

To: Glenn Metzler, Staff HCP Planning Associate
From: Scott Fretz, ESRC Chair
Subject: Comments on the Kawaioloa draft HCP amendment dated September 2018

At its meeting of October 25, 2018, the ESRC requested that its members provide any additional comments on the Kawaioloa draft HCP amendment dated September 2018 to staff in writing. My comments pursuant to that request are provided below.

General comments

1) Population and cumulative impacts. Statutory requirements regarding population and cumulative impacts are provided in §§195D-21(c) and 195D-4(g)(5). The draft HCP accompanies a request for the authorization of incidental take of 265 bats over a 20-year term, or on average, approximately 13.25 bats per year. The cumulative take of bats from other permits and wind facilities on Oahu, in addition to what is being requested in this HCP, would be 352 bats, or an average of approximately 17.6 bats per year. Pursuant to §195D-21(c), the draft HCP shall contain sufficient information for the ESRC or the board to ascertain with reasonable certainty the likely effect of the taking of 265 bats over a 20-year term, or on average, 13.25 bats per year, on the HHB population in the project area, and pursuant to §195D-4(g)(5), the HCP shall provide an adequate assessment of the cumulative impacts that the taking of 352 bats over a 20 year term, or an average of 17.6 bats per year, on the population of HHB on Oahu. To address these requirements, the draft HCP states that the project will result in no population level impacts to HHB because take is expected to be fully offset by mitigation. I am not reasonably certain that this is the case for the following reasons.

The mitigation proposed for the take of HHB includes a combination of land acquisition and habitat restoration projects to offset take. The justification provided for the assumptions that these projects fully offset take are :

- a) That the lands to be acquired presently support HHB, that they are under threat of destruction of HHB habitat, resulting in loss of HHB, and that their protection will enable the present HHB occupants to persist in to the future, resulting in the protection and production of more than 55 bats (tier 4).
 - i) The assumption that the proposed land acquisition will offset take is uncertain because the numbers of HHB present in the lands to be acquired is not known.
 - ii) While it is reasonable to assume that the acquisition of those lands will confer a conservation benefit, it is not reasonably certain they will fully offset take of 55 bats.
- b) That the restoration of presently unsuitable habitat to suitable habitat will result in the production of 150 bats (tiers 5 and 6).
 - i) The conservation biology and recovery needs of HHB are poorly known. The factors and threats that limit populations are not known, it is not known whether suitable habitat is a limiting factor, and there are no published studies or data on HHB that have demonstrated that restoration of habitat resulted in an increase in HHB populations.
 - ii) As with land acquisition, habitat restoration using the best available science is likely to provide a conservation benefit for bats, but, as proposed in the draft HCP, does not provide a reasonable certainty that it offsets take of 150 bats.

- 2) It is not clear how the draft HCP complies with §195D-4(g)(1), which requires that the applicant, to the maximum extent practicable, minimize and mitigate the impacts of the take because it does not provide a commitment to include effective research, development, or deployment of deterrents. As written, the HCP could be implemented without the use of any deterrents, and result in the take of 265 bats. While further development of deterrent technology is desirable, a number of tools and applications are currently available with a reasonable likelihood of success in reducing take and yielding essential information needed to improve the effectiveness of available methods. The draft HCP acknowledges these tools and their potential, yet defers any decisions on whether to use them until 2022 and then pre-conditions their deployment on unspecified future circumstances. It is my understanding that deterrents that are likely to be effective are available now and can be procured and deployed upon approval of the HCP.

Research is ongoing to better understand HHB population biology and to improve the effectiveness of mitigation efforts to offset take. Until that research provides better information to guide planning, I recommend that the draft HCP be amended to request a lower level of authorized take, and to include the deployment of deterrent devices on all turbines immediately. The level of cumulative take authorized should represent a level for which the department is reasonably certain will not result in a decline in the population in the project area, and thereby preclude recovery benefits.

I understand that the authorized take level should represent a realistic take projection based on take models and estimated benefits of deterrents, and suggest that a lower take projection can be reasonably expected through a more aggressive program to deploy effective deterrents.

Technical comments

- 1) Section 5.0 Alternatives
 - a) States that full night time curtailment cannot be done because it would reduce power by 45%, or 61,000 MWh/year. Cites the PPA and implies HECO would not agree to an amendment to the PPA. Staff should confirm with HECO if this is the case and if so consider whether this makes HECO responsible for take.
 - b) States that cut in speeds over 5.5 m/s are not economically viable. Applicant should provide additional information to indicate the minimum power production needed for viability in order to inform determination of the maximum practicable extent of minimization.
- 2) Section 6.3 Population impacts
 - a) p. 26 statement that HHB has persisted with no direct intervention to preserve or protect the species is misleading. Conservation agencies and partners have been supporting research and management actions to benefit HHB for decades, including research and habitat protection measures that have included land acquisition, management, and restoration of hundreds of thousands of acres of native forests, including restoration efforts that have planted more than 250,000 native trees.
- 3) Section 7.6 Bat Mitigation
 - a) 7.6.3.3 The purpose and intent of this section is unclear. The previous section proposed that the funds contributed to the Helemano land acquisition, in the amount of \$2.75M, would serve as mitigation for tier 4. I am in support of that for the reasons stated in the last ESRC meeting. This section provides a confusing discussion of credit that seems inconsistent with that.
 - b) Appendix 19. As discussed at the ESRC meeting, this section is confusing. Please revise so the purpose and intent are clear.

- c) Mitigation for tiers 5-6 are only discussed in concept as a suite of conservation measures on an undetermined acreage in Helemano or elsewhere. No actual project is presented. It is not possible to determine that they will serve to offset take or comply with statute or guidance. Details are needed on the exact site, the current features of the site, HHB monitoring before and after, restoration targets in terms of biological objectives, etc.
 - d) As discussed at the ESRC meeting, 20 acres per bat is not consistent with guidance.
- 4) Section 8.3 Adaptive Management
- a) Triggers and actions are general only and vague. The triggers as written do not provide a clear and effective action that is likely to reduce take.
 - b) Reversion. This section appears to have the intent to relax minimization and would therefore defeat the purpose of the tiers and be inconsistent with requirements to minimize take to the maximum extent practicable. This practice should not be employed and this section should be deleted from the draft.

Project: Kawailoa Amendment

Mehrhoff Comments

October 16, 2018

General:

1. This project is requesting the take of 265 endangered Hawaiian hoary bats and 24 adult/chick endangered Hawaiian petrels. The project appears likely to offset impacts to petrels. However, I have serious concerns about the project’s impact on bats. The draft HCP has not presented a compelling case that the project will not cause a decline in the Oahu bat population or that it will provide a net benefit to this species.
2. For bats, the applicant has committed to implementing weak minimization actions, with the potential for extensive deterrence actions later if they become commercially available and are as effective as Low Wind Speed Curtailment (LWSC). The decision to implement deterrence is to be made by the applicant. In the absence of deterrence measures, the weak minimization actions would remain in effect and the full 265 bats would be expected to be taken.
3. I would suggest the applicant immediately implement LWSC of 6.5 m/s until deterrence equipment can be installed on all turbines. When deterrence measures are approved by DOFAW and fully operational, a reduction in LWSC to 5.0 m/s may be warranted. Further reduction or elimination of LWSC could occur if analyses show that doing so would not impact the Oahu bat population.
4. The proposed Tier 4 mitigation for bats does not appear to offset expected take.

My review of the literature as of October 15, 2018 indicates that the following characteristics of wind projects can have a significant affect on bats. Projects should avoid and minimize impacts by adopting the least impactful suite of characteristics. My assessment of this project is shown in the last columns.

Item	Characteristic	Better (1)	Worse (5)	Current Project	Score
1	Site proximity to known bat areas/high activity/high take.	Far from known problem areas	Within known problem areas	Area of high activity (10x KWP) and known high take. Expect high take at this site.	5
2	Site average wind speed. Increased take expected at low wind speeds.	>10 m/s	<6.5 m/s	5.4 m/s. Expect high take at this wind speed.	5
3	Site proximity to special features: cattle, forest, ravines, cliffs, and water	Non-forested disturbed flat areas	Grazed open forest,	Grazing, water features, forest, and ravines. Increased take expected.	5

	features increase bat activity and take.	without water/cattle	wetlands and ravines		
4	Rotor size. Increases in rotor size increase take and reduce effects of LWSC.	<50 m diameter	>100 m diameter	101 m rotors. Correlated with a 60% increase in baseline take and a 42% reduction in LWSC benefits.	5
5	Turbine feathering. Feathering can reduce take significantly.	Feathered when not generating	No feathering	Night time feathering when not generating. Reduced take expected.	1
6	Low Wind Speed Curtailment (LWSC). Effectively reduces take up to at least 6.5 m/s.	>6.5 m/s	No LWSC	LWSC at 5.0 m/s. This is weak minimization, producing on average a 55% reduction in take. But, project needs a 42% penalty adjustment for use of large rotors.	4
7	Wind speed rolling average. One study showed a 30% reduction in take with 20 minute averages compared to 10 minute average.	20 minute	10 minute	20 minute rolling average. 30% reduction in take expected.	1
8	Wind speed monitoring. Recent study showed turbine meters overestimated wind speeds by 1.0 m/s and had an 81% increase in take.	Via met towers	Via turbine anemometers	Turbine anemometers. Expect 81% increase in take compared to use of met tower data.	5
9	Deterrence actions. Studies have shown a 50-100% reduction in hoary bat fatalities.	Acoustic deterrence	No deterrence	Hope to install deterrence on all turbines by 2020. Not guaranteed though. May reduce take by 50-100 %.	3

Specific:

1. Is the purpose and need logical and accurate? Discussion of project purpose and need seems logical.
2. Project description:
 - a. Site:
 - i. Location map that can be cross referenced to wind speed/other maps. Yes.
 - ii. Average daily wind speed at site: 5.4 m/s.

- iii. Presence of special topographic features at site (cattle, water, forest, ravine/cliff). Grazing, water features, forested areas, and ravines all present. These special features seem to be correlated with increased bat activity/take.
- b. Operations:
- i. MW production: 69 MW facility.
 - ii. Number of turbines: 30 2.3 MW turbines.
 - iii. Rotor diameter: 101 m in length.
 - iv. Nacelle height: 150 m.
 - v. Manufacturer: Siemens.
 - vi. Base cut-in/cut-out speeds: 5.0 m/s.
 - vii. Feathering wind speed: Night-time feathering when in LWSC.
 - viii. Low Wind Speed Curtailment (LWSC):
 - 1. Cut-in/cut-out speeds: Cut in at 5.2 and cut out at 5.0 m/s.
 - 2. Dates: year round.
 - 3. Hours: 7:00 pm to 7:00 am. Since dawn and dusk vary over the year, LWSC should be keyed to actual dawn and dusk, not a year round set 7 to 7.
 - ix. Governing wind speed (LWSC) from met towers or turbine anemometers? Met tower measurements appear more accurate, with turbine meters overestimating wind by 1 m/s and killing 81% more bats. Use of turbine anemometers may need to increase LWSC by 1 m/s to reach anticipated benefits, since many of the baseline research studies on LWSC used met tower data.
 - x. Governing wind speed (LWSC) based on 20 minute rolling averages. This is good from both economic and biological perspectives. Switching from 10 minute to 20 minute rolling averages for LWSC reduced bat take by 30%.
 - xi. Deterrence actions. Project hopes to use deterrence on all turbines by 2020 if they are commercially available and provide benefits at least as good as LWSC. Project intends to implement minimal minimization until then.
 - xii. Operational wind speed monitoring. The project will continue to use turbine monitors. Use of met towers is recommended.
 - xiii. Operational bat activity monitoring. It is unclear if this will continue. It should continue for duration of permit.
 - xiv. Operational bat take monitoring:
 - 1. CARE protocols. Doing standard protocol with dogs, if available.
 - 2. SEEF protocols. Doing standard protocol with dogs, if available.
3. Baseline studies:
- a. Pre-application TEC studies. Completed.
 - b. Pre-application activity monitoring (2 years). Completed, showed 10 times bat activity of KWP.
4. Impacts to species:
- a. Take estimates:
 - i. Total estimated take for species:

1. Hawaiian hoary bat: Requesting an increase in take from 60 to 265 bats over 20 years. Project has already taken 69 bats (13.25 per year) and exceeded their take authorization.
 2. Hawaiian petrel: Requesting take of 19 adult Hawaiian petrels and 5 chicks. One confirmed take occurred without authorization, hence the addition of this species to the amendment.
- ii. Take estimate is logical/consistent with protocols. It appears logical, but it is not possible to verify EOA analyses until all inputs have been provided.
 - iii. All take parameter inputs have not been provided (e.g., EOA inputs). Please provide a table of all EOA inputs.
 - iv. 80% likelihood thresholds were apparently used in EOA analyses.
 - v. Explanations of impacts are provided, but are primarily qualitative discussions with limited quantitative support. Please provide a more detailed discussion of why the take of 265 bats (13.25 bats per year) is not likely to impact the bat population on Oahu.
 - vi. Cumulative effects are discussed, but again, are qualitative. Stating that all projects will comply with State and Federal guidelines and therefore everything is OK, is not very helpful. Please provide a more detailed discussion of why the cumulative take of 350 bats (17.5 bats per year) authorized by this proposal and existing/approved projects is not likely to impact the bat population on Oahu.
- b. Special case effects:
- i. Site wind speed (on take). Areas with lower average wind speeds are expected to have greater bat activity and, thus, increased risk of take by wind projects. This project area has very low average wind speeds (5.4 m/s).
 - ii. Site special features (on take). This project has forests, water features, ravines, and grazing all of which seem to lead to increased risk of bat take.
 - iii. Rotor size has been shown to affect bat take. Larger rotors like the ones used in this project (101 m) are associated with higher rates of bat take (61% increase in take, Table 2). Larger rotors also have been shown to have reduced effectiveness when LWSC is applied (in this case a 42% reduction in benefits, Table 3).
 - iv. Nacelle height (on take). Some studies have shown height to be correlated with take, with higher towers more likely to have increased take. It is unclear if this would be logically true in Hawaii. This project has 150 m tall turbines.
 - v. Feathering (on take). Feathering turbines when they are not actively generating power can greatly reduce bat mortality. This project will feather turbines under LWSC.
 - vi. Low Wind Speed Curtailment. LWSC of at least 6.5 m/s has been demonstrated to reduce bat take. Average reductions in take for 5.0 m/s is 55%, for 5.5 m/s is 66%, and for 6.5 m/s is 77% (Table 1). This project proposes 5.0 m/s, which would be a 55% reduction. However, correcting for large turbines results in only a net 32% reduction in take from unminimized take (Table 3).

- vii. Deterrence. Few studies have been done on deterrence, but some of these have shown a 50-100% reduction in bat take for turbines using acoustic deterrence.
5. Compensatory mitigation: The strategy is OK; acquisition of existing habitat for bats on Oahu and offsetting survival of petrels on Kauai. The preference is for petrel offsets to be on Oahu, but this may prove very difficult to do.
 - a. Mitigation strategy is specific to Tier 4 of the amendment - the acquisition of Helemano Wilderness Area. Other, future efforts, are left vague and to be determined. These should be tightened up to include specific parameters, like acres needed, actions needed, and responsibilities of the project.
 - i. Habitat acquisition is proposed as mitigation for Tier 4. But, the acreage is based on 20 acres per bat and should be based on 40 acres per bat (see page 16 of the guide). In addition, only the portion of the land acquisition that the project is paying for (528 acres) qualifies for mitigation. The net result is mitigation for 13 bats ($528/40=13$). Tier 4 take is 55 bats, so mitigation for an additional 42 bats is needed.
 - ii. Habitat restoration. Potentially to be used for later Tiers of bat take. Petrel predator control seems reasonable, though it is off-island. It would be difficult to do on-island, since I am not sure where you would go.
 - iii. Research is not currently proposed as mitigation in the amendment.
 - b. Mitigation monitoring
 - i. Specific monitoring protocols do not seem to be very applicable for acquisition. The discussion seems reasonable, the project on Kauai may need more specifics of who is responsible for what. A commitment letter from the landowner is needed.
 - ii. Reporting is also fairly minimal, assuming acquisition goes forward. Reporting for petrels needs more detail.
 - c. Outcomes of mitigation:
 - i. Please provide a table with annual take expected and annual offsetting bat/bird numbers showing how each species is offset.
 - ii. Discuss how the above offset table shows that the impacts will, indeed, be offset. If there is a shortfall in offsets, please describe how that will be rectified.
 6. Compliance:
 - a. Take estimate of 265 bats is clear and determinable (assuming we can verify numbers in an EOA with numbers provided by the applicant). Take of 19 adult petrels and 5 chicks is clear, again, inputs are still needed for verification.
 - b. Cumulative effects are discussed, but the discussion is too general and lacks numeric support. This discussion needs more specifics as to take impacts.
 - c. Mandatory actions for take thresholds: This section is generally far too vague.
 - i. Take exceeded. The HCP needs to commit to specific actions if take is exceeded. Those actions should be definitive, like if bat take is exceeded the project will implement a full night-time shutdown until agreement on interim operations is reached with DOFAW.

- ii. Pre-exceedance thresholds. The HCP needs to commit to specific actions if take is expected to exceed warning thresholds. Those actions should be definitive, like if bat take reaches 75% of authorization, the project will implement a LWSC of 6.5 m/s until agreement on interim operations is reached with DOFAW.
- d. The mitigation goal for bats is determinable, but see above for issues with calculations. For petrels, the goal is clear and determinable.
- e. Mandatory actions for mitigation thresholds:
 - i. Mitigation failure is addressed in the HCP, but the backup plans are not fleshed out.
 - ii. Pre-failure thresholds. Again, trigger points need to be added to help identify if the petrel mitigation is headed for failure. How decisions are made to change course need to be discussed.
- f. The HCP does address changed circumstances, in a general way.
- g. Annual reporting:
 - i. Update the EOA graph, to include take estimates and thresholds for the entire project duration should be provided annually (and in the HCP amendment so that the public and readers can better understand the situation. A similar graph needs to be provided that shows how offsets to take progress over the 20 years of the permit.

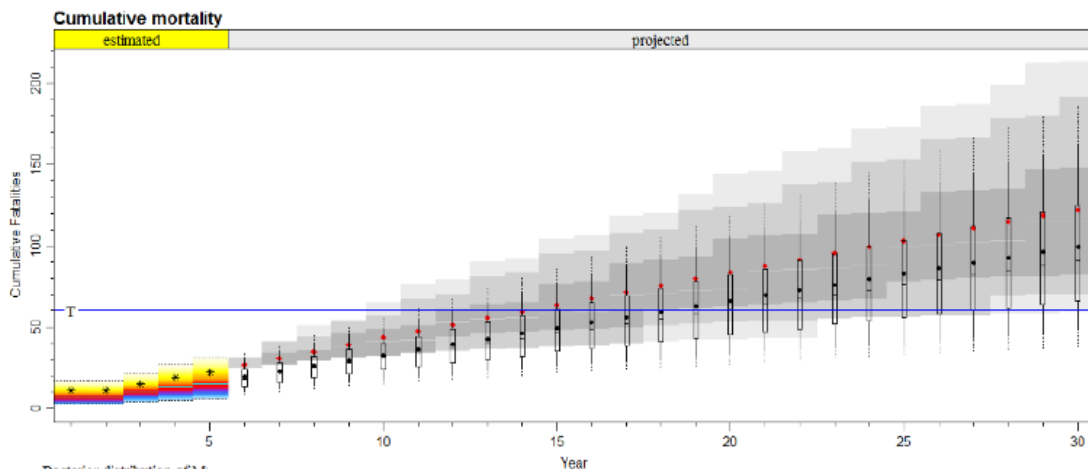


Figure 1. Example Evidence of Absence graph. Similar graphs for the project should be included in the Annual Reports and a revised HCP.

- ii. Annual bat activity at site needs to be provided in order to both get an understanding of bat activity over time as well as to help understand when take is most likely to occur.
- iii. Annual take at site, with associated data on the take is expected to be obtained during the HCP.
- iv. Annual results of mitigation monitoring efforts should be reported annually.
- v. Annual discussion of adaptive management efforts should be provided.

7. Cost-Benefit of:
 - a. Avoidance. Night-time curtailment was discussed and deemed uneconomical.
 - b. Minimization. Minimization efforts are discussed. Additional LWSC above 5.0 m/s were deemed uneconomical and of uncertain value. I strongly disagree with the HCP's statements on the value of LWSC. A cost-benefit analysis of LWSC versus deterrence was not provided.
 - c. Mitigation. Cost benefits of mitigation options are not discussed.
 - d. Anti-minimization (reversion). There presumably are economic numbers behind the potential for reversion of LWSC and other operational measures if take is lower than anticipated, but they are not provided. I found this section to be quite troubling, given the large amount of take requested and the minimal minimization committed to.
8. Review of 195D requirements:
 - a. Addresses island-wide cumulative impacts to the species. The discussion is inadequate to support the requested level of take. This topic needs much more discussion and more quantitative analysis.
 - b. Project:
 - i. Avoidance measures taken. Night-time curtailment was discussed and deemed uneconomical.
 - ii. Minimization measures taken. Minimization efforts are included, but guaranteed actions are minimal (feathering, LWSC of 5.0, 20 minute rolling averages for LWSC). Deterrence is provided as an intention, but not guaranteed. Given the large amount of take expected and requested, the level of minimization is far too low.
 - iii. Mitigation measures taken. The proposed mitigation will not offset anticipated bat take. Mitigation will likely offset expected petrel take.
 - c. There is zero chance that this project will increase the likelihood of bat recovery. Proposed mitigation could help with petrel recovery.
 - d. The project is not consistent with the intent of bat recovery. But is consistent with the stated objectives in the outdated bat recovery plan, in that it does not impact bat populations on Maui and the Big Island.
 - e. All negative impacts are minimized or mitigated. Impacts on the bat are neither adequately minimized nor mitigated. Impacts to petrels appear to be mitigated.

Table 1. Estimating mortality reduction due to Low Wind Speed Curtailment. All scenarios should require feathering of turbines when not generating power.

Purpose of Action	Season	Duration	Wind Speed	Interval Met Tower	Mortality Reduction
Take avoidance	Year-round	Dusk-dawn	No night operation	N/A	100%
Strong minimization	Year-round	Dusk-dawn	>8.0 m/s	20 minute	90%?
High minimization	Year-round	Dusk-dawn	>6.5 m/s	20 minute	77%
Moderate minimization	Year-round	Dusk-dawn	>6.0 m/s	20 minute	71%
Minimal minimization	Year-round	Dusk-dawn	>5.5 m/s	20 minute	66%
Weak minimization	Year-round	Dusk-dawn	>5.0 m/s	20 minute	55%

Table 2. Correction factor to estimated baseline mortality due to large rotor sweep. Mortality estimates for rotor sizes in the table below should be corrected by multiplying the baseline mortality estimate by the multiplier for the appropriately sized rotor. Mortality reductions for larger rotors will need customized analyses.

Rotor Sweep (m)	Addition factor (%)	Multiplier
90-95	9	1.09
96-100	30	1.30
101-110	60	1.61
111-120	100	2.00

Table 3. Correction factor to estimated LWSC mortality reductions due to large rotor sweep. Mortality reductions for larger rotors will need customized analyses.

Rotor Sweep (m)	Reduction factor (%)	Multiplier
90-95	14	0.86
96-100	25	0.75
101-110	42	0.58
111-120	65	0.35

Additional Comments on Auwahi and Kawai loa draft HCP amendments_Mehrhoff_110218.txt
From: Loyal Mehrhoff <LMehrhoff@biologicaldiversity.org>
Sent: Friday, November 02, 2018 11:33 AM
To: Taylor, Lauren; Fretz, Scott; Kawika Winter; Jacobi, James;
gtribble@usgs.gov; Lisa Spain; kburnett@hawaii.edu;
michelle_bogardus@fws.gov; darren_leblanc@fws.gov
Cc: Metzler, Glenn M; Cullison, Katherine
Subject: RE: Comments on Auwahi and Kawai loa draft HCP amendments

Thanks Lauren,

My only additional comment is the following:

While I share concerns about how to properly mitigate for bat take, I do think that habitat restoration or preservation may be a viable option for offsetting bat take. Since bats have been observed using both native and non-native forests as habitat, mitigation could involve the creation/enhancement of native or non-native forests. The restoration/protection of native forests requires the control of key invasive species, including ungulates (e.g., pigs, goats, deer, and cows). Consequently, when mitigation aims to create, restore, or protect native forests the control/eradication of ungulates should be a requirement. Ungulate control would not necessarily need to be undertaken when non-native forests are the goal of habitat creation for bats. Some data shows that grazing by cows (an ungulate) is correlated with increased bat activity. I feel that native forests are a better option for bat-related restoration because they are the forests these bats evolved with and, additionally, native forests provide habitat for other endangered species that are dependent upon native forests. When habitat restoration/protection occurs in endangered species critical habitat (or areas where critical habitat was not designated because of landowner conservation efforts) the end target should be native habitat restoration, not the creation or perpetuation of non-native forests.

Loyal

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Metzler, Glenn M

From: Jacobi, James <jjacobi@usgs.gov>
Sent: Wednesday, October 31, 2018 9:44 AM
To: Metzler, Glenn M
Cc: LeBlanc, Darren; Gordon Tribble; Kimberly Burnett; Hadway, Lisa; Loyal Mehrhoff; Michelle Bogardus (michelle_bogardus@fws.gov); Fretz, Scott; Kawika Winter; Cullison, Katherine; Taylor, Lauren
Subject: Re: [EXTERNAL] Reminder for comments on Auwahi and Kawaihoa draft HCP amendments
Attachments: Auwahi Wind Farm Draft HCP Amendment - Jacobi comments.pdf; Gorresen etal 2018 PlosOne multi-state occupancy foraging habitat use Hawaiian hoary bat Lasiurus.pdf

Hi Glenn,

I have reviewed the proposed Auwahi ammendment document and provided my comments directly on the attached copy. I refrained from duplicating comments that I agreed with on sections that had been previously reviewed by Loyal, and the DOFAW staff.

Overall, I like the direction they are proposing for mitigation with mixed habitat landscape management. However, I feel that the mitigation management response monitoring, relative to bats, is rather weak. I am concerned that the proposed use of acoustic monitoring, specifically focusing on feeding buzzes, will likely result in data that will be difficult to analyze and not yield results that can adequately detect change response to the management actions. A new paper has just been published that demonstrates the value of a multi-state occupancy analysis that incorporates both acoustic and thermal detection, coupled with results from insect biomass sampling, to assess change in bat response. Here is the reference and I attached a copy of their paper too:

Gorresen PM, Brinck KW, DeLisle MA, Montoya-Aiona K, Pinzari CA, Bonaccorso FJ (2018) Multi-state occupancy models of foraging habitat use by the Hawaiian hoary bat (*Lasiurus cinereus semotus*). PLoS ONE 13(10): e0205150. <https://doi.org/10.1371/journal.pone.0205150>

I also looked over the proposed Kawaihoa ammendment document and felt that most of the comments provided at our last meeting, in conjunction with those already provided by DOFAW and Loyal, covered most of the important points of my concerns. However, I felt that the mitigation response monitoring in this document was extremely brief and did not provide adequate details on how they are planning to assess changes in bat activity relative to management actions (either acquisition or on-ground management). Again, they might want to consider the use of the bat activity and habitat use monitoring methods described in the attached publication. I feel that the response monitoring needs to be expanded considerably in their proposal. Additionally, I question the proposed contribution to acquisition of the "Waimea forest" as mitigation to offset incidental take of HHB, given the proximity of this site to the current project where incidental take is currently occurring.

Please let me know if you need any additional information on my comments on these two documents.

Jim Jacobi

U.S. Geological Survey
Pacific Island Ecosystems Research Center
Kilauea Field Station

KWinter comments on Auwahi draft HCP amendments.txt

From: Kawi ka Winter <kwinter@ntbg.org>
Sent: Thursday, November 01, 2018 5:16 PM
To: Fretz, Scott
Cc: Jacobi, James; Metzler, Glenn M; Darren LeBlanc; Gordon Tribble;
Kimberly Burnett; Lisa Spain; Loyal Mehrhoff; Bogardus, Michelle;
Cullison, Katherine; Taylor, Lauren
Subject: Re: [EXTERNAL] Reminder for comments on Auwahi and Kawai loa
draft HCP amendments
Attachments: Kawai loa Ammended HCP - KWinter comments 2018Nov1.pdf

Aloha Glenn,

I have reviewed and comments submitted by Mehrhoff, Jacobi, and Fretz for both Auwahi and Kawai loa, and am in concurrence with their comments. I only have additional comments for Kawai loa, and they are attached here for your inclusion.

Mahalo,

Kawi ka Winter, Ph. D.
Research Associate (Social-Ecological Systems)
National Tropical Botanical Garden

Mobile: [REDACTED]
The mission of the National Tropical Botanical Garden is to enrich life through discovery, scientific research, conservation, and education by perpetuating the survival of plants, ecosystems, and cultural knowledge of tropical regions.

To: Glenn Metzler, Staff HCP Planning Associate
From: Kawika Winter, ESRC At-large member
Subject: Comments on the Kawaihoa draft HCP amendment dated September 2018 Draft
Date: November 1, 2018

At its meeting of October 25, 2018, the ESRC requested that its members provide any additional comments on the Kawaihoa draft HCP amendment dated September 2018 to staff in writing. My comments pursuant to that request are provided herein.

I have reviewed the comments to the amended HCP submitted by members Mehrhoff and Jacobi, and Chair Fretz. I concur with their comments, but would like to make two additional points (below).

1. The HHB occupancy study of Starcevich et al. (2018) submitted on October 16, 2018 should be included in the planning and analysis of the amended HCP. Based on that data, which indicates that the project site is located in the region with the densest HHB population on O`ahu, more stringent wind curtailment speeds should be considered, and full nighttime shut-downs seem warranted.
2. Tier 4-6 mitigation: The narrative in the HCP amendment alludes to ungulate control as a viable mitigation measure for HHB, and in the presentation the applicant's representatives spoke of the potential of using ungulate fencing as viable mitigation. While these measures have been demonstrated to be affective for mitigation of ground-nesting seabirds, there is no evidence that such mitigation would be affective for the HHB, and most evidence supports the notion that such measures would have no benefit to HHB populations. Unless there is scientific justification for using ungulate control (including fencing) as viable approaches to HHB mitigation, there should be no mention of such measures.

Thank you for taking the time to compile our comments.

Sincerely,

A handwritten signature in black ink that reads "Kawika Winter". The signature is written in a cursive, flowing style.

Kawika Winter, Ph.D.

Comments on Auwahi and Kawai loa draft HCP amendments_Burnett.txt
From: Kimberly Burnett <kburnett@hawaii.edu>
Sent: Friday, November 02, 2018 3:22 PM
To: Fretz, Scott
Cc: Loyal Mehrhoff; Taylor, Lauren; Kawi ka Winter; Jacobi, James;
gtribble@usgs.gov; Lisa Spain; michelle_bogardus@fws.gov;
darren_leblanc@fws.gov; Metzler, Glenn M; Cullison, Katherine
Subject: Re: Comments on Auwahi and Kawai loa draft HCP amendments

A few more comments below.

Auwahi comments

Appendix 1: should the cost of higher tiers be proportional to mitigation costs of previous tiers as stated (in this case, tier 4?) I would imagine that mitigation may become increasingly expensive as take increases, since would probably do the conservation easements, water trough modifications, plantings, fencing, etc. in lowest cost areas first. If this is not the case, maybe provide reasoning for why increased mitigation would be a similar cost as previous levels of mitigation.

Kawai loa comments

p. 39: Is there a breakdown of costs for the mitigation funding activities, including monitoring activity of nesting seabirds and predator activity in Hanakapi ai and Hanakoa, focused removal of predators, and controlling non-native barn owls?

p. 50: Can a measure of success be provision of funding and ownership transfers? Shouldn't these be biologically-based measures of success?

pp. 5, 45, Appendix 19: the \$2,750,000 includes the purchase of the 2,900-acre HWA, but what is the funding plan for DOFAW management into the future?

Kim