APPROVED

ENDANGERED SPECIES RECOVERY COMMITTEE

21 MARCH 2014 MEETING MINUTES

Hawai‘i Department of Land and Natural Resources
Kalanimoku Building; 1151 Punchbowl Street; Room 322C; Honolulu, HI 96813

MEMBERS:	Dr. J. Scott Fretz (DLNR); Kristi Young (USFWS); Dr. Gordon Tribble (USGS, present but in audience); Dr. James Jacobi (USGS); Dr. David Penn (UH Environmental Center); Dr. John Harrison (Appointee); and Dr. Patrick Hart (Appointee).
STAFF:	DOFAW: Lisa Hadway, Dr. Marie Morin, Thomas Ka‘iakapu, Afsheen Siddiqi, and Angela Amlin. USFWS: Jodi Charrier.
COUNSEL:	None.
OTHERS:	Frank Bonaccorso (USGS), Mitch Craig (First Wind), Paul Conry (H.T. Harvey), Greg Spencer (H.T. Harvey), Reggie David (Rana Biological Consulting).

ITEM 1. Call to order.

Chair Fretz was not yet in attendance, so DOFAW Administrator Lisa Hadway called the meeting of the Endangered Species Recovery Committee (hereinafter referred to as the "ESRC" or "Committee") to order at 8:42am.

Committee Members introduced themselves.

ITEM 2. Approval of Minutes.

Jacobi asked DOFAW staff member Siddiqi to clarify whether Basecamp would still be used for ESRC document storage (*e.g.*, meeting minutes). Siddiqi replied that the new DLNR website is up and running and documents would be transitioned to this website and are available to the public. It was clarified that all ESRC meeting information is available to the public.

Harrison asked if the wording on page 13 of the minutes should read "severe" as written, or should actually be "several." It was determined that DOFAW staff would review the minutes and amend the Minutes as needed.

DOFAW staff member Amlin stated that Fretz had wanted clarification on Item 6, second paragraph of the minutes, but that she did not have specifics of the request. Siddiqi clarified that Fretz was unsure if he had been quoted correctly in the minutes. The

Committee determined that this was likely a minor amendment and moved to approve the minutes.

MOTION: (Harrison/ Hart)
To approve the minutes.
UNANIMOUSLY APPROVED.

Fretz arrived at 9:00am and stated that he had some issues with the minutes. Jacobi clarified that the minutes were approved pending minor corrections per Fretz's comments. The committee agreed to revisit the minutes later in the meeting.

ITEM 3. **Briefing from Licensee on Status of Seabird Mitigation Required by the Approved Kaheawa Wind Power I and II Habitat Conservation Plans and Incidental Take Licenses:** Habitat Conservation Plan for the Kaheawa Pastures Wind Energy Generation Facility, ITL-08 Issued January 20, 2006 and Habitat Conservation Plan Kaheawa Pastures Wind Power II Wind Energy Generation Facility, ITL-15 Issued January 5, 2012.

Mitch Craig from First Wind was in attendance to provide an update on the Makamaka'ole seabird mitigation site on the north side of West Maui.

Craig stated that two predator-proof enclosures have been completed in the past year: Enclosure A for Newell's shearwater, Enclosure B for Hawaiian petrel. Both enclosures are about 4 - 4.2 acres in size. Craig expressed that First Wind would like the ESRC to visit the Site.

Culverts have been constructed in each enclosure to allow for drainage without damaging the fence. There are screens on each side, and culverts are cemented in on both sides to limit the possibility of rats or mongoose burrowing underneath, or erosion underneath the pipe. There is a checklist that the techs use on their weekly site checks to make sure every aspect of the fence and its integrity are examined. Jacobi asked how they keep the culverts from clogging up. Craig replied that the culverts are screened on both sides and that culverts are inspected after heavy rains and cleaned out if necessary. Screens are removable, so ideally not much will get in with screens on both sides. Jacobi inquired as to whether fence checks were still conducted weekly and, if so, would that frequency continue for the life of the project. Craig replied that yes, the checks would always be weekly.

Each enclosure has two sets of sound systems, for a total of four speakers, powered by solar panels. The burrows are situated in groups and take advantage of areas that drop off close below the burrows so the birds, especially the Newell's shearwater, have the ability to take off into the wind. A song meter is used to ensure that the sound system is working every night. A minute sample is collected each hour and reviewed each week. The speakers come on at sunset and play looped songs until sunrise.

Craig showed an image of burrow boxes with 6 foot long access tubes buried under the ground. Inside the boxes there is a layer of river rock that allows for drainage, and on the top there are bags of sand to make sure the top stays on and heat stays down. Grass around

burrows and decoys will be maintained so the birds can find the burrows. Steve Sawyer from EcoWorks is the consultant on the project.

Jacobi asked if vegetation maintenance is a temporary measure, as in a natural environment there would not be anyone tending the grass. Craig replied that it is not intended to be temporary, but is intended to be optimal for birds to be able to access burrows and to see decoys placed within the site from a distance. The grass will also be kept down on the takeoff areas.

Jacobi asked about the number of burrows. Craig replied that currently there are 32 in each, but the total will eventually be 50. Natural Area Reserve System (NARS) staff was concerned about potential erosion, so they stopped digging burrows for the year to allow the land to recover, with the intention that next season the remainder will be added.

Hart asked if this burrow design has been used before. Craig replied yes. Jacobi asked if it was based on New Zealand design. Greg Spencer (H.T. Harvey) replied yes, the general design has been used before, but due to heavy rainfall at Makamaka‘ole there were modifications made to account for site-specific drainage.

Craig described predator trapping inside the enclosures. Trapping begin over a year ago in Enclosure A. As of two weeks ago, when sound attraction was turned on, all open traps (snap traps) were removed, and only box traps remain for rats and mice. If there are any cats or mongoose they would be trapped, but at this point the only predators they are aware of and have documented with tracking tunnels are mice. Mouse trapping will be an ongoing effort. Total eradication is not expected, but First Wind hopes to keep them at low numbers. Only the Polynesian rat has been trapped there, no black or Norway rats have been caught.

Fretz asked for trapping numbers, and asked if all rats would be out by the time the birds return. Craig said that track tunnels show that the rats are out of both enclosures. Inside Enclosure A, two rats, seven mice, and seven mongoose were previously trapped. Inside Enclosure B, 14 mice were trapped. Craig further explained that the mongoose were caught during construction, prior to completion of the enclosure. Traps outside of Enclosure A caught six mongoose, 14 rats, and one mouse. Outside Enclosure B four rats and a mongoose were trapped.

Jacobi asked about the trapping network outside the Enclosures. Craig replied that there are six rat/mouse traps inside boxes that are considered bird safe inside the Enclosures. There are nine DOC200 double traps outside of Enclosure A and five outside Enclosure B.

Jacobi noted that First Wind is attracting birds into an area that may potentially nest outside the fence, so it is important to consider the impact to those birds as a part of the project. Craig acknowledged that this had been brought up before, and that there is a concern. Jacobi asked if monitoring included looking for dead birds outside the Enclosures. Craig said not at this time. Craig asked how that type of monitoring over rough area should be conducted. Jacobi suggested using the same methods as the initial surveys. Craig said dogs were the best method.

Fretz suggested a combination of night vision and the ongoing auditory surveys. Jacobi suggested periodic ground surveys as well. Craig said that would essentially mean having someone there every night during the season.

Fretz asked if any birds had been heard yet. Craig responded no, but that they should be arriving any day.

It was asked how can the auditory loop be distinguished from actual birds. Craig said he thinks that the sound will wash out the potential to tell if other birds are there, so song meters will be complemented with visual surveys. Hart said that if you know the pattern of the songs being broadcast you can see them via spectrogram comparison. Jacobi suggested the frequency could be turned down or up just a little so it could be filtered out.

Jacobi asked if burrows are being monitored with cameras or toothpicks. Craig stated that they will be, but that Steve Sawyer has impressed on First Wind to be very light in their attention to the site, because it will be obvious if birds begin to use the area, and once there are signs, then they can go in and monitor with toothpicks.

Jacobi asked if there are any sensors in the bottom of the burrows. Craig said no. Jacobi suggested that it should be easy to install a probe or heat sensor. Craig stated that the expectation is that there may not be many birds the first year, and the last thing they want to do is disturb the birds, so it's important to monitor as closely as possible without actually opening the burrows. Jacobi agreed and said that a key part of the mitigation is to have a good handle on how much use of the site there is, and how much productivity there is, as a result of the mitigation, and whether it meets the offset targets. Craig agreed.

The Chair asked if there were any public or partner comments. There were none.

Jacobi asked if Craig could describe the monitoring schedule and protocol. Craig said a minimum of two days a week, up to as many as three in the beginning. Jacobi asked if those were daytime visits. Craig said yes. Jacobi asked what about nighttime visits? Craig said nighttime visits would occur but he did not have a set schedule, although it sounded like the ESRC would consider this important.

Jacobi said yes, the key thing is the outcome: how many birds are produced. Ultimately it is the number of birds that counts, but it is important to understand how the project is progressing, especially in the early days and years of this effort. It is also important for First Wind in terms of implementing any necessary tweaks. Jacobi suggested thinking a little more broadly in terms of how to have a more extensive monitoring program to start with, understanding the need to be cautious and not cause any disturbance.

Craig stated that he understands and that this is something that he has thought of and Greg Spencer and David Ainley have mentioned. Craig believes that for First Wind it is a question of how much effort do they need to put out to make this work, versus how much effort would be great to do in order to get a lot of information. Doing nighttime work is

intensive, but makes sense.

Young stated that since this is the first project of its type here, the understanding of the whole process and what is working or isn't, particularly in the beginning, would be very useful if there are future efforts to do this type of work. This is a chance to learn. Craig agreed.

Jacobi said ultimately the administrative bottom line is: what is being produced as a result of this mitigation versus what is the take, and how can you have confidence in terms of what that final administrative accounting is. At some point there needs to be clarity around this calculation. Ultimately that is a question that would come back to ESRC.

Morin asked if there are currently any petrels or shearwaters in the area. Craig replied that there are birds are in the general area, but not the enclosures. Craig further explained that it was known that birds were present here in the past, and one confirmed burrow and one possible burrow had been found in the enclosure boundaries during surveys. Bird activity in the general area has been documented during nighttime point counts.

Jacobi said that part of the presumption was that until any kind of act of management occurred, predation rates were too high. Birds were likely trying to nest but getting predated. So this action is to hold onto this area as a nesting site.

Morin asked about historic data going back 50 years or so. The committee said there was none. Fretz said that when they went in and started doing the predator control here, predator numbers were really high. So this appears to be remnant habitat that was getting hammered by predators. So since there is bird traffic, this is an ideal place to call the birds back in once predator control is in place.

Craig had referred to the historic name of the site as "'U'au Hill," so Hart asked if the name was an old name. Spencer and Greg stated that it was found on an old map, found during project scoping. Spencer said that he had also spoken to longtime residents of the community, and it appears to have been a historic descriptor of a feature that Spencer thinks they were pretty spot-on with identifying.

Jacobi asked if the planned burrow density was reflective of biological needs, and if any of the Kaua'i Endangered Seabird Recovery Project's (KESRP) data had been used. Craig said they had burrow densities from Haleakala. Fretz said that Steve Sawyer had stated that this figure was comparable to other similar species. Morin said that 50 burrows sounded like nothing compared to other procelarids that nest very densely, like wedgetail shearwaters. Craig stated that Sawyer's experience with other petrels was to group the burrows as close together as he could.

Fretz said that when the NARS permit was renewed, the NARS staff commented that the burrows needed to be in certain places in order to reduce disturbance of uluhe and other native fern vegetation. Fretz asked if this comment had presented an issue. Spencer stated that ideally you want to have burrows out in areas where the birds are going to see them, see the decoys nearby, and not have to search around to locate the burrows in the

understory. Over time birds will probably start to establish their own sites, and those may be on the edge of or inside the uluhe, or even be adjacent to the structures in the open. Spencer asked what was the basis of NARS's suggestion that certain areas should be avoided. Fretz and Craig replied that it was due to disturbance of native vegetation. Fretz said that these ferns are very hard to restore, however, those comments came from a land manager and not a biologist, so could be up for discussion.

Jacobi asked if the expectation was that the birds would colonize other areas in the enclosure. Craig said yes. Spencer stated that there is a lot of capacity to accommodate more burrows.

Morin expressed concern over fledging birds getting caught behind the fence, and asked about the fence material. Young said it was a very fine mesh. Jacobi suggested a daily monitoring effort when fledging starts to identify if that is a potential problem. Craig agreed.

Hart asked if the broadcast recordings were of birds from this area or from other islands. Spencer said that the calls are a combination of calls from Kaua'i and Haleakala. Jacobi asked if the Newell's were from Kaua'i. Spencer said yes. Fretz said the petrels might be genetically more similar to Lanai petrels. Spencer said this is what they are starting with, but there is the potential to gather recordings from this site, particularly for petrels, and that may be something to do in the future.

Hart asked if the broadcast dish is parabolic. Craig said yes. Hart asked what the reason is for using a directional broadcast as opposed to an open microphone. Craig said these speakers are easy to obtain and use, and there are four speakers in each enclosure pointing in different directions.

Fretz stated that the fence is substantial and should be visible to birds. A similar situation occurred where birds were striking a fence on Lanai, and by making the fence more visible with reflective tape birds were able to see and avoid it.

Jacobi asked at what point it will be determined whether or not this project is working. Craig and Spencer believed the initial benchmark was two pairs of birds, one in in each enclosure, after three years. The next benchmark would occur at year five. Fretz said the ESRC should verify by looking at the targets in the management plan.

Craig said that First Wind is also tasked with finding alternative sites in parallel with this effort. First Wind conducted auditory surveys in Kahakuloa, West Maui for Newell's shearwaters for seven nights in 2013. Given the low numbers of birds observed and the difficulty of conducting work at the site, there was been a joint agreement with the State to discontinue surveys at Kahakuloa and instead direct the funds toward other sites. Jacobi asked if it would still be West Maui. Craig said no, the next place for Newell's is East Maui, and then after that comes other islands. Jacobi asked about timing of results. Craig said the intention is to find a place this season where they can assure that the same type of project can be built.

Young and Jacobi stated that it is not just important to know whether or not mitigation targets were achieved, but to know why or why or not. Fretz said that the ESRC requests that when Applicants and staff bring a report before the ESRC, that they be explicit about what the targets are. Craig said he would provide a schedule plan for project assessment.

Jacobi asked if there was collaboration with other programs, such as KESRP on Kauaʻi, to ensure consistent protocols for restoration, management, and assessment. Craig said that other First Wind sites, Kahuku and Kawailoa, are funding KESRP to do seabird monitoring and barn owl control on Kauaʻi. Jacobi asked if barn owls are also a concern at Makamakaʻole. Craig said yes, First Wind hopes to learn from efforts on Kauaʻi, but expects barn owls will be just as much of a concern on Maui. Fretz asked if barn owl control plans are in place. Craig said he is aware it is important but doesn't yet have a plan as to how it will be done. On Kauaʻi they will be using bird sounds to lure barn owls and use bal-chatri traps and shotguns. Fretz said that the US Fish and Wildlife Service has made a rule that control barn owls can be controlled without a permit. Morin clarified that State and Federal entities and agents no longer need a permit, but private citizens still do, and the 124 Rule is finalized cattle egrets and barn owls will be listed as injurious by the State.

ITEM 4. Update on project implementation: Scope of Work for Proctoring of Searcher Efficiency (SEEF) and Carcass Retention (CARE) Trials at Kaheawa Pastures Wind Energy Generating Facility and Kaheawa Wind Power II Wind Energy Generation Facility.

Mitch Craig from First Wind presenting. Craig said that First Wind has contracted WEST, Inc., a well-known consulting firm on the mainland, to perform the scope of work. They have engaged a resident on Maui for on-the-ground work. First Wind has ironed out a migratory bird permitting issue and just needs to get carcasses from the State, and then begin to do the trials.

Craig said there is a scope of work that he could share with the ESRC if they wanted to see it. Young and Jacobi said they would.

Jacobi stated that he thought a QA/QC by an agency was the original intention, and asked if this effort is a replacement for agency QA/QC, and had it been sanctioned by the State. Morin asked if the DOFAW Admin staff had any information. Amlin said that to her knowledge the issue was that the trials needed to be conducted by a third-party, not necessarily the State.

Fretz referenced the minutes from the last meeting. Harrison said pages 12 and 13 of the minutes were clear on the matter. Fretz asked if Jacobi wanted to look over the notes at the break and revisit the question if it was unclear. Jacobi said he would do so.

Fretz invited questions from the public and partners.

Charrier said that Federal and State staff have been working closely with First Wind to review these protocols through a series of internal staff meetings and meetings with the contractor.

Penn said that he recalled that the intent was that the Committee would have a role in looking at the methodology so that there would be consistency in the protocols across sites. Fretz asked if that was being brought up to make sure it goes in the notes, or just to make sure that the staff is keeping a broader view of this as they go through. Penn said yes, and asked if the discussion was applicable in the context of Kahuku. Fretz, said yes, that it was applicable to every wind farm.

ITEM 2. Approval of Minutes. (Revisited)

Fretz returned to the discussion of the meeting minutes, page 6, concerning the Kenai HCP. The applicant had stated they thought they did not need an EA for the Board to approve their HCP, and the Attorney General's (AG) office concurred. Penn had raised the point at the time that if that was the case, then the ESRC might be missing an opportunity to have the AG weigh in on the question of whether or not this project has a net environmental benefit, which is required by Chapter 195D.

In the minutes, the following is attributed to Fretz: "…for the purposes of the Department, how net environmental benefit is defined is up to the Attorney General's office." Fretz wanted to clarify that this is not necessarily the case, and his point was that it was not clear to him in 195D how it is decided that a project has a net environmental benefit, and that it would be beneficial to consult with the AG to get guidance on how they would interpret it, and how they think the Board would interpret it.

Jacobi asked for clarification on whether this was referring to a biological metric and how the AG would know what that is.

Fretz and Penn said it is not clear in the statue that "net benefit" is a biological metric.

Morin said that one of the issues is that195D does not yet have rules, and this type of question seems like something that would be addressed in the rules. So there is need for the State to write the rules, and have the AG serve as reviewer of those rules.

Fretz said the definition of "project" is also unclear – is the "project" the development, or the development plus the HCP and the mitigation.

Jacobi asked if environmental benefit and net benefit were the same, because he interpreted net benefit as being applicable within an HCP/SHA and being a biological metric. Jacobi and Fretz agreed that there is confusion around the language in the statute that needs to be clarified.

Hart said that weighing in on the benefit to the environment in general is beyond the expertise of the ESRC. Fretz agreed that is the purview of the Board, and the interpretation of the statue has been that the ESRC weighs in on net recovery benefit to the species. Jacobi said this sounds like the ESRC should be looking at net benefit defined in biological terms, and the confusion seems to lie in how to define what that net biological benefit is. He believes further discussion is needed.

Young asked how Fretz would like to proceed with amending the minutes. Penn said staff would check the tape to confirm the language used. The committee decided if, after review, the statement attributed to Fretz was incorrectly transcribed, the minutes would be edited to reflect the statement as it was actually made. If the statement was correctly attributed, the minutes would be edited to reference the minutes from the current (March 21, 2014) meeting to provide clarification that Fretz did not intend to say that the AG "decides," but rather that the AG "advises."

Fretz called for a recess, and asked to reconvene at 10:20am.

ITEM 5. **Consideration of appropriate baseline determinations for endangered, threatened, proposed, and candidate plant species.** Baseline determination and compliance regarding plant species in Safe Harbor Agreements.

Morin presented a brief summary of the agenda item, as described in the DOFAW staff summary submitted to the ESRC.

Jacobi stated that this is part of broader discussion of how plant baselines should be handled in HCPs/SHAs, and is not an issue that can be solved in a short discussion within a normal ESRC meeting. He added that the intention of this discussion should be to set up a process by which this issue can be addressed, and suggested putting together a workshop that includes the Committee and other experts to work through this.

Morin asked if Jacobi could identify some of the key issues. Jacobi stated that the issues are (1) how do we determine what an adequate baseline looks like; (2) how do we define baselines in a manner that they are useful for comparison to monitor change; (3) how do we define and assess net benefit; (4) how much commitment is expected from the permittee to determine where the project stands relative to the baseline and net benefit; and (5) is the level of commitment different for an HCP applicant versus an SHA applicant.

Morin added that another issue is the practice of outplanting and if outplants should be counted in the baseline. Jacobi said it would be helpful to get guidance from the agencies on this issue, and sees it as an administrative question.

Jacobi proposed putting together a draft agenda for a workshop that would include these topics so the Committee and experts can address these issues and come up with protocols that can be applied to projects as they come in to maintain consistency.

Morin suggested that there is a similar situation with wildlife species such as bats that lack these kinds of standards. Fretz stated that it has been documented in past meeting minutes that committee has asked for this same kind of a workshop on bats. Jacobi agreed that it has been an ongoing comment that having these types of workshops would be beneficial for consistency.

Jacobi referred to the Hawaiian Pacific Plants Recovery Coordination Committee (HPPRCC) under the USFWS as a source for information on these types of plant questions.

Jacobi also highlighted the differences between HCPs and SHAs and needing to understand how these issues will be addressed in each.

Jacobi suggested planning a plant workshop, and connecting with the HPPRCC and Marie Bruegmann. Fretz suggested that DOFAW staff work on developing an agenda as they are familiar with the issues that need to be addressed. Jacobi offered to assist. He further stated that the product of this workshop should be a set of protocols that can be broadly applied as opposed to addressing specifics projects, and that can be changed as new biological information arises in the future. Jacobi and Harrison suggested involving other USFWS programs in other regions that may have experience with this. Young and Morin said that California and Oregon have SHAs in place for plants.

Fretz summarized that the ESRC is asking DOFAW staff to put together a workshop agenda to address this item, working with USFWS, Jacobi, and other ESRC members as needed. Morin will oversee the effort.

Fretz asked for questions or comments from the public. There were none.

ITEM 6. Briefing on state Section 6 Habitat Conservation Planning Grant for Kauaʻi Nēnē Island-wide Habitat Conservation Plan.

Morin presented a brief summary of the agenda item, as described in the DOFAW staff summary submitted to the ESRC. She stated that three positions will be posted through the Research Corporation of the University of Hawaiʻi (RCUH) – including a lead and two supporting positions – that will be working specifically on developing the KNHCP. Statewide issues concerning nene are significant, and this HCP ties into overall statewide management efforts. There are 1,500 birds currently on Kauaʻi and 578 have been relocated to the Big Island. The HCP will address not just airports and golf courses, but will also include farmers.

Jacobi asked what the concept of optimal habitat is and what the plan is to keep the birds in that habitat. Morin said that is the issue that the HCP seeks to address.

Kaʻiakapu said that nene are being found everywhere on Kauaʻi including backyards and swimming pools, so how we determine where and how we can attract them, and how to keep them there is the key question. He further stated that impacts to crops such as lettuce and kalo have been documented by farmers and within the [Hanalei National Wildlife] Refuge, and a few issues have been reported in corn fields, where the concern is whether nene may nest. He said that the growing population could eventually extend into Game Management Areas, where game bird hunting occurs during nene nesting season, and could pose a significant issue.

Fretz said that the general idea is that there will be a map produced identifying suitable and not suitable habitat. Not suitable areas are classified as such due to issues with public safety, economic impacts, etc. The not suitable landowners are those that can seek a permit under the HCP to haze the birds off the land. The mitigation is that the birds are propagated and managed in the areas defined as suitable habitat. The challenge is

determining who is in a not-suitable zone and should get a permit, such as the airport, but there will be a lot of gray areas and those will be issues that the ESRC will have to address.

Jacobi asked if there should be a Safe Harbor component attached to some of the suitable habitat areas associated with the HCP. Young asked if that was not just mitigation associated with the HCP. Fretz said that USFWS has traditionally not wanted to do this, although it had been done once before, but was problematic. He further said that there are other incentives, such as paying for a conservation easement, and that the issues that came up with the SHA associated with HCP mitigation had been resolved by telling the applicant that if the SHA holder takes the site back to baseline, they must find another site. Jacobi asked which HCP this was. Fretz said it was Kaheawa Wind Power I, and since this issue was solved once, maybe it can be solved again. Jacobi agreed and said that HCPS/SHAs appear to go together in a case like this.

Jacobi asked how nene coming in to Game Management Areas would be resolved, and whether it would come to ESRC or be handled internally by the agencies. Ka‘iakapu said this same issue has come up in the past at Kapapala Ranch, and the State posted information at the entrance informing hunters that nene are in the area. Fretz said that in other cases dogs have been prohibited from hunting areas. Jacobi clarified that he was curious if these issues would come before the ESRC. Fretz said that a request can be made for the State to brief the ESRC, but as the State is currently assuming there is no take of nene associated with bird hunting, it would not come before the ESRC.

Jacobi asked when a draft is anticipated. Morin said hires have not yet been made, so it will not be this year.

Jacobi asked if there were plans to do similar plans for other islands. Fretz replied that yes, DOFAW-Maui would like to do the same on Maui and would put together a Section 6 Grant proposal next year.

Fretz provided background on a pair of Kaua‘i nene that were moved to the Big Island and had since shown up on Oahu at James Campbell; these birds are identifiable by bands with the letter K on their legs.

Fretz asked if there were questions or comments from the public or partners.

A member of the public asked for clarification if the birds at James Campbell have Ks on their bands and if they were moved to the Big Island. Morin said yes. Fretz said that the band has a K so it is easy to identify all the birds originally moved from Kaua‘i Lagoons. The same individual then asked if it could be interpreted that the State is interfering with the new wind farm at Kahuku. Fretz stated that this is not an agenda item, but provided a brief summary of the history of the Governor-issued proclamation to relocate the nene to Maui/Big Island, and described the State’s current deliberation over how to address the issue of nene on Oahu. The same individual asked if the K tells you whether the birds were moved to Maui or the Big Island. Morin replied that there was a number assigned to each bird.

Craig asked if it is part of the long-term recovery plan for Oahu to have nene. Morin said she did not believe it was.

Jacobi asked if there is historic evidence of nene on Oahu. Young said in the 1500s. Morin said no, there was a species in the *Branta* genus, but it was not confirmed that it was nene.

Fretz asked if there were any additional questions from the public. There were none.

ITEM 7. Briefing on on-going work conducted by U.S. Geological Survey Wildlife Ecologist, Dr. Frank Bonaccorso. Current research on the endangered Hawaiian Hoary Bat, ʻŌpeʻapeʻa**.**

Dr. Frank Bonaccorso of USGS provided a presentation on the status of Hawaiian hoary bats. Bonaccorso has been studying Hawaiian hoary bats for 10 years.

Hawaiian hoary bats are a state and federally endangered subspecies. They are distributed through all of the high volcanic islands, not found in the NWHI.

Hoary bats are a tree-roosting species that prefers tall trees that provide a lot of shade. They are a generalist species found from coastal embayments and river mouths at sea level up to nearly the peak of Mauna Loa at 4,000m.

There are three subspecies of hoary bats: South American, North American, and Hawaiian. The Hawaiian subspecies is about 40% smaller than mainland bats.

Seasonal movements in reproduction have been documented. On the Big Island bats migrate altitudinally seasonally from montane, interior habitats in fall/winter/early spring to lowlands to breed where it's warm in spring/summer.

A masters student's dietary analysis showed an overlap in insects consumed by coqui frogs and hoary bats, implying that coqui frogs may be reducing available prey species.

Bonaccorso's group conducts acoustic monitoring for bat calls to determine occupancy by habitat, and seasonal presence. There are two types of calls: search calls and feeding calls/buzzes. A feeding buzz indicates a bat has found a prey item and is sending out rapid pulses to try to intercept it. Lower range bat calls can be heard by humans with the ability to hear very high pitches. Bonaccorso's group has recorded over one million bat calls over the past eight years.

Pupping season runs from very end of June/July 1 until the first couple weeks of August. Preferred roosting canopy has a drop down area because when they release the branch they drop several feet before they take flight. Hoary bats prefer to roost in tall trees with dense foliage. Roosting bats are located with the use of radio tags. About 40 bats have been radio-tagged by Bonaccorso's group in about a five-year period.

In 2013, Bonaccorso's group published a five-year hoary bat occupancy and population trend analysis via the Hawai'i Cooperative Studies Unit (HCSU) technical reports series online.

Studies have been conducted in Indiana, Pennsylvania, and Hawai'i at wind energy facilities including First Wind's facilities at Kahuku and Kawailoa. These studies have used automated software to scan video footage collected to identify bat activity.

In 2013, Bonaccorso published a book chapter that models the colonization of Hawai'i in terms of the flight energetics required to get bats from the Pacific Coast of North America to Hawai'i. Modeling various wind scenarios – including tail wind, tradewinds, and even slight headwinds – bats could make it to Hawai'i with sufficient energy and water stores.

Every fall, bats migrate from Northern California to Southern California, sometimes stopping off on the Farrallon Islands or Channel Islands, with a full content of body fat in the fall. The model predicts that these are the scenarios in which a bat caught off-course by tradewinds could make it to Hawai'i.

The aforementioned five-year occupancy study monitored 21 sites with acoustic detectors, covering a wide range of habitats and elevation gradients. The result was a population trend (not a census; these are solitary, nocturnal, highly mobile tree bats) index based on call detections at each of the sites with a slightly positive slope, indicating a slight growth trend or at least stability in the Big Island population.

Currently, Bonaccorso's group is working on four islands. Big Island studies: Kaloko-Honokohau National Historical Park (two years), Army Guard base by Hilo airport (five years), Mauna Loa Forest Reserve (study just concluded). Maui studies: Army Guard site in northwest, Kahikinui Forest Reserve (eighteen month study concluded, redeploying through the end of 2014). Oahu studies: Kawailoa and Kahuku wind farms, Army and Navy bases (including Pearl Harbor). Kaua'i studies: Pacific Missile Firing Range (study concluded), Pu'u Ka Pele Forest Reserve, Army Guard site (ongoing). Bats have been found at every site except one of the Army Guard sites. Bats in Hawai'i are habitat generalists and can be found just about everywhere. This does not mean every habitat is equal, some habitats are more optimal and support much higher levels of activity (nearly always associated with foraging activity). Laupahoehoe NARS is the area with the highest level of vocalizations over a large part of the ear, and is also wher the highest mist-netting success has occurred.

Bonoccorso's group is working with three different population geneticists at three different universities on the mainland to study conservation genetics of the hoary bat, looking at the C01 gene. There are two major clades – *L. cinereus cinereus* and *L. cinereus semotus*. Results show that there is an ancient Hawai'i clade with eight unique haplotypes (genetic sequences) found only in hoary bats in Hawai'i: six on the Big Island, one on Maui, and one on Kaua'i. This clade is very distinct from the North American clade. However, there are three haplotypes – two on Maui and one Oahu – which cluster with the North American clade, not the Hawaiian clade. This suggests multiple colonization events. Morphologically, some of the bats, particularly from Maui, are very similar to North

American hoary bats. Not exactly the same, they are still a bit smaller, but larger than the Big Island bats. Wing aspect ratio has also undergone character divergence. The next question is to look further into the rates of colonization. Corinna Pinzari (graduate student at UH Hilo) is studying conservation genetics of the Hawaiian hoary bat, including some of these questions.

Bonaccorso's group has tissue samples from about 180 individual bats, some from museums, some from wing biopsy or mist-netted bats, and some from mortalities that came in from various sources. Single nucleotide polymorphism can be looked at in a few individuals, maybe as few as 5, but since you're looking at thousands of genetic loci so it is a very robust technique for estimating the effect of population size. Bonaccorso has not released a population estimate. The only published guess is Quentin Tomich's book about bats in Hawai'i, and that guess was somewhere around 5,000. Bonaccorso does not say whether he agrees with that figure or not. Bonaccorso stated that this genetic data means there may be multiple evolutionary distinct units, but it is unclear if this represents multiple distinct populations, subspecies, etc. These studies will hopefully generate a confidence interval that would suggest an effective historical population. This would also address migration rates – for example, the question of whether bats from the Big Island ever fly over to Maui.

Bonaccorso stated that amateur spelunkers informed him of a large number of bat mummies in a cave on Mauna Loa – Mummy Cave. Upon visiting the cave he found bats skeletons, mummies, and corpses in various states of decomposition. There is a large opening, followed by a constriction, and then beyond the constriction there are 100+ carcasses of bats. This is not the only cave with carcasses on Mauna Loa. Bonaccorso's group is interested in these caves for multiple reasons, one being the possibility of the spread of White-Nose Syndrome (WNS). WNS is through to spread from cave to cave by bats or by cave enthusiasts with fungal spores on the boots and clothes. Bonaccorso had two hypotheses for bat use of the caves: (1) hibernation or roosting and (2) insect presence. Results of surveys showed that they are not hibernating, but acoustic microphones placed at the mouths of 12 focal caves for six months showed feeding activity.

Pohakuloa Training Area (PTA) shares a boundary with the Mauna Loa Reserve, and there was an Environmental Assessment (EA) conducted regarding proposed landing zones, in an area where there are many lava tubes similar to those sampled in this study.

One of the caves is named Mothalaeum after a noctuid moth in the genus *Peridroma*, which is a high-elevation, lava tube sheltering moth. According to Frank Howard at Bishop Museum, back when sugar cane was big industry in the 1920s and 30s, these moths were very abundant in the caves. They lay their eggs on grasses, including sugar cane. Use of a biological control was implemented, and the month populations plummeted, although they are still present in some of these caves.

The highest cave in the study is located at 3,500m the lowest cave is located at 2,200m. The calls recorded show that the bats are feeding in the caves in winter time. Bats were detected on 30-64% of sample nights across the 12 caves. Four of the caves were tracked for both the initial six month period and then redeployed the following winter to see if the

same seasonal pattern was observed. Results showed that it was. These high-elevation sites appear to be important feeding sites, and the *Peridroma* appears to be the only likely prey species.

Bonaccorso has shared some of this information with PTA, and informed them that he would be letting DLNR and USFWS know that he believes these caves are a very important foraging resource. During the winter, in lower elevations on the wet side of the Big Island, there is a large amount of rain, so bats fly up above the cloud inversion layer in order to feed outside of the rain. Bats are moving one-way up to 12 miles in a single night according to radio-tag studies. Mauna Kea Forest Reserve was previously an important late fall/winter foraging area for bats, but there was a fire there in 2010 and the area has not yet fully recovered. Bonaccorso believes that this new information about cave-feeding behavior should be included in the EA, and there is language in the EA that states that if new information becomes available it can be considered.

Penn asked if there was anything similar in coastal cave areas. Bonaccorso said that there are some bat carcasses in lower elevation caves, but most are on private lands and permission to access the caves has been denied. He stated that there are likely different insects sheltering in those caves.

Hoary bats on the mainland don't typically use caves, but Hawaiian hoary bats are clearly using them for foraging both inside and at the entrance as the moths emerge or return.

Fretz asked why the bats are dying in the caves. Bonaccorso compared it to a fish trap with a large chamber, a narrow constriction, and another big chamber. When bats make it into the inner large chamber, being that they are not adapted to orient in caves well, some individuals cannot find the small opening again.

Morin asked if the bats like macadamia nut trees. Bonaccorso said absolutely, mac nut estates are built in ways that are good for bats, such as the construction of wind rows. Bats like to forage on the lee side of wind rows. Wind creates ultrasonics which can confuse bats, and impede their acrobatics. Bonaccorso explained the mechanics of bat feeding acrobatics, and stated that for a few seconds while the bat is chewing on a caught insect, it cannot echolocate, and this is why we see bats getting entangled on barbed wire fences.

Baseline studies at Kahikinui on Maui included 14 acoustic detectors. Studies started in July 2011. For the first few months detection results were quite high, but then for about 18 months, detection results were much lower. It is therefore unclear if the high activity or the low activity levels were the anomaly, so Bonaccorso will be redeploying to gather additional data. He provided an overview of different restoration activities occurring in Kahikinui – fencing, ungulate removal, planting, etc. This baseline will be used to compare levels of bat activity as these restoration activities continue. Jacobi clarified that this is an index of activity, not an actual population count, to provide an idea of relative levels of activity. Bonaccorso concurred.

Fretz asked if home-range tracking for the 40 radio tagged bats indicated a preference for habitat types, and if home-ranges are constricted in preferred habitat. Bonaccorso said that

telemetry studies have been confined to the Hamakua Coast, Hilo, and Waiakea on the east side of the Big Island, so it's a very limited geographic sample. The battery life of the tags is also very short – about 2 weeks. There are pilot studies in the works to try other methods of determining larger movement patterns. Fretz asked if this is currently the best and only technology to develop population estimates. Bonaccorso said no, he believes conservation genetics are the best approach. The recapture rate for bats is very low, as bats learn and will avoid a mist net. Out of 40 individuals, only five have been recaptured, one of which was caught four years later. This individual was roosting in a lychee tree in the arboretum at the DOFAW baseyard in Hilo, and four years later was found to be roosting in the same tree. This individual made about a 5-6 mile feeding circle every night and then returned to its roost tree.

Bonaccorso said that bats will use roost trees long-term, but have secondary and tertiary roost sites in case of weather or tree fall. One landowner in Hilo has observed bats using the same tree for over 50 years.

Fretz asked about the challenges as managers of coming up with how much forest a bat needs. Bonaccorso said some of the 40 bats had small foraging ranges, a term he prefers to home ranges, but some were larger. Fretz followed up that current HCPs use a figure that was derived from information provided by Bonaccorso. Bonaccorso said that this figure was misinterpreted, and that the bats use pockets of habitat, not contiguous habitat. The total area they use may be quite large, but they only forage in small pockets, or core use areas. The core use areas do not appear to overlap. Fretz stated that this is an issue that needs to be resolved for the future. Bonaccorso agreed that the current approach is an oversimplification. Morin asked if bats defend territory. Bonaccorso said that he believes adult males do, given that territories abut but don't overlap, but that subadults may overlap. Morin asked about seeing groups of bats on the Big Island. Bonaccorso said yes, this happens in Manaka and Laupahoehoe, and he believes that is a traditional fall swarming site for mating.

Fretz said that the problem this poses are related to determining cost and how much acreage to require applicants to fund for mitigation. Bonaccorso concurred.

Morin asked if bats defend a roost site. Bonaccorso said bats don't share roost trees, but they will roost in adjacent trees.

Hart asked if these same patterns occur in natural forest or if this is more typical of fragmented, suburban habitat like Hilo and the mac nut fields. Bonaccorso said no, the pattern is similar. However they have collected more data from areas crossed with many roads, like Island Princess, as opposed to natural areas like Laupahoehoe that have just one road due to difficulties following radio-tagged bats. Hart asked why they would make these types of movements if they were in contiguous forest. Bonaccorso said males make the biggest movements, the two largest single night movements have been males in fall-winter, and since males are polygynous they may have a strong incentive to check a lot of area to find females. It could also have to do with insect phenology.

Dan Purcell (member of the public) asked about the overlap with coqui frog diet. Bonaccorso stated that this was a master's thesis by Riley Bernard looking at stomach contents of frogs and fecal pellets of bats at certain sites. The finding was an overlap between 25-30% in the taxa that are fed upon by both species. Most of the sites were low-elevation dominated by alien plants and insects. Purcell asked if this was a concern and what might happen if coqui frogs were eradicated. Bonaccorso said yes it is a concern, and eradication would be a great experiment to collect before and after data, and you might see increased bat use of areas after frogs were removed.

Bonaccorso provided an overview of advances that have been made in monitoring at wind facilities in collaboration with developers on the mainland and Hawai‘i. Current video technology can capture bats at distances of 100m+, both standard video, thermal, and near infrared are currently being used. It is important to avoid capturing images of insects, because if they are dense they create a cloud that obscures the bat. Motion detection software enables researchers to target just the portions of video where bats appear.

Bonaccorso was co-author on a paper submitted to the National Academy the week prior describing the results of video monitoring studies in Indiana in which bat behavior around turbines was categorized into nine different behavior types. Types include exploration (depicted in a near-infrared video and a thermal image video shown by Bonaccorso), serpentine flight, air-braking, and more. Bonaccorso said that one hypothesis as to why bats are attracted to turbines is that tree-roosting bats see turbines as a large tree and potential roosting site. Another hypothesis is that the echolocation reflectivity off the smooth surface of the tower is similar to that of water. Studies have shown similar echolocation off skyscrapers with glass windows in Germany, and bats may be exploring it as a potential water source. A possible solution could be texturizing the metal on the towers. Morin asked if that had been tried before. Bonaccorso said he was not aware if it had.

Fretz asked if the research into monitoring techniques is designed to provide an accurate assessment of take. Bonaccorso said yes, in addition to understanding bat behavior. Jacobi and Craig suggested that this was useful for detecting possible take and following up with carcass searches. Jacobi said it could be used as a coarse filter to see if there is bat activity or not, and intensify carcass searches accordingly.

Fretz said that given the small size of bat carcasses, the need to keep searcher efficiency up can be very expensive. This technology provides an alternate means of detecting. Perhaps just an index, but an index that limits the need for on-the-ground surveys. Jacobi said it is important to be able to calibrate video and ground searches so you feel comfortable going with one versus the other and still coming up with the same answer.

Bonaccorso said a report is expected to come out in the public domain in November.

Purcell asked about other applications for the videography and software, particularly with regard to other species. Bonaccorso said videography can be used to monitoring activity at tree roosts, and the same techniques can be used to monitor birds. Fretz suggested this could be applied at the Makamaka‘ole site.

Bonaccorso said that his group has compared the traditionally used Anabat detectors with Wildlife Acoustics detectors, and in Hawai‘i with Hawaiian hoary bats the Wildlife Acoustic detectors have captured significantly higher call numbers. Jacobi said he would like to eventually see protocols for detecting, identifying, and calculating take of bats similar to those established for forest bird sampling. Beyond this, it would be the ultimate goal to be able to tie bat response to specific management actions. Fretz said that this is the missing piece – translating the number of permitted bats to specific mitigation actions.

Craig pointed out the importance of research versus spending money on mitigation without a clear understanding of how that mitigation impacts bat numbers. Jacobi said that is not necessarily the case, but agreed there is a question of where research fits into the equation of net benefit. Fretz agreed, and said that research as mitigation has been supported in the past in certain cases where deemed appropriate.

Bonaccorso stated that there would a bat symposium taking place during the Hawai‘i Conservation Conference in July 2014.

Fretz asked if there were any questions from the public or partners.

Charrier asked if the winter cave-feeding research would be published. Bonaccorso said he is working on a draft of a technical report and hoped that in a month or two it would be available.

Fretz asked if there were further questions from the public, partners, or committee. There were none.

ITEM 8. **Announcements.** Set next meeting dates. Manuela Huso Take Estimation Presentation and annual HCP/SHA section updates.

The committee selected 9am, June 20, 2014 for the next ESRC meeting, which would include Manuela Huso of USGS providing a Take Estimation presentation to the ESRC. All members present were able to confirm the date except Harrison.

DOFAW staff members Siddiqi and Amlin requested establishment of a repeating date for the annual HCP/SHA section update to the ESRC. The committee selected the fourth Friday of every October. In 2014 the day falls on October 24th.

Jacobi asked if the Committee is supposed to have input on applicant Annual Reports. Fretz confirmed and explained that the process is as follows – the State receives reports from applicants, reviews them, staff puts together comments and obtains comments from USFWS, comments are synthesized and given to the applicants to address, then the reports come to the ESRC. Fretz asked if the ESRC is ok with this process.

Jacobi said that he has confidence in the review process, but would like to ensure that the ESRC is not just rubber-stamping the reports, but is involved in the feedback process.

Jacobi further said that it was useful receiving the Legislative Report and requested that the report be sent out to the committee each year, with questions, comments, and concerns somehow highlighted for the ESRC. Fretz said that these types of concerns are typically included in the staff reports to the ESRC.

Jacobi said that it would be useful to have expected benchmarks compared with where the applicants stand on each in the report to provide a quick understand of status. Fretz agreed that the staff should anticipate these questions and ensure they are addressed in the report. He further said that the Committee can request that the Staff revise the report and bring it back to the ESRC.

Hart stated that timing can impact voting and stated that scheduling enough time for review (*e.g.,* one meeting before items are due for a vote) would be beneficial. Hart recognized that this may not always work logistically, but is ideal. Fretz said that there should be a minimum of two meetings of the committee, at least one before the committee is asked to vote. Fretz further said that 195D states that the ESRC must conduct an Annual Review and make recommendations, but does not actually approve the reports. Jacobi concurred that the ESRC's role is advisory.

Fretz asked if there were any additional announcements. There were none.

ITEM 9. Adjournment.

The Meeting adjourned at 1:10 PM.