

**State of Hawai'i**  
**DEPARTMENT OF LAND AND NATURAL RESOURCES**  
**Division of Forestry and Wildlife**  
**Honolulu, Hawaii 96813**

**August 26, 2021 Meeting**

Endangered Species Recovery Committee  
State of Hawai'i  
Honolulu, Hawai'i

**SUBJECT:** ITEM 1: ESRC VOTE TO RECOMMEND TO THE BOARD OF LAND AND NATURAL RESOURCES TO RESCIND 'UMIKOA RANCH PROTECTED WILDLIFE PERMIT (AKA INCIDENTAL TAKE LICENSE)

Presented for your consideration is a staff summary of background and information relative to the 'Umikoa Ranch permit (Incidental Take License, ITL) and Safe Harbor Agreement (SHA).

Current Status of the SHA and ITL: The ITL was issued as effective from December 5, 2001 to December 4, 2100. The SHA period is from December 5, 2001 to December 4, 2021.

Discussion specific to the SHA: The request to rescind does not apply to the SHA which would require a 180-day notice per provision in Section 15 of the SHA and the ITL is already set to expire in December 2021. However, it is noted that rescinding the ITL eliminates any protection for take of species under the SHA.

Summary of relevant details and history of the SHA:

- The SHA was intended to provide benefit for endangered waterbirds, specifically the Hawaiian Duck or Koloa (*Anas wyvilliana*) and the threatened Hawaiian goose or Nene (*Branta sandvicensis*).
- The baseline numbers for Koloa was determined to be two individuals, one acre of open water habitat, and five acres of adjacent upland habitat. The baseline for Nēnē was determined to be zero.
- The development of the 'Umikoa Ranch SHA was promoted by Ducks Unlimited but subsequently the organization left the islands.
- Two Nene were reported using the ponds in the state waterbird survey results for January 2018. No Koloa were observed. No Nene or Koloa were observed on the property in the January 2019 State waterbird survey. The current status of waterbirds on the property is unknown. In 2020, the ranch manager, after being contacted by the Hawaii Division of Forestry and Wildlife to request conducting a waterbird survey, stated that the landowner did not want them to record any data. However, a September 2020 email from Michelle Bogardus, Maui Nui & Hawai'i Island Team Manager for the FWS, to Habitat Conservation Program (HCP) staff transmitting the federal permit termination letter stated that there were no birds on the property that needed to be moved.
- The original land/permit holder lives in Japan and there has been no contact with DOFAW. All contact has been with a ranch manager.
- Land records indicate that 'Umikoa Ranch was sold to a new owner (ABJU corp.) in 2019. HCP staff spoke in December 2020 with the "agent" for the new owner. The agent, who stated he helped close the transfer, was contacted and was not aware of the SHA.

Details related to the lack of compliance with the SHA and ITL:

- No annual report has been provided for many years by the ITL-holder, a violation of Hawaii's Endangered Species law, Revised Statute HRS § 195D.
- The regulatory agencies have done inspections sporadically with the last occurring in 2018.
- Non-compliance with SHA requirements has been documented during site visits including lack of maintenance of fencing around some of the ponds that are habitat for the endangered waterbirds and lack of, or inadequate predator control efforts.
- The State ITL runs with the land ownership whereas the US Fish and Wildlife Service (USFWS) Federal permit issued in conjunction with the SHA is tied to the original land owner.
- The HCP program was not notified of the transfer of the property in 2019, and has not received the required documentation, a signed agreement that they understand and agree to abide by permit conditions, as required under the permit (ITL).
- The USFWS received a handwritten note from the original landowner dated March 16, 2020 that they wished to terminate the SHA.
- The USFWS rescinded their permit effective March 16, 2020.
- The termination of the federal permit invalidates the state ITL since a valid federal permit is required under terms of the ITL, and without an ITL the SHA, originally set to end in December 2021, has no protection for take of endangered species.

**SUBJECT: ITEM 5: ESRC DISCUSSION OF THE HAWAIIAN HOARY BAT (HHB)  
PRIORITY RESEARCH NEEDS**

Presented for your consideration is a staff summary of background and information relative to the Hawaiian Hoary Bat priority research needs discussion (ITEM 5)

Summary of relevant details:

Listed below are the priority HHB research topics that were identified in the most recent 2021 draft of the guidance document. These can be useful starting points for the discussion of bat research needs. While recent studies have produced important information on HHB status and ecology, several important knowledge gaps remain that are critical for better understanding the limiting factors, abundance and trends, and restoration needs to better conserve this species. The ESRC considers the following studies to be highest priority in order to better offset impacts on HHB populations from incidental take:

- Develop effective methods for estimating HHB population size and trends at an island-wide or large regional scale; [Appendix 1, Goal 1 (a)]. This would expand on research currently conducted by WEST as part of an ongoing mitigation to other islands or regions on the islands of Maui or Hawai'i, and also extend the time-scale for these studies to better determine differential habitat use by HHB and temporal trends in bat activity throughout the study area.
- Determine key demographic parameters for the HHB, including adult and juvenile mortality estimates, maximum age of bat reproduction, and average litter size; [Appendix 1, Goal 1 (b)].
- Determine if habitat restoration efforts result in increased bat occupancy by assessing trends in bat activity and insect food resource availability in similar, adjacent habitats at different stages of forest regeneration. For example, this type of study could be conducted in different aged forest stands at the Hakalau Forest Unit of the USFWS Hakalau Forest NWR on Hawai'i Island, or in similar restoration sequence forests in the Kahikinui area on east Maui; [Appendix 1, Goal 2 (a)].

Included below is Appendix 1 from the 2021 draft of Hawaiian Hoary Bat Guidance document.

## Appendix 1. Hawaiian Hoary Bat Research

### Research Priorities Identified in 2016

Although many studies have been conducted on HHB in Hawai'i and similar species found in North America, there are many issues relating to the distribution, abundance, population trends, limiting factors, and needed management for this species for which information is lacking or poorly known. The following list of expanded or additional priority research questions has been compiled from the two Hawaiian Hoary Bat workshops held in 2015 and 2020, as well as from issues raised during discussions at ESRC meetings. General priority is listed in parentheses for each research topic. This list of research priorities is meant to guide HHB related research efforts that are conducted either directly or indirectly connected to existing or proposed HCP projects.

An ESRC bat task force was convened following the first bat workshop and the task force developed a request for proposal (RFP) for research projects based on the research priorities identified at the time and the funding available. Five proposals for research projects were selected. The components of those projects selected are shown in Table 1. Table 1 also adds several new potential research areas, as described in the research priorities below. The 5 projects selected in 2016 are further described, along with their status, in Section B of this appendix.

#### Goal 1: Basic research

Conduct basic research to obtain information that will guide and assist conservation efforts.

Objectives include:

- a. **Document HHB population distribution and trends.** Conduct island-wide surveys on Maui and O'ahu using replicable methods (e.g. occupancy analysis) to document distribution, annual trends, and seasonal changes in these populations. This information may inform efforts to evaluate risk associated with proposed actions in different areas, as well as inform management decisions for conservation benefit and provide baseline information needed to understand the potential role of habitat suitability in limiting populations of the bat. (1)
- b. **Document demographic information.** Conduct research to determine basic demography, such as annual survival, mortality rates by age class, reproductive success, maximum lifespan, age of 1st breeding, % of breeding females, number of broods per year, mating system, etc. (1)
- c. **Document home range and movements.** Conduct radio-telemetry experiments to better elucidate how nightly movements and home range may differ on different islands, in different habitats, or seasonally. This information can also help with identifying bat use for foraging, roosting, etc., in different habitat types and elevations. (1)
- d. **Document genetic variability.** Collect genetic data to document variability, population structure, estimate effective population size, and provide information about population dynamics. Genetic information will also help with sex determination of damaged carcasses and to possibly differentiate different population groupings in different islands or regions of an island. (1)
- e. **Conduct population modeling.** Obtain and use demographic information to develop population models, including population viability analyses. (1)

**Goal 2: Identify limiting factors.**

Understanding the factors that limit the survival and reproductive success of individuals, and therefore determine how this information relates to the distribution, abundance, and growth of populations, is essential for planning conservation actions designed to increase bat population sizes and create net recovery benefits. Potential factors that may limit bat populations include:

- a. **Suitable habitat.** Bats require suitable habitat for foraging, roosting, and breeding. Studies indicate that bats use a wide range of habitats for foraging, but that mature trees may be important for breeding and roosting. Recent studies have documented aspects of habitat use for breeding and roosting, including tree species and architecture. However, some additional research is needed to improve our understanding of the definition of suitable habitat. Information resulting from habitat research will shed light on the question of whether or not bats are habitat limited. Findings that suitable habitat remains unoccupied would suggest that bats are not habitat limited, that habitat management and restoration would not necessarily result in net recovery benefits, and that other factors may be limiting bat populations. Objectives include, but may not be limited to:
  - i. **Define suitable habitat.** Document aspects of habitat used for foraging, breeding, and roosting, including vegetation community structure, physical attributes, vegetation species used, and tree architecture. (1)
  - ii. **Determine relationship of distribution to suitable habitat.** Document bat distribution and presence or absence in suitable habitat to determine whether suitable habitat is unoccupied. (1)
  - iii. **Determine relationship of abundance to suitable habitat.** Determine whether aspects of suitable habitat are associated with demography and home range such that bat population densities or growth rates are associated with habitat features. (1)
  - iv. **Conduct experimental treatments.** Conduct long term experimental studies (e.g. up to 20 years) in which bat occupancy or abundance is measured in treatment plots designed to increase suitable habitat. Research designed to employ this approach would be expected to require a study of considerable duration, given the long time frames inherent in habitat management and restoration efforts. Several habitat management projects are currently underway, in some cases in which Hawaiian Hoary Bat occupancy was assessed prior to the initiation of management efforts, that may provide opportunities for research consistent with the goals and objectives sought here. Applicants are encouraged to coordinate with current and potential licensees that may have opportunities for such long term research as part of their current mitigation requirements. (1)

**b. Food availability**

Populations may be limited if food resources are variable, scarce, or widely dispersed. Food limitation may impact survival and reproductive success to the degree that populations remain stable or decrease despite the availability of suitable habitat and lack of other threats. The following research objectives may contribute to a better understanding of food limitation.

- i. **Identify diet.** Understand food habits by analyzing fecal samples to provide information on foraging ecology, nutritional needs, and population ecology. (1)
  - ii. **Document prey selection.** Determine which prey taxa are selected or preferred by comparison of diet to food availability. (1)
  - iii. **Food availability habitat type [Added].** Abundance and seasonal trends of preferred HHB prey in different habitats. This research will help to identify foraging habitat use spatially and temporally. (1)
  - iv. **Determine relationship of home range to food availability.** Conduct studies in which food availability is measured within the home ranges of bats and determine whether a correlation exists. (2)
  - v. **Document relationship of food availability to survival and reproductive success.** Conduct studies in which food availability is monitored within and among years to determine whether survival and reproductive success are correlated with food availability. (2)
  - vi. **Conduct experimental treatments.** Conduct experimental studies in which bat demography, occupancy, or abundance is estimated in treatment plots designed to increase food availability. As with objective 2.a.iv. above, this research may require a study of considerable duration, and may be carried out as a part of a study pursuant to that objective, in order to explore the potential relationship between habitat suitability, food availability, and bat population dynamics. (3)
- c. **Pesticides** Pesticide use in agricultural or other areas may place bats at risk to exposure, with resulting impacts on impact growth, survival, or reproductive success.
- i. **Survey and analyze contaminate loads in bats.** (1)
  - ii. **Conduct surveys for chemical residues on bat prey.** (2)
  - iii. **Determine whether demographic variables are correlated with pesticide loads.** (3)
  - iv. **Determine whether high pesticide use areas are associated with low bat occupancy.** (3)

d. **Predators**

Predation may limit populations if bat pups or adults are subject to frequent predation events and high predator populations. Predator impacts on Hawaiian Hoary Bats are largely unknown. The following research may contribute to a better understanding of predatory relationships to bat populations.

- i. **Bat breeding roost monitoring.** Conduct intensive monitoring at roost sites to observe the outcome of pups during the period they are non-volant. (1)
- ii. **Investigation of potential predator's food preferences (e.g. barn owl).** Analyze potential predators' consumed prey items through analyzing pellets, stomach contents, etc. (2)

**Goal 3: Research and development**

- a. **Develop methods for assessing long term population trends.** Statistically robust methods for the detection of long term population trends are currently thought to be cost-prohibitive at relevant spatial scales. Efforts are needed to develop more cost effective methods to carry out state-wide long term population monitoring. (1)

- b. **Develop methods for the estimation of abundance.** Methods for the estimation of bat population levels are currently not available. Efforts are needed to develop and implement such methods in order to inform population models that can be used to understand population status, risk, and sensitivity to incidental take and other threats. (1)

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2021 Hawaiian Hoary Bat Guidance Document

Table 1. Summary of Hawaiian Hoary Bat Research and Associated Goals and Objectives

Note: X indicates primary contributor, x indicates indirect contributor; red text indicates no primary contribution or incomplete information for either Oahu, Maui, or Hawaii island where geographic scope is important; blue text indicates a new research priority or potential priority not in the 2016 RFP

Goals and Objectives	Research Studies Funded by Wind Energy Projects starting after 2016					Other Studies Completed
	Conservation genetics (USGS) [Complete]	Modeling foraging habitat suitability (USGS) [Complete]	Movement, roosting behavior, diet (USGS) [Ongoing]	Home range, movement, habitat util., diet, prey avail. (HT Harvey) [Complete]	Occupancy, distribution habitat use on Oahu (West) [Ongoing]	Various
<b>Goal 1 Basic Research</b>						
a. Distribution					X	x
b. Demography	x		x			x
c. Home range and movements			X	X		X
d. Genetic variability	X		x	x		X
e. Population modeling	x		x	x	x	X
<b>Goal 2 Identify Limiting Factors</b>						
<i>a. Suitable habitat</i>						
a.i. Define suitable habitat		X	X	X	X	X
a.ii. Relationship to distribution		X	X	X	X	x
a.iii. Relationship to abundance		x	x	x	x	x
a.iv. Experimental treatments						x
<i>b. Food availability</i>						
b.i. Diet	x		X	X		X
b.ii. Prey selection		X	X	X		x
b.iii. Food availability habitat type						
b.iv. Relationship to home range			x	x		x
b.v. Relationship to success			x			
b.vi. Experimental treatments						
<i>c. Pesticides</i>						
c.i. Contaminant loads						
c.ii. Contaminants in prey						
c.iii. Correlation of loads-demography						
c.iv. Correlation of loads-occupancy						
<i>d. Predators or Disease</i>						
d.i. Bat reproductive success		x	x	x		x
d.ii. Bat predator food preference (cats, barn owls scat study)						
d.iii. White-nose prevention plan						
<b>Goal 3 Research and Development</b>						
a. Population trend methods						
b. Estimate of abundance methods						
c. Deterrent research						X

### Research Initiated in Response to the 2016 RFP

Five research projects were selected as meeting identified research needs as well as other scientific criteria and were recommended for consideration for funding to HCP (new or amended) applicants. Goals and objectives for each are described below and summarized in Table 1. The status of all five projects are noted below and in Table 1.

#### **Hawaiian Hoary Bat conservation genetics [Complete]**

Research components related to Objectives for Goal 1, Basic Research:

- Quantify levels of genetic variation and population structure throughout Hawai'i
- Determine if distinct population boundaries exist among islands
- Estimate effective population size(s)
- Determine sex of bats collected and carcasses

#### **Modeling foraging habitat suitability of the Hawaiian Hoary Bat [Complete]**

Research components related to Objectives for Goal 1, Basic Research:

- Echolocation, videography, and insect trapping
- Power analysis to estimate sampling effort for future studies of response to habitat restoration

Research components related to Objectives for Goal 2, Limiting Factors:

- Develop and test a technique that combines multiple sampling methods to specifically assess foraging habitat suitability
- Echolocation, videography, and insect trapping
- Power analysis to estimate sampling effort for future studies of response to habitat restoration

#### **Hawaiian Hoary Bat conservation biology: movements, roosting behavior, and diet [Ongoing]**

Research components related to Objectives for Goal 1, Basic Research:

- Home range size- seasonality; three annual cycles
- Habitat use- foraging, roosting, and breeding
- Roost fidelity and roost tree characteristics
- Mother-pup behavior at roosts
- Movement patterns and food availability
- Tissue and fecal collection bank- genetic, diet and pesticide studies

Research components related to Objectives for Goal 2, Limiting Factors:

- Habitat use- foraging, roosting, and breeding
- Roost fidelity and roost tree characteristics
- Movement patterns and food availability
- Insect prey-host plant associations
- Diet analysis- insect prey selection and availability using molecular bar-coding techniques
- Tissue and fecal collection bank- genetic, diet, and pesticide studies



**Hawaiian Hoary Bat home ranges, seasonal movements, habitat utilization, diet, and prey availability (Maui) [Complete]**

Research components related to Objectives for Goal 1, Basic Research:

- Determine home range and nightly and seasonal movements
- Evaluate foraging and roosting behavior
- Document the seasonal movements of bats

Research components related to Objectives for Goal 2, Limiting Factors:

- Define suitable habitat with acoustic sampling and radio-telemetry
- Assess risk of predation at maternity roosts through monitoring

**Analysis of Hawaiian Hoary Bat occupancy, distribution, and habitat use (O'ahu) [Ongoing]**

Research components related to Objectives for Goal 1, Basic Research:

- Document distribution
- Estimate occupancy rates, detection probabilities, and covariate relationships
- Estimate seasonal changes in occupancy

Research components related to Objectives for Goal 2, Limiting Factors:

- Determine habitat suitability and characteristics to include vegetation community data, physical attributes, tree architecture, temperature, distance from water and forest, and other relevant variables
- Resource selection modeling

### Research Initiated in Response to the 2016 RFP

Five research projects were selected as meeting identified research needs as well as other scientific criteria and were recommended for consideration for funding to HCP (new or amended) applicants. Goals and objectives for each are described below and summarized in Table 1. The status of all five projects are noted below and in Table 1.

#### **Hawaiian Hoary Bat conservation genetics [Complete]**

Research components related to Objectives for Goal 1, Basic Research:

- Quantify levels of genetic variation and population structure throughout Hawai'i
- Determine if distinct population boundaries exist among islands
- Estimate effective population size(s)
- Determine sex of bats collected and carcasses

#### **Modeling foraging habitat suitability of the Hawaiian Hoary Bat [Complete]**

Research components related to Objectives for Goal 1, Basic Research:

- Echolocation, videography, and insect trapping
- Power analysis to estimate sampling effort for future studies of response to habitat restoration

Research components related to Objectives for Goal 2, Limiting Factors:

- Develop and test a technique that combines multiple sampling methods to specifically assess foraging habitat suitability
- Echolocation, videography, and insect trapping
- Power analysis to estimate sampling effort for future studies of response to habitat restoration

#### **Hawaiian Hoary Bat conservation biology: movements, roosting behavior, and diet [Ongoing]**

Research components related to Objectives for Goal 1, Basic Research:

- Home range size- seasonality; three annual cycles
- Habitat use- foraging, roosting, and breeding
- Roost fidelity and roost tree characteristics
- Mother-pup behavior at roosts
- Movement patterns and food availability
- Tissue and fecal collection bank- genetic, diet and pesticide studies

Research components related to Objectives for Goal 2, Limiting Factors:

- Habitat use- foraging, roosting, and breeding
- Roost fidelity and roost tree characteristics
- Movement patterns and food availability
- Insect prey-host plant associations
- Diet analysis- insect prey selection and availability using molecular bar-coding techniques
- Tissue and fecal collection bank- genetic, diet, and pesticide studies

**Hawaiian Hoary Bat home ranges, seasonal movements, habitat utilization, diet, and prey availability (Maui) [Complete]**

Research components related to Objectives for Goal 1, Basic Research:

- Determine home range and nightly and seasonal movements
- Evaluate foraging and roosting behavior
- Document the seasonal movements of bats

Research components related to Objectives for Goal 2, Limiting Factors:

- Define suitable habitat with acoustic sampling and radio-telemetry
- Assess risk of predation at maternity roosts through monitoring

**Analysis of Hawaiian Hoary Bat occupancy, distribution, and habitat use (O'ahu) [Ongoing]**

Research components related to Objectives for Goal 1, Basic Research:

- Document distribution
- Estimate occupancy rates, detection probabilities, and covariate relationships
- Estimate seasonal changes in occupancy

Research components related to Objectives for Goal 2, Limiting Factors:

- Determine habitat suitability and characteristics to include vegetation community data, physical attributes, tree architecture, temperature, distance from water and forest, and other relevant variables
- Resource selection model