FOREST STEWARDSHIP PROGRAM

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'a 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 Beverley 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.

HAWAIʻI FOREST STEWARDSHIP PROGRAM

The Hawaiʻi Forest Stewardship Program provides technical advice and financial assistance on a cost-share basis to promote the stewardship, enhancement, conservation and restoration of Hawaiʻi'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.

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.

Wiliwili flower

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 5-10,000 seeds per acre in conjunction with planting and as a stand alone practice. 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: Goodnature™ traps in high priority areas (uhihui trees).

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 partners, including the Forest Stewardship Program (FSP) and the USDA-Natural Resource Conservation Service (NRCS). WDFI did not bulldoze the fence line to preserve the natural rock and topography. However, depending on the site, bulldozing the fence line may allow for easier construction, maintenance, and monitoring. The fence line should be checked at least twice a year to monitor for breaches, vandalism, and other needed repairs.
Firebreaks: Wildfire is one of the biggest threats to the Waikoloa community. Fuel breaks are expensive to maintain but are essential in fire-prone areas. WDFI maintains fuel-breaks of 85 feet because this size was effective in slowing and diverting a fire in 2018. Larger buffers are maintained in areas of highest priority. The management team established and maintains a perimeter firebreak around the three mile fence line. The team also reduced the fountain grass fuel load to a 50-foot radius around trunks of each mature tree. Fire breaks are maintained by killing fountain grass using Imazapyr herbicide applied via boom sprayer on an ATV,wand sprayer from a truck and backpack sprayers.

Waikoloa Dry Forest Initiative

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."**

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.

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.

The Department of Land and Natural Resources
Division of Forestry and Wildlife (DOFAW)
1151 Punchbowl Street Rm 325
Honolulu, Hawai'i 96813
(808) 587-0160

Cooperative Resource Management Forester
http://dlnr.hawaii.gov/forestry/lap/fsp/

DOFAW IS AN EQUAL OPPORTUNITY PROVIDER