DAVID V. IGE GOVERNOR OF HAWAII





### STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621 HONOLULU, HAWAII 96809

Testimony of SUZANNE D. CASE Chairperson

**Before the Senate Committee on** WAYS AND MEANS

Friday, February 23, 2018 11:00 AM **State Capitol, Conference Room 211** 

In consideration of **SENATE BILL 2078** 

RELATING TO PUEO RESEARCH

Senate Bill 2078 proposes to appropriate funds to the Department of Land and Natural Resources (Department) to support research in collaboration with the University of Hawaii (UH) on a twoyear breeding and foraging ecology study of the pueo or Hawaiian short-eared owl (Asio flammeus sandwichensis) on O'ahu. The Department supports this measure provided that its passage does not replace or adversely impact priorities indicated in the Executive Supplemental Budget request.

The Department sees a need for more studies on the pueo, especially on the island of O'ahu where the species is listed as endangered by the State. Since 2017, the Department, in collaboration with UH, has been studying the island wide distribution of pueo on O'ahu. The final results of this study are still pending analysis, but thus far a standardized survey protocol has been developed for pueo, a citizen science project implemented, and surveys at 35 sites over six different habitat types (wetland, grassland, agricultural fields, shrub-land, alien forest, native forest) on O'ahu have been completed. Survey data will be used to model predicted distribution and abundance across these six habitat types on O'ahu. On completion of the study, further studies on distribution, biological threats, and life history traits for this species are recommended.

This measure would provide the funding support for a comprehensive research study on pueo breeding and foraging and is expected to provide information on preferred habitat characteristics for nesting and foraging and identify threats to these species during these periods. The information gained from such efforts would be strongly beneficial for the species and allow for better informed management decisions directly benefitting the pueo.

Thank you for the opportunity to comment on this measure.

### SUZANNE D. CASE CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA

JEFFREY T. PEARSON, P.E. DEPUTY DIRECTOR - WATER

AQUATIC RESQUECES BOATING AND OCEAN RECREATION BUREAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND COASTAL LANDS CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION

LAND STATE PARKS

Testimony Presented Before the
Senate Committee on Ways and Means
Friday, February 23, 2018 at 11:00 a.m.
By
Nicholas Comerford
Dean, College of Tropical Agriculture and Human Resources
And
Michael Bruno
Interim Vice Chancellor for Academic Affairs
Vice Chancellor for Research
University of Hawaii at Mānoa

### SB 2078 – RELATING TO PUEO RESEARCH

Chair Dela Cruz, Vice Chair Keith-Agaran, and members of the Senate Committee on Ways and Means:

Thank you for this opportunity to submit testimony in <u>support</u> of SB 2078.

The Hawaiian short-eared owl (Pueo) is on the endangered species list for the state of Hawaiia. This subspecies has a unique place in the Hawaiian culture, and its survival is complicated by the fact that it is a ground nesting species. This characteristic, along with diminishing habitat, cause concern for the ultimate survival of the Pueo. The ground nesting habit leaves it eggs vulnerable to predators that were not part of its natural history.

The hope is that the proposed research on the Pueo's interaction with its habitat, and identification of preferred breeding habits, will provide the necessary information to land managers that will assure the continued survival of a species which is considered to be the guardian of Hawaiian families. This research will help to better identify its autecology, potential ecological benefits, and the ecosystem services that it provides to society.

Dr. Melissa Price of CTAHR has been working with the UH West Oʻahu (UHWO) group to develop the ideas behind this research. This bill represents a collaboration between the Hawaiʻi Department of Land and Natural Resources, UHWO and CTAHR. Another benefit gained from passing this bill will be the training of one postdoctoral fellow, two graduate students, and two undergraduates in ecology and ecosystem service disciplines. This workforce will be well-suited to work in state agencies or private enterprises to further protect Hawaiʻi's fragile ecology.

Thank you for this opportunity to testify in support of SB 2078.

<u>SB-2078</u> Submitted on: 2/20/2018 10:18:55 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
De MONT R. D. CONNER	Testifying for Ho'omanapono Political Action Committee (HPAC)	Support	Yes

### Comments:

We continue to STRONGLY SUPPORT this bill. Mahalo.

<u>SB-2078</u> Submitted on: 2/21/2018 3:07:40 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Daniel Nellis	Testifying for Dole Food Co. Hawaii	Support	No

### Comments:

Dole Food Co. Hawaii participates with UH CTAHR for their Pueo research. We fully support this project and the bill to fund this work.

thank you,

Daniel Nellis, GM

Submitted on: 2/22/2018 8:28:12 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Melodie Aduja	Testifying for OCC Legislative Priorities Committee, Democratic Party of Hawai'i	Support	No

### Comments:

# OAHU COUNTY COMMITTEE ON LEGISLATIVE PRIORITIES DEMOCRATIC PARTY OF HAWAI'I

THE COMMITTEE ON WAYS AND MEANS

THE SENATE

TWENTY-NINTH LEGISLATURE

**REGULAR SESSION OF 2018** 

Friday, February 23, 2018

11:00 AM

Hawaii State Capitol, Conference Room 211

RE: Testimony in Support of SB2078 SD1 RELATING TO PUEO RESEARCH

To the Honorable Donovan M. Dela Cruz, Chair; the Honorable Gilbert S.C. Keith-Agaran, Vice-Chair, and Members of the Committee on Ways and Means:

Good afternoon, my name is Melodie Aduja. I serve as Chair of the Oahu County Committee ("OCC") Legislative Priorities Committee of the Democratic Party of Hawaii. Thank you for the opportunity to provide written testimony on Senate Bill No. 2078, relating to pueo; research; study; and an appropriation.

The OCC Legislative Priorities Committee is in favor of Senate Bill No. 2078 and support its passage.

Senate Bill No.2078 is in alignment with the Platform of the Democratic Party of Hawai'i ("DPH"), 2016, as it appropriates funds for the department of land and natural resources to conduct, in collaboration with the University of Hawaii college of tropical agriculture and human resources, a two-year breeding ecology study and two-year foraging ecology study on the pueo on Oahu.

The DPH Platform states that "[w]e support the growth of Native Hawaiian farming, agricultural and healing practices. We value and wish to foster the preservation of our host culture." (Platform of the DPH, P. 4, Lines 213-214 (2016)).

Given that Senate Bill No.2078 appropriates funds for the department of land and natural resources to conduct, in collaboration with the University of Hawaii college of tropical agriculture and human resources, a two-year breeding ecology study and two-year foraging ecology study on the pueo on Oahu, it is the position of the OCC Legislative Priorities Committee to support this measure.

Thank you very much for your kind consideration.

Sincerely yours, /s/ Melodie Aduja

Melodie Aduja, Chair, OCC Legislative Priorities Committee

Email: legislativeprorities@gmail.com, Tel.: (808) 258-8889

Submitted on: 2/22/2018 7:58:45 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Lyman L. Abbott	Testifying for Kahoolawe Island Reserve Commission	Support	No

### Comments:

Please support SB2078 for Pueo. We have been recording the occurence of Pueo on Kaho`olawe in relation to heavy rains and mice blooms. They are an integral part of Kaho`olawes ecosystem so please support this bill. Thank you, Lyman

<u>SB-2078</u> Submitted on: 2/21/2018 1:26:49 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Rachel L. Kailianu	Testifying for Ho`omana Pono, LLC	Support	Yes

Comments:

Strong support!!!



### For the Protection of Hawaii's Native Wildlife

### HAWAII AUDUBON SOCIETY

850 Richards Street, Suite 505, Honolulu, HI 96813-4709 Phone/Fax: (808) 528-1432; hiaudsoc@pixi.com www.hawaiiaudubon.org

# THE SENATE TWENTY-NINTH LEGISLATURE REGULAR SESSION OF 2018

### COMMITTEE ON WAYS AND MEANS

Friday, February 23, 2018 11:00 a.m., Conference Room 211, State Capitol

# SB 2078 RELATING TO PUEO RESEARCH

Chairperson Dela Cruz, Vice Chairperson Keith-Agaran, and members of the committee, my name is Linda Paul and I am testifying in **support** of SB 2078 as a volunteer, President of and in behalf of the approximately 2000 members of the Hawaii Audubon Society.

Hawaii is known as the endangered species capital of the United States and unfortunately our native species are continuing to go extinct. The Pueo, Hawaii's only native owl, has joined the long list of native birds that are either extinct or are endangered or threatened. Once widely distributed on all the main islands, the Pueo began declining in the early 1900s as a result of the loss of their ground nesting habitat due to sugar and pineapple cultivation. More recently large scale suburban housing developments have reduced their habitat on Oahu still further. Alien species predation and collisions with wind farms and motor vehicles have also reduced their numbers. In 1982 the State of Hawaii listed the Pueo's Oahu population as endangered.

However, Pueo populations on the neighbor islands are also declining as indicated by the Hawaii Audubon Society's Annual Christmas Bird Count. By how much and at what rate we don't yet know. Pueo are one of the least-studied endemic species and much more data is needed to inform management decisions.

SB 2078 appropriates funds for the Department of Land & Natural Resources - Division of Forestry & Wildlife (DLNR-DOFAW) to conduct, in collaboration with the University of Hawaii College of Tropical Agriculture and Human Resources, a two-year breeding ecology study and two-year foraging study on the pueo on Oahu so that informed decisions can be made that will prevent yet another of our native bird species from going extinct.

Please pass SB 2078 and thank you for giving me the opportunity to testify.

Linda M. B. Paul 808-262-6859

Submitted on: 2/21/2018 4:24:14 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
carmen antaky	Individual	Support	No

### Comments:

I support SB2078 Relating to Pueo Research.

Submitted on: 2/21/2018 11:41:09 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Javier Cotin	Individual	Support	Yes

Comments:

February 21, 2018

Chairs Gabbard, Rhoads, and Kahele, Vice Chairs Riviere, Gabbard, and Mercado Kim, and members of the Committees on Agriculture and Environment, Water and Land, and Higher Education.

I thank you for this opportunity to provide my personal testimony in support of SB2078, Relating to Pueo research. I strongly support this bill.

I wish start by saying that while I am a postdoctoral researcher at the University of Hawai'i at MÄ• noa, I am offering this as personal testimony and do not speak on behalf of the University.

I believe that SB2078 is a measure very worthy of support because it will benefit not only pueo research, but will promote conservation of a native raptor that is culturally and ecologically important to Hawai'i residents. There has been a large community-led call for increased attention to pueo conservation, but unfortunately little is known about pueo nest-site selection and survival, or even long-term population numbers. Thus, those who wish to conserve pueo have little to guide their management actions.

Over the last year I have been working with Dr. Melissa Price lab at UH Manoa, conducting surveys to determine population distribution of pueo across six vegetation types on Oahu. From this study we have learned that pueo are largely using open grasslands, wetlands, and agricultural areas on Oahu. Within the next month we'll have completed analyses and can share population densities in each of these habitat types. We also developed a citizen science portal (pueoproject.com) that allows community members to report sightings of pueo. These reports, many of which came from other islands, expanded our understanding of pueo habitat use. For example, on Oahu we only observed nests in wetlands, agricultural lands, and grasslands, but on Kauai a nest was found under uluhe (fern) in high-elevation native forests. The Kauai Forest Bird Recovery Program regularly sees pueo in native forests as well, suggesting either they are behaving differently on Oahu, or more surveys are needed to detect them in forests on Oahu. The take-home message is that there are many vegetation types important to

pueo habitat conservation in Hawai'i, and pueo likely utilize various habitats across the Hawaiian Islands for foraging and nesting, depending on food availability and predator abundance.

The next step is to determine which factors are having the greatest impact on pueo reproduction and survival, so managers can target conservation efforts toward actions likely to have the greatest benefit. Pueo eggs and chicks are likely eaten by invasive predators such as cats, mongoose, barn owls, and rats. Nests may be more successful in areas with lower predator abundance. SB2078 will provide funds to support research efforts that identify management actions most likely to increase nesting success and survival, and minimize extinction risk.

In closing, I would like to reiterate my enthusiastic support for SB2078, and I want to thank your committees for the opportunity to offer this testimony.

Sincerely,

Javier Cotin

<u>SB-2078</u> Submitted on: 2/21/2018 12:07:11 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Corrina Carnes	Individual	Support	No

### Comments:

I support SB2078 Relating to Pueo Research - increased understanding of population size and behavior are essential to protecting this endangered species.

Submitted on: 2/21/2018 12:25:17 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing	
Dain Christensen	Individual	Support	No	

### Comments:

Thank you for taking the time to read my testimony,

The pueo holds both cultural and ecological value. In general, it is important to preserve biodiversity and the state of Hawai'i has many species for us to watch over. The pueo is an elusive raptor and we need dedicated people hired to research the best methods to estimate the population. Only with accurate numbers of the population can we move forward with management objectives. Only with accurate estimates of the population can we decide how much care this species will need in the future. The cost of extinction is too high and many agree that raptors play an important role in the ecosystem including suppression of rodents populations.

The pueo also holds significant cultural value as it is depicted in traditional art and stories. I fully support allocating funds to research and the development of research methods for the pueo.

Thank you for your time,

Dain Christensen

Submitted on: 2/21/2018 12:31:38 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing	
Jay Penniman	Individual	Support	No	

### Comments:

Please pass and appropriate funds for this essential work for our only remaining native owl. The Pueo, or Hawaiian Short Eared Owl, is critically understudied. We must not loose another species due to our ignorance. Industrial wind energy facilities take these birds regularly. It will is our responsibility to learn about them so we can protect them. MAHALO!

Submitted on: 2/21/2018 1:40:26 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing	
Wendy Kuntz	Individual	Support	No	

### Comments:

The Pueo is an iconic Hawaiian species. Populations of Pueo on Oahu appear to be on the decline, but little is known about the species numbers, ecology or behavior. We need more research to determine important habitat and the best ways to protect Pueo populations into the future.

I support SB2078 Relating to Pueo Research.

<u>SB-2078</u> Submitted on: 2/21/2018 2:08:26 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing	
Patricia Moriyasu	Individual	Support	No	

### Comments:

I support SB2078 Relating to Pueo Research.

Submitted on: 2/21/2018 2:13:38 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing	_
Carolyn Weygan- Hildebrand	Individual	Support	No	

### Comments:

Chair Dela Cruz, Vice Chair Keith-Agaran, and Members of the Senate Ways and Means Committee:

SB2078 -Strong Support

In the matter of Hawaii's pueo, an endangered species in Oahu, time is of the essence. Please pass SB2078 this year. Please encourage a strong multidisciplinary research that involves the University of Hawaii West Oahu, an institution that has embraced the pueo as its mascot and serves the surrounding communities (Ewa/Kapolei/Kalaeloa...) where more pueo research is needed.

Thank you.

<u>SB-2078</u> Submitted on: 2/21/2018 3:48:22 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing	
Javier Mendez-Alvarez	Individual	Support	No	

<u>SB-2078</u> Submitted on: 2/21/2018 11:06:21 PM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Lydi Morgan Bernal	Individual	Support	No

### Comments:

Thank you very much for supporting this important bill to provide critical research on the pueo, one of Hawaii's very special endemic bird species!

Submitted on: 2/22/2018 3:36:40 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Tom Berg	Individual	Oppose	No

Comments:

SB2078 IS A VERY DANGEROUS, AND HARMFUL BILL TO PUEO-

The bill seeks to purposely delay any action to protect known pueo inhabitation on undeveloped State owned lands.

Now is the time to ask the measure be amended to include naming UHWO as a potential site to carry out the pueo research as is the intent of SB2078.

See attachments- mahalo.

"You Can't Fool Me."

Tom Berg

<u>SB-2078</u> Submitted on: 2/22/2018 5:20:39 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing	
Chad Wilhite	Individual	Support	No	

### Comments:

I support SB2078 Relating to Pueo Research so that we may better understand and conserve a culturally and ecologically important species.

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<u>SB-2078</u> Submitted on: 2/22/2018 9:32:43 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Kelly McHugh	Individual	Support	No

<u>SB-2078</u> Submitted on: 2/22/2018 9:37:23 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Cassandra L. Smith	Individual	Support	No

<u>SB-2078</u> Submitted on: 2/22/2018 9:49:11 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Carmela Noneza	Individual	Support	No

<u>SB-2078</u> Submitted on: 2/22/2018 9:52:31 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing	
Philip Kitamura	Individual	Support	No	ı

### Comments:

I support pueo research because they are endangered in Oahu

Chair Dela Cruz, Vice Chair Keith-Agaran, and members of the Ways and Means Committee, I thank you for this opportunity to provide my personal testimony in support of SB2078, Relating to Pueo research. I strongly support this bill.

I wish start by saying that while I am an assistant professor at the University of Hawai'i at Mānoa, I am offering this as personal testimony and do not speak on behalf of the University.

I believe that SB2078 is a measure very worthy of support because it will inform cost-effective and sound approaches to conservation of a native raptor that is culturally and ecologically important to Hawai'i residents. There has been a large community-led call for increased attention to pueo conservation, but unfortunately little is known about pueo nest-site selection and survival, or even long-term population numbers, limiting decision-making capacity. For cost-effective approaches to conservation, we must know which conservation actions will be most likely to reduce mortality and increase reproductive success. This research will identify the main drivers of pueo nesting success, and the factors associated with nest failures and diet, so that landowners and managers can maximize pueo survival and population stability.

Over the last year my wildlife ecology lab at UH Manoa has conducted surveys to determine population distribution of pueo across six vegetation types on Oahu. From this study we have learned that pueo are largely using open grasslands, wetlands, and agricultural areas on Oahu. Based on densities in these habitats calculated from island-wide surveys, early estimates are that roughly ~1000 pueo remain on Oahu (analyses are still taking place and numbers will be updated within the next few weeks). We also developed a citizen science portal (pueoproject.com) that allows community members to report sightings of pueo. These reports, many of which came from other islands, expanded our understanding of pueo habitat use. For example, on Oahu we only observed nests in wetlands, agricultural lands, and grasslands, but on Kauai a nest was found under uluhe (fern) in high-elevation native forests. The Kauai Forest Bird Recovery Program regularly sees pueo in native forests as well, and managers in the Maui Forest Bird Recovery program have observed pueo in native forest bird nesting areas. The take-home message from this first year of study is that there are many vegetation types important to pueo habitat conservation in Hawai'i, and pueo likely utilize various habitats across the Hawaiian Islands for foraging and nesting, depending on food availability and predator abundance.

The next step is to determine which factors are having the greatest impact on pueo reproduction and survival, so managers can target conservation efforts toward actions likely to have the greatest benefit. Pueo eggs and chicks are likely eaten by invasive predators such as cats, mongoose, barn owls, and rats. Nests may be more successful in areas with lower predator abundance. SB2078 will provide funds to support research efforts that identify management actions most likely to increase nesting success and survival, and minimize extinction risk.

A secondary benefit of this funding is that it will train the next generation of conservation professionals. Currently, few local managers are trained raptor biologists. SB2078 will fund training of undergraduate, graduate, and postdoctoral candidates, preparing wildlife management professionals with skills and tools to conserve Hawaii's only widespread native raptor.

In closing, I would like to reiterate my enthusiastic support for SB2078, and I want to thank your committee for the opportunity to offer this testimony.

Sincerely,

Melissa Price

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<u>SB-2078</u> Submitted on: 2/22/2018 10:13:15 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing	
Kristen Harmon	Individual	Support	No	

### Comments:

I support bill SB2078. I strongly support research for the Pueo.

<u>SB-2078</u> Submitted on: 2/22/2018 10:27:58 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Lopaka White	Individual	Support	No

Submitted on: 2/22/2018 10:34:13 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Nathaniel Wehr	Individual	Support	No

### Comments:

I write in strong support of the bill providing funding for pueo research. Pueo are one of the few remaining native species in the Hawaiian Islands, and research is crucial to continue are support for this species. Further, this species is important due to the cultural significance it plays representing many people's 'aumakua. Please, support this bill.

Submitted on: 2/22/2018 10:35:31 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing	
Christine Ahia	Individual	Support	No	1

### Comments:

I'm in support of SB 2078 regarding Pueo research. As a resident of Hawai'i Island and member of several conservation and birding groups, I feel this project on O'ahu is crucial to our knowledge and understanding about this important bird. Cultural importance of the Pueo is highly significant, and now we need to match it with research to ensure its survival on the island. Please support this bill.

Christine Ahia

Submitted on: 2/22/2018 10:47:52 AM

Testimony for WAM on 2/23/2018 11:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Aimee You Sato	Individual	Support	No

### Comments:

I strongly support Pueo research. Pueo are state-listed as Endangered on Oʻahu and provide important ecosystem services, such as controlling populations of introduced rodents. Professors, researchers, and students at the University of Hawaiʻi are committed to the Pueo project, investigating the population size, distribution, and habitat use of the Hawaiian Short-eared Owl (Asio flammeus sandwichensis) on Oʻahu. Pueo are both bioculturally and ecologically important to Hawaiʻi and yet we lack in research and knowledge of this bird. The Pueo project is an amazing example of citizen science and collaborative research between researchers and the community. Pueo hold an important cultural role in people's lives today, commonly revered as 'aumakua or family guardians. Public interest in pueo conservation is recognized by the participation on the citizen science website, which allows community members to input data about pueo sitings. Additional research on biocultural information would be done in collaboration with ongoing citizen science approaches and data gathering.