2013-2014

MAUI FOREST BIRD RECOVERY PROJECT (MFBRP): **WORKPLAN**

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Pacific Cooperative Studies Unit, University of Hawaii, Division of Forestry and Wildlife, State of Hawaii Department of Land and Natural Resources &

12 July 2013

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Introduction

The Maui Forest Bird Recovery Project (MFBRP) is a Pacific Cooperative Studies Unit (PCSU) and State of Hawaii Division of Forestry and Wildlife (DOFAW) project. The United States Fish and Wildlife Service (USFWS), DOFAW, and subject matter experts provide project guidance. This Maui Forest Bird Recovery Project work plan is intended for:

a) MFBRP staff as background on our organization and its activities and for planning.
b) MFBRP collaborators such as Zoological Society of San Diego (ZSSD), The Nature Conservancy of Hawaii (TNC), National Park Service, Natural Area Reserve System (NARS), American Bird Conservancy (ABC), USFWS, and the various watershed partnerships (e.g. Leeward Haleakala Watershed Restoration Partnership (LHWRP)) to inform them of our activities.
c) MFBRP advisors including DOFAW, USFWS, and collaborating scientists to gain advice on project directions and planning.
d) Supporters of MFBRP and organizations concerned with endangered birds and their recovery.

We provide an overview of on-going project activities with an emphasis on 2013-2014 work and outline future projects for which we seek funding and collaboration. For more information about Maui Forest Bird Recovery Project, please visit our website at www.mauiforestbirds.org.

MFBRP Mission

Maui Forest Bird Recovery Project develops and implements techniques to sustain native forest birds through research and applied conservation. The USFWS Revised Recovery Plan for Hawaiian Forest Birds, Hawaii's Comprehensive Wildlife Conservation Strategy (HCWCS), and species specific five year implementation plans guide our work.

MFBRP Long-term goals:

1) Sustain and increase current populations of Maui's endangered forest birds.
2) Monitor a) population status, b) response to management and c) threats to Maui's forest birds.
3) Support and develop forest restoration on leeward Haleakala.
4) Re-establish a second Kiwikiu population on leeward Haleakala.
5) Promote collaboration and policy supportive of Maui's forest birds including reforestation with native tree species.
6) Share information on endangered forest birds with the local Maui community as well as the wider scientific community.

For further reading, please refer to:

- USFWS (2006) Revised Recovery Plan for Hawaiian Forest Birds
- DLNR (2005) Hawaiian Comprehensive Wildlife Conservation Strategy

2013-2014 Basic Staffing

Name	Role	Timing
Core Staff:		
Hanna Mounce*	Project Coordinator	100% year-round
Laura Berthold*	Avian Conservation Research Facilitator	100% year-round
Christopher Warren	Research-GIS Technician	100% year-round
Jenn Atkinson	Program & Outreach Assistant	80% year-round
Temporary Staff:		
TBA x 3**	Temporary Field Technicians	100% February-June 2014
Christa Seidl**	AmeriCorps Intern	100% year-round
Volunteers:		
TBA x 2 **	Restoration Volunteers	100% 10 Weeks Oct-Dec 2013
TBA x 4***	Banding Volunteers	100% January 2014
Supplemental Staff:		
Alex Wang	Graduate Student UH Hilo	January 2014-June 2014
TBA x 2	Telemetry Volunteers	February 2014-June 2014
Peter Motyka	Graduate Student NAU	January 2014-June 2014
TBA x 2	Graduate Student's Volunteers	February 2014-June 2014

Of note:

*Positions listed are contingent upon H. Mounce moving from interim project coordinator in FY2013 to project coordinator in FY2014.

**Housed at the MFBRP field station during their employment.

Volunteer Program

MFBRP has an approved volunteer program with Pacific Cooperative Studies Unit. Additional volunteers may be used throughout the year as needed.

FY 2014 Schedule (1 July 2013- 30 June 2014)

Months	***Staffing***	***Activities***
July	4 Core staff 1 AmeriCorps 2 Graduate students 4 Volunteer technicians Community volunteers	2013 season wrap-up Reporting HCC Conference 1 Nakula trip Manuscript prep Grant writing Hiring volunteers for fall Crowdfunding campaign MAAL grad project AKOH grad project Staff annual leave
August	4 Core staff 1 AmeriCorps 1 Graduate student 1 Volunteer technician	Manuscript prep Field gear repairs Data analyses AKOH grad project Grant writing Hiring volunteers for January AOU Conference Community outreach development Staff annual leave
September	4 Core staff	Field gear repairs Manuscript prep Outplanting prep Data analyses Nakula platform construction Community outreach Grant writing

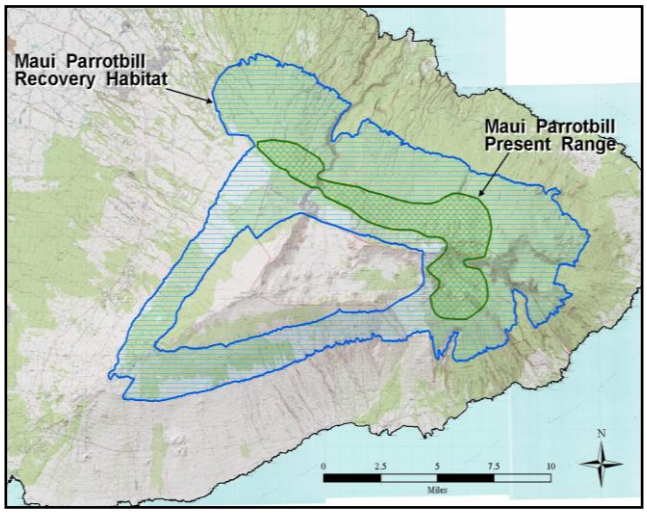
October-December	4 Core staff 1 AmeriCorps 2 Restoration volunteers Community volunteers	Nakula seed collection Nakula outplanting Nakula plot monitoring Hiring temps for spring Prep for MAPA season Grant writing Community fundraising Community outreach
January	4 Core staff 1 AmeriCorps 2 Graduate students 4 Banding volunteers Community volunteers	MAPA season prep Naklua seed collection Nakula plot monitoring WAIK banding AKOH grad project MAAL grad project
February-June	4 Core staff 1 AmeriCorps 2 Graduate Studetns 4 Volunteer technicians 3 Temp hire technicians Community Volunteers	MAPA WAIK reseach Nakula plot monitoring Nakula predator study AKOH grad project MAAL grad project Nakula seed collection Community fundraising Community outreach

Focal Species (Kiwikiu, Akohekohe, Maui Alauahio)

Kiwikiu or Maui Parrotbill (MAPA)

Status: The Kiwikiu or Maui Parrotbill (*Pseudonestor xanthophrys*) is listed as endangered under the US Endangered Species Act, the state of Hawaii, and the International Union for Conservation of Nature (IUCN). Current population estimate is 502 ± 116 individuals. Although the population has been reported as stable for a number of years, there is evidence that the Kiwikiu's range is contracting.

Geographic Area: Restricted to a single population of about 50 km^2, between 1,200 – 2,350 m in east Maui. The species was formerly more widespread and occurred on west Maui and Molokai. Subfossils have been found from drier, low elevation koa (*Acacia koa*) forests, and historic observations suggest that Kiwikiu may have preferred to forage on koa. Now they are restricted to wet ohia-dominated forests.



Primary Threats: Similar to other Hawaiian honeycreepers, Kiwikiu have suffered from habitat destruction, predation by non-native mammals, and disease. Their extremely low reproductive rate and limited distribution makes them very vulnerable to extinction.

Kiwikiu lay a one-egg clutch and produce one fledgling per year (there have been a few sightings of adults caring for 2 offspring at once). Their current range is most likely an artifact of habitat destruction and non-native disease. This is likely suboptimal habitat where frequent storms result in the loss of a high percentage of nests. Climate change is predicted to facilitate upslope movements of disease vectors (mosquitoes). This would further reduce suitable habitat for Kiwikiu unless they develop disease resistance.

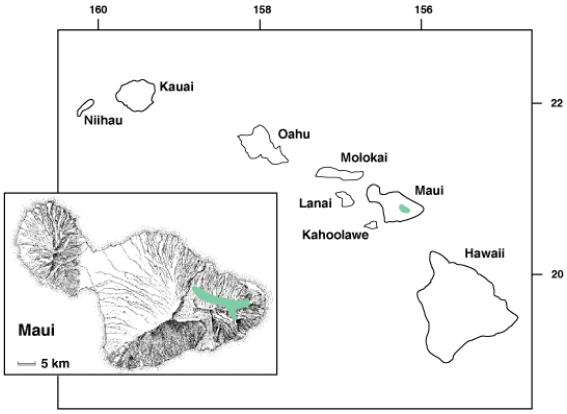
Conservation Planning and Action: Maintaining and monitoring productivity and abundance of Kiwikiu within their current range is a top priority. Establishing a second Kiwikiu population on the southern (leeward side) of east Maui is a high priority recovery action in the USFWS 2006 Revised Recovery Plan for Hawaiian Forest Birds. The climate is less harsh and mosquitoes do not thrive in the area's dry conditions. Restoring leeward mesic and koa forest to establish a second self-sustaining population of Kiwikiu will require substantial time and expenditures. New sites must be fenced, ungulates removed, and predation by rodents must be controlled in addition to restoration of native forest.

Akohekohe or Crested Honeycreeper (AKOH)

Status: The Akohekohe or Crested Honeycreeper (*Palmeria dolei*) is listed as endangered under the US Endangered Species Act, the state of Hawaii, and the IUCN. Current population estimate is 3,800 ± 700 individuals. Although the population has been reported as stable for a number of years, there is concern that Akohekohe range will contract in response to climate change.

Geographic Area: Restricted to a single population in 50 km^2, between 1,200 – 2,350 m on east Maui that overlaps with Kiwikiu. Akohekohe were formerly more widespread

and occurred in west Maui and Molokai. Subfossils have been found from drier, low elevation mesic koa (*Acacia koa*)/ ohia (*Metrosideros polymorpha*) forests, and historic observations suggest that Akohekohe may have preferred mesic forests over wet ohia-dominated forests.



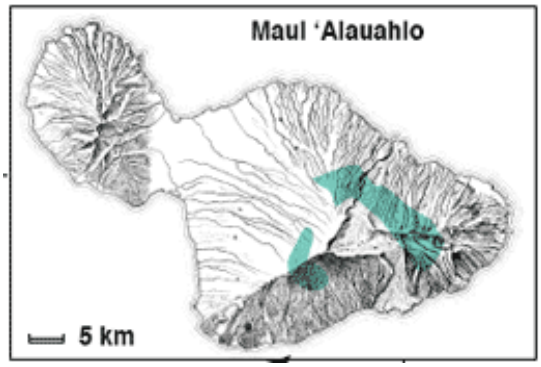
Primary Threats: Similar to other Hawaiian honeycreepers, Akohekohe have suffered from habitat destruction, predation by non-native mammals, and non-native disease. Fortunately, Akohekohe have a moderate reproductive rate, but altitudinal migration in response to ohia flowering phenology may bring them in contact with mosquitoes, thereby increasing mortality from disease. Their limited distribution makes them vulnerable to extinction. Their current range is most likely an artifact of habitat destruction and disease and may be sub-optimal.

Conservation Planning and Actions: Conservation planning and delisting criteria for Akohekohe are described in detail in the USFWS 2006 Recovery Plan for Hawaiian Forest Birds. To secure Akohekohe from extinction another population must be established. Currently, they are restricted to a single, small population that occupies sub-optimal habitat. Restoration of mesic koa/ohia forest at all locations possible above 4,500 ft. and establishment of a second population in a disease-free recovery area is considered essential for recovery. Translocation, rather than captive breeding, is preferred for Akohekohe because they are aggressive and do not adapt well to captive conditions.

Maui Alauahio or Maui Creeper (MAAL)

Status: The Maui Alauahio or Maui Creeper (*Paroreomyza montana*), endemic to Maui, is not listed as endangered under the US Endangered Species Act or the state of Hawaii. The species is listed as endangered under the IUCN. Current population estimate is 35,000 ± 5,000 individuals. Although the Maui Alauahio is considered stable, their population could decline with climate change and associated factors.

Geographic Area: Maui Alauahio occur in two separate populations above 900 m in elevation on the slopes of Haleakala in east Maui. The species was formerly more widespread and occurred on west Maui and Lanai. Fossil evidence suggests that Maui Alauahio were common across the south side of the island and included lowland forests.



Primary Threats: Similar to other Hawaiian honeycreepers, Maui Alauahio have suffered from habitat destruction, predation by non-native mammals, and disease. Their current range is most likely an artifact of habitat destruction and disease and may be sub-optimal. Climate change is predicted to facilitate disease at higher elevations. This would further reduce suitable habitat for Maui Alauahio unless they develop resistance.

Conservation Planning and Actions: Although there are no specific conservation plans for Maui Alauahio, efforts to manage the Kiwikiu may benefit them as well. These projects include ungulate fencing for better habitat, predator control to reduce non-native predators, and restoration of mesic koa/ohia forest on the leeward side of Haleakala. Continued forest bird surveys and habitat monitoring are needed to assess the efficacy of these actions.

KIWIKIU POPULATION VIABILITY INDICATORS

KIWIKIU PRODUCTIVITY

KIWIKIU SURVIVAL AND DISPERSAL

KIWIKIU HOME RANGE SIZE AND VARIABILITY

KIWIKIU POPULATION VIABILITY MODELING

Kiwikiu Productivity

Goals: To collect data necessary for population viability analysis and to determine appropriate management for all areas of the species' range.

Status: Nest success studies in Hanawi NAR 2005-2011, ongoing since 2012 in Waikamoi Preserve. Annual reproductive success studies 2008-2011 in Hanawi NAR and ongoing since 2012 in Waikamoi Preserve.

Task: Estimate productivity for MAPA and identify limiting factors such as causes of nest failure.

2014 Key Tasks and Deliverables:

1. Determine pair densities and production of young per pair in the western portion of Waikamoi Preserve.
2. Use probability of producing an offspring in population viability models.
3. Compile data on nest location, positioning, and success.
4. Provide technical advice to ZSSD, USFWS, and DOFAW related to recovery plan goals for MAPA.
5. Assess bias in productivity estimate as compared with nest success.
6. Provide information to DOFAW & USFWS on productivity at the western edge of their range.

Locations: Waikamoi Preserve, TNC; Hanawi NAR

Collaborators: DOFAW, USFWS, ZSSD, TNC, University of Kent

2014 MFBRP Staffing requirements: 4-6 staff per field trip February-June.

Details:

1. Productivity and survival from Hanawi NAR, which supports the highest density of Kiwikiu, has been established. The project is now focusing on determining demographic rates at the western edge of the species' range.
2. Kiwikiu will re-nest after nest failures, and pairs may make three attempts before producing a fledgling. Proportion of pairs producing an offspring provides a

robust measure of productivity, but verification of offspring presence/absence is challenging as pairs without offspring are less detectable than pairs with an offspring.

3. Pair densities will be estimated by re-sighting of color-banded individuals.
4. 2013-2014 should yield sufficient data to compare Hanawi and Waikamoi individuals between these study areas.

Publications & Presentations as a Result of this Work:

1. Mounce, H.L., Leonard, D.L., Swinnerton, K.J., Berthold, L.K., Iknayan, K.J., and J.J. Groombridge. 2013. Determining productivity of the Maui Parrotbill (*Pseudonestor xanthophrys*), an endangered Hawaiian honeycreeper - In third revision with Journal of Field Ornithology. Journal of Field Ornithology 84(1):32-39.
2. Berthold, L.K., Mounce, H.L., Leonard, D.L., Iknayan, K. J., Becker, C.D., Swinnerton, K.J., and J.J. Groombridge. 2011. Kiwikiu productivity: nest survival and annual reproductive success. Presentation. The Wildlife Society Conference.
3. Mounce, H.L., Iknayan, K.J., Berthold, L.K., and D.L. Leonard. 2011. Kiwikiu productivity: Nest survival and annual reproductive success in the Hanawi Natural Area Reserve, Maui, Hawaii. Poster Presentation. Hawaii Conservation Conference.
4. Becker, C.D., H.L. Mounce, T.A. Rassmussen, A. Rauch-Sasseen, K.J. Swinnerton, and D.L. Leonard. 2010. Nest success and parental investment in endangered Maui Parrotbill (*Pseudonestor xanthophrys*) with implications for recovery Endangered Species Research. 278: 189-194.
5. Mounce, H.L., Becker, C.D., Rassmussen, T.A., Rauch-Sasseen, A., Swinnerton, K.J., and D.L. Leonard. February 2009. Parental Investment at the Nest in Wild Maui Parrotbill (*Pseudonestor xanthrophrys*): Implications for Captive Propagation and Recovery. Presentation. Hawaii Conservation Conference.
6. Mounce, H.L. 2008. What threat do native avian predators pose to Hawaiian honeycreepers? Two cases of predation by pueo (*Asio flammeus sandwinchensis*). Elepaio 68(3): 19-20.

Kiwikiu Survival and Dispersal

Goals: Determine adult and juvenile survival probabilities throughout the species' range. This will help determine recruitment potential and simultaneously provide some information on dispersal behavior. This information is needed to determine the most appropriate method (translocation or captive release) to establish a second population and understand the potential impact these choices will have on the wild populations. This will inform what specific management may be implemented to overcome survival deficiencies and will be used in population models.

Status: Started in 1997 using banding and resights in Hanawi NAR; ongoing in Waikamoi Preserve since 2010.

Task: Calculate survival probabilities for MAPA across their range by age and sex.

2014 Key Tasks and Deliverables:

1. Expand mark-resight effort. Fine tune survival estimates for hatch-year (HY) and second-year (SY) birds.
2. Finish making shape-files for birds banded as HY and SY for use with GIS software.
3. Evaluate the movement of these birds.
4. Investigate dispersal patterns of MAPA based on sex and band location (study area).
5. Continue banding of all age classes.

Locations: Waikamoi Preserve, TNC; Hanawi NAR

Collaborators: TNC, DOFAW, USFWS

2014 MFBRP Staffing Requirements: 4-6 staff per field trip plus additional volunteers and staff for banding trips

Details:

1. Survival data are quite good for MAPA adults due to extensive re-sights and modeling in program MARK.
2. Resights can be obtained in all months.
3. Age ratios may be evaluated as indices of recruitment and population growth.
4. More marked HY and SY birds are needed to accurately model survival of young birds. HY and SY birds are very difficult to mist net and band and more field effort is necessary to obtain adequate samples.
5. 2013-2014 should yield sufficient data to compare Hanawi and Waikamoi individuals between these study areas.

Publications & Presentations as a Result of this Work:

1. Mounce, H.L., Kohley, C.R., Rutt, C., and D.L. Leonard. Maui's Protected Areas Shelter Long-Lived Hawaiian Honeycreepers. Poster Presentation Hawaii Conservation Conference 2012.
2. Kohley, C.R., Rutt, C., Leonard, D.L., and H.L. Mounce. Maui's Protected Areas Shelter Long-lived Hawaiian Honeycreepers - In review
3. Mounce, H.L., Iknayan, K.J., Leonard, D.L., Swinnerton, K.J., and J.J. Groombridge. Management implications derived from long term re-sight data: annual survival of the Maui Parrotbill (*Pseudonestor xanthophrys*) – In 2nd Review with Bird Conservation International.
4. Vetter, J.P., Swinnerton, K.J., VanderWerf, E.A., Garvin, J.C., Mounce, H.L., Breniser, H.E., Leonard, D.L., and J.S. Fretz. 2012. Survival estimates for two Hawaiian honeycreepers. Pacific Science 66(3):299-309.
5. Garvin, J.C., Vetter, J.P., Mounce, H.M., VanderWerf, E.A., Swinnerton, K.J., Breniser, H.E., Becker, C.D., and D.L. Leonard. 2008. Survival estimates of the endangered Maui Parrotbill (*Pseudonestor xanthrophrys*) and the Maui Alauahio (*Paroreomyza montana*). Poster Presentation AOU Conference Portland, OR.

Kiwikiu Home Range Size and Variability

Goal: Estimate home range sizes and compare between the core and edge of the MAPA range to inform the planning for re-establishment of a second population.

Status: Ongoing since 1997.

Task: Map resights of Kiwikiu and Maui Alauahio to investigate individual and temporal variation in home range size. Create metadata file that can relate home range with habitat, age, and sex.

2014 Key Tasks and Deliverables:

1. Identify trends in home range size as they relate to reproduction, habitat quality, conspecific and heterospecific densities, age, and sex.
2. Create home range polygons for Kiwikiu and Maui Alauahio in Waikamoi using only birds with a sufficient number of well-distributed resights.
3. Create metadata files including total home range area and approximate fluctuation of persistently resighted birds in between years when at least two field seasons have occurred.
4. Use Program R to interpret trends.
5. Continue resight effort in Waikamoi.
6. 2013-2014 should yield sufficient data to compare Hanawi and Waikamoi individuals between these study areas. Data analysis to be completed by the end of FY14.

Locations: Waikamoi Preserve, TNC; Hanawi NAR

Collaborators: DOFAW, TNC

2014 MFBRP Staffing requirements*:* 1 GIS specialist, 4-6 staff per field trip.

Details:

1. Resights from Hanawi NAR, which supports the highest density of Kiwikiu, have been established. The project is now focusing on resights at the western edge of the species' range.
2. A minimum number of resights per individual is required for all analyses.

Publications & Presentations as a Result of this Work:

1. Iknayan, K.J., H.L. Mounce, C.D. Becker. August 2010. Home Range Patterns of Maui Alauahio and Maui Parrotbill. Poster Presentation. Hawaii Conservation Conference.

Kiwikiu Population Viability Modeling

Goal: Estimate population viability of MAPA.

Status: Ongoing since 2004.

Task: Estimate population viability of MAPA and compare models to choose the most appropriate method.

2014 Key Tasks and Deliverables:

1. Develop population viability analyses (PVA) models based on Hanawi demographic data.
2. Consider the possibility of including Waikamoi demographic data.
3. Assess MAPA population viability and model variation and sources of variation.
4. Provide PVA estimates to partners.

Locations: Hanawi, NAR; Waikamoi Preserve, TNC

Collaborators: DOFAW, USFWS, University of Kent, TNC

2014 MFBRP Staffing requirements: one staff for collaboration on modeling

Details:

1. High quality survival data for Kiwikiu have been collected from years of mark-resight data collected by MFBRP and USGS and modeled in program MARK. Productivity estimates come from 2008-2011 using annual reproductive success in Hanawi NAR and possibly Waikamoi Preserve.
2. Vortex, RAMAS and other population viability models will be used to model Kiwikiu population dynamics under various scenarios related to genetic, demographic, and environmental stochasticity with one and two populations.
3. Manuscript set to be submitted by the end of 2013.

ESTABLISHING A SECOND POPULATION OF KIWIKIU

PROTOCOL FOR TRANSLOCATION AND REINTRODUCTION

KIWIKIU GENETIC DIVERSITY

Protocol for Translocation and Reintroduction

Goal: Establish a second wild population of Kiwikiu on leeward Haleakala.

Status: Draft postponed in progress as of 2013.

Task: Develop protocols for translocating and reintroducing Kiwikiu to areas of the Nakula NAR based off the best available demographic, genetic, and environmental information.

2014 Key Tasks and Deliverables:

1. Brainstorm and generate an outline for protocols within the Kiwikiu Reintroduction Working Group (WG).
2. Draft translocation protocol from the WG discussions and circulate for review within one year from start of FY14.
3. MFBRP will provide background information and will review plan as it develops but ABC will take the lead on drafting the actual language of the plan.
4. Finishing all publications on MAPA demographics, genetics, and PVA are imperative before the plan is drafted.

Locations: Hanawi, NAR; Nakula, NAR; Waikamoi Preserve, TNC

Collaborators: DOFAW, USFWS, ABC, NARS

2014 MFBRP Staffing requirements: one MFBRP staff intermittently

Details:

1. ABC, DOFAW, and MFBRP are drafting plan after input from the Kiwikiu Reintroduction Working Group.
2. Experimental translocation and/or captive release will be initiated within 5 years from the start of FY14.

Kiwikiu Genetic Diversity

Goal: Determine genetic diversity and structure of current wild Kiwikiu population to inform the establishment of a second population in the Nakula NAR.

Status: All lab work and analyses complete. Manuscript submission fall 2013.

2014 Key Tasks and Deliverables:

1. Submit final genetics manuscript.

Locations: Waikamoi Preserve, TNC; Hanawi NAR; Haleakala National Park

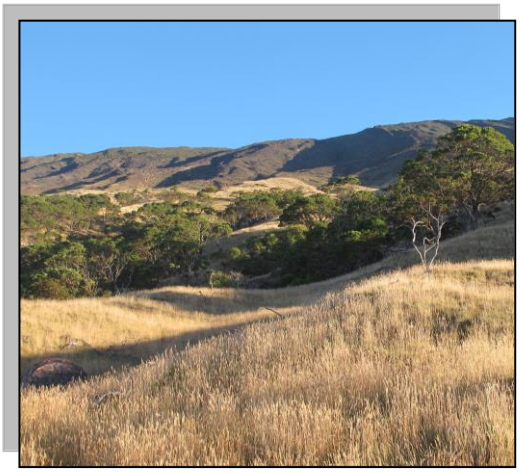
Collaborators: TNC, DOFAW, University of Kent, USFWS, Haleakala National Park, ZSSD, National Museum of National History, Museum of Comparative Zoology, Cambridge University Museum of Zoology, British Museum of Natural History, Brenice Pauahi Bishop Museum, and American Museum of Natural History

2014 MFBRP Staffing requirements: office time for one staff member

Publications & Presentations as a Result of this Work:

1. Mounce, H. L., Raisin, C., Leonard, D. L., Wickenden, H., Swinnerton K. J., and J. J. Groombridge. Using genetic information to design reintroductions: examining alternative strategies using spatial genetic architecture in the critically-endangered Maui Parrotbill (*Pseudonestor xanthophrys*) - In prep (anticipated submission August 2013).
2. Mounce, H. L., Raisin, C., Leonard, D. L., and J. J. Groombridge. 2012. Contemporary Genetic Diversity for the Kiwikiu (Maui Parrotbill; *Pseudonestor xanthophrys*). Poster Presentation. NAOC-V Conference.
3. Mounce, H. L., Raisin, C., Leonard, D. L., and J. J. Groombridge. 2012. Contemporary Genetic Diversity for the Kiwikiu (Maui Parrotbill; *Pseudonestor xanthophrys*). Presentation. Hawaii Conservation Conference.

FOREST RESTORATION


EXPERIMENTAL RESTORATION PLOTS IN NAKULA NAR

PREDATOR ABUNDANCE SURVEYS

SEED COLLECTION

Experimental Restoration Plots in Nakula NAR

Goal: Restore native mesic forest in fenced sections of Nakula NAR.

Status: Plan is complete. All plots and treatments established and a herbicide protocol has been tested and confirmed for use.

Task: Continue trial restoration efforts in Nakula NAR with particular emphasis on restoring Kiwikiu food plants and determining the most efficient and effective methods of restoration for the area.

2014 Key Tasks and Deliverables:

1. All experimental restoration plots need to have treatments applied and monitored FY14.
2. Weeds and other threats in the fenced NAR need to be assessed as they encroach and recover.
3. Collaborations between multiple agencies working on restoring this area need to be better facilitated for sharing resources, protocols, and knowledge.

Locations: Nakula NAR

Collaborators: DOFAW, NARS, USFWS, LHWRP, ABC, Native Nursery, LLC

2014 MFBRP Staffing requirements: all staff plus interns, volunteers and technicians

Details:

1. Complete herbicide for plot treatments as per the trial plan in July.
2. Practice outplanting to refine protocols and establish a planted corridor across the 420 acres in October. Initiate outplanting trials in October through December.
3. Monitor outplanting and natural regeneration plots and implement seed scatter plots January-June.
4. Further details can be found in the “Nakula Trial Restoration Plan.”

Predator Abundance Surveys

Goal: Establish baseline predator abundance levels in order to design appropriate larger scale predator control before future bird releases or translocations .

Status: Plan in draft form.

Task: Implement a 40 ha predator control grid for the control of cats, mongooses, and rats.

2014 Key Tasks and Deliverables:

1. Deploy camera traps in July to confirm presence of predator species suspected.
2. Plan being drafted in fall 2013 by ABC and MFBRP.
3. Trapping grid to be established in May 2014.
4. Follow-up monitoring of trapping grid frequencies still to be determined but likely will be scheduled after June 2014.

Locations: Nakula NAR

Collaborators: DOFAW, NARS, ABC, TNC

2014 MFBRP Staffing requirements: all staff plus interns, volunteers and technicians

Details:

1. Waiting on Institutional Animal Care and Use Committee approval for new kill traps for cats, mongooses, and rats through UH Manoa.

Restoration Seed Collection

Goal: Source seeds for Nakula restoration.

Status: Best seasons for plant phenology identified, one season of collections complete. All seeds either stored or planted out at Native Nursery.

Task: To collect seeds for the outplantings and seed scatter treatments in close proximity to where they will be planted.

2014 Key Tasks and Deliverables:

1. Collect seeds in Nakula in July, January, and April as well as opportunistically during any other trips.
2. Collect seeds that cannot be obtained from Nakula in Kula Forest Reserve throughout the year.
3. Work with LHWRP to get seeds from adjacent Hawaiian Homelands area.

Locations: Nakula NAR, Kula Forest Reserve, Waikamoi Preserve, Hawaiian Homelands

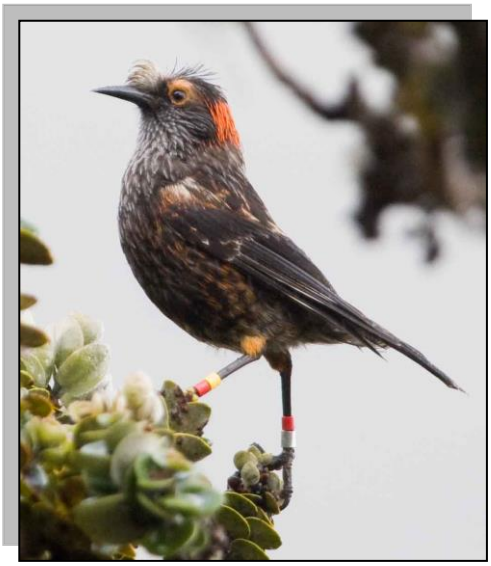
Collaborators: DOFAW, NARS, USFWS, LHWRP, ABC, Native Nursery, TNC, LHWRP

2014 MFBRP Staffing requirements: all staff plus interns, volunteers and technicians

Details:

1. Species included in trials include: kolea, mamane, mamaki, aalii, ohia, koa, olapa, pilo, akala, and kawau.
2. Some seeds are not going to be able to be sourced from Nakula and thus may only be included in the trials on a small scale (e.g. pilo, kolea).
3. Volunteers are a good resource for seed collection trips if each can be partnered with a staff member.
4. Akala seeds can be obtained from Waikamoi Preserve.
5. Further details can be found in the “Nakula Trial Restoration Plan.”

MAUI ALAUAHIO, AKOHEKOHE, AND IIWI



MARK-RESIGHT STUDIES

AKOHEKOHE MOVEMENTS AND DISPERSAL

MAUI ALAUAHIO USE OF NON-NATIVE HABITATS

Mark-Resight Studies

Goal: Monitor dispersal, survival, and home range of Maui Alauahio, Iiwi, and Akohekohe using marked individuals.

Status: Ongoing since 1997 for AKOH and MAAL, started in 2013 for IIWI.

Task: During all banding activities, mostly targeted at Kiwikiu, we color-band these species as they are captured. Resight data is maintained at MFBRP and is available for more in depth analyses as time and funding allows.

2014 Key Tasks and Deliverables:

1. Color-band all Maui Alauahio, Iiwi, and Akohekohe captured during active and passive banding efforts in PoliPoli State Park and Waikamoi Preserve.
2. Gather resights on banded Maui Alauahio, Iiwi, and Akohekohe during Kiwikiu and Akohekohe work in Waikamoi Preserve and Maui Alauhaio and Iiwi in Kula Forest Reserve.
3. Enter all data into resight database at MFBRP.

Locations: Kula Forest Reserve, DOFAW; Waikamoi Preserve, TNC

Collaborators: DOFAW, TNC, Northern Arizona University (NAU), University of Hawaii at Hilo

2014 MFBRP Staffing requirements: all staff plus interns, volunteers and technicians

Details:

1. Data for Maui Alauhaio are available for home range analyses as well as long-term survival between multiple field sites as of the end of 2013.
2. More marked individuals are needed for precise Akohekohe and/or Iiwi analyses.

Akohekohe Movements and Dispersal

Goal: Document Akohekohe movements and take foraging observations of both adult and juveniles using radio-telemetry in Waikamoi Preserve, Maui.

Status: Planning started in 2011. Field work pilot season began in summer of 2013. Three HY Akohekohe captured and tagged in 2013. Full-length field season spring/summer of 2014.

Task: Capture, radio-tag, and track both adult and juvenile Akohekohe.

2014 Key Tasks and Deliverables:

1. Summarize 2013 pilot season data.
2. Determine methods for analyses from 2013 data.
3. Catch ≥10 Akohekohe and record movements during 2013-2014 seasons.
4. Record foraging observations to quantify foraging plants used by individuals throughout the season.

Locations: Waikamoi Preserve, TNC

Collaborators: UH Hilo, TNC, DOFAW

2014 MFBRP Staffing requirements: one staff for oversight, 1 staff to assist with data management, 1-2 staff for field assistance, 1 graduate student, 2 volunteers

Details:

1. Alex Wang will complete an M.S. degree between fall 2012 and fall 2014 with the University of Hawaii at Hilo under Pat Hart.
2. Telemetry work will be completed by Alex Wang and assistants, February-June 2014.
3. Radio-tags will be under 3% of body weight and attached with Rappole harness.
4. MFBRP will house project when available, manage permitting, assist with logistics, and monitor and assist with all banding operations.

Maui Alauahio Use of Kula Forest Reserve, Maui

Goal: Investigate the use of non-native forests by native birds to evaluate the management of non-native forests on Maui for the potential benefit of native forest bird species.

Status: Planning started in 2009; Pilot study in 2013 to continue study in 2014.

Task: Investigate native forest bird species' use of the non-native dominated Kula Forest Reserve and compare bird densities among various vegetation structures within that forest.

2014 Key Tasks and Deliverables:

1. Full proposal to be completed by Peter Motyka in 2013 with MFBRP approval.
2. Summary of first full field season of data to be completed in the spring of 2014.

Locations: Kula Forest Reserve, DOFAW

Collaborators: DOFAW, USFWS, NAU

2014 MFBRP Staffing requirements: one staff for oversight, 1 staff to assist with data management, 1 graduate student, 2 volunteers

Details:

1. Peter Motyka to complete M.S. starting in 2013 with NAU, under Jeff Foster.
2. Study will include capture, banding and resighting of Maui Alauahio and Iiwi, quantification of vegetation structure, variable circular plot counts for bird densities, and nest searching and monitoring for Maui Alauahio.
3. As of July 2013, 2,200 ha of habitat surveyed , three 20 ha plots chosen as study sites, 129 points surveyed for birds by distance sampling and vegetation, 60 Maui Alauahio color-banded, and 16 Maui Alauahio nests found and observed.
4. MFBRP will house project, manage permitting, and assist with logistics.
4. 2014 field season to run February through June with MAAL captures and veg work.

OUTREACH AND COMMUNICATIONS

OUTREACH GOALS

EVENTS AND ACTIVITIES

SOCIAL MEDIA AND PUBLIC COMMUNICATIONS

CROWDFUNDING

PUBLIC HIKES

NATIVE ECOSYSTEMS AWARENESS TRAININGS

PUBLICATION SUMMARY

PRESENTATION SUMMARY

MFBRP Outreach Goals

1. Foster mutual understanding and cooperation between MFBRP, Maui-based conservation organizations, and State and Federal agency partners.

   Activities: Extend ties and foster relationships with MFBRP supporters locally and world-wide.

2. Increase island-wide recognition of MFBRP.

   Activities: Outreach education at community events.

   Educational presentations to community groups.

   Consistent and pronounced branding using MFBRP logo.

3. Improve local community awareness, trust, ownership, and accurate understanding of the MFBRP mission, native forest birds, and native forest bird habitat.

   Activities: Make brochures widely available island-wide.

   Direct supporters to our website through social media, print publications and outreach education activities.

4. Improve visitor awareness of threats to native forest birds and the on-going bird extinction crisis in Hawaii.

   Activities: Implement Native Ecosystems Awareness Trainings with tour guides.

   Pilot a partnership approach to outreach education with one or more local hotels.

   Pursue publication in Hana Hou magazine.

   Pursue a partnership with the Pono Project.

5. Increase global understanding of the uniqueness of Maui's native forest birds, the severity of threats to their survival, the plan for recovery, and options for helping.

   Activities: Submit articles to newsletters and magazines with national and international reach.

6. Increase and diversify fiscal support.

Activities: Broaden MFBRP's fundraising network.
Market "Give Wings to Great Causes" Hawaiian Airlines partnership.
Develop and implement crowdfunding campaigns.
Host fundraisers at supportive local businesses.

Events and Activities

We conduct periodic educational outreach throughout the year as time allows. During these events, we focus on educating residents and visitors about native forest birds, restoration, threats, and our research. Events include:

1. Fundraisers at supportive local businesses - up to six per year.
2. Outreach tables at community events and fairs - up to six per year.
3. Educational exhibit and presentations (e.g. Rotary, Makawao Library, Hawaii Audubon Society) - up to six per year.

Social Media and Public Communications

MFBRP employs a broad-based and multi-faceted communications program to meet outreach goals. Social media (Facebook), e-mail communications (MailChimp), and the semi-annual newsletter (Kiwikiu News) give MFBRP a wide reach for sharing project news, events, fundraisers, and volunteer opportunities with supporters. Social media and public communications are essential for increasing public awareness of forest bird recovery on Maui, engaging with the public, and increasing brand recognition.

Crowdfunding

Throughout the month of July, MFBRP is running a crowdfunding program to purchase trees from Native Nursery. The 2012-2013 seed collection efforts yielded a surplus of seeds that needed to be germinated immediately. There are 1,100 trees that will be ready for planting this fall but for which there is not another funding stream to cover. These trees are extremely valuable for restoration due to their source location.

Crowdfunding and other social media campaigns may be vital to ensure our project is sustainable in the years to come. This campaign is currently focused on supporters and restoration friendly contacts but if successful, the future could expand to businesses wanting to invest in carbon off-set options.

www.razoo.com/story/Nakula

Public Hikes

MFBRP offers guided birding hikes into TNCs Waikamoi Preserve on a limited basis. These are usually arranged for key supporters, collaborators, or project donors. Hikes will not offer to the general public unless MFBRP gets specific funding for such outreach activities. All hikes guided by MFBRP must be pre-approved by TNC.

Native Ecosystems Awareness Trainings

MFBRP, in collaboration with East Maui Watershed Partnership (EMWP) and Maui Invasive Species Committee (MISC) (together called the East Maui Environmental Educator Team) launched the Native Ecosystems Awareness Training (NEAT) program in 2013. The team will develop NEAT as a pilot program for tour guides operating from Waikamoi to Kaupo on the east side of Maui. Included in this program is a thorough

needs assessment and multiple review phases that solicit feedback from participants to maximize the program's value.

Currently there is no direct effort among East Maui conservation groups to provide information to tour operators about interpretation of Maui's natural resources. The role accurate interpretation plays in nature-based tourism is significant and is mutually beneficial to tour operators, visitors, conservation groups, and the nature-based tourism economy. Interpretation provides greater visitor satisfaction levels, which promotes continued visitation while also encouraging visitors' thoughtful consideration of the environment, and facilitates conservation ethics and practices.

Over the last two decades, leaders in the sustainable tourism industry such as National Geographic, Rainforest Alliance, World Wildlife Fund and The International Ecotourism Society have established tour operator training programs to address the need for interpretive expertise. These efforts have been supported by the World Tourism Organization (WTO), the United Nations Environmental Programme (UNEP), and the United Nations Educational, Scientific and Cultural Organization (UNESCO) through the Tour Operators Initiative for Sustainable Tourism Development (TOI). Coupled with criteria established by the Global Sustainable Tourism Council (GSTC), these successful and well-established programs provide an excellent framework for developing a guide training initiative in Maui County.

To address competing demands for organizational resources in the face of decreasing funding, EMWP, MISC, and MFBRP are leveraging outreach and education resources by partnering on this project. By working together to host NEAT, the three organizations can enhance the quality of interpretive information provided to tour guides, including awareness of Hawaii's unique natural resources and the work being done to protect them.

Summary of Publications for 2012-2013

Mounce, H.L. and D.L. Leonard. 2012. Habitat restoration aiding the recovery of the Maui Parrotbill. Biodiversity Science 6.

Mounce, H. 2012. Help Save the Maui Parrotbill. Winging It 24(3).

Vetter, J.P., Swinnerton, K.J., VanderWerf, E.A., Garvin, J.C., Mounce, H.L., Breniser, H.E., Leonard, D.L., and J.S. Fretz. 2012. Survival estimates for two Hawaiian honeycreepers. Pacific Science 66(3):299-309.

Brinck, K.W., Camp, R.J., Gorresen, P.M., Leonard, D.L., Mounce, H.L., Iknayan, K.J., and E.H. Paxton. 2012. 2011 Kiwikiu (Maui Parrotbill) and Maui Alauahio abundance estimates and the effect of sampling effort on power to detect a trend. Hawaii Cooperative Studies Unit, University of Hawaii at Hilo. Technical Report HCSU-035.

Mounce, H.L., Leonard, D. L., Swinnerton, K. J., Berthold, L. K., Iknayan, K. J., and J. J. Groombridge. 2013. Determining productivity of the Maui Parrotbill (*Pseudonestor xanthophrys*), an endangered Hawaiian honeycreeper - In third revision with Journal of Field Ornithology. Journal of Field Ornithology 84(1):32-39.

Jirinec, J., Rutt, C.L., Kutylowski, J.A., Wang, A.X., Kohley, C.R., Wheeler, S.R., Mounce, H.L., and J. Jeffrey. A Nest in Koa (*Acacia koa*) Successfully Fledged Two ‘Akiapōlā‘au (*Hemignathus munroi*). In press with ‘Elepaio.

Mounce, H.L., Iknayan, K.J., Leonard, D.L., Swinnerton, K.J., and J.J. Groombridge. Management implications derived from long term re-sight data: annual survival of the Maui Parrotbill (*Pseudonestor xanthophrys*) – In 2nd Review with Bird Conservation International.

Kohley, C. R., Rutt, C.L., Leonard, D. L., and H. L. Mounce. Maui's Protected Areas Shelter Long-lived Hawaiian Honeycreepers - In review with 'Elepaio.

Mounce, H.L., Raisin, C., Leonard, D.L., Wickenden, H., Swinnerton K.J., and J.J. Groombridge. Using genetic information to design reintroductions: examining alternative strategies using spatial genetic architecture in the critically-endangered Maui Parrotbill (*Pseudonestor xanthophrys*) - In prep (anticipated submission August 2013).

Garvin, J.C., Mounce, H.L., Becker, C.D., and D.L. Leonard. Using discriminant function analysis to accurately sex Maui Alauahio (*Paroreomyza montana*) - In prep.

Summary of Scientific Presentations 2012-2013

Mounce, H.L., Raisin, C., Leonard, D.L., and J.J. Groombridge. 2012. Contemporary Genetic Diversity for the Kiwikiu (Maui Parrotbill; *Pseudonestor xanthophrys*). Poster Presentation. NAOC-V Conference.

Berthold, L.K., Mounce, H. L., Motyka, P.J., and D.L. Leonard. 2012. Experiments with Developing and Using Supplemental Feeders for Kiwikiu (Maui Parrotbill; *Pseudonestor xanthophrys*): Potentials for translocation efforts and population productivity levels. Poster Presentation. Hawaii Conservation Conference.

Motyka, P.J., Mounce, H.L., Leonard, D.L., and J.J. Groombridge. 2012. Comparing mtDNA diversity in the Kiwikiu (*Pseudonestor xanthophrys*) and the Maui Alauahio (*Paroreomyza montana*). Poster Presentation. Hawaii Conservation Conference.

Mounce, H.L., Kohley, C.R., Rutt, C.L., and D.L. Leonard. 2012. Maui's Protected Areas Shelter Long-lived Hawaiian Honeycreepers. Poster Presentation. Hawaii Conservation Conference.

Mounce, H.L., Raisin, C., Leonard, D.L., and J.J. Groombridge. 2012. Contemporary Genetic Diversity for the Kiwikiu (Maui Parrotbill; *Pseudonestor xanthophrys*). Presentation. Hawaii Conservation Conference.

Mounce, H.L., Raisin, C., Leonard, D.L., and J.J. Groombridge. 2012. Contemporary Genetic Diversity for the Kiwikiu (Maui Parrotbill; *Pseudonestor xanthophrys*). Poster Presentation. North American Ornithological Conference.

Summary of Public Presentations 2012-2013

"Maui's Native Forest Birds: Past, Present and Future" by Laura Berthold

Kihei Sunrise Rotary Club, November 7th, 2012.

Makawao Public Library, September 5th, 2012.

AARP-Kihei Chapter, March 12th, 2012.

Wailuku Rotary Club in March, March 29th, 2012.

Kahului Rotary Club in April 9th, 2012.

“Maui Forest Bird Recovery Project: The past, present and future of Maui’s native forest birds and the work toward establishing a second population of Kiwikiu (Maui Parrotbill)“ by Hanna Mounce, Hawaii Audubon Society, November 2013.

“Maui’s Native Forest Birds: Past, Present, and Future “by Laura Berthold

Makawao Public Library, September 11th, 2013.

Hawaiian Island Humpback Whale Marine Sanctuary, July 9th, 2013.

Upcountry Rotary Club, May 31st, 2013 .

“Maui’s Native Forest Birds: Past, Present, and Future” by Peter Motyka, Lanai Blue Aina Trilogy Campaign, April 27th.

MISCELLANEOUS

OTHER TASKS AND MISCELLANEOUS PROJECT RESPONSIBILITIES

PROJECTS SEEKING FUNDING FOR FUTURE WORK

SUPPORTING PROJECT PARTNERS

Other Tasks and Miscellaneous Project Responsibilities

MFBRP is a fully staffed project with fiscal and human resource responsibilities to balance with research and management needs.

1. **Administration:**
    a. **Manage budgets, hiring and purchasing through PCSU / RCUH**
    b. **Maintain non-profit relationship via Tri-Isle RC&D, Inc.**
    c. **Host interns via AmeriCorps and UH Hilo**
    d. **Develop volunteer options through DOFAW, Tri-Isle and UH Manoa.**
2. **Apply for grant opportunities.**
3. **Publish results from current work in local social networks as well as the broader scientific community.**
4. **Present current work and findings at scientific conferences.**
5. Undertake training where applicable, including RCUH requirements, first aid, pesticide application, GIS, helicopter, and firearms.
6. Attend conferences such as the Hawaii Conservation Conference and other appropriate meetings.
7. Contribute to Working Group Meetings, specifically the Kiwikiu Reintroduction Working Group, and the Nakula Restoration Working Group.
8. Update the Kiwikiu 5-year Recovery Plan.

We also assist other science-based programs to gain new insight and experience in other techniques and protocols as well as to aid in overall conservation of Hawaiian flora and fauna. These events and activities include:

9. Volunteer for Leeward Haleakala Watershed Restoration Partnership to conduct forest restoration on leeward east Maui.
10. Trade personnel with Kauai Forest Bird Recovery Project and other partners as needed.
11. Assisting DOFAW with avian related projects and admin as needed.
12. Provide and oversee internships and volunteer opportunities when possible.

Projects Seeking Funding for Future Work

1) Nakula NAR Avian Disease Prevalence

2) Larger Nakula restoration

3) Kiwikiu Reintroduction/Translocation

4) Kiwikiu and Maui Alauahio Diet Studies

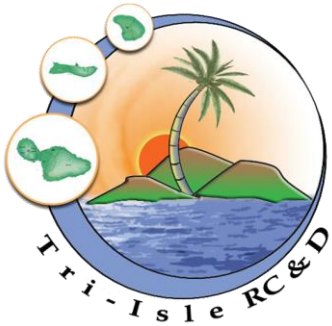
5) Outreach and education to expand current efforts and continue NEAT for year 2

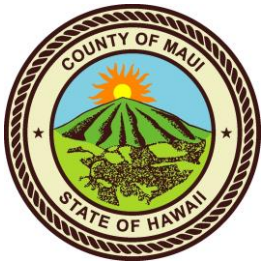
6) Repair and resurrection of DOFAW Forestry House for housing of interns and volunteers

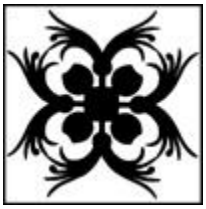
7) Analyze remaining survey count data from Hawaii State bird counts

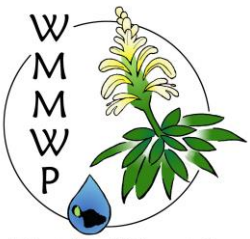
8) Akohekohe dispersal and movements applied to creating a second populations on leeward east Maui

Supporting Project Partners









West Maui Mountains
Watershed Partnership