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CRUISE REPORT[1]

VESSEL: *Oscar Elton Sette*, Cruise 07-09 (OES-57)

CRUISE PERIOD: October 11–November 9, 2007

AREA OF OPERATION: Papahānaumokuākea Marine National Monument (PMNM)

TYPE OF OPERATION: In support of Pacific Islands Fisheries Science Center marine debris removal operations

ITINERARY:

Oct. 11 Embarked scientists: Kyle Koyanagi, Stephane Charette, Kevin Lino, Frank Mancini, Noah Pomeroy, Edmund Coccagna, Susan Cooper Alletto, Shawn Farry, Marie Ferguson, Amy Long, Heather Sandison, Jubilee Felsing-Watkins, Jonathan Blodgett, Max Sudnovsky, Kevin O'Brien, Derek LeVault, Samuel Kahng, Tony Perry. Departed Ford Island, Honolulu, at 0830 to refuel at Pearl Harbor. Refueled and departed Pearl Harbor, Honolulu, at 1300 en route to Lisianski. A safety meeting for scientists was conducted at 1430.

Oct. 12 Transit day. A conductivity-temperature-depth (CTD) cast was successfully conducted at 1230 at CTD station "Nihoa." The ship's safety drills were also conducted in the early afternoon.

Oct. 13 Transit day. Three CTD casts were successfully completed. The first CTD cast was conducted at 0430 at CTD station "Necker," the second at 1230 at CTD station "French Frigate Shoals," and the third cast at 2200 at CTD station "Gardner Pinnacle."

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Oct. 14 Transit day. Two CTD casts were successfully completed. The first CTD cast was conducted at 1230 at CTD station "Maro" and the second cast at 2130 at CTD station "Laysan."

Oct. 15 Transit day. One CTD cast was successfully conducted at 2100 at CTD station "Lisianski."

Oct. 16 Land debris removal was conducted at Lisianski Island. A safety meeting was held at 0730, and three Avon boats were launched at 0745. A monk seal briefing was also given by monk seal specialist, Shawn Farry, who conducted monk seal surveys around the perimeter of Lisianski Island while the marine debris teams recovered land debris. The Achilles was also launched at approximately 1000; crewmembers from the ship visited the island for a couple of hours. All land debris removal operations and monk seal surveys were successfully completed on Lisianski Island, and a total of 4396 kg of land debris were recovered. The *Oscar Elton Sette* departed at approximately 1530 en route to Pearl and Hermes Atoll.

Oct. 17 All four Avons and Safeboat were launched today for the first day of field operations at Pearl and Hermes Atoll. A safety meeting took place at 0730, and the small boats were launched at 0745 at the west in anticipation for marine debris tow survey and removal operations along the fringing reef of the southeastern section of the atoll. All crewmembers of the four Avons conducted marine debris tow surveys and staff from the Safeboat conducted monk seal surveys with scientist Shawn Farry at Seal Kittery Island. Weather conditions remained good throughout the day (minimal wind and swell) allowing all operations to run safely. A total of 936 kg of derelict fishing gear were removed.

Oct. 18 All four Avons and Safeboat were launched at 0745 at the south point of Pearl and Hermes Atoll to conduct field operations along the fringing reef at the northeastern end, as well as along the maze at the inside eastern section of the atoll. Weather reports indicated a significant north swell making it unsafe to launch and recover small boats north along the atoll. As a result, launch and recovery were staged south at Small Boat Pass. Two Avons' crewmembers conducted marine debris swim surveys within the maze while the other two Avons' staff conducted tow surveys along the northeastern fringing reef. The Safeboat's crewmembers continued to conduct monk seal surveys and moved operations to North Island. A total of 1136 kg of marine debris were recovered for the day.

Oct. 19 The north swell inhibiting launch and recovery operations from the previous day dropped considerably. This allowed the *Oscar Elton Sette* to conduct launch and recovery operations at the northern portion of the atoll where small boats would access the inside atoll via Engine Block Pass. All

four Avons were launched at 0745. Two Avons' crewmembers conducted marine debris tow surveys and removal along the northern fringing reef while the other two Avons' personnel conducted swim surveys along the north section of the maze. One Avon included scientist Shawn Farry and he conducted one monk seal survey at North Island. Total debris weight for the day was 1706 kg.

Oct. 20 Marine debris survey and removal operations continued on the north section of the atoll. All four Avons were launched at 0745. Two Avons' staff conducted marine debris tow surveys and removal along the northern fringing reef, and the other two Avons's crewmembers continued to conduct swim surveys along the northern area of the maze. A total of 2184 kg of derelict fishing gear were collected and removed. Weather conditions deteriorated throughout the day.

Oct. 21 Due to a significant increase in northern swell and wind, launch and recovery operations were shifted to the southern part of the atoll where small boats would access Big Boat Pass. All four Avons and the Safeboat were launched at 0745. Two Avons' personnel continued conducting marine debris operations along the northern section of the maze while the other two Avons' crewmembers surveyed shallow water reef environments along the southern section of the maze. A total of 1558 kg of marine debris were removed. The Safeboat's staff continued conducting monk seal surveys at Southeast Island with scientist, Shawn Farry. Weather conditions remained poor as a result of a low pressure system.

Oct. 22 Weather conditions improved in the early morning. Launch and recovery operations continued along the south, and small boats accessed Small Boat Pass. All four Avons and the Safeboat were launched at 0745. All Avons' crewmembers conducted marine debris swim surveys along the middle, eastern section of the maze. The Safeboat's personnel continued conducting monk seal surveys at Southeast Island with scientist, Shawn Farry, where he performed a necropsy on a deceased monk seal found the previous day. A total of 1524 kg of debris were collected and removed for the day.

Oct. 23 Good weather was holding and launch and recovery operations continued along the south where small boat would access Small Boat Pass. All four Avons were launched at 0745. All Avons' crewmembers continued conducting marine debris swim surveys and removal along the middle, eastern section of the maze. Weather conditions improved drastically over the previous 2 days. A total of 1538 kg of derelict fishing gear were removed for the day.

Oct. 24 Due to improved weather conditions, launch and recovery operations relocated to the northern end of the atoll, and small boats accessed the Engine Block Pass. Two Avon teams conducted towboard surveys along the northeastern, fringing reef, and the other two Avons' personnel conducted marine debris swim surveys along the middle, eastern section of the maze. The total marine debris weight removed for the day was 2570 kg.

Oct. 25 Launch and recovery operations continued on the northern end and took place at 0745. Two Avons' staff members continued to survey through swim methods along the middle, eastern section of the maze while the other two Avons' team members continued towboarding along the northeastern, fringing reef. Weather conditions remained stable and increased only slightly throughout the day. The total debris weight recovered for the day was 2050 kg.

Oct. 26 Operable weather conditions allowed for field operations to continue on the north end. All four Avons and the Safeboat were launched at 0745. Two Avon teams conducted towboard surveys along the northeastern, fringing reef, and two Avon teams conducted swim surveys along the middle, western section of the maze. The Safeboat conducted monk seal surveys at North Island. A total of 656 kg of marine debris were removed. Weather conditions deteriorated towards the end of the day.

Oct. 27 Due to deterioration in weather the previous day, launch and recovery operations were moved to the south shore of Pearl and Hermes Atoll. All Avons, as well as the Safeboat, were staged to launch at 0745. Two Avon teams continued to conduct towboard surveys along the northeastern, fringing reef while the other two Avon teams continued to conduct swim surveys along the western section of the maze. The SAFEBOAT staged monk seal surveys with scientist, Shawn Farry. The total marine debris weight collected and removed was 1218 kg.

Oct. 28 All Avons were launched at 0745 and they accessed Big Boat Pass to conduct field operations along the eastern fringing reef of the atoll. Weather conditions remained fair and stable throughout the day, and all Avon teams conducted marine debris towboard surveys and removal. A total of 1039 kg of derelict fishing gear were removed.

Oct. 29 Launch and recovery operations continued on the southern end at Big Boat Pass. All Avon teams conducted marine debris towboard surveys and removal operations along the inside fringing reef next to both Seal Kittery and Grass Islands. One Avon team aided Shawn Ferry in monk seal surveys at Grass Island. A total of 766 kg of derelict fishing gear were recovered.

Oct. 30 All Avons and the Safeboat were launched at the southern end near Big Boat Pass. Two Avon teams conducted scuba proficiency dive operations at a shallow water site (about 35 to 45 ft. depth) located on the outside of the fringing reef along the southwest end (near Seal Kittery Island). Eight scientists as well as NOAA officer, Sarah Harris, took part in dive operations from 0900 to approximately 1200. The two Avons dropped off Sarah Harris at the ship after dive operations and relocated field operations to conduct towboard surveys on the inside fringing reef near Seal Kittery Island. The two other Avon teams conducted swim surveys, northwest, along the maze reef lagoon environment. The total weight of marine debris collected and removed was 924 kg. The Safeboat carried scientist, Shawn Farry, to conduct monk seal surveys at North Island.

Oct. 31 Launch and recovery operations continued on the south end. The two Avons' crewmembers, not included in dive operations the previous day, conducted proficiency scuba dives from 1330 to 1530. Dive operations took place at the same site as the previous day. Before dive operations, the two teams conducted swim surveys along the south reef of the maze. The other two Avon teams conducted swim surveys along the northern section of the maze reef. A total of 1214 kg of debris were collected and removed. The Safeboat was also launched and monk seal surveys at Seal Kittery, Grass, and Southeast Islands were conducted.

Nov. 1 Weather conditions were optimal with minimal swell and 5- to 10-knot winds. All Avons were launched at 0745, and all teams conducted marine debris swim surveys and removal operations along the southern end of the maze. Total weight removed was 1636 kg. A CTD cast was successfully launched at 1800 at CTD station, "Pearl and Hermes Atoll."

Nov. 2 Weather conditions deteriorated through the previous night with high winds between 25 to 30 knots and gusts above 30 knots. Field operations were initially delayed until 1200 but were canceled for the entire day as a result of steady high winds.

Nov. 3 All Avons and the Safeboat were launched at 0745 to access Big Boat Pass for the last day of field operations at Pearl and Hermes Reef. Weather conditions improved from the previous day with winds ranging between 15 and 20 knots. All Avon team members conducted debris swim surveys and removal operations in the shallow water, located at the maze reef environment on the south end of the atoll. A total of 1054 kg of debris were removed. Scientists in the Safeboat continued to assist Shawn Farry with monk seal surveys. Shawn succeeded in locating an entangled monk seal and successfully disentangled the seal, with the assistance of the ship's crew and several scientists from Avon Teams 1 and 3. After field

operations were completed, the *Oscar Elton Sette* departed Pearl and Hermes Atoll at approximately 1630 en route to FFS.

Nov. 4 Transit day.

Nov. 5 Transit day. Scientists and crew prepare for unloading of excess fuel at FFS scheduled for Nov. 6. Shawn Farry is also scheduled to conduct field operations on FFS and tag two monk seals.

Nov. 6 Arrived FFS to transfer 150 gallons of unleaded fuel to FFS's Tern Island and pick up land debris. Two hundred ninety-three kg of derelict fishing gear were removed from Tern Island. Shawn Farry also conducted patrols for untagged weaned pups at Tern and East Islands. Two pups were known to be still nursing at the end of the summer. While no untagged weaned pups were located, an undocumented mother and pup pair were discovered on East Island. At approximately 1330, all small boats were safely onboard and the *Oscar Elton Sette* was en route to Pearl Harbor, Oahu.

Nov. 7 Arrived Pearl Harbor, Oahu approximately at 1400. Disembarked scientific personnel, Kyle Koyanagi, Stephane Charette, Kevin Lino, Frank Mancini, Noah Pomeroy, Edmund Coccagna, Susan Cooper-Aletto, Shawn Farry, Marie Ferguson, Amy Long, Heather Sandison, Jubilee Felsing-Watkins, Jonathan Blodgett, Max Sudnovsky, Kevin O'Brien, Derek LeVault, Samuel Kahng, and Tony Perry.

MISSIONS AND RESULTS:

A. Conduct a maintenance level marine debris operation to remove derelict fishing gear in shallow water coral reef environments. Remove marine debris from Lisianski's shoreline to reduce entanglement hazards for turtles and protect marine mammals.

During the OES-07-09 Marine Debris cruise, all marine debris objectives were met or exceeded. A total of 28,462 kg of derelict fishing gear were removed from Pearl and Hermes Atoll, Lisianski Island, and French Frigate Shoal's shallow coral reef environment and shorelines.

Location	Land/Water Debris	Weight (kg)
Pearl and Hermes Reef	Water debris	23,392
Pearl and Hermes Reef	Land debris	381
Lisianski Island	Land debris	4,396
French Frigate Shoals	Land debris	293
Total	Water and land debris	28,462

B. Conduct CTD casts opportunistically at permanent CTD cast locations listed in cruise instructions.

Location	Date	Notes
Nihoa Island	10/12/07	Successful
Necker Island	10/13/07	Successful
French Frigate Shoals	10/13/07	Successful
Gardner Pinnacle	10/13/07	Successful
Maro Reef	10/14/07	Successful
Laysan Island	10/14/07	Successful
Lisianski Island	10/15/07	Successful
Pearl and Hermes Atoll	11/01/07	Successful

C. Survey and sample derelict fishing gear found for invasive species.

During OES-07-09, invertebrate samples were collected from marine debris that had been pulled from the reefs of Pearl and Hermes Atoll. Each day, any material that had collected in the tarps at the bottom of each Avon was saved and sorted for invertebrates. This meant filtering through sand, algae, rubble and detritus to pick out both mobile and sessile organisms. All four Avons were sampled in this manner. Additionally, one full boatload of debris was examined thoroughly each night and any invertebrates found were saved and sorted. Once grouped by closest feasible taxonomic category, the invertebrates were counted and preserved en masse in ethanol or formalin. A total of 3,115 individual organisms were collected and preserved for further analysis.

D. Conduct pearl oyster and crown-of-thorns starfish surveys.

While conducting marine debris surveys, we continued to obtain current and accurate documentation of population, spatial distribution, and aspects of demography of the pearl oyster (*Pinctada margaritifera*) and crown-of-thorns seastar (*Acanthaster planci*). Specimens of corallivore, *Acanthaster planci*, were collected to aid in the study to better understand their gene flow and connectivity across the Hawaiian Archipelago. During the duration of the marine debris cruise OES-07-09, a total of 50 specimens of *Acanthaster planci* were collected and 81 were recorded. Sixty-two pearl oysters were also recorded during the marine debris surveys.

E. An emergency response mission was organized to conduct Hawaiian Monk Seal Surveys to find and disentangle a subadult male Hawaiian monk seal that was seen entangled in derelict fishing gear at Pearl and Hermes Atoll. Secondary goals, to be conducted in conjunction with searching for GI40, were to conduct population assessment patrols with particular interest in juvenile and subadult seals and to tag untagged weaned pups if located.

The cooperative effort between the Protect Species Division and the Coral Reef Ecosystem Division's Marine Debris Program was a great success with very minimal impact to the cruise's primary mission of removing derelict fishing gear from the PMNM. It worked out very well because of the direct relationship between the two projects. All Protected Species Division primary and secondary missions were met or exceeded.

Lisianski Island:

Completed a seal population assessment patrol at Lisianski.

Pearl and Hermes Atoll:

Conducted searches for GI40 and population assessment patrols at Pearl and Hermes Atoll. An untagged weaned pup was located on North Island. With the assistance of marine debris team personnel, J. Felsing-Watkins and E. Coccagna, the seal was successfully captured and tagged.

A dead weaned pup was discovered in the waters off of Southeast Island. The carcass was in an advanced state of decomposition and the cause of death could not be determined. A partial necropsy was performed, and samples were taken for later analysis.

The entangled seal GI40 was located on Southeast Island. With the assistance of marine debris team personnel, K. Koyanagi, S. Charette, and S. Kanhg, the seal was successfully captured and the debris removed from around its neck.

French Frigate Shoals:

Conducted patrols for untagged weaned pups at Tern and East Islands. Two pups were known to be still nursing at the end of the summer. While no untagged weaned pups were located, an undocumented mother and pup pair were discovered on East Island making the stop at FFS well worth the effort.

SCIENTIFIC PERSONNEL:

Kyle Koyanagi, CRED Marine Debris Operations Manager, Joint Institute for Marine and Atmospheric Research (JIMAR), University of Hawaii (UH)
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Susan Cooper Alletto, CRED Marine Ecosystem Specialist, JIMAR, UH
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Derek Levault, Coral Reef Marine Debris Specialist, AF
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Amy Long, Coral Reef Marine Debris Specialist, AF
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Tony Perry III, LTJG, Pacific Islands Fisheries Science Center, National Marine Fisheries Service
Shawn Farry, Cooperative Scientist, AF

Submitted by: _____
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Approved by: _____
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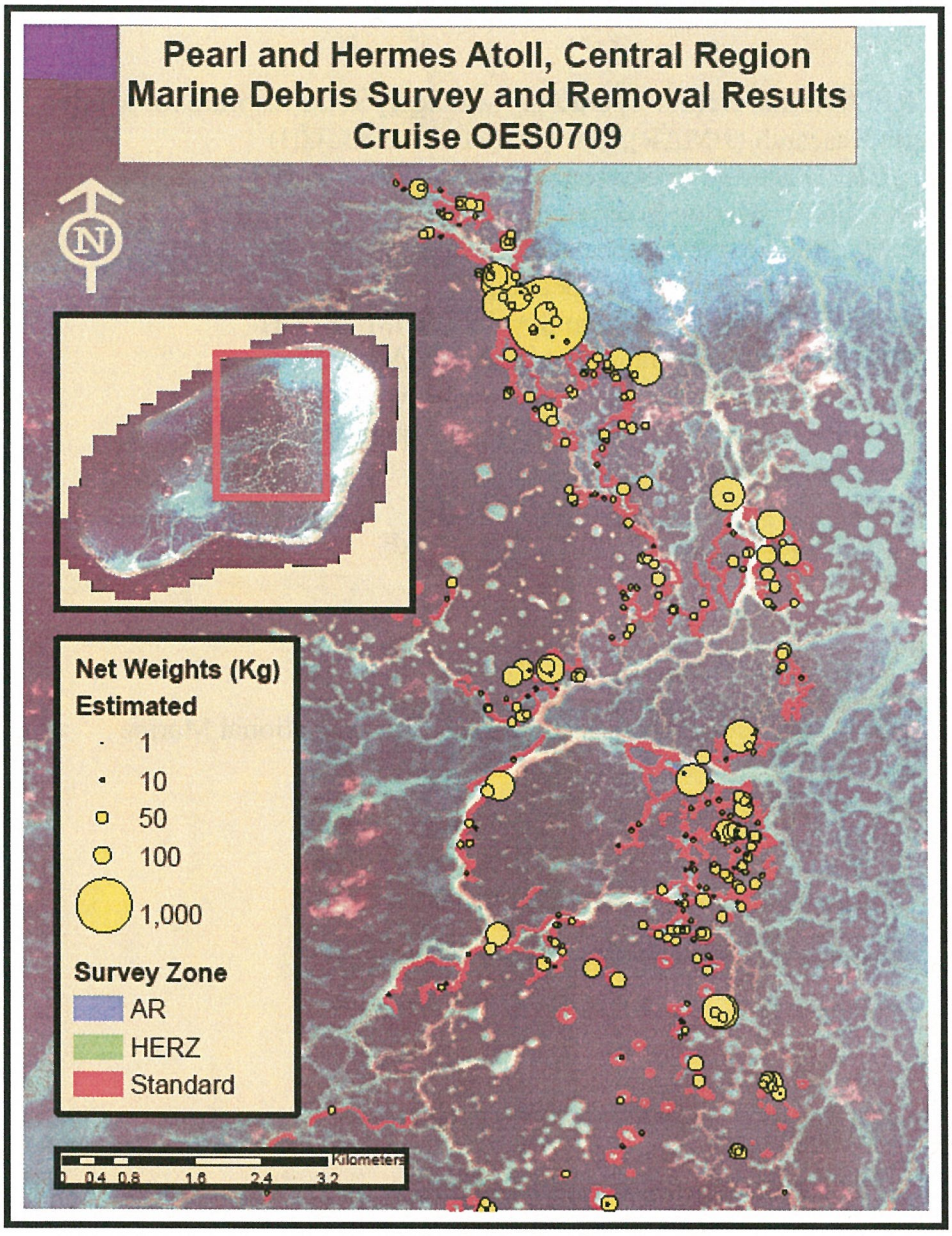

Figure 1.--Pearl and Hermes Atoll marine debris survey sites (Central Region).

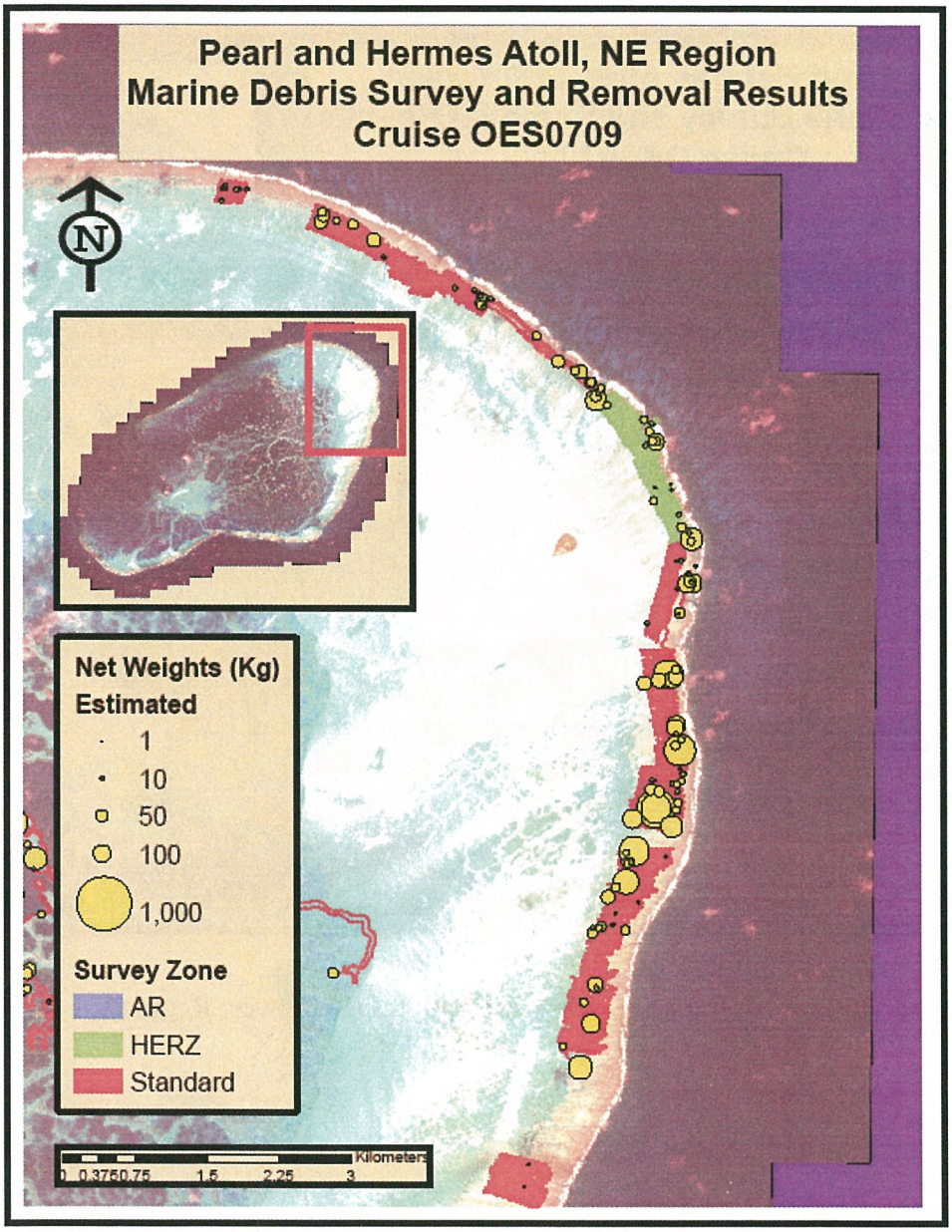

Figure 2.--Pearl and Hermes Atoll marine debris survey sites (Northeast Region).

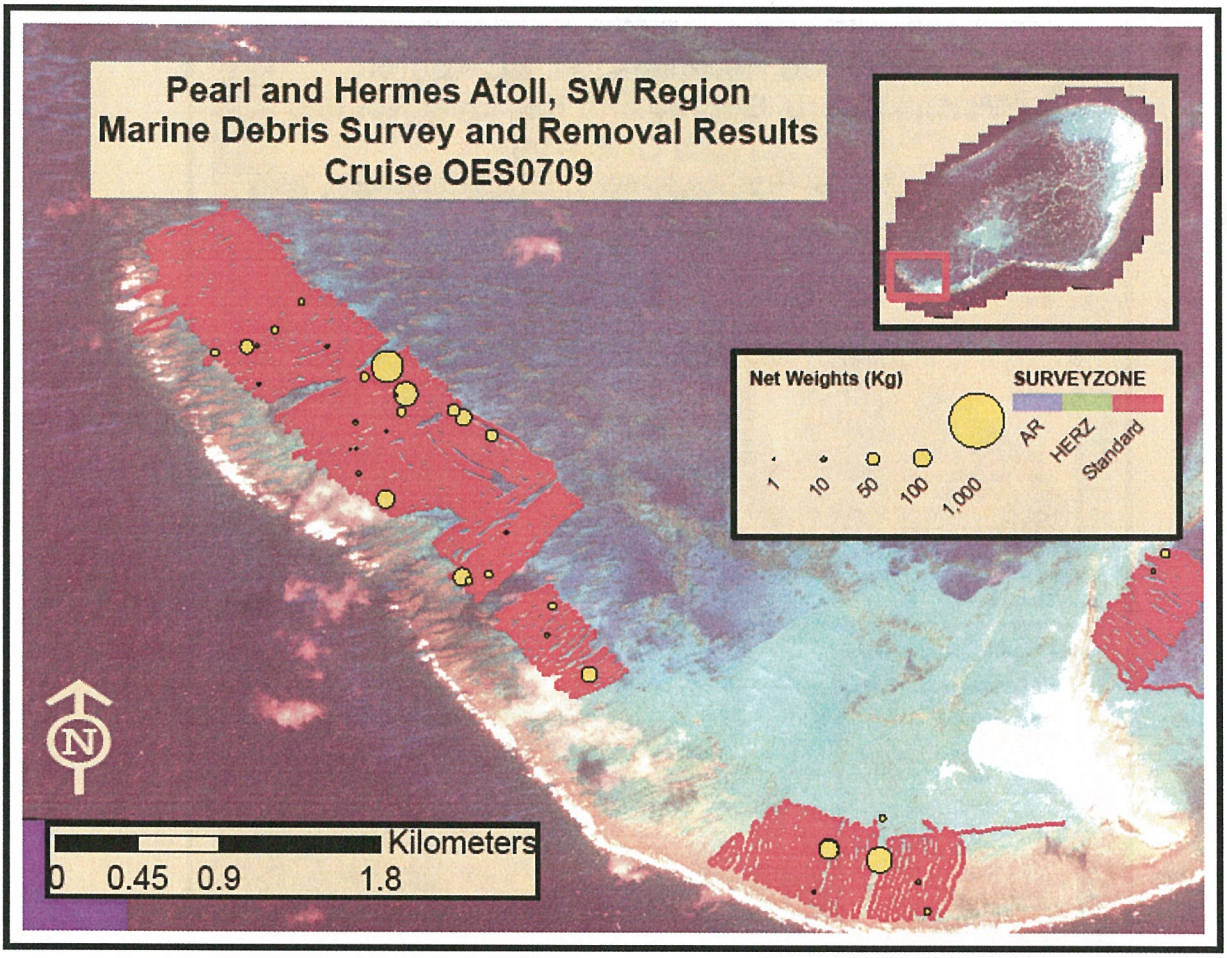

Figure 3.--Pearl and Hermes Atoll marine debris survey sites (Southwest Region).