

State of Hawai'i
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Forestry and Wildlife
Honolulu, Hawaii 96813

November 12, 2021

Chairperson and Members
Board of Land and Natural Resources
State of Hawai'i
Honolulu, Hawai'i

SUBJECT: REQUEST AND JUSTIFICATION FOR COLLECTING UP TO FIVE ADULT
AND SUB-ADULT 'AKIKIKI FROM THE WILD ON THE ALAKA'I PLATEAU,
KAUA'I FOR CAPTIVITY

SUMMARY

The Kauai Forest Bird Working Group recommends collection of up to 5 remaining 'akikiki from the Halehaha Unit as soon as possible (ideally fall 2021-winter 2022) following the Wild Akikiki Collection Plan (Attachment A). These birds will be added to the conservation breeding flock at Maui Bird Conservation Center. The ultimate disposition of collected 'akikiki is a return to the wild once threats are managed.

BACKGROUND

Current status of captive flock including breeding efforts

The captive flock was established by collection of eggs from the wild and hand rearing from 2015 to 2018. As of August 2021, the captive flock consists of 42 'akikiki (15 breeding pairs). Of these, 36 birds are founders (i.e., hatched from eggs collected in the wild). These birds therefore are 4-7 years old and may be reaching the end of their breeding lifespan. The remainder of the birds are offspring of founders, produced from captive breeding since 2016.

Current status of wild population

At Halehaha/Halepa'akai, the number of 'akikiki territories has declined from 35 in 2015 to three in 2021, only one of which was held by a pair. Only two offspring were produced in 2021. Observations in September 2021 suggest that currently only five 'akikiki occupy this unit, including a family group (one male, one female, and the two 2021 offspring) and one lone male. Meanwhile mosquitoes at this site have increased in numbers and duration of occurrence and malaria prevalence has increased.

DISCUSSION

The Working Group reviewed data on 'akikiki (wild and captive) and mosquito trends over several meetings between April and August 2021. These data suggest that 'akikiki may no longer occur at Halehaha as early as spring 2022. The group contends that we should rescue the remaining five 'akikiki from this site before they become extirpated from this area.

Birds rescued from Halehaha and brought to facilities at the San Diego Zoo Wildlife Alliance on Maui can also contribute to the genetic and behavioral diversity of the extant captive flock, "jump starting" or reinvigorating the breeding program.

At other sites north of Koaie Stream (Mohihi and Upper Kawaikoi), the small number of 'akikiki territories appears to be more stable (at about one dozen territories) and mosquitoes are rarely detected. However, malaria prevalence is increasing. These data suggest that 'akikiki may persist for a longer period of time at Mohihi and Upper Kawaikoi. The group recommends monitoring 'akikiki trends at these sites.

The Working Group understands that there are risks to removing an endemic species from its native ecosystem. Nonetheless, the Working Group is comfortable with the risk involved with this plan, since doing nothing would lead to the extirpation of 'akikiki at the Halehaha site.

San Diego Zoo Wildlife Alliance and Kauai Forest Bird Recovery Project have prepared a plan (Attachment A) for the capture of these individuals from Halehaha and transport to the conservation center. We propose to capture and hold birds at the site and transport them directly to the conservation center on Maui via helicopter.

Our current USFWS recovery permit allows for the collection of five individuals per calendar year. Collection of additional 'akikiki adults from other Alaka'i sites is not currently proposed but will be re-evaluated as new information becomes available (e.g., status of 'akikiki and mosquitoes at other sites, collection efforts from Halepa'akai, drafting and reviewing of other statewide planning documents for prevention of honeycreeper extinction). To that end, the working group recommends that the USFWS recovery permit be amended to allow eventual collection of more adult 'akikiki per year.

RECOMMENDATION:

That the Board:

1. Approve Kauai Forest Bird Recovery Project and San Diego Zoo Wildlife Alliance to collect up to five adult/sub-adult 'akikiki from Halehaha as soon as possible and add them to the captive flock as outlined in our Recovery Permit, following the Wild Akikiki Collection Plan.

Respectfully submitted,



David G. Smith, Administrator
Division of Forestry and Wildlife

APPROVED FOR SUBMITTAL:



SUZANNE D. CASE, Chairperson
Board of Land and Natural Resources

Wild 'akikiki collection plan



Photo: Kona Dancil, San Diego Zoo Wildlife Alliance

Hawai'i Endangered Bird Conservation Program, San Diego Zoo Wildlife Alliance
Kaua'i Forest Bird Recovery Project (KFBRP)
Pacific Bird Conservation
State of Hawai'i Division of Forestry and Wildlife (DOFAW)
U.S. Fish and Wildlife Service (USFWS)

Updated October 20, 2021

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Summary

This plan proposes and recommends the capture of up to five subadult and adult 'akikiki between the permitted months of July through February from the Halehaha field site. As of June 2021, KFBRP estimates that there were a maximum of 4 after hatch year (AHY), 2 hatch year (HY), and 5 second year (SY) remaining at Halehaha, although it is possible that other birds, especially SY, evaded detection. However, surveys in September 2021 detected only five birds, including a family group (one male, one female, and the two 2021 offspring) and one lone male. The 'akikiki at Halehaha are on the brink of extirpation.

In addition, approximately six pairs were detected in mid 2021 at other field sites. The populations at these other sites may be more stable than those at Halehaha but insufficient data have been collected; more pairs may occur in these and other sites along the northeastern edge of the range. Depending on the number of 'akikiki that can be collected at Halehaha due to ongoing decreasing numbers, as well as other factors, the Kaua'i Forest Bird Working Group will re-examine after the initial Halehaha collection attempt if additional collections should be done at other sites.

This plan presents justification and operational logistics for collecting wild 'akikiki. Captured 'akikiki would be transported to the Maui Bird Conservation Center (MBCC) and integrated into the existing 'akikiki conservation breeding program.

The collection of more than five 'akikiki will require a modification to the San Diego Zoo Wildlife Alliance and DOFAW permits, which as of October 2021 allows for the collection of only five adult or subadult 'akikiki in total per year. The Kaua'i Forest Bird Working Group recommends that a permit revision request be submitted to USFWS.

The ultimate plan is to return captured 'akikiki to the wild when the threat of avian malaria has been controlled. However, because 'akikiki at Halehaha appears to be on the brink of extirpation (see Justification), the urgent need is to collect wild adults immediately to keep these remaining wild birds alive for as long as possible at the Maui and Keauhou Bird Conservation Centers, where they can also contribute to the genetic and behavioral diversity of the current flock in human care. Future decisions will need to be made regarding the exact plan for the captured birds. For example, it has not been determined yet exactly how long the captured 'akikiki will be held under human care, and if the birds will be released on Hawai'i Island, or back on Kaua'i, in the future.

Removing an endemic species from its native ecosystem is a high-risk operation. Despite the inherent risk involved with this plan, doing nothing would lead to the extirpation of 'akikiki at Halehaha and perhaps later throughout its range. This plan strives to minimize hazard or harm that could befall 'akikiki throughout the entirety of this operation.

Note

This plan was written by the Hawai'i Endangered Bird Conservation Program, San Diego Zoo Wildlife Alliance (SDZWA) (Bryce Masuda, Lisa Mason, Nahi Nawahine-Pilago), KFBRP (Lisa Cali Crampton), Pacific Bird Conservation (Peter Luscomb), USFWS (Michelle Clark), and DOFAW (Lainie Berry).

Request

The Kauai Forest Bird Working Group requests permission from DLNR and DOFAW to **collect up to five adult/sub-adult ‘akikiki from Halehaha as soon as possible** and add them to the captive flock as outlined in our Recovery Permit. The details of this operation are outlined in this Plan.

Justification

- The Working Group reviewed data on ‘akikiki (wild and captive) and mosquito trends over several meetings between April and August 2021.
- **These data suggest that ‘akikiki may no longer occur at Halehaha as early as spring 2022.** The group contends that we should rescue the remaining five ‘akikiki from this site before they become extirpated from this area.
- At other sites north of Koaie Stream (Mohihi and Upper Kawaikoi), the small number of ‘akikiki territories appears to be more stable (at about one dozen territories) and mosquitoes are rarely detected. However, malaria prevalence is increasing.
- These data suggest that ‘akikiki may persist for a longer period of time at Mohihi and Upper Kawaikoi. The group recommends monitoring ‘akikiki trends at these sites.
- Birds rescued from Halehaha and brought to facilities at the San Diego Zoo Wildlife Alliance on Maui can also contribute to the genetic and behavioral diversity of the extant captive flock, “jump starting” or reinvigorating the breeding program.
- The Working Group understands that there are risks to removing an endemic species from its native ecosystem. Nonetheless, the Working Group is comfortable with the risk involved with this plan, since doing nothing would lead to the extirpation of ‘akikiki at the Halehaha site.

Field Methods

Pre-capture Scouting

In the days prior to mist-net capturing, KFBRP will spend time at the capture site(s) to determine if and approximately how many ‘akikiki are present in the area. During the late Summer and Autumn, the site fidelity and territoriality behavior is not known. Therefore, it will be worthwhile to conduct a pre-capture scouting trip immediately before the collection to ensure there are still ‘akikiki in the area. Also, the pre-capture trip may include determining exact mist-net locations, and understanding where and how ‘akikiki move through the forest.

Capture

Captures will occur during one or more 10-day trips between November 2021 and February 2022. It is possible to capture wild ‘akikiki in the autumn, because KFBRP caught five ‘akikiki from September to November 2014, and one at Mohihi in December 2015, although there were

more birds present at Halehaha at that time. After the first 10-day trip is conducted, the Kaua'i Forest Bird Working Group will determine if, and when, additional trips would be conducted at the Halehaha field site or if alternate sites should be considered.

Mist-netting will occur in areas as determined by the pre-capture scouting trip. Audio playback recordings of 'akikiki will be used to attract birds to mist-nets. Given that this operation is taking place outside of the 'akikiki breeding season, playback is considered acceptable for a designated time, i.e., up to 30 minutes/hour for three hours if 'akikiki are observed in the area but not captured. If an individual is not captured on the first attempt, e.g., playback time limit exceeded when birds present, additional playbacks will not be utilized until the following day. Mist-nets will be set up throughout each day, and mist-nets will be closed with enough time for captured 'akikiki to arrive back at base camp by 1500 hours.

Each mist-net capture team of at least two people will set up a series of multiple fine-fibered mist nets strung between trees or on stationary poles and monitored regularly. Mist-nets can only be open during suitable weather, and must be checked at least every half-hour. However, if active playback is used, mist-nets will be continuously monitored. In the case of inclement weather, all nets must be rolled up until the weather clears. Capture attempts will occur throughout the day as weather permits (wind < 15 mph and rain < code of 2 (i.e., light rain capable of accumulating on nets)). Staff that are permitted to capture and band 'akikiki will lead each capture team.

Post-capture logistics

Following capture, minimal processing of each 'akikiki will be conducted at the mist-net capture site.

- 1) Weight using pesola spring scale
- 2) Assessment of eligibility of captured individual 'akikiki for transfer (Appendix 1)
- 3) If feces is produced, then it will be collected in ethanol and sent with the 'akikiki to MBCC for parasite examination.

If the bird is deemed as suitable for transfer (Appendix 1), it will be placed in a transport box (Figure 1) and carefully hiked to base camp. The following information will be labelled on duct tape attached to each transport box: date of capture, time of capture, net, and capture weight.

Alternatively, the bird may be held temporarily (up to 1 hour maximum, provided weather is favorable and food and water can be offered and the bird is monitored in the box and not showing signs of stress) in a transport box at the mist-net as a lure to attract other 'akikiki to fly into the mist-net. However, the well-being of the captured 'akikiki is of the utmost importance. If there are any signs that the captured 'akikiki is stressed or agitated, it will immediately be transported to base camp.

Communication will occur as soon as possible between staff in the field, in order to organize helicopter transport. Also, the SDZWA veterinarian and MBCC staff will also be immediately

alerted once a bird is captured. When a bird is confirmed for transport, a call will be made to schedule helicopter transport preferably for the same day, and preparations will begin for overnight holding of the bird in case the helicopter is unable to arrive on the same day.



Figure 1. Transport boxes for 'akikiki.

Temporary Holding at Base Camp

From the moment that captured 'akikiki are under human care, we will do everything we can to minimize stress, and transfer the bird as quickly as possible to the Maui Bird Conservation Center. At base camp, a quiet, dry, and shaded tent will be designated to store all mosquito-proof transport and holding boxes containing 'akikiki. The tent will minimize visual contact with humans and extreme temperatures. Also, staff will minimize loud noise in the area while the birds are under human care. The key will be to maintain a weather-proof, stress free, and safe environment for the birds to remain while in our care.

Care in Holding Box

After processing, each bird will be carefully placed in a single compartment holding box at base camp. Every effort will be made to avoid unnecessary moving of birds between boxes. Holding boxes are ideal for continuous observation and weight monitoring of each bird, and have solid walls to minimize visual contact that the birds could have with humans and to provide a stable environment. The holding box will measure approximately 23 cm (9") wide, 20 cm (8") high, and 40.5 cm (16") deep (Figure 2). The box will be constructed out of 6 mm (¼") polyvinyl chloride (PVC) sheet material. The two side walls are solid and will have a series of 2.5cm ventilation

holes along the upper portion of each wall. The right side wall will have ventilation holes along the upper portions of the wall plus a trap door measuring 7.5 cm wide by 10 cm tall. This opening is covered with a sliding door. The door is placed on the upper back portion of the right side wall. There will not be a curtain covering the door – previous iterations of this box included a curtain but only when there were large wire sections. The current box that will be used has smaller ventilation holes instead of large wire sections, so a curtain will not be necessary. The trap door is used to facilitate removing birds from the box with minimal stress. The back wall has an opening covered with mosquito-proof pet screen to encourage ventilation of the box. The box has two perches, which will be “securely fastened to avoid bouncing or tipping over during transport” (USFWS permit). The back perch is secured to the sides of the box. The front perch is part of the remote weighing system - two support dowels that are attached to the horizontal perch extend up through the top of the box and attach to a platform (Figure 2). Two holes cut into the top of the box measuring 5/8” in diameter are spaced apart so the 3/16” support dowels to the front perch can easily pass through them. Cloths will be on hand and ready for covering ventilation holes (while ensuring there is still adequate ventilation), in case birds are stressed. The boxes will be labeled with a number to aid in observations and record keeping.



Figure 2. Holding box for 'akikiki

The goal will be to transfer birds to the Maui Bird Conservation Center as quickly as possible after capture. However, temporary holding at base camp for up to 24 hours or more may be required if the helicopter is not able to transport the birds immediately due to poor weather, etc.

Monitoring status of birds

The birds will be evaluated using weight data, activity patterns, posture, body condition, food consumption, and fecal output. The best time to monitor birds is after their first morning feeding. The birds should be hungry and spend much of their time acquiring food. Viewing can be made from the rear of the box where there is a large, screened wall. Fecal output will be monitored. Feces are a good indicator of food consumption. Normal feces should have a large volume of feces (dark portion) with minimal urates (white portion). If the feces are composed of mainly urates that indicates inadequate nutrition and that the bird is now consuming body tissue and its condition is deteriorating. This will signal the need to provide additional and alternative food sources and to more closely monitor the bird's behavior and health. Fecal samples will be collected and sent with the 'akikiki to MBCC for parasite examination.

Weight monitoring

All birds will be weighed regularly while under human care, first at the time of capture, then while in the holding box at base camp at least once in the morning and once in the afternoon daily. Each weight will be documented and compared to previous weights.

Medical care

Pacific Bird Conservation (Peter Luscomb) will oversee care of 'akikiki at base camp, including medical care. SDZWA veterinarians will provide triage and treatment protocols, supplies, and medications. The goal is to transfer 'akikiki out of the field as quickly as possible, and a SDZWA veterinarian will be present when 'akikiki arrive on Maui.

Each 'akikiki will be treated for avian malaria immediately after capture as a precautionary measure because they are known to be extremely susceptible to this disease. Although we will not receive the results of the avian malaria test until several days after capture, other bird species have been treated with prophylactic medication for avian malaria without negative consequences (San Diego Zoo Wildlife Alliance, pers. comm.).

Diet

We will present food items to captured 'akikiki that have been fed to other similar species brought into managed care, specifically live insects. It often takes an extended period of time for wild-caught birds to begin consuming a non-wild diet in human care, and it is possible that wild-caught birds may be slow to accept a non-wild diet in human care. To maximize the likelihood of wild-caught birds consuming a non-wild diet, live food items (e.g. mealworms, crickets, etc) will

be brought into the field and provided to the birds. Foraging activity will be documented. Notes will be taken on what items are consumed and diets modified accordingly.

Measures will be taken to prevent live food items from escaping. All insects taken into the field will be held in tupperware containers that have tops that can be securely closed. The tops will have holes covered with a fine screen to allow proper air circulation and provide security. The insect containers will be kept in the bird tent that is totally enclosed and secured by fine meshed screened doors and vents.

Mealworms will be placed into feeding containers that have smooth and steep sides that the mealworms can not climb out of. The birds will have access to the food items by perching on the rim of the container and pulling out the insects.

Crickets will be in similar containers but the sides will be higher. We will only be using one week old crickets that can be easily contained. Leaf clusters will be placed into the food container holding crickets for feeding. The leaf clusters will act as a hiding place and an area of refuge and hopefully less inclined to escape. This system will also provide the birds with an excellent enrichment opportunity allowing the birds to naturally forage for their food.

Bee larvae will be kept in the original honeycomb until it will be immediately given to the birds. The honeycomb will be transported in sealed containers, which will prevent bee larvae from escaping and prevent excess honey from leaking. Bee larvae moves very slowly so it is unlikely to escape.

The holding cages being used are all designed to be insect proof and should be able to contain the insects that are being fed. If any insect did escape they would be contained in the tent structure. All holding cages will be held on a shelf that will allow easy inspection of the floor to identify any escaped insects. If any insects are found in the tent, they would be collected and placed back into their holding container or disposed of.

Providing diet items

A double set of food and water bowls per holding box will be used to allow one set to be cleaned while the other is filled and offered to the birds. Food will be provided to the birds as soon as possible, even if a helicopter is en route. However, food and water bowls will be removed prior to helicopter transport. Paper for the box floors will be precut so that papers can be changed and birds fed at the same time. If there are multiple birds in multiple holding boxes, notes will be made to distinguish between the papers and diets for each bird.

To remove the service tray from the box, the front door will be lifted up off of the service tray by no more than $\frac{1}{2}$ ", and the tray slowly pulled out. We will be using 4" bowls as one option for providing food and water (in separate bowls), and the bowl is $\frac{1}{2}$ " high. When the bowl hits the back of the front door, we will lift the door just enough so the tray and feed bowl are able to pass under the bottom of the door. We will always lower the door so there is about $\frac{1}{4}$ " of space

between the bottom of the door and the object on the service tray we are trying to remove. 3" D cups may also be used, as a second option for providing food and water (in separate D cups). It is important to have different options available (i.e. both bowls and D cups) in case a bird feeds out of one type, but not the other. The D cups are about 1.5" tall and have two vertical clips on the back. The D cups would be hung onto the back plate of the service tray, and when the D cups reach the door, we will lift the door just enough so the D cups can fit under the door and lower the door as soon as possible.

When the service tray is removed from the box, the paper will be placed onto a table. The food bowls will be placed on the paper. The box's service tray will be cleaned as necessary, fresh paper placed on the service tray, and clean food and water containers on the tray. The service tray will be placed on the bottom front edge of the box and the tray will be inserted back into the box.

When the bird has been fed, each bird will be directly observed again and its location, activity, and posture noted. We will first identify baseline behavioral patterns of each individual bird, such as where they are perched and how does the bird respond during feeding. Then, we will keenly observe each bird for deviations to these behavioral patterns, because deviations may indicate a concern, requiring further observation or intervention.

Once all behavioral observations are made, the food consumption and fecal output will be documented. All unconsumed food and tray paper will be placed into a trash bag. All food prep and cleaning will be done away from the tent, to minimize disturbances. If a bird quickly consumes all of one type of food item, additional amounts of that food item may be added.

Transfer from Halehaha Base Camp to MBCC

A helicopter will utilize the Halehaha landing zone (LZ) to pick up 'akikiki and transport birds to MBCC. One 'akikiki will be transported in each holding box. A holding box containing an 'akikiki will be transferred into a large Rubbermaid® plastic bin with holes drilled in the sides. There will be one holding box in each large Rubbermaid plastic bin. We will also place towels and cardboard padding underneath and around each transfer box, to lessen the noise and vibrations from the helicopter without compromising air circulation. All food and water will be removed from the transport box prior to the helicopter flight.

Windward Aviation will fly from Maui to the Halehaha LZ to pick up and transport 'akikiki to the Kahului airport. Windward Aviation anticipates that the longest delay in being able to transport 'akikiki is one day. We will be prepared to care of 'akikiki at the Halehaha Base Camp for multiple days, in the unlikely and unexpected event that Windward Aviation is delayed. In 2019, Kiwikiu (*Psuedonestor xanthophrys*) were held for up to 8 days in the same holding box and using the same general techniques that we will use during this 'akikiki collection (Warren et. al 2021). Windward Aviation will transport 'akikiki with only the pilot on-board. Prior to the operation starting, Peter Luscomb will assess the helicopter in-person and design a system for ensuring the plastic bin is secure within the helicopter. Windward Aviation is typically available

in the middle of the day. The flight duration in each direction between Kahului airport and the Halehaha LZ is approximately 1.5 to 2 hours. Prior to leaving Maui, Windward Aviation will do a weather assessment to determine the likelihood of being able to land and pick up 'akikiki at the Halehaha LZ. If it is unlikely that the entire transport process can be completed in a single round-trip operation (e.g. due to poor weather), then the helicopter will not leave Maui. MBCC staff will receive 'akikiki at Kahului airport and drive to MBCC, which takes about 30 minutes.

Because 'akikiki will be transported as soon as possible to MBCC, there will likely only be one 'akikiki on each flight. The reasons for transporting 'akikiki out of the field as quickly as possible is to expedite care by the SDZWA veterinarian and transition to housing the 'akikiki at the Maui Bird Conservation Center. However, if budget constraints with helicopter transport are limited, 'akikiki may be cared for at Halehaha for multiple days, which also has the benefit of providing birds with food and water to replace any loss during capture and hiking to base camp. Total transport time must not exceed 6 hours.

Housing at Maui Bird Conservation Center

Upon arrival at the Maui Bird Conservation Center, each bird will be immediately examined by a SDZWA veterinarian. The bird will be housed in a quarantine situation for at least 30 days, to reduce the likelihood of spreading diseases to the existing conservation breeding flock.

Removing birds from holding boxes

When a bird is removed from the holding box, such as upon arrival at the Maui Bird Conservation Center, two people will be needed to remove the bird from the box. One person will stand next to the right side of the box and place a small hand net over the trap door opening. This person will hold the net bag so it extends out from the box providing the bird with an area that it can easily enter. Once the net is properly located and secure, the other person who is stationed at the front of the box will pull up the sliding door on the trap door. They will then pull up the front service door just enough so they can fit their fingers under the door. This is usually enough to encourage the bird to enter the net. Once the bird has entered the net, the first person will grab the net and contain the bird. The bird will be placed in a bird bag, and processing will begin.

Processing at the Maui Bird Conservation Center

As much post-capture processing as possible will be conducted after the bird is transported to the Maui Bird Conservation Center. The following processing will be jointly conducted by Maui Forest Bird Recovery Project (MFBRP) and SDZWA, in the days following the arrival of the bird at the Maui Bird Conservation Center. The highest priority is to ensure the bird is stable and not stressed after arrival, and as a result, these processing activities may occur days after arrival.

- 1) Banding with a unique color band combination that ideally has not previously been used on 'akikiki by either KFBRP or SDZWA. If a captured 'akikiki was previously banded, the bands will be left as-is on the bird

- 2) Physical measurements for sex determination
- 3) Photos for age determination
- 4) Blood sampling of about 20 µL per bird conducted by permitted MFBRP staff, for avian malaria assessment and sex determination
- 5) Subcutaneous fluid administration after blood sample collection, conducted by permitted SDZWA veterinarian
- 6) If feces is produced, then it will be collected in ethanol and examined for parasites

The blood sample will be sent to San Diego for PCR and sequencing. A blood smear will not be conducted due to the small size of the bird and limited amount of blood that will be collected from each individual. The avian malaria testing will not be expedited, because each 'akikiki will already be receiving medications for avian malaria, as a preventative measure. The administration of medication for avian malaria will continue until veterinary and bird care staff determine the individuals have adapted well to managed care. More specifically, behavior, appetite, social interactions, and eliminations will be observed daily to help determine if appropriate adaptation has occurred".

All fecal samples collected during the capture and holding process will be transported with each 'akikiki to MBCC. Upon arrival at MBCC, SDZWA will examine fecal samples for parasites. If a parasite (e.g. coccidia) is detected, it will immediately be reported to the U.S. Fish and Wildlife Service and the State of Hawaii.

Death and Necropsy

This capture, holding, and transport is a significant management action that will save the remaining wild individuals at Halehaha from death. Despite extensive preparation, unfortunate events can happen and mortality could result. If this occurs, the carcass will be sent stored on ice (being careful that the carcass does not touch the ice directly, and only for the carcass to be kept cool by the ice) until it can be transferred to the San Diego Zoo for necropsy. Full gross necropsy and histopathology will be performed, including lung impression smears and PCR for hemoparasites, and additional ancillary diagnostics as appropriate.

In the event of an injury or mortality, operations will immediately halt. According to existing permits, incidental take of wild captured subadults/adults is zero.

Staffing

Mist-net capture team individuals listed on the Recovery Permit at the Halehaha capture site: KFBRP (Lisa Cali Crampton, Justin Hite, Tyler Winter, Bow Tyler) plus helper not on the recovery permit and banding permit (Hannah Landwerlen)

Field Care team at the Halehaha base camp:
Pacific Bird Conservation (Peter Luscomb)

Additional field assistance at the Halehaha capture site:

DOFAW (Lainie Berry)

SDZWA (Bryce Masuda and/or Lisa Mason)

Receiving and Husbandry team at Maui Bird Conservation Center:

SDZWA (Dr. Matt Kinney or Dr. Deena Brenner, MBCC staff)

Partner roles and responsibilities

Kaua'i Forest Bird Recovery Project – pre-capture scouting trip to determine home ranges and locations where 'akikiki frequent and finalize specific mist-net set up locations; conduct mist-netting set up and bird captures

San Diego Zoo Wildlife Alliance – assist with field activities that do not directly involve bird handling or care (unless individual is listed on the permit); provide triage and treatment protocols, supplies, and medications in the field; organize helicopter transport of wild captured 'akikiki from Kaua'i to MBCC; provide medical care of 'akikiki by veterinarian upon arrival at MBCC; conduct fecal examinations; conduct PCR and sequencing of blood samples for avian malaria; holding and care of 'akikiki at MBCC; conduct necropsies

Pacific Bird Conservation – oversee care of wild captured 'akikiki in the field

Maui Forest Bird Recovery Project – after 'akikiki arrive at MBCC, collect blood sample, attach aluminum and color bands, collect morphometric measurements

DLNR-DOFAW – permitting and permissions; assist with field activities

USFWS – permitting and permissions; logistical support as needed

Kaua'i Forest Bird Working Group - provide recommendations to inform decisions

Timeline

- Tentative collection date is a 10-day period between November 29 and December 17, 2021.
- Pre-capture scouting would occur in the days prior to collection
- After the first 10-day trip is conducted, the Kaua'i Forest Bird Working Group will determine if, and when, additional trips would be conducted at the Halehaha field site or if alternate sites should be considered.

References

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Appendix 1. Key for determining eligibility of a captured individual 'akikiki for transfer

Key for determining eligibility at the capture site

- 1A. Visible lesions that may be due to avian pox (this has never been observed before in wild captured 'akikiki) release
- 1B. No visible avian pox-like lesions see 2
- 2A. Injury noted see 3
- 2B. No injuries see 6
- 3A. Old injury, scar tissue visible, no open wounds see 4
- 3B. Active injury, open wound, e.g., active pox lesions, broken leg(s), broken wing(s). (Does not include missing nails.) see 5
- 4A. The injury affects range of motion or otherwise significantly influences foraging potential/efficiency of the birdsee 5
- 4B. The injury is not as described in 4A..... see 6
- 5A. The bird can be released safely back into the wild release
- 5B. The bird is at significant risk of death if released into the wild transport to base camp / transfer to MBCC
- 6A. Vascularized brood patch present or any sign of nesting release
- 6B. No vascularized brood patch present see 7
- 7A. Begging juvenile observed in close proximity or any sign of the captured bird feeding one or more juveniles see 8
- 7B. No juveniles in vicinity transport to base camp
- 8A. Can it be determined that the bird in hand is not the parent of the juvenile? Two additional adults in the area feeding the juvenile or being followed by the juvenile transport to base camp
- 8B. It cannot be determined if the bird in hand is not the parent release

Key for determining eligibility at base camp

9A. Bird shows signs of undue or unusual stress, i.e., gaping, sustained raised crest, closing eyes..... see 5

9B. No unusual stress noted, e.g., bird is active, bright and open eyes, trying to bitesee 10

10A. Bird shows signs of unusual stress in the transport or holding box, e.g., flying repeatedly into walls, gaping, feather plucking, lethargic, crouched or fluffed.... release following expert evaluation

10B. Not as above, or these behaviors cease after 2 hours transfer to MBCC

Appendix 2. Equipment

TBD - mist-netting poles and net kits

10 transport boxes and labels

10 collapsible holding boxes and label

Complete bird banding kits

Data recording sheets

2 folding field tables

55 3" D cups

26 4" plant saucers

2 hand nets for trapping birds out of holding box

2 plastic wash pans

2 Ohaus 120 scales

1 measuring spoon set

Feeding pans for diet

Appendix 3. COVID-19 Requirements and Protocols

All personnel will be required to follow the State of Hawaii's COVID requirements for State facilities, and KFBRP's COVID SOP, which will be provided prior to arrival on Kaua'i. This SOP recommends that all vaccinated personnel who have traveled in the last 10 days secure a negative COVID test prior to going in the field. The Halehaha camp site can accommodate a maximum of six people, while still following COVID-19 social distancing guidelines. Base camp will include multiple cooking and housing zones to accommodate social distancing protocols. All COVID-19 requirements are subject to change, as CDC, Federal, State, Organizational, etc. guidelines and requirements change over time.



Request to Collect up to 5 Adult 'Akikiki from the Wild for captivity

Dr. Lainie Berry
Dr. Lisa "Cali" Crampton

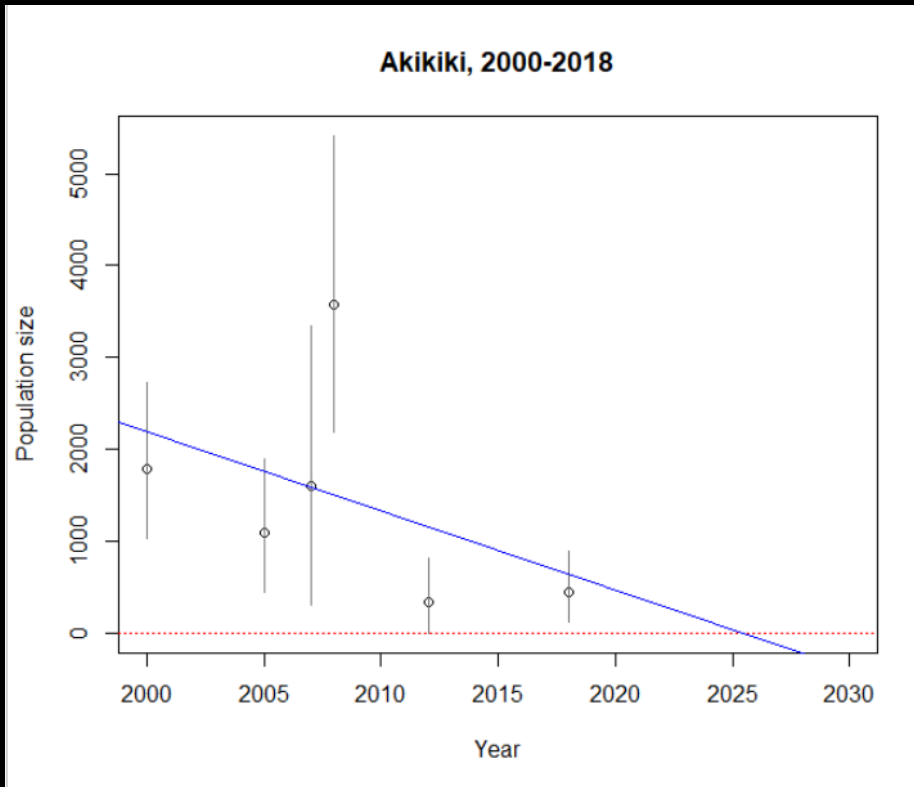
October 2021

Outline



- **Background**
 - Wild flock
 - Captive flock
- Scope of request
- Plan

Wild 'akikiki population trends

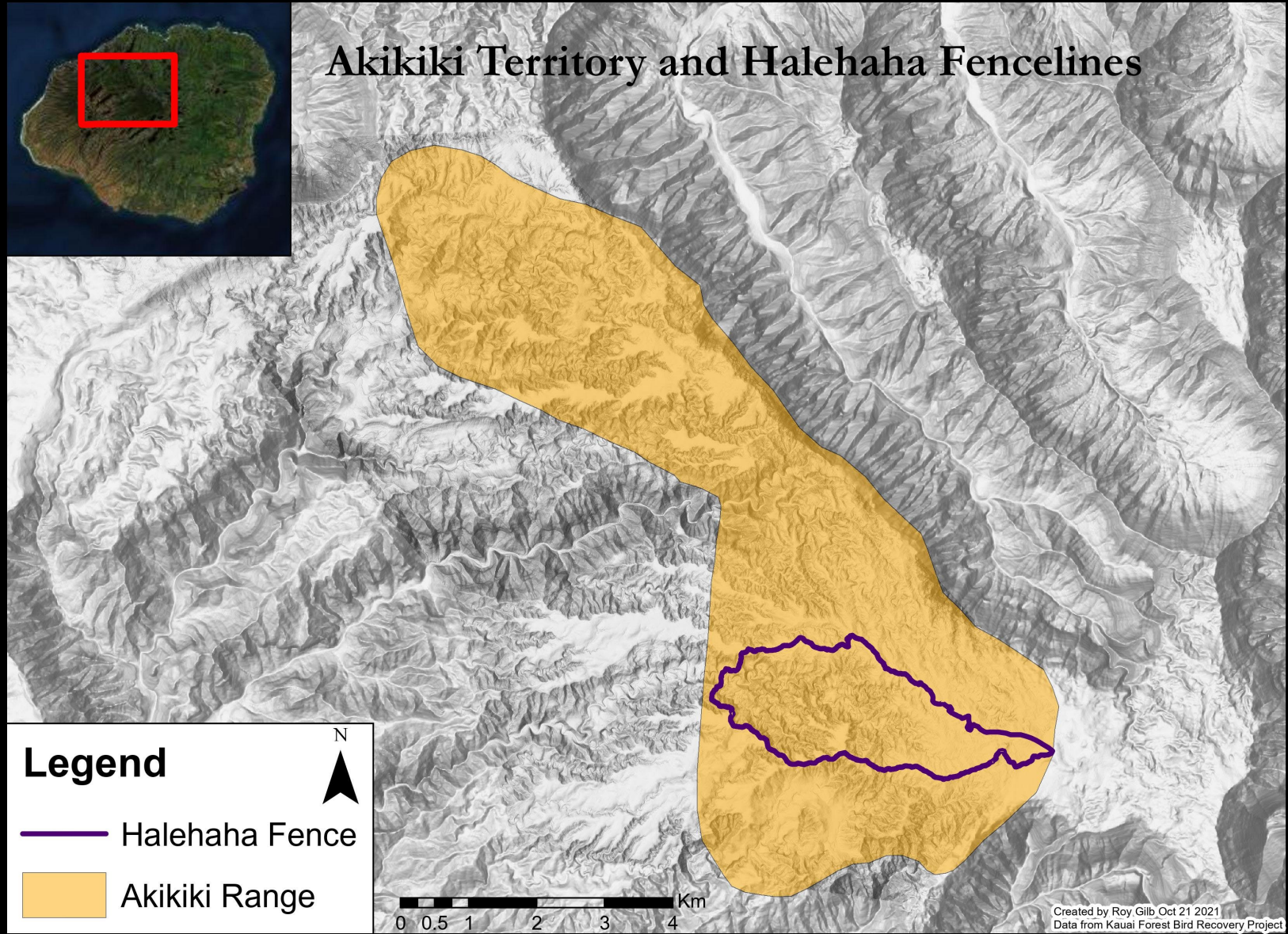


- 2018 estimate: 440 (120-886) birds
- may go extinct in next 3 years



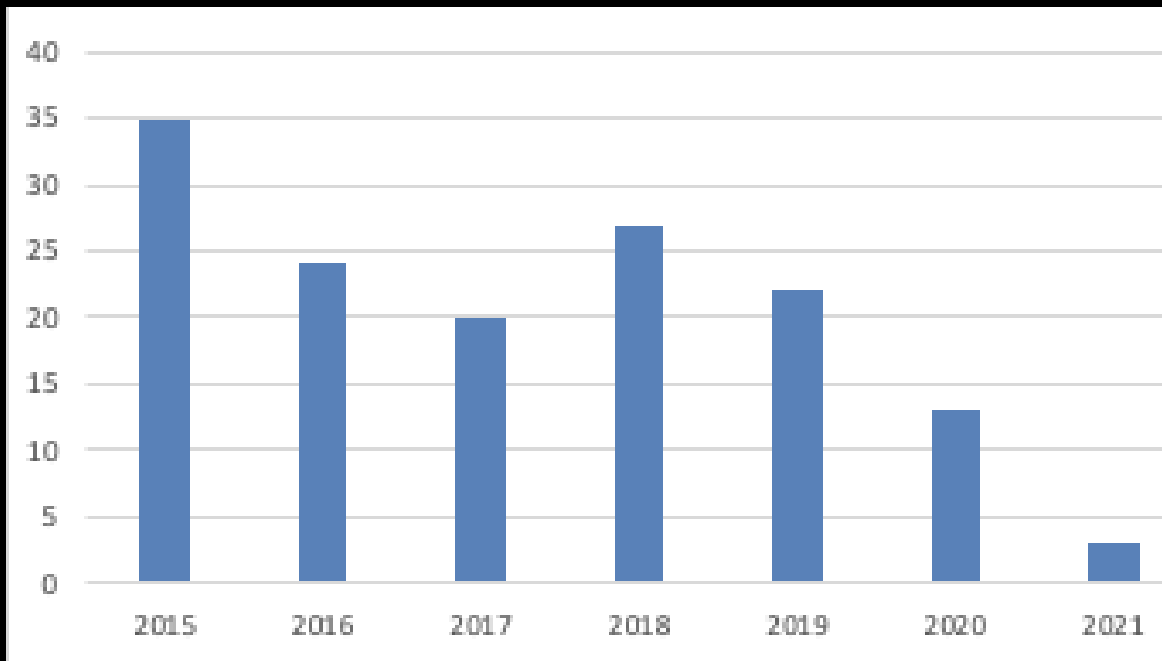
Halehaha/Halepa'ai:

Core of the range



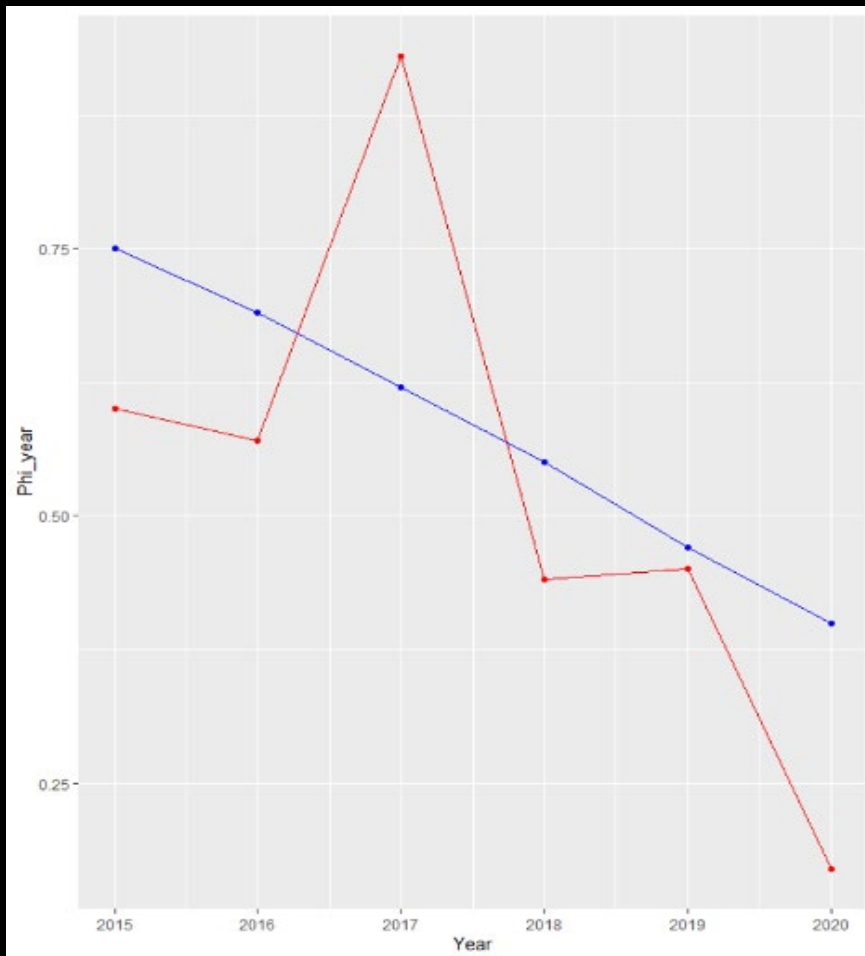
'Akikiki declines at Halehaha

territories at Halehaha 2015-2021



- Only one territory occupied by a pair for the whole season and fledged chicks
- Female disappeared mid-season from second territory
- Third territory occupied by a male only
- In Fall 2021, only 5 'akikiki detected

'Akikiki survival is poor at Halehaha

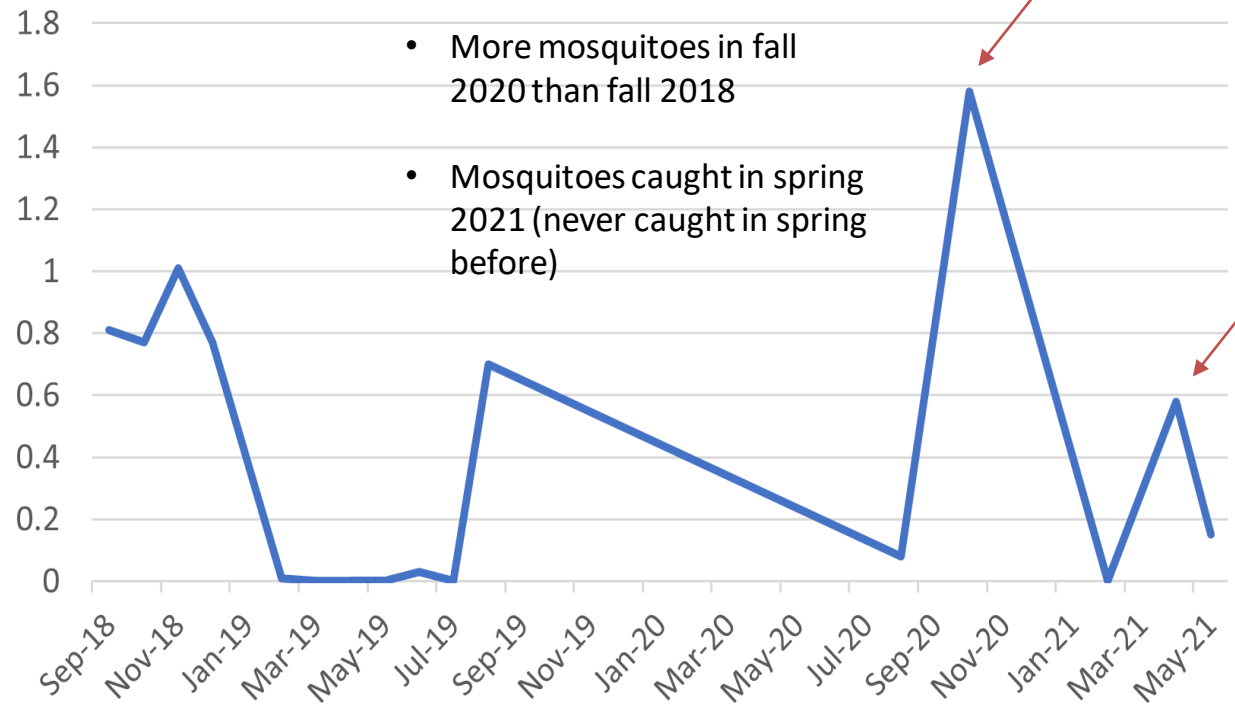


- Males and females combined
- Best model was annual variation (red line) by delta AIC ~ 3 .
- Blue line represents average survival

Mosquitoes recently have increased at Halehaha



#/trap-night



Malaria has become more prevalent in birds at Halehaha

% prevalence (birds positive/total birds sampled)

Species group	1994 (%)	2007-2009 + 2012-2014 (%)
Endemic	2.1	18.2
Non-native	0	23.6
Overall	2.0	19.3



Status of the conservation breeding flock

- Established through egg collections throughout the range in 2015-2018
- Now consists of 42 'akikiki
 - 36 founders (4-7 years old)
 - 6 offspring of founders
 - 15 breeding pairs



Request

- The Working Group requests permission to collect up to 5 'akikiki from Halehaha in fall 2021-winter 2022.
 - Our current permit allows for the collection of 5 individuals year
 - These birds will be added to the conservation breeding flock at MBCC
 - They will be returned to the wild once threats are managed
- Collection of additional 'akikiki adults from other Alaka'i sites is not currently proposed but will be re-evaluated as new information becomes

Justification

- The Working Group reviewed data on 'akikiki (wild and captive) and mosquitos over several meetings between April and August 2021.
- They concur that these data suggest that 'akikiki may no longer occur at Halehaha as early as spring 2022.
- The group contends that we should rescue the remaining five 'akikiki from Halehaha before they become extirpated
- At other sites on the Plateau, the number of 'akikiki territories appears to be more stable (at about one dozen territories total). The group recommends monitoring 'akikiki trends at these sites.
- 'akikiki brought from Halehaha to MBCC can also contribute to the genetic and behavioral diversity of the extant captive flock, reinvigorating the breeding program.

Plan Outline

- In late Nov 2021, KFBRP will scout for 'akikiki at Halehaha
- If 'akikiki are found, KFBRP, SDZWA, and PBC will attempt to capture 'akikiki between in early December 2021
- 'akikiki will be help temporarily on site in mosquito-proof boxes in a sheltered area, offered food and water, treated for avian malaria, and monitored
- 'akikiki will be flown by helicopter from the field site directly to Maui if possible; else via Lihue airport
- On arrival at MBCC they will be examined by veterinarians, where they will be housed in quarantine for 30 days before joining the flock

Community Engagement



A lush forest scene with a stream. On the left, a mossy bank is covered in ferns and other green plants. A stream flows through the center of the image. On the right, there are raspberry bushes with several ripe, dark red raspberries hanging from the branches. The background is filled with dense trees and foliage.

Questions?