FINAL DAMAGE ASSESSMENT and RESTORATION PLAN
and
ENVIRONMENTAL ASSESSMENT
for the
JULY 2, 2005,
M/V CASITAS GROUNDING
at
PEARL AND HERMES ATOLL, NORTHWEST HAWAIIAN ISLANDS, HAWAIIAN ISLANDS NATIONAL WILDLIFE REFUGE PAPAHĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT

Prepared by:
The Natural Resource Trustees
for the M/V Casitas Grounding, Hawaii

U.S. Department of Commerce
National Oceanic and Atmospheric Administration

U.S. Department of the Interior
U.S. Fish and Wildlife Service

State of Hawaii
Department of Land and Natural Resources

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TABLE OF CONTENTS

1.0 INTRODUCTION: PURPOSE OF AND NEED FOR RESTORATION....3
1.1 INTRODUCTION....3
1.2 NATURAL RESOURCE TRUSTEES AND AUTHORITIES....5
1.3 OVERVIEW OF OIL POLLUTION ACT OF 1990 REQUIREMENTS....6
1.4 COORDINATION WITH THE RESPONSIBLE PARTY....7
1.5 PUBLIC PARTICIPATION....8
1.6 ADMINISTRATIVE RECORD....8
1.7 SUMMARY OF THE NATURAL RESOURCE DAMAGEs CLAIM....9
2.0 ENVIRONMENT....10
2.1 Terrestrial Resources....10
2.2 Shallow Reef Marine Resources....13
3.0 INJURY DETERMINATION AND QUANTIFICATION....15
3.1 Summary of preassessment activities....15
3.2 Preassessment approach....15
3.3 Marine Preassessment....15
3.3.1 Evaluation of oil exposure....17
3.3.2 Evaluation of physical injury....18
3.3.3 Debris Recovered....20
3.3.4 Recovery Period....20
4.0 Restoration Planning....22
4.1 Restoration Strategy....22
4.2 Evaluation Criteria....23
4.3 Evaluation of Restoration Alternative 1: No Action/Natural Recovery....24
4.4 Evaluation of Restoration Alternative 2: Ecological Restoration....25
4.4.1 Scaling Approach: Lost Ecological Services....25
4.4.2 Selected Project: Derelict Net and Debris Removal in the Monument....26
4.4.3 Non-Preferred Alternatives....28
4.4.3.1 Primary Restoration: Cementing loose coral fragments and substrate....28
4.4.3.2 Compensatory Restoration: Orphan vessel removal in the Monument....28
4.4.3.3 Compensatory restoration: Alien algae removal in the main Hawaiian Islands....29
5.0 COORDINATION WITH OTHER PROGRAMS, PLANS, AND REGULATORY AUTHORITIES....31
5.1 OVERVIEW....31
5.2 KEY STATUTES, REGULATIONS AND POLICIES....31
6.0 REFERENCES....36

APPENDIX A: FIELD REPORT for the M/V CASITAS VESSEL GROUNDING INITIAL INJURY PREASSESSMENT SURVEYS....39

APPENDIX B. Consent Decree....87

APPENDIX C. NATURAL RECOVERY PROJECTIONS....106

APPENDIX D: List of Contributors....111

LIST OF FIGURES

Figure 1. Map of Pearl & Hermes Atoll showing the various islands. The red triangle indicates the general area of the M/V *Casitas* grounding. (base image credit: Christine Taylor, NOAA's National Marine Sanctuary Program. Grounding indicator added) 4

Figure 2. Map showing the Papahanaumokuakea Marine National Monument and the main Hawaiian Islands. 10

Figure 3. Coral and sediment sampling locations. 17

Figure 4. Sum of detected PAHs between reef sites within the reference transect and the "down current" grounding transect 18

LIST OF TABLES

Table 1. Estimated coral injury based on area of injury, extent of injury, and estimated coral cover. 20

1.0 INTRODUCTION: PURPOSE OF AND NEED FOR RESTORATION

1.1 INTRODUCTION

The M/V Casitas, a 145 ft (44 m) research vessel chartered by the National Oceanic and Atmospheric Administration (NOAA) for marine debris removal, ran aground at Pearl and Hermes Atoll (27° 57.690' N, 175° 46.320' W) within the Hawaiian Islands National Wildlife Refuge (now also part of the Papahānaumokuākea Marine National Monument) on July 2, 2005. At the time of the grounding, the vessel carried 23 adults and had aboard numerous 55-gallon drums containing approximately 1,850 gallons of gasoline, about 30,000 gallons of diesel in the fuel tanks, lines, and engine, and about 200 gallons of lubricating oils in storage. Because the grounding created the substantial threat of a release of oil, the U.S. Coast Guard (USCG) and other federal and state agencies immediately began operations to prevent or minimize any releases of oil into the environment.

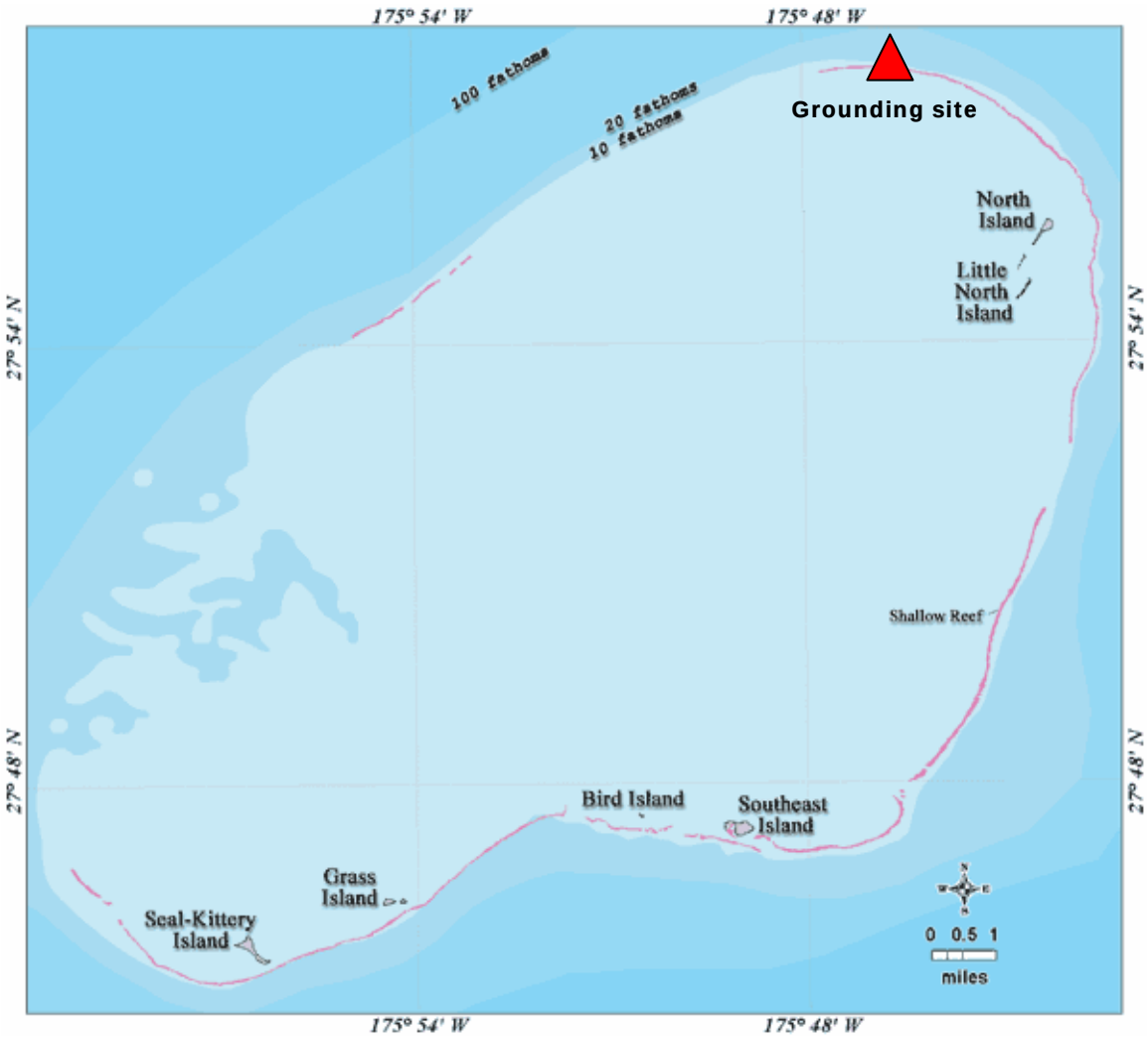

Figure 1. Map of Pearl & Hermes Atoll showing the various islands. The red triangle indicates the general area of the M/V *Casitas* grounding. (base image credit: Christine Taylor, NOAA's National Marine Sanctuary Program. Grounding indicator added)

Once on scene, the USCG reported intermittent sheening around the vessel[1]; although, no fuel leak was documented. Due to the substantial threat of a discharge of diesel, gasoline, and lubricating oils, all parties agreed that the *Casitas* should be removed from the reef before further injuries to the reef ecosystem occurred. The vessel was extracted from the reef on August 4, 2005.

Physical injuries to coral resulting from this grounding included the grounding scar itself, caused by the initial ship impact, and the much more extensive injuries caused by activities related to the removal of the vessel. These latter injuries included breakage of coral heads, scouring of the substrate, and injury to the reef structure itself. These injuries were caused by the *Casitas* as it was towed off the reef and by the anchors, chain, and cables attached to the barge that was used to remove the grounded vessel.

[1] SITREP-POL 5 dated July 5, 2005

In addition, the grounding created a threat of introducing invasive species to the atoll. At least 17 people who were on board the vessel evacuated to North Island, Pearl and Hermes Atoll, where they stayed for several hours before moving to Southeast Island in the same atoll. Because this was an unexpected landing, the individuals involved did not have the opportunity to comply with the National Wildlife Refuge's standard quarantine protocols that are required to prevent the introduction of non-native plants, insects, fungi, and pathogens to these sensitive island environments. The group had just come from Midway Atoll where there are invasive species that pose a great risk to the habitats at Pearl and Hermes Atoll.

A survey team consisting of staff from the United States Fish and Wildlife Service (USFWS), NOAA, the State of Hawaii Division of Aquatic Resources (DAR) (collectively, the Trustees), and POLARIS Applied Sciences, Inc., (representing F/V Northwind, Inc., the Responsible Party (RP)) conducted an injury preassessment at the site August 22-30, 2005. Concurrently, the USFWS conducted baseline terrestrial surveys as a preliminary means to determine if invasive species may have been introduced to North Island as a result of the personnel evacuation following the grounding. In November 2005, the Trustees and RP collaboratively prepared a Field Report providing an approximation of the injuries to the coral reef that were caused by the grounding and vessel removal operations. The total injured area of reef was estimated as 0.42 acres (ac) (1,700 m^2), of which 0.11 ac (445 m^2) was coral.

This vessel grounding and subsequent response activities are referred to in this Final Damage Assessment and Restoration Plan and Environmental Assessment (Final DARP/EA) as the "Incident."

The purpose and need for action is to restore the affected area and injured resources impacted by the Incident. This document provides summarized information regarding the environmental consequences of the Incident, including the affected environment, determination and quantification of natural resource injuries, and natural resource restoration projects selected to address those injuries. This document also serves, in part, as the agencies' compliance with the National Environmental Policy Act (NEPA) and Title 19, Chapter 343, of the Hawaii Revised Statutes (see Section 5 for additional information).

1.2 NATURAL RESOURCE TRUSTEES AND AUTHORITIES

The Final DARP/EA has been prepared jointly by the USFWS, on behalf of the U.S. Department of the Interior, NOAA, on behalf of the U.S. Department of Commerce; and the Department of Land and Natural Resources (DLNR), on behalf of the State of Hawaii. Collectively, these agencies are referred to as the "Trustees" or "Natural Resource Trustees."

Each of these agencies acts as a Natural Resource Trustee pursuant to the Oil Pollution Act of 1990 (OPA) (33 USC §§ 2701 *et seq.*), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR § 300.600), for natural resources injured by the Incident. Executive Order (EO) 12777 designates the Federal Trustees for oil spills while the Governor of Hawaii designates the State Trustees for oil spills in Hawaii. As a designated Trustee, each agency is authorized to act on behalf of the public under State and/or Federal law to assess and

recover natural resource damages and to plan and implement actions to restore natural resources and resource services injured or lost as the result of a discharge, or substantial threat of a discharge, of oil. The Trustees designated the USFWS as Lead Administrative Trustee (LAT) (15 CFR § 990.14(a)).

The State of Hawaii acts under the authority of its Environmental Response Law (Haw. Rev. Stat., Title 10, Ch. 128D). This authority is in addition to any liability which may arise under Federal law.

1.3 OVERVIEW OF OIL POLLUTION ACT OF 1990 REQUIREMENTS

Under OPA, Trustees can recover the cost of restoring, rehabilitating, replacing or acquiring the equivalent of the injured natural resources ("primary restoration"); the diminution in value of those injured natural resources pending restoration ("compensatory restoration"); and reasonable assessment costs.

Before initiating a natural resource damage assessment and restoration (NRDAR), the Trustees must determine that an Incident has occurred; the Incident is not from a public vessel; the Incident is not from an onshore facility subject to the Trans-Alaska Pipeline Authority Act; the Incident is not permitted under Federal, State or local law; and public trust natural resources and/or services may have been injured as a result of the Incident.

Natural resources are defined as "land, fish, wildlife, biota, air, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States, any State or local government or Indian tribe" (15 CFR § 990.30). As described in the OPA regulations, a NRDAR consists of three phases – preassessment, restoration planning, and restoration implementation.

Based on information collected during the preassessment phase, the Trustees make a preliminary determination as to whether natural resources and/or services have been injured and/or are likely to be injured by the Incident. Through coordination with response agencies (*e.g.*, the USCG), the Trustees next determine whether the oil spill response actions will eliminate the injury or the threat of injury to natural resources. If injuries are expected to continue and feasible restoration alternatives exist to address such injuries, the Trustees may proceed with the restoration planning phase. Restoration planning also may be necessary if injuries are not expected to continue or endure but are nevertheless suspected to have resulted in interim losses of natural resources and/or services from the time of the Incident until the time the resources recover.

The purpose of the restoration planning phase is to evaluate the potential injuries to natural resources and services and to use that information to determine the need for and scale of associated restoration actions. This phase provides the link between injury and restoration and has two basic components – injury assessment and restoration selection. The goal of injury assessment is to determine the nature and extent of injuries to natural resources and services, thus providing a factual basis for evaluating the need for, type of, and scale of restoration actions. As the injury assessment is completed, the Trustees develop a plan for restoring the injured natural

resources and services. The Trustees then identify a reasonable range of restoration alternatives, evaluate and select the preferred alternative(s), develop a draft restoration plan presenting the alternative(s) to the public, solicit public comment on the draft restoration plan, and incorporate comments into a final restoration plan.

During the restoration implementation phase, the draft restoration plan may be presented to the responsible party Northwind Inc. (hereafter referred to as the "RP") to implement or to fund the Trustees' estimated costs of implementing the restoration plan. This provides the opportunity for settlement of damage claims without litigation. Should the RP decline to settle, OPA authorizes Trustees to bring a civil action against RPs for damages or to seek funding from the USCG's Oil Spill Liability Trust Fund.

Trustees may settle claims for natural resource damages under OPA at any time during the damage assessment process, provided that the settlement is adequate in the judgment of the Trustees to satisfy the goals of OPA and is fair, reasonable, and in the public interest, with particular consideration of the adequacy of the settlement to restore, replace, rehabilitate, or acquire the equivalent of the injured natural resources and services. Sums recovered in settlement of such claims, other than reimbursement of Trustees' costs, may only be expended in accordance with a restoration plan, which must be made available for public review.

1.4 COORDINATION WITH THE RESPONSIBLE PARTY

The OPA regulations direct the Trustees to invite the RP to participate in the damage assessment and restoration process. Although the RP may contribute to the process in many ways, final authority to make determinations regarding injury and restoration rests solely with the Trustees.

In this case, the RP funded and participated in the injury preassessment at Pearl and Hermes Atoll on August 22-30, 2005. The resulting November 30, 2005, injury preassessment report entitled "Field report for the initial injury preassessment surveys" was prepared collaboratively by the Trustees and RP (see Appendix A).

Due to the remoteness of the injury site and sometimes severe weather and sea conditions, extreme financial, logistical, environmental, and safety constraints are associated with accessing the site for further injury assessment surveys. The Trustees, therefore, decided to develop potential restoration projects based on the preassessment. After considering several restoration options (described in this Final DARP/EA), the Trustees used two potential restoration projects that they considered (Marine Debris Removal and Monitoring of Natural Recovery at the grounding site) to develop a settlement proposal. This proposal was then presented to the RP on June 25, 2007, along with a request that the RP fund and/or implement, in part, the restoration projects as a means to settle the Trustees' natural resource damages claims resulting from the Incident. The RP responded on July 20, 2007, with a request for a mediation/settlement conference. A settlement conference, mediated by Magistrate Kurren of the U.S. District Court Hawaii, was subsequently held in San Francisco, California, on May 22, 2008, immediately following which the settlement terms were agreed upon. These terms were memorialized in a Consent Decree that was made available for public comment on December 5, 2008 (73 F.R. 74192) and subsequently entered by the U.S. District Court on February 13, 2009 (Appendix B).

The RP agreed to provide $2,857,626.48 to the Trustees for "further assessment and for the design, implementation, permitting (as necessary), monitoring, and oversight of restoration projects and for the costs of complying with the requirements of the law to conduct a restoration planning and implementation process." This Final DARP/EA describes the projects that the Trustees selected to implement with these settlement funds.

1.5 PUBLIC PARTICIPATION

Public review of the draft DARP/EA is an integral component of the restoration planning process. Through the public review process, the Trustees seek public comment on the projects being proposed to restore injured natural resources or replace services provided by those resources. The draft DARP/EA provided the public with information about the nature and extent of the natural resource injuries identified and the restoration alternatives evaluated.

Public review of the draft DARP/EA was consistent with all federal and State laws and regulations that apply to the NRDAR process, including Section 1006 of OPA, the OPA regulations (15 CFR Part 990), NEPA, as amended (42 USC §§ 4372 *et seq*.), and its implementing regulations (40 CFR Parts 1500-1508). The public review period for the draft DARP/EA was conducted by the Trustees in early 2011.

A notice of availability for public comment was published in the Honolulu Star Advertiser on January 14 and 15, 2011 and was also posted on Trustee websites. The notice included a link to the draft DARP/EA on the NOAA website as well as the libraries around the State where hard copies of the DARP/EA were available (five libraries on the islands of Hawaii, Maui, Kauai, and Oahu). Following the notice of availability the public was provided a 30 day period to submit comments verbally, via email, or in writing to Matthew Parry of the NOAA Restoration Center. A public meeting was held on February 15, 2011, from 6-8 pm at the Liliha Public library, which was chosen because of its central location in Honolulu.

No public comments were received during the 30 day comment period.

1.6 ADMINISTRATIVE RECORD

The Trustees have compiled an administrative record, which contains documents considered by the Trustees in the development of the draft DARP/EA and, ultimately, this Final DARP/EA. The administrative record is available for inspection by appointment during normal business hours at the U.S. Fish and Wildlife Service's Pacific Islands Fish and Wildlife Service Office, 300 Ala Moana Boulevard, Room 3-122, Honolulu, Hawaii 96813 (phone: 808/792-9400) and at:

Hawaii State Library
478 S. King Street
Honolulu, HI 96813
Telephone: 808-586-3500

Hours of operation:

10am – 5pm	Monday & Wednesday
9am - 5pm	Tuesday, Friday & Saturday
9am – 8pm	Thursday
Closed	Sunday

This Final DARP/EA along with associated documents may also be viewed and downloaded at the following website: http://www.darrp.noaa.gov/.

1.7 SUMMARY OF THE NATURAL RESOURCE DAMAGES CLAIM

The NRDAR damages claim for the Incident encompasses primary and compensatory restoration actions for injuries and potential injuries to the following natural resources and services:

- Coral colonies
- Three dimensional reef structure
- Reef habitat
- Marine fish
- Marine Invertebrates
- Marine algal communities

The Trustees selected natural recovery and monitoring as the primary restoration alternative.

The selected compensatory restoration actions include:

- Derelict net and debris removal at Pearl and Hermes Atoll; and,
- Derelict net and debris removal at nearby Atolls.

2.0 ENVIRONMENT

The purpose of this section is to provide a general description of the environment which encompasses the geographic area where the Incident occurred and where activities related to the Incident (restoration, further assessment, etc.) will be implemented. Although many species and geographic areas are mentioned in this section, those species, habitats and services injured, or potentially injured by the grounding Incident are discussed specifically in the following section. The majority of the information in this section is taken directly from the Papahānaumokuākea Marine National Monument management plan volume II as this document was a joint effort by The State of Hawaii, USFWS, and NOAA and adequately depicts the resources and the environment in the area.

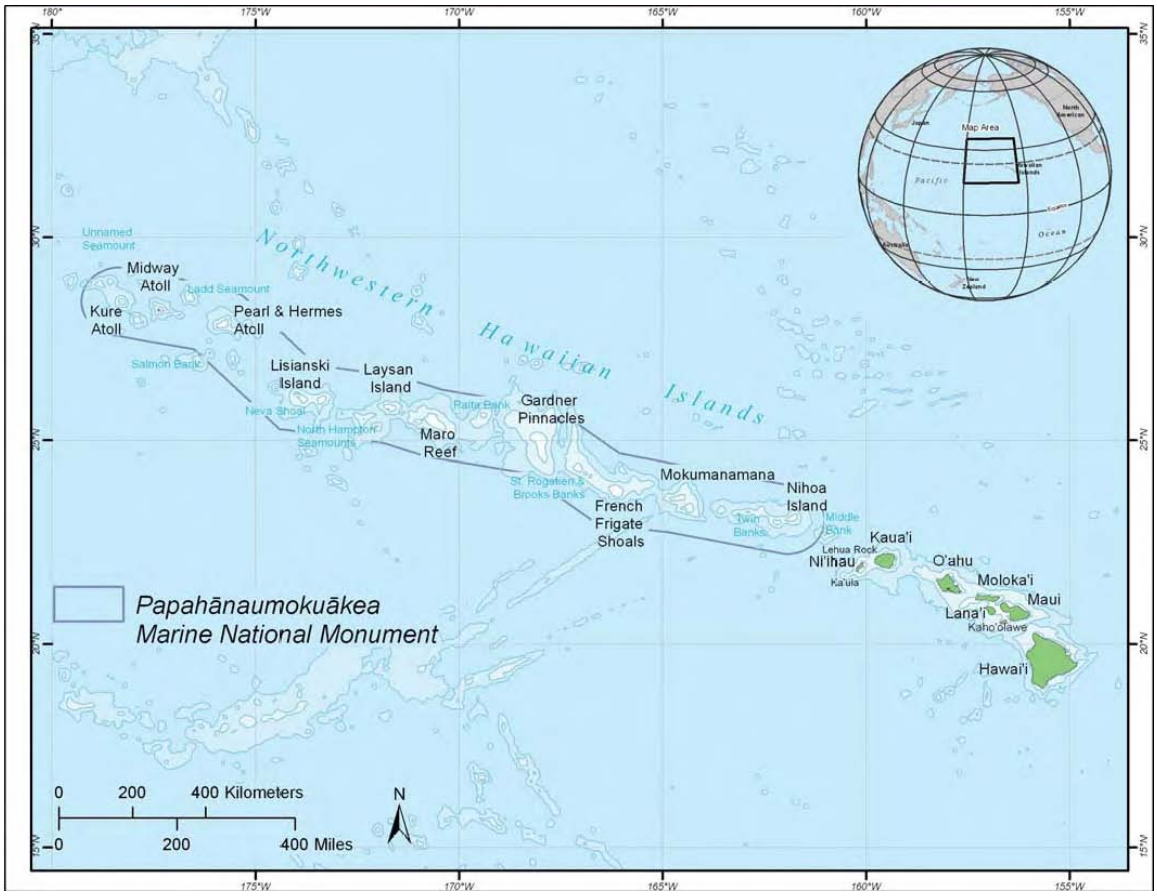

Figure 2. Map showing the Papahanaumokuakea Marine National Monument and the main Hawaiian Islands.

2.1 TERRESTRIAL RESOURCES

There are ten main islands and atolls in the NWHI. The two southernmost islands, Nihoa and Mokumanamana, are basaltic islands. Four of the five middle landmasses are open atolls (French Frigate Shoals [FFS] and Maro Reef) and sandy islands (Laysan and Lisianski). La Perouse

Pinnacle (at FFS) and Gardner Pinnacles are small basaltic outcrops, remnants of islands similar to Nihoa and Mokumanamana. The three northernmost landmasses, Pearl and Hermes, Midway, and Kure, are classical atolls. This emergent land is vital habitat to the 14 million resident and migratory seabirds, which rely on these islands for roosting and breeding habitat and on the surrounding waters for food and which are protected under the Migratory Bird Treaty Act. Included in the 5.5 million seabirds that nest on these islands annually are more than 95 percent of the world's Laysan (*Phoebastria immutabilis*) and black-footed (*Phoebastria nigripes*) albatross (Naughton and Flint 2004). Four endangered endemic bird species that are not seabirds (Laysan duck [*Anas laysanensis*], Laysan finch [*Telespiza cantans*], Nihoa finch [*Telespiza ultima*], and Nihoa millerbird [*Acrocephalus familiaris kingi*]) also breed on the islands.

Nihoa's seabird colony boasts one of the largest populations of Tristam's storm-petrel (*Oceanodroma tristrami*), Bulwer's petrel (*Bulweria bulwerii*), and blue noddies (*Procelsterna cerulea*) in the Hawaiian Islands and very possibly the world. The island is a unique example of a lowland native community, resembling those lowland communities that once occurred on the main Hawaiian Islands but are now almost completely gone (Wagner et al. 1999). The island's vegetation can be classified as part coastal mixed community (*Sida* mixed shrub and grassland) and coastal dry shrubland dominated by 'ilima (*Sida fallax*), 'aweoweo (*Chenopodium oahuense*), and 'ohai (*Sesbania tomentosa*). The island supports 21 native plant species, including 3 endemics: a palm or loulu (*Pritchardia remota*), an amaranth (*Amaranthus brownii*), and an herb (*Scheidea verticillata*) (Wagner et al. 1999). The avifauna of the island includes two endemic passerine birds, the Nihoa finch and the Nihoa millerbird, both listed as endangered under the federal ESA and HRS 195D. The arthropod fauna of the island includes 33 species of mites, 3 species of spiders, and 182 species of insects, 17 of which are endemic, including a katydid (*Banza nihoa*), a giant tree cricket (*Thaumatogryllus conantae*), 2 species of endemic seed bugs (*Nysius nihoae* and *Nysius suffusus*), and an endemic trapdoor spider (*Nihoa mahina*) (Evenhuis and Eldredge 2004). Nihoa also has a rich cultural heritage, with at least 88 known wahi kupuna (ancestral sites), constructed by pre-contact Hawaiians, who inhabited the island for 700 years until 1700 AD, and listed on the NRHP. In Nihoa's Loulu Coastal Forest Community, *Pritchardia remota* assumes complete dominance with a closed canopy and thick layers of fallen fronds in the understory. Native plants growing nearby include *Chenopodium oahuense*, *Sesbania tomentosa*, *Solanum nelsonii*, and *Sida fallax.* Lichens grow on the trunks of the trees (U.S. Fish and Wildlife Service 1998). In this system, *P. remota* provides nesting habitat for red-footed boobies (*Sula sula*) and perching space for brown noddies (*Anous stolidus*), which are two resident seabirds at Nihoa (U.S. Fish and Wildlife Service 1998).

Because of its limited size, Mokumanamana supports only 5 indigenous plant species and no land birds but does harbor 3 species of mites, 2 species of spiders, and 70 species of insects, 11 of which are endemic, including a large weevil (*Rhycogonus biformis*), 2 species of seed bugs (*Nysius neckerensis* and *N. chenopodii*), and a trapdoor spider (*Nihoa hawaiiensis*) (Evenhuis and Eldredge 2004). Sixteen species of seabirds breed here, including the black noddy (*Anous minutus*), which historically was called the Necker Island tern.

Hawaiian monk seals utilize most of the Monument, including the atolls, islands, and waters of the Monument, with varying population (numbers and age structure) and some exchange within the NWHI and the main Hawaiian Islands. The sandy islets of FFS provide nesting sites for 90 percent

of the threatened green turtle (*Chelonia mydas*) population breeding in the Hawaiian Archipelago. In addition, 19 of Hawai‘i’s 22 seabird species are found on the island, giving it the highest species richness of breeding seabirds within the Monument. The dry coastal shrublands of the larger islets within the atoll also support an endemic seed bug (*Nysius frigatensis*), moth (*Agrotis kerri*), and mite (*Phauloppia bryani*) (Usinger 1942; Nishida 2002).

Due to the limited size of the Gardner Pinnacles, they support only a single species of land plant (*Portulaca lutea*) and a few terrestrial arthropod species, but they are by contrast excellent habitat for seabirds (Clapp 1972). Guano from such seabirds gives the peaks a “frosted” appearance, indicating their importance as roosting and breeding sites for at least 12 subtropical species. Landings and terrestrial surveys rarely take place due to the difficulty of getting ashore under all but the calmest ocean conditions.

Maro Reef is a largely submerged open atoll (Clague 1996), with less than 1-acre (4,046.8 square meters) of periodically emergent land. At very low tide, only a small coral rubble outcrop of a former island is believed to break above the surface; as a result, Maro supports no terrestrial biota.

Laysan Island’s ring of sandy dunes surrounds a 173 acre (0.7square kilometers) hypersaline interior lake, a feature unique within the Hawaiian Archipelago and rare within the Pacific as a whole. Because of its elevation of about 40 feet (12 meters), Laysan is well vegetated, supporting at least 30 species of flowering plants, including 5 subspecies that were endemic prior to human contact (Athens et al. 2007), many of which were driven to extinction by the misguided introduction of rabbits (*Oryctolagus cuniculus*) in 1902 during the guano mining era (Ely and Clapp 1973). The plant community is divided into five different associations arrayed in concentric rings around the interior hypersaline lake: coastal shrubs, interior bunchgrass, vines, interior shrubs, and wetland vegetation (Newman 1988). The island also previously harbored five endemic birds, two of which, the Laysan finch and the Laysan duck still survive (Pratt et al.1987). In addition, approximately two million seabirds nest here, including boobies, frigate birds, terns, shearwaters, noddies, and the world’s second-largest black-footed and Laysan albatross colonies. The island also supports a relatively rich collection of arthropods, including a large endemic weevil (*Rhyncogonus bryani*), four endemic moths, an endemic wasp, and three endemic mites. A successful 12-year eradication project to remove the sandbur (*Cenchrus echinatus*), a plant that had displaced native vegetation over 30 percent of the island, has been completed, and an active ecological restoration project is under way to bring back a number of other plants and animals that were lost after the introduction of rabbits (Morin and Conant 1998).

Lisianski supports no endemic land plant or bird species, although it does harbor an endemic seed bug (*Nysius fullawayi flavus*) and an endemic moth (*Helicoverpa minuta*) (Usinger 1942; Nishida 2002). The island also hosts large Bonin petrel (*Pterodroma hypoleuca*) and sooty tern (*Onychoprion fuscata*) colonies, as well as a variety of other seabirds. Lisianski has the only grove of *Pisonia grandis* trees in the entire Hawaiian Archipelago; this tree is dispersed by seabirds and is favored as a nesting site for many tree-nesting seabird species.

Pearl and Hermes Atoll is a true atoll, fringed with shoals, permanent emergent islands, and ephemeral sandy islets. These features provide vital dry land for Hawaiian monk seals, the Hawaiian population of green sea turtles, and a multitude of seabirds, with 16 seabird species breeding here. The permanent islands with higher dunes support an endemic subspecies of native

seed bug (*Nysius fullawayi infuscatus*) (Usinger 1942). Pearl and Hermes also hosts a small population of endangered Laysan finches that were translocated here in the 1960s.

Although Midway's native vegetation and insects have been greatly altered by more than a century of human occupation, the island boasts the largest nesting colonies of Laysan and blackfooted albatrosses in the world, forming the largest colony of albatrosses in the world. The Navy, FWS, and U.S. Department of Agriculture-Wildlife Services (USDA Wildlife Services) successfully eradicated black rats (*Rattus rattus*), accidentally introduced during World War II, from Midway, removed a small forest of mature ironwood trees (an alien invasive species) from Eastern Island and new ironwood seedling from the remaining seedbank are removed as they are detected. Currently the cover on all of the islands at Midway is approximately 30 percent paved or with structures, 23 percent grass and forbs, 18 percent woodland, 7 percent sand and bare ground, 22 percent shrublands, and less than 0.23 percent wetland. Midway Atoll also supports the first successful reintroduced population of endangered Laysan ducks, translocated from Laysan Island in 2004-2005. Laysan ducks utilize both the largely introduced vegetation of Midway Atoll and restored patches of native vegetation. This reintroduction is significant because Island ducks are globally threatened taxa, and because the Laysan duck is the most endangered waterfowl in the Northern Hemisphere and the U.S. Introduced canaries (*Serinus canaria*) breed among historic buildings that mark the beginning of cable communication across the Pacific near the beginning of the 20th century.

Kure Atoll is an important breeding habitat for Christmas shearwaters (*Puffinus nativitatis),* Laysan and black-footed albatross. Kure has at least 11 terrestrial arthropods endemic to Hawai'i and one that is apparently endemic to Kure.

2.2 SHALLOW REEF MARINE RESOURCES

As with the definition of ecosystem, the depth to which the shallow reef is defined is subjective. For this Final DARP/EA, this ecosystem is defined as all waters to a depth of 98 feet (30 meters). Because reef-building corals have a symbiotic relationship with microalgae that allows them to grow and thrive in the nutrient-poor waters of the tropics, these reefs have a depth limit based on the penetration of sunlight into the water column. Generally, coral reefs grow in water less than 98 feet (30 meters) (Grigg and Epp 1989), although non-reef-building corals are able to grow in much deeper waters (Maragos and Jokiel 1986; Veron 1986). In addition, there is a much better understanding of the shallow reef, as most coral reef assessment and monitoring is done in waters shallower than 98 feet (30 meters) (Maragos et al. 2004).

Coral reef ecosystems consist of much more than the reef-building corals for which they are named, including sand and unconsolidated sediments, colonized hard bottom, non-reef-building corals, and macroalgae. Reefs make up approximately 50 percent of the biomass, providing habitat structure, refuge, and food to the diverse group of organisms (Garrison 1999). Even in this relatively pristine coral reef habitat, the percentage of coral cover varies widely. A recent assessment of this habitat determined that coral cover for individual islands ranges from 4.4 percent to 64.1 percent across the chain, and less than 1 percent to close to 100 percent within the

various habitats of the islands (Friedlander et al. 2005). The highest diversity and highest percent coral cover occurs in the middle of the Monument, at the large open atolls of FFS and Maro Reef. Reef, hard bottom, and sediment habitat are interspersed to create a variety of environmental niches and resources for the diverse array of species.

The shallow reef is a dynamic environment, experiencing constant wave surges and powerful winter storms. Tropical storms and hurricanes can generate extreme wave energy that can damage shallow coral reef habitat. These events are the primary natural force in altering and shaping coral reef community structure (Dollar 1982; Dollar and Grigg 2004). They represent potential but infrequent threats to the shallow coral reef ecosystems of the NWHI. There is a growing concern that global warming and the concurrent acidification of the ocean may cause drastic changes to corals in the coming century (Hoegh-Guldberg 1999). While the northern extent of the NWHI, from Kure to Pearl and Hermes Atolls, experiences sea surface temperatures from less than 64° Fahrenheit (18° Celsius) in winter to summer highs exceeding 82° F (28° C), a temperature anomaly of only 1.8° F (1ºC) in the summer of 2002 resulted in widespread mass coral bleaching (Hoeke et al. 2006). Acidification, caused by increased levels of CO_2 in the ocean, inhibits the deposition of calcium carbonate, the primary component of the coral skeleton (Kleypas et al. 2006). Events such as these may be more devastating in the NWHI because these reefs grow more slowly than most other reefs (Friedlander et al. 2005). Fifty-seven species of coral have been identified in the NWHI, with 30 percent of them being endemic. To date, 355 species of algae and 838 species of invertebrates have been documented in a thorough assessment of the Monument's living resources (Friedlander et al. 2005).

Characteristics of the shallow water coral reef habitat change with both island geology and reef orientation to the island. Due to strong wave action and currents, the basalt islands in the southern portion of the Monument have no fringing reef. The underwater habitat is composed primarily of vertical walls and wave-cut benches (Friedlander et al. 2005). Caves, overhangs, and trenches provide small-scale habitat for corals, although basalt blocks, boulders, and pavement are the principal bottom cover. Species diversity is low, relative to the middle and northern atolls. The shallow reef habitat in the middle of the Monument (FFS, Maro Reef, and Lisianski Island) is a series of open atolls that exhibit the highest levels of coral abundance and diversity (Friedlander et al. 2005). The largest pod found in the NWHI of spinner dolphins (*Stenella longirostris*) occurs at FFS (Andrews et al. 2006). The northernmost atolls (Pearl and Hermes, Midway, and Kure) are formed by a continuous barrier reef, where the lagoon is connected to the outside ocean through a series of channels and grooves.

Structurally, apex predators, such as sharks and jacks, dominate fish communities on the reefs in the NWHI. In addition, abundance and biomass estimates indicate that the reef community is characterized by a smaller proportion of herbivores, such as surgeonfish (Family *Acanthuridae),* and more carnivores, such as damselfish (Family *Pomacentridae*), goatfish (Family *Mullidae*), and scorpionfish (Family *Scorpaenidae*). A comparison of both biomass and trophic structure between reef fish communities in the NWHI and main Hawaiian Islands was conducted in 2000. Across similar habitats, biomass was 260 percent greater in the NWHI (Friedlander and DeMartini 2002). Additionally, 54 percent of the biomass in the NWHI was composed of apex predators, compared to 3 percent in the main Hawaiian Islands.

3.0 INJURY DETERMINATION AND QUANTIFICATION

3.1 SUMMARY OF PREASSESSMENT ACTIVITIES

There are three pre-conditions set forth in the OPA natural resource damage assessment regulations before restoration planning can proceed:

1. Injuries have resulted, or are likely to result, from the Incident or response to the Incident;
2. Response actions have not adequately addressed, or are not expected to address, the injuries resulting from the Incident; and
3. Feasible primary and/or compensatory restoration actions exist to address the potential injuries.

A cooperative preassessment was conducted by the Trustees and the responsible party representatives, Polaris Applied Sciences, Inc., with the information collected being used to satisfy the three criteria listed above. The information collected during the preassessment described the impacts related to the Incident and confirmed the need for restoration planning to address the overall injury.

3.2 PREASSESSMENT APPROACH

The goal of injury preassessment under OPA is to determine the jurisdiction of the trustees, determine that the Incident is not excluded under another authority, and to determine whether resources under trusteeship may have been, or may be, injured as a result of the Incident (§ 990.40). Injury determination begins with the identification and selection of potential injuries to investigate given the nature and scope of the Incident. The focus of the cooperative preassessment was to investigate possible injury in both the aquatic (marine) and terrestrial realms.

The Trustees main focus was to pursue restoration as quickly as possible rather than expensive, multi-year injury studies. With this in mind the preassessment used simple, cost effective procedures to document potential exposures and injuries to natural resources and services within both the marine and terrestrial realms.

3.3 MARINE PREASSESSMENT

The marine preassessment focused on documenting potential injury to:

- Coral colonies and reef habitat
- Reef structure
- Fishes
- Invertebrates
- Macroscopic Algae

There had been anecdotal reports of a “sheen” of oil that had occurred during the lightering process of removing oil and fuel from the vessel in addition to photos of a sediment “plume” moving into the lagoon over the reef crest. Additionally, given the large scale barge operations required to remove the vessel, there was reason to suspect physical injuries had occurred to the benthos. The marine preassessment component focused on two potential types of injury, toxic exposure to oil as well as physical injury which may have occurred during response and removal actions during the Incident. Given the remote location and limited amount of time available for the preassessment team to conduct its work the different tasks were prioritized as follows:

1) Document evidence of spill injury and other types of pollutant injuries (e.g., paint and other types of substances from vessel) via sampling of bleached corals, sediment, and other invertebrates.
    a) High Priority Objective: Collect bleached coral samples for evidence of petroleum toxicity. (1) Set up a survey grid to look for bleached coral around the Casitas. Habitat zones evaluated for bleached coral included by priority: a) the coral reef crest immediately adjacent to the vessel; b) inter-islet reef zone; c) lagoon slope; and areas within the lagoon.
    b) High Priority Objective: Collect sediment samples for petroleum and other chemical analyses
    c) Low Priority Objective: Collect other invertebrate organisms as necessary to detect effects of toxicity

2) Document injury in the grounding area as well as surrounding areas.
    a) High Priority Objective: Use Aquamap™ system to measure extent of vessel grounding scar.
    b) High Priority Objective: Measure scar and all physical injury using GPS technology and standard measurement protocols to augment and verify Aquamap measurements.
    c) Medium Priority Objective: Record qualitative observations of the various types of injuries associated with groundings (scarred reef, pulverized reef, sedimentation, etc) and possible response injury.
    d) Medium Priority Objective: Record qualitative observations of any and all biological impacts, mortalities and injury to live coral, invertebrates, fishes, etc.

3) Document general habitat of vessel grounding impact areas and affected habitat areas (reef slope zone, reef crest zone, inter-islet reef zone, lagoon slope zone, coral communities within the lagoon that may have been exposed to petroleum products, using digital video and photo.
    a) Photo and video document various types of habitats and link with spatial data in the vicinity of the grounding.

4) If present remove debris and paint chips left behind from vessel.

5) Conduct more specific photo documentation and other biological assessments with any available expertise and resources

3.3.1 Evaluation of oil exposure

To evaluate possible exposure to oil and potential oil injury to fishes, invertebrates (including corals), and macroscopic algae two types of samples were taken: 1) sediment grab samples 2) coral tissue samples. For a detailed account of sampling methodologies and results see the Casitas Field Report (Appendix A).

Two roughly parallel transects, one at the *Casitas* grounding site and one at a reference location about 200 meters to the west of the grounding site were established and stratified by habitat type, reef slope, outer crest, inner crest, and lagoon slope (Fig 3.).

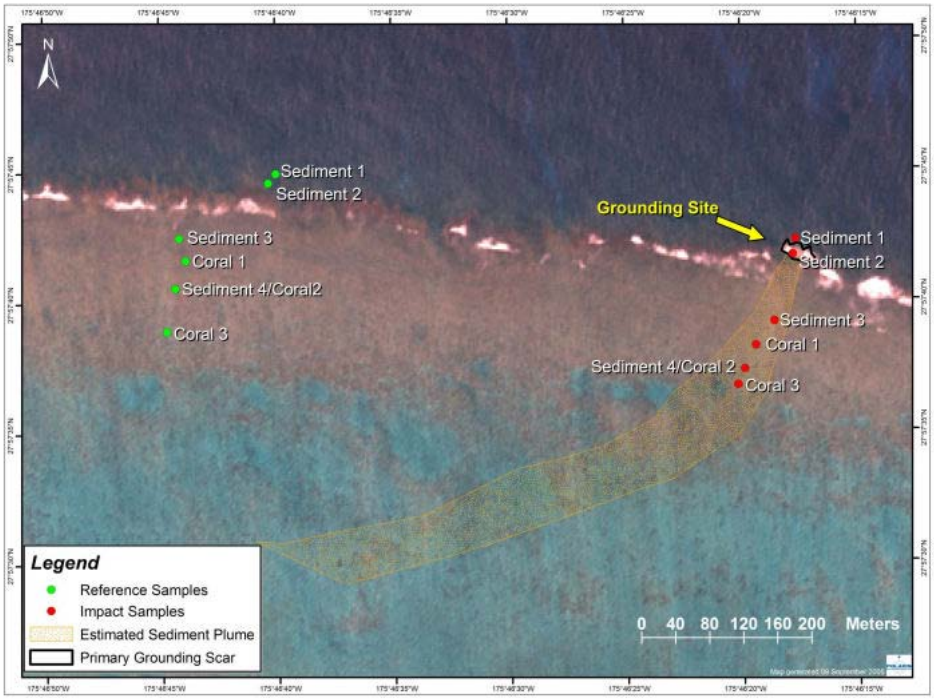

Figure 3. Coral and sediment sampling locations.

Site surveys, visual inspection and photo-documentation did not reveal any substantial evidence of coral bleaching in the area of the grounding nor was there substantial bleaching of corals within the lagoon. Likewise there was no substantial visual evidence of unexplained invertebrate or algal mortality which might have been linked to exposure to oil.

Sediment samples were evaluated for polycyclic aromatic hydrocarbons (PAH), which could indicate oil exposures, using the modified EPA method 8270. Levels of PAHs on the reef slope and crest were comparable, however elevated levels within the proposed “down current” area were found at the inter-islet and lagoon slope sites (Fig 4.) indicating a possible exposure to oil. While these results are not proof of injury they are indicative of a possible exposure to oil. Without any

verifiable injury that could be associated directly with the increased PAH levels, and given the time constraints involved in the, the focus of the preassessment was on documenting the physical injuries to the reef.

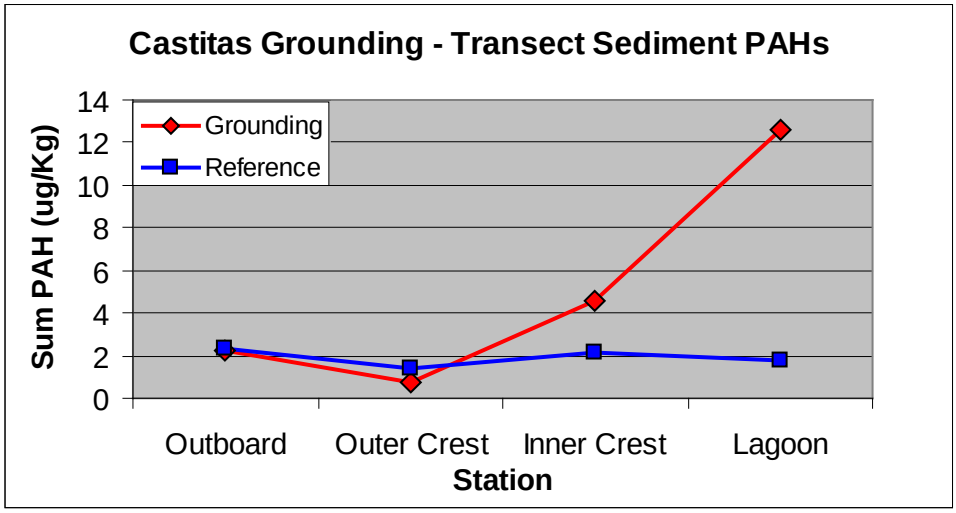

Figure 4. Sum of detected PAHs between reef sites within the reference transect and the "down current" grounding transect.

Roughly 10 pieces of coral tissue samples from different colonies (in order to minimize the amount of tissue taken from a single colony) were collected at each of the 3 sites in both the reference and "down current" grounding transect. Due to the subsequent settlement of the case these samples were not analyzed for oil exposure.

During the site inspection and visual surveys there was no direct evidence of sea turtle or monk seal mortality. Several green sea turtles and a single monk seal were observed during the preassessment trip but none showed any outward signs of stress or physical signs of having been exposed to oil (oiling, scarring, injured eyes, etc.).

3.3.2 Evaluation of physical injury

To evaluate physical injury of corals, reef habitat, and physical reef structure (as well as associated macroscopic algae) a combination of site inspections, visual surveys, underwater sonar mapping, photo/video documentation, as well as physical measurements were conducted. Physical injuries to the reef and associate flora and fauna were measured to the extent permitted by weather, time, and air supplies. The injured zones were identified as the main scar near the reef crest caused by the vessel grounding; the extraction scars created by the vessel; barge, and/or cables on the reef slope adjacent to the main vessel scar; and the anchor/cable scars also on the reef slope. For a detailed account of methodologies and results see the Casitas Field Report (Appendix A).

The estimates of physical injury were made for three distinct zones (Fig. 5), Primary: injury caused by the actual grounding of the vessel; Secondary: injury presumed to have been caused by

removing the vessel, either from cables or the ship itself; Tertiary: injury farther out from the reef crest caused by anchors and cable movements. The secondary injury zone was split up into two distinct areas, the vessel removal zone A and vessel removal zone B. The tertiary injury zone was split up into injury from the anchors and their associated cables (when found), and an intermediate cable injury zone where it was presumed that the salvage barge was located. Table 1 shows all of the estimated injuries. Many of the injury estimates are mixtures of physical measurements, AquaMap™ measurements, areas calculated in ArcGIS from AquaMap™ data, and informed estimation. The estimated coral loss was then calculated from the injury area estimate and informed estimates of coral cover for the different zones of injury.

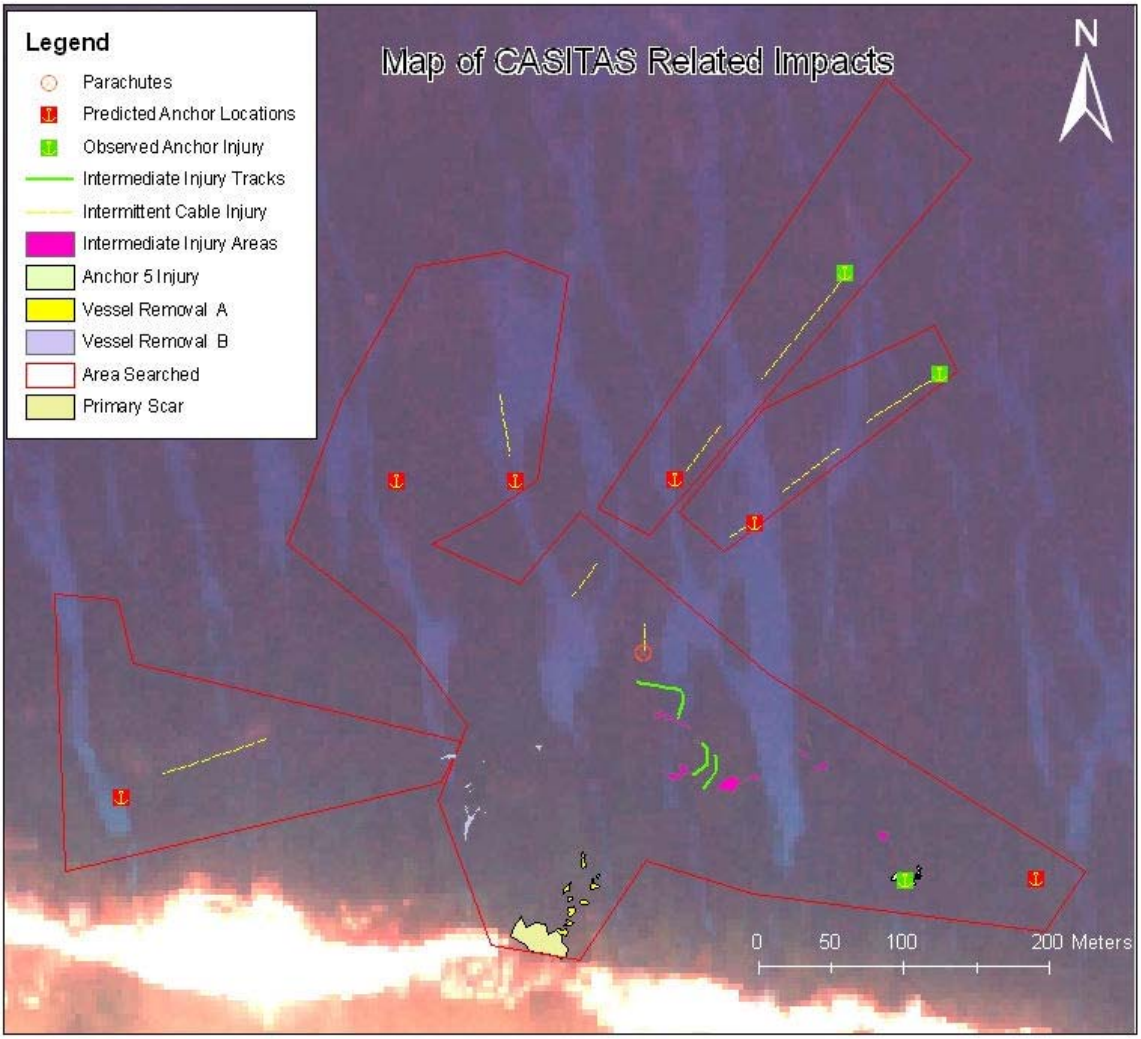

Figure 5 Skiff Based GPS Tracklines Representing Dive/Search Tracks. The map shows areas searched and types of injury found.

Table 1. Estimated coral injury based on area of injury, extent of injury, and estimated coral cover.

Injury Zone	Estimated Injury (m^2)	Estimated % coral cover	Estimated % Injury	Estimated coral loss (m^2)*
Primary				
Scar	599	1.50%	100%	9
Secondary				
Zone A	19	2%	50%	0.5
Zone B	24	2%	50%	1
Tertiary				
Anchors	251	25 to 30 %		85
Intermediate Cable	800	45%	100	365
Total	1693			461

* These estimates are rounded composites of several measurements for ease of presentation and therefore do not exactly match the multiplicative product of estimated coral loss. The exact values can be found in the Field Report (Appendix A).

Calculations of coral loss based on measures of estimated coral cover and percent injury are not exact. However, given the cost, and difficulties in accessing the Incident site, and the time allotted for capturing the size and extent of the injury, this technique proved useful and was deemed adequate by the Trustees.

Even with the time and diving limitations, both the Trustees and Polaris Applied Sciences, Inc, were confident that the majority of the injury to corals, reef habitat, and reef structure was captured. There may still have been undocumented injury from anchor impacts which was not found, as well as injury from other tow cables and chains, but it is unlikely that large areas of injury were missed during the preassessment.

3.3.3 Debris Recovered

A small amount of debris was removed in conjunction with other higher priority activities. Debris consisted mainly of small pieces of metal, clothing, and personal items. An estimated 300 ft. length of ¾ in. nylon line, entangled in the reef adjacent to the grounding site, was removed during one of the injury assessment surveys. In addition, two parachutes (used to air drop emergency pumps to the vessel) were located in the vicinity of where the barge had been anchored. One dive was used on the last day on-site to remove the parachutes so they would not cause additional injury to the reef during the winter storm season.

3.3.4 Recovery Period

Given the slow growing nature of corals a return to baseline following the physical injury from the ship grounding could take many years. Projections of natural recovery, taking into account the

variety of coral species present in the area, estimate that 90% of the injury will recover in 20 years while 100% recovery wouldn't be reached until roughly 40 years after the Incident. Recovery projections were conducted by Dr. Steve Kolinski (NOAA Pacific Islands Region, Habitat Conservation Division). Recovery projections can be seen in their entirety in Appendix C.

4.0 RESTORATION PLANNING

4.1 RESTORATION STRATEGY

The goal of this Final DARP/EA under the OPA regulations, OPA § 990.10, is to "make the environment and the public whole for injuries to natural resources and services resulting from an Incident involving discharge or substantial threat of a discharge of oil…". Specifically this plan is designed to restore lost natural resources and services resulting from the July 2, 2005 grounding of the *Casitas* off of Pearl and Hermes Atoll. The OPA NRDA regulations provide that this goal be achieved by returning injured natural resources to their baseline condition and by compensating for any interim losses of natural resources and services during the period of recovery to baseline.

Restoration actions under the OPA regulations are designated as either primary or compensatory. Primary restoration is/are action(s) taken to return injured natural resources and services to baseline on an accelerated time frame (e.g.- faster than would occur naturally). The OPA NRDA regulations provide that Trustees consider natural recovery as potential primary restoration. Some considerations that weigh in the favor of natural recovery as a preferred alternative include 1) if active primary restoration is infeasible, 2) if active primary restoration is not cost-effective, and 3) if injured natural resources will recover to baseline at a reasonable rate without human intervention. Alternative primary restoration activities can range from natural recovery, to actions that prevent interference with natural recovery, to more intensive actions expected to return injured natural resources and services to baseline faster and/or with greater certainty than natural recovery.

Compensatory restoration is/are action(s) taken to compensate for the interim losses of natural resources and/or services between the time of injury and recovery to baseline. The type and scale of compensatory restoration can depend on the nature of the primary restoration action(s) and the timeline and scope of recovery of injured resources to baseline. When identifying the compensatory restoration components of the restoration alternatives, Trustees must first consider compensatory restoration actions that provide resources and/or services of the same type and quality and of comparable value as those that were lost. If a reasonable range of alternative compensatory actions cannot provide resources and/or services of the same type, quality, and comparable value as those lost then Trustees can consider actions that will at least provide resources and/or services of comparable type and quality.

In considering restoration for injuries resulting from the Incident, the Trustees first evaluated possible primary restoration actions for the injury. Based on that analysis, the Trustees determined that most primary restoration options were infeasible. In addition, the area of injury is expected to recover to baseline naturally within a reasonable amount of time. Given these circumstances the Trustees determined that no active primary restoration actions should be taken and that natural recovery of resource injury was appropriate. In addition to natural recovery, one primary restoration option was considered but deemed inappropriate. In order to balance the interim loss of

natural resources and services until natural recovery to baseline, compensatory restoration alternatives were considered and are presented below.

Reasonable compensatory restoration alternatives must be scaled to ensure that the size or quantity of the proposed project reflects the magnitude of the injuries from the grounding Incident. The Trustees relied on the OPA regulations to select the scaling approach for reasonable compensatory restoration actions. The scaling methods will be discussed in the sections below.

The restoration alternatives included in this plan are projected costs and outcomes based on known methodologies which have been previously applied either to other Incidents, or to related natural resource recovery activities. Specific project details may require additional refinements or adjustments to reflect changing conditions or factors. The Trustees expect that implementation of restoration will begin in 2011. Should implementation be substantially delayed beyond this time period, the Trustees may revise their scaling calculations.

4.2 EVALUATION CRITERIA

The OPA NRDA regulations (§ 990.54) provide that Trustees develop a reasonable range of primary and compensatory restoration alternatives and then identify the preferred alternatives based on the six criteria listed in the regulations:

1. Cost to carry out the alternative action,
2. Extent to which each alternative is expected to meet the Trustees' goals and objectives in returning the injured natural resources and services to baseline and/or compensating for interim losses,
3. Likelihood of success of each alternative,
4. Extent to which each alternative will prevent future injury as a result of the Incident and avoid collateral injury as a result of implementing the alternative,
5. Extent to which each alternative benefits more than one natural resource and/or service, and
6. Effect of each alternative on public health and safety.

In addition, the Trustees considered several other factors including:

1. Nexus to geographic location of the injury,
2. Opportunities to collaborate with other entities involved in restoration projects,
3. Compliance with applicable federal and state laws and policies.

NEPA applies to restoration actions taken by federal Trustees. To reduce transaction costs and avoid delays in restoration, the OPA regulations encourage the Trustees to conduct the NEPA process concurrently with the development of the draft restoration plan.
To comply with the requirements of NEPA, the Trustees considered the effects of each alternative on the quality of the human environment. NEPA's implementing regulations direct federal agencies to evaluate the potential significance of proposed actions by considering both context and

intensity. For the actions proposed in the draft DARP/EA and selected in this Final DARP/EA, the appropriate context for considering potential significance of the action is local, as opposed to national or worldwide.

With respect to evaluating the intensity of the impacts in the proposed action, the NEPA regulations (40 CFR 1508.27) and NOAA's Administrative Order 216-6 require consideration of the following factors:

1. Likely impacts of the proposed projects,
2. Likely effects of the projects on public health and safety,
3. Unique characteristics of the geographic area in which the projects are to be implemented,
4. Controversial aspects of the project or its likely effects on the human environment,
5. Degree to which possible effects of implementing the project are highly uncertain or involve unknown risks,
6. Precendential effect of the project on future actions that may significantly affect the human environment,
7. Possible significance of cumulative impacts from implementing this and other similar projects,
8. Effects of the project on National Historic Places, or likely impacts to significant cultural, scientific or historic resources,
9. Degree to which the project may adversely affect endangered or threatened species or their critical habitat,
10. Likely violations of environmental protection laws,
11. Unique characteristics of the geographic area
12. Degree to which endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973, are adversely affected,
13. Whether a violation of Federal, state, or local law for environmental protection is threatened, and
14. Whether a Federal action may result in the introduction or spread of a nonindigenous species.

4.3 EVALUATION OF RESTORATION ALTERNATIVE 1: NO ACTION/NATURAL RECOVERY

NEPA requires the Trustees to consider a "no action" alternative, and the OPA NRDA regulations also include evaluation of a "natural recovery" option pursuant to §990.53. Under this alternative the Trustees would take no direct action to restore injured natural resources or compensate for lost services. In lieu of direct action the Trustees would rely on natural processes of recruitment and growth for recovery of the injured natural resources including, but not limited to, corals, algae, sessile invertebrates and coralline algae. While natural recovery would occur over varying time scales for various injured resources (see recovery projections Appendix C), the public would not be compensated for interim losses under the no action alternative.

OPA clearly establishes Trustee authority to seek compensation for interim losses pending recovery of the injured natural resources. Such compensation will not be provided through a no action alternative. While the Trustees have determined that natural recovery is appropriate as primary restoration for injuries to coral reef resources at the injury site, the no action alternative is rejected because it fails to provide appropriate compensatory restoration. Natural resource losses were, and continue to be, incurred by the public during this period of recovery from the grounding event and technically feasible alternatives exist to compensate for these losses within a justifiable cost framework.

There are several advantages to natural recovery as primary restoration. Conducting on-site primary restoration would be logistically very difficult and could present severe risks to worker health and safety. Because this area is expected to recover naturally it would make sense to, in essence, "let nature take its course."

4.4 EVALUATION OF RESTORATION ALTERNATIVE 2: ECOLOGICAL RESTORATION

Although there was most likely little or no oil released during the *M/V Casitas* grounding, the Incident and response still caused substantial physical injury to public trust resources in the Monument. Lost ecological services from the Incident are characterized primarily by loss of reef related organisms (mainly coral) and substrate resulting in the reduced ability of the habitat to perform ecological functions such as providing shelter, food, and platforms for recruitment, settlement, and growth of benthic flora and fauna.

4.4.1 Scaling Approach: Lost Ecological Services

The OPA NRDA regulations provide that the Trustees consider compensatory restoration actions that provide services of the same type and quality and of comparable value to those that were injured. When these ecological services can be gained (or saved from loss) the OPA regulations prescribe the "service-to-service" scaling approach to determine the appropriate scale of compensatory restoration.

The Trustees determined that services of the same type and quality and of comparable value to the lost ecological services could be provided through preventing and avoiding coral and substrate injury. Consistent with the OPA regulations, the Trustees followed the "service to service" approach to scale the compensatory restoration project that addresses lost ecological services. To implement this scaling approach the Trustees used the Habitat Equivalency Analysis method, or HEA. HEA is commonly applied in NRDA cases to scale compensatory restoration projects that address lost ecological services. The HEA method is described in the preamble to the OPA regulations as a potential approach to scaling such projects.

In HEA, compensatory restoration projects are scaled so that the quantity of replacement services provided equals the quantity of lost services. In this case the services were quantified based on physical units of measure such as square meters of coral lost and their time to recovery. The

Trustees must evaluate whether compensatory restoration projects can provide services that are comparable to the lost services. In order to do this, the Trustees relied on available data, experience, and best professional judgment, coupled with certain simplifying assumptions, to conduct the HEA calculations.

4.4.2 Selected Project: Derelict Net and Debris Removal in the Monument

Project Description: Marine debris (particularly derelict fishing gear) is a substantial source of coral injury in the Monument. Nets, which frequently get lodged on coral, smother or break the coral underneath. This project will result in the removal of nets from coral reefs in the Monument, thus compensating for coral reef injuries incurred during the *M/V Casitas* vessel grounding and subsequent response. Previous work in the Monument has identified areas where derelict nets and marine debris have accumulated and those general areas of known concentrations will be targeted for maximum effectiveness. Removing derelict nets and debris will have the following benefits which directly restore injury on a resource-to-resource basis: (1) preventing further mortality of the coral colonies under the net debris, (2) preventing further coral mortality by abrasion of nearby coral colonies as the net sways with the water motion, (3) preventing further injury to other areas that would occur if the net or debris breaks loose and settles in a new un-injured area, (4) enhancing coral recruitment by removing debris that would inhibit, through abrasion, the settlement and growth of juvenile corals, and (5) providing benefits to other natural resources such as endangered monk seals, threatened green sea turtles, fishes, and endangered birds in the areas by reducing the probability of entanglement.

Restoration Objectives: The goal of the selected project is to remove derelict nets and debris from areas within the Monument that have high concentrations of these foreign materials. Based upon observations and measurements made during the injury assessment, the Trustees scaled the project based on the loss of 452 m^2 of coral. After applying the data collected and a variety of necessary assumptions (e.g., the percent loss of coral from a net injury, the average size of a net, the time to recovery after net removal), the Trustees determined that they would need to recover approximately 800 nets or pieces of debris to satisfy the compensatory restoration requirement. Because the settlement has already occurred and there is a set amount of money, the overall goal is to maximize the restoration efforts such that the greatest amounts of nets/debris are removed given the fixed amount of restoration monies.

Probability of Success: The probability of success for this project is high. Net/debris removal is a proven restoration technique that has been taking place in Hawaii for over a decade and continues to be conducted in the Hawaiian Islands. Net removal techniques are well-established and relatively easy to implement. The remoteness of the areas in the Monument, as well as the costs associated with working there, makes the planning and logistics difficult but by no means insurmountable.

Performance Criteria and Monitoring: Because the damages settlement has resulted in a fixed amount of restoration money, the overall performance criteria will be that the required amount of nets/debris are removed in the Monument area under that cost ceiling. Much of the performance criteria for the removal activities will fall under established protocols of contract

work in the Monument and for the type of in-water work being done; use of divers/snorkelers, small boat usage, large vessel protocols etc. Trustee representatives will have authority to designate the geographic area where work will occur, to select which nets will be removed, and to provide directions on removing nets to minimize injury to coral or other living marine resources.

Benefits and Environmental Impacts: Derelict nets and debris cause injury to the near shore coral reef environment by smothering, breaking, and abrading benthic flora and fauna. Nets also cause mortality to fishes, sea turtles, marine mammals, and birds as they continue to "fish" and organisms get entangled even though the nets are abandoned. Marine debris removal would beneficially affect the Monument resources by eliminating debris and the injuries it causes.

The potential adverse environmental impacts of marine debris removal in the Monument have previously been analyzed under the Papahānaumokuākea Marine National Monument Management Plan (MMP) and its associated Environmental Assessment (MMP/EA) (USFWS, *et al*., 2008). These documents were promulgated by the Trustees in 2008 as a comprehensive plan for the management of Monument resources and include an analysis of numerous activities – including marine debris removal. The Trustees hereby incorporate by reference the impacts analysis of marine debris removal conducted on pages 179-180 of the MMP/EA.

The MMP/EA concludes that marine debris removal activities conducted in accordance with the MMP's best management practices (BMPs) (See Monument Management Plan, Volume III, Appendix F) would have primarily beneficial effects and only minor, short-term and minimal adverse impacts that can be effectively mitigated through use of the BMPs. For example, marine debris worker could encounter endangered species or marine mammals during restoration activities. To avoid adverse impacts and prevent the potential for unauthorized "takes" of marine mammals or species listed under the Endangered Species Act (ESA), divers observing or encountering marine mammals or ESA-listed species while removing debris would be required to cease all activity until the animal departs the area. Similarly, debris removal workers will not approach or come within 150 ft (46 meters) of any Hawaiian monk seals that are hauled out on a beach. In addition, if nets or debris are heavily encrusted and firmly anchored to the substrate, only those sections that are free would be removed. Completely encrusted nets that are fully incorporated as part of the substrate would not be removed. Live coral colonies, fish, and benthic invertebrates which are caught in the nets and debris as they are removed will be returned to the sea in the general vicinity as soon as practical and to the greatest extent possible. Accordingly, potential adverse impacts are expected to be minor, short term, minimal in nature.

Evaluation: Derelict nets and debris are well documented hazards to marine life in the Hawaiian Islands as well as in the Monument where they will substantially degrade the habitat and cause injury to near shore coral reef resources. Derelict nets and debris have also been found to entangle monk seals, sea turtles, and seabirds in the Monument (Boland, 1997). While there will be some minor, small scale disturbances to natural resources resulting from efforts to remove nets and debris, the Trustees expect these adverse impacts to be short term and minimal, and that the project's overall environmental impacts will be positive.

4.4.3 Non-Preferred Alternatives

Several restoration alternatives were developed under the guidelines in §990.53 for primary, as well as compensatory, restoration of the M/V *Casitas* grounding site. These alternatives were evaluated based on the standards suggested in §990.54, which include: (1) the costs of the alternatives, (2) the extent to which the project is expected to return the resource and services to baseline, (3) the likelihood of success, (4) the probability of preventing future injury, (5) the benefit to other resources, and (6) the effects on public health and safety. These following alternatives were not selected as the preferred restoration method because of feasibility and cost/benefit concerns. The non-preferred alternatives are listed below with their associated explanations and concerns.

4.4.3.1 Primary Restoration: Cementing loose coral fragments and substrate

Cementing loose coral fragments at the grounding site is a non-preferred restoration alternative. Stabilizing the loose coral and associated debris from a grounding could have the following benefits which should accelerate the return of the resources to baseline: (1) preventing further coral mortality of the inured coral fragments from abrasion; (2) preventing further coral mortality by abrasion of nearby coral colonies from debris generated by the grounding, effectively increasing the overall injury; (3) replacing three dimensional habitat complexity in areas where rugosity was lost; and (4) enhancing natural recovery through increased coral recruitment in comparison to areas where debris has not been stabilized.

Cementing loose coral fragments and substrate is not a preferred alternative for primary restoration based on factors such as the length of time which has passed since the grounding, the currently unknown number and state of coral fragments and loose substrate, safety concerns arising from operations in a high wave energy environment, and the costs associated with this type of activity in the remote area of Pearl and Hermes Atoll. The *M/V Casitas* grounded at Pearl and Hermes Atoll in July of 2005 and was removed in the beginning of August 2005. Given that six winter swell seasons of high wave energy have already passed since the grounding the fate of much of the coral fragments and debris is unknown. In all likelihood the coral fragments have undergone complete mortality by this point and have been scattered widely throughout the environment. Associated loose substrate has most likely also been dispersed so that re-attaching debris generated by the grounding is untenable. The possibility that coral recruitment will be enhanced by avoiding scour from debris (by stabilizing the area) is low given that much of the debris has most likely dispersed. Without a clear outcome for positive restoration benefits (given that much of the debris has likely dispersed) and the safety concerns associated with this type of activity in a high wave environment, this is not a preferred option.

4.4.3.2 Compensatory Restoration: Orphan vessel removal in the Monument

When there is no financially viable party that is responsible for addressing a specific vessel grounding the vessel is often referred to as an “orphan.” In many cases, orphan vessels will remain on the reef for years as they break apart and generate debris which increases the initial injury to

reef resources. Orphan vessels are often left in place because there are no clear authorities for removing the vessel, nor are there dedicated sources of funds to pay for removal. Removing orphan vessels from the Monument could have the following benefits: (1) preventing further coral mortality from secondary impacts and movement of the vessel during high wind and wave events, (2) preventing further coral mortality as the vessel breaks apart over the years and large pieces of the vessel move over the reef environment, (3) preventing possible secondary impacts from materials associated with the vessel such as algae blooms caused by introduction of iron into the environment.

Removing future orphan vessels from the NWHI Monument is not a preferred alternative because the number and frequency of vessels that will ground is not known and restoration would be delayed in anticipation of orphan grounding events. Removing known orphan vessels is also not the preferred alternative, since the costs associated with salvaging a vessel in the Monument are extremely high relative to the amount of coral mortality which would be avoided. Accordingly, relatively little restoration could be accomplished with the available restoration funds. Most of the orphan vessels are fairly small, but the costs of sending salvage teams into the remote areas of the Monument would be too high to justify the benefits. Costs associated with chartering a vessel to conduct this type of restoration work will be high (~ $12-15k per day minimum) with several days transit back and forth from the atoll. Additional costs for hiring salvers and small boat operations would add substantially to the overall costs. Given the unpredictable nature of these types of Incidents and injuries the restoration benefits, relative to the preferred alternative, do not justify the costs.

4.4.3.3 Compensatory restoration: Alien algae removal in the main Hawaiian Islands.

This project would provide compensatory restoration for injury to corals by removing and containing alien algae before it smothers existing coral colonies. Invasive alien algae such as *Kappaphycus/Eucheuma* spp., *Gracilaria salicornia*, and *Hypnea musciformis* are overgrowing, smothering, and killing otherwise healthy corals around the Main Hawaiian Islands. Removing algae from areas around the Main Hawaiian Islands could have the following coral restoration benefits: (1) preventing the mortality of corals which are currently covered by alien algae, (2) preventing healthy corals free of algae from being covered by the spread of algae from nearby areas of high algal density, (3) allowing for a return of displaced native benthic and reef associated flora and fauna. The State of Hawaii Division of Aquatic Resources, University of Hawaii Botany Dept., and The Nature Conservancy have a great deal of experience in removing invasive alien algae around the Main Hawaiian Islands and currently have programs which are actively dealing with this issue; thus feasibility for this alternative is high.

Alien algae removal in the main Hawaiian Islands is not a preferred alternative because of the vast geographic distance between the site of the injury and the restoration work, the disparity between resources lost at Pearl and Hermes Atoll and those which would be restored around the main Hawaiian Islands, and the unique cultural and ecological significance of the resources at Pearl and Hermes Atoll. Given that the unique status of the area (a newly minted national Monument) has recently been officially recognized the Trustees prefer that restoration activities, where feasible, be directed at restoring resources located within the Monument itself. While alien algae removal remains a viable alternative for restoration, in order to compensate for the loss at

Pearl and Hermes Atoll and to make the public whole, this is not a preferred restoration alternative.

5.0 COORDINATION WITH OTHER PROGRAMS, PLANS, AND REGULATORY AUTHORITIES

5.1 OVERVIEW

Two major federal laws guiding the restoration of the injured resources and services from the M/V CASITAS Incident are OPA and NEPA. OPA and its regulations provide the basic framework for natural resource damage assessment and restoration. NEPA, as a procedural law, sets forth a specific process of impact analysis and public review. The Trustees elected to combine the Restoration Plan, required under OPA, with the environmental review processes required under NEPA. This is expected to enable the Trustees to implement restoration more rapidly than had these processes been undertaken sequentially.

In addition, the Trustees also consider other applicable laws, regulations and policies at the federal, state and local levels. In particular the restoration planning has focused on coordination with the newly formed Papahānaumokuākea Marine National Monument. The potentially relevant laws, regulations and policies are set forth below.

In addition to laws and regulations, the Trustees must consider relevant environmental programs that are ongoing or planned for in the affected environment. For example, as previously stated, restoration projects and related activities may be occurring in areas currently being monitored or focused on with other programs such as the NOAA Coral Reef Conservation Program, NOAA Marine Debris Program, or as part of the USFWS Refuges Program. The Trustees must ensure that their proposed restoration activities neither impede nor duplicate such programs or plans. By coordinating restoration with other relevant programs and plans, the Trustees can enhance the overall effort to improve the environment of Pearl and Hermes reef and the surrounding Papahānaumokuākea Marine National Monument.

5.2 KEY STATUTES, REGULATIONS AND POLICIES

<u>Oil Pollution Act of 1990 (OPA), 33 USC 2701, *et seq.*; 15 CFR Part 990</u>

OPA establishes a liability regime for oil spills, or threats of spills, which injure or are likely to injure natural resources and/or the services that those resources provide to the ecosystem or humans. Federal and State agencies and Indian tribes act as Trustees on behalf of the public to assess the injuries, scale restoration to compensate for those injuries and implement restoration. Section 1006(e)(1) of OPA [33 USC 2706 (e)(1)] requires the President, acting through the Under Secretary of Commerce for Oceans and Atmosphere (NOAA), to promulgate regulations for the assessment of natural resource damages resulting from a discharge or substantial threat of a discharge of oil. Assessments are intended to provide the basis for restoring, replacing, rehabilitating, and acquiring the equivalent of injured natural resources and services.

This rule provides a framework for conducting sound natural resource damage assessments that achieve restoration. The process emphasizes both public involvement and participation by the Responsible Party(ies). Though the regulations are optional, the Trustees have generally followed them in this assessment.

Hawaii Environmental Response Law, Title 10, chapter 128D, Hawaii Revised Statutes

The State of Hawaii response law addresses the release or threatened release of any hazardous substance, including oil, into the environment. It creates an environmental response fund which can be used to pay for, among other things, costs of removal actions and costs incurred to restore, rehabilitate, replace or acquire the equivalent of any natural resources injured, destroyed or lost as the result of a release of a hazardous substance. The statute further provides that there shall be no double recovery for natural resource damages. The statute states that upon the request of the Department of Health, the attorney general will recover such costs from the responsible parties. The State of Hawaii Department of Health has promulgated regulations to address the cleanup of releases of hazardous substances. The federal and state Trustees have participated in cooperative injury assessment and restoration planning activities so as to avoid the possibility of any double recovery.

National Environmental Policy Act (NEPA), as amended, 42 USC 4321, et seq. 40 CFR Parts 1500-1508

Congress enacted NEPA in 1969 to establish a national policy for the protection of the environment. NEPA applies to federal agency actions that affect the human environment. NEPA established the Council on Environmental Quality (CEQ) to advise the President and to carry out certain other responsibilities relating to implementation of NEPA by federal agencies. Pursuant to Presidential Executive Order, federal agencies are obligated to comply with the NEPA regulations adopted by the CEQ. These regulations outline the responsibilities of federal agencies under NEPA and provide specific procedures for preparing environmental documentation to comply with NEPA. NEPA requires that an Environmental Assessment (EA) be prepared in order to determine whether the proposed restoration actions will have a significant effect on the quality of the human environment.

Generally, when it is uncertain whether an action will have significant effect, federal agencies will begin the NEPA planning process by preparing an EA. The EA may undergo a public review and comment period. Federal agencies may then review the comments and make a determination. Depending on whether an impact is considered significant, an environmental impact statement (EIS) will be prepared or a finding of no significant impact (FONSI) will be issued.

The Trustees have integrated this Restoration Plan with the NEPA process to comply, in part, with those requirements. This integrated process is recommended under §1500.2 “(c) Integrate the requirements of NEPA with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively.”

Hawaii Environmental Impact Statements, Title 19, Chapter 343, Hawaii Revised Statutes

In this chapter, Hawaii has established a system of environmental review to ensure that environmental concerns are given appropriate consideration in decision making along with economic and technical considerations. The statute provides for public review and opportunity for comments on a range of activities such as proposed use of state or county lands or proposed use within the shoreline area. The statute notes that when an action is subject both to this chapter and NEPA, the state agencies "shall cooperate with federal agencies to the fullest extent possible to reduce duplication between federal and state requirements." This cooperation would include concurrent public review.

The Trustees will integrate the federal and state environmental review requirements as they proceed with restoration planning and implementation.

Coastal Zone Management Act (CZMA), 16 USC 1451, *et seq*., 15 CFR Part 923

The goal of the CZMA is to preserve, protect, develop, and where possible, restore and enhance the nation's coastal resources. The federal government provides grants to the states with federally-approved coastal management programs. The State of Hawaii has a federally-approved program. Section 1456 of the CZMA requires that any federal action inside or outside of the coastal zone that affects any land or water use or natural resources of the coastal zone shall be consistent, to the maximum extent practicable, with the enforceable policies of approved state management programs. It states that no federal license or permit may be granted without giving the State the opportunity to concur that the project is consistent with the state's coastal policies. The regulations outline the consistency procedures.

The selected project is consistent to the maximum extent practicable with the enforceable policies of the state coastal program. The Papahānaumokuākea Marine National Monument's Management Plan, which has been promulgated jointly by NOAA, the USFWS, and the State of Hawaii, provides a description of activities that will be undertaken to preserve and maintain environmental quality within the Monument. Section 3.3.1 of the Management Plan and its associated Environmental Assessment outline a Marine Debris Action Plan that includes projects like the selected marine debris project in this Final DARP/EA. As the Management Plan was jointly prepared by the State of Hawaii, the Trustees anticipate that no further coordination under the CZMA will be required. The Trustees will, however, continue to coordinate closely with the Monument's Management Board regarding the selected project.

Endangered Species Act (ESA), 16 USC 1531, et seq., 50 CFR Parts 17, 222, 224

The ESA directs all federal agencies to conserve endangered and threatened species and their habitats and encourages such agencies to utilize their authorities to further these purposes. Under the Act, the NOAA Fisheries and the USFWS publish lists of endangered and threatened species. Section 7 of the Act requires that federal agencies consult with these two agencies to minimize the effects of federal actions on endangered and threatened species.

Several threatened and endangered species occur in the project areas for this Final DARP/EA, including green sea turtles and Hawaiian monk seals. For the marine debris removal project that is selected in this final DARP/EA, the Trustees and the project implementer have evaluated the potential effects of the project on ESA-listed species and ESA critical habitat. Based on this analysis, the Trustees and the project implementer have determined that by following the best management practices developed for marine debris removal activities there will be no potential for "take" or other adverse impacts to ESA-listed species. Therefore, consultation with the USFWS and/or NOAA Fisheries pursuant to Section 7 of the ESA is not required. The Trustees have determined that marine debris removal around Pearl and Hermes and elsewhere in the Papahānaumokuākea Marine National Monument will not adversely affect and will likely benefit some ESA-listed species such as green sea turtles and Hawaiian monk seals.

Magnuson-Stevens Fishery Conservation and Management Act, 16 USC 1801 *et seq*.

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires federal fishery management plans to describe the habitat essential to the fish being managed and describe threats to that habitat from both fishing and non-fishing activities. In addition, in order to protect this Essential Fish Habitat (EFH), federal agencies are required to consult with the National Marine Fisheries Service (NMFS) on activities that may adversely affect EFH.

The Trustees do not anticipate that the selected project in this Final DARP/EA has the potential to adversely affect an EFH. If, upon development of further site-specific information, it is determined that either project could affect an EFH, the Trustees and/or the project implementer, as appropriate, will consult with appropriate NOAA officials.

Hawaii Conservation of Aquatic Life, Wildlife, and Land Plants, Title 12, Chapter 195D

Recognizing that many species of flora and fauna unique to Hawaii have become extinct or are threatened with extinction, the state established procedures to classify species as locally endangered or threatened. The statue directs the DLNR to determine what conservation measures are necessary to ensure the continued ability of species to sustain themselves.

Fish and Wildlife Coordination Act (FWCA), 16 USC 661, *et seq*.

The FWCA requires that federal agencies consult with the USFWS, NMFS, and state wildlife agencies for activities that affect, control or modify waters of any stream or bodies of water, in order to minimize the adverse impacts of such actions on fish and wildlife resources and habitat. This consultation is generally incorporated into the process of complying with Section 404 of the Clean Water Act, NEPA or other federal permit, license or review requirements.

If necessary, the Trustees and/or the project implementers will consult with appropriate agencies as they pursue any required permitting for specific actions that may trigger such consultation.

Executive Order (EO) 13089 Coral Reef Protection

On June 11, 1998, President Clinton issued EO 13089, Coral Reef Protection to address impacts to coral reefs. Sec. 2. Policy states (a) All Federal agencies whose actions may affect U.S. coral reef ecosystems shall: (a) identify their actions that may affect U.S. coral reef ecosystems; (b) utilize their programs and authorities to protect and enhance the conditions of such ecosystems; and (c) to the extent permitted by law, ensure that any actions they authorize, fund, or carry out will not degrade the conditions of such ecosystems. Given that this DARP/EA is designed to restore injured coral and coral reef habitat the compliance with EO 13089 is inherent within the project.

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APPENDIX A: FIELD REPORT FOR THE M/V CASITAS VESSEL GROUNDING INITIAL INJURY PREASSESSMENT SURVEYS

FIELD REPORT
for the
M/V CASITAS VESSEL GROUNDING
INITIAL INJURY PREASSESSMENT SURVEYS

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November 30, 2005

1. BACKGROUND

On July 2, 2005, the M/V CASITAS ran aground on the reef at Pearl and Hermes Atoll, Northwest Hawaiian Islands National Wildlife Refuge, while under contract to the National Oceanic and Atmospheric Administration to conduct marine debris removal. The vessel was extracted August 4, 2005. The grounding, subsequent response, and removal of the vessel potentially injured natural resources under the trusteeship of the Department of the Interior, the Department of Commerce, and the State of Hawaii (the Trustees). The Trustees, in cooperation with Fishing Vessel North Wind, Inc., represented by Polaris Applied Sciences, Inc., are conducting a preassessment of the potential injuries under the provisions of 15 CFR Part 900 (NRDAR Regulations promulgated by NOAA as authorized by the Oil Pollution Act of 1990). As a task within the preassessment project, the Trustees and Fishing Vessel North Wind, Inc., deployed a survey team to the site of the M/V CASITAS grounding to collect ephemeral data at the grounding site and at North and Southeast Islands, which were briefly occupied by the crew of, and others aboard, the CASITAS after abandoning ship. The preassessment team spent 6 days in the field, operating off the M/V FREEBIRD with 9 people to survey, photograph, video-survey, and document qualitative and quantitative ecological information at the physical grounding site, the vessel extraction area (i.e., all areas where vessels operated during the M/V CASITAS lightering and extraction), the intertidal zone, and the atoll islets to which persons were evacuated.

2. <u>SURVEY TASKS AND PRIORITIES</u>:

Two field teams, one terrestrial and one aquatic, were deployed to accomplish the following objectives. Priorities are listed in a general order of importance:

A. Aquatic Surveys.

6) Document evidence of spill injury and other types of pollutant injuries (e.g., paint and other types of substances from vessel) via sampling of bleached corals, sediment, and other invertebrates.
    a) **High Priority Objective:** Collect bleached coral samples for evidence of petroleum toxicity. (1) Set up a survey grid to look for bleached coral around the Casitas. Habitat zones evaluated for bleached coral included by priority: a) the coral reef crest immediately adjacent to the vessel; b) inter-islet reef zone; c) lagoon slope; and areas within the lagoon.
    b) **High Priority Objective:** Collect sediment samples for petroleum and other chemical analyses
    c) **Low Priority Objective:** Collect other invertebrate organisms as necessary to detect effects of toxicity

7) Document injury in the grounding area as well as surrounding areas.
    a) **High Priority Objective:** Use Aquamap system to measure extent of vessel grounding scar.
    b) **High Priority Objective:** Measure scar and all physical injury using GPS technology and standard measurement protocols to augment and verify Aquamap measurements.
    c) **Medium Priority Objective**: Record qualitative observations of the various types of injuries associated with groundings (scarred reef, pulverized reef, sedimentation, etc) and possible response injury.
    d) **Medium Priority Objective:** Record qualitative observations of any and all biological impacts, mortalities and injury to live coral, invertebrates, fishes, etc.

8) Document general habitat of vessel grounding impact areas and affected habitat areas (reef slope zone, reef crest zone, inter-islet reef zone, lagoon slope zone, coral communities within the lagoon that may have been exposed to petroleum products, using digital video and photo.
    a) Photo and video document various types of habitats and link with spatial data in the vicinity of the grounding.

9) Remove debris and paint chips left behind from vessel.

10) Conduct more specific photo documentation and other biological assessments with any available expertise and resources

B. Terrestrial Surveys.

High Priority Objective: Conduct terrestrial surveys on islets to which CASITAS personnel were evacuated to serve as baseline for future monitoring to ascertain whether invasive species may have been introduced as a result of the personnel evacuation and other response activities.

3. **METHODS/RESULTS.**

The survey team arrived at Midway Island NWR on Tuesday, 23 August 2005, and embarked on the M/V FREEBIRD. Following the transit from Midway, the team was on-site at Pearl and Hermes Atoll 24-29 August 2005, returning to Midway the morning of 30 August for the return flight to Honolulu. Although logistical problems were generally limited, one significant issue emerged. After the second day of diving it was discovered that the air compressor borrowed from Midway Island NWR was inoperative. The captain of the FREEBIRD was able to restore some function, but throughout the remainder of the survey period tanks could only be filled to about half capacity, reducing the diving time available.

A. Aquatic Surveys.

1) Sample Collection. Samples of corals were collected for toxicity analysis although no evidence of bleached corals or corals with extruded tissue indicative of toxicity were encountered as specified in the objectives and methods of the assessment plan. Six coral and 24 sediment samples were collected following the protocols in Appendix A Samples were taken following a stratified sampling plan. Two transects, one at the CASITAS grounding site and one at a reference location about 200 meters to the west of the grounding site were established and stratified by habitat type, reef slope, reef crest, inter-islet, and lagoon slope.

a) Tissue samples. Coral samples were collected at three locations on each transect as close to the reef crest as practicable (given weather conditions and the need to have samples on liquid nitrogen within ten minutes of collection), the inter-islet area, and the lagoon slope. Roughly ten pieces of *Porites* sp. were collected at each location, placed in a plastic falcon tube, and then placed in a liquid nitrogen container within ten minutes of collection. All collection sites were marked individually by GPS at the time of collection. Analytical results will be incorporated into the preassessment report when received.

b) Sediment samples. Sediment samples were collected at four locations along each transect; the reef slope, the reef crest (as close as practicable), the inter-islet reef, and the lagoon slope. Three grab samples were collected at each location, one for metals analysis and two for polycyclic aromatic hydrocarbon (PAH) analyses by modified EPA method 8270. Sediments were collected in 250 ml jars and refrigerated after collection. Each collection site was marked by GPS at the time of collection. Coral and sediment collection locations are shown in Figure 1. The

sample log is attached as Appendix C. Analytical results are attached as Appendix D.

c) Other invertebrate samples. Invertebrate samples were not collected due to time constraints and limited availability of mollusks.

2) Physical Injuries. Physical injuries to the reef were measured to the extent permitted by weather, time, and air supplies. The injured zones were identified as the main scar near the reef crest caused by the vessel grounding, the extraction scars created by the vessel, barge, and/or cables on the reef slope adjacent to the main vessel scar, and anchor/cable scars also on the reef slope. The following describes the physical measurements of injured areas, qualitative observations and other activities associated with the physical assessment.

a) Aquamap Measurements. The Aquamap system was employed as described in Appendix A to measure extraction and anchor/cable scars. In the main scar area, the Aquamap system was used in conjunction with physical measures due to limited water depth and sea conditions. The raw Aquamap data files were provided to the Trustees.

b) GPS and Standard Measurements. The estimated GPS coordinates of the anchors provided to the survey team proved to be un-reliable and only injury at anchor sites 4, 5, and most likely 3 could be located with reasonable certainty. No scars associated with anchor sites 1, 2, and 6 were located; however, several scars that seemed to be associated with anchor cables were located between the estimated sites of anchors 2 and 6 and the vessel extraction zone. It is possible anchors 1 and 2 were located further offshore than surveyed, but no evidence of anchor scars were found. No evidence of a scar from anchor 6 was found, indicating that either the anchor was placed in sand or the injury was not surveyed. The mapped areas of injury are shown in Figure 2.

The main scar was measured using GPS technology, Aquamap, and standard measurement protocols as described in Appendix A. The measurements and compass orientations are shown in Figure 3. Additional measurements were made of scars in the extraction areas identified as A and B in Figure 3. Nine scars were marked in Vessel Extraction Zone A with stainless steel pins so they can be relocated in future surveys. Vessel extraction Zone B was measured by Aquamap only. Measurements, GPS coordinates, and descriptions of the injured areas are described in the Casitas Preassessment Marine Report (Appendix E), with a supporting Excel spreadsheet. Figures 4 and 5 show the areas searched in two ways: Figure 4 shows the boat tracks documented by GPS, and Figure 5 shows the estimated sizes of the search polygons.

c and d) Qualitative Observations. Video footage, photographs, and written narratives from divers were used to make qualitative observations of the various types of physical and biological injuries associated with groundings (scarred reef, pulverized reef, sedimentation, etc) and possible response/extraction injury.

Videos and photographs have been provided electronically to all agencies. Diver observations are incorporated into Appendix E.

3) General habitat documentation. Linked with tasks 2(c) and 2(d), above.

4) Debris removal. A small amount of debris was removed incidentally to other higher priority activities. Debris consisted mainly of small pieces of metal, clothing, and personal items such as cassette tapes. An estimated 300 ft. length of ¾ in. nylon line, entangled in the reef adjacent to the grounding site, was removed during one of the injury assessment surveys. In addition, two parachutes were located in the vicinity that remained from equipment having been airlifted into the grounding site during the response. One dive was used on the last day on-site to remove the parachutes so they would not cause additional damage to the reef during the winter storm season.

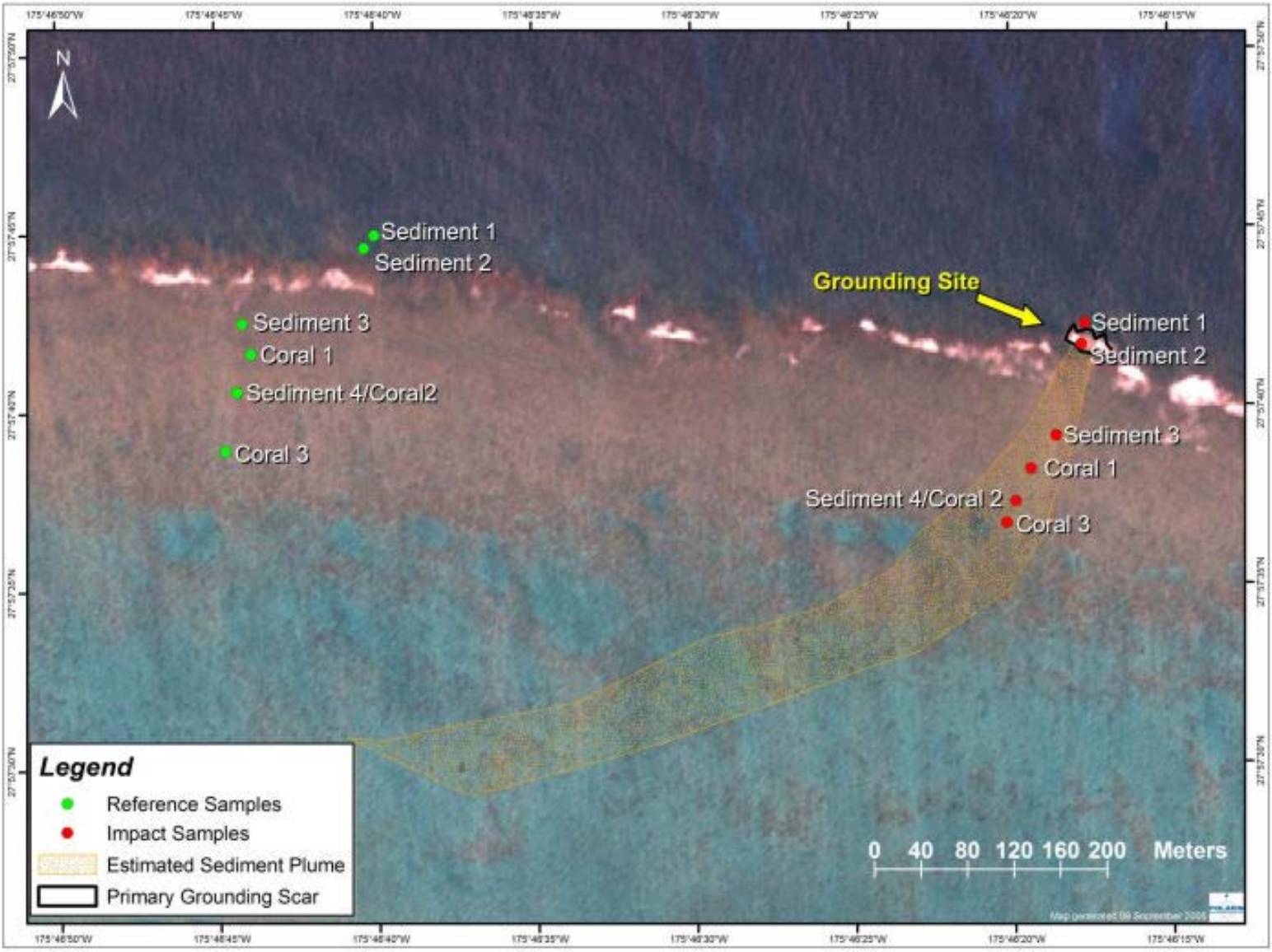
5) Archival photo-quadrat data. The RP representatives collected a small number of photo-quadrats within injured and uninjured areas

B. Terrestrial Surveys.

Terrestrial surveys were conducted on North Island and Southeast Islands in accordance with the protocols described in Appendices B and Pacific Remote Islands National Wildlife Refuge Complex Special Conditions and Rules for Moving between Islands and Atolls and Packing for Field Camps of July 2001.

1) North Island surveys were conducted from the morning of 24 August to the morning of 27 August 2005. Eight invertebrate samples were collected as anticipated. The terrestrial sample log is included in Appendix C. The narrative descriptions of the team's activities are contained in Appendix F. Invertebrate identifications will be incorporated into the preassessment report when received.

2) Southeast Island surveys were conducted from the morning of 27 August to the afternoon of 29 August 2005. Seven invertebrate samples were collected as anticipated. The terrestrial sample log is included in Appendix C. The narrative descriptions of the team's activities are contained in Appendix F. Invertebrate identifications will be incorporated into the preassessment report when received.


N
Sediment 1
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Sediment 3
Coral 1
Sediment 4/Coral2
Coral 3
Grounding Site
Sediment 1
Sediment 2
Sediment 3
Coral 1
Sediment 4/Coral 2
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Legend
Reference Samples
Impact Samples
Estimated Sediment Plume
Primary Grounding Scar
0 40 80 120 160 200 Meters

Figure 1. Coral and sediment sampling locations.

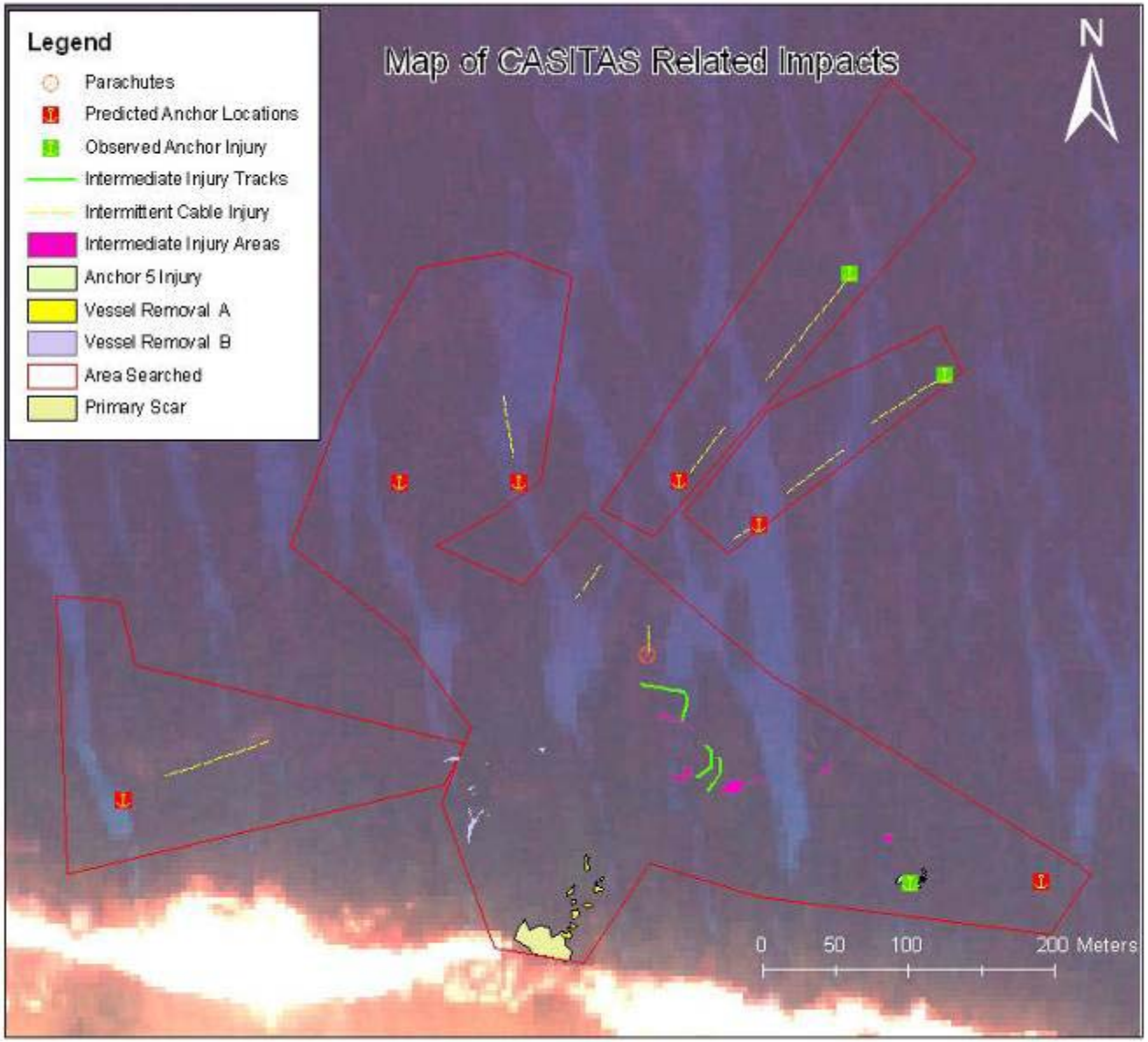

Figure 2. Areas of injury documented by Aquamap.

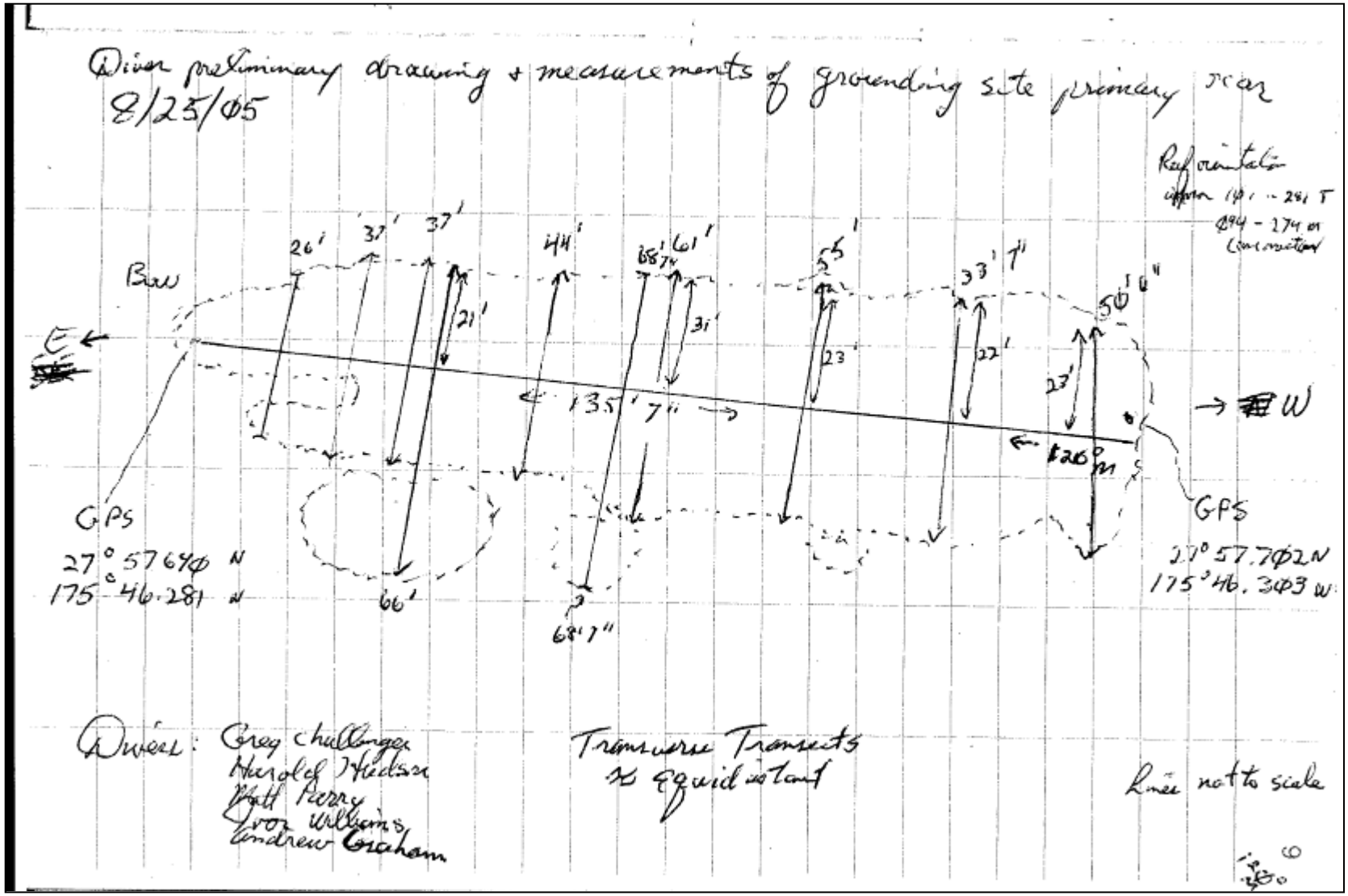

Figure 3. Diagram and measurements of the main scar.

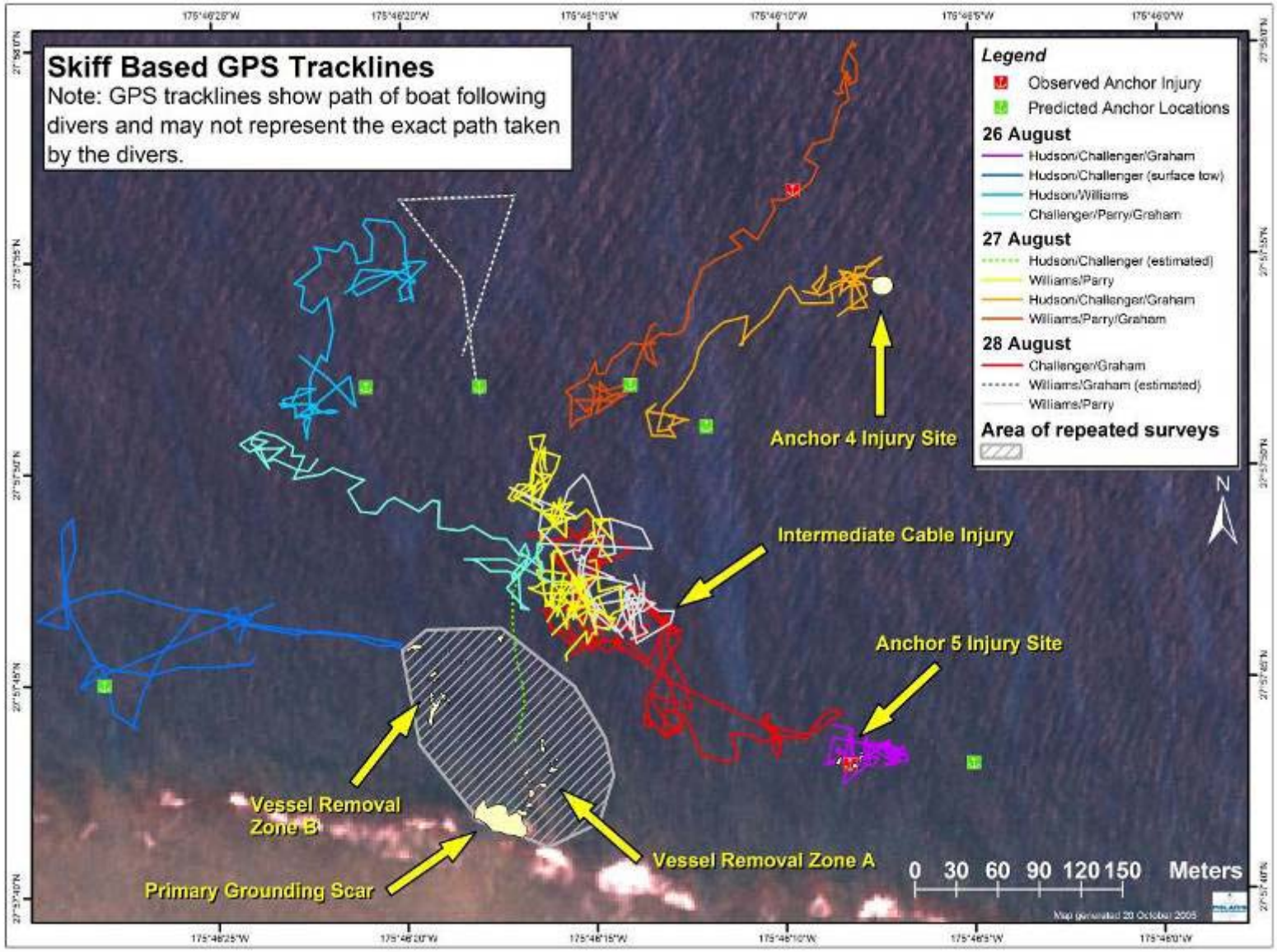

Figure 4. Boat tracks showing areas searched .

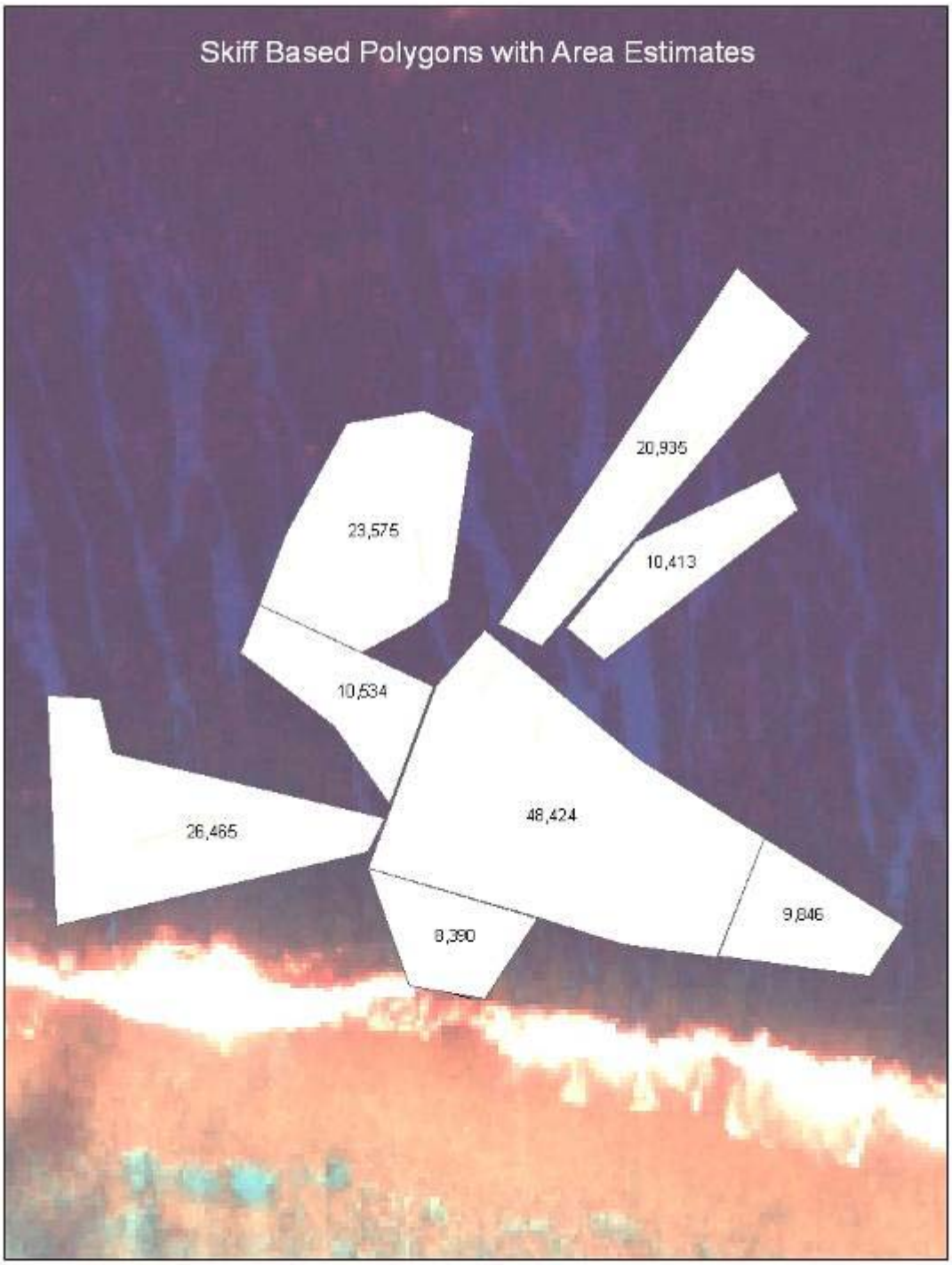

Figure 5. Estimated search area polygons.

APPENDIX A

MV Casitas Grounding Preassessment Expedition Methodology and Protocols for Marine Assessment

The following priority tasks will be conducted:

a) Toxicity Exposure

High Priority**:** Document evidence of spill injury such as bleached corals, coral tissue extrusion, and invertebrate mortality.

There is no confirmation of substantial fuel release and the fuel recovery indicates the petroleum products on-board are largely accounted for. The projected path of sediment and any potentially released fuel will be the initial focus of evidentiary surveys for exposure.

If evidence mentioned above is encountered, the team will collect samples of indicator invertebrates if available for potential chemical analytical analysis of polycyclic aromatic hydrocarbons (Modified EPA method 8270) and biomarkers in the source oils to determine if exposure to the specific source oils occurred. Certain invertebrates such as filter feeders concentrate contaminants and are ideally suited to determine exposure. Appropriate permits and approval must be obtained. Composite samples of at least 8 oz of tissue are required for each sample. Samples must be wrapped in foil, enclosed in plastic, and stored on ice or frozen until shipment to the laboratory under chain of custody.

If evidence of coral bleaching or tissue extrusion is encountered and is unique to potentially exposed areas (or there is uncertainty), coral samples will be collected for evidence of petroleum toxicity. Corals are not ideally suited to determine exposure to the source oil since forensic chemistry is not possible without ample tissue quantity. However, it is possible to apply general knowledge about exposure to hydrocarbons.

A survey pattern to look for bleached coral and other potential evidence of oil exposure around the Casitas will follow the potential trajectory. Habitat zones that should be evaluated should begin close to the vessel and fan outward until all areas are covered or no further evidence is encountered. These areas include: a) The coral reef crest immediately adjacent to the vessel; b) inter-islet reef zone; c) lagoon slope; and areas within the lagoon.

High Priority: Document evidence of petroleum spill and/or other toxic chemical releases into the environment (e.g., anti-corrosive materials from exterior of M/V Casitas) by collection and analysis of sediment samples.

Lower Priority: Remove small debris and paint chips left behind from vessel.

b) Physical Injury

High Priority: Document injury in the grounding area as well as surrounding areas

An AquaMap underwater SONAR system will be used to measure the aerial extent of vessel grounding scar in coordination with natural resource trustees. AquaMap consists of 3 stationary transducers and a hand-held data collection unit. The three transducers are moored underwater and the hand-held unit records its position relative to the three transducers. A GPS position of one of the transducers can be taken and used to place the area in a global reference, but the GPS position is not used when calculating distances and areas measured. AquaMap will be calibrated by using it in concert with a measuring tape for validation.

The trustees will also measure the scar and all physical damage using GPS technology and standard measurement protocols to augment AquaMap measurements. However, GPS on the site has been reported to be very inaccurate. The size of the scar may dictate that measuring tape may be a better method of verification. Video documentation of all AquaMap data collection will be recorded to provide post-survey verification of the scar measurement by other trustees not participating in the Preassessment survey.

The area of injury will be marked by representatives of Polaris Applied Sciences and the trustee agencies using snorkeling or SCUBA equipment where appropriate with multiple lead weights and flagging tape such that all trustees agree on boundary locations. The time to complete a SONAR survey of the flagging tape markers around each injury area is very short, accurate, and saves many days of tedious and less accurate measurements using GPS or measuring tape. A video with an embedded chart can be created that tracks the movement of the dive team and shows the imagery from the position on the chart. From the digital AquaMap files, the area of injury can be calculated. Traditional methods will be used as verification.

In the event that the AquaMap system does not prove to be effective in documenting the injury (extremely shallow water, technical difficulties, etc.) standard measurement protocols will be used. A measuring tape will be placed along the long axis of each injury polygon marked by the joint assessment team members. Divers will use a second measuring tape to measure the width of the polygon perpendicular to the longitudinal measuring tape at defined intervals. Depending on the size of the injury the intervals can range from 1 to 5 meters. GPS positions will be recorded at each end of the longitudinal axis to place the injury polygons in GIS in their relative positions at the site.

Following measurement of the scar and surrounding habitats, qualitative observations of the various types of injuries associated with groundings (scared reef, pulverized reef, sedimentation, etc) will be recorded on underwater slates and with still image and video documentation. Qualitative observations of any and all biological impacts, mortalities and damage to live coral, invertebrates, fishes, etc. will also be recorded.

The general habitat of vessel grounding impact areas and affected habitat areas (reef slope zone, reef crest zone, inter-islet reef zone, lagoon slope zone, coral communities within the lagoon that may have been exposed to petroleum products will be documented using digital video and still photography. AquaMap can be used to support these tasks by recording photo and observation locations.

Lower Priority: If time permits and if deemed useful based on the qualitative high priority data collection, video transects within the injury area, establishment of permanent transects, photo quadrats, rugosity measurements and other quantitative data may be collected in impact and reference locations in consultation with participating members. AquaMap can be used to support these tasks by identifying sample locations.

For safety, dives will be limited to less than 60' and within 2 letter groups of no-decompression limits to avoid the need for a hyperbaric chamber.

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APPENDIX B

MV Casitas Grounding Preassessment Expedition
Terrestrial Survey Methodology and Protocols

Rationale: After the evacuation of the M/V Casitas at least 17 people were transported to North Island, Pearl and Hermes Reef, where they stayed for several hours before moving to Southeast Island in the same atoll. Because this was an unexpected landing, the individuals involved did not have the opportunity to observe the National Wildlife Refuge's quarantine protocols (**see Attachment 3**) that are required to prevent the introduction of non-native plants, insects, fungi, and pathogens to these sensitive island environments. The group had just come from Midway Atoll where there are invasive species that pose a great risk to Pearl and Hermes Reef.

By describing the plant and terrestrial arthropod communities that currently exist at North and Southeast Islands we will have a basis from which to evaluate the same ecological communities later on in order to detect whether or not new species possibly carried to North or Southeast Islands by the crew and passengers of the Casitas have established themselves. As time permits, the terrestrial survey team will also survey the Laysan Finch population at Southeast Island and record other bird and sea turtle observations, as listed below.

Objectives: (In order of their priority)

1. Survey terrestrial environment at North Island and Southeast Island to describe current species composition, phenology, and spatial distribution of plants.
2. Survey terrestrial environment at each site to describe species composition and relative abundance of terrestrial invertebrate species.
3. Do standard survey to estimate population size of the Laysan Finch at Southeast Island.
4. Record species, count active nests, and note breeding chronology of seabirds.
5. Record shorebird species and any other vagrants or migrant birds.
6. Count number of green turtle nests and note evidence of hatching. Count turtles resting on shore at night.

Botanical Survey Methods

Survey entire island, noting all species observed, their phenology and size. Map vegetation associations. Note condition of plants and record evidence of herbivory, salt spray damage or disruption from turtles digging nests. Using approved monk seal and turtle approach guidelines search high tide line for seeds or other plant propagules. Collect or photograph if you are unable to identify them in the field.

Invertebrate Survey Methods

Ant Surveys and Pitfall Surveys

Establish a transect that bilaterally dissects each island. Along that transect, identify equally spaced sampling points (recommend about 5 for the smaller island and approximately 10 stations for the larger lobe of Southeast Island and 5 for the western lobe). Using the GPS receiver mark a waypoint at each station. At these stations on each island, conduct ant surveys using bait cards

and also install pitfall traps. Both the ant card sampling and pitfall trapping should be conducted during non-rainy and ideally, sunny, less windy days.

Ant Card Sampling

Three (3x5") index cards should be placed at each of the stations. Each card will be baited with a small amount of peanut butter, honey and spam (or other processed lunch-type meat). Before placing the cards on the ground, cards should be labeled with a **pencil** to denote the date, station number, and time. Cards should not be placed out when it's raining or after a recent rain since ant activity is lessened. Cards should only be left out for about one hour, never more than two hours. When retrieved each card should then be put in an individual Ziploc bag, labeled on the outside with a permanent marker to indicate the date, time, and station number. The small bags can then be placed in a single, large Ziploc bag. On a separate paper, please note the weather conditions and any other observations during and just prior to collection, and include this paper within the large bag. Keep all ant samples in a cooler (ideally) until they can be placed into a ship freezer for the return trip.

Additional Ant Sampling

When time permits on each visit, collect ants by other means to make sure we get a representative sample of all ant species (since not all ant species are equally attracted to the bait cards or at all). Do the following:

-Collect specimens under rocks and wood

-Take sweep net samples of several plant species

-Ants that are found through sweeping or under rocks and would should be either aspirated or picked up using a small paint brush wetted with 80% ETOH.

-All ants collected this way should be placed in small vials with 80% ETOH and proper labels. Label info should include location, how/where collected, i.e., under rock, or on what plant species, date, and collector's name.

Pitfall Trap Sampling

Locate one pitfall trap at each sampling station established along the transect. Your pitfall trap system could utilize a pair of clear, plastic cups placed into larger, red cups with the bottoms cut out (to increase efficiency in situating the trap cups). Locate your cup pairs about 1 foot apart with an orange stake placed between them to enhance intake by directing ground-crawling arthropods into the cups. Place the red cups with the bottoms cut out into the ground first and then set the clear cups into the red cup so that they sit flat and flush with the ground surface (usually sand). Gently push sand or soil up against cups so that it is as flush as possible with the top edge of the plastic cup (to enhance the chances of bugs stumbling into the cup) and flush against the bottom of the orange

stakes. Fill the clear cups about 3/4 or 2/3's full with SLIGHTLY soapy water. Place cups out on one day and then pick them back up approximately 24 hours later. To extract the specimens from the soapy water, remove the clear cup and pour the water containing the specimens into a straining device. Pick specimens out of the strainer using soft aluminum tweezers and/or a paintbrush and place into a vial containing 80% ETOH.
To prevent finch interference and mortality in the pitfalls cover each trap with a hardware cloth box.

Additional Survey options:
When sweeping vegetation during the day, collect insects and spiders from the net by inverting the net bottom into a large (1 quart) Ziploc bag, shake the net to loosen any clinging arthropods. Be sure to include a label in each Ziploc bag (written in pencil) to include pertinent collecting data, esp. plant type swept with the net. About ten sweeps on each vegetation type should be sufficient to get a good sample. Try to do that at least in two places on each island per vegetation type.

Nighttime Sampling:
Try to do at least one nighttime collecting session per island on an ideally dry and non-windy, non-cloudy evening. Conduct this sample method in the middle of the island. Secure with string or other means, a large white sheet between some supporting vegetation. Turn a bright, ideally white light (for example from one of the new superbright LED-type headlamps) onto the sheet so that it illuminates as much surface area as possible. Hang out for at least one hour, ideally two if possible and collect any moths or flying insects that come to investigate the sheet. These insects can be collected by hand, aspirator, or in the case of quick-flying moths, with a net. Moths should be stored in large (2" or so) plastic vials without ETOH. Other night flying specimens can be collected into one large jar or Ziploc bag. Label everything.

Intertidal Zone Sweeping
During the day when it is sunny, take the net and perform sweeping motions along the shoreline while walking up and down the beach. Keep the net close to the wet sand while sweeping but out of the water. Some flies may be collected this way. They will be adept at escaping the net, so use extra care to either aspirate them out or when shaking them into Ziploc bags. Label everything.

Laysan Finch Monitoring

The majority of all finches at the atoll live on Southeast Island. Note any birds at North Island and record band colors and order if possible. At Southeast do a check of the 59 artificial nest boxes located on the East lobe of the Island. Approach the box quietly and if a finch is observed in the nest box record the observation and quickly move away. If no nest or a nest without a finch on it is observed proceed to remove the lid to check for nesting materials, eggs, chicks, and the state of the nest. Note, remove nestbox lid only when you are sure that an adult is not on or near the nest, or when you can tell that the box is empty. If an active nest is discovered replace the lid quietly

and do not attempt to ascertain nest contents if the adult does not flush. Record band combinations on Southeast Island as well. Note general area in which you sighted bird.

Laysan Finch Survey

As time permits do up to 100 transects on Southeast Island between the hours of 0700 and 1100 to estimate finch density on the island. Each transect should be 100' long by 16.5' wide (8.25' to each side). These quaint measurements are due to the fact that this same methodology has been used since the 1960's. The width of the line, 16.5 feet, is a rod (160 square rods equal an acre) Orient transects on a magnetic North-South bearing. Using the measuring tape learn the number of your paces that equals 100 feet and carry a piece of cord with a small weight tied to the end that equals 8.25 feet to extend periodically to know how wide to make your counting area. With lines and counters in hand, two observers can walk simultaneously two parallel transects separated by about 20' and in this manner walk in a straight line and completed as many 100' transect segments as will fit within the vegetated portion of the island. Any finches that were observed within the reach of the pole to the front and sides should be counted. Finches that are observed to enter into the count area while the survey was in progress should not be tallied. The number of finches counted on each transect is then divided by the area of a transect (1650 square feet) and an estimate of the mean density and the variance of all the transects can be calculated. This density is then multiplied by the total vegetated area of the island to determine an island population estimate. There are 43,650 square feet per acre and there was 30.1 acres of vegetated area at Southeast in 2001.

Seabird and Shorebird Survey

Note each species of seabird observed and whether or not it is breeding. For surface nesting and shrub-nesting species attempt to count or estimate numbers of nests and record breeding stage at eggs or one of the phenological categories on the Breeding Chronology key that will be included in your survey forms. For burrow nesters sketch the general areas on each island that appear to have burrow entrances. Note each species of migrant shorebird seen and estimate numbers.

Turtle Activity Monitoring

Map areas of signs of turtle nesting activity. Map areas of night haul-outs. Look for pre-hatch pits. Look for hatchlings that may be tangled in vegetation. After dark, carefully count the numbers of turtles that come ashore for the night. Try not to use lights at all and avoid frightening the turtles back into the ocean. Use the recommended camp sites situated away from favored night haul-out areas and control light in camp to avoid confusing hatchling turtles. There has rarely been an overnight stay at North Island so mapping night haul-outs will be new information.

APPENDIX C

MV Casitas Grounding Preassessment Expedition
Sample Log

Samples taken at M/V Casitas grounding site 24-25 August 2005
Samples were collected by Matt Parry (NOAA) and Andy Graham (Polaris); received and logged by James Haas (USFWS

Sample #	Transect #	Station#	Sample Matrix	Intended Analysis	GPS Waypoint	Date/Time	L
CAS824 SM2-1	2	1	Sediment	Metals	1	8/24/2005 11:25	N
					2	8/24/2005 11:26	N
					3	8/24/2005 11:28	N
CAS824 SP2-1	2	1	Sediment	PAHs	1	8/24/2005 11:25	N
					2	8/24/2005 11:26	N
					3	8/24/2005 11:28	N
CAS824 SP2-2	2	1	Sediment	PAHs	1	8/24/2005 11:25	N
					2	8/24/2005 11:26	N
					3	8/24/2005 11:28	N
CAS824 SM2-2	2	2	Sediment	Metals	4	8/24/2005 11:34	N
					5	8/24/2005 11:34	N
					6	8/24/2005 11:35	N
CAS824 SP2-3	2	2	Sediment	PAHs	4	8/24/2005 11:34	N
					5	8/24/2005 11:34	N
					6	8/24/2005 11:35	N
CAS824 SP2-4	2	2	Sediment	PAHs	4	8/24/2005 11:34	N
					5	8/24/2005 11:34	N
					6	8/24/2005 11:35	N
CAS824 SM2-3	2	3	Sediment	Metals	7	8/24/2005 15:37	N
CAS824 SP2-5	2	3	Sediment	PAHs	7	8/24/2005 15:37	N
CAS824 SP2-6	2	3	Sediment	PAHs	7	8/24/2005 15:37	N
CAS824 SM2-4	2	4	Sediment	Metals	8	8/24/2005 15:50	N
CAS824 SP2-7	2	4	Sediment	PAHs	8	8/24/2005 15:50	N
CAS824 SP2-8	2	4	Sediment	PAHs	8	8/24/2005 15:50	N
CAS824 2-C4	2		Coral	Biomarker	8	8/24/2005 15:50	N
CAS824 2-C5	2		Coral	Biomarker	9	8/24/2005 17:00	N
CAS824 2-C6	2		Coral	Biomarker	10	8/24/2005 17:05	N
CAS824 SM1-4	1	4	Sediment	Metals	11	8/24/2005 17:38	N
CAS824 SP1-7	1	4	Sediment	PAHs	11	8/24/2005 17:38	N
CAS824 SP1-8	1	4	Sediment	PAHs	11	8/24/2005 17:38	N
CAS824 1-C2	1		Coral	Biomarker	11	8/24/2005 17:38	N
CAS824 SM1-3	1	3	Sediment	Metals	12	8/24/2005 17:47	N
CAS824 SP1-5	1	3	Sediment	PAHs	12	8/24/2005 17:47	N
CAS824 SP1-6	1	3	Sediment	PAHs	12	8/24/2005 17:47	N

CAS824 1-C1	1		Coral	Biomarker	13	8/24/2005 17:53	N
CAS824 1-C3	1		Coral	Biomarker	14	8/24/2005 18:01	N
CAS824 SM1-2	1	2	Sediment	Metals	17	8/25/2005 9:55	N
CAS824 SP1-3	1	2	Sediment	PAHs	17	8/25/2005 9:55	N
CAS824 SP1-4	1	2	Sediment	PAHs	17	8/25/2005 9:55	N
CAS824 SM1-1	1	1	Sediment	Metals	18	8/25/2005 10:02	N
CAS824 SP1-1	1	1	Sediment	PAHs	18	8/25/2005 10:02	N
CAS824 SP1-2	1	1	Sediment	PAHs	18	8/25/2005 10:02	N

Samples taken at M/V Casitas grounding site 24-29 August 2005
Samples were collected by Arlene Pangelinan (USFWS) and Mick Castillo (USFWS -Contract; received and logged by James Haas (USFWS)

Island	**Sample #**	**Date**	**Number Items**	**Sample Matrix**	**Location**
North	1	8/25/05	15 cards in Gal. Ziploc	Ants	Transect
North	2	8/24/05	7 vials	Night Inverts	Westshore
North	3	8/25/05	19 vials in Gal. Ziploc	Night Inverts	b/w Sta.3 and 4
North	4	8/26/05	7 vials in Qrt. Ziploc	Ants	Pitfalls
North	5	8/26/05	Qrt. Ziploc	Inverts	Intertidal zone sweep around Island perimeter
North	6	8/26/05	12 bags in Gal. Ziploc	Inverts	Vegetation sweep samples
North	7	8/26/05	I Vial	Moth sp.	
North	8	Various	3 paper bags	*Solanum nelsonii* berries	Various
Southeast	1	08/29/05	15 bags in Gal. Ziploc	Inverts	Vegetation sweep samples - eastern and western lobes
Southeast	2	08/27/05	15 cards in Gal. Ziploc	Ants	Transect - western lobe
Southeast	3	08/29/05	1 vial in sandwich Ziploc	Inverts	Inter-tidal sweep - western lobe
Southeast	4	08/28/05	1 vial in Qrt. Ziploc	Inverts	Inter-tidal sweep - eastern lobe
Southeast	5	08/28/05	5 vials in Qrt. Ziploc	Inverts	Pitfalls - western lobe
Southeast	6	08/29/05	1 vial in Gal. Ziploc	Beetle (?)	Campsite - western lobe

APPENDIX D

MV Casitas Preassessment Expedition

Analytical Results for Sediment Samples
(See Attached)

Grounding Transect

Class	Abbrev	Client ID	CAS 824 SP2-1 & SP2-2		CAS 824 SP2-3 & SP2-4		CAS 824 SP2-5 & SP2-6		CAS 824 SP2-7 & SP2-8	
		Lab ID	0510002-01		0510002-02		0510002-03		0510002-04	
		Matrix	Sediment		Sediment		Sediment		Sediment	
		Reference Metho	Modified 8270C		Modified 8270C		Modified 8270C		Modified 8270C	
		Batch ID	SS101705B07		SS101705B07		SS101705B07		SS101705B07	
		Sample Size (wet	30.06		30.29		30.85		30.35	
		% Solid	86.25		85.14		78.87		79.1	
		Units	µg/Kg		µg/Kg		µg/Kg		µg/Kg	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	Result	SSRL	Result	SSRL
2	N0	Naphthalene	0.39 J	0.4	0.094 JB	0.41	0.098 JB	0.43	0.26 JB	0.44
2	N1	C1-Naphthalenes	0.15 J	0.4	0.044 JB	0.41	0.073 JB	0.43	0.07 JB	0.44
2	N2	C2-Naphthalenes	0.56	0.4	0.28 J	0.41	0.68	0.43	1.2	0.44
2	N3	C3-Naphthalenes	0.18 J	0.4	U	0.41	0.25 J	0.43	0.65 O	0.44
2	N4	C4-Naphthalenes	0.22 J	0.4	U	0.41	U	0.43	1.8 O	0.44
2	B	Biphenyl	0.075 J	0.4	0.052 J	0.41	0.085 J	0.43	0.42 J	0.44
3	DF	Dibenzofuran	U	0.4	U	0.41	U	0.43	U	0.44
3	AY	Acenaphthylene	0.017 J	0.4	0.0673 J	0.41	0.057 J	0.43	0.062 J	0.44
3	AE	Acenaphthene	0.02 J	0.4	U	0.41	U	0.43	U	0.44
3	F0	Fluorene	U	0.4	U	0.41	U	0.43	U	0.44
3	F1	C1-Fluorenes	U	0.4	U	0.41	U	0.43	U	0.44
3	F2	C2-Fluorenes	U	0.4	U	0.41	U	0.43	U	0.44
3	F3	C3-Fluorenes	U	0.4	U	0.41	U	0.43	U	0.44
3	A0	Anthracene	U	0.4	U	0.41	U	0.43	U	0.44
3	P0	Phenanthrene	0.071 JB	0.4	0.05 JB	0.41	U	0.43	U	0.44
3	PA1	C1-Phenanthrene	0.4 JO	0.4	U	0.41	2.6 O	0.43	1.8 O	0.44
3	PA2	C2-Phenanthrenes/Anthracenes	U	0.4	U	0.41	0.36 J	0.43	0.75	0.44
3	PA3	C3-Phenanthrenes/Anthracenes	U	0.4	U	0.41	0.25 J	0.43	0.84	0.44
3	PA4	C4-Phenanthrenes/Anthracenes	U	0.4	U	0.41	U	0.43	0.59	0.44
3	RET	Retene	U	0.4	U	0.41	U	0.43	U	0.44
3	DBT0	Dibenzothiophene	U	0.4	U	0.41	U	0.43	U	0.44
3	DBT1	C1-Dibenzothiophenes	U	0.4	U	0.41	U	0.43	0.21 J	0.44
3	DBT2	C2-Dibenzothiophenes	U	0.4	U	0.41	U	0.43	0.74	0.44
3	DBT3	C3-Dibenzothiophenes	U	0.4	U	0.41	U	0.43	0.99	0.44
3	DBT4	C4-Dibenzothiophenes	U	0.4	U	0.41	U	0.43	1.1	0.44
4	BF	Benzo(b)fluorene	U	0.4	U	0.41	U	0.43	U	0.44
4	FL0	Fluoranthene	0.022 JB	0.4	0.023 JB	0.41	U	0.43	U	0.44
4	PY0	Pyrene	0.04 JB	0.4	0.036 JB	0.41	0.03 JB	0.43	0.065 JB	0.44
4	FP1	C1-Fluoranthenes/Pyrenes	U	0.4	0.046 J	0.41	U	0.43	0.28 J	0.44
4	FP2	C2-Fluoranthenes/Pyrenes	U	0.4	U	0.41	U	0.43	0.31 J	0.44
4	FP3	C3-Fluoranthenes/Pyrenes	U	0.4	U	0.41	U	0.43	0.23 J	0.44
4	FP4	C4-Fluoranthenes/Pyrenes	U	0.4	U	0.41	U	0.43	U	0.44
4	NBT0	Naphthobenzothiophenes	U	0.4	U	0.41	U	0.43	U	0.44
4	NBT1	C1-Naphthobenzothiophenes	U	0.4	U	0.41	U	0.43	0.14 J	0.44
4	NBT2	C2-Naphthobenzothiophenes	U	0.4	U	0.41	U	0.43	U	0.44
4	NBT3	C3-Naphthobenzothiophenes	U	0.4	U	0.41	U	0.43	U	0.44
4	NBT4	C4-Naphthobenzothiophenes	U	0.4	U	0.41	U	0.43	U	0.44
4	BA0	Benz[a]anthracer	0.016 J	0.4	0.019 J	0.41	0.012 J	0.43	U	0.44
4	C0	Chrysene/Tripher	0.027 JB	0.4	0.023 JB	0.41	0.034 JB	0.43	0.05 J	0.44
4	BC1	C1-Chrysenes	U	0.4	U	0.41	U	0.43	U	0.44
4	BC2	C2-Chrysenes	U	0.4	U	0.41	U	0.43	U	0.44
4	BC3	C3-Chrysenes	U	0.4	U	0.41	U	0.43	U	0.44
4	BC4	C4-Chrysenes	U	0.4	U	0.41	U	0.43	U	0.44
5	BB	Benzo[b]fluoranthene	U	0.4	U	0.41	U	0.43	U	0.44
5	BJK	Benzo[k]fluoranthene	U	0.4	U	0.41	U	0.43	U	0.44
5	BB	Benzo[a]fluoranthene	U	0.4	U	0.41	U	0.43	U	0.44
5	BEP	Benzo[e]pyrene	U	0.4	U	0.41	U	0.43	U	0.44
5	BAP	Benzo[a]pyrene	U	0.4	U	0.41	U	0.43	U	0.44
5	PER	Perylene	U	0.4	U	0.41	U	0.43	U	0.44
6	IND	Indeno[1,2,3-cd]p	0.033 JB	0.4	0.031 JB	0.41	U	0.43	U	0.44
5	DA	Dibenz[a,h]anthra	0.037 JB	0.4	U	0.41	U	0.43	U	0.44
6	GHI	Benzo[g,h,i]peryl	0.025 JB	0.4	0.025 JB	0.41	0.016 JB	0.43	U	0.44
		Sum	2.286		0.7300		4.545		12.557	
		Surrogates (% Recovery)								
		2-Methylnaphthal	83		75		80		74	
		Pyrene-d10	110		108		113		109	
		Benzo[b]fluoranth	95		97		99		96	

Reference Transect

Class	Abbrev	Client ID	CAS 824 SP1-1 & SP1-2		CAS 824 SP1-3 & SP1-4		CAS 824 SP1-6 & SP1-5		CAS 824 SP1-7 & SP1-8	
		Lab ID	0510002-07		0510002-08		0510002-05		0510002-06	
		Matrix	Sediment		Sediment		Sediment		Sediment	
		Reference Metho	Modified 8270C		Modified 8270C		Modified 8270C		Modified 8270C	
		Batch ID	SS101705B07		SS101705B07		SS101705B07		SS101705B07	
		Sample Size (wet	30.87		30.68		30.53		30.7	
		% Solid	81.18		82.88		76.98		77.84	
		Units	µg/Kg		µg/Kg		µg/Kg		µg/Kg	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	Result	SSRL	Result	SSRL
2	N0	Naphthalene	0.14 JB	0.42	0.14 JB	0.41	0.15 JB	0.45	0.19 JB	0.44
2	N1	C1-Naphthalenes	0.087 JB	0.42	0.077 JB	0.41	0.086 JB	0.45	0.062 JB	0.44
2	N2	C2-Naphthalenes	0.47	0.42	0.52	0.41	0.48	0.45	0.95	0.44
2	N3	C3-Naphthalenes	0.18 J	0.42	0.15 J	0.41	0.26 J	0.45	0.28 JO	0.44
2	N4	C4-Naphthalenes	U	0.42	U	0.41	U	0.45	U	0.44
2	B	Biphenyl	0.059 J	0.42	0.074 J	0.41	0.18 J	0.45	0.19 J	0.44
3	DF	Dibenzofuran	U	0.42	U	0.41	U	0.45	U	0.44
3	AY	Acenaphthylene	U	0.42	U	0.41	U	0.45	U	0.44
3	AE	Acenaphthene	U	0.42	U	0.41	U	0.45	U	0.44
3	F0	Fluorene	U	0.42	U	0.41	U	0.45	U	0.44
3	F1	C1-Fluorenes	U	0.42	U	0.41	U	0.45	U	0.44
3	F2	C2-Fluorenes	U	0.42	U	0.41	U	0.45	U	0.44
3	F3	C3-Fluorenes	U	0.42	U	0.41	U	0.45	U	0.44
3	A0	Anthracene	U	0.42	0.017 J	0.41	U	0.45	U	0.44
3	P0	Phenanthrene	0.056 JB	0.42	0.057 JB	0.41	0.072 JB	0.45	0.062 JB	0.44
3	PA1	C1-Phenanthrene	1.3 O	0.42	U	0.41	0.88 O	0.45	U	0.44
3	PA2	C2-Phenanthrenes/Anthracenes	U	0.42	U	0.41	U	0.45	U	0.44
3	PA3	C3-Phenanthrenes/Anthracenes	U	0.42	U	0.41	U	0.45	U	0.44
3	PA4	C4-Phenanthrenes/Anthracenes	U	0.42	U	0.41	U	0.45	U	0.44
3	RET	Retene	U	0.42	U	0.41	U	0.45	U	0.44
3	DBT0	Dibenzothiophene	U	0.42	U	0.41	U	0.45	U	0.44
3	DBT1	C1-Dibenzothiophenes	U	0.42	U	0.41	U	0.45	U	0.44
3	DBT2	C2-Dibenzothiophenes	U	0.42	U	0.41	U	0.45	U	0.44
3	DBT3	C3-Dibenzothiophenes	U	0.42	U	0.41	U	0.45	U	0.44
3	DBT4	C4-Dibenzothiophenes	U	0.42	U	0.41	U	0.45	U	0.44
4	BF	Benzo(b)fluorene	U	0.42	U	0.41	U	0.45	U	0.44
4	FL0	Fluoranthene	U	0.42	0.048 JB	0.41	U	0.45	U	0.44
4	PY0	Pyrene	0.031 JB	0.42	0.05 JB	0.41	0.029 JB	0.45	0.048 JB	0.44
4	FP1	C1-Fluoranthenes/Pyrenes	U	0.42	U	0.41	U	0.45	U	0.44
4	FP2	C2-Fluoranthenes/Pyrenes	U	0.42	U	0.41	U	0.45	U	0.44
4	FP3	C3-Fluoranthenes/Pyrenes	U	0.42	U	0.41	U	0.45	U	0.44
4	FP4	C4-Fluoranthenes/Pyrenes	U	0.42	U	0.41	U	0.45	U	0.44
4	NBT0	Naphthobenzothiophenes	U	0.42	U	0.41	U	0.45	U	0.44
4	NBT1	C1-Naphthobenzothiophenes	U	0.42	U	0.41	U	0.45	U	0.44
4	NBT2	C2-Naphthobenzothiophenes	U	0.42	U	0.41	U	0.45	U	0.44
4	NBT3	C3-Naphthobenzothiophenes	U	0.42	U	0.41	U	0.45	U	0.44
4	NBT4	C4-Naphthobenzothiophenes	U	0.42	U	0.41	U	0.45	U	0.44
4	BA0	Benz[a]anthracer	0.0059 J	0.42	0.013 J	0.41	U	0.45	0.007 J	0.44
4	C0	Chrysene/Tripher	0.012 JB	0.42	0.017 JB	0.41	U	0.45	0.012 JB	0.44
4	BC1	C1-Chrysenes	U	0.42	U	0.41	U	0.45	U	0.44
4	BC2	C2-Chrysenes	U	0.42	U	0.41	U	0.45	U	0.44
4	BC3	C3-Chrysenes	U	0.42	U	0.41	U	0.45	U	0.44
4	BC4	C4-Chrysenes	U	0.42	U	0.41	U	0.45	U	0.44
5	BB	Benzo[b]fluoranthene	U	0.42	U	0.41	U	0.45	U	0.44
5	BJK	Benzo[k]fluoranthene	U	0.42	U	0.41	U	0.45	U	0.44
5	BB	Benzo[a]fluoranthene	U	0.42	U	0.41	U	0.45	U	0.44
5	BEP	Benzo[e]pyrene	U	0.42	U	0.41	U	0.45	U	0.44
5	BAP	Benzo[a]pyrene	U	0.42	U	0.41	U	0.45	U	0.44
5	PER	Perylene	U	0.42	0.23 J	0.41	U	0.45	U	0.44
6	IND	Indeno[1,2,3-cd]p	U	0.42	U	0.41	U	0.45	U	0.44
5	DA	Dibenz[a,h]anthra	U	0.42	U	0.41	U	0.45	U	0.44
6	GHI	Benzo[g,h,i]peryl	U	0.42	U	0.41	U	0.45	U	0.44
		Sum	2.3409		1.383		2.137		1.881	
		Surrogates (% Recovery)								
		2-Methylnaphthal	79		85		82		82	
		Pyrene-d10	113		113		109		112	
		Benzo[b]fluoranth	102		96		101		98	

List of Potential Qualifiers
U: The analyte was analyzed for but not detected at the sample specific level reported.
B: Found in associated blank as well as sample.
J: Estimated value, below quantitation limit.
E: Estimated value, exceeds the upper limit of calibration.
NA: Not Applicable
D: Secondary Dilution Performed
D1: Tertiary Dilution Performed
*: Value outside of QC Limits
$: Surrogate value outside of acceptable range.
X: It is not possible to calculate RPD, one result is below the detection limit, the other is above reporting limit.
G: Matrix Interference.
P: Greater than 40% RPD between the two columns, the higher value is reported according to the method.
I: Due to interference, the lower value is reported.
N: Spike recovery outside control limits.
E: Estimated due to Interference. (Metals)
*: Duplicate outside control limits.
P: Spike compound. (Metals)
J: Below CRDL, Project DL, or RL but greater than or = MDL. (Metals)
C: Sample concentration is > 4 times the spike level, recovery limits do not apply. (Metals)

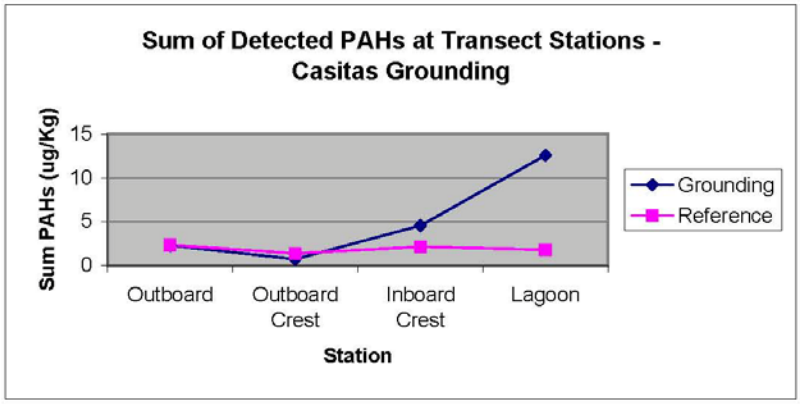
			Grounding Transect				Reference Transect			
			Outboard	Outboard Crest	Inboard Crest	Lagoon	Outboard	Outboard Crest	Inboard Crest	Lagoon
		Client ID	CAS824 SM2-1	CAS824 SM2-2	CAS824 SM2-3	CAS824 SM2-4	CAS824 SM1-1	CAS824 SM1-2	CAS824 SM1-3	CAS824 SM1-4
		Lab ID	0510002-09	0510002-10	0510002-11	0510002-12	0510002-15	0510002-16	0510002-13	0510002-14
		Matrix	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
		% Solid	75.82	77.84	79.47	76.86	83	85.31	78.46	76.95
		Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Class	Abbrev	Analytes	Result	Result	Result	Result	Result	Result	Result	Result
	U	Antimony	0.21	0.21	0.21	0.23	0.2	0.2	0.2	0.2
		Arsenic	0.85	0.81	0.72	0.72	0.73	0.8	0.82	0.72
		Barium	4	4.7	3.8	3.6	4.1	3.7	3.7	3.9
	U	Beryllium	0.12	0.12	0.12	0.11	0.11	0.1	0.12	0.12
	U	Cadmium	0.12	0.12	0.12	0.11	0.11	0.1	0.12	0.12
	E	Calcium	330000	320000	340000	320000	330000	320000	320000	340000
		Chromium	4.1	5.1	4.8	4.9	4.5	3.4	4.6	5.3
		Cobalt	1.5	1.5	1.4	1.4	1.5	1.4	1.4	1.5
	J or U	Copper	4	4.8	2.15	2.2	2.1	2.1	2.25	2.3
		Iron	4800	5000	5400	5200	5400	5200	5400	5300
	J	Lead	0.38	0.48	0.5	0.49	0.35	0.5	0.51	0.54
		Magnesium	34000	33000	32000	32000	29000	41000	33000	30000
	J	Manganese	12	12	11	11	11	15	9.3	32
	UN	Mercury	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
		Nickel	21	22	22	22	23	21	22	23
		Potassium	200	230	180	200	200	200	230	220
	U	Selenium	0.55	0.55	0.55	0.55	0.5	0.5	0.55	0.6
	U	Silver	0.08	0.08	0.08	0.09	0.08	0.08	0.08	0.08
		Sodium	4400	4800	4100	3600	4100	3100	4300	5100
	U	Thallium	0.13	0.67	0.11	0.11	0.11	0.1	0.12	0.12
	U	Vanadium	0.55	0.55	0.55	0.55	0.5	0.5	0.55	0.6
	U	Zinc	5.2	6.4	5.5	5.5	0.5	5	5.5	6

List of Potential Qualifiers

U: The analyte was analyzed for but not detected at the sample specific level reported.
B: Found in associated blank as well as sample.
J: Estimated value, below quantitation limit.
E: Estimated value, exceeds the upper limit of calibration.
NA: Not Applicable
D: Secondary Dilution Performed
D1: Tertiary Dilution Performed
ª: Value outside of QC Limits.
§: Surrogate value outside of acceptable range.
X: It is not possible to calculate RPD, one result is below the detection limit, the other is above reporting limit.
G: Matrix Interference.
P: Greater than 40% RPD between the two columns, the higher value is reported according to the method.
I: Due to interference, the lower value is reported.
N: Spike recovery outside control limits.
E: Estimated due to Interference. (Metals)
¤: Duplicate outside control limits.
P: Spike compound. (Metals)
J: Below CRDL, Project DL, or RL but greater than or = MDL. (Metals)
C: Sample concentration is > 4 times the spike level, recovery limits do not apply. (Metals)

Sum of Detected PAHs (ug/Kg)

		Grounding	Reference
Sta. 1	Outboard	2.285	2.3409
Sta. 2	Outboard Crest	0.7303	1.393
Sta. 3	Inboard Crest	4.545	2.137
Sta. 4	Lagoon	12.557	1.801
	Mean	5.029325	1.917975
	s.d.	5.257166	0.414777



APPENDIX E

MV Casitas Preassessment Expedition

Marine Report

(See Attached)

APPENDIX F

MV Casitas Grounding Preassessment Expedition
Terrestrial Survey Team Narrative Report

Arlene Pangelinan[2]

J. Michael Castillo[3]

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[3] Hawai‘i Natural Resource Services, LLC, Kamuela, Hawai‘i

1. Project Name: M/V Casitas Vessel Grounding Terrestrial Survey Report

2. Location: Pearl and Hermes Atoll, Hawaii Islands National Wildlife Refuge

3. Dates: Expedition: August 23-August 30, 2005
Survey: August 24-August 29, 2005

4. Background:

The Responsible Party and Trustees traveled to the grounding site of the M/V CASITAS (aground July 2, 2005, off Pearl and Hermes Atoll, NWHI) to collect data as part of the Preassessment Phase under the Oil Pollution Act (OPA). Two survey teams were deployed to the grounding site and two islets within the atoll in order to assess the aquatic and terrestrial impacts associated with the grounding incident and the evacuation of the CASITAS crew. The marine team, which was comprised of six members, documented impacts to the coral reef at the grounding site and surrounding marine environments. The terrestrial team, which was comprised of two members, documented the existing ecological conditions on the two islets that served as temporary evacuation sites for the Casitas crew following the grounding.

The primary goal of the terrestrial survey team was to conduct baseline surveys of the existing vegetation and insect assemblages at North Island and Southeast Island. Information on the existing ecological structure and composition of plant and terrestrial arthropod communities provides a benchmark from which to determine whether or not new species may have been carried to North or Southeast Islands by the crew and passengers of the Casitas and have a likelihood of colonizing and establishing themselves on these islets over time.

The specific objectives of the terrestrial survey, in order of priority, were to:

- Survey terrestrial environment at North Island and Southeast Island to describe current species composition, phenology, and spatial distribution of plants.
- Survey terrestrial environment at each site to describe species composition and relative abundance of terrestrial invertebrate species.
- Do standard survey to estimate population size of the Laysan finch at Southeast Island.
- Record species, count active nests, and note breeding chronology of seabirds.
- Record shorebird species and any other vagrants or migrant birds.
- Count number of green turtle nests and note evidence of hatching. Count turtles resting on shore at night.

Special Conditions and Rules for Moving Between Islands and Atolls and Packing for Field Camps within the Pacific Remote Islands National Wildlife Refuge Complex identified in the Scope of Work were observed and adhered to (Annex 1).

Terrestrial preassessment survey activities were conducted over six field days. The survey personnel spent three days each on North Island and Southeast Island. Activities included surveying, monitoring, photographing, and documenting the ecological condition of the atoll islets of North Island and Southeast Island.

5. Introduction

Pearl and Hermes atoll consists of a lagoon surrounded on three sides by a fringing reef that spans approximately 7 kilometers (km) north-south, and 10 km east-west. North Island is positioned approximately 450 meters (m) inside the northeast corner of the fringing reef and is approximately 14 acres in size. The island is shaped like a tadpole, with the head of the island pointing north-northeast and a long sinuous sandy tail that is essentially unvegetated extending to the south-southwest. The vegetated northern section comprises most of the land area and was where sampling was focused. Southeast Island is positioned approximately 100 m inside the outer fringing reef near the eastern corner of the atoll. It is larger and consists of two distinct lobes that are connected by a narrow band of beach sand along the island's northern shore. The two lobes of the island, East and West, together comprise approximately 35 to 40 acres of land area separated by a central lagoon of relatively high salinity.

6. Methods

Vegetation - Vegetation on each island was surveyed and plant communities described. Plant species were identified in the field and the phenological stage of each species was recorded. Plant communities were differentiated based upon visible distinctions in dominant species composition and physiognomic structure.

Invertebrate Sampling – Invertebrate fauna was collected on both islands using an array of sample methods. Samples were either placed in sealed and labeled Ziplock bags, or in small glass and plastic vials. All samples included a paper label. Samples were stored in a cooler until they could be transported to the freezer aboard the Freebird vessel, after which time they remained stored in a cooler with ice packs or in an upright freezer until they could be identified. Identification of specimens is being conducted by US Fish and Wildlife Staff in cooperation with biologists at the Bishop Museum in Honolulu.

Bird censuses were not conducted on North Island nor Southeast Island. Due to intolerably high levels of disturbance resulting from sampling and traveling through seabird and finch habitat, a decision was made to conduct invertebrate sampling only on the West lobe. This decision was based in part upon the assumption that insect distribution and abundance was somewhat similar between the two lobes, particularly with respect to ants.

Ant Bait Card Sampling. One invertebrate sampling transect was established on each island (Figures 4 and 5). Five sampling points equally spaced were established along a central transect on each island using a compass, pacing, and a handheld Garmin GPS unit. On North Island this transect measured 300 m in length and bisected the island running in a north-south direction. The sample stations were spaced 50 m apart along this transect. At Southeast Island the transect bisected the West lobe of the island also had a north-south orientation, but measured 210 m in length and sample stations were spaced 35 m apart. At each sampling point three ant bait cards were placed 10 feet apart in a line perpendicular to and centered on the transect sample point. Each ant bait card was labeled by island, transect sample point, position, date, time, and sampler's names, then baited with small amounts of each of three baits: peanut butter, spam, and honey.

The cards were picked up approximately one hour after deployment and each placed (with bait and insects attached) into a separate quart-sized Ziploc bag which was labeled using a permanent black marker. Bait card sampling was conducted on non-windy days (less than 5 miles per hour (mph) under full to nearly-full sun conditions.

Pitfall Surveys **–** A double-cup pitfall trap was installed at each of the five sample stations on each island following methodology described in the Terrestrial Survey Methodology (Appendix B of this Field Report). Pitfall sampling stations were installed adjacent to ant bait card sampling points as described above. Pitfall traps were revisited 24 hours after deployment, and insects removed from the soapy water solution and placed into vials of 80 % Ethyl alcohol with a label showing island, transect sample station, date, and collector's names. Pitfall sampling was conducted on non-windy days (less than 5 mph) under full to nearly-full sun conditions. Each pitfall trap was covered with a mesh-wire box constructed of hardware cloth to prevent finch interference (Figure 1).

Figure 1. Example of double-cup pitfall trap design with finch exclusion cover on North Island, Pearl and Hermes Atoll, Remote Pacific Islands National Wildlife Refuge.

Nighttime Sampling - Two nighttime collecting sessions were conducted on North Island. Due to windy conditions, nighttime sampling was not conduced on Southeast Island. The night sampling on North Island occurred at two separate locations. The first sample location was at the southeastern end of the island in lightly vegetated coral rubble substrate that supported a relatively low density of nesting seabirds. The second sample location was near the center of the island along the interface between two dominant vegetation types described as Type A and Type B. A white full size bed sheet was strung between two vertical poles and secured with string. Two Petzel LED-type headlamps were used to illuminate the sheets for over one hour each night. All insects that were attracted to the sheet were collected by hand or using an aspirator and placed into a separate vial without ethyl alcohol. Each vial contained a label with information on the island, date, collector's names, and time. All vials were placed in a one-gallon Ziploc bag which was labeled using a black permanent marker.

Vegetation Sweeps **–** During daylight hours, two sweep samples were gathered from each vegetation type per island. Each sweep sample included 10 swings of the net across the top of the vegetation, each swing consisting of an arc in two directions. Samples were stored in a Ziploc with a label describing island, vegetation type, collector's names, date, and time.

Intertidal Zone Sweeping - During the day when it was sunny, sweeps were conducted along the shoreline around the perimeter of each island. On North Island shoreline sweeps occurred over sand. Sweeps on Southeast Island were over sand and corral rubble on East lobe, but also over karst substrate bordering the central lagoon and southern shoreline on West Lobe. Samples were

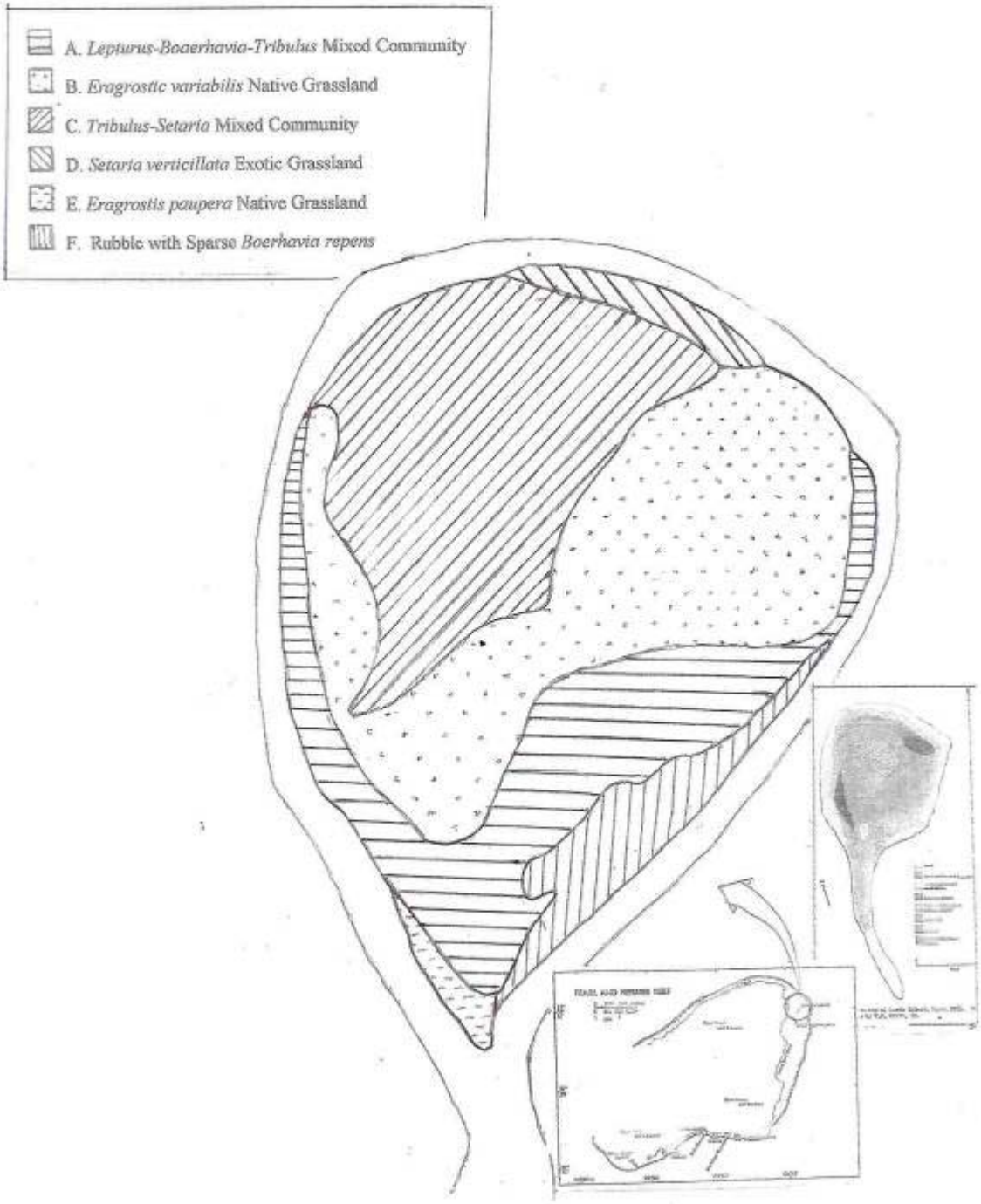
placed into Ziploc bags, and later transferred to vials. Each vial had a label identifying island, date, collector, and time inserted.

7. Results

Vegetation – Six vegetation types from North Island and seven vegetation types from Southeast Island were recorded. Five vegetation types occurred on both islands. The dominant vegetation type on North Island was the native *Eragrostis variabilis* which was noticeably absent from Southeast Island. The East lobe of Southeast Island possessed a large tidal salt marsh dominated by a monotypic stand of *Sesuvium portulacastrum* surrounded by a nearly monotypic stand of *Verbesina encelioides*, both of which were absent from North Island.

The vegetated northerly section of North Island was dominated in stature by the endemic lovegrass *Eragrostis variabilis* which covered a large patch in the central portion of the island and became mixed with other species (Figure 2). The indigenous perennial herb nohu (*Tribulus cistoides*) occurred over much of the island and occurred mixed with the exotic bristly foxtail (*Setaria verticillata*) in the northern portion of the island, and mixed with the indigenous alena (*Boerhavia repens*) and the indigenous grass *Lepturus repens* in the southern end and in narrow bands along western and eastern shorelines. Perhaps the most noteworthy aspect of North Island's vegetation is the fact that it supports a reproductively vigorous population of the rare endemic *Solanum nelsonii* in the north central portion of the island (shown at right). *S. nelsonii* is a candidate for listing under both the US Endangered Species Act of 1973 and the Hawai'i State Endangered Species Law HRS 195D. In addition to the *Solanum* shrub, two other woody plants exist on North Island. Two exotic beach heliotrope (*Tournefortia argentea*) occur, one on each side of the island, and serve as perches for frigate birds and Red-footed boobies. Also, three young native naupaka (*Scaevola sericea*) occur along the island's western shore just above the high water line (Table 1).

Figure 2. Distribution of Plant Communities at North Island, Pearl and Hermes Atoll.



Following are descriptions of the vegetation types from North Island:

A) *Lepturus-Boerhavia-Tribulus* Mixed Native Community: Cover of this community was nearly continuous with dominance more or less equally shared by all three species, *Lepturus repens*, *Boerhavia repens*, and *Tribulus cistoides*. None were dominant in height and the three species occurred mixed within the canopy.

B) *Eragrostis variabilis* Native Grassland: This vegetation type was easily distinguished by the tall dark stalks of bunch grass rising above other species. Perennial herbs such as *Tribulus cistoides* and *Boerhavia repens* shared dominance in places where the grass canopy became more open.

C) *Tribulus-Setaria* Mixed Community: *Tribulus cistoides* dominated cover throughout most of this vegetation type, often intermixed with bunches of the exotic *Setaria verticillata*. This vegetation type appeared to serve as the preferred habitat for the small endangered Laysan finch population on the island.

D) *Setaria verticillata* Exotic Grassland: This vegetation type occurred as a small dense patch along the northern coastline above the high-water mark. Along the margins this type is mixed with *Tribulus* and *Boerhavia*.

E) *Eragrostis paupera* Native Grassland: This low stature grassland dominated the coastal areas above the high-water mark at the southern end of the main part of the island where the island's long sandy tail began to trail southward away from the island's head. It occurred as a sparse cover type rarely exceeding 60 % cover and mixed with *Boerhavia* and *Lepturus* only along its inland margin.

F) Rubble with Sparse *Boerhavia repens*: This vegetation type created sparse cover over coral rubble and sand along the southwestern side of the island. Total cover averaged 50 % and consisted of *Boerhavia repens* and *Lepturus repens*. This type is a sub-type of the denser *Lepturus-Boerhavia-Tribulus* Mixed Community that it borders along its inland margin.

Table 1. Phenological life stage of plant species observed on North Island, Pearl and Hermes Atoll.

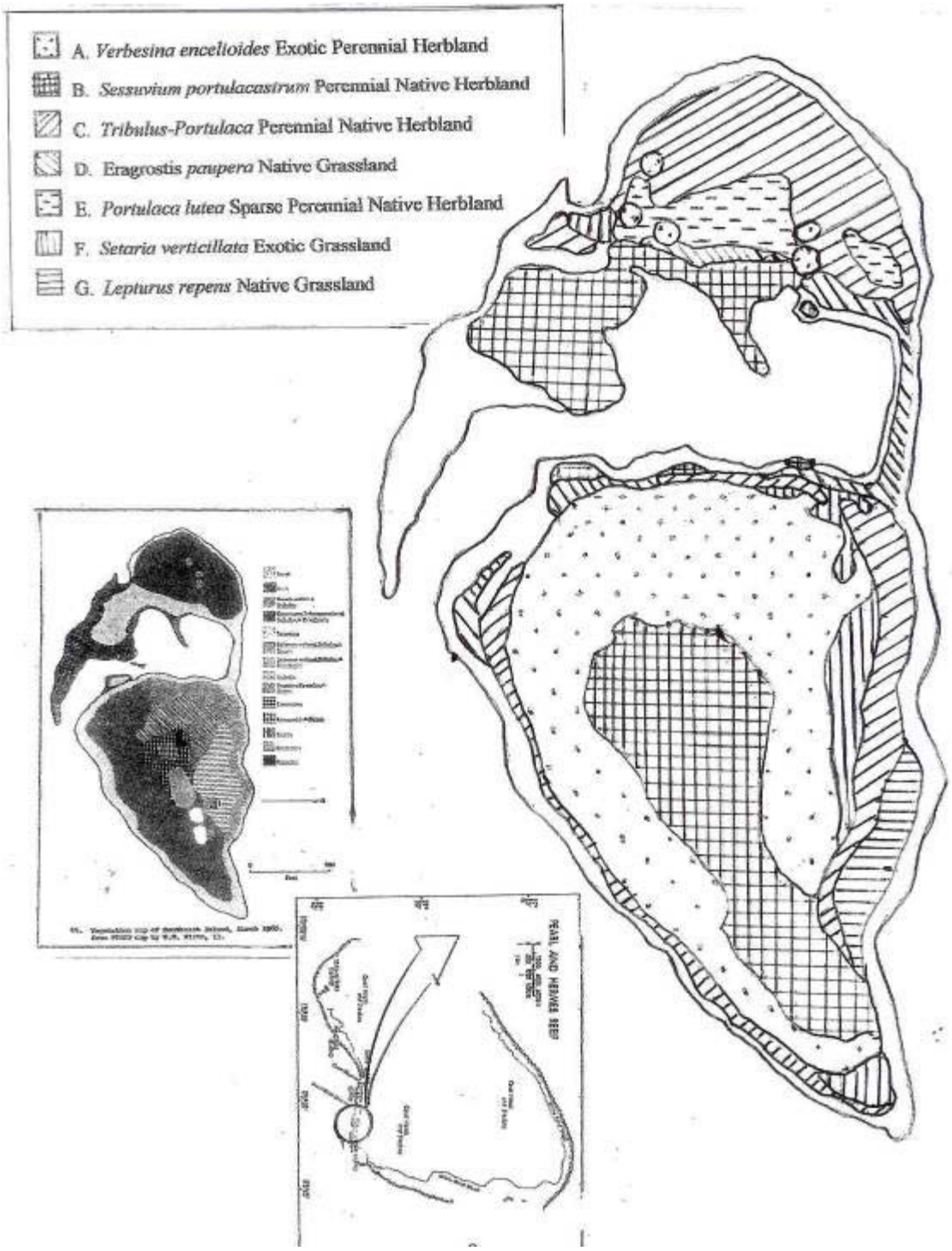
North Island								
Ref.	Taxon	Life Stage						
		Seedling	Juvenile	Vegetative Adult	Flowering Adult	Fruting Adult	Seeding Adult	Dead
1	Boerhavia repens	x	x	x	x	x	x	x
2	Cenchrus echinatus			x	x	x	x	
3	Coronopus didymus			x	x	x	x	
4	Eragrostis paupera		x	x	x	x	x	
5	Eragrostis variabilis			x	x	x	x	
6	Lepidium bidentatum var. o-waihiense	x	x	x	x	x	x	x
7	Lepturus repens	x	x	x	x	x		
8	Portulaca lutea	x	x	x	x	x	x	
9	Scaevola sericea	x	x	x				
10	Setaria verticilllata			x	x	x	x	x
11	Sicyos maximowiczii			x	x	x	x	
12	Solanum nelsonii*			x	x	x	x	
13	Tournefortia argentea	x		x	x			
14	Tribulus cistoides	x	x	x	x	x	x	x

The vegetation of Southeast Island consisted primarily of perennial herbs, but possessed a greater variation in vegetation types (Figure 3) than North Island. The introduced *Verbesina encelioides* dominated most of the East lobe forming distinctive and nearly uniform stand surrounding the *Sesuvium* tidal marsh, but occurred only as small patches (10-20 ft. in diameter) on West lobe (Figure 3). The center of East lobe was dominated by a large (approx 5 acre) tidal salt marsh dominated almost exclusively by *Sesuvium portulacastrum*. This herbland occurred only on Southeast Island, where it dominated two types of substrate, one a low-lying tidally influenced soil substrate in the central-eastern section of the East Lobe, the other carst substrate along lagoon margins and the southern end of West lobe. High points and patches on the lagoon side of the West lobe were barren or partially barren. The alien species control measures implemented during the summers of 2001, 2002, and 2003 appeared to be effective in removing *Sonchus oleraceus* and *Cenchrus echinatus* as they were not observed. However, neither were the two small patches of native *Eragrostis variabilis* reported on East lobe and West lobe by Weggmann and Kropidlowski (2002) (Table 2).

Following are descriptions of the vegetation types from Southeast Island:

A) *Verbesina encelioides* Exotic Perennial Herbland: This type is dominated by mostly monotypic stands of *Verbesina* low in stature (approx. 12”) in windswept and exposed areas

Figure 3. Distribution of Plant Communities and Invertebrate Sampling Transect at Southeast Island, Pearl and Hermes Atoll.



B) *Sesuvium portulacastrum* Perennial Native Herbland: Monotypic stands that vary in size. Along shorelines above the high-water mark small patches occur on karst substrate. Within a low-lying area in the central to eastern portion of the East lobe this type occurs as a large monotypic patch in a tidally-influenced marsh approximately 5 acres in size. Within this tidal marsh, the *Sesuvium* supports a wide variety of insects, including lacewings, medium-sized moths, ants, bugs, flies, and bees and wasps. Wedge-tailed shearwater burrows are in such high abundance within this vegetation type that the ground has developed honeycomb-type structure beneath the *Sesuvium* plants.

C) *Tribulus-Portulaca* Perennial Native Herbland: This vegetation type is dominated by low-stature *Tribulus cistoides* and large sprawling *Portulaca lutea* perennial herbs. Codominant species vary from place to place and include *Lepturus*, *Setaria*, *Eragrostis paupera*, *Boerhavia*, and *Sicyos*, and on the southeast shore of the East lobe, *Lepidium bidentatum* var. *o-waihiense*.

D) *Eragrostis paupera* Native Grassland: A low-stature grassland dominated almost exclusively by *Eragrostis paupera* that occurs mostly as a narrow band just above the high-water mark. Cover ranges from 20 % to 60 % on sand substrate.

E) *Portulaca lutea* Sparse Perennial Native Herbland: Sprawling *Portulaca lutea* plants dominate coral rubble substrate towards the center of West lobe. Plant cover is sparse and ranges from 25 % to 65 %. Associated species include *Tribulus*, *Verbesina*, *Setaria*, and *Boerhavia*.

F) *Setaria verticillata* Exotic Grassland: Often occurring as monotypic patches of stands near shoreline, but above and inland of the *Eragrostis paupera* grassland strand community, in some places mixing with the *Verbesina* Exotic Herbland and *Tribulus-Portulaca* Herbland along margins. Associated species include *Verbesina*, *Tribulus*, *Portulaca*, *Boerhavia*, and *Letpturus*.

G) *Lepturus repens* Native Grassland: This grassland type occurs as monotypic or nearly monotypic patches along the coastal strand zone obove the high-water mark. This type occupies a similar niche as the *Eragrostis paupera* Grassland and sometimes becomes mixed with it. Associated species include *Tribulus*, *Eragrostis paupera*, *Boerhavia*, and *Portulaca*.

Table 2. Phenological life stage of plant species observed on Southeast Island, Pearl and Hermes Atoll.

Southeast Island								
Ref.	Taxon	Life Stage						
		Seedling	Juvenile	Vegetative Adult	Flowering Adult	Fruiting Adult	Seeding Adult	Dead
1	Boerhavia repens		x	x	x	x	x	
2	Coronopus didymus	x	x	x	x	x	x	x
3	Eragrostis paupera	x	x	x	x	x	x	x
4	Lepidium bidentatum var. o-waihiense		x	x	x	x	x	
5	Lepturus repens	x	x	x	x	x	x	x
6	Portulaca lutea	x	x	x	x	x	x	x
7	Scaevola sericea	x						
8	Sesuvium portulacastrum	x	x	x	x	x	x	x
9	Setaria verticilllata	x	x	x	x	x	x	x
10	Sicyos maximowiczii			x	x	x	x	
11	Tournefortia argentea	x						
12	Tribulus cistoides	x	x	x	x	x	x	x
13	Verbesina enceliioides	x	x	x	x	x	x	x

Invertebrates – Invertebrate sampling resulted in at least 9 orders of insects and 2 types of spiders collected from North Island (Table 3) and at least 9 orders of insects and 2 families of Arachnids collected from Southeast Island (Table 4). Ants appeared to be the most abundant group of insects on North Island. Southeast Island also had an abundance of ants, but also had a high number of bird ticks and aphids.

1. *Ant Bait Card Samples*. Five samples of three cards each were collected from the single transect that bisected the island and ran from the northern tip of the island to the base of the southern point of the island. Station 1 fell within vegetation type C, station 2 fell within vegetation type B, station 3 fell long the interface between vegetation types A and B, and stations 4 and 5 fell within vegetation type A. Stations 1-3 yielded the highest ant abundance. Samples were dated Aug. 25, and Aug 28, 2005.

2. *Pitfall Trap Samples*: Specimens collected in pit fall double cup samples on North Island included primarily ants, thrips, and earwigs. It is believed that the thrips came from the flowers of the *Tribulus*. Stations 1-3 yielded the highest abundance of invertebrate specimens. On Southeast Island a few thrips were collected, however there was a high abundance of an undescribed insect collected from the pitfall traps. Samples were dated Aug. 26, and Aug 28, 2005.

3. *Night Light Samples*: Night lighting was used to gather samples on North Island over two nights. Conditions became too windy for night sampling on Southeast Island and no night collecting was conducted there. This method yielded most of the Lepidoptera collected. Samples were dated Aug 24 and Aug 25, 2005.

Table 3. Invertebrate Taxon Collected at North Island, Pearl and Hermes Atoll.

North Island

Ref.	Phylum	Common Name	Order	Family*	Genus*	Relative Abundance	Sum of Samples	Sample Method				
								bait card	pitfall trap	night lighting	sweep	grab
1	Hexapoda	Beetle 1	Coleoptera			Low					x	
2	Hexapoda	Beetle 2	Coleoptera			Low					x	
3	Hexapoda	Earwig	Dermaptera			High			x			
4	Hexapoda	Sand fly	Diptera			Very High						
5	Hexapoda	House fy	Diptera			Mod					x	
6	Hexapoda	Plant hopper	Homoptera			Mod					x	
7	Hexapoda	Leaf hopper	Homoptera			Low					x	
8	Hexapoda	Bug 1	Heteroptera			High					x	
9	Hexapoda	Bug 2	Heteroptera			Mod					x	
10	Hexapoda	Bee/wasp 1	Hymenoptera			Low					x	
11	Hexapoda	Bee/wasp 2	Hymenoptera			Low					x	
12	Hexapoda	Ant 1	Hymenoptera	Formicidae		Very High		x	x	x		
13	Hexapoda	Ant 2	Hymenoptera	Formicidae		High		x	x	x		
14	Hexapoda	Large moth	Lepidoptera			Low	1					x
15	Hexapoda	Microlep	Lepidoptera			Very High			x	x	x	
16	Hexapoda	Thrip	Thysanoptera			High			x			
17	Arachnida	Spider 1	Araneae			Mod				x	x	
18	Arachnida	Spider 2	Araneae			Low					x	

* Verified identification of invertebrate taxa provided as Attachment 1.

4. *Vegetation Sweep Samples*: Two sweep samples were collected for each vegetation sample per island. Sweep sampling yielded the highest number of species of any of the sampling methods and included several species that were unrepresented in other sample methods, including large flies, lacewings, bugs, plant hoppers, and bees/wasps. Samples were dated Aug. 26, and Aug 29, 2005.

5. *Intertidal Zone Sweeps*: The intertidal zone was swept around the perimeter of each island. This method yielded almost exclusively sand flies which were numerous within this zone, but also extended slightly inland into coastal vegetation types. Samples were collected between on Aug. 26, and between Aug. 29, 2005.

6. *Grab Samples*: A single large moth was collected using a sweep net along the north shore of North Island on Aug. 26, 2005. There were at least three individuals similar in size observed fluttering about the island before this one was caught. In addition, a single bug or beetle was collected by hand from within a tent at Southeast Island on Aug. 29, 2005.

Southeast Island

Ref	Phylum	Common Name	Order	Family	Genus	Relative Abund.	Sum of Samples	Sample Method			
								bait card	pitfall trap	sweep	grab
1	Hexapoda	Beetle 1	Coleoptera			Low				x	
2	Hexapoda	Sand fly	Diptera			Very High				x	
3	Hexapoda	House fly	Diptera			Mod				x	
4	Hexapoda	Earwig	Dermaptera			Mod			x		
5	Hexapoda	Plant hopper	Homoptera			High				x	
6	Hexapoda	Leaf hopper	Homoptera			Low				x	
7	Hexapoda	Lacewing	Heteroneura			Low				x	
8	Hexapoda	Bug 1 (longbug)	Heteroptera			High			x	x	
9	Hexapoda	Bug 2	Heteroptera			Low					x
10	Hexapoda	Bee/wasp 1	Hymenoptera			Low				x	
11	Hexapoda	Bee/wasp 2	Hymenoptera			Low				x	
12	Hexapoda	Ant 1	Hymenoptera	Formicidae		Very High		x	x		
13	Hexapoda	Ant 2	Hymenoptera	Formicidae		High		x	x		
14	Hexapoda	Microlep	Lepidoptera			Very High			x	x	
15	Arachnida	Bird tick	Acari			Very High		x	x		
16	Arachnida	Spider 1	Araneae			Mod				x	
17	Arachnida	Spider 2	Araneae			Low				x	

Table 4. Invertebrate Taxon Collected at Southeast Island, Pearl and Hermes Atoll.

Birds –

Seabirds - Seabirds were abundant on both islands. Brown Noddy's dominated the avifauna of North Island, where Masked Boobies, Grey-backed Terns, and Great Frigate Birds also were in abundance (Table 5). On North Island, Brown Noddys appeared to use all habitats for nesting and nested on open rubble, under *Eragrostis variabilis* bunches, and in unoccupied burrows.

Avifauna of Southeast Island was dominated in numbers by Black and Brown Noddys, and on East lobe the drier portions of the *Sesuvium* tidal marsh supported a nesting colony of Wedge-tailed Shearwaters, as shown at right, as well as nesting Sooty and Grey-backed Terns (Table 6).

Table 5. Seabirds and Shorebirds observed at North Island, Pearl and Hermes Atoll.

North Island

Ref	Type	Common Name	Adults	Nests	Eggs	Chicks	Unknown
1	Passerine	Laysan Finch					x
2	Shorebird	Bristle-thighed Curlew					x
3	Shorebird	Ruddy Turnstone					x
4	Seabird	Gray-backed Tern		x	x	x	
5	Seabird	White Term		x	x	x	
6	Seabird	Brown Noddy		x	x	x	
7	Seabird	Masked Booby		x		x	
8	Seabird	Red-footed Booby		x		x	
9	Seabird	Great Frigate Bird		x		x	

Table 6. Seabirds and Shorebirds observed at Southeast Island, Pearl and Hermes Atoll.

Southeast Island

Ref	Type	Common	Adults	Nests	Eggs	Chicks	Unknown
1	Passerine	Laysan Finch					x
2	Shorebird	Bristle-thighed Curlew					x
3	Shorebird	Ruddy Turnstone					x
4	Seabird	Gray-backed Tern		x	x		
5	Seabird	Sooty Tern		x	x		
6	Seabird	White Term		x	x		
7	Seabird	Black Noddy		x	x	x	
8	Seabird	Brown Noddy		x	x	x	
9	Seabird	Brown Booby		x		x	
10	Seabird	Masked Booby		x		x	
11	Seabird	Red-footed Booby		x		x	
12	Seabird	Wedge-tailed Shearwater		x	x	x	
13	Seabird	Great Frigate Bird		x		x	

Laysan Finch Survey - Laysan Finches were observed in camps at both North Island and Southeast Island and along North-facing shores of both islands (Figures 4 and 5). On Southeast Island finches abundant just inside the vegetation along the South-facing shore of East lobe and in various vegetated locations on West lobe. 13 to 18 individuals were counted in the course of other sampling on North Island. On both islands, Finches appeared to be associated primarily with *Tribulus cistoides*. On Southeast Island at least one male and one female each wore a silver aluminum band on the right leg.

Finch Nest Box Survey - Finch nest boxes surveys were not conducted to avoid impacts resulting from disturbance events caused by walking survey transects to finches and other species.. Finch transect sampling was abandoned to avoid the impact to Sooty Terns, Grey-backed Terns, Brown and Black Noddys, and Wedge-Tailed Shearwaters. Upon pacing the 300m transect across East lobe, substantial stress and minor trauma was caused to the nesting and fledging Noddys, Terns and Finchesthat occurred within the *Verbesina* vegetation type on the East lobe. Wedge-tailed Shearwater burrows were abundant in the *Sessuvium* marsh and open patches in the surrounding

Verbesina , The high relative density of *Verbesina* stalks made it difficult for our fledgling and adult nesting birds to escape presence, and it became apparent that traveling through and working within the thickly-covered seabird and finch habitat to gather invertebrate samples, conduct finch monitoring, or check on nest boxes would cause a high level of disturbance that may be significantly adverse and that disturbance from occasionally collapsing burrows was unavoidable.

The effect of monitoring, sampling and vegetation management at North and Southeast Islands has been substantial in the past (Wegmann 2001, Wegmann and Kropidlowski 2002, Sprague 2003).

Turtles -

On North Island Green Sea Turtle nests were distributed along the northern shoreline of North Island and night haul out areas were along the east-facing crescent beach formed at the base of the island's tail (Figure 4). On Southeast Island nests occurred along the northern and western shoreline and night haul out areas were primarily along the north-facing shore of Southeast Island. (Figure 5). All nests seemed to have finished hatching sometime prior to our arrival, perhaps several weeks or more before our arrival. One live turtle hatchling was found in the opening of a seabird burrow near the center of North Island and carried to shore and launched. Two nests appeared to be ready to hatch on the west shore of West lobe of Southeast Island, but did not hatch while we were present.

Figure 4. Distribution of *Solanum nelsonii*, Laysan Finch habitat, turtle nests and haul out areas, and location of invertebrate sample transect at North Island, Pearl and Hermes Atoll.

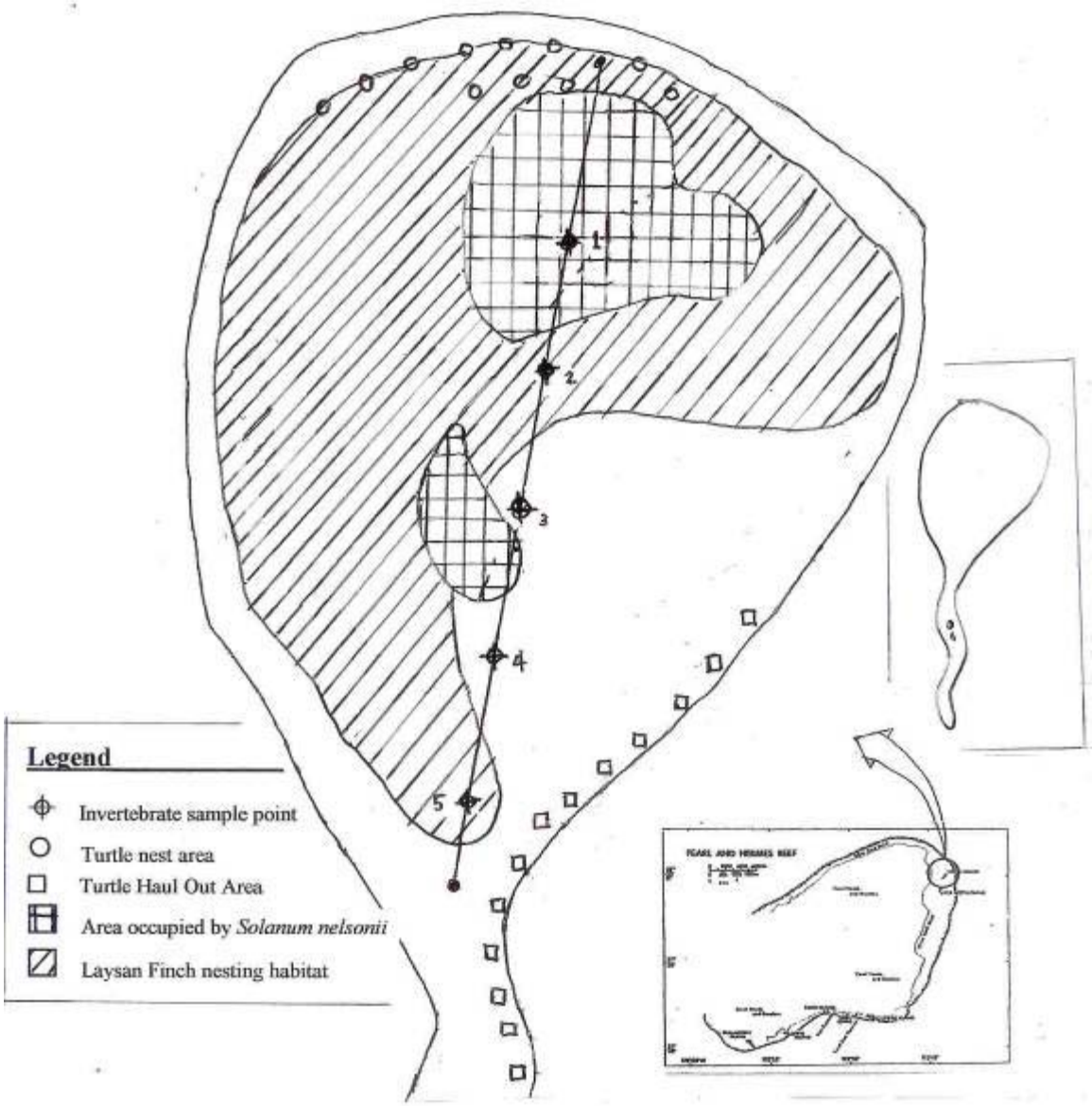
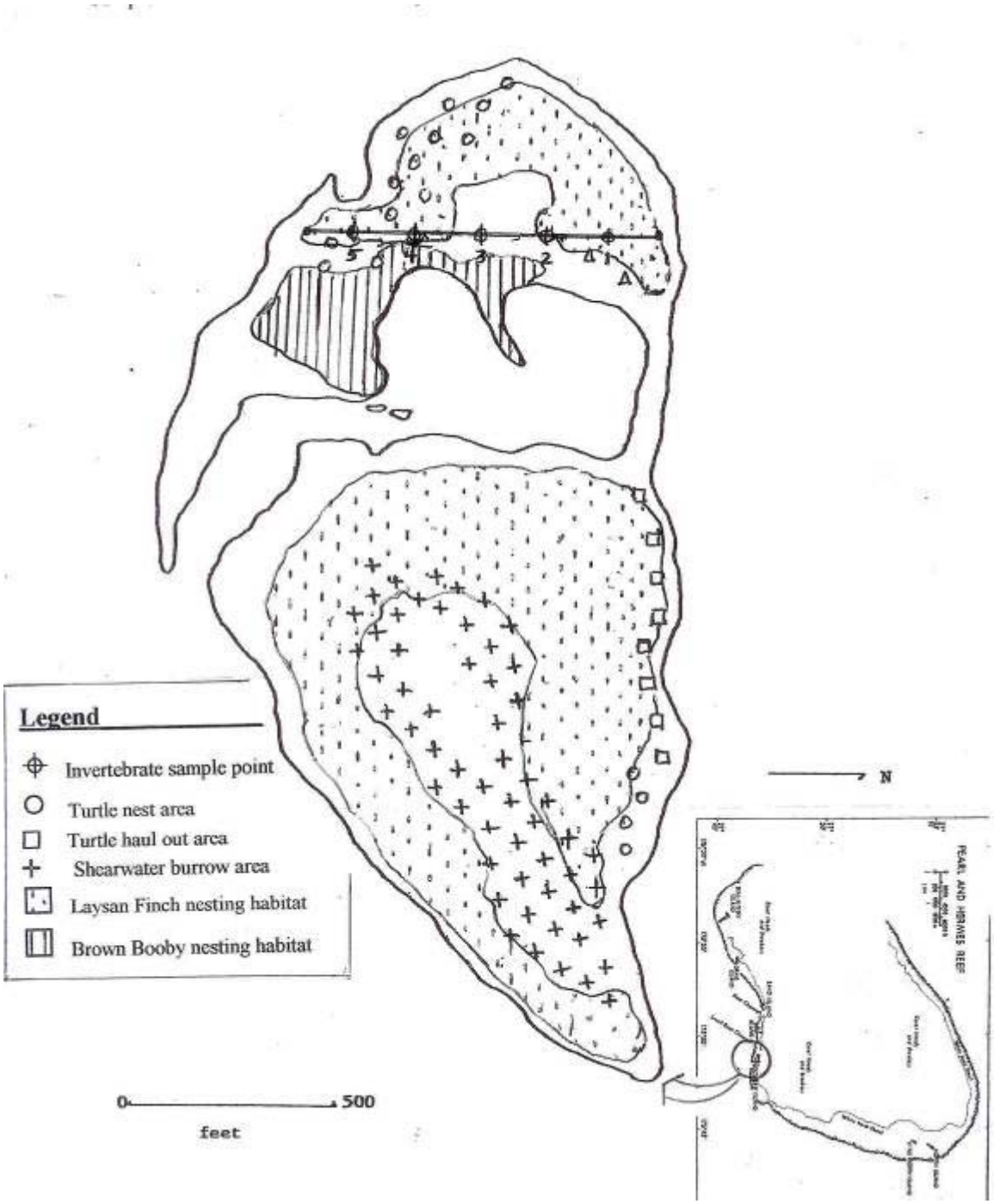


Figure 5. Approximate distribution of Laysan Finch, Brown Booby, and Wedge-tailed Shearwater nesting habitat, Green Sea Turtle nest and haul out areas, and location of invertebrate sample transect at Southeast Island, Pearl and Hermes Atoll.



8. References

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Unknown report. Unknown date. Figures 34 and 44, Vegetation Maps of North Island and Southeast Island, March 1965. Redrawn from PSBSP map by W.O. Wirtz, II.

ANNEX 5. PACIFIC REMOTE ISLANDS NATIONAL WILDLIFE REFUGE COMPLEX, SPECIAL CONDITIONS & RULES FOR MOVING BETWEEN ISLANDS & ATOLLSANDPACKING FOR FIELD CAMPS

July 2001

The islands and atolls of the Pacific Remote Islands National Wildlife Refuge Complex are special places providing habitat for many rare, endemic plants and animals. Many of these species are formally listed as Endangered under the Endangered Species Act. Endemic plants and insects, and the predators they support, are especially vulnerable to the introduction of competing or consuming species. Such introductions may cause the extinction of island endemics, or even the destruction of entire island ecological communities. Notable local examples include: the introduction of rabbits to Laysan Island in 1902 which caused the extinction of numerous plant and insect species, and 3 endemic landbird species; the introduction of rats to many Pacific Islands causing the elimination of many burrowing seabird colonies; the introduction of the annual grass, sandbur, to Laysan Island where it has crowded out native bunch grass thus, eliminating nesting habitat for the Endangered Laysan finch; and, the introduction and proliferation of numerous ant species throughout the Pacific Islands to the widespread detriment of endemic plant and insect species.

Several of the islands within the Refuge Complex are especially pristine, and as a result are rich in rare and special plants and animals. Nihoa Island has 13 potential candidate Endangered insect species, numerous Endangered plants and 2 Endangered birds. Necker Island has Endangered plants and 7 endemic insects that are candidates for the Endangered Species List. Laysan Island has Endangered plants, 5 potential candidate Endangered insect species and the Endangered Laysan finch and Laysan duck. Other islands in the Refuge Complex such as Lisianski, Howland, Baker, and Jarvis and islets in Atolls such as Rose, Pearl and Hermes Reef and French Frigate Shoals provide homes for a variety of endemic and endangered species and require special protection from alien species.

Other Pacific Island such as Kure and the Ahigh islands@ (Oahu, Hawaii, Maui, Kauai, etc.) as well as, certain islands within Midway Atoll, Pearl and Hermes Reef and French Frigate Shoals have plants and animals that are of high risk for introduction to the relatively pristine islands discussed above. Of special concerns are snakes, rats, ants and a variety of other insect and plant species. Harmful plant species of highest concern that we know of are *Verbesina encelioides, Cenchrus echinatus, and Setaria verticillata.*

The U. S. Fish and Wildlife Service is responsible for the management and protection of the islands and wildlife of the Pacific Remote Islands NWR Complex. No one is permitted to set foot on any of the Refuge's islands without the express permission of the Refuge Manager and an appropriate Special Use Permit. Because of the above concerns, the following restrictions on the movement of personnel and materials to the islands of the Refuge Complex exist. Note: Kure Island and Midway Atoll are not part of this Refuge Complex.

With the exception of Tern Island. French Frigate Shoals, the following rules apply:

Clothing and Soft Gear:

1. Any personnel landing boats at any island should have clean clothes and shoes.

2. Any personnel going ashore at any island and moving inshore from the immediate area in which waves are breaking at the time of landing must have new footwear, new or island specific clothes and new or island specific soft gear. All must be frozen for at least 48 hours prior to landing.

3. At the discretion of the local USFWS representative, personnel from the NOAA ship R/V Townsend Cromwell, or any other vessel servicing the Refuge, may be allowed on shore to visit predesignated areas for guided tours. For such tours, personnel must have new footwear, clean clothes and clean soft gear all frozen for at least 48 hours prior to landing.

4. Otherwise, any personnel entering any vegetated area, regardless of how sparse the vegetation, must have new footwear, new clothes and new soft gear all frozen for at least 48 hours prior to landing.

Definitions:
"New" means off the shelf and never used anywhere but the island in question.
"Clothing" is all apparel, shoes, and socks, over and under garments.
"Soft gear" is all gear such as daypacks, fanny packs, packing foam or similar material, camera bags, camera/binocular straps, microphone covers, nets, holding or weighing bags, bedding, tents, luggage, or any fabric or material capable of harboring seeds or insects.

Clothing or gear coming off Kure and Midway should never be moved to any of the other refuge islands:

During transit, clothing and gear coming off Kure and Midway must be carefully sequestered to avoid contamination of gear bound for cleaner islands. Special care must be taken to avoid contaminating gear storage areas and quarters aboard transporting vessels with seeds or insects from these islands.

General Rules:
1. Regardless of origin or destination, inspect and clean all equipment, supplies, etc., just prior to any trip to the Refuge. Carefully clean all clothing, footwear and soft gear following use to minimize risk of cross contamination of materials between islands.

2. Pack supplies in plastic buckets with fitted lids or other salable metal or plastic containers since they can be thoroughly cleaned inside and out. **Cardboard is not permitted on islands.** Cardboard boxes disintegrate in a short time and harbor seeds, animals, etc., which cannot be easily found or removed. **Wood is not permitted unless sealed on all surfaces.**

Wooden boxes can also harbor insects and seeds and therefore are only allowed if well constructed (tight fitting seams are required). All wood must be treated, and inside and outside surfaces must be painted or varnished to provide a smooth, cleanable finish that seals all holes.

3. Freeze or tarp and fumigate then seal all equipment (clothes, books, tents, everything) just prior to departure. Food and cooking items need not be fumigated but should be cleaned and frozen, if freezable. Cameras, binoculars, radios, and other electronic equipment must be thoroughly cleaned, including internal inspection whenever possible, but do not need to be frozen or fumigated. Such equipment can only be packed in wooden crates if treated as in #2 above. Any containers must contain new, clean packing materials and be frozen or fumigated.

4. At present, Tern Island is the singular exception to the above rule, having less stringent rules due to the large number of previously established alien species. Careful inspection of all materials and containers is still required. However, it is acceptable to use wooden and cardboard containers for transporting supplies to Tem Island. Also, there is no requirement for freezing or fumigating items disembarked at Tem. Although requirements for Tem Island are more lax, the Refuge is still concerned about the possibilities of new introductions. Do not wear clothing to Tern Island that has been worn at Pearl and Hermes, Midway Atoll or Kure Atoll.

Additional Special Conditions for Travel to Nihoa Island:

Nihoa is one of the most pristine locations in the Refuge Complex. It is also home to the highest number of federally listed endangered species in the Refuge. It is a small rugged island with many inaccessible areas. Introduction of any alien species could have disastrous results in a very short time. It would be almost impossible to mount any kind of control or eradication program on this island should an alien species become established. Because of these reasons, access to Nihoa is strictly limited, and rules governing entry are more stringent.

Access to Nihoa by permittees will only be allowed under the accompaniment and supervision of a Refuge Representative. The representative, who shall be appointed by the Refuge Manager, will work with permittees to assure careful compliance with all rules for inspection, handling and preparation of equipment. The Refuge Representative will have the authority to control and limit access to various parts of the island to protect animals, plants and archaeological sites, especially endangered species. The Refuge Representative will have the authority to disallow access to the island, or order an immediate departure from the island if conditions for working on the island aren't met or are violated in some way.

All field equipment made out of fabric material or wood must be new, and never previously used in the Northwestern or main Hawaiian Islands. Equipment previously purchased or made for use on Nihoa that has been carefully sealed and stored while away from Nihoa, and not used

elsewhere, may also be brought onto the island. Rules for freezing and/or fumigating are as described for other sites in the Refuge (see above).

Clothing and personal effects must be new or never used anywhere else but at Nihoa. All footwear (shoes, slippers, socks, etc.) must be new, unused, or previously only used on Nihoa and carefully sealed and stored while off of the island.

Additional Special Conditions for Travel Within Pearl and Hermes Atoll:
In recent years *Verbesina encelioides* has been introduced to Southeast Island within Pearl and Hermes Atoll. This noxious weed has taken over a large portion of the island. To prevent the further spread of this weed to the other islets within this atoll the following precaution must be taken:
If when visiting Pearl and Hermes Atoll, personnel travel to any other islet other than Southeast Island, a new pair of shoes and socks must be worn. In other words you must have a new pair of shoes and socks for Southeast Island and one other pair of new shoes and socks that can be worn around to the other islets within the atoll. Do not wear the outer islet shoes and socks on Southeast Island. All other clothing and gear must be carefully inspected before going from Southeast Island to any other islet in the atoll.

Rules Regarding Food:

Fresh foods that are typically transported to island field camps (potatoes, onions, cabbage, apples, oranges, etc.) are not likely to become established and flourish on the Refuge Complex and are allowed. However, other food items such as tomatoes could easily become established. Soil can contain many seeds, eggs, larvae, etc., and cannot be transported to or between islands. Leafy or stalk vegetables may carry scale insects so are forbidden also

Other food species such as alfalfa, mustard and cress, commonly used for sprouted greens, could potentially become established and cannot be brought to the islands. Other species such as mung beans, soy beans and radishes would not likely survive on the islands and can be used for fresh greens. A list of fresh foods and seeds that are prohibited is provided below. Permittees should contact the Refuge Manager for more information, or for questions about items not included on this list.

Strictly Prohibited:
Tomatoes (any variety), ray sunflower seeds, alfalfa seeds, mustard seeds.

Bulk dried fruits are allowed but should be frozen solid for at least one day to kill any insects.

Attachment 1, Invertebrate Taxa collected at North and Southeast Islands, September 2005.
(To be provided following sample identification.)

APPENDIX B. CONSENT DECREE

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Acting Assistant Attorney General
EDWARD H. KUBO, JR.
United States Attorney
R. MICHAEL UNDERHILL
Attorney in Charge, West Coast Office
Torts Branch, Civil Division
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Attorneys for Plaintiff United States of America

UNITED STATES DISTRICT COURT
DISTRICT OF HAWAII

UNITED STATES OF AMERICA, Plaintiff, v. F/V NORTH WIND, Inc., *in personam*, Defendant.	Civil No. 1:06-cv-00272-DAE-BMK IN ADMIRALTY **CONSENT DECREE**

I. INTRODUCTION

A. On or about July 1, 2005, the R/V CASITAS, a 145-foot research vessel owned and operated by F/V North Wind, Inc. ("Defendant"), ran aground on the reef near North Island at Pearl and Hermes Atoll, a part of the Hawaiian Islands National Wildlife Refuge, and which is also within the Papahanaumokuakea Marine National Monument (the "Incident"). At all relevant times, Defendant was the owner and operator of the CASITAS.

B. Defendant North Wind promptly responded to the grounding and cooperated with authorities from the State of Hawaii and the United States Government through the Incident Command Structure. As a result of the joint efforts of the Defendant, its insurers and contractors, on the one hand, and the State and Federal authorities on the other, the R/V CASITAS was removed from the reef.

C. The United States has filed a complaint in this civil action, alleging that the Incident posed a substantial threat of discharge of oil and the actual discharge of oil into and upon the navigable waters of the United States, and caused injury to, loss of, or destruction of natural resources, including the reef. The United States' Complaint alleges that the Incident caused the United States to incur Response Costs as defined herein. The United States also alleged that Defendant is liable for all such Response Costs. In addition, the United States alleged that Defendant is liable for civil penalties under the Clean Water Act ("CWA").

D. In addition, the United States also has potential claims for Damages, as defined herein, which are recoverable under the Oil Pollution Act ("OPA") or under state law.

E. In addition, the State of Hawaii (the "State") has potential claims for Damages, as defined herein, which are recoverable under the OPA or under state law. The State has not yet filed its claims and is thus not yet a party. Under this Consent Decree, the State will become a plaintiff for purposes of settling the claim.

F. The National Oceanic and Atmospheric Administration ("NOAA") the U.S. Fish and Wildlife Service of the Department of the Interior ("USFWS"), and the State have investigated the site of the Incident, as part of a Defendant-funded pre-assessment trip. Based on the data gathered during that trip, Plaintiffs estimated the amount and severity of coral reef harmed by the Incident, and estimated costs for monitoring recovery of the reef, and for projects intended to compensate for injuries to natural resources, including to coral. NOAA, the USFWS, and the State have determined that the amounts recovered as Damages under this Consent Decree are sufficient to provide for compensatory restoration for injuries to the natural resources, for monitoring of their recovery, and for the planning and oversight of the implementation of such restoration. Based on the data it gathered during that trip, Defendant disputed those

amounts, disputed the causal connection between the amounts sought in compensation and disputed jurisdiction for certain claims under OPA '90.

G. The Parties, without the necessity of trial or adjudication of any issues of fact or law and without any admission of liability by Defendant agree, and the Court finds, that this Consent Decree is fair, reasonable, and in the public interest.

Now, therefore, before the taking of any testimony, without the adjudication or admission of any issue of fact or law, and with the consent of the Parties,

IT IS HEREBY ADJUDGED, ORDERED AND DECREED as follows:

II. PARTIES

1. This Consent Decree is made and entered into by and between Plaintiff, the United States of America, on behalf of and including, but not limited to, the United States Coast Guard, National Pollution Funds Center, Oil Spill Liability Trust Fund ("OSLTF"); the National Oceanic and Atmospheric Administration ("NOAA") Department of Commerce; the U.S. Fish and Wildlife Service ("USFWS"), Department of the Interior; and Plaintiff, the State of Hawaii; and Defendant, F/V North Wind, Inc. The State, prior to entry of this Consent Decree is not a party to this civil action. The Parties to this Consent Decree stipulate, and by Entry of this Consent Decree the Court hereby ORDERS, that upon Entry of the Consent Decree the State shall be deemed to be a plaintiff in this civil action.

III. JURISDICTION AND VENUE

2. The United States is authorized to bring suit and the Court has jurisdiction pursuant to 28 U.S.C. §§ 1331 (Federal question) 28 U.S.C. § 1333 (Admiralty), and 1345 (United States as plaintiff), 33 U.S.C. §§ 1321 (CWA) and 2717 (OPA), and 42 U.S.C. § 9613(b) (CERCLA). The States's claims are also brought pursuant to federal law, and so raise a federal question. 28 U.S.C. § 1331.

3. Venue is properly in this Court pursuant to 28 U.S.C. §§ 1391 and 1395, 33 U.S.C. § 2717, and 42 U.S.C. § 9613(b).

IV. APPLICABILITY

4. The obligations of this Consent Decree apply to and are binding upon Plaintiffs, including agencies, departments and political subdivisions thereof, and upon Defendant, and any of Defendant's successors, assigns, subrogees, subrogors, insurers, or other entities or persons otherwise bound by law. Any change in ownership or corporate status of Defendant including, but not limited to, any transfer of assets or real or personal property, shall in no way alter Defendant's responsibilities under this Consent Decree.

V. DEFINITIONS

5. Unless otherwise specified, terms used in this Consent Decree shall have the meaning assigned to them in OPA, CWA, and CERCLA, as applicable. Whenever the following terms are used in this Consent Decree, the definitions specified hereinafter shall apply.

a. "CERCLA" means the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9001, *et seq*.

b. "Consent Decree" means this Decree herein.

c. "CWA" means the Clean Water Act, 33 U.S.C. §§ 1251, *et seq*.

d. "Damages" means any damages recoverable by the United States for injury to, destruction of, loss of, loss of use of, or impairment of natural resources as a result of the Incident, including, but not limited to: (I) the costs of assessing such injury, destruction, or loss or impairment arising from or relating to the Incident; (ii) the costs of restoration, rehabilitation, or replacement of injured or lost natural resources or of acquisition of equivalent resources; (iii) the costs of planning and overseeing implementation of such restoration activities; and (iv) compensation for injury, destruction, loss, loss of use, or impairment of natural resources.

e. "Defendant" means F/V North Wind, Inc., *in personam*.

f. "Entry of the Consent Decree" means the date when this Decree, after signing by the Judge, is entered in the civil docket under Rule 79(a) of the Federal Rules of Civil Procedure.

g. "Incident" means the grounding of the M/V CASITAS on approximately July 1, 2005, on the reef near North Island at Pearl and Hermes Atoll.

h. "NRDAR Fund" means DOI's Natural Resource Damage Assessment and Restoration Fund.

i. "OPA" means the Oil Pollution Act of 1990, 33 U.S.C. § 2701, *et seq*.

j. "Paragraph" shall mean a portion of this Decree identified by an arabic numeral.

k. "Parties" means the Defendant, the United States, and the State.

l. "Plaintiffs" shall mean the United States and the State.

m. "Response Costs" includes both "removal costs" as defined in Sections 1001(31) and 1002(b) of OPA, 33 U.S.C. §§ 2701(31) and 2702(b); and costs of "response" as defined in Section 101(25) of CERCLA, 42 U.S.C. § 9601(25).

n. "Section" shall mean a portion of this Decree identified by a roman numeral.

o. "State" means the State of Hawaii.

p. "Trustees" means NOAA, the USFWS, and the State, acting as trustees for natural resources impacted by the discharge and/or substantial threat of discharges of oil, under 40 C.F.R. Part 300.

q. "United States" shall mean the United States of America including its departments, agencies and instrumentalities, including, but not limited to, the United States Coast Guard, National Pollution Funds Center, Oil Spill Liability Trust Fund ("OSLTF"); the National Oceanic and Atmospheric Administration ("NOAA"), Department of Commerce; the U.S. Fish and Wildlife Service ("USFWS"), Department of the Interior; and the U.S. Coast Guard.

VI. SETTLEMENT PAYMENTS

6. Within thirty (30) days after this Decree has been lodged with this Court, the Defendant shall deposit the amount of three million eight hundred thousand dollars ($3,800,000) into an account bearing interest on commercially reasonable terms, in a federally-chartered bank (hereinafter, the "CASITAS Account"). If the Decree is not entered by this Court, and the time for any appeal of that decision has run, or if this Court's denial of Entry is upheld on appeal, the monies placed in the CASITAS Account, together with accrued interest thereon, shall be returned to the Defendant. If the Decree is entered by this Court, the Defendant shall, within

fifteen (15) Days of the date of Entry of the Consent Decree, cause the monies in the CASITAS Account, and all accrued interest thereon, to be released and disbursed in accordance with the separate payments specified in the immediately following sub-paragraphs.

(a) Payment for Coast Guard Response Costs. Within 15 days of the Entry of the Consent Decree $818,334.17 shall be transferred via Electronic Funds Transfers (EFTs) through the United States Department of Justice for disbursement to the OSLTF (FPN Number H05013) according to instructions to be obtained by defendants from the Dept. of Justice, Torts Branch, Civil Division. A copy of the paperwork documenting the EFTs, and any accompanying correspondence shall reference DOJ # 62-939 and shall be sent to:

R.SCOTT BLAZE
Senior Admiralty Counsel
West Coast Office
Torts Branch, Civil Division
U.S. Department of Justice
7-5395 Federal Bldg., Box 36028
450 Golden Gate Avenue
San Francisco, California 94102-3463
Telephone: (415) 436-6648, (415) 436-6635
scott.blaze@usdoj.gov

(b) Payment for Trustee-Sponsored Restoration. Within 15 days of the Entry of the Consent Decree, the sum of $2,857,626.48, together with all the accrued interest on the total amount of the monies deposited in the CASITAS Account, shall be paid to the Department of the Interior (DOI), on behalf of the Trustees, for the purposes set forth in Subparagraphs (iii) and (iv) below. Such payment shall be made by Electronic Funds Transfer ("EFT") to the U.S. Department of Justice in accordance with instructions that the Financial Litigation Unit of the U.S. Attorney's Office for the District of Hawaii shall provide to the Defendant following Entry of this Decree by this Court. The Defendant shall send a transmittal letter, indicating that the EFT has occurred, to the Parties in accordance with Section IX of this Decree ("Notices") and to:

Department of the Interior
Natural Resource Damage Assessment and Restoration Program
Attention: Restoration Fund Manager
1849 "C" Street, N.W., Mail Stop 4449
Washington, D.C. 20240

The EFT and transmittal letter shall reflect that the payment is being made to the "Natural Resources Damage Assessment and Restoration Fund, Account No. 14X5198 – CASITAS OPA

Incident." DOI will assign these funds a special project number to allow the funds to be maintained as a segregated account within the Department of Interior Natural Resource Damage Assessment and Restoration Fund (the "CASITAS OPA Incident NRD Account").

(I) DOI shall, in accordance with law, manage and invest funds in the CASITAS OPA Incident NRD Account and any return on investments or interest accrued on the Account for use by the Trustees in connection with the further assessment and restoration of Natural Resources affected by the Incident. DOI shall not make any charge against the CASITAS OPA Incident NRD Account for any investment or management services provided.

(ii) DOI shall hold all funds in the CASITAS OPA Incident NRD Account, including return on investments or accrued interest, subject to the provisions of this Decree.

(iii) The Trustees commit to the expenditure of the funds set forth in this Subparagraph (b) for further assessment and for the design, implementation, permitting (as necessary), monitoring, and oversight of restoration projects and for the costs of complying with the requirements of the law to conduct a restoration planning and implementation process.

(iv) The allocation of funds for specific restoration projects will be contained in a Restoration Plan prepared and implemented jointly by the Trustees, for which public notice, opportunity for public input, and consideration of public comment will be provided. The Trustees jointly retain the ultimate authority and responsibility to use the funds in the CASITAS OPA Incident NRD Account to Restore Natural Resources in accordance with applicable law, this Consent Decree, and any Memorandum of Understanding among them. Decisions regarding any use or expenditure of funds under this Section shall be made by the Trustees, and Defendants shall not be entitled to dispute, in any forum or proceeding, any decision relating to use of funds or restoration efforts under this Section.

(c) Payment for DOI Assessment Costs. The sum of $14,018 to DOI, Natural Resource Damage Assessment and Restoration Fund, Account No. 14X5198- CASITAS OPA Incident NRD Account, for reimbursement of its unpaid Natural Resource Damage Assessment costs through June 7, 2008, associated with the Incident. Payment shall be made by EFT to the U.S. Department of Justice in accordance with instructions that the Financial Litigation Unit of the

U.S. Attorney's Office for the District of Hawaii shall provide to the Defendant. At the time of payment, the Defendant shall simultaneously send written notice of payment and a copy of any transmittal documentation (which shall reference DOJ case number 90-5-1-1-09389) to the Parties in accordance with Section IX of this Decree ("Notices").

(d) Payment for NOAA Assessment Costs. The sum of $70,021.35 to NOAA for reimbursement of its unpaid Natural Resource Damage Assessment costs through June 7, 2008, associated with the Incident. Payment shall be made by EFT to the U.S. Department of Justice in accordance with instructions that the Financial Litigation Unit of the U.S. Attorney's Office for the District of Hawaii shall provide to the Defendant. At the time of payment, the Defendant shall simultaneously send written notice of payment and a copy of any transmittal documentation (which shall reference DOJ No. 90-5-1-1-09389) to the Parties in accordance with Section IX of this Decree ("Notices").

(e) Payment for NOAA Response Costs. The sum of forty thousand dollars ($40,000) to NOAA for reimbursement of its unpaid Response Costs associated with the Incident. Payment shall be made by EFT to the U.S. Department of Justice in accordance with instructions that the Financial Litigation Unit of the U.S. Attorney's Office for the District of Hawaii shall provide to the Defendant. At the time of payment, the Defendant shall simultaneously send written notice of payment and a copy of any transmittal documentation (which shall reference DOJ No. 90-5-1-1-09389) to the Parties in accordance with Section IX of this Decree ("Notices").

7. In the event that the Defendant fails to make any of the payments referred to in Paragraph 6 on time, compound interest shall be assessed on such unpaid payment(s) at the annual rate established pursuant to 28 U.S.C. § 1961 for each day that the payment is late.

8. In the event that Defendant fails to make the payments referred to in Paragraph 6 on time, and in addition to any interest accrued thereon, Defendants shall pay a stipulated penalty of $1,000 per day of non-payment.

9. Any stipulated penalty owing to the United States shall be paid by EFT in accordance with instructions to be provided by the Financial Litigation Unit of the U.S. Attorney's Office for the District of Hawaii, or by certified or cashier's check in the amount due,

payable to the "U.S. Department of Justice," referencing DOJ No. 90-5-1-1-09389, and delivered to the office of the United States Attorney, Financial Litigation Unit, District of Hawaii, PJKK Federal Building, 300 Ala Moana Blvd., #6-100, Honolulu, HI 96850, Phone: (808) 541-2850. Payment of stipulated penalties shall be accompanied by transmittal correspondence stating that any such payment is for late payment of amount(s) due under this Decree and shall reference DOJ No. 90-5-1-1-09389 and the civil action name and number.

10. Defendant shall not deduct any stipulated penalty paid under this Section in calculating its federal income taxes.

VII. EFFECT OF SETTLEMENT

11. In consideration of the payments that will be made by Defendant pursuant to this Consent Decree, and effective solely upon Defendant's performance of its payment obligations as set forth in Section VI of this Decree, Plaintiffs covenant not to sue and agree not to assert any civil claims or causes of action against the Defendant pertaining to the Incident for (a) Damages or Response Costs under OPA, CERCLA, or state law, and (b) civil penalties under Section 311(b)(7) of the CWA, 33 U.S.C. § 1321(b)(7). Plaintiffs reserve, and this Consent Decree is without prejudice to, all rights against the Defendant with respect to all matters not expressly included within this Paragraph.

12. Notwithstanding any other provision of this Consent Decree, Plaintiffs reserve the right to institute proceedings against Defendant in this action or in a new action seeking recovery of Response Costs, Damages, or injunctive relief based on: (I) conditions caused by the Incident, unknown to Plaintiff as of the date of lodging of this Consent Decree; or (ii) information received by Plaintiff after the date of lodging of this Consent Decree, and such conditions or information indicate that the Incident has resulted in injury to, destruction of, or loss of Natural Resources of a type or future persistence that was unknown to Plaintiffs as of the date of lodging of this Consent Decree, or that these previously unknown conditions or new information indicate that the Response Actions taken to date are not protective of human health or the environment.

13. Effective upon Entry of the Consent Decree, Defendant and any of Defendant's successors, assigns, subrogees, subrogors, and insurers hereby covenant not to sue and agree not to assert any claims or causes of action of any nature or kind against the United States or the State with respect to any and all claims or causes of action arising out of, relating to, or pertaining to this Decree or to the Incident, including, but not limited to, any claims against the Hazardous Substance Superfund established under CERCLA or the Oil Liability Trust Fund established under OPA, and any claims for contribution under CERCLA or OPA. These covenants not to sue shall not apply in the event that the United States or the State brings a cause of action pursuant to the reservations set forth in Paragraph 12, but only to the extent that Defendant's claims arise from the same Response Costs or Damages that the United States or the State is seeking pursuant to the reservation.

14. This Decree does not limit or affect the rights of Plaintiffs or Defendant against any third parties, not party to this Decree, nor does it limit the rights of third parties, not party to this Decree, against Defendant. This Decree shall not be construed to create rights in, or grant any cause of action to, any third party not party to this Decree.

15. In any subsequent administrative or judicial proceeding initiated by the Plaintiffs for injunctive relief, recovery of Response Costs or Natural Resource Damages, or other relief relating to the Incident, Defendant shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, statute of limitations, or other defenses based upon any contention that the claims raised by the Plaintiffs in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the Covenants Not To Sue set forth in Section VII.

VIII. COSTS

16. Plaintiffs shall be entitled to collect the costs (including reasonable attorneys' fees) incurred in any action necessary to collect any portion of the amounts due under Section VI or any stipulated penalty due but not paid under Section VI, above.

17. Subject to Paragraph 16, each Party shall bear its own attorneys fees and costs in this action.

IX. NOTICES

18. Unless otherwise specified herein, whenever notifications, submissions, or communications are required by this Consent Decree, they shall be made in writing and addressed to the persons identified below. Any Party may, by written notice to the other Parties, change its designated notice recipient or notice address provided above. Notices submitted pursuant to this Section shall be deemed submitted upon mailing, unless otherwise provided in this Decree or by mutual agreement of the Parties in writing.

To the United States:

R. SCOTT BLAZE
Senior Admiralty Counsel
Torts Branch, Civil Division
U.S. Department of Justice
7-5395 Federal Bldg., Box 36028
450 Golden Gate Avenue
San Francisco, California 94102-3463
Telephone: (415) 436-6648
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scott.blaze@usdoj.gov

Chief
Environmental Enforcement Section
DJ# 90-5-1-1-09389
United States Department of Justice
P.O. Box 7611
Washington, D.C. 20044
Fax: (202) 514-2583

Charles McKinley
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1111 Jackson St., Suite 735
Oakland, CA 94607
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Long Beach, CA 90802
Telephone: (562) 980-3237
Fax.: (562) 980-4065

To the State:

Kathleen Ho
Deputy Attorney General
Department of the Attorney General
State of Hawaii
465 S. King Street, Room 200
Honolulu, Hawaii 96813
Telephone: (808) 587-3050
Kathleen.S.Ho@hawaii.gov

To Defendants:

Michael A. Barcott
Holmes Weddle & Barcott
Wells Fargo Center
999 Third Avenue, Ste. 2600
Seattle, Washington 98104
Telephone: (206) 292-8008
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Keesal, Young & Logan
400 Oceangate
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Telephone: (562) 436-2000
Fax: (562) 436-7416
al.peacock@kyl.com.

X. RETENTION OF JURISDICTION

19. The Court shall retain jurisdiction over this case until termination of this Decree, for the purpose of effectuating or enforcing compliance with the terms of this Decree.

XI. MODIFICATION

20. The terms of this Decree may be modified only by a subsequent written agreement signed by all the Parties. Where the modification constitutes a material change to any term of this Decree, it shall be effective only upon approval by the Court.

XII. PUBLIC PARTICIPATION

21. This Decree shall be lodged with this Court for a period of not less than thirty (30) days to allow the opportunity for public notice and comment. The United States reserves the right to withdraw from or withhold their consent to this Decree if the comments from the public regarding the Decree disclose facts or considerations indicating that the Decree is inappropriate, improper, or inadequate.

22. Defendant consents to Entry of this Decree without further notice. Defendant agrees not to oppose the Entry of this Decree by the Court or to challenge any provision of the Decree, unless the consent of the United States has been withdrawn or withheld under the circumstances set forth in the preceding Paragraph, or Plaintiffs have notified Defendant in writing that Plaintiffs no longer support or agree to the Entry of this Decree.

23. If for any reason the Court should decline to approve this Consent Decree in the form presented, this agreement is voidable at the sole discretion of any Party and the terms of the agreement may not be used as evidence in any litigation between the Parties.

XIII. SIGNATORIES/ SERVICE

24. Each undersigned representative of Defendant, the State, and the United States certifies that he or she is fully authorized to enter into the terms and conditions of this Decree and to execute and legally bind the Party or Parties he or she represents to this document.

25. This Decree may be signed in counterparts, and its validity shall not be challenged on that basis.

26. Should Plaintiffs, after Entry of this Decree, commence an action in this Court or any other court of competent jurisdiction to enforce any of the terms of this Decree, then, with respect to such action and only with respect to such action, Defendant agrees to accept service of process by mail of such action and to waive the formal service requirements set forth in Rules 4 and 5 of the Federal Rules of Civil Procedure and any applicable Local Rules of this Court including, but not limited to, service of a summons.

XIV. INTEGRATION

27. This Decree constitutes the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in the Decree and supersedes all prior agreements and understandings, whether oral or written, concerning the settlement embodied herein. No other document, nor any representation, inducement, agreement, understanding, or promise, constitutes any part of this Decree or the settlement it represents, nor shall it be used in construing the terms of this Decree.

XV. FINAL JUDGMENT

28. Upon approval and Entry of this Decree by the Court, this Decree shall constitute a final judgment of the Court, in accordance with Rules 54 and 58 of the Federal Rules of Civil Procedure, as among the Parties.

IT IS SO ORDERED, ADJUDGED, AND DECREED.

Dated: _____

_____
DAVID ALAN EZRA
UNITED STATES DISTRICT JUDGE

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States of America v. F/V North Wind, Inc.:

FOR THE UNITED STATES OF AMERICA:

GREGORY G. KATSAS
Acting Assistant Attorney General
EDWARD H. KUBO, JR.
United States Attorney
R. MICHAEL UNDERHILL
Attorney in Charge, West Coast Office
Torts Branch, Civil Division

Date: 11/13/06

R. SCOTT BLAZE
Senior Admiralty Counsel
Torts Branch, Civil Division
U.S. Department of Justice
7-5395 Federal Bldg., Box 36028
450 Golden Gate Avenue
San Francisco, California 94102-3463
Telephone: (415) 436-6635
scott.blaze@usdoj.gov

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States of America v. F/V North Wind, Inc.:

FOR THE UNITED STATES OF AMERICA:

Date: 8 November 2008

RONALD J. TENPAS
Assistant Attorney General
Environment and Natural Resources Division
U.S. Department of Justice
Washington, D.C.

Date: Oct 17, 2008

STEVE O'ROURKE
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611, Washington, D.C. 20044
Telephone: (202) 514-2779
steve.o'rourke@usdoj.gov

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States of America v. F/V North Wind, Inc.:

FOR THE DEFENDANT F/V NORTH WIND, Inc.:

Date: Sept 30, 2008

Peter Kelly
President
F/V North Wind, Inc.

Date: 9/30/08

Michael A. Barcott
Holmes Weddle & Barcott
Wells Fargo Center
999 Third Avenue, Ste. 2600
Seattle, Washington 98104
Telephone: 206-292-8008
Fax: 206-340-0289
Mbarcott@hwb-law.com

Date: 10/10/08

Albert E. Peacock III
Keesal, Young & Logan
400 Oceangate
P.O. Box 1730
Long Beach, CA 90801-1730
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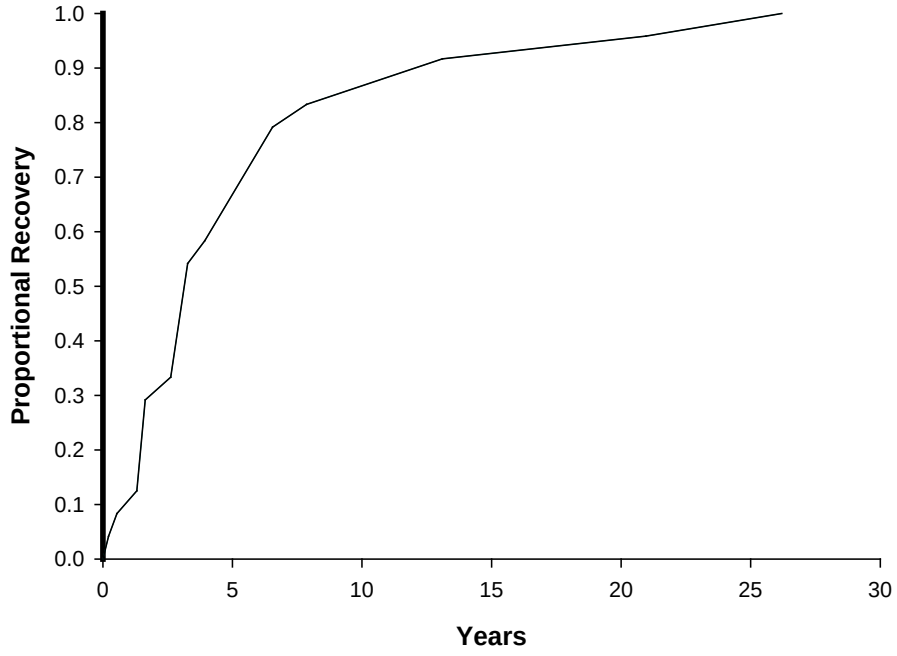
al.peacock@kyl.com.

APPENDIX C. NATURAL RECOVERY PROJECTIONS

Casitas Net Removal Recovery Rate Projections

Nets at Pearl and Hermes reef accumulate and are removed from inner lagoon and back reef areas at a variety of depths (anecdotal average = 15 ft depth). No direct data on the community composition has been collected directly adjacent tangled nets. However, NOAA Coral Reef Ecosystem Division collects data along regular transects in lagoon and back reef habitats at 30 ft. depth. In these models, net impacted coral communities are best represented by average abundance and sizes of major species constituents documented by the NOAA Coral Reef Ecosystem Division along replicate transects in similar habitat areas at 30 foot depths (the best and only information available). Assumed average area of impact per net is 10 m^2. Separate models assume corals are reduced and/or inhibited in size by 50 %, 25 % and 10 %, and will need to grow this amount to fully recover to reference areas sizes following net removal. Only dominant species represented in CRED transects are included. Average abundances within colony size distributions represented by non-whole numbers (i.e., average 0.06 colonies 160 cm in 10 m) are represented by sizes determined through multiplication of proportion and average size category values (i.e., 0.06 colonies * 160 cm = 1 colony at 96 cm size). Growth rates at similar depths, where available in the literature, were used to estimate rates of recovery. Proportional recovery is based on growth of colonies to relevant size category averages.

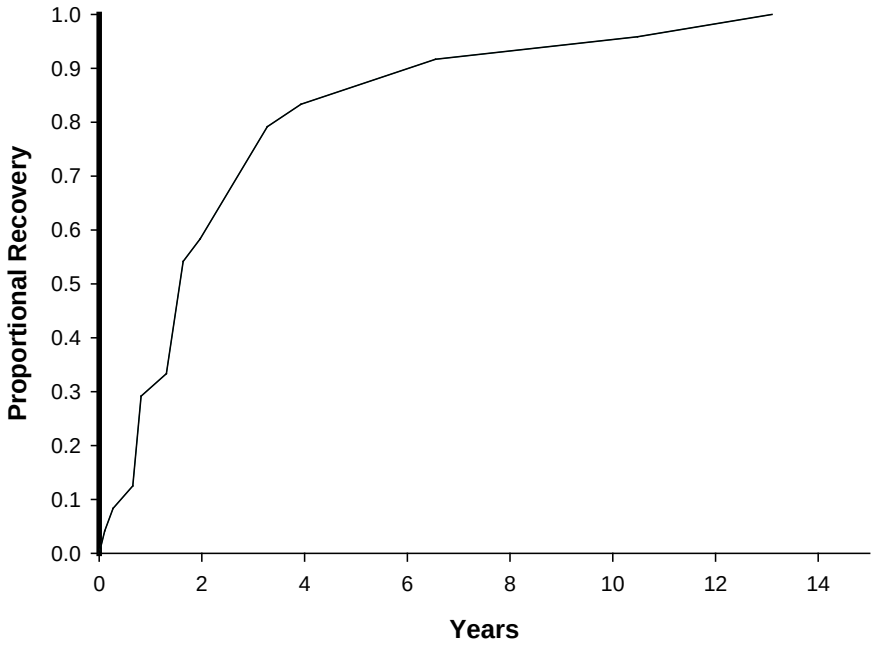
Back Reef (*Montipora* only, growth = 2.29 cm/year)



Time	Cum Rec.
0.2	0.04
0.5	0.08
1.3	0.13
1.6	0.29
2.6	0.33
3.3	0.54
3.9	0.58
6.6	0.79
7.9	0.83
13.1	0.92

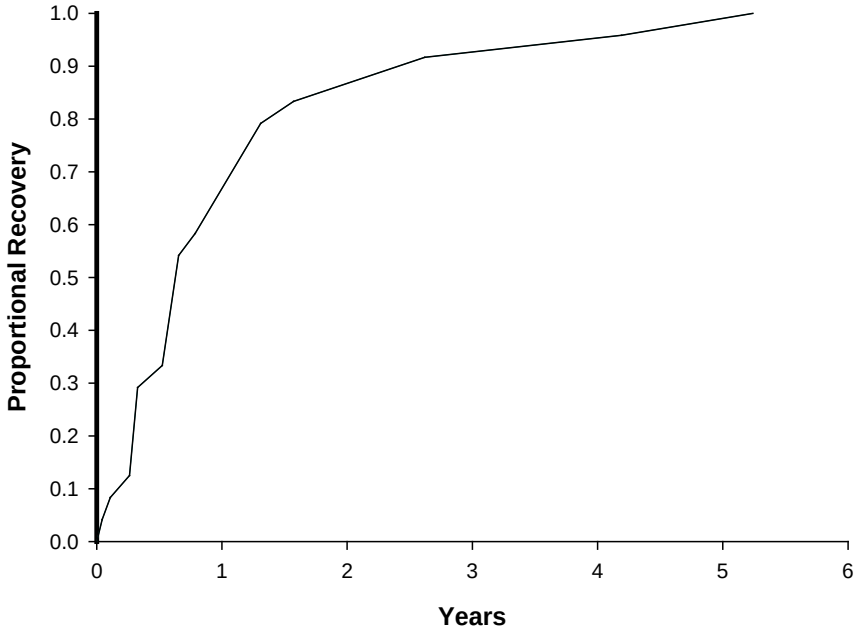
21.0	0.96
26.2	1.00

Figure 1. Recovery projection for corals (*Montipora*) restored through net removal assuming 50 % reduction in size related to net impact (including removal).



Time	Cum Rec.
0.1	0.04
0.3	0.08
0.7	0.13
0.8	0.29
1.3	0.33
1.6	0.54
2.0	0.58
3.3	0.79
3.9	0.83
6.6	0.92
10.5	0.96
13.1	1.00

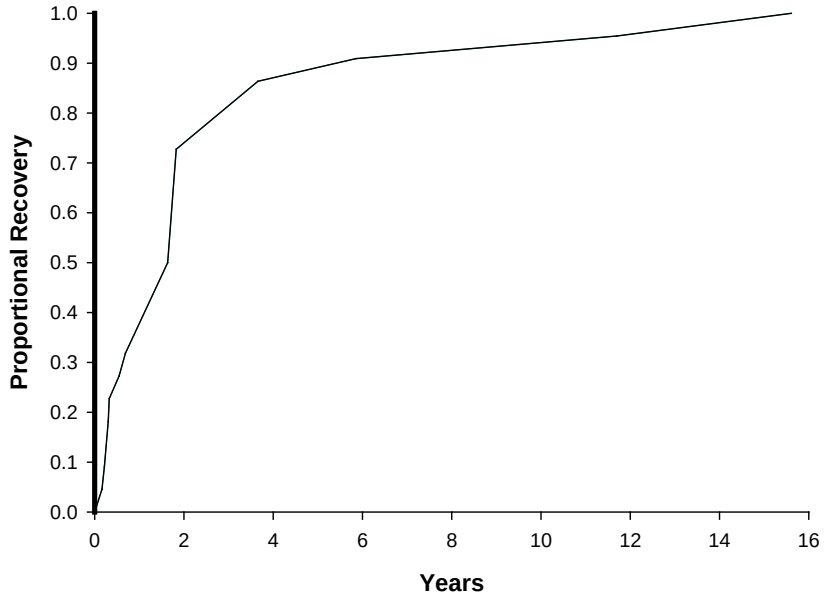
Figure 2. Recovery projection for corals (*Montipora*) restored through net removal assuming 25 % reduction in size related to net impact (including removal).



Time	Cum Rec.
0.04	0.04
0.11	0.08
0.26	0.13
0.33	0.29
0.52	0.33
0.66	0.54
0.79	0.58
1.31	0.79
1.57	0.83
2.62	0.92
4.19	0.96
5.24	1.00

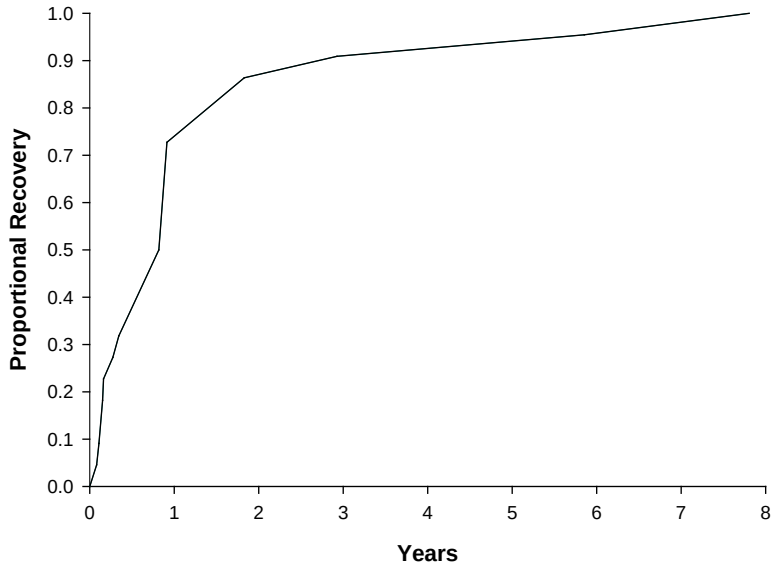
Figure 3. Recovery projection for corals (*Montipora*) restored through net removal assuming 10 % reduction in size related to net impact (including removal).

Lagoon (*Montipora capitata* growth rate = 2.29 cm/yr, *Porites compressa* growth rate = 4.1 cm/yr, and *P. lobata* growth rate = 2.26 cm/yr)



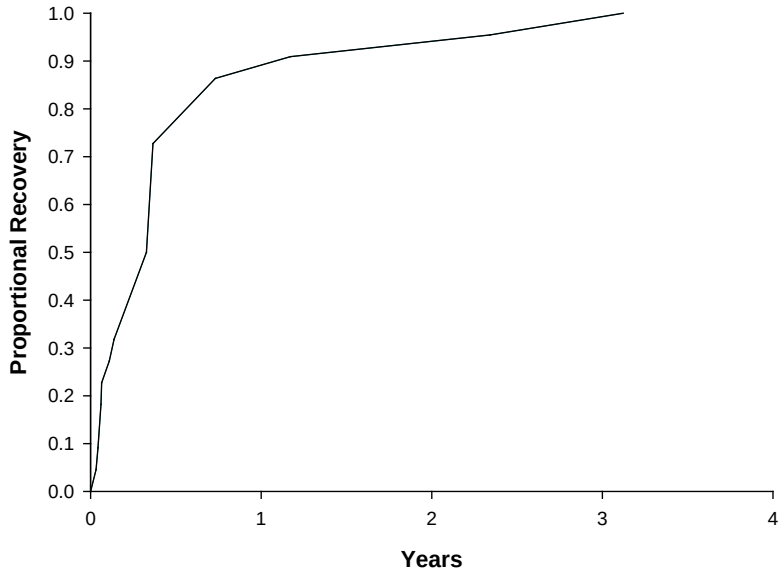
Time	Cum Rec.
0.16	0.05
0.22	0.09
0.30	0.18
0.33	0.23
0.55	0.27
0.69	0.32
1.64	0.50
1.83	0.73
3.66	0.86
5.85	0.91
11.71	0.95
15.61	1.00

Figure 4. Recovery projection for corals (*Montipora, Porites compressa, P. lobata*) restored through net removal assuming 50 % reduction in size related to net impact (including removal).



Time	Cum Rec.
0.08	0.05
0.11	0.09
0.15	0.18
0.16	0.23
0.27	0.27
0.34	0.32
0.82	0.50
0.91	0.73
1.83	0.86
2.93	0.91
5.85	0.95
7.80	1.00

Figure 5. Recovery projection for corals (*Montipora, Porites compressa, P. lobata*) restored through net removal assuming 25 % reduction in size related to net impact (including removal).



Time	Cum Rec.
0.03	0.05
0.04	0.09
0.06	0.18
0.07	0.23
0.11	0.27
0.14	0.32
0.33	0.50
0.37	0.73
0.73	0.86
1.17	0.91
2.34	0.95
3.12	1.00

Figure 5. Recovery projection for corals (*Montipora*, *Porites compressa*, *P. lobata*) restored through net removal assuming 10 % reduction in size related to net impact (including removal).

APPENDIX D: LIST OF CONTRIBUTORS

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