Biological Opinion
For the

Environmental Standards for United States Army Kwajalein Atoll Activities in the Republic of the Marshall Islands

and Section 7 of the United States Endangered Species Act

Action Agencies:	U.S. Army Garrison – Kwajalein Atoll Activity: Dredging Activities at the Kwajalein Barge Slip Ramp to Support Bucholz Army Airfield Repair
Consulting Agency:	National Marine Fisheries Service, Pacific Islands Region
NMFS File No.:	PIRO-2020-01207
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Approved By:	Michael D. Tosatto Regional Administrator, Pacific Islands Region
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Acronyms

Aton	Aids to Navigation
BA	Biological Assessment
BAAF	Bucholz Army Airfield
BMPs	Best Management Practices
BSR	Barge Slip Ramp
cm	Centimeter
COSA	Construction Operation Staging Area
CY	Cubic Yard
dB	Decibel
DEP	Document of Environmental Protection
DPS	Distinct Population Segment
ESA	Endangered Species Act
ft.	Foot/feet
in.	Inches
IUCN	International Union for Conservation of Nature
m	meter(s)
MSA	Material Storage Area
NCA	Notice of Continuing Activity
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NTU	Nephelometric Turbidity Units
PDS	Project Description Sheet
RMI	Republic of the Marshall Islands
rms	Root Mean Square
SOSC	Species of Special Concern
SPC	The Pacific Community
UES	USAKA Environmental Standards
USAG-KA	U.S. Army Garrison – Kwajalein Atoll
USAKA	U.S. Army Kwajalein Atoll
USASMDC/ARSTRAT	U.S. Army Space and Missile Defense Command / Army Forces Strategic Command
USFWS	U.S. Fish and Wildlife Service

Introduction

The U.S. Army Corps of Engineers proposes to perform a one-time dredging project at the Kwajalein Barge Slip Ramp (BSR) to removed accumulated sand and sediment at the slip ramp, and deepen the berthing area to 20 feet. The proposal is part of a larger endeavor to repair the failed and failing components of Bucholz Army Airfield (BAAF) on Kwajalein Island. Dredging of the BSR is required to enable the repair of the BAAF which is a critical lifeline for U.S. Army Garrison – Kwajalein Atoll (USAG-KA). USAG-KA is the location of the Department of Defense's Major Range and Test Facility Base for missile defense and is only accessible by air or sea.

Materials for the BAAF repair project are scheduled to arrive at U.S. Army Kwajalein Atoll (USAKA) via approximately 20 barge deliveries. The BAAF construction operation staging area (COSA) and material storage area (MSA) are located adjacent to the northwest corner of the airfield (Figure 1).

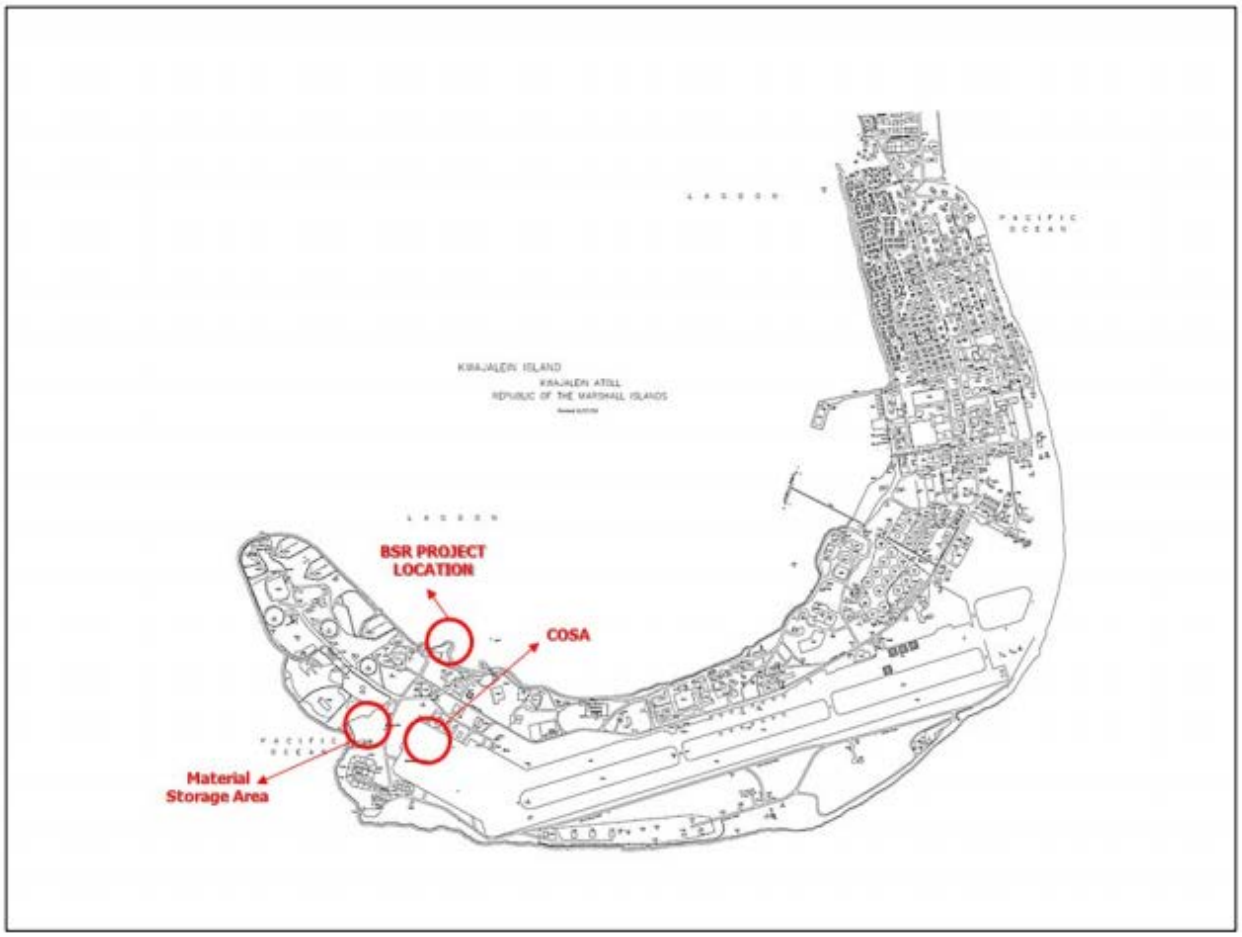

Figure 1. Project location in relation to MSA and COSA.

The BSR is located along the northwest, lagoon facing, shoreline. Utilizing the BSR to offload project materials from barges benefits USAG-KA, due to the proximity of the BSR to the MSA,

and by avoiding the need for heavy truck shipping equipment through residential and recreational areas on the atoll.

Due to prevailing winds and currents, sand builds up at the BSR harbor area. The Notice of Continuing Activity (NCA) for Dredging and Filling (USAKA 2016) indicates a required depth of 18 feet (ft.) to support vessel traffic at the BSR. Current depths are less than 18 ft. in several places adjacent to the BSR wharf and in the approach channel. Maintenance dredging is authorized by the 2017 Document of Environmental Protection (DEP) for Dredging and Filling (U.S. Army Space and Missile Defense Command/Armed Forces Strategic Command (USASMDC/ARSTRAT 2018)) as the harbor is essential for continued operations.
The Endangered Species Act (ESA) would apply for the portions of the action that would take place in and over United States (U.S.) territory and international waters, but not for the portions of the action that would take place within the Republic of the Marshall Islands (RMI). The Government of the RMI has agreed to allow the U.S. Government to use certain areas of USAKA. "USAKA" is defined as "…the [USAKA]-controlled islands and the Mid-Atoll Corridor, as well as all USAKA-controlled activities within the [RMI], including the territorial waters of the RMI". The USAKA controls 11 islets around the atoll. The relationship between the U.S. Government and the Government of the RMI is governed by the Compact of Free Association (Compact), as Amended in 2003 (48 USC 1681). Section 161 of the Compact obligates the U.S. to apply the National Environmental Policy Act of 1969 (NEPA) to its actions in the RMI as if the RMI were a part of the U.S. However, the ESA does not apply within the RMI. Instead, the Compact specifically requires the U.S. Government to develop and apply environmental standards that are substantially similar to several U.S. environmental laws, including the ESA and the Marine Mammal Protection Act (MMPA). The standards and procedures described in the Environmental Standards and Procedures for USAKA Activities in the RMI (aka USAKA Environmental Standards or UES, 15th Edition (USAKA 2018)) were developed to satisfy that requirement. Therefore, the U.S. Government must apply the UES to its activities within the RMI. Because the ESA and UES both apply to this action, this biological opinion was written in a manner that considers and complies with each of those standards, as applicable.

Section 7(a) (2) of the ESA of 1973, as amended (ESA; 16 U.S.C. 1536(a) (2)) requires each federal agency to insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a federal agency's action "may affect" an ESA-listed species, that agency is required to consult formally with the National Marine Fisheries Service (NMFS; for marine species or their designated critical habitat) or the U.S. Fish and Wildlife Service (USFWS; for terrestrial and freshwater species or their designated critical habitat). Federal agencies are exempt from this formal consultation requirement if they have concluded that an action "may affect, but is not likely to adversely affect" ESA-listed species or their designated critical habitat, and NMFS or the USFWS concur with that conclusion (50 CFR 402.14 (b)).

If an action is likely to adversely affect a listed species, the appropriate agency (either NMFS or FWS) must provide a Biological Opinion (Opinion) to determine if the proposed action is likely to jeopardize the continued existence of listed species (50 CFR 402.02). "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly

or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

The UES requires all parties of the U.S. Government involved in this project to consult or coordinate with the NMFS and the USFWS to conserve species and habitats of special concern at USAKA. Section 3.4 of the UES establishes the standards and procedures to be followed "…to ensure that actions taken at USAKA will not jeopardize the continued existence of these species or result in destroying or adversely changing the habitats on which they depend." Section 3.4 is derived primarily from the regulations implementing the ESA, other U.S. regulations, and wildlife protection statutes of the RMI. As such, the list of UES consultation species includes all species present in the RMI that are listed under the ESA (including those that are candidates or are proposed for listing), all marine mammals protected under the MMPA, and all species and critical habitats as designated under RMI law. However, no critical habitat has yet been designated in the RMI.

Under the UES, "the final biological opinion shall contain the consulting agency's opinion on whether or not the action is likely to jeopardize the continued existence of a species or to eliminate a species at USAKA, or to eliminate, destroy, or adversely modify critical habitats in the RMI" (UES at 3-4.5.3(e)). Although the UES does not specifically define jeopardy, the Compact clearly intends that the UES provide substantially similar environmental protections as the ESA. We interpret this to include adoption of the ESA definition of jeopardy, as described above, and this review relies upon the ESA definition of jeopardy to reach its final conclusions. This document represents our Opinion of the effects on marine species protected under the ESA and the UES that may result from the proposed dredging of the BSR. This Opinion is based on the review of the USAG-KA May 8th, 2020, Biological Assessment (BA) for the proposed action (USAG-KA 2020a); recovery plans for U.S. Pacific populations of ESA-listed marine mammals and sea turtles; published and unpublished scientific information on the biology and ecology of ESA-listed marine species, UES-consultation marine species, and other marine species of concern in the action area; monitoring reports and research in the region; biological opinions on similar actions; and relevant scientific and gray literature (see Literature Cited).

1 Consultation History

On May 7, 2020, U.S Army Garrison –Kwajalein Atoll (USAG-KA) requested initiation of formal UES-consultation with NMFS to conduct dredging operations adjacent to the Kwajalein BSR to support BAAF Repair. The Consultation Packet, including the: 1) Dredging and/or Filling Project Description Sheet; Sheet 2 (PDS), May 7. 2020 (NMFS HCD 2020), 2) BA for Dredging Activities at the Kwajalein BSR to Support BAAF Repair, April 2020 (USAG-KA 2020), and the 3) Evaluation of UES Species of Special Concern (SOSC) at Risk from Dredging of the Barge Slip Ram Harbor Area, USAG-KA, RMI, May 6, 2020 (Kolinski 2020), were provided with the May 7, 2020 Consultation Initiation request. The request was to complete Consultation for this proposed project my June 8, 2020. Formal consultation with NMFS Pacific Island Regional Office (PIRO) was initiated on May 8, 2020, resulting in this Opinion.

In the BA, USAG-KA determined that the proposed action was likely to adversely affect (LAA) two marine UES consultation species listed in Table 1, and that the proposed action was not likely to adversely affect (NLAA) 12 consultation species (Table 2).

Table 1. Marine consultation species determined to be adversely affected by the proposed action.

Scientific Name			RMI
Corals			
Heliopora coerulea	Blue coral	X	X
Mollusks			
Pinctada margaritifera	Black-lip pearl oyster		X

Table 2. Marine consultation species determined to not likely to be adversely affected by the proposed action.

Scientific Name	Species	ESA	MMPA	CITES	RMI
Sea Turtles					
Chelonia mydas	Central North Pacific Green Sea Turtle Distinct Population Segment (DPS)	Threatened		X	X
	Central Western Pacific DPS	Endangered		X	X
Marine Mammals					
S. longirostris	Spinner dolphin		X		X
Fish					
Mobula birostris	Giant manta ray				X
Cheilinus undulatus	Humphead wrasse				X
Corals					
Acropora. aspera	No Common Name			X	X
A. dendrum	No Common Name			X	X
A. microclades	No Common Name			X	X
Pavona cactus	No Common Name				X
P. meandrina	No Common Name	Candidate			X
Mollusks					
Hippopous hippopus	Giant clam	Candidate			X
Tridacna squamosa	Giant clam	Candidate			X
T. niloticus	Giant clam	Candidate			X

NMFS further identified and considered a) UES consultation species that may occur in the portion of the proposed action area within RMI territorial waters (Table 3), and b) ESA and MMPA protected species that may occur in the portions of the action area outside of the RMI (beyond 12 nm territorial boundary) in US territory and international waters (Table 4). The inclusion of these species addressed the barge traffic that would occur as a result of the dredging and considers the barge route from the point of origination overseas into the RMI territorial waters, and to the BSR.

It was determined that the proposed action was NLAA these species listed in Tables 3 and 4. The ESA and MMPA protected species outside of the territorial waters of the RMI that NMFS considered consist of primarily offshore pelagic species that may occur in the water column along the barge vessel routes. Potential vessel interactions for the 15 ESA-listed Indo-Pacific coral species were considered along the vessel route in waters outside of the RMI boundary. Also

considered were nearshore marine mammal, sea turtle and fish species that occur in U.S. territorial waters into Long Beach California, the U.S. point of origin for the barge. The description for why the proposed action is NLAA the species identified in Table 2, 3, and 4 is provided in Section 12 of this Consultation.

Table 3. Additional UES/ESA consultation species considered by NMFS that may occur in the portions of the action area within RMI territorial waters species and determined to not likely to be adversely affected by the proposed action (USAKA 2018; Appendix 3-4C; UES 15th edition, pp. 215 - 219).

COMMON NAME	SCIENTIFIC NAME	ESA	MMPA	RMI	UES 3-4.5.1(a)
MARINE MAMMALS					
Bottlenose Dolphin	*Tursiops* sp.		R		
Bottlenose Dolphin, Pacific	*Tursiops gilli*		R		
Common Dolphin	*Delphinus delphis*			2	
Risso's Dolphin	*Grampus griseus*		R		
Spinner Dolphin, Costa Rican	*Stenella longirostris centroamericana*			2	
Spinner Dolphin, Eastern	*Stenella longirostris orientalis*			2	
Spinner Dolphin, Whitebelly	*Stenella longirostris*			2	
Spotted Dolphin, Coastal	*Stenella attenuata graffmani*			2	
Spotted Dolphin, Offshore	*Stenella attenuata*			2	
Striped Dolphin	*Stenella coeruleoalba*			2	
Spinner Dolphin	*Stenella longirostris*		R		
Dugong	*Dugong dugon*	E			
Blainville's Beaked Whale	*Mesoplodon densirostris*		M		
Blue Whale	*Baelaenoptera musculus*	E	M	1	
False Killer Whale	*Pseudorca crassidens*		M		
Finback Whale	*Baelaenoptera physalus*	E	M		
Humpback Whale (Western North Pacific DPS*)	*Megaptera novaeangliae*	E	M		
Killer Whale	*Orcinus orca*		R		
Melon-Headed Whale	*Peponocephala electra*		R		
Pygmy Killer Whale	*Feresa attenuate*		R		
Pygmy Sperm Whale	*Kogia breviceps*		M		
Short-Finned Pilot Whale	*Globicephala macrorhynchus*		M		
Sperm Whale	*Physeter catodon*	E	R	1	
Other Species of Small-Toothed Cetaceans				2	
SEA TURTLES					
Hawksbill Sea Turtle	*Eretmocheleys imbricata*	E		1, 3	
Leatherback Sea Turtle	*Dermocheleys coriacea*	E		1	
Loggerhead Sea Turtle (North Pacific Ocean DPS*)	*Caretta caretta*	E		3	
Olive Ridley Sea Turtle	*Lepidochelys olivacea*	T		3	

COMMON NAME	SCIENTIFIC NAME	ESA	MMPA	RMI	UES 3-4.5.1(a)
FISH					
Bumphead Parrotfish	*Bolbometopon muricatum*				X
Reef Manta Ray	*Manta alfredi*				X
Bigeye Thresher Shark	*Alopias supercilious*				X
Oceanic Whitetip Shark	*Carcharhinus longimanus*	T			
Scalloped Hammerhead Shark (Indo-West Pacific DPS*)	*Sphyrna lewini*	T			
Pacific Bluefin Tuna	*Thunnus orientalis*				X

*DPS=Distinct Population Segment

U.S. Statutes:
ESA = Endangered Species Act of 1973; E = Endangered, T = Threatened, P = Proposed, C = Candidate

MMPA = Marine Mammal Protection Act of 1972; R = Resident, M = Migratory

RMI Statutes:
1 = Endangered Species Act 1975, Title 8 MIRC Chapter 3
2 = Marine Mammal Protection Act 1990, Title 33 MIRC Chapter 2
3 = Fisheries Act 1997, Title 51 MIRC Chapter 2

UES Section 3-4.5.1(a): X = Contained in RMI EPA letter, 12 March 2015, or RMI EPA letter, 28 September 2016

Table 4. Additional ESA and MMPA protected species considered by NMFS that may occur in the portions of the action area outside of the RMI (beyond RMI 12 nm territorial boundary) in and over US territory and international waters and determined to not likely to be adversely affected by the proposed action.

COMMON NAME	SCIENTIFIC NAME	ESA (and MMPA)
Bottlenose Dolphin	*Tursiops* sp.	
Bottlenose Dolphin, Pacific	*Tursiops gilli*	
Risso's Dolphin	*Grampus griseus*	
Spinner Dolphin	*Stenella longirostris*	
Spinner Dolphin, Costa Rican	*Stenella longirostris centroamericana*	
Spinner Dolphin, Eastern	*Stenella longirostris orientalis*	
Spinner Dolphin, Whitebelly	*Stenella longirostris longirostris*	
Spotted Dolphin, Coastal	*Stenella attenuata graffmani*	
Spotted Dolphin, Offshore (Pacific northeastern offshore stock)	*Stenella attenuata attenuata*	Depleted under MMPA
Striped Dolphin	*Stenella coeruleoalba*	
Dugong	*Dugong dugon*	E
Blainville's Beaked Whale	*Mesoplodon densirostris*	
Blue Whale	*Baelaenoptera musculus*	E
False Killer Whale	*Pseudorca crassidens*	
Finback Whale	*Baelaenoptera physalus*	E

COMMON NAME	SCIENTIFIC NAME	ESA (and MMPA)
Humpback Whale (Western North Pacific DPS*)	*Megaptera novaeangliae*	E, Depleted under MMPA
Killer Whale	*Orcinus orca*	
Melon-Headed Whale	*Peponocephala electra*	
Pygmy Killer Whale	*Feresa attenuata*	
Pygmy Sperm Whale	*Kogia breviceps*	
Short-Finned Pilot Whale	*Globicephala macrorhynchus*	
Northern Right Whale Dolphin	*Lissodelphis borealis*	
Baird's Beaked Whale	*Berardius bairdii*	
Bryde's Whale	*Balaenoptera edeni*	
Cuvier's Beaked Whale	*Ziphius cavirostris*	
Longman's Beaked Whale	*Indopacetus pacificus*	
Dwarf Sperm Whale	*Kogia sima*	
Minke Whale	*Balaenoptera acutorostrata*	
North Pacific Right Whale	*Eubalaena japonica*	
Stejnerger's Beaked Whale	*Mesoplodon stejnegeri*	
Gray Whale (throughout range)	*Eschirichtius robustus*	Western N Pacific DPS E, depleted under the MMPA
Sperm Whale	*Physeter catodon*	E
Sei Whale	*Balaenoptera borealis*	E
Short-beaked Common Dolphin	*Delphinus delphis*	
Rough-toothed dolphin	*Steno bredanensis*	
Pacific White-Sided Dolphin	*Lagenorhynchus obliquidens*	
Harbor Porpoise (CA coast)	*Phocoena phocoena*	
Long-Beaked Common Dolphin (S CA coast)	*Delphinus capensis*	
Other Species of Small- Toothed Cetaceans		
California Sea Lion	*Zalophus californianus*	
Guadalupe Fur Seal	*Arctocephalus townsendi*	
Harbor Seal	*Phoca vitulina*	
Northern Elephant Seal	*Mirounga angustirostris*	
Northern Fur Seal	*Callorhinus ursinus*	
Stellar Sea Lion, Eastern DPS	*Eumetopias jubatus*	

COMMON NAME	SCIENTIFIC NAME	ESA (and MMPA)
COMMON NAME	**SCIENTIFIC NAME**	**ESA**
SEA TURTLES		
Green Sea Turtle (Central West Pacific, Central North Pacific, East Pacific, and East Indian-West Pacific DPSs*)	*Chelonia mydas*	E
Hawksbill Sea Turtle	*Eretmocheleys imbricata*	E
Leatherback Sea Turtle	*Dermocheleys coriacea*	E
Loggerhead Sea Turtle (North Pacific Ocean DPS*)	*Caretta*	E
Olive Ridley Sea Turtle	*Lepidochelys olivacea*	T
COMMON NAME	**SCIENTIFIC NAME**	**ESA**
CORALS		
	Acropora globiceps	T
	Acropora jacquelineae	T
	Acropora lokani	T
	Acropora pharaonis	T
	Acropora retusa	T
	Acropora rudis	T
	Acropora speciosa	T
	Acropora tenella	T
	Anacropora spinosa	T
	Euphyllia paradivisa	T
	Isopora crateriformis	T
	Montipora australiensis	T
	Pavona diffluens	T
	Porites napopora	T
	Seriatopora aculeata	T

COMMON NAME	SCIENTIFIC NAME	ESA
FISH		
Oceanic Giant Manta Ray	*Manta birostris*	T
Oceanic Whitetip Shark	*Carcharhinus longimanus*	T
Scalloped Hammerhead Shark (Indo-West Pacific DPS*, Eastern Pacific DPS*)	*Sphyrna lewini*	T

*DPS=Distinct Population Segment

U.S. Statutes:
ESA = Endangered Species Act of 1973; E = Endangered, T = Threatened, P = Proposed, C = Candidate

MMPA = Marine Mammal Protection Act of 1972.

No critical habitat has been designated or proposed for designation for any UES-protected species in the action area or elsewhere in the RMI. No critical habitat or proposed critical habitat has been designated for any ESA protected species in portions of the action area outside of the RMI in or over United States (US) territory and international waters. The proposed action would have no effect on designated or proposed critical habitats. Therefore, critical habitat will not be discussed further.

On May 13, 2020, a coordination call took place between USAG-KA project representatives and NMFS Pacific Islands Regional Office (PIRO) Habitat Conservation Division and Protected Resources Division (PRD). On May 18, 2020 NMFS PIRO PRD requested additional detailed information on the proposed dredge operation timeline; a response to that request was provided by USAG-KA on the same day.

Additional information was provided to NMFS PIRO PRD by USAG-KA on May 31, 2020 providing further details on the barge vessel schedule, routes, and typical vessel use for the BSR.

2 Description of the Proposed Action and Action Area

The USAG-KA and the PDS provided detailed information on the dredge action and action area. The barge traffic that is expected to occur as a result of the dredge action is described in detail below. The purpose of the proposed action is to dredge the BSR to allow for greater draft for future barge operations of approximately up to 20 barge trips to transit to, access, and dock at the BSR for unloading and loading of supplies from between July 2020 to April 2023, post dredging. The dredging action will occur for 14 days, consisting of 2 days of equipment set-up, 2 days of equipment removal, and 10 dredge days of 8 to 10 hours per day of dredging. The dredging is scheduled to begin on June 30, 2020.

The proposed project would accomplish necessary routine maintenance dredging, and also where necessary, take the depth down an additional 2 ft. to a final depth of 20 ft. throughout the approach channel and docking area. This depth will support necessary routine vessel traffic and

allow a fully loaded project supply barge, approximately 100 ft. wide by 400 ft. long with an approximate draft of 19 ft., to enter and dock at the BSR. The dredge depth for this proposed project will be to a depth of 20 ft. to accommodate the 19 ft. draft of the supply barge. The dredge depth to 20 ft. is a one-time action and not setting precedence for future maintenance dredge depths (USAG-KA representative; May 13, 2020 conference call). Per the NCA, the depth of 18 ft. remains the maintenance dredging depth for future maintenance actions at the BSR (USAKA 2016).

As described in the revised ESA regulations at 50 CFR 402.02, the effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. Relying on this definition, effects of vessels trips to and from the dredge site are to be included in the analysis.

The action area consists of the a) dredge footprint, b) BSR wharf face, c) two rip-rap regions in close proximity to the reef, d) reef flat and slope areas to the west and east of the proposed project boundary, and e) entrance channel and lagoon quarry to the north of the proposed project area (Figure 2).

Figure 2. Proposed Action Area.

Beyond addressing normal vessel traffic, the proposed action introduces the use of a fully loaded project supply barge, approximately 100 ft. wide by 400 ft. long with an approximate draft of 19 ft., to enter to arrive at U.S. Army Kwajalein Atoll (USAKA) and dock at the BSR.

The projected barge schedule is expected to include up to a total of 19 barge trips to the BSR within a 34 month time period (July 2020 to April 2023). Seventeen of these barges would be the larger supply barge (100 ft. x 400 ft. x 19 ft.) and 2 would be the smaller size that typically enters the BSR (75 ft. x 320 ft. x 15.5 ft.). An alternative schedule may limit the large supply barge to 12 trips of the larger supply barge and 1 trip with the smaller barge, for a total of 13 barge trips to the BSR during a 25 month duration from July 2020 to July 2022. Either schedule results in the increase in the amount of use and the typical size vessel that uses the BSR. Because of the higher likelihood that the project would require the use of 17 large barge trips and 2 smaller barges up through April 2023, the NMFS considered this timeframe in the development of this Consultation. Based on this schedule, this proposed project would be expected to result in an increase in vessel traffic of 1 to 2 barge trips per month or per every other month for up to 34 months into the Kwajalein Islet lagoon and the BSR (USAG-KA. 2020b).

Vessel route

The supply barge vessels would originate from ports in British Columbia (Canada); Long Beach (California); and Taiwan. Twelve (12) of the barge trips will originate and return to British Columbia, Canada, five (5) trips will be to and from Long Beach, California, and two (2) will be to and from Taiwan. All of the barge vessels are cable-towed from port and enter into the Kwajalein Atoll Lagoon via the main shipping channel at GEA Pass. The USAG-KA tug then joins with the barge in the lagoon and travels during daylight hours at high tide to the BSR dock via an approximately 1500 m (0.81 nautical mile) long buoy-marked approach channel. The tug and barge remain docked for approximately a week to unload and load. When unloading and loading is complete, the barge will depart from the BSR during daylight, high tide.

Vessel use

Vessel traffic enters the Kwajalein Atoll lagoon, RMI, through the main channel at GAE Pass. The existing Echo Pier in the lagoon at USAG-KA receives most of the vessel traffic and normally experiences consistent vessel traffic from several vessels used to support USAG-KA activities, including U.S. Army Vessel LCU 2021, *Great Bridge,* US Army Vessel *Worthy,* US Army Vessel LT-102 *Mystic,* and US Army Vessel *USAKA 1906C.* The single largest daily use of the pier is to support the movement of RMI citizens and USAGKA/RTS employees by ferries and personal transport taxis between Kwajalein Islet and the adjacent islets of Ebeye and Meck, which execute at least 17 berthings on weekdays and 10 to 12 berthings on the weekends. The supply ship *Islander* is a large container vessel that transports materials and supplies to USAG-KA about every 2 weeks. Fuel barges are also in the area periodically. The vast majority of this vessel traffic enters the lagoon via GEA Pass.

Based on records from USAG- KA Marine Operations, normal vessel traffic into the BSR during the last two years (May 2018 through May 2020) consisted of 388 trips (a trip consisting of both the ingress and egress of a vessel from the BSR). This total predominantly constitutes USAG-KA operational vessels. There we an additional 16 visiting vessels which came into the BSR during this time period. While some months or days were busier than others, the total is equivalent to approximately 186 vessels a year, and just over 16 vessels a month that transit in

and out of the BSR (USAG-KA 2020b). As mentioned, the proposed project would be expected to result in an increase in vessel traffic of 1 to 2 barge trips per month or per every other month for up to 34 months into the Kwajalein Islet lagoon and the BSR (USAG-KA. 2020b).

Dredge action

The BSR has long been established a barge loading and unloading area and maintained as such. The BSR area supports regular marine vessel traffic, and maintenance dredging is authorized by the NCA and DEP for Dredging and Filling (USAG-KA 2016, USAG-KA 2017) as the harbor is essential for continued operations. The last dredging activity was April 2007.

Current depths at the BSR are less than the authorized depth of 18 ft. in several places adjacent to the BSR wharf and in the approach channel. The proposed project will increase the depth of the approach channel and docking area to allow barges with up to 20 ft. draft to access the BSR. The dredging activity will remove up to 5,000 cubic yards (CY) of sand, silt, and debris from the area to achieve a water depth of 20 ft. at neutral tide. The removed sand and silt will be stockpiled in the BAAF project MSA. The removed debris will be sorted and disposed of or reused as appropriate. Dredging will remove up to 5 ft. of material in several areas of the project.

The proposed dredging action will dredge out from the BSR shoreline approximately 550 ft. to a depth of 20 ft. in order to provide a sufficient depth for the larger barges to transit in and out of the BSR docking area. Beyond the limit of the dredge action area (Figure 2), the depth of the approach channel deepens so that barges, during daylight high tide operation hours, have an adequate depth (20 ft. or deeper) to transit the approach channel (USAG-KA 2020b). USAG-KA intends to relocate, to the extent possible, non-encrusting UES-consultation species from the dredge area prior to dredge activities, keeping organisms submerged during transit.

Dredging will be accomplished using a long-reach excavator positioned on a Flexifloat spud barge system within the project area.

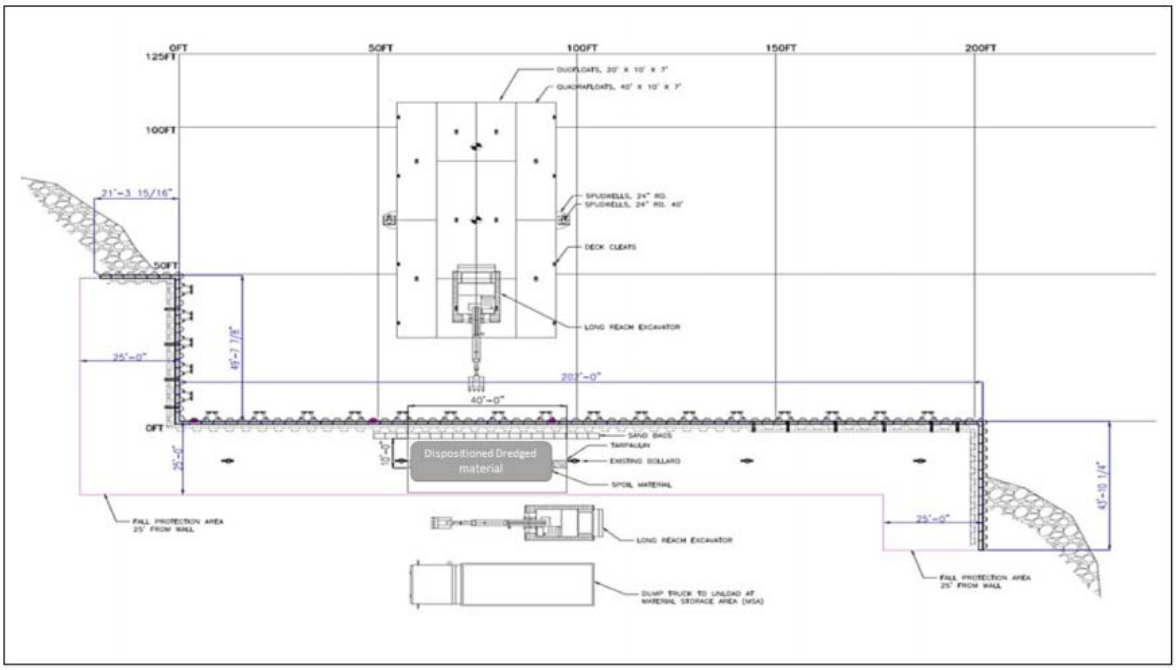

Figure 3. Project Plan

Spoils will be deposited from the excavator bucket onto the wharf then subsequently loaded into dump trucks, using an on-shore excavator, for transit to the stockpile in the MSA. It is expected that water will be lost into the lagoon and onto ground in the BSR while transporting spoils from the excavator to the dump truck. Sandbags will be placed between the interim disposition pile and truck loading zone, and the edge of the wharf to prevent sediment laden water from immediately discharging back into the lagoon. Due to the limited reach of the long reach excavator, some sediment to be dredged in the distal edges of the project footprint may be moved through the project area, in the water, toward the BSR to be subsequently dredged and deposited onto the wharf.

Dredge spoils removed from the BSR area are expected to be non-hazardous, based on previous project data and preliminary sampling of sediment from within the proposed project footprint. Spoils will be placed in dump trucks and transported to the staging area (Figure 4).

Figure 4. Barge unloading route

As the truck transits to the staging area, it is expected water will be lost onto the roadway and leach into the surrounding unpaved areas. The spoils will be stockpiled in the staging area, a Class III groundwater area, as defined by the UES, and outside lenswell recharge areas. Any residual water will both evaporate and leach into the soil. No fill material will be used for this project.

Action Area:

- Dredge Area: The benthic habitat within the primary and secondary dredge areas will be directly affected by removal of sediment from the project footprint.
- Wharf Face*:* The wharf face is directly adjacent to planned harbor dredging activities and will be exposed to elevated turbidity and sediment levels.
- Riprap: Two riprap regions occur in close proximity to the wharf, including between the shoreline end of the wharf and the ramp, and to the east of the north corner of the wharf. These shallow water areas are exposed to fluctuations in tide and wave turbulence, and will likely be exposed to increased levels of turbidity and sediment during dredging activities.
- West Reef Flat and Slope: This area resides approximately 300 ft. (91 m) to the west of the outer proposed boundary of BSR dredge activity. Although distant, it is possible this region may be exposed to project related elevations of turbidity and sediment.
- East Reef Flat and Slope: The east reef flat and slope is adjacent to planned harbor dredging activities and are expected to be exposed to elevated turbidity and sediment levels.

- Entrance Channel and Lagoon Quarry: Portions of the entrance channel and lagoon quarry. These habitats extend up to 400 ft. (122 m) for the entrance channel and up to 700 ft. (213 m) for the lagoon quarry from the northern edge of the proposed primary dredge area, and may be exposed to project related elevations of turbidity and sediment.
- Barge Transit Routes:
    - Areas where sediment backfalls to water during dredging, draining, or transit to uplands.

Best Management Practices (BMPs):

The following BMP will be implemented for all phases of project activity:

- All equipment will be inspected daily, prior to use, for leaks, structural integrity, and potential pollutants prior to the start of dredging. Equipment will be cleaned of any petroleum based product that or other potential polluting material that could be released into the marine environment.
- Ground-based equipment fueling will be perform on land, prior to initiation of work.
- Water based equipment (excavator on the spud barge) fueling will be performed on the spud barge in the lagoon at the BSR. A fuel absorbent sock will surround the spud barge during fueling and operation to prevent any petroleum spills or leaks from entering the water.
- A spill kit will be maintained onsite. Any spills will be responded to immediately to prevent discharge to the lagoon or other water sources and reported in accordance with the BAAF Environmental Protection Plan.
- Dredging and filling operations will cease during adverse weather or water conditions.
- Trash and other debris will be managed appropriately to prevent release into the marine environment.
- Dredge spoils will be stockpiled away from the shoreline.

Turbidity monitoring
Silt curtains will be used around the dredge area during all project activities. The curtains will be anchored in place around the spud barge. If the barge changes position significantly, the curtain will be relocated accordingly. When the barge is within sufficient proximity to the wharf, the curtain will be tied off to the wharf edge and anchored around the barge. This configuration will be used during all transfer of materials from the barge to shore. Structural integrity of the curtain will be inspected, at a minimum, once per operating day.

Turbidity monitoring will be conducted throughout the project as follows:

- A daily log will be completed detailing, at a minimum, the time, location, and results of all measurements, as well as any other pertinent observations.
- Current direction will be recorded daily.

- All turbidity measurements will be collected using a portable turbidimeter, calibrated per manufacturer's recommendations. Calibrations will be recorded as part of the daily monitoring log.
- Monitoring locations will include:
    - 5-6 locations at approximately 50 meters (m) outside the work site, placed in a manner that surrounds dredging related activities – these locations will be adjusted as necessary as the spud barge and silt curtain are moved within the project area, and depending on the dominant direction of subsurface currents.
    - 5-6 locations at approximately 25 m outside the work site, placed in a manner that surrounds dredging related activities – these locations will be adjusted as necessary as the spud barge and silt curtain are moved within the project area and depending on the dominant direction of subsurface currents.
    - Three locations east, west and north at greater distance (500 to 1000 ft.). These locations will remain fixed for the duration of the project.
- All turbidity measurements will be collected using a portable turbidimeter, calibrated per manufacturer's recommendations. Calibrations will be recorded as part of the daily monitoring log.
- Monitoring locations will not be located in a shallow reef area to prevent damage to corals.
- Once per day turbidity measurements will begin at these locations at least 7 days prior to project initiation.
- For the duration of the project, turbidity measurements will be collected from these locations at least five times per working day; once prior to initiation of project activities, at least three times throughout the working day during active dredging, once after completion of dredging each day.
- Turbidity measurements should be collected from multiple depths; 2.5 ft., 5 ft., 10 ft., 15 ft.; at each location, as applicable based on depth at stations, every time measurements are being collected.
- The first measurements of the day will be used to establish the daily baseline.
- In accordance with Section 7.1(c) of the DEP for Dredging and Filling (USAG-KA 2017), if turbidity measurements exceed 10 Nephelometric Turbidity Units (NTU) above the established daily baseline at any of the 50 m sampling locations, at any time during the work day, dredging activity will immediately cease until the turbidity has come back down within limitations.
- Once per day monitoring will be conducted at a single location within the siltation curtain to allow for a comparative evaluation of curtain effectiveness. Such measures will also be taken prior to opening or relocating the net to ensure turbidity is below 10 NTU and above the daily baseline measurement.
- Turbidity sampling of marine vessel related sediment plumes will be collected at the BSR when opportunity allows for comparison with turbidity levels that occur both in and outside of siltation curtains. A baseline sample should also be taken prior to vessel arrival, if possible.
- All turbidity measuring data will be included in the project completion report.

3 Status of the Species

This section presents biological or ecological information for the UES consultation species that the proposed action is likely to adversely affect. As stated above, USASMDC/ARSTRAT determined that the proposed action was likely to adversely affect the two (2) marine UES consultation species, the blue coral (*Heliopora coerulea*) and black-lip pearl oyster (*Pinctada margaritifera*) (Table 1).

One factor affecting species status and habitat (whether or not designated as critical) is climate change. Climate change is altering ocean conditions by modifying currents and upwelling patterns, warming extensive areas of water, changing salinity and pH, disrupting food webs, and altering suitable feeding areas. The NMFS-PIRO (2012a) reports that a meta-analyses of 334 species and a global analyses of 1,570 species showed highly significant, nonrandom patterns of change in accord with observed climate warming in the twentieth century. These data indicate that these changes in species cannot be fully explained by natural variability or other natural factors and are being influenced by phenomena related to climate change (NMFS-PIRO 2012a). However, data and analyses are lacking for the effects of these climate changes on populations and more specifically, on populations in the Action Area (NMFS-PIRO 2012a).

As described above in the introduction, the jeopardy analyses in this Opinion considers the risk of reducing appreciably the likelihood of survival and recovery of UES-protected marine species within USAKA. As such, the Status of the Species Section provides species-specific descriptions of distribution and abundance, life history characteristics (especially those affecting vulnerability to the proposed action), threats to the species, and other relevant information as they pertain to these animals within USAKA. Factors affecting these species within the action area are described in more detail in the Environmental Baseline Section.

3.1 *Heliopora coerulea* (Blue coral)

Heliopora coerulea is a very broadly distributed Indo-Pacific coral. It is considered the oldest living coral species. *H. coerulea* became a consultation species under UES section 3-4.5.1 (a), and retained that status, per the wishes of the RMI Government, after we determined that listing under the ESA was not warranted.

3.1.1 Distribution and Abundance

The reported range of *H. coerulea* is from southern east Africa to the Red Sea, across the Indian Ocean to American Samoa in the central Pacific Ocean, and from Japan, south to Australia (Brainard et al. 2011). Colonies of *H. coerulea* are often patchy in their distribution, but can dominate large areas. It is common in shallow water environments and usually displays a scattered distribution. *H. coerulea* displays a wide geographic distribution at USAKA. Since 2012, *H. coerulea* colonies have been observed at 85 of 182 survey sites, including 8 survey sites at Kwajalein islet, throughout Kwajalein Atoll at all 11 Kwajalein Atoll islets, in the Mid-Atoll Corridor, and around 11 Aids to Navigation (AtoN) locations during biennial inventories. *H. coerulea* colonies have been observed in 11 of 14 habitat types, with the exception of pass bottom, lagoon flat, and AtoN hull, chain or post habitats.

3.1.2 Life History Characteristics Affecting Vulnerability to Proposed Action

H. coerulea is a non-scleractinian stony coral. Stony corals are sessile, colonial, marine invertebrates. Unlike the calcium carbonate skeleton of scleractinian corals, the skeleton of *H. coerulea* consists of aragonite, and it is blue instead of white. As with scleractinian corals, the individual unit of a coral colony is called a polyp, which is typically cylindrical in shape, with a central mouth that is surrounded by numerous small tentacles armed with stinging cells (nematocysts) that are used for prey capture and defense, but instead of living in "cups on the surface of the coral, *H. coerulea* polyps live in tubes within the skeleton. Each polyp is connected to adjacent polyps by a thin layer of interconnecting tissue called the coenenchyme. As with other corals, *H. coerulea* acts as a plant during the day and as an animal at night, or in some combination of the two. The soft tissue harbors mutualistic intracellular symbiotic dinoflagellates called zooxanthellae, which are photosynthetic. Corals also feed by consuming prey that is captured by the nematocysts (Brainard et al. 2011).

H. coerulea is a massive coral that typically forms castellate (castle-like) blades. It occurs in water depths from the intertidal zone down to about 60 m. It is most abundant from the shallow reef crest down to forereef slopes at 10 m, but is still common down to 20 m. Like other corals, *H. coerulea* feeds on tiny free-floating prey that is captured by the tentacles of the individual coral polyps that comprise the colony. *H. coerulea* colonies have separate sexes. Fertilization and early development of eggs begins internally, but the planula larvae are brooded externally under the polyp tentacles. Larvae are considered benthic, as they normally distribute themselves by crawling away vice drifting in the plankton (Brainard et al. 2011).

3.1.3 Threats to the Species

Brainard et al. (2011) suggest that *H. coerulea* is a hardy species. They report that it is one of the most resistant corals to the effects of thermal stress and bleaching, and although there is no specific research to address the effects of acidification on this species, it seems to have survived the rapid acidification of the oceans during the Paleocene-Eocene Thermal Maximum acidification. They also report that disease does not appear to pose a substantial threat, and that adult colonies are avoided by most predators of coral. However, the externally brooded larvae are heavily preyed upon by several species of butterflyfish. Although *H. coerulea* tends to prefer clear water with low rates of sedimentation, Brainard et al. (2011) report that sedimentation does not appear to pose a significant threat to species survival. Land-based sources of pollution may pose significant threats at local scales. Collection and trade appear to be the biggest threat to this species. *H. coerulea* has been reported as one of the top 10 species involved in international trade. Its morphology and natural color make it highly desirable (Brainard et al. 2011). As described above, *H. coerulea* does not appear to be particularly susceptible to effects attributed to anthropogenic climate change, but it is likely being adversely affected by international trade.

3.1.4 Conservation of the Species

H. coerulea is listed in CITES Appendix II and is noted here as general information to the status and conservation of the species across its range. However, the CITES provision does not apply for UES consultation species.

3.2 *Pinctada margaritifera* (Black-lip pearl oyster)

Pinctada margaritifera, the black-lip pearl oyster, is the only mollusk species in the Action Area that requires further consultation under the proposed actions. The *P. margaritifera* species is regulated by Marshall Islands Revised Code 1990, Chapter 1, § 5. There is no designated critical habitat for mollusks at Kwajalein Atoll.

3.2.1 Distribution and Abundance

P. margaritifera are found on reef habitats throughout the tropical Indo-Pacific. *P. margaritifera* are typically found shallower than 8 m (25 ft.) but occurs at least as deep as 15 m (50 ft.; Keenan et al., 2006). Although *P. margaritifera* are occasionally found in the low intertidal zone and can tolerate brief aerial exposure, they are generally found at subtidal depths. These animals typically spawn bimonthly (Nair 2004). Reproduction of mollusks often includes a free-swimming stage (veliger) enabling dispersal over great distances, and genetic similarity across most mollusk species' ranges indicates that long-distance dispersal occurs with regularity. Dispersal on smaller spatial scales of tens of kilometers is much more common (Cowen and Sponaugle 2009; Mumby and Steneck 2008). While veligers may be found in more distant open ocean areas, the amount present will likely be the smaller fraction of the total pool of veligers produced.

P. margaritifera has been documented at 8 of 11 USAKA islets including Kwajalein, Roi-Namur, Ennugarett, Gagan, Meck, Illeginni, Legan, and Eniwetak, as well as on some lagoon and pass AtoNs. *P. margaritifera* is fairly widespread and common. Since 2012, *P. margaritifera* individuals have been observed at 17 of 182 survey sites throughout Kwajalein Atoll, including 5 survey sites at Kwajalein islet, during biennial inventories.

3.2.2 Life History Characteristics Affecting Vulnerability to Proposed Action

P. margaritifera is a sessile, filter-feeding, marine invertebrate, mollusk (oyster). It is normally found attached to hard substrate (including manmade infrastructure and debris) by strong filamentous (byssal) threads that the animal excretes from its hinge area.

3.2.3 Threats to the Species

Current threats include direct harvest, disease, predation, and potentially the effects of anthropogenic climate change. Although the *P. margaritifera* species is not threatened by low population numbers (SMDC 2012), it is susceptible to over-exploitation. Although *P. margaritifera* is probably beginning to be affected by impacts associated with anthropogenic

climate change (described in more detail in the Environmental Baseline section below), no significant climate change-related impacts to its populations have been observed to date.

3.2.4 Conservation of the Species

P. margaritifera is currently managed as an aquaculture species in the RMI (SMDC 2012a).

4 Environmental Baseline

The UES does not specifically describe the environmental baseline for a biological opinion. However, under the ESA, the environmental baseline includes: past and present impacts of all State, Federal, or private actions and activities in the action area; the anticipated impacts of all proposed Federal projects in the action area that have already undergone Section 7 consultation; and the impact of State or private actions which are contemporaneous with the consultation in process (50 CFR 402.02). The ESA Consultation Handbook further clarifies that the environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem, within the action area (USFWS and NMFS 1998). The purpose of describing the environmental baseline in this manner within a biological opinion is to provide the context for the effects of the proposed action on the listed species. We apply the ESA standards consistent with the intent of the UES agreement in our effects analysis. As described in Sections 2 and 3 above, the action area for this consultation consists of the marine waters in and adjacent to the BSR on Kwajalein Islet, Kwajalein Atoll, RMI.

The Marshall Islands consist of 29 atolls and 5 islands aligned in two roughly parallel northwest-southeast chains: the northeastern Ratak Chain and the southwestern Ralik Chain. The total land area is about 70 square miles, and the total lagoon area is about 4,500 square miles. Kwajalein Atoll is located near the center of the island group, about 8 degrees above the equator, and is one of the largest coral reef atolls in the world. The past and present impacts of human and natural factors leading to the status of UES-protected species within the action area include coastal development, armed conflict, direct take, fishing interactions, vessel strikes and groundings, marine debris, and climate change.

Kwajalein Atoll was the site of heavy fighting during World War II (1940s), when the U.S. took it from the Japanese. Many of the islets have been heavily modified by dredge and fill construction operations by both the Japanese and U.S. forces. More recently, the RMI has provided eleven islets around the rim of Kwajalein Atoll for the use by the U.S. Government as part of the RTS. Hundreds of U.S. personnel live on some of the islets, and Marshallese workers commute daily between the U.S. occupied islets and the ones on which they reside. Vessel traffic occurs regularly between the islets, and to and from the atoll. This includes fishing boats, personnel ferries, military service craft, visiting military ships, and cargo vessels that supply the peoples of Kwajalein Atoll.

The RMI Government has provided Kwajalein Islet and ten other islets around the rim of Kwajalein Atoll for the use of the U.S. Government as part of the Ronald Reagan Ballistic Missile Defense Test Site (RTS). Kwajalein Islet is about 2.5 miles (4.0 km) long and about 800 yards (730 m) wide, with an area of about 1.2 square miles (748 acres, 3 km^2). About 1,600 people live on Kwajalein Islet, and many Marshallese workers commute on and off the islet daily. The islet is highly developed, and largely covered by an airfield, housing, and other facilities. Kwajalein Harbor is relatively shallow and protected from strong currents and large waves, but it experiences some water movement due to tidal fluctuations.

The last dredging project at the BSR was in April 2007. The NCA for Dredging and Filling (USAKA, 2016) indicates a required depth of 18 feet (ft.) to support vessel traffic at the BSR. Current depths are less than 18 ft. in several places adjacent to the BSR wharf and in the approach channel (Figure 2). Maintenance dredging is authorized by the DEP for Dredging and Filling (USAG-KA, 2017) as the harbor is essential for continued operations. The proposed project would accomplish necessary, routine maintenance dredging, and take the depth down an additional 2 ft. where necessary, to a final depth of 20 ft. throughout the approach channel and docking area. That maintenance project proposed dredging project at the Kwajalein BSR is part of a larger endeavor to repair the failed and failing components of the BAAF on Kwajalein Island.

In July 2012, NMFS consulted on a ramp repair at the Kwajalein Barge Slip Ramp. In August 2015, NMFS consulted on the Kwajalein Echo Pier Repair project, also on Kwajalein Islet.

Additional UES consultations have been completed across the Kwajalein Atoll. For more than 18 years, the USAKA has participated in testing hypersonic vehicles from intercontinental ballistic missiles and other flight tests launched from Vandenberg Air Force Base and other locations. Vehicle impacts from such tests have occurred and continue to occur on and in the vicinity of Illeginni Islet and in adjacent ocean waters. In the Opinion on the Minuteman III operations through the year 2030 it was estimated that 49,645 colonies of the 15 species of UES corals and 117 top shell snails may be killed (NMFS 2015).

On March 2, 2017, the U.S. Navy Strategic Systems Program (SSP) consulted with NMFS on the effects of a near identical action, the Flight Experiment 1 (FE-1). NMFS concluded in a biological opinion dated May 12, 2017 that the FE-1 would not jeopardize 59 marine ESA/UES consultation species." (PIR-2017-10125; I-PI-17-1504-AG). In that opinion, NMFS estimated that the action would result in up to up to 10,417 colonies of UES consultation corals could experience complete mortality, up to four top shell snails may be killed by the proposed action, and up to 90 clams, and 108 humphead wrasses could be injured or killed by the proposed action.

On February 12, 2019, USASMDC/ARSTRAT, consulted on the Air-launched Rapid Response Weapon (ARRW) Flight Tests. NMFS' Biological Opinion was dated July 30, 2019 (PIRO-2019-00639; I-PI-19-1751-AG). This missile test is expected to impact the same islet targeted in this proposed action. As with the FE-1 and FE-2, impact is expected to occur on land, but could occur in water. In that opinion, NMFS estimated that the action would result in up to 10,417 colonies of UES consultation corals could experience complete mortality, up to four top shell snails may be killed by the proposed action, and up to 90 clams, and 108 humphead wrasses could be injured or killed by the proposed action.

On July 4, 2019, NMFS PIRO completed informal consultation on the effects of launching a Terminal High Altitude Area Defense (THAAD) missile and subsequent intercept of a medium-range ballistic missile over the Pacific Ocean concluding the operation was not likely to adversely affect 44 species protected under the standards and procedures described in the Environmental Standards and Procedures for U.S. Army Kwajalein Atoll (PIRO-2019-01962; I-PI-19-1769-AG). This test is expected to launch from a neighboring islet within USAKA.

Direct take through harvest continues in the RMI for several of the UES consultation species. For example, sea turtles, black lip pearl oysters, and top shell snails (all of which are UES consultation species) are considered a food source or of economic value by many RMI nationals. No information is currently available to quantify the level of impact direct take is having on consultation species. Black lip pearl oysters are cultivated in the RMI for their pearls. Wild oysters are collected by local people for their edible flesh and the shells, which are used to make decorative items. Although RMI nationals are unlikely to take any of these species from USAKA-controlled islets, low numbers of black lip pearl oysters and some corals are likely taken by U.S. personnel who are unaware of their status as UES-protected species. The level of exploitation is unknown, and no concerted research or management effort has been made to conserve these species in the RMI. No information is currently available to quantify the level of impact direct take is having on consultation species in the Marshall Islands.

Nearshore fisheries around Kwajalein Atoll consist primarily of subsistence and recreational fishing for coral reef and pelagic species. Contemporary fishing methods include: boat-based and land-based hook-and-line fishing (handline or rod-and-reel), net fishing (cast, gill, drag, and surround net), spear fishing, hook and gaff, and gleaning (Hensley and Sherwood 1993).

Marine debris continues to accumulate in the ocean and along shorelines within the action area. Despite the development, wartime impacts, and human utilization of marine resources mentioned above, the atoll's position at the center of the Pacific Ocean is far from highly industrialized areas, and its human population remains relatively low. Consequently, the water quality level of the lagoon and the surrounding ocean is very high, and the health of the reef communities, along with the overall marine environment of Kwajalein Atoll, borders on pristine.

As mentioned briefly in the status of species section, anthropogenic climate change stressors are affecting marine ecosystems across the globe. As a global phenomenon, impacts are also likely occurring at Kwajalein Atoll and in the action area. Climate refers to average weather conditions within a certain range of variability. The term climate change refers to distinct long-term changes in measures of climate, such as temperature, rainfall, snow, or wind patterns lasting for decades or longer. The global mean temperature has risen 0.76°C over the last 150 years, and the linear trend over the last 50 years is nearly twice that for the last 100 years (Solomon et al. 2007). Sea level rose approximately 17 centimeters (cm.) or 6.7 inches (in.) during the 20th century (Solomon et al. 2007) and further increases are expected. In addition to increases in ocean temperatures and sea level rise, other global changes include increasing ocean acidification, higher than normal king tides, and increased in storm intensities. While current research is documenting these global and regional changes, specific scientific documentation describing the effects of these climate stressors in the action area lacking

Climate change-induced elevated water temperatures, altered oceanic chemistry, and rising sea

level are contributing to a degradation in the health of coral reef ecosystems and are likely beginning to affect corals and mollusks found in the action area (Hoegh-Guldberg et al. 2017). Globally, ocean acidification is adversely affecting many species of corals and other calcareous species like mollusks. Increasing thermal stress due to rising water temperatures has already had significant effects on most coral reefs around the world. It has been linked to widespread and accelerated bleaching and mass mortalities of corals around the world over the past 25 years (Brainard et al. 2011). As the atmospheric concentration of CO_2 has increased, there has been a corresponding reduction in the pH of ocean waters (acidification). As ocean acidity increases, the calcium carbonate saturation state of the water decreases. Increased ocean acidity has the potential to lower the calcium carbonate saturation state enough to slow calcification in most corals and may increase bioerosion of coral reefs. It is thought to adversely affect fertilization, larval settlement, and zooxanthellae acquisition rates for corals, and can induce bleaching more so than thermal stress, and tends to decrease growth and calcification rates (Brainard et al. 2011). By the middle of this century, ocean acidity could lower calcium carbonate saturation to the point where the reefs may begin to dissolve (Brainard et al. 2011). Coral reef taxa may not have the ability to effectively acclimatize to such rapidly occurring ocean acidification (Comeau et al. 2019).

Attempting to determine whether recent biological trends are causally related to anthropogenic climate change is complicated because non-climatic influences dominate local, short-term biological changes. However, the meta-analyses of 334 species and the global analyses of 1,570 species show highly significant, nonrandom patterns of change in accord with observed climate warming in the twentieth century. In other words, it appears that these trends are being influenced by climate change-related phenomena, rather than being explained by natural variability or other factors (Parmesan and Yohe 2003). The implications of these changes are still mostly not understood in terms of population and species-level impacts. Data specific to the action area are lacking. Over the long-term, climate change-related impacts could influence the biological trajectories of UES-protected species on a century scale (Parmesan and Yohe 2003). However, the effects of climate change stressors for UES consultation species in the action area are not yet predictable or quantifiable at the species-specific level and would require more detailed analysis in this consultation (Hawkes et al. 2009).

5 Effects of the Action

In this section of a biological opinion, we assess the probable effects of the proposed action on UES-protected species. Under the ESA, “effects of the action” are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b), that would be added to the environmental baseline.

Approach. We determine the effects of the action using a sequence of steps. The first step identifies potential stressors associated with the proposed action with regard to listed species. We

may determine that some potential stressors result in insignificant, discountable, or beneficial effects to listed species, in which case these potential stressors are considered not likely to adversely affect protected species, and subsequently are considered no further in this Opinion. Those stressors that are expected to result in significant negative (i.e., adverse) effects to listed species are analyzed via the second, third, and fourth steps described below.

The second step identifies the magnitude of the stressors (e.g., how many individuals of a particular species would be exposed to the stressors; *exposure analysis*). In this step of our analysis, we try to identify the number, age (or life stage), and gender of the individuals that are likely to be exposed to a proposed action's effects, and the populations or subpopulations those individuals represent.

The third step describes how the exposed individuals are likely to respond to the stressors (*response analysis*). In this step, we determine if the stressors are likely to result in any adverse effects on exposed individuals.

The final step in determining the effects of the action is to establish the risks those responses pose to listed resources (*risk analysis*). The risk analysis is different for listed species and designated critical habitat. However, as mentioned above, the action area includes no designated critical habitat, thus it is not considered in this Opinion. Our jeopardy determinations must be based on an action's effects on the continued existence of UES-protected species within USAKA. Because the continued existence of listed species depends on the fate of the populations that comprise them, the viability (probability of extinction or probability of persistence) of listed species depends on the viability of their populations.

5.1 Stressors

The proposed action would cause seven stressors that may affect the species considered in this consultation: direct contact; removal from the water; turbidity and sedimentation; elevated noise levels; exposure to wastes and discharges; loss or degradation of sheltering and forage habitat; and collision with vessels. Three of the stressors, contact; removal; and turbidity and sedimentation are likely to adversely affect two consultation species (Table1).

Similarly, Section 12 provides description for why all of the species identified in Table 2, 3, and 4 are unlikely to be adversely affected, and therefore considered no further in this Opinion. In summary, the coral and mollusk species identified in Table 1 may be adversely affected by direct contact, removal, or turbidity and sedimentation during the proposed dredging activities.

In total, coral colonies within the dredge footprint were estimated to number less the 300 individuals, with up to 5 sites *H. coerulea* (two colonies observed) present. *P. margaritifera* were not observed within the dredge footprint, however less than 10 individuals are assumed to be present (NMFS, 2020). Removal of species to an alternate suitable habitat area can increase survival potential for these individuals if placed in a similar thriving environment (Table 5).

Table 5. Estimated numbers of consultation coral colonies, and individual mollusks adversely affected in proposed dredge footprint.

Scientific Name	Species	Colonies or Individuals Affected
	Corals	
Heliopora coerulea	Blue coral	5 or fewer colonies
	Mollusks	
Pinctada margaritifera	Black-lip pearl oyster	≤ 10 individuals presumed (based on video survey)

5.1.1 Exposure to contact

This section analyzes the proposed action's potential for exposing the blue coral, *H. coerulea* and the black-lip pearl oyster, *P. margaritifera,* to direct contact. This analysis is based on information provided in the BA and PDS for this proposed project, including videos, review of existing past data, and coordination between the NOAA Appropriate Agency Representative (AAR) for the UES and Action agency during the preparation of the BA (USAG-KA 2020; NMFS 2020). Information was also provided by the NOAA AAR for the UES who has surveyed the proposed action area and general project region numerous times, and completed an in-water survey in the project area in 2019.

The sessile UES consultation organisms (corals and black-lip pearl oysters) present in the dredge footprint will be exposed to and highly likely to be damaged by the impact of the dredge bucket or barge spud, buried during sediment moving activities, or removed from the water during sediment removal. The vessel traffic and transits that occur post-dredging actions are not expected to adversely affect these species.

5.1.2 Response to contact

This section analyzes the responses of *H. coerulea*, and the *P. margaritifera* to contact occurring directly from the dredge machinery during the dredging process. It is expected that sessile animals in the dredge footprint to be injured, killed, or displaced by blow of the dredge.

To increase survival potential, movable individuals will be relocated from the proposed dredging footprint and adjacent areas to an alternate suitable habitat area. *H. coerulea* colonies tend to fragment when translocated, so care will be taken to minimize such and to translocate all fragments if such occurs. Even with relocation, take of up to 5 *H. coerulea* and up to 10 *P. margaritifera* is likely (see NMFS, 2020), therefore adverse effects are expected for these species.

5.1.3 Exposure to removal from water

USAG-KA intends to relocate, to the extent possible, non-encrusting UES-consultation species

from the dredge area prior to dredge activities, keeping organisms submerged during transit. Video and surveys indicate the presence of at least 5 sites or less of *H. coerulea* and the potential presence of *P. margaritifera* in the dredge footprint. There is a high likelihood that the coral and oyster will be missed during the relocation attempts and then unintentionally removed from the water during the dredging process and placed with sediment in loading and dewatering areas.

5.1.4 Response to removal from water

H. coerulea, and the *P. margaritifera* need salt water to survive; a long-term aerial exposure as described above will very likely lead to their morality of individuals of these two species as a result of the proposed dredging action.

5.1.5 Exposure to turbidity and sedimentation

H. coerulea, and potentially the *P. margaritifera* occur within the dredge footprint. These sessile species will be exposed to persistent elevations of turbidity and sediment during the dredging and the movement of the debris in proposed project. Dredging activities are scheduled to occur for 10 consecutive days for approximately 8 hours a day. As well, there will be 2 days of equipment staging - set up and tear down of dredging equipment.

The dredge footprint includes an area approximately 120 ft. by 400 ft. (48,000 sq. ft.)) adjacent to the BSR and wharf (Dredge Area 1), and a secondary area about 60 ft. by 60 ft. (1800 sq. ft.) located in the approach channel, 600 ft. from the ramp (Dredge Area 2) (Figure 2). The proposed footprint also includes a Sediment Moving Corridor between the two dredge areas. The proposed action will result in the BSR being dredged down an additional 2 ft., to a final channel depth of 20 ft.. An approximate 5,000 CY of sea bottom (sand, silt, and debris) is to be removed.

Silt curtains will be used around the dredge area during the project in order to minimize the intensity of turbidity and sedimentation of areas outside the dredge impact footprint. Turbidity monitoring will be conducted throughout the project at locations outside of the dredge areas and sediment transport corridor and are therefore primarily designed to minimize impacts for areas outside of the dredge location.

Once per day turbidity measurements will begin at these locations at least 7 days prior to project initiation. For the duration of the project, turbidity measurements will be collected from these locations at least five times per working day; once prior to initiation of project activities, at least three times throughout the working day during active dredging, once after completion of dredging each day. Turbidity measurements should be collected from multiple depths; 2.5 ft., 5 ft., 10 ft., 15 ft.; at each location, as applicable based on depth at stations, every time measurements are being collected. The first measurements of the day will be used to establish the daily baseline.

In accordance with Section 7.1(c) of the DEP for Dredging and Filling (USAG-KA, 2017), if turbidity measurements exceed 10 NTU above the established daily baseline at any of the 50 m sampling locations, at any time during the work day, dredging activity will immediately cease until the turbidity has come back down within limitations at those locations. The 10 NTU

exceedance value is based on the analysis of previous turbidity baseline collections and monitoring of dredge associate turbidity levels at USAKA (Kolinski 2020; USASMDC/ARSTRAT 2018; Appendix 3-2C).

Once per day monitoring will also be conducted at a single location within the siltation curtain to allow for a comparative evaluation of curtain effectiveness. Such measures will also be taken prior to opening or relocating the net to ensure turbidity is below 10 NTU and above the daily baseline measurement. Turbidity sampling of marine vessel related sediment plumes will be collected at the BSR when opportunity allows for comparison with turbidity levels that occur both in and outside of siltation curtains. A baseline sample should also be taken prior to vessel arrival, if possible.

These are useful mitigations specifically designed for keeping turbidity levels down outside of the dredge footprint (in the silt curtain). However, even if a temporary pause in dredging occurs, elevated levels of turbidity and sedimentation levels within the dredge footprint would be expected to persist throughout the project duration. Elevated turbidity levels from the proposed project are considered temporary but would expected to persist for some time (depending on wind and weather conditions) after project completion before eventually returning to the baseline (pre-dredging) condition.

5.1.6 Response to turbidity and sedimentation

Video and surveys indicate the presence of at least 5 sites or less of *H. coerulea* and the potential presence of 10 or fewer *P. margaritifera* in the dredge footprint. As mentioned, USAG-KA intends to relocate, to the extent possible, any non-encrusting UES-consultation species from the dredge area prior to dredge activities. There is a high likelihood that these few existing individual corals and oysters will be missed during the relocation attempts and consequentially directly affected by the proposed dredging actions. In addition to the risk of being directly injured, killed or disturbed by the dredge equipment, the species are expected to be adversely impacted by increased turbidity and sedimentation produced during the proposed daily, two-week long dredging process.

Corals. Increases in turbidity and sedimentation are well documented to have adverse effects on coral species. Increased turbidity and sedimentation effects on corals are directly related to their exposure intensity, duration, and frequency (Erftemeijer *et al*., 2012). Increased turbidity has been shown to stress coral polyps due to shading, which decreases light attenuation to their algal symbionts and subsequently limits energy available to the corals (Erftemeijer *et al*., 2012).

Increased sedimentation can stress corals by shading, inhibiting gas exchange, and increasing susceptibility to disease (Erftemeijer *et al*., 2012). Even the most tolerant of coral species cannot survive high levels of turbidity and sedimentation for more than a few (4-6) weeks (Erftemeijer *et al*., 2012). Turbidity and sedimentation increases have also been demonstrated to reduce coral recruitment in the form of reduced survival and settlement of larvae (Erftemeijer *et al*., 2012).

Mollusks. Mollusks are also likely to be adversely affected by increased turbidity and sedimentation. *P. margaritifera* is a suspension filter feeder, and studies have shown that it

grows best in waters with low turbidity (Yukihira *et al*., 1999). As filter feeders, it is necessary that their gills and filtering organs remain clear to allow for water transport. While the effects of turbidity and sedimentation on *P. margaritifera* remain largely unknown, increased turbidity is likely to adversely affect feeding and gas exchange in this species. Burial of species can occur from the sediment movement in the dredging process. Depending on sedimentation levels, individual mollusks and coral would expected to be physiologically and physically compromised or killed.

6 Population scale analysis

This section analyzes the effect on the populations posed by the effects of the proposed action on individuals of UES-protected marine species at USAG-KA, from exposure to direct impact, removal from the water, and turbidity and sedimentation as described above. Because this Opinion assumes mortality for all exposed individuals, regardless of the stressor, the population level assessment below focuses on the species impacts from the direct contact and removal.

As described in the exposure analyses above, up to 5 or fewer sites of *H. coerulea* (blue coral) and 10 or fewer individual *P. margaritifera* (black-lip pearl oysters)(UES-consultation species) could experience mortality from the BSR dredge. This mortality would be due to direct contact from the dredge equipment and attempts to remove (relocate) the individuals from the proposed dredge footprint.

Based on the best information available, we believe that these corals are all widely distributed around the atoll, and that the potentially impacted area represents a very small fraction (not currently quantifiable) of coral-occupied habitat at Kwajalein Islet, and likely below 1% of coral-occupied habitat at USAKA. As described above, NMFS further believes that the distribution and abundance of this coral species in similar habitat areas outside of the proposed action area, would be much higher to their estimated distribution and abundance inside the proposed action area, and as such, these 5 or fewer sites represent a tiny fraction of their species found around Kwajalein islet and across USAKA. Therefore, based on the best available information, we consider the risk negligible that project-related effects from the proposed dredging project would eliminate *H. coerulea* at USAKA, or appreciably reduce the likelihood of the species survival and recovery at USAKA and across its range.

As well, using video data, it was determined that *P. margaritifera* (black-lip pearl oyster) presumably occurs within the dredging footprint. Based on the video and local knowledge of the site, the abundance of the oyster in the dredge footprint is presumed to be approximately 10 or fewer individuals. As a UES-consultation species we give the benefit of the doubt to the species and analyze the proposed action making this assumption of presence.

P. margaritifera has been documented at 8 of 11 USAKA islets including Kwajalein, Roi-Namur, Ennugarett, Gagan, Meck, Illeginni, Legan, and Eniwetak, as well as on some lagoon and pass AtoNs. *P. margaritifera* is fairly widespread and common. Since 2012, *P. margaritifera* individuals have been observed at 17 of 182 survey sites throughout Kwajalein Atoll, including 5 survey sites at Kwajalein islet, during biennial inventories.

The expected mortality of 10 or fewer individual *P. margaritifera* in the region is a tiny fraction of the species abundance. Therefore, based on the best available information, we consider the reduction in abundance from direct contact, removal, and turbidity and sedimentation does not impair population viability parameters. In other words the reduced number of species is such a small fraction of overall abundance that, when considered in isolation, will not alter distribution or reproduction of the species. The remainder of our analysis will add these effects to the baseline, and evaluate the additive effect relative to the status of the species, and factor cumulative effects in the action area.

Summary

Based on the analysis of potential stressors presented as part of this Opinion, sessile UES consultation species within the dredge footprint, including the blue coral, *H. coerulea*, and black-lip pearl oyster, *P. margaritifera*, are the only SOSC expected to be adversely and directly affected by stressors from project impacts including: direct contact, removal from the water, and turbidity and sedimentation. In total, coral colonies within the dredge footprint were estimated to number less the 300 individuals, with up to 5 *H. coerulea* (two colonies observed) present. *P. margaritifera* were not observed within the dredge footprint, however fewer than 10 individuals are assumed to be present (NMFS, 2020). Removal to species to an alternate suitable habitat area can increase survival potential for these individuals if placed in a similar thriving environment. However, take of all removal of individuals is conservatively assumed.

7 Cumulative Effects

The UES does not specifically describe “cumulative effects” for a biological opinion. However, Section 161 of the Compact provides that for U.S. Government activities requiring the preparation of an environmental impact statement (EIS) under NEPA, the U.S. Government shall comply with environmental standards that protect public health and safety and the environment that are comparable to the U.S. environmental statutes, including the Endangered Species Act.

Although not all USAKA actions that require formal consultation also require the preparation of an EIS, such as this action, we analyze cumulative effects in all USAKA consultations as that term is defined in the ESA implementing regulations. Unlike the meaning of the same term in NEPA, cumulative effects are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02 and 402.17(a)). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to a consultation under USAKA Environmental Standards.

Many of the cumulative effects will be related to effects in the baseline. The current impacts at RMI from coastal development, fisheries interactions, vessel groundings, direct take, marine debris, and global climate change are expected to continue to intensify over time. The intensification of those impacts is expected to cause cumulative effects on UES-protected marine species at USAKA. Continued growth of the human population at Kwajalein Atoll would likely result in increased coastal development, fishing pressure, vessel traffic, and pollution of the marine environment.

Anthropogenic release of CO_2 and other greenhouse gases is considered the largest contributor to global climate change, and it is expected that the release of those gases is likely to continue, with the rate of their release expected to increase during the next century (Brainard et al. 2011). Therefore, global climate change is expected to continue to impact UES-protected marine species and their habitats, especially on those species that are dependent on shallow coastal reefs and shorelines, such corals and marine mollusks. There currently is no comprehensive assessment of the potential impacts of climate change within the action area or specific to UES-protected marine species.

While it is likely that climate change will effect UES-protected species over the long-term, its effects on populations of these species in the near future is impossible to quantify based on the current state of knowledge and available data (NMFS-PIRO 2012a).

The effects of global climate change, the most significant of which for corals are the combined direct and indirect effects of rising sea surface temperatures and ocean acidification, are currently affecting corals on a global scale, particularly in parts of the Caribbean. The return frequency of thermal stress-induced bleaching events has exceeded the ability of many reefs and coral species to recover there. Brainard et al. (2011) report that those effects likely represent the greatest risk of extinction to ESA-candidate corals over the next century. Field observation and models both predict increasing frequency and severity of bleaching events, causing greater coral mortality and allowing less time to recover between events. However, predicting how global climate change may impact particular species remains poorly understood, especially in understudied areas such as USAKA.

The effects of global climate change could act synergistically on corals affected by the proposed action. The ability of impacted corals to respond to the effects of the proposed action could be reduced due to the effects of elevated temperatures and increased ocean acidity, and the longer it takes for impacted corals to recover from the effects of the proposed action, the more likely it becomes that the effects of climate change would synergistically impact those corals. However, the degree to which those synergistic impacts may affect corals over the time required for them to recover from project impacts is unknown.

The effects of global climate change could also act synergistically on mollusks affected by the proposed action. However, no specific information is currently available to assess the impacts. Changes in ocean temperature and chemistry, and rising sea level may be affecting these species because they depend on an exoskeleton that is comprised primarily of calcium carbonate. We expect that minimally, increased acidity could have effects that parallel those described for corals above.

8 Integration and Synthesis of Effects

The purpose of this Opinion is to determine if the proposed action is likely to jeopardize the continued existence of UES-protected marine species at USAKA. “Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a UES-

protected marine species at USAKA by reducing the reproduction, numbers, or distribution of that species. This Opinion considers the Effects of the Action within the context of the Status of the Species, the Environmental Baseline, and Cumulative Effects as described in Section 5 under "Approach".

We determine if reduction in fitness to individuals of marine consultation species that may result from the proposed action are sufficient to reduce the viability of the populations those individuals represent (measured using changes in the populations' abundance, reproduction, spatial structure and connectivity, growth rates, or variance in these measures to make inferences about the risk of reducing the likelihood of survival and recovery of UES-protected species). In order to make that determination, we use the population's base condition (established in the Status of Listed Species and Environmental Baseline sections of this Opinion), considered together with Cumulative Effects, as the context for the overall effects of the action on the affected populations at USAKA. The following discussion summarizes the probable risks the proposed action poses to coral, and mollusk identified in the Effects of the Action section.

8.1 Coral (*Heliopora coerulea*)

As described in the Effects of the Action section, a total of up to 5 colonies of the UES-consultation blue coral (*Heliopora coerulea*) could be killed through some combination of direct contact, exposure, and turbidity and sedimentation.

As discussed in the Status of the Species, *H. coerulea* displays a wide geographic distribution at USAKA. Since 2012, *H. coerulea* colonies have been observed at 85 of 182 survey sites, including 8 survey sites at Kwajalein islet, throughout Kwajalein Atoll at all 11 Kwajalein Atoll islets, in the Mid-Atoll Corridor, and around 11 AtoN locations during biennial inventories. *Heliopora coerulea* colonies have been observed in 11 of 14 habitat types, with the exception of pass bottom, lagoon flat, and AtoN hull, chain or post habitats.

As discussed more fully in the Environmental Baseline and Cumulative Effects sections, the effects of direct take, military training and maintenance activities, human utilization of marine resources, fisheries actions, marine debris, and climate change are expected to continue and likely become more frequent and or intense in the future for this species, and climate change is also expected to continue over time, increasing impacts to corals, including *H. coerulea*. However, the impact and time scale of these effects on the trajectory of the affected coral populations at USAKA, and across Oceania is currently uncertain and given the relatively short duration of effects associated with the action, they cannot be meaningfully evaluated as having a compounding influence.

The proposed action is anticipated to result in the mortality of up to 5 or fewer *H. coerulea* coral colonies at Kwajalein islet. These coral colonies represent an extremely small fraction of the total number of colonies found at USAKA, and even less around Kwajalein islet. The potential loss of these coral colonies is not expected to significantly impact reproduction or to impede the recovery of their species across Kwajalein Atoll and the RMI. Therefore, when taken in context with the status of these species, the environmental baseline, cumulative impacts and effects, the proposed action is not likely to eliminate the UES consultation coral species, *H. coerulea*

considered in this Opinion, or appreciably reduce the likelihood of its survival and recovery across the RMI.

8.2 Black-lip pearl oyster (*Pinctada margaritifera)*

As described in the Effects of the Action section, a total of up to 10 *P. margaritifera* could be killed through some combination of direct contact, exposure, and turbidity and sedimentation.

As discussed in the Status of Listed Species, *P. margaritifera* have been reported at 8 of 11 USAKA islets including Kwajalein, Roi-Namur, Ennugarett, Gagan, Meck, Illeginni, Legan, and Eniwetak, as well as on some lagoon and pass AtoNs. *Pinctada margaritifera* is fairly widespread and common. Since 2012, *P. margaritifera* individuals have been observed at 17 of 182 survey sites throughout Kwajalein Atoll, including 5 survey sites at Kwajalein islet, during biennial inventories.

As discussed more fully in the Environmental Baseline and Cumulative Effects sections, the effects of direct take, military training and maintenance activities, human utilization of marine resources including fisheries activities, marine debris, and climate change are expected to continue and likely worsen in the future for this species. However, the impact and time scale of these effects on the trajectory of the affected *P. margaritifera* populations at USAKA is currently uncertain, and those impacts are expected to occur on a time scale, against which the impacts of the proposed action would be indistinguishable.

The proposed action is anticipated to result in death of up to 10 or fewer individual *P. margaritifera*. The affected oysters would represent a small fraction of the total number of this species found at USAKA, and even less around Kwajalein islet. The potential loss of these individual *P. margaritifera* is not expected to significantly impact reproduction or to impede the recovery of their species across Kwajalein Atoll and the RMI. Therefore, when taken in context with the status of these species, the environmental baseline, cumulative impacts and effects, the reduction in number of this species caused by the proposed action is not likely to alter the reproduction or distribution of the UES consultation oyster species, *P. margaritifera,* or appreciably reduce the likelihood of its survival and recovery across the RMI.

9 Conclusion

After reviewing the current status of UES-protected marine species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NMFS' Opinion that the USAG-KA's proposed dredging of BSR, Kwajalein Atoll, RMI, is not likely to jeopardize the continued existence of the UES-protected coral, *Heliopora coerulea,* or *Pinctada margaritifera*, considered in this Opinion.

As described in the introduction, no critical habitat has been designated or proposed for designation for any UES-protected marine species in the action area or elsewhere in the RMI.

10 Incidental Take Statement

The UES does not specifically describe "take" for a biological opinion. However, under the ESA "take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the reasonable and prudent measures and terms and conditions of the Incidental Take Statement (ITS). Although the ESA does not specifically apply to actions taken at USAKA, under section 161 of the Compact and the UES, the ESA provides the basis for determining the level of incidental take, so the ESA definitions will be used for this Opinion.

10.1 Anticipated Amount or Extent of Incidental Take

Based on the analysis in the accompanying Opinion we conclude that the dredging project at the Kwajalein Islet BSR at the USAKA RTS, would result in the take of blue coral and black-lip pearl oysters individuals. As described above in the exposure and response analyses, we expect that up to 5 colonies of blue corals, and up to 10 individuals of black-lip pearl oysters are expected to killed or injured by the proposed action (Table 5).

10.2 Effect or Impact of the Take

In this Opinion, we determined that this level of anticipated take is a one-time small reduction in abundance that is not likely to result in the jeopardy of any of the UES consultation species expected to be taken by the proposed action.

10.3 Reasonable and Prudent Measures

We believe the following reasonable and prudent measures, as implemented by the terms and conditions, are necessary and appropriate to minimize impacts of the proposed action and monitor levels of incidental take. The measures described below are non-discretionary and must be undertaken in order for the ITS to apply.

1. The USAG-KA shall conduct turbidity monitoring throughout the project to ensure that take caused by exposure to turbid conditions is kept to a minimum.
2. The USAG-KA shall record and report all action-related take of UES-consultation species.

10.4 Terms and Conditions

The USAG-KA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. The following terms and conditions are also provided in the PDS for this proposed project (NMFS 2020).

1. To meet reasonable and prudent measure 1 above:
    a. A daily log will be completed detailing, at a minimum, the time, location, and results of all measurements, as well as any other pertinent observations.

b. Current direction will be recorded daily.
c. All turbidity measurements will be collected using a portable turbidimeter, calibrated per manufacturer's recommendations. Calibrations will be recorded as part of the daily monitoring log.
d. Monitoring locations (identified in Figure 2-5 of the BA) will include:
    - 5-6 locations at approximately 50 m outside the work site, placed in a manner that surrounds dredging related activities. These locations will be adjusted as necessary as the spud barge and silt curtain are moved within the project area, and depending on the dominant direction of subsurface currents.
    - 5-6 locations at approximately 25 m outside the work site, placed in a manner that surrounds dredging related activities. These locations will be adjusted as necessary as the spud barge and silt curtain are moved within the project area and depending on the dominant direction of subsurface currents.
    - Three locations east, west and north at greater distance (500 to 1000 ft.). These locations will remain fixed for the duration of the project.

e. Monitoring locations will not be located in a shallow reef area to prevent damage to corals.
f. Once per day turbidity measurements will begin at these locations at least 7 days prior to project initiation.
g. For the duration of the project, turbidity measurements will be collected from these locations at least five times per working day; once prior to initiation of project activities, at least three times throughout the working day during active dredging, once after completion of dredging each day.
h. Turbidity measurements should be collected from multiple depths; 2.5 ft., 5 ft., 10 ft., 15 ft.; at each location, as applicable based on depth at stations, every time measurements are being collected.
i. The first measurements of the day will be used to establish the daily baseline.
j. In accordance with Section 7.1(c) of the DEP for Dredging and Filling (USAG-KA, 2017), if turbidity measurements exceed 10 NTU above the established daily baseline at any of the 50 m sampling locations, at any time during the work day, dredging activity will immediately cease until the turbidity has come back down within limitations.
l. Once per day monitoring will be conducted at a single location within the siltation curtain to allow for a comparative evaluation of curtain effectiveness. Such measures will also be taken prior to opening or relocating the net to ensure turbidity is below 10 NTU and above the daily baseline measurement.
m. Turbidity sampling of marine vessel related sediment plumes will be collected at the BSR when opportunity allows for comparison with turbidity levels that occur both in and outside of siltation curtains. A baseline sample should also be taken prior to vessel arrival, if possible.
n. All turbidity measuring data will be included in the project completion report.

2. To meet reasonable and prudent measure 2 above:
    a. The USAG-KA shall assign appropriately qualified personnel to record all suspected incidences of take of any UES-consultation species.

b. The USAG-KA shall utilize digital photography to record any UES-consultation species found injured or killed in or near the ocean target areas and/or at Kwajalein. As practicable: 1) Photograph all damaged corals and/or other UES-consultation species that may be observed injured or dead; 2) Include a scaling device (such as a ruler) in photographs to aid in the determination of size; and 3) Record the location of the photograph.
c. Within 6 months of completion of the action, USAG-KA will provide a report to NMFS. The report shall identify: 1) turbidity data; 2) the identity and quantity of affected resources (include photographs and videos as applicable); and 3) the disposition of any relocation efforts.

11 Conservation Recommendations

The following conservation recommendations are discretionary agency activities provided to minimize or avoid adverse effects of a proposed action on UES-protected marine species or critical habitat, to help implement recovery plans, or develop information.

1. We recommend that the USAG-KA continue to work with NMFS staff to conduct additional marine surveys around Kwajalein Islet to develop a comprehensive understanding of the distribution and abundance of species that are there.
2. We recommend that the USAG-KA continue to work with NMFS staff to conduct marine surveys at additional sites around all of the USAKA islets and in the mid-atoll corridor to develop a more comprehensive understanding of the distribution and abundance of species and habitats at USAKA.
3. We recommend that the USAKA develop capacity and procedures for responding to marine mammal and turtle strandings.
    a. Acquire required permits and training to perform necropsies and/or to take and transport tissue samples.
    b. Develop professional relations with qualified federal agencies and universities to capitalize on samples and information gained at USAKA.
    c. Develop mechanisms to collect and disseminate the information.
4. We recommend that the USAKA develop a 3- to 5-year Maintenance Plan for reoccurring inlet and channel maintenance dredging activities, and pier replacements at USAKA. Coordinate with NMFS on a Programmatic UES Consultation in order to address UES-consultation requirements for these actions with a single Programmatic Opinion.

Reinitiation Notice

This concludes formal consultation on the dredging activities at the Kwajalein Barge Slip Ramp at the USAKA/RTS, RMI. Reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law, and if:

1. The amount or extent of anticipated incidental take is exceeded;
2. New information reveals that the action may affect UES-protected marine species or critical habitat in a manner or to an extent not considered in this Opinion;
3. The action is subsequently modified in a manner that may affect UES-protected marine species or critical habitat to an extent, or in a manner not considered in this Opinion; or

4. A new species is listed or critical habitat designated that may be affected by the action.

12 Species Not Likely to be Adversely Affected

As explained above in Section 1, USAG-KA determined that the proposed action was not likely to adversely affect (NLAA) the 12 consultation species listed in Table 2, or their habitats and designated as critical under the ESA and/or the UES. This section serves as our concurrence under section 7 of the ESA of 1973, as amended (16 U.S.C. §1531 *et seq*.), and under section 3-4.5.3(d) of the UES, 15th Edition, with USASMDC/ARSTRAT's determination.

NMFS PIRO further considered and determined that additional UES species within the RMI that may occur in the action area, particularly the barge vessel route was NLAA those species (Table 3).

Some portion of the proposed action and action area (barge vessel route) also occurs outside of the boundaries of the RMI. NMFS PIRO further considered ESA and MMPA protected species that may occur in the portion of the action area outside of the RMI and determined these species were NLAA by the proposed action (Tables 4).

The UES does not specifically define the procedure to make a NLAA determination. However, the Compact clearly intends that the UES provide substantially similar environmental protections as the ESA. We interpret this to include adoption of the ESA NLAA determination process. In order to determine that a proposed action is not likely to adversely affect listed species, under the ESA, we must find that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint FWS-NMFS Endangered Species Consultation Handbook (USFWS and NMFS 1998). Insignificant effects relate to the size of the impact and should never reach the scale where take occurs; discountable effects are those that are extremely unlikely to occur; and beneficial effects are positive effects without any adverse effects (USFWS and NMFS 1998).

The potential stressors are:

a. Removal from water
b. Turbidity and sedimentation;
c. Elevated noise levels;
d. Exposure to wastes and discharges;
e. Loss or degradation of sheltering and forage habitat;
f. Collison with vessels.

Each of these stressors are addressed below to determine whether or not individuals of any of the ESA-listed and UES-protected marine species considered in this consultation are likely to be adversely affected by that stressor. The species that may be exposed to stressors during each phase, and their likely response to exposure are based on the biological and/or ecological characteristics of each species. Any incidence where a stressor has more than a discountable risk of causing an adverse effect on any individual of the ESA- and/or UES-protected species will

result in that stressor and those species being considered in the following section of this biological opinion.

a. Removal:

The removal of highly motile UES SOSC (fishes, sea turtles, and marine mammals) from the water by dredging activities is discountable given motile species ability to swim away from harmful activities and the use of proposed motile species related BMPs which include halting work when these species are observed within the work area.

b. Turbidity and Sedimentation:

Turbidity is the degree to which light passing through a water column is scattered by suspended organic and nonorganic matter, while sedimentation is particulate matter carried by water that settles on objects within or on the bottom of a body of water. The potential for proposed activities to bury highly motile UES SOSC (fishes, sea turtles, and marine mammals) are discountable given motile species ability to swim away from harm and the use of proposed motile species related BMPs included in this Opinion's Terms and Conditions.

c. Exposure to elevated noise levels:

The proposed actions may affect listed species exposed to project-related noises. 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. Noises generated from dredging are not impulsive and will be too low to cause barotrauma or non-auditory injury. Hearing loss (PTS and TTS) is unlikely because although some noises may be loud enough, hearing loss could only occur at close distances and long durations to sea turtles, dolphins, fish, or elasmobranchs. If operators adhere to the BMPs, such exposure would not occur.

Reine et al. (2014) compiled data from several different types of sounds generated during dredging, including barge activities including using anchoring spuds, which are proposed in this action. Reine et al. (2014) presented data of anchoring spud sounds which were recorded in 173 decibel (dB) root mean square (rms) at 1m from the source, and 138 dB rms 220 m from the source, or 147.4 dB rms 55m from the source. Mechanical backhoe sounds from engines were recorded at 167 dB rms at 1m, and rock breaking from mechanical dredging (which is not expected but could occur in some spots) were recorded at 179.4 dB rms at 1m and 148.4 dB rms at 60m. Sounds at 173 dB and 179 dB could be higher than TTS thresholds for some marine mammals, but would require long or repeated exposures to cause TTS. With the BMPs in place that require work to halt when sea turtles, marine mammals, or manta rays are observed within 50m of the work area, this is unlikely to occur.

The vessels used for the action include a barge for the spuds and support vessels. Vessels of this size generally emit noises that range between 150 and 170 dB. Vessels generate louder noises while it travels at higher speeds. During dredging, the vessels mostly sit idle and will likely emit noises at the lower end of their range. While the vessel is moving at higher speeds, such as ocean

transit, the noise source is mobile, which reduces exposure to animals in the action area. Mobile, offshore, pelagic species (marine mammals, sea turtles, rays, sharks) protected under the ESA and MMPA may occur in the portion of the proposed action (barge vessel routes) that occur outside of the boundary of the RMI (Table 4). Because of short duration to noise exposure from the transiting barge, and the overall small the total number of vessel trips (1 barge per month to every other month for 34 months), noise as stressor is expected to be negligible for these species from this proposed project.

All noises could potentially elicit a behavior response from any animal. NMFS has suggested behavior response thresholds of 120 dB rms for continuous sounds and 160 dB rms for impulsive sounds for marine mammals and 160 dB rms for all types of sounds for sea turtles (NMFS 2018), and 150 dB for fishes. Noises generated from common dredging activities described above and vessels could be louder than those respective thresholds, which could affect UES consultation species. According to the practical spreading model, the zone of influence could extend far from the source.

Although the NOAA acoustic threshold exists for behavioral responses, it is less understood or studied than hearing loss and non-acoustic injury. Animals may respond to noises by avoiding, halting their activities, experience reduced hearing by masking, or attraction to source noises. Avoidance is most likely, and a common natural reaction by listed species and considered low risk. Sea turtles, marine mammals, rays, sharks, and Humphead wrasse are large and agile, and capable of swimming away safely from any disturbance that would harm them. Attraction to sounds are unusual but sometimes happen. With the BMPs in place, the applicant will avoid effects associated with attraction by halting work when UES consultation species are observed within 50 meters of the work area and will not restart until the animal is no longer observed. We expect minimal risk from behavioral changes by exposed to sounds generated during construction. We expect the sounds generated by underwater and upland construction will have insignificant effects to UES consultation species.

d. Exposure to waste and discharges:

Equipment spills and vessel discharges could contain hydrocarbon-based chemicals such as fuel oils, gasoline, lubricants, hydraulic fluids and other toxicants, which could expose protected species to toxic chemicals. Depending on the chemicals and their concentration, the effects of exposure may range between animals temporarily avoiding an area, to death of the exposed animals. The UES prohibit the intentional discharge of toxic wastes and plastics into the marine environment. Additionally, USAG-KA has incorporated into the proposed action conservation measures that include measures intended to prevent the introduction of wastes and toxicants into the marine environment. Based on this, USAG-KA expects that project related discharges and spills would be infrequent, small, and quickly cleaned if they do occur. Therefore, it was determined that exposure to wastes and discharges would result in insignificant effects on UES-protected marine species.

e. Loss or degradation of sheltering and forage habitat:

The dredge footprint consists primarily of a sand bottom with very limited exposed structure that may serve as habitat for UES SOSC. Scattered rock outcrops and debris that serve as habitat for

corals, various macroinvertebrates and fish, and various forms of macro-algae that may serve as shelter for fish, are likely to be removed. Many of the UES SOSC types of forage in the Action Area appear common throughout USAKA, including plankton, in-fauna, turf and macro-algae, and various macroinvertebrates including corals. Though less common, the ephemeral small-bladed seagrass, *Halophila gaudichaudii*, which may serve as forage for the green sea turtle is regionally present outside the dredge footprint with distributions also noted at other USAKA islets (NMFS and USFWS, 2017).

The BSR wharf face serves as substrate for UES coordination coral species, which are mainly encrusting. The wharf face will not be altered as part of this project. The east and west reef flat areas provide shelter and forage habitat for various sessile and mobile UES SOSC. The turbidity mitigation and monitoring controls described in the BMPs are expected to significantly reduce the likelihood of loss or degradation of shelter and forage habitat for UES consultation species outside the dredge footprint area.

The dredge footprint contains an extremely limited amount of sheltering and forage habitat. Therefore the loss and degradation of sheltering and forage habitat within the dredge footprint would result in insignificant effects to UES consultation species.

f. Collision with vessels:

The projected barge schedule is expected to include up to a total of 19 barge trips to the BSR within a 34 month time period (July 2020 to April 2023). Seventeen of these barges would be the larger supply barge (100 ft. x 400 ft. x 19 ft.) and 2 would be the smaller size that typically enters the BSR (75 ft. x 320 ft. x 15.5 ft.). An alternative schedule may limit the large supply barge to 12 trips, and 1 trip with the smaller barge for a total of 13 barge trips to the BSR during a 25 month duration from July 2020 to July 2022. Either schedule results in the increase in the amount of use and the typical size vessel that uses the BSR. Because of the higher likelihood that the project would require the use of 17 large barge trips and 2 smaller barges up through April 2023, the NMFS considered this timeframe in the development of this Consultation.

The Proposed Action is anticipated to increase vessel activity only slightly in the nearby Kwajalein Lagoon area, including the BSR. In addition to the normal vessel traffic described earlier, the proposed action would be expected to result in an increase in vessel traffic of 1 to 2 barge trips per month or per every other month for up to 34 months into the Kwajalein Islet lagoon and the BSR (USAG-KA 2020b).

The larger supply barge (100 ft. x 400 x 19 ft.) with a 19 ft. draft, compared to the smaller size barge BSR (75 ft. x 320 ft. x 15.5 ft.) with a 15.5 ft. draft, to be used to enter the BSR post-dredging, is currently able to navigate adequately with enough draft through all portions of the vessel route (overseas, GAE channel into Kwajalein Atoll lagoon, and the BSR access channel) except for the entrance to the BSR docking area. The proposed dredging action will provide for sufficient depth at the BSR to allow the larger barge to approach and dock without scouring the sea floor at the ramp.

NMFS reviewed the ESA protected coral species and the likelihood for potential exposure while

the barge vessel would be transiting outside of the RMI territorial waters from the mainland port overseas. Since the barge vessel would be utilizing designated navigation channels into the ports, the likelihood of impacting listed corals is negligible. The transit across seas and into RMI territorial waters would not expose corals to the barge vessel action.

Sea turtles and marine mammals must surface to breathe, and sea turtles are known to rest or bask at the surface. Therefore, when at or near the surface, they are at risk of being struck by project- related vessels. Potential injuries and their severity will depend on the speed of the vessel, the part of the vessel that strikes the animal, and the body part impacted. Injuries from boat strikes may include bruising, broken bones or carapaces, and lacerations. Sharks, rays, and humphead wrasse respire with gills and as such do not need to surface to breathe and are only infrequently near the surface. They are also agile and capable of avoiding oncoming vessels.

Hazel *et al.,* (2007) report that vessel collision is a significant source of anthropogenic mortality for marine turtles. Based on Hawaii data for the period of 1998 to 2007 (NMFS 2008), the estimated total number of green turtles killed annually by boat collisions in the Main Hawaiian Islands (MHI) was between 25 and 50. More current estimates from the Navy place the number killed annually closer to 250. The number of hawksbills similarly killed was much lower; between 0.2 and 0.4 turtles annually. The nearshore densities of boats and turtles are much lower around Kwajalein Islet than in Hawaiian nearshore waters, thus the number of green and hawksbill turtles killed annually by boat collisions around Kwajalein Islet is likely much lower.

The exposure and risk to the ESA and MMPA protected species outside of the RMI are offshore pelagic species that may occur in the proposed action barge vessel routes. However, because of the low increase in the number of vessels (1 barge every month to every other month for 34 months), risk to vessel impacts is negligible. Vessel operators must be responsible to actively watch for and avoid sea turtles, marine mammals and fish (wrasse. rays, sharks). They are required to adjust their speed based on expected animal density and on visibility conditions to allow adequate reaction time to avoid marine animals.

Additionally, no action-related anchoring is planned and vessel operators are well trained to avoid running aground. Based on the expectation that the project would require very slow speed vessel operations, and that the vessels would be operated in accordance with project controls that require vessel operators watch for and avoid protected marine species, the risk of collisions between project-related vessels and sea turtles, marine mammals, and fish result in insignificant effects on UES-, ESA- and MMPA protected marine species.

13 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Opinion addresses these DQA components, documents compliance with the DQA, and certifies that this Supplement has undergone pre-dissemination review.

13.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this Opinion are the SSP, and USASMDC/ARSTRAT. Other interested users could include the citizens of RMI, USFWS, and NOAA. Individual copies of this Opinion were provided to the USASMDC/ARSTRAT. The format and naming adheres to conventional standards for style.

13.2 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

13.3 Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. The documents adhere to published standards including the NMFS ESA Consultation Handbook, and ESA regulations, 50 CFR 402.01 et seq.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this Opinion contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and reviewed in accordance with Pacific Islands Region ESA quality control and assurance processes.

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