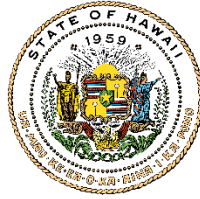


JOSH GREEN, M.D.  
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE  
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



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STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
KA 'OIHANA KUMUWAIWAI 'ĀINA

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HONOLULU, HAWAII 96813

**ENDANGERED SPECIES RECOVERY COMMITTEE (ESRC) PUBLIC MEETING**

**DATE:** October 30, 2023  
**TIME:** 9:00 AM HST  
**LOCATION:** DLNR – DOFAW Main Conference, Kalanimoku Building 1151  
Punchbowl St, Room #325., Honolulu, Hawai'i

Online via Zoom; and Livestream via YouTube recorded at  
<https://www.youtube.com/watch?v=OhGmLOXLolc&t=183s>

**DRAFT MEETING MINUTES**

**MEMBERS**

Lisa Hadway Spain	Kawika Winter
Melissa Price	Karen Cortot
Michelle Bogardus	Afsheen Siddiqi

**STAFF**

Myrna N. Giraldo Perez DOFAW	David G. Smith DOFAW	Kathryn Stanaway DOFAW
Kinsley McEachern DOFAW	Amanda Macias DOFAW	Danica Swenson AG

**OTHERS**

Marcos Gorrensens USGS	Kristina Montoya USGS	Corinna Pinzari USGS
Jennifer Taylor TetraTech	Scott Rotman Brookfield Renewables	Molly Stephenson Brookfield Renewables

**10.30.2023/9:07AM/ [00:0:21](#)**

**ITEM 1 - Call to order, announcements.**

Lisa Hadaway Spain called the meeting to order.

Myrna made the following announcements:

- Loyal is no longer with ESRC. Completed the two terms.
- Open seat at ESRC.
- Lainie Berry is no longer a representative for DOFAW. Dave Smith delegated Afsheen Siddiqi for this meeting.
- New member of the Habitat Conservation Planning (HCP) team, Amanda Macias (Kupu intern).
- Robert (Bob) Reed is no longer the representative for the USGS. Karen Cortot is the new representative.
- Tentative meeting in December 2023.
- Housekeeping rules
  - No questions or comments can be made in the Zoom chat.

**10.30.2023/9:09AM/ [00:02:47](#)**

**ITEM 2. Approval of Draft Summary Meeting Minutes from the following ESRC public meetings:**

- Two-Day Meeting: June 22, 2023 & June 23, 2023
- Two-Day Meeting: January 09, 2023 & January 11, 2023
  - Clarification on the meeting notes by Melissa Price.
    - Melissa wanted to know if Kawika's comments were to be added to the meeting minutes for the ESRC meeting in June 2023.
    - Kinsley clarified the changes had been made and will be in the final draft.
  - Melissa motioned to approve the June meeting minutes.
  - Michelle Bogardus seconded.
    - Afsheen voted yes.
    - Lisa voted yes.
    - Karen voted yes.
  - Motion to approve the January meeting minutes by Melissa.
    - Michelle seconded.
    - Afsheen voted yes.
    - Lisa voted yes.
    - Karen voted yes.

**10.30.2023/09:12 AM/[05:00:00](#)**

**ITEM 3. Presentation by the U.S. Geological Survey (USGS) and ESRC Discussion on the following manuscripts from the Hawaiian Hoary Bat Conservation Project:**

- Seasonal and elevational differences by sex in capture rate of 'ōpe'ape'a (*Lasiurus semotus*) on Hawai'i Island presented by Marcos Gorrensens.
- Multi-scale assessment of roost selection by 'ōpe'ape'a, the Hawaiian hoary bat (*Lasiurus semotus*) presented by Kristina Montoya.
- Genetic diversity, structure, and effective population size of an endangered, endemic hoary bat, 'ōpe'ape'a, across the Hawaiian Islands presented by Corinna Pinzari.

## Questions and Comments from the ESRC Members:

- Melissa: I had a question about the roost that was in uluhe; what was the height?
  - Kristina: In that uluhe, the found roost was only used for 24 to 48 hours and the height was two meters off the ground. An outlier for many reasons, and that was a high-elevation habitat.
  - Melissa: I've heard many people make odd comments when referring to uluhe like its invasive, coming from site managers and they were frustrated. It is underappreciated, the importance it has in holding the soil in place and you have found that it served as a bat roost which needs to be appreciated.
  - Kristina: Pictures of the roost were included in the paper, that demonstrate how the bat was using it.
- Melissa: Specific to ESRC, how can roost information be used to inform survey protocols or population estimates in the HCPs? How do you see this tying into improving HCPs?
  - Kristina: There are a couple of key takeaways for population. You always want to refer to the genetics as it is a more impactful measure of population. Key takeaways that we found include that there exist roosts in the edge habitats but there were caveats. Roost edges are easier to track bats back to. Edges are important, but they are not the only important thing. Big, dense trees are important for maternity roosts, and that is important to emphasize. Roost trees weren't only native trees. There's a legacy tree component for bat roosts, where I would caution the need to investigate an area if there is a big lychee tree within conservation areas.
- Melissa: There are a handful of things that the ESRC needs to look at. What is killing the bats, and how do we look at that elsewhere? With the information informing roost, how does your information inform causes of mortality and how do we make up those numbers elsewhere?
  - Kristina: It is difficult, and the big question is always how do we grow bats? All the information is connected, speaking to the roost aspect, the maternity roosts are one of the closer metrics we can get, in growing bat habitat, and we have identified more maternity roosts. For further ongoing studies, we need to look at how the roosts are being used, and why the bats are choosing these roosts.
- Afsheen: Following up on creating bats? One of the things in the HCPs we are looking at includes net conservation benefits How many non-native species the bats use, and how to rectify by using native species, 'Ōhi'a and uluhe. Do you have recommendations of native species that are used by the bats that we can recommend to these projects for mitigation or restoration projects?
  - Kristina: Uluhe roosts were an outlier. They did roost in lama and 'Ōhi'a. I think there is flexibility in the species. In some ways, that can be helpful. It is not necessarily species-dependent. There is more of a physical attribute to these trees that influences bats to roost in them.
  - Afsheen: The flexibility of species is understandable, but I'm just thinking of native species we can recommend. I know you said that Koa wasn't used much.
  - Kristina: Koa wasn't used much, but it is something that we have identified them foraging in, those Koa habitats. It isn't something necessarily what we saw them

- roosting in. There is sort of this roosting habitat and foraging habitat.
- Marcos: It gives us information on foraging habitats. Diversity is key, and some of them are slow growing, but it is never too late to start, and mixing in components with roosting and foraging is useful.
  - Melissa: Even though the 'Ōhi'a might not reach the height that would provide the benefit within the scope of the HCP, I think the high use and benefits highlight the importance of including these species in these projects, but it is providing a net benefit.
  - Lisa: In this discussion of roost, the maternity roost is really important, and understanding the structure of the maternity roost trees, the variability there, a lot of these projects will have to focus on what maternity roost needs are.
    - Kristina: Right, the very large lychee and mango trees used over years, are massive trees, and very old trees. The structure is in the way that you can have multiple bats in one tree, and there are lower interactions between bats given the roosts are far away from each other. You can plant these trees, but to get to the large trees, the aspect of the preservation of these large trees is important and an important component to conservation.
    - Marcos: We also suspect these large trees and structures would be related to rat predations. We see black rats in lower stature trees, and we don't seem them in tall trees. Tall stature trees might be one focus, but it does take time to grow those.
  - Melissa: Based on maternity roosts and pupping, were you able to get information on pupping success?
    - Kristina: There's some small data on pupping success, one of the challenges was that we would track a bat to a tree while we were searching for a tree, that a couple of times we have only found single bats, and the maternity clusters were unmarked. It was difficult to tell if it was the same maternity cluster for the whole season. If they moved within the same tree, it was hard to tell if it was the same cluster, and whether or not they moved or there was predation. We did not witness any predation, but we did witness rats in the trees.
  - Marcos: Rats were active close to the roost, and perch location. We also witnessed barn owls in the area. The mobility of the mom with the pups is essentially zero in the first few weeks. The mom can carry them for the first few days, but they are stuck in the roost trees until the pups start to ween. The mom can leave at that point and the pups themselves can change roost areas. This window of pupping success is very narrow, and it is complicated by the fact of unmarked bats in the trees as well.
  - Melissa: One take away I'm hearing, is to increase rat control and barn owl control in areas that are non-native species dominated to increase pupping success. I have read a paper of cats being a source of predation for bats as well.
    - Marcos: We didn't see cats, but rat predation is a significant impact. Because the bats perch on the very tips of these branches, there might be an indication of that the bats could leave if they must. Rat control is worthy of investigation.
  - Afsheen: The female philopatry that you're observing, I'm curious of how many individuals you saw that have returned to the same tree, and how often they are returning to the same tree?
    - Kristina: We don't know if it is female philopatry to the one tree we saw, which was several hundred years old. The landowners had seen bats in and out of that

- tree for decades and we investigated the tree since it was seen as a maternity roost for several years in a row. We asked if these bats were related, and if the pups came back year after year. And it made us ask why these large trees are used, and what is the relationship there.
- Karen: There was a paper bark tree that was also used right?
    - Karina: Yes. That paper bark tree was used for several years as a maternity roost, and it was not particularly wide, so we never found single individual bats. It wasn't used at the same time as other bats, but there was return to this tree to have pups.
  - Michelle: On the roost side of the presentation, I am understanding the trees and the fidelity issues more. We are looking at, we can look at the species of bat roosts, but we are also looking at species of trees of correct tree height and DBH that indicate a preference, correct?
    - Kristina: We had 56 roost trees of the 19 species, not all of them are created equal. In our model, fidelity was part of the selection. So, if you have a tree used for one or two days, that still counts. There is a subset of trees that were used over seasons and those are the trees that we want to emphasize because those trees were used for longer over time.
  - Michelle: Elevation, we have talked about an upper bound of roost trees. What was that elevation number, and did it change?
    - Kristina: For maternity roosts, it has been 1,000 meters (m) in elevation. For the roost we found, it was at an elevation of 894 m, and was an 'Ōhi'a, which holds for what we determined. During maternity roost season, we had higher elevation roosts, but for maternity roost, we had that limitation because of pups being vulnerable, so lower elevations made sense.
  - Melissa: For genetics, I was curious. It sounds like you're suggesting a species split? What is the timeline for that to take place? Who makes the decision?
    - Corinna This is still under active taxonomic debate; there is genetic evidence of the elevation of the subspecies to a full species. There are a number of bodies that do taxonomic work that have said. *L. semotus* should be a full species. It isn't recognized by the International Union for the Conservation of Nature (IUCN) database, and there is no sort of change to the naming of the U.S. Fish and Wildlife Service. It isn't something we've looked at specifically, but our information has continued to support genetic information that was found before. Morphological data could be used to help support the taxonomic issues. The genetic information obtained was lumped across the islands as one species.
  - Melissa: I know that for the birds, the American Ornithologists' Union (AOU) determines the naming?
    - Corinna: This is a debate going on in the bat community too, the American Society of Mammologists is suggesting a different genus name.
  - Melissa: What are the implications for us on the ESRC for the function of the HCP?
    - Corinna: Based on the information and data we are just saying *L. semotus* is a full species and different from the American *L. cinereus*. We are using it as a single species across all the islands. Other work being done has shown even genetically distinct populations by island.
  - Melissa: My memory is that the way Hawai'i Revised Statute (HRS) 195D is written it

calls out genetically distinct populations of species for plants, but not for animals?

- Afsheen: Yes, that is correct, but in general, if the impact is on a specific island, mitigation should be done on that island. We are trying to keep the impact and the mitigation in the same area the committee has supported.
- Michelle: Even if there was a taxonomic name of the species, it wouldn't change the species listing status. Changing the taxonomic considerations of the Hawaiian hoary bat will not change its protections.
- Afsheen: I believe it is the same on the State side.
- Michelle: This is not a recommendation, but if it were to be listed as distinct listed species by island that is a whole other ball game. That would be when we would have to look at the listing status per population per island.
- Karen: Michelle, the USFWS is doing a review currently for upgrading the species, and looking at the genus?
  - Michelle: We do five-year reviews for species on a cycle, and I can't remember where we are in the cycle for the Hawaiian hoary bat. I can go back to our team and find out. Every five years we reaffirm that the species is still needing the same species status.
- Melissa: The effective population sizes that are showing here, and I realize this is effective population size and not population count, can it go to critically endangered?
  - Michelle: For the USFWS the only designations are threatened or endangered.
- Melissa: I was curious while I know that effective population sizes and the actual population sizes relationships are hard to determine without intensive work, but with this small effective population size, can it be expected to be based off of founder effects because of relatively young island populations or are these reflective of population size?
  - Corinna: It could, but I don't know how to untangle that. I do think some of it could be that, but we have worked on other analyses that haven't been published yet and looked at pairwise sequentially Markovian coalescent (PSMC) analysis over time, on how populations could have changed. That kind of analysis could answer the question you had. There was some evidence of bottleneck in this paper.
  - Melissa: On Hawai'i Island we can feel decent about the relationship based off of the sample size and the effective population size. There is a fair amount of genetic diversity. Maui is equivalent, but O'ahu's effective population size is half the sample size. Could you talk about those relationships, the sample size vs the effective population size and what that might mean for the trends?
  - Corinna: For Hawai'i and Kauai'i Islands, you got the trends correct. I don't know how the trend would change for O'ahu if we collected more samples, but samples were obtained from all the possible sites, but it is interesting to see we don't have an upper bound of genetic diversity.
  - Melissa: These numbers speak to species on the brink of extinction and are very concerning.
  - Corinna: If you compare these numbers to other island species, they are on par with critically endangered species, for effective population sizes.

## **ESRC Members Provided the Following Additional Recommendations:**

Melissa: Population viability, and what mitigation can be done to help the viability, and what long term kills can be had. We need to account how each new HCP will impact the mortality of the bats. If the numbers are this low, every bat taken at wind farms is really concerning. And we need to determine how many bats we are allowing the wind farms to take, and how that informs how we make decisions for these HCPs.

Michelle: This is a conversation we need to have regarding roost sites and how this impacts the analysis of take under an HCP, and what recommendations could happen for mitigation for new projects. For all the projects we have now are already permitted, and that's done. For all of the new things coming online I would like to make sure applicants and permittees are considering the information that they've heard today when they are putting together the mitigation packages.

- I do expect that all of this information will inform future permitting decisions and on the USFW side, the issue of biological opinions. This will be taken back to our folks for other types of take authorizations and federal biological opinions that we issue beyond that of HCPs.

Melissa: Afsheen, on the State side, what's is the possibility of developing the population viability analyses (PVAs) and using that information to inform HCP decisions. I don't know how we, as the ESRC, can make good decisions without that information.

Afsheen: Unfortunately, we don't have staff that are able to do PVAs within DOFAW. We rely a lot on the USFWS for that information. We don't have the capacity to do that every time an HCP comes forward for an amendment or new ITL for bats. Just realistically speaking. We can definitely seek to work with USFWS or others, or it's a matter of contracting that out for the expertise that we don't have.

Melissa: I know you are limited on what the legislature would approve. But writing this out into a position description, it can be written in for software that is free to do predictive analysis models. There is a full range, and it is not unreasonable to ask for the basic level models. The baseline is the hardest effort you have to consider, and then tweak for newer HCPs. Hopefully you can write it into a job description. I don't see how we can make good decisions, as the ESRC, when there are so many projects impacting the same species and we don't have a single model to tell us the impact these projects will have on mortality.

Michelle: I struggle with the level of uncertainty in models, that being said we have to invest in the tools for uncertainty to inform us for decision making. The call would be to Marcos and with the information that we have, ask what makes the most sense given what we already have. There is a conversation to be had here for the appropriate approach, of if there is an array of approaches.

Marcos: Start with the white paper, in the guidance document which would be a good place to start as there is a PVA done.

Michelle: Thank you, I do remember that, now what has to be done is to update that information based on these new findings.

Melissa: This is something I would like to see DOFAW HCP do in house in future.

**10.30.2023/10:57 AM/1:51:06**

**BREAK: 10 Minute break**

**10.30.2023/11:10 AM/2:05:10**

**Public Comments:**

Frank Bonaccorso: Given the importance of legacy trees can a citizen stewardship recognition award be created to the private landowners, to keep these legacy trees open to these researchers and open to the bats?

- Marcos: I think it is a great idea, it is clear that we depend on access to private lands all over, and that is key to doing this research, and future research will also depend on that.
- Afsheen: DOFAW has a big tree competition every year to recognize trees that are significant. This is part of the forestry program, but there is some effort for people to get recognized for having a significant tree.
- Marcos: To follow up on that we do not want to disturb these trees, and roosts, so maybe we can recognize an area without attracting people to the specific trees.
- Karen: From the USGS standpoint we do keep these points secure to preserve the areas. I don't know if there is a mechanism for recognizing these people on the State or USFWS.
- Michelle: USFWS have several programs to recognize landowners, and I need to check back in with my team to see how to offer these recognitions to these landowners for bats.

Melissa: I had checked with the DOFAW HCP staff for the allowable number of mortalities for the existing HCPs for O'ahu alone, that number is 176, and we have an effective population size, according to the information, of 21. So, to me this is kind of a mismatch. We don't know pupping success, so I don't need a PVA to tell me we are at a concerning ratio. I just wanted to put that on the record.

Myrna: Comment from the public, we received a comment from Michael Whitby,  
"Hello,

*I wanted to pass along some information in regards to a question asked about bat species determinations during the ESRC meeting today. In the past there has not been a strong 'taxonomic authority' for bats.*

*Recently, the Global Bat Taxonomy Working Group was started by Dr. Nancy Simmons at AMNH to coordinate between the AMNH's batnames.org database, the Mammalian Diversity Database (MDD; hosted by ASM) and IUCN Bat Specialist Group. It's a network/working group currently, but with the idea that consensus can be built, decisions are published through Zenodo, and then those decisions reflected back to the MDD and batnames.org. The idea is that MDD will be the final authority given it has sustained support by ASM.*

*Thank you. Michael Whitby"*

**10.30.2023/11:55AM/2:55:58**

**Lunch Break**



10.30.2023/12:40 PM/3:29:44

**ITEM 4. Presentation by Jenny Taylor, on behalf of Brookfield Renewable Partners, and ESRC Review & Discussion of the Kahuku Wind Project Tier 2 Hawaiian Hoary Bat Mitigation Plan for the Helemano Mitigation Area at the 'Ewa Forest Reserve on O'ahu**

**Questions and Comments from the ESRC Members:**

Karen: In terms of the relationship with lease holder and the grazing people. Is there cooperation with the lease holder and the movement of the cattle? How does that play out?

- Jennifer: It is a land licensee, so the land is licensed to be grazed. My understanding is the licensee works with DOFAW on how the land can be used. It's DOFAW's determination. In discussion with DOFAW and the land licensee we've talked about if there is room for growth with the number of cattle on the site and could we use the intensive and focused grazing at the site for vegetation management. And it was determined to be able to do so through a Memorandum of Understanding (MOU) with DOFAW and it would have structural components with DOFAW and the land licensee. When the license is up, DOFAW states they have the ability to rewrite a request for proposal (RFP) for grazing so that Kahuku would be involved with the future land licensee.

Karen: If there is a significant increase in activity over the 3-5 years, what would be the plan after 5 years to maintain corridors? Does that fall back on DOFAW?

- Jennifer: One of the ways we see net benefit is long-term changes to the habitat and fire suppression. We've had conversations with DOFAW O'ahu about future funding, which would be discussed in the MOU.

Melissa: Clarification, order of operations, the details Karen is asking about, are you saying that those won't be written out until things are approved?

- Jennifer: The MOU isn't finalized because the plan isn't finalized. The MOU and the plan are parallel processes, and the MOU follows closely with the approved plan. We really sought to incorporate the numerous amounts of feedback in the plan from several people. We believe we have put forth a very solid demonstration of habitat improvement that will show a net benefit. We didn't want to jump into an MOU without approval. Because of the timeline with the end of the permit term, we wanted to start the baseline monitoring for a full year prior to the plan being approved.

Afsheen: I was curious about parcels 3 and 4 with open habitat areas where actual management isn't occurring, and why those areas were chosen as opposed to areas that are under it where there are more forested areas and habitat that could be created for the Hawaiian hoary bat.

- Jennifer: The parcels were chosen due to the ability to have focused cattle grazing, and the fencing was important to keep the cattle part of the plan. Also, understanding that there is edge habitat that could provide habitat for roosting was also taken into consideration.
- Tom Snetsinger: The fact that the cattle are using these fenced areas does provide for the longer-term management and the hope is to get the cattle to do most of the management and to make a self-sustaining environment.

Melissa: So, this is mitigation for take of 8 bats over 7 years. And essentially based on the

assumption that increasing food availability will make up for those 8 bats? What evidence do you have that food is the limiting factor/growth of the population?

- Jennifer: What we are looking at is the use of the whole area, and both by allowing for greater foraging opportunities and maintaining corridors, it increases the potential of food availability; the ability to have cattle move through that area is the intent. So, moving through that area and then potentially using those edges we created for roosting is how we think of the benefit.

Melissa: If the assumption is that food is a limiting factor and the need is to increase food, and if we assume that cattle dung increases food, and lanes increase food, and you've done an excellent job outlining a study that has done work to increase the food, what is the baseline assumption/evidence for food being a limiting factor because if that is what this whole plan is based around, then how is that making up for those 8 bats? Where did this assumption come from?

- Tom: This isn't just us looking at food, but based on the roost study, it is also increasing the edges to increase roosts. They don't have to travel far to carry out their biological needs. We are also providing easier roost sites, and that is the best understanding in increasing the concentration of bat habitat and the ability to open up the area to other bats. It does tie those pieces together.
- Chris Todd: In terms of "do we know if the limiting factor of the population size of O'ahu is limited on foraging opportunities, or the ability to find foraging sites, or the limitation of diet," no, we don't have an answer to that. We do know that use of the area is limited and some of the activities suggest that bats are traversing over the area, but the use of it is not heavy. The idea is that if you can increase foraging opportunities and increase food resources bats will start to use that as a foraging site and in doing so you would open up other areas for bats to use in that area. But if it is a limiting factor, it isn't known.

Melissa: If you are going to bring bats into the area by increasing food availability in the area. I'd like to see other areas that could address sources of mortality. Such as rat control, barn owl control, perhaps even cat control. If you are drawing them in, you need to address sources of mortality. And based off the information we heard today, also addressing issues that could impact pupping success. Those large trees are important, and I don't know if you have those at your site. It might mean you can add something slow growing, in those lanes, to maintain the open lane, but long term 'Ōhi'a are associated with long term insect diversity, long term roosting sites. And based on the information we heard today regarding the effective population; we need to look at sources of mortality and what can ensure that the 8 bats are offset.

- Marcos: Did you want us to provide feedback on the roost habitat and roost attributes?
- Kristina: Albizia were not found as a roost tree in our study, there were maybe one or two albizia dominated forests that we tracked bats to in our study, but we didn't identify them as roost trees. We need to look back at the study to see more specifically.
- Marcos: We did have a study at Kawailoa Wind that looked at bat foraging and found a correlation with *Coleoptera* beetles, specifically dung beetles. So, there is that link with bats and cattle and it is possible that enhancing both the structural components and the abundance of particular insects could increase the bats using the area and offset some of the fatalities. There is an 'Ōhi'a forest close by the site, and it is possible that bats are roosting nearby and could potentially benefit from the enhanced area for foraging.

- Chris: There are several roost tree species in the area. Albizia is not considered a roost tree, it is listed in the literature, but from the literature study we did, I mistakenly added albizia as a roost tree species. There are roost trees on site, including African Tulip. When going through the creation of the corridors, those trees will be kept. The combination of foraging corridors and roost trees could increase insect abundance.

Kawika: I have to leave to another meeting, I apologize. I wanted to point out that we have talked a lot about the monitoring methodology that has been used for years in these projects. And we have talked for years that there are sharp tools and blunt tools. I'm pretty sure in the bat guidance we have some language, and some decisions at the ESRC level that we were not going to continue to allow for the bluntest tools being used for monitoring, and I have some recollection about using thermal detection, as an important tool that all projects should be using going forward. I'm pretty sure I'm remembering that correctly, and if so then I would expect this mitigation to be held to those standards. I have to leave, but I just wanted to have this stated for the minutes.

Melissa: That was my memory too that we had discussed the importance of including thermal alongside acoustic moving forward.

- Chris: To comment on some of the monitoring beyond the single metric of an increase in detection rate. We were also trying to look at the local behavior and trying to look at how bats are using the area based on the local behavior. So, we have a series of metrics, so are we seeing passive calls or a change from those passive calls to a higher detection of feeding buzzes and looking at foraging durations. Are we seeing an increase in the amount of time spent at this foraging site? Are we seeing the time intervals throughout the night? We will look at groupings, or multiple detections at different detectors. To give us a better understanding of foraging behavior changes over time.

Melissa: How many monitors will be used; it seems like a lot for a small area. 180, 36 per parcel and control site. I'm used to working on projects with less capacity for monitoring. I'm curious what resolution of information are you hoping to get? And the tradeoffs of using thermal monitors instead that can get you population densities.

- Chris: There are locations that won't be continuously monitored over the course of the entire year. 3 detectors will be deployed at each parcel for a total of 15.
- Jenny: The map is comprehensive, and the monitors will be moved every three months.

Melissa: Can you provide the rationale for that given that bat activity changes throughout the year?

- Chris: We were hoping to look at occupancy and use it as a metric. The independence is the issue, and the site is small enough to have that issue. We are moving the detectors around so we can monitor the pockets within the corridors and be able to sample the area as a whole. We chose to keep the design to move them around as opposed to stationary units.

Melissa: How big is the area?

- Jennifer: The area is 176 acres. The legend on the map shows distance in miles. The distance that it covers from first entering the parcels to the tip is 2.5-3 miles along the road.

Melissa: How far away can an acoustic detector detect bats?

- Chris: About 50 meters in perfect conditions, but 30 meters in reality.

Melissa: Okay, I know you probably consulted Marcos, but moving every three months, when we already know there is variability throughout the year seems to confound the interpretation of the data, but obviously you have spent a lot more time thinking about this than I have, but I don't know. That design is very confusing to me as to why that would be done.

Karen: In the plan, the plots are a minimum of 100 meters apart? So often time it'll be more than 100 meters? It could potentially be more than that?

- Chris: It is a minimum of 100 meters, so it can be more than that.

Karen: Is this the setup you are using for the acoustic detectors, and I was wondering if you are going to use the same set up as WEST and was used in the previous study in the area in terms of height? I see you're going to keep them in the vegetation.

- Chris: They are within open areas, we moved away from using a pole set up. It is basically the same equipment, it is an SM4 with an SMM-U2 high frequency microphone. It is waterproof and angled at 45 degrees, and it allows us to move them more easily. They are within a range of 6-7 feet off the ground, where using a pole is 9 feet off the ground.
- Karen: I just want to make sure its comparable with the large-scale work WEST did throughout the island, I wanted it to be specific.

Melissa: If I understand correctly, the mitigation consists of cutting lane and removing vegetation from those lanes, and letting the cattle passively graze through those lanes to keep vegetation down. You have 15 monitors that will be moved throughout the site to look at system response, is there anything I'm missing from the mitigation actions there?

- Jennifer: Not from the primary, but the secondary is the inclusion of that dip tank from the water feature.

Melissa: Given the 8 bats, and if we have a population of 45, that's something. We only know the effective population. I would like predator control added to the plan to address mortality issues, particularly rat and barn owl control. I recommend continuing to provide samples to USGS; this would still be important with the intent of improving population estimates. Another consideration, instead of just removing invasive species, out planting native species, particularly 'Ōhi'a, that can provide that long-term net benefit to the species. I would like to see those three things, based on what was presented today, to directly address making up for that eight. You didn't present today on any of the things to decrease the mortality at the wind farm, is that part of tier 2?

- Michelle: No, it is not part of tier 2, it is defined by other things in the HCP.

Lisa: I've seen in the field is the take of bats by barbed wire, and it is interesting to see the analysis of the fence. Based on the fencing pictures in the report, vegetation covering a fence line is not good, especially if you have cattle, because the vegetation can make the fence lay down, and the cattle can escape. I wish DOFAW O'ahu was here to give us a better story about the fencing. From the perspective of someone who has had to worry about fence management and maintenance, I want to get a sense of how the barbed wire conversation went because that has always been a bat concern.

- Jennifer: Most of the areas of risk were along the road where it was most open, and it

was highly encased in vegetation along the back areas. The back areas kind of traverse a natural gully. We walked the fence line and saw it was intact from what we could tell, following the GPS fence line. The other component is the integrity of the fence in those areas is holding the cattle in and there didn't seem to be any concern about the cattle escaping. The fence line is intended to be monitored, but as far as a mitigation action we didn't feel the amount that would be changed as a result of that action would support much of a benefit based on the current risk to the bats being fairly low.

- Lisa: So, if take of a bat occurs during the course of this project, whose bat is it?
- Michelle: At least on the USFWS it would not be the wind farms. I mean we would have to look at it more closely, but my understanding is that it would be part of DOFAW O'ahu take. This is part of the ongoing conversations of barbed wire across the board.
- Karen: If there was an observed take would that trigger some sort of action in terms of dealing with the barbed wire fence? Because right now it is only part of the adaptive management. Has there been any discussion of what would happen if there was a take?
- Jennifer: The take of the bat was not taken into consideration in our mitigation plan. Part of that is based on our understanding of the risk posed by the fence. That is not to say that if there was take based on the barbed wire fence that we wouldn't bring up that adaptive management action. It is just not written that way for that scenario based on the risk analysis.
- Karen: I am assuming that part of the fence monitoring would include looking for take as well?
  - Jennifer: Absolutely.

Melissa: Going back to the principle of what we are trying to look at here is: I would like to see that we are making an effort of reducing other forms of mortality to make up for the predicted mortality at the wind farm. Following on Karen's comment, taking the preventative measure of removing the top wire, which from my understanding, is the riskiest portion of the fence; having that as a mitigation action shows good faith that we are removing all known potential sources of mortality in the area. We are addressing predators; we are addressing barbed wire fencing to create a safe haven for the production of bats and help populate other areas. I would love to see that added in even though it was analyzed as a low source of mortality. Removing it seems like a logical step in this plan.

Michelle: I want to note that the barbed wire predates the Helemano area being transferred to DOFAW O'ahu authority. This was part of a large land purchase and makes for interesting dynamics. I would like to know from DOFAW O'ahu, what the plans for barbed wire are across the site for future discussion.

- Tom: One of the concerns about replacing the top strand of barbed wire with smooth wire is that replacing wire requires clearing the fence. This is a balancing act to minimize exposure risk, while offering some identification if it became significant; this is what would happen during adaptive management.
- Jennifer: I'll add we did struggle with that concern because in order to address this we would have to create risk because we would be exposing the risk. This is where we landed, which would provide, from our perspective, the least amount of risk of the barbed wire fence to bats.

Michelle: Jenny did you talk to DOFAW O'ahu about this strategy for the barbed wire and they

were okay with it?

- Jennifer: Yes, we had conversations with them early on about what it would look like to replace it, and then again in looking at doing the fence line assessment in March. I'm trying to remember where we left off in conversation but using it as an adaptive management action seemed to be the best course of action. It is a possibility, dependent on the vegetation over the course of time at the site.

Michelle: I want to clarify, the trigger that would result in this adaptive management action would be if the project has not met the success criteria?

- Jennifer: If we start to see greater exposure which increases the risk of the fence. The trigger is at 20% high risk; this is the threshold for adaptive management.

Melissa: I am advocating in the situation, at the outset, of creating a safe haven for bats. We need to take a proactive approach to reduce sources of mortality, not just trying to grow food for bats.

### **Questions and Comments from the Public:**

Kathryn Stanaway: Reading through the plan, a suggestion: you made it clear in your slides that from the acoustic monitoring you are going to measure foraging behavior and roosting behavior, but it wasn't clear in the plan itself. I would make it a bit clearer so the public can understand the metrics. In section 1.2 you talked about how important it is to measure the changes in behavior as opposed to increased activity, and that is why I bring it up, just my suggestion.

### **Cont. Questions and Comments from the ESRC members:**

Karen: It isn't until the analysis section that the metrics of feeding buzzes come in, I think it would be beneficial to bring in the metrics of behavior in the beginning of the report.

Melissa: Karen what are your thoughts on the rotation of the acoustic monitors, if they are wanting to look at that level of detail from the metrics, but the acoustic monitors are moving to different locations each month, does that confound your ability to read the data?

- Karen: I think since Marcos is still on, he could do a more thorough job answering that question.
- Marcos: When we discussed this earlier: the advantage of moving the acoustic monitors, it becomes representative sample of the parcel. If you keep the monitors in the same location, you end up in a dead zone for monitoring or a placement that isn't optimal for picking up bats. So, moving around and randomizing every month amongst the parcel sites will give you a better overall sample of what is occurring in that particular parcel. The placement of the acoustic detectors is important, and there is concern about attaching it to the tree. There are some logistical issues with having the detectors on a pole in respect to cattle being present. But the placement is important; the detectors should be placed optimally, and Chris Todd has a lot of experience with this. Rotating the detectors will also be important with sampling thoroughly the parcels, as small as they are, in the most effective way.
- Melissa: Okay, I guess I just have to see how the data reviews. I just know that we have seen annual trends, but if you're moving each month and also looking at monthly trends,

but if they were in a different spot each time it's hard to parse it out, but if the goal is not to look at monthly trends and look at annual trends, maybe that works. I don't know. I'll wait to see what the graphs look like.

- Chris: Going back to mounting the detectors whether to a tree or a pole, you still have to deal with potential canopy cover. The corridors do not exist, as of yet, so you have to deal with the small overstory. We are working to move them to the open area pockets and are angling them away from the trees. I feel confident in the placement of how they are being used.

Chris: I do have a question, as I was a little confused, in terms of predation most of you had mentioned taking action towards predation, specifically you mentioned owls and rats. I know there was discussion during the USGS presentation, but I am not aware of any evidence that owls are predating bats, does that exist?

- Melissa: When we have been looking at pueo diets, not that you will be removing pueos, there was one event on the continent of short-eared owl pellets having bats. So, I think owls could be predating on bats, and I think that is a generalized statement. I don't think many predator studies have been done in Hawai'i, but Marcos mentioned it earlier.
- Marcos: Yes, that's just an anecdotal observation we did use a lot of thermal videos at the roost sites. At one of the roosts sites, we did see barn owl activity, and because it was so closely tied to the first night of when the pups started flying, they were very uncoordinated and they came back to roost, barn owls were present. We didn't see any take by the owl, but there is potential for predation. We saw a lot of rat activity close to the roosts.
- Chris: Did you see any evidence of mortality in general?
- Marcos: Not at any of the roosts.

Michelle: I have a very strong opinion of invasive species control, and would like it to be done, but I'm struggling with this being a recommendation from the ESRC and agencies to applicants and permittees because I just don't know yet on whether or not we have enough information yet. I am not confident right now formally recommending barn owl control or rat control as a means of mitigation. That being said, I think it is always beneficial to do those actions in combination with habitat restoration and everything else.

- Melissa: What I would push back on is that no one has given me a good explanation as to why all the mitigation funds should go into food availability. I think causes of mortality, controlling potential sources of predation is much more direct to making up the losses elsewhere that is caused by windfarms. I think there are equal amounts of evidence, and more to the point. For example, with pueo, what would you do to help pueo. In areas of predator control we have seen more pueo nesting. It's totally correlative. With bats we just haven't put in enough time to know what the sources of mortality are. Using best available knowledge across experts to say that these have been noted as sources of mortality elsewhere. It's in the literature that cats are a source of predation for bats. I think there is good probable cause to include predator control in something like this, and it is much more to the point. If you are going to draw them into the area, you need to create a safe haven.

Karen: Melissa, are you proposing for rat control for an entire area, or if a roost tree is

identified?

- Melissa: I think the amount of monitoring that is needed to identify a roost tree is not included in the plan, so probably looking at a grid in an area with a likely roost tree. I would defer to Marcos and team who spent time tracking bats to say where it would be most effective.
- Kristina: Identifying a roost tree in the area would include identifying the species most likely to be a roost tree and looking at images during nesting season. It is a significant amount of work to identify a roost tree, and more specifically a maternity roost tree.
- Marcos: The trees were identified by radio tracking bats to their roost trees, and then you start monitoring for predator control, which I think is outside the scope of this project.
- Melissa: Maybe to ask a broader question, and this would go to Afsheen, is this the kind of thing the mitigation plan could contribute to, rat control to help the broader restoration plans in the area?
- Afsheen: Unfortunately, I don't have my O'ahu Branch here with me today. I know when we purchased this parcel, it was for a number of things including bat habitat, recreation use (hunting), but I don't know the broader picture of what they are doing at the moment.
- Jennifer: It was our understanding that because the land is licensed for grazing, restoration for the Helemano section was targeted outside of the grazed areas.
- Melissa: It has always been hard for bats because we don't have great data of sources of mortality other than the wind farms themselves. The evidence of food availability being the limiting factor for bats is just as weak as the amount of data showing that rats, barn owls, and cats might be a problem. I just think it is important to go after those losses, especially if the numbers are as low as the genetics are telling us they are. So, I will continue to push for the best available we can do, and I am not convinced that what we are doing now is going to make up for the loss of the eight.
- Afsheen: Our management plan does include restoration above the parcels and that includes listed plants as well. Rat control does benefit the plants.

Myrna: In regard to O'ahu's management goals at the Helemano area as whole, one of the goals is to manage T&E species with the focus on the Hawaiian hoary bat. Post Kahuku, DOFAW O'ahu is committed to maintaining the bat lane corridors and the water feature at the site.

### **Cont. Questions and Comments from the Public:**

Frank: With regard to barbed wire on the fence, every strand is a threat to bats. Was the barbed wire assessment based off empirical data or just on the assumption based on how high the strand is off the ground?

- Chris: We looked at a metric system of a 1-5 scale. We looked at the fence and if it was completely encased in vegetation, if so, there was no risk. There was a large percentage of the fence line that was completely engulfed. The other thing we looked at was fence accessibility for bats based on vegetation, and how many strands were exposed.

Frank: Is the cattle lease a locked in deal, or is there a possibility of using goats/sheep to



provide the dung?

- Jennifer: From our understanding is that the license expires in the next few years, and the right of first refusal goes to the licensee, who is a cattle rancher. If that doesn't get removed, we have the opportunity for something like that, but right now it is strictly cattle grazing.

Frank: Regarding predation, there is no evidence of bats turning up in owl pellets, but there are lots of rodents. The same thing for cats. Rats, I don't know, but it is more probable. Like Michelle, I'm skeptical that putting a great deal in predation will reduce the overall mortality of bats.

Melissa: Frank, I'm hearing you say that complete removal of the barbed wire would reduce, in your opinion, a very strong source of mortality? I can find the paper that shows that cats are a source of mortality, and that the short-eared owl pellet had a hoary bat<sup>1</sup>. In regard to increasing food availability do you feel like that is going to help overcome a major barrier to population growth?

- Frank: Again, there is no evidence of what the limiting factors are for the bats, but listening to the plan, I felt like it is one of the best plans to date. Whether food is limiting or not, no one can say, I think enhancing food availability with some roost tree possibilities is a good thing to try. Whether that is successful you will have to wait. A question for the ESRC, when you approve a plan with an MOU and mitigation actions, does take permit kick in immediately or does the take permit trigger after an initial period of positive results being shown?
- Michelle: For USFWS side the permit is effective the day the permit is issued. Obviously, we always try to have mitigation happen concurrently with take authorization and/or beforehand. In this case, this is a long-permitted project that has been in operation for well over a decade.

### **Vote for Recommendation of Approval, Approval with Amendments, or Rejection**

Lisa: Is there anyone on the ESRC willing to make a motion?

Afsheen: I just want to make sure that we have quorum.

Lisa: Yes, we do, we have five of us.

Karen: For the adaptive management part, is it just DOFAW that approves the adaptive management plan, or does that go back to the ESRC?

- Jennifer: Our intent, with the plan, is to work on the adaptive management plan with both agencies (USFWS and DOFAW HCP) and it is up to DOFAW HCP staff to bring it to the ESRC, from my understanding.
- Myrna: Adaptive management, if need be, will be consulted between the two agencies, and bringing the plan to the ESRC is not a requirement. If need be, it is something, we can bring up as a potential agenda item.

Lisa: I would like to note that Melissa has provided a reference for cat threats to bats worldwide, can DOFAW add the article she provided to the meeting materials and minutes<sup>2</sup>.

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<sup>1</sup> Pending article citation

<sup>2</sup> Oedin, M., Brescia, F., Millon, A., Murphy, B. P., Palmas, P., Woinarski, J. C. Z., & Vidal, E. (2021). Cats *Felis catus* as a threat to bats worldwide: a review of the evidence. *Mammal Review*, 51(3), 323–337. <https://doi.org/10.1111/mam.12240>

- Melissa: I would like to note on the Web of Science, there are multiple papers on bats, not on our bat, but shows both the impacts of cats worldwide, as well as rats worldwide. There is solid evidence worldwide of the impact of cats and bats, although the work hasn't been done here. I think it is enough to say that there can be a benefit of predator control and the impacts of cat and rats on bats.

Michelle: I will be honest with the committee right now, in this point in the process this is the third time we have reviewed the plan, they have gone through multiple revisions, spoke with ESRC members and both agencies. I think that on the USFWS side we were intending to approve it as written, and we have the letter from DOFAW indicating their support for the completion of the drafting. I am inclined to approve it as written or with specific things we would like to see be included in the plan. It would need to be written out so that the permittee can go back with the specific revisions. We are struggling with new information coming in and making sure that we are making timely decisions based on information we have available to us at the time. I am anticipating that all the new information coming in will change things for upcoming permits or tiers. I just want to make sure we are making timely decisions with what we've got. Given where this project has been over the course of the past two years, I hope we approve it or give them very specific, clear direction, that would allow for those next steps to be taken. They are currently in tier 2, and I would like to see this move forward, or have specific guidance on how to move forward.

- Melissa: I would like to see one action that addresses sources of mortality. Three potential actions could include the removal of barbed wire. Moving forward we might not want to have an assumption that cattle are beneficial to bats if they need barbed wire. Other ideas include rat control, or cat control. Something to directly address sources of mortality. I'd like to see at least one.
- Lisa: From my perspective, it is always a challenge to think about native species restoration in non-native forest. Unfortunately, this is our reality moving forward. I would like to see success here to make sure our species survive. I too am concerned about the barbed wire, and perhaps there are ways that portions of the fence that are most exposed are addressed first. There are many ranchers on Hawai'i Island that have worked with fences that don't have barbed wire, with cattle next door, so I would encourage that to happen here. We can talk about this for the next 10 years, so we need to see if this can work.
- Karen: I'm in agreement, we are in the place where minimization of take is the most important thing we need to do, given the limited information of limiting factors, and this plan incorporates a lot of information.
- Afsheen: I would like to echo the comments made addressing known mortality issues here on Hawai'i. The barbed wire is something we can address directly. I don't want to speak for O'ahu's Branch, but if we can find ways of addressing barbed wire on cattle ranches in other places in Hawai'i we can find ways here. I would like to see this plan move forward.

Lisa: Motion to approve the recommendation with the amendment that at least one mitigation action is included.

- Melissa: Move to approve the current plan with the amendment of removing all exposed barb wire, and if more barbed wire gets exposed then it is removed and replaced with something that is not a risk for bat.

Lisa: Motion to approve the plan with the amendment of removing barbed wire. Is there a second to this?

- Michelle: I don't know if that can happen without speaking to the permittee. I'm happy to second, but I don't know if that makes any difference if the permittee can't agree.
- Tom: Yes, that is something that we have to regroup with the permittee. I think there is potentially some options that don't include removal, and there needs to be some practical exploration that needs to be done.
- Chris: Would a visual deterrent in areas of exposure be something that could work, from a practical perspective?
- Michelle: I would defer to others; I don't think visual deterrents have ever been tried before. That doesn't mean that it can't be used, but I don't have the evidence of it working for bats.
- Lisa: I have seen bats snagged in pasture fences and snagged in canopy covered areas. They can fly close to the fence and get hooked. I would say that the ESRC can make a recommendation, and if the permittee doesn't agree, more conversation needs to happen.
- Michelle: I agree with that Lisa. I would like DOFAW O'ahu to review the proposed plan for barbed wire and make sure they are okay with that.
- Jennifer: Am I understanding correctly that targeting the exposed areas of the barbed wire meets the intent as a mortality minimization and we could leave the adaptive management section of looking at enclosed vegetation, and a change in that as is, and have that as an adaptive management trigger? And we make these revisions, and the decision is that it can move forward, what happens?
- Lisa: As I understand this, if revisions fall within the viewpoint of the ESRC recommendations, the plan can move forward.
  - Jennifer: So final approval would be with DOFAW HCP, based on their understanding of the changes with the amendment that was voted on?
- Michelle: We would be voting on the plan with a recommended amendment. If the DOFAW HCP staff determine the revised plan adequately meets the intent of the ESRC's approval with the recommendation, they can move forward, if not it would have to come back to the ESRC per the terms from the HCP.

**10.30.2023/2:22 PM/5:14:48**

#### **MOTION**

- Lisa motioned to approve the plan with the amendment to reduce and take away the barbed wire in exposed areas.
  - Michelle seconded it.
  - Melissa voted yes.
  - Karen voted yes.
  - Afsheen voted yes.
  - Unanimous vote to approve the plan with the amendment.

#### **Final Recommendations:**

- For Kahuku: To continue providing the bat samples to the USGS.

- For DOFAW: To have DOFAW O‘ahu staff be present for these specific island examples/meetings.

**10.30.2023/2:24 PM/5:16:24**

**ITEM 5: Establishment of Quarterly ESRC Public Meetings for Calendar Year 2024**

- Myrna: Recommendations would include either the 1<sup>st</sup> or 3<sup>rd</sup> Friday of the month.
- Melissa: No to the 1<sup>st</sup> Friday because of standing faculty meetings.
- Lisa: Fine with the 3<sup>rd</sup> Friday, just double check on State holiday for those Fridays.
- Michelle: Can prioritize these meetings.
- Karen: 3<sup>rd</sup> Friday works well.

**10.30.2023/2:29 PM/5:21:54**

**ITEM 6. Adjournment**

- Melissa motioned to adjourned.
  - Michelle seconded.
  - Lisa voted yes.
  - Afsheen voted yes.
  - Karen voted yes.