



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1845 Wasp Blvd., Bldg. 176
Honolulu, Hawaii 96818
(808) 725-5000 • Fax: (808) 725-5215

MAY 26 2017

Mr. Tunis W. McElwain
Acting Chief, Regulatory Office
U.S. Army Corps of Engineers
Honolulu District Regulatory Office
Building 230
Fort Shafter, HI 96858-5440

RE: Reinitiation of Informal Consultation for the U.S. Army Corps of Engineers Pac-SLOPES Program (PIR-2017-10106, I-PI-16-1500-AG)

Dear Mr. McElwain:

This letter responds to your April 11, 2017 letter requesting concurrence that the effects of a program implementing standard local operating procedures in the central and western Pacific region (Pac-SLOPES) is not likely to adversely affect (NLAA) endangered or threatened species, or designated critical habitat, under our jurisdiction, pursuant to section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. §1531 *et seq.*). The National Marine Fisheries Service's (NMFS) response to this request is pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for the preparation of letters of concurrence.

The U.S. Army Corps of Engineers (USACE) permits actions or projects under section 10 of the Rivers and Harbors Act of 1899 and section 404 of the Clean Water Act, or as carried out by the Corps as part of civil works programs authorized by sections 206, 536, and 1135 of the Water Resources Development Act. Many of these projects include activities that are minor, repetitive and predictable in nature, and share similar requirements for regulatory approval. Under Pac-SLOPES, applications for proposed actions that the USACE finds to be within the range of effects considered in the corresponding concurrence letter are issued a permit with conditions. Applications found not to be within this range of effects are submitted to NMFS for a site-specific ESA consultation. A series of Pac-SLOPES programmatic concurrence letters have been issued in 2010 and 2017. This consultation is a reinitiation of the 2015 consultation and includes minor modifications to the Pac-SLOPES program.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The concurrence letter will be available through NMFS' Public Consultation Tracking System [<https://pcts.nmfs.noaa.gov>]. A complete record of this consultation is on file at the Pacific Island Regional Office, Honolulu, Hawaii.

Other Federal action agencies or multiple action agencies conduct activities identical to those permitted by the USACE and completing ESA section 7(a)(2) consultation through this Pac-SLOPES consultation. However, this Pac-SLOPES consultation does not extend to these other Federal agencies. Other Federal action agencies may adopt the Pac-SLOPES program, including all BMPs and exclusion, and request



concurrence from NMFS for a not likely to adversely affect determination. In response, NMFS will concur that the new Federal action agency(s) are not likely to adversely affect the ESA-listed species. Upon demonstration that the new Federal action agency understands and has the capacity to implement the Pac-SLOPES program (or those portions of the program that they will implement), we expect that the process for completing section 7(a)(2) consultation will be relatively rapid.

Consultation History

The NMFS consulted previously with the USACE on the Pac-SLOPES program on August 6, 2010 (PIR-2010-03501), and on October 5, 2015 (PIR-2016-9840). Experiences of the USACE and NMFS during administration and implementation of the Pac-SLOPES program guide the USACE and NMFS in their determination of when it is necessary to adjust actions authorized under the Pac-SLOPES consultation. These adjustments ensure that covered actions will continue to meet ESA requirements; share characteristics that produce environmental effects which are minor, repetitive, and predictable in nature; and share similar requirements for regulatory approval. This reinitiation consultation is based on a new BE received from USACE on April 11, 2017.

Between August 6, 2010 and April 13, 2017, the USACE permitted 203 actions under the Pac-SLOPES consultation. Most of the actions occurred in the Main Hawaiian Islands, and most of the actions were repairs or installation of structures within a marina or harbor. The number of actions and their locations are summarized in Table 1. From August 2010, the most projects permitted under Pac-SLOPES was in the calendar year of 2012 when the USACE issued 43 permits under Pac-SLOPES. No full year had fewer than 24 actions, and in 2016 the USACE issued 27 permits under Pac-SLOPES. One action, disposal of a 5,000-foot piece of plastic to the bottom of the ocean fit in none of the 14 categories; and was erroneously permitted and should not have been permitted under Pac-SLOPES.

After reviewing the effects of projects permitted under the described action, NMFS and USACE agreed to remove some activities from Pac-SLOPES. We also agreed to remove some restrictions from some activities as well. The changes to Pac-SLOPES are listed below:

- The USACE will consult with local biologists (either NMFS HCD representatives in their respective locations, or the appropriate local government agencies) to determine mass coral spawning events and avoid in-water construction during those periods.
- Actions will be limited to in-kind replacement of structures.
- Hopper dredging is excluded from the action, and suction dredging will be limited to equipment and methods described in the BE.
- Placement of treated wood is restricted.
- Placement of mooring buoys in the Hawaiian Islands Humpback Whale National Marine Sanctuary are no longer restricted.
- Pile removal and installation by vibratory hammer is no longer restricted.
- Construction in estuaries or nearshore marine habitat is no longer restricted to vessel-based, or out-of-water based machinery.

Table 1. Number of actions permitted under Pac-SLOPES for each activity, on each island between August 6, 2010, through April 13, 2017.

Activity	Total for activity	Hawaiian Islands					Guam	CNMI			American Samoa
		Oahu	Maui	Kauai	Hawaii	Lanai	Guam	Saipan	Tinian	Rota	Tutuila
Site Preparation	0										
Survey Activities	12	3		1			4	2		1	1
Marina Improvements	49	19	5	3	5	3	12	1	1		
Piling Installation	0										
Mooring	34	9	5	1	5		5	4	1	3	1
Dredging	13	5	3	1	2			1			1
Other minor discharge/dredge	18	12	1	2	1		1	1			
Utility Line	11	5		1	2		2	1			
Outfall repair	13	8	1		2		1				1
Bank Stabilization	31	15	2	6	3		4				1
Stream clearing	10	6	1	1	1		1				
Road repair	1		1								
Bridge Repair	6	2	1	2							1
Removal of structure/vessel	4		1			1		2			
Ocean disposal ^a	1	1									
TOTAL	203	85	21	18	21	4	30	12	2	4	6

a –denotes actions that do not appear to fit into the 14 identified categories, and is not permitted under Pac-SLOPES

Proposed Action

In summary, the USACE is proposing to issue permits regulated under Section 10 of the Rivers and Harbors Act of 1899 (Section 10) or Section 404 of the Clean Water Act (Section 404) to various applicants conducting 14 types of common activities occurring in the Commonwealth of the Northern Mariana Islands (CNMI), Guam, American Samoa, Pacific Remote Island Areas (PRIA), and the Hawaiian Islands. Under Pac-SLOPES, the USACE will apply conditions when they issue Section 10 and Section 4 permits that will minimize risk to ESA resources and comply with the Pac-SLOPES program. The actions permitted under Pac-SLOPES include but are not limited to: construction or installation of any wharf, dolphin (cluster of piles to be used as a navigational guide), weir, boom, breakwater, jetty, groin, bank stabilization, mooring structure, aerial or subaqueous power transmission line, intake or outfall pipe, permanently moored floating vessels, tunnels, artificial canals, boat ramps, aids to navigation, and any other permanent or semi-permanent obstacle or obstruction to navigation.

Under the proposed programmatic consultation, the Corps would use Pac-SLOPES to issue permits for the following categories of actions:

1. Site Preparation for Above-water or Over-water Construction;
2. Survey Activities;

3. Marina or Harbor Repair and Improvement Activities;
4. Piling Installation, Repair, Replacement and/or Removal;
5. Installation and/or Repair of Buoys and Other Similar Structures;
6. Maintenance Dredging;
7. Other Minor Discharges and Dredging/Excavation;
8. Utility Line Installation and Repair;
9. Outfall Structure Repair and/or Replacement;
10. Maintenance of Existing Bank Stabilization Structures;
11. Stream Clearing Activities;
12. Road Repair, and/or Improvements;
13. Bridge Repair and Replacement;
14. Removal of Structures or Vessels.

Each of these categories of actions includes multiple activities, and projects permitted under Pac-SLOPES often have actions that span multiple categories. Projects are explicitly excluded from authorization under Pac-SLOPES, and as such require individual consultation, if they include any of the following activities:

1. Blasting or use of explosives for demolition purposes.
2. Installation or proofing of steel or concrete pilings and/or sheetpile via impact hammer.
3. Construction of new bank stabilization, including any expansion of existing bank stabilization.
4. Construction of new roads.
5. New construction dredging or in-water trenching.
6. Construction of new or expanded effluent discharge systems.
7. Any use of treated wood in marine or aquatic habitats.

As part of a permit evaluation or administrative review process:

1. The USACE will confirm whether or not a proposed project is within the present or historic range of an ESA-listed marine species or designated critical habitat, and make an effects determination;
2. If the USACE determines that the project may affect an ESA-listed marine species or critical habitat, the Corps will review the project for applicability under Pac-SLOPES based on the following criteria:
 - a) The proposed project conforms with all applicable requirements and limitations described herein;
 - b) The general conditions below can be applied to the project; and
 - c) All potential effects on ESA-listed marine species or critical habitats are within the range of effects considered in the programmatic consultation with NMFS PRD for the implementation of Pac-SLOPES. Actions that do not initially comply with Pac-SLOPES may be brought into compliance through technical assistance between the applicant, the USACE, and NMFS;
3. The USACE will submit the *Pac-SLOPES Notification and Verification Form* (Appendix B) to NMFS PRD and request confirmation that the action is within the scope of Pac-SLOPES; and
4. NMFS PRD will confirm if the given action complies with Pac-SLOPES.

As part of an adaptive management approach to improving the conservation value, efficiency, and accountability of this program; the USACE will coordinate an annual meeting with NMFS PRD in August/September of each year to discuss the number, types and location of projects completed under Pac-SLOPES and to share lessons learned in the application of this program to actions throughout the region.

The USACE will apply a number of general conditions to each action permitted under Pac-SLOPES. These conditions are described in detail in Section 2.0 of the BE, and are intended to minimize exposure

to listed species, and minimize the impact of project implementation on critical habitat and the habitat of listed marine species. The USACE detailed best management practices in Section 6.0 in their BE. The BMPs are intended to avoid or minimize a number of stressors that could occur during the construction or the future operation of the structure. These include avoiding collisions with vessels, direct contact with listed species, entanglements, exposure to hazardous chemicals or materials, minimizing exposure to elevated noise levels, exposure to elevated turbidity, the mobilization or introduction of invasive species, disturbance from human activity or equipment operation, and loss of forage habitat.

Action Area

The action area for the Pac-SLOPES program includes all areas affected by noise, turbidity, general construction-related disturbance, vessels, accidental wastes and discharges, and long-term effects from new or replaced structures. The geographic extent of the program encompasses the lands and adjacent waters on and around the Main Hawaiian Islands (MHI), the Northwest Hawaiian Islands (NWHI), American Samoa, Guam, CNMI, and the PRIA where ESA-listed marine species or their habitats may be impacted by USACE's actions. Within this geography, the action area includes but is not limited to all navigable waters of the United States within three miles of shoreline, other water bodies, and adjacent wetlands; such as nearshore marine waters, shoreline areas inland to the point where impacts to the marine environment and ESA-listed marine species are no longer reasonably certain to occur, and upstream into upland watersheds to the point where impacts to the marine environment and ESA-listed marine species are no longer reasonably certain to occur.

Listed Species

The USACE determined that the ESA-listed threatened and endangered species under NMFS jurisdiction listed in Table 2 are known to occur, or could reasonably be expected to occur within 3 miles of shoreline where all of the projects permitted under Pac-SLOPES occur, and may be present in the action area. We included species that the USACE determined the Pac-SLOPES program would have no effect on because some of the pelagic and deepwater species may occur within the action area. In a telephone conversation with the USACE, we agreed to evaluate the effects of the proposed actions under Pac-SLOPES which may affect, but is not likely to adversely affect all species listed in Table 2, and is not likely to jeopardize the continued existence of the proposed species listed in Table 2.

Table 2. ESA-listed species considered in this consultation.

ESA Species	Listing Status	Listing Date and Federal Register Notice	Critical Habitat Date and Federal Register Notice (if applicable)
Green sea turtle (<i>Chelonia mydas</i>) Central North Pacific DPS (T) Central West Pacific DPS (E) Central South Pacific DPS (E)	Threatened (T) and Endangered (E)	05/06/2016 81 FR 20057	Not designated
Hawksbill sea turtle (<i>Eretmochelys imbricata</i>)	Endangered	06/02/1970 35 FR 8491	09/02/1998 63 FR 46693 Not in action area
Leatherback sea turtle (<i>Dermochelys coriacea</i>)	Endangered	06/02/1970 35 FR 8491	01/26/2012 77 FR 4170 Not in action area
Loggerhead sea turtle (<i>Caretta caretta</i>) North Pacific DPS South Pacific DPS	Endangered	09/22/2011 76 FR 58868	Not designated
Olive Ridley sea turtle (<i>Lepidochelys olivacea</i>)	Threatened	07/28/1978 43 FR 32800	Not designated
Hawaiian monk seal (<i>Neomonachus schauinslandi</i>)	Endangered	11/23/1976 41 FR 51611	08/21/2015 80 FR 50925
False killer whale (<i>Pseudorca crassidens</i>) Insular MHI DPS	Endangered	11/28/2012 77 FR 70915	Not designated
Humpback whale (<i>Megaptera novaeangliae</i>) Western North Pacific DPS	Endangered	12/02/1970 35 FR 18319	Not designated
Sei whale (<i>Balaenoptera borealis</i>)	Endangered	12/02/1970 35 FR 18319	Not designated
Blue whale (<i>Balaenoptera musculus</i>)	Endangered	12/02/1970 35 FR 18319	Not designated
Fin whale (<i>Balaenoptera physalus</i>)	Endangered	12/02/1970 35 FR 18319	Not designated
Sperm whale (<i>Physeter macrocephalus</i>)	Endangered	12/02/1970 35 FR 18319	Not designated
Scalloped hammerhead shark (<i>Sphyrna lewini</i>) Indo-West Pacific DPS	Threatened	09/02/2014 79 FR 38213	Not designated
<i>Acropora globiceps</i>	Threatened	10/10/2014 79 FR 53851	Not designated
<i>Acropora jacquelineae</i>	Threatened	10/10/2014 79 FR 53851	Not designated
<i>Acropora retusa</i>	Threatened	10/10/2014 79 FR 53851	Not designated
<i>Acropora speciosa</i>	Threatened	10/10/2014 79 FR 53851	Not designated
<i>Euphyllia paradivisa</i>	Threatened	10/10/2014 79 FR 53851	Not designated

<i>Isopora crateriformis</i>	Threatened	10/10/2014 79 FR 53851	Not designated
<i>Seriatopora aculeata</i>	Threatened	10/10/2014 79 FR 53851	Not designated
Oceanic Whitetip Shark (<i>Carcharhinus longimanus</i>)	Proposed Threatened	12/29/2016 81 FR 96304	N/A
Giant manta ray (<i>Manta birostris</i>)	Proposed Threatened	01/12/2017 82 FR 3694	N/A

Detailed information about the biology, habitat, and conservation status of sea turtles, sharks, rays, and corals can be found in their status reviews, recovery plans, federal register notices, biological review team reports, and other sources at <http://www.nmfs.noaa.gov/pr/species/esa/>.

Critical Habitat

Hawaiian monk seal critical habitat is the only designated critical habitat within the action area. In designated areas of the NWHI, critical habitat for Hawaiian monk seals includes: all beach areas, sand spits and islets, including all beach crest vegetation to its deepest extent inland, lagoon waters, inner reef waters, and including marine habitat through the water's edge, including the seafloor and all subsurface waters and marine habitat within 10 m of the seafloor, out to the 200-m depth contour line (relative to mean lower low water).

In designated areas of the MHI, critical habitat for monk seals includes the marine environment with a seaward boundary that extends from the 200-m depth contour line (relative to mean lower low water), including the seafloor and all subsurface waters and marine habitat within 10 m of the seafloor, through the water's edge 5 m into the terrestrial environment. Detailed information on Hawaiian monk seal critical habitat can be found at: http://www.fpir.noaa.gov/PRD/prd_critical_habitat.html.

Analysis of Effects to Listed Marine Species

To determine that a proposed action is NLAA listed species, NMFS must find that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint USFWS-NMFS Endangered Species Consultation Handbook: (1) insignificant effects relate to the size of the impact and should never reach the scale where take occurs; (2) discountable effects are those that are extremely unlikely to occur; and (3) beneficial effects are positive effects without any adverse effects (USFWS & NMFS 1998). This standard, as well as consideration of the probable duration, frequency, and severity of potential interactions, was applied during the analysis of effects of the proposed action on ESA-listed marine species, as is described in detail in the USACE's consultation request. In addition, NMFS independently analyzed the risk of effects to listed marine species and designated critical habitat for the Hawaiian monk seal. The analysis includes the 14 action types along with all general conditions and BMPs.

Implementation of activities authorized by the USACE under Pac-SLOPES may affect listed marine species during and after construction in the following ways: vessel collision, direct contact, entanglement, disturbance from human activity and equipment operation, elevated noise, elevated turbidity and sedimentation, exposure to wastes and discharges, loss of forage area, and a long-term increase of manmade structures within the action area.

Vessel collisions

Many of the action categories described above involve the use of vessels in nearshore marine waters as well as in the lower reaches of rivers and streams. Vessels may range in size from small outboard boats

used to install silt curtains or support divers, up to large tugboats and barges used to position heavy equipment at project locations.

The USACE will apply BMPs as conditions to permits that involve the use of vessel to minimize the risk of a vessel colliding with a listed species. The BMPs include limiting vessel speeds, altering course when listed species are sighted, and putting the engine in neutral when listed animals approach the vessel or are in close proximity to the vessel.

The speed restrictions are intended to reduce the probability of collisions, and the severity of injuries if one occurs. Hazel et al. (2007) demonstrated greater vessel speed increased the probability that sea turtles would fail to flee from the approaching vessel. Additionally, operating at higher speeds makes it more difficult for operators to detect sea turtles, especially during choppy or low-visibility conditions. Vanderlaan and Taggart (2007) report that the severity of injury to large whales is directly related to speed. They found that the probability of lethal injury increased from 21% for vessels traveling at 8.6 knots, to over 79% for vessels moving at 15 knots or more. We assume collisions at higher speeds would result in more severe injuries for all animals.

Sea Turtles. NMFS (2008) estimated 37.5 sea turtle vessel strikes and mortalities occur every year from an estimated 577,872 trips per year in Hawaii. This results in a 0.006% probability of a vessel strike for each vessels trip, many of who are not reducing speeds or employing lookouts for listed species. Considering the BMPs included with this project including the use of lookouts, slower speeds and avoidance of areas when listed species are observed, the probabilities are likely even lower. The number of vessel trips from other marinas or docks to and from the site will not likely exceed 100. If we calculate the worst case potential for strikes it would be 0.6 per year (based on 100 trips X 0.006); this probability does not incorporate the lower risk based on the proposed reduced vessel speed. We do not have similar data from CNMI or Guam, but vessel strikes on turtles have been documented there. We expect the same probabilities as those expected in Hawaii, and probably lower due to smaller sea turtle populations in that archipelago. We also do not have similar vessel strike data from American Samoa or the PRIAs. We expect the probability of vessel strikes in those areas to be similar to those of Hawaii's. Thus, a risk of 0.6% of an encounter between a vessel and a sea turtle is extremely low, thus the risk of effects on sea turtles for this stressor is discountable.

Hawaiian Monk Seals. NMFS considers it highly unlikely that vessels used for Pac-SLOPES will collide with Hawaiian monk seals. Hawaiian monk seals are uncommon in nearshore waters, and it is relatively easy to avoid area where they are known or observed using as haul out areas or nursing site. According to PIFSC's database there have been only four verified vessel strikes of Hawaiian monk seals since 1981 (John Henderson, PIFSC 5/4/17). Other wounds and blunt force trauma have been documented but wounds, especially those that have healed, are difficult to confirm as vessel strikes, and other blunt force trauma such as intentional killing. Presuming that the number of vessel trips does not increase under Pac-SLOPES and the location of trips is consistent with the past, then NMFS considers the risk of a vessel collision with a Hawaiian monk seal to be discountable.

Whales. There are data suggesting that the probability of vessel collisions between whales and vessels associated with categories of actions covered by the Pac-SLOPES consultation would be more uncommon than that of sea turtle vessel strikes. Lammers et al. (2013) estimated at most the risk was 7 humpback whale strikes per year, which is less than 1/5 of the number reported for sea turtles (or 2/5 if you consider that humpback whales are in Hawaii for at most half of the year). Lammers et al. (2013) noted that most strikes occurred in February and March, which is the peak of the humpback whale season in Hawaii. This increases the odds of a vessel strike. Furthermore, most recorded vessel strikes occurred with calves. These trends are relevant because they represent a biased rate of collision. The Hawaii humpback whale DPS is no longer listed under the ESA and are by far more common than any of the listed whale species

in the region or in this consultation. The trends of this study are not comparable to the West North Pacific DPS where there are no breeding grounds in U.S. territorial waters, or peak seasons where they are common and concentrated around islands. Most listed baleen whales will be solitary and the rate of vessel strikes for this species will be likely lower than the rate of strikes documented by Lammers et al. (2013). False killer whales commonly travel in pods and are known to approach vessels and ride the bows of vessels. We have little to no data on vessel strikes on false killer whales, but false killer whales are much more agile than baleen whales and few vessel strikes on false killer whales have been reported. We expect the probability of vessel strikes of false killer whales to be lower than reported in Lammers et al. 2013. Considering the low probability of vessel strikes, the rarity of listed animals in action areas, and that most projects occur close to shore, we expect effects on listed whales from vessel collisions to be discountable.

Sharks and rays. Sharks and rays may occasionally swim on the surface of the ocean but, unlike sea turtles and marine mammals, sharks and rays do not need to surface to breathe. Manta rays are commonly observed on the surface, and vessel collisions are listed as a threat to giant manta rays (82 FR 3694) because manta ray aggregation sites are sometimes in areas of high maritime traffic, many rays are potentially at risk of being struck by vessels. These aggregation sites do not exist near the action areas of most projects, and will be avoided during transit. We do not have vessel strike information on sharks and rays, and few are ever reported. The probability of a vessel collisions with sharks, and rays associated with the Pac-SLOPES program is very low since most projects are nearshore where giant manta rays generally are not observed. We expect effects on sharks and rays from vessel collisions to be discountable.

Corals. Vessels accidentally ground on coral reefs throughout the Pacific. The vessels used in these projects could ground and damage listed corals. The USACE will apply BMPs to all projects with the potential to impact corals which will reduce the risk of an interaction between a vessel and corals. Project applicants will use experienced operators who are familiar with the action area and will have local knowledge and be able to avoid coral and hard substrate during transit. The USACE will require vessels be well-maintained reducing the risk that they will stall and ground. In addition, operators will avoid anchoring during operation, or avoid anchoring in or near coral, and avoid operations during inclement weather. These all reduce the probability of vessel grounding or damage to coral associated with vessel movement. We expect effects on listed corals from vessel groundings to be discountable.

Direct contact. The USACE will permit actions covered by this consultation that will use divers, have workers wading into waters, use equipment working from vessels or from land, and will occasionally drive equipment into the water. During these and other similar construction activities, workers risk accidental contact with listed species. The USACE will apply BMPs as conditions to their permit which will minimize their risk of contacting and injuring a listed species during construction. Listed species in the action area that could be affected include green and hawksbill sea turtles, Hawaiian monk seals, sharks, and corals.

Corals. Projects that would affect structures or substrate with ESA-listed corals attached are excluded from coverage under Pac-SLOPES. However, some projects will occur in areas that have listed corals nearby. Applicants will refer to existing surveys within an action area to determine if any of the listed corals are in the work area and could be impacted by any of their proposed activities. As a matter of practice, applicants will avoid touching, moving, or damaging all corals. If listed corals are in the action area and where contact with some corals is inevitable (e.g., cable installation), workers will be briefed by local biologists or experts on listed corals to avoid contact with them. To minimize impacts to coral larvae, notably the listed species covered in this programmatic consultation, the permittee shall avoid in-water work during mass-coral spawning times or peak coral spawning seasons. Permittees must consult with local biologists (either NMFS HCD representatives in their respective locations, or the appropriate

local government agencies) to determine the exact period and dates when coral spawning would occur for the given year. All moorings will be placed with an appropriate length or with midline floats so moorings will not ground; further, the mooring will be positioned far enough away from coral reefs where it or the vessel will not contact any coral, and will be made of materials that can withstand most weather events so it does not break and float into reefs. With BMPs in place, and general avoidance of corals and exclusion of projects with listed corals on structures that will be worked on, the effects of direct contact on coral will be insignificant.

Direct contact with non-coral ESA-listed species (marine mammals, sea turtles, sharks, and rays) is not likely to occur because the conditions of the USACE's permit will include BMPs that include constant vigilance during construction. All applicants will be required to designate a competent observer who will search and monitor work sites and adjacent areas prior to the start of work each day, including prior to resumption of work following any break of more than one-half hour. All in-water work will be postponed or halted when ESA-listed marine species are within 50 yards of the proposed work, and will only begin/resume after the animals have voluntarily departed the area. If a listed animal enters within 50 yards of the work area after work has commenced, a biologist may determine if work may continue without disturbing the listed animal (divers performing surveys or underwater work [excluding the use of toxic chemicals] is likely safe, the use of heavy machinery is not). All workers will avoid interacting with any listed species.

The applicant may place, pour, or inject concrete below the water surface or adjacent to the water to repair a failing structure. Uncured concrete can leach into the water column where it could kill organisms, and irritate skin, eyes, nasal passages, gills, and other organs of listed animals. Under Pac-SLOPES, the USACE will require applicants to implement BMPs to avoid placing wet concrete in the water column. These BMPs include using a fast-forming non-reactive grout, or tremie concrete where a box is placed and sealed where concrete cannot spill into the water column before it cures. With the BMPs in place, proper selection of grout formulae, or use of tremie concrete, we expect a minimal risk of wet concrete leaching into the water column or exposing listed corals, sea turtles, sharks, or Hawaiian monk seals. The applicant may also place underwater epoxy during some of the action categories. The epoxy adheres to hard surfaces and cures within hours, which reduces exposure time and probabilities of interaction with listed species. The epoxy is also water resistant and does not leach or dissolve in water (Z*SPAR Splash Zone A-788 MSDS), and will not degrade the water column and organisms around them. The applicant will minimize the amount and extent of epoxy use to minimize the risk of contact with sea turtles, Hawaiian monk seals, sharks, or rays.

Entanglement. The USACE will issue permits under Pac-SLOPES that will add ropes and other materials to the action area which could be entanglement hazards to listed animals and corals. Prior to installation of buoys, the USACE will review the highest and lowest astronomical tides in the area to ensure the proper length of ropes are installed. The USACE will ensure that permittees will use the least amount of rope possible to minimize the amount of entanglement hazard on site, and to maximize the amount of time when ropes are pulled tightly. This will reduce the risk of entanglement. Rope entanglement is a relatively rare cause of death for sea turtles. In decades of stranding data and thousands of recorded strandings, the turtle stranding network in Hawaii has never recorded an entanglement of a sea turtle on an active mooring buoy (PIFSC 2016), and Hawaiian monk seals have not been documented entangled in active mooring buoys (John Henderson, PIFSC pers com., 5/5/17). Humpback whales have been entangled in active buoys in Hawaii, which has led to a requirement of state permits to install them in approved areas which are generally shallow, adjacent to marinas, away from reefs, and where humpback whales are more commonly observed. Although the Hawaii DPS is no longer listed under the ESA, it still underlines the threat of entanglement from buoys if not properly sized or placed and has implications for other whale species in other parts of the action area. Whales, Hawaiian monk seals, and sea turtles have all been entangled with ropes in the Pacific region. This suggests that derelict ropes when they get

detached could be a concern, although the majority of these entanglements are from derelict fishing gear. While we do not have comparable data in Guam, CNMI, or American Samoa, we expect the mechanism of entanglement in the ocean to be the same everywhere.

For activities USACE permits covered by Pac-SLOPES, all moorings will be placed with an appropriate length or with midline floats so it will not ground, will be positioned far enough away from coral reefs where it or the vessel will not contact any coral, and will be made of materials that can withstand most weather events so it does not break and float into reefs. Any permanent or long-term mooring deployments will include an inspection and maintenance program to reduce the likelihood of failures. By proper sizing of the ropes, placement in shallow waters, and inspection and maintenance of moorings, the USACE will reduce the risk of entanglement to listed species. The rate of mooring placement permitted under Pac-SLOPES has been about 5-10 per year, with most of them going in the MHI where they are regulated by the state for placement and other concerns. We expect this trend to continue at the same rate. We expect the risk of entanglement to be discountable to listed species.

Behavioral disturbance from human activity and equipment operation. The activities covered under Pac-SLOPES could disturb green and hawksbill sea turtles, Hawaiian monk seals, and scalloped hammerhead sharks in the action area. Non-consumptive human interactions like recreational diving, viewing, and approaching animals has been demonstrated to negatively affect wildlife by reducing foraging time, reducing survival, reducing breeding success, and other sublethal effects (Hayes et al. 2016). Underwater work by divers could mimic recreational diving in some ways. Wading in water or on shore may have similar disturbance effects. Heavy equipment on vessels, on land near water, or in water may cause greater disturbance to listed animals due to greater noise and turbidity generation. Those stressors are discussed below. The USACE will apply BMPs as conditions to their permits to minimize the effects of interactions with listed species. Applicants under the permit will not enter an area when a listed sea turtle, seal, or shark is observed within 50 yards of the site, and will not interact with, pursue, or touch listed animals if they enter the work area. The applicant will also avoid working when listed animals are observed within 50 yards of the work area, or a biologist may determine if an activity can continue if the risk of disturbance is low. Thus, we believe that some interaction may occur, but it will be temporary, minimal and unlikely to cause more than a minor behavioral avoidance that will not reduce the animal's ability to feed or rest. We expect the effects of human disturbance to be insignificant to listed species.

Elevated noise. Many activities covered under the Pac-SLOPES program will generate sounds that may affect listed species. Man-made sounds can affect animals exposed to them in three ways: non-auditory damage to gas-filled organs, hearing loss expressed in permanent threshold shift (PTS) or temporary threshold shift (TTS), and behavioral responses or changes. Sounds generated from the permitted activities will not cause non-auditory injury (Finneran and Jenkins 2012), but could be great enough to cause TTS (which is considered harm or likely to adversely affect a listed species), and cause behavioral response. Since each species is different in size and anatomy, they receive sounds differently and have different sensitivities to effects of sound. We have defined our thresholds for TTS and behavioral changes in Table 3, where sounds at these thresholds are believed to cause temporary hearing loss or behavior changes which could be considered harmful to individuals of the hearing group. The sounds generated during construction include common construction noises from vessels, dredging, heavy machinery on vessels, on shore, on overwater structures, or in water, hand tools, and pile driving.

Table 3. Estimated thresholds for TTS and behavioral changes for hearing groups (NMFS 2016).

Hearing Group	Weighted TTS onset threshold (SEL _{CUM})	Estimated threshold for behavioral changes
Low-frequency cetaceans (humpback whale and other baleen whales)	179 dB	Continuous = 120 dBRMS Non-continuous = 160 dB (re: 1 μ Pa)
Mid-frequency cetaceans (false killer whales and other toothed whales)	178 dB	Continuous = 120 dBRMS Non-continuous = 160 dB (re: 1 μ Pa)
Phocid pinnipeds (Hawaiian monk seals and other true seals)	181 dB	Continuous = 120 dBRMS Non-continuous = 160 dB (re: 1 μ Pa)
Sea turtles	200 dB	160 dB
Sharks and rays	185 dB	160 dB

Large vessels like barges used to carry pile driving equipment can create sounds ranging from 170-190 dB (re: 1 μ Pa). Smaller vessels like skiffs with outboards commonly used to assist in-water and near-water construction range from 150-170 dB. Vessels are generally mobile and the sound sources are considered non-impulsive and mobile. We also evaluated air bubbles from SCUBA, which were reported by Radford et al. (2005) with mean levels of 161 dB and mean peak levels of 177 dB at 1 meter. We consider this source a non-impulsive, mobile, intermittent noise source. Because of the mobile nature of vessels and the intermittent nature of SCUBA bubbles, Hawaiian monk seals, sea turtles, sharks, and rays are not likely to be exposed to the source long enough or continuously enough to experience TTS from vessels and SCUBA air bubbles.

The USACE will permit maintenance dredging activities which will create noise in the action area. Reine et al. (2014) compiled sound recordings from several types of dredging. These included sounds generated during cutterhead suction dredging, engine and generator noises, rock breaking, barge loading from mechanical backhoe dredging, hydraulic rams, anchoring spuds, walking anchoring spuds, and unidentified popping sounds that are commonly recorded. Each type of sound has frequencies that are detectable by both sea turtles and monk seals. All recordings were measured and calculated in decibels (dB) reference: 1 μ Pa-1 m root mean squared (dBrms), which measures continuous noises, and displayed in Table 4. Measurements were from various projects throughout the U.S. Hydraulic (or suction) dredging was described as quiet and continuous. The sound created by cutterhead dredging was considered continuous and main sources of the sound were believed to be the sound of the sediments breaking apart as they were being sucked into the dredging arm, and the mechanical sound of the pumps. Reine et al. (2014) described the sounds generated by mechanical dredging as repetitive and not continuous. The processes that comprise sound sources associated with mechanical bucket or backhoe (excavator) dredges fall within several categories: Physical removal of sediment from the substrate as the bucket is inserted into the bed, forced through the bed in a “scooping” arc, and removed from the bed produces grinding and scraping sounds. These measurements are consistent with those referenced in the USACE’s BE.

Table 4. Sound level recording levels for typical types of dredging (Reine et al. 2014).

Source of sound	Source level recordings (generally measured 1 meter away from source)	Recordings at various distances (The highest recorded in a series of distances)
Cutterhead Dredging	175 dB _{rms}	151 dB _{rms} at 50 meters
Mechanical backhoe sounds from engines and generator	167 dB _{rms}	134 dB _{rms} at 135 meters
Rock breaking from mechanical dredging	179.4 dB _{rms}	148.4 dB _{rms} at 60 meters
Hydraulic ram	164 dB _{rms} (backcalculated)	138 dB _{rms} at 60 meters
Barge loading	166 dB _{rms} (backcalculated)	139.5 dB _{rms} at 100 meters
Anchoring spuds	173 dB _{rms}	138 dB _{rms} at 220 meters
Walking spuds	176 dB _{rms}	147 dB _{rms} at 75 meters

The loudest activities presented in Reine et al. (2014) were rock breaking from mechanical dredging which were recorded in 179.4 dB_{rms} at 1m from the source, and cutterhead suction dredging which was recorded at 175 dB_{rms} at 1m. Both levels are not loud enough to immediately cause TTS in any of the listed animals and their hearing groups. However, repeated and continuous exposure at those levels could cause some TTS in some animals. Sound exposure from rock breaking was analyzed as an impulsive mobile and intermittent sound source. Sound exposure from cutterhead dredging was analyzed as a non-impulsive mobile and continuous source. Exposure to 8 hours to either of these source levels could create sound exposure levels that could be harmful to marine mammal, sea turtle, and shark hearing but only if they are within a meter from the source. Considering the BMPs that are being applied to the action, and the mobile nature of marine mammals, sea turtles, sharks, and rays this degree of exposure is highly unlikely to occur.

Engines and the mechanisms of sound generation from land-based heavy equipment and machinery in and near water are similar to those generated by engines in machinery used in dredging and the vessels that carry them. The sounds generated by on-land machinery in and near-water are similar in nature, volume, and intensity as defined in Table 4, namely for backhoe sounds from engines and generator, and rockbreaking from mechanical dredging. Similarly, the sounds generated by mechanical equipment in or near water are not considered loud enough to cause TTS immediately, and while sound exposure levels from continuous exposure could cause TTS, this level of response is unlikely because the animal would have to be within a meter of the source, and exposed for a long period of time.

Anthony et al. (2009) presented sounds generated from most underwater hand tools, including pneumatic drills, saws, hammers, chippers, grinders, welding tools, cutting torches, and air, bolt or stud guns. With the exception of air, bolt and stud guns, all noises produced by common hand tools produce sounds that are not loud enough to cause non-auditory injury or immediate hearing loss to marine animals nearby. With the exception of gun tools, all other hand tools do not generate sounds loud enough to cause TTS initially and even with a conservative estimate of 8 hours of exposure at their respective amplitudes, cumulative sound exposure levels are only high enough to cause TTS in listed animals less than 1 meter away.

Table 5. Noise levels generated by underwater tools (Anthony et al. 2009).

Source of noise	Source Noise Level (in water) dB re. 1 μ Pa @ 1 m
Concrete island drilling structure	175
3 underwater tools: pneumatic rock drill two different high pressure water jet lances	Up to 170.5
Chainsaw (Stanley CS11)	162
Disk grinder (Stanley GR24)	158
Rock breaker (Stanley B67)	180
Rock chipper (Stanley CH18)	163
Hand drill (Stanley DL08)	159
Impact wrench (Stanley IW16)	167
Clucas 'Kerri cable' cutter	163
Clucas 'oxy-arc' cutter	148

Sounds generated by seismic survey air-guns generate sounds that are loud enough to damage internal organs, and bolt guns, and stud guns are loud enough to cause hearing loss in sea turtles and marine mammals, and would create large zones of influence radiating from the source. These tools are generally used for construction or repair of large structures and are never used during projects permitted under Pac-SLOPES and are not expected to be used under Pac-SLOPES (pers. com. Katy Damico, USACE, 3/29/17).

The applicants may remove and install piles by vibrating them into the sediment with a vibratory hammer. The USACE is restricting the use of impact pile driving in Pac-SLOPES. Vibratory pile driving creates continuous noises that can have different levels of effects than impulse sounds to marine mammals and other marine organisms, at different frequencies and intensities. Vibratory pile driving 24-inch piles were recorded at 165 dB_{RMS} at a depth of 15 meters (Rodkin and Pommerink, 2014). We have no data on similar recordings at shallower depths. Assuming eight hours of pile driving per day, vibratory pile driving could create cumulative sound exposure levels (SEL) that could cause TTS. In practice, vibratory installation and removal of piles is not completely continuous because pile driving stops as installation and removal are completed. Therefore, the estimated SEL is an overestimate because animals are unlikely to be exposed to 8 continuous hours; it is more likely that animals will be exposed during 15-30 minute intervals with breaks in between. Even so, those levels calculated from 8 continuous hours of exposure to sounds at 165 dB_{RMS} would dissipate to the threshold for phocid pinnipeds (Hawaiian monk seals) within 77 feet from the source. Similarly, sea turtles, sharks and rays may be exposed to their thresholds for TTS, but those sounds dissipate within a few feet from the source. Listed species will hear sounds produced during construction. However, considering these isopleth values are also overestimates, and the BMPs which include halting of activities when listed animals are observed within 50 yards of the work site, or more depending on the extent of pile driving activity, it is unlikely that they would be exposed long enough and continuously enough to experience TTS. Thus, for all listed marine species exposed to sounds generated by activities permitted by the USACE and covered by Pac-SLOPES will be below the threshold for hearing loss or other physical effects.

While we do not expect physical injuries from exposure to noise, marine mammals, sea turtles, sharks, and rays will hear and could respond negatively to noises at amplitudes outlined in Table 3. The current NOAA guidelines for behavioral effect is 120 dB_{RMS} for marine mammals; this is a low threshold and, using a practical spreading model, the zone of influence can be very large during pile driving. For this

reason, the USACE is requiring NMFS to review monitoring plans for projects permitted under Pac-SLOPES to ensure that the applicants are providing adequate monitoring and large enough exclusion zones where noise-generating work would stop if the listed animal is within the zone of influence.

Many noises generated by the variety of activities permitted under Pac-SLOPES could be high enough to disturb and alter the behavior of listed animals. Although the true cause of those anticipated behavior responses are unclear since animals can use other cues such as vision to trigger a behavioral response. Hawaiian monk seals, sea turtles, sharks, and rays may respond to noises by avoiding the vicinity or halting their activities. The noise may mask the normal auditory signals in their environment, or cause an attraction to source noises. Avoidance is most likely, and we consider avoidance of the construction area to be a common natural reaction by listed species and considered it to be a low risk behavior (of little to no significance to the animal). Seals, sea turtles, sharks, and rays are large and agile, and capable of swimming away safely from any disturbance that would harm them. Temporary avoidance of these areas during construction, and masking will have little effect on them. Attraction to sounds are unusual but sometimes happen. The applicant will not conduct noisemaking work areas when there are Hawaiian monk seals, sea turtles, sharks, and rays present and will halt operations when they are observed within 50 yards of the work site, or more depending on the extent of pile driving activity. We expect the effects from sounds generated by actions permitted under Pac-SLOPES to be insignificant to listed species.

Elevated turbidity and sedimentation. The applicants may expose listed species to elevated turbidity or sedimentation, especially during activities such as stream clearing, maintenance dredging and pile removal. Some turbidity is expected to leave the work site but not at levels that would harm listed species. Sea turtles and sharks are often observed in turbid waters, and any who would enter turbid waters in the action area will be there by their choice. Listed sea turtles, monk seals and sharks are highly mobile and capable of avoiding turbid areas. The USACE will apply BMPs as conditions to their permit such as halting construction when listed species are in the action area which would further minimize their exposure. Suspended sediments carried from the site could spread to areas where favorable habitat such as corals and sea grasses exist. The USACE will exclude projects from Pac-SLOPES where high turbidity will be generated near corals, including the listed corals. We expect small increases in turbidity from activities permitted by Pac-SLOPES to have minimal effects to listed species, and will not have long-term effects to coral or favorable habitat and should not degrade the quality or quantity of forage habitat for listed species. We expect effects on listed species from turbidity and sedimentation to be insignificant.

Exposure to wastes and discharges. Permittees may expose listed species to waste and discharge associated with heavy equipment and vehicles. However, all equipment and vehicles will be checked prior to the start of each day's activities and maintained in proper working condition. In addition, the applicant will strictly adhere to all BMPs, conditions and exclusions provided as part of the proposed action for Pac-SLOPES, and regional conditions under their Nationwide permit system. These measures include a contingency plan, and conservation measures which include BMPs for fueling sites, hazardous waste management and disposal, spill kits and absorption pads on site, and recovery of spilled materials. This will reduce the likelihood of a discharge or accidental release of wastes. All platforms will have a fully sealed containment to contain potential hydraulic leaks. Discharges and spills could occur but they are expected to be infrequent, small, and quickly cleaned. Based on properly maintaining all vessels and equipment, and adherence to proposed BMPs, we expect waste or discharge from the project activities would have insignificant effects to listed species.

Loss of forage area. The applicants may expose listed species to long-term habitat changes due to activities permitted under Pac-SLOPES. Most of the projects proposed under Pac-SLOPES will limit construction to replacements within the original footprint of the existing structures, and will not add structure to the action area. There will be some addition to the action area which could result in some loss

of forage area or change to foraging habitat during some activities. These activities include but are not limited to: mooring buoy placement, utility line placement, and some harbor improvements. The additions will be small scale additions to the action area, where they would not be a blockage to listed animals, prevent coral and other favorable habitat features from growing, or create a structure that would damage or reduce the quality of nearby habitat. All dredging under Pac-SLOPES will be maintenance dredging, and will be in the original footprint of previously dredged areas. Construction dredging, namely newly dredged areas or deepening of previously dredged channels past their original footprints, are excluded from Pac-SLOPES. Dredging will alter the depth profile of the water column, but will not change benthic habitats because dredging hard substrate is restricted under Pac-SLOPES and would be limited to unconsolidated sediments where corals do not colonize. The change of depths will have a minimal, if any, effect on sea turtles, sharks, and monk seals that use the action area. Unconsolidated sediments host a number of infauna species within the sediments which have minimal direct forage value for sea turtles, Hawaiian monk seals, and sharks. The loss of infauna within the dredged and removed sediments will likely have minimal short-term effect to listed species because they do not forage on them directly. Some macroalgae could be present in small amounts within the dredging footprint, which green sea turtles can forage on but it would be limited to growing on cobbles and small boulders. The amount of macroalgae impacted by dredging will be minimal within the action area and most individual sea turtle foraging ranges. Dredging of areas with seagrass will not be permitted under Pac-SLOPES. Long-term effects to listed species will likely be minimal because most infauna and algae are resilient and will recruit and replenish new and/or disturbed areas. We expect alterations of forage habitat due to dredging to be short-term in nature, and will have an insignificant effect on listed species. We expect addition of manmade structures into the action area from Pac-SLOPES to have an insignificant effect on listed species.

Analysis of Effects to Designated Critical Habitat

Many of the activities described above will be conducted in Hawaiian monk seal critical habitat. The effects of this proposed action to critical habitat could occur in marine foraging areas out to 200 meters deep, or on land defined in 80 FR 50925 which is essential for resting, molting, socializing, nursing and pupping. Most activities permitted under Pac-SLOPES are replacements in-kind and do not result in long-term changes to the physical or biological features of the habitat. Most of the activities will create turbidity, noise, and general construction disturbances in the water column which are mostly temporary and will dissipate once construction is complete. The applicants will use slow speeds, lookouts, direct routes, and other BMPs to minimize collisions, and their presence will have little effect on the conservation value of the critical habitat. Dredging will be limited to previously dredged areas and unconsolidated sediments, which provide little or no forage value for Hawaiian monk seals and will have minimal and immeasurable effects on the conservation value of Hawaiian monk seal critical habitat. Addition of manmade structures under Pac-SLOPES will be limited to placement of mooring buoys and similar structures, piles, and utility lines. The additions will be small scale additions to the action area, where they would not create a dangerous obstacles like entanglements, blockages to listed animals, prevent coral and other habitat features from growing, or create a structures that would damage or reduce the quality of foraging habitat in the action area. The effects from construction, vessel movement, and installation of moorings, utility lines, pilings, and other minor structures within harbors, along with the implementation of BMPs is not likely to reduce adequate prey quality and quantity for adult or juvenile monk seals, or prevent them from hauling out for resting, molting, pupping or nursing, and therefore is not likely to reduce the conservation value of the critical habitat in the action area.

Based on consideration of the record as presented in the information and assessments in the USACE's consultation request and follow-up materials, the best scientific information available about the biology and expected behaviors of the ESA-listed marine species considered in this consultation, and the risk of effects to designated critical habitat, NMFS agrees with 1) the list of ESA-listed species and critical

habitat potentially exposed to the effects of the action, 2) the suite of identified stressors, and 3) the USACE's assessment of exposure risk and significance of exposure to those stressors.

Conclusion

NMFS concurs with your determination that implementing the Pac-SLOPES program in the central and western Pacific region is not likely to adversely affect:

- Green sea turtle
 - Central North Pacific DPS
 - Central West Pacific DPS
 - Central South Pacific DPS
- Hawksbill sea turtle
- Leatherback sea turtle
- Loggerhead sea turtle
 - North Pacific DPS
 - South Pacific DPS
- Olive ridley sea turtle
- Hawaiian monk seal
- False killer whale
 - Insular MHI DPS
- Humpback whale
 - Western North Pacific DPS
- Blue whale
- Fin whale
- Sei whale
- Sperm whale
- Scalloped hammerhead shark
 - Indo-West Pacific DPS
- *Acropora globiceps*
- *Acropora jacuelinae*
- *Acropora retusa*
- *Acropora speciosa*
- *Euphyllia paradivisa*
- *Isopora crateriformis*
- *Seriatopora aculeata*

Furthermore, the Pac-SLOPES program in the central and west Pacific region is not likely to adversely affect Hawaiian monk seal critical habitat. We also concur that the proposed action will not jeopardize the continued existence of the oceanic whitetip shark and the giant manta ray, which are proposed for listing. This conclusion is based on your description of the action, the methods and material identified, and BMPs included in the description of the action. We expect all aspects of the project are implemented as described including BMPs and excluded activities. This concludes your consultation responsibilities for this action under the ESA for species under NMFS' jurisdiction. If necessary, consultation pursuant to Essential Fish Habitat would be completed by NMFS' Habitat Conservation Division in separate communication.

ESA Consultation must be reinitiated if: 1) take occurs; 2) new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the identified action is subsequently modified in a manner causing effects to listed species

or designated critical habitat not previously considered; or 4) a new species is listed or critical habitat designated that may be affected by the identified action.

Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. The USACE has the same responsibilities, and informal consultation offers action agencies an opportunity to address their conservation responsibilities under section 7(a)(1).

The US Coral Reef Task Force listed pollution as one of the eight threats that should get immediate action by its member agencies and our non-governmental partners. NOAA's Coral Reef Conservation Program lists land-based sources of pollution as one of three major threats to coral health and the species that depend on healthy habitats. The USACE can contribute to improving water quality in the Pacific Islands Region by containing and reducing land-based pollution from upland actions.

- We recommend the USACE promote stormwater reduction or treatment by issuing permits that require stormwater treatment for new impervious surfaces and surfaces that do not currently have stormwater treatment when they are replaced or repaired, especially pollution generating impervious surfaces like roads and parking lots.
- We recommend the USACE reduce or minimize runoff by incorporating low impact development concepts for permitted development, preserving greenspace, using pervious pavement options and minimizing impervious surfaces, and using areas vegetated with native plants for passive stormwater treatment.

Bank stabilization on beaches, namely hardening of shorelines, can severely alter shorelines, increase erosion in surrounding areas, cause sedimentation that could impact corals or other sensitive habitat features nearby, and/or make it uninhabitable to Hawaiian monk seals and sea turtles.

- To avoid long-term alterations to shorelines, the USACE can reduce long-term effects from bank stabilization by using alternative techniques like preserving or planting shoreline vegetation, or using beach nourishment.
- The USACE should consider alternatives to hardening the shoreline by using T-groins or small breakwaters positioned further out into the water. This may reduce erosion of the beach, and retain sediments for use by sea turtles, Hawaiian monk seals, and other fauna, and provide stability where engineered approaches have failed repeatedly.

The USACE can reduce or minimize catastrophic erosion by minimizing development in floodplains, constricting waterways, and maximizing vegetation.

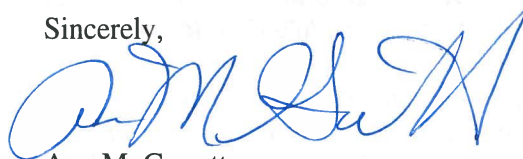
- We recommend the USACE consider restricting new development in floodplains to avoid increasing runoff and flooding. We also recommend that redevelopment in floodplains reduce impervious surfaces and incorporate low impact development ideas to reduce its impact to floodplains and watersheds.
- When replacing water crossings, we recommend the USACE size bridges and water crossings properly to maximize freeboard and reduce constriction. This will reduce upland flooding, downcutting and incision of the streambed, bank scour, and potential of catastrophic erosion.

To avoid repeated bank failures, erosion of shorelines, flooding, damage to structures, future repairs, and adverse effects associated with structures, we recommend the USACE use sea level rise data to anticipate

future water levels and frequency of natural events, and design according to those needs, and anticipate future costs and mitigation needs for structures.

If you have further questions please contact Joel Moribe on my staff at (808) 725-5142 or joel.moribe@noaa.gov. Thank you for working with NMFS to protect our nation's living marine resources.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Ann M. Garrett', with a stylized, flowing script.

Ann M. Garrett
Assistant Regional Administrator

NMFS File No. (PCTS): PIR-2017-10106
PIRO Reference No.: I-PI-16-1500-AG

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