



Native Hawaiian Plant Society

Nanea Nā Pua O Ka 'Āina Aloha

NHPS Newsletter

February 2021

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Hybrid Ecosystems as a Model for Restoration **By Dr. Rebecca Ostertag, Professor, Biology; Associate Program Chair, M.S. in Tropical Conservation Biology and Environmental Science**

Loosely translated, 'Liko Nā Pilina' means "Budding (or growing) new partnerships (or relationships)." We chose this name because our project represents the concept of hybrid ecosystems. In Hawai'i, a hybrid ecosystem represents a compromise between an all native-dominated ecosystem and a novel ecosystem, in which the mix of species is entirely new and non-native. While the hybrid ecosystem concept is not appropriate everywhere, our past research made us realize it can be the right management approach for degraded Hawaiian forests with some native species left, but where the invasion has already been substantial and where it will continue in the future due to its location (e.g., low elevation, near human settlement).

With initial funding from the Strategic Environmental Research and Develop Program with additional funding from the National Science Foundation and the Hawai'i Army National Guard, the 'Liko Nā Pilina project was born in late 2011 at the Keaukaha Military Reservation in Hilo. We were motivated by our past work in

lowland Hawaiian rainforests, as they experience low amounts of native species regeneration and exist only in remnant patches filled with highly invasive plant species. We used the ecological concept of functional traits to pick our species for the restoration. Functional traits are plant characteristics relating to growth, reproduction, and resource use, such as photosynthesis rate, seed size, and foliar nutrients. We worked with 21 species and developed four different experimental treatments—two of which had species similar in their functional traits (redundant) and two of which had species that were more different in their traits (complementary). To use a sports analogy, the redundant type of team has a bunch of good players but they are not diverse in their strategies, while the complementary team has species that use a diverse approach to play the game. In the language of experimental design, the team is a "treatment." The mix of species are either: 1) native or 2) non-native and non-invasive including noni, kamani, mountain apple, as well as mango and avocado. Our experiment is to determine which treatment does best, and under what environmental circumstances.

Why create these hybrid ecosystems when they never existed before in Hawai'i? One of our goals is to build more invasion-resistant forests—and the idea is that higher functional diversity will help. Due to isolation, the native Hawaiian species have a limited set of functional traits, generally those that were selected for by the long-distance journey to Hawai'i and can survive under harsh conditions. Unfortunately, many of Hawai'i's highly invasive species have a different suite of functional trait values and can readily outcompete the native species. Additionally, our goal is to create self-sustaining ecosystems with cultural value as well.



One of the experimental plots showing the creation of a hybrid forest about 5-yr after planting, including hapu'u and false kamani.

Continued on the next page

NHPS 2020 Service Trips

June 20th

Olinda Rare Plant Facility

Facility Director Anna Palomino was the leader of this service trip. Eleven participants spent most of the morning weeding invasive grasses between the a'ali'i (*Dodonaea viscosa*). A'ali'i alters the soil to make it more suitable for other native plants. Olopua (*Nestigis sandwicensis*) with ahinahina (*Artemisia mauiensis*) were planted in the cleared areas. We also gained some experience working with the "Root Slayer" a tool used for digging up plants with nasty tap roots and also cutting into hard soil with less effort. Anna gave us a tour of the greenhouse where she continues cultivation work with native species.



July 18th

Kauluwehi at University of Hawai'i Maui College

Led by NHPS Board Member Dustin Palos. Kauluwehi means a place for beautiful plants to thrive. This is an ethnobotanical rain garden exhibiting a variety of native species such as Kokio ke'oke'o, *Hibiscus arnottianus subsp. immaculatus*, endemic to Moloka'i, now cultivated on all the islands. One of our tasks involved removing 'uala (sweet potato) used as ground cover in order to plant more native plants. All the green debris is composted. In a different section of the garden, maia (bananas) were planted as part of the food crop. Dustin offers free and fee based workshops including edible landscaping and beginner gardening.



August 15th

Ha'ikū School

This trip, led by Project Leader Becky Lau, created a bare strip on both sides of the fence for the convenience of school staff who mow the grass on either side. Naio papa (*Myoporum sandwicense*) was also planted. Unfortunately we discovered the recently introduced pest of the nightshade family *Solanaceae* (tomato family), *Lema solani*. Refreshing fruit drinks were provided by Anna Mae Shishido.



October 17th

Maui Nui Botanical Garden

During this month's service trip, we weeded one of the planting mounds, then weeded potted plants to be given away during the Arbor Day give-away, and washed pots. Our work was supervised by Executive Director Tamara Sherill and Garden & Nursery Manager Chris d'Avella. Participants were provided with a delicious lunch from Ba-le sandwich shop, and a lau hala bracelet Tamara made! NHPS members also assisted MNBG at their socially distanced Arbor Day event on November 7! The event was a great success.



November 11th

Fleming Arboretum at Pu'u Mahoe

Our hosts were Catherine Davenport and David Moran. Members helped clear out the ubiquitous vine, glycine (*Neonotonia wightii*) which is a recently arrived pest in the Arboretum, though it's been a problem elsewhere on Maui for years. Participants planted endemic hame (*Antidesma pulvinatum*) trees and maua (*Xylosma hawaiiense*). Maua was formerly considered a member of the willow family, but is now classified in *Flaucortiaceae*. For a sweet treat after lunch, everyone enjoyed a refreshing purple cow ice cream dessert while admiring the lovely view from the family's cabin down to La Perouse Bay.



December 12th

Ha'ikū School

Becky Lau led a crew of 10 NHPS members. 'Aweoweo (*Chenopodium oahuense*), 'ohelo kai (*lyceum sandwicense*), 'ilima (*Sida fallax*), pa'u o Hi'iaka (*Jacquemontia sandwicensis*), mao (*Gossypium tomentosum*) were some of the native plants who found homes along the fence line. The plants were donated by the Maui Nui Botanical Garden. Chickens have been an issue so in order to prevent them from trampling on the young native plants, marking flags were placed along the area creating a whimsical display.



Ma'o Hau Hele (*Hibiscus brackenridgei*) Exclosure By Hank Oppenheimer, Project Leader

2020 was a challenging year in so many ways! Maui had a really long and severe drought, especially the leeward areas. COVID-19 has made things more complicated with social distancing protocols requiring folks to be in separate vehicles; not easy when a 4-WD is needed.



The next generation of Ma'o Hau Hele

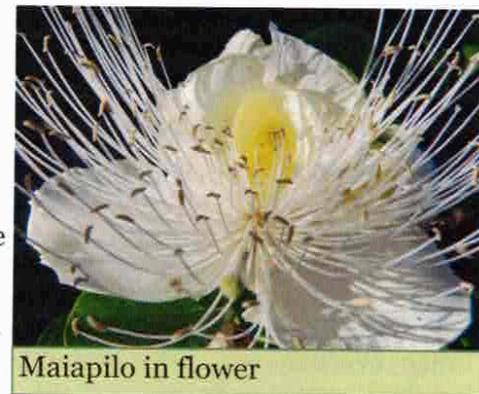
Last years' fires in the old sugar cane fields of central Maui forced many feral deer and pigs into new places, and some moved into the area around the exclosure. The Plant Extinction Prevention Program had some material left over from another fence project, and with permission from the landowner, we retrofitted the existing fence to exclude deer, which could easily jump over the fence since it was constructed to keep only cattle, and then goats out. Working with the Dept. of Land & Natural Resources, Division of Forestry & Wildlife, Native Ecosystems & Management staff we carried almost 100 ten foot long T-posts and a half dozen rolls of plastic mesh, plus miscellaneous tools and material up to the exclosure and installed it. We also made some of the existing tie-backs more secure; this hadn't been done since the early 1990's so it was due for some maintenance. While the surrounding area looks overgrazed by deer, no animals have gotten inside the fence. We also did a lot of weed work, mostly had pulling lions ear (*Leonotus nepetifolia*) and glycine (*Neonotonia wightii*), as well as digging out clumps of Guinea grass (*Urochloa maxima*). The silver lining is there is not much surrounding understory vegetation to carry a fire, but let's keep our fingers crossed we don't test that theory!

The Ma'o Hau Hele themselves looked a bit drought stressed, with a few old plants dying, but there is a new generation underneath waiting for winter rains, which seems to have begun. Other rare plants also affected by the dry conditions, like the Endangered *Schiedea salicaria*, and *Achyranthes splendens*, were holding their own, also waiting for life-giving rain.

Mahalo Nui to NEPM staff Kanoa Severson, Molly Wirth, and Iokepa Dela Cruz; Keali'i Kaaikala from KUPU/ Hawaiian Invertebrate Program; and of course, landowner Duane Ting of Flyin' Hawaiian Ziplines. Hopefully we can resume our normal volunteer service trips in 2021, as vaccines for the coronavirus are developed and become available and we can work closely together again- there will lots of work to do!

'Awikiwiki (*Canavalia pubescens*) Exclosure By Hank Oppenheimer, Project Leader

Our annual trip to the 'awikiwiki exclosure had only a small handful of participants, but thankfully there weren't many weeds to deal with. I guess that means we've successfully knocked the seed bank down of weeds like koa haole, and Natal Redtop grass, and new seeds rarely get blown (or flown- by birds) in. The indigenous koali 'awa (*Ipomoea indica*) is an issue since it wants to smother *everything* in sight, but it is an excellent ground cover and helps keep weeds out. We have to be careful and surgical in its control. The exclosure looks good after the last retrofit, although some of the metal rings that hold up the new plastic mesh need to be replaced with plastic zip-ties. No sign of goats or deer inside! The bad news is the larger, old vines have passed away; the good news is there is a whole new generation of seedlings to take their place. That is exactly what this species' strategy is. There are also many maiapilo seedlings (*Capparis sandwichiana*) as well as mature flowering & fruiting shrubs. Mahalo to volunteers Becky & Diana, and especially to landowner 'Ulupalakua ranch for continuing access.



Maiapilo in flower

Please visit us at NHPS.smugmug.com for additional photos of our accomplishments this year!

A Friendly Reminder: Many of these locations that have rare native plants, we feel are a privilege to visit. In order to minimize any impacts these areas, please make sure your footwear and gear are clear of weed, seeds and pests. To protect these locations, please disable the GPS on your camera (this goes for cell phones as well – enabling airplane mode tends to work best). The background in images should also not reveal the location. **Mahalo!**☺

President’s Message

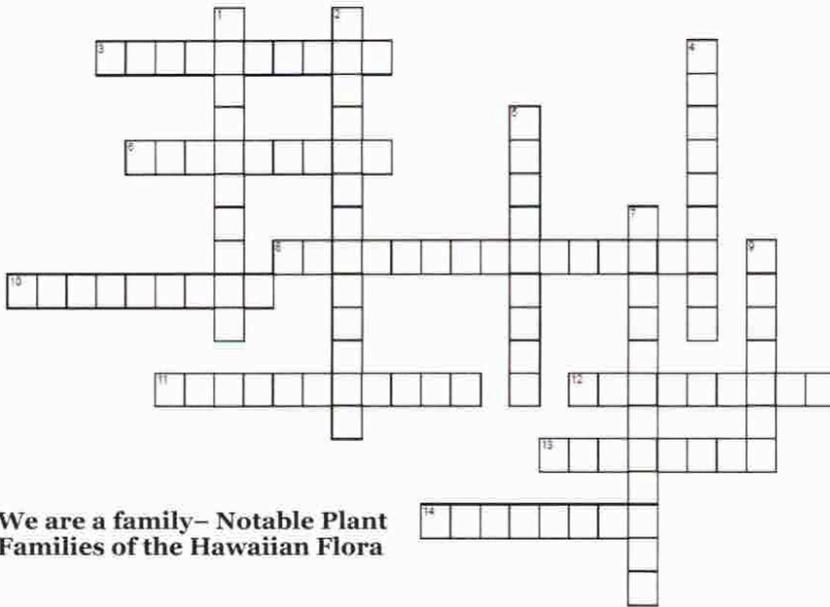
The COVID -19 pandemic has turned our lives upside down. Though unable to meet for some of our normal programs, we maintained our mission to promote Native Hawaiian Plants in Hawai’i. Irene Newhouse continued to organize monthly service trips. Becky Lau led restoration work at Kanahā Pond Wildlife Preserve and native landscaping at Hai’kū Elementary School. Dustin Palos started a new plant project to grow native plants and food at UH Maui College and Hank Oppenheimer continued his work to protect endangered native plants at the Ma’o Hau Hele and ‘Awikiwiki exclosures. Lucky for Maui, Hank also helped to discover (with other members of the Plant Extinction Prevention Program) a lovely, new native flower on Mauna Kahalawai, *Cyanea heluensis*! We truly appreciate everyone’s continued support and hard work during this especially hard year. Everyone willing to work wearing a facemask is welcome!

Please stay safe and thank you for making Maui an even better place to live.

Martha E. Martin, President Native Hawaiian Plant Society



Plant Puzzles by Chuck Chimera



We are a family– Notable Plant Families of the Hawaiian Flora

ACROSS

- 3** This largest of all plant families is instantly recognizable for its composite flower heads and one-seeded achene fruits. A particularly charismatic species growing in the house of the sun flowers once in its life before dying.
- 6** Members of this monocot family, swaying in the breeze, are an iconic part of tropical beaches. In Hawai’i, fans of this family often grow one of the 22 species in the only native genus.
- 8** Hawaiian ecosystems are cursed by at least 17 naturalized species of this largely tropical family with no native Hawaiian species.
- 10** A plant family renowned for its aromatic culinary herbs, native Hawaiian species are odorless and would be a lame addition to most recipes.
- 11** This second (or first depending on who’s counting) largest plant family is popular for the diversity of striking, colorful flowers among its 28,000 or so species, yet includes only three native

Hawaiian representatives.

- 12** This dicot family includes important food and timber species, as well as Hawai’i’s most important native forest tree, now threatened by a serious pathogenic disease resulting in the rapid death after wounding and infection.
- 13** The third largest plant family in the world, notable for its nitrogen fixation. Fabulous native species include an important forest tree, a dry forest tree used for surfboards, and an endemic genus named after a Hawaiian deity.
- 14** Sailors in the 1800s would rue the day they ran out of the vitamin C-rich fruit of this family. Native members include about 60 native taxa, including a tree with cube-shaped, anise-scented fruits, which are strung in leis.

DOWN

- 1** Members of this family are notorious for their stinging hairs which can really (h)urt. Most Hawaiian species lack stinging hairs, and are valued for their use as fiber, tea, or a host plant for Kamehameha butterflies.
- 2** This striking family, recognized by the curved flowers that match the shape of honeycreeper bills, has the most native species in Hawai’i. Unfortunately, many have gone extinct, or are so rare that it may require backcountry camping to see them in person.
- 4** A dicot family with important food, fiber, and ornamental species, including two endemic genera, and Hawaii’s state flower.
- 5** A dicot plant family including native herbs, shrubs, and trees, as well as an economically important crop whose beans are roasted for a hot morning beverage some consider more valuable than rubies.
- 7** Fans of Swiss naturalist and humanist Conrad Gessner (and who isn’t) will recognize this family for the genus with the second most native species in the Hawaiian flora.
- 9** The third or fourth largest family of flowering plants. Species include staples of the world’s food supply, an important plant for roof thatching in Hawai’i, but NOT the kind one might smoke medicinally or recreationally.

Answer on page 7

In Memoriam of Martha Vockrodt Moran

I first met Martha only perhaps two years after meeting, interacting and knowing David Moran with my young family in 1987 in Olinda. They were almost our nearest neighbors in those years in the small top of Olinda Road community. Martha and her doggies were steadfast friends of my 3 and five year-old son and daughter. A friend of all birds and all plants cemented our feelings to Martha too.

Oh my. Difficult to do her justice. She wrote amazingly herself about what she found life to be...but let me mention some things.

What do I associate with Martha:

Definitely flowers of every kind. Every color and no season without abundance.

Also fruits of every kind, shared from the Fleming arboretum, from West Mau'i, and allover, from wherever and to whomever she went, Martha always shared. Always served up overabundant and graciously at our house. Often they would simply appear without word or warning on our garage table or floor. Cherimoya, lilikoi, citrus, avocados, and so on. At the Holidays miraculously beautiful wreathes would be placed among the fruits and the best Guava Jam anybody could dream of. We were in awe often.

All this is to say I remember her best I think in scents of plants, bundles of plants, beautiful masterfully put together bouquets.

PLANT, PLANTS, PLANTS and D.T. Fleming Arboretum – mostly Hawaiian native species, often very rare, or even rarest of rare plants – Loulu, 'alani hibiscus, ko'oloa-ula, kokio and so much more. The care Martha had – one of her goals – was to let people see what she and Fleming Arboretum had to share to the world with its treasures. This involved volunteers, volunteers, volunteers such as NHPS, scouts of all kinds and ages, from youngest to Eagle scout applicants, cowboys on horses at the Fleming Arboretum to get dollars for St. Jude's and still have fun and educate about her arboretum passions. It was also hula halau with Kumu Mistress Gordean Baily and haumana of Wehi Wehi Lei Lehua chanting while seated on the slopes of the arboretum, bringing the living old ways into Martha and our presences.

Martha organized a formal Friends of D.T. Fleming Arboretum Board which met 2002-2003. She became talented at accessing diverse grant monies, and other support for the arboretum under her full control. It has been a great honor to help Martha see her vision, and future for the arboretum for so many years. Now she has transitioned away I can still know she is there in the winds, the rustling leaves of the Mother 'alani, or loulu trees, under the mists that cradle Pu'u Mahoe.

I observed for decades now, Martha's earnest and ongoing attempts to pursue globally important, place based biodiversity conservation at Fleming Arboretum from a place of love, and as much science as she could, for the place and the plants present inside the crater. Continuing with that effort and vision the Board continues to assess and help, while the mechanics of the arboretum falls to the capable, and willing husband David as the new era is unfolding at Pu'u Mahoe.

OF COURSE before ending I see and hear the ever present small dog spirits that always surrounded Martha and David. Small, often previously injured and delicate needing her to carry them, or energetic little sprites like Maia or Rocky ... that continues too.

Good bye Martha – see you in the arboretum. Do say hello!

By Dr. Fern P. Duvall II



In Memoriam of Ted Kawamura

Ted Kawamura grew up in Lahaina and was a much beloved teacher at Lahainaluna. In the sixties and seventies, Ted led a lobbying effort that resulted in the construction of an agricultural instructional facility at Lahainaluna. The partnerships he built led to increased funding for every ag. program in the state. In the eighties and nineties, he was a founding driver in crafting the Vocational-Technical and Practical Arts Education Strategic and Operational Plans, which included Native Hawaiian agriculture as a curriculum focus. Ted was also a scientist who applied his knowledge base to managing and expanding ventures in floriculture, animal husbandry and aquaculture. We lost a Titan and a scholar with the heart of a warrior, but his legacy still supports and drives agricultural education and the Hawai'i FFA. He made us all better. Respectfully submitted on behalf of past, present and future generations or the Hawai'i FFA, Ken Kahihara, Leslie Sutherland Hiraga, Keith Ideoka, Mats Okamoto, David Fuertes and Jeff Yamaguchi



NHPS Events & Announcements

NHPS Regular Service Trips

Our weekly native plant projects at Kanahā Pond and the Hai'ikū Elementary School only missed trips in April and May! The native plant garden in the courtyard of the Kahului Public Library has been closed since Aug. 9th, due building renovation work. When the branch opens again, we can maintain the native plant garden.

Kanahā Pond By Becky Lau, NHPS Project Leader

Kanahā Pond was designated as a state sanctuary in 1951 and as a National Natural Landmark in 1971. Golden Crown-Beard (*Verbesina encelioides*), a very aggressive annual herb and Bitter Melon (*Momordica charantia*), a fast growing vine, are the biggest issues in the area we are working to restore. However, due to the drier conditions over the summer, the native plants continue to thrive whereas the invasive's weren't as prevalent. This makes our work a little easier. Restoring the fence is a priority to keep out cats and deer. Bring your camera as you may encounter one of the 3 endangered species of native waterfowl; the Hawaiian Coot, the Hawaiian Duck and the Hawaiian Stilt.



Ha'ikū School Project Update By Becky Lau, NHPS Project Leader 808-575-2369 Mondays 3:30-5:30

Over 25 Species of native Hawaiian plants have been planted at the school. We continue to reestablish the fence line with ma'o (*Gossypium tomentosum*), 'ilima papa (*Sida fallax*), aweoweo (*Chenopodium oahuense*), nehe (*Lipochaetna sp.*) and naio papa (*Myosporum sandwichense*). Many of these plants were donated by the Maui Nui Botanical Garden. Chickens remain and issue.



Annual NHPS Membership Meeting & Guest Speaker

February 26th (Friday) 2021 at 7:00 pm
Speaker: Kerri Fay, The Nature Conservancy
Location: via Zoom

NHPS Guest Speaker

We will have our traditional February speaker on Friday February 26, 2021. Kerri Fay from The Nature Conservancy will speak on controlling Himalayan ginger at Waikamoi Preserve at 7PM. Due to covid restrictions, her talk will be virtual via the Zoom application. Participation is, as always, free, but users will need to obtain a registration number by emailing the NHPS Secretary, Irene Newhouse, at einew@hotmail.com. You will receive your registration number as well as detailed instructions for connecting via computer or smart phone.

Mahalo Nui Loa to the following donors for their generous contributions in 2020

Individual Donors

- Harold Appleton
- Debbie Brown
- Martha Martin
- Angela Kepler



Corporate, Government & Exclosure Partners

- Maui County Parks and Recreation
- Maui Nui Botanical Gardens
- Ha'ikū Elementary School
- Kahului Public Library
- Duane Ting and family and Flyin'
- Hawaiian Zipline
- Hawai'i State Department of Land and Natural Resources
- 'Ulupalakua Ranch

Thank you to our masked up 2020 Volunteers

George and Janet Allan, Cynthia Canham, Francis Cane, Diane Carr, Nikki Clark, Niissa Clark, Cathy Davenport, Bran Deham, Iokepa Dela Cruz, James Donaldson, Martin Frye, Keali'i Kaaiakala, Becky Lau, Christina Levang, Ua Maki, Martha Martin, Karen Moku, Irene Newhouse, Dustin Palor, Katie Romanchuk, Kanoa Severson, Anna Mac Shishido, Johann Josef Smith, Bella Sparkman, Duane Sparkman, Andrea Strauchler, Joy Tamayose, Dray and Julia Wilson, and Molly Wirth



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Save the Date for our Annual Native Hawaiian Plant Society Membership Meeting & Guest Speaker



February 26th (Friday) 2021 at 7:00 pm

Speaker: Kerri Fay, The Nature Conservancy

Location: via Zoom

Topic: Controlling Himalayan Ginger

DON'T FORGET TO RENEW!

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