland. Impacts would be less than significant.

Sea Turtles. Green and hawksbill sea turtles are known to utilize Apra Harbor (Figure 10.2-2) but there are few records documenting use of beaches. Hawksbill turtles occasionally approach the edges of the mangroves to feed on certain species of sponges (G. Davis, Pers. Comm. cited in Wiles and Ritter 1993) (see Figure 10.2-1). Green sea turtles have nested along the northern beaches of Orote Point and there is a 1997 record of hawksbill nesting in or around Sumay inlet (G. Davis Pers. Comm. cited in Grimm and Farley 2008). Polaris Point beaches are identified as potential nesting beaches (Grimm and Farley 2008), but there is no documentation that they have ever used Polaris Point beaches (Defley 2009). The potential for use of this beach is considered very low due to suboptimal beach morphology including the following features: minimal height above the water level, very narrow, and very rubble substrate from dredge spoil origins (Defley 2009). Direct impact to the potential nesting beaches from noise and artificial lighting is possible during dredging operations but pile driving noise at the berthing is unlikely to be a concern because the distance to the nearest known nesting beach at Sumay Cove is approximately 3,800 ft (1,158). Potential impacts on sea turtles from lighting during dredging operations would be minimized to less than significant through the use of special lights or lighting control and potential nesting beach monitoring. Although sea turtles are not known to be particularly sensitive to noise, beach monitoring would help to evaluate any potential effects from noise (Bartol et al. 1999; Ketten and Bartol 2006).

BMPs would be employed to protect sea turtles during dredging. Artificial or excessive lighting (especially short wavelengths such as ultraviolet, blue, green, and white) would be avoided during nesting and hatching seasons near Sumay Cove where possible, or shielded and/or filtered if they cannot be avoided and noise in the Sumay Cove area would be minimized. Additionally, during the period of nighttime dredging activities observers would monitor all potential nesting beaches and look for recent turtle tracks and signs of nesting activity. If a nest is observed, the area would be photographed and marked, and the date and location recorded; hatching from the nest would be monitored. During imminent hatching all activities that might affect the species would be halted. Any observed disturbance to the species that was noted during monitoring would be halted. Therefore, with implementation of BMPs, spill plans, and with adequate spill equipment and response capabilities, in addition to nest observation, impacts to terrestrial environments would be less than significant.

Formal consultation with USFWS and National Oceanic and Atmospheric Administration (NOAA) in the context of Section 7 consultation will include the special-status species discussed above. Informal consultations have been ongoing since June 2007 concerning the proposed action.



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Operation

Vegetation

There would be no direct or indirect impacts to vegetation. No native vegetation would remain in the area after construction.

Wildlife

Very few terrestrial species use the area proposed for the aircraft carrier berth because it is a developed area. Direct impacts to terrestrial wildlife at the aircraft carrier berthing area would be less than significant.

The aircraft carrier wharf area is over one-half mile from the Sasa Bay wetlands. Noise and activity from operations at the wharf would be very unlikely to affect these areas. Impacts would be less than significant. Ship operations out in the harbor would involve potential lighting and noise during nighttime operations. Lighting and noise from nighttime operations would temporarily impact migratory birds using or potentially using Sasa Bay and its extensive mangroves. As discussed below in Potential Mitigation Measures for Alternative 1 Impacts, during nighttime no vessels or any activity would be allowed within Sasa Bay, the limits of which are defined by the Government of Guam Sasa Bay preserve boundary in order to mitigate for impacts. With implementation of these measures, impacts would be less than significant.

Potential severe oil spills from proposed action under Alternative 1 are unlikely given the history of Navy operations in Apra Harbor. However, if a severe oil spill were to occur and reach the mangroves, substantial damage to that community would be likely. The Sasa Bay mangrove area is approximately 4,000 ft (1,220 m) from the proposed wharf area project locations. This wetland is a large natural wetland that fringes the bay in eastern Apra Harbor (see Figure 10.2-2). The mangroves and associated wetlands further inland are supported by flows of the Sasa, Laguas and Aguada Rivers. Various mangrove species occupy the edge of the bay and there is a small grove of nipa near the Laguas River (Moore et al. 1977). Other areas are occupied by dense, disturbed secondary forest that floods seasonally and in scattered areas are beds of reeds and an intertidal mudflat generally lacking in vegetation (Wiles and Ritter 1993). This wetland is important for aquatic organisms that are specific to mangroves, including molluscs, clams and oysters, fiddler crabs, land crabs and mangrove crabs. The mangroves are nursery grounds for various marine fishes (Wiles and Ritter 1993).

Mangrove responses to oil spills have been summarized by Hoff et al. (2002). Mangrove tree species themselves are highly susceptible to oil exposure and the lighter oils are more acutely toxic than heavier oils. Acute effects of oil (mortality) occur within 6 months of exposure and usually within a much shorter time frame (a few weeks). Common responses of mangrove tree species to oil include yellowing of leaves, defoliation, and tree death. Mangrove communities are complex but the available information suggests that the mangrove faunal community recovers faster than the mangrove trees themselves (Hoff et al. 2002).

The potential that oil spills at the berthing area would reach the mangroves is partly controlled by currents in Apra Harbor. Currents in the harbor are predominantly wind-driven, and occur as a two-layered system. Project area currents were found to be weak with surface currents at 4 to 8 centimeters per second (Eriksen 2009). Tidal effects within the harbor are small. The surface layer flows in the direction of the wind, and the deeper layer flows in the opposite direction. During typical trade wind conditions, surface flow is to the west out of the harbor, while deeper flow is to the east into the harbor. Surface flows to the west would move an oil spill away from the Sasa Bay mangroves. However, it is noted that during

typhoons, when spills are more likely to occur, surface water movements may be towards the mangroves. Minimization measures for responding to spills are discussed below.

The capability to respond to any spill resulting from the proposed action is substantial. NOAA has developed a modeling tool for spills called the General NOAA Operational Modeling Environment and has developed specific information for Apra Harbor (NOAA 2009). Other minimization is discussed in the potential mitigation section.

The potential for sediment migration and petroleum spills reaching mangrove areas would be minimized through BMPs with avoidance and minimization measures. A spill prevention, control, and countermeasures plan would be in place. With the combined prevention, and response and cleanup capabilities, potential impacts to the mangrove areas and the migratory birds and other species it supports that would result from operations would be less than significant.

Special-Status Species

Species present in the area are discussed below.

- *Mariana Common Moorhen*. Noise and activity and incidental bird boat strikes during operations would have a less than significant effect on the moorhen because it is over one-half mile (0.8 km) to the nearest known habitat, wetlands to the west of Sumay inlet. Petroleum spills would be unlikely to impact moorhen habitat because the freshwater wetland habitat of the moorhens are behind shorelines or behind mangroves. Impacts to the moorhen would be less than significant.
- *Sea Turtles*. Sea turtles are known to use the marine environment in the area and these impacts are evaluated under the marine biological resources section, Chapter 11 of this Volume. As discussed under construction, the nearest known sea turtle nesting area is documented from Sumay Cove, approximately 3,800 ft (1,158 m) from the ship berthing area, so direct impacts to sea turtles from noise or lighting during construction or operations in the berthing area would be less than significant. Petroleum spills (see also the discussion under wildlife above) would significantly impact the potential sea turtle nesting area at Sumay Cove and possibly other potential sea turtle beaches. To protect sea turtles during dredging, artificial or excessive lighting (especially short wavelengths such as ultraviolet, blue, green, and white) would be avoided during nesting and hatching seasons near Sumay Cove where possible, or shielded and/or filtered if they cannot be avoided and noise in the Sumay Cove area would be minimized. Additionally, during the period of nighttime dredging activities observers would monitor all potential nesting beaches and look for recent turtle tracks and signs of nesting activity. If a nest is observed, the area would be photographed and marked, and the date and location recorded; hatching from the nest would be monitored. During imminent hatching all activities that might affect the species would be halted. Any observed disturbance to the species that was noted during monitoring would be halted. Therefore, with implementation of BMPs, spill plans, and with adequate spill equipment and response capabilities, in addition to nest observation, impacts to terrestrial environments would be less than significant.

Best Management Practices

To control and manage invasive species impacts, a Regional Micronesian Biosecurity Plan with Risk Analysis is currently being developed by the National Invasive Species Council in conjunction with USFWS, U.S. Department of Agriculture, Guam Division of Aquatic and Wildlife Resources, and other

interested parties to facilitate a comprehensive approach to control invasive species export, import, and spread. This plan will address all aspects of the proposed military buildup. Further description is provided in the Volume 2, Chapter 10 discussion for Alternative 1. Specific protection measures included within this BMP that would apply to most actions proposed in this EIS/OEIS, including those associated with the aircraft carrier are:

- Compliance with the COMNAV Marianas Training Handbook, COMNAV Marianas Instruction 5090.10A and DoD Transportation Regulations (4500.9-R, Chapters 505 and 506) will be required for travel to and from training sites within the Mariana Islands Range Complex. The intent of these measures is to minimize the transport of potentially invasive plant and animal species (other than BTS which is addressed separately below) associated with transport of troops and personnel within and between Guam and the CNMI.
- The Navy would supplement and update the existing environmental education program for new arrivals. The updates may include (1) mandatory viewing of a new BTS educational video, (2) pocket guides with BTS information and personal inspection guidelines, and (3) assurance that BTS awareness extends from the chain of command to the individual marine and Sailor.
- The DoD, working in collaboration with the USFWS, and United States Department of Agriculture – Wildlife Services (USDA-WS) and Animal and Plant Health Inspection Service (APHIS) will decide how best to implement the Joint Region BTS Control Plan relevant to the proposed activities. The Navy strategy will involve three components: (1) avoidance, (2) minimization, and (3) offsetting measures. Specific aspects of these strategies are still in development and will be included in the USFWS Biological Opinion; however, the overall strategies are outlined in the following bullets.
- The Navy, in compliance with the DoD Defense Transportation Regulations, Chapter 505 protocols, is committed to implementing 100 percent inspection of all outgoing vessels and aircraft with dog detection teams. This could be supplemented by other pest control expertise (with appropriate USDA-WS BTS detection training and oversight) to meet 100 percent inspection goals for large-scale training activities. The Navy understands that inspection capacity limitations exist within the present USDA-WS interdiction capabilities. In the event of DoD-related, vehicles, and equipment leaving Guam without inspection, the Navy will notify the point of destination port or airport authorities.
- The Navy could support rapid response actions to BTS sightings within the CNMI and locations outside of the CNMI and Guam, specifically Hawaii, by working with USGS Biological Resources Discipline (BRD) in developing procedures and protocols that will support rapid action for a BTS sighting. The Navy could also establish temporary snake-free quarantine areas for cargo traveling from Guam to CNMI and locations outside of the CNMI and Guam. These BTS sterile areas would be subject to multiple night searches with appropriately trained interdiction (dog) teams. Temporary barriers are preferable to permanent enclosures because of the variable sizes needed for various training activities.
- The Navy would fund additional research to protect ESA-listed and recently delisted species from BTS. From the research and development list provided by the BTS Technical Working Group, the Navy proposes to fund the United States Geological Survey (USGS)-led project for integrating canine and human search teams, which will improve snake sightings in low density areas (e.g., to ensure a snake can be found if a sighting occurs on Tinian). Other promising research would also be funded such as chemical irritants to assist dog teams with

capture of detected snakes. If successful, this method enhancement would fully integrate three tools: human searching, dog-aided searches, and snake repellents/irritants.

- The movement and spread of invasive plant and animal species within Guam and to other locations from Guam is a potential indirect impact resulting from actions proposed. Invasive species might be imported to Guam through shipment of supplies and equipment. This could result in significant impacts to all special-status species however, to prevent potentially invasive species from being imported to or exported from Guam from all actions proposed, a comprehensive invasive species program, as discussed above, would be implemented as a BMP. With implementation of this minimization measure, impacts from invasive species would be less than significant.

As mentioned previously, in addition to the BMPs discussed above, additional BMPs are listed and discussed in Volume 7.

Table 10.2-1 summarizes Alternative 1 impacts.

Table 10.2-1 Summary of Alternative 1 Impacts

<i>Area</i>	<i>Project Activities</i>	<i>Project Specific Impacts</i>
Apra Harbor Polaris Point	Construction	Construction on land would occur in an area already developed with minimal or no native vegetation; wildlife use of this terrestrial area is also minimal or if used it is by species widespread on Guam; the nearest area with abundant wildlife is the Government of Guam Sasa Bay preserve over 4,000 ft (1,220 m) distant; noise and activity from night-time dredging of Apra Harbor would result in significant disturbance to migratory birds in terrestrial areas of Sasa Bay but would be mitigated to less than significant; potential impacts from excessive lighting during dredging on the sea turtle nesting area at Sumay Cove would be minimized to less than significant.
	Operation	There would be potential significant direct impacts to wildlife at Sasa Bay from noise and light, mitigated to less than significant; there would be potential significant impacts to sea turtles at Sumay Cove and other beaches from potential petroleum spills, minimized to less than significant.

10.2.2.2 Alternative 1 Potential Mitigation Measures

The following potential mitigation measure would be required for Alternative 1.

- During nighttime no vessels or any activity would be allowed within Sasa Bay, the limits of which are defined by the Government of Guam Sasa Bay preserve boundary in order to mitigate for impacts.
- Conduct sea turtle natural history studies to better understand the species and benefit long-term military mission planning.
- The 5-Step Hazard Analysis and Critical Control Point planning method (an international standard, ASTM E2590-08) for reducing or eliminating the spread of unwanted species would be used for high-risk activities (to be identified in the Biosecurity Plan) and would be required for all construction project sites.

10.2.3 Alternative 2 Former Ship Repair Facility (SRF)

10.2.3.1 Onshore and Offshore

All proposed activities under Alternative 2 Former SRF (referred to as Alternative 2) are the same as those proposed under Alternative 1 except that aircraft carrier berthing would occur at the Former SRF and not Polaris Point (see Table 10.2-1). All proposed wharf and building construction actions under this alternative would be conducted in areas that are already developed and are currently used for existing Navy operations.

Construction

Vegetation

Impacts would be the same as for Alternative 1.

Wildlife

Impacts would be the same as for Alternative 1.

Special-Status Species

Mariana Common Moorhen. Impacts to the Mariana common moorhen would be the same as for Alternative 1.

Sea Turtles. The potential sea turtle nesting area Sumay Cove is approximately 1,800 ft (549 m) from the proposed aircraft carrier berthing site. Although a recorded nesting has only occurred once (in 1997) and no activity has been recorded since that time, it is possible it could be used again. Artificial light sources at night during construction that shine on a nesting beach could result in a number of impacts including: deterring adult females from exiting the water to lay eggs on the beach, causing abandonment of nesting attempts, disorienting adult females after nesting, or disorienting hatchlings. BMPs would be used to eliminate or reduce the impacts of artificial night lighting such as through the use of special or hooded lights. Observers would monitor potential sea turtle nesting at any beaches in the vicinity that are determined to be viable potential nesting beaches and activity and nests would be recorded and monitored through hatching.

Construction at the berthing area would generate noise. The Navy recognizes that there are many on-going and recent past studies on the subject of potential exposures to sea turtles from pile driving actions. Further research and validation of these studies are necessary prior to being able to determine the applicability of the methodologies and results to the proposed action within this EIS/OEIS. The Navy will continue to research these studies and where appropriate, incorporate and apply methodologies, analysis, and results to the on-going impact analysis to sea turtles from the proposed action. Applicability of these studies will also be coordinated through consultations with the National Marine Fisheries Service. The Final EIS/OEIS will contain revised sea turtle impact analysis as developed through the process described above. The monitoring that would be in place for potential sea turtle nesting areas would help to determine if there were any effects and, if necessary, noise reduction methods would be employed. With these BMPs, impacts to sea turtles would be less than significant.

The same BMPs for Alternative 1 for construction at the berthing area would be employed to protect sea turtles during dredging.

Operation*Vegetation*

Impacts would be the same as for Alternative 1.

Wildlife

Impacts would be the same as for Alternative 1.

Special-Status Species

Impacts to special-status species would be similar to those described for Alternative 1. An additional potential impact would be as described below.

Sea Turtles. Artificial lighting during operations would potentially affect Sumay Cove in a similar manner to that described for construction above. Measures for minimization would be employed to eliminate or reduce the impacts of artificial night lighting such as through the use of hooded lights. Observers would monitor potential sea turtle nesting at any beaches in the vicinity that are determined to be viable and activity and nests would be recorded and monitored through hatching. Any disturbances noted would be halted or corrected. . Lighting would be controlled during operations, using the same methods as during construction. With these measures, impacts to sea turtles would be less than significant.

Table 10.2-2. Summary of Alternative 2 Impacts

<i>Area</i>	<i>Project Activities</i>	<i>Project Specific Impacts</i>
Apra Harbor Former SRF	Construction	Construction on land would occur in an area already developed with minimal or no native vegetation; wildlife use of this terrestrial area is also minimal or if used it is by species widespread on Guam; the nearest area with abundant wildlife is the Government of Guam Sasa Bay preserve over 4,000 ft (1,220 m) distant; noise and activity from night-time dredging of Apra harbor would result in significant disturbance to migratory birds in terrestrial areas of Sasa Bay but would be minimized to less than significant; there would be potential significant direct impacts to sea turtles from artificial lighting and noise, minimized to less than significant.
	Operation	There would be potential significant direct impacts to wildlife at Sasa Bay from noise and light, minimized to less than significant; there would be potential significant direct impacts to sea turtles from artificial lighting and noise, minimized to less than significant.

10.2.3.2 Alternative 2 Potential Mitigation Measures

Mitigation measures would be the same as those previously described for Alternative 1.

10.2.4 No-Action Alternative

Existing terrestrial biological resources would remain unchanged under the no-action alternative.

10.2.5 Summary of Impacts

Table 10.2-3 summarizes the potential impacts of each action alternative and the no-action alternative.

Table 10.2-3. Summary of Impacts

<i>Alternative 1</i>	<i>Alternative 2</i>	<i>No-Action Alternative</i>
Vegetation		
NI	NI	NI
Wildlife		
SI-M <ul style="list-style-type: none"> • Significant direct impact to Sasa Bay wildlife from noise and activity during nighttime dredging and during nighttime operations, minimized to less than significant 	SI-M <ul style="list-style-type: none"> • Significant direct impact to Sasa Bay wildlife from noise and activity during nighttime dredging and during nighttime operations, minimized to less than significant 	NI <ul style="list-style-type: none"> • No impacts to terrestrial biological resources
Special-Status Species		
SI-M <ul style="list-style-type: none"> • Significant potential direct impacts to wildlife at Sasa Bay, minimized to less than significant • Significant potential direct impact to sea turtles at Sumay Cove beach from night lights and noise during construction, minimized to less than significant 	SI-M <ul style="list-style-type: none"> • Significant potential direct impacts to wildlife at Sasa Bay, minimized to less than significant • Significant potential direct impact to sea turtles at Sumay Cove beaches from night lights and noise during construction and operation, minimized to less than significant 	NI <ul style="list-style-type: none"> • No impacts to terrestrial biological resources

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

10.2.6 Summary of Potential Mitigation Measures

Table 10.2-4 summarizes the potential mitigation measures to compensate for the impacts.

Table 10.2-4. Summary of Potential Mitigation Measures

<i>Alternatives 1 and 2</i>	<i>No-Action Alternative</i>
<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
<ul style="list-style-type: none"> • No ships would be allowed to enter Sasa Bay at night • Conduct sea turtle natural history studies to better understand the species and benefit long-term military mission planning • Use Hazard Analysis and Critical Control Point planning for high-risk activities and construction projects 	<ul style="list-style-type: none"> • None

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