

KAUAI FOREST BIRD RECOVERY PROJECT



2018

NEWSLETTER

FEMMES FATALES

Rats are large, vile, and vicious killers of our beloved birds, but there is another killer out there that really sucks.

You are familiar with them,
they lurk around,

Ruin your backyard,
and even live in town.

They soar through the night
hardly making a sound,

Often only noticed
once they touch down.

Their bite can hurt,
maybe a slight sting.

To humans an annoyance,
but to forest birds death they bring.

Once bitten they may no longer sing,
Unless we are the ones

to take them under our wing.



KFBRP field crew 2018 - Left to right: Chris Taft, Katie Temple, Emma Cox, Justin Hite, Tyler Winter, Bryn Webber, Doug Marcum

2018 Field Season Recap

This season marked a successful conclusion of our four-year egg collection effort to build a conservation breeding program in partnership with San Diego Zoo Global, DOFAW, and USFWS. This year, we added a twist: to better locate ‘Akeke’e nests and understand their breeding behavior, we tagged several with radio transmitters, and followed them around the forest. On the Birds, Not Rats! front, we deployed 124 more rat traps at a different field site, using our recently-acquired LiDAR imagery to plan trap locations, for a total of 425 traps protecting birds from predation on 525 acres. We also used LiDAR for estimating and exploring bird habitat, leading us to a new important pocket (“UUK”) of all three endangered forest bird species. Details of all these exciting projects are to be found in this newsletter!

Another highlight was the Hawaiian Forest Bird Survey that we conduct every 5 to 6 years. The results, with population estimates, will hopefully be published soon, so be on the lookout! We had a great turnout of volunteers, thus we were able to survey all the core forest bird habitat with two + rounds of point counts, and many periphery transects too. We added Hanakoa Valley to our area of transects and now have a more inclusive range of habitat on the island.

Femmes Fatales continued...

Mosquitos are threatening our forest birds. There are five species on the island, none of which are native, but only one of the species, *Culex quinquefasciatus*, carries avian malaria. Only females transmit the disease, because females need a blood meal before mating and laying their eggs. Other than that blood meal, mosquitos are nectarivores (eat nectar)!

Malaria is caused by a small protozoan that invades blood cells. The parasite will continue to attack, live, and accumulate in a native forest bird's body until the bird dies, often of malaria-related illness. In comparison, non-native birds evolved resistance to malaria prior to being released in Hawai'i by developing anti-bodies that can fight and flush out the parasite.

When we mist net, or capture, birds we often take blood samples. If the bird has malaria, the DNA of the malaria will be present in the bird's blood, and we can test for it. Rarely do we catch an I'iwi, 'Akikiki, or 'Akeke'e with malaria. At first you may think that is a good thing, but if these birds contract malaria, they will presumably die before we can catch them, hence the absence of birds that test positive. On Kaua'i, the forest birds that seem to be showing some resistance to avian malaria are the Puaiohi, Kaua'i 'Elepaio and 'Apapane,

which is bitter sweet because as much as we want our birds to survive, they are now local reservoirs of disease. The other native forest bird species (all honeycreepers) are very susceptible to malaria, and increased mosquito presence has caused their populations to decline rapidly.

For more than 20 years, mosquito research has been conducted in the Alaka'i Plateau, monitoring streams and other habitat for adult mosquitos, larvae, and malaria presence in birds. The Alaka'i's high elevation use to be a mosquito-free haven for birds, because the cool temperatures and massive amounts of rain interrupted *Culex* egg and larval development. However, due to climate change, more adult *Aedes* and *Culex* mosquitoies have been found in the plateau. Warmer temperatures and decreased fall flood events lead to more stagnant bodies of water that are suitable breeding habitat for mosquitos.



Mosquito feeds on blood from 'Apapane. Photo by Jack Jeffrey

SWAT A SKEETER

We may not be able to slow climate change in time to save the birds, but there is new technology that can be used to stop the spread of avian malaria. *Wolbachia* is a naturally occurring bacteria in mosquitos and other insects that can be manipulated to create sterile males. In wild populations, male and female mosquitos have the same strain of *Wolbachia*, and they mate creating hundreds of eggs. However, if they carry different strains of *Wolbachia*, the female will not lay viable eggs. By introducing a different strain of *Wolbachia* to lab-raised males that are released into the wild, we can significantly reduce the mosquito population within one generation. This technique has already been used in other parts of the United States to stop mosquitos spreading diseases that affect humans such as Dengue and Zika.

To implement the *Wolbachia* strategy we need to continue mosquito research to determine the source and breeding locations of *Culex* mosquitos. In recent years we have consistently found high numbers of adults, but not as many larvae. So that presents a conundrum: where are all the adult *Culex* coming from? Are they traveling up into the Alaka'i from lower elevations, or breeding and hatching in the Alaka'i? Keep in mind that finding mosquito larvae in Alaka'i is harder than finding a needle in a hay stack: we have to find and survey stagnant bodies of water in a rainforest on top of a mountain that is filled with streams, bogs, and pig wallows.

Currently, our past Kupu intern, Bryn Webber, is leading charge on mosquito research in the Alaka'i working for USGS. Although USGS sampling ends in February 2019, KFBPR is hiring a new mosquito research technician to continue monitoring adult and larval presence throughout 2019 with a grant from the Hawaii Invasive Species Committee. You can help fund this critically important mosquito research by supporting our campaign "**Songs Not Silence!**" <https://www.gofundme.com/Songs-Not-Silence>

Final Collection for Captivity

In our final year of the egg collection program, we focused on 'Akeke'e nests, as 'Akikiki were already well-represented in captivity. 'Akeke'e have been historically hard to follow, unlike the 'Akikiki pairs who forage and collect nest material near their territory. 'Akeke'e appear with the sound of a soft "sweet," and within a few flaps of their wings, disappear. The past three years of nest searching have yielded on average four 'Akeke'e nests, and 3 chicks in captivity. So this year we turned to technology – radio telemetry – to give us a hand. We caught eight 'Akeke'e this year, more than ever before! We placed radiotransmitters on five individuals, and observed their movements on the plateau, including a female foraging with her recent fledglings.

With this new focus on 'Akeke'e, the help of the transmitters, and the collective growing knowledge of our staff, we found nine nests and collected 13 eggs this year! At an 'Akeke'e nest at our new UUK site, we observed some odd behavior. In addition to the breeding pair, several other adults visited and tended the nest! Also at UUK, we heard a new 'Akeke'e song variant, and found several 'Akikiki pairs. We collected eggs from one 'Akikiki nest, hopefully expanding the genetic diversity of the conservation breeding flock. This gives us hope for more young 'Akikiki and 'Akeke'e to be discovered this coming year!



A female 'Akeke'e that was just banded

Over four years, we collected 63 eggs from 32 'Akikiki nests and 17 eggs from 10 'Akeke'e nests. 'Akikiki have really taken to captivity, and the conservation breeding flock now numbers 44 birds, two of which have started to have families of their own (see next page). Despite this year's field successes with 'Akeke'e, this species performs more like other small passerines in captivity, with approximately 62% survival of chicks. The 10 'Akeke'e in the conservation breeding flock provide an insurance policy against extinction of the species but are insufficient to maintain genetic diversity. Thus we are investigating other management options for this species.



One of the eight 'Akeke'e mist netted this year. Check out that crooked beak that they use to pry open buds when they forage!

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For more information about our projects, please contact us or visit us on the web.
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Our Nonprofit Partner:
Garden Island Research Conservation and Development

First 'Akikiki Hatch Gives Hope for the Future

You've heard about our egg collection effort for years now, but how are those eggs doing? They are no longer eggs, that's for sure. Bryce Masuda, who manages the San Diego Zoo Global's Hawai'i Endangered Bird Conservation Program, gives us an update on the 'Akikiki breeding program:

When a unique honeycreeper found only on Kaua'i is on the brink of extinction, what can be done to save it? Five years ago, we convened with bird conservationists from across Hawai'i and together decided that starting a conservation breeding program was an essential step in preventing the 'akikiki from disappearing forever.

This opportunity to help save a species was no easy task. After five years of many passionate and dedicated partners working together to overcome challenges, we have reached an exciting milestone in the recovery efforts for 'akikiki. For the first time ever, 'akikiki have successfully bred in captivity at our Maui Bird Conservation Center!

Both parents, a 3-year old male and a 2-year old female, were originally collected as eggs from the wild. Their offspring was parent-reared, raised completely by its mother in a natural environment at our Center with minimal human intervention.

Since 2015, our partnership has been collecting 'akikiki eggs from the Alaka'i Wilderness Reserve as part of an effort to save this species from extinction. After many painstaking hours of the Kauai Forest Bird Recovery Project team finding 'akikiki nests in the wet rain forest, we collected and brought eggs into human care to start a conservation breeding population. However, no one had any

previous experience with this species in an intensive care setting, so we had to develop new techniques "on the fly" working together with specialists in aviculture, husbandry, behavioral ecology, veterinary medicine, and wildlife diseases.

Today, 'akikiki in our conservation breeding program are starting to reach maturity and beginning to reproduce. This exciting milestone of 'akikiki breeding in captivity confirms that the many techniques we used to collect and incubate wild eggs, and hand-rear nestlings were indeed successful. We look forward to releasing this young bird and its future offspring back into the wild on Kaua'i, as soon as the threats in the wild are mitigated.

This milestone would not have been possible without a strong collaboration and lots of hard work by teams from the Kaua'i Forest Bird Recovery Project, State of Hawai'i Department of Land and Natural Resources Division of Forestry and Wildlife, U.S. Fish and Wildlife Service-Pacific Islands Fish and Wildlife Office, and San Diego Zoo Global. This effort has also been supported by the Mohamed Bin Zayed Species Conservation Fund, American Bird Conservancy, Smithsonian Conservation Biology Institute, Hawaiian Airlines, Kauai Realty, Bryan and Tanya Tanaka, and anonymous donors.

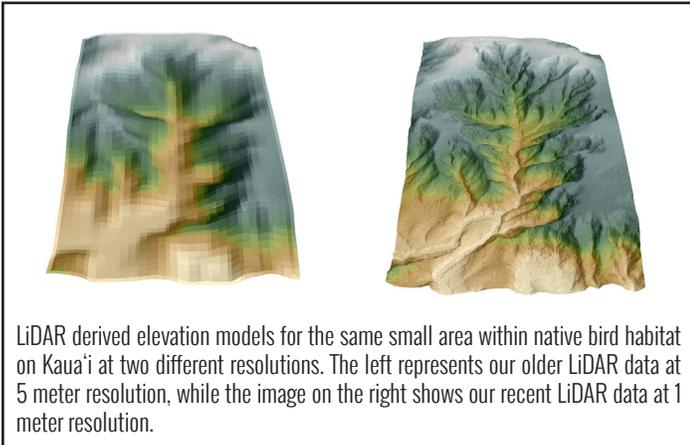


Wild eggs turned parents. The successful journey of 63 eggs, has led harvested eggs like these breeding successfully in captivity.

LiDAR Leads the Way

High resolution remote sensing is becoming a more common tool in conservation around the world, providing projects with extremely detailed structural data on management lands. In our last newsletter we mentioned acquiring high resolution LiDAR of the remaining habitat of Kaua'i's native forest birds, and the results were stunning. LiDAR or Light Detection and Ranging uses a combination of light reflection and radar to measure the earth's surface allowing users to derive values that represent elevation, vegetation structure, slope and more. We have been using nine environmental factors derived from this new high resolution LiDAR as inputs for a

predictive model of species occupancy across the Alaka'i Plateau. We are specifically looking at the endangered 'Akikiki and 'Akeke'e to better focus our management strategies to save these two important and threatened honeycreeper species. This field season we were able to explore a few "hot spots" not previously surveyed or visited with high predicted occupancy in order to ground-truth the accuracy of the models. We are currently incorporating these models and observation in a manuscript for publication with collaborators at UCLA and Cal Poly...stay tuned!



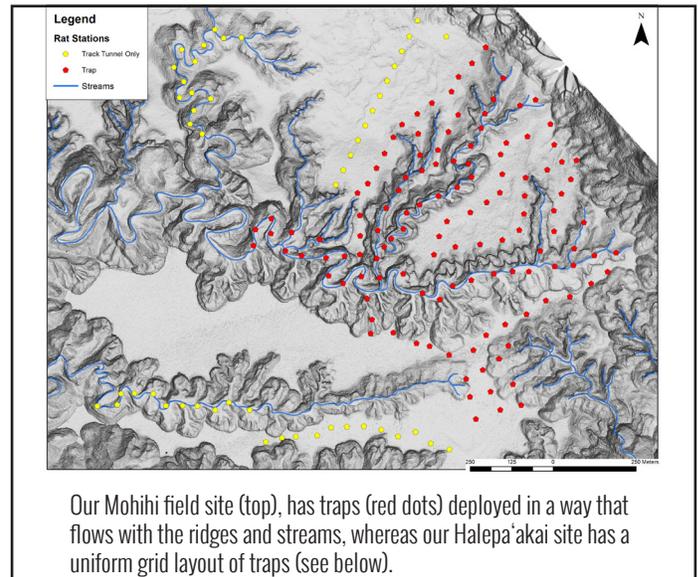
LiDAR derived elevation models for the same small area within native bird habitat on Kauai at two different resolutions. The left represents our older LiDAR data at 5 meter resolution, while the image on the right shows our recent LiDAR data at 1 meter resolution.

More Traps, Fewer Rats

Rat trapping sounds easy and finite, but our rat traps are located in one of the wettest places on earth. Some have been deployed in the Alaka'i for four years, during which time they have experienced the same amount of rain that has fallen on New York in the past 30 years. All that rain can really take a toll on our equipment. Thus crews maintain the traps at each site every three to four months to make sure they are working properly, hiking on average 10 km a day over ridges and down into valleys, carrying supplies needed to maintain the traps (see figure on right).

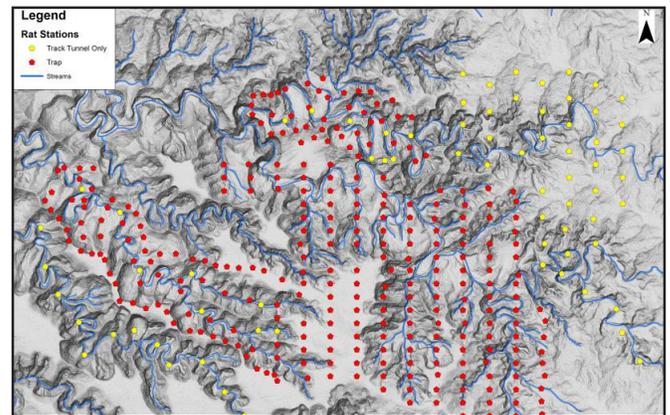
These are not your average kitchen mouse traps. These self-resetting Goodnature A24s use a small battering ram powered by CO2 to deliver a quick succinct blow to kill the rodents. The rodents are lured in by the non-toxic bait slowly released by canisters in the trap. Counters are also attached to the traps, to help us estimate how many rats are being killed in between rat trap checks.

While it is difficult for humans to traverse our field site, rats have no problem locating the delicious, fragrant, chocolate bait dripping from the automatic lures inside of an A24. Based on counters and corpses there were minimum 692 kills at our 302 traps between



Fall 2017 and July 2018 at Halaepa'akai. Since spring 2015 we have removed more than 2597 rodents! We also measure the presence of rats by placing ink plates in tunnels with a dollop of peanut butter in the middle to entice rodents to step in the ink and leave their tracks. Where there are traps, only 26% of tunnels have rodent tracks compared to 97% where there are no traps! In October, we set out 124 more A24 traps at our Mohihi field site covering approximately 160 acres.

We would not have been able to kill all these rats without you! Your donations via our Birds, Not Rats! T-shirt campaign helps buy lure and CO2. Mahalo!



Rat Funfact

You know that fresh, new plastic smell? Yeah, well rats are terrified of it. They are neophobes and are very cautious of new objects in their environment. The tunnels we use to house our ink plates to track abundance have to be significantly weathered and constant in their environment for our rat interactions to be consistent.

ROD: The Latest Bad Guy on the Block

by Kim Rodgers, Kaua'i ROD Outreach Specialist

In the Hawaiian culture, the saying “*I walea ka manu i ka ‘ula o ka lehua*” translates to “The bird is attracted by the redness of the lehua” and hints at the intimate connection between tree and bird.

The ‘ōhia lehua (*Metrosideros polymorpha*), is a flowering tree in the myrtle family and is endemic to Hawai‘i. As an early colonizer after a new lava flow, it’s known as a keystone species of the Hawaiian forest and is considered critical to the function of Hawaiian watersheds and the ecology of Hawai‘i. It produces a dizzying display of flowers, made up of a myriad of stamens that range in color from fiery red to bright yellow.

Unfortunately, a disease known as Rapid ‘Ōhi‘a Death (ROD) is killing the trees. First detected on Hawai‘i Island more than four years ago, it has since affected more than 135,000 acres of ‘ōhi‘a forest on the largest of Hawai‘i’s islands. Hundreds of thousands of trees have died.

Earlier this year, ROD was confirmed on Kaua‘i at Moloa‘a State Forest Reserve. In the last month, it has been reported in two additional locations on Kaua‘i—Halelea Moku and near the Lihue-Koloa Forest Reserve. This confirms ROD at three distinct locations--one at 600 feet, one at 1,000 feet, and another at 1,600 feet above sea level. These represent different forest types, including very disturbed and intact forests.

This is devastating news. However, conservationists are responding. On Kaua‘i, teams have conducted aerial drone flights and helicopter surveys using digital mobile sketch mapping and identified 22 areas on state and private lands with ‘ōhi‘a trees showing symptoms consistent with the disease. So far in 2018, 76 samples have been collected and submitted for lab testing. A total of 17 trees have tested positive for *Ceratocystis huliohia*, the slower moving ROD-causing species.

Scientists at the U.S. Department of Agriculture have identified two different species of fungi that cause ROD, *C. huliohia* and *C. lukuohia*. Both species are new to science. Scientists have also determined the disease enters the tree through open wounds (made by humans through clippings, trimming, weed whacking,



l'iwi perched among its main food source, 'ōhi'a - Photo by KFBRP staff

and stepping on tree roots; or other animals, such as rooting pigs; or broken branches caused by strong winds/storms). Once the fungal spores enter the trees, the disease advances by cutting off the tree’s flow of water. Thus, one way to help slow or prevent the spread of ROD is to avoid wounding ‘ōhi‘a.

How You Can Help Prevent the Spread of ROD

- 1) If you see ‘ōhi‘a with a limb or crown turning brown, take a picture, and contact KISC via email (saveohia@hawaii.edu) or phone (808-821-1490). Samples of the wood must be taken by trained technicians and tested in a laboratory to confirm the presence of the ROD fungi.
- 2) Avoid injuring ‘ōhi‘a. Wounds serve as entry points for the fungus and increase the odds that the tree will become infected and die from ROD. Avoid pruning and contact with heavy equipment wherever possible.
- 3) Clean gear and tools, including shoes and clothes, before and after entering the forest and areas where ‘ōhi‘a may be present. Brush all soil off tools and gear, then spray with 70% rubbing alcohol. Wash clothes with hot water and soap.
- 4) Wash your vehicle with a high-pressure hose or washer if you’ve been off-roading or have picked up mud from driving. Clean all soil off tires--including mountain bikes and motorcycles--and vehicle undercarriage.
- 5) Don’t move ‘ōhi‘a wood or ‘ōhi‘a parts, including adjacent soil. The disease can be spread to new areas by moving plants, plant parts, and wood from infected areas to non-infected areas.

100-Year Flood



In April this year Kaua'i was hit with historic amounts of rain, which caused massive land slides, and extreme flooding on the north shore. The roads and homes are still recovering from the damage. What was the storm like in one of the wettest places on earth? How did it affect the birds who were in the thick of breeding season? An excerpt from the notebook of field assistant Elizabeth Abraham explains:

Phew! What a Week. It started with a nest collection on Wednesday April 11th, and finished this with another collection on Wednesday, April

19th! Meanwhile, on April 14th, Kaua'i got slammed with over 49in of rain in a 24-hour period! We were on national news for what was a 100-year flood. Two staff members were riding out the weather in the core habitat where they were working on our rat grid and I was up at one of our ridge locations with a volunteer! We had hiked from a remote site to our ridge camp on Saturday just as the rain started. We flagged transects as we moved southeast along the plateau and got completely soaked. When we arrived at camp, it was only to discover that the weight of all the water had caused the tent to collapse and fill with water too! Good thing the down pour was so intense and there wasn't much else we could do, so we had plenty of time to repair the tent and bail it out. Once the tent was clean and we were dry, we rode out the storm playing cards and watching the light show outside. It was definitely a wet 24 hours, but I got to snap a pretty cool picture the next morning of all the water falls on the ridge across from camp.

We were successfully able to count our transects over the next two days and the nests we were monitoring weathered the storm perfectly! All of our nests were still active at our remote site when we returned and the collection on Wednesday, April 11th went beautifully. The weather was even the nicest I've seen it in a long time. Many mahalos to our helicopter crew for flying us out with eggs on Wednesday despite how busy everyone is with recovery and relief efforts on the North Shore of the Garden Island.

In the News

This year the New York Times Magazine featured us in an article that poses the question, "Should some species be allowed to die out?" It highlights our beloved 'Akikiki, which numbers fewer than 500 individuals left in the wild. Despite the grim title of the article, we are determined, and we refuse to give up on the 'Akikiki and the other forest bird species. We are thankful for the publicity that brought more widespread knowledge about the work we do for the birds. You can read the article here:

<https://www.nytimes.com/2018/03/13/magazine/should-some-species-be-allowed-to-die-out.html>



'Akikiki - Photo by Patrick Blake

Sharing about the Birds is Caring about the Birds!

We love to talk to people about birds! It is fun to share the beauty of Kaua'i's forest birds with our community! One comment that we often get is: "Oh, but I thought they were all extinct!" Luckily, they are NOT and this year, we had the opportunity to share this information at a few great outreach events on the other Hawaiian islands! One was the "Hawai'i Island Festival of Birds", a celebration on the Big Island of Hawai'i's birds and all the conservation projects working hard to make sure we don't lose any more species. We were also invited to participate in the "Symphony of the Hawaiian Birds" on O'ahu, a partnership of the University of Hawai'i, the Hawai'i Symphony Orchestra, and the Bishop Museum. This innovative collaboration uses music and art to educate the public on the challenges Hawai'i's birds are facing. Our goal is to bring this concert to Kaua'i soon, so stay tuned!

Of course, we also participated in outreach events here on Kaua'i. We had a fun day in Koke'e with the 5th grade students from the Navy Hale Keiki School on O'ahu. They came over on a field trip and wanted to learn all about Kaua'i's birds! We had a blast at the Girl Scouts STEM event, teaching over 60 girl scouts how conservationists, biologists, and engineers worked together to harvest two little eggs from a nest in a 40-foot tree. We also participated in the Island School Community Fair and the Ma Uka a i Kai Lā 'Ohana, a family day in Koke'e teaching kids with Hawaiian ancestry about protecting and conserving our natural resources. Another one of our well-attended outreach events this year was Dr. Lisa "Cali" Crampton's talk at the Hawaii Alliance For Science lecture series "Science at your Library". Her talk entitled "Saving the Jewels of the Forest" drew a big crowd to the Lihue Library; if you missed it, you can still watch it here <http://www.hawaiiallianceforscience.com/science-your-library.html>. If you are interested in having us at your school or organization for a talk in 2019, please don't hesitate to contact us. We look forward to sharing our love for Kaua'i's birds with you!



DONATE YOUR TIME

Our project utilizes a lot of stellar volunteers to assist us in the field and in the office. We would not be able to achieve everything we do without them! Mahalo! If you would like to volunteer with us, check out our website's volunteer tab, and contact us with a brief description of how you would like to get involved and your resume for field work.



A great way to help is to get out there and go birding! We encourage you to let us know of any sightings of native forest birds on our website kuaiforestbirds.org/get-involved. If hiking with a GPS, please record the exact location of the bird, or if on any of the trails in Koke'e, record the nearest mile marker. We're even interested in low elevation locations of common birds like 'Apapane, 'Amakihi, and 'Elepaio, so if you're on any of the west side trails, like the Nualolo trail, let us know if you see those species.

If you are unable to be a hands-on volunteer, support us by following us on social media, and share with your friends! We are on Instagram, Facebook, and Twitter! We also post blogs regularly on our website at kuaiforestbirds.org, so you can stay in the know about our latest work from our staff's point of view.



Join KFBRP for the Waimea Christmas Bird Count!

Meet in the meadow at Koke'e Lodge at 8:30am to be guided on trails with our staff and observe a banding demonstration in the meadow!

OR

Meet Bryn at Kawai'ele at 9am to count water birds!

Email Abby at intern@kuaiforestbirds.org for additional information

Moving Forward

2019 will be another exciting year. We will continue our rat trapping efforts maintaining all 425 traps. Since we will not be collecting eggs this year, we are excited to monitor and observe 'Akikiki pairs forming and fledgling new chicks this spring. With the success of the 'Akeke'e telemetry in 2018, we will be putting radio transmitters to other species of birds to see what we can learn about their behaviors and movements around the plateau, using automated telemetry towers to monitor their movements. Stay tuned for any exciting discoveries we make along the way!



New Faces

Erica Gallerani

Erica Gallerani inherited her fondness for birds from her Dad and discovered her love of the outdoors in the Blue Ridge Mountains of North Carolina. Determined to pursue a career in conservation she majored in Environmental Sciences at UNC-Chapel Hill where she developed her passion for remote sensing and GIS. Picking up a Geography minor, Erica also worked on her skills in coding and data management. After graduating in 2017 she worked as an aquatic ecology intern at Everglades National Park solidifying her focus in tropical ecology. Eager to continue practicing her computer skills she joined the Kaua'i Forest Bird Recovery Project as the GIS and Database Management Assistant. She is thrilled to be back on an island full of interesting endemics, similar to her study abroad site of the Galapagos, and to be working with high resolution remotely sensed data!



Abigail Kreuser

Abigail Kreuser is a recent graduate of Florida State University's Biology program. She is this year's intern for the Kupu-Americorps Conservation Leadership Development Program. Her first introduction into the bird world was participating in undergraduate research projects on cooperative breeding of Brown-headed Nuthatch at Tall Timbers Research Station in Florida. Her projects looked at task partitioning of removing fecal sacs in pairs and groups, and comparing the differences in chick growth. Before moving to Kaua'i, Abby worked as a Black Bear Management intern at the Florida Fish and Wildlife Conservation Commission. There she engaged the community at outreach events and authored an addition to the Black Bear Management Plan. Through experience, Abby has learned that the conservation and management of wildlife relies critically on people. Abby is stoked to be a part of the project and assist with the research and conservation of Kaua'i's forest birds.

