NOAA Marine Debris Program
Innovative Removal
Northwestern Hawaiian Islands Debris Removal


Photo: NOAA

Project Description

Since 1996, the Pacific Islands Fisheries Science Center (PIFSC) has surveyed the Northwestern Hawaiian Islands (NWHI) on a near-annual basis and removed nearly 848 metric tons of derelict fishing gear (DFG) and plastics from this protected region. In 2006, NWHI marine debris removal efforts, led by the PIFSC Coral Reef Ecosystem Program (CREP), were reduced to a maintenance level and focused on keeping pace with new accumulations through the resurveying of areas with historically high densities of marine debris. However, this "maintenance level" of removal remains demanding, as DFG continues to accumulate at an estimated 52 metric tons per year in the NWHI. To keep up, the CREP Marine Debris Project regularly surveys and removes debris from the shorelines and shallow coral reef environments of Pearl and Hermes Atoll, Midway Atoll, Kure Atoll, Lisianski Island, Laysan Island, Maro Reef, and French Frigate Shoals in the NWHI.

Innovative Techniques

Due to the remoteness of the NWHI, the only feasible way to access this area is via NOAA Ships or approved charter vessels. Operations occurring on large ships such as these require detailed risk analysis and management between all personnel involved (scientists, ship command and crew, etc.). Shorelines are surveyed and DFG and other marine debris are removed from these remote locations using small (17-18') inflatable boats, which then transport the debris to NOAA Ships or charter vessels.

Diving operations are also conducted through freediving, requiring divers to be put through a rigorous 1-2 month training to meet NOAA Scientific Diver and Marine Debris Specialized Task Endorsement requirements.

Personnel utilize two methods for the in-water survey and removal of derelict fishing gear. Free-dive towboarding, also known as Manta Tow, allows for rapid visual surveys in shallow water (less than 30 feet) and maximum area coverage. This unique method requires divers to visually survey the benthic habitat while being towed behind a small boat operating at 1-2 knots. Snorkel (swim) surveys are primarily used around reticulated reefs or in areas which are too shallow or intricate to conduct towboard operations effectively. In both methods, divers conduct surveys until DFG is located and data are collected. Divers determine if the DFG is removable and if so, DFG is manually removed to minimize further damage to the entangled and surrounding reef. Survey design changes annually as historical data are used to target "hotspots" where DFG has been known to accumulate.

Uses & Lessons Learned

The CREP Marine Debris Project has worked over the course of 20 years to remove large amounts of debris from remote and sensitive ecosystems. Throughout this project, inflatable boats have proven to be extremely efficient in these coral reef environments because of their ability to operate in shallow waters, high carrying capacity, and stability when hauling in heavy debris. Other, larger boats/platforms have been suggested as alternatives but fail to meet the needs of the remote survey locations.

Freediving has also been found to be more efficient than the use of SCUBA, as most nets are found at shallow depths. SCUBA equipment has also been found to pose a high entanglement hazard in comparison to the streamlined figure of a freediver.

Lift bags are used to bring larger nets to the surface, but require sufficient training and must meet all Occupational Safety and Health Administration requirements and other diving regulations.

Through trial and error, the best knives for in-water DFG removal efforts have proven to be H1 stainless steel Spyderco blades. For shoreline DFG, Swiss Victorinox serrated paring knifes have shown to be effective at cutting DFG and are inexpensive, easy to transport, and durable.

Point of Contact

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