EXECUTIVE SUMMARY

INTRODUCTION

This Environmental Assessment is being prepared to evaluate the potential environmental effects of the U.S. Navy's proposal to lift the Japanese ship *Ehime Maru* from the seafloor, transport the vessel to a shallow-water site in order to recover the crewmembers, and then permanently relocate the ship to a deep-water site. Preparation of the Environmental Assessment implements U.S. law and policy, contained in the National Environmental Policy Act and its implementing regulations, to consider the potential environmental effects of federal actions as part of the agency's decision processes. The analysis in the Environmental Assessment will assist Navy officials in making informed decisions concerning recovery of *Ehime Maru* crewmembers, their personal effects, and certain unique characteristic components of the ship (such as the anchors, forward mast, placard, and ship's wheel), while minimizing the risk to divers, the environment, equipment, and other personnel involved. The Proposed Action would also include the safe removal, to the maximum extent practicable, of diesel fuel, lubricating oil, loose debris, and any other materials that may degrade the marine environment, and the relocation of *Ehime Maru* to a deep-water site. This is not a salvage operation to recover the ship.

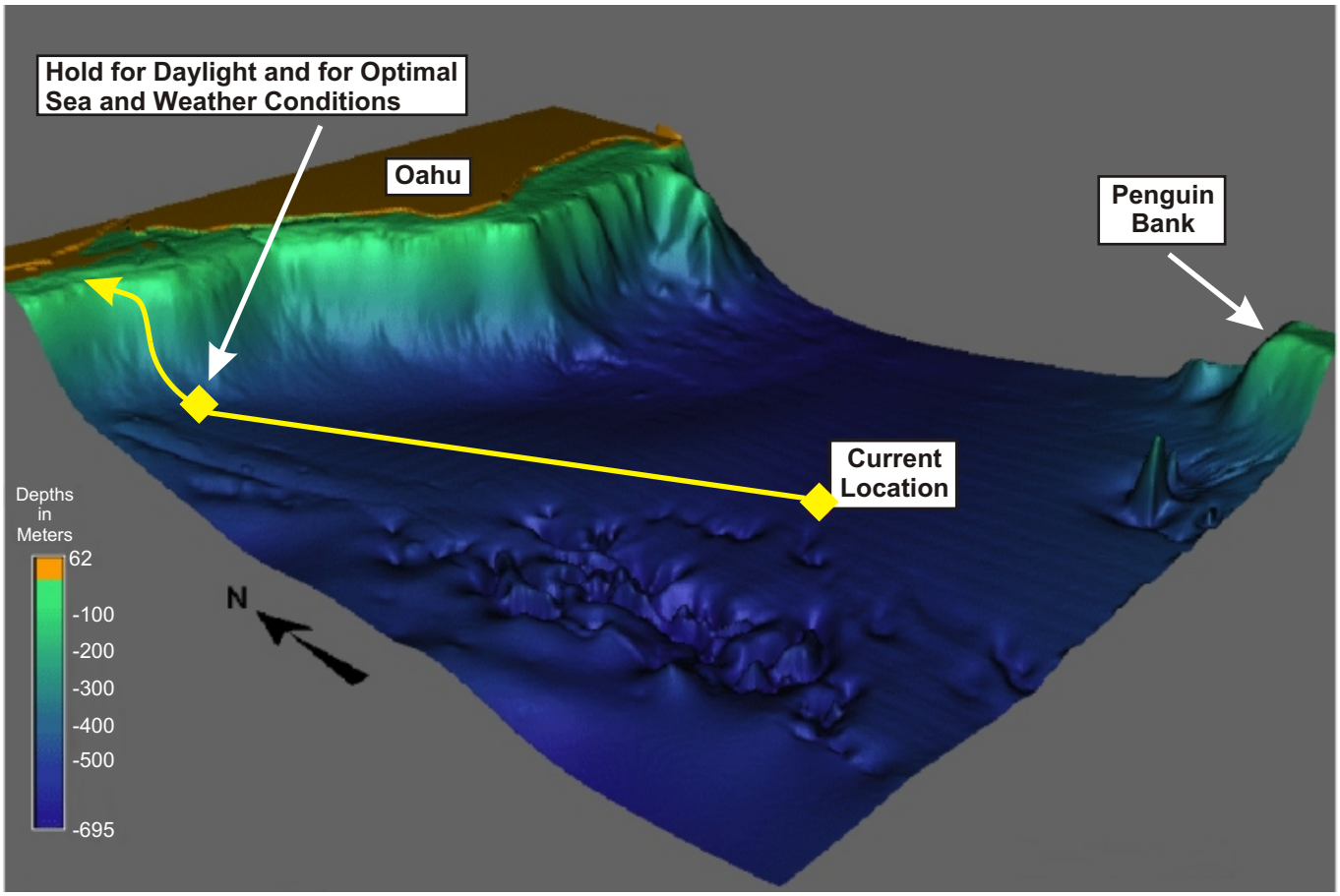
BACKGROUND

On February 9, 2001, USS *Greeneville*, a Los Angeles class submarine, collided with *Ehime Maru*, a Japanese training and fishing vessel, approximately 9 nautical miles (17 kilometers) south of Diamond Head on the island of Oahu, Hawaii (figure ES-1). *Ehime Maru* sank in approximately 2,000 feet (600 meters) of water. At the time of the sinking, 26 of the 35 crewmembers were rescued. However, despite an extensive air and sea search for the nine remaining crewmembers, the Navy was unable to locate them, and it is presumed that they were trapped inside the vessel or went overboard as the ship went down. The vessel is resting upright on the seafloor at 21 degrees 04.8 minutes North latitude, 157 degrees 49.5 minutes West longitude, outside of state of Hawaii waters. The Navy and the Commanding Officer, USS *Greeneville*, have accepted full responsibility for the collision and its result.

Following communication with the Government of Japan to determine the desires of the families of the missing crewmembers, the Navy has agreed and is determined to make all reasonable efforts for the recovery of *Ehime Maru* crewmembers, their personal effects, and certain unique characteristic components of the ship.

EVALUATION OF ALTERNATIVE RECOVERY METHODS

The Navy assembled a diverse and knowledgeable team of experts to evaluate the feasibility and effects of alternative methods of conducting recovery operations. Using Remotely Operated Vehicles with video cameras, the Navy was able to determine that *Ehime Maru* had suffered obvious external hull damage. Although the bottom of the hull is



Source: U.S. Department of the Navy, 2001b

Current Location of *Ehime Maru*

Figure ES-1

Not to Scale

1_1CurrentLocation053101

not visible, it is expected that the vessel has a large hole in the bottom of the hull near its stern, caused by the rudder of the Navy submarine. This was the likely cause of the rapid sinking of the vessel. It is also assumed that the force of the collision opened the vessel's bulkheads and that fuel tanks and other closed containers were crushed by the enormous change in pressure caused by the rapid sinking of the vessel to its present 2,000-foot (600-meter) depth. Consequently, it is possible that a substantial quantity of diesel fuel and lubricating oil has leaked out of the storage tanks and has collected in pockets within the vessel's hull.

Due to the extensive structural damage to *Ehime Maru*, the Navy determined that a number of potential recovery methods were not feasible. The use of Remotely Operated Vehicles is not feasible because they do not have the capability to cut through obstructions or to enter closed compartments to make a thorough search for the crewmembers. Similarly, available saturation diver systems are not capable of conducting recovery operations at the 2,000-foot (600-meter) depth.

Unprotected divers cannot work at a 2,000-foot (600-meter) depth. Consequently, the Navy considered lifting *Ehime Maru* from the seafloor and suspending it within 100 feet (30 meters) of the heavy-lift vessel and using divers to recover crewmembers and personal effects while *Ehime Maru* was suspended in the open ocean. However, the Navy rejected this alternative because its experts concluded that there was an unacceptable risk to the lives of divers involved in the recovery effort.

The Navy also considered a number of alternative ways of removing *Ehime Maru* from the water to conduct recovery activities. However, none of these alternatives were considered feasible due to the structural damage to the vessel's hull and the unavailability of an effective method to transport or transfer the vessel to an out-of-water site for recovery operations. Furthermore, the risks to Hawaii's pristine environment were considered too great to attempt to transfer *Ehime Maru* out of the water.

PROPOSED ACTION AND ALTERNATIVES

The Navy proposes to lift *Ehime Maru* approximately 100 feet (30 meters) off the seafloor with specially designed equipment and lifting mechanisms. While suspended in the water approximately 100 feet (30 meters) above the seafloor, the vessel would be transported to a shallow-water recovery area only during daylight hours. Once stabilized at a shallow-water recovery area, a team of American and invited Japanese divers would conduct a thorough search of all safely accessible areas of the vessel in order to find and recover the crewmembers and personal effects. While searching, the divers would videotape all of their activities. The Navy would then attempt to remove diesel fuel and lubricating oil and other materials that could adversely affect the marine environment. After inviting Japanese divers to conduct a final search of the ship, the Navy would secure compartments and openings in the vessel to prevent loose material from escaping and would transport *Ehime Maru* to a deep-water relocation site.

The Navy, with the assistance of state and federal agencies, conducted extensive surveys and analyses of potential shallow-water recovery sites to determine which sites warranted

further consideration and analysis in this Environmental Assessment. Five sites were initially identified as potential shallow-water recovery sites. They included a site adjacent to the Honolulu International Airport Reef Runway, a site off Ewa Beach west of the entrance to Pearl Harbor, a site on the Waianae Coast north of Barbers Point Harbor, and two sites off of Molokai, one just east-southeast of Laau Point and the other on the western edge of Penguin Bank.

The Navy determined that the Penguin Bank site would present an unacceptable risk to divers during recovery operations due to hazardous sea-state conditions. Both Molokai sites are also located within the Hawaiian Islands Humpback Whale National Marine Sanctuary. Consequently, these sites were not given further consideration and are not evaluated for environmental effects in this Environmental Assessment.

Following a further evaluation of the remaining three sites, including safety, security, environmental and logistical considerations, the Navy identified the Reef Runway site as its preferred site for conducting shallow-water recovery operations.

The site that the Navy is considering for deep-water relocation of *Ehime Maru* is southwest of the Reef Runway shallow-water recovery site just beyond the 1,000-fathom (6,000-foot, 1,800-meter) contour and outside U.S. territorial waters.

Although this recovery operation has been deemed technically feasible, the proposed engineering solutions are untested in this type of operation. Engineers and salvage experts have based their feasibility assessment upon estimates and calculations on the size of the hole in *Ehime Maru* and their considered opinion on the anticipated structural integrity of *Ehime Maru*. However, since they have done these calculations and estimates without having seen the damage to *Ehime Maru* (the vessel sits upright in 2,000 feet [600 meters] of water), there is some uncertainty as to the exact level of damage.

Although there are risks and potential structural damage that could prevent the Navy from successfully achieving its goal, the Navy is confident that it could lift and move *Ehime Maru* to a shallow-water site for recovery of the crewmembers and would make every reasonable effort to do so. At various critical points in the Proposed Action, structural failure could preclude continuation of the mission. Unplanned occurrences such as this would cause the Navy to reevaluate whether recovery operations should continue or be terminated based on feasibility and probability of crewmember recovery. Depending upon where a failure might occur and if the Proposed Action were stopped, the Navy would attempt to recover as many crewmembers, personal effects, and other objects as possible. To the maximum extent practicable, these objects would include the cargo nets, fishing hooks and long lines, rafts, rigging on the masts, and any other obstacles that could cause a future impact to the marine environment. Extreme structural damage, if present, would prevent the vessel being moved intact and thus would prevent the Navy from conducting the planned recovery operations. This recovery operation is not without risks, and there is no guarantee of success.

Because of the nature and uniqueness of the Proposed Action, engineering methods continue to mature. As specific changes are developed they would be evaluated within the context of the Proposed Action. If the changes introduce a potential for environmental effects that are substantially different, then additional environmental documentation would be prepared.

In accordance with the requirements of National Environmental Policy Act, a Recovery-not-possible Alternative was also considered that would leave *Ehime Maru* in its current location and present condition.

POTENTIAL ENVIRONMENTAL EFFECTS

Due to the limited scope and nature of the recovery operation, only water quality, marine biological resources, public health and safety, and airspace are likely to be affected by recovery activities. The greatest potential for effects to water quality, marine biology, and health and safety would result from hazardous materials, such as diesel fuel or lubricating oil escaping from *Ehime Maru* during lifting, transit, or shallow-water recovery operations. These potential environmental effects are summarized below.

Current Location

At the time of the collision with the Navy submarine, *Ehime Maru* carried approximately 65,000 gallons (246,000 liters) of diesel fuel, 1,200 gallons (4,500 liters) of lubricating oil, and 46 gallons (182 liters) of kerosene, as well as smaller quantities of other materials, such as paints, solvents, and chemicals. No polychlorinated biphenyls (PCBs) or asbestos were aboard or used in the ship's construction or equipment. Based on aerial observations for 3 days following the collision, the Navy has conservatively estimated that the volume potentially remaining, and thus the maximum credible release, would be approximately 45,000 gallons (170,000 liters).

There is no evident long-term adverse effect on the marine environment from the previously released petroleum products. Any release of diesel fuel or lubricating oil during efforts to lift *Ehime Maru* would occur deep in the ocean and would likely disperse in the water column with little, if any, visible effect at the surface. However, the Navy would have pollution response vessels and materials available to control these releases, should they surface. There would be some disturbance to the area in the immediate vicinity of the vessel during activities to place lifting plates under its hull and to lift it off the bottom. However, any effects on marine organisms would be limited and short term.

A surface safety zone with a radius of 3 nautical miles (approximately 6 kilometers) around the heavy-lift vessel and a temporary flight restriction area in airspace up to an altitude of 2,000 feet (approximately 600 meters) would be established to prevent interference with recovery operations. Normal flight activities would not be affected.

Transit to Shallow-water Recovery Site

There are some characteristics of the ocean bottom (gradient and relief) along the transit route from the current location of *Ehime Maru* to the shallow-water recovery site that

could potentially interfere with the towing clearance. The major concern during transit would be the potential release of contaminants (mainly diesel fuel and lubricating oil) from the vessel into the marine environment. This could temporarily contaminate marine waters and adversely affect marine mammals, migratory birds, and other protected species, such as sea turtles. However, the Navy would minimize the likelihood of harm to any of these protected species by including preventive measures as an integral part of the Proposed Action to contain any release of hazardous materials while in transit. These preventative measures are as follows:

Recovery Plan (Anticipated Releases):

- Incorporating environmental considerations into final site selection within the shallow-water recovery area
- Pre- and post-inventories of bird habitat
- Real-time spot weather forecasts
- Removing cargo nets, long line fishing gear, and other equipment that might be lost during transport, prior to initial lift of the vessel
- Availability and use of skimmers and booms
- Oil-plume modeling of wind direction, speed, and sea states necessary to avoid oil on beach
- Provide real-time surface and water-column currents
- Timing the final move to the shallow-water recovery site with favorable wind, current, and tides
- Placing U.S. Fish and Wildlife Service and/or National Marine Fisheries Service personnel on skimmers to respond to oiled bird incidents
- Standing up oiled bird stabilization facilities at Kaneohe or Pearl Harbor

Unanticipated Releases:

- Pre-developed Incident Action Plan
- Standing up Unified Command

Specifically, the Navy would deploy skimmer systems and containment booms during transit and recovery operations to ensure an immediate response capability in the event of a release. The vessel would be moved only during daylight hours and during favorable weather conditions to ensure the safety of operation personnel, to minimize the potential for mishaps, and to ensure detection of any "sheen" resulting from the release of diesel fuel or lubricating oil. A surface safety zone with a radius of 1 nautical mile (approximately 2 kilometers) centered on the recovery vessel during recovery operations would be established to protect the public and prevent interference with recovery operations. The Federal Aviation Administration may impose a temporary flight restriction in the airspace above the shallow-water recovery site. Normal flight activities would not be affected.

Modeling conducted by the National Oceanic and Atmospheric Administration determined optimal sea state and wind conditions for transit. These models assumed an average wind speed of 10 knots (approximately 20 kilometers per hour) for the shallow-water recovery site and were run for ebb and flood tidal conditions. This modeling also provided the Navy with an acceptable methodology from which to predict the extent and locations that releases of diesel fuel would travel. Overall, these models showed that winds from the east would very likely push diesel fuel onto the beach during both tidal conditions over a 24-hour period with no intervention. Likewise, with no intervention, winds from the east/northeast could also potentially push diesel fuel onto the beach during either tidal condition over a 24-hour period. Winds from the north or northeast would push the diesel fuel out to sea.

Infrequently, light trade wind conditions in the morning can cause a local onshore wind, or seabreeze, in the afternoon. During an uncontained diesel fuel or lubricating oil release, such a seabreeze could potentially result in the substance washing on shore.

Therefore, during the transit to the shallow-water recovery site, the heavy-lift vessel would remain approximately 3 nautical miles (approximately 6 kilometers) from the shallow-water recovery site and wait for optimal sea and weather conditions before proceeding. This, coupled with the extensive preventative measures that the Navy would employ, would minimize the potential for any releases being pushed toward the shore. The potential for transit during easterly winds exists. However, this would only occur when other sea conditions (tide, current, sea state) are predicted to be as favorable as possible. Skimmer systems and containment booms would already be in place or on standby if decisions must be made to transit with easterly winds, thus minimizing potential impacts to the environment.

Shallow-water Recovery

The Reef Runway shallow-water recovery site is close to sensitive shore and beach areas and in relatively shallow water (approximately 115 feet [35 meters] deep). Consequently, any significant release of diesel fuel or lubricating oil would have greater potential impacts than in deeper water, either at the current location or during transit. However, the Navy has developed extensive plans and procedures, in coordination with state and federal emergency planning agencies, to minimize the potential for environmental impacts at these sites.

The Navy would have on-scene containment booms, skimmer systems, and dispersants available to contain and clean up any releases during recovery operations. Every effort would be made to prevent any releases from reaching beach or shore areas. An Incident Action Plan has also been prepared and approved to address unanticipated releases. Additionally, a Unified Command with representatives from the State of Hawaii, the U.S. Coast Guard, and the Navy would be established, consistent with the Incident Command System, during the lift and relocation phase of the operation in order to monitor the execution of the recovery plan and to assist the Navy in the case of unanticipated release.

The U.S. Fish and Wildlife Service would conduct pre-recovery and post-recovery surveys of three areas on Oahu and one on the island of Kauai to identify any oiled birds. In addition, U.S. Fish and Wildlife Service and/or National Marine Fisheries Service observers would be stationed on the skimmer vessel to identify any birds, mammals, or sea turtles that may come in contact with a release. If it is possible, oiled birds would be stabilized and delivered to a rehabilitation facility. The International Bird Rescue Research Center would be contacted for technical assistance with rescue and rehabilitation of oiled birds. Overall, potential impacts to migratory seabirds are unlikely.

Disturbance of marine organisms at the shallow-water recovery site could result from placement and stabilization of *Ehime Maru*, anchoring of support vessels, and operation of support and recovery equipment. However, these effects would be minimized by careful placement of the hull and mooring system to avoid live coral and sensitive fish and the threatened green sea turtle habitat. The Reef Runway recovery site is a disturbed habitat and, consequently, green sea turtles are not common at that location. Extensive underwater surveys have been conducted at the shallow-water site to assist Navy and natural resource agencies in identifying specific areas within the site where recovery operations may be conducted with the least impact to live coral, green sea turtles, and other marine organisms on the seafloor.

Recovery operations may generate interest from the public. Consequently, measures would be instituted to protect both the public and recovery personnel. It is critical both to their safety and effectiveness that the diving team be able to act and communicate without physical or noise interference from the public. Consequently, the Navy would establish a surface safety zone with a radius of 1 nautical mile (approximately 2 kilometers) around the recovery operations to ensure diver safety. Communications integrity for the recovery operations would be maintained by establishing a temporary flight restriction area at and below an altitude of 2,000 feet (approximately 600 meters) within a radius of 1 nautical mile (approximately 2 kilometers). The Reef Runway recovery site is within the Naval Defense Sea Area controlled by the Navy and is under the active control of the Honolulu Control Facility. In addition, a temporary flight restriction area in the airspace around the site and the release of a Notice to Airmen would be implemented to preclude aircraft intrusion into the area. Recovery operations at the Reef Runway recovery site would not affect scheduled airline flight routes or activities.

Recovery of *Ehime Maru* crewmembers, their personal effects, and certain unique characteristic components of the ship is the Navy's primary goal. Once this is accomplished, a secondary objective would be to attempt to remove to the maximum extent practicable any remaining diesel fuel, lubricating oil, or other materials that could be hazardous to the marine environment. However, diver safety would be of paramount importance, both in efforts to recover the crewmembers and, subsequently, to remove hazardous materials from the vessel. A Diving Medical Officer and technicians and standby divers would be available on the diving support vessel during all diving activities, which would occur only during daylight hours. Decompression chambers would also be present on the support vessel. In addition, the Fleet Recompression Chamber at Pearl Harbor and local hospitals could be reached within a matter of minutes from the Reef Runway recovery site in the event of an emergency.

Relocation to Deep-water Site

Following recovery of *Ehime Maru* crewmembers, their personal effects, certain unique characteristic components, and the removal to the maximum extent practicable of the diesel fuel, lubricating oil, and other known hazardous materials, Japanese divers would be invited to do a final inspection of *Ehime Maru*. Afterwards, Navy divers would secure doors by any means available to prevent loose material from falling off the vessel during relocation to the deep-water site. The vessel would then be lifted clear of the seafloor by the diving support barge and relocated to the deep-water site, following a previously surveyed route to avoid obstructions and sensitive areas. Navy skimmers and other response equipment would remain available during this phase of the operation to ensure releases of any residual diesel fuel or lubricating oil from the vessel would not adversely affect the marine environment. Upon arrival at the deep-water relocation site outside U.S. territorial waters, *Ehime Maru* would be released and allowed to sink to the bottom of the sea in over 1,000 fathoms (6,000 feet or 1,800 meters) of water. The vessel would be equipped with a pinger that would assist in identifying *Ehime Maru's* final location coordinates accurately on the seafloor. The signal from the pinger would be similar to the type used on airplanes and would be localized. Therefore, the pinger would not be expected to adversely affect individual animals and would stop functioning after about 30 days. Relocation to the deep-water site is not expected to result in any noticeable reduction in water quality or have any long-term effect on marine resources or biota.

Recovery-not-possible Alternative

Under this alternative, *Ehime Maru* would not be recovered and would remain at its current location in its present condition. This alternative would not allow for the recovery of potentially remaining hazardous materials that could affect water quality. The deck would not be cleared of cargo nets, fishing hooks and long lines, rafts, rigging on the masts, and any other obstacles that could cause a future impact to the marine environment. However, this alternative would eliminate the potential for a release close to shore because the ship would not be moved. No impacts to marine resources including Essential Fish Habitat, migratory birds, marine mammals, or threatened or endangered species are expected from this alternative. Under this alternative, because of the current location at 2,000 feet (600 meters), there would be no increased risk to public health and safety. This alternative would not allow for the recovery of potentially remaining hazardous materials that could affect the environment. Under this alternative, no temporary flight restriction would be required. Consequently, there would be no impacts to controlled/uncontrolled airspace, enroute low altitude airways, or airports or airfields in the general airspace use region.

CONCLUSION

Based on the information gathered during preparation of the Environmental Assessment, the Proposed Action would not result in significant impacts to the environment, as shown in table ES-1.

Table ES-1: Comparison of Actions and Alternatives

RESOURCE CATEGORY	PROPOSED ACTION					RECOVERY NOT POSSIBLE ALTERNATIVE
	Current Location	Transit to the Shallow Water Recovery Site	Shallow Water Recovery Site	Transit to the Deep Water Recovery Site	Deep Water Relocation Site	
Water Quality	Appropriate procedures and equipment would be in place to minimize potential impacts to water quality from a diesel fuel or lubricating oil release.	Appropriate procedures and equipment would be in place to minimize potential impacts to water quality from a diesel fuel or lubricating oil release.	Appropriate procedures and equipment would be in place to minimize potential impacts to water quality from a diesel fuel or lubricating oil release at the shallow-water recovery site. No long-term impacts would occur.	Diesel fuel and lubricating oil and other hazardous materials would be removed prior to transit. Appropriate procedures and equipment would be in place to minimize potential impacts to water quality during transit.	Diesel fuel and lubricating oil and other hazardous materials would be removed prior to relocation to minimize potential long-term impact to water quality.	Potential for continued slow release of diesel fuel and lubricating oil remaining on the vessel to affect localized water quality.
Marine Biological Resources	Minimal impact to Essential Fish Habitat or coral, marine mammals, migratory birds, or threatened or endangered species.	Minimal impact to Essential Fish Habitat or coral, marine mammals, migratory birds, or threatened or endangered species.	Minimal impact to Essential Fish Habitat or coral, marine mammals, migratory birds, or threatened or endangered species.	Minimal impact to Essential Fish Habitat, marine mammals, migratory birds, or threatened or endangered species.	Minimal impact to Essential Fish Habitat, marine mammals, migratory birds, or threatened or endangered species.	Potential impact from exposed cargo nets, fishing hooks and lines, rafts, and other obstacles.
Health and Safety	Appropriate health and safety procedures and equipment would be in place to minimize risk to worker and public safety.	Appropriate health and safety procedures and equipment would be in place to minimize risk to worker and public safety.	Appropriate health and safety procedures and equipment would be in place to minimize risk to worker and public safety. Activities would occur within existing restricted area, which would minimize risk to diver safety.	Appropriate health and safety procedures and equipment would be in place to minimize risk to worker and public safety.	Appropriate health and safety procedures and equipment would be in place to minimize risk to worker and public safety.	No impact
Hazardous Materials and Hazardous Waste	Procedures and equipment would be in place to minimize impacts from an unanticipated diesel fuel or lubricating oil release.	Procedures and equipment would be in place to minimize impacts from an unanticipated diesel fuel or lubricating oil release.	Procedures and equipment would be in place to minimize impacts from an unanticipated diesel fuel or lubricating oil release.	Oil and other hazardous materials would be removed prior to transit as practicable. Equipment and procedures would be in place to minimize impacts from an unanticipated diesel fuel or lubricating oil release.	Oil and other hazardous materials would be removed prior to relocation as practicable to minimize potential long-term impact.	Potential for continued slow release of diesel fuel or lubricating oil remaining on the vessel.
Airspace	Establishment of a temporary flight restriction would not impact airspace use.	Establishment of a temporary flight restriction would not impact airspace use.	Establishment of a temporary flight restriction would not impact airspace use.	Establishment of a temporary flight restriction would not impact airspace use.	Establishment of a temporary flight restriction would not impact airspace use.	No impact

ACRONYMS AND ABBREVIATIONS