DEPARTMENT OF THE NAVY
U.S. NAVAL BASE GUAM
PSC 455 BOX 152
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June 15, 2021

Mr. Michael Tosatto
Pacific Islands Regional Office
National Marine Fisheries Service
1845 Wasp Blvd., Bldg. 176
Honolulu, HI 96818

Dear Mr. Tosatto,

Subject: REQUEST FOR CONSULTATION ON THE EFFECTS FROM THE INSTALLATION OF THE UNDERWATER ELECTROMAGNETIC MEASURING SYSTEM, OUTER APRA HARBOR, U.S. NAVAL BASE GUAM

Pursuant to section 7(a)(2) of the *Endangered Species Act of 1973* (ESA), as amended (16 USC§ 153 et seq.), the U.S. Navy (Navy) requests informal consultation with the National Marine Fisheries Service regarding the proposed construction of an Underwater Electromagnetic Measuring System (UEMMS) at Outer Apra Harbor, Guam. As described in the enclosed consultation document, the proposed action may affect but is not likely to adversely affect the following ESA-listed species: the threatened green sea turtle (*Chelonia mydas*), the endangered hawksbill sea turtle (*Eretmochelys imbricata*) and the threatened scalloped hammerhead shark (*Sphyrna lewini*). We request your concurrence with our 'not likely to adversely affect' determinations, and hereby request informal consultation under Section 7 of the ESA.

This letter also requests your review and conservation recommendations to fulfill the Navy's requirements to consider the impacts of its actions on Essential Fish Habitat (EFH) as required by the *Magnuson-Stevens Fishery Conservation and Management Act* (16 USC§ 1801 et seq.).

In brief, the Navy proposes to construct and operate a UEMMS to service Navy surface ships and submarines homeported, forward-deployed or visiting Naval Base Guam. The Proposed Action includes both in-water and shore-side infrastructure to passively measure vessels' electromagnetic signatures and transmit data to facilities on land. The data received from the measurements provide a means to determine a vessel's susceptibility to certain seaborne-influenced mines. The action will permanently alter seafloor habitat in the Outer Apra Harbor navigation channel through the installation of a passive 22-sensor array with associated power and data cables connecting ashore at Polaris Point. The Project is anticipated to begin operations in 2022 for Navy ships and submarines deployed to the region, and the installation will not operationally increase vessel traffic within the harbor. The in-water actions will be undertaken in daylight hours only and will require approximately 10 months to complete.

Subject: REQUEST FOR CONSULTATION ON THE EFFECTS FROM THE INSTALLATION OF THE UNDERWATER ELECTROMAGNETIC MEASURING SYSTEM, OUTER APRA HARBOR, U.S. NAVAL BASE GUAM

Regarding ESA-listed species:
Potential impacts to ESA-listed species may occur from exposure to the following stressors: disturbance from human activity and equipment operation; elevated underwater noise levels; increased suspended sediments; direct physical contact; vessel collisions; waste and discharge; and entanglement. Based on the best available data, environmental impact analysis, and the implementation of best management practices (BMPs) described in enclosure, the Navy determined that these potential impacts are discountable or insignificant to ESA-listed species. The Navy requests your concurrence with our determination that the proposed Action may affect but is not likely to adversely affect the ESA-listed species above.

Regarding EFH:
The Navy has determined that the proposed Action will adversely affect the quality and quantity of EFH at the sensor array site and cable path, but most of the effects will be managed and minimized with the incorporation of BMPs. Potential adverse effects that are likely to occur to EFH are based on exposure to the following stressors: physical removal; increased suspended sediments; elevated underwater noise levels; waste and discharge; aquatic invasive species; chemical contaminants; and hypoxia. Removal of the marine invertebrate community in the Action Area will be permanent, and the Navy is proposing avoidance, minimization, and offset mitigation measures to compensate for the unavoidable loss of ecosystem functions and services. The remaining effects will primarily be temporary, restricted to the Action Area, and rendered minimal by the implementation of BMPs.

Thank you for your consideration of our request for your review and concurrence. Should you have any questions or concerns, please contact is Kevin Lino at NAVFAC Pacific at (808) 472-1087 or kevin.lino@navy.mil.

Sincerely,

Ed Moon

Edward Moon
Installation Environmental Program Director
By direction of the Commanding Officer

Enclosure: 1. Endangered Species and Essential Fish Habitat Assessment: Consultation for the Underwater Electromagnetic Measuring System Apra Harbor, U.S. Naval Base Guam

U.S. DEPARTMENT OF COMMERCE
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Edward Moon
Installation Environmental Program Director
Naval Base Guam
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July 21, 2021

Dear Mr. Moon:

The National Marine Fisheries Service, Pacific Islands Regional Office (NMFS), received the Naval Facilities Engineering Command Pacific's (the Navy) essential fish habitat (EFH) consultation initiation request for the installation of an underwater electromagnetic measuring system (UEMMS) in Outer Apra Harbor, Guam. We have reviewed the EFH Assessment (EFHA) titled "Final Endangered Species and Essential Fish Habitat Assessment: Consultation for the Underwater Electromagnetic Measuring System (UEMMS)" and agree that there will be unavoidable and substantial adverse effects to sensitive and hard-to-replace EFH due to the proposed action including a conservative unavoidable loss estimate of 3,273.7 square meters (m^2) of benthic EFH and 3,270 coral colonies. We also agree that the mitigation plan put forward by the Navy, which includes avoidance through a range of best management practices (BMPs), minimization through the translocation of corals, and offset via the creation of new habitat area, is a viable approach to conserving EFH. We have provided three EFH conservation recommendations pursuant to the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act; Section 305(b)(2)) as described by 50 C.F.R 600.920. Your implementation of the proposed conservation recommendations and all of the proposed BMPs will ensure that expected and potential adverse effects to EFH are avoided, minimized, offset for, or otherwise mitigated.

Project Description
The Navy proposes to construct and operate an UEMMS in Outer Apra Harbor, Guam. The UEMMS will passively measure magnetic and electric field signatures of surface ships and submarines,

hereafter vessels, to ensure vessels meet magnetic signature limits specified in the Office of the Chief of Naval Operations Instruction S8950.2H. The proposed action includes both in-water and shore-side infrastructures to passively measure electromagnetic signatures of vessels and transmit data to facilities on land. The sensor array will be installed on the seafloor of Outer Apra Harbor 915 meters (m) northwest of Polaris Point in 17 m of seawater.

Installation of the senor array will require excavation, backfilling and disposal of material from the array site, water jetting or drilling of holes at the array site, deployment and anchoring of subsea cables, and excavation and backfilling at the egress location at Polaris Point. Extensive proposed mitigation, including coral translocation, is planned, detailed in the minimization and offset sections below. In-water construction activities are expected to take approximately 10 months to complete.

Sensor Array Excavation, Installation, and Backfill

Once coral translocation has occurred (detailed in the minimization section below), an estimated 918 cubic meters (m^3) of material will need to be excavated from the array site before sensor installation can occur. The material will be excavated with a closed-bucket excavator to minimize inadvertent discharges into the water column. Excavated materials will be deposited at the Guam Deep Ocean Disposal Site (G-DODS) 20.6 kilometers (km) offshore of Guam in 2,680 m of seawater. The G-DODS was designated as an exclusive ocean dredged material disposal site in 2010 (Final Rule 40 CFR Part 228; 21 FR Notice 54497).

Once excavation and disposal is completed, the Navy will begin installing the UEMMS sensor array. The sensor array proposed for deployment will consist of a line of 22 sensors (13 Electromagnetic triaxial (EMT) sensors and eight magnetometer triaxial (MT) sensors extending 128 m and spaced six m apart, as well as one conductivity, temperature and depth (CTD) sensor). The CTD sensor will be installed at the northeast end of the array. Each sensor will be mounted to a 30.5-centimeter (cm) diameter fiberglass reinforced plastic sensor tube that will be embedded six m deep into the seafloor at each location. A 15 cm diameter fiberglass reinforced plastic cable guide stake will also be embedded 1.2 m deep into the seafloor three m to the southeast of each sensor tube. Sensor tube and guide stake installations will be performed by divers using a water jetting process known as a handheld hydraulic breaker. A large steel pipe will be used to push the tubes to the appropriate depth as the high-pressure water loosens the bottom material. If water jetting is not feasible due to seafloor characteristics, 30-cm diameter pilot holes will be drilled into the seafloor and marine grout will be used to secure the tubes at the same locations. Additionally, 30 m of sensor cable will be installed between each sensor and guide stake, and secured with eyebolts, poly webbing, and zip ties. After installation, the excavated area, including the coiled cables, will be covered with 826 m^3 of non-magnetic, certified contaminant free backfill material in order to restore the excavated area to the original water depth.

Subsea Cable Installation and Anchoring

To transmit data of electromagnetic signatures collected by the UMMES to facilities on land, 27 subsea cables, 5 additional guide stakes, and 29 concrete anchor discs will need to be installed along the 975 m cable route. The subsea cables are made up of shielded and sheathed copper wires with a diameter of 2.64 cm. One cable will extend from each of the 22 sensors to a common path marked by guide stakes along the southeast side of the array. Five additional cables will also be routed to the array for future use. Three additional guide stakes will be installed adjacent to the array site and two additional guide stakes will be installed at Polaris Point to secure each end of the subsea cable. The cables will be bundled using polypropylene webbing at each sensor and at each guide stake. Divers will lay the cable along the cable route and select a location every 30 m along the pathway for deployment of a 1.2 m diameter concrete anchor disc that will secure the cable to the seafloor. The concrete anchor discs will be deployed by a crane and barge with the assistance of divers to ensure areas with coral cover are avoided.

Subsea Cable Egress and Trenching

To protect the cables from wave and storm damage at Polaris Point, high-density polyethylene (HDPE) conduits will be deployed . The HPDE conduits will be bundled together into a single 71-cm diameter, 38-m long cable duct, anchored 10.5 m below mean low low water (MLLW). The bottom of the duct will be secured in place using a stainless steel anchor band span and earth anchors. The earth anchors will be installed to a depth of 2.4 m by a vessel using a topside pneumatically-driven jackhammer. At 4.5 m below MLLW, the remaining 24 m of duct will transition underground until it reaches a concrete transition vault.

An oblique trench 17 m wide, 15 m long, and 3 m deep will be excavated by a closed-bucket excavator to create the necessary slope for burial of the conduit at the surface. Prior to excavation, 95.6 m^3 of existing shoreline revetment material will be relocated by an excavator to a similar depth adjacent to the site. The Navy estimates that 172 m^3 of subbase materials will be excavated and placed on land. After the conduit has been secured, the subbase material and revetment material will be reused as backfill to bury and protect the cable conduit duct.

Consultation History

Substantial pre-consultation occurred between NMFS and the Navy that began in February 2014. In September 2015, NMFS led a preliminary survey effort to document the resources within the proposed action area in Apra Harbor, Guam. In November 2015, the Navy presented the first set of quantitative survey findings and a report to NMFS documenting the resources in the action area. No additional coordination occurred between 2016 and 2018. In February 2019, pre-consultation continued between NMFS and the Navy. In November 2019, the Navy hosted an interagency meeting with NMFS and the US Army Corps of Engineers (USACE) to discuss concerns and proposed a mitigation strategy be conducted, similar to the approach that had recently been implemented for a project at Lima, Mike, and November wharves in Apra Harbor, Guam. The Navy and NMFS agreed to perform a similar Habitat Equivalency Analysis (HEA) model to quantify the interim loss of ecosystem services and function associated with the adverse effects of this proposed

action, and developed a quantifiable mitigation strategy focusing on EFH area replacement. The Navy worked with NMFS to generate parameters (e.g., expected injury, service levels, discount rate, and years to recover) for inclusion in the HEA model. In January 2020, NMFS and the Navy had a call to discuss final survey methods and the plan to use photogrammetric orthomosaic surveys to document benthic organisms and stationary point counts to document the fish communities at each location. In September 2020, the Navy performed extensive surveys at each of the project areas following the approaches previously agreed upon with NMFS. In November 2020, the Navy presented the updated findings (i.e., effectively replacing the 2015 information) from the benthic and fish surveys to NMFS. In December 2020, the Navy hosted an additional inter-agency coordination call with NMFS and the USACE, clarifying their plan to submit consultation documents in the spring of 2021. In January and May 2021, NMFS reviewed a draft of the consultation documents, including substantive discussions regarding the proposed mitigation and requests for additional information regarding water quality be included within the final EFHA.

Essential Fish Habitat

The marine water column from the surface to a depth of 1,000 m from shoreline to the outer boundary of the Exclusive Economic Zone (200 nautical miles (nm)), and the seafloor from the shoreline out to a depth of 400 m around each of the Mariana Islands, have been designated as EFH. As such, the water column and bottom and all surrounding waters and submerged lands around Guam are designated as EFH and support various life stages for the management unit species (MUS) identified under the Western Pacific Regional Fishery Management Council's, Pelagic and Mariana Archipelago Fishery Ecosystem Plans (hereafter, Mariana FEP). The MUS and life stages found specifically within Apra Harbor include eggs, larvae, juveniles, and adults for Bottomfish and Pelagic MUS. Habitat Areas of Particular Concern (HAPCs) only occur for these MUS within the Marianas. Specific types of habitat considered as EFH include coral reef, patch reefs, hard substrate, artificial substrate, seagrass beds, soft substrate, mangrove, lagoon, estuarine, surge zone, deep-slope terraces and pelagic/open ocean.

Baseline Condition

Benthic Community

Photogrammetric orthomosaic surveys were performed within the sensor array impact area (17 sites) and adjacent to the impact area (15 sites). Coral cover within the impact area averaged 32.5% while coral cover at the adjacent sites ranged from 13.2% at the southwest to 49.1% at the northeast end of the array. The *Porites rus* coral complex, which is made up of flat, horizontal plates, and cylindrical vertical pillars, was dominant throughout the entire array area. The Navy identified 7,534 coral colonies within the direct impact area of which only 1,166 coral colonies were not part of the *Porites rus* complex. The direct impact area also included 18% macro algae and cyanobacteria cover, 7% other fauna, and 35.7% hard substrate covered in turf algae.

The cable route survey did not include photogrammetric orthomosaic grid cells because preliminary surveys had already identified a route where the scattered and overall low density of coral could be avoided. One rocky feature at 310 m which included *Porites speciosa* and *Leptosiris sp.* and a northwest-facing slope at 550 m with *Porities rus* were observed and prioritized for avoidance during the cable deployment. Coral abundance was 2.5% within the survey grid cells at the Polaris Point egress impact site, totaling 145 colonies, and dominated by *Porites rus* and other massive *Porites sp*.

The proposed mitigation site at Mound 9 was also surveyed at six photogrammetric orthomosaic grid cell sites. Coral cover across all sites was 5.4% while loose sediment and rubble made up 70.8% of the benthos. These numbers support the proposed mitigation to stabilize and recolonize target areas at Mound 9.

Fish

A total of 30 stationary point count surveys were performed in September 2020, which identified 69 species across 19 families. Analysis included a baseline species-richness comparison between the sensor array impact area and the proposed mitigation site at Mound 9, which indicated that different species could be found at each location. The continued inclusion of fish surveys at future time points has the potential to help the Navy illustrate the effectiveness of their mitigation activities at Mound 9 (Opel 2017).

Water Quality

A particle tracking model was developed to evaluate the movement of re-suspended dredge sediment in Apra Harbor in 2017 (Gailani 2017). The model tested eight scenarios for the proposed action at the outer harbor basin including 600 times more material then what is being proposed for UEMMS. The model concluded that lateral transport is nominal for Apra Harbor due to the low water velocities and that sediments will generally stay within the dredge footprint or just adjacent to the site. The Navy also examined the recent turbidity study performed during Pearl Harbor maintenance dredging activities, which concluded that rain events generated far more turbidity at collection sites than they could achieve in a worst-case scenario where turbidity BMPs failed. The Navy is also proposing a range of BMPs to ensure that the turbidly of waters outside silt curtains do not exceed 20 Nephelometric Turbidity Units (NTU), a level that NOAA's Office of Coastal Management has identified as high for nearshore and estuarine habitats. Sedimentation and turbidity caused by dredging, backfilling, and ocean disposal should be minimal and temporary if the proposed BMPs and monitoring efforts are being followed to ensure that the silt curtains are functioning properly.

Ecological Roles

The principal benthic organisms provide ecological services (e.g., water filtration and maintaining balanced nutrient concentrations) and provide physical habitat at both micro- and macro-scales. At a micro scale, the shape of benthic organisms change water movement, which can influence the settlement (McDougall 1943) and behavior of larvae and the availability of planktonic prey

(Williams 1964). Sessile organisms provide refuge from predators, particularly for larvae and small sized species (Russ 1980; Sutherland 1974). Sessile organisms provide new ecological niches increasing species diversity. At a macro-scale, corals are the primary habitat builders in the coral reef ecosystem that benefit juvenile, sub-adult, and adult life stages of the MUS that utilize this designated EFH. The non-coral invertebrate marine successional and filter feeding community also plays an important role in the ecology of these systems (Stella 2011). The morphology, shape, and composite features of benthic organisms can also influence feeding strategies of these MUS.

Adverse Effects

The proposed construction and dredge activities will result in: physical damage from dredging, water jetting and drilling, backfilling, anchor deployment, and diver activities; turbidity and sedimentation from dredging, backfilling, and ocean disposal; the potential for introduction of invasive species and chemical contamination from equipment, vessels, and deployed materials; and potential introduction of toxopathological agents during in-water diving activities.

The project activities will result in a combination of short-term, long-term, and permanent loss of hard bottom. The project activities will result in unavoidable and substantial long-term to permanent adverse effects to sensitive and hard-to-replace EFH, including the loss of corals and non-coral invertebrates (e.g., successional community, filter feeders, etc.), and their ecosystem services and functions. The action will directly affect 7,680 coral colonies, and replace or remove 1,666.9 m^2 of benthic substrate (725 m^2 direct removal from the array site, 739 m^2 from construction activities, 33.9 m^2 from permanent anchors, and 169 m^2 at egress).

<u>Physical Impacts to Benthic and Water Column Communities (physical stressor):</u>

Physical damage to principle benthic organisms from dredging, backfilling, jetting or drilling, anchor deployment, and diver activities is expected to cause breakage or dislocation (i.e., mortality), but can also result in sub-lethal tissue abrasion. Corals, which are primarily responsible for the structural complexity of coral reefs, are particularly vulnerable to physical damage because their slow-growing carbonate skeleton is relatively brittle and their polyps are easily damaged. In general, lobate, encrusting, and other massive colony morphologies tend to withstand breakage better than foliose, table, plating, and branching morphologies; more fragile forms tend to have higher growth rates (Riltzler 2001). Reduction of topographic complexity in the habitats of the coral reef ecosystem reduces biodiversity and productivity (Alvarez-Filip et al. 2009). The Navy has proposed BMPs, minimization (coral translocation), and offset (new habitat creation), that has the potential to replace the ecosystem services that will be unavoidably lost from proposed action.

<u>Sedimentation and Turbidity (pollution stressor):</u>

Suspended sediment can elicit short- and long-term responses from aquatic organisms depending on the quantity, quality, and duration of suspended sediment exposure (Kjelland et al. 2015). Coral reef organisms are easily smothered by sediment (Golbuu et al. 2003), and rates > 100 milligrams/cm/day can kill exposed coral tissue within a few days (Riegl and Branch 1995),

although corals show considerable interspecific variability. Sedimentation can also reduce photosynthetic rates (Philipp and Fabricius 2003), disrupt polyp gas exchange, inhibit nutrient acquisition (Richmond 1996), cause tissue damage (Rogers, 1990), reduce recruitment success (Gilmour 1999; Hodgson 1990), and increase metabolic costs due to enhanced mucus production (Telesnicki and Goldberg 1995).

Invasive Species (biological stressor):

Introduced species are organisms that have been moved, intentionally or unintentionally, into areas where they do not naturally occur. Marine species can be introduced to new biogeographies, typically via transport on vessel hulls, in ballast water, or on marine equipment. Invasive species can rapidly increase in abundance and can dominate their new environment, creating adverse ecological effects to other species of the ecosystem, and their respective functions and services that may be provided (Goldberg and Wilkinson 2004). Invasive species can decrease species diversity, change trophic structure, and diminish physical structure, but adverse effects are highly variable and species-specific. The Navy has put forward BMPs that will minimize the potential introduction of invasive species associated with this action.

Chemical Contamination (pollution stressor):

Chemical pollutants can have a variety of lethal and sublethal effects on habitat-forming marine organisms, including alteration of growth, interference with reproduction, disruption of metabolic processes, and changes in behavior. These adverse effects can cascade through ecosystems, altering species composition and ecosystem functions and services. Some pollutants are environmentally persistent and can take years or even decades to biodegrade, and others can bioaccumulate and biomagnify through the food chain, eventually posing a direct threat to human health. Many contaminants readily attach to sediment particles and are transported into the ocean where they become entrained in the bottom sediment of estuaries, reefs, and potentially deeper ocean ecosystems. Once trapped in sediment pore water, they can continue to flux into the overlying water column, creating a persistent source of contamination long after the initial input has ended, especially in the sediment of many industrialized bays and watersheds (Nalley et al. 2021). Dredging can release containments trapped in layers of accumulated sediment and pore water at concentrated levels, sometimes referred to as "black water". Petroleum contamination can adversely affect coral, with results including mortality, inhibition of reproduction, reduced calcium deposition, alteration of physiological processes, tissue loss, and reduced carbon fixation (Turner and Renegar 2017). The Navy has put forward BMPs and monitoring protocols that should minimize the threat of chemical contamination associated with this action.

Toxicopathological Agents (pollution stressor):

Recent studies have shown that sunscreens and other products containing oxybenzone, butylparaben, octinoxate, and 4-methylbenzylidene camphor can disrupt coral production, cause coral bleaching, and damage coral DNA at very low concentrations (Downs et al. 2016). The

proposed transplanting activities will result in divers working directly with, and in close proximity to, thousands of corals, creating a potential exposure pathway for toxicopathological agents to come into contact with corals or to enter the water column near corals. The Navy has not put forward BMPs that will minimize the risk of toxicopathological agents being introduced into the marine environment.

Navy-proposed BMPs

To avoid and minimize potential adverse effects to EFH, the following BMPs and minimization measures will be implemented:

Physical Impacts to Benthic and Water Column Communities

- All vessel and silt curtain anchors will be set on hard or soft, sandy bottom void of coral and seagrass, and chosen anchor locations take into consideration damage that could occur from the anchor chain if the vessel moves due to currents or tides. If practicable, all intertidal work will be conducted at low or slack tides.
- Divers will select the locations for anchors along the cable route and avoid coral colonies and substrate that supports coral growth. Divers will also ensure that anchor chains do not scour the environment where sensitive benthic organisms could occur.
- Work platforms and barges will be oriented to minimize shading to the most reasonable extent practicable. Vessels will be positioned so that the path of the sun will cross perpendicular to the length of the platform to reduce the duration of shading, and thereby allowing light into areas under barges and work platforms.
- A storm plan has been developed that includes specific conditions (Guam Condition Level III) that will require work to stop, and the removal or securing of equipment 48 hours ahead of any potential storms.
- While in water depths where the draft of the vessel provides less than a 2-m clearance, all vessels will operate at "no wake/idle" speeds at all times and should preferentially follow deep-water routes (e.g., marked channels) whenever possible. If operating in shallow water, all vessels should employ a dedicated "lookout" to assist the pilot with avoiding coral colonies and other benthic organisms that might extend up from the bottom.

Increase in Sedimentation and/or Turbidity

- During in-water construction and dredging activities, the Navy will ensure that a rigorous water quality monitoring plan will continuously monitor and adaptively manage the turbidity levels resulting from the proposed action and ensure BMPs are working properly. Turbidity data will be collected using real time monitoring devices at two test stations and two control stations.
- Coral translocation and all in-water activities will cease during the primary Guam coral spawning events each year for hard (scleractinian) corals. The coral spawning period is estimated to be 21 days total, including 8 days prior to the full moon and 14 days after.

- A Storm Water Pollution Prevention Plan (SWPPP) will be developed by the construction contractor once selected to reduce on-site erosion and off-site sedimentation.
- An 8-m length silt curtain will be deployed and monitored immediately adjacent to and around the dredge barge.
- A silt fence and silt barriers will be installed around the cable excavation area and shoreline at Polaris Point.
- If a silt plume is observed within the action area, project activity will stop and corrective action will be taken immediately. Work will not resume until after the correction is completed.
- Transportation of dredged material to the G-DODS shall only be allowed when weather and sea state conditions will not interfere with safe transportation and will not create risk of spillage, leak or other loss of dredged material in transit to the G-DODS.
- Dredged material shall not be leaked or spilled from disposal vessels during transit to the G-DODS.
- Dredged material will only be discharged from the center of the surface disposal zone (i.e. center of the G-DODS) designated in the permit.
- No more than one disposal vessel will be present within the permissible dumping target area at any time.
- Each disposal vessel will be inspected and certified (EPA and USACE approved Scow Certification Checklist) prior to every trip to the G-DODS.

<u>Increase in Contaminants</u>

- A plan to prevent trash and debris from entering the marine environment will be developed and include installation of a temporary floating debris boom around all in-water work areas.
- An oil spill contingency plan to control and clean spilled petroleum products and other toxic materials will be included in the SWPPP and implemented throughout construction of the proposed action.
- Oil or other hazardous substances will be prevented from seeping into the ground or entering any drainage inlet or local bodies of water.
- When applicable, all temporary fuel oil or petroleum storage tanks will be surrounded with a temporary berm of sufficient size and strength to contain the contents of the tanks (plus 10% freeboard for precipitation) in the event of an accidental release.
- Fueling of proposed action-related vehicles and equipment will take place at least 15 m (50 ft.) away from the water and within a containment area, preferably over an impervious surface. With respect to equipment (e.g., crane on the barge) that cannot be fueled on land, spill prevention booms will be employed to contain potential spills. All fuel spilled will be cleaned immediately.
- Lubricants and excess oil will be disposed of in accordance with applicable federal, territory, and local regulations, laws, ordinances, and permits.

- Appropriate materials to contain and clean potential spills will be stored at the work site and be readily available.
- All proposed action-related materials and equipment placed in the water will be free of pollutants.
- Pre-work inspections of heavy equipment for cleanliness and leaks will be conducted daily, with all heavy equipment operations postponed or halted until leaks are repaired and equipment is cleaned.

Increase in Invasive Species

- The portions of the equipment that enter the water will be clean and free of pollutants, including aquatic invasive species (AIS). All vessels and equipment (including barges, dry docks, and dredging equipment) will be free from fouling organisms before entering Guam's coastal waters (3 nm offshore).
- A biofouling management plan will be developed for all vessels entering Guam coastal waters.
- The Navy will coordinate with and follow the Joint Region Marianas (JRM) Integrated Natural Resources Management Plan (INRMP). The JRM INRMP contains objectives and actions that define and implement invasive species management, which begins through prevention, then addresses early detection and monitoring, and finally control and eradication.

Navy-proposed Minimization

The Navy is proposing to translocate 6,300 of the 7,680 coral colonies from the project impact area, whichfall within the preferred size, morphology, and observed health range. The corals considered not appropriate for translocation include:

1. All corals less than 10 cm from: *Leptastrea purpurea, Pavona cactus, Pectinia paeonia, Astreopora spp., Porites spp.* massive, and the *Porites rus* complex.
2. Half of the corals less than 10 cm from: *Pachyseris speciosa, Porites cylindrical, Stylocoeniella armata, Galaxea spp, Lobophyllia spp*., and *Pavona varians sp*.
3. Select corals less than 10 cm from: *Pocillopora acuta* and *Pocillopora damicornis*.
4. All corals that are undergoing bleaching, are stressed/diseased, have encrusting or boring sponge cover, or are otherwise unhealthy.
5. All flat-encrusting growth forms.

The majority of the translocated corals will be moved to a location in Outer Apra Harbor called Mound 9. The Navy is currently planning to move 24 of the largest coral colonies, 104 other select colonies, and an additional 103 coral colonies from Polaris Point to adjacent sites and not Mound 9. The Navy is planning to monitor (i.e., quantify and assess the resource conditions) corals from each of these locations at pre-determined intervals over two years after translocation (e.g., three monitoring events occurring at the time of completed translocation, 12 and 24 months thereafter).

NMFS considers this a minimization measure because the corals that survive translocation are not unavoidably lost and do not require direct offset. Based on the previous performance of similar outplanting efforts within Apra Harbor, the Navy expects a minimum of 4,410 coral colonies (70%) to survive the relocation effort and that number could be much higher based on the recent success of translocation efforts at X-Ray wharf (i.e. 4,410 is a conservative estimate). The proposed approach will leave behind 1,380 smaller corals and potentially lose an additional 1,890 corals after translocation, resulting in a conservative unavoidable loss estimate of 3,270 corals.

Navy-proposed Offset

The Navy worked with NMFS through early coordination to generate parameters (e.g. expected injury, service levels, discount rate, and years to recover) for a Habitat Equivalency Analysis (HEA) to quantify the interim loss of ecosystem services and function associated with the adverse effects of this proposed action, and developed a quantifiable mitigation strategy focusing on EFH area replacement. The Navy built in several conservative assumptions into the HEA regarding two-dimensional surface area, three-dimensional surface area, largest morphology, and estimates of coral survivorship. The Navy also included an area loss estimate for the marine successional and filter feeding community within the HEA. Collectively, these conservative choices resulted in a HEA requirement of 3,273.7 m^2 of offset for unavoidable losses to EFH, an area that justifiably exceeds the two-dimensional estimation of physical impacts, which was 1,666.9 m^2.

The Navy has proposed to offset the 3,273.7 m^2 of lost EFH through the generation of new and improved habitat. The Navy plans to remove anthropogenic debris, stabilizing substrate, and deploy limestone boulders at Mound 9. These measures will generate area for coral settlement and regrowth, increase rugosity, and increase benthic complexity in an area where corals have historically flourished (i.e. prior to WWII dredging). The proposed improvements at Mound 9 are also expected to benefit coral reef associated species known to be a food sources for benthic MUS (Nakamura et al. 2008).

To achieve the required offset the Navy plans to stabilize 1,235.9 m^2 of rubble at Mound 9, and place 615 limestone boulders that will provide 2,041.8 m^2 of new surface area. These two measures will generate 3,277 m^2 of offset. The Navy has also calculated that the coral estimated not to survive translocation have the potential to provide an additional 1,890 m^2 of new area above what was required within the HEA, providing an additional conservative buffer to the modeled requirement. The Navy is also proposing to move other invertebrates to Mound 9 as part of the translocation effort when feasible.

The Navy is planning to monitor (i.e., quantify and assess the resource conditions) the fish and benthic community at the Mound 9 restoration site at pre-determined intervals over two years after translocation (e.g., three monitoring events occurring at the time of completed translocation, 12 and 24 months thereafter). The offset effectiveness monitoring effort will likely align with the

translocation survivorship monitoring planned as part of the proposed minimization in the section above.

NMFS Concerns

NMFS is concerned that the proposed activity will cause physical damage to EFH resources, including unavoidable loss of corals and non-coral invertebrates (i.e., substantial adverse effects), turbidity and sedimentation leading to degradation of coral condition, introduction of invasive species, introduction of chemical contamination from equipment, and introduction of toxicopathological contaminants during diver activities. NMFS is also concerned that translocation of corals from the *Porites rus* complex, which make up the majority of corals within the action area, may not respond well to translocation efforts due to their size and morphology. These concerns could result in long-term to permanent loss of corals, non-coral invertebrates, and their ecosystem services and function as discussed below.

Construction and dredging activities associated with this action will directly impact an estimated 1,666.9 m^2 of two-dimensional benthic area (2,661 m^2 of modeled EFH when including coral morphology), including more than 7,680 coral colonies. Minimization measures are expected to protect approximately 4,410 of the 6,300 coral colonies proposed for translocation, leaving more than 3,000 corals unavoidably lost. The Navy has put forward a realistic mitigation strategy to offset for lost EFH (e.g., corals and filter feeders), which has the potential to increase overall habitat area over time. The proposed approach hinges on successful coral recruitment at Mound 9 to replace the lost habitat area and demonstrate a return to comparable coral densities, and ecosystem function, to what we would have seen in the action area over the next 30 years (i.e. the selected Visual HEA service recovery period). If the new boulders and stabilized areas fail to resemble a reasonable facsimile of the coral diversities and densities that would have occurred within the action area, effective offset of EFH has failed. The HEA has proven to be an effective tool in developing the theoretical offset, but should be supported by long-term monitoring and adaptive management to ensure that the expected level of recovery occurs.

The mitigation projects proposed as minimization and offset have the potential to adversely affect EFH through vessel (e.g. physical damage and chemical contamination risks) and diver interactions (e.g. physical damage, introduction of toxicopathological agents, and invasive species risks) associated with the surveying, coral transplanting, staging and moving of the limestone boulders at Mound 9.

EFH Determination

NMFS agrees with the Navy's determination that the proposed action will adversely affect EFH and result in unavoidable loss. Furthermore, NMFS determines that even with the avoidance, minimization, and offset measures proposed by the Navy, the proposed action could still have long-term to permanent adverse effects to EFH associated with the implementation of the proposed

mitigation strategies, unexpectedly low survivorship for translocated corals (e.g. *Porites rus complex*), or resulting from delays in coral recovery and/or recruitment at Mound 9.

Conservation Recommendations

NMFS provides the following EFH conservation recommendations in accordance with the EFH provisions of the Magnuson-Stevens Act (50 C.F.R. 600.920) to help the Navy ensure that adverse effects to EFH including corals are avoided, minimized, offset for, or otherwise mitigated.

Conservation Recommendation #1: To ensure that the proposed offset from the HEA is effective, the Navy should develop a plan for implementation that would quantify coral recruitment and growth over time (i.e., out years) at Mound 9. This data could then be integrated into a follow-up modelling effort to determine if recovery is matching rates used within the original HEA, and that ecosystem function is being effectively offset. To support this effort, the Navy should consider coordinating this monitoring plan with the actions listed within the 2019 JRM INRMP, Marine Habitat Management section. If the 2019 JRM INMRP is not prescriptive enough to meet the needs of this specific consultation, then the Navy should consider including Mound 9 surveys within the next update to the JRM INRMP.

Conservation Recommendation #2: Coral translocation, benthic surveys, boulder deployment, benthic stabilization activities, sensor installation, cable deployment, and anchoring activities will all require the staging of materials in the marine environment and/or be supported by divers. The Navy should ensure that these activities avoid any unnecessary contact with marine organisms and that divers also avoid exposing corals directly or indirectly to toxicopathological agents.

Conservation Recommendation #3: To ensure that the translocation of coral colonies from the *Porites rus* complex (>80% of corals in the action area) is meeting early survivorship targets, the Navy should provide NMFS a monitoring report after each monitoring event. Each report should clearly documents the performance of the *Porites rus* complex and include a comparison of performance between morphology types, colony sizes, and translocation location (i.e. those moved to Mound 9, moved adjacent to the array area, or to Polaris Point). If survivorship of translocated corals does not meet the 70% survivorship target (as compared to control sites) at the end of the survey period, the Navy should coordinate with NMFS to discuss the potential need for additional offset.

Please be advised that regulations (Section 305(b)(4)(B)) of the Magnuson-Stevens Act to implement the EFH provisions require that Federal action agencies provide a written response to this letter within 30 days of its receipt and at least 10 days prior to final approval of the action. A preliminary response is acceptable if final action cannot be completed within 30 days. The final response must include a description of measures to avoid, minimize, and offset the adverse impacts of the activity. If the response is inconsistent with our EFH conservation recommendations, an adequate explanation for not implementing the recommendations must be provided.

Conclusion

Upon review of the consultation documents for the proposed construct and operation of an underwater electromagnetic measuring system in Outer Apra Harbor, Guam, NMFS determines that there will be unavoidable loss and substantial adverse effects to sensitive and hard-to-replace EFH. NMFS expects that many adverse effects to EFH from these project activities can be avoided and/or minimized if all of the proposed BMPs are fully implemented, and coral translocation achieves the targeted success levels. Additionally, NMFS believes that full offset can be realized so long as the Navy follows the EFH conservation recommendations provided by NMFS and reengages using the HEA to confirm that natural settlement and recovery of corals is meeting or exceeding the recovery rates put forth in the model. NMFS provides the EFH conservation recommendations as described above to help the Navy ensure that adverse effects to EFH including coral reef resources are avoided, minimized, offset for, or otherwise mitigated. Please don't hesitate to contact Steve McKagan at 670-234-0004 and/or steven.mckagan@noaa.gov should you have any questions, comments, or require additional technical assistance.

Sincerely,

Gerry Davis
Assistant Regional Administrator
Habitat Conservation Division

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DEPARTMENT OF THE NAVY
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Gerry Davis
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Dear Mr. Davis,

Subject: CONSULTATION ON THE EFFECTS TO ESSENTIAL FISH HABITAT FROM THE INSTALLATION OF THE UNDERWATER ELECTROMAGNETIC MEASURING SYSTEM, OUTER APRA HARBOR, U.S. NAVAL BASE GUAM

In accordance with the Essential Fish Habitat (EFH) provisions of the *Magnuson-Stevens Fishery Conservation and Management Act* (MSA; 6 U.S.C. § 1801 et seq.), the Navy is providing this letter as a response to the National Marine Fisheries Service (NMFS) conservation recommendations letter dated 21 July 2021. The EFH consultation is for proposed installation the underwater electromagnetic measuring system (UEMMS) in Outer Apra Harbor, U.S. Naval Base Guam. Many of the effects from the project can be avoided and minimized through the implementation of the Best Management Practices (BMPs) that were described in the Navy's EFH assessment that was submitted to NMFS on 21 June 2020. The Navy understands that conservation recommendations from NMFS are intended to enhance, or to be in addition to, BMPs and the Navy provides its responses to the conservation recommendations below.

NMFS Conservation Recommendation #1: To ensure that the proposed offset from the Habitat Equivalency Analysis (HEA) is effective, the Navy should develop a plan for implementation that would quantify coral recruitment and growth over time (i.e., out years) at Mound 9. This data could then be integrated into a follow-up modelling effort to determine if recovery is matching rates used within the original HEA, and that ecosystem function is being effectively offset. To support this effort, the Navy should consider coordinating this monitoring plan with the actions listed within the 2019 JRM INRMP, Marine Habitat Management section. If the 2019 JRM INMRP is not prescriptive enough to meet the needs of this specific consultation, then the Navy should consider including Mound 9 surveys within the next update to the JRM INRMP.

Navy Response to Conservation Recommendation #1: The Navy understands that while the HEA is currently the best available program that provides an efficient method of predicting likely loss and recovery of coral and calculating the required compensation, subsequent monitoring of coral recruitment and growth will confirm the accuracy of the HEA predictions and the efficacy of the implemented mitigation measures. The Navy's subject matter experts will

develop a two-year monitoring and maintenance plan consistent with the five-year adjacent monitoring for the Lima, Mike, and November Wharves (LMN) translocation project at Mound 9. In response to this conservation recommendation, the Navy plans to evaluate the HEA analysis (or an equivalent and improved model analysis) for the impact area of LMN and Mound 9 after five years of monitoring that can be compared with the UEMMS monitoring data later in 2025.

Furthermore, the Navy agrees with this Conservation Recommendation, that the monitoring plan for all Mound 9 projects should consider aligning with the 2019 JRM INRMP. In addition, subject to available funds, the Navy will consider including funding support for the long-term monitoring events at Mound 9 within the next update to the JRM INRMP. As per the policy set forth in Chief of Naval Operations Instruction (OPNAVINST) 5090.1E, Environmental Readiness Program, all mitigation requirements must be coordinated in advance with natural resources managers representing the Installation Commanding Officers. If appropriate, the responsibility for the compensatory requirement can be realigned to the Natural Resources Conservation program at Naval Base Guam.

NMFS Conservation Recommendation #2: Coral translocation, benthic surveys, boulder deployment, benthic stabilization activities, sensor installation, cable deployment, and anchoring activities will all require the staging of materials in the marine environment and/or be supported by divers. The Navy should ensure that these activities avoid any unnecessary contact with marine organisms and that divers also avoid exposing corals directly or indirectly to toxicopathological agents.

Navy Response to Conservation Recommendation #2: The Navy agrees with Conservation Recommendation 2 and will ensure that the appropriate BMPs are implemented during the coral translocation, benthic surveys, boulder deployment, benthic stabilization activities, sensor installation, cable deployment and anchoring activities, including avoidance of physical contact with organisms not transplanted (especially coral). The Navy will stabilize and secure materials that are staged on the bottom, while also avoiding movement during inclement weather. The Navy will be using experienced coral biologists for the coral transplantation and habitat restoration. The divers are knowledgeable about the risk of disease to corals including the use of reef-safe sunscreen. To the best of their ability, all divers will avoid exposing corals directly or indirectly to toxicopathological agents.

NMFS Conservation Recommendation #3: To ensure that the translocation of coral colonies from the *Porites rus* complex (>80% of corals in the action area) is meeting early survivorship targets, the Navy should provide NMFS a monitoring report after each monitoring event. Each report should clearly documents the performance of the *Porites rus* complex and include a comparison of performance between morphology types, colony sizes, and translocation location (i.e. those moved to Mound 9, moved adjacent to the array area, or to Polaris Point). If survivorship of translocated corals does not meet the 70% survivorship target (as compared to control sites) at the end of the survey period, the Navy should coordinate with NMFS to discuss the potential need for additional offset.

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Navy Response to Conservation Recommendation #3: The Navy agrees with Conservation Recommendation 3 and will ensure that three monitoring reports documenting the performance of the translocated corals at the three translocation sites, including the *Porites rus* complex, will be provided to NMFS upon completion of coral translocation and after both subsequent monitoring events (12 & 24 months). The Navy agrees to coordinate with NMFS if the rate of survival does not meet the 70% survivorship target after the final monitoring period.

The Navy appreciates NMFS's effort and careful deliberation invested in evaluating the proposed actions and providing these three EFH conservation recommendations. Should you have any questions or concerns, please contact Kevin Lino at NAVFAC Pacific at (808) 472-1087 or kevin.c.lino.civ@us.navy.mil.

Sincerely,

Ed Moon

Edward Moon
Installation Environmental Program Director
By Direction of the Commanding Officer