

by Diane Drigot

# Safeguarding Hawaii's Endangered Stilts



**Hawaiian stilt**

Photo by Robert Shallenberger

**Mokapu Elementary School students planting a native plant garden at Mokapu Central Drainage Channel, which connects with Nu'upia Ponds**

Photo by Diane Drigot



The Mokapu Peninsula component of Marine Corps Base-Hawaii (MCBH) is a busy military installation on the island of O'ahu. This 2,951-acre (1,195-hectare) facility also provides safe haven for some 50 species of waterbirds, shorebirds, and seabirds. Among them are all four of Hawaii's endangered waterbirds: the ae'o or Hawaiian stilt (*Himantopus mexicanus knudseni*), 'alae keo'keo or Hawaiian coot (*Fulica alai*), 'alae ula or Hawaiian gallinule (*Gallinula chloropus sandvicensis*), and koloa or Hawaiian duck (*Anas wyvilliana*).

The best stilt habitat on base is at Nu'upia Ponds Wildlife Management Area, a complex of interconnected shallow ponds and vegetated mudflats. Shoreline marshy areas, golf course ponds, and a constructed storm water retention basin also contain waterbird habitat. Management activities at MCBH have more than doubled the number of stilts counted on base from about 60 to 130 over the past 20 years. Currently, the base harbors nearly 10 percent of the state's total estimated stilt population of 1,500 to 1,800 birds (Rauzon and Tanino 1998). Increased stilt reproduction is most noted where there is deliberate manipulation of invasive plants. Two of the main species targeted for control are mangrove (*Rhizophora mangle*) and pickleweed (*Batis maritima*).

Mangroves are not native to Hawaii. Introduced in the early 1900s, this species is now a major pest in coastal wetlands, including Nu'upia Ponds. In the early 1980s, base resource managers and community volunteers began to remove small mangroves with hand-held tools. In the 1990s, more than \$2 million was spent on mechanical removal of about 20 acres (8 ha) of mangrove and

associated monitoring studies (Drigot 1999). Volunteers keep mangrove regrowth in check.

Since the early 1980s, invasive pickleweed has been controlled through annual "mud ops" maneuvers by Marine Corps Assault Amphibian Vehicles (AAVs). These 26-ton vehicles are normally excluded from the wildlife reserve, but each year, just before onset of stilt nesting season, they are deliberately deployed in supervised plow-like maneuvers. The AAV vehicles break open thick mats of pickleweed, improving stilt nesting and feeding opportunities while also giving drivers valuable practice in unusual terrain. Their plowing action creates a checker-board pattern of "moats and islands" that inhibits predator (e.g., the non-native mongoose) access to stilt eggs. It also helps newly-hatched stilts find aquatic food, such as flies, larvae, crustaceans. Stilt chicks must feed themselves from birth.

Following an integrated ecosystem approach, MCBH resource managers address stilt needs in other areas while also enhancing the quality of life for military occupants. One area of focus is Mokapu's Central Drainage Channel, which funnels ground and surface water through the urbanized landscape, Nu'upia Ponds, and out into Kan'eohe Bay. More than a drainage system, this dynamic channel receives fresh surface and ground water runoff as well as tidal salt water. Fish and crustaceans enter this system, attracting native waterbirds, shorebirds, and seabirds, which regularly forage along the ditch's riparian banks.

Several barracks along this drainage ditch house Marines and Sailors. A multi-million dollar program is renovating and rebuilding barracks for active-duty

personnel, and base resource managers are working with planners to build such projects in an “environmentally friendly” way. For example, in 1999, construction began on a streamside barracks that included landscaping with native plants and a storm water retention basin to attract native waterbirds, while also implementing a Best Management Practice for storm water retention. The construction contractor, Dick-Pacific, hired Ducks Unlimited to design the basin to these specifications. One of the project features was a pond that was constructed to trap potentially muddy storm water runoff from the barracks site and the surrounding 700-acre (280-ha) drainage area. The pond was designed to give runoff water enough time to filter through the ground and slowly make its way downstream, instead of flowing quickly through the drainage channel. If no stormwater retention basin had been designed into the project, heavy rains might have caused potentially contaminated, muddy stormwater runoff to flow into Nu’upia Ponds and Kane’ohe Bay. Thus, with this basin, water quality is improved using the filtering capabilities of nature.

The pond and drainage channel are connected by culverts that allow tidal influences into the pond. When the tide rises and water moves up the channel, the basin fills, and small fish and larvae (food for the birds) enter the pond. As the tide lowers, basin water depth decreases to create a mudflat, which is attractive habitat for native birds such as stilts. At a scientist’s suggestion (M. Rauzon), gravel islands were added to create nesting substrate that is reasonably secure from predators. Even before construction of the barracks was completed, the basin passed inspection by a pair of stilts that nested and hatched a clutch of three eggs on one of the new gravel islands.

Elsewhere along this channel, volunteers have helped to establish two native plant riparian gardens. Elementary school teachers have been trained and encouraged to use the area for environ-

mental education. Students plant, weed and monitor garden progress, measure water quality, and observe stilt use of the stream habitat.

Through dedication and hard work, environmental staff, planners, contractors, community volunteers, active-duty Marines and Sailors, and state and federal advisors will continue to implement this vision of a healthier watershed.

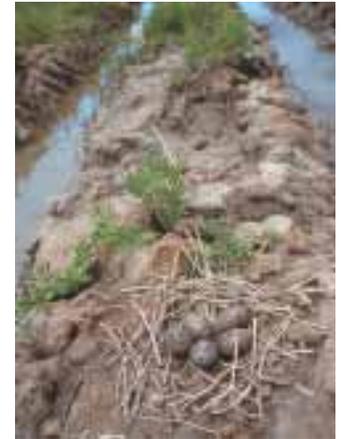
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### References

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**Hawaiian stilt nest with eggs on mudflat shaped by AAV plowing at Nu’upia Ponds**

*Photo by Mark Rauzon*

**An AAV driver plows through mudflats overrun with invasive pickleweed in Nu’upia Ponds to create better nesting surface for stilts.**

*Photo by Diana Drigot*

