ENVIRONMENTAL ASSESSMENT
For
Kure Atoll Salvage Action

Papahānaumokuākea Marine National Monument
Northwestern Hawaiian Islands
Hawai‘i

National Oceanic and Atmospheric Administration
National Ocean Service, Office of National Marine Sanctuaries

October 14, 2016

1.0 PURPOSE AND NEED

1.1 Introduction

NOAA, along with its Co-Trustee partners U.S. Fish & Wildlife Service (FWS) and the State of Hawai‘i (State), proposes to issue a Monument permit to Element Environmental, LLC (E2) to access the Papahānaumokuākea Marine National Monument (PMNM or Monument) to recover an excavator and other debris associated with the capsizing of a landing craft in the Kure Atoll lagoon on September 2, 2016, at the earliest opportunity. The U.S. Army Corps of Engineers (USACE) is contracting E2 to recover the excavator and debris, and E2 is sub-contracting Sea Engineering, Inc. (SEI) to conduct the actual salvage operations. This action is necessary to remove the excavator from the lagoon, stop further damage to Monument resources, and remove all debris associated with the capsizing of the landing craft.

To address what NOAA feels to be a serious potential threat to the biological and physical environment of Kure Atoll from the excavator and the associated debris, our agency is expediting, through proper means, regulatory processes to evaluate and permit the salvage operation at Kure Atoll to ensure the removal of those items before weather conditions would force the Monument managing partners to wait until the spring of 2017 to perform that action. Consistent with this exigency, NOAA has prepared this environmental assessment consistent with Council on Environmental Quality's May 12, 2010, Memorandum entitled "Emergencies and the National Environmental Policy Act.[1]"

The USACE plans to issue a Nationwide permit #22 (NWP 22), which is a permit for the removal of wrecked, abandoned, or disabled vessels, or the removal of man-made obstructions to navigation. The USACE utilizes its own programmatic National Environmental Policy Act (NEPA) consultations, along with Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations completed by NOAA to meet federal consultation requirements for the NWP 22 permit. This environmental assessment (EA) addresses issuance of a joint PMNM permit, signed by NOAA, U.S. Fish & Wildlife Service (FWS) and the State, and the salvage of the excavator and the recovery of all debris. This EA has been expedited in accordance with the Council on Environmental Quality (CEQ) guidance on completing NEPA consultations for emergency actions. No activities are planned to occur on Hawaiian Islands National Wildlife Refuge (HINWR) lands. For more information please visit http://www.papahanaumokuakea.gov/.

Within the Monument lies Kure Atoll, the northernmost island in the Hawaiian island chain and is located approximately 2,000 km northwest of Honolulu and 95 km from Midway Atoll. Kure Atoll consists of a lagoon encircled by a fringing reef, one vegetated island (Green Island) and several small sand spits that vary in size depending upon the tide, currents and shifting sand.

In 1960, the United States Coast Guard (USCG) constructed Long Range Aids to Navigation (LORAN) Station Kure on Green Island which was used for ship and air navigation from 1961 until 1992 (Woodward-Clyde, 1994). The purpose of the LORAN station was to provide a precision radio navigation system to help mariners, aviators, and those interested in terrestrial navigation obtain an accurate position.

During the operation of LORAN Station Kure, waste generated by the USCG was disposed of at the southwestern end of Green Island, near the southwestern end of the runway in a location known at the

[1] Available at: https://ceq.doe.gov/ceq_regulations/Emergencies_and_NEPA_Memorandum_12May2010.pdf (last visited October 13, 2016).

Scrap Metal Dump. Scrap metal and electrical components (i.e., capacitors, batteries and transformers) containing hazardous materials (such as polychlorinated biphenyls (PCBs)) were buried in the Scrap Metal Dump and not removed when the Coast Guard dismantled the LORAN station and turned Kure Atoll back to the State in 1992.

From December 1991 to October 2008, various surveys and sampling efforts were conducted to determine the extent of the contamination on Green Island from the operation of the USCG LORAN station. Based on the results of the surveys and other activities, the USCG determined the best course of action was to remediate the dump site through excavation and relocation of soil containing significant PCB concentration from the dump site to a new excavation pit to be located further away from the shoreline and at a higher elevation. Moving the materials to this new location would limit the further migration of PCBs from the existing Scrap Metal Dump site via wave action from large storm events and sea level rise.

To address the contaminants on Green Island, Kure Atoll, the USCG had the USACE contract with Element Environmental, LLC (E2) to perform the following major tasks: removal and transport of significantly PCB-impacted soil from the Scrap Metal Dump to a 2016 Reburial Pit (to be excavated by E2) located along the old runway; line the 2016 Reburial Pit with activated carbon, wrap the PCB-soil contents of the reburial pit with activated carbon, and cap the 2016 Reburial Pit with a permeable geomembrane. From August 17 through September 1, 2016, the E2 performed the remediation efforts on Green Island, Kure Atoll.

Demobilization of the E2 equipment and crew after the completion of the remediation of the Scrap Metal Dump began on September 2. Equipment and crew were transported off Green Island using a Pacifica Workboat landing craft. The incident that resulted in the current situation occurred at approximately 1700 local time on September 2, 2016 during the last run of the landing craft from the beach at Green Island back to the support vessel, the M/V *Kahana*. The landing craft was loaded with a Komatsu PC35 mini-excavator, a roll of chain link fence and ramps for the landing craft door. During the transit to the M/V *Kahana* the cable holding the landing craft's bow loading ramp door broke, allowing the door to fall open, resulting in the immediate swamping and subsequent capsizing of the of the vessel. Rescue efforts resulted in recovery of all crew and some personal items, but the landing craft's load was deposited on the seafloor in approximately 2 m of water and 120 m from the shoreline of Green Island.

No immediate attempt was made to right the capsized landing craft due to the approaching darkness, so the landing craft was secured by anchoring it in place. The M/V *Kahana* proceeded to Midway Atoll to drop off most of the E2 and Pacifica field crew for the return flight to Honolulu. On September 3, the remaining Pacifica personnel returned to Kure Atoll aboard M/V *Kahana*, righted the capsized landing craft and recovered the landing craft ramps, anchors, lines and straps. However, they were unable to recover the mini-excavator, roll of chain link fence, and the landing craft's windshields and aluminum roof, which had become separated from the landing craft when it capsized. To recover the remaining equipment and associated debris still on the bottom of Kure Lagoon, E2 has contracted the salvage operation to Sea Engineering, Inc. (SEI), a Hawaii-based salvor.

Besides the presence of the excavator and the associated debris, the incident has introduced the potential for exposure to pollutants from the hydraulic fluid, engine oil, and diesel fuel that were in the excavator. Estimates for each of these possible pollutants are: 38.9 liters of hydraulic fluid, 7.7 liters of engine oil, and 43.9 liters of diesel fuel. Combined, these contaminants represent a potential threat to the biological

and physical resources of Kure Atoll. The excavator is also equipped with a 12V battery that holds a small amount of sulfuric acid.

Regulatory Background:

As previously mentioned, Kure Atoll is part of Papahānaumokuākea Marine National Monument and is administered jointly by three Co-Trustee agencies – the Department of Commerce through the National Oceanic and Atmospheric Administration (NOAA), the Department of the Interior through the U.S. Fish and Wildlife Service (USFWS), and the State of Hawai‘i through the Department of Land and Natural Resources (DLNR), collectively, the Co-Trustees. The Co-Trustees work in close collaboration and consultation with the Office of Hawaiian Affairs to ensure that both cultural and natural resources are protected in a manner aligned with Native Hawaiian resource management best practices. This unique management partnership of the Monument allows for the protection of the entire ecosystem through a stringent permitting process.

NOAA is charged with co-managing the Monument as well as administering several environmental statutes including the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation Management Act (MSA), and National Environmental Policy Act (NEPA) that have interagency consultation and permitting requirements. Federal agencies are required to consult with the appropriate offices when an action triggers a consultation provision in any of these statutes.

Presidential Proclamation 8031, that established the Monument, and codifying regulations at 50 C.F.R. Part 404 stipulate that all activities in the Monument, with limited exceptions, require a permit. In addition, each Monument issued permit must be signed by all three Co-Trustee agencies to be valid. The Monument permitting program is designed to manage and minimize human impact, ensuring the protection of the Monument’s natural, cultural, and historic resources and a Monument permit is required for the Proposed Action. All Monument permit applications must meet the ten applicable Findings of Presidential Proclamation 8031, described below, prior to issuance of a permit:

1. The activity can be conducted with adequate safeguards for the resources and ecological integrity of the Monument.
2. The activity will be conducted in a manner compatible with the management direction of the Proclamation, considering the extent to which the conduct of the activity may diminish or enhance Monument resources, qualities, and ecological integrity; any indirect, secondary, or cumulative effects of the activity; and the duration of such effects.
3. There is no practicable alternative to conducting the activity within the Monument
4. The end value of the activity outweighs its adverse impacts on Monument resources, qualities, and ecological integrity.
5. The duration of the activity is no longer than necessary to achieve its stated purpose.
6. The applicant is qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.
7. The applicant has adequate financial resources available to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.
8. The methods and procedures proposed by the applicant are appropriate to achieve the proposed activity’s goals in relation to their impacts to Monument resources, qualities, and ecological integrity.

9. The applicant's vessel has been outfitted with a mobile transceiver unit approved by NOAA Office of Law Enforcement and complies with the requirements of Proclamation 8031.
10. There are no other factors that would make the issuance of a permit for the activity inappropriate.

All Monument issued permits undergo a review process, during which time all relevant federal and state regulations and policies are complied with prior to issuance. All Monument permits are signed by the three Co-Trustees: NOAA, FWS, and the State. In addition, issued permits contain General Terms and Conditions that satisfy Proclamation 8031 and Monument regulations. Issued permits also specify the requirements for compliance with quarantine protocols to avoid introduction of alien species, and list prohibited activities such as the disturbance of cultural sites or historic artifacts. Special Conditions may also be applied to particular permits, placing additional restrictions on activities in order to minimize impacts to Monument resources.

[Note: Since all the activities associated with this permit will occur within the original Monument boundaries, and since policies and procedures for administering the requirements of Presidential Proclamation 9478 regarding the Monument Expansion area have not been developed yet, the requirements of Proclamation 9478 are not addressed in this document.]

1.2 Proposed Action.

NOAA, along with its Co-Trustee partners FWS and the State, proposes to issue a Monument permit to E2 (through a subcontractor) to access the Monument and conduct the salvage of a mini-excavator and other associated debris from Kure Atoll lagoon using pontoon floats and lift bags. Due to the risk to the environment from pollutants on the excavator, the potential entanglement hazards from the excavator and associated debris, and the potential impact hazard to the coral reef ecosystem, the Monument managers feel it is critical to perform the salvage operation as soon as possible before the Northwestern Hawaiian Islands winter weather patterns of high winds and high seas begin. The goal is to remove the excavator and associated debris during the last two weeks of October, with the actual salvage operation taking 2 – 4 days depending on weather. Actual dates may vary depending on actual on site weather conditions.

The decision pending the outcome of this EA is whether to issue a Monument permit based upon the information provided in SEI's comprehensive salvage plan (Appendix A). This EA will inform the decision whether a Finding of No Significant Impact (FONSI) is possible. If a FONSI is not appropriate, an Environmental Impact Statement will be prepared.

1.3 Action Area.

The Action Area is Kure Atoll lagoon, including submerged lands permanently or periodically covered by tidal waters up to the high water line, the surrounding coral reefs, and the waters that would be transited between Honolulu and the atoll. At the time of the incident, the excavator and associated debris was in approximately 3 m of water and 100 m offshore of Green Island.

2.0 Description of Alternatives

Two alternatives are being considered: Issuing a permit to E2 to enter the Monument and perform salvage activities to remove the mini-excavator and associated debris from the lagoon at Kure Atoll, or taking no action (no permit would be issued and no salvage activities would occur).

SEI performed a risk assessment and developed a salvage plan which would be used for the recovery of the excavator and debris at in the lagoon at Kure Atoll. SEI evaluated a number of salvage alternatives, including:

- Float the excavator with lift bags and tow the excavator to the main support vessel using the SEI's 8 m Rigid Hull Inflatable Boat (RHIB);
- Drive the excavator into shallower waters and winching or driving it onto a landing craft for transport back to the main support vessel;
- Float the excavator with lift bags and take it into shallower water and winch it onto the deck of a supporting landing craft and drive it back to the main support vessel; and
- Mobilize SEI's 74 ft. landing craft *Huki Pau* with 5-ton crane which could access the shallow water of the lagoon, and winch the excavator into the SEI landing craft, and drive it back to the main support vessel.

All of the alternatives considered were based on the availability and use of the M/V *Kahana*, which is a U.S flagged freight vessel based in Honolulu, Hawaii which is owned and operated by Hawaii Resource Group. The vessel has a length of 185 feet, a beam of 35 feet, and gross weight of 260 tons. The vessel is powered by twin Caterpillar D399 engines, which provide 2250 HP to power two 86 inch bronze propellers. The crew size of the *Kahana* is normally 10, but the vessel has 17 berths which allow it to take on a minimum number of additional crew or passengers.

Although the *Huki Pau* would be able to access Kure Atoll lagoon, the vessel would have to be towed from Honolulu to Kure Atoll behind the main support vessel to be used for the salvage operation. The additional risks associated with towing the *Huki Pau* were deemed to be excessive and this option was removed from the risk analysis. The other three alternative salvage methodologies were carried forward within the risk analysis, which is described in greater detail below.

Based on the remaining potential salvage alternatives, SEI identified the following major tasks that may be incorporated into the operation: 1) utilize lift bags to float the excavator and tow to a predetermined location, 2) remove the excavator arm, if needed, to eliminate dragging the arm across the seafloor, 3) pressurize hydraulics using external hydraulic power unit to drive the excavator to shallower water, and 4) winch the excavator onto a landing craft.

These major tasks were analyzed for their risk of failure, risk of additional pollution, and environmental impact to the surrounding area. An overall risk assessment (low, medium, high) was then given to each task. The assessment is summarized in Table 1, below.

Salvage Operation Tasks	Risk of Failure	Pollution Risk	Environmental Impact Risk	Overall Risk Assessment
Float Excavator with Lift Bag and Tow to Predetermined Location	L	L	L	L
Remove Excavator Arm	L	M	L	M
Drive Excavator to Shallower Water & Onboard Landing Craft	M	M	H	H

Winch On-board Landing Craft from Shallow Water	M	M	H	H

Table 1: Kure Atoll PC-35 Salvage Effort Task - Risk Assessment Table

Based on the risk assessment, SEI evaluated that driving the excavator to shallower water as well as winching the excavator onto the landing craft once in shallow water presented the highest risk for pollution and environmental impact. These risks included loss of hydraulic fluid during excavator operation as well as significant impact to the seafloor in the nearshore area of Green Island. The risk assessment led SEI to select its preferred alternative: Float the Excavator with Lift Bag and Tow to Predetermined Location. This alternative, along with the No Action Alternative (leave the excavator and associated debris in place) will be discussed in greater detail below.

2.1 Alternative 1 (Preferred Alternative): Issue a PMNM conservation and management permit to conduct salvage operations by floating the excavator and associated debris with lift bags and towing the excavator to the main support vessel

Under Alternative 1, the excavator and associated debris would be salvaged from the lagoon at Kure Atoll. The M/V *Kahana* would be used to transport equipment and personnel from Honolulu to Kure Atoll, which is located approximately 2000 km from O'ahu. Upon arrival at Kure Atoll, the M/V *Kahana* would anchor outside of the fringing reef in deeper water, and remain on station to bring the excavator and debris onboard and to transport everything back to Honolulu.

Onsite, SEI crew would utilize an 8 m RHIB with an inboard Cummins diesel to transit from the M/V *Kahana* to the salvage site and evaluate site conditions and the position of the excavator and debris. Divers would photo document the current condition prior to beginning salvage operations. The initial inspection would also include verification of the tow route to ensure adequate water depth and to determine potential environmental impacts.

Prior to commencing salvage operations, SEI crew would deploy 70 m of oil boom around the excavator, and anchor the corners to the seafloor on sandy bottom. After the boom is in place, a 100 m oil absorbent sausage boom would be placed inside of the oil boom. Finally, six oil absorbent diapers would be bundled at each corner of the oil boom.

During the salvage operation, the M/V *Kahana's* support boat the *Alewa*, which is a twin-engine 35 foot landing craft, would be used for dive support. The *Alewa* would be outfitted with environmental cleanup equipment, dive and safety equipment, SCUBA tanks, rigging, pontoon and life bags, an air compressor and hose. Once onsite, the *Alewa* would be secured to the excavator, and the oil boom would be extended around the work site. The sausage boom and oil diapers would be deployed as described above. Salvage of the excavator would be completed using a combination of Subsalve pontoons and lift bags. SEI would utilize two 3-ton pontoon bags, for a buoyancy lift of 6 tons, to lift the 3.7 ton excavator. An additional 2-ton closed lift bag would be added prior to the towing part of the salvage to ensure a 2:1 lift to weight ratio. Once afloat, the SEI RHIB would be attached to the excavator with a 1 ½ inch tow line, and the excavator would be towed back to the M/V *Kahana*. During the transit, the *Alewa* would transit alongside and be prepared to respond with additional flotation or compressed air. Upon arrival at the M/V *Kahana*, the excavator would be lifted aboard using the vessel's deck mounted crane which has a safe work load limit of 13,300 lbs. Once on deck, the excavator would be secured and transported back to Honolulu.

The primary salvage plan would be to raise and tow the excavator as one piece, but if conditions dictate, SEI would remove and recover the excavator arm separately. In the event that the excavator arm needs to be removed, SEI divers would disconnect the six hydraulic lines and plug each line with an appropriate factory plug. During the disconnection of the hydraulic lines, a small amount of fluid would be introduced into the marine environment, but the spill precautions described above would prevent the contaminants from escaping the salvage area. To remove the excavator arm, divers would remove the pin that holds the arm in place, or burn the arm off using an underwater burning gear. Once detached, the arm would be placed on the seafloor using 1 ton lift bags, and recovered after the remainder of the excavator has been secured aboard the M/V *Kahana*. Recovery of the arm would be accomplished using two 2 ton lift bags on each end of the excavator arm attached to a ¾ inch wire rope sling. Once at the surface, the excavator arm would be towed back to the M/V *Kahana* and lifted onto the deck.

Finally, salvage of the chain link fence, glass windows and aluminum roof would be completed from the *Alewa*. Divers would use a combination of life bags, chain come-alongs and rigging to either bring material on-board or secure them to the side of the *Alewa*. Divers would complete a final sweep of the area to ensure no miscellaneous debris remains and video documentation of the area would be completed.

2.2 Alternative 2: No action alternative

Under the no action alternative, a Monument conservation and management permit would not be issued to conduct salvage operations. As a result, the excavator and the associated debris would remain in place in the lagoon at Kure Atoll, no salvage operation would be attempted, and the M/V *Kahana* and its crew would not travel to Kure Atoll to conduct the salvage operations. The excavator and the associated debris would represent a threat to the biological resources and the environment at Kure Atoll now and into the future. Those threats include: exposure to the contaminants on the excavator, entanglement (leading to potential injury or mortality) to marine animals (including the critically endangered Hawaiian monk seal), and damage to the pristine coral reef ecosystem as the excavator and the other debris move around the bottom of the lagoon due to wave action. If the excavator and other debris wash up on the beach at Green Island, it will become an entanglement hazard (leading to potential injury or mortality) not just to marine life such as Hawaiian monk seals and turtles, but also to seabirds.

2.3 Alternatives considered, but excluded from further analysis

As discussed above, two other alternatives, pressurize hydraulics using external hydraulic power unit to drive the excavator to shallower water and winch the excavator onto a landing craft were initially considered, but were not carried forward for further consideration due to the high likelihood for failure or the greater likelihood for adverse impacts to the environment and biological resources of the Monument.

The extended time (4 – 5 weeks) in the saltwater environment, and the potential effects of that exposure on the excavator's electronics and gears, added considerable uncertainty about the feasibility of being able to pressure the hydraulics and to use external hydraulic power to drive the excavator into shallow water. In addition, the act of driving the excavator across 100 m of sand bottom and close to Green Island, which is designated as Hawaiian monk seal critical habitat, could result in adverse impacts to endangered sea turtles and monk seals, and could negatively impact coral resources in the lagoon.

The alternative of winching the excavator onto a landing craft would also require moving the excavator into shallow water before it could be picked up and placed into the landing craft. Although the excavator would be floated and towed into shallower water, this alternative would require the presence of equipment

and salvage crew near the shoreline which is used extensively by Hawaiian monk seal for hauling out and for nursing monk seal pups. This alternative also introduces considerable risk for the introduction of pollutants into the nearshore environment from release of oil, fuel and hydraulic fluid, as well as potential increased risk to the coral reef ecosystem.

3.1 Affected Environment

3.1 Papahānaumokuākea Marine National Monument

3.1.1 Location and Physical Environment

Physical Characteristics

The Hawaiian Archipelago is a part of the Hawaiian Ridge-Emperor Seamount chain in the central North Pacific Ocean. The Hawaiian Ridge-Emperor Seamount chain is comprised of more than 80 volcanoes and is the result of the Pacific Plate traveling northward then northwestward over the stationary Hawaiian oceanic "hot-spot" (currently located underneath the Island of Hawaiʻi) over the past 70 million years (USGS 1999). The Hawaiian Ridge-Emperor Seamount chain extends approximately 6,000 km from the main Island of Hawaii to the Aleutian Trench, which parallels the Aleutian Islands of Alaska. The Hawaiian Ridge section of this chain is approximately 2,600 km in length, extending from the Island of Hawaii to Kure Atoll (USGS 1999).

The Archipelago is comprised of two island groups: The Main Hawaiian Islands (MHI) and the Northwestern Hawaiian Islands (NWHI) or Papahānaumokuākea Marine National Monument. The Monument is one of the largest marine conservation areas in the world. Established on June 15, 2006, the Monument was created by Presidential Proclamation 8031 under the authority of the Antiquities Act (16 U.S.C. §§ 431-433). The area is also designated as a Particularly Sensitive Sea Area (PSSA) under the International Maritime Organization (IMO) and is a UNESCO World Heritage site.

The extensive coral reefs found in the NWHI are home to over 7,000 marine species, one quarter of which are found only in the Hawaiian Archipelago. Many of the islands and shallow water environments are important habitats for rare species such as the threatened green turtle and the endangered Hawaiian monk seal, as well as the 14 million seabirds representing 22 species that breed and nest there. Land areas of the NWHI also provide a home for four species of birds found nowhere else in the world, including the world's most endangered duck, the Laysan duck. The NWHI is of great importance to Native Hawaiians, with significant cultural sites found on the islands of Nihoa and Mokumanamana, both of which are on the National and State Register for Historic Places.

Kure Atoll is the most northwestern island in the Hawaiian chain and occupies a singular position at the "Darwin Point," which is the northern extent of coral reef development, beyond which coral growth cannot keep pace with the rate of geological subsidence. Kure's coral is still growing slightly faster than the island is subsiding. As Kure Atoll continues its slow migration atop the Pacific Plate, it too will eventually slip below the surface. This 29.8-million-year-old atoll is nearly circular, with a reef 6 miles (9.6 kilometers) in diameter enclosing a lagoon with two islets comprising over 200 acres (0.81 square kilometers) of emergent land, flanked by almost 80,000 acres (324 square kilometers) of coral reef habitat. Of the two enclosed islets, the only permanent land is found on crescent-shaped Green Island, which rises to 20 feet (6.1 meters) above sea level and is located near the fringing reef in the southeastern quadrant of the lagoon.

Meteorological/Climatological and Air Quality

The climate of the entire Hawaiian archipelago features mild temperatures year-round, moderate humidity, persistent northeasterly trade winds, and infrequent severe storms. Hawaii's climate is notable for its low day-to-day and month-to-month variability. The surrounding ocean has a dominant effect on the weather of the entire archipelago. The maximum monthly climatological mean sea-surface temperature measured over the last 20 years at Kure is 80.6 ºF in August with monthly minimums in February at 66.2 ºF. Most of the storms that impact the archipelago develop in the eastern tropical Pacific, but some form in the central tropical Pacific, and occasionally typhoons approach the NWHI from the Western Pacific.

Much more common, and perhaps more significant as a natural process affecting the geology and ecology of the NWHI, are the extra-tropical storms and significant wave events that regularly move across the North Pacific in the boreal winter. These large wave events (larger than 10-meter) influence the growth forms and distribution of coral reef organisms and affect the reproductive performance of winter-breeding seabirds nesting on low islets in the NWHI. Annually, wave energy and wave power are highest between November and March and lowest between May and September.

The atmospheric environment throughout the NWHI is generally considered to be relatively pristine. This is due to the remoteness of the NWHI, the fact that most of the islets and shoals remain uninhabited, and the fairly consistent trade wind conditions.

Although relatively pristine, the NWHI are experiencing the impacts of climate change due to rising sea levels, warming water temperatures, and more frequent and stronger storms. Average global sea level has risen approximately 3 cm since 1901, and is predicted to rise between 5 – 13 cm by 2100, depending on which regional climate change projection is referenced (IPCC 2013). Additionally, evidence suggests that the rate of sea level rise varies regionally, primarily due to the variation of plate-tectonic activity. In 2007, the IPCC predicted a rate of sea level rise of 1.2 to 2 mm per year in the equatorial Pacific. It should be noted that observed rates of sea level rise have continually outpaced the IPCC's previous worst case scenario models (PICC 2013).

With rising sea levels, inundation of low-lying island areas, coastal erosion, and saltwater intrusion into subsurface freshwater aquifers are of concern for many Pacific islands. High seasonal and storm waves will travel further inland as sea level increases, creating new wetlands and causing change to existing waterways such as streams and estuaries, surface drainage, and increasing the likelihood of for flooding if high tide coincides with heavy rainfall. Coastal erosion may increase the introduction of sediments into the marine environment, decreasing overall water quality.

Warming sea temperatures will also cause significant changes to the NWHI environment. Recent coral bleaching events have been documented, most significantly at Lisianski Island in 2014 and 2015. Coral bleaching can result in temporary bleaching of the coral or in permanent death of the coral. Increased sea temperatures can also alter the behavior of native species, causing them to become destructively invasive, and can increase the likelihood that alien species can establish themselves in areas where they otherwise could not have flourished. Any man-made stressors such as pollution or impact damage, can lower an ecosystem's resistance to climate change impacts, and should be minimized whenever possible.

The degree of the vulnerability of the Northwest Hawaiian Islands is uncertain, because these islands are made-up primarily ancient volcanic seamounts with fringing coral reefs. Nonetheless, the area of submerged lands will shift inland with sea level rise.

Pacific Ocean around the Hawaiian Archipelago

The marine environment of the NWHI and waters offshore the MHI are generally considered pristine. The archipelago spans such a great distance that the opposite ends often experience different oceanographic and meteorological conditions (Friedlander et al. 2009). Biological productivity in the pelagic zone is very dynamic. Physical conditions present in the water column, such as isotherm and isohaline (temperature and salinity) boundaries, often determine what species will be present in the surrounding waters (USFWS 2008). A mixed layer is present below the surface and ranges in depth from 130 m in winter to less than 30 m in summer. Below this layer there is a thermocline from 25° Celsius (C) at the surface to 5°C at 800 m, then decreases to 1.5°C at the bottom. Surface salinities range from 35.2 parts per thousand (ppt) at 26°N to 34.3 ppt at 10°N. Salinity reflects the balance between precipitation and evaporation so the decrease in salinity at the southern end of the Hawaiian Islands reflects the higher amount of precipitation near the Inter-Tropical Convergence Zone. Salinity tends to decrease with depth, indicating the sinking of lower salinity water from the northern ocean. Higher salinity water (35.2 ppt) is present at the surface down to 160 m, lower salinity (34.1 ppt) down to 550 m, and then the salinity increases slightly to 34.7 ppt for very deep abyssal waters (Flament et al. 1998).

Nutrient conditions in the Hawaiian Islands are influenced by both local and regional factors. Localized wind and bathymetric features may cause upwelling to occur, bringing the cooler, nutrient-rich deep water closer to the surface. Circulation cells and wake eddies found downstream of oceanic islands may concentrate plankton, enhancing productivity near those islands (Ashmole and Ashmole 1967; Boehlert 1993; USFWS 2008). Regional factors include subtropical fronts and the high chlorophyll content of the associated waters north of the front.

The NWHI are located at the northern edge of the oligotrophic tropical Pacific, in the North Pacific central gyre ecosystem. Regional factors are largely influenced by the position of the subtropical front and associated high chlorophyll content of waters north of the front. High-chlorophyll waters intersect the northern portions of the NWHI during southward winter migrations of the subtropical front. The influx of nutrients to the NWHI from these migrations is considered a significant factor influencing different trophic levels in the NWHI. The NWHI are near the 18°C sea surface isotherm, a major ecological transition zone in the northern Pacific. This boundary, also known as the "chlorophyll front," varies in position both seasonally and annually, occasionally transgressing the Monument boundary and surrounding the northern atolls of Kure and Midway. The movement of the front influences overall ocean productivity, and resultant recruitment of certain faunal elements such as Hawaiian monk seals and Laysan and black-footed albatrosses. The northernmost atolls also are occasionally affected by an episodic eastward extension of the Western Pacific warm pool, which can lead to higher summer ocean temperatures at Kure than are found in the more "tropical" waters of the main Hawaiian Islands farther south.

Acoustic Environment

Underwater sound in the ocean can come from a variety of natural and anthropogenic sources. Anthropogenic sources include shipping, general vessel traffic, tour or recreational boats, fishing vessels, aircraft, research, energy and mineral exploration, underwater construction, seismic devices, pingers, and

navy activities, such as use of sonar and underwater explosions. Potential impacts of sound on marine organisms can range from no or very little effect to various levels of behavioral reactions, physiological stress, threshold shifts, auditory masking, and direct trauma. Responses to sound generally fall into three categories: behavioral, acoustic, and physiological. Noise pollution can be intense and acute or less intense and chronic. Commercial shipping is considered to be the major contributor to low frequency noise within the NWHI. Commercial and recreational vessel traffic both contribute to low frequency noises with the MHIs.

3.1.2 Biological Environment

Biological Habitat

The Hawaiian island archipelago supports a diverse and unique array of both marine and terrestrial flora and fauna. With a spectrum of bathymetry and topography ranging from abyssal basins at depths greater than 5,000 m below sea level to rugged hill slopes and cliff tops of each island, the Hawaiian Islands represent a complete cross section of a Pacific archipelagic ecosystem. Habitats in the Hawaiian island archipelago include deep pelagic basins, abyssal plains, submarine escarpments, deep and shallow coral reefs, shallow lagoons, littoral shores, dunes, and dry coastal grasslands and shrublands. Relatively high percentages of most taxonomic groups in the Hawaiian Islands are found nowhere else on earth.

The physical isolation of the Hawaiian Archipelago explains the relatively low species diversity and high endemism levels of its biota (DeMartini and Friedlander 2004). The direction of flow of surface waters explains biogeographic relationships between the Hawaiian Islands and other sites, such as Johnston Atoll to the south, as well as patterns of endemism, population structure, and density of reef fish within the archipelago.

Fishes, Invertebrates and Seabirds

The shallow marine component of the NWHI are nearly pristine in most locations and has been described as a “predator-dominated ecosystem,” an increasingly rare phenomenon in the world’s oceans. Large, predatory fish—such as sharks, giant trevally, and Hawaiian grouper—that are rarely seen and heavily overfished in populated areas of the world are extremely abundant in the waters of the NWHI. For instance, such species comprise only 3 percent of fish biomass in the heavily used main Hawaiian Islands, but by contrast represent 54 percent of fish biomass in the waters of the NWHI. The NWHI are also characterized by a high degree of endemism in reef fish species, particularly at the northern end of the chain, with endemics comprising more than 50 percent of the population in terms of numerical abundance.

The majority of the NWHI consists of deep pelagic waters that surround the island platforms. At least 15 banks lie at depths between 30 and 400 m within the NWHI, providing important habitat for bottomfish and lobster species as well as deepwater precious coral beds, including ancient gold corals whose growth rate is now estimated to be only a few centimeters every hundred years and whose ages may exceed 2,500 years. At depths below 550 m, a diverse community of octocorals and sponges flourish. Even deeper yet, the abyssal depths of the NWHI harbor low densities of organisms, and yet the total biomass of the abyssal community is quite large because of the large area of this habitat type within the NWHI. Occupying this habitat are unique and poorly documented fishes and invertebrates, many with remarkable adaptations to this extreme environment.

Kure Atoll's outer reef forms a nearly complete circular barrier around the lagoon, with the exception of passages to the southwest, and the associated marine habitats support 155 species of reef fishes. Fish species endemic to the Hawaiian Archipelago compose 56 percent of all fish recorded here. There are 27 species of coral found at the atoll. The atoll is an important breeding site for black-footed and Laysan albatrosses, Christmas shearwaters, and 14 other breeding seabirds.

Protected Species/Marine Mammals

The NWHI provide important habitat for many protected species such as the Hawaiian monk seal (*Neomonachus schauinslandi*), five species of sea turtles and an array of cetaceans and other marine mammals. Hawaiian monk seals utilize most of the NWHI, including its atolls, islands, and waters, with varying population (numbers and age structure) and some exchange between the NWHI and the main Hawaiian Islands.

Hawaiian monk seals are wide-ranging, air-breathing aquatic carnivores that spend a majority of their time in the ocean, although they also rely on terrestrial habitat. Monk seals utilize aquatic habitat for foraging, socializing, mating, resting, and traveling. Adept at propulsion in the water, individual monk seals may travel hundreds of miles in a few days (Littnan et al., 2006) and dive to more than 500 m (Parrish et al., 2002).

Hawaiian monk seals are distributed throughout the NWHI, with subpopulations at French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Atoll, Kure Atoll, and Necker and Nihoa Islands. Capture-recapture estimates for the six main NWHI puts the population at 862 (NOAA 2015). The estimate for the sub-population of monk seals at Kure Atoll is 100 - 125 individuals. The data from the capture-recapture estimates indicates that the population trend for the six NWHI sub-populations is decreasing.

The five species of sea turtles that occur in the NWHI are loggerhead (*Caretta carretta*), green (*Chelonia mydas*), olive ridley (*Lepidochelys olivacea*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*), all of which are protected by the Endangered Species Act (ESA). While the sandy islets of French Frigate Shoals provide nesting sites for 90 percent of the threatened green turtle population breeding in the Hawaiian Archipelago, many more islets and atolls provide important nesting habitat for all five species of sea turtles.

Historically, green turtles have been the most abundant species of turtle found at Kure Atoll (Woodward 1972), but recent research has indicated that the total number of turtles of any kind are minimal at Kure Atoll (DLNR 2002).

The waters of the NWHI are also home to 20 cetacean species, six of them federally recognized as endangered under the ESA and recognized as depleted under the MMPA. The great whales occur throughout the Pacific. Four baleen whales—blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), sei whale (*Balaenoptera borealis*), and north Pacific right whale (*Eubalaena japonica*) —and one toothed whale, the sperm whale (*Physeter macrocephalus*), are listed under the ESA. All four of the baleen whales are known to occur in this area of the north Pacific, but are all considered relatively rare in Hawaiian waters. Spinner and bottlenose (*Tursiops truncates)* dolphins are year-round residents of the NWHI. They are not considered threatened or endangered under the ESA or depleted under the MMPA, though they are protected under the MMPA. Both dolphin species occur in the marine waters from the island of Hawai'i to Kure Atoll and a resident population of spinner dolphins inhabits the Kure Atoll lagoon during the day.

3.1.3 Socioeconomic Environment

Maritime Transportation/Traffic and Military Operations

Entering the Monument is prohibited without a permit, except for law enforcement when responding to emergencies, armed forces activities and exercises, and passage without interruptions. All U.S. vessels, passing through the Monument without interruption, are subject to various prohibitions and must provide notification prior to entering and after leaving the Monument. In addition, in 2003 the Monument was designated as a Particularly Sensitive Sea Area, and protective measures consisting of (1) expanding and consolidating the six existing Areas to be Avoided in the Monument into four larger areas and enlarging the class of vessels to which they apply; and (2) establishing a ship reporting system for vessels transiting the Monument, which is mandatory for ships 300 gross tons or greater that are entering or departing a U.S. port or place and recommended for other ships, were adopted. With the exception of a few small boats at Midway Atoll and Tern Island, no vessels have home ports in the NWHI. For this reason, almost all marine traffic in the waters surrounding the NWHI is made up of Department of Defense vessels conducting training and testing activities, transiting vessels, USCG ships, and separately permitted vessels.

Commercial, Economic, and Other Human Uses

The NWHI has a long history of human use. Native Hawaiians explored these waters, established settlements, and conducted religious ceremonies for hundreds of years prior to the arrival of the first Europeans. Most extractive uses in the ocean, including whaling, and a variety of fishing ventures, ended by the early 1900s. The Navy conducts training and testing within the Hawaii Operating Area, which includes a portion of the Monument. In addition, the Department of Defense conducts missile defense testing, including missile intercepts, in and around the Monument. The earliest intensive scientific expedition in the Northwestern Hawaiian Islands was the Rothschild Expedition in 1891. The proposed activity would not impact commercial activity permitted under a Special Ocean Use (SOU) permit category because of the limited scope and time in which the proposed action would occur.

Research and Education

Compared to the past, there is little human activity in the NWHI today. With the departure of the military and the phasing out of all commercial fishing by 2011, the main marine-related activities are research, wildlife management, and transiting ships. Per Presidential Proclamation 8031, access to the Monument may occur under six types of permitted activities: 1) research, 2) education, 3) conservation, 4) Native Hawaiian practices, 5) Special Ocean Use and 6) recreational activities. On average, 27 permits are issued each year for access to the Monument. Of those, 45 percent of the total permits issued are research based, and typically 4 percent are education based. The majority of education and outreach efforts occur within the Main Hawaiian Islands in an effort to “bring the place to the people” as a way to continue to provide educational opportunities while minimizing human impact on Monument resources. Separately permitted research and education activities that further the research, education and conservation and management of the Monument occur on an annual basis.

3.1.4 Hazardous Material

Solid Waste

In general, all hazardous material and hazardous waste management activities within the marine areas of the Monument are on marine vessels. The controlled environment onboard these vessels allows for proper containment of chemical substances. In a shipboard environment there are numerous engineering and management controls that prevent hazardous chemicals or materials from contaminating crew, passengers, and the environment. Pursuant to the Resource Conservation and Recovery Act, 42 U.S.C. § 6921-6939f, any hazardous waste generated aboard a marine vessel, such as mercury containing light bulbs, waste paint, dry cleaning and photo-processing operations, batteries, or solvents, is required to be offloaded and properly disposed of in land-based treatment or disposal facilities. Monument regulations and permit conditions provide additional safeguards on hazardous material and waste management including requirement for vessel monitoring systems and reporting all release incidents.

There are only three known locations in the Monument where terrestrial hazardous materials exist: Tern Island at French Frigate Shoals, the islands at Midway Atoll, and Green Island at Kure Atoll, all related to past use by the Department of Defense and U.S. Coast Guard. An incident during remediation of the Green Island site is what resulted in the need for this proposed action.

3.1.5 Maritime Heritage & Cultural Environment

Native Hawaiian Cultural Significance

The ocean serves as a central source of physical and spiritual sustenance for Native Hawaiians on a daily basis. Poetically referred to as Ke kai pōpolohua mea a Kāne (the deep dark ocean of Kāne), the ocean was divided into numerous smaller divisions and categories, from the nearshore to the deeper pelagic waters (Malo 1951). Likewise, channels between islands were also given names and served as connections between islands, as well as a reminder of their larger oceanic history and identity.

Today, Native Hawaiians continue to maintain their strong cultural ties to the land and sea. This concept of interconnectedness transcends geography. Native Hawaiians understand the importance of managing the islands and waters as one, as they are inextricably connected to one another (Beckwith 1951). Despite the fact that the NWHI were not used and experienced on a daily basis by most Hawaiians, they have always been seen as an integral part of the Hawaiian Archipelago and have been honored as a deeply spiritual location, as evidenced by the many wahi kūpuna, or sacred sites, on Nihoa and Mokumanamana.

Mokupāpapa literally means flat island, and the name was ascribed to Kure Atoll by officials of the Hawaiian Kingdom in the 19th century. Under the reign of King David Kalākaua, the Hawaiian Kingdom disbursed an official envoy to Kure Atoll to take 'formal possession' of the atoll. At the time, Kure was known in the kingdom as Ocean Island, but Hawaiian Kingdom officials indicated that Kure was "known to ancient Hawaiians, named by them Moku Pāpapa and recognized as part of the Hawaiian Domain."

Maritime Heritage Significance

In addition to the rich Native Hawaiian cultural setting, maritime activities following Western contact with the Hawaiian Islands have left behind the historical and archaeological traces of a unique past. Currently, there are over 60 known ship losses and/or confirmed sites among the NWHI, the earliest loss dating back to 1818. This, combined with 67 known aircraft crashes, gives a total of over 120 potential maritime heritage resource sites.

As American and British whalers first made passage from Hawai'i to the seas near Japan in 1820, they encountered the low and uncharted atolls of the NWHI. At times the treacherous nature of navigation in the region gave rise the Western names of the islands and atolls as we know them today. Pearl and Hermes Atoll is named for the twin wrecks of the British whalers Pearl and Hermes lost in 1822. Laysan was reportedly discovered by the American whale ship Lyra prior to 1828. The history of American whaling is a significant part of our national maritime heritage and is a topic that encompasses historic voyages and seafaring traditions set on a global stage as these voyages had political, economic and cultural impacts. As a nation we were intimately involved in the whaling industry in important and complex ways. There are 10 known whaling shipwrecks in the NWHI. Three of these have been located (American whaler Parker and British whalers Pearl and Hermes) and their archaeological assessment is underway. Whaling vessel wreck sites from the early 19th century are quite rare, and the study and preservation of heritage resources is an important concern. The NWHI provide a unique glimpse into our maritime past.

Despite being slowly integrated into navigational charts, the NWHI remained an area of low and inconspicuous reefs and atolls for many years, frequented by shipwrecks and castaways. Russian and French ships of discovery transited the NWHI, and sometimes found themselves upon the sharp coral

reefs. Nineteenth century Japanese junks of the Tokugawa Shogunate period, drifting away from their home islands and into the Pacific, were reportedly washed onto the sands of the atolls. Hawaiian schooners and local fishing sampans voyaged into the archipelago, many not to return. Marine salvage expeditions based out of the main Hawaiian Islands profited from the area, although existing records of their cruising activities are scarce. These types of sites have the potential to yield information about early historic period voyages in the Pacific and about the seafaring traditions of many cultures.

There are four significant maritime heritage resource sites in or near the Kure Atoll lagoon, the nearest to the excavator site being the wreck of the U.S.S. *Saginaw*, located approximately two miles northeast on the outside edge of the surrounding fringe reef. None of the maritime heritage resource site are within two miles of any of the projected transit routes into or out of the lagoon.

4.0 Environmental Consequences

This section evaluates the environmental consequences of the alternatives as described in Chapter 2 (Description of Alternatives). The environmental effects of these alternatives are evaluated within the context of the physical, biological, socioeconomic and historic and cultural setting. Information about the physical, biological, socioeconomic and historic and cultural sanctuary setting can be found in Chapter 3 (Affected Environment).

4.1 Characterizing Effects

NEPA requires consideration of the effects of major federal actions on the quality of the human environment (42 U.S.C. § 4332(c)). Effects are characterized as negligible, less than significant, or significant, and are also characterized by type (adverse or beneficial), context, intensity and duration (short- or long-term)(40 C.F.R. § 1508.27). Effects can be further characterized by whether they affect resources directly or indirectly. The following definitions and characterizations were used for this analysis:

- Negligible effects – effects for which virtually no effect to a resource can be detected (whether beneficial or adverse), essentially "neutral" or hardly noticeable effects.
- Less than significant effects – effects that do not rise to the level of significance as defined below, or these can be thought of as "minor" effects.
- Significant effects – effects resulting in an alteration in the state of a physical, biological, historic/cultural or socioeconomic resource. Long-term or permanent effects or effects with a high intensity or frequency of alteration to a resource, whether beneficial or adverse, would be considered significant. The significance threshold is evaluated on a case-by-case basis, taking into consideration the context and intensity of each action.
- Direct effects – effects that are caused by the action and occur at the same time and place.
- Indirect effects – effects that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.
- Minimization – actions that limit the degree or magnitude of the action and its implementation.

- Mitigation – actions that are taken or avoided in order to either minimize or avoid impact by limiting the magnitude of affect or rectify or reduce impact over time by either repairing the affected environment or providing substitute resources.

Certain activities may be modified as a result of interagency consultation with NMFS pursuant to the Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Endangered Species Act (ESA), in order to minimize impact on protected species. Specific mitigation and minimization measures are included as either part of this document or concurrent consultations, such as under the ESA or Essential Fish Habitat under the MSA. All necessary consultations with NMFS will be completed and incorporated by reference herein prior to final publication of this EA.

Under the preferred alternative, the M/V *Kahana* would transport all equipment and personnel from Honolulu, Hawaii to Kure Atoll within the NWHI. Once on station, SEI would salvage the excavator and associated debris from Kure Atoll. The salvage operation (described in Section 2.1) would be monitored by U.S. Army Corps of Engineers staff who would provide a dive safety officer and by DLNR staff who would serve as resource monitors. Salvage operations would include video documentation of the before and after condition of the site, as well as the actual salvage operation. Through the use of pontoon floats and lift bags, the excavator would be raised to the surface, and then towed outside of the fringing reef. The excavator would be lifted onto the deck of the M/V *Kahana* using the vessel's crane. The associated debris (chain-link fencing, windows, aluminum roof) would be removed after completing the salvage of the excavator, and would precede a final sweep of the area for additional debris and further video documentation. The potential adverse impacts from this alternative could include those associated with the transit of the M/V Kahana from Honolulu to Kure Atoll and back, and those associated with the salvage operation; but the potential adverse impacts from release of the contaminants contained within the excavator to the physical and biological resources of the Monument could be avoided. In addition, impacts from wave and current induced movements of the debris in the marine environment, as well as impacts associated with entanglement, would be lessened through the removal of the material from the marine environment. As further discussed below, impacts from implementing the preferred alternative are expected to be below significance due to the nature of the activities, the best management practices that will be employed, and the temporal and geographic limits of the salvage operation.

Under the No Action Alternative, the excavator and associated debris would remain in the lagoon at Kure Atoll, and be subject to movement within the lagoon and towards land due to currents and large wave events. Under this alternative, any adverse impacts associated with the transit of the M/V *Kahana* from Honolulu to Kure Atoll and back, as well as the actual salvage operation would be avoided; but the adverse impacts to the physical and biological resources could occur due to the continued presence of the excavator, the contaminants it contains, and from the associated debris. The continuing risks could include: entanglement, exposure to contaminants, and damage to habitats, which could result in injury or mortality to the biological resources and habitats at Kure Atoll.

4.1.1 Physical & Biological Environment

Activities associated with the salvage operation (preferred alternative) are expected to have less than significant adverse impacts to the physical and biological marine environment. Furthermore, any impacts would be minimized by the adherence to Monument Best Management Practices (BMPs), included here as Appendix B, and as required by the PMNM permit, as well as other minimization and mitigation actions resulting from other associated consultations, such as ESA. The following analysis describes

potential impacts and the anticipated mitigation measures that would be employed to maximize protection of the physical and biological environment during the salvage operation.

As previously mentioned, Kure Atoll is approximately 2,000 km northwest of the island of O‘ahu. The M/V *Kahana* would transport the salvage equipment and personnel that would be performing or overseeing the salvage operation from Honolulu to Kure Atoll and back to Honolulu. The transit would be expected to take approximately five days, and the vessel would make no intervening stops, instead taking as direct a route as possible to Kure Atoll, and then anchoring outside of the fringing reef for the extent of the salvage operation. The transit of the M/V *Kahana* would be expected to have less than significant adverse impacts on the biological and marine environment since it would follow MARPOL 73/78 regulations while outside the Monument, and Monument Boating management practices (see Appendices) while inside the Monument, with regards to discharge and garbage disposal. The potential exists for negative adverse impacts to the biological environment during the transit of the M/V *Kahana* from Honolulu to Kure Atoll and back should it strike any of those resources during the transit; but the vessel would be required to follow the Marine Mammal Viewing Guidelines (see appropriate BMP, Appendix B) within the Monument which restrict vessel speeds, requires vessels to maintain certain distances from marine mammals and turtles, and to yield the right-of-way, which should reduce the likelihood of striking any ESA-listed species or other biological resources during the portion of the transit through the Monument. For the transit to and from Honolulu and the Monument boundary the BMPs proposed by SEI, which include reduced vessel speed in proximity to listed species and employing observers while underway, would reduce the likelihood of adverse impacts to the biological resources if implemented properly.

The salvage of the excavator and the associated debris would take place in mid to late-October 2016. The timing of the salvage operation would be prior to the winter weather conditions that bring large waves and strong currents to the Hawaiian Archipelago making the operation much more difficult. The proposed work plan indicated that salvage activities would only proceed if wave heights were less than 1 m, and the proposed window is likely the last opportunity to perform the salvage until late spring of 2017.

Salvage operations may adversely affect the biological environment through the potential for entanglement with ropes, straps and lines used in the salvage; from damage due to contact from vessels, lift bags or floats, and from an accidental release of pollutants or waste from the vessels or equipment being salvaged. But, every effort would be made to avoid or minimize any damage, including 24x7 monitoring by USACE and State resource monitors. The salvage operation would take into consideration measures that would minimize impacts to the marine environment (including the seafloor and surrounding coral reef) while ensuring the safety of the salvage team. To minimize the chance of interaction with protected species, topside support aboard all operating vessels would constantly monitor for the presence of protected species. Should a protected species be present in the work area, work would not commence until the species is no longer present, as prescribed in the Terms and Conditions of the Monument permit. Should an ESA-listed species enter the work area, work would only proceed consistent with any mitigations identified during the ESA consultation for this proposed activity.

The mobilization, demobilization, and vessel operation activities associated with the salvage operation would require between 2 – 4 days and result in a temporary disturbance to the biological and physical environment at Kure Atoll. The most likely reaction by the biological resources of the atoll would be a general avoidance of the area where the salvage activities would occur. This avoidance could have direct adverse impacts to the fitness of the resources impacted, but these impacts would likely be less than significant and temporary, and would not affect the long-term health of an individual, because of the short

duration of the salvage operation, the limited area where the project activities would be taking place, and the expected compliance to the Terms and Conditions of the permit and with the BMPs for the Monument. Any impacts to the physical environment of the atoll would be minimal due to the relatively small amount of contaminants contained within the excavator (see section 1.1), the use of spill response equipment to capture any spills, the limited biological resources in the immediate sandy area of the lagoon where the excavator lies, and the expected compliance to the Terms and Conditions of the permit and the BMPs in place for the Monument, It is further expected that the site of the salvage would recover quickly after the operation was completed because of the minimal disturbance expected.

The actual act of salvaging the excavator could result in the accidental release of oil, hydraulic fluid, fuel, or battery acid, which poses a risk to the physical and biological environment of Kure Atoll. Because of the measures that would be implemented to contain any fluids that might be released from the excavator during the salvage operation (as described in section 2.1), the potential for impacts would be less than significant because they would be contained within the salvage site by the spill response gear and quickly diluted by the surrounding water. Because of the dilution factor, any accidental release would not pose a long-term risk.

Black water discharge (untreated sewage water) is not allowed anywhere within the Monument, so there would be negligible effects to the marine environment and the biological resources of the Monument from vessel discharge, provided all regulations and conditions are adhered to. Should the M/V *Kahana*, the *Alewa*, or the SEI RHIB require minor maintenance while at Kure Atoll, where possible, bio-based lubricants and fluids (and, in some cases bio-based fuels) would be used to further reduce the threat to habitat resources in the unlikely event of an unintentional spill. In general, vessel operators would practice heightened awareness to be careful not to impact habitat resources when conducting activities.

Because of the amount of equipment (vessels, salvage gear, etc.) and personnel involved in the proposed salvage operation, there is a risk of adverse impacts to the physical and biological environment of the Monument and the waters that would be transited prior to accessing the Monument; but the impacts should be less than significant based on adherence to the Terms and Conditions of the Monument permit and BMPs in place for any authorized permittee. While the permit Terms and Conditions and BMPs are technically only applicable inside the Monument boundaries, there will be USACE and State resource monitors on board to strongly encourage compliance with Terms and Conditions and BMPs throughout the voyage and operation. Under normal circumstances, any incident that might occur during the transit to and from Kure Atoll and the salvage operation itself would result in insignificant impacts due to compliance with permit Terms and Conditions, adherence to the Monument BMPs and to the Environmental Protection Concerns in Section 8 of the Salvage Plan (Appendix A), active involvement of resource monitors, and the short-term duration and localized area in which the activities might occur.

Under the No Action Alternative, the possibility of impacts from the hydraulic fluid, gasoline, and diesel fuel contained in the excavator remaining in the lagoon would likely be less than significant due to the rapid dilution of the chemicals if they were released into the marine environment, but the impact could be significant and adverse if exposure occurred at the source. These contaminants could have direct impact on monk seals or sea turtles found at the atoll through contact, or through prey species consumed by those species. Both of these exposure pathways could result in monk seals and turtles becoming sick which would reduce their fitness, or possibly result in mortality if sufficient exposure were to occur. The risk to corals from exposure to any contaminants would likely include increased susceptibility to disease or even mortality.

The excavator has a single 12V battery that contains acid. Over time the battery would corrode, and likely release the acid into the nearby environment. Since the acid would dilute quickly in the marine environment the impact would likely be less than significant, but if monk seals or turtles were to be exposed to full strength acid, the impact would be adverse and significant due to the likelihood of an individual being burned where the acid made contact on the body or even result in blindness if the acid were to make contact with the eyes. The result of any burn on the body would likely be reduced fitness, and could result in mortality if the burn site were to become infected. For an individual that was blinded, mortality would be a certainty. Due to the rapid dilution of the acid, the potential risk to corals would likely be minimal unless the colonies were in very close proximity to the excavator.

The chain link fence represents a significant entanglement hazard for monk seals and turtles. The fence is 10 m long, 2 m high, and weighs approximately 100 kg. While in the lagoon, a monk seal or turtle that were to be caught in or under the fencing would most likely not be able to free themselves and would drown. The entanglement concern is also an issue if the fencing were to wash up near or on the shoreline of Green Island. Here a monk seal or turtle that might be entangled in the mesh could be severely injured which at the very least would reduce its fitness, and could result in mortality.

Leaving the excavator and other equipment in the Kure Atoll lagoon will likely result in potentially significant damage to the seafloor and coral reef ecosystem within the lagoon due to unpredictable movement of the excavator and equipment around seafloor due to seasonal wave action. Any equipment or debris that washed up on the beach will also be an entanglement hazard for seabirds.

4.1.2 Socioeconomic Environment

The Monument is a fully protected marine environment and no commercial activities beyond uninterrupted passage can occur unless specifically permitted by the Monument co-managing agencies. Should no action be taken, additional resources would be necessary to both remove and possibly repair damage to the marine environment as a result of debris movement. This activity is not likely to impact vessels transiting the area as no vessel transit occurs at or near the excavator location. Under either alternative, we anticipate negligible or neutral effects to the No effect on the socioeconomic environment is anticipated, unless no action is taken and the excavator causes further damage to marine resources.

4.1.3 Maritime Heritage and Cultural Environment

As discussed above, there are four known historic or maritime heritage resources in or near the Kure Atoll lagoon. All of the known sites are on or near the lagoon's fringing reef, and none of the sites are closer than two miles to the current excavator location or any of the projected routes into or out of the lagoon. As such, under the Preferred Action Alternative, impacts to known historic or maritime heritage sites from anchoring and unintentional striking or groundings are unlikely, but could occur if unidentified resources were encountered during the activity. The vessel operations associated with the salvage operations would be isolated and limited in space and time. Vessel operators would have an appropriate tonnage USCG license and experience for the vessel size. Under the permit Terms and Conditions and as required within the Monument BMPs, vessel operators are required to adhere to all protocols and procedures in place for the Monument to avoid impacts to habitat and other resources when conducting activities within the Monument; in addition, USACE and/or State resource monitors will be present during all salvage operations. In-water assessment and salvage operations are also not likely to adversely affect maritime heritage resources, cultural resources and historic properties. While intentional or accidental improper diving techniques and overuse of specific locations can result in damage to these

resources, divers would be required to follow the Monument Best Management Practice for Maritime Heritage Resources (BMP #017). In-water activities are limited in scope, time, and space. Should a new maritime heritage site be identified, GPS coordinates would be obtained and reported to the ONMS Maritime Heritage Coordinator, per the Monument BMP #017. In line with the analysis above, the proposed action activities (under the preferred alternative) are expected to result in negligible effects to maritime heritage and the cultural environment.

Under the No Action Alternative, the excavator and associated debris remaining in the lagoon and could cause further damage to marine resources possibly including maritime heritage and cultural environment resources. Should no action be taken, additional resources would be necessary to both remove and possibly repair damage to the marine environment as a result of debris movement.

4.2 *Cumulative Impacts*

The cumulative effect of the proposed action under the preferred alternative is the incremental environmental effect that the proposed action has when added to other past, present, and foreseeable future actions in the affected environment (40 CFR 1508.7). Cumulative effects are critical to explore because individually insignificant actions may sometimes combine to cause significant adverse impacts. To identify potential cumulative effect concerns, ONMS considered the effects of the operations identified under the preferred alternative in conjunction with the effects associated with other past, present, and foreseeable future actions in the affected environment. The operations that were identified as having some potential to contribute to cumulative effects include those that could result in seafloor disturbance and impacts to living marine resources. Effects are described below.

4.2.1 Cumulative Effects on Physical & Biological Environment

Assessment and salvage operations authorized by a Monument permit that could result in disturbance to the physical and biological environment include vessel operations and in-water activities, including diving-related activities and actual salvage operations. The actual salvage operation is expected to take two days, but may take longer depending on the weather. The main impacts are expected to be disturbance to the seafloor and impacts on living marine resources from the actual retrieval and towing of the excavator. Vessel operations under the proposed action would be speed-restricted, conducted by professional salvors, and waste water discharge would be regulated.

On average, approximately five permits are issued per year that allow access to Kure Atoll. Three of these permits are issued every year, these include: a permit each for State of Hawai‘i and the monk seal field camps, and one for the Rapid Ecological Assessment Program (RAMP) surveys by Pacific Islands Fishery Science Center. The State of Hawai‘i field camp is a year-round presence of approximately five staff members who perform biological surveys and eradication programs. The monk seal field camp consists of two staff members who spend approximately 60 - 90 days in the atoll performing biological surveys. The RAMP cruise is an annual marine survey of the islands and atolls in the NWHI, which usually requires a couple of days at each atoll or island. The presence of permitted vessels for the RAMP surveys and field camp support missions represents the only time vessels are at Kure Atoll. Individual permits for third-party applicants are issued for Kure Atoll, but these uncommon (a couple per year), and access is usually based on the schedule of the aforementioned permitted vessels. While Kure Atoll field camp staff operate small boats in the lagoon, these operations are almost solely for transit back and forth between other islands and support vessels, with virtually no disturbance of the coral reef ecosystem or marine life in the lagoon.

When combined with the activities described above, the limited scope and short duration of the proposed salvage operation are expected to result in minor, short-term disturbance; and when taken as a whole, are expected to result in negligible cumulative effects on the physical and biological resources at Kure Atoll.

Throughout the Hawaiian island archipelago, vessel operation and transit activities are not expected to yield significant cumulative impacts. All activities in the Monument, with few exceptions, require a Monument issued permit, resulting in minimal and controlled activities occurring within Monument boundaries. While vessel operations are less regulated outside of Monument boundaries throughout the Main Hawaiian Islands, the proposed action's vessel operations outside of the Monument is limited to transit from Honolulu to the point at which the contractor enter/exits the Monument.

4.2.2 Cumulative Effects on Socioeconomic Environment

No significant cumulative effect on the socioeconomic environment is anticipated from implementation of the preferred alternative. The Monument is a fully protected marine environment and no commercial activities, other than uninterrupted transit can occur unless specifically permitted by the Monument co-managing agencies. Additional effects on socioeconomic resources are expected to be positive and beneficial. The removal of the excavator and associated debris would ensure there is no further damage to the marine environment at Kure Atoll associated with the September 2, 2016 incident. As a result, the proposed action activity is not expected to result in any significant cumulative effects on the socioeconomic environment.

4.2.3 Cumulative Effects on Maritime Heritage and Cultural Environment

No known cultural, historic or maritime heritage resources are present in the area impacted by the excavator and other debris, therefore, the preferred alternative analyzed in this environmental assessment would not be expected to result in significant effects on the maritime heritage and cultural environment. All operational activities are designed to retrieve and transport the excavator and associated debris from the Monument to Honolulu, Hawaii, in order to remove the threat of further damage to resources. While intentional or accidental improper diving techniques and overuse of specific locations can result in damage to these resources, divers for the proposed activity would follow the Monument Best Management Practice for Maritime Heritage Resources (BMP #017, see Appendix B). In-water activities would be limited in scope, time, and space. Activities to assess the situation and remove the excavator and associated debris would be limited to the incident site and would not take longer than necessary to assess the situation, remove the excavator and associated debris and transport it back to Honolulu, Hawaii. Given the lack of known cultural, historic or maritime heritage resources in the affected area, and the use of the above described BMPs, these operations are not expected to result in any significant cumulative adverse effects on maritime heritage and cultural environment resources.

5.0 CONSULTATIONS

Endangered Species Act

On October 11, 2016, the ONMS initiated informal consultation per Section 7(a)(2) of the ESA. In its letter, ONMS evaluated the effects of the proposed salvage operation on the following ESA-listed marine species: green sea turtle, hawksbill sea turtles, leatherback sea turtles, North Pacific loggerhead sea turtle DPS, olive ridley sea turtles, Main Hawaiian Islands false killer whale DPS, blue whales, fin whales, North Pacific right whales, sei whales, sperm whales, and Hawaiian monk seals. In the request letter,

ONMS determined that the potential effects of the salvage operation on ESA-listed marine species presented above from the proposed action are expected have insignificant or discountable effects on protected species and designated critical habitat. Therefore, the proposed action is not likely to adversely affect those species or their critical habitat. On October 12, 2016, NMFS concurred with ONMS' determination regarding the potential impacts to ESA-listed species, and provided a Letter of Concurrence (NMFS 2016) which completed the ONMS requirements to consult with NMFS under the Endangered Species Act.

Essential Fish Habitat Assessment

The site for the proposed action is comprised of monk seal critical habitat and essential fish habitat as defined under the Magnuson Stevens Act. Vessel and salvage operations, including diving-related activities may be necessary to complete the salvage effort to remove the excavator and associated debris at Kure Atoll. Potential impacts may include additional risk of grounding of a vessel or other equipment necessary for salvage operations, disturbance to the seafloor due to in-water activities, and unintentional contact with coral reefs during operations. Aforementioned impacts would be reduced or eliminated due to the general and special conditions imposed on the proposed action. In accordance with the Monument Co-Trustee permit, under which the proposed action would be authorized, contractors and partner agency representatives would be required follow a set of BMPs to minimize any potential damage to bottom habitat or the water column to the greatest extent possible. In the Monument, per Proclamation 8031, anchoring on coral is prohibited. In addition, managers limit activities in accordance with the following BMPs: instruments are deployed and lowered onto sandy substrate whenever possible; deployment of instruments occurs slowly and under constant supervision to minimize risk and mitigate impacts if a collision or entanglement occurs; and while vehicles or personnel are deployed, spotters monitor the activities at all times. Lastly, for the safety of the salvage personnel, as well as the biological resources of the Monument, no night operations would be allowed.

On October 7, 2016, ONMS initiated informal consultation, under the Magnuson-Stevens Fishery Conservation and Management Act, on impacts to EFH; on October 11, 2016 NMFS concurred via e-mail with the determination made by ONMS that the action may affect but is not likely to adversely affect EFH. This determination is based on the implementation of required and recommended mitigation measures that would minimize or altogether avoid impacts to EFH, thus ensuring the protection of the marine environment during activities. Cumulative impacts of implementing the preferred alternative are expected to be less than significant. Assessment of impacts on the incident site would be completed prior to, and after removal of the excavator and debris.

National Historic Preservation Act

Under the provisions of Section 106 of the National Historic Preservation Act of 1966, the Secretary of the Interior has compiled a national register of sites and buildings of significant importance to America's history. Sites in the NWHI include cultural sites on Nihoa and Mokumanamana, and historic sites on Midway Atoll. The Proposed Action would not cause any significant impacts to historic properties, including registered sites or buildings on shore or any such submerged site, such as shipwrecks because activities are ocean-based and not near known historic properties.

REFERENCES

Ashmole, N.P., & Ashmole, M.J. 1967. Comparative feeding ecology of seabirds of a tropical oceanic island. Bulletin of the Peabody Museum of Natural History. 24: 1–131.

Beckwith, Martha W. Translation of the Kumulipo: A Hawaiian Creation Chant. 1951. Previous translation by Queen Liliʻuokalani, circ. 1897.

Boehlert, G.W. 1993. Fisheries and marine resources of Hawaiʻi and the U.S.- associated Pacific Islands: An introduction. Marine Fisheries Review. 55(2): 3-6.

DeMartini, E.E. and A.M. Friedlander. 2004. Spatial Patterns of Endemism in Shallow Reef Fish Populations of the Northwestern Hawaiian Islands. *Marine Ecology Progress Series* 271:281-296.

DLNR. 2002. Northwestern Hawaiian Islands/Kure Atoll Assessment and Monitoring Program. Walsh, W., R. Okano, R. Nishimotot, and B. Carman. Final Report March 2002: Grant Number NA070A0457. 60 pp.

Flament, P., Kennan, S., Lumpkin, R., Sawyer, M., Stroup, E.D. 1998. Ocean Atlas of Hawai'i. Retrieved from http://www.soest.hawaii.edu/hioos/oceanatlas/authors.htm. Date accessed January 14, 2011.

Friedlander, A. and E. DeMartini. 2002. Contrast in density, size, and biomass of reef fishes between the Northwestern and the main Hawaiian Islands: the effects of fishing down apex predators. *Marine Ecological Progress Series* 230: 253-264.

Littnan, C., B. Stewart, P. Yochem, and R. Braun. 2006. Survey for selected pathogens and evaluation of disease risk factors for endangered Hawaiian monk seals in the main Hawaiian Islands. Ecohealth Vol. 3: Issue 4: P. 232-244.

Malo, David. Ka Moʻolelo Hawaii (Hawaiian Antiquities). 2nd Ed. Bishop Museum Press, 1951.

NMFS. 2016. Letter of Concurrence from Ann M. Garrett to Athline Clark in response to a Request for Section 7 Consultation sent by the ONMS to NMFS on October 11, 2016.

NOAA. 2015. U.S Pacific Marine Marine Mammal Stock Assessments:2014. Carretta J., E. Olsen, D. Weller, A. Lang, K. Forney, J. Baker, M. Muto, B. Hanson, A. Orr, H. Huber, M. Lowry, J. Barlow, J. Moore, D. Lynch, L. Carswell and R. Brownell Jr. NOAA Technical Memorandum: NOAA-TM-NMFS-SWFSC-549. 414pp.

Parrish, F.A., K. Abernathy, G.J. Marshall, and B.M. Buhleiert. 2002 Hawaiian monk seals (*Monachus schauinslandi*) Foraging in deep-water coral beds. Marine Mammal Science 18 (1): 244–258.

U.S. Geological Survey. 1999. The long trail of the Hawaiian hotspot. Retrieved from http://pubs.usgs.gov/gip/dynamic/Hawaiian.html.

USFWS. 2008. Papahānaumokuākea Marine National Monument Management Plan: Vol. 1. Washington, DC: U.S. Government Printing Office.

Woodward-Clyde Consultants 1994. *Kure Atoll Scrap Metal Dump Ecological Risk Assessment*. January.

Woodward, P. 1972. The natural history of Kure Atoll, Northwestern Hawaiian Islands. Atoll Research Bull. 164: 1-318.