

U.S. Marine Corps Training and "Sweat Equity" Over- come Foreign Plant Invaders

Marine Corps Base Hawai'i, Kaneohe Bay, Hawai'i

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Pickleweed (*Batis maritima*) and mangroves (*Rhizophora mangle*) are aggressive plants, non-native to Hawai'i, that have spread rapidly through coastal wetlands, where they displace, and sometime eliminate, native vegetation and wildlife. Unlike in their native habitats in other tropical regions, the mangroves introduced into Hawai'i in the early 20th century are a serious pest and significant threat to native biological diversity. The Hawaiian stilt (*Himantopus mexicanus knudseni*), a federally listed endangered species, has declined for several reasons, including loss of mudflat foraging and nesting habitat overtaken by these invasive plants. If left uncontrolled, these aquatic invaders provide cover for predators, clog and stagnate waterways, obstruct floodwater drainage, increase algal production, lower water quality and oxygen available for indigenous aquatic life. These are some of the major challenges facing resources managers at Marine Corps Base Hawai'i's Mokapu peninsula, known as MCBH—Kaneohe Bay, on the island of O'ahu's windward side. Marine Corps Base Hawai'i (MCBH) wetland habitat here provides home to about 10 percent of the State's remaining Hawaiian stilt population. Three other endangered Hawaiian waterbird species are also found here, as well as over fifty species of shorebirds and seabirds counted over the past 50 years. In addition, dense mangrove thickets along the peninsula's border with Kaneohe Bay provide cover for illegal activity, such as fish poaching.

An Innovative Solution

For the past twenty-five years, MCBH has deployed innovative approaches to address these serious threats to environmental health by combining combat training with habitat restoration and by uniting military and civilian volunteers in weed removal service projects that build sustained community support for the military as exemplary environmental stewards.

"PICKLEWEED PATROLS." Starting in the early 1980s, with partner agency input from U.S. Fish and Wildlife Service and Hawai'i's Department of Land and Natural Resources, MCBH resources managers have supervised training maneuvers by 27-ton amphibious assault vehicles (AAVs) of the Third Marine Regiment's Combat Assault Company in pickleweed-infested wetland mudflats on base. These maneuvers have become an annual event, just before onset of stilt breeding season. The plowing action creates a beneficial checkerboard "moat and island" pattern in the terrain which controls pickleweed infestation, discourages predator access, improves the ground surface for stilt nesting, and provides ready access by newly-hatched stilt to water-resident food sources (e.g., flies, larvae, crustaceans). This is critical as stilt chicks must forage for themselves at birth. These maneuvers also provide Marines valuable training which they have nicknamed their annual "Mud Ops" maneuvers. AAV drivers, whose training options are limited elsewhere in Hawai'i, gain valuable practice in this difficult, muddy terrain, by deliberately getting their AAVs stuck. They build teamwork skills while towing their vehicles in daisy-chain fashion to get them unstuck. Developing such skills is an established part of USMC training curriculum and have proven useful in situations, such as recently in Iraq, where a mechanized company got mired in the mud during an attack and had to extract itself quickly while under hostile fire.



Left: Marine Corps Base Hawai'i, Kaneohe Bay. Below: Natural resources monitoring at MCB Hawai'i. (Photo: U.S. Marine Corps)



"MANGROVE BUSTER" TEAMWORK. Also starting in the early 1980s, MBCH resources managers and Marines began teaming with civilian volunteers such as the Sierra Club, other environmental, youth, school, and civic organizations to host "ecology camps" and service projects to remove mangrove with hand tools and forge bonds with each other while working toward a shared goal of improved environmental health. Contractors with mechanized equipment also played a crucial role in areas where the infestation was too thick for hand-tools to tackle alone. A total of about twenty acres of mangrove forest have been removed by these efforts.



Above: Hawaiian stilt forages in mudflats
(Photo: R. Shallenbarger)



Above: AAVs plowing pickelweed-infested mudflats to open up better habitat for endangered Hawaiian stilts to nest and forage.



Left: AAV crews gain valuable team-building skills while getting their 27-ton vehicles "unstuck" from difficult muddy terrain. (Photos: D. Drigot)



Right: Wetlands prior to (top) and after (bottom) removal of invasive non-native mangroves. (Photos: GeoSight International, Inc.)



Accomplishments, Results, and Positive Publicity

During the time span of implementing these innovations, pickleweed has been kept in check, “Mud Ops” is featured annually in the popular media, and in 2004, a nationally-distributed poster celebrating this partnership between combat training and conservation was produced as part of a “Saving a Few Good Species” awareness campaign, co-sponsored by the Marine Corps and the U.S. Fish and Wildlife Service. <http://www.fws.gov/endangered/pubs/marines.html>

During the same period, almost all mangrove infestation in MCBH wetlands has been removed. Systematic counts of stilt on-base have documented a steady rise in their numbers, from about 60 to 160 birds, and other environmental improvements have been scientifically documented. MCBH is recognized as a proactive conservation leader in the State of Hawai‘i’s Aquatic Invasive Species Management Plan (2003) (see http://www.hawaii.gov/dlnr/dar/pubs/ais_mgmt_plan_final.pdf) and in the National Wildlife Federation’s publication Under Siege: Invasive Species on Military Bases (2005). MCBH won the 2005 Natural Resources Conservation Award in the Secretary of Defense’s interservice military competition. National and international publications further detail benefits of this novel partnership between combat training and conservation. See, for example, D. Drigot, 2001. “An Ecosystem-based Management Approach to Enhancing Endangered Waterbird Habitat on a Military Base,” Cooper Ornithological Society’s Studies in Avian Biology, No. 22, edited by J. M. Scott, S. Conant, and C. van Ripper, III ; and M.J. Rauzon & D. C. Drigot, 2002 “Red mangrove eradication and pickleweed control in a Hawaiian wetland, waterbird responses, and lessons learned,” in Turning the Tide: The Eradication of Invasive Species, edited by C.R. Veitch and M.N. Clout, Occasional Paper of the IUCN Species Survival Commission No. 27, IUCN–The World Conservation Union, Gland, Switzerland.

Conclusion

It took unwavering vision, resources manager and military teamwork, about \$2.5 million, the sweat of thousands of volunteers, contractor know-how and combat military might in a persistent push over 25 years to bring pickleweed and mangrove infestations under control at MCBH, but it was well worth the effort. Twenty acres of “saved” habitat may not seem like a lot, but in a small island state hosting about 25 percent of the United States’ listed endangered species, it represents a significant achievement in providing a “proving ground” of what can be done when partners work effectively together, often “outside the box” and with a shared vision of possibilities. This story also shows that while Marines are limited in funding and numbers, they are unsurpassed in motivation and creativity and willingness to work with other groups. Other branches of the military and community groups elsewhere across the state have also joined forces, battling invasive species in other irreplaceable Hawaiian habitats. Through determined, innovative teamwork, together we will curb the onslaught of invasive species. We will do it because we have no other choice but to protect our military’s ability to train, preserve Hawai‘i’s ecosystems—a unique part of our nation’s heritage—and to help sustain a healthy economy. We hope to inspire similar efforts elsewhere. Remember, however, it takes years of persistence to win this battle and the effort should be immune from partisan politics.



Combined Marine and civilian volunteers and contractors conquer foreign plant invaders at MCBH wetlands, restore endangered species habitat, and build community bonds. (Photos: top and bottom, D. Drigot; center, M. Rauzon)