ENVIRONMENTAL ASSESSMENT FOR MALALOA WHARF EXTENSION
Pago Pago, Tutuila, American Samoa

Prepared for:
American Samoa Department of Port Administration

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EXECUTIVE SUMMARY

Proposed Action

The American Samoa Department of Port Administration (AS-DPA) proposes to extend the current wharf in Malaloa, Pago Pago Harbor in Tutuila Island. The proposed extension is 453 feet-long and 45 feet-wide to provide wharf space for the American Samoa longliners. The wharf extension is to be built as a permanent structure and replicates the existing wharf and dredge the seaward side of the project footprint.

The Malaloa Wharf and the proposed action footprint is in the inner and northwestern most part of the Pago Pago Harbor of Tutuila Island. Pago Pago Harbor is a relatively large inlet that deeply indents the southeast shore of Tutuila Island forming an extensive naturally protected deep water harbor. The harbor is the deepest in the South Pacific making it strategic for navigation. Pago Pago harbor has a maximum width of 9.6 km and a minimum width of 1.2 km. The Harbor was designated a special management area (SMA) by the American Samoa Coastal Management Act of 1990 because of its "unique and valuable characteristics" and the "imminent threat from development pressures" (ASCA § 24.0503). Its marine boundaries are defined by a straight line from Goat Island Point to the jetty at Leloaloa (ASCA § 26.0221) and include ~1.2 km^2 of marine habitat. The Pago Pago Harbor SMA includes the inner harbor area and fronts the western portion of a ~10.4 km^2 watershed in extensively impacted condition.

Purpose and Need

The wharf extension and associated dredging will address the space limitation issue of the American Samoa longliners and create additional wharf space for sportfishermen and visiting yachts. These longliners target the South Pacific Albacore mostly within the Territory's EEZ. They also provide the fish for canned albacore that specifically supplies the US military. The local owners of longliners reached out to the Western Pacific Regional Fishery Management Council (WPRFMC) for assistance on the need for additional wharf space. The Council, in turn, provided some funding for a feasibility study. The American Samoa Department of Port Administration has applied for funds from the Department of Interior to fund the construction of the wharf extension.

Alternatives

This Environmental Assessment analyzes 3 alternatives: No Action, Wharf extension using sheet piles (preferred action); and Wharf extension using end-bearing steel pipe piles. The No Action Alternative serves as the baseline against which the proposed action and other alternatives are analyzed. This environmental assessment evaluates potential effects on environmental resources. The analyzed effects of the three alternatives are shown in Table 1. Because this action does not constitute a major Federal action significantly affecting the quality of the human environment, preparing an environmental impact statement is not required and signing a finding of no significant impact is adequate and appropriate.

Environmental Consequences

Implementing the No Action Alternative will have no significant impact on the natural environment but will have significant impact on the tuna industry and the American Samoa economy. The American Samoa and other foreign longliners and the US-flagged purse seiners will continue to have limited wharf space and the processing of raw materials for the tuna industry will be affected. This will inhibit the economic potential of the tuna cannery and indirectly impact the local economy.

On the other hand, implementing the wharf extension alternatives will have short-term, direct but negligible and minor adverse impact on the corals, associated fish, and turtles on the proposed dredging area. Sheet Piles and End-Bearing Piles have similar impact on the environment. However, sheet piles construction is cheaper than end-bearing piles.

Table 1. Summary of Potential Impacts to Resources from the Proposed Action and No-Action Alternative.

	Corals	Fish	Sea Turtles	Sea Birds	Marine Mammals	Socio-Economics
ALTERNATIVES						
No Action	0	0	0	0	0	---
Wharf Extension (Sheet Piles)	-	-	-	0	0	+++
Wharf Extension (End-Bearing Piles)	-	-	-	0	0	++

Legend:
No Impact - 0
Negligible to Minor Adverse Impact = -
Moderate Adverse Impact = --
Significant Adverse Impact = ---
Negligible to Minor Positive Impact = +
Negligible Positive Impact = ++
Significant Positive Impact = +++

1.0 INTRODUCTION, PURPOSE AND NEED

1.1 Introduction

The EA has been prepared according to the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality regulations implementing NEPA (Title 40 of the Code of Federal Regulations [40 CFR] Parts 1500–1508). It assesses the potential impacts of the extension of the Malaloa wharf, Pago Pago Harbor. The proposed action is the construction of an extension 453 feet in length and 45 feet wide in Malaloa, and associated dredging, and the transit of dredged material to the disposal at the Government-owned landfill site located in Futiga, Tutuila Island, American Samoa. The dredged material will be used to fill the sheet pile and the dredged area will provide an additional wharf space for small boats. The extension of the wharf would provide space for the American Samoa longliners. Wharf space has been a persistentlimitation especially for the longliners. The American Samoa-Department of Port Administration has hired Coral Reef Consulting to prepare this Environmental Assessment (EA) to evaluate the impacts of the proposed wharf extension project.

1.2 Purpose and Need

There is a need to extend the Malaloa Wharf and provide space for longliners and small vessels. There is no dock space for the longliners. These longliners target the South Pacific Albacore mostly within the Territory's EEZ. They also provide the fish for canned albacore that specifically supplies the US military. The local owners of longliners reached out to the Western Pacific Regional Fishery Management Council (WPRFMC) for assistance on the need for additional wharf space. The Council, in turn, provided some funding for a feasibility study. The American Samoa Department of Port Administration has applied for funds from the Department of Interior to fund the construction of the wharf extension. A secondary purpose of the wharf extension is to create additional wharf space for visiting yachtsand sportfishermen by dredging the shoreward side of the project footprint.

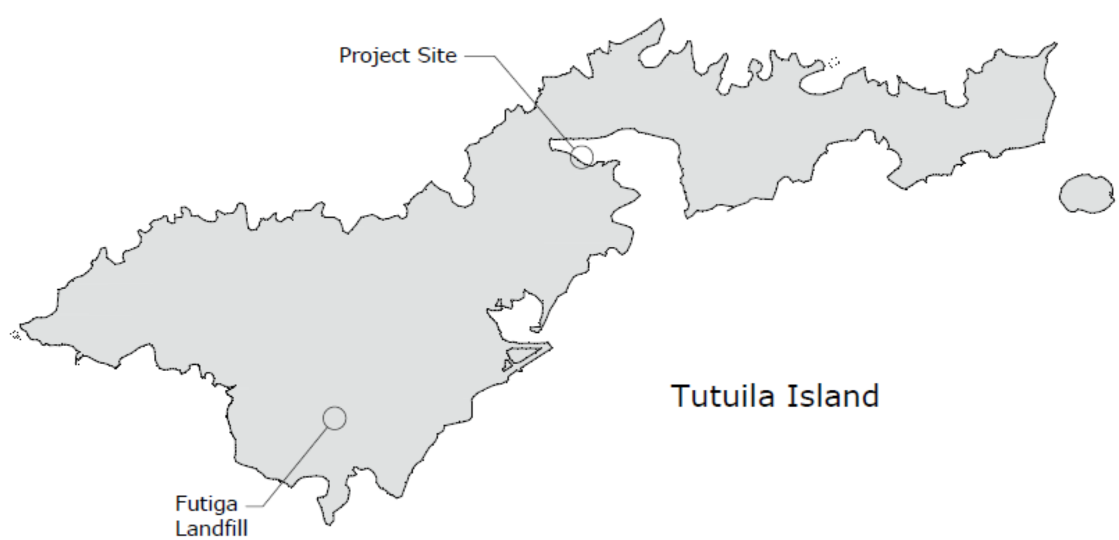
1.3 Authority

The American Samoa Department of Port Administration (AS-DPA) has three divisions: (a) Seaport Division, (b) Airport Division, and (c) Security and Safety Division. These divisions consist of subdivisions that ensure accountability and stability for the major operations and services to the public. As with the airport, it has the authority to maintain and develop the seaport of the Territory. Its vision statement is: "In the global market, American Samoa will become the hub of Pacific Island Region." Its mission is "In Partnership with Port Users, DPA shall provide excellent services to its Customers and the Community, in by doing so - raise the standard of living of the Territory in a manner that protects our environment and maintains the best of our *fa'a*-Samoa (Samoan way of life)".

As part of its mandate, AS-DPA has applied for funds from the Department of Interior to extend the current wharf in Malaloa, Pago Pago Harbor. AS-DPA has hired Coral Reef Consulting to prepare this Environmental Assessment (EA) to evaluate the impacts of the proposed wharf extension project. The EA has been prepared according to the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality regulations implementing NEPA (Title 40 of the Code of Federal Regulations [40 CFR] Parts 1500–1508).

1.4 Pago Pago Harbor

The location of the proposed wharf extension would be at approximately 14°19'25.06" S 170°42'35.94" W in the village of Malaloa, and in the inner and northwestern most part of the Pago Pago Harbor of Tutuila Island. American Samoa has 6 islands (Tutuila, Aunuu, Ofu, Olosega, Tau, Swains) and one atoll (Rose). Tutuila is the largest and most populated island. It isof volcanic origin with steep mountainsides, small valleys, and a narrow coastal fringe of relatively level land. The island is a narrow mountain range consisting of basic igneous rock and its mountains extend approximately 32 km. from east to west. Pago Pago harbor has amaximum width of 9.6 km and a minimum width of 1.2 km. Tutuila has been exposed to significant erosion and consequently has an insular shelf that is 4 km. wide on average and 320 km^2 of coral reef ecosystem. Its northern and southern sections are exposed to varying levels of wave intensity from swells generated by the trade winds.



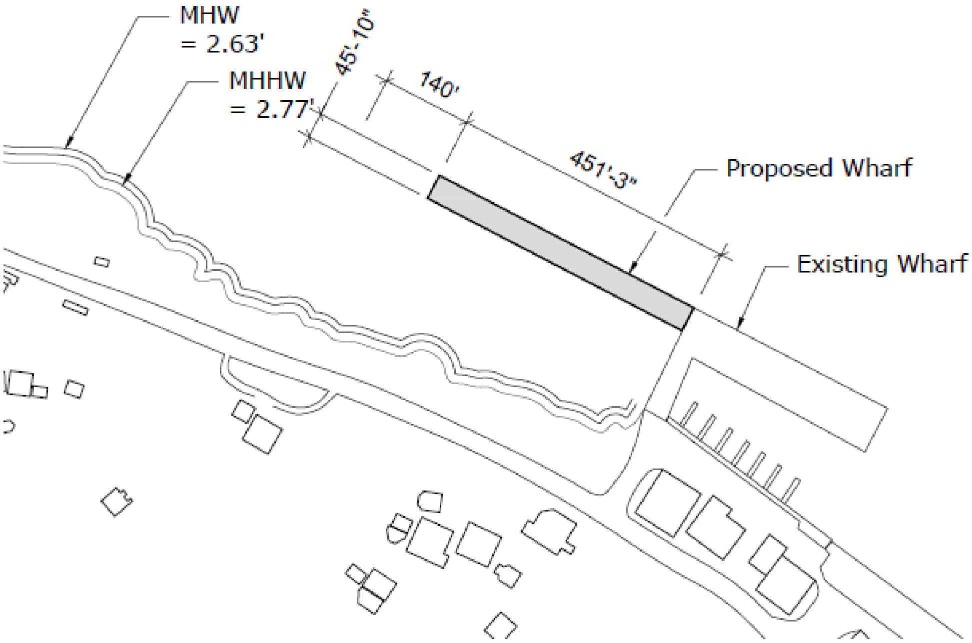


Figure 1. Location of project footprint and the proposed project.

1.5 Physical description of habitat

Pago Pago Harbor is a relatively large inlet that deeply indents the southeast shore of Tutuila Island forming an extensive naturally protected deep water harbor. The harbor is the deepest in the South Pacific making it strategic for navigation. Whalers sailing in the Pacific were among the first to visit the harbor. By the mid-nineteenth century, Pago Pago was one of the prime whaling ports in the entire Pacific Ocean. By the early 1800′s, European traders made frequent stops at these islands. The traders were on their way to China, carrying goods for sale. The site was chosen in 1872 by Commander R.W. Meade, who negotiated facilities for a coaling station for the U.S. Navy from the Samoan high chief Mauga. From 1878 to 1951, the area was the site of a coaling and repair station for the U.S. Navy, known then as United States Naval Station Tutuila. It remained an active naval base from 1900 to 1951 and is now a regular port of call for all types of vessels. American Samoa became even more important to the United Stated during the Second World War when Pago Pago was a naval base and staging point for the Navy offense in the Pacific. On September 29, 2009, Pago Pago was inundated by a tsunami generated by an undersea earthquake of magnitude 8.3, centered 190 km to the south in the Pacific. The tsunami caused extensive damage resulting in scores of deaths, the destruction of villages around Pago Pago Harbor and deposited significant debris to the harbor. Finally, American Samoa is also experiencing impacts of long-term climate change with increasing sea levels and consequently higher wave energy/disturbance and increasing sea surface temperature (Pirhalla et al. 2011). Increasing sea surface temperatures will have significant impact of coral reef habitat degradation and loss and most probably decline in associated fisheries (Hughes et al. 2003**).**

1.6 Biota and faunal description

The Pago Pago Harbor was designated a special management area (SMA) by the American Samoa Coastal Management Act of 1990 because of its "unique and valuable characteristics"and the "imminent threat from development pressures" (ASCA § 24.0503). Its marine boundaries are delimited by a straight line from Goat Island Point to the jetty at Leloaloa (ASCA § 26.0221) and include ~1.2 km^2 of marine habitat. The primary reason for this and other designated SMAs is to regulate onshore activities in the wetland areas that could be harmful to unique marine ecosystems (Gombos et al. 2007).

The Pago Pago Harbor SMA includes the inner harbor area and fronts the western portion of a ~10.4 km^2 watershed in extensively impacted condition. There is natural sedimentation caused by highly erosive soils on steep slopes and increased surface runoffs due to extensive urbanization. Nearshore water quality has also been severely degraded by nutrient and chemical discharges by the tuna canneries and other historical industrial and commercial activities adjacent to the harbor. Management of the SMA is primarily by the American Samoa Coastal Management Program (ASCMP) of the Department of Commerce. However, there is no written management plan (Gombos et al. 2007). Sale of fish or shellfish from the inner Harbor is prohibited due to contamination by heavy metals and other pollutants (ASEPA 1991). The harbor has also experienced several algal blooms since 2008 most probably due to the introduction of nutrients. In short, the Pago Pago harbor is a chronically disturbed marine environment.

There is only one species of seagrass in Tutuila, *Halophila ovalis*. Its beds occur as very narrow, pot-sized beds in the harbor. The seagrass beds usually occur as very small patches near the shore of sedimented habitats. Almost nothing is known of their ecology in American Samoa except that they are characterized by high turn-over based on observations. There has been some difficulty in developing monitoring protocols for *H. ovalis* due to its high turn-over rate and tendency to be buried in sediment.

2.0 PROPOSED ACTION AND ALTERNATIVES

This section presents the Preferred Proposed action (Sheet pile) and the No Action Alternative. The alternative to the Proposed Action (End-bearing pile) is also considered. The proposed action is described in Section 2.1 while the alternative is described in Section 2.2. The baseline of No Action is described in Section 2.3.

2.1 Alternative 1- Construct a longline wharf by extending an existing wharf in Malaloa, Pago Pago Harbor using sheet pile option (preferred)

Under this alternative, the American Samoa Government (ASG) would construct a new wharf by extending an existing wharf in Malaloa, Pago Pago Harbor. The proposed wharf is located on land owned by the American Samoa government. The wharf will be 453 feet in length and 45 feet wide. It will use an existing access road currently used for the existing wharf. The project also proposes to dredge the shoreward side of the proposed wharf extension. The wharf extension isto be built as permanent structure in its respective area. This option most closely replicates the existing wharf. The design comprises steel sheet pile sections that enclose the new wharf on 3 sides and is connected to the west end of the existing wharf structure. The sheet piles are vibrated to a specified depth and supported at the top by tie rods attached to continuous double channel waters. The wharf is filled with dredged sand from the shoreside seabed and imported granular material and has a reinforced concrete slab on grade deck. Preliminary construction costestimates indicate this design is also the least costly option. See Appendix 1 for the wharf design.

The survey set-out will establish permanent reference points located at the shoreline and on the existing wharf. It is envisaged that dredging of the inner channel will be carried out concurrently with the construction of the new wharf. Wharf construction will begin from the western edge of the existing wharf with construction of a soil berm that coincides with the centerline of the new wharf deck. The fill material used for the berm will comprise a mixture of imported rock to provide better stability, and sand dredged from the inner channel or shoreside.

The berm provides a working platform from which the crane will position itself, set up, and drive the new steel sheet piles along both sides of the berm for the length of the new wharf. As platform construction and sheet pile driving proceeds at the wharf site, a pair of temporary, parallel soil berms are constructed within the inner channel. Material excavated from the shoreside seabed is used to construct the berms, with the balance from the imported material transferred to the wharf fill. Once partial dredging of the inner channel reaches the westernmost limit, the temporary berms will be removed and the material hauled to the wharf. Surplus dredged material will be transported off site. The surplus dredged material will be carted for disposal at the Government-owned landfill site located in Futiga. Imported granular material specified for the wharf slab subbase will be sourced from existing, privately-operated quarries onthe island.

The sheet piling is the preferred option since it replicates the existing wharf. Pier extension using end-bearing piles will involve longer piles if the seabed is deep and pile driving to a deeper depth would propagate more sound disturbance. In addition, a sheet piled wharf is stronger than an end-bearing piled wharf. Dredging is unavoidable as the project footprint shoreside is very shallow (~6 ft). Sheet piling or end-bearing piles will use a barge to launch construction. Dredging the shoreward side would involve relocating over 600 colonies of corals to minimize project impact. Sheet piling alternative is not only deemed as the lesser damaging alternative as piles are not driven deeper. It is also a stronger design and least variable wharf design, would involve less sound disturbance and finally consistent with the existing wharf design. Preliminary construction cost estimates also indicate this design to be the least costly option.

The proposed wharf runs east-west and is parallel to but set-off from the shoreline. The wharf construction features an enclosed sheet pile bulkhead filled with imported material beginning from the existing seabed level up to the underside of the new concrete deck slab. The facility has wharf access along both sides of the structure. The depth of water on the harbor side of the wharf approximately matches the proposed design depth (MSL -15’) from whence the seabed falls away to deeper water. The depth of water on the landward side of the wharf varies but is less than design depth (MSL -12’), and the new access channel requires to be deepened. Dredging and filling is therefore necessary for this project.

The bid documents provide for the selected contractor to carry out a detailed geotechnical investigation prior to construction. This is to confirm the depth to hard stratum below the structure, and to determine the overburden soil composition. A borehole drilled in 2011 as part of the site investigation for the nearby Department of Marine and Wildlife Resources (DMWR) wharf confirmed the overburden there to be comprised of loose sands with dead coral fragments. This type of material is suitable for filling the new wharf bulkhead.

A dredge-to-fill operation proposes to excavate an access channel on the landward side of the new wharf and fill between the sheet pile bulkheads. The dredged in-situ material is similar in composition to the seabed soils under the new adjacent wharf. The dredging and filling operation is estimated to take 3 months to complete. During this period, disturbance of seabed soils in the immediate vicinity of the Project site is inevitable, however, provision has been made to install a full depth silt curtain completely around the works' area.

Estimated earthworks' quantities:

Total volume of dredged material = 10,930 cy
Less volume of dredged material hauled to landfill = (3,325 cy)
Total volume of dredged material retained on site = 7,605 cy

Total volume of dredged-to-fill material = 7,605 cy
Total volume of imported subbase fill = 2,671 cy
Total volume of permanent fill material = 10,276 cy

The dredging boom would physically contact all seafloor in the dredge footprint and remove the uppermost portions of unconsolidated seafloor habitat. Dredging would cause a temporary increase in turbidity in the area being dredged.

2.2 Alternative 2- Construct a longline wharf by extending an existing wharf in Malaloa, Pago Pago Harbor using end-bearing piles (not preferred)

This option considers end-bearing steel pipe piles driven to refusal. The design comprises a series of 4-pile bents spaced at 13'-4" centers for the full length of the wharf. The deck structure features a grid of precast reinforced concrete girders set on pile caps. Precast concrete slab panels are placed on the girders, followed by a cast-in-place topping slab that ties all the elements together. This option would also need to launch a barge during construction.

2.3 Alternative 3- No ActionUnder this alternative, the American Samoa Government would not extend the Malaloa Wharf. Under no action, American Samoa longline boats would have no wharf space.

3.0 THE AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

In this section, the baseline condition of each potentially affected resource is described and the potential impacts of the no action alternative and the proposed and alternative actions are described and analyzed. The affected environment includes the living and nonliving components of the Pago Pago Harbor. Biological resources evaluated are the those covered especially under the Endangered Species Act: Sea Turtles (Section 3.4), Marine Mammals (Section 3.5), Seabirds (Section 3.6), Hard Corals (Section 3.7), and Fish (Section 3.8). Resources that were not evaluated but also generally addressed (Section 3.0) are public health and safety, fishing community, biodiversity and ecosystem function, climate change, and other resource categories and issues because there is no nexus between the proposed action and the resource. Environmental impacts, also called environmental consequences, are characterized by duration (long-term or short-term), severity (none, negligible, minor, moderate, or major), quality (beneficial or adverse), causation (direct or indirect), and significance (intensity and context). Cumulative impacts are evaluated in Section 4.0. Effects. Conclusions are provided in Section 5.0.

3.1 Affected Environment

A marine underwater survey conducted on Aug. 2, 2018 on the proposed wharf extension project site showed substrate/habitats with percent cover as: sand, pavement, rubble (89.2%), dead coral with algae (7.3%), live hard corals (1.4%), and macroalgae (0.4%). Two species of corals were noted but these are not federally listed, nor have they been petitioned as endangered or threatened. Relatively undisturbed coral reefs in American Samoa have approximately 30% live coral cover. The live hard coral cover found at this location is drastically low (1.4%). Although there are no habitat features for sea turtles in the action area, one transient hawksbill sea turtle (*Eretmochelys imbricata*) was previously observed swimming within the proposed project area. Fishes found were mostly of site-attached damselfishes, cardinalfishes, some generalist-feeding butterflyfishes, wrasses, surgeonfishes and a bream that is usually found in sandy/muddy areas.

On April 3, 2019, three DMWR staff snorkeled in the proposed project site (including the proposed dredging area) and located coral colonies, counted their number, estimated colony sizes and noted their GPS positions. Around 647 coral colonies were located in the proposed project and dredging sites. The proposed dredging site was shallow (6-7 ft) and this shallow depth of the reef most probably enabled the corals to thrive in highly-sedimented and highly-stressed environment. Around 60% of the coral colonies were *Pocillopora damicornis*, a coral that is stress-resistant. The lesser abundant corals are also commonly found in shallow reef flats and are also known to be abundant in stressed environments. Most of the located coral colonies are located in the proposed dredging area. Finally, the benthos characteristics of the deeper seaward side of the proposed project indicated that the live coral cover was even much lower at 0.6%. The benthos was similarly dominated by sand, pavement and rubble at 78%. Macroalgae was higher compared to the proposed project site at 20%. Macroalgae (*Halimeda*) is an indicator of nutrient input. The benthos covers of these three benthos categories indicate a highly stressed environment. These findings are consistent with water quality assessment of the Pago Pago Watershed by the American Samoa-Environmental Protection Agency. AS-EPA has rated this watershed ‘extensive’: (1) for the streams’, aquaticlife and swimming activities are Not Supported (N^P); (2) the ocean, fish consumption andswimming activities are Not Supported (N^P); and (3) water quality 'impaired'.

3.2 Environmental Consequences

3.2.1 Proposed Action

Under Alternatives 1 and 2, the impacts of the commercial fishing wharf construction on the physical environment and Essential Fish Habitat (EFH) would be limited to the construction phase of the project. The wharf will be 450 feet long and 45 feet wide. The shore wide side of the proposed wharf will be dredged under both Alternatives 1 and 2. The nature and degree of the effect of the proposed discharge will differ, individually and cumulatively, on the characteristics of the substrate at the proposed disposal site.

Pile Driving and Dredging Sound Production

Pile-driving and dredging may produce in-water sound levels capable of injury or adverse behavioral modifications for fish, marine mammals and sea turtles. The effects of exposure to sound vary with the frequency, intensity, and duration of the sound source, and the hearing characteristics of the affected animal. Effects may include: (1) physical injury and/or permanent hearing damage, also referred to as permanent threshold shift (PTS); and (2) behavioral impacts through temporarily reduced sensitivity also referred to as temporary threshold shifts (TTS), temporarily masked communications or acoustic environmental cues, and modified behavior such as attraction or areal avoidance.

Sound typically loses intensity with distance as it moves away from the source. This is called transmission loss, which varies according to several factors in water, such as water depth, bottom type, sea surface condition, salinity, and the amount of suspended solids in the water. Sound energy dissipates through mechanisms such as spreading, scattering, and absorption (Bradley andStern 2008). Spreading refers to the decrease in sound energy as it radiates outward from the source. In addition to spreading, sound energy can be lost through scattering and absorption. Scattering refers to the sound energy when it "bounces" off of an irregular surface or particles in the water. Absorption refers to the energy that is lost through conversion to heat due to fiction. Irregular substrates, rough surface waters, and particulates in the water column increase scattering loss, while soft substrates, such as mud and silt increase absorption loss. Shallow near shore waters with irregular bottoms and high levels of sand and silt are considered poor environments for acoustic propagation. Sound typically dissipates more rapidly under those conditions than in open waters.

The piles would be driven into deep unconsolidated sediments. The project description reported that the piles would be driven at the lowest power setting, and that based on recent pile driving at an adjacent site, with the same pile driver, the in-water source level is expected to be about 101 dB re 1 µPa @ 1 meter. Dredging will be conducted using an excavator with a long reach boom and bucket mounted on a floating barge at various points throughout the project footprint to be dredged. Dredged material will be deposited on another barge until it is fully loaded on waiting trucks and hauled to approved disposal area.

The effects thresholds currently used by NMFS are marine mammal-specific and based on levels of harassment as defined by the Marine Mammal Protection Act (MMPA). For exposure to sounds in water, ≥ 180 dB and ≥ 190 dB are the thresholds for Level A harassment (i.e., injury and/or PTS) for cetaceans and pinnipeds, respectively. The thresholds for Level B harassment foron all marine mammals in the form of TTS and other behavioral impacts are ≥ 160 dB for impulsive noises and ≥ 120 dB for non-impulsive noise. Because vibratory pile driving causes non-impulsive noise, the 120 dB threshold would apply for this action. The available data indicate that 166 dB represents the threshold at which sea turtles exhibit behavioral responses to sound (Lenhardt et al. 1983, 1985).

Dredging can have direct effects through the removal and damage of reef communities and habitats if not relocated. However, indirect lethal or sublethal effects on the surrounding reef communities through elevated turbidity and sedimentation is not expected. The Harbor, in general, has low coral cover except for few reef pockets which are located distant from the project footprint. The resuspension of sediment may alter light penetration and reduces the growth and calcification of coral colonies (Dodge et al. 1974, Fabricius, 2005) and is also responsible for smothering and abrading colonies (Rogers 1990). Sedimentation and turbidity stress can also affect settlement and recruitment processes (Fabricius 2005). Since coral cover is low in vicinity,we do not expect these impacts are significant. Moreover, the resuspension of sediment can release contaminants, thus increasing water pollution and the risk of coral diseases (Haapkylä et al. 2011, Erftemeijer et al. 2012, Burns 2014, Pollock et al. 2014).

The long-term effects of the dredging and filling operations are considered minimal. Pago Pago Harbor is a sheltered harbor, closed at the western end. Currents have very low velocities and wave action is minimized by winds which are moderated by the surrounding mountain ridges and the Harbor being relatively sheltered. Sedimentation due to dredging is expected and may increase during the construction phase. However, Best Management Practices (Appendix 2) such as silt screens among others will be employed. The sedimentation will not be new sediment into the system, but will be existing sediment stirred up during construction. The project area has been physically altered in the past where the area had been dredged for fill materials to construct an airport, indicating that the general project area has historically been altered. However, dredging may stir up potential hazardous materials although this is remote possibility. There is very low coralcover in the general area and the coral colonies that will be affected by dredging are proposed to be relocated.

3.2.2 No Action Alternative

Under No Action Alternative, no new wharf would be constructed and existing conditions of the physical environment and habitat in the Pago Pago Harbor would remain.

3.3 Enlisted Species Impact Analytic Approach

The following section analyzes the potential direct and indirect impacts the proposed project may have on ESA-listed marine life in American Samoa. The analyses are based on the proposed construction location and methods, the included BMP, the biology and life history of the listed species, and on the overlap between the habitats used by those species and the action area. The impact analysis is based on identity and magnitude of stressor, species probability of exposure, expected response and risk assessment.

3.4 Sea Turtles

3.4.1 Affected Environment

Hawksbill and green turtles are the most common species of sea turtles found in local waters. There is one record of a leatherback turtle that was incidentally captured about five kilometers south of Swains Island and three records of olive ridleys (two dead and one live sighting; Utzurrum 2002). Hawksbill and green turtle populations have declined precipitously in American Samoa (Grant et al. 1997). Despite federal and territorial laws prohibiting the killing of sea turtles and an extensive education program, some sea turtles and eggs were harvested illegally in American Samoa (Grant et al. 1997). In addition to direct take of turtles and eggs, degradation of nesting habitat by coastal construction, environmental contaminants, and increased human presence are viewed as the major problems to the recovery of green and hawksbill turtle populations. Beach mining and beach erosion are also detrimental because the islands of American Samoa have very few beaches suitable for turtle nesting habitat. Increasing sea levels associated with climate change would also translate to loss of nesting beach habitats. Seawalls have been constructed to mitigate increasing sea levels and wave damage. These seawalls have led to loss of nesting sites but also created new beaches most probably due to changes in nearshore oceanography and patterns of sand deposition. On the basis of recent surveys, the total number of nesting femalesea turtles (hawksbill and green turtle species combined) is estimated to be approximately 120 (Utzurrum 2002).

The life cycle of the green sea turtle involves a series of long-distance migrations back and forth between their feeding and nesting areas (Craig 2002). In American Samoa, their only nesting area is at Rose Atoll. When they finish laying their eggs there, the green turtles leave Rose Atoll and migrate to their feeding grounds elsewhere in the South Pacific. After several years, the turtles will return to Rose Atoll to nest again. Two green turtles with tagged flippers, and three that were tracked by satellite after nesting at Rose Atoll, were recovered in Fiji (Balazs et al. 1994). In addition, a green turtle with tagged flippers from Rose Atoll was found dead in Vanuatu less than one year later (G. H. Balazs 1994, cited in Grant et al. 1997). Results indicate that green turtle migratory routes from Manu'a to the foraging grounds follow closely those previously recorded from Rose Atoll although the Great Barrier reef as a foraging ground is a new observation. Hawksbill turtles are most commonly found at Tutuila and the Manua Islands. They are known to nest at Rose Atoll and Swains Island (Utzurrum 2002). Hawksbill turtles from Ofu were shown to have radically different migration patterns from those of greens and an increased deployment of tags is required to better identify routes and foraging grounds.

In 1993, the fishing crew of an American Samoa government vessel pulled up a small freshly dead leatherback turtle about 5.6 kilometers south off Swains Island. This is the first leatherback turtle seen by the vessel's captain in 32 years of fishing in the waters of American Samoa. The nearest known leatherback nesting area to the Samoan Archipelago is the Solomon Islands (Grant 1994). Olive Ridley turtles are uncommon in American Samoa, although there have been at least three sightings. Necropsy of one recovered dead olive Ridley found indicated that it was injured by a shark, and may have recently laid eggs, indicating that there may be a nesting beach in American Samoa (Utzurrum 2002). In 2006, there were two interactions observed between loggerhead turtles and American Samoa-based longline fishing gear. There are no records of loggerhead nesting in American Samoa.

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action

Direct impact

Should a sea turtle be directly beneath pile driving equipment, or other equipment or materials as they are deployed, they could be struck by that material or equipment when it is sent to the seafloor. Potential injuries and their severity would depend on the animal's proximity to the bottom when struck, the angle of the strike, and the body part impacted. Injuries could include cuts, bruises, broken bones, cracked or crushed carapaces, and amputations, any of which could result in the animal's death. However, the proposed work would be restricted to a small area. Seaturtles in the vicinity of project activities would most likely avoid the area due to the noise and human activity. Based on the information above, we believe that sea turtles are both capable and likely to avoid the area, and we are unaware of any information that contradicts this conclusion. Additionally, the BMPs (Appendix 2) require the contractors to watch for sea turtles, starting 30 minutes prior to commencing work, with work being postponed or halted when those animals are within 50 yards (46 m), and to pay particular attention in the area where project materials or equipment would enter the water. As such, we have determined that the likelihood of a sea turtle being affected by project-related direct impact is discountable.

Collision with vessels

The proposed action could involve construction-related vessel operations (e.g., barge) in the near shore waters of Pago Pago Harbor. Sea turtles must surface to breathe, and they are known to rest or bask at the surface. Therefore, when at or near the surface, they are at risk of being struck by vessels or their propellers as project-related vessels operate at, or transit to and from, the project site. Potential injuries and their severity will depend on the speed of the vessel, the part ofthe vessel that strikes the animal, and the body part impacted. Injuries from boat strikes may include bruising, broken bones or carapaces, and lacerations. Although not identified as a significant risk for either sea turtle species at American Samoa, the recovery plan for green sea turtles reports that boat collision is a major threat around the Main Hawaiian Islands (NMFS & USFWS 1998a), the recovery plans for both animals (NMFS & USFWS 1998a & b) report that collisions have occurred. We do not expect boat/barge speeds (>2 knots) that will cause serious injury to the turtles.

Existing information about sea turtle sensory biology suggests that sea turtles may rely more heavily on visual cues, rather than auditory, to initiate threat avoidance. Research also suggests that sea turtles cannot be expected to consistently notice and avoid vessels that are traveling faster than 2 knots (kts) (Hazel et al., 2007). Consequently, vessel operators must be responsible to actively watch for and avoid marine mammals and sea turtles, and to adjust their speed based on expected animal density and on visibility conditions to allow adequate reaction time to avoid marine animals. Based on the expectation that the proposed work would require a low number of short-distance vessel trips, and on the expectation that project-related vessels would be operated in accordance with BMP that require vessel operators to watch for and avoid protected marine species and to operate at reduced speeds, the risk of collisions between project-related vessels and sea turtles is discountable.

Exposure to elevated noise levels

Green and hawksbill sea turtles immediately adjacent to the noise source may experience temporary, mild behavioral effects, and would be able to swim beyond this range or to the surface (Lenhardt 1994). However, the physiology of sea turtles makes them less at risk to adverse impacts from noise than marine mammals (Lenhardt et al. 1983; 1985). The available data indicate that 166 dB represents the threshold at which sea turtles exhibit behavioral responses to seismic airguns, NOAA has set the exposure threshold for disturbance at 160 dB and for injury and hearing loss at 180 dB. The project description reported that the piles would be driven at the lowest power setting, and that based on recent pile driving at an adjacent site, with the same pile driver, the in-water source level is expected to be about 101 dB re 1 µPa @ 1 meter. Therefore, direct effects of noise may affect but are not likely to adversely affect greenand hawksbill sea turtle species, while no effects from noise are expected to leatherback, olive ridley or loggerhead sea turtles. As noted in the analysis for ship strikes and entrainment (below),vessel noise may cause any unseen turtle (on or near the harbor bottom) in close proximity to the dredging action to swim away, reducing the risk of this threat.

Disturbance from human activity and equipment operation

This stressor refers to construction-related disturbances other than the exposure to elevated noise levels. The proposed work would occur in a marine habitat where sea turtles may be directly exposed to project-related activity. The reaction of an exposed sea turtle could range from one extreme where the animal calmly approaches and investigates the activity, to an opposite reaction of panicked flight, where an animal injures itself in an attempt to flee. However, sea turtles around Tutuila typically avoid human activity. Therefore, we believe that the most likely effect of this interaction would be a temporary avoidance behavior leading to an exposed animal leaving the project area without injury. The BMP would reduce the likelihood of this interaction by watching for sea turtles before commencing work and by postponing or halting operations when those animals are within 50 yards (46 m) of the project site. Based on the information above, we expect that disturbances from human activity and equipment operation would be infrequent and non-injurious, resulting in insignificant effects on sea turtles.

Exposure to elevated turbidity

During the proposed construction activities, turbidity would be expected to occur. Since sea turtles breathe air instead of water, exposure to increased turbidity should not adversely affect their respiration or other biological functions. Although sea turtles are often observed in highly turbid waters, it is impossible to predict how individual animals might react to plumes of elevated turbidity. Some may avoid dense turbidity plumes in favor of clearer water and this is highly probable since turtles are known to depend on visual cues. The project BMP requires the contractor to reduce the likelihood of this interaction by the installation of silt curtains around the construction site to contain sediments mobilized by the proposed in-water work. As such, we expect that turbidity plumes would be predominantly limited to the area within the silt curtains, with some level of elevated turbidity possibly detectable periodically beyond the silt curtains. Turbidity may vary with tide level and changes and water current speed. Since the project area is close to shore in an enclosed bay, water circulation would not be a factor. We expect that the distance from the project site where sea turtles would likely avoid the area due to project-related in-water work would likely extend beyond the range of any turbidity plumes likely to affect turtle behavior. Based on this information, we expect that it is unlikely that sea turtles would be exposed to high levels of project-related turbidity, and any exposure to elevated turbidity would have insignificant impacts on exposed turtles.

Exposure to wastes and discharges

Construction wastes may include plastic trash and bags that may be ingested and cause digestive blockage or suffocation, or if large enough, along with discarded sections of ropes and lines, may entangle marine life. Wastes may also be generated by resuspension from dredged sediment. The existence of contaminants in the seabed soils to be discharged is unknown. The movement of the dredged materials, however, is limited to excavation from the new channel, and cartage for discharge within interlocking sheet pile bulkhead walls of the new wharf structure. The material proposed for discharge is therefore contained by silt curtains during the dredging operation, and by sealed bulkhead walls when discharged as fill. Surplus dredged material noted under Section above will be loaded into dump trucks and transported to the government-operated landfill at Futiga.

Equipment spills, discharges, and run-off from the project area could contain hydrocarbon-based chemicals such as fuel oils, gasoline, lubricants, hydraulic fluids and other substances, which could expose sea turtles to toxic chemicals. Depending on the chemicals and their concentration, the effects of exposure may range between animals temporarily avoiding an area, to death of the exposed animals. Local and Federal regulations prohibit the intentional discharge of toxic wastes and plastics into the marine environment. Additionally, the project BMP includes specific measures intended to prevent the introduction of wastes and toxicants into the marine environment. Based on the information above, we expect that construction-related discharges and spills would be infrequent, small, and quickly cleaned if they do occur. Therefore, we have determined that exposure to construction-related wastes and discharges would result in insignificant effects on sea turtles.

3.4.2.2 No Action Alternative

Under No Action Alternative, no new wharf would be constructed and sea turtles would face the baseline conditions of the physical environment, habitat and threats in the Pago Pago Harbor.

3.5 Marine Mammals

3.5.1 Affected Environment

Thirteen (all cetaceans) have been reported or confirmed in the waters of American Samoa. These include two baleen whale species (humpback and minke whales) and eleven odontocetes (dolphins, porpoises and other toothed-whales). The 13 cetaceans are not listed under the Endangered Species Act. Southern Pacific Humpback whales have been observed in American Samoa between June and September. Moreover, sperm whales are occasionally seen. Several species of dolphins also frequent the islands. In addition, there are anecdotal observations of both false killer whales and short-finned pilot whales occasionally stealing bait and fish from American Samoa-based longline gear. There are no pinnipeds (i.e.*,* seals and sea lions) known to occur in American Samoa.

There is considerable local knowledge about humpback whales from an established research program. Local understanding of the remaining species is more limited, based on some field research, stranding records and literature reviews (DMWR 2016). Despite limited local understanding, available evidence suggests that odontocete diversity at American Samoa is similar to other areas in Oceania where surveys have been done, for example at Samoa and the Solomon Islands (Johnston et al. 2008).

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Marine mammals have not been observed in Pago Pago Harbor especially in the proposed project footprint. There is no impact on marine mammals under this alternative.

3.5.2.2 No Action Alternative

Under No Action Alternative, no new wharf would be constructed and the baseline conditions of the physical environment, habitat and threats in the Pago Pago Harbor remain. Marine mammals have not been observed in Pago Pago Harbor especially in the proposed project footprint which is very shallow. There is no impact on marine mammals under this alternative.

MARINE MAMMAL SPECIES CONFIRMED IN AMERICAN SAMOA AND THEIR MANAGEMENT STATUS		
Common name	**Scientific name**	**Status**
Humpback whale	*Megaptera novaeangliae*	ESA:Delisted in 2016 (Oceania DPS) IUCN:Endangered (Oceania subpopulation)
Minke whale, (Dwarf/Antarctic)	*Balaenoptera acutorostrata/ Balaenoptera bonaerensis*	ESA-Not listed, IUCN-Least Concern/ ESA-Not listed, IUCN-Data Deficient
Sperm whale	*Physeter macrocephalus*	ESA: Endangered, IUCN-Vulnerable
Dwarf sperm whale	*Kogia sima*	ESA: Not listed, IUCN-Data deficient
Killer whale	*Orcinus orca*	ESA: Not listed, IUCN-Data Deficient
False killer whale	*Pseudorca crassidens*	ESA: Not listed, IUCN-Data Deficient
Short-finned pilot whale	*Globicephala macrorhynchus*	ESA: Not listed, IUCN-Data Deficient
Bottlenose dolphin	*Tursiops 21runcates / Tursiops aduncus*	ESA: Not listed, IUCN-Least Concern ESA: Not listed, IUCN-Data Deficient
Spinner dolphin	*Stenella longirostris longirostris)*	ESA: Not listed, IUCN-Data Deficient
Striped dolphin	*Stenella coeruleoalba*	ESA-Not listed, IUCN-Least Concern
Pantropic spotted dolphin	*Stenella attenuata*	ESA-Not listed, IUCN-Least Concern
Rough-toothed dolphin	*Steno bredanensis*	ESA-Not listed, IUCN-Least Concern
Cuvier's beaked whale	*Ziphius cavirostris*	ESA-Not listed, IUCN-Least Concern

Seabirds Known to Be Present Around American Samoa.

Common Name	Scientific Name
Resident Seabirds (breeding birds):	
Puffinus pacificus	Wedge-tailed shearwaters
Puffinus lherminieri	Audubon's shearwater
Puffinus nativitatis	Christmas shearwater
Pseudobulweria rostrata	Tahiti petrel
Pterodroma heraldica	Herald petrel
Pterodroma brevipes	Collared petrel
Sula sula	Red-footed booby
Sula leucogaster	Brown booby
Sula dactylatra	Masked booby
Phaethon lepturus	White-tailed tropicbird
Phaethon rubricauda	Red-tailed tropicbird
Fregata minor	Great frigatebird
Fregata ariel	Lesser frigatebird
Sterna fuscata	Sooty tern
Anous stolidus	Brown noddy
Anous minutus	Black noddy
Procelsterna cerulea	Blue-gray noddy
Gygis alba	Common fairy-tern (white tern)
Visitors/Vagrants	
Puffinus tenuirostris	Short-tailed shearwater
Pterodroma inexpectata	Mottled petrel
Pterodroma alba	Phoenix petrel
Fregetta grallaria	White-bellied storm petrel
Nesofregetta fuliginosa	Polynesian storm petrel (Pratt considers this a resident)
Larus atricilla	Laughing gull
Sterna sumatrana	Black-naped tern

3.6 Seabirds

3.6.1 Affected Environment

There are various seabirds found in American Samoa. Twelve species of migratory seabirds reside on Rose Atoll. The bristle-thighed curlew (*Numenius tahitiensis*) is a migratory species listed by the IUCN Red List Category as "Vulnerable" because of a small, declining population (estimated to be 7,000 birds worldwide). The primary threat is predation occurring on wintering grounds (BirdLife International 2009). This migratory shorebird resides on Rose Atoll in American Samoa. In addition, the Newell's shearwater is regarded as a visitor to American Samoa.

Baseline data on seabirds in American Samoa is patchy and incomplete. This results from the difficulties in establishing regular access to known seabird areas, which frequently require boat access. As such, studies have been sporadic over the years and much of the data has been collected incidentally. Most of the seabird species found on Tutuila Island inhabit the north shore, which is less accessible to people and where the important nesting habitat for coastal cliff nesting birds (DMWR 2016) are located. Seabird numbers indicated highest abundance in Swains island. Overall seabird abundance on Ta'u seems low, likely due to the absence of offshore island and rocky cliff areas that can provide refuge for seabirds. Rose Atoll is an important seabird breeding site in American Samoa as many ground-nesting colony species utilize the island. It is also the only island in American Samoa that is free of rats and year-round human habitation.

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

There are very limited seabirds observed in Pago Pago Harbor especially in the proposed project footprint. There is no impact on seabirds under this alternative.

3.6.2.2 No Action Alternative

Under No Action Alternative, no new wharf would be constructed and the baseline conditions of the physical environment, habitat and threats in the Pago Pago Harbor remain. There are very limited seabirds observed in Pago Pago Harbor especially in the proposed project footprint. Seabirds are mostly found in north Tutuila. There is no impact on seabirds under this alternative.

3.7 Hard Corals

3.7.1 Affected Environment

There are over 200 species of corals in American Samoa (Fenner, pers. Comm.). The six hard corals that have been listed as threatened under the Endangered Species Act are: *Acropora globiceps*, *Acropora speciosa*, *Acropora retusa*, *Isopora crateriformis*, *Euphyllia paradivisa* and *Acropora jacquelinae*. All of these corals have been deduced to have declined in abundance for the last 50 to 100 years although no species-specific information available.

Acropora globiceps is a digitate coral that is known to occur on upper reef slopes, reef flats and adjacent habitats from 0 to 8 m in water depth. This coral is uncommon in American Samoa.

Acropora speciosa has a morphology described as thick cushions or bottlebrush branches. It is known to occur on lower reef slopes and walls. Its depth range is 12 to 40 meters, and has been found in mesophotic (>100 m depth) habitats.

Isopora crateriformis forms encrusting plates to over a meter in diameter. There is a moderate level of taxonomic uncertainty for this coral. Veron (2014) stated that *I. crateriformis* can be easily confused with *I. cuneata*. This coral is found in shallow, high-wave energy environments, from low tide to at least 12 meters deep, and has been reported from mesophotic depths. *I. crateriformis* is one of the most common species on upper reef slopes of southwest TutuilaIsland and Ofu Island. This species is not found in Pago Pago Harbor.

E. paradivisa is a sub-massive coral and its habitat is shallow or mid-slope reef environments protected from wave action, from five to 20 meters depth. This coral is rare in American Samoa and few colonies only found in deeper waters. *Acropora jacquelineae* is a coral that is found in the eastern Indian Ocean and the central and western Pacific Ocean. In the United States, it couldoccur in American Samoa. Colonies of *Acropora jacquelineae* are flat plates up to 1 meter in diameter. The upper surface is covered with many very thin projections called corallites, which are smooth on their sides. Colonies are uniform gray-brown or pinkish in color.

Colonies of *Acropora retusa* are flat plates with short, thick finger-like branches, with the branches appearing rough and spiky because its radial corallites are variable in length. Colonies are typically brown or green in color. This coral is a hermaphrodite, containing both male and female gametes. *Acropora retusa* occurs in shallow reef slope and back-reef areas, such as upper reef slopes, reef flats, and shallow lagoons, and its depth range is 0 to 5 meters. It is a rare coral.

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

The ESA-listed corals have not been recorded in Pago Pago Harbor especially in the proposed project footprint. The harbor is not a critical habitat for the ESA-listed corals. There is no impact on ESA-listed corals under this alternative.

3.7.2.1 No Action Alternative

Under No Action Alternative, no new wharf would be constructed and the baseline conditions ofthe physical environment, habitat and threats in the Pago Pago Harbor remain. The ESA-listed corals have not been recorded in Pago Pago Harbor especially in the proposed project footprint.The harbor is not a critical habitat for the ESA-listed corals. There is no impact on ESA-listed corals under this alternative.

3.8 Fish

3.8.1 Affected Environment

Three fish found in American Samoa have been listed as threatened under ESA: (1) the giant manta ray (*Manta birostris*); (2) the oceanic whitetip shark (*Carcharhinus longimanus*); and the scalloped hammerhead (*Sphyrna lewini*).

The giant manta ray is found worldwide in tropical, subtropical, and temperate bodies of water and is commonly found offshore, in oceanic waters, and near productive coastlines. They are filter feeders and eat large quantities of zooplankton. Giant manta rays are slow-growing, migratory animals with small, highly fragmented populations that are sparsely distributed across the world. The main threat to the giant manta ray is commercial fishing, with the species both targeted and caught as bycatch in a number of global fisheries throughout its range. Manta rays are particularly valued for their gill rakers, which are traded internationally. The giant manta ray is mostly caught by pelagic fisheries, as bycatch by longlining and purse seining. Although longline CPUE data from the American Samoa suggests minimal catch, the giant manta ray is listed as threatened throughout its range based the analysis of the significant portion of its range (SPR).

Oceanic whitetip sharks (*Carcharhinus longimanus*) are large sharks (up to 3-4 m in length) found in tropical and subtropical oceans throughout the world. It is a pelagic species, generally remaining offshore in the open ocean, on the outer continental shelf, or around oceanic islands inwater depths greater than 600 feet. They live from the surface of the water to at least 498 feet deep. Oceanic whitetip sharks have a strong preference for the surface mixed layer in warm waters above 20°C, and are therefore is a surface-dwelling shark. They are long-lived (up to 36 years), late maturing (6 to 9 years age at maturity), and have low to moderate productivity (average of 6 pups and reproducing every other year). The oceanic whitetip shark is considered a top predator, eating at the top of the food chain. They are opportunistic, feeding primarily on bony fishes and cephalopods, such as squid. However, they also reportedly feed on large pelagic sportfish (e.g., tuna, marlin), sea birds, other sharks and rays, marine mammals, and even garbage. The primary threat to the oceanic whitetip shark is incidental bycatch in commercial fisheries. Because of their preferred distribution in warm, tropical waters, and their tendency to remain at the surface, oceanic whitetip sharks have high encounter and mortality rates in fisheries throughout their range. Information on the global population size of the oceanic whitetip is lacking. However, several lines of evidence suggest that the once common and abundant shark has experienced declines of potentially significant magnitude due to significant fishing pressure.

Scalloped hammerhead sharks (*Sphyrna lewini*) are moderately large sharks (3-4 m in length) with a global distribution. They are recognized by their laterally expanded head that resembles a hammer, hence the common name “hammerhead.” They live in coastal warm temperate and tropical seas over continental and insular shelves, as well as adjacent deep waters, but seldom found in waters cooler than 22° C (Compagno 1984, Schulze-Haugen and Kohler 2003). Its distribution ranges from the intertidal and surface to depths of up to 450-512 m (Sanches 1991, Klimley 1993), with occasional dives to even deeper waters (Jorgensen et al. 2009). It has also been documented entering enclosed bays and estuaries (Compagno 1984). Scalloped hammerhead sharks have been recorded in coral reef areas of depth 10-20 m in Hawaii and Pacific Remote Island Areas from underwater surveys conducted by NOAA Pacific Island Fisheries Science Center. They are also inferred to occur in the Samoan and Mariana Archipelagoes.

Scalloped hammerhead sharks are highly mobile and partly migratory and are likely the most abundant of the hammerhead species (Maguire et al. 2006). They move along continental margins as well as between oceanic islands in tropical waters (Kohler and Turner 2001, Duncan and Holland 2006, Bessudo et al. 2011, Diemer et al. 2011, Prus 2013). Tagging studies indicate movement up to about 150 km but also exhibiting site fidelity. Tagging also indicate that juvenile scalloped hammerheads prefer to aggregate in deeper water during the day, where the habitat is composed mainly of mud and silt (Duncan and Holland 2006). Areas of higher hammerhead shark abundance also corresponded to locations of greater turbidity and higher sedimentation and nutrient flow (Duncan and Holland 2006).

The scalloped hammerhead shark is a high trophic level and opportunistic feeder with a diet that includes a wide variety of teleosts, cephalopods, crustaceans, and rays (Compagno 1984, Bush 2003, Júnior et al. 2009, Noriega et al. 2011). Immature *S. lewini* also feed on reef and pelagic fish (*Chiroteuthis* sp. and *Vampyroteuthis infernalis*) that inhabit deep waters (Júnior et al. 2009). Growth rate is relatively slow and maximum age ranging from 20 to 30 years. Age of maturity varies geographically but averages around 12 years. Scalloped hammerhead sharks are both targeted and taken as bycatch in many global fisheries. They are targeted by semi-industrial, artisanal and recreational fisheries and caught as bycatch in pelagic longline tuna and swordfish fisheries and purse seine fisheries. In American Samoa, scalloped hammerhead shark is a bycatch of the longline fishery that targets south Pacific albacore (SPA). However, this shark is a very rare bycatch with only 8 fish recorded by fishery observers from 2006 to 2010 (with 6 to 30% observer coverage).

The giant manta ray and oceanic white tip shark are most found in the pelagic waters. The scalloped hammerhead is rare in American Samoa (Zgliczynski et al. 2013). We do not expect these ESA listed fish to be found in Pago Pago Harbor.

3.8.2 Environmental Consequences

3.8.2.1 Proposed Action

There is no impact on ESA-listed fish under this alternative.

3.8.2.2 No Action Alternative

Under No Action Alternative, no new wharf would be constructed and the baseline conditions of the physical environment, habitat and threats in the Pago Pago Harbor remain. Since the three ESA-listed fish are pelagic (giant manta ray and oceanic white tip shark) and rare (scalloped hammerhead), there is no impact on ESA-listed corals under this alternative.

3.9 Other Resource Categories and Issues

3.9.1 Public Health and Safety

The addition of the new wharf is expected to aid in public health and safety in terms of search and rescue and natural disaster relief efforts. Tutuila has one main road that mostly follows the coastline. The new wharf will provide an additional access point to nearshore and offshore areas of the southern coastline of Tutuila which will aid search and rescue efforts. In an event of a road closure due to a natural disaster, the new wharf could serve as an access point to provide aid relief to remote areas affected by a road closure. Disturbance related to noise is minimal as most of the sound is created in-water where it is dissipated quickly due to turbidity and soft sediments.

3.9.2 Socioeconomics and Transportation

The tuna industry accounts for 40% of the American Samoa economy and underlines the importance of this industry. The tuna canneries provide a significant source of employment in the Territory. It employs roughly 5,000 people covering 2,500 in the cannery and 2,500 ancillary jobs (American Samoa Department of Commerce, 2021). The canneries receive tuna from the US-flagged tuna purse seiners, and American Samoa and foreign-flagged longliners as the raw materials for exported canned tuna. It is estimated that American Samoa longliners offload an estimated $4 million worth of south Pacific albacore for the cannery. In addition, their by-catch is an increasingly important fish source for the local communities. The tuna processed from longliners and purse seiners are exported as canned tuna worth over $200 million annually.

The establishment of the commercial fishing boat wharf is expected to benefit the fishing community on Tutuila by providing much needed wharf space. This is a persistent problem and issue that has been also recognized by various federal agencies that provide financial assistance for infrastructure development. It will also provide more convenience for the longliners especially during the off-seasons.

The new wharf is not expected to significantly increase the number of longliners on Tutuila, because vessel ownership and maintenance is costly and the longline fishery for the south Pacific albacore has been in decline for a long time due to the relatively lower quality and value of its meat, declining catch rates and high longline operation costs.

3.9.3 Biodiversity and Ecosystem Function

The proposed action involving the funding for a commercial fishery wharf will have minimal impacts to ecosystem function or biodiversity. The project site is already degraded due to various coastal development in many years. In addition, best management practices will be implemented.

Sedimentation within the project area may increase during the construction phase. However, Best Management Practices such as silt screens will be employed. Additional biological survey by marine biologists in DMWR found ~600 coral colonies, most of them found in the area proposed to be dredged. It is proposed that these coral colonies be relocated to minimize project construction.

3.9.4 Climate Change

In a 2007 report, the Intergovernmental Panel on Climate Change (IPCC) states that: "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level (IPCC 2007)." Climate change and potential sea level rise may negatively affect target and non-target fish species, protected species, human communities, marine ecosystems, essential fish habitat and other habitats found in and around American Samoa. Fish stocks and sea turtle populations would continue to be monitored in American Samoa through logbook reports and longline vessel observer coverage, as well as through international efforts to monitor some marine populations.

Climate change resulting in sea level rise may affect some marine populations. Other potential impacts could be a shift in nesting beaches of sea turtle populations with sea level rise, changes in prey food availability due to acidification of seawater; and changes in ocean currents that could affect foraging or migratory activities. Under natural conditions, beaches can move landward or seaward with fluctuations in sea level. Climate change would not, however, impact the effectiveness of Alternatives 1 or 2 and 3 or the impacts of these proposed alternatives in the short term. Sea level is expected to rise more.

3.9.4 Other Issues

Regulations implementing the National Environmental Protection Act (NEPA) indicate that the following additional issues are considered when evaluating impacts of a proposed action.

Degree to which effects on the human environment are highly controversial

The effects of the proposed action are not controversial. The funding of the Malaloa wharf extension project will result in a small project site and controlled sedimentation input into the system is expected to result.

Degree to which effects are highly uncertain or involve unique or unknown risks

The funding of the Malaloa wharf project is not an unusual project that would involve unique or unknown risks. Boat wharf spaces are common throughout, thus the Army Corps of Engineers has created a general Nationwide Permit program for these types of projects.

Degree to which proposed action affects unique areas, historic and cultural resources, parkland, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

The proposed project will be located on public space owned by the American Samoa Government and overseen by the Department of Parks and Recreation. The project will only require a small portion of public areas and is not located within an ecologically critical area or a historical property. The Pago Pago Harbor as a whole has been used for *fautasi* 'canoe' races.The project will not impact the conduct of these traditional canoe races.

Degree to which proposed action affects districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places.

The proposed Malaloa wharf extension project will not have an effect on districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places.

Degree to which proposed action could be expected to result in the introduction or spread of a nonindigenous species.

The local longliners mostly fish within the American Samoa EEZ. Hence, the potential for the proposed project to introduce or spread of a non-indigenous species is highly unlikely. Fishing boats also are also required to change their bilge water in a significant distance before wharf.

Degree to which proposed action is likely to establish precedent for future actions with significant effects or represent a decision in principle about a future consideration.

The new wharf will not result in automatic approval or funding of additional wharf facilities. As such, any additional wharf projects will be evaluated on a case-by-case basis.

4.0 Cumulative Impacts

Cumulative impacts are the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Future federal, state and private actions are considered to the extent that some information is available to support an assessment of environmental impacts.

Past, Present and Foreseeable Future Actions

Numerous federal, state, and private actions and natural events could harm or disturb resources in the vicinity of the project area and in Pago Pago Harbor. In this context, cumulative impacts can be expected to accrue from intentional and unintentional human actions, and probable but uncontrollable natural events. The cumulative impacts assessment includes only those resources that would be affected by the proposed action to at least a negligible degree. Resources not affected by the proposed action are not considered in the cumulative impacts analysis. This cumulative impacts analysis addresses only impacts associated with other projects that may include: (1) sea turtles; (2) marine mammals; (3) sea birds; (4) corals; and (5) fish.

These reasonably current and foreseeable actions are considered in the cumulative impacts analysis:

a.) ***Fagatogo Floating Wharf Pile Driving and Repairs***. Pile driving is being completed inthe Fagatogo floating wharfs that service sport fishermen and commercial alia boat fishermen. Pile driving involves only one pile that is expected to have very limited environmental impact but future repairs may have significant or insignificant impact. In any case, the maintenance of the Fagatogo Floating Wharfs is expected to increase small boat activity.

b.) ***'New' Pago Pago Ramp***. A new ramp in addition to the 'old' Pago Pago ramp has just been completed. The ramp is expected to increase alia boat activity.

c.) ***Cannery Wharfs***. The cannery regularly maintains its wharfs that serve purse seiners and longliners and are expected to be repaired in the future. This will allow more purse seiners and longliners activity in the harbor.

d.) ***Service Wharf and the Malaloa Wharf***. The Department of Port Administration maintains the Pago Pago Harbor service wharf and the Malaloa Wharf and repairs and developments are expected in the future. This will allow more inter-island, international (tourist cruise boats) and cargo boat traffic in the future.

e.) ***The Shipyard***. The American Samoa Government maintains a shipyard. The shipyard services all types of boats both local and regional and its operations will increase boat activity.

f.) ***Seawalls***. The government has just completed seawall sections in Utulei, Leloaloa and Fagaalu. Future repairs of these seawalls are expected to impact similar resources.

4.1 Cumulative impact analysis of the proposed action

Cumulative impacts are described in terms of the expected activities in the action area, the overlap of the Preferred Alternative with impacts of other actions, and the incremental contribution of the proposed action on cumulative impacts.

4.2 Cumulative Impacts on Sea Turtles

The greatest risk to sea turtles are vessel strikes, entanglement in fishing gear, commercial fishing practices (e.g. longlining), and degradation of nesting beaches. Of these threats, only vessel strikes remotely overlaps with the proposed action. The objectives of the future projects expected to occur in Pago Pago Harbor are similar to the proposed action: repair,reconfiguration, improvement, and expansions of various wharfs. Effects of the cumulative projects are expected to be similar to, but to exceed the magnitude of, the proposed action. Any activity that increases vessel traffic will contribute to cumulative impacts on sea turtles.

Present and foreseeable future projects with construction components, such as dredging and pier repair upgrades, would result in temporary and localized effects to water quality that would be individually comparable to those associated with the proposed harbor dredging. Cumulative impacts on sea turtles from water quality changes, however, would be less than significant relative to vessel activity. We don't expect similar future projects to impact marine mammals, seabirds, fish and corals as examined in this environmental assessment.

The proposed location of the wharf extension is not in a pristine area, but has been subject to dredging and sedimentation in years past. It is expected that there will be very insignificant cumulative impact of the project to the ecosystem in Pago Pago Harbor. The impacts of increasing sea level and wave disturbance and increasing sea temperature will have significant negative impact of marine habitat integrity in American Samoa. These changes are expected to lead to loss of nesting habitats. The impacts of climate change will be compounded by localized stressors.

There is very significant coastal development in the harbor including resident housing, sports fields, business establishments such as restaurants and a hotel, the cannery, and ship repair facility. Marine debris and eutrophication, as evidenced by occasional algal blooms, are major problems in the harbor. The harbor has been a major location of disturbance since it became a port of call of whalers and a naval base during the war. The characteristics of the marine environment reflect a chronic highly stressed ecosystem.

5.0 CONCLUSIONS

Implementing the No Action Alternative would have no significant impact on the quality of human life and the environment in the project footprint and Pago Pago Harbor. It would have no effect on most resources with federal nexus such as ESA-listed turtles, marine mammals, seabirds, corals and fish. It would have long-term, direct significant adverse effects on socioeconomics of the tuna industry. The processing of raw tuna resources for the cannery will be significantly slowed down due to the limitation of wharf space available for longliners and purse seiners. It would also directly adversely impact economic activity such as the landing and consumption of the by-catch of longliners. The by-catch of longliners such as wahoo and marlin have become increasingly important protein source for American Samoa based on commercial vendor receipt data collected by the Department of Marine and Wildlife Resources. It has even overtaken the importance of coral reef and mesophotic reef fishes as protein source in the Territory. These by-catch are significantly less expensive than reef and bottomfish.

On the other hand, implementing the Proposed Action would have no significant negative impact on the quality of human life or the marine environment in Pago Pago harbor. With the implementationof the BMPs, the proposed action would have short-term, direct, negligible to moderate adverse impacts on the environment. The proposed action would have no effect, negligible effects, or very minor effects on marine mammals, seabirds, corals, fish and turtles. The impact to non-ESA corals will be minimized by relocating the colonies found in the project footprint. It would have negligible to minor effects on sea turtles, primarily due to vessel collision with sea turtles during dredging. It would have moderate but localized adverse effects on water quality, primarily from temporary turbidity and sedimentation. On the other hand, the Proposed Action It would have significant beneficial effects on transportation by improving conditions for safe fishing vessel navigation and socioeconomics by supporting vessel-based economic activity such as importing and processing of raw tuna materials for the cannery. It would also supply the by-catch of longliners to the community, this by-catch is the most important source of fish protein in the Territory. The predicted effects of the Proposed Action and the No Action Alternative on resources are summarized in Table 1. Because the Proposed Action does not constitute a major Federal action significantly affecting the quality of the human environment, preparing an environmental impact statement is not required and signing a FONSI (Finding of No Significant Impact) is appropriate.

Appendix 2. Proposed Management Best Practices During the Project Construction

A constant vigilance shall be kept for the presence of protected marine species (mostly sea turtles) during all aspects of the proposed action, particularly in-water activities such as pile driving, boat operations, dredging, and the lifting and movement of wharf components.

1. The project manager shall designate an appropriate number of competent observers to survey the areas adjacent to the proposed action for sea turtles and marine mammals.
2. Surveys shall be made prior to the start of work each day, and prior to resumption of work following any break of more than one half hour. Periodic additional surveys throughout the work day are strongly recommended. Observers shall remain alert for protected species from 30 minutes prior to commencement of work till 30 minutes after shut-down.
3. All work shall be postponed or halted when sea turtles and/or marine mammals are within 50 yards of the proposed work, and shall only begin/resume after the animal(s) have voluntarily departed the area. With the exception of pile-driving and heavy lifting, if sea turtles and marine mammals approach within 50 yards after work has already begun, that work may continue if, in the best judgment of the project supervisor, the activity would not affect the animal(s). For example; wholly above-water work or divers performing surveys or minor underwater work would likely be permissible, whereas in-water operation of heavy equipment is not.
4. Any pile driving shall be postponed or halted when any marine mammals are within 100 yards, and any sea turtles are within 50 yards of the proposed work.
5. Any pile driving will employ soft-start or ramp-up techniques (slow increase in hammering intensity), at the start of each work day or following any break of more than 30 minutes.
6. An enclosed bubble curtain system shall be installed and operated around the project area during construction.
7. No construction will be conducted after dark unless that work has proceeded uninterrupted since at least 1 hour prior to sunset, and no sea turtles or marine mammals have been observed near the 50- and 100-yard safety ranges.
8. Special attention will be given to verify that no sea turtles and marine mammals are in the area where equipment or materials (i.e. piles, spuds, or anchors) are expected to contact the substrate before that equipment/material may enter the water.
9. To the extent practicable, equipment and material will be lowered to the bottom in a controlled manner. This can include the use of cranes, winches, or other equipment that affect positive control over the placement and rate of descent.
10. In-water tethers, as well as mooring lines for vessels and marker buoys shall be kept to the minimum lengths necessary, and shall remain deployed only as long as needed to properly accomplish the required task.
11. When piloting vessels, vessel operators shall alter course to remain at least 100 yards from whales, and at least 50 yards from other marine mammals and sea turtles.
12. Reduce vessel speed to 10 knots or less when piloting vessels at or within the ranges described above. Operators shall be particularly vigilant to watch for turtles at or near the surface in areas of known or suspected turtle activity, and if practicable, reduce vessel speed to 5 knots or less.
13. If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches the vessel, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance.
14. Marine mammals and sea turtles shall not be encircled or trapped between multiple vessels

or between vessels and the shore.

15. Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA- listed marine species.

16. A contingency plan to control toxic materials shall be developed and followed to prevent toxic materials from entering or remaining in the marine environment during the project.
17. Appropriate materials to contain and clean potential spills shall be stored at the work site, and be readily available.
18. All project-related materials and equipment to be placed or operated in the water shall be free of pollutants.
19. The project manager and heavy equipment operators shall perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations shall be postponed or halted should a leak be detected, and shall not proceed until the leak is repaired and equipment cleaned.
20. Fueling of land-based vehicles and equipment shall take place at least 50 feet away from the water (and away from drains), preferably over an impervious surface. Fueling of vessels shall be done at approved fueling facilities.
21. A plan shall be developed and followed to prevent debris and other wastes from entering or remaining in the marine environment during the project. All debris, unsalvageable wharf materials, and general wastes will be properly contained and disposed of at an approved upland disposal site.
22. Runoff, turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of erosion control practices, effective silt containment devices, and the curtailment of work during adverse weather and tidal/flow conditions. The contractor will be required to install and maintain full-depth turbidity curtains around the project sites during the course of the construction.

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