

ENDANGERED SPECIES RECOVERY COMMITTEE (ESRC) SITE VISIT

February 15, 2019 MEETING MINUTES

Meeting Location: Auwahi Wind Farm, 20100 Pi'ilani Highway, Kula, HI 96790

MEMBERS: Scott Fretz (DLNR), Loyal Mehrhoff (At-Large), Lisa Spain (At-Large), Kim Burnett (UH), Gordon Tribble (USGS), Jim Jacobi (USGS), Michelle Bogardus (USFWS)

STAFF: DOFAW: David Smith, James Cogswell, Glenn Metzler, Lauren Taylor, Fern Duvall
USFWS: Darren LeBlanc, Diane Sether, John Vetter

AUWAHI: Lisa Briggs, Marie VanZandt, Marilyn Teague, Steve Perrizo, Jeff Stuber, George Akau, Alicia Oller (TetraTech), Matt Stelmach (TetraTech)

OTHERS: Mitchell Craig, Sean Moura, Kirk Tomita, Ethan Romanchak, Diana Crow, Kaimi Konaihele, Donna Sterling, Kaleo Cullen, Laura Berthold, Chad Newman

AGENDA

ITEM 1. [Site visit to Auwahi Wind Farm to inform the ESRC review of the Auwahi Wind Farm draft Habitat Conservation Plan \(HCP\) amendment published in the OEQC Environmental Notice on December 8, 2018.](#)

SCOTT FRETZ introduces himself and calls the meeting to order.

FRETZ: The purpose of this meeting today is a site visit for the Committee. We're going to visit a couple sites. For the public, you guys are welcome to come along to that and there is a waiver that you need to sign and there's going to be a briefing from Auwahi here that you need to see.

ESRC members identify themselves by raising their hands and stating their names.

FRETZ: For those of you from the public, those are the Committee members that are interested in hearing your comments and testimony, and there will be an opportunity for that today. The Committee is not going to deliberate on any issues or make any decisions today. The purpose is to go and see things on site firsthand in the field. Of course you can talk to the members anytime you want in the course of the day. Auwahi is going to talk to you about safety and behavior.

MARIE VANZANDT: I am Marie VanZandt and I am working with Sempra on the Auwahi HCP. Thank you everybody for coming. Over in the corner is Steve Perrizo, the plant manager, and Jeff Stuber, the operations manager, so he is going to be chatting a little bit about turbine specific questions. And George Akau, the project biologist, many of you know him. I'm going to turn it over to Jeff and George to provide the briefing.

JEFF STUBER: Welcome to Auwahi Wind Energy. We're just going to go over a brief introduction here and get everyone on their way. We're going to talk about the site visit schedule, the route we're going to take, and then some basic safety items as well.

JEFF STUBER points out the wind farm and mitigation site boundaries on a map.

We are connected electrically via an overhead electric gen-tie line to our project substation which is located just behind Maui Meadows. The main highway everyone took out, Kula Highway, turns into the Upper Pi'ilani Highway; that's the main route to the site. There are some alternate sites that were approved to bring the large turbine components during construction to this location here.

A brief overview of the project. We achieved commercial operations on December 28, 2012. Installed generation capacity on site is 24 megawatts of wind turbines. We also have an energy storage component as well of 11 megawatts, 4.4 megawatt hours. Annually we power 14,500 Maui homes. Our OP taker is Maui Electric and we have a 20 year agreement at the project with Maui Electric. Some brief technical specs on the turbines, and we can get more into this at the site visit down there, but these are 80 meter towers with a 101 meter rotor diameter, roughly 8,000 meters squared rotor swept area. Kinda the industry height right now for wind turbines across the U.S. is 80 meters. The Kawailoa site which some of you recently visited, they're a little taller at 100 meter towers. It really depends on the wind resource for the site, how they spec these out. The tower itself does have an accession ladder all the way to the middle, that's how the technicians are able to reach the top to perform maintenance and address any issues with the turbines. These are a little bit different and newer technology. These are direct drive wind turbines, meaning it has no gearbox up inside the nacelle. There's quite a bit less moving parts in this technology. It's really taken off in the offshore application and it's been working really great for us out here. Siemens builds these wind turbines. And we can get into more technical questions down at the pads later.

GEORGE AKAU: Some of the species are the species that are listed here in our HCP. The Nēnē pen up at the National Park. This is how the 'Ōpe'ape'a restoration site used to look, a little Koa popping up. The 'Ua'u, the Hawaiian Petrel; all the sites now you can see are pretty clear, but below Skyline Road up there in DHHL, Kahikinui plans up there, 800 acres. And the Blackburn's Sphinx Moth: you can also see that restoration site if you look up the hill for the 1,500 'Aiea trees that are planted up there in 600 acres of dryland forest that were made with the Auwahi Forest Restoration Project.

We're pretty busy out here. We do a lot of community engagement. We team up a lot with Maui Nui Seabird Project. We help with the banding of the adults at the beginning of the season and the chicks at the end. March usually, the shearwaters start showing up. Also we take out community members, friends, other partners to help us do some restoration and learn from their projects how they're doing restoration. We just recently went up with Leeward Haleakala doing some plantings up in their Nakula area. We try to participate with Kahikinui homestead area. The most recent one is a bus stop. The Hawaiian Sailing Canoe Association, we've partnered up with them over the last year and we're working on a volunteer trip out to Kaho'olawe to do some restoration out there. Last year we sponsored the Hawaiian language event, the Ho'omau.

GEORGE AKAU provides instructions on signing in, signing liability waivers, safety, and driving to the sites.

SPAIN: Can I ask a question? On the map that showed Kanaio NAR, what's the land use in that area that is below Kanaio? Is that State DOFAW land? I'm thinking about we're doing restoration and there's these highly protected areas of native forest, and I'm thinking about where bats live. It would be helpful to put perspective on that.

FRETZ: Good point. There's a parcel of unencumbered State land that recently DOFAW has been moving forward with the intent to do management there for compatible uses. Those compatible uses would include shoreline protection, recreational trails and access—there's a historic trail that goes through here, the King's Trail, the Holapili Trail—and have public hunting up here, and endangered species protection in areas where endangered species are present. That's in the early planning stages so an EA and a management plan will be put together for that. So there's potential opportunities for mitigation in some of those areas, but there's not a management plan assembled yet.

SPAIN: But it's got ideas of broader public use and potential forest?

FRETZ: It is available for habitat management activities, yes.

SPAIN: Thank you.

MARIE VANZANDT provides carpooling instructions and the group transits to the turbine pads.

JEFF STUBER: First of all, any mechanical or operational questions on the wind farm while we're standing here?

MEHRHOFF: So each of the turbines has its own wind meter?

JEFF STUBER: Correct. You'll see if you look on the top, on the back of the nacelle there's the cooling tower which houses the radiator and on top you'll see wind instrumentation. We have primary and secondary wind vanes, anemometers, lighting detection and protection, and aviation obstruction lights, the red flashing beacons. There is a speed up calibration used to offset the weight coming off of the rotor in front of the instrumentation.

MEHRHOFF: Do you have a met tower here?

JEFF STUBER: We do. You'll see it down the hill, it's an 80 meter permanent met tower, the red and white tower behind us.

MEHRHOFF: Does it provide the wind speed difference between the wind tower and the turbine?

JEFF STUBER: It's more of a reference. During the power quality testing in the beginning or just coming out of construction, that was the primary reference for the test unit which was Turbine 6. Those were correlated to each other.

UNKNOWN VOICE: What's making the whistle?

JEFF STUBER: Depending on the blade angles you may get a whistle on some of the blade tips that are coming through the air. The rotor operational speed is about 16 rpms; the tip of the blade, however, is moving pretty quickly, just under 200 miles an hour. About 187 miles per hour. Just to give you a little reference there!

The turbines all operate independently from one other to track the wind direction. You'll see they're all pointed in slightly different directions so they all operate independently via their logic controllers inside. And then they're all controlled via a master part controller up in our operations building, which makes the whole site behave as one generator in the eyes of our OP taker Maui Electric.



Photos A and B: Auwahi Wind Farm turbines.

FRETZ: Is that area outside of the pad part of the search, or not searched? The vegetation, rocky area there?

GEORGE AKAU: Right now we just search the pads and the roads. And you can see all the PVC orange/blue pipes: that marks out the search area on the pads and the road. We used to search out there, 100 meters out into the bushes. We have some data for that if you look back at our past reports. But the pads and the roads, we started doing that with the humans and over the last year we switched over to dog searching and right now, if you wanted the SEEF numbers, 100% on the pads and the roads.

JACOBI: If you're just searching here, why can't you achieve 100%? It looks like you can see pretty quickly.

GEORGE AKAU: It does. But when you test them, it's not the case. It's about 70%. You can look back at past reports, but 60-70% with humans. It's just hard out here, they're little. We use surrogate rats for the bats and it kind of blends in with the landscape. On the road we had a forklift driver, a contractor, find one. An incidental find. If you see a wing, definitely large birds you can get 100% with humans, but rats or bats, it's a lot harder. There's a lot of data on human searches out there on other sites.

MARIE VANZANDT: George, would you like to add anything on the thermal or acoustic work that's going on at the site? And then we can open up for any last questions.

FRETZ: Okay. And are you going to talk to us about deterrents, or any other issues?

GEORGE AKAU: Right now we have a monitor at the top of the turbine, right on top of the radiator tower up there. We're using Elekon Batloggers. The Natural Power Consultants, Ltd., Christine Sutter is doing that. Now we're doing a risk analysis of the rotor sweep area because the Elekon units can detect bats throughout the rotor sweep area unlike other detectors that don't have that much of a range. Also, to follow up to that study, the USGS is doing a thermal study. They're looking up at the rotor sweep area and correlating the acoustics and thermal detections and seeing if when bats are up there, are they silent. Just looking at the risk, what the activity is at the turbine and the rotor sweep area at different wind speeds.

JACOBI: Are you doing any acoustic monitoring around the site in a larger sense, too?

GEORGE AKAU: USGS and TetraTech in the initial years, TetraTech did two detectors on site right here between Turbines 1 and 2, and down at Turbine 6. That data is in fiscal year annual report 2015 or so. And then, USGS in last year's report put out the detectors throughout the site on the far side. Not in this area but on the Ranch property on the far west side. They have some data. That's all public.

JACOBI: Is that continuous monitoring, or is that just a one shot and that's it?

GEORGE AKAU: The USGS study is still working on the analysis. This would be the third study that's being done down here.

SPAIN: Is there a particular take number per tower? Are there certain towers that have more take than others?

GEORGE AKAU: Yeah. This one is probably one of the towers that has the highest observed take.

MARIE VANZANDT: There have been 21 found bat fatalities here across the site. They've been found at each of the turbines but at different levels. Bats have been found at all the turbines; maybe six at this turbine, four at another. I don't know the numbers quite off my head but it isn't statistically significant

per se for particular turbines, but we do know that more bat fatalities occur at the top four than the bottom four, and that is something that we can say.

UNKNOWN VOICE: Was there not a spike when they had the big fire in Kahikinui, and then it has come down again?

MARIE VANZANDT: Yes, when was that? 2016? There was. We had higher take that year than any of the previous years and there was a fire out there. This side is known for fires. I think Donna, you can speak to the fires on this side of the mountain. Definitely, depending on the year, they get fires out here and that was definitely a big year.

DONNA STERLING: We've had seven fires since '03 when we moved here, but that was the largest one with three or five different spots that were started along the road. That took six weeks, maybe two months to burn 6,000 acres, all the way up to the top. My house was burnt around. Our other foundation was burnt around. So I didn't know that the impact of a fire would impact 'ōpe'ape'a.

MARIE VANZANDT: There was also a lot of hurricanes that year. All of us are trying to find the answers. That's something that definitely was pointed to.

JACOBI: Do you have any plans to try to work in deterrents other than the smart curtailment, which isn't a deterrent, that's more of a reaction?

MARIE VANZANDT: Right now it sounds like Kawailoa is going to be implementing deterrent technology out at the site and I think we're all excited to see the results of that, and see how effective it is for Hawaiian Hoary Bats. At this point we're implementing minimization measures of 6.9 meters per second from August through September, and 5.0 meters per second for the rest of the year. Those are minimization strategies that we know have been proven effective on the mainland and we're waiting to see the results of the deterrent studies here in Hawai'i.

MEHRHOFF: Is there any difference in the wind speed between the area up here and the area down by the coast?

STEVE PERRIZO: Yes, we have seen the more consistent wind speeds will be down towards the bottom of the site here. Number 8, for example, is our best performing wind turbine overall. So it's not only all the higher wind speeds we'll see down there consistently, it's the more consistent production winds overall we'll see down towards the bottom. Or it can be a little bit more turbulent too if you compare the top of the site versus the bottom. That may be because of the ridge here up in front of us. Our normal direction is northeast. Trade winds coming through, we may get a little more turbulence coming off these ridges right in front of us, versus down at the bottom where it's got a nice clean wind coming up the channel right here.



Photo C: ESRC site visit to Auwahi Wind Farm on February 15, 2019.

ITEM 2. Opportunity for public comments at Auwahi Wind Farm.

FRETZ: Any other questions? Public comments at this time from what you've seen at this site so far? Okay, seeing none.

ITEM 3. Site visit to the existing Tier 1 Pu'u Makua mitigation site and proposed Tier 4 mitigation site for the Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) take mitigation measures outlined in the Auwahi Wind Farm draft HCP amendment.

MARIE VANZANDT: We're up here at the Pu'u Makua Tier 1 restoration site. A couple things I want to point out: right below us is what's being proposed for the Tier 4 mitigation site. So you see that it's mostly pasture down there. There is some Koa out planted at the Ranch, some experimental Koas. There's those dead Eucalyptus trees out there in the background. I think the beetles are attacking them. Is that right, Diana?

DIANA CROW: Yeah.

MARIE VANZANDT: The Tier 1 Pu'u Makua site, it's a 130 acres. It's put into a conservation easement in perpetuity. There's an ungulate proof fence that surrounds the entire area, and within the Pu'u Makua area there's about 40 acres that have been out planted and that's about 13,000 plants. And then there's this existing out planting from Art Medeiros. It's about ten acres, and just to give you a perspective on time, this Art Medeiros area was planted in 2004, and this area down here was planted in 2015. So we have Koa out plantings and interspersed is 'A'ali'i, some Umeke, a bunch of other different

species. On this hillside too, just to talk about growth time, there is 'Ōhi'a out planted on this hill at the same time in 2015 and you can barely see them, but you might see them popping up about a foot or so tall.

In terms of Tier 2 and 3, this is also where the bat research took place in this parcel and the surrounding, we call it the Waihou area. So there were five bat detectors and then later on more were added. There were two on this ridgeline over here. One at the bottom of this out planting near a gulch sort of area. Some up here in sort of an open pasture near Wattle, and we're just getting the results from that two and a half to three year acoustic study, which is exciting, some of the results coming out of there. For instance, one of these acoustic meters before the restoration work had been done it was at about 17% detectability and now it's up to like 90%. Anecdotal, but exciting in terms of the acoustic work that is being done. In terms of other things I might want to point out, we did have a big radio telemetry component initially as part of the research project but as you were driving up you saw those big communication towers, and that caused some electromagnetic interference, so we had to drop that portion and focus more on the diet of the bat. 12 bats were caught out here and we're going to go visit the area where those bats were captured—we call it the Duck Ponds. I'll turn it over to Scott for the official commenting.



Photo D: Pu'u Makua Tier 1 restoration site facing makai.



Photo E: Pu'u Makua Tier 1 restoration site facing makai, just right of Photo D. Proposed Tier 4 mitigation site is the light green pasture in background.



Photo F: Pu'u Makua Tier 1 restoration site, right of Photo E turning to face mauka.

JACOBI: In this area here is your management going to be focused on the invasion of Wattle and pines and things like that? Is that part of it or is it planted and done?

MARIE VANZANDT: Yes, and Dave brought up a good question in the car which I wanted to touch on too which was about success criteria. For success criteria for Tier 1, there were two success criteria and the first one was percent cover of woody native species. They want by 2025 there to be a 50% cover within the 130 acres. The second success criteria was percent invasive target species. The target species are

the Black Wattle, the Bocconia, Monterey Pine, and Tropical Ash. I think Claude is out here, Claude did the initial big push with removing a lot of the Black Wattle, Tropical Ash, and Monterey Pine in the first couple years, and now it's a lot of just maintenance and keeping an eye. The guys come through twice a year, do sweeps. For the most part I don't think there's any of those particular species alive in here.

GEORGE AKAU: Yes, still working on the seeds that pop up, especially along the fence line where we have the Black Wattle right outside on that side.

JACOBI: There are no ungulates in here at all, no pigs?

GEORGE AKAU: No. Once they put the fence in, 130 acres is pretty much ungulate free.

JACOBI: And how are you monitoring the cover?

MARIE VANZANDT: So there is a yearly protocol for percent cover with line intercept method. We summarized the past four years of data in the annual report that you guys are all reviewing. There's an appendix in there that talks about the methodology.

ETHAN ROMANCHAK: Would you say you've been above or below your expectations, just going into it a few years?

MARIE VANZANDT: I feel it's been above my expectations in terms of survival of the plant species. With the fence we've had over 90% success. If we put a plant out here it's going to survive, it's going to grow. Every time it's exciting to come back up and see those Koas two or three feet higher.

JACOBI: Are you concerned that a component is 'Ōhi'a and it's going to take a lot longer to get to that goal?

MARIE VANZANDT: Yes, and the management side of that is what is sort of concerning, but at the same time we sort of knew that going in and tried to focus in certain areas if we were going to put 'Ōhi'a.

JACOBI: I think part of it is it is a long term perspective in terms of where things are going and in some ways that's a valid approach there, but it may not be quite as timely in terms of doing the kind of mitigation you need because of those kind of issues. It's something that may be worthwhile to talk about in the ESRC at the review.

GEORGE AKAU: There's other tree species like 'Ōlapa, Kāwa'u, there's a whole hub of Kae right over there, Māmani, Kolea. They just don't grow as fast. There's a whole patch of Kolea in the grass over there.

JACOBI: By themselves it's hard for them to get going. You really need a matrix.

UNKNOWN VOICE: The Naio.

JACOBI: Yes, Naio would be good.

GEORGE AKAU: There's some Naio. They're just slow growing as well. There's some Lā'ua plant.

JACOBI: So your goal is really more aimed at tree cover rather than trying to recreate any kind of a former native vegetation type.

MARIE VANZANDT: I think that's a secondary goal. We are trying to within the area that Art Medeiros and his team planted out in 2004, and Diana was a part of that work, starting to go back in there and put in understory type plants and build the diversity. But first goal is percent cover of woody species and making sure we have that canopy for bats.

GEORGE AKAU: It also helps with our grass. The leaf litter that the Koas produce helps with the grass maintenance in those areas.

MEHRHOFF: Speaking of grass, do you remember when Art did his, did he take the grass out before he put his in?

MARIE VANZANDT: Yes. So Art had different goals and a different concept. What he did was control the grass, put out 'A'ali'i, and then from there build in tree species. His was from the bottom up, while ours is from the top down.

MEHRHOFF: Are you going to be able to compare those two techniques at the end of this?

MARIE VANZANDT: I think it's something that could be compared, and possibly put acoustic meters out there. His project is a really exciting project. Part of our Blackburn's Sphinx Moth work was supporting that and the 'Aiea trees.

DIANA CROW: And we did two different controls at that time. We did big blanket herbicide. We also started doing like small circles that we were planting in, but that got easily invaded. But we were always aware of erosion potential. It was kind of hard because they're pretty steep areas.

MEHRHOFF: Do you think with what you've seen here and there you'll be able to compare and get some learning out of that?

DIANA CROW: If they ask me I'll throw my two cents in, because now I'm not working on this area here, so I don't really know.

MATT STELMACH: I think there's two different goals for the sites. This is a mitigation site and that is a restoration site.

MEHRHOFF: I'm just saying at the end, can we do a comparison of which one works best not only for bats but for other things as well?

MARIE VANZANDT: I think you would have to start investigating what bats are doing in that area.

GEORGE AKAU: But yeah they go through. They still control grass. Bocconia is another one that creeps into the area.

MARIE VANZANDT: They're a little lower too. They have to deal with the Glycine. Up here we don't have to deal with it as much. We're happy it's not up here.

KAIMI KONAIHELE: It likes to stay in lower elevations. It's like a belt that comes through. It doesn't really want to come above that level. If you were to drive down through it you'd see it weaving through the grass a little bit, and you start seeing it on the fences, then you get to an area where it is all you see.

FERN DUVALL: The other big difference was for Art's, trying to create plants that are going to do a lot of leaf litter, that he was hoping would be the suppression of other weedy type species.

KAIMI KONAIHELE: Once he killed the grass he wanted something to be up here quick that would help keep the grass submissive.

ETHAN ROMANCHAK: And they're inherently different sites. More of a soil profile here; rocky there. Wetter here.

FRETZ: Looking at this area—and you guys said you planted other species besides Koa—what other species did you plant and how many relative to the Koa? Because it looks like it is a lot of Koa.

MARIE VANZANDT: Yeah, it was predominantly Koa. I would say 50% of the plants were Koa because our goal was woody species, fast growing. But also I think 10-15% 'A'ali'i, Naio was another one that I think was about 10%. I'd have to go back for the numbers but the main ones were 'Ōhi'a, Naio, 'A'ali'i, Māmani.

FRETZ: And you said survival is high. Is it high for all of those species or are there differences?

MARIE VANZANDT: There were some differences but I would say overall it was high for most all the species. The one that we did have more of a hard time with was Māmani. Were there any others overall we had a hard time with?

GEORGE AKAU: Just in certain areas. Like Māmake doesn't do so good in here. In the cindery slope areas it does really good. 'A'ali'i sometimes. You think it would do good up here, especially looking at Art's, but not in the grassy stuff, but definitely in the cinder slope area. Certain areas they do better. They're still alive.

FRETZ: So you guys made the comparison to Art's stuff, top down to bottom up. So in 20 years, are you going to get there from the top down to where Art's is, from the bottom up?

MARIE VANZANDT: I think that's what our goals would be but overall, in terms of it is a mitigation project and we gotta meet our success criteria—our number one goal is to meet the success criteria, reduce invasive species and increase woody canopy cover—but ultimately it is a restoration site, and we want to increase diversity and have an understory.

FRETZ: So the criteria didn't have diversity in it, it just had woody species, 50% cover?

MARIE VANZANDT: Yes.

DIANA CROW: There was also a component with you needed to have so much open space within, as well, not even considering all the pastures around it.

MARIE VANZANDT: Yes. In talking about strategy with DOFAW and Fish and Wildlife, even back then, we were talking about edges, corridors, and they were like, let's make sure there's bat lanes. And that's why it's sort of chunked out so bats should be able to traverse the area, but it's also a lot of edge habitat, which we've been learning from the H.T. Harvey guys is important.

FRETZ: So for Tier 4, the hedgerows you were talking about were down through that area over there?

MARIE VANZANDT: So the Tier 4 site is right below us. The fence sort of cuts down right at the bottom of the hill. So all that open pasture right there is what is being proposed to incorporate hedgerows and water features into that area.

FRETZ: This deer fence over here that does down is a 130 acre enclosure separate from Tier 4?

MARIE VANZANDT: Yeah, and Tier 4 is the proposed mitigation and it's 1,700 acres.

SPAIN: Are we going to talk more about Tier 4, or is this the best place to do it?

MARIE VANZANDT: We're going to go over to one of the ponds and that's where we're going to end the tour, so maybe that's where we also focus on Tier 4.

FRETZ: Other questions from the Committee?

KAIMI KONAIHELE: One thing I want to point out is where we're standing is the cusp of the atmospheric differences. The rainfall on this side is completely different from there. We're basically on the rift zone from Haleakalā to the ocean, so everything on this side is very different from this side. So when you talk about comparing what Art is doing over there, it's really hard to do.

SPAIN: Can I ask a question about deer, goats, kind of distribution. How high up are the deer coming?

KAIMI KONAIHELE: Deer all the way up. If you were coming over here on this ridgeline, you had your windows down, you might smell them. They live right there. There's tons of them. Goats not so much. Occasionally you might see one. When I was a kid, you used to see a lot of goats up here. Not so much anymore. Above the highway you see them crossing every now and then, but they don't come up this way anymore.

MEHRHOFF: What is the Ranch's plan for the upper tier of the Ranch? Restoration?

KAIMI KONAIHELE: This section up here, we look at it with a couple different things in mind. One of them is it's a safety valve in times of drought, because it's cooler, the grass is lusher. It's got more of an open area we can move cattle up into. Fence is the problem. The fence going up doesn't tie in, motorcycles coming across, a lot of trespassing. It's hard for us to really manage that area. We don't have water going all the way up there. This is the height of our water extent coming along this road. We actually pump it towards the Duck Ponds here and gravity flow it out towards Waikahe side. We can put in more solar pumps and take water up that way, but right now it's just open wild country. Wild cattle up there, pigs.

MEHRHOFF: What does the Ranch want to do with it?

KAIMI KONAIHELE: Right now we want to try and manage what we have on our plate. Right now we don't have any long term goals for it, but it is something we keep in the back of our mind in terms of if things start to dry up downside, we can bring cattle up there. The problem is again we don't have any real control over where they go. We're very open to lots of different projects like this.

UNKNOWN VOICE: How many heads of cattle do you guys run?

KAIMI KONAIHELE: We're just about 3,000 head all together. We have two main breeding herds and we have another replacement herd and the rest are young cattle and bulls. We have a little less than 500 sheep. Goats are a very small component. And we also have a herd of maybe 150 elk. Lots of pigs.

FRETZ: Any other questions from the Committee? If not, we'll go to the next site.

MATT STLEMACH: The reason we are up here is this is one of the ponds. This was built awhile back I think as part of some Federal money for Ducks Unlimited. This has been one of the study sites used as part of the research that was occurring here. So this is a good site for us to talk for a number of reasons. One, this is a location of high bat acoustic activity. And another is this is an example of the ponds, similar to the ponds we might be constructing for Tier 4 mitigation.

This site is where USGS had done a number of mist netting, and they captured 11 bats right here. And one of the bats was recaptured twice. When I was talking with Corinna she said she had observed bats drinking from the ponds here and they had a high level of foraging calls at the ponds, so really indicative of the use rate of some of the ponds. There's one pond here and there's several more just down below. You can't see them from here. There's a combination of features here that are important for the bats, and from what we've been able to glean from the literature and bat behavioral observations, a combination of water features, edge habitat, and open spaces for foraging are important. So that's why we've designed the Tier 4 to be what it is.

JACOBI: Is this important for resolving limiting factors or is it accumulators?

MATT STELMACH: Those are where we've seen bat activity higher than other areas. I don't think we have knowledge of what limiting factors are, so I don't want to speculate on that.



Photos G and H: Examples of existing “Duck Ponds” proposed for Tier 4 mitigation.

MATT STELMACH: The Tier 4 mitigation really highlights the matrix habitat, so combining not just reforestation but having a significant amount of edge habitat which has been shown to be significantly correlated with bat activity, having the water features, and then having the open areas. Additionally, working with the Ranch having ranching being a co-occurring activity to be a compatible use.

KAIMI KONAIHELE: We won't have anything coming in here. This is fenced off. We do have deer coming in here but we don't have a deer fence around this area; it's just been kept cattle free. There are pigs in here. Basically wildlife is in here, but no livestock with cattle, sheep, anything like that.

MATT STELMACH: I guess what I mean is the Ranch would still be able to ranch in the area.

UNKNOWN VOICE: But it's been found to be beneficial because of the insects created in the livestock dung, or whatever? It's like a food source?

MATT STELMACH: There's been a number of hypotheses for why bat activity is associated with cattle. And some papers have looked at dung beetles and some papers have looked at whether it is associated with the cows themselves or with the dung, but there hasn't been strong evidence in support of one hypothesis.

TRIBBLE: So for Tier 4, is it gonna be fenced and de-ungulated?

MATT STELMACH: Tier 4 is focused on reforestation. So there's fencing proposed as part of the reforestation effort in order to ensure the trees grow, but the goal is not fencing, the goal is bats.

TRIBBLE: I understand that.

JACOBI: The whole idea is to create the corridors?

MATT STELMACH: Yeah.

FRETZ: And then later the fence could be removed so the understory could be impacted by feral ungulates?

MATT STELMACH: There's no intention to remove the fencing, but it's primarily in order to establish the canopy and the edges that bats are associated with.

SPAIN: So if you can help me remember, how wide are the proposed hedgerows, and they'll have deer fence down each side of them?

MATT STELMACH: The hedgerows are proposed for 80 feet wide at a minimum. And then the fencing would depend on what is existing in the area and what's needed. So it's not principally a fencing project, it's a bat restoration project. Fencing is there to facilitate the growth of the trees so it's kinda on an as needed basis.

FRETZ: I guess what I'm getting at is because you keep referring back to the growth of the trees, will those tree corridors be maintained ungulate free so even after you have trees tall enough that goats can't eat them, or the deer, that they'll be maintained free of deer so understory can continue to grow.

MATT STELMACH: Ungulate removal isn't proposed as part of the Tier 4 mitigation. And understory is a consideration and so we've included out planting of 'A'ali'i as an understory. But fencing, as Kaimi was

saying, in the areas where the Ranch has created these sort of postage stamps, there's not a lot of pressure from deer.

KAIMI KONAIHELE: That's not to say there's no deer there, they just have so much around that they're not driven to jump a four foot fence to get into a plot that's not much bigger than this. So there's no pressure there but there are hundreds of deer on the other side of the fence. So when I talk to Marie about this, my understanding was we're going to do a minimum of 80 feet but because this is such a rough terrain out here—it's very steep—it may be wider, but it won't ever be more narrow than 80 feet. And just by the fact that it's deer fence it's going to be ungulate proof and not have cattle in there. Whether or not you have pigs in there is a different story, because if you don't skirt it pigs can go underneath it. There's no goats in the area, just deer and cattle.

FRETZ: Questions?

MEHRHOFF: In drier areas if you're putting in water, one of the things you'd be worried about would be bumping up the deer or goat population but here I think it's quite wet enough where you don't have to worry about that, is that right?

KAIMI KONAIHELE: If you put a pond over there there's already rivulets coming down and natural little accumulations of water everywhere. We do pump water over there so we can have a solid supply of water there, but a lot of times when we're trying to get cattle out of there, you have a hard time by just turning off drops because they can find water there. There's plenty of water.



Photo I: Example of "Duck Pond" proposed for Tier 4 mitigation.

ITEM 4. Opportunity for public comments at the mitigation sites.

FRETZ: Any other questions for the Committee or for anyone else? Are there any public comments from the two brave members of the public that are still here?

LAURA BERTHOLD: I did want to point out that earlier when we were at the restoration site that there are Hawaiian Honeycreepers there. I know it's not mitigation that's for them but there's an 'I'iwi, Maui 'Alauahio, 'Apapane, and 'Amakihi, which is a plus side.

ETHAN ROMANCHAK: My last one is it was brought up once over there but also the idea of these trees creeping into the Tier 4 mitigation area that's been thought through. I know there will be more hedgerows but we all know that Tropical Ash is moving. I've watched that green turn into dotted dark green. So it sounds like it's been addressed but I did want to make the comment that in my mind, 20 year from now, the Ashs will beat Koas in shading the canopy so it should be an active measure if Ash is identified as an invasive. I don't know if anyone has an answer, I'm just saying in my mind Tropical Ash is going to be one of the game changers. Nature, bats last, kind of thing.

GEORGE AKAU: We don't cut during the pupping season so a lot of stands you see over there, bats could be roosting.

ETHAN ROMANCHAK: I imagine the cows are a great tool between the hedgerow areas.

KAIMI KONAIHELE: It will actually be somewhat of a symbiotic relationship because the fencing will help us be better managing of that area. Part of the reason we can't get in there is because of the rain, it makes everything nice and soft. The cattle come in there and it makes it worse. And then we go in there with the trucks. It's just a love hate thing. This water's awesome but it also makes the roads worse. So as far as the cattle battling against the Ash. If we were to go back in there with more fencing, more intensive, and the numbers of the Ash were actually knocked back, it would be advantageous for the cattle to then go in there and stomp/break/eat, whatever they do. They are a good tool against the Wattle for sure. Part of the reason we have so much Wattle on the other side now is because we used to have four cow herds and we combined them down to two. The good news of that is our pastures get more rest, get more growth, and they're more healthy. The bad news is the pastures get more rest so now everything benefits. Wattle comes up, Blackberry comes up. As long as the cattle get back to the Wattle while it's still relatively young they can eat it, but if it gets too tall for them they'll start to fall off, they won't eat as much.

GEORGE AKUA: There's a cabin over here past the pine overstory, that's the area of all the acoustic detectors put out that had the highest bat activity. So sometimes nonnative forest cover can be beneficial to bats. The USGS study showed that.

KAIMI KONAIHELE: I think in that respect getting rid of the Ash, it's a balance where if you go and wipe them all out you're taking away some of the natural habitat they've been making use of, the trees which are an invasive species. But I think if you were to bring up something in replacement that would be a benefit. But if you wipe one out and expect another to come up right quick, I think you'll be losing there.

FRETZ: We'll adjourn the meeting here once we're sure there's no other questions or comments for the Committee. Anything else? Seeing none, we're adjourned.

ITEM 5. *Adjournment.*