COMBINED BIOLOGICAL ASSESSMENT AND ESSENTIAL FISH HABITAT ASSESSMENT

for Maintenance Dredging of Agat Small Boat Harbor with Beneficial Use of Dredged Material at Nimitz Beach, Agat, Guam

Action Agency: Honolulu District, U.S. Army Corps of Engineers, Civil and Public Works Branch

Authority: Section 107 of the Rivers and Harbors Act of 1960, as amended

Consulting Agencies: National Marine Fisheries Service, Pacific Islands Regional Office and U.S. Fish and Wildlife, Service Pacific Islands Fish and Wildlife Office

Honolulu District
U.S. Army Corps of Engineers

CONTENTS

ATTACHMENTS

A1- Avoidance and Minimization Measures

A2- Compiled Technical Assistance

A3- Marine Biological Survey, 2021

AI Content Disclaimer
Some of the content in this document was generated using artificial intelligence tools. While these tools can assist in drafting, summarizing, or organizing information, the final editorial judgment and review were performed by human authors.

1 INTRODUCTION

Agat Small Boat Harbor (SBH) is located on the west coast of Guam near Ga'an Point and provides berth for up to 150 recreational and fishing vessels. Over time, sediment has accumulated within the harbor's general navigation features, reducing navigability and necessitating maintenance dredging for the first time since construction. USACE Honolulu District, Civil and Public Works Branch, is proposing to maintenance dredge Agat SBH to restore the authorized project depths and opportunistically beneficially use the dredged material to reclaim the beach at Nimitz Beach Park in Agat, Guam (Figure 1).

Figure 1 Agat SBH and Nimitz Beach Park, Agat, Guam

This action, funded and undertaken by USACE, constitutes a federal undertaking requiring compliance with the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery

Conservation and Management Act (MSA). Accordingly, USACE has prepared this combined Biological Evaluation (BE) and Essential Fish Habitat Assessment (EFHA) to evaluate potential effects of the proposed action on listed species, designated critical habitat, and EFH.

1.1 Regulatory Framework and Consultation Requirements

This combined BE/EFHA has been prepared in accordance with Section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.) and the implementing regulations at 50 CFR 402.12(f), which describe the required contents of a Biological Assessment (BA), and 50 CFR 600.920(e), which outline the required elements of an EFH Assessment (EFHA). With this BA/EFHA, USACE seeks to initiate informal ESA consultation and abbreviated EFH consultation with the Protected Resources Division and Habitat Conservation Division of the National Marine Fisheries Service (NMFS) Pacific Islands Regional Office, and the U.S. Fish and Wildlife Service (USFWS) Pacific Islands Fish and Wildlife Office.

This BA/EFHA incorporates by reference existing, relevant biological evaluations and consultation documents to avoid unnecessary duplication. The analysis presented here is intended to supplement that body of work by addressing project-specific components and updating conclusions where new scientific information, regulatory changes, or newly listed species warrant additional evaluation. Additionally, USACE sought technical assistance during the planning of this maintenance action to solicit feedback, identify resource impact concerns and with sufficient time to preemptively incorporate recommended best management practices (BMPs), i.e., ESA conservation measures and EFH conservation recommendations.

This document provides a description of the proposed action including avoidance and minimization measures, a description of the affected environment including ESA-listed species and critical habitat and designated EFH that occurs within and may be affected by the federal action, an evaluation of potential effects including cumulative effects, and presents USACE's effect determinations for both ESA and EFH resources.

1.2 Purpose and Need

Agat SBH was authorized for construction in June 1986 under Section 107 of the River and Harbor Act of 1960, as amended (Section 107) and completed in March 1989. Figure 2 depicts the project general navigation features: an entrance channel (1000 feet long, 120 feet wide, 14 feet deep); a turning basin (200 feet long, 150 feet wide, 11 feet deep); a main access channel (500 feet long, 75 feet wide, 9 feet deep); two breakwaters (985 feet long and 65 feet long); and two revetted moles (200 feet long and 348 feet long). The Port Authority of Guam (PAG) is the harbor non-federal sponsor and is responsible for harbor operations and portside maintenance.

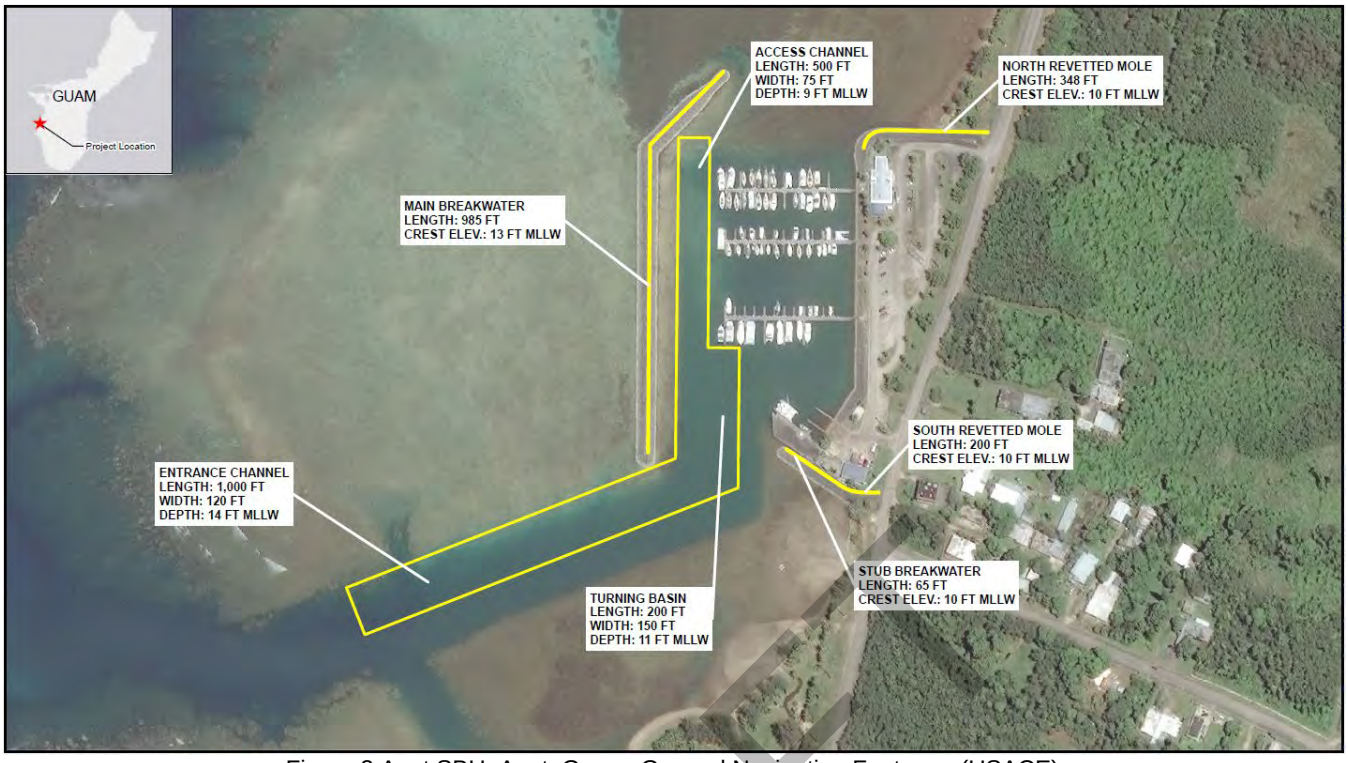


Figure 2 Agat SBH, Agat, Guam. General Navigation Features. (USACE)

1.2.1 Maintenance Dredging

Under Section 107, USACE is funded and authorized to maintain the general navigation features of Agat SBH at full federal expense. Shoaling has reduced depths in the entrance channel to –9 ft MLLW (authorized –14 ft; up to 5 ft delta), in the turning basin to –9 ft MLLW (authorized –11 ft; 2 ft delta), and in the access channel to –5 ft MLLW (authorized –9 ft; 4 ft delta). Maintenance dredging is required to restore authorized depths and ensure safe navigation of the completed Corps project. See Figure 3.

Due to low shoaling rates, this is the first maintenance dredging cycle since the harbor's completion in 1989. Based on historical trends, the next cycle is anticipated approximately 35 years from now.

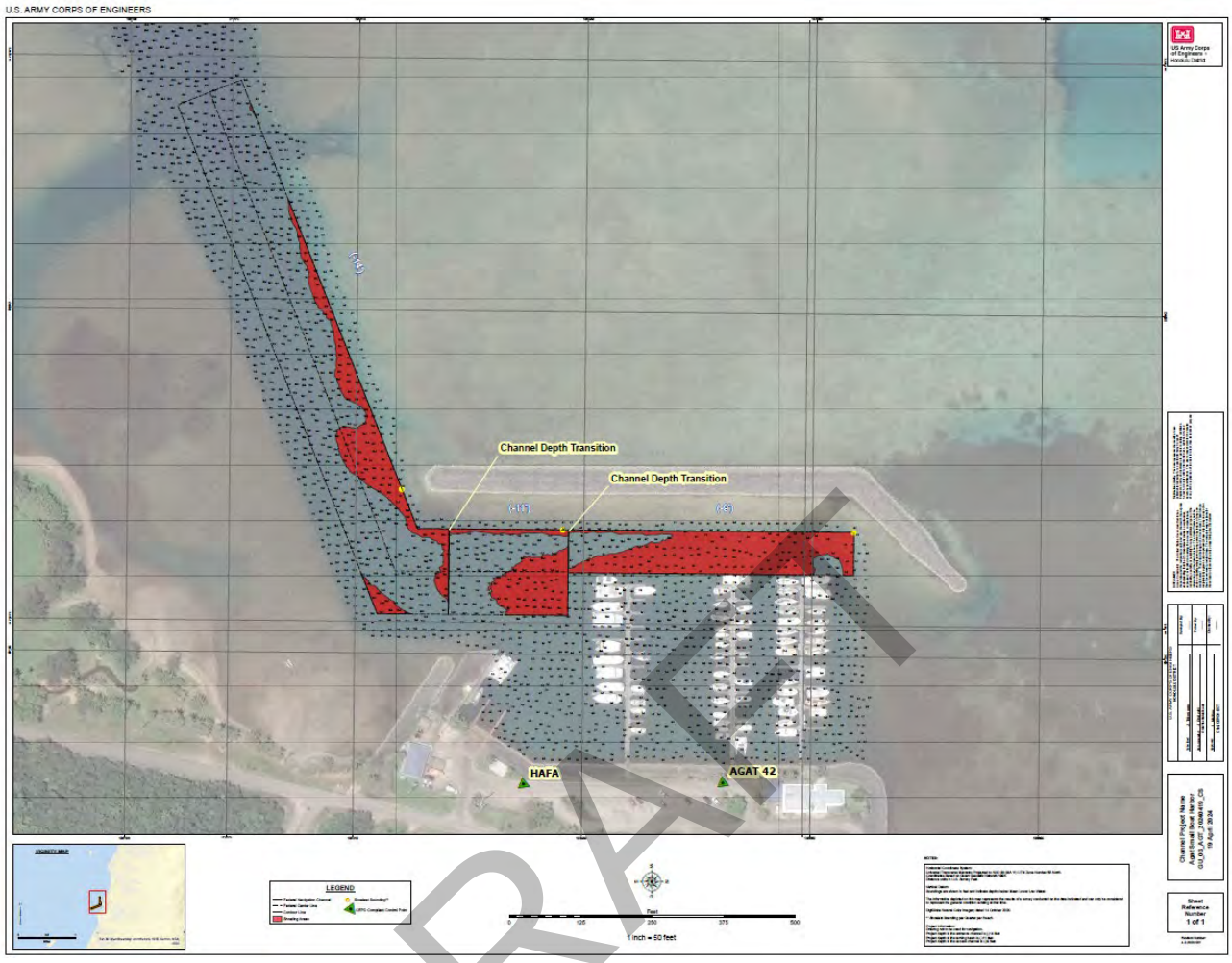


Figure 3 April 2024 Hydrosurvey, Agat SBH. Red polygon indicates depths within federal channel that are shallower than authorized project depth, i.e., dredge footprint. (USACE)

1.2.2 Beneficial Use of Dredged Material at Nimitz Beach Park

USACE evaluated upland disposal and ocean disposal alternatives; both would result in permanent loss of beach-quality sediment. With support from the Government of Guam and the U.S. Environmental Protection Agency, USACE proposes beneficial use of dredged material (BUDM) at Nimitz Beach Park to preserve native sediment and provide coastal storm risk management benefits. The Government of Guam serves as the non-federal sponsor for the project and supports the BUDM alternative.

Nimitz Beach Park is an 11-acre public recreation area with a narrow sandy beach, shallow reef, and significant cultural and community value. Shoreline erosion has damaged park infrastructure, including concrete walkways. Coastal trees that have eroded into the wash of the waves have died and only the cut stump remains. Placement of dredged material would restore eroded shoreline, protect park facilities, and help stabilize local littoral transport processes. Figure 4 and Figure 5 illustrate existing shoreline erosion and infrastructure damage.

Figure 4 Erosion at north end of Nimitz Beach as of Sep 2025. Sidewalk has eroded into the shoreline. (USACE 2025)

Figure 5 Erosion at south end of Nimitz Beach as of Sep 2025. Escarpment is 4 to 6 feet tall. (USACE 2025)

1.3 Relationship with Other Environmental Compliance

USACE has determined that the proposed action is eligible for coverage under multiple Department of Defense Categorical Exclusions (CATEX) under the National Environmental Policy Act, including: VIII. Civil Works Program of the USACE (2) minor maintenance dredging using existing disposal sites; VII. USACE (5) all applications which qualify as letters of permission; and I. Department of the Army (c)(1) wildlife habitat improvement activities not involving herbicides or more than one mile of road construction, and restoration of wetlands, streams, riparian areas, and other water bodies. Through this consultation and additional evaluation, USACE will determine whether extraordinary circumstances exist that would require preparation of an Environmental Assessment or Environmental Impact Statement.

2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action:

The proposed action or 'federal action' includes two components: dredging and dredged material disposal. Specifically, the maintenance dredging of the federal entrance channel, turning basin and access channel of the Agat SBH, followed by the BUDM to stabilize and reclaim the eroded beach at Nimitz Beach Park in Agat, Guam (Figure 6). If the proposed maintenance dredging method falls through, USACE contingency will be standard mechanical dredging, placing dredged material in a scow and transporting the dredged material for ocean disposal at the U.S. Environmental Protection Agency (EPA) designated Guam Deep Ocean Dredged Material Disposal Site (GDODS). USACE considers both the preferred alternative, inclusive of all design modifications and best management practices (BMPs) described in Section 2.1.4, and the contingency plan, to be the proposed action.

Maintenance dredging is a wholly waterborne activity occurring within the limits of the federal harbor. Further details of each component, from site preparation to maintenance dredging and BUDM, is provided below.

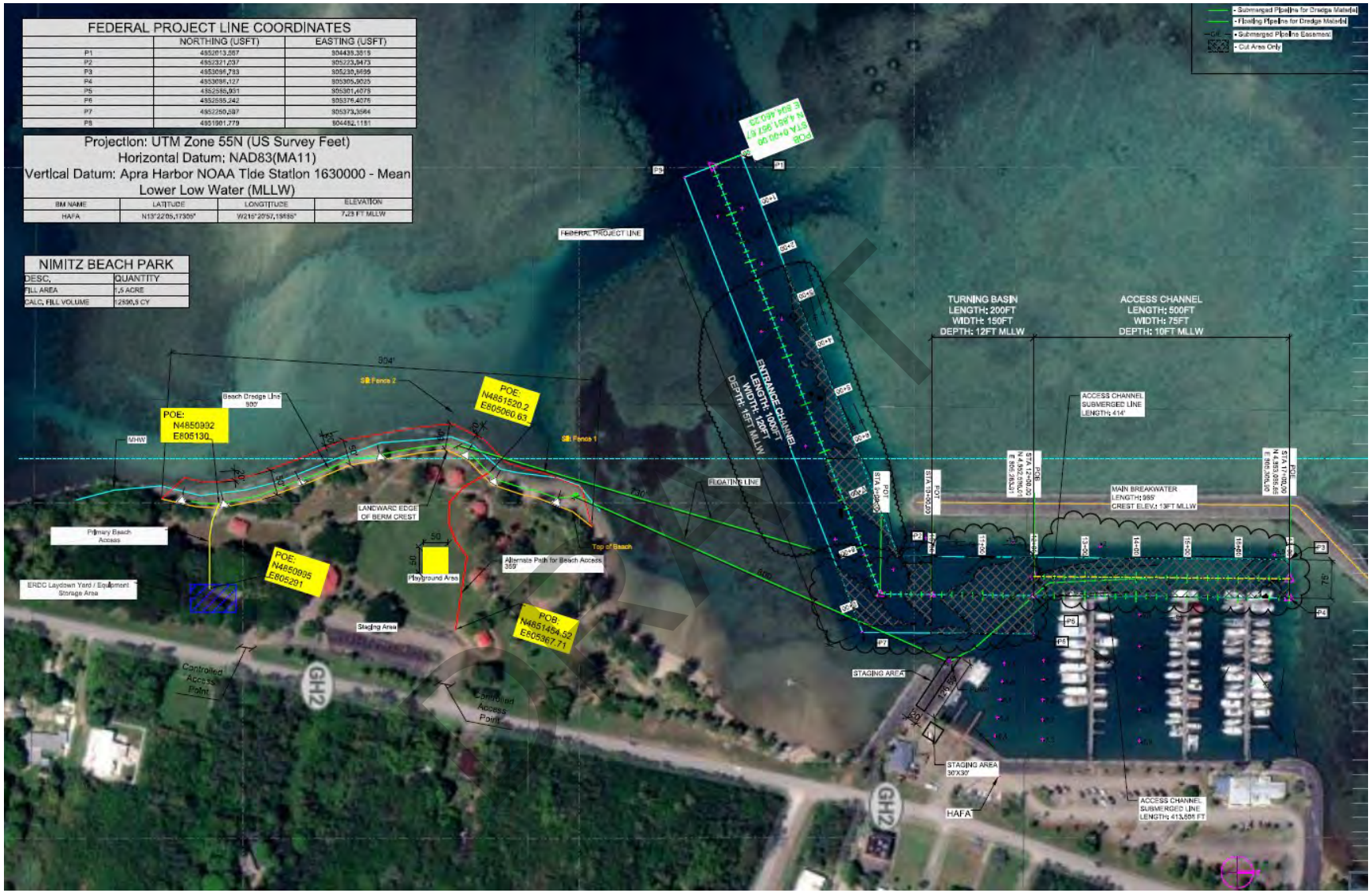


Figure 6 Site Plan - Proposed Action and Action Area, Agat SBH and Nimitz Beach Park (ERDC 2025) Maintenance dredging footprint to right (cross hatch gray polygon), dredged material conveyance pipeline (green line), beach reclamation fill footprint to left (red outline polygon)

2.1.1 Site Preparation Activities

Staging/Access. An upland staging area has been designated in the parking lot of Nimitz Beach Park along Route 1. Equipment, construction materials and waste will be stored here. No earth-moving activities are proposed in this area. See Site Plan Figure 7.

A single construction access path will provide equipment ingress and egress from the staging area to the shoreline. The 12-foot-wide access path will consist of ungrouted small boulders and rock placed on the existing grade to stabilize the ground for equipment ingress and egress. USACE proposes two alignments: a shorter pathway along the southern end of the beach park that traverses beneath and between scattered trees in the park and a longer pathway along the northern end that encounters only a few, sparsely scattered coconut trees near the shoreline. The final alignment will be determined based on the results of a tree snail survey by a qualified biologist. If no tree snails are observed, then either path is viable. If tree snails are observed, then the northern pathway will be used, and appropriate buffers will be applied around host plants. In coordination with the non-federal sponsor, USACE will abandon the access path in place for use by the Guam Department of Parks and Recreation for park operations and maintenance.

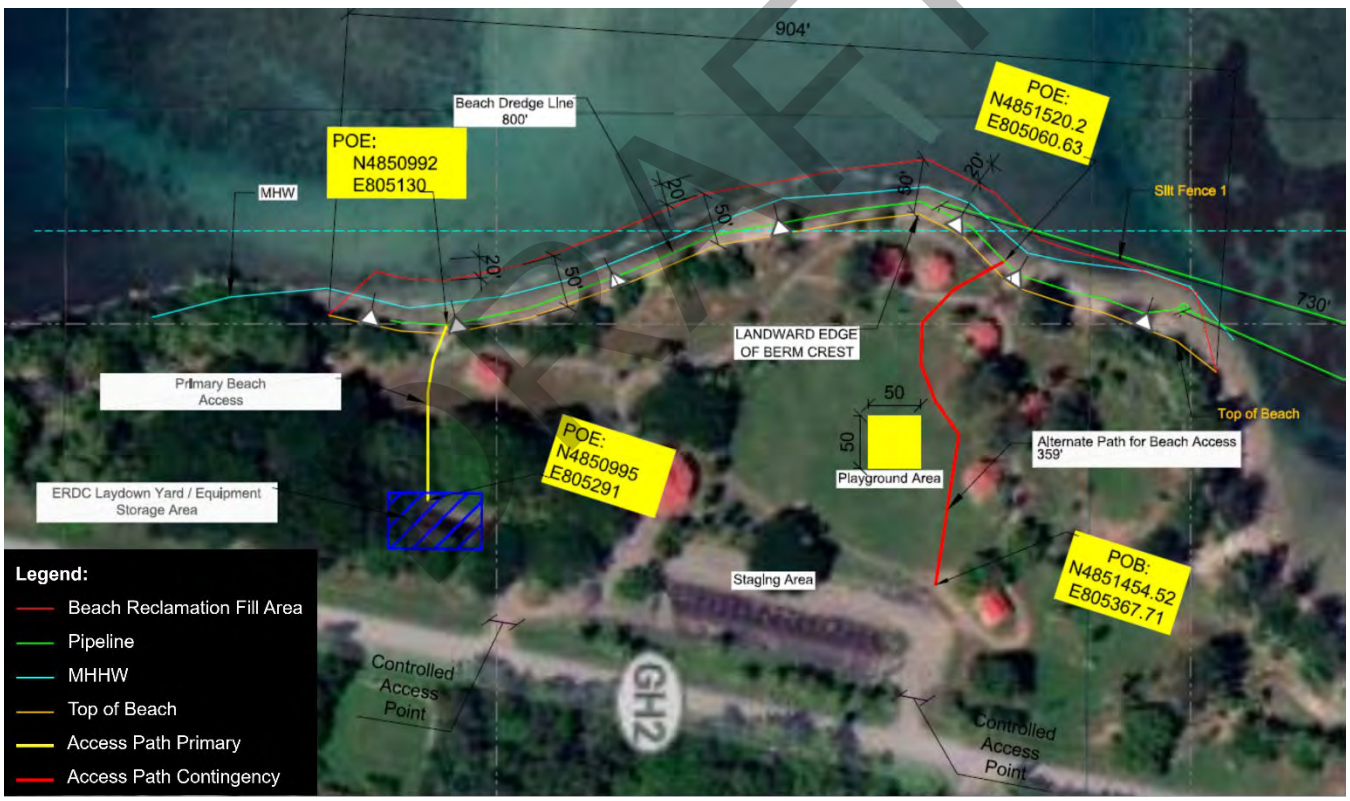


Figure 7 Site Plan at Nimitz Beach Park (ERDC 2026)

Debris Removal. Prior to beneficial use activities at Nimitz Beach Park, USACE will remove all debris from within the beach reclamation fill area. See debris Figure 8. Debris includes concrete sidewalk segments that have eroded from the beach park into the shoreline, as well

as tree stumps, driftwood, and other dead vegetative material that has accumulated along the shoreline. Live vegetation occurring along the beach escarpment will not be removed. All debris will be collected from the beach and trucked back to the staging area using the designated access path. Equipment to be utilized: an 8-ton CAT 308 Mini Excavator with rubber tracks (8.5-feet tall by 7.6-feet wide) for debris removal, and two smaller skid steers to move pipe and help with demobilization.

Figure 8 Example Concrete and Other Debris Along Shoreline

2.1.2 Maintenance Dredging of Agat SBH

Based on the design dredge depths for Agat SBH, approximately 5,850 cubic yards of material require removal in order to restore authorized project depths (Figure *9*). With a 1-foot industry-standard overdredge allowance, a total of 8,300 cubic yards (up to 9,000 cy when factoring in "fluff"/aeration of sediment) of dredged material will be removed.

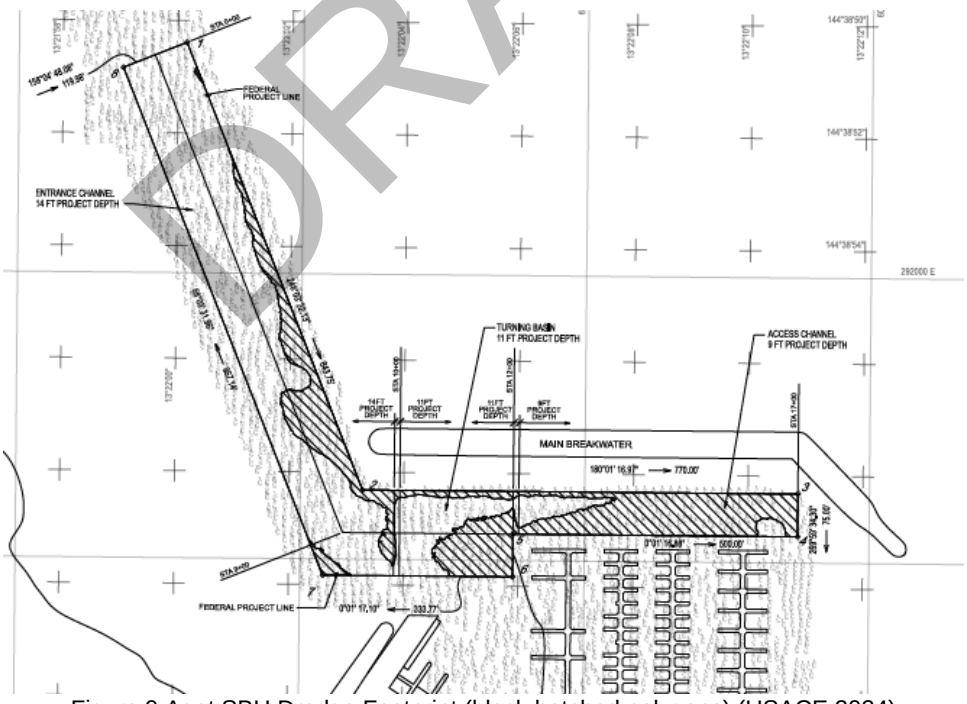


Figure 9 Agat SBH Dredge Footprint (black hatched polygons) (USACE 2024)

USACE has retained the support of the U.S. Army Engineer Research and Development Center (ERDC) to implement novel dredging technology in this region. In coordination with ERDC, USACE proposes to utilize a 20-ton CAT320 long reach excavator staged atop a barge (Figure 10). The excavator will be retrofitted with an EDDY Dredge Head 32-inch diameter cutter head operating at 60-90 rotations per minute that is lowered into the sand (Figure 11). The cutter head agitates the substrate to bring it into suspension, removing 6-inch-deep layers at a time.

Figure 10 Example Excavator Staged atop Barge

Figure 11 Dredge Head to be Attached to Long Reach Excavator

Affixed immediately adjacent to the cutter head is an 8-inch diameter suction intake pipe that draws up the agitated slurry of seawater and sand. The sand slurry is approximately 40%

solids at the cutterhead, diluted by the pumping system to approximately 15-20% at the discharge end. The resulting fill rate is approximately 125 cy sand/hr or 2 cy/min. The intake pipe is retrofitted with a 3-inch grate to prevent entrainment of protected marine species.

The slurry is transported via a 6-inch diameter floating pipeline from the dredge area to the placement area at a velocity of 15 feet per second. The slurry is pumped with a series of booster pumps atop the barge and on land at the harbor. ERDC is in the process of designing energy dissipators for the end of the pipe system to minimize erosion and maximize accretion within the containment area.

The dredge barge will be supported by a push boat for maneuvering within the project area. The dredge plant will have two spuds placed exclusively within the federal channel to anchor the barge during dredging. The dredging sequence prioritizes the turning basin, followed by the access channel. The entrance channel is more exposed to wave energy than the rest of the harbor. Therefore, it will be dredged only as weather and sea conditions allow, and which may occur at any point during the operation.

Dredge and fill operations will occur between the hours of 0700 and 1700 daily over a typical 5-day work week. No nighttime work is proposed. Operations will be actively managed in consideration of daily tides, weather and wave predictions and while minimizing impacts to vessel calling and navigation in and around the harbor.

2.1.3 Beneficial Use of Dredged Material at Nimitz Beach Park

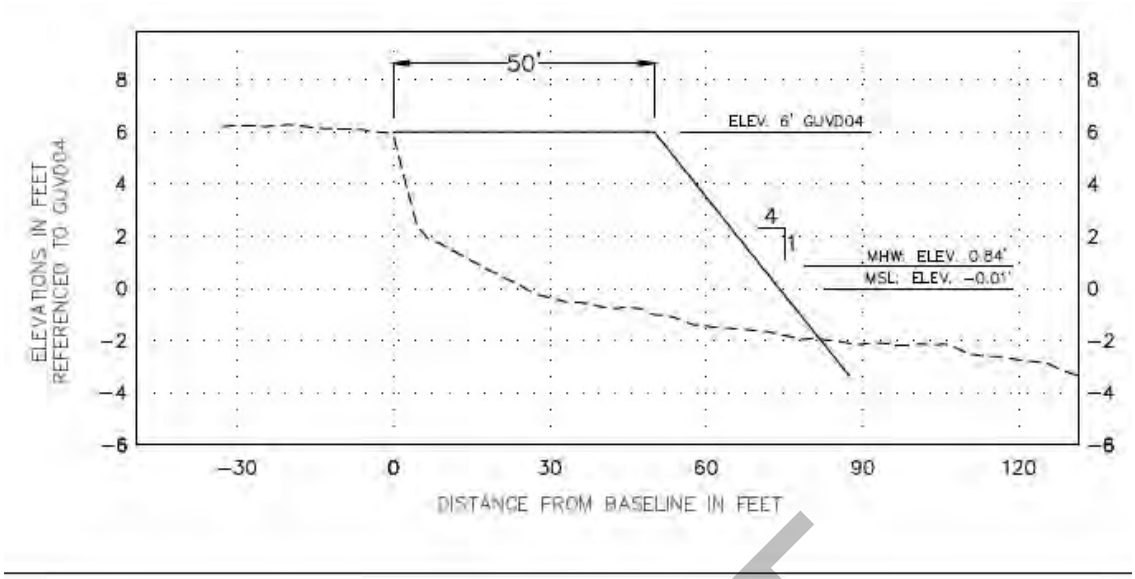
The intake pipeline will require up to two booster pumps located on the barge and in harbor uplands to effectively transport the dredged material slurry the distance from the dredge area to the fill area (Figure 12). The pipeline will be floated along its length using high-density polyethylene collar buoys from the harbor to the north face of the Nimitz Beach shoreline.

Divers will be available on site to assist in determining the most practicable alignment of the floating pipeline that avoids direct impact to corals or seagrasses and minimizes inadvertent impact on other sensitive resources. Additional floats will be available to double up, if necessary, to ensure adequate buoyancy along the pipeline. The shortest pipeline alignment would provide the greatest efficiency for conveying dredged material from the harbor to Nimitz Beach. USACE is also evaluating longer shoreline-proximate alignments that optimizes avoidance and minimization of adverse impacts on sensitive benthic resources. If wave conditions or weather compromise the structural integrity of the floating pipeline, ERDC will implement a contingency plan to pause dredging and secure the pipeline. The pipeline located within the harbor will be secured to the jetty, and the segment crossing from the harbor to Nimitz Beach will be retracted and brought back onto land.

Figure 12 Dredged Material Pipeline Conveyance Alternate alignments are presented. Pipeline from entrance channel (dark orange) and Access Channel (light orange) in harbor will feed to submerged pipeline (red) and to harbor booster pump (light orange square) and convey material to floating pipeline (yellow) that will either cross the corridor and land on Nimitz Beach or follow the beach crest of the shoreline. Pipeline on shore will follow beach contour to beach reclamation fill area (green). Access Ingress/Egress path at Nimitz Beach Park in green with preferred alignment to south and contingency alignment to north. Beach reclamation fill area seaward limit (red) and approximate stabilized toe at end of project (light orange).

The pipeline will come ashore on the north face of Nimitz Beach and run along the upper shoreline, following the beach park perimeter to the southern end of the reclamation area. Beach reclamation activities will begin at the south end where the impacts of erosion on the shoreline are the greatest and progress northward. It is possible that there will not be enough volume of dredged material to completely fill the eroded Nimitz Beach shoreline. Reclaiming the beach at the south end will create a sediment supply that will contribute to the gradual infilling of the northern reaches of the eroded Nimitz Beach shoreline in accordance with historic longshore sediment transport

The beach reclamation area spans 792 feet along the shoreline. The beach fill will match the elevation of the existing beach crest and will extend 50 feet seaward at a uniform height, with no constructed slope. Approximately 1 acre of the 1.5-acre fill footprint will occur below the High Tide Line (Mean High Water Mark). See Cross-Section Figure 13.



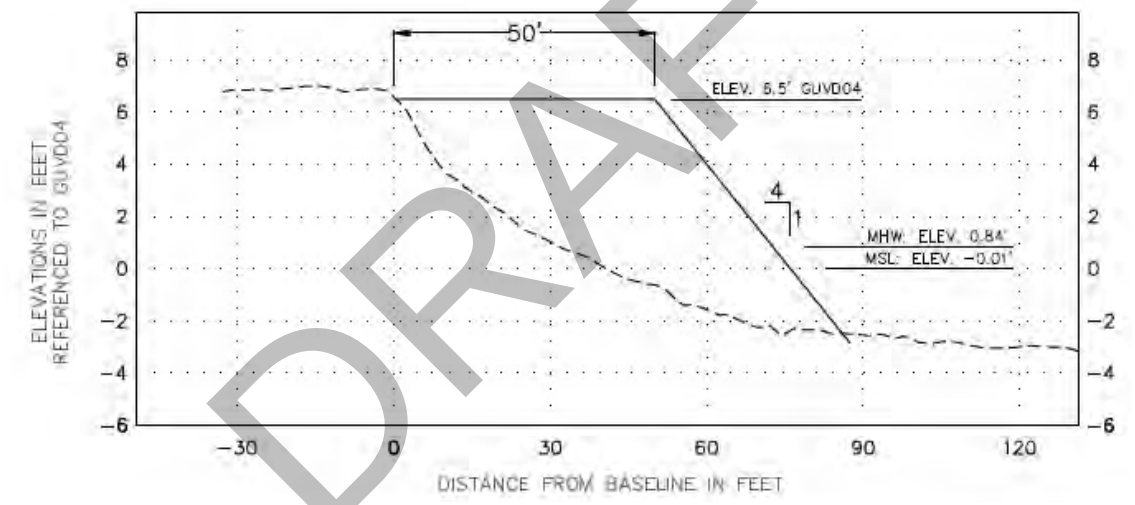


Figure 13 Cross Section Concept Drawing of Beach Reclamation Fill Area at Nimitz Beach Shoreline

The seaward limit of the beach reclamation fill area, would be cordoned off using burlap silt fencing anchored into the substrate. Fill activities will occur within manageable “cells” (approximately 4’ x 4’ x 4’, or multiples thereof) bounded by the escarpment on the landside and filter fabric lined HESCO barriers Figure 14. This method is intended to prevent direct discharge into the ocean, facilitate filtration of the slurry through the filter fabric and retain sediments, reduce turbidity and stabilize the reclaimed beach in manageable cells as the fill activity progresses along the shoreline. Filling will continue until the cell is “full” of slurry. Sequentially the next cell will be filled moving northward and seaward. As the seawater continues to percolate, a cell may be refilled multiple times until it reaches the grade/height of the bordering shoreline. As the filling progresses northward, the distal 20-ft segment of pipeline

will be disconnected, as needed. When a cell is deemed full and complete, the cell perimeter will be removed.

Figure 14 Example HESCO Barrier

Once maintenance dredging is complete, dredging equipment will be demobilized and activities to shape and stabilize the beach reclamation fill area will continue. A high-track D3-D6 dozer with 6-way blade will be used atop the reclaimed beach to push sand and grade the shoreline to meet the design specifications (approximately 792-feet long by 50-feet wide). The final beach reclamation activity will be the removal of the perimeter silt fence. If sea conditions allow, and if project observations indicate that additional turbidity-control measures are warranted, a secondary silt fence may be installed 20 feet seaward of the original. This additional barrier would further limit turbidity and provide temporary stabilization of the beach reclamation fill area once the initial fence is removed. When the silt fence is removed, the seaward face of the reclamation area will naturally adjust to a stable profile, with the toe extending approximately 20 feet beyond the former fence line. All temporary barriers will be removed at the completion of the project.

Note, the reclaimed beach fill footprint is approximate, contingent upon the volume of dredged material available for beneficial use. It is likely there is not sufficient volume to fill the proposed beach reclamation footprint. USACE is prioritizing addressing the down current south end which has experienced the highest intensity erosion.

2.1.4 Proposed Mitigation

USACE proposes the following mitigation to conserve fish and wildlife resources including but not limited to ESA listed species, designated critical habitat and EFH. USACE considers and applies a progressive approach to mitigation: avoidance first, followed by minimization and lastly, compensation or offset. The following mitigative measures are proposed because they are appropriate, feasible, practicable, and commensurate to anticipated adverse effects and will become specifications of any the dredge plan to be enforceable upon USACE and ERDC/Navy personnel to implement. The mitigative measures are an integral component of the proposed action.

2.1.4.1 Design Modifications

USACE sought technical assistance from federal resource agencies beginning in Fall 2024 to solicit baseline information, accept feedback on the proposed action and consider agency-recommended mitigative measures. Those concerns that could be addressed during the planning of the proposed action were incorporated either as design modifications built into the project means and method, or as best management practices to ensure avoidance and minimization of resources of concern. Modifications to the design based on concerns raised and balancing the needs of the project and operational and site safety are described below:

Concern	Design Modification
Loss of finite natural resource	To minimize the loss of a finite natural resource (sand), USACE's preferred dredged material disposal alternative is beneficial use via beach reclamation of the eroded shoreline fronting Nimitz Beach Park rather than ocean or upland disposal. Additionally, selecting a beneficial use location that is within the same littoral cell of the dredged material rather than to another beach (shoreline fronting Agat Mayor's Complex shoreline) outside of the originating littoral cell.
Anchor impacts to benthic substrate and resources	USACE will employ spud anchoring rather than traditional anchor and mooring systems for the dredged barge to minimize the dredge barge footprint and minimize potential for inadvertent direct impacts to high coral cover areas adjacent to the harbor. All spud deployments will be within the existing federal navigation channel.
Direct impacts to sensitive marine resources	USACE conducted two dive surveys to inform the site plan layout including means, method and alignments. USACE will have divers on site than could assist with alignment selection and adjustments throughout the project duration.
Hydraulic dredging entrainment of juvenile sharks and sea turtles	USACE will retrofit the 8-inch pump head with a 3-inch exclusion screen to prevent entrainment of protected species.
Impacts to vegetation that may provide suitable habitat for ESA listed tree snails	USACE will not propose any activity that directly impacts, has contact with or otherwise affects trees, shrubs or their understory. Pipeline Alignment. The alignment for the dredged material slurry conveyance pipeline upon reaching Nimitz Beach was realigned to follow the beach crest/shoreline rather than to traverse through the Beach Park to avoid potential impacts to vegetation that may provide suitable habitat for tree snails. Site Access Contingency. Two alignments are proposed for a single ingress/egress access pathway for equipment and vehicles transporting material and equipment from the staging area in the parking lot to the beach. The shorter, more cost-effective path goes through a forested area that may provide suitable habitat for tree snails, and the longer, more costly path avoids forested areas. The final alignment will be selected based on the results of a tree snail survey prior to mobilization. If no tree snails are observed, then designation of either path is viable. If tree snails are observed, then appropriate buffers will be applied and the latter pathway that avoids forested areas will be utilized.
Impacts to benthic resources from dredged material conveyance	The marine corridor between the harbor and Nimitz Beach has been surveyed for presence of sensitive benthic resources. The tentative alignment was selected based on the survey results and is intended to minimize potential for impacts to benthic resources. USACE will float the pipeline over these resources rather than lay the pipeline on the seafloor and utilize diver assistance to ensure the selected alignment is sufficiently buoyant and not causing impact to benthic resources. Additional floats will be available on site to ensure buoyancy. Contingency plans have been built into the project in the event of inclement weather.
Minimize spread of turbidity	ERDC will monitor dredging and fill operations for visible turbidity plumes and direct operational adjustments as needed. Pump output and dredge swing speed may be modified in real time to maintain effective and efficient intake, conveyance, and discharge of dredged material from the harbor to Nimitz Beach. If a containment cell begins generating a visible plume, the discharge pipe can be repositioned to an open or settled cell to allow the prior cell to settle and the plume to dissipate.
Minimize discharge and spread of suspended sediments at Nimitz Beach	USACE has modified the design to incorporate perimeter silt fencing and sub-cells created using HESCO barriers to maintain better control and management of the filling process, maximize sediment retention from the slurry, facilitate filtration of the slurry and minimize spread of turbidity beyond the beach reclamation fill area.

2.1.4.2 Avoidance and Minimization Measures

Project BMPs designed to avoid and minimize adverse impacts to protected resources are included as an attachment to this BA/EFHA.

2.1.4.3 Compensation/Offset

USACE has determined that implementation of design modifications and addition of avoidance and minimization measures have sufficiently and commensurately mitigated potential adverse effects to fish and wildlife resources, ESA listed species and suitable and critical habitat and EFH such that no further mitigation in the form of compensation or offset is warranted. This determination is supported by the effects analysis provided in Section 4.0 below.

2.2 Alternatives

USACE considered a range of dredging and dredged material disposal alternatives prior to identifying the proposed action. Alternatives were evaluated based on site conditions, the environmental baseline, the project's purpose and need, operational feasibility and safety, and potential effects on fish and wildlife resources, ESA-listed species and critical habitat, and EFH. Several alternatives were ultimately determined to be impracticable or otherwise unable to meet the project's purpose and need. These alternatives are summarized below for documentation of USACE's alternatives analysis. The effects analysis in Section 4.0 focuses on the anticipated impacts of the preferred alternative, or proposed action.

2.2.1 Alternative Dredge Method: Traditional Mechanical Dredging (Eliminated)

This alternative would involve removing accumulated sediments using conventional mechanical equipment such as an excavator with an environmental bucket mounted on a barge and silt curtains or a corral to isolate and contain the active dredge area (Figure 15). Disposal options include upland and ocean disposal.

Figure 15 Example Mechanical Maintenance Dredging, Kaunakakai, Molokai, Hawaii by USACE. Mechanical dredge staged atop dredge barge in foreground, active dredging in corral, dredged material scow abutting barge to left.

Mechanical dredging may generate higher turbidity, requires additional vessel trips and more sediment handling prior to disposal. The resulting longer overall construction duration increases the duration of exposure of project-related impacts to sensitive resources. BUDM would be impracticable compared to the preferred alternative due to the additional handling, i.e., double-handling, transport requirements, and associated costs.

This alternative was determined to be impracticable because it does not meet the project's purpose and need as efficiently as hydraulic dredging.

2.2.2 Alternative Dredged Material Disposal Method: Ocean Disposal (Retained as Contingency Only)

This alternative would involve transporting dredged material by tug and scow to the USEPA-designated Guam Deep Ocean Disposal Site (GDODS), located approximately 20 miles offshore (Figure 16). Due to the distance, USACE anticipates no more than one load per scow per day. Sediment characterization conducted under the Ocean Testing Manual indicates the material is 98% coarse sand and suitable for ocean disposal under federal criteria. Typical scow capacity ranges from 2,000 to 3,000 cubic yards, though scows are often loaded below full capacity to account for ocean conditions during transit.

Figure 16 USEPA Designated GDODS Ocean Disposal Site

Pending site-use approval from USEPA, USACE anticipates ocean disposal would be technically feasible and represent the lowest-cost disposal option. However, this method would permanently remove beach-quality sand from the littoral system, eliminating the opportunity to support shoreline restoration at Nimitz Beach Park. Ocean disposal also requires offshore transit, additional vessel operations, and a longer overall construction duration compared to hydraulic dredging with BUDM.

While ocean disposal meets the purpose and need, hydraulic dredging with beneficial use

placement provides greater overall environmental benefit. Accordingly, ocean disposal is retained only as a contingency alternative.

2.2.3 Alternative Dredged Material Disposal Method: Upland Disposal (Eliminated)

This alternative would require mechanical dredging and trucking the wet material to Nimitz Beach Park for dewatering. Additional sediment testing would be required prior to landfill acceptance, followed by hauling the dewatered dredged material to an existing landfill permitted to accept dredged material. USACE has identified Northern Hardfill in Yigo, approximately 25 miles north of Agat, as a potential disposal facility (Figure 17). The disposal process would require an estimated 800 truckloads on public roadways and approximately 6 months to complete.

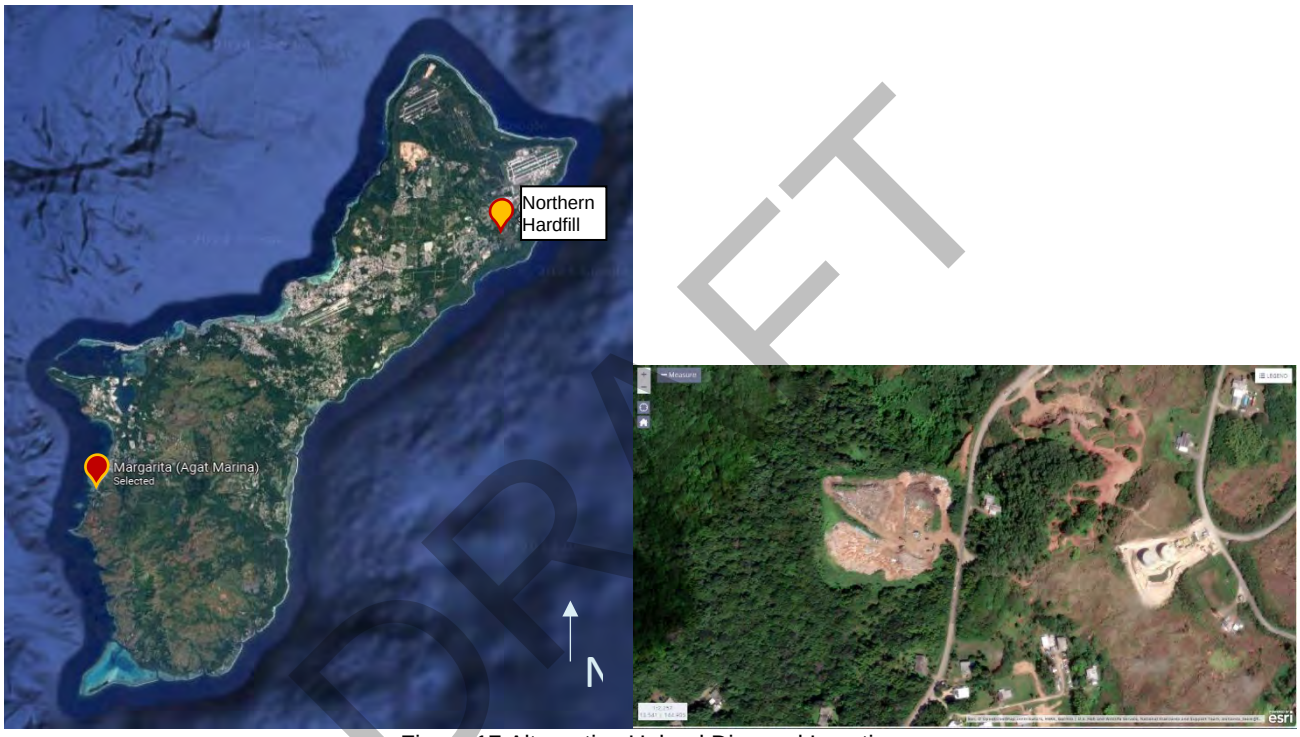


Figure 17 Alternative Upland Disposal Location

Upland disposal would remove beach-quality sand from the littoral system and forego the opportunity to restore the eroded shoreline at Nimitz Beach Park. This alternative requires double-handling (Agat SBH to Nimitz Beach Park; Nimitz Beach Park to landfill) which would significantly draw out the construction duration, substantially increase traffic, emissions, and construction-related disturbance. In coordination with the Government of Guam and USEPA, USACE determined that upland disposal is not environmentally preferable and does not support the project's purpose and need.

This alternative was eliminated from further consideration because it is impracticable relative to hydraulic dredging with beneficial use placement and would result in greater environmental and operational impacts.

2.2.4 Alternative Beneficial Use Location: Agat Mayor's Complex (Eliminated)

The Agat Mayor identified both Nimitz Beach Park and the shoreline fronting the Agat Mayor's Complex (AMC) as potential receptor sites for beneficial use of the clean, beach-quality dredged material. Similar to Section 2.2.1, mechanically dredged sediments would be dewatered at Nimitz Beach Park and then trucked approximately 1.8 miles north along Highway 2 to the shoreline fronting AMC. The material would be placed along the beach in a similar manner to Nimitz Beach Park as necessary to achieve a stable profile (Figure 18).

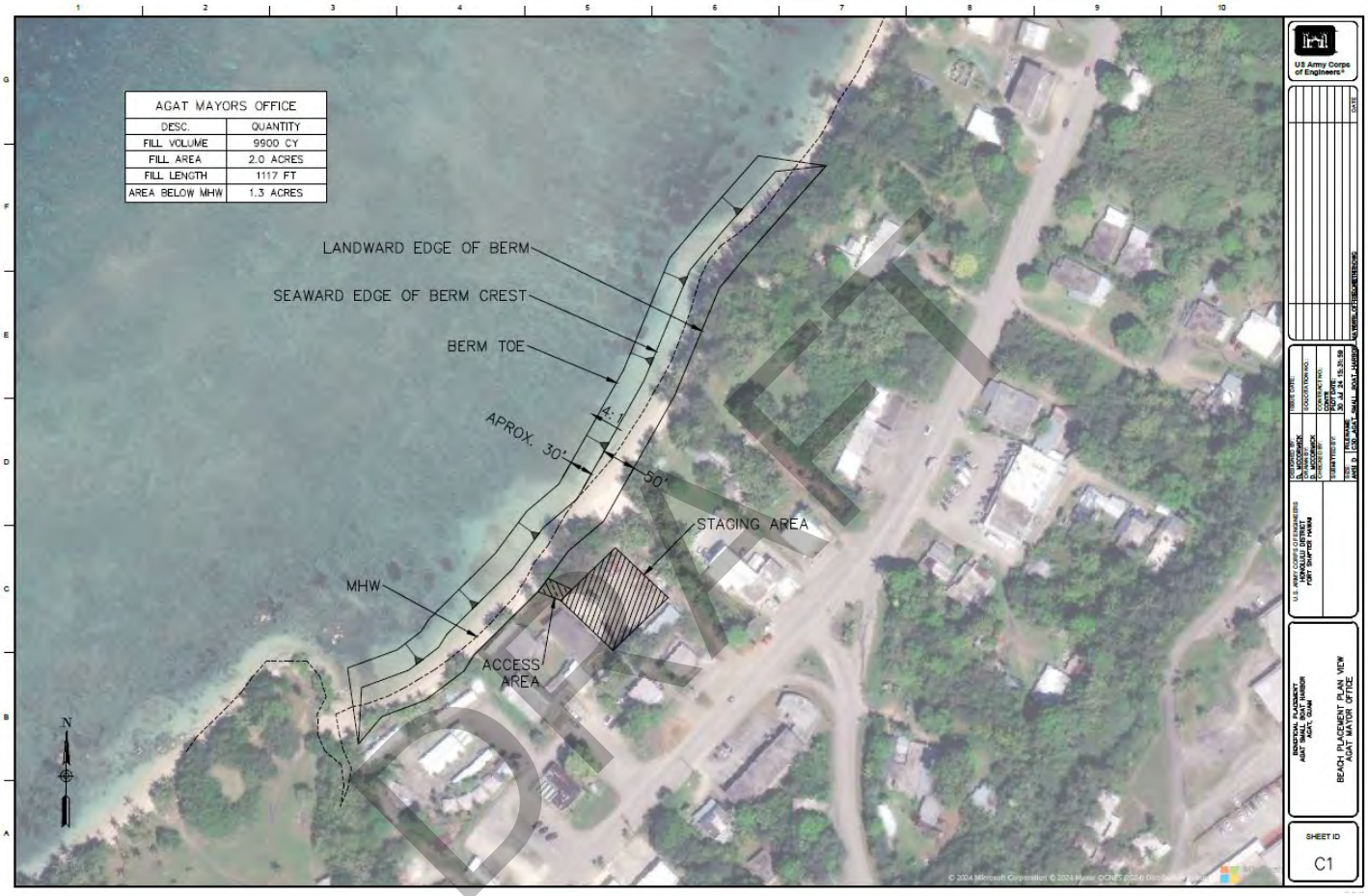


Figure 18Dredged Material Placement at Agat Mayor's Complex (Plan View)

Although this alternative continues to preserve the natural resource, AMC is not located within the same littoral cell as the harbor. Placement at AMC would also require double-handling (Agat SBH to Nimitz Beach Park; Nimitz Beach Park to AMC), compared to direct placement at Nimitz Beach Park.

Beneficial use at AMC does not meet the project's purpose and need as effectively as placement at Nimitz Beach Park and is less efficient operationally. Accordingly, this alternative was eliminated from further consideration.

2.2.5 No Action Alternative

Under the No Action Alternative, maintenance dredging of Agat SBH would not occur, and no BUDM or other sediment management actions would be implemented. Under the current authority funding and authorizing operation and maintenance of Agat SBH, USACE is responsible for maintaining the harbor only. This authority does not extend to Nimitz Beach Park. Accordingly, the opportunity to beneficially use clean, beach-quality sediment to support shoreline restoration at Nimitz Beach Park, utilizing federal funding, would be foregone. Existing erosion along the park's shoreline would continue, and no sediment would be added to the littoral system to improve coastal resilience or public access.

The No Action Alternative neither meets the project's purpose and need nor the USACE responsibility to maintain the completed Corps project, allowing for the ongoing degradation of navigation conditions at Agat SBH. Therefore, this alternative is not considered practicable.

3 AFFECTED ENVIRONMENT

This section describes the affected environment for the proposed maintenance dredging of Agat SBH and the BUDM at Nimitz Beach Park, consistent with the required contents of an Endangered Species Act (ESA) Biological Assessment and an Essential Fish Habitat (EFH) Assessment. This section establishes the baseline physical and biological conditions within the harbor, the adjacent reef-flat and nearshore marine environment, and the terrestrial portions of Nimitz Beach Park where site preparation, staging, and access activities will occur. Together, these areas comprise the action area. USACE reviewed existing literature representing the best available scientific information to define the environmental features, i.e., species and their habitats, that may be directly or indirectly exposed to project-related stressors, within the Action Area. The studies and surveys summarized in Section 3.1 provides the primary information sources used to develop this baseline, supplemented by USACE and ERDC site walkthroughs that informed the identification of terrestrial staging and access areas.

3.1 Data Collected in Support of the Proposed Action

USACE has conducted multiple site-specific technical studies and surveys to characterize the physical (Section 3.2) and biological (Section 3.3) conditions within the action area. These datasets form the primary information sources for the design of the proposed action and to form an understanding of the affected environment necessary to evaluate potential environmental effects. Summaries of each of the following datasets are provided below:

- FY24 Hydrographic Condition Survey (USACE, 2024)
- Agat Bay Regional Shoreline Assessment (USACE, 2020)
- Sampling and Analysis Report for Agat SBH (Element Environmental, 2023)
- Marine Biological Survey of Agat Boat Harbor (MRCI, 2021)
- Marine Biological Survey Surrounding Nimitz Beach Park (ERDC, 2025)

Each study provides unique and complementary information regarding shoreline processes, seafloor morphology, sediment characteristics, and existing physical conditions within and adjacent to the federal navigation channels, as well as biological community composition, habitat distribution, and the presence of resources that may be exposed to project-related stressors. Summaries of each dataset are provided below. Note, terrestrial conditions within Nimitz Beach Park were characterized through several site walkthroughs conducted by USACE and ERDC staff to identify potential staging, access, and site preparation areas; no formal terrestrial biological surveys were performed.

3.1.1 FY24 Hydrographic Condition Survey (USACE, 2024)

The FY24 Hydrographic Condition Survey provides the most recent bathymetric dataset for Agat SBH, documenting existing depths within the federal navigation channels and identifying areas of shoaling relative to authorized project dimensions. The survey includes detailed soundings for the entrance channel (14-foot project depth), turning basin (11-foot project depth), and access channel (9-foot project depth), and serves as the primary dataset for assessing current navigational conditions (USACE, 2024; See Figure 19).

The 2024 survey shows that depths within the federal limits have decreased due to continued

sedimentation, consistent with the sediment-sink behavior identified in the 2020 Regional Shoreline Assessment. Measured depths range from approximately −6 to −13 feet MLLW in the access channel, −10 to −12 feet MLLW in the turning basin, and −12 to −14 feet MLLW in the entrance channel (USACE, 2024). These variations indicate shoaling throughout the system, with some areas approaching or exceeding the loss of authorized depth necessary to maintain safe navigation.

The survey also delineates the spatial distribution of shoaled areas, providing essential information for determining dredge volumes, refining the dredge footprint, and evaluating the extent of sediment accumulation since the last hydrographic survey in 2021. As the most current bathymetric dataset available, the FY24 survey forms the basis for the engineering design of the proposed maintenance dredging and supports the evaluation of both direct and indirect effects associated with sediment removal and placement.

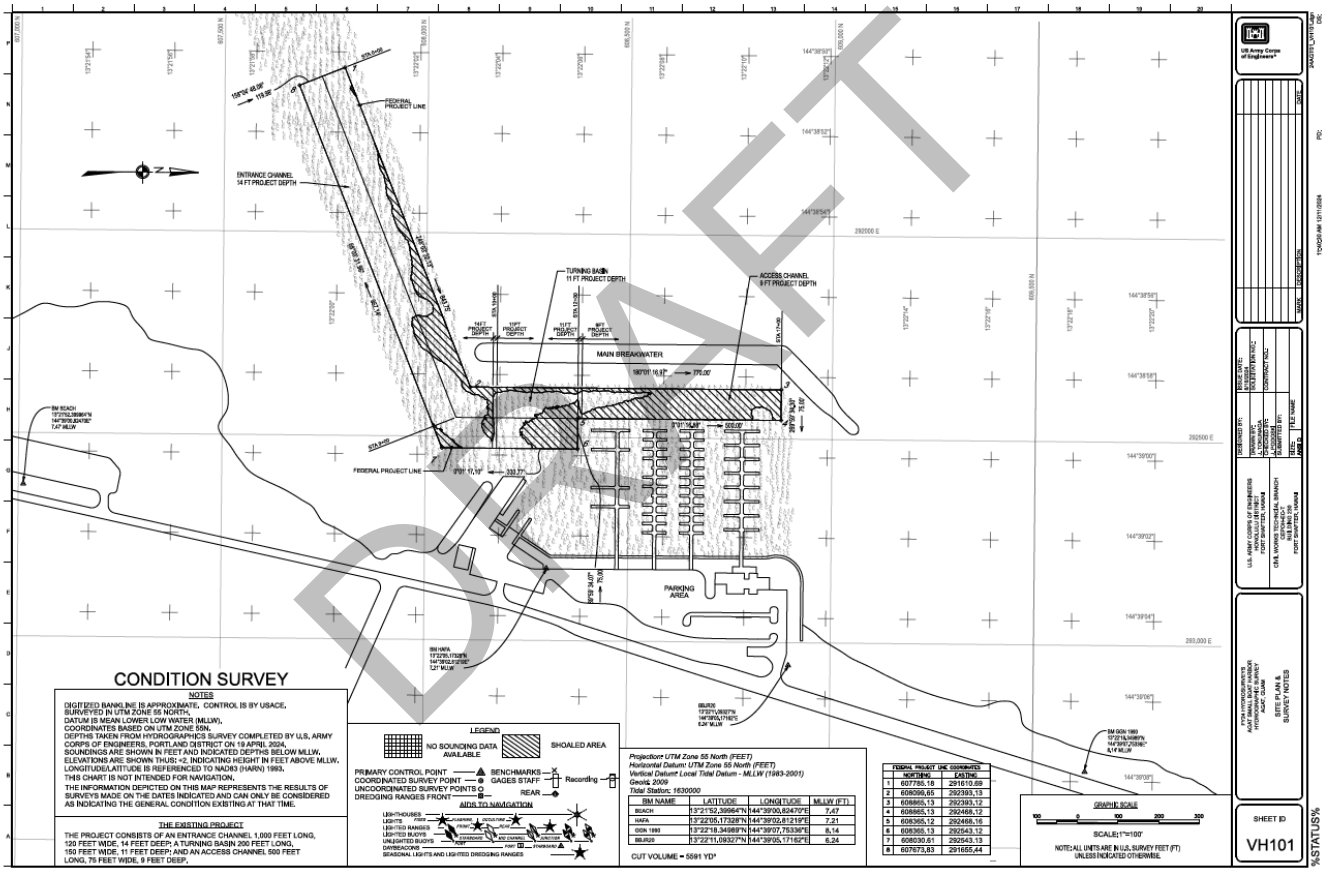


Figure 19 Agat SBH 2024 Hydrographic Survey (USACE)

3.1.2 Agat Bay Regional Shoreline Assessment (USACE, 2020)

The Agat Bay Regional Shoreline Assessment provides a comprehensive evaluation of historical shoreline change, sediment transport, and coastal processes along the western shoreline of Guam, including the area surrounding Agat SBH. The study analyzes long-term shoreline trends, pre- and post-harbor construction conditions, and the influence of local

bathymetry and reef morphology on sediment movement (USACE, 2020).

The assessment concludes that sediment transport in Agat Bay is governed by small, localized circulation cells rather than a single dominant alongshore drift. North of Agat SBH, the prevailing sediment transport direction is from north to south, while at Nimitz Beach Park the direction has reversed from historical patterns since construction of the harbor, and now moves from south to north (USACE, 2020). Hydrographic surveys incorporated into the assessment show that Agat SBH functions as a sediment sink, trapping material that would otherwise move alongshore and contributing to shoaling within the federal navigation channels.

The RSA also identifies chronic erosion along the shoreline fronting Nimitz Beach Park, driven by offshore sediment transport during typical and extreme wave events, region-wide sediment deficits, and elevated water levels in recent years (USACE, 2020). Erosion has progressed landward to the existing vegetation line, resulting in a steep shoreline escarpment and reduced beach width. Although the RSA does not explicitly recommend BUDM from Agat SBH at Nimitz Beach Park, its findings directly informed the development of the current project. The documented sediment deficits, erosion patterns, and harbor-related sediment trapping provide the technical basis for evaluating beneficial use as a practicable and environmentally beneficial alternative.

Accordingly, the RSA supports USACE's pursuit of beneficial use placement as the preferred alternative by demonstrating both the need for sediment along the Nimitz Beach shoreline and the availability of clean, beach-compatible material within the harbor system.

3.1.3 Sampling and Analysis Report for Agat SBH (Element Environmental, 2023)

The Sampling and Analysis Report (SAR) characterizes sediment quality within Agat SBH to evaluate the suitability of dredged material for ocean disposal or beneficial use. The study includes sediment chemistry, grain-size distribution, and physical characteristics of material collected from the entrance channel, turning basin, and access channel (Element Environmental, 2023). Analytical results were compared to applicable screening levels and regulatory criteria to determine whether the material is suitable for unconfined open-water placement, e.g., at G-DODS or upland beneficial use.

The SAR concludes that sediments within the harbor consist primarily of clean, coarse calcareous sand with low concentrations of contaminants. All analytes were below screening thresholds, and no constituents of concern were identified that would limit beneficial use. USACE received approval of the sampling and analysis plan from USEPA prior to conducting the sampling effort and transmitted the results to USEPA for preliminary feedback. USEPA determined by email that Tier 3 bioassay testing was not necessary due to the composition of the dredged material at 98% coarse grain sand.

The SAR is limited to in-harbor sediment characterization and does not include shoreline, nearshore, or terrestrial sampling at Nimitz Beach Park.

3.1.4 Marine Biological Survey of Agat Boat Harbor (MRCI, 2021)

The Marine Biological Survey of Agat Boat Harbor provides high-resolution mapping of seafloor morphology, substrate composition, and habitat structure within and adjacent to the federal navigation channels. Although the primary purpose of the survey was to document biological resources, the dataset includes detailed physical descriptors that directly inform the characterization of the affected environment for the proposed action (MRCI, 2021).

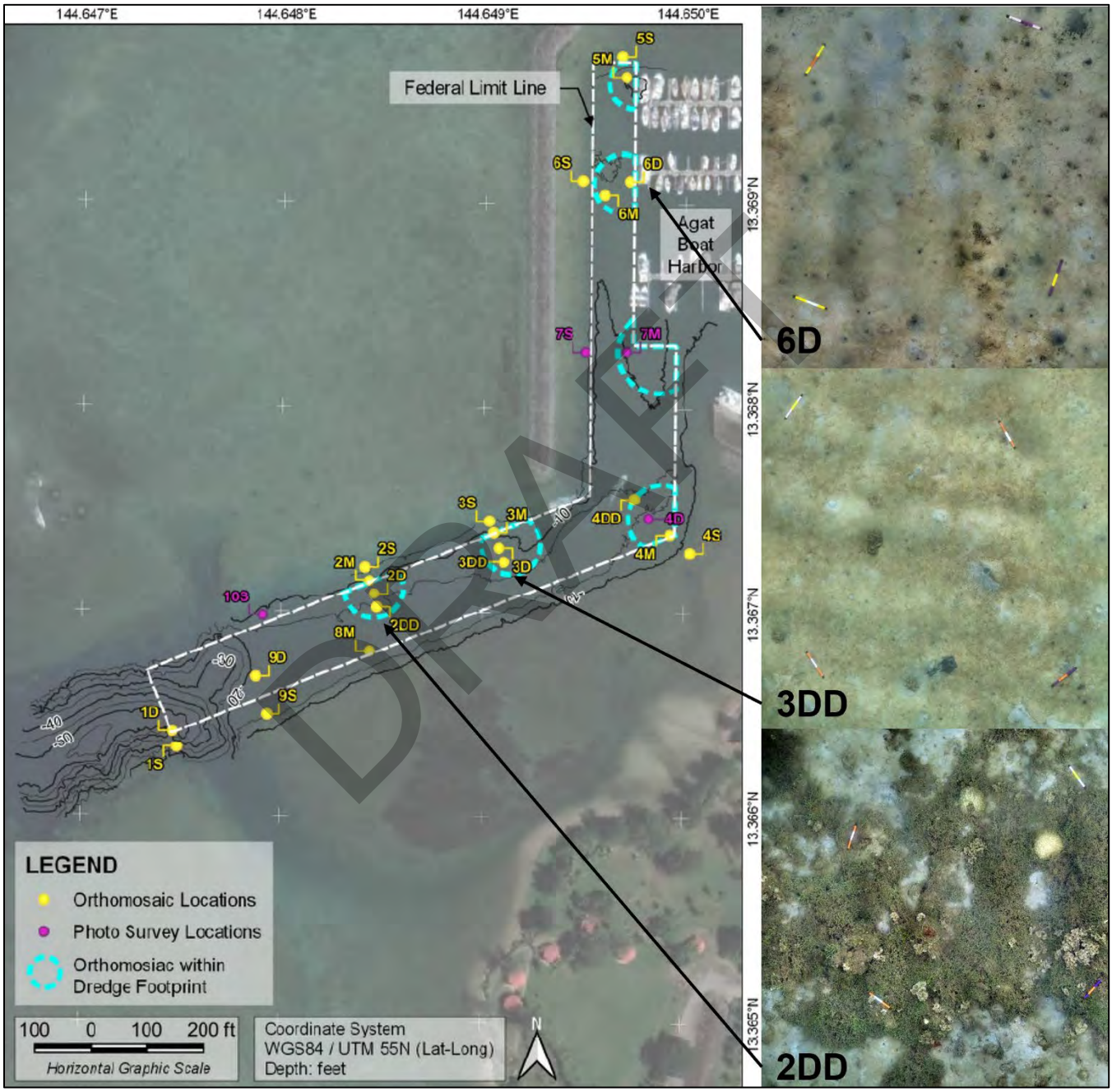


Figure 20 Agat SBH Marine Biological Survey Orthomosaic Sites and Results (MRCI 2021)

Within the federal navigation channels and proposed dredge footprint, the survey documents a predominantly sand-dominated channel floor interspersed with rubble and low-relief hard bottom, confirming that the physical environment most directly affected by dredging consists of unconsolidated carbonate sand and sparse hard-bottom features. The entrance channel consists primarily of sand (average of 65 %) interspersed with algae (26%). Orthomosaics 2DD and 3D characterize the entrance channel. Site 2DD identified two Porites coral heads, the only coral identified within the dredge footprint of the navigation channel. Site 6D, similar to Site 3D characterizes the remainder of the harbor floor as nearly completely barren expanses of sand (MRCI, 2021). See Figure 20.

Outside the federal limits, the survey characterizes two distinct geomorphic settings relevant to evaluating indirect effects: Boundary Reef Flats on the north and south sides of the entrance channel, consisting of shallow sand flats, eroded fossil limestone, and scattered massive and branching corals; and Breakwater Reef Flats along the inner harbor margin, composed of shallow limestone platform and sand patches. These areas exhibit greater structural complexity than the channel floor and represent the primary locations where indirect effects such as turbidity or sediment deposition could occur during dredging (MRCI, 2021).

The survey also maps the High Coral Outer Reef, located seaward of the entrance channel and outside both the federal limits and the anticipated indirect-effects zone. This area is characterized by 20–30-foot depths, high-relief fossil limestone reef, and complex geomorphology (MRCI, 2021). It is important to note that this ecologically sensitive feature occurs beyond the dredge footprint and outside the zone of expected turbidity dispersion.

Overall, the 2021 survey provides the most detailed and spatially explicit mapping of seafloor morphology available for Agat SBH. Its physical and biological descriptors support the distinction between directly affected areas (within the dredge footprint) and adjacent reef flats where only indirect effects may occur and therefore contribute essential baseline information for evaluating the environmental consequences of the proposed maintenance dredging.

3.1.5 Biological Survey of Nimitz Beach (ERDC 2025)

In June 2025, ERDC dove the nearshore area between Agat SBH and Nimitz Beach Park, including the proposed beneficial use placement area to gather biological and geomorphic information. The survey includes mapping of coral heads, seagrass, sandy substrate, reef features, and areas of elevated turbidity (ERDC, 2025).

The dataset identifies the distribution of coral heads within the nearshore zone, including isolated colonies occurring landward of the reef margin in the corridor between the harbor and Nimitz Beach. Seagrass beds are mapped in shallow areas north of Nimitz Beach Park, providing information on the extent and location of benthic vegetation that may be exposed to turbidity or sedimentation during beneficial use placement. The survey also delineates reef areas in the remnant reef/high coral cover area from which the harbor was constructed and the sandy substrate and zone of high turbidity in the shallow subtidal and intertidal waters of Nimitz Beach, offering a spatial understanding of habitat types and water-quality conditions

where beach reclamation is proposed. See Figure 21.

The survey provides essential information for evaluating potential effects of BUDM on biological resources in proximity to Nimitz Beach. Although primarily biological in focus, the mapping of substrate types and turbidity patterns also contributes to the physical characterization of the nearshore environment relevant to the proposed action. The survey is limited to nearshore marine habitats and does not include terrestrial portions of the action area at Nimitz Beach Park.

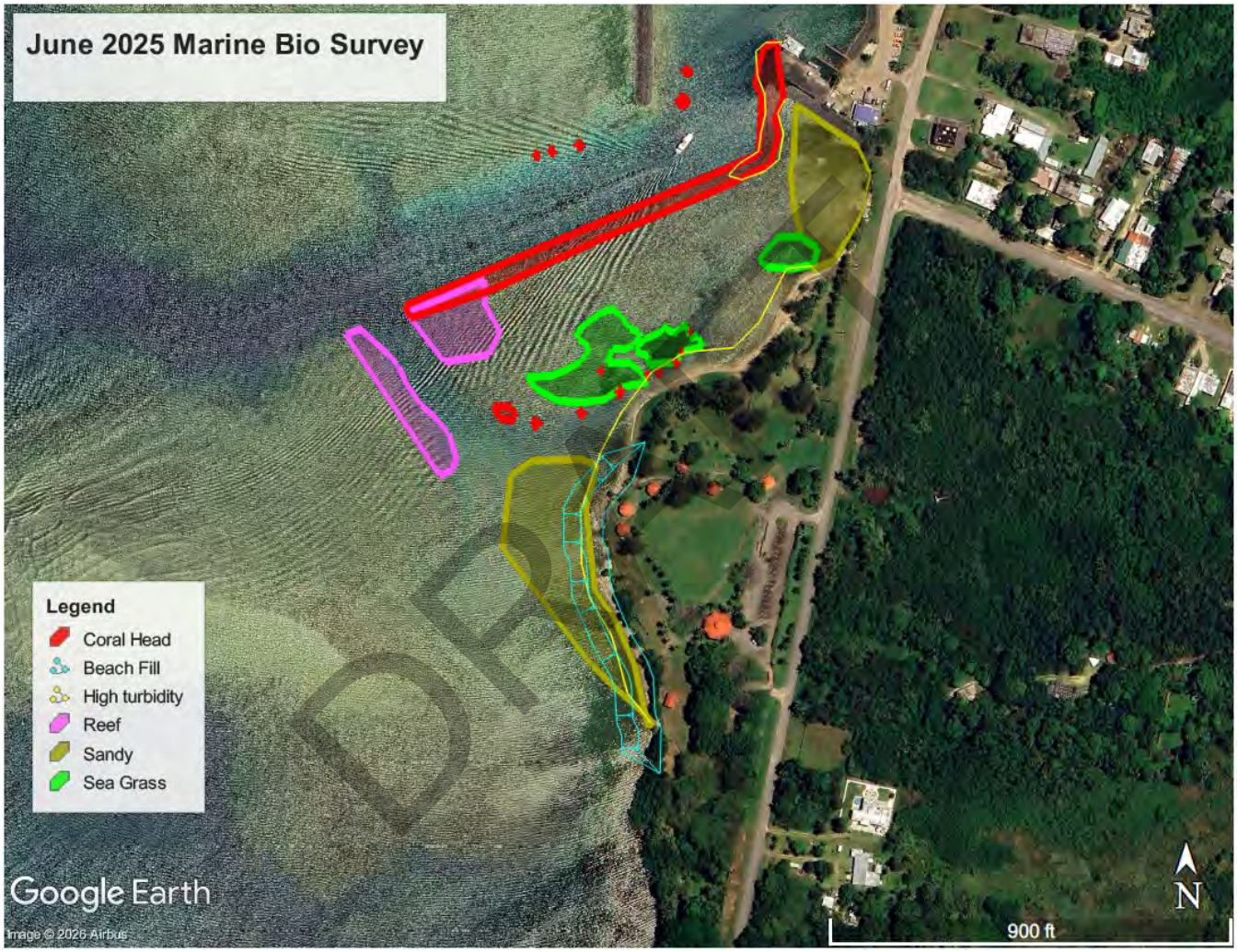


Figure 21 Results of marine biological survey fronting Nimitz Beach and towards Agat SBH (USACE 2025)

3.2 Physical Setting

This section describes the physical setting of the action area, including the dredged harbor basin, the adjacent reef-flat and nearshore marine environment, and the terrestrial portions of Nimitz Beach Park where site preparation, staging, and access activities will occur. The physical setting encompasses seafloor morphology, shoreline conditions, sediment characteristics, and coastal geomorphology, as well as the upland park features that form the

landward extent of the action area. Information presented in this section is derived from the technical studies summarized in Section 3.1, including hydrographic surveys, shoreline assessments, and marine biological mapping, supplemented by USACE and ERDC walkthroughs that documented existing physical conditions within the terrestrial staging and access areas.

3.2.1 Bathymetry

Agat SBH is an engineered basin excavated from a former shallow reef-flat environment, creating a deepened, anthropogenically modified seafloor within the federal navigation channels (MRCI, 2021). Construction of the entrance channel, turning basin, and access channel involved cutting through limestone platform and carbonate sand, producing depths that contrast with the surrounding natural reef flats.

The most recent hydrographic survey documents current bathymetric conditions and areas of shoaling relative to authorized project depths (USACE, 2024). Depths within the federal limits range from approximately −6 to −14 feet MLLW, reflecting sediment accumulation since prior surveys.

Outside the federal channels, the seafloor transitions quickly to shallow reef-flat topography composed of low-relief fossil limestone, sand patches, and scattered hard-bottom features (MRCI, 2021). This natural reef-flat morphology forms the broader physical setting surrounding the harbor entrance and adjacent shoreline.

3.2.2 Substrate

Substrate within the federal navigation channels consists predominantly of coarse calcareous sand with less than 2 percent fines, reflecting the carbonate-dominated material that accumulates within the dredged basin (Element Environmental, 2023). The channel floor also contains intermittent patches of rubble and low-relief hard bottom, consistent with a previously excavated and anthropogenically modified environment (MRCI, 2021).

Outside the federal limits, substrate transitions to natural reef-flat conditions composed of shallow sand flats, eroded fossil limestone, and scattered hard-bottom features (MRCI, 2021). These mixed substrates extend along the harbor entrance and adjacent shoreline. In the nearshore area fronting Nimitz Beach Park, substrate is primarily unconsolidated sand, consistent with the shoreline setting and the mapped distribution of sandy bottom in the 2025 nearshore survey (ERDC, 2025). Water depth and substrate distribution define the benthic habitats within the action area.

3.2.3 Benthic Habitats

Benthic habitats within the action area reflect the transition from the dredged harbor basin to the natural reef-flat and nearshore environments that characterize the broader Agat shoreline. Within the federal navigation channels, the seafloor consists primarily of coarse calcareous sand with intermittent rubble and low-relief hard bottom, consistent with a previously excavated basin that continues to accumulate sediment (Element Environmental 2023; MRCI 2021).

Biological resources within the dredged basin are limited due to low substrate complexity and regular sediment infilling.

Outside the harbor limits, benthic habitat transitions to natural reef-flat conditions composed of fossil limestone pavement, shallow sand patches, and scattered hard-bottom features (MRCI 2021). The FWCA Planning Aid Letter identifies areas of higher coral cover along the hard pavement bordering the dredged channel between the harbor and Nimitz Beach Park, as well as additional coral colonies near the outer harbor entrance (FWCA Planning Aid Letter 2025). Seagrass beds and additional coral colonies occur north of the Nimitz Beach Park shoreline, where the conveyance pipeline will be floated between the harbor and the beach (FWCA Planning Aid Letter 2025).

The Service also noted that portions of the southern nearshore area were not surveyed and may contain additional benthic resources outside the documented footprint (FWCA Planning Aid Letter 2025). These benthic habitat patterns define the physical structure of the seafloor adjacent to the shoreline and provide the substrate template on which biological communities occur.

3.2.4 Coastal Processes

Coastal processes in Agat Bay are influenced by localized circulation cells that move sediment along short, discrete pathways rather than a single dominant alongshore drift (USACE, 2020). North of Agat SBH, sediment generally moves from north to south, while at Nimitz Beach Park the transport direction is reversed, moving from south to north following harbor construction (USACE, 2020). These patterns are consistent with the accumulation of sand within the federal navigation channels documented in recent hydrographic surveys (USACE, 2024).

The RSA describes seasonal swell regimes, storm-driven wave conditions, and elevated water levels that affect sediment mobility and shoreline change along the western coast of Guam (USACE, 2020). These processes have contributed to long-term accretion along the northern portion of Nimitz Beach, where uplands have gradually built seaward, and erosion along the southern portion, where wave action and sediment deficits have produced a steep shoreline escarpment and caused the vegetation line to recede landward. Similar storm-driven erosion patterns, including episodic overwash and exposure of the coastal terrace along adjacent segments of the Agat shoreline, are described in the Agat Section 14 Draft IFR-EA (USACE, 2024).

Nearshore wave action and wave runup along the shoreline fronting Nimitz Beach Park regularly suspend sand and fine material, producing naturally elevated turbidity in the shallow nearshore zone (USACE, 2020). Tidal fluctuations and water-level anomalies further influence nearshore hydrodynamics, affecting the depth and extent of wave interaction with the shoreline and adjacent reef flats (USACE, 2020).

Together, these processes define the prevailing sediment movement, shoreline evolution, and turbidity conditions within the action area.

3.2.5 Shoreline and Nearshore Conditions

The shoreline fronting Nimitz Beach Park consists of a sandy beach backed by low-lying coastal terrain. The RSA documents long-term shoreline change in this area, including accretion along the northern portion of the beach, where uplands have gradually built seaward since construction of Agat SBH, and erosion along the southern portion, where sediment deficits and wave-driven transport have caused the shoreline to retreat landward (USACE, 2020). This erosion has produced a steep shoreline escarpment and resulted in the recession of the vegetation line, narrowing the beach berm and exposing the landward edge of the coastal terrace. Comparable shoreline conditions—including escarpment formation, vegetation-line retreat, and the presence of a narrow, low-lying coastal terrace immediately landward of the beach—are documented for adjacent portions of the Agat Bay shoreline in the Agat Section 14 Draft IFR-EA (USACE, 2024).

Nearshore substrate in the placement area is predominantly unconsolidated sand, consistent with the shoreline setting and recent nearshore mapping (ERDC, 2025). Regular wave action and wave runup suspend sand and fine material in the shallow nearshore zone, resulting in naturally elevated turbidity along the shoreline (USACE, 2020). A USACE coastal engineer walked Nimitz Beach and observed coarse grain sand with a higher content of fines than the harbor sands. The coastal engineer opined that the dredged material would be compatible at Nimitz Beach.

These features characterize the physical shoreline and nearshore environment adjacent to the proposed placement area and define the transition between the marine environment and the terrestrial portions of Nimitz Beach Park.

3.2.6 Summary of Physical Conditions

The action area encompasses a dredged harbor basin, surrounding reef-flat habitats, and the shoreline and nearshore zone fronting Nimitz Beach Park. Bathymetry within the harbor reflects its origin as an excavated basin, with depths modified by sediment infilling documented in recent hydrographic surveys (USACE 2024). Substrate inside the federal navigation channels consists primarily of coarse calcareous sand with minor fines, while natural reef-flat areas outside the harbor contain fossil limestone, sand patches, and scattered hard bottom (MRCI 2021; Element Environmental 2023).

Benthic habitat distribution reflects the transition from the dredged basin to natural reef-flat conditions, including limestone pavement, sand patches, scattered hard bottom, and localized coral and seagrass resources documented in the 2021 and 2025 surveys (MRCI 2021; FWCA Planning Aid Letter 2025). Coastal processes in Agat Bay are shaped by localized circulation cells, seasonal wave conditions, and tidal fluctuations, which influence sediment movement and nearshore turbidity patterns (USACE 2020).

Shoreline mapping shows long-term accretion along the northern portion of Nimitz Beach Park and erosion along the southern portion following harbor construction (USACE 2020). The nearshore zone is characterized by unconsolidated sand and naturally elevated turbidity

associated with regular wave action and wave runup (ERDC 2025; USACE 2020). Landward of the shoreline, the physical setting includes a narrow, low-lying coastal terrace where erosion has produced a shoreline escarpment and caused vegetation-line retreat.

These physical characteristics define the environmental setting in which biological communities occur within the action area.

3.3 Biological Setting

Biological conditions within the action area have been characterized using the 2021 USACE marine biological survey of Agat SBH and the 2025 ERDC nearshore survey extending between the harbor and Nimitz Beach Park. The U.S. Fish and Wildlife Service (Service, USFWS) did not conduct independent field surveys but reviewed and synthesized these datasets to identify the distribution of coral colonies, seagrass beds, hard-bottom features, and sandy substrate within and adjacent to the project footprint (FWCA Planning Aid Letter, 2025; FWCA Technical Assistance Letter, 2024). The Service also incorporated general terrestrial observations from USACE and USFWS site visits associated with nearby shoreline-protection planning efforts, which document a narrow, highly modified coastal terrace and a vegetation line influenced by long-term shoreline change. These terrestrial observations provide context for the limited upland biological resources within the action area but do not constitute a formal terrestrial survey.

The following subsections describe the benthic habitats, fish and wildlife resources, EFH, and ESA-listed species known or expected to occur within the action area based on these available data. Terrestrial biological conditions are described only at a high level, consistent with the limited information available from USACE and USFWS walkthroughs and the absence of site-specific terrestrial biological surveys. This approach is consistent with anticipated impacts of the waterborne activity.

3.3.1 Fish and Wildlife Resources

3.3.1.1 Marine Resources

The descriptions below reflect biological resources documented in the 2021 USACE and 2025 ERDC surveys and in the Service's FWCA correspondence, and do not characterize potential or unobserved species use. Fish and wildlife resources within the action area reflect the transition from the dredged harbor basin to natural reef-flat, nearshore, and shoreline environments.

Marine fish assemblages documented in the 2021 USACE survey and the 2025 ERDC nearshore survey include species associated with sandy bottom, low-relief hard bottom, and reef-flat habitats. These surveys identified common reef and nearshore taxa such as surgeonfishes, wrasses, damselfishes, and goatfishes, with higher species richness and abundance occurring along the natural hard-bottom features outside the dredged basin. The FWCA Planning Aid Letter notes that these reef-flat and nearshore habitats support a diverse assemblage of juvenile and adult reef fishes and provide foraging habitat for mobile predators (FWCA Planning Aid Letter 2025). These observations represent the best available information

on fish assemblages within the action area.

Invertebrate resources within the action area include coral colonies, macroinvertebrates associated with hard-bottom features, and infaunal organisms within sandy substrate. The 2021 USACE marine biological survey documented two isolated *Porites* coral colonies within the entrance channel, representing the only hard corals observed within the dredge footprint. Outside the harbor, additional coral colonies occur along the hard pavement bordering the dredged channel and within reef-flat areas north of Nimitz Beach Park, as documented in the 2021 USACE survey, the 2025 ERDC nearshore survey, and the FWCA Planning Aid Letter (2025). Macroalgal communities, including *Halimeda* spp. and *Caulerpa* spp., were observed within the channel and nearshore habitats, contributing to the biological structure of sandy and mixed-substrate areas. These invertebrate and macroalgal observations are limited to areas surveyed and do not extend beyond documented features.

Seagrass resources within the action area are limited but present. The 2021 USACE survey identified a small patch of *Halophila* sp. within the access channel, with localized cover up to 4 percent in one mid-depth orthomosaic and an average of approximately 1 percent across the channel habitat. The 2025 ERDC nearshore survey also documented seagrass (*Halophila* sp.) in the shallow marine waters between the harbor and Nimitz Beach Park, including within the corridor where the conveyance pipeline will be floated. These nearshore seagrass patches occur north of the northern shoreline of Nimitz Beach Park and are highlighted in the FWCA Planning Aid Letter as resources that may be susceptible to turbidity or disturbance during pipeline deployment (FWCA Planning Aid Letter 2025). These mapped seagrass areas represent the full extent of documented seagrass within the action area.

Sea turtles are known to transit the nearshore waters fronting Nimitz Beach Park and Agat SBH, where sandy substrate and shallow depths provide potential foraging and resting habitat. No sea turtles were observed during the 2021 or 2025 surveys, and available information reflects potential rather than confirmed use.

3.3.1.2 Terrestrial Resources

No formal terrestrial biological survey was conducted for this project. USACE and ERDC staff have conducted several site visits to refine the project design, identifying alternatives and contingencies based on site conditions. The study area of the Agat Section 14 IFR-EA covers a similar coastal area of Agat Bay just north of the action area (USACE, 2024). The Affected Environment section provides the best available information for characterizing terrestrial vegetation and wildlife use within the action area.

The park is a high-use public recreational area with grassed parkland and sandy beach. The Government of Guam Department of Parks and Recreation provides regular landscaping and groundskeeping. The vegetation reflects a mix of ornamental and native coastal vegetation typical of Agat's coastal areas such as scattered *coconut palms (*Cocos nucifera), ironwood trees (*Casuarina equisetifolia*), and other planted vegetation. A mature, mixed-species forested area borders the main parking area at the southern end of the beach park, where

equipment and materials will be staged. Groundcover species such as morning glory and native coastal trees including pagu (*Hibiscus tiliaceus*) form the vegetation line at the top of the beach. The shoreline also contains remnant pagu, ironwood, and coconut stumps, reflecting the long-term erosion that has affected the beach margin. Wildlife use of the park is typical of developed coastal environments on Guam and includes species adapted to disturbed or landscaped habitats, as described in the IFR-EA.

Additional discussion of terrestrial ESA-listed species (Mariana fruit bat and three tree snail species) and proposed terrestrial critical habitat for the green sea turtle is provided in Section 3.3.3.2.

The FWCA Planning Aid Letter identifies the nearshore zone as potential habitat for green sea turtles (*Chelonia mydas*), consistent with regional observations of turtle use of sandy and mixed-substrate nearshore environments.

Shoreline and intertidal wildlife resources are limited due to the narrow, wave-washed beach and the absence of stable intertidal platforms. Occasional use of the beach by shorebirds is possible, and the FWCA Technical Assistance Letter notes that species such as Pacific golden plover (*Pluvialis fulva*) may occur opportunistically along developed shorelines in the region (FWCA Technical Assistance Letter, 2024).

3.3.2 Essential Fish Habitat

Essential Fish Habitat (EFH) within the action area is designated under the Magnuson–Stevens Fishery Conservation and Management Act for federally managed species of the Mariana Archipelago and Pacific Pelagic Fisheries. EFH descriptions for these fisheries are published in the Fishery Ecosystem Plan (FEP) for the Mariana Archipelago and the FEP for Pacific Pelagic Fisheries of the Western Pacific Region (WPRFMC 2009a, 2009b), replacing the former Fishery Management Plans. Under these FEPs, EFH remains designated for Mariana Bottomfish and Pelagic Management Unit Species (MUS), while Crustacean and Coral Reef MUS were reclassified as Ecosystem Component Species under FEP Amendment 5 (WPRFMC 2018).

3.3.2.1 Mariana Bottomfish EFH

Mariana Bottomfish MUS, including snappers, groupers, emperors, and jacks, utilize a broad range of benthic and water-column habitats from the shoreline to 400 meters in depth, as well as the water column from the surface to 1,000 meters (WPRFMC 2009a). Within this depth range, the FEP identifies EFH for bottomfish MUS as the water column and the underlying benthic habitats, including unconsolidated sand, rubble, and other soft-bottom substrates that support benthic infauna and small crustaceans serving as prey for these species (WPRFMC 2009a).

3.3.2.2 Pelagic EFH

Pelagic MUS, including tunas, billfishes, and other wide-ranging oceanic species, rely on the water column rather than benthic habitats for all life stages. The Pelagic FEP identifies EFH for these species as the water column from the shoreline to the outer boundary of the EEZ,

extending to 0–200 meters for eggs and larvae and 0–1,000 meters for juveniles and adults (WPRFMC 2009b). Pelagic species forage on mobile nekton, micronekton, and zooplankton in the open water column and not in benthic habitats. Benthic habitat disturbance such as can be expected from maintenance dredging and fill activities does not affect EFH for Pelagic MUS. EFH effects for these species are limited to water-column pathways such as turbidity or entrainment.

3.3.2.3 EFH within the Action Area

Based on the physical and biological setting within the action area, EFH consists of shallow water-column EFH for Pelagic and Bottomfish MUS and unconsolidated sandy substrate EFH for Mariana Bottomfish MUS. Coral colonies, scattered hard-bottom features, and localized seagrass patches occur within the nearshore environment and contribute to the ecological diversity of Agat Bay; however, these habitats are not identified as EFH for the MUS evaluated in this consultation in either the Mariana Bottomfish or Pelagic FEPs (WPRFMC 2009a, 2009b). EFH within the dredged harbor basin is limited due to low substrate complexity and regular sediment infilling, although the water column remains designated EFH for pelagic life stages of both MUSs.

3.3.2.4 HAPC in the Action Area

No Habitat Areas of Particular Concern (HAPC) occur within the EFH action area. EFH types such as mangroves, lagoon or estuarine habitats, surge zones, deep reef slopes, banks, seamounts, or pelagic ecosystems are not present within or adjacent to the project footprint. These EFH types are not discussed further in this analysis.

3.3.3 Endangered Species

ESA-listed species under the jurisdiction of NMFS and USFWS that may occur within or near the action area include marine species associated with the nearshore waters of Agat Bay and terrestrial species associated with the narrow upland strip landward of Nimitz Beach Park. Pursuant to Section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), USACE requested technical assistance from NMFS and USFWS on protected species in Agat Bay in September 2024. The Services provided identified species and critical habitat, both listed and proposed for listing, within each respective agencies' jurisdiction that may occur within the action area. The compiled species list is below:

Table 1: Compiled ESA Species List* potentially present in the ESA Action Area.

Common Name	Scientific Name	Status	Critical Habitat (Y/N)	Observed in Action Area (Y/N)
Green sea turtle, Central West Pacific DPS	*Chelonia mydas*	Endangered	Proposed 7/19/2023 88 FR 46572	Likely present
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	N; Not in Action Area	Unlikely to occur
Indo-West Pacific scalloped hammerhead shark	*Sphyrna lewini*	Threatened	No	Likely present
Indo-Pacific Coral	*Acropora globiceps*	Threatened	Y; Designated 7/15/2025 90 FR 31800	N; not observed in any survey
Giant Clam (Proposed 7/25/2024 89 FR 60498)	*Tridacna derasa* *T. gigas* *Hippopus hippopus*	Endangered Endangered Threatened	N/A	N; not observed in any survey
Mariana fruit bat	*Pteropus mariannus*	Threatened	N; None Designated	No record
Humped tree snail/ akaleha'	*Partula gibba*	Endangered	N; None Designated	Awaiting Pre-Construction Survey Results
Guam tree snail, akaleha'	*Partula radiolata*	Endangered	N; None Designated	Awaiting Pre-Construction Survey Results
Fragile tree snail, akaleha'	*Samoana fragilis*	Endangered	N; None Designated	Awaiting Pre-Construction Survey Results
*Cyan shading indicates shared NMFS and USFWS jurisdiction, blue shading indicates NMFS jurisdiction, Green shading indicates USFWS jurisdiction.				

3.3.3.1 ESA Species – NMFS Jurisdiction

This BA incorporates by reference the species accounts, life-history information, and regional distribution summaries provided in the Biological Evaluation of the Effects of Implementing Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES) (USACE & NMFS, 2022). Although the proposed action includes activities that are not eligible for Pac-SLOPES coverage, several components of the action are similar to activity types evaluated in the Pac-SLOPES programmatic consultation. Accordingly, Pac-SLOPES provides the foundational biological information for ESA-listed marine species in the region. This BA augments that baseline with updated best available scientific information (BASI) published since 2022, including new Federal Register actions, updated population trends, revised threat assessments, and species-specific information relevant to the action area.

For species whose regulatory status has changed since 2022, including Indo-Pacific coral critical habitat (final rule), green sea turtle marine critical habitat (proposed rule), and the proposed listing of ten giant clam species. This BA provides updated biological descriptions, habitat associations, and threat analyses based on the most recent NOAA technical

memoranda, status review reports, and Federal Register notices.

3.3.3.1.1 Species With No Regulatory Change Since 2022

These species retain the regulatory status described in Pac-SLOPES (2022). Pac-SLOPES provides the baseline biology, supplemented with updated BASI where available.

3.3.3.1.1.1 Green Sea Turtle (*Chelonia mydas*) – Central West Pacific DPS, Endangered (81 FR 20057)

The green sea turtle was listed as threatened on July 28, 1978 (43 FR 32800). On April 6, 2016 a final rule to list each population by one of 11 distinct population segments was issued and identified eight DPSs as threatened and three as endangered (81 FR 20057). Life-history, distribution, and threat information is incorporated by reference from Pac-SLOPES (USACE & NMFS, 2022). Updated BASI indicates continued regional population variability, with some Western Pacific nesting sites showing stable or increasing trends while others exhibit declines associated with climate-driven nest loss and disease prevalence (Seminoff et al., 2015). Vessel strike risk remains a significant threat in nearshore habitats (Hazel et al., 2007).

Agat occurrence: While green sea turtles are common in nearshore marine waters around Guam, including harbor environments, no individuals were observed during either the 2021 USACE or 2025 ERDC surveys. The FWCA Planning Aid Letter identifies the nearshore zone as potential foraging and transit habitat.

Critical Habitat: Critical habitat for the Central West Pacific DPS was proposed by NMFS (88 FR 46572) and USFWS (88 FR 46376) in 2023 and after drafting of Pac-SLOPES. The description of proposed marine critical habitat and its applicability to the action area is provided in Section 3.3.3.1.2.2.

3.3.3.1.1.2 Hawksbill Sea Turtle (*Eretmochelys imbricata*), Endangered (35 FR 8490)

The hawksbill sea turtle was listed as endangered on June 2, 1970 (35 FR 8490) Pac-SLOPES provides the baseline biology. Updated BASI indicates continued low abundance in the Western Pacific, with threats including entanglement, illegal harvest, and climate-driven coral loss (NMFS & USFWS, 2013).

Agat occurrence: No individuals observed in 2021 or 2025 surveys; reef-crest and fore-reef habitats preferred by hawksbills are absent. Occurrence is unlikely.

Critical Habitat: None designated in Guam.

3.3.3.1.1.3 Scalloped Hammerhead Shark (*Sphyrna lewini*) – Indo-West Pacific DPS, Threatened (79 FR 38213)

The scalloped hammerhead shark (*Sphyrna lewini*) was listed as threatened under the ESA for the Indo-West Pacific Distinct Population Segment (DPS), which includes Guam and CNMI, on July 3, 2014 (79 FR 38213). Pac-SLOPES provides baseline biology. Updated BASI indicates continued global declines due to bycatch and fin trade (Miller et al., 2013); juvenile use of shallow coastal habitats documented in other regions (Jorgensen et al., 2009); and significant

population reductions across the Indo-Pacific driven by cumulative fishing pressure, habitat degradation, and climate-related stressors (Pacoureau et al., 2021).

Agat occurrence: Although NMFS and regional fishery ecosystem plans identify Apra Harbor as a known nursery area for scalloped hammerhead sharks, no such nursery-type habitat has been documented in Agat Bay. The action area lacks the sheltered, low-energy embayment characteristics associated with pupping and neonate rearing. No scalloped hammerhead sharks have been documented in Agat Bay or Agat SBH in any available biological surveys (USACE 2021; ERDC 2025; Element Environmental & Anchor QEA 2023). NMFS has noted that Guam's shallow coastal waters may function as potential nursery-type habitat for neonates, but no such use has been documented in Agat Bay. Any occurrence by juveniles or adults would be transient.

Critical Habitat: None designated.

3.3.3.1.1.4 Indo-Pacific Coral (79 FR 53851), Threatened

Acropora globiceps was listed as threatened on September 10, 2014 (79 FR 53851). Pac-SLOPES provides baseline biology for *Acropora globiceps*, *A. retusa*, *A. speciosa*, *Isopora crateriformis*, and *Euphyllia paradivisa*. Studies indicate an increasing vulnerability to bleaching, sedimentation, and ocean acidification (Brainard et al., 2011). Although all five species have ranges that include Guam, only *A. globiceps* has been documented in Guam (Brainard et al., 2011). Both 2021 and 2025 marine biological surveys conducted for the proposed action did not observe *A. globiceps* within the survey area.

Agat occurrence: The 2021 USACE survey documented only two scattered, individual colonies of *Porites* spp. on the floor of the harbor entrance channel; no ESA-listed corals were identified. The FWCA Planning Aid Letter confirms absence of listed corals.

Critical Habitat: See **Section 3.3.3.1.2.1**.

3.3.3.1.2 Species With Regulatory Change Since 2022

These species have undergone ESA regulatory changes since Pac-SLOPES (2022), e.g., proposed or final listing, and require updated biological descriptions, habitat associations, and regulatory context.

3.3.3.1.2.1 Indo-Pacific Corals: Final Critical Habitat Designation (2025)

Regulatory Context

At the time Pac-SLOPES was finalized, critical habitat for the five Indo-Pacific ESA-listed corals (*Acropora globiceps*, *A. retusa*, *A. speciosa*, *Isopora crateriformis*, and *Euphyllia paradivisa*) had been proposed but not finalized (85 FR 76262). In July 2025, NMFS published the Final Rule designating critical habitat for these species (90 FR 31800).

The final rule designates critical habitat in several U.S. Pacific jurisdictions, including American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Pacific Remote Islands, and Hawai'i. Designated units contain the physical and biological features essential to

the conservation of the listed coral species.

Essential Features:
The final rule identifies a single essential feature shared across all five species: Sites that support the normal function of all life stages of the corals (reproduction, recruitment, and maturation) consisting of natural, consolidated hard substrate or dead coral skeleton that is free of algae and sediment at the appropriate scale at the point of larval settlement or fragment reattachment, and the associated water column.

Guam Critical Habitat Units
The 2025 Final Rule designates multiple critical habitat units in Guam, primarily located along the island's western and northern reef systems. These units include areas where essential features occur at sufficient quality and extent to support conservation of the listed coral species.

Action Area Applicability
The 2025 Final Rule excludes certain federally managed areas from critical habitat designation where chronic disturbance, altered substrate, or persistent sedimentation prevent the essential feature from occurring. Agat Harbor is explicitly identified in the rule as a federally authorized channel and harbor that does not provide the quality of natural, consolidated hard substrate or dead coral skeleton necessary to support the conservation of the five Indo-Pacific coral species; therefore, the harbor interior and maintained channel are not designated critical habitat. Outside the harbor footprint, however, portions of the action area include natural reef flat and high-coral-cover habitats that meet the essential feature definition—specifically, areas of consolidated hard substrate or dead coral skeleton free of algae and sediment, along with the associated water column. These areas fall within designated critical habitat under the final rule. In contrast, the unconsolidated sediments that characterize the proposed beach-reclamation footprint do not contain the essential feature and are not designated critical habitat. As a result, the action area encompasses excluded managed areas (the harbor and channel), areas that do not meet the critical habitat definition (sandy beach fill area) and designated critical habitat (reef flat and adjacent natural substrate areas outside the harbor).

3.3.3.1.2.2 Green Sea Turtle (*Chelonia mydas*) Proposed Marine Critical Habitat

Regulatory Context
At the time Pac-SLOPES was finalized (USACE & NMFS, 2022), no marine critical habitat had been proposed for the Central West Pacific Distinct Population Segment (DPS) of the green sea turtle. On July 19, 2023, NMFS published a Proposed Rule to designate marine critical habitat for this DPS (88 FR 46572). On the same date, USFWS published a Proposed Rule to designate terrestrial habitat for this DPS (88 FR 46376). Under the joint NMFS–USFWS framework, NMFS is responsible for marine critical habitat, while USFWS is responsible for terrestrial nesting habitat. This subsection addresses only the marine portion of the proposed designation.

The proposed rule identifies marine areas that contain the physical and biological features

essential to the conservation of the DPS, including foraging habitat, resting habitat, and migratory corridors connecting foraging and nesting areas.

Essential Marine Habitat Features
In the proposed rule, NMFS identified marine critical habitat for the Central West Pacific DPS by evaluating the best available scientific information on green turtle habitat use within U.S. waters, focusing on areas that contain the physical and biological features essential to the species' conservation. Based on the species' life-history needs, particularly, foraging, resting, and movement between reproductive and foraging areas. The proposed rule identifies three categories of essential marine features: 1) reproductive essential features include sufficiently dark, unobstructed nearshore waters from the mean high water line to 20 meters depth adjacent to nesting beaches, which allow for transit, mating, internesting, and post-hatchling movement, 2) benthic foraging and resting essential features include underwater refugia and food resources, e.g., seagrasses, macroalgae, and invertebrates, occurring from the mean high water line to 20 meters depth in sufficient condition, distribution, abundance, and density to support survival, growth, development, and reproduction, and 3) migratory essential features consist of unobstructed nearshore corridors that allow turtles to move between foraging/resting areas and reproductive areas, where such corridors are known to occur. These features reflect the habitat characteristics necessary to support the species' core biological functions and form the basis for identifying marine areas proposed as critical habitat.

Proposed Marine Critical Habitat Units in Guam
For the Central West Pacific DPS, NMFS determined that all nearshore waters of Guam from the mean high water line to 20 meters depth contain the essential marine features required for the conservation of the DPS. These essential features include benthic foraging and resting habitat consisting of underwater refugia such as reefs, rocks, and troughs; food resources including seagrass, marine algae, and marine invertebrates; sufficient condition, distribution, diversity, abundance, and density of these resources to support survival, development, growth, and reproduction.

The text also documents high densities of foraging/resting green turtles around Guam demonstrating that Guam's nearshore waters provide high-value foraging and resting habitat for the DPS.

Reproductive Essential Feature in Guam
USFWS proposed Guam nesting beaches as terrestrial critical habitat. NMFS identified the adjacent marine area, from the mean high water line to 20 m depth, as containing the reproductive feature essential to the conservation of the Central West Pacific DPS. Thus, marine waters adjacent to nesting beaches in Guam (mean high water line to 20 m depth) are considered reproductive essential habitat.

No migratory essential feature has been identified for this DPS because turtles use multiple oceanic migratory paths rather than a narrow corridor.

For the Central West Pacific DPS, NMFS determined that all nearshore waters of Guam from

the mean high water line to 20 meters depth contain essential reproductive and benthic foraging/resting features, making these areas high-value marine habitat for the DPS and part of the proposed marine critical habitat network.

Action Area Applicability
The action area does not contain any proposed marine critical habitat for the Central West Pacific DPS. The nearshore environment adjacent to Agat SBH lacks the essential features identified in the proposed rule, including persistent seagrass beds, high-productivity algal foraging habitat, and unobstructed migratory corridors between foraging and nesting habitats. The harbor interior consists of coarse calcareous sand, low-relief hard bottom, and limited benthic productivity—conditions that do not meet the essential feature definitions in the proposed rule. Available survey data (USACE 2021; ERDC 2025) confirm the absence of green sea turtles within the action area. Accordingly, the proposed action will have no effect on proposed marine critical habitat for the Central West Pacific DPS.

3.3.3.1.2.3 Giant Clams (*Hippopus hippopus, Tridacna gigas, T. derasa*) Proposed Listing (2024)

Regulatory Context
On July 25, 2024, NMFS published a proposed rule to list ten giant clam species under the ESA, including *Hippopus hippopus*, *Tridacna gigas*, and *T. derasa* (NMFS 2024, 89 FR 60498). This represents a regulatory change since Pac-SLOPES (USACE & NMFS 2022), which pre-dated the proposed listing and did not incorporate updated conservation status or threat assessments. The 2024 NMFS Status Review concludes that *T. derasa* and *T. gigas* are in danger of extinction in a significant portion of their ranges (proposed endangered), while *H. hippopus* is likely to become endangered in the foreseeable future in a significant portion of its range (proposed threatened) (NMFS 2024). No critical habitat was proposed for any giant clam species.

Habitat Requirements
Giant clams occupy shallow reef and reef-adjacent habitats but do not require live coral. Habitat use ranges from generalist species (e.g., *T. gigas*) that occur on sand, rubble, rock, seagrass beds, and macroalgal zones, to more specialized species such as *T. derasa* (offshore reefs) and *H. hippopus* (sandy lagoon flats and seagrass beds). Settlement studies indicate a preference for rugose substrates and cues from crustose coralline algae, reflecting two core environmental needs: (1) high light availability to support photosymbiosis, and (2) suitable substrate that provides stable attachment and cryptic settlement sites.

These requirements make giant clams sensitive to turbidity, sedimentation, and loss of consolidated substrate.

Population Trends
The Status Review documents severe historical declines for all three species due to intensive harvest for meat and shell, with *T. gigas* and *T. derasa* experiencing widespread extirpation across portions of their ranges (NMFS 2024). *H. hippopus* shows a similar pattern of decline,

though some localized populations persist at low densities. Recovery has been limited by slow growth, late maturity, and low natural recruitment, resulting in fragmented and sparsely distributed populations.

Threats
The 2024 Status Review identifies a consistent suite of threats affecting all three species:

- Historical and ongoing overharvest, including illegal collection (NMFS 2024);
- Habitat degradation, particularly loss of hard-bottom substrate, coral reef decline, and sedimentation that reduces light penetration;
- Climate-driven thermal stress and bleaching, which disrupt symbiosis and increase mortality;
- Ocean acidification, which impairs calcification and shell formation;
- Low recruitment and population fragmentation, limiting recovery potential; and
- Insufficient regulatory mechanisms in portions of their ranges.

These threats interact cumulatively, reducing habitat suitability and constraining population growth.

Guam Distribution
Historical accounts and fossil evidence indicate that *Hippopus hippopus*, *Tridacna derasa*, *T. gigas*, and *T. squamosa* were all native to Guam (Collins et al. 1983; Newman & Gomez 2000). However, multiple assessments report that *T. derasa*, *T. gigas*, and *H. hippopus* have been extirpated from the island (Munro & Heslinga 1983; Sant 1995; Wells 1997; Neo et al. 2017). *T. squamosa* is considered the only remaining species, and it persists at very low abundance (Neo et al. 2017). Past efforts to reintroduce *T. derasa* and *T. gigas* through hatchery and broodstock programs in the 1980s and 1990s were largely unsuccessful, with no evidence of established wild populations (Heslinga et al. 1984; Wells 1997). More recently, Guam's Division of Aquatic and Wildlife Resources initiated a community-led mariculture program in 2021, but this effort focuses on *T. maxima*, not the three ESA-petitioned species.

No individuals were documented during the 2021 USACE benthic survey or the 2025 ERDC nearshore biological survey of Agat SBH. The FWCA Planning Aid Letter similarly does not identify giant clams within the action area.

Habitat conditions in Agat Bay are characterized by elevated turbidity, fine sediment deposition, and limited consolidated substrate and are therefore inconsistent with the clear, high-light, hard-bottom reef environments required by these species (NMFS 2024). Based on the best available scientific information, giant clams are not expected to occur within the action area.

Action Area Applicability
No individuals of *H. hippopus*, *T. gigas*, or *T. derasa* have been documented within the action area, and the nearshore environment adjacent to Agat SBH does not contain the habitat characteristics described in the Status Review as essential for giant clam conservation. The

harbor and adjacent nearshore zone lack clear water, stable hard-bottom substrate, and high-light reef environments required for settlement, attachment, and long-term survival.

3.3.3.1.3 Contingency Alternative: Ocean Disposal

If USACE pursues the contingency alternative of ocean disposal, the following species may occur within the action area including the transit corridor to and at the G-DODS: leatherback sea turtle (*Dermochelys coriacea*), South Pacific loggerhead sea turtle (*Caretta caretta*), olive ridley sea turtle (*Lepidochelys olivacea*), oceanic whitetip shark (*Carcharhinus longimanus*), giant manta ray (*Mobula birostris*), blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), sei whale (*Balaenoptera borealis*), sperm whale (*Physeter macrocephalus*), and Western North Pacific humpback whale (*Megaptera novaeangliae*). These species and potential impacts from dredged material transport and disposal are fully described in Pac-SLOPES and accordingly incorporated by reference, with no update or augmentation warranted.

The proposed action, i.e., BUDM to reclaim the beach at the Nimitz Beach eroded shoreline would have no effect on these pelagic marine species. However, should USACE pivot and pursue alternative disposal at G-DODS, then the proposed action may affect, but is not likely to adversely affect the above listed marine ESA-listed species through implementation of applicable standard BMPs as described in the 2022 programmatic ESA consultation.

3.3.3.2 ESA Species – USFWS Jurisdiction

Pac-SLOPES (USACE & NMFS 2022) does not include biological evaluations for USFWS-jurisdiction terrestrial species. Full species accounts are provided below using the best available scientific information (BASI), including USFWS recovery plans, 5-year reviews, and peer-reviewed literature.

3.3.3.2.1 *Mariana Fruit Bat (*Pteropus mariannus), Endangered (80 FR 59424)

Life History and Ecology

The Mariana fruit bat (fanihi) is a medium-sized, canopy-roosting pteropodid bat endemic to the Mariana Islands. It is primarily frugivorous, feeding on breadfruit, figs, bananas, and other native and introduced fruits, as well as flowers and leaves (Wiles & Fujita 1992). Fruit bats serve as important seed dispersers and pollinators in native limestone forest ecosystems (USFWS 1990). Individuals roost in large emergent trees, often in colonies, and exhibit strong fidelity to traditional roost sites (Wiles 1987).

Population Trends

The species declined sharply on Guam beginning in the 1950s due to hunting, habitat loss, and predation by introduced mammals. By the mid-1980s, the Guam population had collapsed to only a few individuals (Wiles 1987). The most recent 5-year review confirms the species is functionally extirpated on Guam, with no resident population, no known roosts, and only rare transient individuals occasionally reported (USFWS 2019). All known breeding colonies occur in the CNMI and not Guam (USFWS 2019).

Threats
Primary threats include predation by brown tree snakes, habitat loss and fragmentation, illegal hunting, and disturbance at roost sites (Wiles et al. 1995; USFWS 2019). On Guam, brown tree snake predation remains the dominant factor preventing recolonization (USFWS 2019).

Guam Distribution
Historically widespread, the species is now considered extirpated on Guam (Wiles 1987; USFWS 2019). No roosts, foraging activity, or stable occupancy have been documented for decades. Occasional single-bat sightings are interpreted as vagrants from the CNMI rather than evidence of local use (USFWS 2019).

Action Area Applicability
The action area contains no suitable roosting or foraging habitat. Vegetation consists of scattered coconut palms, ironwood, sea hibiscus, and mowed herbaceous vegetation, none of which provide the tall, closed-canopy limestone forest structure required for roosting (USACE 2020). Occurrence in the action area is extremely unlikely.

3.3.3.2.2 Tree Snails (Family Partulidae; *Partula gibba, Partula radiolata, Samoana fragilis*), Endangered

These species share similar life history traits and threats; therefore, a combined overview is provided, followed by species-specific distribution notes.

Life History and Ecology
Partulid tree snails are small, arboreal gastropods endemic to the Mariana Islands. They inhabit the undersides of leaves and stems of native shrubs and trees in moist forest habitats. They are nocturnal, slow moving, and highly sensitive to microhabitat conditions. Partulids are ovoviviparous, giving birth to live young, and have low reproductive rates, making populations vulnerable to disturbance. The 2020 status reviews emphasize that these species require shaded, humid, wind-protected forest interiors with stable moisture conditions, typically found only in mature limestone forest (USFWS 2020a–c).

Population Trends
All three species have undergone severe declines across their ranges due to predation by the introduced rosy wolf snail (*Euglandina rosea*), habitat loss, and stochastic events such as typhoons (USFWS 2020a–c). Populations are now extremely small, fragmented, and restricted to remnant forest patches on Guam and the CNMI. The status reviews describe remaining populations as “extremely small,” “highly fragmented,” and occupying only a fraction of their historical ranges, with many former sites now devoid of snails. Surveys over multiple decades have documented continued contraction of occupied habitat, and the reviews note that any single disturbance event—such as a storm, drought, or localized vegetation loss—could eliminate an entire micro-population.

Post-storm observations following Typhoon Mawar provide additional evidence of the species’ precarious status. USACE was informed through discussions with the USFWS Pacific Islands Fish and Wildlife Office that strong winds and heavy rainfall associated with Typhoon Mawar

may have redistributed individual tree snails or small clusters across the landscape (USFWS, personal communication, 2024). Federal Emergency Management Agency (FEMA) debris-management operations provide supporting evidence for this possibility; *Partula radiolata* individuals were documented within vegetative debris at a Temporary Debris Management Site, confirming survival of at least some snails following the storm (FEMA, 2024).

However, no new populations or distributional expansions have been reported, and severe canopy loss in northern Guam—documented by USFWS—likely further reduced suitable habitat (USFWS 2023). These findings reinforce the species' vulnerability to stochastic events and the continued contraction of occupied habitat.

Threats
Major threats include predation by *E. rosea* (primary driver of decline), habitat loss and degradation, invasive ants, typhoons and drought, and climate-driven changes in moisture regimes (USFWS 2020a–c). Recolonization is unlikely once a patch is lost, therefore the species remain at high risk of localized extinction from even minor disturbances.

Species-Specific Guam Distribution
- *Partula gibba*: Historically widespread on Guam; now restricted to a few small, isolated populations in northern limestone forest (USFWS 2020a). No populations occur in southern Guam. The species persists only in highly localized patches, often limited to a small number of host trees.
- *Partula radiolata*: Historically occurred on Guam and Rota; now extremely limited and primarily restricted to northern Guam forest refugia (USFWS 2020b). The status review describes the species as severely reduced in abundance and occupying only a small portion of its former range.
- *Samoana fragilis*: Historically occurred on Guam and Rota; now extremely rare and likely extirpated from Guam (USFWS 2020c). Recent surveys have failed to detect the species on Guam, and the review concludes that it is functionally absent from the island.

Action Area Applicability
The action area contains no native limestone forest, no moist understory vegetation, and no arboreal microhabitats suitable for partulid snails (USACE 2020). Tree snail expert Dr. Curt Fiedler confirmed that vegetation near the shoreline is unsuitable for partulid snails due to constant sun, wind, and salt spray exposure, which create microclimatic conditions incompatible with their moisture-dependent physiology. He further noted that ironwood *(Casuarina equisetifolia*) is not a host plant, that *Hibiscus tiliaceus* (pagu) is only rarely used, and that morning glory and other coastal vines are not used at all (C. Fiedler, personal communication, November 2025). These observations align with the USFWS status reviews, which identify mature, shaded limestone forest as the only habitat capable of supporting these species (USFWS 2020a–c). The exposed coastal vegetation within the action area, e.g., ironwood, coconut palm, sea hibiscus, and low herbaceous or vine cover lacks the canopy

structure, humidity, and host-plant assemblages required for tree snail occupancy.

3.3.3.2.3 Green Sea Turtle (*Chelonia mydas*) Terrestrial Jurisdiction (USFWS)

Regulatory Context

At the time Pac-SLOPES was finalized (USACE & NMFS 2022), terrestrial critical habitat for the Central West Pacific DPS of the green sea turtle had not yet been proposed. On July 19, 2023, USFWS published a Proposed Rule to designate terrestrial critical habitat for this DPS (88 FR 46376; USFWS 2023). On the same date, NMFS published a Proposed Rule to designate marine critical habitat (88 FR 46572; NMFS 2023). Under the joint NMFS–USFWS framework, USFWS is responsible for terrestrial nesting habitat, while NMFS is responsible for marine habitat. This subsection addresses only the terrestrial portion of the proposed designation. The proposed rule identifies nesting beaches that contain the physical or biological features (PBFs) essential to the conservation of the DPS, including suitable nesting substrate, beach morphology, and environmental conditions that support egg incubation and hatchling emergence.

Essential Terrestrial Habitat Features — Central West Pacific DPS

The proposed terrestrial critical habitat rule identifies several physical or biological features (PBFs) essential to nesting, incubation, hatchling emergence, and internesting use for the Central West Pacific DPS of the green sea turtle (88 FR 46376; USFWS 2023). Consistent with the definition at 50 CFR 424.02, these features must occur in sufficient quality, quantity, and spatial arrangement to support the species' life-history needs. The essential terrestrial PBFs include:

- Dry sandy beaches above the mean high water line, providing unobstructed access for nesting females and hatchlings, and containing supralittoral zones that remain dry enough for nest placement.
- Sand substrate with suitable physical properties, i.e., compaction, moisture, temperature, and gas exchange, to support nest construction, embryo development, and hatchling emergence.
- Sufficient natural darkness on nesting beaches to prevent disturbance or disorientation of nesting females and hatchlings.
- Natural coastal processes, or artificial habitats that effectively mimic them, which maintain beach structure, sediment movement, and long-term habitat availability for nesting and hatchling emergence.

Overall, the PBFs emphasize unimpeded access, suitable sand conditions, natural darkness, and dynamic coastal processes that sustain functional nesting habitat over time.

Critical Habitat Units

Critical habitat units are specific, mapped terrestrial areas that were occupied at the time of listing and contain one or more physical or biological features essential to the conservation of the green sea turtle, and which may require special management or protection; the proposed rule identifies 101 such units across all DPSs, including 23 units (≈304 ac) within the Central West Pacific DPS. Unit GU-07 is located along the natural open-coast beach of Agat Bay and

does not overlap the Agat SBH or Nimitz Beach Park footprint (88 FR 46376; USFWS 2023). GU-07 represents a discrete, biologically important internesting beach area where natural coastal processes remain intact. In comparison, the harbor occupies a hardened, modified shoreline with no natural beach or supralittoral zone and Nimitz Beach Park shoreline is characterized by high recreational use, periodic grooming, and localized erosion. Accordingly, the action area does not contain the necessary terrestrial PBFs characteristic of the critical habitat unit GU-07 polygon.

Guam Terrestrial Habitat Distribution

The proposed rule identifies 14 terrestrial critical habitat units (GU-01 through GU-14) in Guam that contain the essential features at sufficient quality and extent to support conservation of the DPS (88 FR 46376; USFWS 2023). These units are generally located on remote, low-disturbance shorelines with minimal artificial lighting, intact coastal processes, and adequate dry-sand nesting habitat. Nesting in Guam is described as infrequent and opportunistic, with most confirmed nests occurring on isolated northern and eastern beaches, as well as Cocos Island (USFWS 2023).

Action Area Applicability

One terrestrial critical habitat unit (GU-07) occurs in Agat Bay, but no terrestrial critical habitat units occur within Agat SBH or Nimitz Beach Park, i.e., within the action area (88 FR 46376; USFWS 2023). These locations lack the physical and biological features identified in the proposed rule, including extra-tidal dry sandy beach above MHWL, adequate beach width, natural dune or vegetation structure, and low light conditions.

The terrestrial portion of the action area does not contain any proposed critical habitat for the Central West Pacific DPS. The beach within the action area is narrow, wave-washed, and highly disturbed, with the high tide line reaching the base of an eroded escarpment. Artificial lighting from adjacent facilities, heavy recreational use, and chronic sand compaction further reduce habitat suitability. These conditions do not meet the essential feature definitions in the proposed rule, which require wide, gently sloping beaches with minimal lighting and disturbance. These conditions do not meet the essential feature definitions in the proposed rule (88 FR 46376; USFWS 2023) or the regulatory definition of physical or biological features at 50 CFR 424.02. In addition, the Guam Department of Agriculture confirmed that no nesting has been recorded at Nimitz Beach or within the action area (pers. comm., January 2026).

4 EFFECTS ANALYSIS

Section 4 evaluates the potential effects of the proposed action on ESA-listed species, species proposed for listing, designated and proposed critical habitat, and Essential Fish Habitat (EFH) within the action area. Consistent with 50 CFR 402.02, the ESA analysis considers all direct and indirect "effects of the action" that are reasonably certain to occur, while under the Magnuson–Stevens Act an "adverse effect" on EFH includes any impact that reduces the quality or quantity of EFH (50 CFR 600.810). This effects analysis incorporates by reference the exposure pathways, habitat/species-specific analyses, and baseline impact mechanisms previously evaluated under the USACE & NMFS Programmatic ESA and EFH consultations. The biological evaluation and EFHA that support each of these consultations, respectively, already address the majority of routine dredging-related, or similar effects. This section focuses on project-specific conditions, unique exposure pathways, and any aspects of the proposed action that differ from or extend beyond the programmatic analyses.

The action area includes the federal navigation features of Agat SBH, the nearshore marine corridor between the harbor and Nimitz Beach, and the upland and intertidal portions of Nimitz Beach Park where dredged material will be placed. USACE anticipates that the proposed action may affect protected resources through the following ESA vectors: vessel strike, direct physical impact, entrainment/impingement, turbidity and sedimentation, noise and vibration, exposure to wastes and discharges, habitat modification, disturbance from human activity and equipment and lighting, and EFH stressors: turbidity and sedimentation, underwater noise, entrainment, physical disturbance and habitat conversion. Each vector and stressor is evaluated using the best available scientific information, the environmental baseline described in Section 3, and the programmatic consultations incorporated by reference.

4.1 Vectors that May Affect ESA Species and Critical Habitat

The following discussion focuses on the proposed action, maintenance dredging with BUDM. The contingency plan to utilize mechanical dredging is fully covered under Pac-SLOPES, and USACE therefore incorporates by reference the Pac-SLOPES BE (USACE & NMFS 2022). As concluded in the Pac-SLOPES BE, mechanical maintenance dredging may affect but is not likely to adversely affect ESA species listed at 3.3.3.1.3 or critical habitat through vectors such as vessel collision**, direct physical impact**, disturbance from human activity and equipment operation**, elevated noise***, turbidity and sedimentation***, exposure to wastes and discharges***, and loss of forage habitat***, provided prescribed BMPs are implemented to ensure effects are discountable** or insignificant***.

The dredged material disposal method under the contingency alternative is ocean disposal at the GDODS and presents effects that are not covered by Pac-SLOPES. As a point of clarification, USACE has federal control under Section 103 of the Marine Protection, Research and Sanctuaries Act for the transport of dredged material for the purpose of ocean disposal while USEPA, as the site manager for GDODS, has the federal control to authorize use of the ocean disposal site. Accordingly, USEPA has completed Section 7 ESA consultation in establishing and operating the GDODS with NMFS, as documented in their informal consultation completed with a letter of concurrence from NMFS dated January 16, 2025. The

USEPA-NMFS Section 7 ESA consultation provides a comprehensive analysis that covers the effects of the dredged material disposal at the disposal site. USACE is responsible for evaluating the effects of transport of the dredged material to GDODS on ESA listed marine species. Vessel strike is the only vector that may affect ESA species and is evaluated in Section 4.1.1 below.

4.1.1 Vessel strike

Vessel strikes may occur when project-related vessels or support boats collide with ESA-listed marine species present in the action area. Pac-SLOPES identifies vessel strikes, i.e., collision with vessels, as a potential vector for all in-water construction and maintenance activities, including maintenance dredging, noting that vessel movement can disturb or injure marine wildlife when not properly managed (Pac-SLOPES Section 5.1). Under the programmatic consultation, vessel-strike risk is minimized through speed restrictions, standoff distances, and shutdown procedures that ensure listed species are detected and avoided before vessel operations proceed. USACE have adopted all Pac-SLOPES BMPS related to vessel strike.

For this project, vessel-strike risk is limited to the slow and predictable movement of the hydraulic cutterhead dredge barge within Agat SBH and the transit of small support vessels within the harbor to reposition the dredge barge and transport crew to and from the barge. These vessels will operate at low speeds and within a confined, shallow-water environment, which inherently reduces the likelihood of collision with listed species. In the unlikely event of a vessel grounding outside the harbor listed or coral critical habitat could be directly physically impacted by resulting in damage to the coral reef biological community and the underlying hard pavement.

Although not reported in Agat SBH or near Nimitz Beach, scalloped hammerhead sharks have been documented in nearby Apra Harbor and may rear young in shallow embayments (Duncan et al., 2006; Jorgensen et al., 2009; Budd et al., 2021). Green and hawksbill sea turtles are known to forage in nearshore Guam waters; green more commonly than hawksbill (Seminoff et al., 2015; NMFS & USFWS, 1998a, 1998b). Sea turtles must surface to breathe, making them potentially at risk to vessel interactions. Vessel-strike risk increases with vessel speed, as turtles have less time to detect and avoid approaching vessels (Hazel et al., 2007).

Project-specific conditions further reduce this risk. The dredge barge will be repositioned only intermittently and at extremely slow speeds, with the assistance of a support tug that will operate within a narrow, predictable corridor. All vessel operations will comply with the NOAA-NMFS ESA BMPs included in the Environmental Protection Plan (EPP) (See Attachment A1, BMPs F.1-F.6, and A.7). These project-specific BMPs originate from Pac-SLOPES but have been refined for relevance and applicability to the proposed action. These BMPs are at least consistent with, and may be more protective than, the avoidance and minimization measures required under Pac-SLOPES. The requirement for competent trained observers (BMP A.4–A.7) to conduct pre-work surveys, maintain constant vigilance, and implement shutdowns ensures that listed species are detected before vessel movement occurs, providing an additional layer of protection in direct response to the potential presence of juvenile hammerheads and foraging turtles in the action area.

Recent USACE surveys did not document ESA-listed species within the harbor during project-specific fieldwork. Given the minimal use of vessels operated at slow speeds in a confined harbor, the presence of trained observers, and the enforceable ESA BMPs that require immediate shutdown when listed species approach, the probability of a vessel strike occurring during this project is extremely low. The extremely low likelihood of a strike due to slow vessel speeds, confined operations, trained observers, and enforceable ESA BMPs supports a determination that vessel-strike effects are discountable.

Under the contingency alternative, USACE would mechanically dredge Agat SBH, place dredged material into a scow and tow the scow to the GDODS for ocean disposal. The approximate 8,000 cubic yard volume of sand would require up to 8 scow loads and roundtrips to GDODS. The tug presents a potential for vessel strike to sea turtles, sharks and the pelagic species listed at Section 3.3.3.1.3. The vessel would be bound to the same speed restrictions and monitoring requirements to minimize potential for vessel strike. The potential for vessel strike is higher under the contingency alternative than the proposed action, but still relatively low based on the low number of trips, the slow speed of the tug and scow, the vastness of the ocean, the mobility of pelagic turtles, whales and fish and with the inclusion of vessel strike BMPs, USACE expects the vessel-strike effects would be discountable.

This vector presented by the proposed action affects individual animals only and does not alter any physical or biological features essential to the conservation of designated or proposed critical habitat. This vector is not anticipated to impact critical habitat, however, in the unlikely event of a vessel grounding, coral critical habitat would be at risk for physical damage. The damage would be localized and may result in a long-term natural recovery; however, the essential physical features would not be permanently changed so as to inhibit recovery or cause further damage. The proposed action would not destroy or adversely modify proposed or designated critical habitat.

4.1.2 Direct Physical Impact

Direct physical impact may occur when equipment, divers, vehicles, or construction materials contact the seafloor, benthic habitat, terrestrial substrate, or vegetation. Pac-SLOPES defines “direct physical impact” as an in-water vector associated with divers, wading workers, and equipment operating below the water surface, where accidental contact with ESA-listed marine species or benthic resources may occur (Pac-SLOPES Section 5.2). The proposed action includes both marine and terrestrial components, therefore this vector is expanded to encompass any project activity that could physically disturb marine or terrestrial habitat or directly contact ESA-listed species. Under the programmatic consultation, direct physical impact is minimized through controlled equipment handling, diver awareness, and pre-construction identification of sensitive resources; these principles apply equally to the terrestrial components of the proposed action.

For the proposed action, direct physical impact in the marine environment may occur when the spuds anchors are deployed and when the hydraulic cutterhead dredge head is utilized across the dredge footprint, during diver-supported installation of the conveyance pipeline along the

harbor bottom and across to the Nimitz Beach shoreline, during repositioning and operation of the pipeline, and filling activities occurring behind silt-containment devices within the beach reclamation area. These activities occur in areas that have been previously disturbed—either artificially (the dredged harbor bottom) or naturally (the intertidal zone)—and are not conducive to coral colonization. Pre-construction surveys confirmed the absence of ESA-listed corals within the dredge footprint, pipeline alignment, and beach placement area (Element Environmental & Anchor QEA, 2023; USACE benthic survey, 2021). This is consistent with regional assessments indicating that ESA-listed Indo-Pacific corals are patchily distributed and largely absent from developed harbor basins (Brainard et al., 2011; 79 FR 53851).

To avoid and minimize direct physical impact to marine ESA-listed species and benthic resources, USACE has adopted all applicable Pac-SLOPES BMPs to address direct physical impact as listed in Attachment A1; in particular, BMPs A.2, A.8 and C.1-C.3. The project design further reduces the potential for direct physical impact by conducting all dredging from a stationary barge, limiting diver activity to brief, targeted tasks, and confining all fill placement to engineered containment cells within the beach reclamation area. The extremely low potential for direct physical impact, given the absence of listed corals, the use of controlled and localized construction methods, the implementation of Pac-SLOPES BMPs, and the restriction of work to previously disturbed areas, supports a determination that this vector is discountable.

Direct physical impact on land may occur during the following activities involving heavy equipment: construction of the temporary access path, debris removal within the beach reclamation area, equipment ingress and egress, and grading of the reclaimed beach. The proposed action incorporates design modifications and BMPs that avoid trimming, removal or other impacts to vegetation that may house listed tree snails or bats, requires pre-construction surveys, constant vigilance and regular monitoring for ESA-listed species, including sea turtles on land. For example, the access path alignment will be determined on-site based on the results of pre-construction surveys. If tree snails are detected, the alignment will shift to avoid forested areas, and appropriate buffers will be applied. All terrestrial work will occur in previously disturbed areas, and no trees, shrubs, or understory vegetation will be removed. As a result, the potential for direct physical impact to affect terrestrial ESA-listed species or their habitat is extremely low, or discountable.

This vector presented by the proposed action focuses primarily on impacts to species, however, in consideration of proposed and designated critical habitat in the marine environment of the action area, would not alter any physical or biological features essential to the conservation of designated or proposed critical habitat. This vector is not anticipated to impact critical habitat, however, in the unlikely event of a vessel grounding, coral critical habitat would be at risk for physical damage. The damage would be localized and may result in a long-term natural recovery; however, the essential physical features would not be permanently changed so as to inhibit recovery or cause further damage. The proposed action would not destroy or adversely modify proposed or designated critical habitat.

4.1.3 Entrainment/Impingement

Entrainment and impingement may occur when aquatic organisms are drawn into or against the suction intake of dredging equipment. Pac-SLOPES identifies entrainment as a potential vector for hydraulic dredging activities, particularly where suction heads lack protective screening or are operated in areas used by ESA-listed species (Pac-SLOPES Section 2.2.6). Under the programmatic consultation, this vector is minimized through intake screening, diver monitoring, and operational controls that prevent protected species from entering the suction field.

For the proposed action, entrainment risk is limited to the 8-inch suction intake attached to the hydraulic cutterhead dredge. The intake is retrofitted with a 3-inch exclusion screen, which prevents the entrainment of sea turtles, sharks, rays, marine mammals, and other large-bodied organisms. NMFS confirmed the 3-inch exclusion screen is adequate to prevent entrainment of ESA listed species (Personal communication, January 2026) and complies with implementation of Pac-SLOPES Activity BMP J.2 and J.6. The cutterhead removes sediment in shallow, 6-inch layers by agitating sand into suspension, after which the slurry is drawn through the screened intake and conveyed through the pipeline to Nimitz Beach. No other project components—including the floating pipeline, booster pumps, or beach discharge—create entrainment or impingement risk for ESA-listed species.

Given the presence of the 3-inch exclusion screen, the shallow dredge depth, and the slow, controlled operation of the cutterhead, the potential for entrainment or impingement of ESA-listed species is extremely low. ESA-listed sea turtles and scalloped hammerhead sharks are too large to pass through the 3-inch exclusion screen and cannot be entrained by the suction intake. The cutterhead operates at slow rotational speeds (60–90 rpm) and removes only thin layers of sand, further reducing the suction field and limiting the potential for impingement. Juvenile scalloped hammerheads documented in Apra Harbor (Budd et al., 2021) and sea turtles foraging in nearshore Guam waters (Seminoff et al., 2015) would be able to detect and avoid the dredge head, and mandatory shutdown procedures ensure that dredging ceases if any ESA-listed species approaches the work area. The presence of the three-inch exclusion screen, the shallow and slow operation of the cutterhead, and the ability of ESA listed species to detect and avoid the equipment result in an extremely low likelihood of entrainment or impingement, supporting a determination that this vector is discountable.

This vector would have no effect on critical habitat.

4.1.4 Turbidity

Turbidity elevated above ambient levels may occur when dredging or material placement activities suspend fine sediments into the water column, generating sediment plumes. Pac-SLOPES identifies turbidity as a potential vector for hydraulic dredging and pipeline discharge activities, particularly where sediment is suspended in the water column and may affect water clarity, light penetration, or the ability of ESA-listed species to forage, navigate or, in the case of zooxanthellae for listed corals, photosynthesize (Pac-SLOPES Section 5.6). USACE has adopted all applicable general and activity-specific BMPs that address turbidity

and sedimentation. For the proposed action, both dredging and filling activities may generate sediment plumes, requiring proper management. Turbidity and sediment plumes are aquatic phenomena and do not affect terrestrial ESA-listed species or terrestrial habitats.

Within Agat SBH, turbidity may occur when the cutterhead agitates sediment into suspension. Hydraulic dredging inherently reduces the spread of suspended sediments because the cutterhead agitates material directly into a suction intake, limiting the volume of sediment released into the water column. The dredge head removes sediment in shallow, 6-inch layers, minimizing the volume of material disturbed at any one time. The harbor bottom consists primarily of unconsolidated sand that settles rapidly, and the enclosed basin limits plume dispersion. Turbidity may also occur briefly during diver-supported pipeline alignment, but this disturbance is localized and short-lived. At Nimitz Beach, slurry discharge occurs entirely within engineered containment cells bounded by filter-lined HESCO barriers and silt fencing, which retain sediment and allow water to percolate through filter fabric. Any turbidity that escapes the containment system is expected to be minor, localized, and temporary.

Turbidity generated during dredging may temporarily reduce water clarity within the harbor, but the spatial extent is limited by the enclosed basin and the rapid settling characteristics of sandy substrate. ESA-listed sea turtles and scalloped hammerhead sharks are mobile and capable of avoiding localized turbidity. Listed corals reproduce in the water column and that both filter feed and symbiotically depend on photosynthetic zooxanthellae for food. As sessile, benthic organisms, listed corals vulnerable to elevated turbidity which can reduce solar irradiance, disrupt reproduction and feeding and if subjected to sedimentation, will divert energy away from vital processes to producing mucus to slough off settled sediments.

Turbidity levels generated during dredging are expected to be minor, localized, and temporary, and are not anticipated to reach levels that would cause physiological stress or behavioral disruption in ESA-listed species. At Nimitz Beach, turbidity generating activities are isolated and contained within the engineered fill cells and minimizes potential to enter the nearshore environment where ESA-listed species may occur. The minor, localized, and temporary turbidity expected during dredging and contained fill placement, combined with the mobility of listed species and the rapid settling of sandy sediments, supports a determination that effects to ESA listed species from this vector are insignificant.

This vector would have no effect on critical habitat.

4.1.5 Sedimentation

Sediment deposition and burial may occur when suspended sediments settle out of the water column and accumulate on the seafloor or benthic habitat, and especially, ESA listed corals. Pac-SLOPES identifies sediment deposition as a potential vector for hydraulic dredging and material placement activities, particularly where fine sediments may settle on benthic organisms or alter substrate conditions (Pac-SLOPES Section 5.6). For the proposed action, sediment deposition may occur within Agat SBH during cutterhead dredging and, to a lesser extent, during diver-supported pipeline installation. At Nimitz Beach, all slurry discharge occurs

within engineered containment cells bounded by HESCO barriers and silt fencing, which retain sediment and prevent deposition in the nearshore marine environment.

Within the harbor, sediment deposition is expected to be minor, localized, and temporary. Hydraulic dredging captures sediment directly into the suction intake thereby substantially reducing the amount of material available to settle outside the dredge footprint in comparison to mechanical dredging. The dredge head removes sediment in shallow, 6-inch layers, and the sandy substrate settles rapidly, limiting the horizontal extent of deposition. The harbor bottom is already composed of unconsolidated sand, and any deposition will occur within the previously disturbed dredge footprint. No ESA-listed corals occur within the harbor or along the pipeline alignment, and the substrate does not support coral recruitment or growth. At Nimitz Beach, sediment deposition is confined to the engineered fill cells to minimize the generation and spread of sediment plumes in the marine environment that may settle on adjacent habitat. Any incidental leakage is expected to be minimal and quickly diluted by wave action. Sediment deposition is an aquatic process and does not affect terrestrial ESA-listed species or terrestrial habitats.

Sediment deposition within the harbor would occur primarily within the federal boundaries of the harbor with minimal settlement of suspended sediments beyond the harbor. Sea turtles and sharks are mobile and capable of avoiding localized increases in suspended sediment or settling material. The sandy substrate settles rapidly and does not create conditions that would measurably impair foraging, navigation, or respiration at a duration that would substantially affect species behavior or critical habitat. At Nimitz Beach, sediment deposition is confined to the engineered fill cells and does not occur directly in nearshore waters where ESA-listed species may occur.

The action area contains designated critical habitat for listed corals only (see Section 3.3.3.1.2.1), specifically the reef flat with hard substrate located between Agat SBH and Nimitz Beach. This reef flat lies beneath the floating pipeline route and is not directly within the footprint of any project activity that may generate sediment plumes, e.g., hydraulic dredging within the harbor and slurry placement within the engineered fill cells along the west face of Nimitz Beach. Sediment generation will be actively minimized by design—hydraulic dredging captures sediment directly into the suction intake, and beach fill occurs within fully contained cells. Any incidental plumes would be minor, short-lived, and would not measurably modify the essential features of coral critical habitat during construction.

Post-construction, natural shoreline stabilization driven by prevailing longshore sediment transport has the potential to move sediments northward toward coral critical habitat. However, based on the RSA report’s analysis of historic shoreline profiles and quantified erosion and accretion rates, USACE anticipates that sediment migration would occur slowly, on the order of decades, and that transported material would likely settle within the harbor, consistent with observed maintenance dredging needs. The minor, localized, and temporary nature of sediment deposition within previously disturbed areas, combined with the absence of listed corals in the harbor and the containment of all beach fill within engineered cells, supports a

determination that effects to ESA listed species from this vector are insignificant.

This vector would have no effect on critical habitat.

4.1.6 Noise and Vibration

Noise and vibration may be generated by dredging equipment, support vessels, construction machinery, and personnel activities associated with the proposed action. Pac-SLOPES defines “underwater noise” as a vector associated with hydraulic dredging, vessel operation, and diver-supported activities, where non-impulsive sound may disturb ESA-listed marine species (Pac-SLOPES Section 5.5). USACE has adopted Pac-SLOPES BMP E.1 to address underwater noise from maintenance dredging. The proposed action includes both marine and terrestrial construction components. Accordingly, this vector is expanded to include airborne noise from heavy equipment, and vehicles operating at Nimitz Beach Park that may be detectable by terrestrial ESA-listed species. No impulsive sound sources (e.g., impact hammers, pile driving, explosives) are generated by the proposed action.

Underwater noise may be generated by the hydraulic cutterhead dredge (cutterhead rotation, suction pump, onboard machinery), support vessels maneuvering within the harbor, and diver-supported pipeline installation. Pipeline installation produces only incidental noise from diver movement and occasional contact between the pipeline and the seafloor. These sounds are low-intensity and short-duration (Reine 2014).

Airborne noise may be generated by construction equipment operating on the beach (excavators, bulldozers, loaders), vehicles accessing the temporary path, generators and pumps, and personnel activity during debris removal and grading. Airborne noise is confined to recreational and developed areas of Nimitz Beach Park and does not occur within or adjacent to densely forested native vegetation that may support ESA-listed tree snails or bats. Pre-construction surveys and design modifications ensure that no equipment operates within snail habitat or near potential bat roost trees. Noise levels from construction equipment attenuate rapidly with distance and are further reduced by vegetation, topography, and the open coastal setting.

The low-intensity, non-impulsive, and short-duration noise generated by dredging and construction activities, combined with the distance from sensitive terrestrial habitats and the mobility of marine species, supports a determination that effects to ESA listed species from this vector are insignificant. This vector would have no effect on critical habitat.

4.1.7 Exposure to Wastes and Discharges

Marine and terrestrial exposure to fuels, lubricants, hydraulic fluids, or other contaminants may occur if such materials are accidentally released during dredging or construction. Pac-SLOPES identifies accidental spills as a potential vector but notes that adherence to standard BMPs, spill prevention plans, and equipment maintenance minimizes this risk (Pac-SLOPES Section 5.7). The programmatic biological evaluation covers both in-water and nearshore construction activities, therefore both marine components of the proposed action, e.g., hydraulic dredging, vessel operation, and diver-supported activities, and terrestrial

components that may affect the marine environment, e.g., site preparation and grading of the reclaimed beach, are covered under Pac-SLOPES. The project does not introduce any contaminant sources or pathways beyond those already analyzed in the programmatic consultation. Accordingly, USACE incorporates by reference the Pac-SLOPES assessment for Exposure to Wastes and Discharges in its entirety and has adopted all applicable Pac-SLOPES BMPs that address this vector, including but not limited to BMP B.1-B.7.

The extremely low likelihood of accidental contaminant release due to comprehensive spill-prevention BMPs, equipment maintenance requirements, and the absence of new contaminant pathways supports a determination that effects to ESA listed species from this vector are discountable. This vector is unlikely to occur and would have no effect on critical habitat.

4.1.8 Habitat Modification

Habitat loss or modification may occur where construction activities remove or alter substrate, topography, or vegetation. This activity is not covered under Pac-SLOPES. For the proposed action, habitat modification is limited to maintenance dredging within the authorized harbor footprint and placement of clean sand within engineered containment cells to reclaim the eroded shoreline at Nimitz Beach.

The sandy-bottom nearshore zone fronting Nimitz Beach Park does not provide foraging habitat for green sea turtles. The area is characterized by unconsolidated sand, chronic wave-driven turbidity, and the absence of seagrass, macroalgal beds, or hard-bottom substrates that support benthic productivity. Accordingly, beach fill does not modify any habitat features used by ESA-listed green sea turtles. In addition, the sandy-bottom nearshore zone fronting Nimitz Beach Park does not provide foraging habitat for hawksbill sea turtles. Hawksbills are obligate spongivores that forage primarily on demosponges, soft corals, and other invertebrates associated with complex hard-bottom reef structure (Meylan 1988; NMFS & USFWS 1998; Seminoff et al. 2015). No such habitat occurs within the dredge footprint, pipeline corridor, or beach-fill area (MRCI 2021; ERDC 2025). Accordingly, beach fill does not modify any habitat features used by hawksbills.

Maintenance dredging occurs entirely within the previously disturbed harbor basin and does not remove or alter natural reef, hard substrate, or other habitat features that may support ESA-listed marine species. The existing Nimitz Beach shoreline is not suitable for sea turtle nesting due to its narrow, wave-washed profile, intertidal sand that is submerged at high tide, and a steep eroded escarpment along the southern shoreline. Heavy public use and artificial lighting further reduce suitability. Beach fill is confined to engineered containment cells and does not modify natural nearshore or benthic habitat. The reclaimed beach will not be illuminated and is not intended or designed to create nesting habitat. No ESA-listed corals occur within the dredge footprint, pipeline alignment, or fill area, and no essential features of designated or proposed marine critical habitat are present in these locations.

All terrestrial work occurs in previously disturbed areas of Nimitz Beach Park. No trees,

shrubs, or understory vegetation are removed, and no work occurs within or adjacent to vegetation that may support ESA-listed tree snails or bats. Prior to beach fill, USACE will assist the Government of Guam in removing concrete debris that has eroded into the intertidal zone. This requires routing tracked equipment along the beach at low tide but avoids the need to establish multiple access paths from upland areas. These activities do not occur within suitable terrestrial ESA habitat.

Habitat modification is proposed in areas that do not support ESA-listed species or their habitat. The reclaimed beach is neither designed nor intended to create nesting habitat and does not introduce new ESA habitat features. Habitat modification associated with maintenance dredging and contained beach fill occurs only in areas that do not support ESA listed species or the habitat features they rely on, supporting a determination that effects to species are insignificant. Project activities occur outside designated coral critical habitat and do not alter any essential features, supporting a determination that the vector would have no effect on critical habitat.

4.1.9 Disturbance from Human Activity and Equipment Operation

Disturbance from human activity and equipment operation may occur where construction personnel, vehicles, or heavy machinery generate visual disturbance, vibration, or physical presence near terrestrial habitats. Pac-SLOPES identifies disturbance from human activity and equipment operation as a potential vector for covered activities such as construction equipment operating near the marine environment and shoreline work (Pac-SLOPES Section 5.4 and Sections 2.2.1 and 2.2.6 for covered activities). All in-water and nearshore components of the proposed action, including maintenance dredging, pipeline installation and site preparation activities, are fully covered under Pac-SLOPES, and no additional analysis is required for marine species or marine critical habitat. USACE has adopted all applicable general and activity-specific BMPs that address this vector.

Beach reclamation fill activities will occur within the containment cells and not in open water to avoid direct impacts with marine listed species. Repositioning of the conveyance pipeline along the shoreline and within the beach fill area requires manpower and may require equipment use, both of which may affect listed species on land and in nearshore waters. The increase in activity will likely cause mobile species to avoid the area without injury.

All terrestrial work occurs within the developed, recreational coastline of Nimitz Beach Park. Construction activities will not occur within or adjacent to vegetation that may support ESA-listed tree snails or bats; to be confirmed by pre-construction survey and onsite observation. The temporary access path, debris removal, and grading of the reclaimed beach will not require or cause removal of vegetation and will avoid host trees used by terrestrial ESA species. Equipment ingress and egress are restricted to a single designated pathway to minimize disturbance. Human presence and equipment operation are therefore limited to areas that do not support terrestrial ESA species or their habitat.

Additionally, no nighttime work will occur, and no artificial lighting will be used; therefore,

disturbance from lighting is not part of this vector and human presence will not be induced by the proposed action at nighttime. Air emissions from construction equipment will disperse rapidly in the open coastal environment and will not reach or affect terrestrial ESA habitat; therefore, air quality does not constitute a separate effects pathway.

Dust in the action area has the potential to affect tree snails as a desiccant. However, project-related dust generation is not expected to occur at levels that could affect tree snails. All dredging, slurry conveyance, and beach reclamation activities involve wet coarse-grain materials that do not produce airborne particulates. The only potential dust source is construction of the temporary ingress/egress path using coarse stone within the developed park. This activity is limited in duration, occurs in previously disturbed areas, and is located far from any vegetation capable of supporting tree snails. In the unlikely event tree snails are detected during pre-construction surveys, USFWS-required 10-meter buffers would fully eliminate any potential exposure. Accordingly, dust as a vector is discountable. (USFWS 2025 Draft Conservation Measures; Fiedler 2019).

Disturbance from human activity and equipment operation is limited to during construction only and will occur in accordance with BMPs that impose monitoring, buffer and standoff requirements for species that may occur in the action area, and mobile marine species would simply avoid the area, supporting a determination that effects to species are insignificant. While this vector focuses primarily on impacts to species, the proposed action would not alter any essential features, supporting a determination that this vector would have no effect on critical habitat.

4.1.10 Lighting

Pac-SLOPES does not address lighting because it is a terrestrial vector under USFWS jurisdiction. Artificial lighting can affect terrestrial ESA-listed species by altering behavior, disrupting foraging or roosting, or deterring or disorienting sea turtles seeking or using shoreline habitats. For this project, USACE proposes only daytime work and does not anticipate the use of artificial lighting. However, consistent with USFWS recommended conservation measures for listed bat and sea turtles, lighting BMPs will be included in the Environmental Protection Plan (EPP) as contingency measures.

No nighttime work is proposed, and no artificial lighting will be used at Nimitz Beach Park. As a contingency, and consistent with USFWS recommendations, any outdoor lighting that may be required for safety or emergency purposes will be hooded and directed downward, meet UFC 3-530-01 lighting levels, use long-wavelength (yellow/orange/red) bulbs, employ motion sensors or be turned off when not needed, and avoid illumination of vegetation or microhabitats that may support ESA-listed bats or tree snails.

No artificial lighting will be used during the project and will therefore have no effect on species or critical habitat.

4.2 Effects on ESA-Listed Species

The ESA species impact assessment evaluates the potential for the proposed action to affect

federally listed species and designated or proposed critical habitat under NMFS and USFWS jurisdiction. The analysis is structured around the ESA vectors identified in Section 4.1, which describe the specific pathways through which project activities may result in exposure, including vessel strike, direct physical impact, entrainment/impingement, turbidity and sedimentation, noise and vibration, exposure to wastes and discharges, habitat modification, disturbance from human activity and equipment operation and lighting. These vectors define the mechanisms by which listed species could be affected and provide the framework for evaluating exposure, expected response, and consequence. The following species-specific assessments apply the vector-based framework to the presence, behavior, and habitat use of ESA-listed marine, nearshore, and terrestrial species within the action area, leading to the effect determinations presented below.

4.2.1 Marine Species (NMFS Jurisdiction)

4.2.1.1 Green Sea Turtle (*Chelonia mydas*)

Presence in the Action Area

Green sea turtles forage widely in nearshore Guam waters and may transit through the entrance of Agat SBH or the nearshore corridor between the harbor and Nimitz Beach. The nearshore sandy-bottom environment within the beach fill area at Nimitz Beach Park does not provide foraging habitat for green sea turtles; it contains no seagrass beds, macroalgal flats, or hard-bottom substrates that support green sea turtle foraging (Sections 3.2; ERDC 2025).

Exposure to Vectors

Green sea turtles may transit through the entrance of Agat Small Boat Harbor or move through nearshore waters between the harbor and Nimitz Beach, but the sandy-bottom environment at Nimitz Beach does not provide foraging habitat. No seagrass beds, macroalgal flats, or hard-bottom substrates that support green sea turtle foraging occur within the placement area.

Potential exposure pathways include vessel strike, physical contact with equipment, entrainment or impingement, turbidity and sedimentation, underwater noise, and exposure to wastes or discharges. Vessel operations will occur at slow speeds within a confined harbor area, reducing the likelihood of interaction. The hydraulic dredge intake is fitted with a 3-inch exclusion screen that prevents entrainment of sea turtles. Turbidity and sedimentation generated during dredging and placement are expected to be localized and temporary, occurring within the enclosed harbor or within engineered containment cells at Nimitz Beach. Underwater noise from dredging and vessel activity is non-impulsive, low intensity, and limited in range and mobile species can avoid localized noise sources without injury. No contaminants or harmful discharges are expected to enter the marine environment.

These vectors represent the primary mechanisms through which green sea turtles could be exposed to project-related stressors.

Expected Response and Consequence

Green sea turtles are highly mobile and capable of avoiding localized disturbances such as

vessel traffic, turbidity plumes, or construction noise. With slow vessel speeds, predictable operations, and required monitoring and shutdown procedures, the likelihood of physical contact or behavioral disruption is low. The exclusion screen on the dredge intake eliminates the risk of entrainment or impingement.

Short-term increases in turbidity within the harbor or containment cells are not expected to affect sea turtles, as these areas do not contain foraging resources and turtles can readily avoid reduced-visibility conditions. Underwater noise levels are below thresholds associated with injury or significant behavioral modification. The placement area lacks seagrass, macroalgae, or other foraging substrates and therefore does not alter habitat features used by green sea turtles or reduce the availability of resources.

Overall, any response by green sea turtles is expected to be limited to brief avoidance behavior, with no injury, displacement, or loss of habitat function anticipated.

Effect Determination
Impacts to green sea turtles are expected to be insignificant and discountable. The proposed action may affect but is not likely to adversely affect green sea turtles.

Critical Habitat Determination
The action area lacks essential features that define critical marine habitat for green sea turtles and is therefore absent of proposed critical habitat. Because green sea turtle marine critical habitat is proposed but not yet designated, effects are evaluated under the ESA conferencing provisions at 50 CFR 402.10. Based on the absence of essential features within the project footprint and the limited, temporary nature of project effects, the proposed action is *not expected to destroy or adversely modify proposed critical habitat.*

4.2.1.2 Hawksbill Sea Turtle (*Eretmochelys imbricata*)

Presence in the Action Area
Hawksbill sea turtles are rare around Guam and not expected to occur in the action area. No nesting habitat occurs within the action area. The nearshore sandy-bottom environment at Nimitz Beach Park does not support hawksbill foraging. No foraging resources were documented in the 2021 or 2025 marine surveys.

Exposure to Vectors
Potential exposure pathways are the same as those identified for green sea turtles and include vessel strike, physical contact with equipment, entrainment or impingement, turbidity and sedimentation, underwater noise, and exposure to wastes or discharges.

Expected Response and Consequence
Given the rarity of hawksbill sea turtles in the action area and the absence of nesting or foraging habitat, the likelihood of interaction with project activities is extremely low. If a hawksbill enters the action area, any response is expected to be negligible, with no measurable ecological consequence.

Effect Determination
Impacts to hawksbill sea turtles are expected to be discountable and should it occur, insignificant. The proposed action may affect but is not likely to adversely affect hawksbill sea turtles.

Critical Habitat Determination
N/A. The Services have neither proposed nor designated critical habitat for this species.

4.2.1.3 Scalloped Hammerhead Shark (*Sphyrna lewini*)

Presence in the Action Area
Scalloped hammerheads have not been documented in Agat SBH but have been recorded in nearby Apra Harbor. Juveniles may use shallow embayments for rearing.

Exposure to Vectors
Relevant vectors include vessel strike, underwater noise, turbidity, sedimentation, and entrainment. Vessel speeds are low and confined to the harbor. The 3-inch exclusion screen prevents entrainment. Underwater noise is low-intensity and short-range and non-damaging to elasmobranchs. Turbidity and sedimentation are localized and temporary.

Expected Response and Consequence
Hammerheads are highly mobile and capable of avoiding localized disturbances. Design and operations modifications, monitoring and shutdown procedures further reduce risk.

Effect Determination
Effects to scalloped hammerhead sharks are expected to be discountable and should they occur, insignificant. The proposed action may affect but is not likely to adversely affect scalloped hammerhead sharks.

Critical Habitat Determination
N/A. The Services have neither proposed nor designated critical habitat for this species.

4.2.1.4 Indo Pacific Corals (*A. globiceps*)

Presence in the Action Area
Of the 15 Indo-Pacific Corals listed as threatened in the Pacific Islands, only Acropora globiceps is known to occur in Guam waters. However, based on dive surveys of the action area, no A. globiceps were observed. NMFS has designated critical habitat for listed corals in Guam; however, Agat Harbor is excluded from the designation. Coral reef habitat that meets the critical habitat designation occurs within the action area, but outside the beach reclamation fill area which is entirely comprised of sandy bottom.

Exposure to Vectors
Listed corals and coral critical habitat within and adjacent to the project area may be exposed to stressors associated with dredging, material placement, and vessel activity. As immobile benthic invertebrates, corals are susceptible to physical contact from vessels or heavy equipment operating in shallow waters. Although no Acropora globiceps colonies were

documented within the dredge or fill footprints, other listed corals or reef structures occurring nearby could be exposed to accidental direct physical impact if equipment or vessels deviate from planned work areas, e.g., spud anchoring in coral reef or vessel grounding.
Corals outside the immediate work footprint may also be indirectly exposed to turbidity and sedimentation generated during dredging and fill placement. Suspended sediments can reduce light availability and settle on coral surfaces, and the degree of exposure depends on sediment grain size, water movement, and the duration of dredging activities. The project's use of hydraulic dredging, discharge into contained cells, and silt fencing around the fill area is expected to limit the release and spread of suspended material. The dredged material consists of approximately 98% coarse-grain sand, which settles rapidly and reduces the potential for long-distance plume transport. Visual monitoring with adaptive management will further constrain the spatial and temporal extent of turbidity.

Direct physical impact by equipment, vessels and underwater divers and indirect impacts of turbidity and sedimentation represent the primary pathways through which listed corals and coral critical habitat could be exposed to project-related stressors.

Expected Response and Consequence
Given the limited and controlled exposure pathways described above, listed corals and coral critical habitat are expected to exhibit minimal biological response to the proposed action. Direct physical injury is unlikely because no *A. globiceps* occur within the work area and project design features reduce the potential for vessel or equipment contact with reef structures. As a result, colony breakage, abrasion, or mortality is not anticipated.

Indirect exposure to turbidity and sedimentation may cause short-term physiological responses in corals located near the dredge and fill areas. Temporary increases in suspended material can reduce light availability, prompting reduced photosynthetic activity or short-term stress behaviors such as mucus production or sediment rejection. However, these responses are expected to be minor and reversible. The coarse-grain nature of the dredged material limits the duration of turbidity and results in light, rapidly settling deposition that corals can typically tolerate or shed without lasting harm.

Any effects that do occur are expected to be localized to the immediate vicinity of the work area, short-lived due to rapid settling of coarse sediments, and insufficient to alter the structure, function, or conservation value of coral critical habitat. Overall, the anticipated biological response and ecological consequence of the proposed action are low in magnitude and duration.

Effect Determination
Effects to ESA listed corals in the action area are expected to be discountable and should they occur, insignificant. The proposed action may affect but is not likely to adversely affect listed corals.

Critical Habitat Determination
The proposed action would not destroy or adversely modify coral critical habitat.

4.2.1.5 Giant Clams (*Tridacninae spp.*) — Proposed Listing (NMFS)

Presence in the Action Area
Historical accounts indicate that giant clams were once native to Guam; however, multiple assessments report that *Hippopus hippopus*, *Tridacna gigas*, and *T. derasa* have been extirpated from the island (Munro & Heslinga 1983; Sant 1995; Wells 1997; Neo et al. 2017). No individuals were documented during the 2021 USACE benthic survey and the 2025 ERDC nearshore biological survey of Agat SBH, or in the FWCA Planning Aid Letter. Habitat conditions in Agat Bay are inconsistent with the clear, high-light, hard-bottom reef environments required by these species (NMFS 2024). Based on the best available scientific information, giant clams are not expected to occur within the action area.

Exposure to Vectors
Giant clams do not occur within the action area and no suitable habitat is present, therefore, there is no exposure pathway to any marine vector. NMFS has indicated that all BMPs developed to avoid and minimize impacts to ESA-listed corals (e.g., substrate avoidance, controlled equipment handling, turbidity containment) also function to avoid and minimize impacts to giant clams, as both groups share similar sensitivities to sedimentation, turbidity, and substrate disturbance.

Expected Response and Consequence
N/A. USACE has determined the proposed action would have no exposure to giant clams and therefore, no response or consequence is anticipated.

Effect Determination
Impacts to giant clams are expected to be discountable. Because giant clams are proposed for ESA listing but not yet formally listed, effects are evaluated under the ESA conferencing provisions at 50 CFR 402.10. Based on the likely absence of giant clams and the lack of suitable habitat within the action area, the proposed action is expected to result in no effect to the proposed species.

Critical Habitat Determination
N/A. The Services have neither proposed nor designated critical habitat for this species.

4.2.2 Terrestrial Species (USFWS Jurisdiction)

4.2.2.1 Green Sea Turtle and Hawksbill Sea Turtle

Presence in the Action Area
No nesting habitat for either species occurs within the action area. The Nimitz Beach shoreline is unsuitable for nesting due to its narrow, wave-washed profile littered with concrete and vegetative debris, intertidal sand submerged at high tide, steep eroded escarpment, heavy public use, and artificial lighting (Section 3.2). The Guam Department of Agriculture confirmed no local record of green sea turtle nesting at Nimitz Beach.

Although sea turtles may occasionally haul out or bask in certain regions, basking is a population-specific behavior not documented for the Central West Pacific DPS or for hawksbill sea turtles in the Pacific Islands Region. The best available scientific information—including NOAA's global status reviews (Seminoff et al. 2015), the NMFS & USFWS (1998) Pacific recovery plans, and the absence of any published records of basking or non-nesting haul-out behavior in Guam—shows no evidence of this behavior in the Mariana Archipelago. Basking is known primarily from Hawaiian and Galápagos green turtle populations and has not been observed in Guam for either species.

The physical conditions at Nimitz Beach Park are also incompatible with voluntary haul-out behavior, which requires a wide, dry, low-energy beach platform with low disturbance and low artificial lighting. As described in Section 3.2.5, the shoreline fronting Nimitz Beach Park is narrow, wave-washed, steeply escarped, and heavily disturbed, with no dry sand platform above high tide. These conditions make haul-out or basking biologically implausible for either species.

Exposure to Terrestrial Vectors
Potential terrestrial exposure pathways include artificial lighting, human presence, equipment operation, and direct physical impact. These vectors are unlikely to materialize impacts because no nesting or haul-out habitat exists, and no nighttime work or artificial lighting will occur. All work will take place in naturally or artificially disturbed areas that do not provide terrestrial habitat for sea turtles.

To ensure that no turtles are present during construction, the project incorporates NMFS and USFWS conservation measures, including pre-construction surveys, daily morning shoreline surveys, daytime monitoring during construction, 100-foot buffers, and immediate shutdown procedures if a turtle is observed. These measures eliminate the potential for undetected exposure and ensure that any turtle approaching the shoreline would be identified and protected before work proceeds. Additionally, filling activities along the beach would occur within contained cells excluding potential direct impact.

Expected Response and Consequence
Due to the site conditions, nesting and haul-out behaviors are not expected in the action area. Additionally, the project design contains the work area and eliminates nighttime and lighting-related vectors. Therefore, the likelihood of terrestrial interaction is low; even lower for hawksbill sea turtles that are rare in Guam. If a turtle were to approach the shoreline during daylight hours, required surveys and monitoring would detect its presence, and shutdown procedures would prevent disturbance or physical interaction. Any behavioral response would be limited to brief avoidance, with no potential for injury or habitat modification.

Effect Determination
Effects to sea turtles on land are expected to be discountable. The proposed action may affect but is not likely to adversely affect green sea turtles and hawksbill sea turtles in the terrestrial portions of the action area.

Critical Habitat Determination
The Services have not proposed critical habitat units in the action area and is therefore absent of proposed critical habitat for green sea turtle. Because green sea turtle terrestrial critical habitat is proposed but not yet designated, effects are evaluated under the ESA conferencing provisions at 50 CFR 402.10. Based on the absence of critical habitat units within the project footprint and the limited, temporary nature of project effects, the proposed action is *not expected to destroy or adversely modify proposed critical habitat for green sea turtles.*

The Services have neither proposed nor designated critical habitat for hawksbill sea turtles.

4.2.2.2 Mariana Fruit Bat (*Pteropus mariannus*)

Presence in the Action Area
No roosting or foraging habitat occurs within the developed shoreline of Nimitz Beach Park. No native forest or suitable canopy is present within or adjacent to the project footprint. Consistent with the species' extirpated status on Guam (USFWS 2019), the USFWS's ESA technical assistance correspondence (2024; 2025) did not identify any bat presence or habitat in the project vicinity and did not require monitoring. Although the Mariana fruit bat is considered extirpated on Guam and no suitable habitat occurs within or near the action area (USFWS 2019), the possibility of a transient individual passing through the broader region cannot be entirely ruled out. The only USFWS recommended conservation measure to shield new outdoor lighting, is a standard precaution applied broadly on Guam, not an indication of expected occurrence.

Exposure to Vectors
Potential vectors include disturbance from human activity, equipment operation, airborne noise, and lighting. No nighttime work or artificial lighting will occur, and all terrestrial work is confined to previously disturbed areas lacking vegetation capable of supporting roosting bats. Airborne noise dissipates rapidly in the open coastal environment and does not reach suitable habitat. No suitable bat habitat occurs in the action area, therefore no exposure pathway exists.

Expected Response and Consequence
Given the absence of suitable habitat, the species' extirpated status on Guam, and the lack of lighting or nighttime activity, no interaction is expected.

Effect Determination
Effects to Mariana fruit bat are expected to be discountable. The proposed action may affect but is not likely to adversely affect Mariana fruit bat.

Critical Habitat Determination
N/A. The Services have neither proposed nor designated critical habitat for this species.

4.2.2.3 Tree Snails (*Partula gibba*, *Partula radiolata*, and *Samoana fragilis*)

Presence in the Action Area
Tree snails occupy native forest vegetation and are not typically associated with the habitats

present along the developed shoreline, open sand, or recreational areas of Nimitz Beach Park. No suitable host vegetation occurs within the project footprint, however mature trees occurring along the south end of the beach park may provide host habitat opportunistically.

Exposure to Vectors
Potential terrestrial exposure pathways include disturbance from human activity, equipment operation, and airborne noise. These vectors are unlikely to be relevant because no suitable host vegetation occurs within the project footprint, and all terrestrial work is confined to previously disturbed areas that lack native forest or canopy structure used by tree snails. Mature trees at the south end of Nimitz Beach Park may provide opportunistic host habitat, but these areas lie outside the active work zone.

Pre-construction surveys will identify any snails or potential host plants within or near the project area, and a 100-foot buffer will be applied around any detected individuals or vegetation. No nighttime work or artificial lighting will occur, eliminating additional disturbance vectors. With all vegetation avoided and buffers in place, the potential for tree snails to be exposed to project activities is extremely low.

Expected Response and Consequence
The action area is absent of suitable habitat such as native forest. Additionally, all work avoids vegetation, and any opportunistic host plants will be identified and buffered prior to construction. Therefore, tree snails are not expected to be impacted by project activities. If an individual were present near the project boundary, required surveys and buffers would prevent disturbance or physical contact. Airborne noise and human activity would remain at distances that preclude behavioral or physiological effects.

Effect Determination
Effects to *Partula gibba*, *Partula radiolata*, and *Samoana fragilis* are expected to be **discountable**. The proposed action may affect but is not likely to adversely affect tree snails.

Critical Habitat Determination
N/A. The Services have neither proposed nor designated critical habitat for these species.

4.3 ESA Cumulative Effects Analysis
Under the ESA, cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur within the action area (50 CFR 402.02). Federal actions are not included because they require and would be addressed under separate ESA consultation.

The action area includes the federal navigation features of Agat SBH, the nearshore marine corridor between the harbor and Nimitz Beach, and the upland and intertidal portions of Nimitz Beach Park. This area is characterized by recreational shoreline use, small-boat harbor operations, and periodic coastal maintenance conducted by local agencies.

Future non-Federal actions reasonably certain to occur within the action area are limited. The

Government of Guam has voluntarily committed to two actions associated with the project area: (1) planting native vegetation along the reclaimed beach crest, and (2) conducting short- and mid-term monitoring of shoreline migration and dredged-material movement following project completion. These actions are not funded, implemented, or required by USACE, and are not interrelated or interdependent with the proposed action. As non-Federal actions reasonably certain to occur within the action area, they must be considered as cumulative effects under 50 CFR 402.02. Both actions are beneficial or neutral, do not introduce new ESA exposure pathways, and do not elevate the risk of effects to ESA-listed species or critical habitat.

Future non-Federal actions reasonably certain to occur in the action area are limited to routine recreational use of Nimitz Beach (e.g., swimming, shoreline access, fishing), small-scale park maintenance by the Government of Guam, and recreational boating within Agat SBH. Regional socioeconomic trends—including population decline in Hågat (Agat), tourism growth centered in northern Guam, and delayed military relocation—do not indicate any foreseeable non-Federal development or construction within the action area. No other future State, territorial, or private actions are identified in available planning documents or socioeconomic analyses. (USACE, 2024) These activities are ongoing components of the environmental baseline and are not expected to increase in intensity or geographic extent, would not introduce new ESA exposure pathways and are not expected to interact cumulatively with the short-term, localized effects of the proposed action.

USACE expects the proposed action's effects to be temporary, localized, and discountable at the vector level. Additionally, reasonably foreseeable non-Federal actions are limited, beneficial, or neutral. Accordingly, in consideration of the totality of cumulative effects, USACE does not expect elevated risk of effects to ESA-listed species or critical habitat. The cumulative effects context does not alter the effect determinations presented in Section 4.2.

4.4 Essential Fish Habitat (EFH) Stressors

USACE consulted NMFS Habitat Conservation Division for technical assistance for the proposed action (NMFS 2024). NMFS identified the following stressors that are reasonably expected to occur and that have a clear pathway from the proposed action to affect EFH for Pelagic and Mariana Bottomfish Management Unit Species (MUS) described in Section 3.3.2: turbidity and sedimentation, underwater noise, entrainment, physical disturbance and habitat conversion as the relevant stressors for this project. NMFS also identified the following stressors that likely would not be of concern for the proposed action given site conditions within the action area: nutrient loading, chemical contamination, invasive species, reduced irradiance and hypoxia.

USACE utilized the USACE-NMFS 2022 Pacific Islands Region Programmatic EFH Consultation and EFH Assessment as the foundation for general descriptions of the impact of stressors on EFH and the source for commensurate, corresponding conservation recommendations. USACE acknowledges that maintenance dredging and beach reclamation

are explicitly excluded from coverage under the Programmatic EFH Consultation. Accordingly, the following subsections provide a project-specific EFH effects analysis.

4.4.1 Turbidity and Sedimentation

The Programmatic EFHA provides general descriptions of turbidity and sedimentation generated by hydraulic dredging, noting that suspended sediments and localized deposition may temporarily reduce EFH quality but are typically short-lived and spatially constrained (USACE & NMFS 2022, Section V.B). The proposed action involves maintenance dredging and BUDM involving beach reclamation fill activities. Both activities are not covered by the Programmatic EFHA and are discussed further below.

During maintenance dredging of Agat SBH, turbidity generated by the cutterhead will be concentrated at the seafloor, where suspended sediments are intended to be immediately entrained into the suction head. Unlike using a cutterhead for new dredging which generates significantly more turbidity and can produce widespread fine grain sediment plumes, the cutterhead used in the proposed action will agitate shoaled unconsolidated sediments to suspend sediments for the suction intake. The dredged material in Agat SBH is 98% sand. Coarse sand settles rapidly, resulting in minimal turbidity generation and negligible sediment deposition outside the immediate dredge footprint (USACE 2021).

The BUDM, i.e., beach reclamation fill activities at Nimitz Beach may generate turbidity. However, the means and method for the beach reclamation fill activities have been designed to minimize spread of turbidity by isolating turbidity generating activities within filter-lined containment cells. Slurry discharge will be deposited into engineered containment cells designed to promote settling and percolation of seawater while maximizing sediment retainment. Additionally, a sediment fence will be implemented around the perimeter of the beach reclamation fill area to further reduce spread of turbidity. USACE expects minimal turbidity to escape the fill area. Beach fill grading will occur entirely within the reclaimed upland footprint and will not generate turbidity in marine waters. Natural shoreline processes affecting placed sand do not constitute project-related turbidity under EFH regulations (50 C.F.R. § 600.810).

Conveyance of dredged material from the harbor to the beach fill area would occur in a closed system and not generate turbidity. However, in the unlikely event of a pipeline break, the hydraulic dredge pump would continue conveying slurry until operators identify the failure and shut down the system. The slurry would inadvertently discharge into the corridor between the harbor and Nimitz beach. Under a conservative assumption of a 15-minute delay in shutting down the system, the maximum release would be approximately 34 cubic yards of slurry (20% sediment), of which roughly 7 cubic yards is sand. If uniformly deposited across the approximately 5.62-acre nearshore corridor, this would form a layer only about 0.01 inches thick. The dredged material is coarse calcareous sand and is expected to settle rapidly to the seafloor near the break location, generating only short-lived, highly localized turbidity.

4.4.2 Underwater Noise

The Programmatic EFHA describes underwater noise, in general, resulting from in-water work activities and qualitatively describes thresholds known to cause injury or behavioral disruption to managed species (USACE & NMFS 2022, Section V.D). These general descriptions inform the project-specific analysis below.

Section 4.1.6 describes the following noise generating sources associated with the proposed action: maintenance dredging using a cutter head dredge in sand, tug-assisted repositioning of the barge and lowering of spud anchors, pumps operating atop barge and in harbor area, pipeline installation with assistance of divers generating minimal, short duration noise, fill activities positioning the end of the conveyance pipeline and the filling of the beach reclamation fill area and lastly equipment use near the ocean for site preparation activities prior to beach fill and use of heavy equipment atop the reclaimed beach for grading. No pile driving, blasting, or other high-intensity, impulsive noise-generating activities will occur. No permanent, chronic noise source will be constructed under the proposed action. All noise-generating activities will terminate at the conclusion of the proposed action.

4.4.3 Entrainment

Section 4.1.3 comprehensively discusses project-related activities that may result in entrainment of ESA listed species. Likewise, hydraulic dredging equipment draw water and sediment into the suction head and can entrain planktonic organisms, eggs and larvae, small prey fish, weak swimmers and small benthic infauna. The suction dredge has been purposefully retrofitted with a 3” grate to prevent entrainment of listed species, fish and larger prey. Anything smaller than the grate size will be suctioned into the intake along with the dredged material and unavoidably lost.

4.4.4 Physical Disturbance

Maintenance dredging at Agat SBH will temporarily disturb approximately 1.8 acres of unconsolidated sandy substrate shoaled within the authorized federal navigation project. Dredging returns the area to its previously authorized depth without altering the underlying habitat type and thus represents a temporary physical disturbance, not a true loss. Associated benthic communities will also be disturbed by the maintenance dredging.

The beach reclamation fill activities will disturb the intertidal and nearshore shallow water habitat and associated benthic communities along the shoreline of Nimitz Beach Park. The end result is a permanent conversion of marine habitats to uplands, as discussed below.

4.4.5 Habitat Conversion

The dredged material will be beneficially used to reclaim the eroded shoreline at Nimitz Beach. Beach reclamation at Nimitz Beach will result in the permanent conversion of approximately 1 acre of intertidal and shallow subtidal unconsolidated substrate and water column to uplands (approximately 1 acre of the 1.5-acre fill footprint occurs below the High Tide Line/Mean High Water Mark). The existing substrate EFH is sandy bottom with no hardbottom, coral, seagrass, or other structured habitats (USACE 2021 benthic survey). The intertidal and shallow water

column is high energy and dynamically influenced by the tide and wave conditions along the shore. The intersection of the wash of the waves and the shoreline would be extended seaward by approximately 50 feet over the length of the fill area, 792 feet. The constructed beach buffer would prevent erosion of terrigenous sediments into the ocean currently occurring at Nimitz Beach shoreline.

4.4.6 EFH Stressor Summary

The existing substrate and water column within the action area is designated EFH for Pelagic and Mariana Bottomfish MUS. USACE has identified the following stressors to the existing habitat: turbidity, underwater noise, entrainment, physical disturbance and habitat conversion. The degree of the anticipated effects on EFH are described in detail in the following section.

4.5 Effects by EFH Type and Fishery

Essential Fish Habitat (EFH) for Pelagic and Mariana Bottomfish MUS occurs throughout the action area and includes two EFH types: (1) water-column EFH (for pelagics and bottomfish) and (2) substrate EFH (for bottomfish) (Section 3.3.2). The following analysis evaluates the project-related stressor effects described in Section 4.4 on each EFH type and associated fishery

4.5.1 Water Column EFH for Pelagic and Mariana Bottomfish MUS

The proposed action may affect water-column EFH through turbidity, underwater noise, entrainment and habitat conversion. The water column is a critical component of the EFH designation through which marine life processes, in particular larval stages of fish, corals, and crustaceans, occur (USACE & NMFS 2022). Pelagic MUS predominantly rely on the water column for all life stages with EFH designated for these species from the shoreline to the EEZ, from the surface down to 200 meter depth for eggs and larvae and down to1,000 meters for juveniles and adults. Pelagic species forage on mobile nekton, micronekton, and zooplankton in the open water column and pelagic eggs and larvae rely on regional circulation patterns for transport, retention, and dispersal (WPRFMC 2009b). Mariana Bottomfish MUS also utilize the water column for foraging and movement, although their primary EFH is associated with benthic habitats (WPRFMC 2009a).

Turbidity

Expounding on discussions in both programmatic ESA and EFH consultation specific to the proposed action, turbidity, i.e., sediments suspended in the water column can reduce water clarity and impact predator-prey dynamics, interrupt larval dispersal and settlement, reduce solar irradiance and the settled sediments can smother sessile benthic organisms (USACE & NMFS 2002). Turbidity reduces the quality of water-column EFH. The extent and magnitude of the adverse effect depends on sediment characteristics and exposure duration, where permanent and chronic inputs of fine sediments are known to be more impactful than short-duration exposure to coarse sand.

As described in Section 4.4.1, any turbidity generated by hydraulic dredging will be concentrated near the seafloor and will dissipate rapidly due to both the coarse grain dredged

material and the dredge method utilizing a suction intake attached to the cutterhead designed to draw in a slurry of water and sediments in suspension. Turbidity generated by conveyance of the pipeline is not expected, with the rare exception of pipeline breakage and inadvertent slurry release. Lastly, turbidity generation will be minimized to the greatest extent practicable through implementation of the selected beach fill method utilizing filter-lined containment cells and silt fencing.

Through design modification developed in response to technical assistance and recommendations from the resource agencies to avoid and minimize adverse impacts to protected resources, USACE expects that turbidity generated would be minimal and temporary. Additionally, implementation of standard and project specific ESA conservation measures and EFH conservation recommendations consistent with programmatic ESA and EFH consultations in the Pacific Region would further minimize turbidity generation and spread.

While the turbidity impacts described above will reduce the quality of water column EFH, and to a much lesser degree, substrate EFH, for Pelagic and Marianas Bottomfish MUSs, the impacts would be short term and insignificant and do not have the potential to cause substantial adverse effects to EFH.

Underwater Noise

Underwater noise can affect marine species by altering behavior, masking biologically important sounds, causing developmental delays, disrupting reproductive success and at sufficiently high sound pressure levels, causing auditory injury, and in extreme cases, death (NMFS 2024). Noise pollution degrades the acoustic environment and disturbs normal behaviors and patterns thereby reducing the quality of water column EFH. Eggs and larval stages of both MUSs are especially vulnerable to underwater noise while juvenile and adult Pelagic fish are more affected by impulsive, broadband water-column noise (like pile driving) and Bottomfish are most affected by low-frequency, continuous, vibration-heavy noise (like dredging or engines). The severity of effects depends on the sound pressure level, distance from the source, and duration of exposure.

The proposed action involving maintenance dredging and BUDM would generate noise above background levels temporarily through the duration of construction and would not create any permanent noise sources in the action area. Hydraulic dredging generates non-impulsive, continuous, and low-intensity sound and are among the quietest dredging methods. Sound produced by the cutterhead would be attenuated by shallow water depth, sandy substrate, and the enclosed harbor basin. Pelagic and bottomfish MUS are unlikely to be exposed to noise generated by the project because they do not occupy shallow, nearshore harbor environments (WPRFMC 2009 a & b). Project-related noise generated would temporarily reduce the quality of EFH for Pelagic and Mariana Bottomfish MUS, however, exposure would be short term and exposure localized to the action area. Adverse effects to water column EFH would not be substantial.

Entrainment

Hydraulic dredging entrains seawater, substrate, and the associated biological resources drawn into the cutterhead during excavation. Entrainment would only occur during active construction and does not impose long-term changes to water-column processes that support federally managed fisheries. Passive drifters such as planktonic organisms, pelagic eggs and larvae, and small fishes or other weak swimmers are susceptible to entrainment, but only within the immediate suction field at the cutterhead (Reine 1998). Larger motile fishes that contribute to the Pelagic and Bottomfish MUS forage base are not vulnerable due to the exclusion grate retrofitted to the suction intake. Additionally, juvenile and adult MUS species are not commonly present in nearshore harbor areas where dredging occurs and likely would not be entrained by the dredge.

Entrained organisms are unlikely to survive transport through the pipeline or deposition at Nimitz Beach due to velocity, agitation, and burial within the containment cell. Most entrained organisms are early life stages with naturally high mortality. While mortality of entrained individuals is expected to be high, near 100%, the proportion of the total planktonic, larval, and small-prey community entrained represents an extremely small fraction of the extensive water-column EFH available in Agat Bay and the Western Pacific region. The loss of small prey organisms may result in a temporary, localized reduction in benthic or water-column prey availability within the dredge footprint, but this effect is spatially confined and short-lived (Reine 1998).

Accordingly, while the removal of planktonic organisms, eggs, larvae, and small prey constitutes a temporary reduction in water-column EFH quality, the extremely small volume of water affected relative to the EFH designation, and the short duration of construction indicate that entrainment effects are not expected to result in population-level or EFH-scale impacts. Entrainment-related adverse effects to EFH are anticipated to be minimal, localized, temporary, and not substantial.

Habitat Conversion

The BUDM to reclaim the eroded shoreline at Nimitz Beach Park would convert the existing shallow subtidal and intertidal habitat within the fill area to uplands. This action would result in the permanent loss of approximately 1 acre of water-column (and substrate) EFH designated for Pelagic and Mariana Bottomfish MUS. The water column present in the fill area is limited to the intertidal and shallow subtidal zone, which, as confirmed by dive survey, is naturally turbid due to wave breaking and continual suspension of shoreline sediments. These conditions create a highly dynamic environment with low ecological diversity and limited suitability for supporting the life-history functions of Pelagic and Bottomfish MUS, which primarily utilize deeper, offshore waters (WPRFMC 2009 a & b).

EFH within the action area is of relatively low-value for both fisheries' species along the wave-dominated, sandy bottom habitat. The permanent loss of EFH at Nimitz Beach shoreline represents a small, localized reduction in available EFH relative to the extensive EFH designations that extend from the shoreline to the EEZ. Although the conversion of shallow

subtidal and intertidal habitat to upland constitutes an adverse effect to EFH, the minimal acreage affected, the low ecological value of the habitat for both MUS groups, and the highly localized nature of the impact indicate that the adverse effect would not be substantial.

4.5.1.1 Conclusion for Water Column EFH

In consideration of Pelagic and Mariana Bottomfish MUS lifecycle dependencies on water column EFH, the discussions above conclude that the expected temporary reduction in quality and permanent reduction in quantity of water column EFH would be localized to the action area and minimal relative to the state of the fishery and vastness of the EFH designation and therefore not substantial.

4.5.2 Substrate EFH (Mariana Bottomfish MUS)

The following section considers the effect sedimentation, temporary physical disturbance, temporary loss of benthic infauna, and permanent habitat conversion may have on substrate EFH designated for Mariana Bottomfish MUS. Pelagic MUS EFH designation is for water column only; no substrate EFH is designated for this fishery.

Sedimentation

Turbidity generated by the proposed action would settle rapidly on the surrounding substrate due to the coarse grain size of the dredged material. Sediment characterization indicates that approximately 98 percent of the material is coarse calcareous sand, which settles quickly, remains close to the point of disturbance, and is not easily resuspended. As a result, only minor turbidity and correspondingly minor sedimentation are expected.

Spread of suspended sediments to surrounding habitats is further minimized through project design features—such as placement of slurry into filter-lined containment cells—and BMPs that include visual monitoring and adaptive management to maintain operations within acceptable turbidity limits. Any turbidity that does occur would consist of coarse sand consistent with the dominant substrate type in the action area.

Given the limited extent of suspended sediment, rapid settling behavior, and the similarity of deposited material to existing unconsolidated sandy substrate, sedimentation is not expected to measurably adversely affect the substrate EFH designated for Mariana Bottomfish MUS in the action area.

Physical Disturbance

Expounding upon the description of physical disturbance in the Programmatic EFH consultation, the proposed action would physically disturb substrate EFH through hydraulic suction dredging and beach fill activities. The harbor is dominated by unconsolidated sandy bottom with few seagrass patches and no complex benthic habitats such as hard pavement or coral reef. Hydraulic dredging within Agat SBH would remove shoaled sediments that constitute substrate EFH within the federal navigation channel, resulting in a temporary reduction in EFH quantity. While approximately 1.8 acres of sandy substrate EFH would be disturbed or removed, Mariana Bottomfish MUS are primarily associated with deeper reef-slope habitats and have no documented dependency on nearshore harbor substrate,

although individuals may opportunistically forage in shallow waters.

Removal of shoaled sediments would also remove the benthic invertebrate and infaunal community associated with the sandy substrate. USACE expects that the surrounding substrate benthic and infauna communities would remain intact and available to naturally recolonize the remaining substrate at variable rates (Wooldridge 2016). While the natural restoration of the benthic infaunal community may take a year or more, the purpose of the harbor and of the maintenance dredging is to provide navigation and is not intended to preserve benthic communities opportunistically established in the federal channel. The loss of benthic communities within the dredge footprint would result in a short-term reduction in prey availability for Mariana Bottomfish MUS and thereby reduces the quality of substrate EFH. Likewise, the burying of existing substrate with dredged material to reclaim the eroded shoreline at Nimitz Beach would result in the permanent loss of any associated benthic communities.

The temporary and localized reduction in substrate EFH quantity from dredging, together with the consequential temporary reduction in substrate EFH quality associated with infaunal removal, is not expected to be substantial within the context of the EFH designation for Mariana Bottomfish MUS.

Habitat Conversion
Placing dredged material along the eroded shoreline at Nimitz Beach Park would convert the existing shallow subtidal and intertidal habitat within the fill area to uplands. This action would result in the permanent loss of approximately 1 acre of sandy intertidal and shallow-water substrate EFH designated for Mariana Bottomfish MUS. The fill footprint consists entirely of unconsolidated sandy bottom with no structured habitats or high-value benthic communities such as hard pavement, coral, or seagrass (USACE 2025). The dredged sand used for beach reclamation is consistent with naturally occurring shoreline sediments transported by longshore processes and does not introduce new substrate types to the nearshore environment (USACE 2020).

Mariana Bottomfish MUS utilize benthic habitats and primarily utilize deeper reef-slope substrate, with no documented dependency on intertidal or shallow subtidal sandy substrates. While individuals may opportunistically forage in nearshore waters, the substrate EFH within the fill area represents low-value habitat for the fishery.

Although the proposed action would permanently reduce the quantity of substrate EFH by approximately 1 acre, this loss is small, localized, and limited to low-value sandy substrate within the broader EFH designation, which extends from the shoreline to 400 meters depth. Accordingly, the adverse effect to substrate EFH designated for Mariana Bottomfish MUS would not be substantial.

4.5.2.1 Conclusion for Substrate EFH
Temporary effects from dredging and permanent effects from beach reclamation are limited in spatial extent and do not alter the broader availability or ecological function of substrate EFH

for Mariana Bottomfish MUS. With implementation of all applicable EFH Conservation Recommendations, adverse effects on substrate EFH are expected to be not substantial.

4.6 EFH Cumulative Effects Analysis

USACE consider adverse effects of the proposed action on EFH pursuant to the Magnuson–Stevens Fishery Conservation and Management Act, cumulative effects include individual, cumulative, or synergistic consequences of actions (50 C.F.R. § 600.810(a), 600.920). With respect to cumulative effects, USACE evaluated the potential impacts of past and present activities, as well as future non-Federal actions reasonably certain to occur within the EFH action area, when added to the direct and indirect effects of the proposed action. Federal actions are not included because they undergo separate EFH consultation.

The EFH action area encompasses the federal navigation features of Agat SBH, the nearshore marine corridor between the harbor and Nimitz Beach, and the intertidal and shallow subtidal zone along the Nimitz Beach shoreline. Existing conditions are characterized by unconsolidated sandy substrate, naturally turbid nearshore waters, recreational shoreline use, and small-boat harbor operations.

Future non-Federal actions reasonably certain to occur within the EFH action area are limited. The Government of Guam has voluntarily committed to two actions associated with the project area: 1) Planting native vegetation along the reclaimed beach crest; and 2) Conducting short- and mid-term monitoring of shoreline migration and dredged material movement following project completion.

These actions are not funded, implemented, or required by USACE, and are not interrelated or interdependent with the proposed action. As non-Federal activities, reasonably certain to occur, they qualify as cumulative effects. Both actions are beneficial or neutral with respect to EFH. Vegetation planting would stabilize the reclaimed shoreline and reduce terrigenous sediment input to nearshore waters, and shoreline monitoring would not introduce any EFH stressors.

Additional non-Federal actions reasonably certain to occur include public recreational use of Nimitz Beach (swimming, shoreline access, fishing), small-scale park maintenance by the Government of Guam, harbor landside facilities operation and maintenance by Guam Port Authority, and recreational boating within Agat SBH. These activities are ongoing components of the environmental baseline and are not expected to increase in intensity or geographic extent. They do not introduce new EFH stressors beyond those already present in the baseline and are not expected to interact cumulatively with the short-term, localized effects of the proposed action. Regional socioeconomic trends including population decline in Hågat (Agat), tourism growth concentrated in northern Guam, and delayed military relocation, do not indicate any foreseeable non-Federal development or construction within the EFH action area. No other future State, territorial, or private actions are identified in available planning documents or socioeconomic analyses.

The proposed action's EFH stressors, turbidity and sedimentation, underwater noise, entrainment, physical disturbance, and habitat conversion, are localized, short-term, and largely confined to the action area. The only permanent EFH effect is the conversion of approximately 1 acre of intertidal and shallow subtidal sandy substrate to uplands. The reasonably certain non-Federal actions identified above would not increase turbidity or sedimentation, introduce underwater noise sources beyond existing recreational levels, present risk of entrainment, disturb, convert or otherwise modify existing habit to the level and degree of the proposed action. These foreseeable non-Federal activities are limited in scope, beneficial or neutral, and do not introduce new EFH exposure pathways and are not expected to interact cumulatively with the project's temporary stressors or with the small, localized permanent loss of EFH.

Cumulative effects on EFH for Pelagic and Mariana Bottomfish MUS are expected to be minimal and not substantial. Future non-Federal actions reasonably certain to occur within the action area are limited, beneficial, or neutral and do not contribute additional EFH stressors. When added to the proposed action's localized and largely temporary effects, the cumulative effects context does not elevate the risk of substantial adverse effects to water column or substrate EFH. The cumulative effects analysis does not alter the conclusions presented in Section 4.5 regarding the magnitude or significance of EFH impacts.

5 SUMMARY OF ESA AND EFH EFFECT DETERMINATIONS AND REQUEST FOR AGENCY RESPONSES

This section summarizes the effect determinations reached under the Endangered Species Act (ESA) and the Essential Fish Habitat (EFH) provisions of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) and formally requests the appropriate agency responses for informal ESA consultation and abbreviated EFH consultation.

5.1 ESA Effect Determinations

Based on the analysis presented in Sections 4.1–4.3, and the baseline environmental conditions described in Section 3.0, the USACE has determined the following:

ESA-Listed Marine Species (NMFS Jurisdiction)

- **Central West Pacific green sea turtle (*Chelonia mydas*)**: *May affect, not likely to adversely affect*
- **Hawksbill sea turtle (*Eretmochelys imbricata*)**: *May affect, not likely to adversely affect*
- **Indo-West Pacific scalloped hammerhead shark (*Sphyrna lewini*)**: *May affect, not likely to adversely affect*
- **Indo-Pacific coral (*A. globiceps*)**: *May affect, not likely to adversely affect*
- **Pelagic ESA-listed species potentially present during contingency ocean disposal** (leatherback, loggerhead, olive ridley, oceanic whitetip, giant manta ray, blue whale, fin whale, sei whale, sperm whale, Western North Pacific humpback whale): *No effect* under the preferred alternative; *May affect, not likely to adversely affect* under the contingency ocean-disposal alternative.
- **Giant Clams (*Hippopus hippopus*, *Tridacna gigas*, and *T. derasa*):** *expected to result in no effect to the proposed species*[1]
- **Pelagic Species (under contingency action only) - leatherback sea turtle (*Dermochelys coriacea*), South Pacific loggerhead sea turtle (*Caretta caretta*), olive ridley sea turtle (*Lepidochelys olivacea*), oceanic whitetip shark (*Carcharhinus longimanus*), giant manta ray (*Mobula birostris*), blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), sei whale (*Balaenoptera borealis*), sperm whale (*Physeter macrocephalus*), and Western North Pacific humpback whale (*Megaptera novaeangliae*):** May affect, not likely to adversely affect.

[1] Because giant clams are proposed but not yet listed, effects are evaluated under the ESA conferencing provisions at 50 CFR 402.10.

ESA-Listed Terrestrial and Nearshore Species (USFWS Jurisdiction)

- **Sea turtles in terrestrial habitat (green, hawksbill)** – *May affect, not likely to adversely affect*
- **Mariana fruit bat (*Pteropus mariannus mariannus*)** – *May affect, not likely to adversely affect*
- **Tree snails (Partula gibba, P. radiolata, Samoana fragilis)** – *May affect, not likely to adversely affect*

Critical Habitat (NMFS and USFWS)

- **Indo Pacific corals marine critical habitat** – *No destruction or adverse modification*
- **Green sea turtle proposed marine and terrestrial critical habitat** –*not expected to destroy or adversely modify**[2]

ESA Consultation Request
Pursuant to Section 7 of the ESA and in accordance with 50 CFR 402.13, USACE seeks to initiate informal consultation with NMFS and USFWS on the proposed action and concurrence with the effect determinations above to complete the consultation. USACE considered and incorporated feasible and practicable conservation measures for endangered species and critical habitat offered by the Services under technical assistance. USACE anticipates that these consultations should proceed without undue delay.

With respect to those species proposed for listing or critical habitat designation, USACE has determined the proposed action is not likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat. In anticipation of formal listing or designation, USACE seeks conference with the Services and requests any additional conservation measures, but not concurrence on the preliminary effect determinations.

5.2 EFH Effect Determinations

Based on the EFH baseline described in Section 3.3.2 and the effects analysis in Sections 4.4–4.6, USACE has determined the following:

Water Column EFH (Mariana Bottomfish and Pelagic MUS)

- **May adversely affect EFH** but does **not have the potential to cause a substantial adverse effect**.

Substrate EFH (Mariana Bottomfish MUS)

- **May adversely affect EFH** but does **not have the potential to cause a substantial adverse effect**.

[2] Because green sea turtle critical habitat is proposed but not yet designated, effects are evaluated under the ESA conferencing provisions at 50 CFR 402.10.

HAPC

- None present — **no effect**.

EFH Consultation Request

Based on the preceding assessment, USACE has determined that the proposed action may adversely affect EFH but does not have the potential to cause a substantial adverse effect. Accordingly, USACE seeks abbreviated EFH consultation under 50 CFR 600.920(h) with NMFS. USACE will respond in writing to any EFH Conservation Recommendations offered by NMFS.

6 REFERENCES

Brainard, R. E., Asner, G. P., Oliver, T., McCoy, K., Mangubhai, S., Moffitt, R., … Miller, J. (2011). Status review report of 82 candidate coral species petitioned under the U.S. Endangered Species Act. NOAA Technical Memorandum NMFS-PIFSC-27. https://repository.library.noaa.gov/view/noaa/696.

Braley, R. D. (2010). The distribution and status of giant clams (family Tridacnidae): A short review. Raffles Bulletin of Zoology, 58(1), 17–20. https://www.researchgate.net/profile/Peter-Todd-7/publication/239593629_The_distribution_and_status_of_giant_clams_family_Tridacnidae_-_A_short_review/links/58c23a8792851c0ccbed925c/The-distribution-and-status-of-giant-clams-family-Tridacnidae-A-short-review.pdf?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19.

Budd, A. M., Cooper, M. K., Le Port, A., Schils, T., Mills, M. S., Deinhart, M. E., Huerlimann, R., & Strugnell, J. M. (2021). First detection of critically endangered scalloped hammerhead sharks (Sphyrna lewini) in Guam, Micronesia, in five decades using environmental DNA. Ecological Indicators, 127, 107649. https://doi.org/10.1016/j.ecolind.2021.107649

Duncan, K. M., Martin, A. P., Bowen, B. W., & De Couet, H. G. (2006). Global phylogeography of the scalloped hammerhead shark (Sphyrna lewini). Molecular Ecology, 15(8), 2239–2251. https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1365-294X.2006.02933.x.

Element Environmental, LLC, & Anchor QEA, LLC. (2023). Final sampling and analysis report: Engineering and environmental support for maintenance dredging at Agat Small Boat Harbor, Agat, Guam. Prepared for the U.S. Army Corps of Engineers, Honolulu District. Internal document not accessible online.

Federal Register. (1970). Conservation of endangered species and other fish and wildlife. 35 FR 8490. https://www.govinfo.gov/content/pkg/FR-1970-06-02/pdf/FR-1970-06-02.pdf.

Federal Register. (2014). Endangered and threatened wildlife and plants; Threatened and endangered status for distinct population segments of scalloped hammerhead sharks. 79 FR 38213. https://www.federalregister.gov/documents/2014/07/03/2014-15710.

Federal Register. (2014). Final listing determinations on proposal to list 66 reef-building coral species… 79 FR 53851. https://www.federalregister.gov/documents/2014/09/10/2014-20814.

Federal Register. (2016). Identification and listing of eleven DPS of green sea turtles… 81 FR 20057. https://www.federalregister.gov/documents/2016/04/06/2016-07587.

Federal Register. (2025). Endangered and threatened species; Designation of critical habitat for five species of threatened Indo-Pacific corals. 90 FR 31800. https://www.federalregister.gov/documents/2025/07/15/2025-13238/endangered-and-threatened-species-designation-of-critical-habitat-for-five-species-of-threatened

Hazel, J., Lawler, I. R., Marsh, H., & Robson, S. K. A. (2007). Vessel speed increases collision risk for the green turtle Chelonia mydas. Endangered Species Research, 3, 105–113. https://www.researchgate.net/publication/225298281_Vessel_speed_increases_collision_risk_for_the_green_turtle_Chelonia_mydas/link/00b4952c21485aa5c4000000/download?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19.

Jorgensen, S. J., Klimley, A. P., Muhlia-Melo, A. F., Morgan, S. G., Espinoza, E., & Taylor, V. (2009). Scalloped hammerhead shark Sphyrna lewini utilizes deep-water, hypoxic zone in the Gulf of California. Journal of Fish Biology, 74, 1682–1687. https://onlinelibrary.wiley.com/doi/10.1111/j.1095-8649.2009.02230.x?msockid=3b58dad577cf659206e1cdd17638641b

Kinch, J., & Teitelbaum, A. (2010). Proceedings of the Regional Workshop on the Management of Sustainable Fisheries for Giant Clams (Tridacnidae). Secretariat of the Pacific Community. https://library.sprep.org/sites/default/files/547.pdf.

Lucas, J. S. 1988. Giant clams: description, distribution, and life-history. In: J. W. Copland and J. S. Lucas (eds) Giant clams in Asia and the Pasific. ACIAR Monograph 9: 21 – 32. https://ageconsearch.umn.edu/record/118042?v=pdf.

Meylan, A. (1988). Spongivory in hawksbill turtles: A diet of glass. Science, 239(4838), 393–395. https://www.jstor.org/stable/1700236

Miller, M. H., Carlson, J., Cooper, P., Kobayashi, D., Nammack, M., & Wilson, J. (2013). Status review report: Scalloped hammerhead shark (Sphyrna lewini). NOAA. https://repository.library.noaa.gov/view/noaa/17697.

Muirhead, C., Piniak, W. E. D., Nowacek, D. P., & Harms, C. (2025). *Sea turtle acoustic ecology: Addressing priority data gaps in knowledge of sea turtle hearing sensitivity* (BOEM Report No. 2025-011). Bureau of Ocean Energy Management. https://tethys.pnnl.gov/publications/sea-turtle-acoustic-ecology-addressing-priority-data-gaps-knowledge-sea-turtle-hearing

Munro, J. L. (1992). Giant clams. FFA Report 92/75. Pacific Islands Forum Fisheries Agency. https://docslib.org/doc/3798658/giant-clams-by-john-l-munro-ffa-report-92-75.

Nieder, C., Rapson, J., Montgomery, J. C., & Radford, C. A. (2023). Comparison of auditory evoked potential thresholds in three shark species. *Journal of Experimental Biology,*

226(18), Article jeb245973. https://doi.org/10.1242/jeb.245973https://journals.biologists.com/jeb/article/226/18/jeb245973/333995/Comparison-of-auditory-evoked-potential-thresholds

NMFS. (2023). Endangered and threatened wildlife and plants; Proposed rule to designate marine critical habitat for the green sea turtle. Federal Register, 88(137), 46572-46671. https://www.federalregister.gov/documents/2023/07/19/2023-14109/endangered-and-threatened-wildlife-and-plants-proposed-rule-to-designate-marine-critical-habitat-for

NMFS. (2024). Endangered and threatened wildlife and plants; Proposed listing determinations for ten species of giant clams under the Endangered Species Act. 89 FR 60498 (July 25, 2024). Docket No. 240626-0177. https://www.fisheries.noaa.gov/action/proposed-rule-10-species-giant-clams-under-endangered-species-act

NMFS. (2024). *Habitat Conservation Division Technical Assistance for Agat Small Boat Harbor Maintenance Dredging* [Email communication, S. Hanser]. Internal document not accessible online.

NMFS. (2024). *Protected Resources Division Technical Assistance for Agat Small Boat Harbor Maintenance Dredging* [Email communication, B. Stablow]. Internal document not accessible online.

NOAA Fisheries. (2024). Status Review Report of Seven Giant Clam Species Petitioned Under the U.S. Endangered Species Act: Hippopus hippopus, H. porcellanus, Tridacna derasa, T. gigas, T. mbalavuana, T. squamosa, and T. squamosina. https://www.fisheries.noaa.gov/s3//2024-07/StatusReview-GiantClams-508.pdf

NMFS & USFWS. (1998a). Recovery plan for U.S. Pacific populations of the green turtle (Chelonia mydas). https://repository.library.noaa.gov/view/noaa/15970.

NMFS & USFWS. (1998b). Recovery plan for U.S. Pacific populations of the hawksbill turtle (Eretmochelys imbricata). https://repository.library.noaa.gov/view/noaa/15969.

NMFS & USFWS. (2013). Hawksbill sea turtle (Eretmochelys imbricata) 5-year review. https://repository.library.noaa.gov/view/noaa/17041.

Pacoureau, N., Rigby, C. L., Kyne, P. M., Sherley, R. B., Winker, H., Carlson, J. K., Dulvy, N. K. (2021). Global drivers of shark population declines. Science of the Total Environment, 769, 144–179. https://doi.org/10.1016/j.scitotenv.2021.144179

Reine, K., and Clarke, D. 1998. “Entrainment by hydraulic dredges–A review of potential impacts.” Technical Note DOER-E1. U.S. Army Engineer Research and Development Center, Vicksburg, MS. https://erdc-

library.erdc.dren.mil/server/api/core/bitstreams/81b728f8-70cf-4ef8-e053-411ac80adeb3/content

Reine, K. J., & Dickerson, C. (2014). *Characterization of underwater sounds produced by a hydraulic cutterhead dredge during maintenance dredging in the Stockton Deepwater Shipping Channel, California* (ERDC TN-DOER-E38). U.S. Army Engineer Research and Development Center. https://erdc-library.erdc.dren.mil/server/api/core/bitstreams/81b728f8-6ef7-4ef8-e053-411ac80adeb3/content

Rosov, B., Bush, S., Briggs, T. R., & Elko, N. (2016). The state of understanding the impacts of beach nourishment activities on infaunal communities. *Shore & Beach, 84*(3), 51–55. https://asbpa.org/wp-content/uploads/2016/06/Rosov-et-al.-2016-Infaunal-Impacts.pdf

Seminoff, J. A., Allen, C. D., Balazs, G. H., Dutton, P. H., Eguchi, T., Haas, H. L., … Waples, R. S. (2015). Status review of the green turtle (Chelonia mydas) under the U.S. Endangered Species Act. NOAA-TM-NMFS-SWFSC-539. https://repository.library.noaa.gov/view/noaa/4922.

Soo, P., & Todd, P. A. (2014). The behaviour of giant clams (Bivalvia: Cardiidae: Tridacninae). Marine Biology, 161, 2699–2710. https://www.researchgate.net/publication/266321987_The_behavior_of_giant_clams_Bivalvia_Cardiidae_Tridacninae/link/548036a80cf250f1edbfc841/download?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19.

U.S. Army Corps of Engineers & National Marine Fisheries Service. (2022). Magnuson-Stevens Fishery Conservation and Management Act, Programmatic Essential Fish Habitat Consultation. Honolulu, HI: U.S. Army Corps of Engineers, Honolulu District, and NOAA National Marine Fisheries Service, Pacific Islands Regional Office. Internal document not accessible online.

U.S. Army Corps of Engineers, Honolulu District. (2020). *Agat Bay regional shoreline assessment: Final assessment report.* U.S. Army Corps of Engineers. Internal document not accessible online.

U.S. Army Corps of Engineers, Honolulu District. (2024). *FY24 hydrographic condition survey: Agat Small Boat Harbor, Guam* (Sheet VH101). U.S. Army Corps of Engineers. Internal document not accessible online.

U.S. Federal Emergency Management Agency. (2024, February 15). Preserving Guam's natural beauty during Typhoon Mawar debris cleanup. FEMA. https://www.fema.gov/press-release/20240215/preserving-guams-natural-beauty-during-typhoon-mawar-debris-cleanup

U.S. Fish and Wildlife Service. (1990). *Mariana fruit bat and little Mariana fruit bat recovery plan.* U.S. Fish and Wildlife Service, Portland, OR. https://ecos.fws.gov/docs/recovery_plan/901102.pdf.

USFWS. (2019). 5-year review: Summary and evaluation for the Mariana fruit bat (Pteropus mariannus mariannus). Pacific Islands Fish and Wildlife Office, Honolulu, HI. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3210.pdf

U.S. Fish and Wildlife Service. (2020). 5-year review: Summary and evaluation for the tree snail Partula gibba. Pacific Islands Fish and Wildlife Office, Honolulu, HI.
PDF: https://ecos.fws.gov/docs/tess/species_nonpublish/3014.pdf

U.S. Fish and Wildlife Service. (2020). 5-year review: Summary and evaluation for the tree snail Partula radiolata. Pacific Islands Fish and Wildlife Office, Honolulu, HI.
PDF: https://ecos.fws.gov/docs/tess/species_nonpublish/3011.pdf

U.S. Fish and Wildlife Service. (2020). 5-year review: Summary and evaluation for the tree snail Samoana fragilis. Pacific Islands Fish and Wildlife Office, Honolulu, HI.
PDF: https://ecos.fws.gov/docs/tess/species_nonpublish/3010.pdf

U.S. Fish and Wildlife Service. (2023). Endangered and threatened wildlife and plants; Designation of critical habitat for the green sea turtle; Proposed rule. Federal Register, 88(137), 46376–46420. https://www.federalregister.gov/documents/2023/07/19/2023-14225/endangered-and-threatened-wildlife-and-plants-designation-of-critical-habitat-for-green-sea-turtle

U.S. Fish and Wildlife Service. (2024). *Agat Small Boat Harbor Maintenance Dredge: Fish and Wildlife Coordination Act Correspondence* [Official Correspondence, A. Nadig]. Internal document not accessible online.

U.S. Fish and Wildlife Service Ecological Services. (2024). *Technical Assistance for the Hagat Small Boat Harbor Maintenance Dredging and Dredged Material Disposal, Agat, Guam* [Official Correspondence, J. Flores]. Internal document not accessible online.

U.S. Fish and Wildlife Service. (2025). *Agat Small Boat Harbor Maintenance Dredge Project: Fish and Wildlife Coordination Act Planning Aid Letter* [Official Correspondence, M. Bogardus]. Internal document not accessible online.

U.S. Fish and Wildlife Service Ecological Services. (2026). *Draft Conservation Measures for the Hagat Small Boat Harbor Maintenance Dredging and Dredged Material Disposal, Hagat, Guam* [Draft Correspondence]. Internal document not accessible online.

Wiles, G. J. (1987). The status of fruit bats on Guam. *Pacific Science, 41*(1), 1–16. https://www.researchgate.net/publication/237684269_The_status_of_fruit_bats_on_Guam.

Wiles, G. J., & Fujita, M. S. (1992). Food habits, foraging behavior, and population structure of the Mariana fruit bat. *Journal of Mammalogy, 73*(2), 414–428. Inaccessible online.

Wiles, G. J., Worthington, D. J., Beck, R. E., & Aguon, C. F. (1995). The decline of fruit bats on Guam: Causes and recommendations. *Pacific Science, 49*(1), 1–16. Inaccessible online.

Wiles, G. J., & Johnson, N. C. (2004). Population size and natural history of Mariana fruit bats (Chiroptera: Pteropodidae) on Sarigan, Mariana Islands. *Pacific Science, 58*(4), 585–596. https://scholarspace.manoa.hawaii.edu/server/api/core/bitstreams/bb4653e4-eefc-4ffb-99a1-96b303c4084f/content.

Wooldridge, T., Henter, H. J., & Kohn, J. R. (2016). Effects of beach replenishment on intertidal invertebrates: A 15-month, eight-beach study. Estuarine, Coastal and Shelf Science, 175, 24–33. https://doi.org/10.1016/j.ecss.2016.03.018

WPRFMC. (2009a). Fishery Ecosystem Plan for the Mariana Archipelago. https://www.wpcouncil.org/fep/WPRFMC%20Mariana%20FEP%20(2009-09-22).pdf.

WPRFMC. (2009b). Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region. https://www.wpcouncil.org/wp-content/uploads/2019/05/WPRFMC-Pelagic-FEP-2009-09-21.pdf.

WPRFMC. (2018). Amendment 5 to the Fishery Ecosystem Plan for the Mariana Archipelago. https://media.fisheries.noaa.gov/dam-migration/marianas-fep-amd-5-ecosystem-components.pdf.