

Waikoloa Dry Forest Initiative

Waikoloa, Hawaii



“Our mission is to preserve, protect and restore a remnant native Hawaiian dry forest ecosystem through land management, outreach, education and grass roots advocacy.”

- Jen Lawson

The Waikoloa Dry Forest Recovery project is a native dry forest restoration on 275 acres of land south of Waikoloa Village. The rugged a’ala lava landscape is home to endemic, critically endangered uhiuhi trees and culturally significant wiliwili trees. Hawaiian tropical dry forests are rare and typically a mix of small trees, shrubs, and grasses. Rainfall is low, generally less than 127 cm of rain per year. Tropical dry forests are highly endangered habitats all over the world due to pressure from land conversion, wildland fire, and invasive species.

In 2000, a group of neighbors and native plant enthusiasts proposed a community-based effort to restore the wiliwili lowland dry forest outside of Waikoloa. The goal was to restore the forest to the point where it would regenerate self-sustaining populations of nine endangered plant species. The community members established the Waikoloa Dry Forest Initiative (WDFI) non-profit to assist in fund-development efforts. WDFI’s is guided today by Jen Lawson and Beverly Brand. Their objectives include native species protection, habitat restoration and education about the dry forest habitat. The public benefits from the activities of the recovery project through reduced fire threat, invasive species management, watershed improvements, education, and ecotourism opportunities.

HAWAI’I FOREST STEWARDSHIP PROGRAM

The Hawai’i Forest Stewardship Program provides technical advice and financial assistance on a cost-share basis to promote the stewardship, enhancement, conservation and restoration of Hawai’i’s forests. The FSP primarily funds long-term forest management planning and may support implementation of this plan for 10 years. The FSP focuses on the following objectives: forest productivity, native ecosystem health and biodiversity, watershed quality, wildlife habitat and recreation.



Waikoloa Dry Forest Management

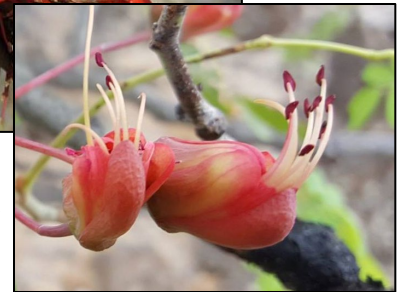
“This site provides an excellent opportunity for collaborative learning about Hawaii’s culturally and ecologically important native dry forests”

Wiliwili: The wiliwili tree is one of Hawaii’s few deciduous trees, which sheds its leaves in the summer in order to conserve water. The tree flowers through late summer through fall with a variety of vibrant colors including orange, red, peach, salmon, green, yellow or white. 24 wiliwili trees currently call Waikoloa home.



Wiliwili flower

Uhiuhi: Uhiuhi wood was used by Hawaiians to make fish hooks since the wood is so dense that it sinks rather than floats. There are about 100 wild uhiuhi, a federally endangered species, left in the Hawaiian Islands; 13 are alive and thriving at Waikoloa.



Uhiuhi Flower

Seed Sourcing and Propagation: Jen Lawson, the land manager, recommends growing seedlings in an onsite nursery to reduce introduction of pests. She sources her seeds “as close to home as possible” so the plants are better adapted to the site. A permit is required to collect the Federally endangered uhiuhi seeds.



Seed scatter is more successful on pahoehoe lava rock than a‘a.

Seed Scatter: The management team tried seed scattering to increase understory plants and found it more time and cost effective than outplanting seedlings. Jen recommends scattering approximately 5000 seeds per acre as opposed to outplanting 200-300 plants. Seeds should be scarified first (a process of breaking, scratching or mechanically altering the seed coat to make it permeable to water) to increase germination and establishment. However, without rainfall the scarified seeds will lose their viability. Optimal months for scatter in Waikoloa are typically October to April and regular weed management is necessary for success.

Irrigation: In this harsh site dominated by a‘a lava rock with minimal soil, irrigation lines can increase the establishment of native seedlings. The dry forest at Waikoloa features low rainfall, high temperatures, strong winds and lack of existing canopy cover to protect plantings. A 1.5” pipe and a 1” sub-main pipe were installed in each planting area. From here, easy-to-move drip irrigation tape directed water to individual plants and is extremely efficient. Jen irrigates after outplanting using **one gallon per week for about 6 months** to ensure seedling establishment especially if planting took place during a dry season or drought.



Waikoloa Control of Threats: Invasives and Fire



Gall Wasp damage

Erythrina Gall Wasp

Effects: Causes leaf deformation, reduction in growth, and tree death.

Control: Bio-control agent of parasitoids provided by DOFAW, University of Hawaii, and Department of Agriculture.

Black Twig Borer

Effects: Drills into the trunks of uhiuhi trees weakening them.

Control: Healthy trees can resist damage. Monitor populations frequently.

Feral Ungulates (Goats)

Effects: Over-grazing and trampling results in death of plants and prevents regeneration.

Control: Perimeter fence for exclusion or individual tree cages coupled with population control by local hunters.

Rats

Effects: Eat uhiuhi seeds and gnaw the bark increasing the tree's susceptibility to pathogens.

Control: Rodenticide bait stations applied in a grid spacing of 25m



Fencing: The fence is essential to protect the habitat from feral ungulate damage. Installation of the 3 mile fence required significant financial and staff resources and took two years to complete. Cost-share funding was secured from multiple partners, including the Forest Stewardship Program (FSP) and the USDA-Natural Resource Conservation Service (NRCS). Jen made the decision early on to not bulldoze the perimeter line to preserve the natural rock and topography. If she were to do it again, she would have bulldozed the fence line to allow for easier construction, maintenance, and monitoring. Jen suggests walking the entire fence line at least twice a year to monitor for breaches, vandalism, and other needed repairs.

Firebreaks: Wildfire is one of the biggest threats to the community of Waikoloa. The management plan called for 100-130 foot fire breaks. However, Jen found these breaks were too wide to control regularly with such a small staff and reduced them to 85 feet targeting larger buffers in areas of highest priority. The first priority for the management team was to establish a perimeter firebreak around the three mile fence line. Next, the team reduced the fountain grass fuel load to a 50-foot radius around trunks of each mature tree. Fountain grass was killed using glyphosate herbicide applied via backpack sprayer.

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Education and Community Outreach: Volunteer workdays have built a network of support through schools, community groups, civic clubs, and local businesses. Jen believes the connections she has made with other dry forest projects and the networking within the community is key to success. “Reforestation is hard, you have to network with other people.”



Wiliwili Festival: A celebration of the native dryland forest and the wiliwili flowering season is now held every year in Waikoloa Village. The festival offers educational workshops, speakers, tours, native plant sales, keiki activities, silent auction, live music, and food. Almost 2,000 people participated in the 2017 festival.



Waikoloa Future Foresters: 20-30 students meet onsite every other Saturday to explore and learn about Waikoloa. The Future Foresters gives children the opportunity to become stewards of their environment as they learn to germinate, plant, and nurture native and endangered tree species.



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