State of Hawaii
Department of Agriculture
Agricultural Loan Division

June 22, 2021

Department of Agriculture
Honolulu, Hawaii

Subject: **Loan Presentation**

APPLICANT:

AAA Controls Inc.
16-566 Keaau-Pahoa Road #188-128
Keaau, HI 96749

Austin Mauch (Co-Borrower)
16-566 Keaau-Pahoa Road #188-128
Keaau, HI 96749

CLASSIFICATION & ELIGIBILITY:

AAA Controls Inc. (AAA) was incorporated in Hawaii in November 2009 and meets the definition and eligibility requirements of a Food Manufacturer specified in Chapter 155 of the Hawaii Revised Statutes (HRS). AAA operates under the trade name Paradise Farms of Hawaii and produces food items using Hawaii-grown agricultural products as an ingredient in the manufacturing process since 2010. Austin Mauch, President, owns 100% of the company's stock, and has resided in Hawaii since 2008.

COMMODITY:

Kukui, macadamia, papaya; fresh and processed.

CREDIT HISTORY:

SEE EXHIBIT A (CONFIDENTIAL)

OTHER STATE AGRICULTURAL LOANS:

N/A

A1

LOAN REQUEST & PURPOSE:

Amount	Class E – Direct Facility Loan
$390,000	Purchase Price
- 58,500	Less: 15 % Capital Contribution
$331,500	Total Loan Request

Loan proceeds will be utilized to finance 85% of the purchase price for commercial property and improvements to be used as a commercial kitchen in the manufacture of food products.

TERMS:

Amount:	$331,500
Term:	Twenty (20) years
Interest rate:	3.00%, fixed.
Repayment:	Monthly principal and interest payments of $1,838.49 due on the first of each month until loan maturity.

SECURITY:

The proposed loan will be secured by:

- A first mortgage lien over 7,416 square feet (s.f.) of fee, CDH (Downtown Hilo Commercial District) zoned property and improvements located at 362 Kinoole Street, Hilo, HI, and further identified as TMK: (3) 2-3-012-056. Improvements consist of a two-story, 3,660 s.f. commercial building with 4 open striped stalls.

- A first UCC security interest over all assets of the company, including accounts, inventory, equipment, and general intangibles.

Loan-to-Value: $\frac{\$331,500 \text{ (SALD 1st Mortgage)}}{\$420,000 \text{ (Appraised Value)}} = 79\%$

A recent appraisal by Colin Jewell, CGA, on May 7, 2021 reported a market value of $420,000 for the property. The appraiser noted the building was in fair condition and the proposed use and existing improvements are consistent with the commercial zoning and highest and best use as improved.

Since the real estate provides adequate collateral for the loan with a loan-to-value ratio (LTV) of 79%, the value of the company's assets were not factored into the above computation.

GUARANTORS: None

FINANCIAL CONDITION: SEE EXHIBIT A (CONFIDENTIAL)

REPAYMENT ABILITY: SEE EXHIBIT A (CONFIDENTIAL)

INSURANCE: Hazard and hurricane insurance with the State Agricultural Loan Division named as first mortgagee.

Evidence of general commercial liability and product liability insurance with the State Agricultural Loan Division listed as certificate holder.

BACKGROUND/ MANAGEMENT ABILITY:

Austin Mauch has an engineering background covering the design, installation, and development of control systems for various industries. This includes machine control, batching, packaging, and other aspects involved in the manufacturing process. His work in the field dates back to 1987. Mr. Mauch relocated to Hawaii in 2008 to be closer to his extended family. AAA was formed a year later and initially offered consultative services for manufacturers and municipalities. Clients included Hawaiian Springs Water Bottling, Waiakea Hawaiian Volcanic Water and Hawaii Rainbow Produce.

In late 2010, AAA began to focus on providing locally made specialty products to customers and retailers both at home and abroad. In doing so, the company developed into one of the only local producers of inamona on the Big Island. By calling on his engineering acumen, Mr. Mauch designed specialized types of machinery/equipment (packaging machine, oil press, etc.) which facilitated the food manufacturing process. A few years later, AAA became the leading supplier of inamona within the State and commenced marketing throughout the mainland, Canada, U.K., Brazil, and Germany.

Inamona is a condiment used in Hawaiian cooking and made from roasted kukui nuts (candlenuts) and sea salt. Most of the kukui nuts are Hawaii-grown and purchased from various individuals. Inamona is traditionally used to enhance the flavor of poke and sushi, however, it can be incorporated into many different recipes like soups, stews, and a range of vegetable dishes. It can also be ground into flavorful sauces and is often used as a thickening agent in those settings. Restaurant dishes include Pulehu Grass Fed Filet Mignon, Seared Mahi Mahi with Warm Tomato Inamona Salad, and Inamona Pesto.

To keep pace with growing demand, a part-time manager and assistant was hired, and operations moved to a Hilo bakery in 2015. At the time, the facility was sufficient but not optimal as it provided little storage room for raw materials, equipment and more importantly, kitchen access was limited to just two days per week. As orders continued to rise, it became clear AAA needed to relocate to a larger facility. This past March, AAA moved into the facility formerly known as Jimmy's Drive-Inn (Hilo). The property has proven ideal since it provides a certified kitchen, large walk-in refrigerator and freezer, and plenty of needed space for manufacturing and storage. Amenities also include three-phase electrical, gas and water services.

SUMMARY:

Over the last decade, AAA has achieved remarkable success in processing and marketing inamona not only within the State but throughout the world. The shift into food manufacturing was a savvy one that benefited the company financially. With the exception of 2020, annual revenue has grown successively in each of the last eight years. The company has also generated strong, historical levels of cash on a routine basis which easily covers the requested loan payment. As such, AAA is viewed as a sound credit risk with the ability to repay the money borrowed. The requested loan is further strengthened with a mortgage over the commercial real estate property being acquired. With an LTV of 79%, the State's collateral position is good.

The proposed loan is essential in order for the owner to close on the purchase. After being acquired, the property's improvements will provide the space necessary to meet the company's manufacturing needs especially since new products will be introduced soon . These will include dehydrated foodstuffs, powdered items, and baked goods, all featuring locally grown crops. One recipe will use non-gluten flour processed from island-grown macadamia nuts as a key ingredient. As more products are introduced and sales move higher, the owner plans to progressively ramp up hiring.

Not counting the economic facets, we should remember the important role food manufacturers like AAA serve in Hawaii's agricultural industry. At the core, they link farmers and other agricultural producers with consumers. They do this by processing crops and other products into fished goods ready for the grocer or wholesaler to sell to households, restaurants, or institutional services.

Synonymous with our local culture, poke serves as an excellent example. Although some poke is sold at restaurants and seafood establishments, it is primarily sold in grocery outlets like KTA, Safeway, Costco, and like stores on the mainland. Even with the proliferation of poke shops all over the world, one might still have heard people sigh that they just cannot satisfy their craving for more poke.

A5

TURNDOWNS:

The borrower was denied credit from Central Pacific Bank and CU Hawaii Federal Credit Union due to the following:

- Insufficient cash flow to service the debt.
- Lack of funds for down payment and closing costs.

RECOMMENDATIONS: Loan approval is recommended based on the borrower's ability to service proposed debt requirements, equity contributed, successful experience manufacturing local food products and the real estate collateral further securing this request.

Date

5/20/21

Recommended by:

Gareth Mendonsa
Business Loan Officer

Date

5/27/21

Reviewed and concurred by:

Dean M. Matsukawa
Division Administrator

Date

6/9/2021

Approved for submission

Phyllis Shimabukuro-Geiser
Chairperson, Board of Agriculture

A7

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
HONOLULU, HAWAII

June 22, 2021

Board of Agriculture
Honolulu, Hawaii

Subject:	REQUEST APPROVAL FOR ACCEPTANCE OF PERPETUAL NON-EXCLUSIVE DRAINAGE EASEMENT FROM AMAZON.COM SERVICES LLC, AS GRANTOR IN FAVOR OF STATE OF HAWAII, AS GRANTEE; TMK: 1st Div/1-2-025:036; HONOLULU, ISLAND OF OAHU, HAWAII
Grantor:	AMAZON.COM SERVICES LLC
Grantee:	STATE OF HAWAII
Land Area:	14.4470 acres
Tax Map Key:	1st Div/1-2-025:036
Term:	Perpetual

BACKGROUND:

AMAZON.COM SERVICES LLC purchased a 14-acre parcel from Servco Hawaii in July 2020 with plans to construct a delivery center. Amazon intends to relocate an existing drainage easement on the acquired property to facilitate their development plans.

Amazon's property abuts the Department of Agriculture ("Department") Plant and Non-Domestic Animal Quarantine facility on Auiki Street, Sand Island, Honolulu, Hawaii ("Auiki Street Facility"). The drainage easement between properties favors Department in perpetuity.

The new drainage easement relocation is shown in red hashed lines skirting perimeter of proposed building site as described on Exhibit "A". The old easement is shown in blue hashed lines cutting through middle of Amazon's proposed 142,600 SF building site.

The Department expressed concerns about future maintenance and repair responsibilities, liabilities associated with the relocation, and the potential impact the drainage easement relocation could have on its ability to obtain regulatory approvals for any future construction,

repair, and maintenance work that may be necessary or desirable at the Auiki Street Facility in the future. While the Department has no current objections to the relocation of Easement '1,' given its concerns regarding potential future impacts, it is amenable to the proposed relocation of the existing drainage easement, subject to the following:

1. Amazon is responsible for and performs all appropriate establishment, construction, repair, and maintenance of the easement;
2. Amazon indemnifies and holds the Grantee harmless from any and all liability, damages, or injury arising from Amazon's construction, repair, and maintenance of the easement;
3. Amazon is prohibited from constructing any improvement within the easement area that alters or hinders the drainage functions of the easement without prior written approval from the Grantee; and
4. The Grantee reserves its rights to full use and enjoyment of the easement area for the purposes granted.

RECOMMENDATION:

The Department recommends that the Board of Agriculture approve the execution and acceptance of a perpetual non-exclusive easement from AMAZON.COM SERVICES LLC in favor of the Department, for drainage purposes benefitting the Department's Plant and Non-Domestic Animal Quarantine facility on Auiki Street, subject to the conditions set forth above, and provided;

1. All related documents shall be subject to review and approval as to form by the Department of the Attorney General; and
2. Such other terms and conditions as may be prescribed by the Chairperson, to best serve the interests of the State.

Respectfully submitted,

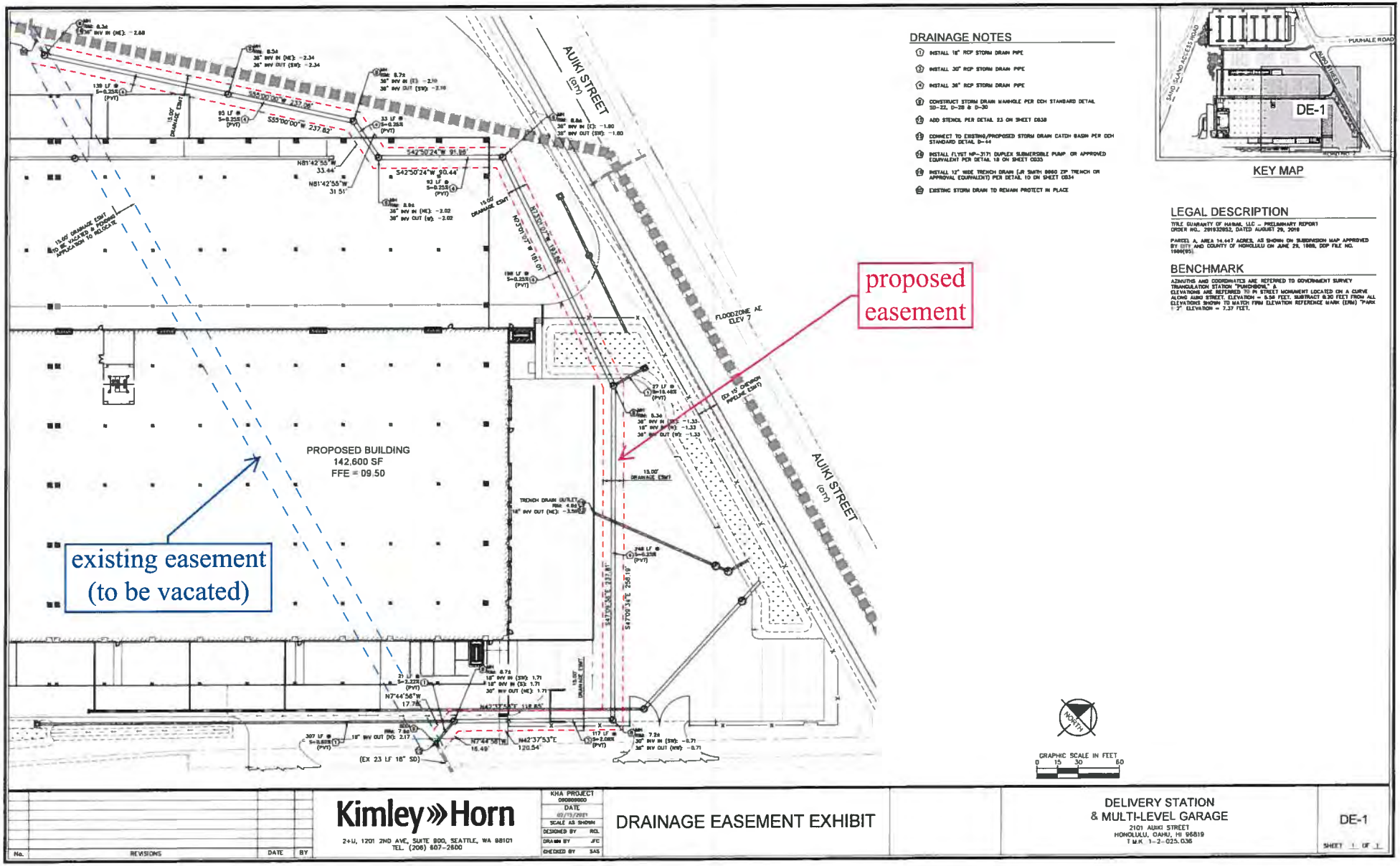
FOR BRIAN KAU, P.E.
Administrator and Chief Engineer
Agricultural Resource Management Division

Attachment – Exhibit "A"

APPROVED FOR SUBMISSION

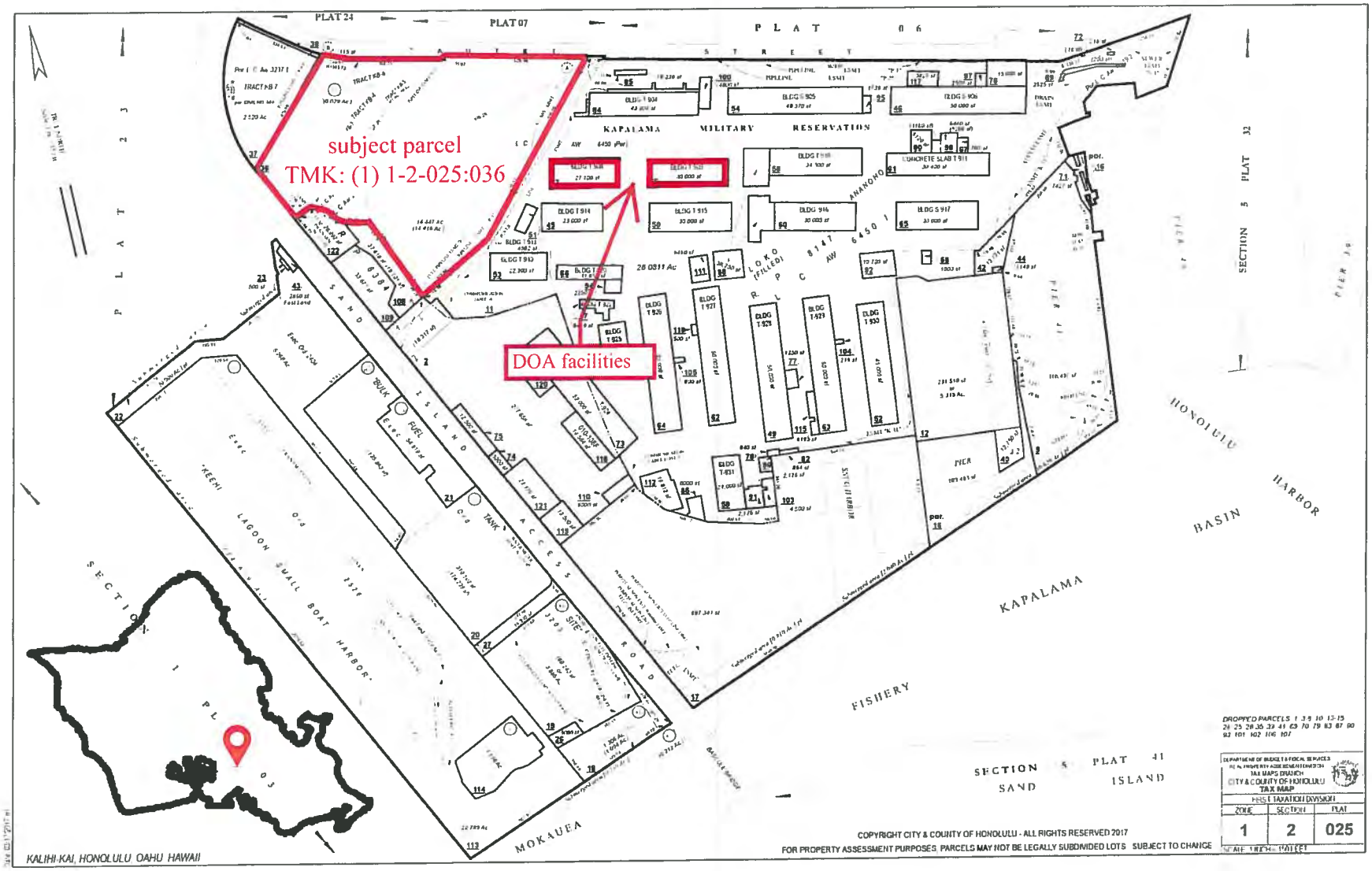
PHYLLIS SHIMABUKURO-GEISER
Chairperson, Board of Agriculture

Exhibit "A"
(page 1 of 2)



B.3

Exhibit "A"
(page 2 of 2)



STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
HONOLULU, HAWAII

June 22, 2021

Board of Agriculture
Honolulu, Hawaii

Subject: CERTIFICATION OF ACREAGE ASSESSMENTS FOR THE HONOKAA-PAAUILO, KAHUKU, MOLOKAI, WAIMANALO, AND WAIMEA IRRIGATION SYSTEMS, 2022 FISCAL YEAR

BACKGROUND:

Section 167-19(a), Hawaii Revised Statutes, states, "The board shall determine and certify on or before June 30 of each year the amount of acreage assessments necessary in that fiscal year for the acquisition, construction, operation, and maintenance of irrigation facilities for each project, and the acreage of agricultural and pasture land of each land occupier within the project." For the 2022 fiscal year, the Agricultural Resource Management Division has determined that acreage assessments for the following irrigation systems are:

Irrigation System	Acreage Assessment
Honokaa-Paauilo	$90,687.00
Kahuku	$29,200.00
Molokai	$90,687.00
Waimanalo	$90,687.00
Waimea	$90,687.00

The acreage of agricultural and livestock lands of each land occupier within the Irrigation Systems are as follows:

Irrigation System	Agricultural Acreage	Livestock Acreage	Land Occupier Exhibit
Honokaa-Paauilo	757	5,806	A
Kahuku	168	None	B
Molokai	3,379	None	C
Waimanalo	1,011	None	D
Waimea	736	None	E

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RECOMMENDATION:

1. That the Board determine and certify that the amount of acreage assessments necessary for annual maintenance of the listed five (5) irrigation systems for fiscal year 2022 are as listed.

2. That the Board determine and certify that the acreage of agricultural and livestock lands of each land occupier within the listed irrigation system is as set forth in attachments A through E.

3. That the Board determine and certify that agricultural lands shall bear 100% of the annual acreage assessments, for the Kahuku, Molokai, Waimanalo, and Waimea Irrigation Systems; and

4. That the Board determine and certify that agricultural and pastoral lands shall bear 70% and 30%, respectively, of the annual acreage assessments for the Honokaa-Paauilo Irrigation System.

Respectfully submitted,

BRIAN KAU, P.E.
Administrator
Agricultural Resource Management
Division

Attachments

APPROVED FOR SUBMISSION:

PHYLLIS SHIMABUKURO-GEISER
Chairperson, Board of Agriculture

Exhibit A – Honokaa-Paauilo System, Acreage by Account FY2021

ACCT	ACRES
6801	7
6803	10
6804	7
6810	2
6812	2
6813	5
6819	9
6822	11
6823	20
6824	5
6830	14
6832	6
6833	5
6835	3
6837	4
6841	3
6845	7
6851	5
6853	5
6855	5
6857	5
6859	5
6861	2
6862	4
6863	5
6864	5
6865	5
6867	5
6868	3
6870	5
6871	4
6873	5
6874	5
6875	5
6876	5
6880	3

ACCT	ACRES
68011	13
68060	13
68091	5
68250	3
68260	4
68341	5
68381	6
68402	6
68430	4
68461	12
68600	5
68680	4
68690	5
68790	3
68910	15
68930	16
68981	6
68990	3
69090	9
69311	3
69331	10
69341	5
69360	4
69371	7
69380	2
69410	2
69581	11
69640	13
69650	8
69661	10
69760	10
69830	8
6821	14
7000	15
7005	60
7006	21

ACCT	ACRES
7063	446
7064	17
7066	163
7069	68
7073	100
7074	68
7077	26
7080	100
Total:	**6,563**

ACCT	ACRES
6892	5
6894	12
6897	10
6901	5
6904	4
6905	14
6907	9
6908	5
6910	6
6911	22
6914	39
6921	17
6935	1
6940	4
6953	11
6954	13
6955	16
6956	8
6960	12
6962	21
6967	8
6969	7
6970	4
6971	4
6972	3
6975	12
6987	2
6990	5
6991	4
6993	6
6995	6
6996	2
6997	5
6998	14
6999	5

ACCT	ACRES
7007	4
7008	8
7009	10
7010	192
7011	9
7012	3
7013	34
7016	57
7017	27
7018	260
7020	163
7036	677
7037	125
7038	3
7040	3
7042	311
7043	351
7044	32
7045	716
7047	682
7048	47
7049	32
7050	13
7051	2
7052	4
7053	10
7054	142
7055	140
7056	4
7057	6
7058	594
7059	15
7060	29
7061	1
7062	2

ACCT	ACRES

Exhibit B – Kahuku, Acreage by Account FY2021

ACCT	ACRES
3501	15
3502	7
3503	7
3504	11
3505	4
3506	4
3507	9
3508	7
3509	9
3510	4
3511	4
3512	4
3513	6
3514	5
3515	2
3516	6
3517	8
3518	7
3519	8
3520	9
3521	6
3522	8
3523	8
3524	10
Total:	**168**

State of Hawaii
Department of Agriculture
Plant Industry Division
Plant Quarantine Branch
Honolulu, Hawaii

June 22, 2021

Board of Agriculture
Honolulu, Hawaii

SUBJECT: Request to: (1) Allow the Importation of Two Mute Swans, *Cygnus olor*, an Animal on the List of Restricted Animals (Part B), by Permit, for Exhibition, by Grand Hyatt Kauai Resort and Spa; and (2) Update Permit Conditions for the Importation of Two Mute Swans, *Cygnus olor*, an Animal on the List of Restricted Animals (Part B), by Permit, for Exhibition, by Grand Hyatt Kauai Resort and Spa.

I. Summary Description of the Request:

PQB NOTES: *The Plant Quarantine Branch (PQB) submittal for requests for import or possession permits, as revised, distinguishes information provided by the applicant from procedural information and advisory comment and evaluation presented by PQB. With the exception of PQB notes, hereafter "PQB NOTES," the text shown below in Section II from page 2 through page 6 of the submittal was taken directly from Grand Hyatt Kauai Resort and Spa's application and subsequent written communications provided by the applicant Mr. Jezrael Campos. For instance, the statements on page 5 regarding effects on the environment are the applicant's statements in response to standard PQB questions and are not PQB's statements. This approach for PQB submittals aims for greater applicant participation in presenting import requests in order to move these requests to the Board of Agriculture (Board) more quickly, while distinguishing applicant provided information from PQB information. The portion of the submittal prepared by PQB, including the Advisory Subcommittee Review, Advisory Committee Review and the Proposed Import Conditions is identified as Sections III, IV and V of the submittal, which start at pages 6, 10 and 14 respectively.*

We have a request to review the following:

COMMODITY: Two (2) Mute Swans, *Cygnus olor.* (Refer to Appendix A for Permit Application).

PQB NOTES: *On November 10, 2020, Jezrael Campos informed PQB via email that they will be revising their requests due to budget restraints and changing needs of the hotel. The request was to move forward with the acquisition of two (2) Mute Swans only and disregard the requests for flamingos and cranes.*

SHIPPER: Travis Williams, Williams Exotic Waterfowl, 12795 SW 67th Drive, Lake Butler, Florida 32054. (Refer to Appendix B for resume)

IMPORTER: Jezrael Campos, Wildlife Attendant, Grand Hyatt Kauai Resort and Spa (GHKRS), 1571 Poipu Road, Koloa, Hawaii 96756. Phone No.: (808) 240-6590. (Refer to Appendix C for resume).

PQB NOTES: *The PQB has previously approved Import Permits for Linda Elliott and Jezrael Campos, GHKRS on November 27, 1990, March 5, 2013 and December 11, 2017, for the Import of Mute Swans, Cygnus olor. (Refer to Attachments 1, 2 and 3)*

CATEGORY: The Mute Swan, *Cygnus olor,* is on the List of Restricted Animals (Part B). Pursuant to Hawaii Administrative Rules (HAR) Chapter 4-71, *Cygnus olor* may be imported into Hawaii for private and commercial use, including research, zoological parks, or aquaculture production.

II. Information Provided by the Applicant in Support of the Application:

PROJECT: The mission of the GHKRS is to create a magical experience for all our guests and the presence of exotic animals incite such feelings as enchantment and wonder.

OBJECTIVE: The objective of importing swans is to add a touch of elegance and beauty as well as a tropical flare with a splash of color to the landscape. The ambiance of the Grand hotel experience is excitingly enhanced by exotic creatures. Swans can live up to 30 years on average and will live out those years under the care and management of hotel staff and a state certified veterinarian.

PROCEDURE: After arrival they will be examined by a veterinarian for general health and will be quarantined from resident animals for a period of at least

30 days after which they will be released into their designated habitat. Should any sign of illness be detected at any time under the hotel's care the established vet will be notified, and an exam will be scheduled. Any treatment advised will be done according to recommendations and instructions. If the swans die before their expected lifespan and there is cause for concern a necropsy will be ordered to determine the cause of death and the carcasses will be disposed of accordingly. The hotel expects to keep all the animals according to their respective lifespan of up to 60 years, however, should there be a decision to relinquish

ownership, proper permitting and procedures will be followed as advised by Hawaii Department of Agriculture.

DISCUSSION:

1. **Person Responsible:** Jezrael Campos, Wildlife Attendant, GHKRS, 1571 Poipu Road, Koloa, Hawaii 96756. Main Office No.: (808) 742-1234. Cell No.: (808) 635-5642. Fax No.: (808) 240-6590.

   Experience of at least 15 years in avian handling including parrots, swans, ducks, geese, and cranes. Developing techniques to incite in people a natural curiosity and love for animals while treating them with respect and dignity. Constantly advancing knowledge in a broader array of wildlife species in order to educate and inform a variety of audiences about the responsibility of caring for animals. Working closely with a veterinarian on consultation, medical procedures, and medical treatment of various avian species.

2. **Safeguard Facility and Practices:** GHKRS, 1571 Poipu Road, Koloa, Hawaii 96756. Main Office No.: (808) 742-1234. Cell No.: (808) 635-5642. Fax No.: (808) 240-6590. (Refer to Attachment 4 for the GHKRS Wildlife Guide and map).

   The animals will be quarantined at the Wildlife compound on the east wing of the hotel along Ainako Street. Heading west on Kaumualii Highway turn left onto Maluhia Road. Turn left at Ala Kinoiki Road and at the end turn left onto Poipu Road. Turn Right onto Ainako Street. Effluent from the pond drains into a sump that is pumped to the hotel's sewage treatment plant at the end of Poipu Road. Any runoff from the ground goes into a French drain that runs through bag filters and absorbed by the earth.

   Biosecurity: The swans will be kept in an enclosure fitted with a two-foot-tall two-inch by two-inch wire mesh fence. This serves as a barrier between the animals and people to keep both parties safe. (Refer to Attachment 5 for the Exhibit Photographs). Any breach will be assessed and fortified as needed. CCTV surveillance cameras are placed in view of the animals' exhibits and at each entry point and security staff routinely monitor their areas. Should there be an escape every attempt will be made to safely retrieve the animal by any means necessary including the use of nets and traps up to and including dispatching them as a last resort. (Refer to Attachments 6, 7 & 8 respectively for the Wildlife Safety Procedure, the Wildlife Natural Disaster Protocol, and the Wildlife Fire Evacuation Procedure). All the animals are naturally found outdoors but shade and shelter will be provided as necessary. The use of security cameras and staff monitoring has proven effective in diverting guests in the past from entering the exhibits and hurting themselves or the animals.

3. **Method of Disposition:** If any animal dies before its expected lifespan and there is cause for concern a necropsy will be ordered to determine the cause of death and the carcass will be disposed of accordingly including the use of a veterinary crematorium or a private burial site. Should a disease be the cause of death all other animals within proximity will be quarantined and monitored at the hotel's Wildlife compound according to a vet or other authoritative entity's recommendations. If criminal vandalism is a cause of death the carcass will be stored in the freezer until authorities have been notified and reasonable efforts have been made to prosecute the vandal after which the carcass will be disposed of as previously mentioned. The hotel expects to keep all the animals according to their respective lifespan of up to 60 years, however, should there be a decision to relinquish ownership, proper permitting procedures will be followed as advised by Hawaii Department of Agriculture.

4. **Abstract of Organism:**

The **mute swan** (*Cygnus olor*) is a species of swan and a member of the waterfowl family Anatidae. It is native to much of Eurosiberia, and (as a rare winter visitor) the far north of Africa. It is an introduced species in North America – home to the largest populations outside of its native range – with additional smaller introductions in Australasia and southern Africa. The name 'mute' derives from it being less vocal than other swan species.[2][3][4] Measuring 125 to 170 cm (49 to 67 in) in length, this large swan is wholly white in plumage with an orange beak bordered with black. It is recognizable by its pronounced knob atop the beak, which is larger in males.

Adults of this large swan typically range from 140 to 160 cm (55 to 63 in) long, although can range in extreme cases from 125 to 170 cm (49 to 67 in), with a 200 to 240 cm (79 to 94 in) wingspan.[13][14] Males are larger than females and have a larger knob on their bill. On average, this is the second largest waterfowl species after the trumpeter swan, although male mute swans can easily match or even exceed a male trumpeter in mass.[4][15] Among standard measurements of the mute swan, the wing chord measures 53–62.3 cm (20.9–24.5 in), the tarsus is 10–11.8 cm (3.9–4.6 in) and the bill is 6.9–9 cm (2.7–3.5 in).[4]

The mute swan is one of the heaviest flying birds. In several studies from Great Britain, males (known as *cobs*) were found to average from about 10.6 to 11.87 kg (23.4 to 26.2 lb), with a weight range of 9.2–14.3 kg (20–32 lb) while the slightly smaller females (known as *pens*) averaged about 8.5 to 9.67 kg (18.7 to 21.3 lb), with a weight range of 7.6–10.6 kg (17–23 lb).[4][16][17][18][19] While the top normal weight for a big cob is roughly 15 kg (33 lb), one unusually big Polish cob weighed almost 23 kg (51 lb) and this counts as the largest weight ever verified for a flying bird, although it has been questioned whether this heavyweight could still take flight.[20]

Young birds, called cygnets, are not the bright white of mature adults, and their bill is dull greyish-black, not orange, for the first year. The down may range from pure white to grey to buff, with grey/buff the most common. The white cygnets have a leucistic gene. Cygnets grow quickly, reaching a size close to their adult size in approximately three months after hatching. Cygnets typically retain their grey feathers until they are at least one year old, with the down on their wings having been replaced by flight feathers earlier that year.

All mute swans are white at maturity, though the feathers (particularly on the head and neck) are often stained orange-brown by iron and tannins in the water.[21]

Mute swans are not naturalized in Hawaii.

All of the animals have the potential of becoming established in Hawaii if allowed to fly free, however they will all be pinioned and prevented from escaping into the wild. If they were to ever be allowed to establish themselves the potential for harm would be from the mute swans which would foul waterways and fresh water sources and while in the nesting season will protect their nest and young aggressively.

Swans have the potential of feeding on fish, reptiles, amphibians, and insects as well as grasses and leafy vegetables here in Hawaii. Ranches and sanctuaries across North America breed these animals for preservation and exhibition in zoos and private collections. Although wild by nature, they can be tamed.

Diseases common among such animals are parasites such as louse flies and fowl pox transmitted by mosquitoes. They are also commonly prone to bumble foot.

5. Effects on the Environment:

a. The probability of swans establishing themselves in the wild here is very, very low given they will be pinioned. GHKRS has had swans and cranes for the last 30 years and is able to keep them contained.

b. The economic consequences of importing swans is quite positive. Many guests of the hotel enjoy seeing exotic animals and appreciate their beauty. They are attracted by the charm they bring to the hotel. Environmentally, they have the potential of fouling fresh water sources and pose a safety risk to aviation, therefore every attempt will be made to continue the assurance of keeping them from escaping into the wild.

c. **Biosecurity**: The swans will be kept in an enclosure fitted with a two-foot-tall two-inch by two-inch wire mesh fence. This serves as a barrier between the animals and people to keep both parties safe. (Refer to Attachment 5 for the

Exhibit Photographs). Any breach will be assessed and fortified as needed. CCTV surveillance cameras are placed with a view of the animals' exhibits and at each entry point and security staff routinely monitor these areas. Should there be an escape, every attempt will be made to safely retrieve the animal by any means necessary including the use of nets and traps, up to and including dispatching them as a last resort. (Refer to Attachments 6, 7 & 8 respectively for the Wildlife Safety Procedure, the Wildlife Natural Disaster Protocol, and the Wildlife Fire Evacuation Procedure). All the animals are naturally found outdoors but shade and shelter will be provided as necessary. The use of security cameras and staff monitoring has proven effective in diverting guests in the past from entering the exhibits and hurting themselves or the animals.

6. **Alternatives:** There are no alternatives to this project. Either GHKRS is able to secure these animals, as stated, or not at all.

7. **References:** https://en.wikipedia.org/wiki/Mute_swan

III. Advisory Subcommittee Review

This request was submitted to the Advisory Subcommittee on Land Vertebrates for their review and recommendations. Their recommendations and comments are as follows:

1. **I recommend approval ___ / ___ disapproval to allow the importation of two Mute Swans, (*Cygnus olor*), an animal on the List of Restricted Animals (Part B), by permit, for exhibition, by Grand Hyatt Kauai Resort and Spa.**

Dr. Allen Allison, Vice President/Assistant Director, Research and Scholarly Studies, Bernice Pauahi Bishop Museum: Recommends approval.

Comments: "Inasmuch as these swans will be pinioned and under close management, they are unlikely to present an environment[al] threat. The permit conditions are rigorous but reasonable."

Dr. Sheila Conant, Professor/Chairperson (ret.), University of Hawaii at Manoa, Department of Zoology: Recommends disapproval.

Comments: "The application states: 'The objective of importing swans is to **add a touch of elegance and beauty as well as a tropical flare with a splash of color to the landscape**.'

'The mission of the GHKRS [Grand Hyatt Kauai Resort and Spa] is to create a **magical experience** for all our guests and the **presence of exotic animals incite such feelings as enchantment and wonder.'**

Numerous scientific and popular report, articles, news stories, etc. support the conclusion that Mute swans have a detrimental ecological impact on ecosystems throughout the world. They contribute to the reduction of SAV (submerged aquatic vegetation) and disrupt ecosystems by driving native species out of their natural habitats. Also, the aggressiveness of males, which weigh 24 to 26 lbs, defending nests/territories) is dangerous to other animals (especially native waterbirds) and humans (see below)."

> Michelle Tavares-Cassel, Assistant Director of Engineering, GHKRS Response: "We have not had one instance of escaped swans, and our habitats are man-made and will not impact any natural habitat adjacent to."

Even if only female swans (weight 19-20 lbs) were imported, if they escape from captivity at the Grand Hyatt Kauai Resort and Spa, they still could harm native waterfowl and possibly humans. Although the male swan is especially aggressive in protecting its nest and territory, both sexes are large and, if provoked may seriously harm humans and other animals.

To clarify the impression given by the first statement quoted above:
'add a touch of elegance and beauty as well as a tropical flare with a splash of color to the landscape.'

Mute swans are indeed elegant and beautiful—at least from a distance. Mute swans are not a tropical species, their principal distribution is Eurosiberia. The only 'splash of color' this white swan would add is the black and orange coloration of the bill.

To clarify the impression given by the second statement quoted above:
'The mission of the GHKRS is to create a **magical experience** for all our guests and the **presence of exotic animals incite such feelings as enchantment and wonder.'**

The magic,...enchantment and wonder would vanish if even one of these animals harms people or escapes and harms native waterfowl. There is an actual record of a male mute swan attacking and killing a man in a kayak. This event was certainly not magic, enchanting, or wonderful. The man had been hired to take care of the swans, which were imported to drive off native waterfowl. He is survived by his wife and two small children."

Michelle Tavares-Cassel's Response: "Unsure how this instance relates to our request?"

Dr. Fern Duvall, Ecosystems Protection and Management, Hawaii Department of Land and Natural Resources-Division of Forestry and Wildlife: Recommends disapproval.

Comments: "Sure wish there was more time allotted for preparing a statement on this and the three other permits which were sent to me. Hard to read all of this in a short time and attain due-diligence.

Mute swans have negative habitat and ecosystem issues in all places they have been introduced if they should escape. I think this importation request has more potential for harmful outcomes than is alluded to in the write-up provided. I FULLY AGREE that they should be pinioned to prevent flight risk; also the importation should be females only (less aggressive to other waterfowl and humans would be the expectation). The GHKR is a location with native endangered species (Nene, Gallinules, Coots) which could be impacted by threat and attack behaviors of the mute swans. If aggression were to result in killing of the endangered species GHKR would be liable for legal 'take'. The swans should be kept where the native species do not nest, or have offspring – should PQB allow the importation – even of same sex mute swans."

Michelle Tavares-Cassel's Response: "Property agrees with the pinioning as noted, and females would be ok should that be the direction. Swans are in separate exhibits not tied to the other waterfowl."

Dr. Isaac Maeda, DVM, HDOA-Animal Industry Division: Recommends approval.

Comments: "No comments."

Mr. Tom May: No response.

Dr. Carolyn McKinnie, DVM, Supervisory Veterinary Medical Officer, USDA, Animal and Plant Health Inspection Service-Animal Care: Recommends disapproval.

Comments: "Birds are regulated under the AWA (Animal Welfare Act) though no standards have been set as yet. Currently we are in the process of developing bird standards so in the future these animals will be regulated and inspected by USDA.

One concern that I see is the need for more swans as other Mute swans have been imported per PQB above on November 27, 1990, March 5, 2013 and December 11, 2017. According to documentation submitted, these Mute

swans animals can live an average of 30 years but up to 60 years. According to the requestor all swans are dead. It would be understandable for the first swans imported in 1990 to be deceased. However, 4 other swans have been brought in, 2 of these 4 years ago and 2 others 8 years ago.

Was a necropsy performed on these animals? Are there husbandry issues (food, water quality, sanitation, predation etc.) contributing to the death of these animals?

Having this additional information is important in evaluating this request."

Michelle Tavares-Cassel's Response: Response pending.

(Refer to Attachment 9 for Mrs. Tavares-Cassel's email response following up on the Advisory Subcommittee's comments).

2. I recommend approval ___ / ___ disapproval to update the above-stated permit conditions for the importation of two Mute Swans, (*Cygnus olor)*, an animal on the List of Restricted Animals (Part B), by permit, for exhibition, by Grand Hyatt Kauai Resort and Spa.

Dr. Allen Allison: Recommends approval.

Dr. Sheila Conant: Recommends disapproval.

Comments: "Clearly this permit application was not supported by any in-depth research about the impacts of the Mute Swan, either as a native or invasive species. I find it shocking that the permit application made it as far as it did in the administrative process."

Michelle Tavares-Cassel's Response: "As stated previously, we have imported swans with no issues over the past 30 years, with your inspectors doing site visits and signing off on the request. Unsure what has changed with the process?"

Dr. Fern Duvall: Recommends disapproval.

Comments: "I did not see any research provided to support why the import is being requested, and reviews of what swans can do when invasive in other locations."

Michelle Tavares-Cassel's Response: "We are requesting import of 4 swans as several of our European Swans were lost due to old age, and the exhibits are missing the grace and beauty of these specific species of waterfowl. Guests also ask for them quite often."

"There are many species of very colorful or unique duck species that could better be used to show color and enchantment for visitors. Swans as very heavy big birds have too many potentials for direct impacts to native rare species on the site, and to human visitors under the right (actually) wrong circumstances."

Michelle Tavares-Cassel's Response: "No guest impact to date from swans."

Dr. Isaac Maeda: Recommends approval.

Comments: "No comments."

Mr. Tom May: No response.

Dr. Carolyn McKinnie: Recommends approval.

Comments: "N/A"

IV. Advisory Committee Review

This request was submitted to the Advisory Committee on Plants and Animals (Advisory Committee) at its meeting on June 8, 2021 via a Zoom virtual meeting. PQB Land Vertebrate Specialist Noni Putnam provided a synopsis of the request. She noted that the applicants Mr. Jezrael Campos and Michelle Tavares-Cassel were in attendance and available to answer questions, if needed.

Advisory Committee Chairperson Darcy Oishi asked the members of the Advisory Committee if they had any questions for PQB or the applicant.

Advisory Committee Member Dr. Benton Pang stated that he has questions regarding procedures on the attachments. Dr. Pang wanted to verify if there are always procedures, inspections and health certificates required prior to birds arriving into Hawaii? He further asked, "Are these procedures always in place when importing birds to Hawaii?" Ms. Noni Putnam said, "That is correct." Plant Quarantine and Animal Quarantine have their own conditions and requirements that they regulate and enforce.

Advisory Committee Member Ken Matsui said that Ms. Putnam referred to earlier submittals by the Grand Hyatt. He asked if the Grand Hyatt previously had mute swans? Ms. Putnam stated that the attachments do show that the Grand Hyatt previously had swans at their facility. Ms. Putnam said that the PQB was notified of the swans passing on, and it appears to be one of the reasons for the request. Mr. Matsui asked if the swans they want to import are all females or both males and females? Ms. Putnam stated that the application is for two mute swans. She deferred the question to the Grand Hyatt Kauai. Mr. Matsui also asked if the Grand Hyatt ever had issues with the swans escaping; for instance, in the case with a hurricane? Ms. Putnam said, "no" according to the information provided. The birds at their facility are pinioned and closely watched.

Ms. Michelle Tavares-Cassel, Grand Hyatt Kauai, said that they do have emergency procedures in place for natural disasters, and that they collect all of the animals which are placed indoors in separate crates. She said that they have an indoor wildlife facility which is located indoors and inside of their landscaping compound area. She further mentioned that the birds are also pinioned to prevent the birds from flying away and that there are security-wellness check procedures in place 24 hours a day. Ms. Tavares-Cassel said they are currently working on expanding their CCCS (Closed Caption Camera System) to make sure there are cameras on every exhibit on property. Chairperson Oishi asked Ms. Putnam if there had been any reports of any mute swan attacks noting the concerns expressed by some of the advisory committee members? Ms. Putnam said that there have been no reports of any aggression or attacks on record from the five facilities that currently have mute swans at their facilities.

Committee member Matsui restated his question regarding if the Grand Hyatt Kauai would be importing all females or both males and females? Ms. Tavares-Cassel said that they don't have a preference and that the swans don't normally reproduce on property. Mr. Matsui asked if there are any Nene geese in any adjacent areas? Ms. Tavares-Cassel said that they have a separate area for two Nene geese that they are housing for the State. She further said that they have had these Nene geese for 20+ years which were transferred to their facility through the State due to injury. Mr. Matsui stated that he saw a YouTube video of swans going after Canadian geese, which is just a color variation of Nene geese. He asked if there was any problem with the compatibility of those two geese? Ms. Tavares-Cassel said that they are in separate exhibits, therefore, there have been no problems.

Committee Chair Oishi asked Ms. Putnam what will happen if the Board does not update the permit conditions? Ms. Putnam said that it is her understanding if the conditions are denied, the import permit will not be granted. She noted that there are other sites that also have restricted animals, and her goal is to work with those permittees to update old existing conditions to include applicable requirements of municipal, state, or federal law.

Jonathan Ho, Acting Plant Quarantine Branch Manager, said that the submittal is requesting to allow importation and update the permit conditions; they're tied together. He reiterated Ms. Putnam's comments that if the Board does not want to update permit conditions, then they would very likely not allow importation. He said that if the Committee felt there was something inadequate regarding the conditions, this is the time to insert additional language regarding importation. Mr. Ho said because there was discussion regarding allowing only females, that could be a suggested requirement, but it's the Committee's decision.

Committee member Matsui asked if the mute swans that are already in Hawaii are both males and females or, are they one sex or another? Ms. Tavares-Cassel said that they have both males and females. Mr. Matsui stated that if we allow only females, it doesn't matter because there are both males and females already here.

Advisory Committee Member Rob Hauff stated that Ms. Tavares-Cassel also mentioned that there are Nene geese already on display, and they don't interact with the swans. He asked, "What about wild Nene geese flying around Kauai?" He said that he noticed that the pen is open with a two-foot barrier. Mr. Hauff asked "Are there any interactions between the wild Nene?" Ms. Tavares-Cassel stated that in her six-year tenure, she has never seen wild Nene land on the property, and that Jez [Jezrael Campos] could attest to that. She said that she sees them flying overhead all the time, and she's unsure why they stay away – "maybe because there's so many people here." Ms. Tavares-Cassel further mentioned that occasionally, she'll see a Koloa duck, and then it'll disappear.

Committee member Dr. Pang asked if there were any other wild birds that enter the water features on the property, and are the water features artificial or natural? Jezrael Campos, Grand Hyatt Kauai, said that the water features are man-made; they are not actual sources; any run-off goes back into the water filtration system; and nothing goes back into the natural habitat. Ms. Tavares-Cassel reiterated that only once or twice in her six years she has seen a Koloa duck in the water features and that lasts a day or two, and then they're gone again; nothing else.

Committee member Hauff asked Ms. Putnam if it would make any sense to change the conditions to import only females knowing that there are males, with the idea that eventually there would be only a female population and that would be additional security against reproduction?

Ms. Putnam stated that based on the suggestions of the advisory subcommittee, the advisory committee could recommend a stipulation be added into the permit conditions requiring the importation of only females. Ms. Putnam said her understanding is the Grand Hyatt Kauai does not currently have any mute swans at their facility, but they do have other Black swans on their property that are male. She further mentioned the

facility is planning to house the mute swans in a different area from the other swans. Ms. Putnam said that if the advisory committee does recommend to move forward with this, the conditions can stipulate only male or only female.

Committee member Matsui states that he's unclear as to what impact this restriction of "only females" would have at other institutions that have other male mute swans. He asked if they would be allowed to continue to have them, or we would effectively be forcing them to get rid of them? Ms. Putnam said that her understanding is that facilities that currently have males and females would be able to continue with operations based on the conditions set forth at the time. She further mentioned that if there should come a time where problems arise, we will address them at that time. Moving forward, if there is concern regarding allowing only females, we'll address it at this time. If there are any other facilities requesting import, then those conditions will be dealt with at that time.

Mr. Ho stated that the current conditions do not prohibit breeding. He said that instead of limiting by sex, you could limit propagation in the conditions. Mr. Ho said they do provide us with inventory, and if they were intentionally or unintentionally breeding them, the applicant would have to take corrective actions or would be in violation of the permit conditions. He said the applicant can attest to whether they can separate them or not and noted the likelihood of breeding them is very low.

Mr. Ho addressed Mr. Matsui's comment by saying that right now the current conditions do stand. He reiterated, "As Noni stated, they would technically still be allowed." Moving forward, should there be a need to strongly regulate that, we can work with them outside of the permitting process.

Ms. Putnam said that Dr. Carolyn McKinnie stated in her comments: "Birds are regulated under the AWA (Animal Welfare Act) though no standards have been set as yet. Currently, we are in the process of developing bird standards so in the future these animals will be regulated and inspected by USDA." Ms. Putnam said that in the event state or federal rules or regulations are presented, the PQB would work with those agencies to make sure the sites adhere to state and federal conditions. If the permittees are not able to follow the state or federal rules or regulations, appropriate steps will be taken regarding the disposition of the animals.

Chair Oishi requested a motion. Receiving no responses from the committee members, Chair Oishi made a motion to approve. Advisory Committee Member Dr. Maria Haws seconded the motion. Chair Oishi asked if there was any discussion? Mr. Hauff said that he wasn't sure how the other committee members felt about adding in the "females only" condition. Chair Oishi asked Ms. Putnam if she was aware of any progeny from imported mute swans? Ms. Putnam said, "yes".

Chair Oishi asked Ms. Putnam if the permit conditions were set for the Hyatt at this point, would all future applicants requesting importation of mute swans have the same permit conditions that the Board sets? Ms. Putnam stated that any future requests to import mute swans would follow the conditions reviewed by the advisory committee as approved by the Board. Chair Oishi says that it's pertinent to have a discussion given the additional information.

Committee member Hauff asked to amend the existing motion or recommend a new motion. Chair Oishi asked the committee if they wanted to recommend females only or prohibit breeding? Mr. Hauff stated that breeding would likely be accidental and not intentional, and did not know how you would prevent accidental breeding. Chair Oishi reiterated that one of the recommendations was that males are more aggressive than females, so he suggested recommending that only females be allowed for import. He made a motion to approve the request and amend the permit conditions to restrict importation to females only. Mr. Hauff seconded the motion. The motion was called to vote.

Vote: APPROVED 6/0, with 1 abstention

Motion Passed.

V. Proposed Import Permit Conditions

1. The restricted article(s), two (2) Mute Swans, *Cygnus olor* including progeny, shall be used for exhibition, a purpose approved by the Hawaii Department of Agriculture (HDOA), Board of Agriculture (Board), and shall not be given, sold, and/or transferred in Hawaii unless approved by the Board. Release of the restricted article(s) into the environment is prohibited.

2. Only female restricted article(s) may be imported.

PQB NOTES: *Condition No. 2 was added as a result of the Committee's recommendation.*

3. The permittee, Jezrael Campos, Grand Hyatt Kauai Resort and Spa, 1571 Poipu Road, Koloa, Hawaii 96756, shall be responsible and accountable for the restricted article(s) imported, including progeny, from the time of their arrival to their final disposition.

4. The restricted article(s), including progeny, shall be safeguarded at Grand Hyatt Kauai Resort and Spa, 1571 Poipu Road, Koloa, Hawaii 96756, a site inspected and approved by the Plant Quarantine Branch (PQB) prior to importation.

Removal of the restricted article(s), including progeny, to another site shall require a site inspection and prior approval by the PQB Chief.

5. The restricted article(s) shall be maintained by the responsible person, Jezrael Campos, Grand Hyatt Kauai Resort and Spa, 1571 Poipu Road, Koloa, Hawaii 96756, or by trained or certified personnel designated by the permittee.

6. The restricted article(s) shall be imported only through the port of Honolulu, as approved by the Board. Entry into Hawaii through another port is prohibited.

7. The permittee shall provide the HDOA, PQB and the Animal Industry Division (AID) with the confirmed arrival date, time, mode of transportation, and any other required information for the arrival of the restricted article(s) at least 48 hours prior to arrival. The permittee shall notify the HDOA, PQB and AID immediately of any changes to this information.

8. Each shipment shall be accompanied by a copy of the PQB permit for the restricted article(s) and an invoice, packing list, or other similar PQB approved document listing the scientific and common names of the restricted article(s), the quantity of the restricted article(s), the shipper, and the permittee for the restricted article(s).

9. The restricted article(s), including progeny, shall be pinioned and permanently marked with a unique identification code that is approved by the PQB Chief.

10. At least four sides of each parcel containing the restricted article(s) shall be clearly labeled with "Live Animals" and "This Parcel May be Opened and Delayed for Agriculture Inspection" in 2-inch minimum sized font.

11. All bedding used to transport the restricted article(s) and fecal material from the restricted article(s) shall be bagged and disposed of directly into the municipal landfill.

12. The restricted article(s), including progeny, shall comply with all pre-entry and post-entry animal heath requirements of the AID.

    a. The restricted article(s) shall be accompanied by an original and valid health certificate issued by a U.S. Department of Agriculture (USDA) accredited veterinarian within seven (7) days prior to importation. The health certificate shall declare the restricted article(s) are free from brucellosis, hepatitis, West Nile Virus, morbillivirus, calicivirus, heartworm, toxoplasmosis, and any other disease designated by the HDOA State Veterinarian.

b. Upon arrival at the port of Honolulu, the restricted article(s) must be issued a permit to ship (form DC-8), by the HDOA State Veterinarian or authorized representative, prior to transport to the approved site.

13. The restricted article(s), including progeny, shall be subject to inspection by the HDOA, PQB, and the AID prior to entering the State.

    a. It is the responsibility of the permittee to provide any restraint(s), including chemical restraint(s), deemed necessary by the AID to conduct a proper inspection. Any associated costs and/or arrangement is the responsibility of the permittee.

14. The approved site, restricted article(s), progeny, records, and any other document pertaining to the restricted article(s) and progeny under this permit, may be subject to post-entry inspections by the HDOA, PQB, and the AID. The permittee shall make the site, restricted article(s), progeny, and records pertaining to the restricted article(s) available for inspection upon request by a PQB inspector.

15. The permittee shall adhere to the use, facility, equipment, procedures, and safeguards described in the permit application and as approved by the PQB Chief and Board.

16. The permittee shall have a biosecurity manual available for review and approval by the PQB, at the time of the initial site inspection and any subsequent post-entry inspection(s), which identifies the practices and procedures to be adhered to by the permittee to minimize or eliminate the risk of theft, escape, or accidental release of the restricted article(s), including the risk of introduction and spread of diseases and pests associated with the restricted article(s) to the environment. The permittee shall adhere to all practices and procedures as stated in this biosecurity manual.

17. The permittee shall immediately notify the PQB Chief verbally and in writing under the following circumstances:

    a. If any escape, theft, release, disease outbreaks, pest emergence and/or mortality involving the restricted article(s) or progeny under this permit occurs. If the restricted article(s) or progeny escape or are found to be free from confinement, the HDOA may confiscate or capture the restricted article(s) at the expense of the permittee, pursuant to the Hawaii Revised Statutes (HRS), §150A-7(c). The AID shall also be notified of any sign or occurrence of disease.

b. If any changes to the approved site, facility and/or procedures regarding the restricted article(s), including progeny, are made, then the permittee shall also submit a written report documenting the specific changes to the PQB Chief.

c. If a shipment of the restricted article(s) is delivered to the permittee without a PQB "Passed" stamp, tag or label affixed to the article, container, or delivery order that indicates that the shipment has passed inspection and is allowed entry into the State, then the permittee shall not open or tamper with the shipment and shall secure, as evidence, all restricted article(s), shipping container(s), shipping document(s) and packing material(s) for PQB inspection.

d. If the permittee will no longer import or possess the restricted article(s) or progeny authorized under this permit, then the permittee shall also submit a written report to the PQB Chief stating the name and address of the individual to whom the restricted article(s) will be transferred to. If the restricted article(s), including progeny, will be transferred within the State, a PQB possession permit shall be obtained by the new owner prior to transfer. Once the transfer is complete, this permit shall be cancelled.

e. If the restricted article(s) or any progeny expires, then the permittee shall also submit a written report to the PQB Chief that details the circumstances surrounding the death of the restricted article(s), the cause of death of the restricted article(s), and any other information deemed necessary by the PQB Chief. The permittee shall also submit a necropsy report from a USDA accredited veterinarian within thirty (30) days post-mortem.

18. The permittee shall submit a copy of all valid licenses, permits, certificates or other similar documents required by other agencies for the restricted article(s) to the PQB Chief. The permittee shall immediately notify the PQB Chief in writing when any of the required documents are suspended, revoked, or terminated. This permit may be amended, suspended, or cancelled by the PQB Chief upon suspension, revocation, or termination of any license, permit, certificate, or similar documents required for the restricted article(s).

19. It is the responsibility of the permittee to comply with all applicable requirements of municipal, state, or federal law pertaining to the restricted article(s) including progeny.

20. The permittee shall submit a semi-annual report to the PQB Chief in January and July of all restricted articles(s) imported or possessed. The report shall be in a format approved by the PQB Chief and include the following information for the prior 6-month period:

a. The permit number, quantity, scientific name of each restricted article(s);

b. The status of the use and possession of the restricted article(s);

c. A summary of any significant changes to the permittee's operation, personnel, and/or procedures; and

d. Any significant events that occurred at the permittee's site.

21. Any violation of the permit conditions may result in citation, permit cancellation, and enforcement of any or all of the penalties set forth in HRS §150A-14.

22. The permittee is responsible for costs, charges, or expenses incident to the inspection, treatment or destruction of the restricted article(s), as provided in Act 173, Session Laws of Hawaii 2010, Section 13, including, if applicable, charges for overtime wages, fixed charges for personnel services, and meals.

23. A cancelled permit is invalid and upon written notification from the PQB Chief, all restricted article(s) listed on the permit shall not be imported. In the event of permit cancellation, any restricted article(s) imported under permit may be moved, seized, treated, quarantined, destroyed, or sent out of State at the discretion of the PQB Chief. Any expense or loss in connection therewith shall be borne by the permittee.

24. The permit conditions are subject to cancellation or amendment at any time due to changes in statute or administrative rules restricting or disallowing import of the restricted article(s) or due to Board action disallowing a previously permitted use of the restricted article(s).

25. These permit conditions are subject to amendment by the PQB Chief in the following circumstances:

a. To require disease screening, quarantine measures, and/or to place restrictions on the intrastate movement of the restricted article(s), as appropriate, based on scientifically validated risks associated with the restricted article(s), as determined by the PQB Chief, to prevent the introduction or spread of disease(s) and/or pests associated with the restricted article(s).

b. To conform to more recent Board approved permit conditions for the restricted article(s), as necessary to address scientifically validated risks associated with the restricted article(s).

Mute Swans, *Cygnus olor*
Grant Hyatt Kauai Resort and Spa

26. The permittee shall agree in advance to defend and indemnify the State of Hawaii, its officers, agents, and employees for any and all claims against the State of Hawaii, its officers, agents, or employees that may arise from or be attributable to any of the restricted article(s) that are introduced under this permit. This permit condition shall not apply to a permittee that is a federal or State of Hawaii entity or employee, provided that the state or federal employee is a permittee in the employee's official capacity.

STAFF RECOMMENDATION: Based on the recommendations and comments of the Advisory Subcommittee on Land Vertebrates and the Advisory Committee on Plants and Animals' (6/0/1) recommendation to approve this request, the PQB recommends approval of this request with the proposed permit conditions.

Respectfully Submitted,

JONATHAN K. HO
Acting Manager, Plant Quarantine Branch

CONCURRED:

BECKY L. AZAMA
Acting Administrator, Plant Industry Division

APPROVED FOR SUBMISSION:

PHYLLIS SHIMABUKURO-GEISER
Chairperson, Board of Agriculture

PQ-7 (01/04)

State of Hawaii
Department of Agriculture
PLANT QUARANTINE BRANCH
1849 Auiki Street, Honolulu, HI 96819-3100
Phone: (808) 832-0566, FAX: (808) 832-0584

For Office Use Only

Fee: $_____ Receipt No._____

☐ Approve Permit No._____ Date:_____

☐ Disapprove ☐ Other _____

Processed by:_____ Date:_____

PERMIT APPLICATION FOR RESTRICTED COMMODITIES INTO HAWAII

Date: *July 10, 2020*

In accordance with the provision of Chapter § 4-71, Hawaii Administrative Rules of the Division of Plant Industry, Department of Agriculture, a permit is requested for the following commodities:

Please type or print clearly.

Quantity	Commodity	Scientific Name
4	Mute Swans	Cygnus olor
2	Black Crowned Cranes	Balearica povonina
2	Chilean Flamingos	Phoenicopterus chilensis

RECEIVED
AUG 03 2020
PLANT QUARANTINE BRANCH

PAID

Amount:	Chk:
$50 —	3000 4747
Date:	Initial:
8/3/20	TJ

Name and address of shipper: Travis Williams, 12795 SW 67th Drive Lake Butler, FL 32054

(Mainland or Foreign address)

Approximate date of arrival: January 5, 2021

Mode of Shipment: ☐ Mail ☑ Air Freight ☐ Boat

Type of Permit:
- --- Import
  - ☑ one time only ☐ multi-shipments
- --- Intrastate shipment
  - ☐ one time only ☐ multi-shipments
- ☐ Possession

Object of importation:
- ☑ Kept caged at all time
- ☐ Used for propagation
- ☐ Imported for exhibition
- ☐ Imported for liberation
- ☐ Other purposes - specify _____

Please type or print clearly.

Applicant's Name Jezrael Campos

Company Name Grand Hyatt Kauai (if applicable)

Hawaii Mailing Address 1571 Poipu Road Koloa, HI 96756

Telephone number 808-742-1234

Facsimile number 808-240-6590

Fee Amount Enclosed (cash, check or mail order) $ 50.00

(complete reverse side)

C20

PLEASE COMPLETE THE FOLLOWING INFORMATION (attach extra sheet if necessary)

1. State in detail the reasons for introduction (include use or purpose).

   The hotel's previous swans are now deceased and their exhibits are empty therefore we are looking to refill those areas. The introduction of new species adds to the mission of Grand Hyatt Kauai to provide a "magical experience" The beauty and grace of swans and the messengers of peace as seen in crowned cranes inspire awe and wonder for the natural world. Flamingos are reminiscent of tropical flare and splash the landscape with color, again adding ambiance to the Grand Experience of hotel guests.

2. Person responsible for the organism (include name, address and phone number).

   Jezrael Campos
   1571 Poipu Road
   Koloa, HI 96756
   808-742-1234

3. Location(s) where the organism will be kept and used (include address, contact and phone number).

   Grand Hyatt Kauai
   1571 Poipu Road
   Koloa, HI 96756
   Jezrael Campos
   808-742-1234

4. Method of disposition.

   Community crematorium, private burial, or municipal waste, otherwise transferred to new permit holder.

5. Give an abstract of the organism with particular reference to potential impact on the environment of Hawaii (include impact to plants, animals and humans).

   Mute swans have a potential to foul open water sources. This can be maintained by keeping them in an enclosure. Swans are mostly grass grazers and should not impose a threat to local crops. They are prey animals and pose no physical harm to humans or other animals except to defend their territory during nesting season. When kept caged at all times they have minimal impact to Hawaii environment.

****

I request permission to import the articles as listed on the permit application and further, request that the articles be examined by an authorized agent of the Department of Agriculture upon arrival in Hawaii.

I agree that I, as the importer, will be responsible for all costs, charges or expenses incident to the inspection or treatment of the imported articles.

I further agree that damages or losses incident to the inspection or the fumigation, disinfection, quarantine, or destruction of the articles, by an authorized agent of the Department of Agriculture, shall not be the basis of a claim against the department or the inspectors for the damage or loss incurred.

Signature _____ (Applicant) **Date** July 10, 2020

TRAVIS W. WILLIAMS

Home: 12795 SW 67th Drive, Lake Butler Fl. 32054 · 352-494-1028
Twluv21@aol.com

Experience of more than 20 years in avian handling including swans, ducks, geese, and cranes. Developing techniques to incite in people a natural curiosity and love for animals while treating them with respect and dignity. Constantly advancing knowledge in a broader array of wildlife species in order to educate and inform a variety of audiences about the responsibility of caring for animals. Working closely with a veterinarian on consultation, medical procedures, and medical treatment of various avian species.

EXPERIENCE

2006 – PRESENT

OWNER, WILLIAMS EXOTIC WATERFOWL

As owner, I oversee all animal care to ensure a proper habitat and balanced diet is maintained for all animals. Sales and marketing.

2004-2018

CORRECTIONAL OFFICER CAPTAIN, FLORIDA DEPARTMENT OF CORRECTIONS

Delegates post assignments, specific duty assignments, coordinates leave use and ensures accurate completion of attendance and leave reports. Works with lead officers to ensure proper security coverage. Conducts periodic individual counseling with staff to outline problem areas and give additional duties or instructions. Performs crisis intervention functions to include but not limited to subduing violent or uncooperative inmates, defending persons against attack, or preventing escapes. Maintains facility security. This includes performing contraband searches. Provides emergency assistance during emergencies, disasters and accidents to include but not limited to CPR, first aid, apprehension of escaping or escaped inmates, implementation of evacuation procedures, security of inmates and/or areas in accordance with the emergency.

EDUCATION

1998-2000

LAKE CITY COMMUNITY COLLEGE

Course study was in forestry and Agriculture

SKILLS

- Animal handling
- Veterinary assistance
- Animal nutrition and food preparation
- Oversight of animal husbandry
- Sales and marketing

ACTIVITIES

Majority of my time is spent with my family and caring for our animals. We are a family owned and operated business, I enjoy teaching my kids about animals and how to properly care for them.

JEZRAEL CAMPOS

Home: PO Box 403 Koloa, HI 96756 · 808-634-3593
Office: 1571 Poipu Rd. Koloa, HI 96756 · 808-742-1234
jezkauai@gmail.com · jezrael.campos@hyatt.com

Experience of at least 15 years in avian handling including parrots, swans, ducks, geese, and cranes. Developing techniques to incite in people a natural curiosity and love for animals while treating them with respect and dignity. Constantly advancing knowledge in a broader array of wildlife species in order to educate and inform a variety of audiences about the responsibility of caring for animals. Working closely with a veterinarian on consultation, medical procedures, and medical treatment of various avian species.

EXPERIENCE

JULY 6, 2005 – PRESENT
WILDLIFE LEAD, GRAND HYATT KAUAI RESORT AND SPA
Oversight in wildlife exhibition and guest interaction with various avian and aquatic species including veterinary attention and maintenance in a hospitality setting.

2003 – 2005
COOK III, SHERATON KAUAI RESORT
Handled various cooking duties including preparatory work while incorporating basic cooking techniques in a fast-paced casual restaurant.

EDUCATION

MAY 2003
AAS CULINARY ARTS, KAUAI COMMUNITY COLLEGE
Learned and developed trade techniques and practices. Participated in real life operations in a classroom setting.

SKILLS

- Animal handling
- Veterinary assistance
- Animal nutrition and food preparation
- Oversight of animal husbandry
- Public relations and speaking

ACTIVITIES

Majority of my time is spent caring for my plants and animals. Nature fascinates me and I pour a lot of effort into learning all that I can about the creatures I care for. If at all possible I also enjoy going out and seeing the natural habitats of the plants and animals I'm interested in to get a better understanding on how best to care for them.

Attachment 1

PQ-8b
5/87

Permit No. 11-91-K-4719

Date Nov. 27, 1990

State of Hawaii
DEPARTMENT OF AGRICULTURE
Plant Quarantine Branch
701 Ilalo Street
Honolulu, Hawaii 96813-5524

IMPORT PERMIT

(Valid for one shipment(s) within one year(s) from date)

Permission is hereby granted to introduce the following, in accordance with Chapter 71, Rules of the Division of Plant Industry, Department of Agriculture, and the conditions listed below. ***(Each lot must be inspected by a Plant Quarantine Inspector upon arrival before release.)***

Quantity	Commodity	Scientific Name
2 male & female Please see attached conditions.	Mute Swan	Cygnus olor

Conditions: Must be certified in accordance with ~~Reg. 11~~ 9, 19 attached and must be certified as to progeny of captive populations or have been held in captivity for a period of one year immediately prior to importation or have been specifically approved for importation by the board.

(NO SUBSTITUTIONS ALLOWED)

INSTRUCTION To Shipper: One copy of permit to accompany shipment to Hawaii.

Conditions or Object of Importation:

- ☒ To be kept in captivity at all times. (Cap'd)
- ☐ For propagation
- ☐ Other _____

Conditions: It is the responsibility of the named importer to personally contact the Federal Government as to their requirements which are contingent to this permit.

Name and Address of Shipper: International Animal Exchange, 601 Wildlife Pkwy., Grand Prarie, TX 75050

Name and Address of Importer: Hyatt Regency Kauai / Steve Stamper / Linda Elliott
1571 Poipu Beach Rd., Koloa, Kauai, HI 96756 Phone: 742-1234

Terry A. Nakahara
CHIEF PLANT INSPECTOR

Yukio Kitagawa
CHAIRPERSON, BOARD OF AGRICULTURE

FOR OFFICIAL USE ONLY

PORT _____ ARRIVAL DATE _____ FLIGHT/SHIP _____

WAYBILL NO. _____ INSPECTION DATE/TIME _____ INSPECTOR _____

REMARKS _____

Permit #11-91-K-4719

07/89

Conditions applicable to birds imported for Display:

1. Each lot of birds shall be inspected by a State Veterinarian upon arrival and all dead birds shall be returned to the Department of Agriculture for necropsy. The owner shall keep a record of all introduced birds and progenies for the inspection of State officials.

2. The following birds shall be pinioned:

Flamingoes	Ibis
Swans	Geese
Spoonbills	Cranes
Ducks	

All birds shall be certified by a veterinarian as pinioned and subject to inspection upon arrival by a State Veterinarian.

3. All birds for exhibition out of cages shall be pinioned prior to entry into Hawaii.

4. Birds shall meet all Federal requirements.

5. Inspection of birds may be made at any time by representatives of the Division of Animal Industry, Hawaii Department of Agriculture. Birds shall be dusted with an approved pesticide on entry into the State to prevent the introduction of ectoparasites, or certified by a veterinarian as being ectoparasite-free.

6. Must be enclosed in fenced area.

7. Post entry inspection by Plant Quarantine staff.

8. All progenies must be pinioned and certified by a veterinarian.

Permit No.: 14-03-K-L5188

Date: March 05, 2013

State of Hawaii
DEPARTMENT OF AGRICULTURE
Plant Quarantine Branch
1849 Auiki Street
Honolulu, Hawaii 96819

IMPORT PERMIT

(Valid for one shipment within one year)

Permission is hereby granted to introduce the following commodity(s), in accordance with Chapter 4-71, Hawaii Administrative Rules of the Division of Plant Industry, Department of Agriculture, and the conditions listed below. (Each commodity must be inspected by a Plant Quarantine Inspector upon arrival before release.)

Quantity	Unit	Commodity	Scientific Name
2		swan, mute	*Cygnus olor*

Please See Attached Permit Conditions.

Approved port of entry: HONOLULU

(NO SUBSTITUTIONS ALLOWED)

INSTRUCTION To Shipper: One copy of permit to accompany shipment to Hawaii.

Object of Importation: Kept caged at all times

Name and Address of Shipper: Travis Williams, 12795 SW 67th Drive Lake Butler, FL 32054

Phone:

Name and Address of Importer: Grand Hyatt Kauai, Jezrael Campos, 1571 Polpu Road Koloa, HI 96756

Phone: 808-742-1234

CHIEF PLANT INSPECTOR

Russell S. Kobayashi

CHAIRPERSON, BOARD OF AGRICULTURE

FOR OFFICIAL USE ONLY

STATION _____ ARRIVAL DATE _____ FLIGHT/SHIP _____

WAYBILL NO. _____ INSPECTION DATE/TIME _____ INSPECTOR _____

REMARK _____

Permit No.: 14-03-K-L5188

Date: March 05, 2013

PLANT QUARANTINE BRANCH

Permit Conditions

Condition

Restricted B Bird for Display

ANIMAL-Pet bird pre-shipment requirements

CONDITIONS FOR BIRDS, RESTRICTED LIST, PART B (DISPLAY)

1. All parcels containing these birds imported into the State shall be placed in containers separate from other animals and marked "LIVE ANIMALS" and "MAY BE OPENED AND DELAYED FOR AGRICULTURAL INSPECTION". In addition, all hand-carried birds or birds checked in as baggage must be turned over to the respective airline agent before disembarking. Airline agents shall deliver said parcels to the Airport Animal Holding Facility, Honolulu International Airport, Honolulu, HI 96819, (808) 837-8092 upon arrival. Birds arriving after 4:30 P.M. will be held over until the following day for inspection.

2. Each lot of birds shall be inspected by a State Veterinarian upon arrival and all dead birds shall be returned to the Department of Agriculture for necropsy. The owner shall keep a record of all imported birds and progeny. All imported birds and their progeny must be marked with a permanent unique identification code (metal leg band, metal wing band, computer chip, etc.)

3. All non-native birds and their progeny exhibited in open holding or exhibit areas shall be surgically rendered flightless. This surgical procedure is subject to verification and inspection by a veterinarian authorized by the State.

4. A semi-annual report shall be submitted to the Plant Quarantine Branch providing documentation of all births, deaths, and other dispositions of the birds and their progeny.

5. Birds on the Restricted List, Part B, shall meet all Municipal/State/Federal requirements, in particular, the Wild Bird Conservation Act and CITES regulations.

6. Inspection of birds may be made at any reasonable time by the representatives of the Hawaii Department of Agriculture. Birds shall be certified by a veterinarian as being free of ectoparasites and communicable diseases.

7. All birds must be certified in accordance with Chapter 4-19 Hawaii Administrative Rules, and be accompanied by a valid and current health certificate issued within seven days prior to entry into the State. The health certificate must declare the birds to be free from ectoparasities and symptoms of transmissible disease or evidence of recent exposure to these diseases. Birds must not have been vaccinated with a live virus vaccine other than Newcastle disease within the sixty-day period before shipment.

8. Before the sale of any Restricted Listed – (Part B) bird or progeny thereof, the prospective buyer must obtain a site inspection by the Department of Agriculture and possess a Valid Possession Permit. (Local sales of birds on the Restricted

List, Part B will be only from those outlets certified by the Model Aviculture Program (MAP), provided that appropriate site inspections have been conducted.)

9. The permittee shall be liable to pay all expenses associated with the recapture or destruction of escaped animals including expenses incurred by the State as a result of the escape.

10. The permittee shall agree in advance to defend and indemnify the State of Hawaii for any and all claims against the State that may arise from or be attributable to any of the regulated animals that are introduced under this request.

PQPERMIT-1
Rev. 9/97
Amended 10/19/05

PRE-SHIPMENT REQUIREMENTS FOR PET BIRDS

1. **Import Permit** from the Plant Quarantine Branch. Call 808 832-0566.

2. **Poultry and Bird Import Permit** from the Livestock Disease Control Branch. Must be taped on the shipping crate. Issued only to accredited veterinarians. Call 808 837-8092, 7 days a week, 8:00 am through 4:30 pm Hawaii Standard Time or e-mail request to hdoaic@hawaii.gov or fax to 808 837-8094.

3. **Health Certificate**. Issued within 10 days of entry. Must include:
   a. Description of birds.
   b. Leg band or microchip numbers (except budgies, canaries, cockatiels, doves, finches and lovebirds).
   c. A statement that the birds are free of external parasites and symptoms of transmissible diseases or evidence of recent exposure to parasites or diseases.
   d. A statement that the birds have not been vaccinated with a vaccine containing a live agent during the 60 day period before shipment.

4. **7-Day Isolation**: Birds must be isolated in a mosquito-free/proof enclosure under the supervision of the veterinarian issuing the health certificate. The isolation must be for a minimum of 7 days (168 hrs), and the birds must enter the State within 36 hours of completion of the isolation. (Budgies are exempt).

5. The birds shall be released and transported in a mosquito-proof container.

ENTRY INTO THE STATE WILL BE PERMITTED ONLY THROUGH THE HONOLULU INTERNATIONAL AIRPORT

THE IMPORTATION THROUGH THE UNITED STATES POSTAL SERVICE IS PROHIBITED

FEB 22, 2008

Permit No.: 18-12-O-L6312

Date: December 11, 2017

State of Hawaii
DEPARTMENT OF AGRICULTURE
Plant Quarantine Branch
1849 Auiki Street
Honolulu, Hawaii 96819

IMPORT PERMIT

(Valid for one shipment within one year)

Permission is hereby granted to introduce the following commodity(s), in accordance with Chapter 4-71. Hawaii Administrative Rules of the Division of Plant Industry, Department of Agriculture, and the conditions listed below. (Each commodity must be inspected by a Plant Quarantine Inspector upon arrival before release.)

Quantity	Unit	Commodity	Scientific Name
2		swan, mute (NO SUBSTITUTIONS ALLOWED)	*Cygnus olor* Approved port of entry: HONOLULU Please See Attached Permit Conditions.

INSTRUCTION To Shipper: One copy of permit to accompany shipment to Hawaii.

Object of Importation: Kept caged at all time, exhibition (private)

Name and Address of Shipper: Travis Williams, 12795 SW 67th Drive Lake Butler, FL 32054

Phone:

Name and Address of Importer: Grand Hyatt Kauai, Jezrael Campos, 1571 Poipu Road Koloa, HI 96756

Phone: 808-742-1234

CHIEF PLANT INSPECTOR

CHAIRPERSON, BOARD OF AGRICULTURE

FOR OFFICIAL USE ONLY

STATION _____ ARRIVAL DATE _____ FLIGHT/SHIP _____

WAYBILL NO. _____ INSPECTION DATE/TIME _____ INSPECTOR _____

REMARK _____

Permit No.: 18-12-O-L6312

Date: December 11, 2017

PLANT QUARANTINE BRANCH
Permit Conditions

Condition

ANIMAL CONDITIONS- RESTICTED B BIRDS FOR DISPLAY

Pre-shipment requirements for Birds 9-17-2013

CONDITIONS FOR BIRDS, RESTRICTED LIST, PART B (DISPLAY)

1. All parcels containing these birds imported into the State shall be placed in containers separate from other animals and marked "LIVE ANIMALS" and "MAY BE OPENED AND DELAYED FOR AGRICULTURAL INSPECTION". In addition, all hand-carried birds or birds checked in as baggage must be turned over to the respective airline agent before disembarking. Airline agents shall deliver said parcels to the Airport Animal Holding Facility, Honolulu International Airport, Honolulu, HI 96819, (808) 837-8092 upon arrival. Birds arriving after 4:30 P.M. will be held over until the following day for inspection.

2. Each lot of birds shall be inspected by a State Veterinarian upon arrival and all dead birds shall be returned to the Department of Agriculture for necropsy. The owner shall keep a record of all imported birds and progeny. All imported birds and their progeny must be marked with a permanent unique identification code (metal leg band, metal wing band, computer chip, etc.)

3. All non-native birds and their progeny exhibited in open holding or exhibit areas shall be surgically rendered flightless. This surgical procedure is subject to verification and inspection by a veterinarian authorized by the State.

4. A semi-annual report shall be submitted to the Plant Quarantine Branch providing documentation of all births, deaths, and other dispositions (See condition #8) of the birds and their progeny.

5. Birds on the Restricted List, Part B, shall meet all Municipal/State/Federal requirements, in particular, the Wild Bird Conservation Act and CITES regulations.

6. Inspection of birds may be made at any reasonable time by the representatives of the Hawaii Department of Agriculture. Birds shall be certified by a veterinarian as being free of ectoparasites and communicable diseases.

7. All birds must be certified in accordance with Chapter 4-19 Hawaii Administrative Rules, and be accompanied by a valid and current health certificate issued within seven days prior to entry into the State. The health certificate must declare the birds to be free from ectoparasities and symptoms of transmissible disease or evidence of recent exposure to these diseases. Birds must not have been vaccinated with a live virus vaccine other than Newcastle disease within the sixty-day period before shipment.

8. Before the sale of any Restricted Listed – (Part B) bird or progeny thereof, the prospective buyer must obtain a site inspection by the Department of Agriculture and possess a Valid Possession Permit. (Local sales of birds on the Restricted List, Part B will be only from those outlets certified by the Model Aviculture Program (MAP), provided that appropriate site inspections have been conducted.)

9. The permittee shall be liable to pay all expenses associated with the recapture or destruction of escaped animals including expenses incurred by the State as a result of the escape.

10. The permittee shall agree in advance to defend and indemnify the State of Hawaii for any and all claims against the State that may arise from or be attributable to any of the regulated animals that are introduced under this request.

PQPERMIT-1
Amended 01/23/05

PRE-SHIPMENT REQUIREMENTS FOR BIRDS

1. **Poultry and Bird Import Permit** from the Livestock Disease Control Branch. Must be taped on the shipping crate. Issued only to accredited veterinarians. Call 808 837-8092, 7 days a week, 8:00 am through 4:30 pm Hawaii Standard Time or e-mail request to hdoaic@hawaii.gov or fax to 808 837-8094, at least two weeks before arrival to Honolulu.

2. **Import Permit** from the Plant Quarantine Branch. Call 808 832-0566.

3. **Health Certificate**. Issued within 10 days of entry. Must include:
   a. Description of birds.
   b. Leg band or microchip numbers (except budgies, canaries, cockatiels, doves, finches and lovebirds).
   c. A statement that the birds are free of external parasites and symptoms of transmissible diseases or evidence of recent exposure to parasites or diseases.
   d. A statement that the birds have not been vaccinated with a vaccine containing a live agent during the 60 day period before shipment.

4. **7-Day Isolation**: Birds must be isolated at the veterinary clinic in a mosquito-free/proof enclosure under the direct supervision of the veterinarian issuing the health certificate. The isolation must be for a minimum of 7 days (168 hrs), and the birds must enter the State within 36 hours of completion of the isolation. (Budgies are exempt).

5. The birds shall be released and transported in a mosquito-proof container.

ENTRY INTO THE STATE WILL BE PERMITTED ONLY THROUGH THE HONOLULU INTERNATIONAL AIRPORT

THE IMPORTATION THROUGH THE UNITED STATES POSTAL SERVICE IS PROHIBITED

Frequently asked Questions

Why don't the birds fly away?
-The State of Hawaii requires that all non-native birds in captivity be caged, therefore, because our birds are not caged we have to clip their wings (trimming of the flight feathers).

Do the parrots talk?
-All of our parrots talk, however, they only speak when excited or if they want attention.

Where do the parrots go at night?
-All the parrots are kept in a room located in a staff only area on the far end of Shipwreck Wing.

Why is Kauai Girl alone?
-Unlike majority of swans Kauai Girl prefers to be alone. She was born and hand raised on property and prefers human interaction over other swans.

When are the parrots out on display?
-Parrots are out in the lobby atrium during the hours of 8am-2pm. *weather permitting.

How often do you feed the koi fish?
-We feed them twice daily but offer fish feeding for our guests only at 9am in front of the Tidepools Restaurant.

What do the parrots eat?
-We feed our parrots a variety of nutritious fruits, vegetables, seeds and nuts.
*Note: Please do not feed our parrots.

Creatures commonly seen at and around the resort

- Black-crowned Night Heron
- Brown Anole
- Cane Toad
- Cattle Egret
- Giant African Snail
- Gold-dusted Day Gecko
- Golden Plover
- Great Frigate Bird
- House Finch
- House Gecko
- House Sparrow
- Japanese White-eye Bird
- Jungle Fowl (Chickens)
- Myna Bird
- Northern Cardinal
- Red-crested Cardinal
- Spotted Dove
- White-rumped Shama
- White-tail Tropic Bird
- Zebra Dove

GRAND HYATT KAUAI
Wildlife Guide

E walina mai o malihini! Aloha and welcome! We are the home to a small variety of wildlife. Please feel free to meander through the lush grounds and peruse the exhibits. Inside you will find a map that will guide you to each member of our wildlife ohana. For the health and safety of our animals please do not enter their exhibits or handle and feed them. Mahalo!

There are more than 300 different species of parrots in the world. Parrots are divided into groups such as macaws, amazons, cockatoos, lovebirds, parakeets, lories, cockatiels and many more. In the past 20 years parrots have become the most popular pet bird in America due to their beautiful colors and entertaining antics.

NIELE

Location: Lobby Atrium
DOB: July 1990
Height: 39"
Lifespan: Up to 100 years
Species: Hyacinth Macaw
Latin Name: Anodorhynchus hyacinthinus
Weight: 3.25 lbs

Hyacinth Macaws are endangered species due to their diminishing habitat. They are found in the upper canopy of the rain forest and in the open woodlands of northern Brazil. A few have been seen in Bolivia and northern Paraguay. Niele joined the resort shortly after the opening in 1990. She is the largest of all the parrot species. Her name in Hawaiian means "nosey", which suits her very well. She says "Aloha", "Howzit", "Hello" and most commonly "Cracker". She has one of the most powerful beaks giving her the capability of cracking open some of the hardest shelled nuts, such as a macadamia.

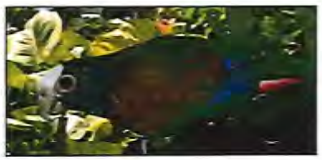
RICO

Location: Lobby Atrium
DOB: July 1990
Height: 35.5"
Weight: 3.5 lbs
Species: Green-winged Macaw
Latin Name: Ara chloroptera
Lifespan: 70-80 years

Found in eastern Panama through northern South America, the Green-winged is most at home in humid, lowland forests. Improper land management in this area could threaten its future.

Rico also came to the resort shortly after the opening in November of 1990. He has a very demanding and yet fun-loving personality. He likes to eat orange slices, which he dips in his water to make orange flavored water. Rico says "Hello", "Aloha", "Polly want a cracker?" and "Come here Rico". He enjoys it when you whistle the tune from Hawaii 5-0 and if excited may show you his little dance.

SUGAR



Location: Seaview Terrace
Latin Name: Pionus selinoides
DOB: 2007
Height: 8"
Species: White-capped Pionus
Lifespan: 20-30 years
Weight: 7.5 oz

The White-capped Pionus is one of eight species of Pionus, which can all be identified by the red feathers below their tail. Native to Mexico and South/Central America the White-capped Pionus is the smallest of the Pionus species but usually has the best personality. While these parrots tend to be quieter they can also be feisty. White-capped Pionus parrots can be shy with new people.

As with other parrots, Sugar enjoys bathing in anything from a light mist to a gentle shower. She is not much of a talker but she can meow just like a kitty cat.

CRANEY CRANE

Location: Tidepools Pond
Species: Demoiselle Crane
Latin Name: Anthropoides virgo

Demoiselle cranes are the smallest of the crane species. They are found in most parts of Eurasia in semi-arid areas where they are used as watchdogs.

Demoiselle cranes average 38 inches in height. Though they do not have webbed feet, they will wander about and swim. The demoiselle is also noted for its elaborate dances. You will often hear Craney Crane do her trumpet like call when she sees or hears a golf cart passing by. She has been with the hotel since 1994.

RADJAH SELDUCKS

Location: Front Entry Pond
Species: Radjah Shelducks
Latin Name: Tadorna radjah

Radjah Shelducks are black and white colored ducks with the legs, feet and bill being light pink. These ducks have a body length of about 20 inches with the wingspan being about double their length. Their iris is also pink.

Native to Australia, shelducks prefer to live in marshes and lagoons. They like to travel in pairs or small flocks. Male ducks can be heard making a whistling sound, while the females can be heard with a harsh rattle. Our shelducks joined the premises in 2012 after the unfortunate closing of their previous home in Kona, HI.

IKAIKA & MISSY

Location: Ist floor entrance of Poipu Wing below Ilima Terrace
Species: Nene Goose
Latin Name: Branta sandvicensis

The Nene goose is the Hawai'i State Bird and a relative to the Canada goose. Hunting and feral animals nearly drove the species to extinction until they were protected by law and a restoration project was established in 1949. Early programs for returning captive bred birds to the wild proved difficult, but recent efforts have been very successful. There are now stable populations of Nene on the islands of Hawai'i, Maui and Kauai.

Its primary predators are mongoose (on all islands but Kauai) and feral dogs and cats which prey upon the Nene eggs and young. Preservation efforts are continuing and the success of the Nene in Hawai'i is promising. Nene have a life span of over 20 years. They mate for life and are able to reproduce as early as 3 years of age.

NEW SWANS

Location: Tidepools Pond (NEW SWANS)
Ilima Terrace Pond (NEW SWANS)
Species: Mute Swan
Latin Name: Cygnus olor

NEW SWANS

Mute swans are commonly native to most parts of Europe and Asia. Males are known as cobs, females as pens and their babies as cygnets. They like to live in wetlands, rivers, ponds and streams. Mute swans are mostly silent, vocalizing with snorting and hissing sounds. Although beautiful to admire, mute swans are very territorial and will defend themselves with their powerful wings. Kauai girl was born at the resort in 1999 which is how she got the name "Kauai Girl". Kaiko in Hawaiian means "a strong sea current" and Haunani means "Snow Beauty". Kaiko and Haunani arrive at the Grand Hyatt Kauai in 2017.

BULLY & PRINCESS

Location: Front Entry Ponds
Bully & Princess (Guest Parking Side)
Hoku & Mahina (Waterfall Side)
Species: Black Swan
Latin Name: Cygnus atratus

HOKU & MAHINA

Black Swans are primarily black with snow-white secondary and primary flight feathers. Black swans have longer necks than other swans, with the male holding his neck more erect than the female. A pair will produce young year round as both male and female share incubation duties. Bully and Princess have been with the property since 1991 making them one of the original members of the wildlife ohana. Hoku in Hawaiian means "star" and Mahina means "moon". They arrived at the resort in 2018.

AFRICAN CROWNED CRANES

Location: Tidepools, Ilima Terrace & Front Entry Ponds
Species: Black crowned crane
Latin Name: Balearica povonina

Koi descend from common carp that originated in Central Asia where the breeding of these fish is documented as far back as 500 BC. The Japanese perfected the art of breeding Koi to produce a variety of colors. Show koi can be valued in the thousands of dollars. The shape of their body, head, fins and color patterns determine their value. On average they live about 30 year but the oldest know fish lived over 200 years.

DUKE

Location: Lobby Atrium
DOB: March 1994
Height: 32"
Weight: 2.5 lbs
Species: Blue and Gold Macaw
Latin Name: Ara ararauna
Lifespan: 70-80 years

Blue and Gold macaws are found from eastern Panama through northern South America in lowland humid forests. They are the most numerous and secure of all the wild parrots. They are the most commonly kept parrot due to their availability, color and fine disposition. Duke has a very calm and laid back personality. He enjoys eating bananas, papayas, almonds and walnuts. He says words such as "Hello", "Aloha", "Pretty Bird", "Polly want a cracker?" and "Hi Duke".
Some of Dukes favorite things to do are play with cardboard boxes and hang upside down on his perch. He also enjoys the song "Duke of Earl" when sung by men with deep, low voices.

TAHOE

Location: Lobby Atrium
Species: Miligold Macaw
Latin Name: Ara ararauna x Ara militaris
DOB: October 1975
Lifespan: 70-80 years
Height: 32"
Weight: 2.0 lbs

Native to most parts of South and Central America, the Miligold macaw is the first generation of cross breed macaws. Miligolds are a mix between a Blue and Gold macaw and a Military macaw. The father gene is more dominant and influences their overall appearance. Miligold macaws are often known to be gentle natured birds.

Tahoe can come across as shy at first but she does have a very playful personality. She enjoys dancing in the rain and plays an occasional "peek-a-boo" with you. She can be heard saying words such as "Hello", "Peek a Boo" and "Tahoe". Tahoe can also be seen dancing while she hums and beat boxes to herself.

ELMO

Location: Lobby Atrium
Latin Name: Ara chloroptera
DOB: March 2015
Height: 34"
Species: Green-winged Macaw
Lifespan: 70-80 years
Weight: 2.9lbs

Found in eastern Panama through northern South America, the Green-Winged is most at home in humid, lowland forests. Improper land management in this area could threaten its future.

Elmo is our youngest macaw and has a very playful and inquisitive nature. He says words such as "Hello", "Hi", "Hi Elmo", "Okay", "Ready" and when really excited shouts "Yay". Some of his favorite things to do are play on his swing and sing his own special song.

HOKU & MAHINA/RED EAR SLIDER TURTLES

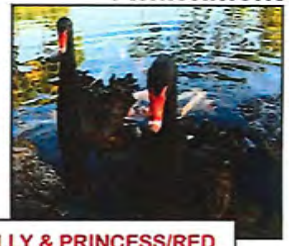
ELMO

RICO

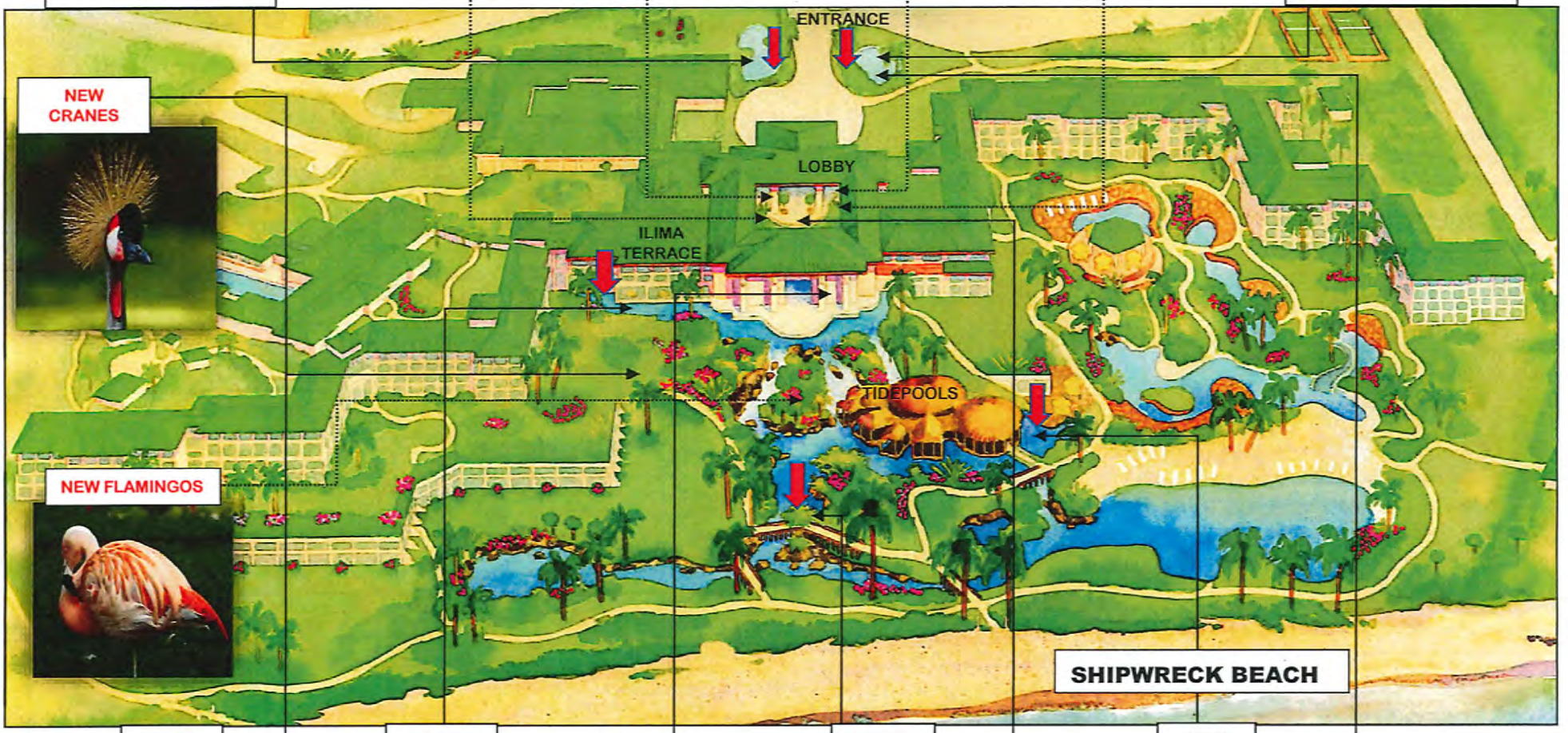
Red arrows indicate drain/sump

NIELE

DUKE



BULLY & PRINCESS/RED EAR SLIDER TURTLES



NEW CRANES

NEW FLAMINGOS

IKAIKA & MISSY

NEW SWANS

SUGAR

CRANEY CRANE

TAHOE

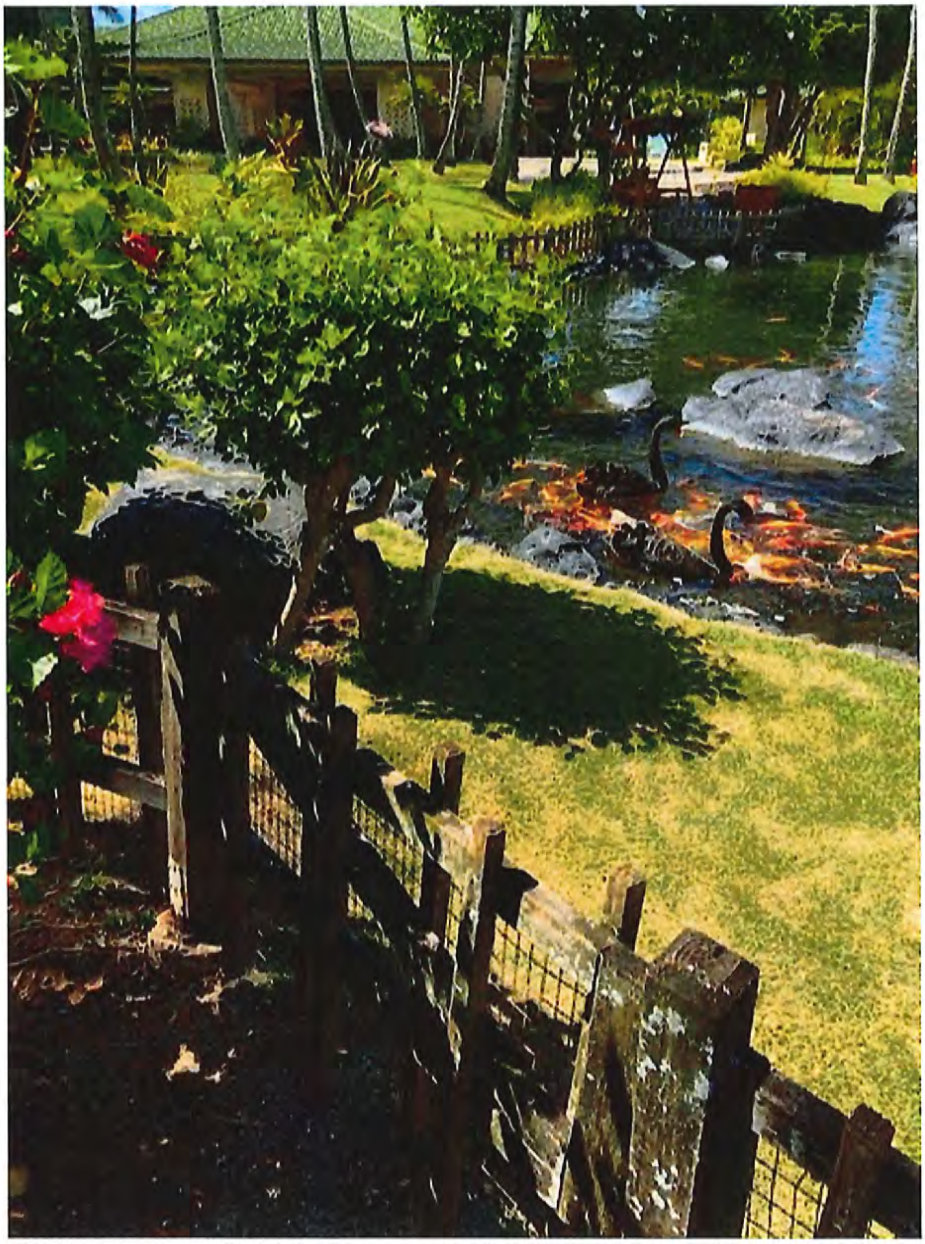
NEW SWANS

SHELDUCKS

Photograph 1: Depicts Hoku & Mahina's perimeter fence. Thirty (30) inch tall with four (4) to six (6) inch spacing in between wood.

Photograph 2: Depicts Hoku & Mahina's exhibit.

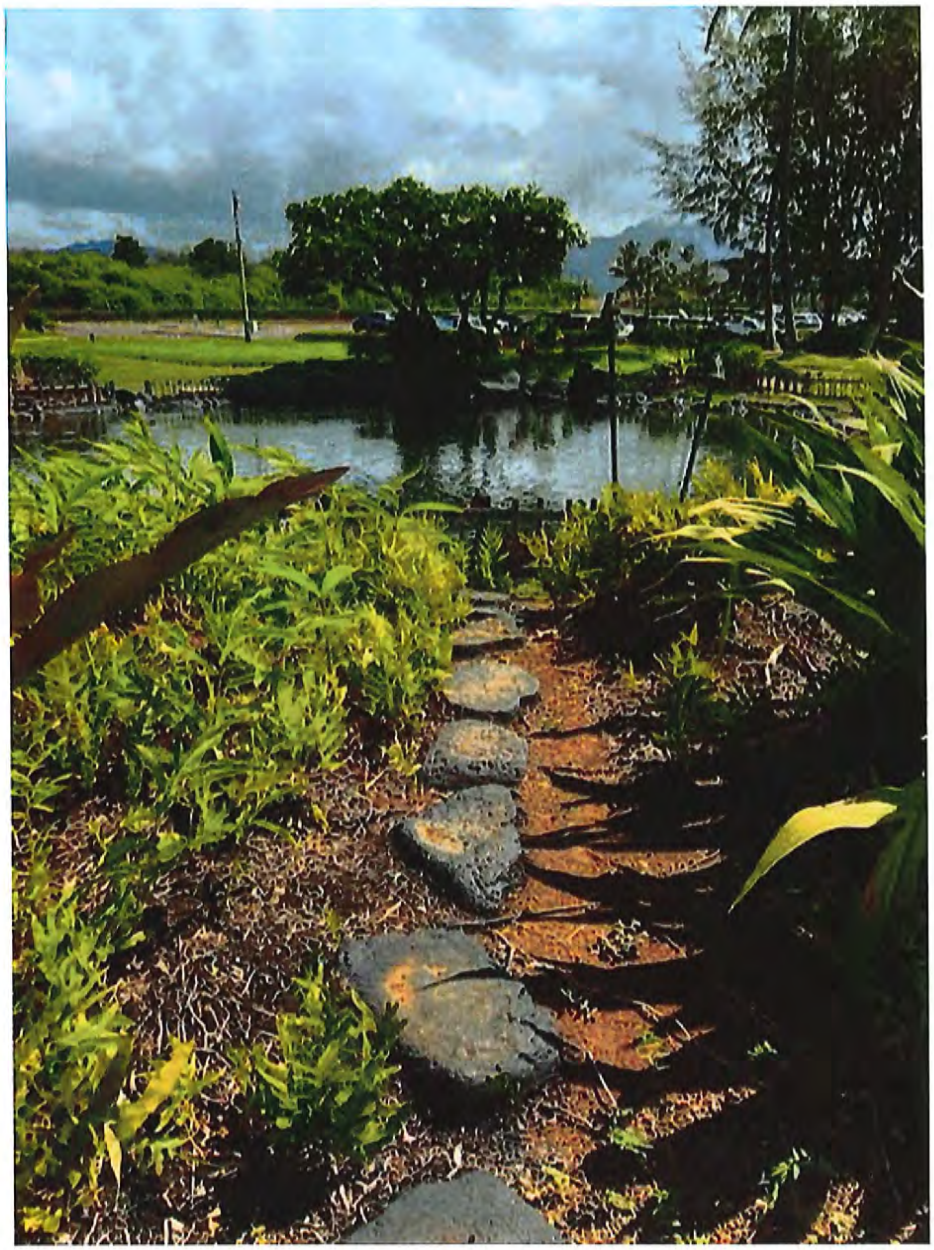
Photograph 3: Depicts Hoku & Mahina's perimeter fence.



Photograph 4: Depicts Hoku and Mahina's exhibit. Perimeter wood fence at twenty four (24) inch with four (4) inch spacing. Approximately one hundred (100) square feet living space.

Photograph 5: Depicts Bully and Princess's exhibit.

Photograph 6: Depicts Bully and Princess's perimeter fence height.



Photograph 7: Depicts a walkway to Bully and Princess's exhibit.

Photograph 8: Depicts Bully and Princess's exhibit.

Photograph 9: Depicts Bully and Princess's exhibit.

Photograph 10: Depicts the new swan exhibit.

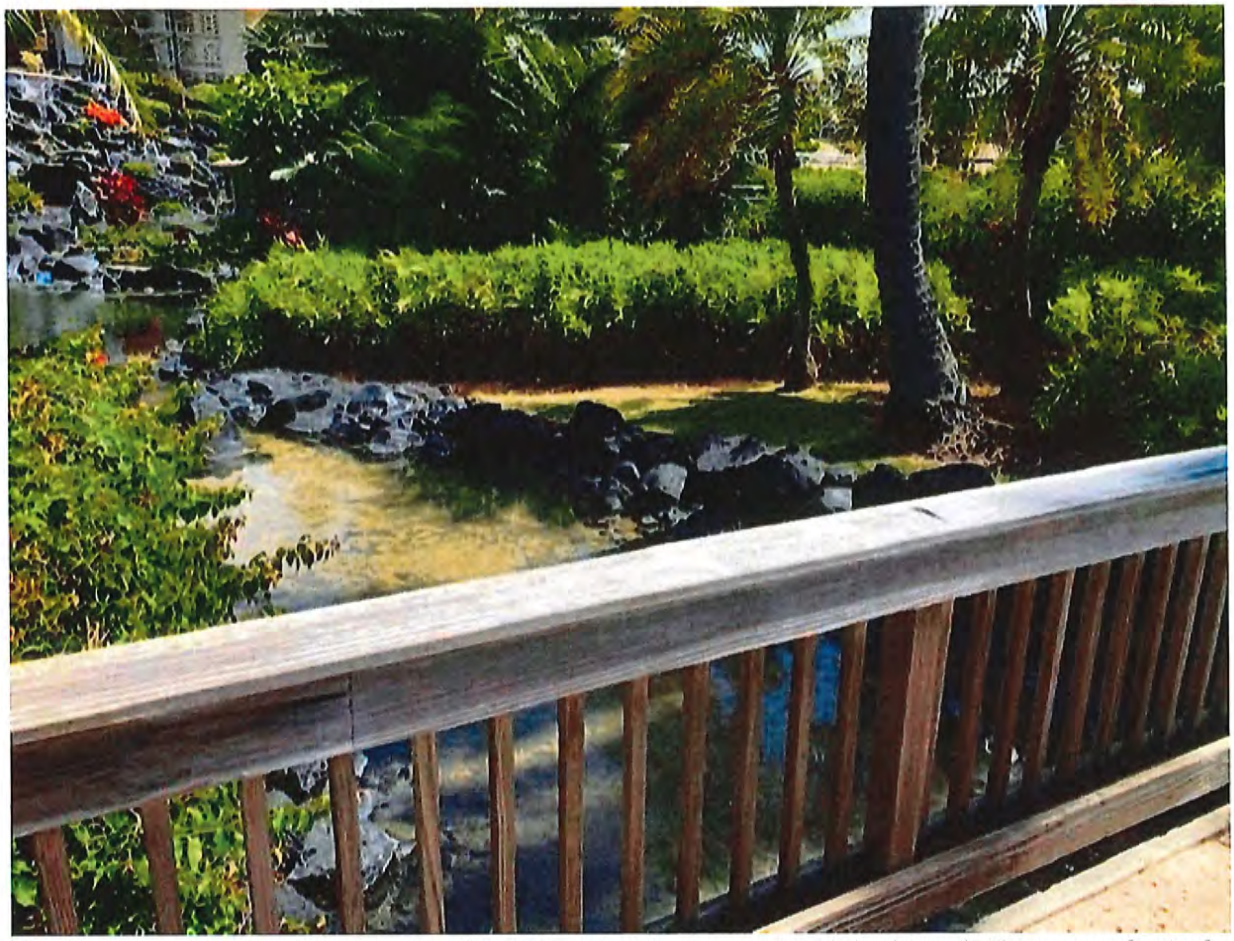
Photograph 11: Depicts new swan exhibit with bird barrier netting at Ilima Restaurant.

Photograph 12: Depicts the three (3) foot hedge at Ilima Restaurant near the new swan exhibit.

Photograph 13: Depicts new swan exhibit barrier hedging.

Photograph 14: Depicts Craney Crane's exhibit perimeter fence at two (2) inches by three (3) inches spacing by twenty six (26) inches tall.

Photograph 15: Depicts the view looking at Craney Crane's exhibit from the guest path.

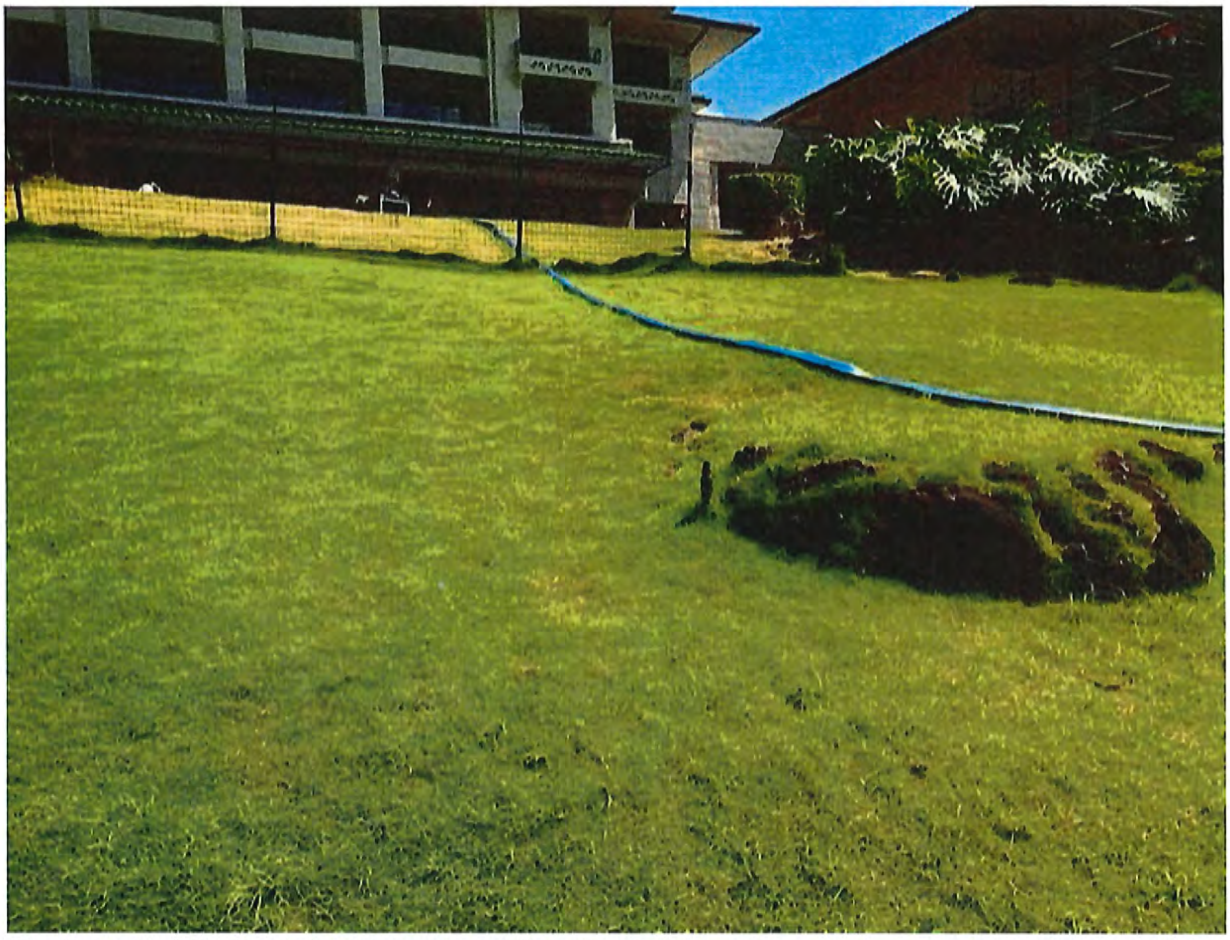


Photograph 16: Depicts Craney Crane's exhibit. Approximately thirty (30) square feet of living space.

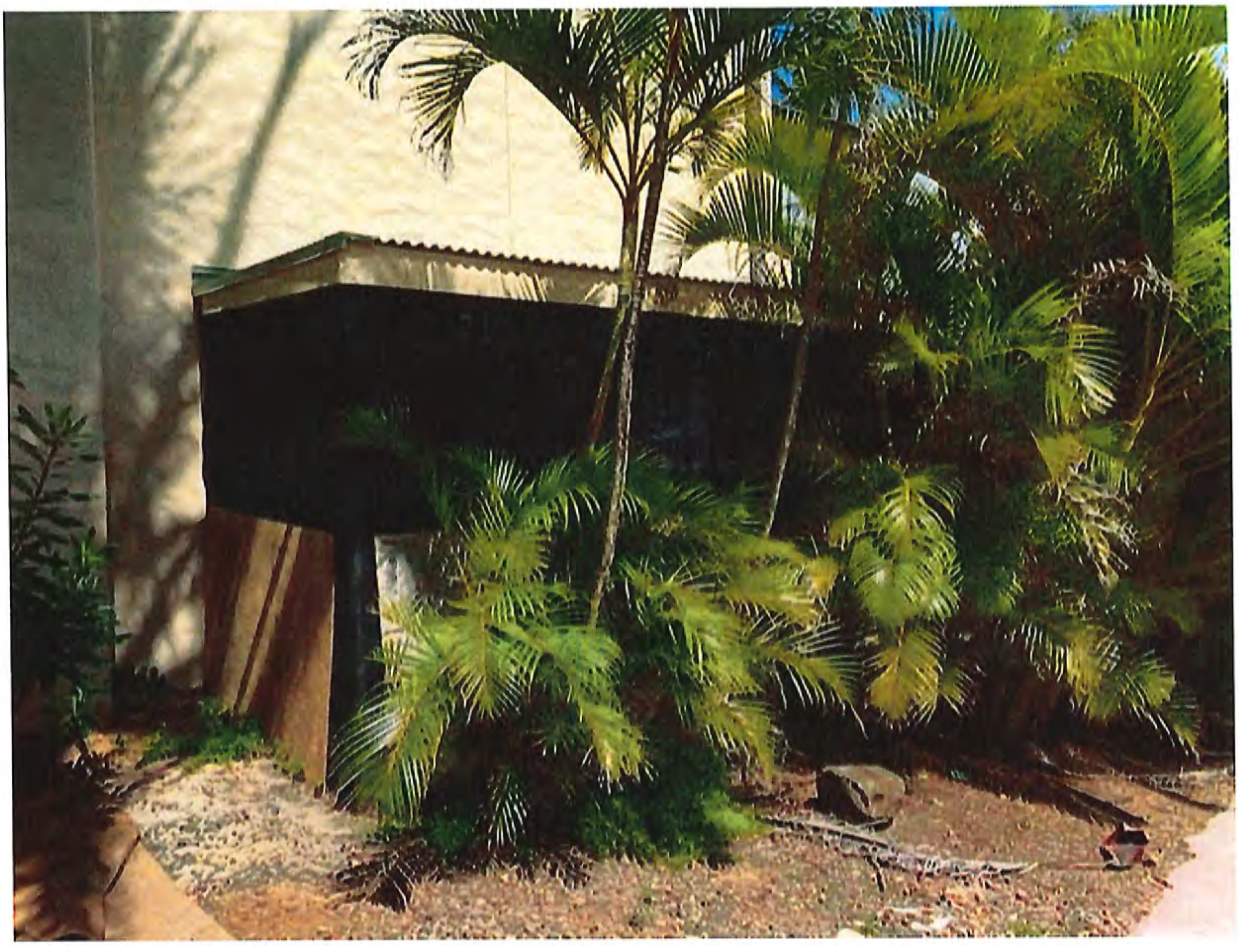
Photograph 17: Craney Crane's pond-side fence. Two (2) inch by three (3) inch spacing. Twenty six (26) inches tall.

Photograph 18: Craney Crane's pond-side view.

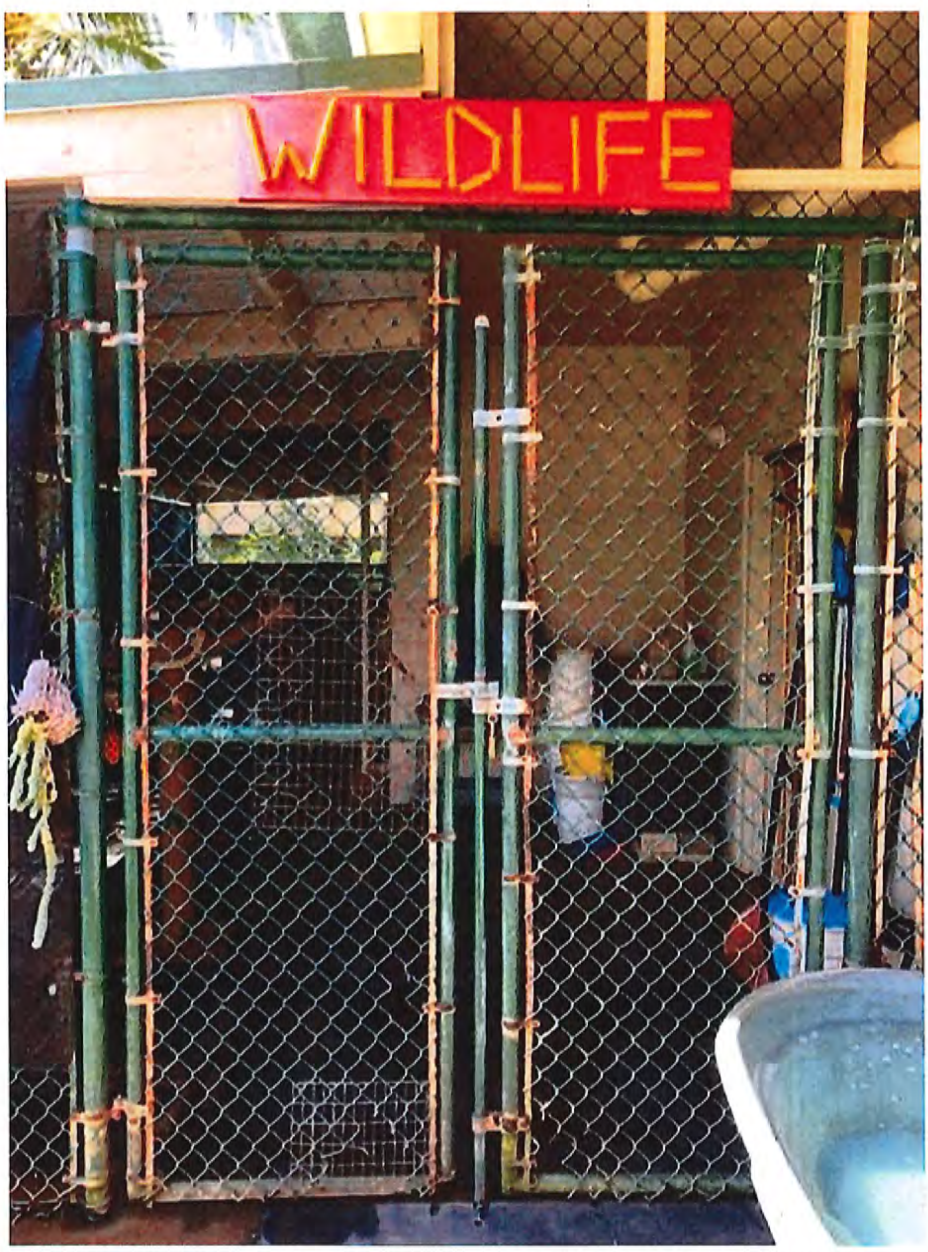
Photograph 19: Depicts the nene exhibit. Approximately fifty (50) square feet living space.



Photograph 20: Depicts the nene exhibit guest view.



Photograph 21: Depicts the screened Wildlife bird holding area.



Photograph 22: Depicts the lock-secured gate to Wildlife holding area.

Photograph 23: Depicts the bird holding room inside of the lock-secured gate to Wildlife Compound holding area.

Photograph 24: Depicts the lock-secured door to the Wildlife Compound office.

Photograph 25: Passcode entrance to Wildlife Compound from Ainako Street.

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KAUA'I RESORT & SPA

Wildlife Safety Procedure

Loitering, Trespassing & Suspicious Behavior by non-Hotel Guests including Theft

1. If the person is not on Hotel property, Security Department personnel should notify the police or applicable local law enforcement and maintain visual contact with the individual via human or CCTV surveillance.

2. If the person is on Hotel property, security personnel must approach the person to ask them to explain the purpose of their presence and their actions in polite and courteous manner. However, if security personnel have reason to fear for their own safety, they must immediately notify the Security Team Leader / Supervisor on duty, who shall determine whether to notify the police or local law enforcement agency rather than approaching the suspicious individual directly.

3. If security personnel determine that the person has no legitimate purpose for their presence in the area, or that their actions may pose a security threat, the following actions must be taken: a. If the person does not have a legitimate purpose for being on Hotel property, they must be asked to leave the property, and security personnel must remain in visual contact with them, at least until such time as they have departed the Hotel premises. b. If the person has a valid purpose for their presence on Hotel property, but the intent of their activity or actions are reasonably determined to pose a potential security threat, they must be asked to immediately discontinue the activity. In such cases, the situation must be immediately reported to the ranking security person on the property at the time, who must determine the need for further action, if any. The Security Team Leader must also report the matter to the MOD.

In Case of Escape

1. Should an animal elude capture or possession of Wildlife staff every attempt should be made to locate and maintain visual contact on its whereabouts until a net or trap can be retrieved for pursuing it.

2. If an animal is lost, all grounds staff and security personnel is to be notified to be on alert and report back any sightings to Wildlife attendants.

3. Should someone in the community see or capture the animal they will be asked to return it to the hotel or be held for retrieval.

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KAUA'I RESORT & SPA

Wildlife Natural Disaster Protocol

Should a tropical storm or hurricane threaten the island of Kauai, the following procedure is to be implemented at least 72 hours prior to the anticipated event:

1. Food Storage
    a. Vendor to deliver one month of food supply.
    b. Store food supply in Wildlife compound grain room.

2. Prepare Wildlife Compound to house animals.
    a. Create floor space to house and separate animals.
    b. Using 2" wire mesh fencing, designate animal compartments within the holding area.
    c. Collect all animal carriers (stored in loft) for later use.
    d. Bring animals to Compound and place them in designated compartments.
    e. Provide water and a ration of food for each animal.

3. Store animals indoors.
    a. At least 24 hours prior to a storm warning place each animal or pair of animals in evacuation crate and store inside Wildlife safe room.

b. Secure doors and gate prior to leaving the compound.

c. When safe to return to the compound, inspect animals for health and place them in Wildlife holding pens.

d. If exhibits are clear of debris and hazards they may be returned to their areas.

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KAUA'I RESORT & SPA

Wildlife Fire Evacuation Procedure

AFTER HOURS

- If the fire is on the SHIPWRECK SIDE of the hotel and may pose a threat to the wildlife compound, CONTACT Wildlife Manager AND Wildlife Lead Handler. If not available, contact other bird handlers ASAP. (Contacts posted below)
- Handlers will place parrots into carriers* and drive them over to Kuhio's meeting room for staging that night.
- Water and feed containers will be brought over ONLY if fire does not require immediate evacuation. If not able to pack containers, see culinary for metal dishes for water bowls until fire has been put out or no longer a threat.

DURING WORK HOURS

- Radio or call Wildlife Manager and all wildlife attendants of any fires around the area or if present at the hotel.
- Depending on where the fire is, animals will be loaded into carriers* and brought to designated safe areas. (Safe areas include Kuhio's, Wildlife compound, and guest parking stalls E14-16)

*CARRIERS WILL BE STORED IN WILDLIFE SUPPLY ROOM AND LANDSCAPING LOFT

CONTACT NAMES AND NUMBERS

• Michelle Cassel	Wildlife Manager	808-280-6977
• Derwin Nohara	Asst. Mgr. Engineering	808-634-5323
• Wildlife Attendant on Duty		808-635-5642
• Jezrael Campos	Wildlife Lead	808-634-3593
• McKenzie Javelosa	Wildlife Attendant	808-631-9378
• Kolomana Jacinto	Wildlife Attendant	808-634-0629

Aloha from the Grand Hyatt Kauai,

In my twenty year tenure working for Hyatt, and two separate properties that housed established wildlife collections, there has not been one instance of our flock going missing and/or impacting the native flora/fauna of either island. The Hyatt prides ourselves on building out our facilities in the highest standard, including the exhibits for our wildlife collection. We do also understand and are aware that all waterfowl entering the state should be pinioned, so as not to escape and proliferate, as that would be quite devastating to the island's ecosystem.

We here at the Grand Hyatt Kauai have very high standards of operation, an incredible wildlife staff that provides constant care to all animals on property, including the endangered Nene Goose put into our knowledgeable and capable hands through the State of Hawaii. We have housed these injured Nene, and so far, they have lived a wonderful and long life, eating well, and content and happy in their habitat.

Regarding our property swans, in 30 years, there have not been any guest encounters to date with any of our waterfowl. No security reports, phone calls, colleague reports, EVER. We are very confident that our swans do not leave their fenced in habitats and ponds, and as you should know, they tend to establish a territory and feel safer within their exhibit.

That being said, I would like to welcome any member of your subcommittee to walk the property with me, so reassurances can be met. We've done countless site visits with several of your state inspectors over the 30+ years of operation here at the Grand Hyatt, and all of them were positive. I don't quite understand the negative concerns from your advisory meeting, when prior years were met with great partnerships between the hotel and State Ag. Could you advise what changes were implemented over the past year? We have been compliant with all aspects of importation and permitting, and will continue to be great partners in the future. I've also added a few responses below to the member comments.

Please feel free to reach out and call me at any time.

Mahalo for your consideration,

MICHELLE TAVARES-CASSEL
Assistant Director of Engineering

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State of Hawaii
Department of Agriculture
Plant Industry Division
Plant Quarantine Branch
Honolulu, Hawaii

June 22, 2021

Board of Agriculture
Honolulu, Hawaii

Subject: Request to: (1) Determine if the Establishment of the Southern House Mosquito, *Culex quinquefasciatus*, a Vector of Avian Malaria in Hawaii, Constitutes an Ecological Disaster;

(2) Allow the Importation of the Southern House Mosquito, *Culex quinquefasciatus*, an Unlisted Insect, Inoculated with a Foreign *Wolbachia* Bacteria Species, by Special Permit, for Laboratory, Field-Release, and Area-Wide Mosquito Suppression Research, by the University of Hawaii at Mānoa; and

(3) Establish Special Permit Conditions for the Importation of the Southern House Mosquito, *Culex quinquefasciatus*, an Unlisted Insect, Inoculated with a Foreign *Wolbachia* Bacteria Species, by Special Permit, for Laboratory, Field-Release, and Area-Wide Mosquito Suppression Research, by the University of Hawaii at Mānoa.

I. Summary Description of the Request

PQB NOTES: *The Plant Quarantine Branch (PQB) submittal for requests for import or possession permits, as revised, distinguishes information provided by the applicant from procedural information and advisory comment and evaluation presented by PQB. With the exception of PQB notes, hereafter "PQB NOTES," the text shown below in Section II from page 2 through page 6 of the submittal was taken directly from Drs. Reed and Medeiros' application and subsequent written communications provided by the applicants. For instance, the statements on pages 18 through 22 regarding effects on the environment are the applicant's statements in response to standard PQB questions and are not PQB's statements. This approach for PQB submittals aims for greater applicant participation in presenting import requests in order to move these requests to the Board of Agriculture (Board) more quickly, while distinguishing applicant provided information from PQB information. The portion of the submittal prepared by PQB, including the Environmental Assessment, Advisory Review, and Proposed Permit Conditions, are identified as Sections III, IV, and V of the submittal, which start at pages 24, 26, and 36 respectively.*

C. quinquefasciatus Board
Laboratory & Field Release Research
F. Reed & M. Medeiros – University of Hawaii

We have a request to review the following:

COMMODITY: 25,000 southern house mosquitoes, *Culex quinquefasciatus*, inoculated with *Wolbachia* bacteria. Mixed sex, eggs and larvae.

SHIPPERS:
1) Robert Harrell II, University of Maryland Institute for Bioscience and Biotechnology Research, Insect Transformation Facility, 9600 Gudelsky Dr., Rockville, Maryland 20850

2) Zhiyong Xi, Michigan State University, Department of Microbiology and Molecular Genetics, Giltner Hall, 293 Farm Lane, Room 314M, East Lansing, Michigan 48824

3) Stephen Dobson, University of Kentucky, Department of Entomology, S-307D Ag Science Ctr N, Lexington Kentucky 40546-0091

IMPORTERS:
1) Floyd Reed, University of Hawaii at Mānoa (UHM), 2538 McCarthy Mall, Edmondson Hall 216, Honolulu, Hawaii 96822, Ph: (808) 956-6489

2) Matthew Medeiros, University of Hawaii at Mānoa, 1993 East-West Road, Honolulu, Hawaii 96822 Ph: (808) 956-8187

CATEGORY: Southern house mosquitoes, *C. quinquefasciatus,* is an unlisted animal. Chapter 4-71, Hawaii Administrative Rules, allows importation of unlisted animals into Hawaii for the purpose of remediating medical emergencies or ecological disasters, or conducting scientific research that is not detrimental to agriculture, the environment, or humans by special permit on a case-by-case basis.

PQB NOTES: *The importation of an unlisted animal is prohibited except under special permit purposes determined appropriate by the Board (i.e., remediating medical emergencies or ecological disasters, or conducting scientific research that is not detrimental to agriculture, the environment, or humans). For example, an unlisted fish or bird may only be imported for purposes such as remediating a medical emergency or ecological disaster, or conducting scientific research that is not detrimental to agriculture, the environment, or humans.*

II. Information Provided by the Applicants in Support of the Application

OBJECTIVE: To conduct scientific research and mass rearing of *C. quinquefasciatus* in controlled laboratory settings at the University of Hawaii at Mānoa,

and to enable field applications of *C. quinquefasciatus* inoculated with bacteria (*Wolbachia* spp.) to suppress mosquito numbers and [attempt to] prevent an ecological disaster.

PROJECT: This is an application for a permit to conduct laboratory and field release research using imported southern house mosquitoes, *C. quinquefasciatus* (Diptera: Culicidae), that have been inoculated with bacteria (*Wolbachia* spp.) not native to the mosquito's current internal fauna. The presence of the foreign bacteria within the mosquito's reproductive system will render the inoculated imported mosquitoes unable to successfully mate with their own species in the islands, a term called cytoplasmic incompatibility. Cytoplasmic incompatibility has been used with much success in other parts of the world to reduce mosquito populations and thus reduce transmission of mosquito-vectored diseases to humans. We propose to use cytoplasmic incompatibility to reduce current populations of *C. quinquefasciatus*, the vector of avian malaria, a disease which has devastated Hawaii's native bird populations, causing an ecological disaster which threatens the extinction of Hawaii's native bird species.

Mosquitoes are not native to Hawaii, and they negatively affect multiple sectors that are important to the State, from human health to conservation to tourism and economics. On January 17, 2017, the Hawaii Invasive Species Council, an inter-departmental collaboration comprised of the Departments of Land and Natural Resources (DLNR), Agriculture (HDOA), Health (HDOH), Transportation (HDOT), Business, Economic Development & Tourism (HDBEDT), and the University of Hawaii (UH) passed resolution 17-2, specifically pertaining to mosquitoes. Resolution 17-2, entitled, "Supporting Evaluation and Implementation of Technologies for Landscape-Scale Control of Mosquitoes, With a Focus on Mitigating Both Human and Wildlife Health Risks," recognizes that mosquitoes in the State of Hawaii are non-native and an important pest species to control. The resolution encourages researchers and management agencies to pursue research that can benefit human and wildlife health, as well as the economy by controlling and/or preventing the establishment of mosquito populations. (https://dlnr.hawaii.gov/hisc/files/2013/02/HISC-Reso-17-2-signed.pdf).

C. quinquefasciatus is an invasive, disease-spreading mosquito found throughout Hawaii. The species was introduced accidentally to Hawaii in the early 1800s. *C. quinquefasciatus* is a known vector of zoonotic diseases such as West Nile virus and lymphatic filariasis. In Hawaii, *C. quinquefasciatus* is also the primary vector of avian pox and of *Plasmodium relictum*, a parasite responsible for avian malaria (van

Riper *et al.* 1986). These two diseases were major factors in the extinction of more than half of Hawaii's endemic honeycreepers and continue to be the leading driver in the ongoing extinction risk of most of the remaining species (reviewed in Atkinson and LaPointe 2009; Atkinson *et al.* 2014). Several extant bird species, such as the ʻiʻiwi (*Drepanis coccinea*), ʻapapane (*Himatione sanguinea*), ʻakohekohe (*Palmeria dolei*), Kauaʻi ʻamakihi (*Chlorodrepanis stejnegeri*), ʻakiapolaʻau (*Hemignathus wilsoni*), ʻanianiau (*Magumma parva*), ʻakekeʻe (*Loxops caeruleirostris*), Hawaii ʻakepa (*Loxops coccineus*), ʻakikiki (*Oreomystis bairdi*), palila (*Loxioides bailleui*), and kiwikiu (*Pseudonestor xanthophrys*) are now restricted to upper elevations where temperatures are too cold for the mosquito and plasmodium parasite to persist (Atkinson *et al.* 1995). However, climate modeling predicts that the disease distribution will spread to higher elevations in the Hawaiian Islands and, therefore, contribute to continued loss of avian diversity (Fortini *et al.* 2015; Liao *et al.* 2017). Indeed, at least two native honeycreeper species have experienced sudden, severe declines in the last decade, and are predicted to become extinct in the wild in the next 5-10 years if mosquito-borne diseases are not mitigated. Efforts to address these diseases through utilization of traditional vector control methods (e.g., pesticides) are inadequate at a landscape scale, and may be problematic for other nontarget protected species (e.g., endangered Hawaiian *Drosophila*, US Fish and Wildlife Service (USFWS) 2006). Current efforts to control mosquito-vectored disease outbreaks are limited to reducing mosquito breeding site locations and applications of various larvicides and adulticides when travel imported cases of human arboviral diseases are identified by the HDOH.

On September 6-7, 2016, local, national, and international experts gathered in Hawaii to discuss how to mitigate mosquito-borne diseases, including avian malaria and avian pox. The strategy deemed most favorable in terms of its effectiveness, technical readiness, and safety was *Wolbachia*-based cytoplasmic incompatibility. Cytoplasmic incompatibility results from the presence of a bacterium, *Wolbachia*, in the cells of the mosquito. Many arthropod species, including several native species here in Hawaii, naturally contain diverse strains of *Wolbachia* (Bennett *et al.* 2012; Hoffmann *et al.* 2015). *Wolbachia* are a type of arthropod endosymbiont that do not occur in humans or other vertebrates. Approximately 50% of insect species naturally have *Wolbachia* (Weinert *et al.* 2015), although many of these insects can survive without *Wolbachia (*e.g., Hamm *et al.* 2014*)*. The largest effect of *Wolbachia* is on mating compatibility between individual insects that carry the bacteria. However, there are secondary effects that are being studied by many labs. These include altered host insect lifespan

and reduced vector competence (see Hoffmann *et al.* 2015 for review).

In nature, *Wolbachia* are passed from females to their offspring. Different strains of *Wolbachia* have also been introduced into insects in laboratories. If a male mosquito with one type of *Wolbachia* mates with a female mosquito that has a different strain of *Wolbachia* the resulting offspring can be inviable and not develop into mosquito larvae because of a mismatch of cellular signals (loss of the male parental chromosomes, Callaini *et al.* 1997; Tram and Sullivan 2002; see also Hamm *et al.* 2014) originating from *Wolbachia*. If sufficient numbers, on the order to 10 times the wild population size (Dame *et al.* 2009), of male mosquitoes of a different *Wolbachia* type are released, wild females are more likely to mate with males of a different *Wolbachia* type and are predicted to have far fewer viable offspring. With subsequent releases, this process can significantly suppress the wild population numbers of mosquitoes over the following generations over a geographic area (Laven 1967; Sinkins *et al.* 1995; Dobson *et al.* 2001; Blagrove *et al.* 2012). *Wolbachia* male-based insect control programs have been highly successful for reducing local mosquito populations around the world (e.g., Atyame *et al.* 2015; Atyame *et al.* 2016; Mains *et al.* 2016; Waltz 2016), and this approach has received U.S. federal, state, and local approvals of field trials in California, Florida, and Kentucky (Waltz 2016). *Wolbachia* cannot be spread by the released males, because *Wolbachia* are only passed from mother to offspring. It is also worth noting that male mosquitoes do not bite or vector disease. [As discussed below, only males would be released.] Note that in addition to *Wolbachia* strategies for mosquito population suppression, other *Wolbachia*-based strategies have also been used to alter (rather than suppress) insect populations (*e.g.,* O'Neill *et al.* 2018).

In order to generate the mosquitoes with a different *Wolbachia* type, the naturally-occurring *Wolbachia* strain is cleared from the mosquitoes using the antibiotic tetracycline. Then *Wolbachia* can be harvested from cells of another insect species (this can be another mosquito or a non-mosquito species) and introduced into the cleared mosquitoes via microinjection. Another method to establish new *Wolbachia* strains is to mate a *Wolbachia*-carrying female insect to males that have been cleared of their naturally-occurring *Wolbachia* via antibiotic. Because *Wolbachia* are maternally inherited (described above), this cross results in all of the offspring inheriting whichever *Wolbachia* strain is contained in the female parent.

Purpose of application

In this application, we seek to import *C. quinquefasciatus* that have already had their endogenous *Wolbachia* replaced with a different strain, or which naturally carry *Wolbachia* strains that are not already found here. Imported strains will be those that are reported to be incompatible with strains currently present in local *C. quinquefasciatus*. When male *C. quinquefasciatus* carrying the imported strain mate with female *C. quinquefasciatus* carrying the local strain, the eggs should not hatch, and mosquito population suppression should result. This import permit application has been developed in conjunction with staff at the HDOH, DLNR, and the USFWS. This application is being submitted in response to Resolution 17-2, so that we are better able to pursue research that can benefit human and wildlife health, as well as the economy, by controlling mosquito populations (https://dlnr.hawaii.gov/hisc/files/2013/02/HISC-Reso-17-2-signed.pdf).

In the case of certain shippers, we seek to re-import mosquitoes which have been physically collected from the Hawaiian Islands (*e.g.*, Michigan State University, United States Department of Agriculture (USDA)-Animal Plant and Health Inspection Service (APHIS)-Veterinary Services (VS) collection permit 16-3). In these cases, the naturally-occurring *Wolbachia* will be cleared, and the new strain of *Wolbachia* introduced in the laboratory via microinjection and/or crossing with female mosquitoes that carry a different *Wolbachia*.

PROCEDURE: We would like to import three strains, two of which already exist in the State of Hawaii. These are:

- *Wolbachia albopictus A* (*wAlbA*) imported in *C. quinquefasciatus*. In Hawaii, this strain already exists in *Aedes albopictus*.
- *Wolbachia albopictus B* (*wAlbB*) imported in *C. quinquefasciatus*. In Hawaii, this strain already exists in *Aedes albopictus*.

Once imported, we will rear the imported mosquitoes to the maximum capacity of our facilities. Male mosquitoes with one or more of the imported strains (*wAlbA / wAlbB / wPip4*) could then be used for incompatible crosses to females that carry *wPip5*. The attached letter from the DLNR describes how there is an ecological disaster occurring (*i.e.* Hawaii's native birds going extinct). The imported mosquito[e]s are intended for release (only males are intended for release) to mitigate this disaster. Based on the prior use of this technology in California, Florida, and Kentucky, we do not expect releases of these male mosquitoes to have a negative impact on agriculture, the environment, or public health and safety.

PQB NOTES: *In addition to this request, the applicants have submitted a request to import the aforementioned species of unlisted Wolbachia bacteria. The import request for the Wolbachia species was submitted to the PQB Advisory Subcommittee on Bacteria for review and recommendation. The Advisory Subcommittee on Bacteria unanimously deemed these Wolbachia species to be low risk, and recommended approval of the import request via a letter of authorization. Hawaii Administrative Rules §4-71A-25(b) states: "An unlisted microorganism that is determined by the department to be a low risk microorganism may be allowed import by a letter of authorization issued by the Chief without advisory committee review or board approval."*

DISCUSSION:

1. Persons Responsible:

1) Floyd A. Reed, UHM, 2538 McCarthy Mall, Edmondson Hall 216, Honolulu, Hawaii 96822 Ph: (808) 956-6489.

2) Matthew Medeiros, University of Hawaii at Mānoa, 1993 East-West Road, Honolulu, Hawaii 96822 Ph: (808) 956-8187

2. Safeguard Facility and Practices:

Safeguards: All mosquitoes for import have been lab reared for at least three (3) generations. This will mitigate the risks of infections of microorganisms and parasites to the mosquitoes – thus lowering the risk of the mosquitoes accidentally introducing a new parasite or pathogen that may attack other insects to Hawaii. To eliminate the risk of escape during transport, only eggs and/or larvae will be imported. In order for these mosquitoes to acquire and vector a disease, an adult female must blood feed from a disease-infected vertebrate, and the pathogen must survive in the mosquito and be injected into another vertebrate during a subsequent blood feeding. These mosquitoes will be reared from eggs/larvae to adults under laboratory conditions with no opportunity for wild blood feeding. We use commercially available bovine blood (Lampire Biological Laboratories) that has been screened for pathogens prior to shipment. This dramatically minimizes the possibility of infection. We also intend to release only male *C. quinquefasciatus* into the environment. Male mosquitoes do not feed on blood and, therefore, cannot vector a disease. To achieve this goal, lab reared pupae will be passed through a mesh to screen out the larger female pupae while allowing the smaller male pupae through for collection and field release. Additional mechanisms for sex separation may also be used.

We do plan for the mosquitoes to carry *Wolbachia* bacterium. *Wolbachia* is an obligate endosymbiont and cannot survive outside of the host invertebrate. *Wolbachia* strains already exist in Hawaii in a range of invertebrates in the wild,

including mosquitoes (Bennett *et al.* 2012). The presence of *Wolbachia* endosymbionts is the normal state for 40% to 60% of arthropods and does not represent an unusual or pathogenic bacterial infection (Stouthamer *et al.* 1999; Zug and Hammerstein 2012). *Wolbachia* are not capable of infecting human cells.

We will use DNA isolation and sequencing to confirm the identity of the *Wolbachia* strain present in the mosquitoes. We have already used these techniques to identify some strains already present in Hawaii.

In addition to Hawaii's import requirements, the shipper and/or receiver will obtain the following permit: USDA-APHIS-VS permit VS16-6A (Mar 95): US Veterinary Permit for Importation and Transportation of Controlled Materials and Organisms and Vectors. One of our shippers, Michigan State University, has already applied for a USDA-APHIS-VS permit VS16-6A permit.

Facilities: All imported mosquitoes will be kept at UHM, 2538 McCarthy Mall, Edmondson Hall 401, Honolulu, Hawaii 96822.

A dedicated mosquito 250 ft^2 insectary is located within a locked Biosafety Level 2 (BSL-2 is defined by the CDC, Richmond and McKinney 1999, for work with agents associated with human diseases (i.e., pathogenic or infectious organisms) that pose a moderate health hazard) biological research laboratory within Edmondson Hall on the UHM campus. This facility is subject to institutional biosafety committee review annually. Edmondson Hall is locked outside of standard business hours and is patrolled by campus security. The research lab is locked at all times, 24 hours a day, and is only accessible by approved individuals that are conducting research in the lab and have completed biosafety training. Within this space is a single door access insectary (ASL-2, Scott 2005) that is prominently posted as restricted access with only the people working directly with the mosquitoes named on the sign (Floyd Reed, Matthew Medeiros, and their lab personnel). This room has an electric "bug zapper" that attracts and kills any possible escaped mosquitoes. Larvae are kept within covered trays, and adult mosquitoes are kept within cages. See Figures 1 - 4.

The cages and trays are [the] primary containment. The insectary room is a secondary level of containment with a door, drop cloth, and electric adult mosquito attractant and killer. The locked lab with no openings (door or window) directly to the outdoors are a third level of containment.

Laboratory floor plan - 401-404 entire, basic

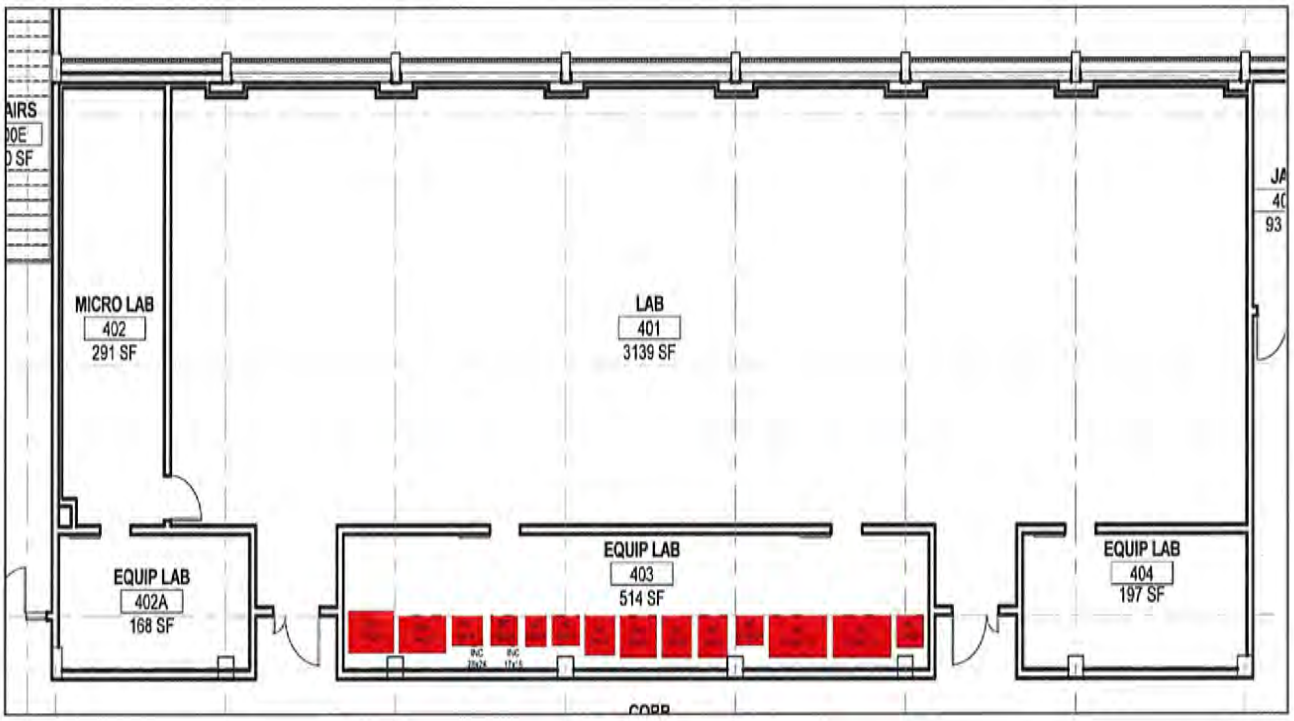


Figure 1: Floor plan (part A) for the UHM laboratory facilities described in this application.

C33

Laboratory floor plan - 401-404, Reed lab space

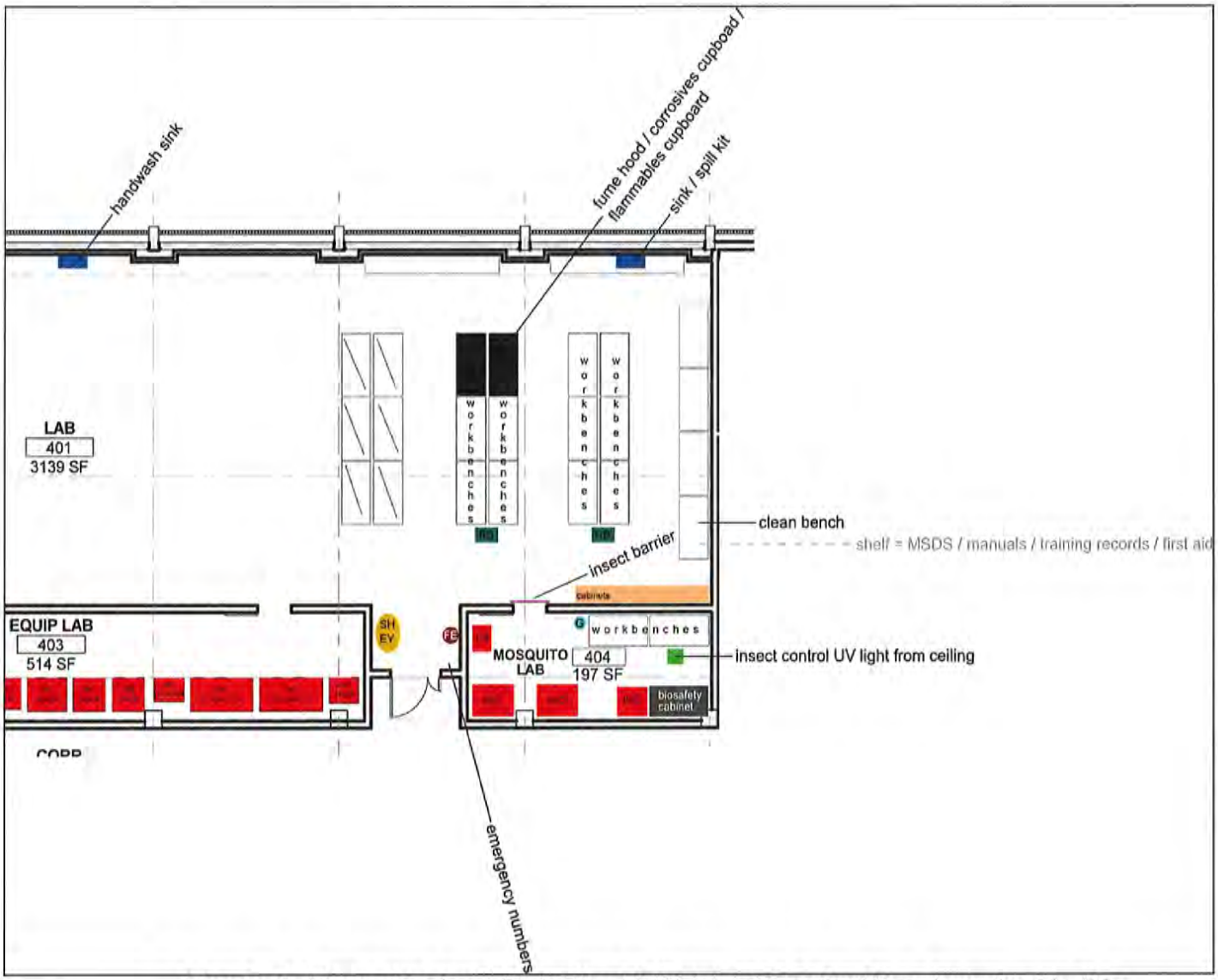


Figure 2: Floor plan (part B) for the UHM laboratory facilities described in this application.

Figure 3. Locked entrance to the 401 lab within Edmondson Hall.

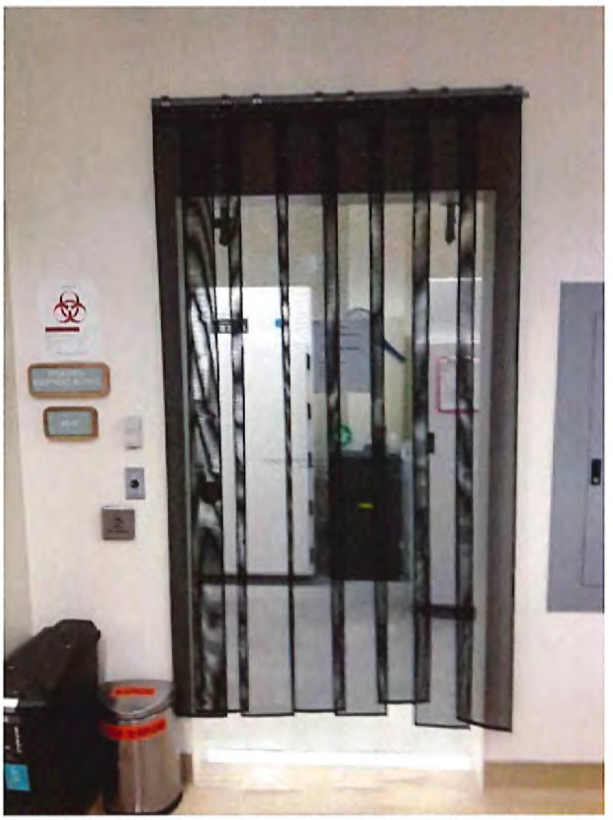


Figure 4. Entrance to the mosquito lab within Edm. 401.
This is a sliding glass door behind a "strip door" curtain.

C35

University of Hawaii Biosafety
The Institutional Biosafety Committee (IBC) was created in accordance with National Institutes of Health (NIH) Guidelines for Research Involving Recombinant DNA Molecules. Additional areas of oversight include federal requirements regulated by the

- NIH Office of Science Policy, now "Program on Biosecurity and Biosafety Policy" (PBBP)
- NIH PBBP Dual Use Research of Concern (DURC)
- CDC/USDA Select Agent Program
- Hawaii State requirements that include Hawaii Department of Agriculture importation regulations.

Additional details can be found at: **https://www.hawaii.edu/researchcompliance/ibc.**

The IBC is comprised of university faculty and staff and representatives from the community. The committee is responsible for reviewing all research and instructional-use activities involving recombinant DNA activity, infectious agents, and toxins. All members are appointed by the vice president for research and serve a three-year term.

Institutional Biosafety Committee Chair: Eric Ako

Designated Institutional Official: Leonard R. Gouveia, Jr.

Members

Member Designation	Number of Members	Area of Expertise
Institutional Member	1	Animal Medicine
Non-institutional Member	1	Animal Medicine
University Scientist	1	Cell Biology
Institutional Member	2	Environmental Issues
University Scientist	1	Genetics
University Scientist	3	Infectious Disease
Non-institutional Member	1	Infectious Disease

University Scientist	1	Microbiology
University Scientist	3	Molecular Biology
University Scientist	1	Plant Pathology
Institutional Member	2	Plant Sciences
Non-institutional Member	1	Plant Sciences
University Scientist	2	Reproductive Biology
Designated NIH IBC Biosafety Representative	1	
Ex Officio	1	

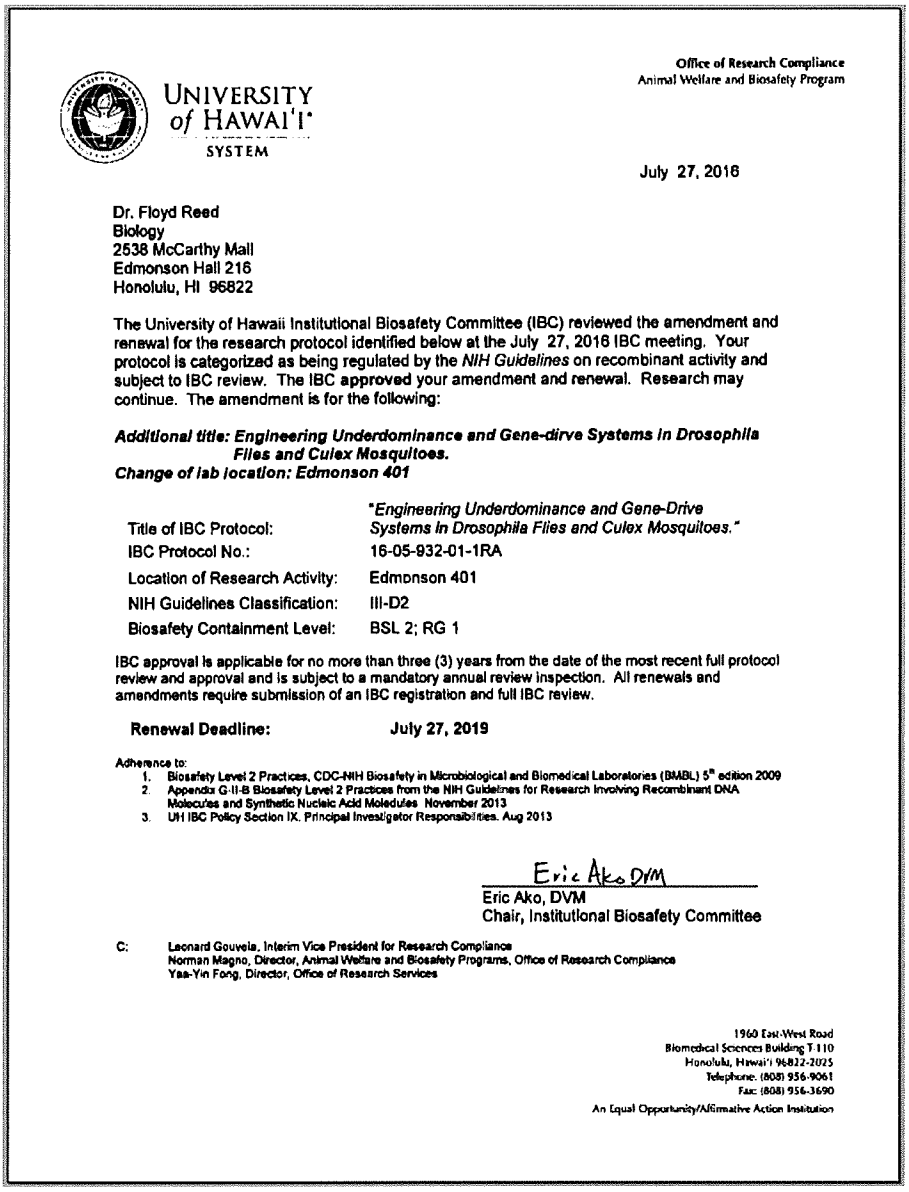
Additional details can be found at: **https://www.hawaii.edu/researchcompliance/ibc.**

University research involving recombinant DNA must comply with National Institutes of Health (NIH) Guidelines. Failure to comply risks suspension, limitation, or termination of financial assistance of NIH projects or all NIH funding for recombinant DNA research projects (NIH Guidelines Section I-D). Visit the NIH Office of Biotechnology Activities, now PBBP, for more information on these guidelines. Lab inspections for compliance are scheduled on an annual basis.

Observations of non-compliance: Any purported or observed non-compliance will be investigated and documented in an inspection report. Each violation will be evaluated on a case-by-case basis and classified as either "major" or "minor" and subject to the following IBC actions:

Major Violations: The Principle Investigator (PI) will be notified to immediately cease and desist all research activities and a full investigation will be conducted. During such time, grant funding may be withheld. The PI's Department Chair and Dean will also receive copies of the notification. The IBC will inform all parties when research activates may recommence. Situation details, investigation findings and corrective actions will be reported to all appropriate agencies no later than 30 days from the initial inspection report.

Minor Violations: First infraction/notice – The PI will receive a copy of the report which serves as the first notification of the violation. The report will contain the recommended corrective action and a deadline for completion. The lab will be required to undergo a follow-up inspection to verify that the violations were corrected. The PI and any lab personnel involved in the non-compliance will also have to complete a re-training session with the Animal Welfare and Biosafety Program (AWBP) Training Specialist. The Reed Laboratory is certified as compliant by the IBC (See Figs. 13-16).



UNIVERSITY of HAWAI'I SYSTEM

Office of Research Compliance
Animal Welfare and Biosafety Program

July 27, 2016

Dr. Floyd Reed
Biology
2538 McCarthy Mall
Edmonson Hall 216
Honolulu, HI 96822

The University of Hawaii Institutional Biosafety Committee (IBC) reviewed the amendment and renewal for the research protocol identified below at the July 27, 2016 IBC meeting. Your protocol is categorized as being regulated by the *NIH Guidelines* on recombinant activity and subject to IBC review. The IBC **approved** your amendment and renewal. Research may continue. The amendment is for the following:

Additional title: Engineering Underdominance and Gene-dirve Systems in Drosophila Flies and Culex Mosquitoes.
Change of lab location: Edmonson 401

Title of IBC Protocol:	*"Engineering Underdominance and Gene-Drive Systems in Drosophila Flies and Culex Mosquitoes."*
IBC Protocol No.:	16-05-932-01-1RA
Location of Research Activity:	Edmonson 401
NIH Guidelines Classification:	III-D2
Biosafety Containment Level:	BSL 2; RG 1

IBC approval is applicable for no more than three (3) years from the date of the most recent full protocol review and approval and is subject to a mandatory annual review inspection. All renewals and amendments require submission of an IBC registration and full IBC review.

Renewal Deadline: **July 27, 2019**

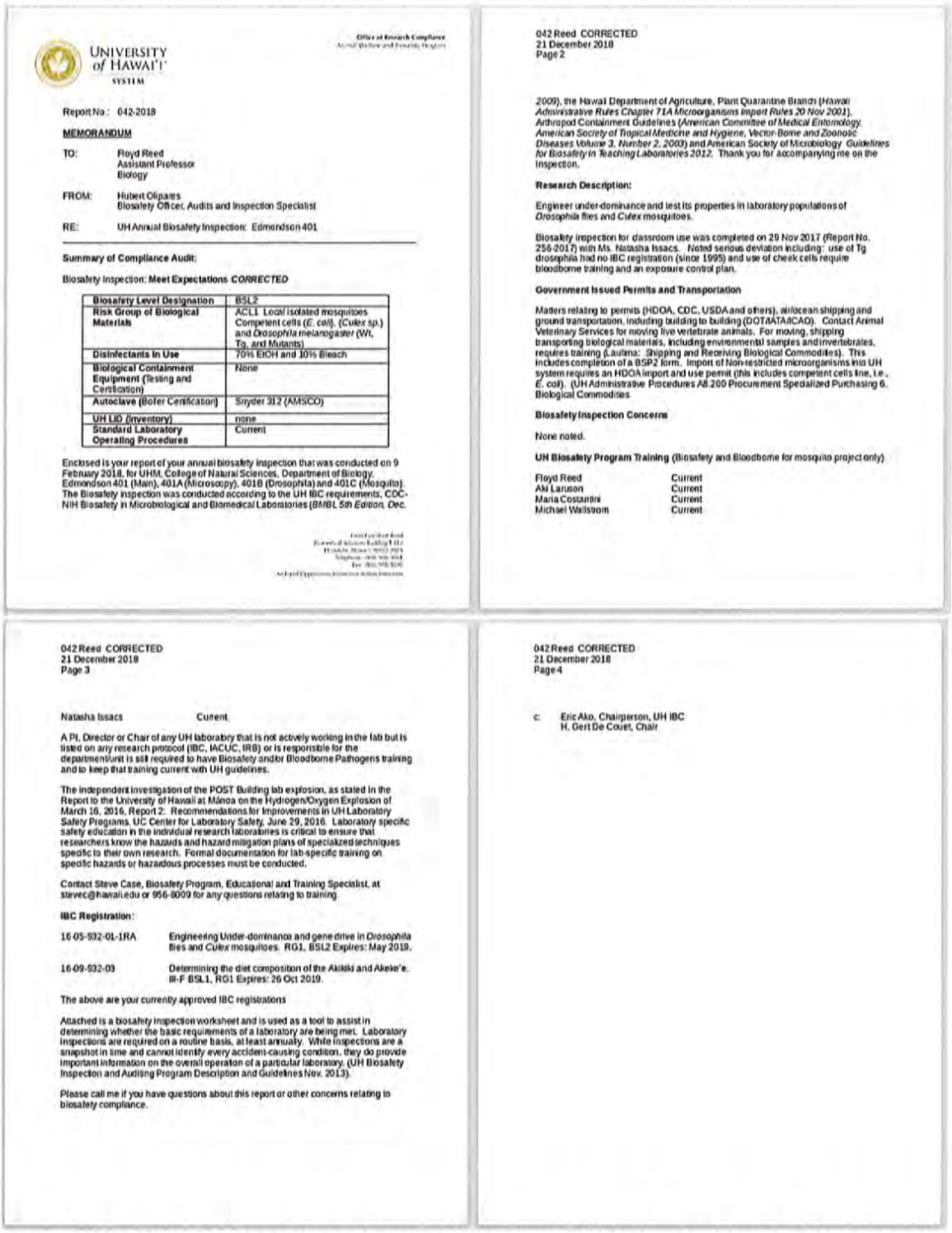
Adherence to:
1. Biosafety Level 2 Practices, CDC-NIH Biosafety in Microbiological and Biomedical Laboratories (BMBL) 5th edition 2009
2. Appendix G-II-B Biosafety Level 2 Practices from the NIH Guidelines for Research Involving Recombinant DNA Molecules and Synthetic Nucleic Acid Molecules November 2013
3. UH IBC Policy Section IX. Principal Investigator Responsibilities. Aug 2013

Eric Ako DVM
Eric Ako, DVM
Chair, Institutional Biosafety Committee

C: Leonard Gouveia, Interim Vice President for Research Compliance
Norman Magno, Director, Animal Welfare and Biosafety Programs, Office of Research Compliance
Yaa-Yin Fong, Director, Office of Research Services

1960 East-West Road
Biomedical Sciences Building T 110
Honolulu, Hawai'i 96822-2025
Telephone: (808) 956-9061
Fax: (808) 956-3690
An Equal Opportunity/Affirmative Action Institution

Figure 13: Copy of renewal approval letter for Reed's research to control *C. quinquefasciatus*



UNIVERSITY of HAWAI'I SYSTEM

Office of Research Compliance

Report No.: 042-2018

MEMORANDUM

TO: Floyd Reed
Assistant Professor
Biology

FROM: Hubert Olipares
Biosafety Officer, Audits and Inspection Specialist

RE: UH Annual Biosafety Inspection: Edmondson 401

Summary of Compliance Audit:

Biosafety Inspection: **Meet Expectations *CORRECTED***

Biosafety Level Designation	BSL2
Risk Group of Biological Materials	ACL1. Local isolated mosquitoes Competent cells (*E. coli*), (*Culex sp.*) and *Drosophila melanogaster* (Wt, Tg, and Mutants)
Disinfectants in Use	70% EtOH and 10% Bleach
Biological Containment Equipment (Testing and Certification)	None
Autoclave (Boter Certification)	Snyder 312 (AMSCO)
UH LID (Inventory)	none
Standard Laboratory Operating Procedures	Current

Enclosed is your report of your annual biosafety inspection that was conducted on 9 February 2018, for UHM, College of Natural Sciences, Department of Biology, Edmondson 401 (Main), 401A (Microscopy), 401B (Drosophila) and 401C (Mosquito). The Biosafety inspection was conducted according to the UH IBC requirements, CDC-NIH Biosafety in Microbiological and Biomedical Laboratories (*BMBL 5th Edition, Dec.*

042 Reed CORRECTED
21 December 2018
Page 2

2009), the Hawaii Department of Agriculture, Plant Quarantine Branch (*Hawaii Administrative Rules Chapter 71A Microorganisms Import Rules 20 Nov 2001*), Arthropod Containment Guidelines (*American Committee of Medical Entomology, American Society of Tropical Medicine and Hygiene, Vector-Borne and Zoonotic Diseases Volume 3, Number 2, 2003*) and American Society of Microbiology *Guidelines for Biosafety in Teaching Laboratories 2012*. Thank you for accompanying me on the inspection.

Research Description:

Engineer under-dominance and test its properties in laboratory populations of *Drosophila* flies and *Culex* mosquitoes.

Biosafety inspection for classroom use was completed on 29 Nov 2017 (Report No. 256-2017) with Ms. Natasha Issacs. Noted serious deviation including: use of Tg drosophila had no IBC registration (since 1995) and use of cheek cells require bloodborne training and an exposure control plan.

Government Issued Permits and Transportation

Matters relating to permits (HDOA, CDC, USDA and others), air/ocean shipping and ground transportation, including building to building (DOT/IATA/ICAO). Contact Animal Veterinary Services for moving live vertebrate animals. For moving, shipping transporting biological materials, including environmental samples and invertebrates, requires training (Laulima: Shipping and Receiving Biological Commodities). This includes completion of a BSP2 form. Import of Non-restricted microorganisms into UH system requires an HDOA import and use permit (this includes competent cells line, i.e., *E. coli*). (UH Administrative Procedures A8.200 Procurement Specialized Purchasing 6. Biological Commodities

Biosafety Inspection Concerns

None noted.

UH Biosafety Program Training (Biosafety and Bloodborne for mosquito project only)

Floyd Reed	Current
Aki Larusen	Current
Maria Costantini	Current
Michael Wallstrom	Current

042 Reed CORRECTED
21 December 2018
Page 3

Natasha Issacs Current

A PI, Director or Chair of any UH laboratory that is not actively working in the lab but is listed on any research protocol (IBC, IACUC, IRB) or is responsible for the department/unit is still required to have Biosafety and/or Bloodborne Pathogens training and to keep that training current with UH guidelines.

The independent investigation of the POST Building lab explosion, as stated in the Report to the University of Hawaii at Manoa on the Hydrogen/Oxygen Explosion of March 16, 2016, Report 2: Recommendations for Improvements in UH Laboratory Safety Programs. UC Center for Laboratory Safety, June 29, 2016. Laboratory specific safety education in the individual research laboratories is critical to ensure that researchers know the hazards and hazard mitigation plans of specialized techniques specific to their own research. Formal documentation for lab-specific training on specific hazards or hazardous processes must be conducted.

Contact Steve Case, Biosafety Program, Educational and Training Specialist, at stevec@hawaii.edu or 956-8009 for any questions relating to training.

IBC Registration:

16-05-932-01-1RA	Engineering Under-dominance and gene drive in *Drosophila* flies and *Culex* mosquitoes. RG1, BSL2 Expires: May 2019.
16-09-932-03	Determining the diet composition of the Akiāiki and Akeke'e. III-F BSL1, RG1 Expires: 26 Oct 2019.

The above are your currently approved IBC registrations

Attached is a biosafety inspection worksheet and is used as a tool to assist in determining whether the basic requirements of a laboratory are being met. Laboratory inspections are required on a routine basis, at least annually. While inspections are a snapshot in time and cannot identify every accident-causing condition, they do provide important information on the overall operation of a particular laboratory. (UH Biosafety Inspection and Auditing Program Description and Guidelines Nov. 2013).

Please call me if you have questions about this report or other concerns relating to biosafety compliance.

042 Reed CORRECTED
21 December 2018
Page 4

c: Eric Ako, Chairperson, UH IBC
H. Gert De Couet, Chair

Figure 14: Copy of most recent inspection approval letter for Reed. Most recent inspection date was 9 February 2018. Approval letter is incorrectly dated 21 December 2018.

Office of Research Compliance
Biosafety Program

UNIVERSITY of HAWAI'I SYSTEM

October 28, 2020

Dr. Matthew Medeiros
Life Sciences Building (LSB), 316
1800 East-West Road
Honolulu, Hawaii 96822

This letter acknowledges the receipt and review of your renewal IBC registration identified below. Your protocol is categorized as being regulated by the *NIH Guidelines* on recombinant activity and subject to IBC review and approval. The IBC has **approved** your registration.

Title of IBC Protocol:	*Biology and Vectorial Capacity of Mosquitoes in Hawai'i*
IBC Protocol No.:	20-09-135-01-2A-2R
Location of Research Activity:	LSB 303
NIH Classification:	III-F
Biosafety Containment and RG:	BSL 2, RG 2
Renewal Deadline:	**October 28, 2023**

IBC approval is applicable for no more than **three (3) years** from the date of the most recent full protocol review and approval and is subject to a mandatory annual review inspection. Renewals and amendments require submission of an IBC registration and full BC review.

Adherence to:

1. Biosafety Level 2 Practices, CDC-NIH *Biosafety in Microbiological and Biomedical Laboratories* (BMBL 5th edition 2009)
2. Appendix G-11-8 Biosafety Level 2 Practices from the *NIH Guidelines for Research Involving Recombinant DNA Molecules and Synthetic Nucleic Acid Molecules*
3. UH IBC Policy Section IX. Principal Investigator Responsibilities January 2020

Eric Ako, DVM
Chair, Institutional Biosafety committee

c: Victoria Rivera, Director, Office of Research Compliance
Norman Magno, Manager, Biosafety Program, Office of Research Compliance

2425 Campus Road, Sinclair 10
Honolulu, Hawaii 96822
Phone: (808) 956-3197 Fax: (808) 956-9150

Figure 16: Copy of renewal approval letter for Medeiros research to control *Culex quinquefasciatus*

3. Method of Disposition:

Mosquitoes are killed by freezing at -20° C for 24 hours, and then all biological waste is autoclaved prior to disposal. Shipping substrate will also be autoclaved prior to disposal.

4. Abstract of the Organism:

C. quinquefasciatus is a sexually reproducing species. Minimum generation times are approximately three weeks. A single fertilized female can lay over 100 eggs (*C. quinquefasciatus* in the form of egg rafts) so there is a tremendous and rapid potential growth rate. Mature adults are up to approximately a centimeter in length and can live for a few months. Mosquito life cycles are well understood for most species, including all those established in Hawaii (e.g., Kauffman *et al.* 2017).

Larvae feed on organic material found in pools of water. Both adult males and females feed on water that contains carbohydrates (water with sap or nectar). Only mature females seek out and feed on vertebrate blood prior to egg laying. *C. quinquefasciatus* in Hawaii appears to prefer avian blood sources but will also feed on mammalian blood including humans. Some species of mosquitoes can be considered generalists and can obtain blood meals from a variety of hosts, including reptiles such as skinks (Mendenhall *et al.* 2012).

C. quinquefasciatus is thought to have originated in Southeast Asia but has spread worldwide in tropical and temperate climates (there is uncertainty about the precise geographic origin of *C. quinquefasciatus*, which has long been distributed over a broad geographic range (Fonseca *et al.* 2000; 2006). Today, this species is established in Asia, Africa, Europe, North America, South America and Oceania including Hawaii. Specifically, in Hawaii, this species is widespread on all the main islands.

The optimal temperature range for development and growth of this species is approximately 20° C to 29° C (Rueda *et al.*1990; Delatte *et al.* 2009). This species does not tolerate temperatures above 35° C and can withstand limited exposure to temperatures near freezing (eggs are more tolerant of freezing than the adults).

This species relies on pools of still water with organic material for the growth of larvae. Only adult females bite [animals], as they require blood meals from vertebrate hosts to develop their eggs (e.g., Kamgang *et al.* 2012; Takken and Verhulst 2013).

This species has the potential to vector important human pathogens (Gratz 2004; Effler *et al.* 2005; Arensburger *et al.* 2010; Bonizzoni *et al.* 2013). It is also the

primary vector of avian malaria and avian pox which are major factors in the decline and extinction of many Hawaiian forest bird species (Warner 1968; van Riper *et al.* 1986; Atkinson *et al.* 1995)

5. Potential Impact to the Environment:

C. quinquefasciatus is already widely established in the wild on all of the main islands in Hawaii. An additional five other "biting" non-native mosquito species have also become established: *Aedes. albopictus* (Asian tiger mosquito) *Ae. aegypti* (Yellow fever mosquito), *Ae. japonicus* (Rock pool mosquito), *Wyeomyia mitchellii* (Bromeliad mosquito), and *Ae. vexans* (Inland floodwater mosquito).

C. quinquefasciatus also carries a strain of *Wolbachia* in the wild here in Hawaii. *Wolbachia* are not infectious to humans and are vertically transmitted through the [mosquitoes] eggs from one generation to another (Werren *et al.* 2008). The *Wolbachia* bacteria are obligate endosymbionts and can only survive inside the insect host's cytoplasm. A mosquito transinfected with a different strain of *Wolbachia* that results in cytoplasmic incompatibility (e.g., *C. quinquefasciatus* carrying the *Ae. albopictus* strain *Wolbachia*) would not be able to successfully reproduce with a wild mosquito. Therefore, if individual mosquitoes did become temporarily established, then they will quickly die off over the following generations because of cytoplasmic incompatibility with wild mosquitoes of the same species (with which they would be expected to encounter and mate).

If both sexes of transinfected mosquito were to be accidentally released, they are unlikely to maintain a breeding population of a transinfected mosquito. *Wolbachia* invasions into populations require a critical threshold frequency of infection that needs to be overcome before a novel *Wolbachia* infection can spread into a population. The *Wolbachia* infection rate must exceed 20-45% before it can spread/establish (Hoffmann *et al.* 2011; Barton and Turelli 2011; Jiggins 2017). This is evident in large scale releases such as in Cairns Australia, where millions of transinfected mosquitoes (both sexes) with *Wolbachia* are released into the environment to control disease transmission, yet they do not easily reach fixation in the wild. If transinfected mosquitoes were to become established, the establishment is likely to be spatially localized due to incompatibility with neighboring mosquito populations.

Potential impacts of this introduction

Pros: Importation of *C. quinquefasciatus* will allow the study of *Wolbachia*-based control strategies for mosquitoes that are widespread in Hawaii and which have negative impacts to humans, wildlife, and pets. This research could be a valuable future resource for mosquito management applications, including preventing the extinction of native forest birds and preventing human disease outbreaks. This would have a wide range of positive effects on human health, conservation, the economy, and tourism in Hawaii.

Cons: It is hard to imagine any negative effects since the species is already established in Hawaii. Importing these organisms will not have any foreseeable beneficial effect to the organisms already in Hawaii. The introduction of, for example, increased genetic variation within the mosquito species will be minimized by crossing the lines to mosquitoes originating from Hawaii.

Potential environmental, economic and societal impacts of pathogens, parasites or other contaminants that may accompany this introduction

The presence of unintended accompanying microbiota is minimized by the sterile laboratory-rearing conditions used. These mosquitoes have been maintained for many generations in the lab environment and have not had the opportunity to obtain pathogens from the wild from blood feeding. The presence of intended microbiota, the *Wolbachia*, potentially has very positive effects on the environment—via population suppression of mosquitoes that vector avian pathogens—societal—the suppression of human disease vectored by mosquitoes—and economic—potential increased tourism and lessened disease burden—effects.

Potential for this organism to become established in Hawaii should it escape confinement

This mosquito species is already well-established in Hawaii, as are many different strains of *Wolbachia*. Because of cytoplasmic incompatibility, the escape of mosquitoes carrying a new *Wolbachia* strain is not expected to be stable over the following generations. Outcrossing to locally established mosquitoes will result in cytoplasmic incompatibility and the failure of offspring to develop. There is an extensive body of literature surrounding this mosquito species, its impact upon Hawaii, and *Wolbachia*-mediated cytoplasmic incompatibility. This is not meant to be an exhaustive literature review, rather this provides a broad foundation of relevant points.

6. References:

General information about *C. quinquefasciatus*:

Arensburger, P., Megy, K., Waterhouse, R. M., Abrudan, J., Amedeo, P., Antelo, B., ... & Campbell, C. L. (2010). Sequencing of *C. quinquefasciatus* establishes a platform for mosquito comparative genomics. *Science*, *330*(6000), 86-88.

Rueda, L. M., Patel, K. J., Axtell, R. C., & Stinner, R. E. (1990). Temperature-dependent development and survival rates of *C. quinquefasciatus* and *Aedes aegypti* (Diptera: Culicidae). *Journal of Medical Entomology*, *27*(5), 892-898.

Information about *C. quinquefasciatus* in Hawaii:

Atkinson, C.T., and LaPointe, D.A. (2009). Introduced avian diseases, climate change, and the future of Hawaiian honeycreepers. *Journal of Avian Medicine and Surgery,* 23, 53-63.

Atkinson, C.T., Utzurrum, R.B., Lapointe, D.A., Camp, R.J., Crampton, L.H., Foster, J.T., and Giambelluca, T.W. (2014). Changing climate and the altitudinal range of avian malaria in the Hawaiian Islands–an ongoing conservation crisis on the island of Kaua'i. *Global Change Biology* 20, 2426-2436.

Atkinson, C. T., Woods, K. L., Dusek, R. J., Sileo, L. S., & Iko, W. M. (1995). Wildlife disease and conservation in Hawaii: pathogenicity of avian malaria (*Plasmodium relictum*) in experimentally infected Iiwi (*Vestiaria coccinea*). *Parasitology*, *111*(S1), S59-S69.

Fonseca, D. M., Lapointe, D. A., & Fleischer, R. C. (2000). Bottlenecks and multiple introductions: population genetics of the vector of avian malaria in Hawaii. *Molecular Ecology*, *9*(11), 1803-1814.

Fonseca, D. M., Smith, J. L., Wilkerson, R. C., & Fleischer, R. C. (2006). Pathways of expansion and multiple introductions illustrated by large genetic differentiation among worldwide populations of the southern house mosquito. *The American Journal of Tropical Medicine and Hygiene*, *74*(2), 284-289.

Fortini LB, Vorsino AE, Amidon FA, Paxton EH, Jacobi JD (2015) Large-Scale Range Collapse of Hawaiian Forest Birds under Climate Change and the Need 21stCentury Conservation Options. *PLoS ONE* 10(10): e0140389.

Tempelis, C. H., Hayes, R. O., Hess, A. D., & Reeves, W. C. (1970). Blood-feeding habits of four species of mosquito found in Hawaii. *The American Journal of Tropical Medicine and Hygiene*, *19*(2), 335-341.

van Riper, C., van Riper, S. G., Goff, M. L., & Laird, M. (1986). The epizootiology and ecological significance of malaria in Hawaiian land birds. *Ecological Monographs*, *56*(4), 327-344.

Warner, R. E. (1968). The role of introduced diseases in the extinction of the endemic Hawaiian avifauna. *The Condor*, *70*(2), 101-120.

Information about *Wolbachia*, with a focus on cytoplasmic incompatibility and the *C.* mosquito species discussed in this permit:

Atyame, C. M., Cattel, J., Lebon, C., Flores, O., Dehecq, J.-S., Weill, M., Gouagna, L. C. & Tortosa, P. (2015) Wolbachia-based population control strategy targeting *C. quinquefasciatus* mosquitoes proves efficient under semi-field conditions. *PLoS ONE* 10, e0119288.

Atyame, C. M., Labbé, P., Lebon, C., Weill, M., Moretti, R., Marini, F., Gouagna, L. C., Calvitti, M. & Tortosa, P. (2016) Comparison of irradiation and Wolbachia based approaches for sterile-male strategies targeting *Aedes albopictus*. *PLoS ONE* 11, e0146834.

Barton, N. H., & Turelli, M. (2011). Spatial waves of advance with bistable dynamics: cytoplasmic and genetic analogues of Allee effects. The American Naturalist, 178(3), E48-E75.

Blagrove, M. S., Arias-Goeta, C., Failloux, A. B., & Sinkins, S. P. (2012). Wolbachia strain wMel induces cytoplasmic incompatibility and blocks dengue transmission in *Aedes albopictus*. *Proceedings of the National Academy of Sciences*, *109*(1), 255-260.

Callaini, G., Dallai, R., & Riparbelli, M. G. (1997). Wolbachia-induced delay of paternal chromatin condensation does not prevent maternal chromosomes from entering anaphase in incompatible crosses of *Drosophila simulans*. *Journal of Cell Science*, *110*(2), 271-280.

Dobson, S. L., Marsland, E. J., & Rattanadechakul, W. (2001). Wolbachia-induced cytoplasmic incompatibility in single-and superinfected *Aedes albopictus* (Diptera: Culicidae). *Journal of Medical Entomology*, *38*(3), 382-387.

Hamm, C. A., Begun, D. J., Vo, A., Smith, C. C., Saelao, P., Shaver, A. O., ... & Turelli, M. (2014). Wolbachia do not live by reproductive manipulation alone: infection polymorphism in Drosophila suzukii and D. subpulchrella. Molecular Ecology, 23(19), 4871-4885.

Hoffmann, A. A., Montgomery, B. L., Popovici, J., Iturbe-Ormaetxe, I., Johnson, P. H., Muzzi, F., ... & Cook, H. (2011). Successful establishment of Wolbachia in Aedes populations to suppress dengue transmission. *Nature*, 476(7361), 454.

Hoffmann, A. A., Ross, P. A., and Rašić, G. (2015) Wolbachia strains for disease control: ecological and evolutionary considerations. *Evolutionary Applications*, 8(8), 751-768.

Jiggins FM. (2017) The spread of Wolbachia through mosquito populations. *PLoS Biology* 15(6):e2002780.

Laven, H. (1967). Eradication of Culex pipiens fatigans through cytoplasmic incompatibility. *Nature*, *216*(5113), 383-384.

Liao W, Atkinson CT, LaPointe DA, Samuel MD (2017) Mitigating Future Avian Malaria Threats to Hawaiian Forest Birds from Climate Change. *PLoS ONE* 12(1): e0168880.

Mains, J. W., Brelsfoard, C. L., Rose, R. I. & Dobson, S. L. (2016) Female adult *Aedes albopictus* suppression by Wolbachia-infected male mosquitoes. *Scientific Reports* 6, 33846.

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III. Environmental Assessment (EA):

Pursuant to a May 2008 Hawai'i Intermediate Court of Appeals decision ('Ohana Pale Ke Ao v. Board of Agriculture, 118 Haw. 247 (Haw. App. 2008), the Department of Agriculture's (Department's) import permit process is subject to the requirements of the Hawai'i Environmental Protection Act, Chapter 343, Hawai'i Revised Statutes (HRS). Under this decision, the requirement for an EA as a condition of the import permit or related authorization applies in those circumstances where the underlying permit activity for the importation initiates a "program or project" and where the use of state or county funds or state or county lands is involved. When those circumstances are present, as they appear to be when a new organism is used in a new program or project located at a facility located at UHM or UHH (state lands), an EA is required to determine whether the proposed project or program is likely to have a significant impact on the environment. However, certain activities may be eligible for "exemption" under provisions established through the Environmental Council, State Office of

Environmental Quality Control (OEQC), provided that the project or program is determined to have little or no impact on the environment.

Exemption from EA: In September 2008, the Department obtained the concurrence of OEQC's Environmental Council for exemption from EA for those Plant Quarantine Branch import permits and related authorizations that satisfy certain criteria, including conditions to minimize risk to agriculture, horticulture, the environment, or animal or public health. The exemption from EA for animals applies to the import of animals for various purposes according to their placement on lists maintained by the Board of Agriculture (Board) and subject to permit conditions appropriate to eliminate or minimize risks associated with the animals and their use. (See Exemption Class #10., item 3.f. of the Department's exemptions, under the links for exemptions for state agencies at: http://oeqc2.doh.Hawaii.gov/Agency_Exemption_Lists/Forms/AllItems.aspx). Permit conditions address matters such as health requirements, special precautions, and safeguarding from escape, theft or release. Under the exemption, purposes for importation of animals include, but are not limited to, direct sales as food or for aquaculture production for food, fish, feed, pet trade (tropical fish); for animal import for purposes such as scientific research by qualified entities and universities in standard research settings; municipal zoo or aquarium exhibition; captive breeding programs by qualified entities; animal feed (mealworms and crickets); pet trade or individual possession. The exemptions from EA are only applicable when a project or program will probably have minimal or no significant effect on the environment. Under OEQC's rules and the Departments' exemption list, exemptions are inapplicable when the cumulative impact of planned successive actions in the same place, over time, is

significant, or when an action that is normally insignificant in its impact on the environment may be significant in a particularly sensitive environment.

PQB Process for Exemption from EA: When seeking an exemption from EA for an import and release request that requires the full Board review process, the Department must obtain the advice of other outside agencies or individuals having jurisdiction or expertise as to the propriety of the exemption. (Section 11-200-8(a), HAR) The Board review process already includes recommendations and comments from the technical consultants (Advisory Subcommittee Members) and the Advisory Committee on Plants and Animals (Advisory Committee). The representation of outside agencies such as the Hawai'i Department of Land and Natural Resources, University of Hawai'i, and Hawai'i Department of Health, OEQC, on the Advisory Committee provide opportunities for these agencies' input on the public health and environmental aspects of the import and appears to meet the consultation requirement of OEQC's rule. In addition, the input received from the Department's technical consultants on the Advisory Subcommittees, as individuals with expertise on the subject matter and the presence of individuals from the Hawai'i Department of Land and Natural Resources, University of Hawai'i, and the Honolulu Zoo (retired director) on the Advisory Committee appears to meet the consultation requirement.

Where the recommendations from the technical consultants and Advisory Committee support exemption from an EA, the Department may prepare a declaration of exemption, which includes a description of the import request, lists of consultants, consultants' recommendations and comments, and the basis for the Department's determination of "probably minimal or no significant effect on the environment." The declaration of exemption from EA is submitted to the Board together with the import request. Where the recommendations from the technical consultants and Advisory Committee support an EA, the Department may require an EA as a prerequisite for Board review.

Analysis of Application re EA: Under the above-cited court decision, the EA requirement is triggered under certain circumstances, including when an applicant proposes an action on state lands that requires agency approval and is not specifically exempted under Chapter 343, HRS. That is the case here. The applicant's request in this instance involves importation of the southern house mosquito, *Culex quinquefasciatus,* for laboratory, field-release, and area-wide mosquito suppression research based at UHM, i.e., on state lands; therefore, agency approval is required for the applicant's proposed action/activity on state lands. As PQB understands the court's analysis in the 'Ohana Pale decision, the activity proposed under this permit application would initiate a project that uses state lands, initially triggering the EA requirement. However, the project may be able to qualify for exemption from EA under an applicable Department exemption. This analysis will continue below the discussion on Advisory Subcommittee review.

IV. Advisory Review:

Advisory Subcommittee Review: This request was submitted to the Advisory Subcommittee on Entomology for their review and recommendations. Their recommendations and comments are as follows:

1. **I recommend Approval___/___Disapproval of a finding that the establishment of the Southern House Mosquito, *C. quinquefasciatus*, a vector of Avian malaria, in Hawaii would constitute an ecological disaster.**

Dr. Jesse Eiben: Recommends approval.

Comments: "The mosquito is already present in Hawaii, and is an ecological disaster due to being a vector of disease. Adding more *C. quinquifasciatus* to control the existing same species is a viable method to limit the current ecological disaster."

Dr. Peter Follett: Recommends approval.

Comments: "This mosquito species was introduced many years ago and is having a serious impact o[n] native birds through the transmission of avian [malaria]."

Dr. Mark Wright: Recommends approval.

Comments: "*C. quinquefasciatus* is widespread in Hawaii from previous accidental introductions."

Dr. Daniel Rubinoff: Recommends approval.

Comments: "This is a very important project and it should be advanced as quickly as possible. My only question, repeated throughout this evaluation, is that the mosquitoes brought to Hawaii were originally from Hawaii, such that they do not bring in genetic diversity to Hawaiian mosquitoes that might have negative consequences. If other mosquitoes will be brought in, not originally from Hawaiian stock, perhaps the researchers could address why that wouldn't be a concern. But to be clear, this is critical research and it should be supported as efficaciously as possible."

Applicant's Response: "With a replaced Wolbachia strain that results in cytoplasmic incompatibility the actual fitness is predicted to be frequency dependent. If imported mosquitoes with strain A (inoculated imported *Wolbachia*) were to escape, and were rarer than the mosquitoes carrying strain B (*Wolbachia* strains already established in Hawaii), which is virtually certain, then they are predicted to quickly be removed from the wild because their offspring would die off due to cytoplasmic incompatibility. As far as relative fitness in

isolation (just A and just B) it is hard to know how to test this because it might depend on the lab conditions used; however, there is no a priori reason to expect mosquitoes with a different strain of *Wolbachia* to be more fit than the ones in the wild."

Ms. Janis Matsunaga: Recommends approval.

Comments: "Research shows clear data that *Culex quinquefasciatus*-vectored avian diseases are primary contributors to endemic Hawaiian honeycreeper declines and extinctions. As these endemic birds' ecological ranges are shrinking, invasive mosquitoes' ranges are expanding and rising in elevation with warming temperatures. According to DLNR Chairperson Suzanne Case's letter of support, 'Five honeycreeper species [of only 21 species of extant forest birds] are likely to lose all or most of their range and become extinct by 2100 due primarily to avian malaria.'

The arrival of *C. quinquefasciatus* and the zoonotic diseases which they vector, the decimation of native forest habitat for Hawaiian honeycreepers, and the expansion of breeding habitat for *C. quinquefasciatus* into upper elevation forests are directly linked to the actions of humans.

This constitutes an ecological disaster to the remaining native Hawaiian forests and ecosystems for the reasons stated by Chair Case, 'These native birds serve critical ecological functions in our forests as pollinators and seed dispersers for the shrubs and trees that comprise our life-giving watersheds.' "

2. I recommend Approval___/___Disapproval to allow the importation of the southern house mosquito, *C. quinquefasciatus*, an unlisted insect, inoculated with foreign *Wolbachia* bacteria, for field-release, and area-wide mosquito suppression research, by the University of Hawaii at Mānoa.

Dr. Jessie Eiben: Recommends approval.

Dr. Peter Follett: Recommends approval.

Comments: "I approve of the petitioners' approach to use *Wolbachia* and cytoplasmic incompatibility to reduce the impact of this mosquito."

Dr. Mark Wright: Recommends approval.

Comments: "This action will create very few risks for any negative impacts in Hawaii, and has the potential to provide an effective and environmentally safe method for suppression of invasive *C. quiquefasciatus* in Hawaii."

Dr. Daniel Rubinoff: Recommends approval.

Comments: "My only concern/question is the source of the imported mosquitoes. Could they add genetic diversity to the existing populations in Hawaii with undesirable traits like cold-hardiness? If the source of all mosquitoes to be imported is Hawaii (and they were sent to Kentucky, infected, and returned) then this is a non-issue. But if the mosquitoes are being imported from other regions and have developed, for example, increased cold tolerance, [then] that would not be a trait we [do not] want brought to Hawaii."

Applicant's Response: "With a replaced Wolbachia strain that results in cytoplasmic incompatibility the actual fitness is predicted to be frequency dependent. If imported mosquitoes with strain A (inoculated imported *Wolbachia*) were to escape, and were rarer than the mosquitoes carrying strain B (*Wolbachia* strains already established in Hawaii), which is virtually certain, then they are predicted to quickly be removed from the wild because their offspring would die off due to cytoplasmic incompatibility. As far as relative fitness in isolation (just A and just B) it is hard to know how to test this because it might depend on the lab conditions used; however, there is no a priori reason to expect mosquitoes with a different strain of *Wolbachia* to be more fit than the ones in the wild."

Ms. Janis Matsunaga: Recommends approval.

Comments: "Approval to allow the importation of *C. quinquefasciatus* with consideration to the following:

1. Subject (2) '*Allow the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species, by Special Permit, for Laboratory, Field-Release, and Area-Wide Mosquito Suppression Research, by the University of Hawaii at Mānoa*;' should be separated into clear subjects/parts.

For example:

a. Allow the Importation of the Southern House Mosquito, *Culex quinquefasciatus*, an Unlisted Insect, Inoculated with a Foreign *Wolbachia* Bacteria Species, by Special Permit, for Laboratory [and Area-Wide Mosquito Suppression?] Research by the University of Hawaii at Mānoa.

b. Allow the Field-Release of the Southern House Mosquito, *Culex quinquefasciatus*, an Unlisted Insect, Inoculated with a Foreign *Wolbachia* Bacteria Species, by Special Permit, [for Area-Wide Mosquito Suppression Research].

i. 'Area-wide mosquito suppression research' is not clearly defined anywhere in this document so I am unclear on what this means and how it relates to what we are recommending for approval. Is this part of the field-release research (Field-release and subsequent area-wide mosquito suppression research)? Should this be part of 'post-release monitoring and research'?

This is a combined application for both the import and release. I believe the permits should be separated between import and release. This is a multi-stage project and different steps and information are to be considered for each distinct action. As the applicants may need to obtain EAs and other applicable permits (including the possibility of release permits) from other agencies, I do not agree to lump everything together 'as is'."

2. *Safeguard Facility and Practices:*
Safeguards: We will use DNA isolation and sequencing to confirm the identity of the Wolbachia strain present in the mosquitoes.

"When will this be done? Upon import only? Or upon import and prior to release?"

PQB Response: The two types of research mentioned (laboratory research and field release research) were not separated in order to make this submittal more succinct.

"Area-wide mosquito suppression research" is part of field release research.

Locally collected mosquitoes have been collected under USDA-Animal Plant and Health Inspection Service (APHIS)-Veterinary Services (VS) collection permit 16-3. Permit Condition No. 22 requires that the applicants be compliant with all federal, state, and county requirements regarding the research and release of mosquitoes under this project – including obtaining any applicable permits. Penalties for non-compliance are mentioned in Permit Conditions Nos. 24 & 25, including immediate cancelation of permit(s), devitalization of all mosquitoes, progeny, and imported *Wolbachia* strains, and possible citations.

Question No. 6: "Are the proposed permit conditions sufficient to assure the requested species, southern house mosquito, *C. quinquefasciatus,* an unlisted insect, inoculated with foreign *Wolbachia* bacteria, presents probably minimal or no significant effects on the environment?" has been asked to HDOA's Subcommittee on Entomology to determine whether an EA exemption for this project should be granted.

To address Ms. Matsunaga's concern about genetic testing occurring upon arrival of the mosquitoes to Hawaii and just prior to field release of the mosquitoes, PQB has created Permit Condition No. 13.

3. I recommend Approval___/___Disapproval to allow the release of the southern house mosquito, *C. quinquefasciatus*, an unlisted insect, inoculated with foreign *Wolbachia* bacteria, for laboratory, field-release, and area-wide mosquito suppression research, by the University of Hawaii at Mānoa.

Dr. Jessie Eiben: Recommends approval.

Comments: "An ex-situ area-wide and in-situ lab colony population genetic study of the mosquito should be continuous and ongoing prior to new mosquito release to verify any new mosquitoes are of a variety not new to Hawaii. I recommend not releasing new genetics of mosquitoes to Hawaii. However, due to the control tactics employed here, and the varieties of Culex world-wide, even some new genetics will not constitute too great a risk. Once the incompatibility of the Wolbachia strain is verified, I approve field release with subsequent monitoring."

Dr. Peter Follett: Recommends approval.

Comments: "Yes, I approve based on what is presented in this petition, as long as Carter Atkinson and Dennis Lapointe have also provided input and approve of the approach as presented in this petition."

PQB Response: This submittal has been given to Drs. Atkinson and Lapointe for their review and comments. As of this meeting, Dr. Atkinson has responded. His response is below:

"I've reviewed the documents that were attached to your email and found them to be technically accurate and well-written. I fully support the request for a permit to import *Culex quinquefasciatus* mosquitoes that have been inoculated with atypical strains of *Wolbachia*. I agree that release of these mosquitoes will be of little risk to native biota and will not pose a threat to Hawaiian ecosystems or human or animal health. In addition, I believe that the applicants have suitable containment procedures and secure facilities for handling imported Culex and are well-qualified for the proposed research."

Dr. Mark Wright: Recommends approval.

Comments: "I believe this action has essentially zero risks for negative consequences, and a high probability of providing a new option for suppression of an invasive mosquito species."

Dr. Daniel Rubinoff: Recommends approval.

Ms. Janis Matsunaga: Recommends approval.

Comments: "Approval to allow the release of *C. quinquefasciatus* with consideration to the following:

1. Subject (2) '*Allow the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species, by Special Permit, for Laboratory, Field-Release, and Area-Wide Mosquito Suppression Research, by the University of Hawaii at Mānoa*;' should be separated into clear subjects/parts.

This is a combined application for both the import and release. I believe the permits should be separated between import and release. This is a multi-stage project and different steps and information are to be considered for each distinct action. As the applicants may need to obtain EAs and other applicable permits (including the possibility of release permits) from other agencies, I do not agree to lump everything together 'as is'.

For example:

a. Allow the Importation of the Southern House Mosquito, *Culex quinquefasciatus*, an Unlisted Insect, Inoculated with a Foreign *Wolbachia* Bacteria Species, by Special Permit, for Laboratory [and Area-Wide Mosquito Suppression?] Research by the University of Hawaii at Mānoa.

b. Allow the Field-Release of the Southern House Mosquito, *Culex quinquefasciatus*, an Unlisted Insect, Inoculated with a Foreign *Wolbachia* Bacteria Species, by Special Permit, [for Area-Wide Mosquito Suppression Research].

2. Subject (4) addresses 'Determine the Probable Impact on the Environment if the Southern House Mosquito, *Culex quinquefasciatus*, an Unlisted Insect, Inoculated with a Foreign *Wolbachia* Bacteria Species, are **Accidently Released**;' but no subject clearly addresses 'purposefully field-released *C. quinquefasciatus*'.

Regarding release:
There should be clear sections on this submittal and separate permits because most information provided here addresses importation and lab research but not the field release of *C. quinquefasciatus*. There is no information explaining what the procedure or plan is for release of this insect. There is no explanation on where the applicants plan on releasing this organism, how they plan on releasing, when, etc.

There is just one line in the procedure regarding '*The imported mosquitos[sic] are intended for release (only males intended for release) to mitigate this disaster.*'

- Are release permits from USDA required?

- At what point will the first releases be made?

- What will the quality control standards be to determine that release stock is not contaminated prior to release?

If there is no clear release procedure or plan as of now, perhaps there should be a permit condition to include a pre-release report and SOP submitted to PQB (and approved) prior to initial release."

PQB Response: The two types of research mentioned (laboratory research and field release research) were not separated in order to make this submittal more succinct.

In response to Entomology Subcommittee Member Matsunaga's concerns about the lack of permit conditions for field release of mosquitoes, PQB has created Permit Conditions Nos. 13, 14, 15, and 16. These permit conditions should satisfy prerelease concerns about the mosquitoes. Permit Condition No. 17 addresses post-release monitoring.

The applicants will be responsible for obtaining any other permits as a requirement for issuance of an import and possession permit from PQB.

Field release of the mosquitoes will be determined by the results of laboratory research, submission of a PQB approved field release plan (as required by Permit Conditions Nos. 14 and 15), and how quickly the applicants will rear a population of Wolbachia inoculated mosquitoes sufficient enough to release.

To confirm mosquitoes reared for field release are infected with the inoculated Wolbachia bacteria, genetic testing will be required prior to field release (Permit Condition No. 13).

4. I recommend Approval___/___Disapproval to establish permit conditions for the importation of the southern house mosquito, *C. quinquefasciatus*, an unlisted insect, inoculated with foreign *Wolbachia* bacteria, for laboratory, field-release, and area-wide mosquito suppression research, by the University of Hawaii at Mānoa.

Dr. Jessie Eiben: Recommends approval.

Dr. Peter Follett: Recommends approval.

Comments: "Yes, I approve. But please also get approval from the experts in this field, Carter Atkinson and Dennis Lapointe, who have studied this system in the field for many years."

PQB Response: This submittal has been given to Drs. Atkinson and Lapointe for their review and comments. As of this meeting, Dr. Atkinson has responded and is supportive of this project. Although he did not comment on the permit conditions, they were included in the draft he reviewed.

Dr. Mark Wright: Recommends approval.

Dr. Daniel Rubinoff: Recommends approval.

Ms. Janis Matsunaga: Recommends approval.

5. If the requested species, southern house mosquito, *C. quinquefasciatus*, an unlisted insect, inoculated with foreign *Wolbachia* bacteria, is accidentally released, what is the probable impact on the environment?

___ minimal or no significant effects on the environment.
___ other (if "other", please explain).

Dr. Jessie Eiben: Minimal or no significant effects on the environment.

Comments: "Minimal accidental release does not create a sufficient influx of new genetics, Wolbachia strains, or quantity of mosquitoes to warrant a major impact on the environment."

Dr. Peter Follett: Minimal or no significant effects on the environment.

Comments: "The probable impact is beneficial. This is a[n] alien mosquito species wreaking havoc on native bird fauna. Genetic techniques to reduce its impact are appropriate."

Dr. Mark Wright: Minimal or no significant effects on the environment.

Comments: "It is very unlikely that negative impacts will arise from the accidental release of this mosquito, already broadly established in Hawaii."

Dr. Daniel Rubinoff: Minimal or no significant effects on the environment.

Comments: "Given the caveat that they are from mosquitoes sent from Hawaii originally, there would seem to be essentially no risk whatsoever."

Ms. Janis Matsunaga: Minimal or no significant effects on the environment.

Comments: "Why is this question asked only if *C. quinquefasciatus* is accidentally released and it is not asked for when this organism is purposefully released when submittal Subject (2) includes both the import AND release of this insect? Why ask this question for the accidental release when the purposeful release permit has been lumped with the importation ....'for field-release research'? This is very confusing.

Question to the applicants:
Have there been any further sampling/studies of strains naturally occurring in HI following Atkinson et al. (2016)'s fieldwork? The authors state that sampling was minimal and should be expanded. Is there a more recent publication?"

PQB Response: This is a standard question the PQB asks permit applicants when they intend to import regulated articles for research. Entomology Subcommittee members are asked to estimate risk in the event the organism escapes or is accidentally released into the environment.

This question is also posed to Subcommittee members to determine whether an EA exemption can be issued by the PQB for the research and/or field release of the mosquitoes, as is the case in this instance.

6. Are the proposed permit conditions sufficient to assure the requested species, southern house mosquito, *C. quinquefasciatus*, an unlisted insect, inoculated with foreign *Wolbachia* bacteria, presents probably minimal or no significant effects on the environment?

___ Yes

___ No (If "No", please explain and suggest appropriate conditions).

Dr. Jessie Eiben: Yes.

Comments: "The facility listed and detailed is sufficient to maintain a colony of these mosquitoes in situ, until a time when regulated release may be allowed. I recommend a 2nd 2-door zipper screen-mesh vestibule to be added and affixed to the mosquito room for an additional protocol. But I think the current proposal is minimally sufficient."

Dr. Peter Follett: Yes.

Dr. Mark Wright: Yes.

Comments: "The applicants have submitted procedures and plans that should ensure that *C. quiquefasciatus* infected with Wolbachia are well-contained and do not present risks for negative environmental impacts."

Dr. Daniel Rubinoff: Yes.

Ms. Janis Matsunaga: No.

Comments: "Most are sufficient; however, it would be clearer and more transparent if the permits and permit conditions were separated into separate parts for the Import and the Release (such as what I stated above for the special permit approval):

1. Importation of *C. quinquefasciatus* for laboratory research.
2. Field-release of *C. quinquefasciatus* and subsequent area-wide mosquito suppression research.

For Permit Condition No. *5. "The permittee(s) shall submit samples of the restricted article(s) prior to importation to the PQB upon request.*
- How will they do this specifically prior to importation?
- What life stages?
- Alive? Dead?
- Prior to each shipment from various shippers?
- Why not submit samples from the actual shipment both at the time of import/shipment received and after adults emerge in the lab?

*If there is no clear release procedure or plan as of now, perhaps there should be a permit condition to include a pre-release report and SOP submitted to PQB (and approved) prior to initial release."

For Permit Condition No. *13. "The permittee(s) shall submit a report to the PQB on results of post release monitoring programs on a semi-annual basis.*- Semi-annually for how long?
- This should state specific data to include:
  - Pre-release quality control measures taken
  - Release data to include:
    - o Species and strain of *Wolbachia* released
    - o Locations released
    - o Dates released
    - o # of individuals released per strain
    - o Generation released

What will post-release monitoring/research include?

Will this include capture and DNA extraction work to determine if populations of transinfected individuals and/or sexes are accidentally released and establish breeding populations?

How will results of the effectiveness of releases be measured?"

PQB Response: The two types of research mentioned (laboratory research and field release research) were not separated in order to make this submittal more succinct. The PQB also believes that permit conditions currently are satisfactory to address import of the mosquitoes, laboratory research, and field release research.

Permit conditions must also be approved by the Board of Agriculture. Given that the applicants have not yet planned release dates, locations, the amount of individuals to release, data to collect, etc., the PQB did not wish to set experimental protocol for the researchers by asking the Board to approve conditions that may hinder research and future experimental design for field release and monitoring.

As the establishment of *Culex quinquefasciatus* and its ability to vector diseases that decimate Hawaii's native bird populations is likely to be seen as an ecological disaster, PQB felt that combining the permit conditions would ensure that the research could be conducted as expeditiously as possible and not add additional delays, such as requiring the applicant to go before the Board a second time for approval of permit conditions for field release research.

Permit Conditions Nos. 13 -17 were included to give the PQB time to consult with its subject matter experts in order to determine the efficacy and safety of field release(s) of *Cu. quinquefasciatus* for cytoplasmic incompatibility testing.

To address Ms. Matsunaga's question about Permit Condition No. 5, it is standard practice for the PQB to collaborate with HDOA's Plant Pest Control Branch (PPC) to confirm the identity of insects that are imported for research. The applicants will be required to submit specimens of imported insects in the life stage(s) requested by the PPC Entomologists for identification confirmation. The specific details of how that would need to occur can be done independently from the permit.

ADVISORY COMMITTEE REVIEW: This request was submitted to the Advisory Committee on Plants and Animals (Advisory Committee) at its meeting on June 8, 2021, held online via Zoom.

Mr. Christopher Kishimoto, PQB Entomologist, provided a synopsis of this import request.

Advisory Committee Member Leslie Segundo addressed the Committee about the determination of whether or not an EA exemption can be issued, saying that there are thirteen (13) criteria set forth in Chapter 343, Hawaii Revised Statutes, that need to be examined. If there is a finding that the cumulative effect of a project has a significant effect on the environment or if sensitive environments are involved, an EA exemption cannot be issued.

Advisory Committee Member Dr. Benton Pang asked Committee member Segundo if there was a difference between a positive impact or a negative impact in determining the issuance of an EA exemption.

Committee member Segundo replied that the statute (Chapter 343, HRS) does not consider whether or not an environmental impact is positive or negative. If the impact of the project is significant on the environment, an EA exemption cannot be issued.

Committee member Segundo reiterated that the possible impact on the environment needs to be run through the criteria set forth in Chapter 343, HRS to determine significance. A question about likely impact on the environment cannot simply be asked and answered to determine the issuance of an EA exemption. Committee member Segundo said that a project needs to determine one of three things: 1) Will the project really have minimal or no significant impact on the environment? 2) If the environmental impact of the project is unknown, an EA must be completed with public input.
3) Whether an Environmental Impact Statement needs to be prepared.

In light of what Committee member Segundo said, Advisory Committee Chairperson Darcy Oishi asked Mr. Kishimoto, noting that the subcommittee on Entomology members had determined there was no significant impact on the environment caused by this project, did that mean there was no significant impact or no significant negative impact caused by the project. Mr. Kishimoto replied that the subcommittee members likely meant that there would be no significant negative impacts on the environment.

Chairperson Oishi mentioned that the applicants only selected intrastate shipments of mosquitoes on the PQB permit application. Mr. Kishimoto said it was an error, and that the applicants were importing mosquitoes from out of state with the possibility of intrastate shipments in the future.

Chairperson Oishi asked the applicants if there has been an extensive study on *Wolbachia* bacteria in *Cu. quinquefasciatus* to determine what strains of *Wolbachia* to inoculate the mosquitoes with and if anyone else had already inoculated *Cu. quinquefasciatus* successfully with the three strains the applicants plan to import?

One of the applicants, Dr. Matthew Medeiros, replied that a technical report, completed a few years ago, included one of the most extensive surveys of *Wolbachia* presence within *Cu. quiquefasciatus* populations in Hawaii. Dr. Medeiros said that the dominant strain of *Wolbachia* found throughout the state was *Wolbachia pipientis,* and he had conducted similar work mainly on Oahu that confirmed the results of the technical paper.

Dr. Medeiros also said that the *Wolbachia* strains they will import will not be compatible with any *Wolbachia* currently found in *Cu. quinquefasciatus* in Hawaii.

The other applicant, Dr. Floyd Reed, added that mosquitoes with incompatible strains of *Wolbachia* would find it difficult to establish in Hawaii because so few mosquitoes would possess the new strain of Wolbachia. Those mosquitoes would most likely get bred out of existence since the new *Wolbachia* strain would be outcompeted by the well-established strain. Dr. Reed also told the Advisory Committee that incompatibility between the strains of Wolbachia they wish to import and the strains currently found in Hawaii within *Cu. quinquefasciatus* has been confirmed. Dr. Reed further stated that cytoplasmic incompatibility has been established in a range of insects dating back to the 1940s.

Committee member Dr. Pang asked about the first point of the submittal's title if "avian influenza" should be changed to "avian malaria". Dr. Reed agreed.

Committee member Dr. Pang said that he noticed this in a couple of places within the submittal and this should be changed to say "avian malaria" because that is an important correction to make.

PQB NOTES: *The change has been made and "avian influenza" has been replaced by "avian malaria" in this submittal.*

Committee member Dr. Pang also noted that the applicants listed they intend to import 12,500 mosquitoes inoculated of each strain of the *Aedes albopictus Wolbachia* but the submittal says they will import 2,500 mosquitoes. Committee member Dr. Pang wanted to know which number was correct.

Mr. Kishimoto replied that 12,500 mosquitoes was the correct number.

PQB NOTES: *The number of mosquitoes in this submittal has been changed to 25,000, which accurately reflects how many individuals the researchers intend to import that are inoculated with each strain of the Aedes albopictus Wolbachia bacteria (12,500 mosquitoes per strain of Wolbachia).*

Committee member Dr. Pang asked if one of the Wolbachia strains (WPip4) could be removed from the request since it is not currently found in Hawaii. Dr. Reed agreed to remove this strain from consideration.

PQB NOTES: *The Wolbachia strain WPip4 has been removed from this submittal.*

Committee member Dr. Pang then asked the applicants if they would be agreeable to only importing mosquitoes from Michigan State University (MSU) since they would ship mosquitoes that were collected from Hawaii. Dr. Reed agreed.

Chairperson Oishi asked the applicants if the mosquitoes from MSU were pure Hawaiian in origin or if they had been crossed with other mosquitoes that were not collected in Hawaii?

Dr. Reed replied that they had recently found out that the Hawaii collected mosquitoes had been crossed with mosquitoes not of Hawaii origin in order to get the new strains of *Wolbachia*. They thought that the Hawaii collected mosquitoes were going to remain pure, but this was not the case. Dr. Reed said that once the hybrid mosquitoes acquired the new Wolbachia strain, they were backcrossed with the Hawaiian mosquitoes, for what is now 7 generations. Dr. Reed also said they would like to continue to backcross those mosquitoes once they arrive in Hawaii with Hawaiian mosquitoes to remove any undesirable genetic traits that could be of concern and to increase fitness so the males are more competitive in the field after release.

Chairperson Oishi then asked Dr. Reed what genetic markers he uses to determine if a hybrid mosquito can be considered "Hawaiian" and how it could be determined that a mosquito was considered "Hawaiian enough" to be released?

Dr. Reed said that he had tried to generate a genome for Hawaii *Cu. quinquefasciatus* mosquitoes but that has been delayed due to the pandemic. He said there are continuous introductions of *Cu. quinquefasciatus* to the islands due to travel and transport. No one knows how often these introductions are or how many mosquitoes are introduced. Regarding the concern about the MSU mosquitoes being transported to Hawaii, he said there is likely some genetic diversity of *Cu. quinquefasciatus* already in Hawaii. Dr. Reed said it would be prudent to continue backcrossing the MSU mosquitoes with locally collected mosquitoes to bring their genetics as close to Hawaii mosquitoes as possible. He said if you backcrossed the MSU hybrid mosquitoes with Hawaii collected mosquitoes for 10 generations, there is essentially no chance for any of the non-Hawaiian mosquito genes to be present and established in the MSU mosquito's genome.

Hearing no other questions for the applicants or PQB, Chairperson Oishi talked about a motion for the Committee to vote on.

Committee member Dr. Pang told Chairperson Oishi that there was testimony from the public and asked whether a motion should be made before or after hearing public testimony.

Chairperson Oishi said that he wanted to make a motion before hearing from the public.

Committee member Dr. Pang moved that the Committee recommend approval of the permit application to the Board of Agriculture with the amendments he had recommended such as the change in wording from "avian influenza" to "avian malaria", removing the *Wolbachia* strain WPip4 from the request, and allowing only mosquitoes from MSU and the University of Kentucky (UK) to be imported.

Chairperson Oishi asked Mr. Kishimoto if he understood what the amendments to the motion would be.

Mr. Kishimoto asked Committee member Dr. Pang why he wanted to include UK as a possible source of mosquitoes for the permit applicants? Committee member Dr. Pang replied that he was part of some discussions to try to have UK get some of the Hawaiian hybrid mosquitoes from MSU. He wanted to have UK as an approved source of mosquitoes just in case they were unable to get them from MSU.

Chairperson Oishi then asked Mr. Kishimoto if it would be possible to limit the source to allow the applicants to receive mosquitoes only from sources that had mosquitoes of Hawaiian origin? Mr. Kishimoto replied that could be done and the permit conditions could be amended to accommodate that request. Committee member Dr. Pang was in agreement.

Committee member Robert Hauff asked where the original sources of mosquitoes were mentioned in the submittal? Committee member Dr. Pang replied that the sources were on the second page. He said he was not aware of the University of Maryland having mosquitoes of Hawaiian origin but had heard there was a possibility of MSU and UK working collaboratively with the Hawaii hybrid mosquitoes.

Committee member Hauff asked if the change in requirements for shipping sources of mosquitoes was acceptable to the permit applicants? Committee member Dr. Pang answered, "yes."

Committee member Segundo asked if the motion on the submittal was approved for laboratory and field release research, did that mean that there would be no EA conducted under Chapter 343, HRS? Mr. Kishimoto asked Mr. Segundo if an EA was

needed for the lab research? Mr. Segundo replied that an EA was not needed for the lab research, but it would be necessary for the field-release research because sensitive environments such as national parks or areas with pristine habitat could be possible release sites.

Mr. Kishimoto said that other agencies were working on getting EAs completed for release sites but that would be done later when release sites were chosen.
Mr. Segundo asked what constitutes field release? Mr. Kishimoto replied that the field release meant that the researchers would be releasing male *Cu. quinquefasciatus* mosquitoes that had been inoculated with a different strain of *Wolbachia* than the strains that naturally occurred in that species in Hawaii for cytoplasmic incompatibility field tests.

Mr. Segundo wanted to know where the release sites would be, and would they include sensitive environments? Dr. Reed mentioned that there were several requirements including United States Department of Agriculture and Environmental Protection Agency requirements that needed to be completed. No mosquitoes would be taken out of the lab until they received all approvals for field release. Dr. Reed said they are working with multiple agencies including DLNR, U.S. Fish & Wildlife Service, ABC Birds, and others to find and secure all the requirements needed for all of their research. He said until all requirements were met, the mosquitoes would be kept in an arthropod level 2 secure facility within a Biosafety level 2 secure facility at UH Mānoa.

Dr. Reed said that early field release trials could be cage trials that are conducted in non-environmentally sensitive areas. The ultimate goal would be to conduct field release on Kauai and east Maui because of the endemic and endangered birds that are there, but that is not where the first field trials will take place. He said they have been planning this with DLNR. Committee member Hauff, who serves on the Committee for DLNR, confirmed that an EA would be completed before a mosquito field release was conducted in any sensitive bird habitat.

Chairperson Oishi asked Dr. Reed if there was a difference between a cytoplasmic incompatibility program that releases mosquitoes to help protect native birds versus research the applicants want to do that may include caged trials out in the environment? Dr. Reed said this was all part of a process to have something available to help stop native forest bird extinction; field cage trials, included. But this will also help prevent human disease, as well, since *Cu. quinquefasciatus* vector important human pathogens that are not yet in Hawaii.

Chairperson Oishi asked for clarification about the research aspect of this project. Mosquitoes released into cages in the environment versus mosquitoes released without any containment into the environment. Dr. Reed responded that they would do whatever they are required to do. If the EPA requires field cage studies or incremental studies for field release, they will do that. But they would always want to continuously monitor the progress of the releases. For data collection, a couple of things they would

be looking for would be presence of *Wolbachia* strains in the wild and if native bird populations are recovering.

In light of what was recently discussed, Chairperson Oishi asked Committee member Dr. Pang if he would like to amend his original motion. Committee member Dr. Pang replied that he would like to keep his motion as is. Chairperson Oishi asked Committee member Dr. Pang if he wanted to amend his motion, specifically in regard to acceptable sources of *Wolbachia* inoculated mosquitoes. Chairperson Oishi also asked Committee member Dr. Pang if he wanted to name specific approved shippers of mosquitoes or if he wanted to keep things a little broader to allow for flexibility in who the permit applicants could receive mosquitoes from? Committee member Dr. Pang said that he wanted to allow for more flexibility as long as only mosquitoes with Hawaiian genetics were shipped and used for this project.

Committee member Hauff seconded the motion.

Chairperson Oishi then asked for comments from the public, limiting comments to four minutes in length and asking those making public comments to introduce themselves and name their affiliations.

Katherine McClure, a postdoctoral fellow from Cornell University, who studied avian malaria in lowland Hawaii wanted to underscore the dire situation Hawaii's native forest birds are currently in with regard to avian malaria. She said that cytoplasmic incompatibility is safe for humans, animals, plants, and the environment and represents the best technique available to suppress mosquito populations in Hawaii.

Teya Penniman, Project Coordinator for a multiagency group called Birds Not Mosquitoes and employed by the American Bird Conservancy, said there were three federal agencies, three state agencies, and four nonprofit groups that are working together to support the effort to obtain a permit to research and apply mosquito cytoplasmic incompatibility in Hawaii. Individuals within the Birds Not Mosquitoes group include the state's top forest bird experts, mosquito ecologists, vector control specialists, modelers, communications specialists, and cultural advisors. Their board consists of state and federal agency leaders. Ms. Penniman said that if this permit application is approved, it would pave the way for Hawaii to be the first place in the world to use cytoplasmic incompatibility for conservation purposes. She also said that this technique has already been tested and its effects can be reversible, if necessary, by simply discontinuing release of the incompatible mosquitoes. Any and all releases of mosquitoes would only be done after satisfying all state and federal regulatory requirements. The American Bird Conservancy also believes that any risks to the environment caused by this project would be very small.

Dr. Chris Farmer, the Hawaii Program Coordinator for the American Bird Conservancy said he strongly supported UH's application to import *Cu. quinquefasciatus* for cytoplasmic incompatibility studies. Dr. Farmer stated that since the arrival of humans to Hawaii, approximately two-thirds of the endemic bird species have become extinct, 33 of Hawaii's remaining 44 bird species are listed under the Endangered Species Act, and 11 species have not been seen for decades and are likely extinct. Dr. Farmer said that unless this project is approved, up to 12 native honeycreeper species are expected to become extinct in the near future due to introduced diseases, particularly avian malaria, which is transmitted by mosquitoes like *Cu. quinquefasciatus*. Due to global warming, these mosquitoes are gradually moving up into higher elevations and more habitat for native birds. Dr. Farmer said that the loss of Hawaii's native birds is not just a past ecological disaster, but it is an ongoing one as well, and he predicted another wave of extinctions would occur soon. He said there is now a method using Wolbachia infected mosquitoes that would help save Hawaii's native birds.

David Smith, the Administrator for the Division of Forestry and Wildlife of the Department of Land and Natural Resources represented Suzanne Case, the Chairperson of DLNR. Mr. Smith said DLNR fully supports this permit request and sees the decline of Hawaii's native forest birds as an ecological disaster. They foresee the imminent collapse of native forest birds on Kauai due to global warming which allows mosquitoes to spread to higher elevations. He said they consider three species of birds to be going extinct very soon followed shortly by several more species.

Dr. Hanna Mounce, coordinator of the Maui Forest Bird Recovery Project and Executive Director of Na Koa Manu Conservation stated that she has been working to save Hawaii's native forest birds for the past 16 years. She said that other than humans, there has been no introduction that has caused the death of more forest birds than mosquitoes and the diseases they spread. Avian malaria is a primary contributor to population range limitations, declines, and extinctions for Hawaiian honeycreepers. The spread of *Cu. quinquefasciatus* and avian malaria continues to overwhelm Hawaii's native forest bird populations. Maui has only 6 forest bird species remaining and 2 of them are likely to go extinct within the next decade unless something is done to save them. The kiwikiu may have as few as 75 individuals left. Native birds serve as pollinators and seed dispersers to plants that comprise Hawaii's watersheds. This cytoplasmic incompatibility project is one of the best shots to save the remaining native birds. Pursuing this project to save native birds in no way limits similar projects that could help save humans from mosquito-vectored diseases too.

Eric Vanderwerf, from the non-profit group Pacific Rim Conservation, has been working on the conservation management of Hawaiian Birds for the past 35 years. He reiterated what other commentators had said, saying that the loss of Hawaii's native birds is an ongoing catastrophe that has been happening for decades. Hawaii has already lost

most of its native forest birds, and avian malaria and avian pox virus, which are spread by mosquitoes, are the biggest threat to existing populations. He said that in the past we did not have adequate tools to protect native birds, but we do now, so please allow us to use this (cytoplasmic incompatibility) in Hawaii. Mr. Vanderwerf said that he strongly supported this proposal. He agreed with Dr. Mounce saying that if we don't use this technique soon, Hawaii could lose more bird species.

Dr. Dennis Lapointe, Ecologist with the United States Geological Survey, said he has been studying avian diseases and the role of mosquitoes in the transmission of avian malaria for almost 30 years. He is a member of the Birds Not Mosquitoes steering committee and its research subcommittee. Dr. Lapointe said in the 30-year history of the Pacific Islands Ecosystem Research Center, they repeatedly documented the negative impacts of avian malaria in native Hawaiian forest birds, including the recent rapid decline in native forest bird communities on Kauai and Maui and the changing role of mosquitoes as transmitters of avian malaria and how that is affected by climate change. Dr. Lapointe said that the establishment and spread of *Cu. quinquefasciatus* in the Hawaiian Islands threatens the remaining populations of native forest birds, thereby constituting an ecological disaster.

Chairperson Oishi asked if there were any more comments.

Committee member Dr. Pang wanted clarification on the proposed amendment about restricting the type of mosquitoes that the permit applicants could receive to include only mosquitoes that had genetic material from Hawaii collected *Cu. quinquefasciatus*. Committee member Dr. Pang asked Mr. Kishimoto if he could recite the exact wording to make sure that only Hawaiian biotype mosquitoes would be used.

Mr. Kishimoto responded that he did not have specific language drafted yet but that he would create a permit condition that stated that the permit applicants would only be allowed to get their mosquitoes imported from sources that have mosquitoes that have been collected in Hawaii.

Chairperson Oishi called on PQB Acting Manager Jonathan Ho.

Mr. Ho said that to address what Dr. Pang would like, PQB could amend Permit Condition No. 1 to define "restricted article(s)" to mean "Hawaiian biotype Southern House Mosquito, *Culex quinquefasciatus*". From there, PQB would work with the applicants to ensure only Hawaiian biotype mosquitoes are imported as requested by the Committee. This would also be less cumbersome and give the applicants more freedom than allowing only certain shippers for this project. Amending Permit Condition No. 1 this way would make it very clear that this is what the Committee is recommending.

PQB NOTES: *Permit Condition No. 1 has been amended to reflect this requirement. While it is clear that the Cu. quinquefasciatus mosquitoes being imported have genetics different those from Hawaii, the term "Hawaiian biotype" was used to ensure that the intent of the Advisory Committee was maintained and that any mosquitoes allowed would have the majority of their genetics from a Hawaii source.*

Committee Member Dr. Pang asked Mr. Kishimoto if a future request to use this mosquito control technique was issued, would PQB be able to process the request faster given that this particular request took a while to come before the Committee?

Mr. Kishimoto replied that it would depend on the nature of the request. If the request was different, for a different purpose, or used other mosquito species, for example to control mosquitoes specifically for human diseases, it could still take some time to process. Mr. Kishimoto stated that there is typically a lot of questions and communication that goes on between PQB and the applicants with a submittal like this.

Committee Member Dr. Pang said he understood.

There was no further discussion. Chairperson Oishi called for a vote.

Vote: Recommend approval with changes to Permit Condition No. 1 – 6/0, with one abstention.

Motion passed.

V. Proposed Special Permit Conditions

1. The restricted article(s), Hawaiian biotype Southern House Mosquito, *Culex quinquefasciatus* (Say, 1823), inoculated with a foreign *Wolbachia* bacteria species, shall be used for laboratory, field-release, and area-wide mosquito suppression research, purposes approved by the Board of Agriculture (Board). Live sale or transfer of the restricted article(s), including progeny, is prohibited, except as approved by the Board.

2. The permittee(s), Dr. Floyd Reed, University of Hawaii at Mānoa (UH Mānoa) Edmundson Hall Room 216, 2538 McCarthy Mall, Honolulu, Hawaii, 96822 and Dr. Matthew Medeiros, University of Hawaii at Mānoa, 1993 East-West Road, Honolulu, Hawaii 96822 shall be responsible and accountable for all restricted article(s) imported, including progeny, from the time of receipt until their final disposition.

3. The restricted article(s), including progeny, shall be safeguarded at UH Mānoa Edmundson Hall Room 216, 2538 McCarthy Mall, Honolulu, Hawaii 96822, a site

inspected and approved by the Plant Quarantine Branch (PQB) prior to importation. Movement of the restricted article(s), including progeny, to another site shall require a site inspection and approval by the PQB Chief prior to movement.

4. The restricted article(s), including progeny, shall be maintained by Dr. Floyd Reed, UH Mānoa, 2538 McCarthy Mall, Edmundson Hall Room 216, Honolulu, Hawaii 96822 and Dr. Matthew Medeiros, University of Hawaii at Mānoa, 1993 East-West Road, Honolulu, Hawaii 96822, or by trained or certified personnel designated by the permittee(s).

5. The permittee(s) shall submit samples of the restricted article(s) prior to importation to the PQB upon request.

6. Prior to the arrival of each shipment containing the restricted article(s), the permittee(s) shall provide to the PQB Chief the following information in writing:

    a. Expected arrival date;

    b. A copy of the shipping waybill or tracking numbers for each parcel;

    c. A copy of the invoice, packing list or other similar PQB approved document that states the quantity of the restricted article(s), the scientific and common name(s) of the restricted article(s), the shipper, and the consignee for the restricted article(s);

    d. The names and addresses of the shipper and permittee(s); and

    e. The total number of parcels.

7. The restricted article(s) shall be imported only through the port of Honolulu, as approved by the Board. Entry into Hawaii through another port is prohibited.

8. At least four sides of each parcel containing the restricted article(s) shall be clearly labeled in plain view with "Live Animals" and "This Parcel May be Opened and Delayed for Agriculture Inspection", in 1/2" minimum-sized font.

9. The restricted article(s) shall be shipped in sturdy PQB-approved containers designed to be escape-proof and leak-proof.

10. Each shipment of the restricted article(s) shall be accompanied by a complete copy of the PQB permit with permit conditions for the restricted article(s), and an invoice, packing list or other similar PQB approved document listing the scientific and common names of the restricted article(s), the quantity of the restricted article(s), the shipper, and the permittee(s) for the restricted article(s).

11. The permittee(s) shall immediately notify the PQB Chief in writing under the following circumstances:

    a. If any escape, theft, accidental release, disease outbreaks, pest emergence and/or mass mortalities involving the restricted article(s), including progeny, under this permit occurs. The department may confiscate or capture the restricted article(s) and any progeny that escapes or is found to be free from confinement at the expense of the owner, pursuant to the Hawaii Revised Statutes (HRS), §150A-7(c).

    b. If any changes are made to the approved sites, facilities or containers used to hold the restricted article(s), including progeny.

    c. If a shipment of the restricted article(s) is delivered to the permittee(s) without a PQB "Passed" stamp, tag or label affixed to the article, container or delivery order that indicates that the shipment has passed inspection and is allowed entry into the State. Under this circumstance, the permittee(s) shall not open or tamper with the shipment. Additionally, the permittee(s) shall secure all restricted article(s), shipping containers, shipping documents and packing materials for the PQB.

    d. If the permittee(s) are found in violation of any municipal, state or federal policies, rules and/or laws, pertaining to the restricted article(s).

    e. If the permittee(s) will no longer import and/or possess the restricted article(s) authorized under this permit. Under this circumstance, the permittee(s) shall inform the PQB Chief of the final disposition for the restricted article(s), including progeny, and the permit will be canceled.

12. In the event that the restricted article(s) become parasitized or infected by disease, all restricted article(s), including progeny, from which the parasitized or infected restricted article(s) originated shall be considered compromised and immediately subjected to a treatment(s) approved by the PQB Chief. All shipping containers, packing materials, equipment, and any other items used in conjunction with the compromised restricted article(s), shall also be subjected to a treatment(s) approved by the PQB Chief.

13. To ensure *Wolbachia* inoculation, the permittee(s) shall conduct DNA isolation and sequencing to determine the *Wolbachia* strains infecting the restricted article(s) and provide the results to the PQB:

    a. Within 7 days upon receipt of the restricted article(s); and

    b. Within 30 days prior to removal of the restricted article(s) from all safeguarded locations.

14. At least 30 days prior to any field release of the restricted article(s), the permittee(s) shall submit a detailed plan for field release research, including release sites, monitoring procedures, data collection requirements and any other pertinent information regarding the field release research to the PQB. Field release may occur provided the information provided is reviewed and approved by the PQB Chief in writing.

15. Prior to interisland transportation, all restricted article(s) shall be presented to the PQB for inspection. The permittee(s) shall also follow Permit Conditions Nos. 6, 9, and 10 for each interisland shipment. The PQB inspector shall affix an interisland certificate of inspection to the shipment as verification of a completed inspection.

16. The permittee(s) shall submit a semi-annual report to the PQB on the results of all research including post-release monitoring programs. The report shall be submitted by the 31st of January and July of each year and shall cover the prior 6-month period.

17. The permittee(s) shall adhere to the use, facility, equipment, procedures, and safeguards described in the permit application, and as approved by the Board and the PQB Chief.

18. Any approved site, restricted article(s), progeny, and records pertaining to the restricted article(s) or progeny under permit may be subject to post-entry inspections by the PQB, upon arrival at the permittee(s) facility. The permittee(s) shall make the approved site, restricted article(s), progeny, and records pertaining to the restricted article(s) or progeny available for inspection upon request by a PQB Inspector.

19. The permittee(s) shall have a biosecurity manual available for review and approval by the PQB, at the time of the initial site inspection and any subsequent post-entry inspections, which identifies the practices and procedures to be adhered to by the permittee(s), to minimize the risk of theft, escape, or accidental release of the restricted article(s), including progeny, including minimizing the risk of introduction and spread of diseases and pests associated with the restricted article(s) to the environment. The permittee(s) shall adhere to all practices and procedures as stated in this biosecurity manual.

20. The permittee(s) shall submit to the PQB Chief a copy of all valid licenses, permits, certificates, or other similar documents required by other agencies for the restricted article(s). The permittee(s) shall immediately notify the PQB Chief in writing when any of the required documents are suspended, revoked, or terminated. This permit may be amended, suspended, or canceled by the PQB Chief in writing, upon suspension, revocation, or termination of any required license, permit, certificate or similar document for the restricted article(s).

21. It is the responsibility of the permittee(s) to comply with any applicable requirements of municipal, state, or federal law pertaining to the restricted article(s).

22. The permittee(s) shall be responsible for all costs, charges, or expenses incident to the inspection, treatment, or destruction of the restricted article(s) or progeny under this permit, as provided in Act 173, Session Laws of Hawaii 2010, Section 13, including, if applicable, charges for overtime wages, fixed charges for personnel services, and meals.

23. Any violation of the permit conditions may result in citation, permit cancelation, and enforcement of any or all of the penalties set forth in HRS §150A-14.

24. A canceled permit is invalid and upon written notification from the PQB Chief, all restricted article(s) listed on the permit shall not be imported. In the event of permit cancelation, any restricted article(s) imported, including progeny, may be moved, seized, treated, quarantined, destroyed, or sent out of State at the discretion of the PQB Chief. Any expense or loss in connection therewith shall be borne by the permittee(s).

25. The permit conditions are subject to cancelation or amendment at any time due to changes in statute or administrative rules restricting or disallowing import of the restricted article(s) or due to Board action disallowing a previously permitted use of the restricted article(s).

26. These permit conditions are subject to amendment by the PQB Chief in the following circumstances:

    a. To require disease screening, quarantine measures, and/or to place restrictions on the intrastate movement of the restricted article(s), as appropriate, based on scientifically validated risks associated with the restricted article(s), as determined by the PQB Chief, to prevent the introduction or spread of diseases and/or pests associated with the restricted article(s).

    b. To conform to more recent Board approved permit conditions for the restricted article(s), as necessary to address scientifically validated risks associated with the restricted article(s).

27. The permittee(s) shall agree in advance to defend and indemnify the State of Hawaii, its officers, agents, and employees for any and all claims against the State of Hawaii, its officers, agents, or employees that may arise from or be attributable to any of the restricted article(s) that are introduced under this permit. This permit condition shall not apply to a permittee that is a federal or State of Hawaii entity or employee, provided that the State or federal employee is a permittee in the employee's official capacity.

STAFF RECOMMENDATION: Based on the recommendations and comments of the Advisory Subcommittee on Entomology and the Advisory Committee's (6-0) recommendation to approve this request, the Plant Quarantine Branch recommends approval with the proposed permit conditions.

Respectfully Submitted,

JONATHAN K. HO
Acting Manager, Plant Quarantine Branch

CONCURRED:

BECKY L. AZAMA
Acting Administrator, Plant Industry Division

APPROVED FOR SUBMISSION:

PHYLLIS SHIMABUKURO-GEISER
Chairperson, Board of Agriculture

PQ-7 (01/04)

State of Hawaii
Department of Agriculture
PLANT QUARANTINE BRANCH
1849 Auiki Street, Honolulu, HI 96819-3100
Phone: (808) 832-0566, FAX: (808) 832-0584

For Office Use Only

Fee: $_____ Receipt No._____

☐ Approve Permit No._____ Date:_____

☐ Disapprove. ☐ Other _____

Processed by:_____ Date:_____

PERMIT APPLICATION FOR RESTRICTED COMMODITIES INTO HAWAII

Date: *April 6, 2021*

In accordance with the provision of Chapter HRS 150A, Hawaii Administrative Rules of the Division of Plant Industry, Department of Agriculture, a permit is requested for the following commodities:

Please type or print clearly.

Quantity	Commodity	Scientific Name
12,500	Southern house mosquitoes containing Wolbachia	Wolbachia albopictus strain A
12,500	Southern house mosquitoes containing Wolbachia	Wolbachia albopictus strain B

RECEIVED
APR 19 2021
PLANT QUARANTINE BRANCH

NO PAYMENT
Date: 4/19/21 Initial: TGY

Name and address of shipper: _____

_____

(Mainland or Foreign address)

Approximate date of arrival: _____

Mode of Shipment: ☑ Mail ☐ Air Freight ☐ Boat

Type of Permit:
- --- Import
  - ☐ one time only ☐ multi-shipments
- --- Intrastate shipment
  - ☐ one time only ☑ multi-shipments
- ☐ Possession

Object of importation:
- ☐ Kept caged at all time
- ☐ Used for propagation
- ☐ Imported for exhibition
- ☐ Imported for liberation
- ☑ Other purposes - specify For research in laboratories at the University of Hawaii

Please type or print clearly.

Applicant's Name Floyd Reed: Matthew Medeiros

Company Name University of Hawaii
(if applicable)

Hawaii Mailing Address Please see attached

_____

Telephone number Please see attached

Facsimile number n/a

Fee Amount Enclosed (cash, check or mail order) $ Please see attac

(complete reverse side)

PLEASE COMPLETE THE FOLLOWING INFORMATION (attach extra sheet if necessary)

1. State in detail the reasons for introduction (include use or purpose).

   Please see attached.

2. Person responsible for the organism (include name, address and phone number).

   Please see attached.

3. Location(s) where the organism will be kept and used (include address, contact and phone number).

   Please see attached.

4. Method of disposition.

   Please see attached.

5. Give an abstract of the organism with particular reference to potential impact on the environment of Hawaii (include impact to plants, animals and humans).

   Please see attached.

****

I request permission to import the articles as listed on the permit application and further, request that the articles be examined by an authorized agent of the Department of Agriculture upon arrival in Hawaii.

I agree that I, as the importer, will be responsible for all costs, charges or expenses incident to the inspection or treatment of the imported articles.

I further agree that damages or losses incident to the inspection or the fumigation, disinfection, quarantine, or destruction of the articles, by an authorized agent of the Department of Agriculture, shall not be the basis of a claim against the department or the inspectors for the damage or loss incurred.

Signature [redacted] **Date** April 7, 2021

(Applicant)

PQ-7 (01/04)

State of Hawaii
Department of Agriculture
PLANT QUARANTINE BRANCH
1849 Auiki Street, Honolulu, HI 96819-3100
Phone: (808) 832-0566, FAX: (808) 832-0584

For Office Use Only

Fee: $_____ Receipt No._____

☐ Approve Permit No._____ Date: _____

☐ Disapprove ☐ Other _____

Processed by: _____ Date: _____

PERMIT APPLICATION FOR RESTRICTED COMMODITIES INTO HAWAII

Date: April 12, 2021

In accordance with the provision of Chapter HRS 150A, Hawaii Administrative Rules of the Division of Plant Industry, Department of Agriculture, a permit is requested for the following commodities:

Please type or print clearly.

Quantity	Commodity	Scientific Name
12500	Southern house mosquitoes containing Wolbachia	Culex quinquefasciatus with Wolbachia albopictus strain A
12500	Southern house mosquito containing Wolbachia	Culex quinquefasciatus with Wolbachia albopictus strain B

RECEIVED
APR 19 2021
PLANT QUARANTINE BRANCH

NO PAYMENT
Date: 4/19/21 Initial: TSY

Name and address of shipper: _____

(Mainland or Foreign address)

Approximate date of arrival: _____

Mode of Shipment: ☑ Mail ☐ Air Freight ☐ Boat

Type of Permit:
- --- Import
  - ☐ one time only ☐ multi-shipments
- --- Intrastate shipment
  - ☐ one time only ☑ multi-shipments
- ☐ Possession

Object of importation:
- ☐ Kept caged at all time
- ☐ Used for propagation
- ☐ Imported for exhibition
- ☐ Imported for liberation
- ☑ Other purposes - specify For research in laboratories at the University of Hawaii

Please type or print clearly.

Applicant's Name Matthew Medeiros

Company Name University of Hawaii (if applicable)

Hawaii Mailing Address See attached

Telephone number see attached

Facsimile number n/a

Fee Amount Enclosed (cash, check or mail order) $ see attached

(complete reverse side)

PLEASE COMPLETE THE FOLLOWING INFORMATION (attach extra sheet if necessary)

1. State in detail the reasons for introduction (include use or purpose).
   See attached

2. Person responsible for the organism (include name, address and phone number).
   See attached

3. Location(s) where the organism will be kept and used (include address, contact and phone number).
   See attached

4. Method of disposition.
   See attached

5. Give an abstract of the organism with particular reference to potential impact on the environment of Hawaii (include impact to plants, animals and humans).
   See attached

****

I request permission to import the articles as listed on the permit application and further, request that the articles be examined by an authorized agent of the Department of Agriculture upon arrival in Hawaii.

I agree that I, as the importer, will be responsible for all costs, charges or expenses incident to the inspection or treatment of the imported articles.

I further agree that damages or losses incident to the inspection or the fumigation, disinfection, quarantine, or destruction of the articles, by an authorized agent of the Department of Agriculture, shall not be the basis of a claim against the department or the inspectors for the damage or loss incurred.

Signature _____ **Date** April 12 2021
(Applicant)

Curriculum Vitae

Floyd A. Reed, Ph.D.

April 15, 2019

Contact

2538 McCarthy Mall,
Edmondson Hall 216
University of Hawai'i at Mānoa
Honolulu, Hawai'i 96822 USA

E-mail: floydr@hawaii.edu
Official Website: http://manoa.hawaii.edu/biology/people/floyd-reed
Unofficial Website: http://hawaiireedlab.com/wpress/

Education

2004. Ph.D. Department of Molecular Biology and Genetics
Cornell University, Ithaca, New York, USA
Dr. Charles F. Aquadro, adviser (Population Genetics)
Committee Members (Ph.D. minors)
Dr. Richard T. Durrett (Applied Math)
Dr. Richard G. Harrison (Ecology and Evolution)
Dr. Kenneth A. R. Kennedy (Anthropology)

1996. B.A.(hons) Department of Biology
Department of Chemistry (second major)
Warren Wilson College, Swannanoa, North Carolina, USA
Dr. C. Lee Swendsen, adviser

Work Experience

2016–present. Associate Professor. Department of Biology, University of Hawai'i at Mānoa, Honolulu, Hawai'i, USA

2011–2016. Assistant Professor. Department of Biology, University of Hawai'i at Mānoa, Honolulu, Hawai'i, USA

2008–2011. Independent Group Leader. Department of Evolutionary Genetics, Max Planck Institute for Evolutionary Biology, Plön, Germany

2006–2008. Research Associate. Department of Biology, University of Maryland, College Park, Maryland, USA. Supervisor Dr. S. Tishkoff.

2004–2006. Faculty Research Assistant. Department of Biology, University of Maryland, College Park, Maryland, USA. Supervisor Dr. S. Tishkoff.

1996–2004. Various Teaching Assistant (TA) and Research Assistant (RA) positions. Department of Molecular Biology and Genetics, Cornell University, Ithaca, New York, USA.

1993–1996. Dark Room and Printing Press Operator. Warren Wilson College Print Shop, Swannanoa, North Carolina, USA. Supervisor Rev. G. Tolleson.

1993. Outdoor Living Skills (OLS) cluster leader. Gwynn Valley Summer Camp, Transylvania Co., North Carolina, USA. Supervisor Ms. G. Powell.

1992–1993. Custodian janitor. Western Carolina University, Cullowhee, North Carolina, USA.

1992. Day Camp Counsellor and Assistant Farm Manager. Gwynn Valley Summer Camp, Transylvania Co., North Carolina, USA. Supervisor Mr. D. Robertson.

Teaching Experience

2018. Instructor. BIOL 172L + BIOL 499 SEA-PHAGES lab. University of Hawai'i at Mānoa. fall. Co-taught with Dr. R. Chong.

2018. Seminar. ZOOL 490b Synthetic Biology (writing intensive). University of Hawai'i at Mānoa. fall. Co-organized with Dr. J. Walguarnery.

2018. Seminar. ZOOL 490b Origin and Future of Life (writing intensive). University of Hawai'i at Mānoa. spring. Co-organized with Dr. J. Walguarnery.

2014–present. Co-lecturer. ZOOL 780 Foundations of Ecology and Evolution. University of Hawai'i at Mānoa. alternate fall semesters (with Drs. A. Wright and R. Thomson)

2013–present. Instructor. BIOL 375L Genetics Lab (biology major core class), University of Hawai'i at Mānoa. fall semesters

2011–present. Lecturer. BIOL 375 Genetics (biology major core class). University of Hawai'i at Mānoa. fall semesters

2014–2016. Lecture. BIOL 650 Population Genetics. University of Hawai'i at Mānoa. alternate spring semesters

2014. Seminar. BIOL 490 GMO's: Science and Society (ethics focus). University of Hawai'i at Mānoa. spring. Co-organized with Dr. H. De Couet.

2011. Co-lecturer. Evolutionary Genetics. Max Planck Institute for Evolutionary Biology. (Dr. J. Bains, Dr. D. Greig)

2005. Co-lecturer. Human Genetics. University of Maryland, College Park. (Dr. S. Tishkoff)

1993. Outdoor Living Skills Team Leader and Instructor. Gwynn Valley Summer Camp Transylvania Co., North Carolina. Supervisor Ms. G. Powell.

Teaching Training

2018. Workshop for the SEA-PHAGES, HHMI, discovery-based undergraduate research course, cohort 11b. University of Maryland, Baltimore County. Sponsored by the Howard Hughes Medical Institute.

An international summer workshop to learn about how to conduct a discovery-based undergraduate research course in undergraduates' freshman year. `https://seaphages.org/`

2014. Workshop, Genome Consortium for Active Teaching, GCAT: Synthetic Biology. University of Maryland, Baltimore County. Sponsored by the Howard Hughes Medical Institute and The National Science Foundation.

A national summer workshop to learn about how to incorporate synthetic biology, along with active learning approaches, into undergraduate teaching labs. http://www.bio.davidson.edu/GCAT/GCATSynBio.html

2013. Workshop, The National Academies Summer Institutes on Undergraduate Education. University of Hawai'i at Mānoa. Sponsored by the Howard Hughes Medical Institute and The National Academies.

A summer workshop for individuals from institutes around the West Coast to learn about and practice aspects of scientific teaching. http://www.academiessummerinstitute.org/

2002. Teaching Assistant, BIOGD 282 Human Genetics, Instructor Dr. M. Hamblin, nonmajors

1998. Teaching Assistant, BIOGD 481 Population Genetics, Instructor Dr. C. Aquadro, majors

1997. Teaching Assistant, BIOGD 281 Introduction to Genetics, Instructor Dr. R. MacIntyre, majors

1996. Teaching Assistant, BIOGD 281 Introduction to Genetics, Instructor Dr. M. Goldberg, majors

Publications

As of October 14, 2018 I have an H-index of 22 and an i10-index of 24 from 36 publications with 4,544 total citations (Google Scholar Profile). A "☯" symbol denotes an equal contribution. (Articles "in preparation" are not listed here except for our book contract.)

Pending 2019-2020. Á. J. Láruson & F. A. Reed. *Population Genetics with R: A Practical Guide*. Writing contract with Oxford University Press.

2018. F. A. Reed, T. G. Aquino-Michaels, M. S. Costantini, Á. J. Láruson, & J. T. Sutton. RPM-Drive: A robust, safe, and reversible gene drive system that remains functional after 200+ generations. arXiv preprint arXiv:1806.05304. (submitted to *Proceedings of the National Academy of Sciences USA*)

2018. Á. J. Láruson, S. E. Coppard, M. H. Pespeni, F. A. Reed. Gene expression across tissues, sex, and life stages in the sea urchin *Tripneustes gratilla* [Toxopneustidae, Odontophora, Camarodonta]. *Marine Genomics* 41: 12–18. doi:10.1016/j.margen.2018.07.002

2018. S. E. Kingston, P. Martino, M. Melendy, F. A. Reed, and David B. Carlon. Linking genotype to phenotype in a changing ocean: inferring the genomic architecture of a blue mussel stress response with genome-wide association. *Journal of Evolutionary Biology* 31(3): 346–361. doi:10.1111/jeb.13224

2017. Bryk, J., Reeves, R. G., Reed, F. A., & Denton, J. A. Transcriptional effects of a positive feedback circuit in *Drosophila melanogaster*. *BMC Genomics* 18(1): 990. https://bmcgenomics.biomedcentral.com/articles/10.1186/s12864-017-4385-z

2017. F. A. Reed. Evolutionary Genetic Engineering in the Indo-Pacific: Conservation, Humanitarian, and Social Issues. https://arxiv.org/pdf/1706.01710.pdf

2017. F. A. Reed. CRISPR/Cas9 Gene Drive: Growing Pains for a New Technology. *Genetics* 205: 1037–1039. doi:10.1534/genetics.116.198887

2016. Láruson, Á. J. and F. A. Reed. Stability of Underdominant Genetic Polymorphisms in Population Networks. *Journal of Theoretical Biology* 390: 156–163. doi:10.1016/j.jtbi.2015.11.023.

2016. Shaefer, A., J. Wolf, P. C. Alves, L. Bergström, G. Colling, *et al.* Reply to Garner *et al. Trends in Ecology and Evolution* 31: 83–84. doi:10.1016/j.tree.2015.11.010

2015. Shaefer, A., J. Wolf, P. C. Alves, L. Bergström, M. W. Bruford, *et al.* Genomics and the challenging translation into conservation practice. *Trends in Ecology and Evolution* 30: 78–87. doi:10.1016/j.tree.2014.11.009

2014. Tabios, M., L. Boell, and F. A. Reed. A new mutation of PDA synthase, *sepia*, isolated from wild *Drosophila melanogaster. Drosophila Information Service* 97: 176–177. http://www.ou.edu/journals/dis/DIS97/Tabios%20176.pdf

2014. Reeves, R. G., J. Bryk, P. M. Altrock, J. A. Denton, and F. A. Reed. First Steps Towards Underdominant Genetic Transformation of Insect Populations. *PLoS ONE* 9: e97557. doi:10.1371/journal.pone.0097557

2014. Gokhale, C. S., R. G. Reeves, and F. A. Reed. Dynamics of a combined medea-underdominant population transformation system. *BMC Evolutionary Biology* 14: 98. doi:10.1186/1471-2148-14-98

2013. Reed, F. A., A. Traulsen, and P. M. Altrock. Underdominance. In *Encyclopedia of Genetics*, S. Brenner & J. H. Miller, Eds., Elsevier Science, Inc.

2012. Reeves, R. G., J. Denton, F. Santucci, J. Bryk, and F. A. Reed. Scientific Standards and the Regulation of Genetically Modified Insects. *PLoS Neglected Tropical Diseases* 6: e1502. doi:10.1371/journal.pntd.0001502

2012. Reed, F. A. Modern Human Migrations: The First 200,000 Years. In *Migrations: Interdisciplinary Perspectives*, M. Messer, R. Schroeder & R. Wodak, Eds., Springer. doi:10.1007/978-3-7091-0950-2

2012. Traulsen, A. and F. A. Reed. From genes to games: Cooperation and cyclic dominance of meiotic drive alleles. *Journal of Theoretical Biology* 299: 120–125. doi:10.1016/j.jtbi.2011.04.032

2011. Altrock, P. M., A. Traulsen, and F. A. Reed. Stability Properties of Underdominance in Finite Subdivided Populations. *PLoS Computational Biology* 7: e1002260. doi:10.1371/journal.pcbi.1002260

2011. Haubold, B., F. A. Reed, and P. Pfaffelhuber. Alignment-free estimation of nucleotide diversity. *Bioinformatics* 27: 449–455. doi:10.1093/bioinformatics/btq689

2011. Stemshorn, K. C., F. A. Reed, A. W. Nolte, and D. Tautz. Rapid formation of distinct hybrid lineages after secondary contact of two fish species (*Cottus* sp.). *Molecular Ecology* 20: 1475–1491. doi:10.1111/j.1365-294X.2010.04997.x

2010. Altrock, P. M., A. Traulsen, R. G. Reeves, and F. A. Reed. Using underdominance to bi-stably transform local populations. *Journal of Theoretical Biology* 267: 62–75. doi:10.1016/j.jtbi.2010.08.004

2010. Allaby, R. G., F. R. Friedlaender, F. A. Reed, K. K. Kidd, J. R. Kidd, *et al.* Prehistoric Pacific Population Movements. pp. 143–157 in *The Global Origins and Developments of Seafaring*, A. Anderson, J. H. Barrett & K. V. Boyle, Eds., ISBN: 978-1-902937-52-6, McDonald Institute for Archaeological Research, Cambridge, UK.

2009. Tishkoff, S. A., F. A. Reed, F. R. Friedlaender, C. Ehret, A. Ranciaro, *et al.* The Genetic Structure and History of Africans and African Americans. *Science*

324: 1035–1044. doi:10.1126/science.1172257

2008. Milinski, M., R. Sommerfeld, H.-J. Krambeck, F. A. Reed, and J. Marotzke. The collective risk social dilemma, and the prevention of simulated dangerous climate change. *Proceedings of the National Academy of Sciences USA* 105: 2291–2294. doi:10.1073/pnas.0709546105

2008. Reed, F. A. Are Humans Still Evolving? In *Encyclopedia of Life Sciences: Handbook of Human Molecular Evolution*, D. N. Cooper & H. Kehrer-Sawatzki, Eds., John Wiley & Sons, Ltd., Chichester, UK. http://www.els.net doi:10.1002/9780470015902-.a0020794

2008. Friedlaender, J. S., F. R. Friedlaender, F. A. Reed, K. K. Kidd, J. R. Kidd, *et al.* The Genetic Structure of Pacific Islanders. *PLoS Genetics* 4: e19. doi:10.1371/journal.pgen.0040019

2007. Tishkoff, S. A., M. K. Gonder, B. M. Henn, H. M. Mortensen, N. Fernandopulle, *et al.* History of click-speaking populations of Africa inferred from mtDNA and Y chromosome genetic variation. *Molecular Biology and Evolution* 24: 2180–2195. doi:10.1093/molbev/msm155

2007. Reed, F. A. Two-locus epistasis with sexually antagonistic selection: A genetic Parrondo's paradox. *Genetics* 176: 1923–1929. doi:10.1534/genetics.106.069997

2007. Gonder, M. K., H. M. Mortensen, F. A. Reed, A. de Sousa, and S. A. Tishkoff. Whole mtDNA Genome Sequence Analysis of Ancient African Lineages. *Molecular Biology and Evolution* 24: 757–768. doi:10.1093/molbev/msl209

2007. Tishkoff, S. A.[●], F. A. Reed[●], A. Ranciaro, B. F. Voight, C. C. Babbitt, *et al.* Convergent adaptation of human lactase persistence in Africa and Europe. *Nature Genetics* 39: 31–40. doi:10.1038/ng1946

2006. Reed, F. A. and S. A. Tishkoff. African human diversity, origins and migrations. *Current Opinion in Genetics & Development* 16: 597–605. doi:10.1016/j.gde.2006.10.008

2006. Reed, F. A. and C. F. Aquadro. Mutation, selection and the future of human evolution. *Trends in Genetics* 22: 479–484. doi:10.1016/j.tig.2006.07.005

2006. Kontanis, E. J. and F. A. Reed. Evaluation of real-time PCR amplification efficiencies to detect inhibitors. *Journal of Forensic Sciences* 51: 795–804. doi:10.1111/j.1556-4029.2006.00182.x

2006. Reed, F. A. and S. A. Tishkoff. Positive selection can create false hotspots of recombination. *Genetics* 172: 2011–2014. doi:10.1534/genetics.105.052183

2005. Reed, F. A., J. M. Akey, and C. F. Aquadro. Fitting background-selection predictions to levels of nucleotide variation and divergence along the human autosomes. *Genome Research* 15: 1211–1221. doi:10.1101/gr.3413205

2005. Reed, F. A., R. G. Reeves, and C. F. Aquadro. Evidence of susceptibility and resistance to cryptic X-linked meiotic drive in natural populations of *Drosophila melanogaster*. *Evolution* 59: 1280–1291. doi:10.1111/j.0014-3820.2005.tb01778.x

2004. Reed, F. A. *Characterizing Diversity Reducing Selection in Humans and Fruitflies.* Ph.D. Dissertation, Cornell University, Ithaca, NY. http://wwwlib.umi.com/dissertations/fullcit/3149436

2003. Reed, F. A., E. J. Kontanis, K. A. R. Kennedy, and C. F. Aquadro. Ancient DNA prospects from Sri Lankan highland dry caves support an emerging global pattern. *American Journal of Physical Anthropology* 121: 112–116. doi:10.1002/ajpa.10211

2001. Aquadro, C. F., V. L. Bauer DuMont, and F. A. Reed. Genome-wide variation in the human and fruitfly: a comparison. *Current Opinion in Genetics & Development* 11: 627–634. doi:10.1016/S0959-437X(00)00245-8

Field Experience

2010. Preliminary arrangements for future human DNA sample collection in Mali. December.

2007. Processing regional government permit applications for future human DNA sample and phenotype data collection in Addis Ababa and Awassa, Ethiopia. November.

2006. Human DNA sample and phenotype data collection in Marsabit, Dirib Gombo, North Horr and Lake Turkana, Kenya. May-July.

1996. Cherokee Archaeology Field School. Warren Wilson Site, Swannanoa, NC. Supervisor D. Moore, North Carolina state archaeologist. June-July.

Other Experience and Professional Memberships

2018–present. Affiliate faculty of the Department of Biology, University of Hawai'i at Hilo. `https://hilo.hawaii.edu/depts/biology/`.

2017–present. Affiliate faculty of the Anthropology Graduate Program, University of Hawai'i at Mānoa. `http://www.anthropology.hawaii.edu/`.

2016. Mosquitoes in Hawaii: Novel approaches to confront mosquito vectors and mosquito-borne pathogens in the Hawaiian Islands. Hawai'i Volcanoes National Park. Invitation-only. September.

2016–present. Associate Editor for the *Journal of Heredity.*

2016. Gene Drives: A Deliberative Workshop to Develop Frameworks for Research and Governance. NCSU Genetic Engineering and Society Center. Invitation-only. February.

2016–present. Member faculty of the Ecology, Evolution, & Conservation Biology (EECB) Graduate Specialization Program, University of Hawai'i at Mānoa. `http://www.hawaii.edu/eecb/`.

2015–present. Member of an inter-agency Hawaiian Forest Bird Conservation Genetic Pest Management Technologies working group.

2013–present. Member. Society for the Study of Evolution

2013–present. Member. American Indian Science and Engineering Society (AISES)

2011. Review Committee. *Deutshe Forschungsgemeinschaft* (German National Research Foundation) for the research unit "Natural selection in structured populations"

1999–2004. Member. American Indian Program of Cornell University

Grants

2018. U.S. National Institutes of Health COBRE: Integrative Center for the Earth's Microbiome and Human Health. One of five JI's with a total award of $2,366,501 for five years. Total Reed lab allocation of $212,250 in year one. Role JI

2017. U.S. National Science Foundation (NSF). REU Site: Environmental Biology for Pacific Islanders. (Three years, final funding details to be determined.) PI's Michael Hadfield, Matt Medeiros. Role Participating Lab.

2016. State of Hawai'i, Department of Land and Natural Resources with matching funds from the U.S. Fish and Wildlife Service. Wolbachia replacement for cytoplasmic incompatibility in *Culex quinquefasciatus*. One year. $90,585.46. Role Co-PI with Dr. J. Sutton of the University of Hawai'i Hilo.

2016. U.S. National Science Foundation (NSF). REU Site: Undergraduate Research Experiences in DNA-based discoveries in Hawai'i's biodiversity. Award 1560491. 3 years, $347,580. PI's Stuart Donachie, Stephanie Kraft-Terry. Role Participating Lab.

2012. Victoria S. and Bradley L. Geist Foundation, administered by the Hawai'i Community Foundation, Medical Research Program. Engineering Underdominance in *Culex quinquefasciatus*. 12ADVC-51343. 18 months, $50,000. Role PI

2010. *Deutshe Forschungsgemeinschaft* (DFG , German National Research Foundation). *Die Entstehung von Resistenzen gegen genetisch induzierte Sterilitt bei Insekten.* (The evolution of resistance to genetically induced sterility in insects.) RE-3062/2-1. 2 years, €59,385+BAT IIa/E13 pay-scale personnel support (approximately €120,000 total, or $170,000 equivalent). Role PI

2006. U.S. National Institutes of Health (NRSA). Characterizing a genetic history of African populations. F32HG003801/F32HG03801. 2 years, $98,224. Role Postdoc.

2002. Sigma Xi Grants-in-Aid of Research. Optimization and discrimination of background-selection and hitch-hiking predictions on the human X-chromosome. $640. Role Grad. Student

Patent Applications

Max-Planck-Gesellschaft zur Frderung der Wissenschaften E.V. (Max-Planck-Society for the Advancement of Science), applicant. Reeves, R. G. and F. A. Reed, inventors. (2012) Stable transformation of a population and a method of biocontainment using haploinsufficiency and underdominance principles. WO2014096428

University of Maryland, applicant. Tishkoff, S. A. and F. A. Reed, inventors. (2008) Single nucleotide polymorphisms and the identification of lactose intolerance. WO2008057265

Honors and Awards

2015. Nominated for an Excellence in Teaching award in the College of Natural Sciences, University of Hawai'i at Mānoa, Honolulu, HI.

2014. Nominated for an Excellence in Teaching award in the College of Natural Sciences, University of Hawai'i at Mānoa, Honolulu, HI.

2007. Selected for a competitive award from the U. S. National Institutes of Health, Loan Repayment Program for Health Disparities Research. (forced to decline because of subsequent employment outside of the U.S.)

2004. Supported by an award from The Center for Bioinformatics and Computational Biology, University of Maryland, College Park, MD.

2001. Fitch prize finalist. Reed, F. A., and C. F. Aquadro. The effects of deleterious mutations on levels of variation in the human genome. Annual meeting of the Society for Molecular Biology and Evolution. July 2001, Athens, GA.

2000. Selected for the NSF Training Grant "Evolution from DNA to the Organism: The Interface between Evolutionary Biology and the Mathematical Sciences." Administered by the Department of Biometrics, Cornell University, Ithaca, NY.

2000. Fitch prize finalist. Reed, F. A., and C. F. Aquadro. Detecting recent selection in humans using microsatellites. Joint meetings of the Society for Molecular Biology and Evolution & the American Genetics Association. June 2000, New Haven, CT.

1996. Recipient of a competitive summer semester tuition waiver for students of Cherokee heritage. Cherokee Archaeology Field School. Warren Wilson Site, Swannanoa, NC.

1996. Elected class speaker for the Warren Wilson College commencement ceremony. May 1996, Swannanoa, NC.

1996. The Edward C. Jeffrey Award in Biological Sciences. Department of Biology, Warren Wilson College, Swannanoa, NC.

1996. First Place in Undergraduate Research Presentations, Biological Sciences IV. The 93rd annual meeting of the North Carolina Academy of Science, March, Wake Forest University, Winston-Salem, NC.

1994. CRC Press Freshman Chemistry Award. Warren Wilson College, Swannanoa, NC.

Invited Talks

2018 Reed, F. A., J. T. Sutton, J. A. Denton. Robust, safe, and reversible gene drive. Entomology Society of America annual meeting. Vancouver, Canada. November. (The presentation time was missed because of a late flight.)

2018 Reed, F. A. Protecting Hawaiian birds from avian malaria. International Ornithological Congress. Vancouver, Canada. August. (Declined because of insufficient travel funds and teaching responsibilities.)

2018 Reed, F. A. Robust, safe, and reversible gene drive. American Malacological Society, Western Society of Malacologists joint meeting, Honolulu, Hawai'i. June.

2017 Reed, F. A. Genetic pest management in Hawai'i. Conservation Genetics Workshop. Hawaiian Institute for Marine Biology, Kāne'ohe, Hawai'i. February.

2017 Reed, F. A. Emerging opportunities for genetic pest management in Hawai'i. Hawaiian Entomological Society meeting. Honolulu, Hawai'i. February.

2015 Reed, F. A. Genetic Engineering for Species Conservation Applications in Hawai'i. Okinawa Institute of Science and Technology, Okinawa, Japan. August.

2014. Reed, F. A. Genetic Engineering for Species Conservation Applications in Hawai'i. ConGenOmics Workshop. Uppsala, Sweden. March.

2014. Reed, F. A. Genetic Engineering for Species Conservation Applications in Hawai'i. Department of Entomology, North Carolina State University, Raleigh, NC. March.

2012. Reed, F. A. Genetically transforming a population using underdominance. Hawai'i Institute of Marine Biology, Kane'ohe, Hawai'i, September.

2011. Reed, F. A. Underdominance Predictions and Genetically Transforming a Population. Department of Zoology, University of Hawai'i at Mānoa. February.

2011. Reed, F. A. Underdominance Predictions and Population Transformations. Department of Biology, Ludwig Maximilian University, Munich, Germany. January.

2010. Reed, F. A. On GeneCulture Coevolution: Language and Music. Technological, dialectological and theoretical linguistics meeting. Department of Lingusitics and

Scandinavian Studies. University of Oslo, Oslo, Norway. September.

2010. Reed, F. A. On GeneCulture Coevolution: Adult Lactose Tolerance in Africa. Department of Tumor Biology, Institute for Cancer Research, The Norwegian Radium Hospital, Oslo, Norway. September.

2010. Reed, F. A. Modern human migrations: the first 200,000 years. *Interdisziplıäres Dialogforum*, Migrations: Interdisciplinary Perspectives. University of Vienna, Vienna, Austria. July.

2009. Reed, F. A. Underdominance Predictions and Population Transformations. Institute for Population Genetics, University of Veterinary Medicine Vienna. Vienna, Austria. November.

2009. Reed, F. A. Underdominance Predictions and Population Transformations. Department of Evolutionary Biology, Uppsala University, Uppsala, Sweden. October.

2009. Reed, F. A. Underdominance and Population Transformations. Mind the gap: joining theoretical and empirical population genetics. VW-Stiftung Workshop, Freiburg, Germany. October.

2008. Reed, F. A. and M. Schönbrunn. Gene-Culture Coevolution: A Focus on Music in Africa. Geniale Science Festival, Department of Art and Music, Beliefeld University, Beliefeld, Germany. October.

2007. Reed, F. A. The Structure and Migrations of Human Populations in Africa. The African Society of Human Genetics, Cairo, Egypt. November.

2007. Reed, F. A. The Genetic Structure of Human Populations in Africa. Aquavit V meeting, The Max Planck Institute for Evolutionary Biology, Plön, Germany. March.

2007. Reed, F. A. A Microsatellite Based Likelihood-Approximation with Simultaneous Mutation, Demographic and Selective Inference. The Institute for Genetics, University of Cologne, Cologne, Germany. March.

2007. Reed, F. A. Using microsatellites to characterize human population structure in Africa and simultaneously infer selection and demography in Drosophila. The Department of Genetics, North Carolina State University, Raleigh, North Carolina. January.

2002. Reed, F. A. Levels of human polymorphism are consistent with weak background-selection. The Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany. December.

2000. Reed, F. A., and C. F. Aquadro. Detecting recent selection in humans using microsatellites. LSU Ecology & Evolution Department, Baton Rouge, Louisiana. November.

2000. Reed, F. A. The genetic history of the Jacob breed of sheep. National meeting of the Jacob Sheep Breeders Association, Gilbertsville, New York. June.

Broader Media Impact

I was interviewed for an article on commercial genetic testing by Tam, N. (2017) "23 Defines You." *Ho'a O'ahu* `https://www.hoaoahu.com/genetic-testing`

Our laboratory work on mosquito Wolbachia replacement in Hawai'i has been reported in various media sources including:

Anonymous (2017) 'Birth control' targets Hawaii's mosquitoes to protect native birds. *The Garden Island* `http://thegardenisland.com/news/state-and-regional/`

birth-control-targets-hawaii-s-mosquitoes-to-protect-native-birds/article_cb3e8482-f958-11e6-8f93-4be24a81ac33.html

Anonymous (2017) Hawaii implements mosquito 'birth control' to protect native birds. *KHON2* http://khon2.com/2017/02/22/hawaii-implements-mosquito-birth-control-to-protect-native-birds/

Anonymous (2017) Hawaii implements mosquito 'birth control' to protect native birds.. *WAVY.com* http://wavy.com/2017/02/23/hawaii-implements-mosquito-birth-control-to-protect-native-birds/

Anonymous (2017) Birth control for mosquitoes targeted at saving Hawaiian birds. *University of Hawai'i News* http://www.hawaii.edu/news/2017/02/22/birth-control-for-mosquitoes-targeted-at-saving-hawaiian-birds/

Anonymous (2017) DLNR NEWS RELEASE: "Birth control" for mosquitoes targeted at saving unique, imperiled Hawaiian birds. *State of Hawai'i Governor's Office* http://governor.hawaii.gov/newsroom/latest-news/dlnr-news-release-birth-control-for-mosquitoes-targeted-at-saving-unique-imperiled-hawaiian-birds/

Anonymous (2017) State pursues mosquito 'birth control' to save native birds. *Hawai'i News Now* http://www.hawaiinewsnow.com/story/34578965/state-pursues-mosquito-birth-control-to-save-native-birds

Anonymous (2017) Mosquito 'Birth Control' Targets Saving Hawai'i's Birds. *Big Island Now* http://bigislandnow.com/2017/02/22/mosquito-birth-control-targets-saving-hawaii-birds/

Anonymous (2017) VIDEO: Mosquito "Birth Control" Under Development At UH. *Big Island Now Video News* http://www.bigislandvideonews.com/2017/02/25/video-mosquito-birth-control-under-development-at-uh/

Anonymous (2017) Mosquito 'Birth Control' Aims to Protect Native Birds. *Maui Now* http://mauinow.com/2017/02/22/mosquito-birth-control-aims-to-protect-native-birds/

Anonymous (2017) Birth control for mosquitoes targeted at saving Hawaiian birds. *ScienceBlog* https://scienceblog.com/492388/birth-control-mosquitoes-targeted-saving-hawaiian-birds/

Ashe, I. (2017) Game-changer; UH research looking at unique way to stop mosquito-borne diseases in Hawaiian birds. *Hawaii Tribune-Herald* http://www.hawaiitribune-herald.com/news/local-news/game-changer-uh-research-looking-unique-way-stop-mosquito-borne-diseases-hawaiian

Else, J. (2017) New technique could save endangered birds on Kauai. *The Garden Island* http://thegardenisland.com/news/local/new-technique-could-save-endangered-birds-on-kauai/article_d8e36bf5-bd24-57a4-93f8-8db5fdc50ba5.html

Murray, M. M. (2017) Lab-altered mosquitoes may save rare birds. *Frontiers in Ecology and the Environment* 15(3): 120.

Nabarro, M. (2017) Birth control for mosquitoes, effort to save native birds. *KITV* http://www.kitv.com/story/34580499/birth-control-for-mosquitoes-effort-to-save-native-birds#

Our laboratory work on mosquito genetic engineering in Hawai'i has been reported in

various media sources including:

Harvey, C. (2016) This new gene technology could wipe out entire species – to save others. *Washington Post* https://www.washingtonpost.com/news/energy-environment/wp/2016/09/07/this-new-gene-technology-could-wipe-out-entire-species-to-save-others/

Goldman, J. G. (2016) Harnessing the Power of Gene Drives to Save Wildlife. *Scientific American* http://www.scientificamerican.com/article/harnessing-the-power-of-gene-drives-to-save-wildlife/

Schughart, A. (2016) *Beschleunigte Vererbung mit Gene Drive: Unkontrollierbar oder Lebensretter?* (German language, English translation: Accelerated Heredity with Gene Drive: Uncontrollable or Lifesaver?) *WIRED* https://www.wired.de/collection/science/beschleunigte-vererbung-mit-gene-drive-unkontrollierbar-oder-lebensretter

Áki Láruson (Reed lab) and Caitlyn Genovese (Moran lab) were interviewed about their sea urchin research in 2014 by Jay Fidell in a "Research at UH Mānoa" segment on "ThinkTech Hawai'i." https://youtu.be/R1BJ0vZZTBc

Reeves *et al.* (2012) was the subject of an editorial, two expert commentaries and initiated the PLoS Genetically Modified Insect Collection of PLoS Collections http://www.ploscollections.org/GMInsect. This work was also featured in several news sources:

von Bredow, R. (2012) *Armee der Killermücken. Der Spiegel* 5:100-102. (German print version)

von Bredow, R. (2012) The Controversial Release of Suicide Mosquitoes. Spiegel Online: http://www.spiegel.de/international/world/0,1518,812283-2,00.html (English online version)

Callaway, E. (2012) What should the public know about GM insect trials? Nature News Blog http://blogs.nature.com/news/2012/01/what-should-the-public-know-about-gm-insect-trials.html

Hoffman, E. (2012) Genetically engineered mosquito buzz continues. Friends of the Earth Blog http://www.foe.org/news/blog/2012-02-ge-mosquito-buzz-continues-concerns-around-transpare

Ledger, W. (2012) GM mosquito release not transparent, say scientists. Cayman-NewsService http://www.caymannewsservice.com/science-and-nature/2012/02/02/gm-mosquito-release-not-transparent-say-scientists

Webb, C. (2012) Time to regulate the release of GM mosquitoes and here's how. The Conversation http://theconversation.edu.au/time-to-regulate-the-release-of-gm-mosquitoes-and-heres-how-5062

Tishkoff *et al.* (2009) was featured on the cover of Science and was the subject of several newspaper, magazine and online articles including:

Achenbach, J. (2009) African's Have World's Highest Genetic Diversity, Study Finds. *The Washington Post* (published online http://www.washingtonpost.com/wp-dyn/content/article/2009/04/30/AR2009043002485.html).

Gibbons, A. (2009) Africans' Deep Genetic Roots Reveal Their Evolutionary Story. *Science* 324: 575. http://science.sciencemag.org/content/324/5927/575

Gill, V. (2009) Africa's genetic secrets unlocked. BBC News (published online http://news.bbc.co.uk/2/hi/science/nature/8027269.stm).

Kwok, R. (2009) Africa's genetic history unraveled. Nature News (published online doi:10.1038/news.2009.426)

Wade, N. (2009) Eden? Maybe. But Where's the Apple Tree? *The New York Times* Section A, Page 6, May 1 (published online http://www.nytimes.com/2009/05/01/science/01eden.html?ref=world).

Milinski *et al.* (2008) was featured in the commentary section of PNAS and picked up by news agencies.

Dreber, A. and M. A. Nowak (2008) Gambling for global goods. *PNAS* 105: 2261–2262.

Leahy, S. (2008) Climate Change: A Game With Too Many Free Riders. *Inter Press Service News Agency*, April 4, (published online http://ipsnews.net/news.asp?idnews=41859).

Friedlaender *et al.* (2008) was the subject of several newspaper and magazine articles including:

Handwerk, B. (2008) Polynesians Descended From Taiwanese, Other East Asians. *National Geographic News*, (published online) January 17. http://news.nationalgeographic.com/news/2008/01/080117-polynesian-taiwan.html

Holden, C. (2008) Polynesians Took the Express Train Through Melanesia to the Pacific. *Science* 319: 270.

Wilford, J. N. (2008) Pacific Islanders' Ancestry Emerges in Genetic Study. *The New York Times*, Section A, Page 6, Column 1, January 18.

My presentation at 2007 The American Anthropological Association meeting was featured online by Nature.

Callaway, E. (2007) Music is in our genes. Nature News (published online) December 10. http://www.nature.com/news/2007/071210/full/news.2007.359.html doi:10.1038/news.2007.359

Tishkoff *et al.* (2007) was the subject of several newspaper and magazine articles including:

Check, E. (2006) How Africa learned to love the cow. *Nature* 444: 994–996.

Gibbons, A. (2006) Human Evolution: There's More Than One Way to Have Your Milk and Drink It, Too. *Science* 314: 1672.

Wade, N. (2006) Lactose Tolerance in East Africa Points to Recent Evolution. *The New York Times* Section A, Page 15, Column 1, Dec. 11.

Weiss, R. (2006) The Key to Lactose Tolerance. *The Washington Post* Section A, Page 8, Column 1, Dec. 11.

My presentation at 2005 The American Association of Physical Anthropology meeting was featured in the news section of Science (later published as Tishkoff *et al.* (2009) above).

Culotta, E. (2005) Human Relations. *Science* 308: 491.

I consulted for and briefly appeared in a 2001 Discovery Channel documentary "The Ultimate Guide: Mastodon in Your Backyard," aired in October 2001.

Supervisory Experience

Postdoctoral

Sutton, Jolene T. 2013–2015. Engineering underdominance in Culex mosquitoes. University of Hawai'i at Mānoa.

Denton, Jai A. 2010–2013. Mutation screens for the evolution of resistance to genetic pest management techniques. Max Planck Institute for Evolutionary Biology.

Reeves, R. Guy 2008–2013. Engineering underdominance to safely and reversibly modify insect pest populations. Max Planck Institute for Evolutionary Biology.

Graduate

Sung, Helen 2019–present. M.S. Zoology Program, U.H. Mānoa

Wallstrom, Michael A. 2017–present. M.S. Zoology Program, U.H. Mānoa

Costantini, Maria 2016–present. Ph.D. Zoology Program, U.H. Mānoa

Láruson, Áki J. 2013–2018. Ph.D. Zoology Program, U.H. Mānoa

Schukies, Stella S. 2011–2012 Masters Diploma. *Christian-Albrechts-Universität zu Kiel*, Dept. of Evolutionary Ecology and Genetics. Laboratory research conducted at the Max Planck Institute for Evolutionary Biology.

Babiker, Hiba M. A. 2010–2012 Ph.D. The International Max Planck Research School for Evolutionary Biology.

Graduate Committees

Current

Sean Canfield (PhD), Elena Hughes (PhD), Tom Iwanicki (PhD), Jared Nishimoto (MS), Alina Pang (PhD), Kirill Vinnikov (PhD), Van Wishingrad (PhD)

Completed

Silvia Beurmann (PhD), Helena De Souza Brasil Barreto (MS), Carly Fitzpatrick (MS), Elizabeth Henry (MS), Jessica Maxfield (PhD), Emilie Richards (MS), Orion Rivers (PhD), Michael San Jose (PhD), Janna Zoll (MS)

Undergraduate

Galvizo, Glenn. 2018. BIOL 499 Directed Research. Approximate Bayesian Computation with human microsatellite data.

Aquino-Michaels, Todd. 2017. BIOL 499 Directed Research. Environmental RNA interference in *Culex* mosquitoes.

Ajifu, Rumer. 2017. Summer REU program. Opsin expression and popualtion genetics in *Tripneustes gratilla.*

Quiogue, Zachary. 2017. Summer REU program. Oviposition preference of *Aedes albopictus.*

Barton, Casey. 2016–present. BIOL 499 Directed Research. Analysis of Toxopneustidae sea urchin test morphology.

Holcomb, Angelina. 2016–present. BIOL 499 Directed Research. Effects of telomere complex disruption on longevity in *Drosophila melanogaster*.

Sharp, Victoria. 2016. Summer REU program. Analysis of Toxopneustidae sea urchin jaw morphology.

Lau, Alyssa. 2016. Summer REU program. Testing alternative Culex mosquito feeding methods.

Paulino, Stacey. 2015–2016. Isolating and characterizing novel *Vibrio coralliilyticus* lysing Vibriophage.

Wallstrom, Michael. 2014–2015. BIOL 499 Directed Research. Describing Hawaiian Porifera with phylogenetics.

Wagner, Chelsea. 2014. BIOL 499 Directed Research. Sea urchin larvae survival under cold stress.

Asao, Kenton. 2014. BIOL 499 Directed Research. Hawaiian damselfly karyotyping.

Roup, Fabrece. 2013–2015. Testing migration–selection equilibrium in an underdominant Drosophila system.

Tabios, Myles. 2013. BIOL 499 Directed Research. Characterizing a novel spontaneous mutant of *sepia* in *Drosophila melanogaster*.

Müller, Hagen. 2009–2010. Trans-generational Influence of Tetracycline on *Drosophila melanogaster*. Bachelor Thesis. Fachhochschule Bingen, University of Applied Sciences, Dept. of Life Sciences and Engineering. Bingen, Germany.

Professional

Möller, Anita 2008–2011. Part-time laboratory technician. Max Planck Institute for Evolutionary Biology.

Gorsler, Vanessa 2010–2011. *Auszubildende als Biologielaborantin* (certificate training for laboratory work in biology). Max Planck Institute for Evolutionary Biology.

Klocksin, Carlos 2010. *Auszubildende als Biologielaborantin* (certificate training for laboratory work in biology). Max Planck Institute for Evolutionary Biology.

Langer, Katharina 2008–2009. *Auszubildende als Biologielaborantin* (certificate training for laboratory work in biology). Max Planck Institute for Evolutionary Biology.

Weiß, Katharina 2008. *Auszubildende als Biologielaborantin* (certificate training for laboratory work in biology). Max Planck Institute for Evolutionary Biology.

References

Dr. Charles F. Aquadro, Professor, and Director, Cornell Center for Comparative and Population Genomics. Department of Molecular Biology and Genetics, Cornell University, Ithaca, NY. Email: cfa1@cornell.edu

Dr. Mohamed A. F. Noor, Professor, Department of Biology, Duke University, Durham, NC. Email: noor@duke.edu

Prof. Dr. Arne Traulsen, Director of the Department of Evolutionary Theory, Max Planck Institute for Evolutionary Biology, Plön, Germany. Email: traulsen@evolbio.mpg.de

MATTHEW CHRISTOPHER IKAIKA MEDEIROS
CURRICULUM VITAE

I. PERSONAL INFORMATION

Assistant Professor
Pacific Biosciences Research Center
University of Hawai'i at Mānoa
Honolulu, HI

mcmedeir@hawaii.edu
Phone: (808)-956-8187

II. EDUCATION

2007-2013 Doctor of Philosophy, Biology
University of Missouri-St. Louis
Department of Biology
Program in Evolution, Ecology and Systematics
Advisor: Robert E. Ricklefs
Dissertation: *Elucidating the Factors that Modulate the Distribution of Avian Haemosporida Parasites across a Community of Hosts*

2001-2006 Bachelor of Science
University of Hawai'i at Mānoa
Major: Zoology

III. IDIOMS

English: Native language
Portuguese: Understand well, read well, and speak fair
Hawaiian: familiar

IV. EXPERIENCE

2019- Co-Director
Center for Microbiome Analysis through Island Knowledge and Investigation (C-MĀIKI)
University of Hawai'i at Mānoa
Honolulu, HI

2019- Chief Scientist
Insectary for Scientific Training and Advances in Research (InSTAR)
University of Hawai'i at Mānoa
Honolulu, HI

2016- Assistant Professor
Pacific Biosciences Research Center
University of Hawai'i at Mānoa
Honolulu, HI

2015-2016 Post-doctoral Researcher
Department of Entomology
Texas A&M University
College Station, TX
Advisor: Gabriel L. Hamer, Ph.D.

2014-2015 Post-doctoral Researcher
Laboratório de Ecologia e Conservação de Aves

Departamento de Zoologia
Universidade de Brasília
Advisor: Miguel Â. Marini, Ph.D.

2012-2013 Graduate School Dissertation Fellow
University of Missouri-St. Louis

2007-2012 Graduate Assistant
Department of Biology
University of Missouri-St. Louis
Activities: Teach and coordinate a Human Anatomy and Physiology lab course for undergraduate students.

2006-2007 Fieldwork coordinator
Department of Zoology
University of Hawai'i at Mānoa
Activities: Organized and coordinated a bird mist-netting operation on O'ahu, Hawaii

V. TEACHING

Courses

2018-2019 Instructor
Introduction to Systems Biology (OEST 103)
University of Hawai'i at Mānoa
Activities: Develop curriculum, deliver lectures, administer examinations

2014 Field Instructor
Techniques in ornithology field course (Pantanal, Brazil)
Universidade de Brasília
Activities: Demonstration and instruction on field methods associated with the study of birds.

2007-2012 Lab Instructor
Human Anatomy and Physiology Laboratory (BIOL 1131)
University of Missouri-St. Louis
Activities: Lectures on relevant topics associated with laboratory activities; instruction on practical exercises (i.e. dissection, anatomical structure identification); setting up, administering, and grading practical exams.

2006 Teaching Intern
Animal Evolution (ZOOL 480)
University of Hawai'i at Mānoa
Instructor: John Stimson

Student Mentoring and Training.

2021- Francisca Rodríguez, PhD student, University of Hawai'i at Mānoa, Botany
Committee member
Project: Aquatic microbiomes of bromeliad axial environments

2021- Spencer Alascio, Master's student, University of Hawai'i at Mānoa, Zoology
Committee member
Project: Small lizard life-history traits and its role in invasion biology.

2021- Jose Carranza, Master's student, University of Hawai'i at Mānoa, Zoology
Committee member
Project: Diet of small lizards in an introduced lizard community.

2021- Jordan M Gossett, PhD student, University of Hawai'i at Mānoa, Zoology
Committee member
Project: Evolutionary biology of cave dwelling insects.

2020- Chasen Griffin, PhD student, University of Hawai'i at Mānoa, Zoology

PhD advisor
Project: Heterogeneity in the vectorial capacity of mosquito populations

2020- **Danya Weber, Masters student, University of Hawai'i at Mānoa, Zoology**
Masters Advisor
Project: Avian malaria and bird conservation in Hawai'i

2019 Jeromalyn Santos, REU Intern, University of Guam
Mentor
Project: Wolbachia genetic diversity in *Culex quinquefasciatus* mosquitoes on O'ahu

2019 Kahiwahiwa Davis, REU Intern, Gonzaga University
Mentor
Project: Larval mosquito development and microbiota assembly across different plant sources of detritus

2018 Kristen Feato, REU intern, Chaminade University
Mentor
Project: The avian microbiome of O'ahu forest birds

2018 Ma. Vida Amor Echaluse, REU intern, Northern Marianas College
Mentor
Project: Angiostrongylus transmission in suburban environments across an environmental gradient

2017-2020 Alex Ching, Masters student, University of Hawai'i at Mānoa, Entomology
Committee member
Project: Microbiome of tephritid flies.

2017- Randi Rollins, PhD student, University of Hawai'i at Mānoa, Zoology
Committee member
Project: The ecology of *Angiostrongylus* transmission.

2017- Maria Costantini, Ph.D. candidate, University of Hawai'i at Mānoa, Zoology
Committee member
Project: Role of the avian microbiome in conservation.

2017-2018 Stevie Kennedy-Gold, Masters student, University of Hawai'i at Mānoa, Zoology
Committee member
Project: Behavioral changes in lizards across different communities

2016-2018 Rachel Sommer, Masters student, University of Hawai'i at Mānoa, Zoology
Committee member
Project: Two invasive veronicellid slugs in the Hawaiian Islands: life history and microbiome

2017 Rachelle Tom, REU intern, Kapiolani Community College
Mentor
Project: The distribution of mosquitoes across an elevational gradient

2016- **Priscilla Seabourn, Ph.D. candidate., University of Hawai'i at Mānoa, Entomology**
PhD Advisor
Project: Ecology of mosquitoes on Maui, Hawai'i

2016- Robyn Screen, Ph.D. candidate, University of Hawai'i at Mānoa, Zoology
Committee member
Project: Behavioral and stress responses of *Anolis sagrei* to urban habitats

2015-2019 Andrew Golnar, Ph.D. student, Texas A&M University, Entomology
Committee member
Project: The influence of coinfection on arbovirus transmission ecology

2014-2015 Nicole Dubois, Master's student, Universidade de Brasília
Data analysis training
Project: Adaptive nest site choice in *Aratinga aurea*

2014-2015 Gabriela Correa, Master's student, Universidade de Brasília
Data analysis training
Project: Changes in avian community structure after fire

2010-2011	Jon-Erik Hansen, Undergraduate student, University of Missouri-St. Louis Laboratory training Project: *Avian Haemosporida in mosquito vectors.* Currently a laboratory technician at Monsanto, Inc.
2010	Genevieve Pang, Undergraduate student, Washington University Laboratory training Project: *Avian Haemosporida in Panamanian bird.* Currently a graduate student at Michigan State University.
2005-	Supervised more than 30 assistants, undergraduate students, and graduate students in ornithological fieldwork techniques.

graduate students for whom I serve as committee chair are bolded

VI. RESEARCH

Overall research statement: I am a natural historian at heart who is fascinated with the complexity of nature. This fascination compels me to maintain diverse interests in ecology, evolution, and conservation biology. While my research retains distinct foci, I am eager to explore questions that broaden my appreciation for how organisms interact with each other and their environment. A central theme of my work is to combine field, laboratory, and mathematical and theoretical techniques to answer questions in ways that could not be achieved through one technique alone. Currently, my primary research focuses on the proximate and ultimate drivers of infectious disease transmission across various ecological scales, from dynamics within host individuals, to those that manifest within and between ecological communities across heterogeneous landscapes. By elucidating these mechanisms that modulate infectious disease dynamics, we aim to inform strategies that limit opportunities for infectious disease emergence and develop evidence-based approaches that mitigate transmission risks.

VII. PROFESSIONAL SERVICE, ACTIVITIES, AND IMPROVEMENT

Peer Reviewer

The Auk	Journal of Parasitology
Biological Invasions	Malaria Journal
Behavioral Ecology and Sociobiology	Parasites and Vectors
Ecohealth	PeerJ
International Journal of Parasitology	PLoS NTD
Journal of Animal Ecology	The ISME Journal
Ecology	Microbiome

Classes and Workshops

2019	National Science Foundation DEB REU workshop in in Roslynn, VA
2018	National Science Foundation GEO REU workshop in Boulder,CO
2009	Data Analysis and Presentation in R workshop University of Missouri-St. Louis

Working Groups

2017-	Hawai'i Bird Conservation Forum
2016-	Hawai'i Mosquito Working Group
2016-	All-Mosquito Working Group (invitation only) A gathering of local, national, and international experts to review options for mosquito population suppression in Hawai'i.

International Meetings and Presentations

2019	American Society of Tropical Medicine and Hygiene Annual Meeting (poster presentation)

2008	American Association for the Advancement of Science-Pacific regional meeting (oral presentation)
2005	Cooper Ornithological Society Annual Meeting 2005 (oral presentation)
2004	Cooper Ornithological Society Annual Meeting 2004 (oral presentation)

Invited Talks

2020	Ecology, Evolution, and Conservation Biology, University of Hawai'i at Mānoa
2019	Hawaii Department of Health Vector Control Workshop Keynote
2019	Natrual Resource and Environmental Management, University of Hawai'i at Mānoa
2018	Pacific Birds meeting
2018	University of Hawai'i-West O'ahu Math+Science+*X* seminar
2017	Department of Biology seminar series, University of Hawai'i at Mānoa
2017	Pacific Biosciences Research Center, University of Hawai'i at Mānoa
2016	Pacific Biosciences Research Center, University of Hawai'i at Mānoa
2015	Wildlife Disease Association-Texas A&M Student Chapter
2015	Vector Seminar Series, Texas A&M University

VIII. GRANTS, FELLOWSHIPS, and SCHOLARSHIPS AWARDED

Grants-Awarded

2020-	$378,652	National Science Foundation DBI 1659889 REU SIE: Environmental Biology for Pacific Islanders (PI: Medeiros)
2018-	$1,061,250	National Institutes of Health P20GM125508-01 Integrative Center for Environmental Microbiomes and Human Health (Role: Project Leader) Project: Microbiome Diversity in Insect Vectors and its Influence on Pathogen Transmission (PI: Medeiros)
2017-2018	$700,000	Strategic Investment Initiative , Office of the Vice Chancellor for Research, University of Hawai'i at Mānoa Microbiomes of Hawaiian ahupua'a (ridge-to-reef) watersheds: Data acquisition and mathematical analysis to discover the basis of sustainability across vital Hawaiian landscapes Awarded to C-MĀIKI - Center for Microbiome Analysis through Island Knowledge and Investigation (Role: Investigator/ Member of C-MĀIKI Leadership Team)
2017-2019	$414,604	National Science Foundation REU Site DBI 1659889 Environmental Biology for Pacific Islanders (Role: Co-PI, PI: M. Hadfield)
2016-2018	$222,750	National Institutes of Health R21 AI128953-01 Social-ecological factors influencing receptivity to Zika virus and the efficacy of interventions in communities along the Texas-Mexico border. (Role: Investigator, PI: G.L.Hamer)
2016-2017	$250,000	Lawrence Livermore National Laboratory (05/01/16-04/30/19) Integrated vector-animal-human test bed for surveillance of high-consequence trans-boundary infectious diseases (role: Investigator, PI: G.L. Hamer)

Research Grants-Pending

2020-2024	$20,000,000	EPSCoR RII Track-1 MIDAAS- Microbiomics Integrated with Data Analytics to Advance Sustainability. (PI: Gwen Jacobs, Role: Project Leader; Mosquitoes: Biocontrol of invasive species through microbiome assisted rearing.)

Scholarships and Fellowships

2012-2013	Dissertation Fellowship

University of Missouri- St. Louis
University of Missouri-St. Louis Graduate School Fellowship in the amount of $15,000 to support a student during the final stages of a dissertation

2010 Raven Fellowship
University of Missouri- St. Louis
Department of Biology Fellowship in the amount of $7500 to support a student while conducting research for a semester.

2004-2005 Minority Access to Research Careers research student
University of Hawai'i at Mānoa
Tuition and stipend, advisor: Rebecca Cann, Leonard A. Freed; project: Avian malaria among a lowland community of forest birds on O'ahu, Hawaii

2004 Research Experience for Undergraduates student
University of Notre Dame
Summer stipend, advisor: John Adams, project: Isolation and characterization of MAEBL (merozoite apical erythrocyte-binding ligand) in rodent malaria

2003-2004 Haumana Biomedical Program research student
University of Hawai'i at Mānoa
Stipend, advisor: Leonard A. Freed; project: Reproductive Biology of the Hawai'i 'Ākepa (*Loxops coccineus coccineus*)

2003-2004 Presidential Scholar
University of Hawai'i at Mānoa
Tuition and stipend

IX. PUBLICATIONS

Golnar, A, **Medeiros, M.C.I.**, Rosenbaum, K., Bejcekm J. Hamer, S.A., & Hamer, G.L. (2021). Vector-borne blood-parasites of the great-tailed grackle (*Quiscalus mexicanus*) in east-central Texas, USA. *Microorganisms*, *9:* 504.

Juarez, J.G., Garcia-Luna, S. , **Medeiros, M.C.I.,** Dickinson, K.L., Borucki, M.K., Frank, M., Badillo-Vargas, I., Chaves, L.F., & Hamer, G.L. (2021). The eco-bio-social factors that modulate *Aedes aegypti* abundance in South Texas border communities. *Insects* 12:183.

Rollins, R. L., Cowie, R. H., Echaluse, M. V., & **Medeiros, M.C.I.** (2021). Host snail species exhibit differential *Angiostrongylus cantonensis* prevalence and infection intensity across an environmental gradient. *Acta Tropica* 216: 105824. https://doi.org/10.1016/j.actatropica.2021.105824.

Seabourn, P.S., Spafford, H., Yoneishi, N.M., & **Medeiros, M.C.I.** (2020). The *Aedes albopictus* (Diptera: Culicidae) microbiome varies spatially and with Ascogregarine infection. *PLoS Neglected Tropical Diseases* 14(8): e0008615. https://doi.org/10.1371/journal.pntd.0008615

Medeiros, M. C., Rollins, R. L., Echaluse, M. V., & Cowie, R. H. (2020). Species identity and size are associated with rat lungworm infection in gastropods. *EcoHealth*, *17*(2), 183-193.

Poh, K. C., **Medeiros, M. C**.I., & Hamer, G. L. (2020). Landscape and demographic determinants of Culex infection with West Nile virus during the 2012 epidemic in Dallas County, TX. *Spatial and Spatio-temporal Epidemiology*, 33, 100336.

Cowie, R.H., Rollins, Randi L., **Medeiros, M.C.I.,** & Christensen, C.C. (2019) New records of Clausiliidae: *Tauphaedusa tau* (Boettger, 1877)(Gastropoda: Heterobranchia) on O'ahu, Hawaiian Islands, and the first global record of infection of a clausiliid land snail with *Angiostrongylus cantonensis* (Chen, 1935), the rat lungworm. Bishop Museum Occasional Papers 126, 11–18.

Martin, E., **Medeiros, M.C.I.**, Carbajal, E., Valdez, E., Juarez, J.G., Luna, S.G., Salazar, A., Qualls, W.A., Hinojosa, S.,

Borucki, M.K. & Manley, H.A. (2019). Surveillance of *Aedes aegypti* indoors and outdoors using Autocidal Gravid Ovitraps in South Texas during local transmission of Zika virus, 2016 to 2018. Acta Tropica 192, 129-137.

Martin, E., Chu, E., Shults, P., Golnar, A., Swanson, D. A., Benn, J., Kim, D., Schneider, P., Pena, S., Culver, C., **Medeiros, M. C. I.**, Hamer, S.A., & Hamer, G.L. (2019). *Culicoides* species community composition and infection status with parasites in an urban environment of east central Texas, USA. Parasites & Vectors, 12(1), 39.

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I acknowledge that this CV is the most current and correct as of the date of the signature.

Signature  Date: 4 March 2020

Standard Operating Procedures: Mosquitoes Updated: March 9, 2021 Reed Research Group, School of Life Sciences, University of Hawai'i at Mānoa
Lead PI: Dr. Floyd Reed

Standard Operating Procedures

Mosquitoes

Mosquito rearing protocol: Mosquito eggs and/or larvae are easily collected from the wild by using standard traps (containers of aged tap water and grass clippings). Egg rafts and larvae are easily identifiable to species. Larvae are reared in tap water and fed with commercially available fish food pellets. Once larvae develop to pupae, they are transferred to 1- or 2-square foot mosquito-rearing cages (*e.g.,* BioQuip; https://www.bioquip.com) to eclose (*i.e.,* former pupae emerge as adults). Adults are provided with sugar water as a food source. Adult female *Culex quinquefasciatus* and *Aedes albopictus* require blood meals for egg development. When adults are approximately one week old they are provided up to three separate blood meals. Bloodmeals are provided in the form of commercially available bovine blood (available from Lampire Biological Products; blood is obtained from healthy, adult animals; www.lampire.com). Approximately 2-7 days after bloodmeals, containers of water are added to the adult cages to provide oviposition substrate to the gravid females. Eggs are transferred to larval rearing trays. The approximate generation time is 3-4 weeks.

Safety handling practices: Latex or nitrile gloves should be worn when handling bloodmeal material. Latex or nitrile gloves should be worn when personnel put their hands into adult cages. Mosquito traps should be checked regularly (*e.g.,* at least monthly) to ensure they are functioning properly. Electric (battery operated) aspirators, rather than mouth aspirators, should be used to extract individual adults from cages as required.

Disposal: Adult cages that have produced eggs are frozen for at least 24 hours to kill the mosquitoes. Larvae can also be killed by freezing for at least 24 hours. Between uses, all materials (*e.g.,* cages) are washed with commercial dish soap. If disinfection is deemed necessary, 70% ethanol or 10% bleach solution is used as appropriate. Biological materials are autoclaved as necessary.

Authorship: This original document was primarily written by Dr. Jolene Sutton and edited by Dr. Floyd Reed as necessary to keep it up to date.

Attachment 4

DAVID Y. IGE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

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

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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

April 30, 2020

Phyllis Shimabukuro-Geiser, Chair
Hawai'i Department of Agriculture
1849 Auiki Street
Honolulu, HI 96819

Aloha Chair Shimabukuro-Geiser,

I am writing to support the permit applications submitted jointly by the University of Hawai'i at Mānoa and Hilo for the importation of *Culex quinquefasciatus* (*Cx. quinquefasciatus*) mosquitoes. The Department of Land and Natural Resources understands that the University of Hawai'i is seeking approval to import *Cx. quinquefasciatus* containing *Wolbachia* strains *wPip4*, *wAlbA*, and *wAlbB*. These permit applications are integral to a statewide initiative, of which DLNR is a part, to suppress *Cx. quinquefasciatus* using the Incompatible Insect Technique in order to prevent the imminent extinction of many native Hawaiian forest bird species from mosquito-borne avian malaria. Protection of our native forest birds is one of the highest priorities for DLNR.

The Incompatible Insect Technique acts as a form of "birth control" by releasing male mosquitoes transinfected with a strain of the bacterium *Wolbachia* that is different from the strains found in Hawai'i. When lab-reared male *Cx. quinquefasciatus* that are infected with *Wolbachia* strains *wAlbA*, *wAlbB*, or *wPip4* mate with wild females that have the Hawai'i *wPip5* or *wPip3* strains, little to no viable larvae are produced. This technique requires repeat releases of lab-reared males to flood the population. If releases stop, mosquito population levels will rebound. This technique is safely being used worldwide to suppress populations of human disease-carrying mosquitoes.

DLNR requests that the Department of Agriculture consider these permit applications under any and all DOA statutes and administrative rules that might help to expedite permit approval while ensuring appropriate public input and environmental safeguards. In particular, DLNR draws attention to HRS §150A-6.2, which allows the DOA to issue, on a case-by-case basis, a "special permit" for the introduction of unlisted animals, such as *Cx. quinquefasciatus*, for the purpose of remediating medical emergencies or agricultural or ecological disasters, or conducting scientific research that is not detrimental to agriculture, the environment, or humans. The importer must meet permit requirements or other guidelines as determined by the Board of Agriculture.

I. The looming extinction of numerous endemic forest birds qualifies as an "ecological disaster" sufficient to justify issuance of a special permit under HRS §150A-6.2.

The forests of Hawai'i once held more than 100 species of native birds. Today, only 21 species of forest birds persist in the main Hawaiian Islands, with 12 of these currently endangered or threatened. Those that persist do so in greatly-diminished numbers, with severely contracted ranges mostly limited to high-elevation remnant native forests out of reach of non-native disease. These native birds serve critical ecological functions in our forests as pollinators and seed dispersers for the shrubs and trees that comprise our life-giving watersheds. Native forest birds also hold prominent places in native Hawaiian culture; many 'ōlelo no'eau tell of this deep cultural connection.

Avian malaria is a primary contributor to population range limitations, declines, and extinctions for Hawaiian honeycreepers. Further, this impact is predicted to be exacerbated by climate change that will allow mosquitoes to occupy currently mosquito-free high elevation forest. Five honeycreeper species are likely to lose all or most of their range and become extinct by 2100 due primarily to avian malaria: the 'akeke'e (945 individuals remaining), 'akikiki (468 individuals), 'ākohekohe (1,768 individuals), Hawai'i 'ākepa (13,892 individuals), and kiwikiu (157 individuals). Another two species are predicted to lose over 75% of their already greatly diminished current range by 2100: `Akiapōlā`au (1,496 individuals) and 'Alawī (12,501 individuals).

In 2016, a multi-agency group convened in Hawai'i to seek strategic solutions to eliminate mosquito-borne diseases affecting humans and wildlife and concluded that use of the Incompatible Insect Technique to suppress *Cx. quinquefasciatus* mosquitoes is currently the most feasible option for saving the last of Hawai'i's forest bird species.

II. Issuance of a special permit under HRS §150A-6 is justified because the importation is for the purpose of conducting non-detrimental scientific research, specifically to explore the use of the Incompatible Insect Technique for conservation purposes.

DLNR understands that the request by the University of Hawai'i to import transinfected *Cx. quinquefasciatus* mosquitoes will be quality tested to verify the reproductive incompatibility of the Wolbachia strain. If the ecological disaster classification is granted, the field releases of these mosquitoes will begin, while the UH labs can conduct additional research with this strain.

While the permit applications also seek approval for the eventual release of these mosquitoes, no releases will occur before first securing applicable permits from the U.S. Environmental Protection Agency. Additionally, DLNR is actively involved in the multi-agency Steering Committee for Landscape-scale Mosquito Control, including efforts to ensure meaninful community engagement about this issue. DLNR anticipates that an Environmental Assessment will be necessary before any release occurs at a landscape level to meet National Environmental Policy Act and Hawaii Environmental Policy Act requirements.

Additionally, information gained from this research is likely to yield lessons applicable to the potential use of the technique for human health purposes. During the 2019 legislative session, the Hawai'i State Legislature demonstrated its interest in this technique by its request for a multi-

agency report on the potential use of the *Wolbachia* bacteria to control mosquitos on a landscape scale for disease control.

DLNR also notes that the permit applications seek to bring into the State a species that is already widespread in the Islands. *Culex quinqefasciatus* was the first, and one of the most serious insect pests to come to Hawai'i, believed to have arrived on a ship in 1826. The purpose of this importation is to reduce the undeniably adverse impacts of this invasive species.

Thank you for your consideration. Please don't hesitate to ask if further clarification is needed.

Sincerely,

Suzanne D. Case

DGS

SUZANNE D. CASE
Chairperson

cc: Floyd Reed, Ph.D., University of Hawai'i at Mānoa
Jolene Sutton, Ph.D., University of Hawai'i at Hilo
Natalie Gates, DVM, Superintendent, Haleakalā National Park
Bruce Anderson, Ph.D., Hawai'i Department of Health
Katherine Mullett, U.S. Fish and Wildlife Service
Hawai'i Department of Agriculture, Plant Quarant

Signature: DGS

Email: david.g.smith@hawaii.gov

Attachment 5

DAVID Y. IGE
GOVERNOR OF HAWAII

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

ROBERT K. MASUDA
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AQUATIC RESOURCES
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

June 7, 2021

TO: Advisory Committee on Plants and Animals
Hawaii Department of Agriculture

FROM: David G. Smith, Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources

SUBJECT: Support for the importation of *Culex quinquefasciatus* mosquitoes with *Wolbachia*

The Hawai'i Department of Land and Natural Resources (Department) stands in strong support of the permit application submitted by the University of Hawai'i at Mānoa for the importation of *Culex quinquefasciatus* mosquitoes. The Department believes that the issuance of a special permit under HRS §150A-6.2 is justified given that the extinction of multiple Hawaiian forest bird species is likely within the next five years if intervening measures of mosquito control are not taken. The Department believes that the rapid decline of these endemic species fits the definition of an "ecological disaster".

Mosquitoes are not native to Hawai'i and spread diseases which threaten public health and native wildlife. Past and recent work has confirmed that the primary threat to native Hawaiian birds is avian malaria, transmitted by a non-native vector, the southern house mosquito (*Culex quinquefasciatus*). Protection of our remaining native forest birds is one of the highest priorities for the Department. Federally endangered forest birds on Kaua'i and statewide have rapidly declined in the last 20 years and have reached perilously low numbers. Surveys on Kaua'i in 2018 found only 454 'akikiki, and only 1162 'akeke'e were estimated to still exist in the wild. On Maui, surveys estimated only 1,768 'ākohekohe and 152 kiwikiu remained in 2017.

Low temperatures at high elevations have historically limited the spread of mosquitoes and the reproduction of malaria, which has a strict thermal limit. However, climate conditions in Hawai'i are changing rapidly due to global warming, allowing mosquitoes to move into areas which were formerly mosquito-free and malaria-free. Given these dire circumstances, the Department strongly supports using mosquitoes with *Wolbachia* bacteria for landscape-scale mosquito control in Hawai'i to prevent extinction of Hawaiian forest birds. Such technology is already being applied elsewhere in the US and internationally to suppress populations of mosquitoes of public health concern. The Department has been working to facilitate planning, research, and development of

the Incompatible Insect Technique (IIT) utilizing *Wolbachia* bacteria as a tool for landscape-scale control for *Culex quinquefasciatus* in Hawai'i since 2016, and the urgency of this work is heightened every passing year as populations of our unique native species continue to plummet.

The application of traditional chemical controls for mosquitoes in natural areas is impractical and causes unacceptable non-target impacts, whereas IIT carries no non-target risks to native species, humans or the environment. Furthermore, mosquitoes were first introduced to the Hawaiian Islands in the 1800s, and while they are used opportunistically as prey items, no species native to Hawai'i are dependent on their presence for survival. The control of mosquito populations in Hawaiian forests would thus cause no negative impacts on Hawaiian species.

The import of *Culex quinquefasciatus* into Hawai'i would allow the University of Hawai'i to advance research and development of the Incompatible Insect Technique in collaboration with DLNR and DOH, to meet the requirements for regulatory approval of the use of the technique in Hawai'i. The approach could eventually be used for the benefit of public health as well as for conservation.

While the applicants also seek approval for the eventual release of *Culex quinquefasciatus* mosquitoes, no releases will occur without first securing all appropriate Federal and State permits from the U.S. Environmental Protection Agency (EPA) and Hawaii Department of Agriculture, and completing environmental compliance under the National Environmental Policy Act and Hawaii Environmental Policy Act. Additionally, the Department is actively involved in the multi-agency Birds not Mosquitoes Steering Committee, which is pursuing community engagement and public outreach as utilizing this tool appears increasingly possible.

Ho, Jonathan K

From: Lukas Kambic <kambic@hawaii.edu>
Sent: Monday, June 7, 2021 2:51 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony in support of import permit for Wolbachia-transfected mosquitoes

Committee Members,

I support approval of the recommendation to allow importation and study of *Wolbachia*-transfected *Culex quinquefasciatus* mosquitoes. Worst-case potential adverse impacts in the event of unintended release are minor in magnitude, while the ecological threat of *Culex*-borne avian malaria is clear and urgent. Historical experience with biotechnology policy shows that regulatory delays often serve to amplify unjustified public mistrust. Decisive bureaucratic movement will send a broad-reaching message of commitment to defense of Hawaii's ecosystems against the accelerating avian pathogen crisis.

Thank you for your service and consideration.

Lukas J. Kambic
UH Hilo/RCUH
kambic@hawaii.edu
(808) 987-3913

Ho, Jonathan K

From: Teya Penniman <TPenniman@abcbirds.org>
Sent: Monday, June 7, 2021 3:41 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony - HDOA Plants and Animals Committee - UH Import Permit

Aloha Chair Oishi and Committee Members,

Thank you for the opportunity to provide testimony on the import permit application by the University of Hawai'i. The application seeks permission to import Hawai'i biotype *Culex quinquefasciatus* mosquitoes that have been transinfected with the *Wolbachia* bacteria for the purpose of research and eventual release for landscape-scale mosquito control.

I am the Project Coordinator for the multi-agency partnership called Birds, Not Mosquitoes and an employee of the American Bird Conservancy (ABC). I am testifying as an employee of ABC **in support** of this permit application.

You will hear from other testifiers about the dire situation our endemic forest birds are facing due to the spread of avian malaria by invasive *Culex* mosquitoes. Suppressing the vector of this disease was already considered urgent, but recent field reports have underscored just how little time we have left to save these iconic species, found nowhere else in the world.

What I want to focus on is the depth of commitment brought to the Birds Not Mosquitoes project. We have three different federal agencies, three state agencies, and four nonprofits who are working together on the use of the Incompatible Insect Technique to save our forest birds while we still have a chance. This project is guided by our Steering Committee, along with our Research and Community Engagement teams, which include the states' top forest bird experts, mosquito ecologists, vector control specialists, modelers, communications specialists, and cultural advisors. An Executive Committee comprised of state and federal agency leaders is working to expedite the project wherever feasible.

This is not your run-of-the-mill import application and it should not be considered as such. While we expect you to apply all applicable standards, we also emphasize the urgency of the situation. We believe the eventual use of the Incompatible Insect Technique in Hawai'i will be its first use in the world for conservation purposes, but it is hardly an untested strategy. Moreover, what is before you today is an application allowing the re-importation of a widely-established pest species with the potential to be a game-changer for our native forest birds. Any environmental releases will require satisfying well-defined state and federal regulatory processes. The American Bird Conservancy believes any environmental risks associated with this import permit application are extremely small, even more so when balanced against the option of doing nothing.

Mahalo for hearing my **support** of this application.

Teya
Teya M. Penniman, Coordinator
Birds, Not Mosquitoes
TPenniman@abcbirds.org
808-280-1170

Ho, Jonathan K

From: Laura Berthold <laura@mauiforestbirds.org>
Sent: Monday, June 7, 2021 4:48 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony in favor of Allowing the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species

Aloha Members of the Advisory Committee on Plants and Animals,

Please approved the request to **Allow the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species, by Special Permit, for Laboratory, Field-Release, and Area-Wide Mosquito Suppression Research.**

Without this mosquito control on the ground in Hawaii within a couple of years, **we are going to possibly lose four more native forest bird species.** We no longer have any ability to recover or prevent the extinction of our forest birds without this landscape-level tool. I have watched these birds (Maui endemic species, Kiwikiu, endangered, and the liwi, threatened) die from disease spread by mosquitoes. It is limiting their populations, reducing their numbers, and bring them to the brink of extinction!

We need to do SOMETHING to help these birds and this is our BEST chance to save these species. These birds are important to Hawaiian culture, the Hawaiian ecosystems, and should be given the ability to continue surviving in the wild. Please ACT on this opportunity to help these species.

Please approve!!

Mahalo,
Laura Berthold

--
Laura Berthold
Maui Forest Bird Recovery Project
Ornithological Research/Logistics and Outreach Technician
2465 Olinda Road, Makawao, HI 96768
(808) 573-0280- office
(808) 269-9381- cell
www.mauiforestbirds.org

Ho, Jonathan K

From: Erin Bell <ebell@mauiforestbirds.org>
Sent: Monday, June 7, 2021 4:48 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony in favor of Allowing the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species

Aloha Members of the Advisory Committee on Plants and Animals,
Please approved the request to Allow the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species, by Special Permit, for Laboratory, Field-Release, and Area-Wide Mosquito Suppression Research.
Without this mosquito control on the ground in Hawaii within a couple of years, we are going to possibly lose four more native forest bird species. We no longer have any ability to recover or prevent the extinction of our forest birds without this landscape-level tool.
It is our kuleana to protect our native forest birds as best as we can, this is our best option.
This is of utmost precedence.
Please approve!!
Mahalo,
Erin

Ho, Jonathan K

From: Zach Pezzillo <zach@mauiforestbirds.org>
Sent: Monday, June 7, 2021 4:48 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony in favor of Allowing the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species

Aloha Members of the Advisory Committee on Plants and Animals,

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Without this mosquito control on the ground in Hawaii within a couple of years, we are going to possibly lose four more native forest bird species. We no longer have any ability to recover or prevent the extinction of our forest birds without this landscape-level tool.
This is of utmost precedence. Myself, along with many others, have literally watched these species die from avian malaria. This is the only solution that can save these species.

Please approve!!

Mahalo,

Zach Pezzillo
Maui Forest Bird Recovery Project
Field and Data Technician

Ho, Jonathan K

From: Natalie Wronkiewicz <natalie@mauiforestbirds.org>
Sent: Monday, June 7, 2021 4:50 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony in favor of Allowing the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species

Aloha Members of the Advisory Committee on Plants and Animals,
Please approve the request to ***Allow the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species, by Special Permit, for Laboratory, Field-Release, and Area-Wide Mosquito Suppression Research.***
Without this mosquito control on the ground in Hawaii within a couple of years, we are going to possibly lose four more native forest bird species. We no longer have any ability to recover or prevent the extinction of our forest birds without this integral landscape-level tool.
This is of utmost precedence for forest bird conservation in Hawaii, a delicate island ecosystem.
Please approve!!
Mahalo,
Natalie

Ho, Jonathan K

From: Bret Mossman <birdshawaiipastpresent@gmail.com>
Sent: Monday, June 7, 2021 11:30 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony Mosquito Import

Aloha Kākou,

Please support this permit!

Importing mosquitoes into Hawai'i sounds crazy, but this is the first best hope we've had in the last 250 years to save our native birds from extinction.

At present there are no measures that can be taken to meaningfully reduce mosquitos on the landscape. They can be treated with chemicals and some traditional management techniques such as ungulate control helps, but every year mosquitoes continue to expand their range and kill more and more native birds.

Hawai'i is the bird extinction capitol of the world. I'm 25 and already 2 species have disappeared in my lifetime. More than 30 have vanished in the last 250 years, almost entirely due to mosquitoes.

By approving this permit researchers and state biologists will be able to get to work to develop tools to finally fight against mosquitoes in a meaningful way, and in the process work towards protecting our manu and public health.

Mahalo nui loa,

Bret Nainoa Mossman

Conservation Council for Hawai'i

Hawai'i's voice for wildlife
Kō Hawai'i o nā holoholona lōhiu

An affiliate of the National Wildlife Federation

State of Hawaii Department of Agriculture
Tuesday, June 8, 2021 9am
Via Zoom
Agenda Item V.2

Conservation Council For Hawaii strongly supports actions that will help to save our forest birds from the rapidly spreading avian malaria throughout Hawaii and therefore ask the department to determine that Avian Malaria is an ecological disaster in Hawaii, Approve a Special Permit for the *Wolbachia* Inoculated mosquitos to be brought back to Hawaii under the University Hawaii for research and release, and to understand that there are no significant effects on the environment posed by the *Wolbachia* Inoculated Mosquitoes.

Mahalo For the Opportunity to offer our support of Agenda V.2.

Attachment 5

Ho, Jonathan K

From: Hanna Mounce <mounce@mauiforestbirds.org>
Sent: Monday, June 7, 2021 11:34 AM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony in favor of Allowing the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species

Aloha Members of the Advisory Committee on Plants and Animals,
Please approved the request to **Allow the Importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species, by Special Permit, for Laboratory, Field-Release, and Area-Wide Mosquito Suppression Research.**
Without this mosquito control on the ground in Hawaii within a couple of years, we are going to possibly lose four more native forest bird species. We no longer have any ability to recover or prevent the extinction of our forest birds without this landscape-level tool.
This is of utmost precedence.
Please approve!!
Mahalo,
Hanna

Dr. Hanna L. Mounce
Coordinator - Maui Forest Bird Recovery Project
2465 Olinda Road, Makawao, HI 96768-7138 USA
www.mauiforestbirds.org

808-573-0280 MFBRP Office
808-421-7483 Cell

Ho, Jonathan K

From: Pete Jalbert <pete@mauirealestate.com>
Sent: Monday, June 7, 2021 12:01 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Importation of the Southern House Mosquito, Culex quinquefasciatus

Aloha,
I am writing in support of the importing of the Southern House Mosquito as a potential means of mosquito suppression. The expanded altitudes of avian malaria is a massive threat to our critically endangered native bird populations on Haleakala. Anything we can do at this point to protect these species is imperative. It is particularly important as warming temperatures seem to be rapidly expanding the altitude of this disease on Haleakala.

Best,

Pete Jalbert R(S)
The Maui Real Estate Team, Inc.
808 283 3868
pete@mauirealestate.com
www.mauirealestate.com

Attachment 5

National Park Service
U.S. Department of the Interior

Interior Regions 8, 9, 10, and 12

333 Bush Street, Suite 500
San Francisco, CA 94104

415-623-2100 phone
415-623-2380 fax

Interior Regions 8, 9, 10, and 12 Memorandum

Date: **June 8, 2021, 09:00 am**

To: **Advisory Committee for Plants and Animals, Hawai'i Department of Agriculture**

From: **Natalie Gates, Superintendent, Haleakalā National Park, Maui**

Subject: **University of Hawaii application to HDOA to import the transinfected *Culex quinquefasciatus* into Hawai'i , Advisory Committee for Plants and Animals**

The staff and management of Haleakala National Park, a unit of the National Park Service, would like to provide the Advisory Committee information on the potential benefits of importation by special permit of the Southern House Mosquito, *Culex quinquefasciatus*, inoculated with Wolbachia, for mosquito suppression research by the University of Hawaii. The technology is likely the best tool available to prevent extinction in several critically endangered species of Hawaiian forest birds that inhabit the lands managed by the National Park Service.

Ninety-five of 142 endemic Hawaiian bird species have become extinct and 33 of Hawai'i's remaining 44 endemic birds are listed under the Endangered Species Act. The Kiwikiu, or Maui Parrotbill, is rapidly approaching extinction with total numbers likely <200. Haleakala National Park biologists are concerned that, under current conditions, the Maui Parrotbill may become extinct in the next 5 years. The principal cause is avian malaria, transmitted by *Culex quinquefasciatus* mosquitoes, an introduced species in Hawaii.

The Maui Parrotbill currently inhabits lands managed by the National Park Service and Hawaii Department of Lands and Natural Resources. Along with these two agencies, US Fish and Wildlife Service, US Geological Survey, Hawaii Department of Agriculture, University of Hawaii, Hawaii Department of Health and several non-profit conservation groups are actively involved in developing field solutions that will save the critically endangered bird species. Standard available methods for control of mosquitoes, such as adulticidal and larvicidal pesticides, are infeasible in the rugged, remote and widespread habitat these endangered birds depend on. The risks to humans or other species from releasing Wolbachia-infected *Culex quinquefasciatus* males into areas already infested with this non-native mosquito species are believed to be negligible.

The importation of this vital biotechnology will be critical for Haleakala National Park and other land managers in Hawaii to help save Hawaiian forest birds from extinction. Please let me know if I can provide any other information to the Committee.

Ho, Jonathan K

From: Rachel Kingsley <rakingsl@hawaii.edu>
Sent: Monday, June 7, 2021 1:53 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony in support of Allowing the Importation of the Southern House Mosquito, Culex quinqefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species

Aloha Members of the Advisory Committee on Plants and Animals,
The state of Hawai'i is often referred to as the extinction capital of the United States. It's a fact that is sad and unfortunately true. For many of the endemic species that have called these islands home, it is too late. For others, they are on the brink of extinction and they may soon be gone as well. For years we have heard talk of the need and urgency to do something. The time is now. The steps needed are to control the spread of disease. I urge you to approve this recommendation and support this important landscape-level tool. The native species of these islands are what makes the islands so unique and special. Please help us to save what is left.
Mahalo for your time and consideration,
Rachel

--
Rachel Kingsley
Hawaiian Forest Bird Outreach and Education Technician
Pacific Cooperative Studies Unit
University of Hawai'i Mānoa
C/O Hawai'i Department of Land and Natural Resources
Division of Forestry and Wildlife
19 East Kawili St.
Hilo, HI 96720
Work Phone: (808)348-7898
alalaproject.org

The Nature Conservancy Hawai'i

The Nature Conservancy, Hawai'i Program
923 Nu'uanu Avenue
Honolulu, HI 96817

Tel (808) 537-4508
Fax (808) 545-2019
nature.org/hawaii

Testimony of The Nature Conservancy in support of the University of Hawai'i application for a permit to conduct laboratory and field release research using imported southern house mosquitoes, *C. quinquefasciatus* (Diptera: Culicidae), that have been inoculated with bacteria (*Wolbachia* spp.) not native to the mosquito's current internal fauna.

Advisory Committee on Plants and Animals
Hawai'i State Department of Agriculture
Virtual Videoconference Meeting
June 8, 2021 at 9:00 AM

Aloha Chairperson Oishi and Committee Members:

The Nature Conservancy (TNC) supports the University of Hawai'i application for a permit to conduct laboratory and field release research using imported southern house mosquitoes, *C. quinquefasciatus* (Diptera: Culicidae), that have been inoculated with bacteria (*Wolbachia* spp.) not native to the mosquito's current internal fauna.

This permit will allow Hawai'i to take steps toward developing and implementing a mosquito control program that uses *Wolbachia* bacteria to reduce mosquito populations throughout the state, which would have positive impacts on human health and the precarious state of native forest birds.

Hawai'i's native forest birds highlight the extraordinary biodiversity of our islands. However, these species are facing extreme threats from avian pox and avian malaria being transmitted by introduced mosquitoes. Due to the increased temperatures as a result of climate change, mosquitoes are now expanding into higher elevations where the birds had previously been safe from disease transmission. The expansion of mosquitoes is causing rapid declines in native forest bird populations.

TNC manages forest preserves throughout the state, many of which provide habitat for native forest birds. In order to ensure these endangered species will survive, bold science-based actions must be taken. Evidence has shown that mosquito control utilizing *Wolbachia* bacteria can be very effective and safe for humans, and there is growing consensus that it is the most promising approach for saving Hawai'i's native birds. Now is the time for the state and its partners to take serious action before we lose any more of our precious native birds.

Mahalo for the opportunity to support this vital effort to protect our native birds.

The Nature Conservancy of Hawai'i is a non-profit organization dedicated to the preservation of the lands and waters upon which all life depends. The Conservancy has helped protect more than 200,000 acres of natural lands in Hawai'i and Palmyra Atoll. We manage 40,000 acres in 13 nature preserves and work in over 50 coastal communities to help protect and restore the nearshore reefs and fisheries of the main Hawaiian Islands. We forge partnerships with government, private parties, and communities to protect forests and coral reefs for their ecological values and for the many benefits they provide to people.

Ho, Jonathan K

From: Anela E <[redacted]>
Sent: Monday, June 7, 2021 2:04 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony in SUPPORT of plan to control mosquitoes to save our forest birds

Aloha,
I STRONGLY SUPPORT the plan submitted that proposes the control of mosquitoes to save our forest birds. Our native forest birds are a natural and cultural treasure. Thank you for your consideration of this matter. I urge the advisory committee to support this proposal.

Ke Aloha Nō,
'Ānela

Sent from my iPhone

Attachment 5

Ho, Jonathan K

From: Lisa Cali Crampton <cali@kauaiforestbirds.org>
Sent: Monday, June 7, 2021 2:07 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] testimony in support of request to import transinfected Culex quinquefasciatus

Aloha,

I am writing in support of the application from Medeiros and Reed to import transinfected *Culex quinquefasciatus* to Hawaii for the purposes of conducting laboratory and field release research. Mosquitoes are not native to Hawaii and vector devastating human and avian diseases. As the leader of the Kauai Forest Bird Recovery Project for the last 11 years, I have witnessed increases of mosquito populations and concomitant crashes of native forest bird populations here on Kauai. Landscape-level mosquito control using these imported transinfected mosquitoes is the best hope for saving these bird species and averting an ecological disaster.

Thank you for your consideration of my testimony.

best regards,
Lisa

—
Dr. Lisa "Cali" Crampton
Project Leader
Kauai Forest Bird Recovery Project
PO Box 27 (USPS mail) or 3751 Hanapepe Rd (courier packages)
Hanapepe HI 96716
808.335.5078

Ho, Jonathan K

From: Sam 'Ohu Gon III [redacted]
Sent: Monday, June 7, 2021 2:15 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony - HDOA Mosquito Request-PA, June 8, 2021

Aloha Members of the HDOA Advisory Committee for Plants and Animals:

As a Hawaiian cultural practitioner, I **support** the application by the University of Hawai'i to import the Hawai'i biotype Culex quinquefasciatus mosquito that has been transinfected with the Wolbachia bacteria for the purpose of research and eventual release for landscape-scale mosquito control.

I recognize the huge importance that Hawai'i's native forest birds play in the cultural foundations of Hawai'i. It is deeply saddening to me that, of all the birds that contributed to the beautiful expressions of featherwork in our 'ahu'ula and mahiole, only the scarlet red-feathered 'i'iwi remains alive. The 'ō'ō and mamo, because of their habit of seasonal migration into the lowlands after mosquitoes and their diseases were introduced, were snuffed out, just as tens of thousands of Hawaiians died in the epidemics brought by Western contact. Now our native forest birds are no longer safe even in the high elevation refuges, where cool air kept mosquitoes and malaria from spreading. Global warming is allowing mosquitoes to move and persist into higher elevations where the birds had previously been safe from disease. The expansion of mosquitoes is causing rapid declines in native forest bird populations.

The goddess Lā'ieikawai lived in a house thatched with brilliant feathers, and was carried about by birds. Queen Kapi'olani's love song Ipo Lei Manu composed for Kalākaua, called him a regal 'i'iwi of the uplands. Our forest birds have always been deep in the psyche of Hawaiians. To save the living cultural legacy of our birds, Wolbachia bacteria can and should be used. We need this action now, before another vital part of our cultural foundation is lost.

Mahalo for hearing my **support** for this import permit.

Sam 'Ohukani'ōhi'a Gon III
Kumu Oli, Hālau Mele (Nā Wa'a Lālani Kāhuna)

Ho, Jonathan K

From: Lorraine Waianuhea [redacted]
Sent: Monday, June 7, 2021 2:20 PM
To: HDOA.PQ.TESTIMONY
Subject: [EXTERNAL] Testimony to APPROVE permit related to importing modified Culex quinquefasciatus

Aloha, here is my written testimony. I do not plan to deliver it live.

I strongly urge the Advisory Committee on Plants and Animals to APPROVE the permit that would "allow the importation of the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species, by Special Permit, for Laboratory, Field-Release, and Area-Wide Mosquito Suppression Research, by the University of Hawaii at Manoa..."

Ten species of Hawai'i forest birds have been declared extinct or likely to be extinct during my parents' lifetimes: Moloka'i creeper (1963), Kaua'i 'akialoa (1965), Oloma'o (1980), O'ahu 'alauahio (1985), 'Ō'ū (1987), Kaua'i 'ō'ō (1987), Maui 'akepa (1988), Kāma'o (1989), Nukupu'u (1998), Po'ouli (2004). As of today, June 8th 2021, the 'Alalā (Hawaiian crow) currently only lives in conservation breeding centers. Recent estimates indicate precipitous population declines for the Kiwikiu (Maui Parrotbill) and 'Akikiki (Kaua'i Creeper). Clearly, we are in an extinction crisis. Decades of avian malaria studies by expert researchers in Hawai'i conclude that avian malaria is the greatest immediate threat to the survival of many of our native forest bird species. Importing Culex quinquefasciatus modified with Wolbachia to Hawai'i under this special use permit is a critical first step to implementing successful landscape-scale mosquito control to prevent the extinction of Hawaiian honeycreeper species due to avian malaria. Today, I can only learn about the Kaua'i 'ō'ō through illustrations, a handful of photos, written accounts, and museum specimens. I do not want to have to explain to my future children and grandchildren what a Kiwikiu or 'Akikiki is in that way. I imagine a future where I can take them into the forest so they can experience these birds in person, however that future will not exist without mosquito control and avian malaria management. Extinction is forever. Our Hawaiian honeycreepers are running out of time. Please APPROVE this permit so our birds can get the help they desperately need before it is too late.

No kākou ke kūleana. This is our responsibility to future generations.
Lorraine Kamamoali'i'aimokuakamakeaweamahi Waianuhea
Resident of Hilo, Hawai'i
Bachelor's of Science in Biology

State of Hawaii
Department of Agriculture
Plant Industry Division
Plant Quarantine Branch
Honolulu, Hawaii

June 22, 2021

Board of Agriculture
Honolulu, Hawaii

SUBJECT: Request for: (1) Preliminary Approval of Proposed Amendments to Chapter 4-71, Hawaii Administrative Rules, "Non-Domestic Animal Import Rules," to Remove the Vasa Parrot, *Coracopsis vasa,* from the List of Restricted Animals (Part B), and add it onto the List of Conditionally Approved Animals;

(2) Authorization for the Chairperson to Schedule a Public Hearing and Appoint a Hearing Officer in Connection with Proposed Amendments to Chapter 4-71, Hawaii Administrative Rules, "Non-Domestic Animal Import Rules," to Remove the Vasa Parrot, *Coracopsis vasa,* from the List of Restricted Animals (Part B), and add it onto the List of Conditionally Approved Animals;

(3) Provided the Vasa Parrot, *Coracopsis vasa* is Placed on the List of Conditionally Approved Animals, Allow the Importation of One Vasa Parrot, *Coracopsis vasa*, by Permit, for Individual Possession as a Domestic Animal Companion, by Lise Madson; and

(4) Provided the Vasa Parrot, *Coracopsis vasa,* is Placed on the List of Conditionally Approved Animals, Establish Permit Conditions for the Importation of One Vasa Parrot, *Coracopsis vasa,* for Individual Possession as a Domestic Animal Companion, by Lise Madson.

I. Summary Description of the Request

PQB NOTES: *The Plant Quarantine Branch (PQB) submittal for requests for rule amendments, import or possession permits, as revised, distinguishes information provided by the applicant from procedural information and advisory comment and evaluation presented by PQB. With the exception of PQB notes, hereafter "PQB NOTES," the text shown below in Section III from page 3 through page 8 of the*

C75

submittal was taken directly from Lise Madson's application and subsequent written communications provided by Ms. Madson. For instance, the statements in Section III beginning at page 3 regarding information in support of the request are the applicant's statements in response to standard PQB questions and are not PQB's statements. This approach for PQB submittals aims for greater applicant participation in presenting requests in order to move these requests to the Board of Agriculture (Board) more quickly, while distinguishing applicant-provided information from PQB information. The portion of the submittal prepared by PQB, including the Factual Background of the Petition, Proposed List Changes, Advisory Subcommittee Review, Advisory Committee Review, and Proposed Permit Conditions are identified as Sections II and IV, V, VI, and VII of the submittal, which start at pages 2, 9, 9, 13, and 18 respectively.

We have a request to review the following:

COMMODITY: (1) Vasa Parrot, *Coracopsis vasa*.

SHIPPER: Lise Madson, [redacted]
Phone No.: [redacted]

IMPORTER: Lise Madson, [redacted]

CATEGORY: The Vasa parrot, *C. vasa,* is currently on the List of Restricted Animals (Part B). Pursuant to Hawaii Administrative Rules (HAR) Chapter 4-71, *C. vasa* may be imported into Hawaii for private and commercial use, including research, zoological parks, or aquaculture production. Ms. Madson is requesting that this species be reviewed and considered for placement on the List of Conditionally Approved Animals (CA List), which is incorporated under Chapter 4-71, HAR. If the Board grants preliminary approval for future placement, pursuant to the rulemaking requirements of Chapter 91, Hawaii Revised Statutes, the CA List will be amended to include *C. vasa.* Organisms on the CA List are allowed for individual possession, businesses, government agencies, or institutions.

II. Factual Background of the Petition

In 2019, Ms. Madson initially contacted the Hawaii Department of Agriculture (HDOA) PQB and inquired about importing a Vasa Parrot, *C. vasa*, into Hawaii. PQB staff informed Ms. Madson that under Chapter 4-71, HAR, the PQB's Non-Domestic Animal Import Rules, the Vasa Parrot is currently listed on the Department's RB List. The PQB informed Ms. Madson that the import of animals on the RB List are not allowed for personal use and/or individual possession, and is limited to certain purposes, such as

private and commercial use, including research. Ms. Madson was informed that an amendment to Chapter 4-71, HAR would be necessary before the Vasa Parrot could be imported for individual possession, and she submitted a petition for placement of *C. vasa* on the CA List as animals on this list are allowed for individual possession. Ms. Madson's original petition is included as Appendix A.

At the Board's April 14, 2020 meeting, this petition was originally reviewed by the Board and denied. At that time, due to Governor Ige's COVID-19 emergency proclamation to maintain public safety, members of the public were not allowed to attend the Board's meeting. Ms. Madson was informed of the Board's denial via email by PQB staff. However, due to the possibility that an email did not meet notice requirements, the PQB requested that Ms. Madson's petition be reconsidered for review. The Board, on its own motion, re-heard Ms. Madson's request at its meeting on December 15, 2020. Ms. Madson was able to attend virtually and speak on behalf of her petition, and as a result, the Board deferred her request and directed the PQB to complete the review so the Board could make a better determination at a future meeting. Because of the Board's directive, the PQB has performed a complete review as part of the rulemaking proceedings, including establishing permit conditions.

On May 17, 2021, Ms. Madson served the Department with a formal complaint to immediately initiate rulemaking. The complaint is attached as Appendix B.

On May 18, 2021, this request was submitted to the Advisory Subcommittee on Land Vertebrates for their review.

At the Board's May 25, 2021 meeting, the Board reviewed Ms. Madson's complaint and request to immediately initiate rulemaking. After review, the Board denied Ms. Madson's request without prejudice and again directed the PQB to go through the review process; then it would be brought back before the Board for possible future rulemaking.

The request was subsequently reviewed by the Advisory Committee on Plants and Animals (Committee) on June 8, 2021.

PQB NOTES: *On March 2, 2021, Ms. Madson was provided with a draft version of this submittal for review. Using this, she has provided two separate submittals with differing points from what was provided by PQB, particularly with regards to information provided regarding the Factual Background Section. The first revised submittal has been included as Appendix C. Just prior to Committee review, Ms. Madson subsequently revised her submittal. It was presented to the Committee and is included as Appendix D.*

III. Information Provided by the Applicant in Support of the Request

PQB Notes: *The information provided in this section is copied directly from Ms. Madson's most recent revised submittal, Appendix D.*

The vast majority of parrot species are already included in the list of Conditionally Approved animals, pursuant to HAR § 4-71-6.5:

FAMILY Psittacidae

Agapornis (all species in genus)
Alisterus (all species in genus)
Amazona (all species in genus)
Anodorhynchus (all species in genus)
Aprosmictus (all species in genus)
Ara (all species in genus)
Aratinga (all species in genus except~- nana astec)
Bolborhynchus lineola
Cacatua (all species in genus)
Callocephalon fimbriatum
Calyptorhynchus (all species in genus)
Cyanoliseus patagonus
Cyanoramphus (all species in genus)
Deroptyus accipitrinus
Eclectus roratus
Elophus roseicapillus
Enicognathus (all species in genus)
Eunymphicus cornutus
Leptosittaca branickii
Melopsittacus undulatus
Neophema (all species in genus)
Nymphicus [holandicus) hollandicus
Pionus (all species in genus)
Platycercus (all species in genus)
Poicephalus (all species in genus)
Polytelis (all species in genus)
Probosciger aterrimus
Psephot.us (all species in genus)
Psittacula alexandri
Psittacula cyanocephala
Psittacula·cterbiana
Psittacula eupatria
Psittacula himalayana
Psittacula roseata
Psittacus erithacus

Purpureicephalus spurius
Pyrrhura (all species in genus)
Tanygnathus (all species in genus)

Petitioner is not a natural scientist by trade but has a graduate degree in law and was a practicing judge. Petitioner prefers to rely on the information included in the technical report prepared by Phillip Greenwell, M.S. (Wildlife Management and Conservation) who has field experience in the management, control, and assessment of avian invasive species in island environments and is better suited to gauge the accuracy and relevancy of the information. (Appendix C, Exhibits 4 and 5). Petitioner sought Mr. Greenwell's review largely to provide PQB with the technical information it admitted it was lacking during the April 14, 2020 Board meeting to enable it to move forward with her petition for rulemaking. Dr. Patrick Hart, Ph.D., an avian biologist and ecologist of the Biology Department of the University of Hawaii, Hilo Campus, confirms and supports the findings of Ms. Greenwell's review. (last page of Appendix C)

Of note, Mr. Greenwell's review includes a risk assessment of invasiveness for *C. vasa* in Hawaii using guidelines provided by the World Organization of Animal Health (OIE). The OIE guidelines for assessing the risk of non-native animals becoming invasive are the gold standard for evaluating the potential for a species' invasiveness around the world and are recommended for use in the Convention on Biological Diversity (CBD). Mr. Greenwell also draws elements for his review from the *Hawaiian Pacific Weed Risk Assessment*, which provides modified assessment protocols for alien plant species.

While key excerpts of Mr. Greenwell's review are provided below, PQB and the Board are urged to consider the review in its entirety. *C. vasa* is native to Madagascar. There are no known feral colonies of the species outside its native range.

- Primarily the route of establishment is very restricted. There is a limited breeding population within North America, and there have been no exports of this species from its native habitat since 1993. It is highly unlikely sufficient numbers would be imported to found a potential feral colony.

- The pathway of invasion is strictly control or restricted. All imports must pass through the Hawaiian Department of Agriculture for approval. It is possible to therefore limit both numbers and sex of the species to ensure a suitably biased demographic (i.e. all males). Health and security are also similarly governed so risk of accidental escape or the introduction of pathogens or parasites is also controlled.

- Unlike other parrot species (with the exception of one other species, the Eclectus parrot) Vasa parrots have a complex polygynandrous breeding system. To

successfully rear young[,] females depend on multiple attending males to feed her intensely across the breeding season. Unless a large founding population is simultaneously introduced[,] then it is unlikely that the correct sex ratio will be achieved in Hawai'i. It is possible that multiple males are required to help provide the nourishment to the rapidly developing chicks (one of the fastest development times in psittacines). Lack of food of suitable quantity or quality can stunt or limit growth during this critical development time. It has been proposed that food availability might be an ecological constraint, one which applied selective pressures towards this unusual reproductive system in *Coracopsis* species.

- Unlike the other psittacines established in the state vasa parrots are obligate secondary nest cavity users. This means that [these] birds do not excavate nests or modify/enlarge existing holes, but must find appropriately sized cavities to nest in. The other species currently feral in the state (Cockatoos, Amazons and conures) are all adept at modifying existing cavities. No gnawing/chewing behavior has been observed in Vasa parrots, indeed they are generally a non-destructive species and one of the few larger species that may be maintained in planted flights in captivity. Therefore suitable nest sites are likely to be a limit[ing] resource for this species (particularly given the number of other psittacine species in the state competing for the nesting sites).

- Unless a large consignment of birds is released simultaneously into the habitat then smaller locali[z]ed escapes of individual are unlikely to establish viable populations, given the constraints of founder population dynamics. Genetic bottlenecks and inbreeding are likely to reduce fitness in species with low founder populations. Immigration of unrelated individuals is required to sustain genetic diversity and of course this would be controlled by import permits.

- Changes to the basal metabolic rate in this species requires a greater quantity and/or quality of food to accommodate for these changes. It is possible that these changes are associated with breeding and parental behav[io]rs, particularly as the development of the young is fast, and again can be referred to the breeding system with multiple males delivering food to the female. Given the nutritional requirements for successful reproduction, it is unlikely that in a novel habitat with unfamiliar food resources[,] that a foundling population will find sufficient material to meet calorific and dietary needs.

- Despite the rapid development of the young birds, Vasa parrots nest only once in their native habitat. Clutch size is also small, approximately 4 eggs.

- This species was intentionally released/introduced into an alien environment (Reunion Island) and the population failed to establish. It is unknown how many individuals were released, or the processes involved, but it is important to note that they have been purposely released without success of establishment.

Mr. Greenwell concludes that the introduction of the vasa parrot does not represent a threat of invasion in the state of Hawaii, in its own right, or, when compared to other Psittacidae members. *C. vasa's* low potential for invasiveness is based on its life characteristics and other attributes. Given the species' unusual breeding system, unique dietary requirements, and obligate cavity nesting needs, it appears unlikely that a wild population could become established, even in the unlikely situation where multiple birds were imported in the future. Indeed, a review of the literature shows that the species has not ever successfully established a feral population outside its native habitat of Madagascar, even when an intentional attempt to colonize *C. vasa* was made. In addition, the species is not particularly popular in the pet trade due to what many find an undesirable appearance, and as a result, it is imported into the United States in low numbers. These factors provide strong support for the State of Hawaii to transfer *C. vasa* from the "restricted animal" to the "conditionally approved" animal list, where the vast majority of Psittacidae—several of which have a greater potential for invasiveness--are placed. The reproductive biology, social structure and unique dietary requirements of *C. vasa* are similar to that of the eclectus parrot, which is on the "conditionally approved" list of Psittacidae, providing additional support of transfer of *C. vasa.*

In reviewing Mr. Greenwell's review as a whole it does not appear there are any identifiable negative environmental consequences to importing this organism into Hawaii that are different from those associated with a large number of parrot species that are already on the Conditionally Approved list. There are no known negative potential impacts to native or endemic species given the quarantine requirements for all parrots. There is no evidence to suggest that the impact of importing the Vasa parrot is greater than that of the many Conditionally Approved parrots, and much evidence suggesting that the impact of importing the Vasa parrot would be less than that of many parrots that are already on the Conditionally Approved list. The vast majority of parrot species are already included in the list of Conditionally Approved animals, pursuant to HAR § 4-71-6.5:

PROPOSED USE: The Petitioner will maintain the animal for individual possession as a domestic animal companion for personal home use and enjoyment. The Petitioner will keep the animal indoors at her personal residence and will not allow the animal to fly freely in the wild. When the animal is not under the Petitioner's direct supervision and observation, the animal will be maintained in a secure cage or aviary. The Petitioner will provide regular veterinary check-ups and veterinary care to prevent disease. The Petitioner has no plans to breed the animal. Upon the animal's death, the Petitioner will

responsibly dispose of its remains as stated above. The Petitioner's proposed use is similar to that of a "pet".

DISCUSSION:

1. **Person Responsible:** Lise Madson, JD, [redacted] (See Appendix E for Lise Madson's resume)

2. **Safeguard Facilities and Location:** Madson residence, [redacted]

3. **Method of Disposition:** Due to the uniqueness of the parrot, if the parrot were to die, it's body would be donated to the University of Hawaii at Hilo Biology Department for use or dissection and be kept frozen until use, and would be cremated after their use, to prevent any chance, however slim, of spread of disease or contamination.

4. **Abstract of Organism:**

   a. Common Name: Greater Vasa Parrot; Scientific Name *Coracopsis vasa.*

   b. Organism's Life History: Please see Review provided by Phillip Greenwell, *Review of the potential invasiveness of the Vasa parrot (Coracopsis vasa) as compared to other members of the Psittaciadae family*, for more detailed information. (Appendix C, Exhibits 4 and 5)

5. **Effects on the Environment:** Negligible. Please see Review provided by Phillip Greenwell, *Review of the potential invasiveness of the Vasa parrot (Coracopsis vasa) as compared to other members of the Psittaciadae family*, for more detailed information. (Appendix C, Exhibits 4 and 5)

6. **Biosecurity:** Petitioner will keep animal indoors at her personal residence. At all times when the animal is not under her direct personal observation and supervision, the animal will be kept in a secure cage or aviary. Petitioner will not allow the animal to fly freely outdoors in the wild. Petitioner will provide regular veterinary maintenance and care to prevent disease. Petitioner has no plans to breed the animal. Petitioner will contact the DOA/PQB in the unlikely event of an accidental escape into the wild.

7. **Alternatives:** N/A

IV. Proposed List Changes

Ms. Madson is proposing to change the placement of the Vasa Parrot, *C. vasa,* from the List of Restricted Animals (Part B), and to be placed on the List of Conditionally Approved Animals. Ms. Madson is proposing the following amendments to achieve this:

1. Section 4-71-6.5, List of Restricted Animals (Part B)

   Removes Scientific Name: "*Coracopsis vasa*" and Common Name: "Parrot, Vasa".

2. Section 4-71-6.5, List of Conditionally Approved Animals

   Adds Scientific Name: "*Coracopsis vasa*" and Common Name: "Parrot, Vasa".

V. Advisory Subcommittee Review

This request was submitted to the Advisory Subcommittee on Land Vertebrates for their review and recommendations. Their recommendations and comments are as follows:

1. **I recommend approval ___ / ___ disapproval to remove the Vasa parrot, *Coracopsis vasa*, from the List of Restricted Animals (Part B), and add it onto the List of Conditionally Approved Animals.**

Dr. Allen Allison, Vice President/Assistant Director, Research and Scholarly Studies, Bernice Pauahi Bishop Museum: Recommends Disapproval.

> Comments: "I think that it would set a very bad precedent to add a restricted species to the List of Conditionally Approved Animals simply because this is apparently the only way for someone to bring, what is in effect a pet, to Hawaii. I can accept that *Coracopsis vasa* is unlikely to be invasive, etc., but there is still a risk, and I think that it would be foolish to take that risk just so someone can import a pet, however compelling the circumstances."

Dr. Sheila Conant, Professor/Chairperson (ret.), University of Hawaii at Manoa, Department of Zoology: Recommends Disapproval.

> Comments: "The Board should not approve this petition because approval would set a precedent of making exceptions to our rules and regulations prohibiting importation of non-native animals. I realize this is an application from a pet owner for a single, pet animal. However, if it is approved, HDOA is likely to be deluged with similar applications.

Parrots are on the List of Restricted Animals because they have the potential to escape into the wild and damage agriculture and native ecosystems. Although this is only one bird, someone else might import another individual of the same species, but different sex. Both animals might escape and establish a population. As unlikely as this appears to be, it has happened before and may well happen again if this application is approved.

Protecting Hawaii's native biota and ecosystems is a serious responsibility of HDOA (as well as DLNR) and should take precedence over the desires of an individual to import her pet."

Dr. Fern Duvall, Ecosystems Protection and Management, Hawaii Department of Land and Natural Resources-Division of Forestry and Wildlife: Recommends Disapproval.

Comments: "I have read the analysis of Dr. Hart of UH and do agree that the species is perhaps among the least likely of even the conditionally approved parrots to become established in the wild. Nonetheless, I think setting a precedent for parrot species conflicts with Chapter 183D of the HRS and should not be permitted.

Under statutory authorities provided by Chapter 183D, Hawaii Revised Statutes, the Department of Land and Natural Resources maintains Hawaii Administrative Rules Chapter 124, which defines 'injurious wildlife' as 'any species or subspecies of animal except game birds and game mammals which is known to be harmful to agriculture, aquaculture, indigenous wildlife or plants, or constitute a nuisance or health hazard and is listed in the exhibit entitled 'Exhibit 5, Chapter 13-124, List of Species of Injurious Wildlife in Hawaii...'

Under HAR 13-124-3 (d), no person shall, or attempt to:

1. Release injurious wildlife into the wild;
2. Transport them to islands or locations within the State where they are not already established and living in a wild state;

Injurious Wildlife Export Permits
As authorized by the Board of Land and Natural Resources, the Division of Forestry and Wildlife may permit for export of injurious wildlife in certain situations. DOFAW will consider permit applications on a case-by-case basis, but general guidelines are as follows:

- **Research, educational display, or exhibition (e.g., universities, zoos, museums):** Project leaders should submit an export application along with a copy of a government-issued photo ID, and a letter on institutional letterhead

describing the research and/or educational use of the exported individuals, along with a plan for safely collecting and transporting the individuals.

I point out that DOFAW Mr. David G. Smith previously did not find the research justified – so I think the Vasa parrot import should be denied for it would make unprecedented changes to the Chapter 183D HRS.

The current, official list of injurious wildlife in Hawaii can be found in HAR 13-124, Exhibit 5. Examples of injurious wildlife include:

- All species in the family PSITTACIDAE (Parrots)"

Dr. Isaac Maeda, DVM, State Veterinarian, HDOA-Animal Industry Division: Recommends Approval.

Comments: None provided.

Mr. Tom May: No response.

Dr. Carolyn McKinnie, DVM, Supervisory Veterinary Medical Officer, USDA, Animal and Plant Health Inspection Service-Animal Care: Recommends Approval.

Comments: "Based on the science and research submitted, it doesn't appear that the Vasa parrot would cause harm if accidentally released. It doesn't appear to be able to survive in the wild in the case of accidental release in its non-native habitat. The requirements for it to breed and nest are challenging and unlikely to occur in Hawaii."

2. Provided the animal is placed on the List of Conditionally Approved Animals, I recommend approval ___ / ___ disapproval to allow the importation of one vasa parrot, *Coracopsis vasa*, by permit, for individual possession as a pet by Lise Madson.

Dr. Allen Allison: Recommends Approval.

Comments: "I am recommending that *Coracopsis vasa* not be placed on the List of Conditionally Approved Animals. However, if it is placed on the list, then there is no reason to deny a request to import a single individual."

Dr. Sheila Conant: Recommends Disapproval.

Comments: "See above comments."

Dr. Fern Duvall: Recommends Disapproval.

Comments: "Please see my comments and reasoning in #1 above, as the reasoning remains pertinent to the species and case."

Dr. Isaac Maeda: Recommends Approval.

Comments: "Conditional by permit should be OK."

Mr. Tom May: No response.

Dr. Carolyn McKinnie: Recommends Approval.

Comments: "Birds are regulated under the AWA though no standards have been set as yet. Currently, we are in the process of developing bird standards so in the future birds will be regulated and inspected by USDA for exhibitors, breeders and dealers. However, any animal in private ownership would not be regulated. This applicant is not licensed with USDA.

Based on science and research, the likelihood of escape and surviving in the wild is low.

In the application, housing and husbandry are not described if the parrot was allowed to be imported into Hawaii. It's housing, husbandry and feeding needs to be delineated."

3. Provided the animal is placed on the List of Conditionally Approved Animals, I recommend approval ___ / ___ disapproval to establish permit conditions for the importation of one vasa parrot, *Coracopsis vasa*, for individual possession as a pet by Lise Madson.

Dr. Allen Allison: Recommends Approval.

Comments: Again, I am not recommending that *Coracopsis vasa* not be placed on the List of Conditionally Approved Animals. However, I find the permit conditions reasonable if *Coracopsis vasa* is placed on the List of Conditionally Approved Animals and the request to import a single individual is approved."

Dr. Sheila Conant: Recommends Disapproval.

Comments: "See above comments."

Dr. Fern Duvall: Recommends Disapproval.

Comments: "See above in point #1. Also, research on a single Vasa parrot would not elucidate the research hypotheses generally for the species. It would provide only so much individual bird knowledge as was gleaned from Dr. I. Pepperberg's fascinating work with the single bird 'Alex,' and for which I believe has not been reproduced in research with any other gray parrots to my knowledge."

Dr. Isaac Maeda: Recommends Approval.

Comments: None provided.

Mr. Tom May: No response.

Dr. Carolyn McKinnie: Recommends Approval.

Comments: "N/A"

VI. Advisory Committee Review

This request was presented to the Committee at its meeting on June 8, 2021, via a Zoom meeting. Acting PQB Manager Jonathan Ho provided a summary of the request. Committee Chairperson Darcy Oishi asked if the Committee had questions for the PQB or the applicant.

Committee Member Rob Hauff said that the lists already have broad categorizations of organisms on them, and he was struggling with the possibility of setting precedent with this proposal. He said it appeared that this was low risk because it is a single male bird that would be kept indoors and asked if changing the list placement was the only way to accommodate the request, or was there a way to provide an exception without changing the rules? Mr. Ho said, "correct" and the list placement defines who can import an animal and also the specific uses that the animal could be used for. He said that an animal on the List of Restricted Animals, Part B (RB List) could not be imported as a domestic animal companion and that there were certain provisions for unlisted animals, such as the prior mosquito request by special permit; therefore, the only way to issue a permit in this instance would be to change the list placement.

Committee Member Hauff asked if a reptile collector requested a rare snake to be placed on the List of Conditionally Approved Animals (CA List), would that be analogous to this situation? Mr. Ho said that he understood where Mr. Hauff was coming from and that anyone has the ability to submit a petition. He noted that from a regulatory standpoint, the Vasa parrot, which likely poses a similar risk to those birds already being allowed on the CA List, could still be disapproved by the Board. Mr. Ho said that

ultimately PQB enforces the rules, noting the Advisory Subcommittee responses were very varied with both approvals and disapprovals and there was no way to guarantee that the Vasa Parrot would not be invasive. He said that if the Vasa parrot is placed on the CA List, then it would be eligible for importation by any other individual for any approved purpose. Mr. Ho said that if the Committee is concerned about the possibility of escape and establishment, then the conditions could be amended to allow the importation of males, only. He said that the review process is designed to assess the potential for risk, even with animals with little background information, and if there is not enough to properly assess risk, then the request could ultimately be denied.

Committee Member Hauff said the permit conditions state that the bird needs to be imported into Honolulu. He said the DLNR injurious wildlife rules restrict movement interisland, so how would the applicant get the bird to Hawaii Island? Mr. Ho said that the Board determines the approved ports of entry and Honolulu is the only full port of entry. He said that any bird species that is imported has to come to Honolulu. Mr. Ho said PQB's understanding of the injurious wildlife rules was they restricted the interisland movement of species from an island they are established to an island where they are not established. He gave an example of a parakeet being imported into Honolulu, inspected, then given a certificate to move to Kauai. Committee Chair Oishi asked if the importation process would not be complete until the animal arrives at its neighbor island destination? Mr. Ho said, "no", the inspection would be conducted in Honolulu, and if it passes inspection, would then be certified for inter-island movement. Mr. Hauff asked if the import process is what determines the exemption from the DLNR rules? Mr. Ho said that when those rules were initially enacted, there was a question about how imports would work due to the port-of-entry issue. Mr. Ho said that the Land Vertebrate Specialist at that time, Mr. Keevin Minami, said he spoke to Mr. Chee at DLNR, who said that because the animals were not collected, they were exempt from the regulation and PQB has been operating under this premise.

Committee Chair Oishi said that some of the Subcommittee members noted the precedent-setting nature of this request and asked if there has been an RB List to CA List change before? Mr. Ho said that he was not aware of any recent requests of that nature but noted that in the '90s there were a lot of requests to add unlisted animals to the CA List. He said the only recent instance of a downward placement of an animal was the change in placement of water buffalo from the List of Restricted Animals, Part A, to the RB List. He said with regards to precedent, anyone has the right to submit a petition and go through the process. Mr. Ho said that he didn't think this was precedent setting but noted that it could feel that way due to the complaint and PQB was going through the process to be compliant.

Committee Member Dr. Benton Pang said the lists were created some time ago. He asked how are the lists updated and who is responsible for those updates? Mr. Ho said

that statutorily, any change to the lists would come before the Committee for review. He said any changes would be the responsibility of PQB. Mr. Ho noted that the lists were old and that a comprehensive review of the lists had not been done for some time. He said that for every animal on a list, the review of an individual species involves a lot of work, noting how in-depth a submittal is, that PQB is not currently set up to undertake a comprehensive review of the lists, and doing so would require tremendous resources. Mr. Ho said that PQB is working on individual requests as received to update conditions to address current risks as this is more manageable, while trying to determine a long-term solution to list placement. He said there is a potential for other agencies to start the process and noted PQB did collaborate with DLNR Division of Aquatic Resources on the process to restrict some aquatic species. Mr. Ho said setting a priority or need for changes would make the changes more manageable. He noted removal of certain amphibians from the CA List due to the U.S. Fish and Wildlife Service restrictions, based on the risk of spreading Chytrid fungus, would be a good compartmentalized undertaking.

Committee Member Dr. Pang asked if there has been a prior instance of allowing only a single animal as a domestic animal companion? Mr. Ho said that he was not aware of that but noted that it is within the Committee's authority to make a recommendation to allow it. Committee Member Kenneth Matsui said that the Committee had allowed a single pet turtle many years prior. Mr. Ho said that it was possible that there was an allowance for that situation because prior to the mid-2000s animals on the RB List could be imported as pets on a case-by-case basis, noting that it was possible to have a monkey as a pet; however, that provision has since been removed. Chair Oishi said that the changes to restrictions for pets happened at the same time the regulations for primates changed.

Committee Member Hauff said he had seen the request for public hearings come before the Board at the May meeting, which was denied, and asked why it is back before the Committee now? Mr. Ho said that PQB has been working with Ms. Madson to do the review, but she filed a formal complaint, so the Board chose to immediately review the request because they have the authority to go straight to the next steps in rulemaking, which was the public hearing. He said that PQB had already submitted the request to the Subcommittee for review and had planned the Committee review, so the Board decided to delay the request so that a complete review could occur at the June Board meeting for a final determination.

Chair Oishi noted that Emily Gardner had comments. Ms. Gardner introduced herself and stated she was representing Ms. Madson. Ms. Gardner noted the PQB had suggested Ms. Madson petition the Board and that the literature review provided by Mr. Greenwell and statement by Dr. Hart both indicated that the Vasa parrot poses less of a risk to the environment than the parrot species that are already on the CA List. She

noted that Vasa parrots have odd reproductive behavior and environmental requirements for reproduction, and they bond very closely with their owners. She said the chance of escape of this particular animal is minimal but noted it did not address the broader concern should other individuals want to import Vasa parrots. Ms. Gardner said that there has been almost no successful breeding of this species in captivity or outside its native habitat. She said the applicant is committed to being a responsible owner and was open for questions.

Committee Member Matsui said Fireweed, *Senecio madagascariensis,* is a big problem for ranchers because if cattle eat it, they can die. He asked if the Vasa parrot used fireweed as nesting material? Ms. Gardner said that she was an attorney, not a scientist, but could relay that question to the appropriate individuals and get a response back to the Committee. Mr. Matsui said the problem is that the change in placement was the issue not the individual bird. Ms. Gardner said that she understood the placement issue. Mr. Matsui said that a moth, *Secusio extensa*, a fireweed biocontrol agent, was released to control fireweed and asked if the Vasa parrot would eat the moth. Ms. Gardner said she was unsure but said that it was likely that other parrot species on the CA List are already doing so. Mr. Matsui said that because fireweed and the Vasa parrot are both from Madagascar, there could be an inherent resistance to the toxins within fireweed which warrants additional consideration. Ms. Gardner responded that Dr. Hart of UH Hilo would likely be able to answer these technical questions.

Chair Oishi asked if there were any further questions. Dr. Pang asked if there were conditions to ensure the imported animal would not be a potential vector for diseases or parasites. Ms. Gardner said that Ms. Madson was open to any reasonable requirements and noted the request was reasonable. Mr. Ho noted that proposed Condition No. 7 addressed the concern, noting that banding and 7-day mosquito-proof enclosure requirements also need to be followed as they are requirements by the HDOA Division of Animal Industry (AI). He said should the request be approved, that upon import, the parrot would be taken to the AI facility at the airport to ensure disease requirements are met and PQB inspectors would conduct the inspection at the AI office. Mr. Matsui asked if AI still required banding? Mr. Ho said that the conditions were reviewed by Dr. Isaac Maeda, State Veterinarian, who recommended establishment of the conditions as provided, therefore assumed the requirement to still be in effect.

Committee Member Dr. Maria Haws said the assessment appeared solid from a scientific standpoint and the lists are outdated. She said that there has been considerable time given in reviewing these requests, and there are organisms with inappropriate list placement. She said she understands PQB's constraints, but something needs to be done about revising the lists and changing the rules so requests can be reviewed in a more efficient fashion.

Chair Oishi called for a motion. Mr. Matsui recommended that approval be granted with a requirement that only males be allowed as this would allow import and minimize the risk of establishment. Chair Oishi seconded the motion and asked for further discussion or public comment. Mr. Hauff asked if a male only requirement would be feasible? Mr. Ho said that it could be done and that should this be approved, the list placement would only make the Vasa parrot eligible for importation. Should another individual request import for a purpose different than what is proposed here, they would have to go through the full review. He also noted that there are already bird species on the list that are male only. Chair Oishi asked if the applicant was responsible for ensuring that the animal is a male. Mr. Ho said that the health certificate would indicate sex.

Committee Member Haws stated that if the proposal to accept males only is accepted, what would happen to a future individual on Kauai that wants to import a female Vasa parrot? Would there be females only on Kauai and males only on Hawaii Island? She said that it seemed silly that the first applicant would set the standard for importation and that it did not seem like a very scientific approach. Mr. Matsui said that finches have been males only for decades and that has limited risk of them getting established. Dr. Haws agreed that a mono-sex population did reduce risk, but it highlighted that the process was piecemeal and needs to review the way that this is done. She also asked how do you get something off the CA List; does someone from the public need to petition the Board to do that? She felt that the likelihood of that would be low and that the agency should be doing that work and noted she was not objecting to the particular request but was reiterating that the way the conditions are made needs to be revisited. Mr. Ho said that the rules were set up for a specific species and specific use and noted that the possibility of females only on Kauai is something that could be done. He said that the rules were written this way to give flexibility in allowing specific uses while being able to evaluate and manage possible risks associated with those import requests. Mr. Ho said that the rules were created in the 1990s and at that time there was no Amazon.com online shopping or access to many of the exotic species that is now currently available. He said figuring out a way to deal with list placement of animals is noted and from a regulatory standpoint, typically PQB would not lower restrictions without a request, as that could be interpreted as preferential to those getting the subsequent imports. Mr. Ho said that increasing restrictions on certain animals is certainly something PQB could do and how that should occur needs to be developed.

Chair Oishi asked if there were any other comments or discussion. Hearing none, he called for a vote.

Vote: RECOMMEND APPROVAL with amendments. 6/1

Motion Passes.

VII. Proposed Import Permit Conditions

Provided that the proposed change in list placement for *C. vasa* is approved, there are no significant concerns brought up during the public hearing process, and the rule-making process is completed, the PQB will utilize the proposed conditions listed below, as approved by the Board, for administrative permit issuance. Should any significant concerns be brought up during the public hearing process, the changes in list placement may proceed; however, depending on the concern and at the Board's discretion, the permit conditions may need to go back through the review process to properly address those concerns and may prevent the administrative issuance of a permit.

1. The restricted article(s), one (1) Vasa parrot, *Coracopsis vasa*, shall be used for individual possession as a domestic animal companion , a purpose approved by the Board of Agriculture (Board), and may be sold, given away, or transferred in Hawaii. Release into the environment is strictly prohibited.

PQB NOTES: *Due to the Committee's added requirement to allow only male Vasa parrots, the allowance to breed them has been removed from Condition No. 1.*

2. Only male restricted article(s) may be imported.

PQB NOTES: *Condition No. 2 was added as a result of the Committee's recommendation.*

3. The permittee, Lise Madson, 18-1989 Nau Nani Road, Mountain View, Hawaii, 96771, shall be responsible and accountable for all restricted article(s) imported, from the time of their arrival to their final disposition.

4. The restricted article(s) shall be imported only through the port of Honolulu, as approved by the Board. Entry into Hawaii through another port is prohibited.

5. Each shipment of the restricted article(s) shall be accompanied by a copy of the PQB permit and permit conditions for the restricted article(s), and an invoice, packing list, or other similar PQB approved document listing the scientific and common names of the restricted article(s), the quantity of the restricted article(s), the shipper, and the permittee for the restricted article(s).

6. The restricted article(s) shall be permanently marked with a unique identification code, e.g., metal leg band, metal wing band, computer chip, etc.

7. At least four sides of each parcel containing the restricted article(s) shall be clearly labeled in plain view with "Live Animals" and "This Parcel May be Opened and Delayed for Agriculture Inspection" in 1/2 minimum sized font.

8. The restricted article(s) shall comply with all pre-entry and post-entry animal heath requirements of the HDOA, Division of Animal Industry (DAI).

9. The restricted article(s) shall be maintained at all times in a cage, aviary, or other enclosure that prevents escape into the environment.

10. The approved site, restricted article(s) and records pertaining to the restricted article(s) under permit may be subject to post-entry inspections by the PQB. The permittee shall make the site, restricted article(s) and records pertaining to the restricted article(s) available for inspection upon request by a PQB inspector.

11. The permittee shall immediately notify the PQB Chief verbally and in writing under the following circumstances:

    a. If any escape or release involving the restricted article(s) under this permit occurs. If the restricted article(s) escape or are found to be free from confinement, the HDOA may confiscate or capture the restricted article(s) at the expense of the permittee, pursuant to the Hawaii Revised Statutes (HRS), §150A-7(c).

    b. If a shipment of the restricted article(s) is delivered to the permittee without a PQB "Passed" stamp, tag or label affixed to the article, container, or delivery order that indicates that the shipment has passed inspection and is allowed entry into the State. Under this circumstance, the permittee shall not open or tamper with the shipment and shall secure as evidence all restricted article(s), shipping container(s), shipping document(s) and packing material(s) for PQB inspection.

12. It is the responsibility of the permittee to comply with all applicable requirements of municipal, state, or federal law pertaining to the restricted article(s).

13. In the event that the restricted article(s) are sold, given away, or transferred in the state, the applicant is responsible for informing the new owner that the restricted article(s) cannot be released into the environment and must be kept caged at all times.

14. The permittee is responsible for costs, charges, or expenses incident to the inspection, treatment or destruction of the restricted article(s), as provided in Act 173, Session Laws of Hawaii 2010, Section 13, including, if applicable, charges for overtime wages, fixed charges for personnel services, and meals.

15. Any violation of the permit conditions may result in citation, permit cancellation, and enforcement of any or all of the penalties set forth in HRS §150A-14.

16. A cancelled permit is invalid and upon written notification from the PQB Chief, all restricted article(s) listed on the permit shall not be imported. In the event of permit cancellation, any restricted article(s) imported under permit may be moved, seized, treated, quarantined, destroyed, or sent out of state at the discretion of the PQB Chief. Any expense or loss in connection therewith shall be borne by the permittee.

17. The permit conditions are subject to cancellation or amendment at any time due to changes in statute or administrative rules restricting or disallowing import of the restricted article(s) or due to Board action disallowing a previously permitted use of the restricted article(s). The permit conditions are further subject to amendment to conform to more recent Board approved permit conditions for the restricted article(s), as necessary to address scientifically validated risks associated with the restricted article(s).

18. The permit conditions are subject to amendment by the PQB Chief to require disease screening, quarantine measures, and/or to place restrictions on import from certain points of origin, as appropriate, based on scientifically validated risks associated with the restricted article(s), as determined by the PQB Chief, as necessary to prevent the introduction or spread of disease(s) and/or pests associated with the restricted article(s).

19. The permittee shall agree in advance to defend and indemnify the State of Hawaii, its officers, agents, and employees for any and all claims against the State of Hawaii, its officers, agents, or employees that may arise from or be attributable to any of the restricted article(s) that are introduced under this permit. This permit condition shall not apply to a permittee that is a federal or State of Hawaii entity or employee, provided that the state or federal employee is a permittee in the employee's official capacity.

STAFF REQUEST: Provided that the Board approves this request, the Plant Quarantine Branch requests authorization to schedule a public hearing and appoint a hearing officer in connection with the proposed amendments to Chapter 4-71, Hawaii Administrative Rules, "Non-Domestic Animal Import Rules," to change the list placement of the Vasa Parrot, *Coracopsis vasa*, from the List of Restricted Animals, Part B, to the List of Conditionally Approved Animals.

STAFF RECOMMENDATION: Based on the recommendations and comments of the Advisory Subcommittee on Land Vertebrates and the Advisory Committee on Plants and Animals majority recommendation to approve this request, the PQB recommends approval of this request.

Respectfully Submitted,

JONATHAN K. HO
Acting Manager, Plant Quarantine Branch

CONCURRED:

BECKY L. AZAMA
Acting Administrator, Plant Industry Division

APPROVED FOR SUBMISSION:

PHYLLIS SHIMABUKURO-GEISER
Chairperson, Board of Agriculture

COPY

State of Hawaii
Department of Agriculture
PLANT QUARANTINE BRANCH
1849 Auiki Street, Honolulu, HI 96819-3100

July 15, 2019

Re: Madson/Vasa Parrot

Dear Madam or Sir,

Enclosed please find $2500.00 for the fee to ask that the Vasa Parrot, Coracopsis Vasa, be removed from the Restricted B List and added to the conditionally approved list.

I have inclosed the form provided from David Lingenfelser, Acting Land Vertebrate Specialist, Hawaii Department of Agriculture, Plant Quarantine Division.

My extensive research and interviews with Vasa parrot experts and scientist leads to the conclusion that Vasa parrots are less likely to have any destructive effect on any aspect of Hawaii environment, as compared to most on the conditionally approved list. Vasas are notoriously hard to breed, rare, not popular as pets (though very interesting to scientists and students), and in a 15 year study in the Mainland USA the only parrot type not observed in the wild was a Vasa parrot, again emphasizing that even if one did escape they are unlikely to survive in the wild. One specialist reported that after captivity wild caught Vasas nearly starved rather than going back to their "wild" diet.

Further, no scientist can point to any reason with today's scientific knowledge as to why Vasa parrots were on the Restricted List in the first place. I suspect there was not much known about them at the time the rule was written: That has changed, and as they are not destructive to Hawaii, I ask that this rule change be expedited.

If there are other forms I need to submit for this rule change request, please let me know as soon as possible.

Yours Gratefully,

Lise Madson

RECEIVED
JUL 22 2019
PLANT QUARANTINE BRANCH

Lise Madson [redacted] Vasa Parrot Permit Application

State of Hawaii
Department of Agriculture
PLANT QUARANTINE BRANCH
1849 Auiki Street, Honolulu, HI 96819-3100

Dear Hawaii Board of Agriculture,

I have submitted three applications to the HDOA, 1. I submitted my application to bring a Vasa Parrot to Hawaii for private and commercial uses. 2. I submitted another application July 1, 2019 to bring the vasa parrot in for private non-pet use as an Emotional Support Animal. And finally, after talking with the HDOA, I have also submitted $2500 and a request that Vasa Parrot, Coracopsis Vasa, be removed from the Restricted B list and be placed on the conditionally approved list.

For the reasons explained in this letter, I cannot return to my home in Hawaii until I get permit approval. After five years on this project, I do not want to give up my research, my passion, my parrot, or my home in Hawaii. I am asking for your help expediting this process. This is just one male, hand-raised Vasa parrot and in no way destructive or detrimental to Hawaii, as I will show, but rather a benefit to Hawaii.

I am a disabled retired person with a degree in Environmental Law. Throughout my lifetime, I have been active in animal rescue.

When I was young, I trained as a vet tech, and worked at the Colorado State University Vet Hospital including in their raptor and bird rehabilitation areas. It was there that I fell in love with learning more about birds and caring for them. Also, early in my life, I worked in the vet area of the Denver Zoo. I studied Animal Science at the University of Massachusetts as an undergraduate. I was rancher, raised and rescued dogs, cats, parrots, cattle and horses. I earned an degree in Environmental Law from Lewis & Clark College. I served as Justice of the Peace. After becoming disabled, I began an affiliation with TTOUCH organization, founded by world famous Linda Tellington-Jones of Kailua-Kona, Hawaii. I competed in toward the 2012 Paralympics in Para Dressage, competed internationally in Para Reining. I run a social media site promoting the adoption of mustangs, and another for disabled riders, as well as promoting the TTOUCH organization.

Five years ago I rescued a vasa parrot. Grover, then named Groucher, had been hand-raised and therefore bonds to people, in particular, me, rather than other birds. He had not been out of his cage in four years, a very small cage, and he swore and bit. After five years, he has turned into a reliable and gentle creature; I used the TTOUCH methods to rehab this Vasa.

Linda Tellington-Jones has authored 22 books which have been translated into 13 languages. In association with Linda, I am writing a book on Vasa parrots and TTOUCH, and Grover in particular. Linda has worked with animals like Keiko the killer whale and helped animals from dressage horses, to tigers, around the globe.

After coming to Hawaii to help Linda with several seminars, I decided to sell my house in Oregon and move to the Big Island. After buying a property, I ran into difficulty getting a permit for Grover.

No one knows why Vasa Parrots are on the Restricted B list; it appears to be in error. Despite extensive research and consultations with scientists and aviculturalists around the globe, no one can identify any way that a Vasa parrot could be dangerous or harmful to the flora or fauna, the people or aquaculture, or the environment of Hawaii. As a matter of science, Vasas are less of a threat to the environment, people, flora and fauna of Hawaii than a common cockatiel. One thought is that since Hawaii does not routinely update their rules, which were written in 1990, and since Vasas were brought to the USA in the 1980s, that maybe just the newness of the parrot landed it on the restricted list. I believe the concern was that if large amounts of Vasa were imported they could establish a colony, like cockatoos in Australia (Cockatoos, despite this risk, are conditionally approved to come to Hawaii). The risk of the Greater Vasa proved, once more was known about them, unfounded.

The Greater Vasa parrot is less a threat than the cockatiel for the following reasons: Vasas are rare. They are unpopular as pets because they are plain grey parrots and the females loose their head feathers and look like vultures during breeding season. The male, also during breeding season, has external genitalia. And while the adaptations of the Vasa, which are from Madagascar, make it fascinating to writers and researchers, scientists and students of evolution, it makes in unpopular as a pet. Along with its rarity, the Vasa parrot has proven hard to breed. Of the first 500 to come to the USA, only 30 chicks were produced in near ten years. Only a half dozen breeders in the USA have successfully produced vasa chicks those average one chick per year; a number so low it appears Vasas are becoming more rare in captivity. The zoo at Salt Lake City tried to breed these parrots and also failed. Most people have never seen a Vasa parrot. According to the HDOA, apparently one has never been imported to Hawaii, nor has anyone petitioned as far as the employee in charge knows. Another reason that the parrot is not a threat to Hawaii is because while there are some Vasas on the mainland, in a 15 year study by the University of Chicago on observations of birds in the wild on the mainland, not a single vasa was observed; every other parrot was. This may be due to their lack of popularity, their breeding challenges, or to an inability to survive and adapt to any environment after captivity; there are reports that wild caught Vasas, after being fed a commercial diet, will refuse to eat the native diet, and appear willing to starve rather than go back to foraging. It takes three to four males to one female to breed vasas: a UK study recently found that the male vasas were observed using tools, rocks, to grind shells into a calcium supplement for the females.

Hand-raised vasas, like Grover, are imprinted on people and unlikely to be successful or happy in an institutionalized setting like a zoo. He has been habituated to people and for all practical purposes views me as his flock. Hand-raised male vasas are unlikely to breed with female vasas.

My research and writing addresses both TTOUCH in rehabbing animals but also the ethical and moral issues associated with hand-raising animals, from Vasa parrots to horses.

My research on Vasa parrots is centered on Grover, and stopping five years into my study of Grover is not an option. I attempted to have Grover cared for by others, but due to bonding issues he became overly vocal, started swearing again, and showed signs of stress. We have all seen parrots that suffer emotional and physical trauma when those they are bonded with desert them or die. This is one of the ethical issues I am addressing in my book: Parrots bond rather permanently with people if they are hand-raised, and will rip their feathers out, self-mutilate and scream, if bonds are broken.

Add to this that I, disabled, suffered a head injury and coma. This led to emotional regulation problems. Spending so much time studying Grover led me to return his bond. While perhaps not ideal for a "hard" scientist, with my degree in Environmental Law, Sociology and minor in Psychology, these are exactly the issues I am addressing in my work. Just as Grover gains support from me, I gain emotional support from Grover.

While I never wanted or intended to have an emotional support animal, which I view as a crutch and generally not needed, after my coma and head injury I found myself much better off with Grover than without. In fact, I would rather give up all my pets, my service dog and my horses, and my house in Hawaii rather than Grover. However, I am certain under the circumstances that the Board will reach the conclusion that Vasa parrots are not a threat to Hawaii, but rather can be beneficial for students to study, and enrich people's understanding of the unique ways animals evolve on islands.

Grover is not a pet. An emotional support animal is by definition, not a pet. It is more a medical or psychological device. As a research subject, Grover is also not a pet. However, I am also asking that ALL vasa parrots be reclassified as conditionally approved, under a separate petition. Because there is no reason that I can determine or that they should not be conditionally approved. Recent studies have shown that keeping parrots as companion animals may in some instances preserve a breed enough so that it can avoid extinction.

I am told that the Board takes six months to a year to process these applications. I ask that under the circumstances due to my home being in Hawaii and having to stay in a trailer, on a limited income, until the permit is granted, that it be expedited. I am optimistic that the Board will approve a permit because, frankly, there is no reason for this bird to be on the Restricted List B, scientifically.

Further, as an ESA, processing the application should be quicker and more streamlined than pet. To be clear I do not generally support exotics being ESAs. I think an ESA horse or monkey should not be allowed. However, parrots are often used for veterans with PTSD, and others with emotional regulations issues within there homes because

compared to a dog, they can be much different in there interaction with the person, and require less complicated care for a person who may not be able to venture out as often as another emotional support animal might require. As for me in particular, it would take years and suffering to transfer my emotional support to another animal. One reason parrots are ideal for this is because with excellent care, they can live as long as the human they are helping.

In this application I am asking that this Vasa be permitted for commercial and private purposes. Restricted list A is for exhibition. It would be, humbly in my opinion, arbitrary an capricious to ignore Restricted List B as a separate and broader category than exhibition. Indeed, private use is defined as "for non-commercial purposes, such as non-profit research, and does not include individual possession of an animal as a pet." Commercial purposes is not defined.

My using the bird as a medically prescribed emotional support animal is a private, non-pet use that should be recognized and permitted. Using the bird for research, even by a private individual, should meet the requirements; I believe "such as non-profit research" was intended in the admin rules as an example not as the only allowed private use, but in case of a more narrow interpretation, I am in the process of forming a non-profit corporation in Hawaii that will then clearly meet this definition. Using the bird for TTOUCH and the University of Hawaii at Hilo to teach students in the Tropical Bird Conservation and Environmental Studies programs should meet the letter of the law of the admin rules for commercial purposes, as should my writing a book.

I ask to be able to have the bird stay at my property in Mountain View, HI, and I ask to be able to use the bird at my location in Mountain View for University of Hawaii at Hilo's students, and also with TTOUCH, at the Mountain View address, including for social media, demonstrations and promoting TTOUCH.

I would as the Board to issue a permit promptly. Please ask your scientists. They will tell you what I have: A vasa parrot is less a threat than a cockatiel: they are hard to reproduce, carry no unique threats, they are merely a rare parrot of great interest to scientists and students, but unpopular as a pet.

In the meantime, in order to continue my research and because of my emotional reliance on Grover, I have a perfectly good home in Hawaii, that I am unable to live in. (my daughter and her fiance live there with me so I can't just sell the house and move back to the mainland). Instead, I am living in a horse trailer in Oregon until this matter can get resolved. As a disabled person, with health issues, this is a huge burden.

I ask the the Board honors the objective of Chapter 150A of the Hawaii Revised Statutes with say that the objective is to restrict or prohibit importation of specific non-domestic animals that are detrimental to the agricultural, horticultural, and aquacultural industries, natural resources and environment of Hawaii. There is simply no scientific evidence that a Vasa parrot is detrimental. Indeed, the evidence is that by understanding the Vasa parrot, and using him for research and education that Vasas

would benefit science and understanding of natural resources and environments, directly benefiting TTOUCH students and University of Hawaii students, but also indirectly leading to better understanding of island's evolution of birds, both birds from Hawaii and other islands such as Madagascar. . .

I am asking that you expedite this matter because of this unusual situation.

Gratefully,

Lise Madson

STATE OF HAWAI'I CIRCUIT COURT OF THE FIRST ☒ CIRCUIT	**SUMMONS** TO ANSWER FIRST AMENDED **VERIFIED COMPLAINT**	APPENDIX B

CASE NUMBER
1CCV-21-0000578

PLAINTIFF'S NAME & ADDRESS, TEL. NO.
Emily A. Gardner #6891
Emily A. Gardner, Attorney at Law, LLLC
4348 Walalae Avenue, Suite 256
Honolulu, HI 96816
Tel: (808) 348-0929

Electronically Filed
FIRST CIRCUIT
1CCV-21-0000578
11-MAY-2021
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PLAINTIFF	VS.	DEFENDANT(S)
Lise Madson		Hawaii Department of Agriculture, Phyllis Shimabukuro-Geiser, In her Capacity as Chairperson of the Hawaii Board of Agriculture, DOE Defendants 1-10

TO THE ABOVE-NAMED DEFENDANT(S)

You are hereby summoned and required to file with the court and serve upon

EMILY A. GARDNER

First Amended Verified Complaint

plaintiff's attorney, whose address is stated above, an answer to the ~~complaint~~ which is herewith served upon you, within 20 days after service of this summons upon you, exclusive of the date of service. If you fail to do so, judgment by default will be taken against you for the relief demanded in the complaint.

THIS SUMMONS SHALL NOT BE PERSONALLY DELIVERED BETWEEN 10:00 P.M. AND 6:00 A.M. ON PREMISES NOT OPEN TO THE GENERAL PUBLIC, UNLESS A JUDGE OF THE ABOVE-ENTITLED COURT PERMITS, IN WRITING ON THIS SUMMONS, PERSONAL DELIVERY DURING THOSE HOURS.

A FAILURE TO OBEY THIS SUMMONS MAY RESULT IN AN ENTRY OF DEFAULT AND DEFAULT JUDGMENT AGAINST THE DISOBEYING PERSON OR PARTY.

DATE ISSUED	CLERK	CIRCUIT COURT CLERK
MAY 11, 2021	/s/ N. ANAYA	

The original document is filed in the Judiciary's electronic case management system which is accessible via eCourt Kokua at: http:/www.courts.state.hi.us

In accordance with the Americans with Disabilities Act, and other applicable state and federal laws, if you require a reasonable accommodation for a disability, please contact the ADA Coordinator at the Circuit Court Administration Office on OAHU- Phone No. 808-539-4400, TTY 808-539-4853, FAX 539-4402; MAUI- Phone No. 808-244-2929, FAX 808-244-2777; HAWAII- Phone No. 808-961-7424, TTY 808-961-7422, FAX 808-961-7411; KAUAI- Phone No. 808-482-2365, TTY 808-482-2533, FAX 808-482-2509, at least ten (10) working days prior to your hearing or appointment date.

Emily A. Gardner #6891
Emily A. Gardner, Attorney at Law, LLLC
4348 Waialae Avenue, Suite 256
Honolulu, HI 96816
Tel: (808) 348-0929
Email: egardner808@gmail.com

Attorney for Plaintiff
LISE MADSON

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IN THE CIRCUIT COURT OF THE FIRST CIRCUIT

STATE OF HAWAII

Lise Madson, Plaintiff, v. Hawaii Department of Agriculture, Phyllis Shimabukuro-Geiser, in her Capacity as Chairperson of the Hawaii Board of Agriculture, DOE Defendants 1-10, Defendants.	CIVIL NO.: 1CCV-21-0000578 (Declaratory Judgment) **FIRST AMENDED VERIFIED COMPLAINT FOR DECLARATORY RELIEF**

FIRST AMENDED VERIFIED COMPLAINT FOR DECLARATORY RELIEF

COMES NOW, Lise Madson, ("Plaintiff") by and through her undersigned counsel , and brings the following allegations and claims against the State of

Hawaii Department of Agriculture and Phyllis Shimabukuro-Geiser, in her Capacity as Chairperson of the Hawaii Board of Agriculture ("Defendants"):

I.

JURISDICTION AND VENUE

1) This Court has jurisdiction and venue over the above Defendants under Hawaii Revised Statutes § 666-1(1) which provides original jurisdiction to hear and determine all claims against the State founded upon any statute of the State; or upon any regulation of an executive department.

2) Venue is proper before this Court under Hawai`i Revised Statutes § 603-36(5).

II.

PARTIES

3) Plaintiff Lise Madson is and was at all times relevant hereto a resident of the State of Hawaii who resides in Mountain View, Hawaii.

4) Defendant Hawaii Department of Agriculture is an executive department of the State of Hawaii.

5) Defendant Phyllis Shimabukuro-Geiser is the Chairperson of the Hawaii Board of Agriculture.

6) Plaintiffs have reviewed records that were made available to them in order to ascertain the true and full names and identities of all defendants in this action, but no further knowledge or information regarding the parties responsible is

available at this time and Plaintiffs are unable to ascertain the identity of the defendants in this action designated as DOE DEFENDANTS 1-10 ("Doe Defendants"). Doe Defendants are sued herein under fictitious names for the reason that their true names and identities are unknown to Plaintiffs except that they may be connected in some manner with Defendants and may be agents, attorneys, servants, employees, employers, representatives, co-venturers, co-conspirators, associates, or independent contractors of Defendants and/or were in some manner responsible for the injuries or damages to Plaintiffs and their true names, identities, capacities, activities and responsibilities are presently unknown to Plaintiffs or their attorney.

III.

FACTS

7) Plaintiff owns a Vasa parrot, *Coracopsis vasa*. She has owned the bird since 2014 but was unable to bring the bird with her when her family relocated to Hawaii in 2019 from Oregon because this species of parrot is presently listed on the Department of Agriculture's list of Restricted Animals. Plaintiff developed a strong bond with the bird as it served as her companion while she was recovering from a traumatic and serious physical injury.

8) There are roughly 350 species of parrots in the world. Of the roughly 350 species of parrots, only four currently appear on the Department of

Agriculture's list of Restricted Animals and require a private use permit for import into the State of Hawaii. The vast majority of parrot species are presently listed on the Department of Agriculture's list of Conditionally Approved Animals and do not require a private use permit for import into the State of Hawaii. Animals on the Conditionally Approved list may be imported into the State of Hawaii for individual or personal use, including for use as a pet.

9) When Plaintiff was preparing to relocate to Hawaii in 2019, she reviewed the Department of Agriculture's lists of Conditionally Approved Animals and Restricted Animals, pursuant to HAR § 4-71. Plaintiff was surprised to see that the Vasa parrot was included on the Department's list of Restricted Animals and thought it might have been a typo.

10) As a longtime owner of a Vasa parrot, Plaintiff knew the species was neither endangered or threatened and that it had certain physical and behavioral traits that make it difficult to breed, both in the wild and in captivity. The species is only found naturally in Madagascar but is sometimes kept as a pet due to the species' high intelligence. Deliberate attempts to colonize the species in other parts of the world have failed.

11) Plaintiff contacted the Department of Agriculture's Plant Quarantine Branch in early 2019 and inquired whether and how she might be able to import her bird

into Hawaii. Plant Quarantine Branch staff recommended that Plaintiff submit a petition to reclassify the bird from the Restricted to the Conditionally Approved Animal list, and import the bird for individual use/or, to apply for a private use permit to conduct scientific research with the bird as a Restricted Animal.

12) The Hawaii Agricultural Board administrative rules, HAR § 4-1-23(a), provides, in relevant part:

The adoption, amendment, or repeal of any rule of the board may be made by the board on its own motion, or by petition of any interested person or agency.

13) On July 15, 2019, Plaintiff, pursuant to Hawaii Administrative Rule (HAR) § 4-1-23(a), and the recommendation of the Plant Quarantine Branch, submitted a petition to Defendants through Defendants' Plant Quarantine Branch, to initiate rule making and rule amendment to Chapter 4-71, HAR to change the placement of the Vasa parrot, *Coracopsis vasa*, from the List of Restricted Animals (Part B) to the List of Conditionally Approved Animals. When and if the bird was reclassified from a Restricted Animal to a Conditionally Approved Animal, Plaintiff would be entitled to seek a permit to import the bird into the State for individual use.

14) Plaintiff submitted the requisite $2,500 processing fee to Defendants at the same time and along with her petition.

15) Defendants, through their Plant Quarantine Branch, acknowledged receipt of Plaintiff's petition on July 22, 2019.

16) Plaintiff's bank records establish that Defendants cashed Plaintiff's check for the $2,500 petition processing fee on January 17, 2020.

17) Defendants' Plant Quarantine Branch originally submitted Plaintiff's petition to the Agriculture Board on March 24, 2020. The submittal was signed by Jonathan K. Ho, Acting Manager of the Plaint Quarantine Branch, and stated that "Section 4-1-23(c) Hawaii Administrative Rules (HAR) requires after filing such a petition, the Board must either deny the Petition or initiate rule making." In his March 24, 2020 submittal to the Agriculture Board, Mr. Ho also stated that "Ms. Madson's Petition appears to conform to the[se] procedural prerequisites for Board consideration."

18) The Agriculture Board formally considered Plaintiff's petition to initiate administrative rule making at its April 14, 2020 meeting. The petition was presented by Plant Quarantine Branch staff. During the Board's consideration, Defendant Chairperson inquired why the Plant Quarantine Branch failed to provide a recommendation for action on Plaintiff's petition. Plant Quarantine Branch senior staff, Trenton Yasui, stated that the Branch was not able to make a recommendation due to a lack of technical information typically generated by advisory review.

19) The Plant Quarantine Branch stated that it lacked technical information to make a recommendation to the Agriculture Board for its' April 14, 2020 meeting despite the fact that the Plant Quarantine Branch had acknowledged receiving Plaintiff's petition more than eight months before and had cashed Plaintiff's check for the $2,500 processing fee, more than two months before.

20) Because the Plant Quarantine Branch failed to provide the Agriculture Board with the technical information it needed to properly consider Plaintiff's petition, the Agriculture Board voted to deny Plaintiff's petition, pending the completion of an advisory review by the Plant Quarantine Branch. Due to COVID-19, the Agriculture Board meeting was not held publicly, and Plaintiff was unable to attend.

21) Neither the Plant Quarantine Branch nor the Department, nor the Chairperson of the Agriculture Board provided Plaintiff with a written notice of its denial of Plaintiff's petition at its April 14, 2020 meeting and the reasons, therefore as required by Hawaii Revised Statutes § 91-6 and HAR 4-1-24.

22) Plaintiff's permit application to conduct private research on the bird and import it into the State of Hawaii as a Restricted Animal was considered and denied by the Agriculture Board during a subsequent meeting of the Agriculture Board on December 15, 2020. Plaintiff was provided with written notice of the

Board's decision to deny her research permit application which was dated January 15, 2021.

23) Plaintiff is not contesting the Board's decision to deny her permit application for research as a Restricted Animal. The time to do so has lapsed. Plaintiff notified the Department that she was not contesting the Department's denial of her research permit application on February 2, 2021.

24) Plaintiff had also submitted an application to the Department of Agriculture to import the bird as an emotional support animal as a Restricted Animal in July 2019. This permit application was denied by the Board Chairperson in writing on August 7, 2020. In its letter of denial, the Department stated that it viewed the use of an animal for emotional support to be "equivalent to individual possession or personal use of an animal." Plaintiff is not contesting the Board's decision to deny this permit application for use of a Restricted Animal as an emotional support animal. The come to do so has lapsed. Plaintiff notified the Department that she is not contesting the Department's denial of her permit application to import the bird as a Restricted Animal as an emotional support animal on February 2, 2021.

25) Plaintiff has notified the Department in writing that she is no longer pursuing her permit applications to import the bird as a Restricted Animal for the purpose of conducting research or as an emotional support animal, and, that she is only

continuing to pursue her petition to initiate administrative rule making and rule amendment to change the list placement of the Vasa parrot from the Restricted Animal List to the Conditionally Approved Animal list and import the bird for individual use.

26) During the December 15, 2020 Agriculture Board meeting, Plaintiff's petition to initiate administrative rule making and rule amendment to Chapter 4-71, Hawaii Administrative Rule (HAR) to change the list placement of the Vasa parrot, *Coracopsis vasa*, from the list of Restricted Animals (Part B) to the List of Conditionally Approved Animals was resubmitted to the Board.

27) Jonathan Ho, Acting Director of the Plant Quarantine Branch, notified the Agriculture Board that the Branch did not notify Plaintiff in writing within the 30-day timeframe that the Board had denied Plaintiff's petition, resulting in automatic rule making.

28) During the December 15, 2020 Agriculture Board meeting, Defendant Chairperson stated that the Board could deny Plaintiff's petition and direct the Plant Quarantine Branch to route the petition through the review process and come back to the Board at another meeting or could deny the petition consider it at another time.

29) Other Agriculture Board members expressed interest in deferring a vote at the December 15, 2020 Board meeting because there "is a lack of sufficient reasons for denial."

30) Jonathan Ho informed the Agriculture Board that the Plant Quarantine Branch could complete a full review in February 2021.

31) Upon learning that the Plant Quarantine Branch could provide a technical review in February 2021—nearly one year and seven months after it received Plaintiff's petition-- the Agriculture Board voted to further defer a decision on Plaintiff's petition to initiate rule making and rule amendment pursuant to HAR § 4-1-23.

32) Due to the Plant Quarantine Branch's repeated failure to provide an internal review of the Vasa parrot to serve as the basis for a recommendation to the Agriculture Board, Plaintiff commissioned a literature review of the species by a biologist holding a Master of Science in Wildlife Management and Conservation Biology who has significant experience in avian invasive species in island ecosystems. The biologist, Phillip Greenwell, opined that the Vasa parrot has an unusually low potential for invasiveness and posed no significant threat to the environment. On February 2, 2021, Plaintiff, through the undersigned counsel, provided the Plant Quarantine Branch with Mr. Greenwell's report to assist them with their internal review process with a letter

inquiring when Plaintiff's petition would again be considered by the Agricultural Board.

33) An Avian Ecologist and Professor of Biology at the University of Hawaii at Hilo who has been conducting research on the ecology and conservation of native Hawaiian forest birds for 30 years has reviewed Mr. Greenwell's literature review and support his conclusions that it is "highly unlikely that vasa parrots could successfully establish a breeding population in Hawaii," and "there is no good biological reason for the vasa parrot to have a 'restricted' listing while many other parrot species that have far greater potential for invasion are less restricted."

34) The Plant Quarantine Branch and the Defendant Chairperson have failed to resubmit Plaintiff's petition to the Agriculture Board, have failed to issue a letter of denial to Plaintiff, and have failed to initiate rule making and rule amendment. Defendants' actions in failing to act in a timely manner on Plaintiff's petition are not supported by Hawaii law.

35) Hawaii Revised Statutes § 91-6, Petition for adoption, amendment or repeal of rules, provides:

> Any interested person may petition an agency requesting the adoption, amendment, or repeal of any rule stating reasons therefor. Each agency shall adopt rules prescribing the form for the petitions and the procedure for their submission, consideration, and disposition. **Upon submission of the petition, the agency shall within thirty days either deny the petition in writing,**

stating its reasons for the denial or initiate proceedings in accordance with section 91-3

36) Moreover, the rules for the Agriculture Board's denial of a rule making petition , HAR § 4-1-24, Denial of Petition, provides:

> Any petition that fails to comply in any material respect with the requirements of this chapter or fails to disclose sufficient reason to justify conducting rulemaking proceedings shall not be considered by the board. **The board shall promptly notify the petitioner in writing of such denial, stating the reasons therefor.** Denial of a petition shall not prevent the board from acting on its own motion, upon any matter disclosed in the petition. The petitioner may seek judicial review of denial.

37) The language of Hawaii Revised Statutes § 91-6, Petition for adoption, amendment or repeal of rules is clear, unambiguous, and provides a specific time period within which a state agency must act.

38) The Hawaii Supreme Court has ruled that all state and county boards, commissions, departments and offices must conform to the Administrative Procedures Act when acting in a rule making capacity, and, that where language of a statute is plain and unambiguous that a specific time provision must be met it is mandatory and not merely directory. *Town v. Land Use Commission*, 53 Haw. 538.

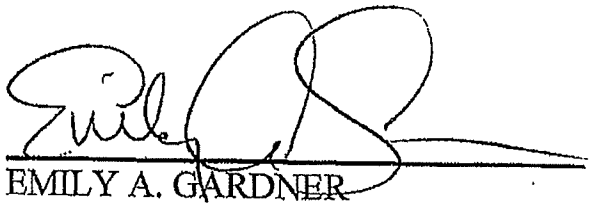
39) There is a lack of sufficient grounds to deny Plaintiff's petition, or, to continue to further defer action on Plaintiff's petition for rule making and rule amendment pursuant to HAR § 4-1-23.

40) Plaintiff is entitled to automatic rule making in accordance with the mandate of HRS § 91-6 and procedures set forth in HRS § 91-3.

WHEREFORE, Plaintiff prays for declaratory relief against Defendants and in favor of the Plaintiff as follows:

1. An order requiring Defendants pursuant to immediately initiate rule making and rule amendment to Chapter 4-71, HAR to change the placement of the Vasa parrot, *Coracopsis vasa*, from the List of Restricted Animals (Part B) to the List of Conditionally Approved Animals in accordance with the provisions of HRS 91-3;
2. Plaintiff's reasonable attorneys' fees and costs;
3. For such other and further relief as the Court may deem just and proper.

Dated: Honolulu, Hawai`i, May 11, 2021



EMILY A. GARDNER
Attorney for Plaintiff
LISE MADSON

VERIFICATION OF FIRST AMENDED COMPLAINT

I, Lise Madson, declare as follows:

1. I have personal knowledge of the facts alleged in the First Amended Complaint and am competent to testify to the matters in the First Amended Complaint.

2. I have read the First Amended Complaint in this matter and verify and confirm that to the best of my knowledge, information and belief, the factual allegations contained in the First Amended Complaint are true and correct.

I declare under the penalty of perjury that the foregoing is true and correct.

Dated: May 11, 2021

LISE MADSON
Plaintiff

DAVID Y. IGE
Governor

JOSH GREEN
Lt. Governor

PHYLLIS SHIMABUKURO-GEISER
Chairperson, Board of Agriculture

MORRIS M. ATTA
Deputy to the Chairperson

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 South King Street
Honolulu, Hawaii 96814-2512
Phone: (808) 973-9600 FAX: (808) 973-9613

March XX, 2021

Please Respond By:
March XX, 2021

TO: Advisory Subcommittee on Land Vertebrate Animals

PETITIONER: Lise Madson

THROUGH: David Lingenfelser, Noni Putnam
Land Vertebrate Specialists
Hawaii Department of Agriculture
Plant Quarantine Branch

SUBJECT: Request for the initiation of administrative rulemaking and rule amendment to Chapter 4-71, Hawaii Administrative Rules (HAR) to change the list placement of the Vasa Parrot, *Coracopsis vasa*, from the List of restricted Animals (Part B) to the List of Conditionally Approved Animals.

CATEGORY: The Vasa parrot, *C. vasa,* is currently on the List of Restricted Animals (Part B). Pursuant to Hawaii Administrative Rules (HAR) Chapter 4-71, *C. vasa* may be imported into Hawaii for private and commercial use, including research, zoological parks, or aquaculture production. Ms. Madson is requesting that this species be reviewed and considered for placement on the List of Conditionally Approved Animals (CA List), which is incorporated under Chapter 4-71, HAR. If the Board grants preliminary approval for future placement, pursuant to the rulemaking requirements of Chapter 91, Hawaii Revised Statutes, the CA List will be amended to include *C. vasa*. Organisms on the CA List are allowed for individual possession, businesses, government agencies, or institutions.

I. Factual Background of Ms. Madson's Petition for Rule-Making

In early 2019, Ms. Madson initially contacted the Hawaii Department of Agriculture (HDOA) PQB and inquired about importing a Vasa parrot, *C. vasa*, into Hawaii. She spoke with David Lingenfelser, who was the Acting Land Vertebrate Specialist for PQB. Mr. Lingenfelser asked Ms. Madsen what she would be using the parrot for. Ms.

Madson informed Mr. Lingenfelser that the parrot would primarily be for her individual possession. Mr. Lingenfelser informed Ms. Madson that the Vasa parrot was currently a "Restricted B" organism, and that under chapter 4-71, HAR, the PQB's Non-Domestic Animal Import Rules, importation would require a permit. Mr. Lingenfelser's initial recommendation to Ms. Madson was to seek a rule-amendment to reclassify the parrot as a "Conditionally Approved" organism, pursuant to Hawaii Revised Statutes (HRS) §91-6. Ms. Madson submitted a petition for rule-making and amendment.

At the time of Ms. Madson's initial inquiry, Mr. Lingenfelser also suggested that Ms. Madson could apply for a permit to import the parrot as a "Restricted B" organism and suggested that she provide as much detail as possible describing what the bird will be used for. Ms. Madson inquired whether the parrot could qualify as an Emotional Support Animal (ESA) and if ESA use would provide grounds to obtain a permit to import the animal under chapter 4-71 HAR. Ms. Madson has a past history of physical trauma and reports that she has developed a strong emotional bond with the parrot and that it has provided her with companionship. The bird had been incorporated into her treatment when recovering from a serious illness and in a coma. Mr. Lingenfelser relayed that ESA might potentially provide grounds for an importation permit. Based on advice she received from Mr. Lingenfelser, Ms. Madson submitted a permit application to import the parrot as an ESA under chapter 4-71 HAR in the event her petition for administrative rule-making was declined.

About the same time in 2019, Ms. Madson contacted Mr. Lingenfelser to inquire about the status of her petition for rule-making and her import permit application for ESA. Additional discussion was had regarding Ms. Madson's uses of the parrot. Ms. Madson relayed that because the parrot displays remarkable intelligence and has the ability to speak, she had been conducting anecdotal research with the parrot while it was in her possession (research involved the Tellington TTouch® Method, which seeks to increase understanding of the human-animal bond and has been recognized as an effective and valuable method to reduce stress in both humans and animals and is particularly useful in reducing stress in wildlife rehabilitation and enhance the well-being of animals in zoos. Some of Ms. Madson's research methods were modeled after Dr. Irene Pepperburg's work with Alex, the African Grey parrot). Ms. Madson further relayed that she had been receiving mentoring and advice from researchers affiliated with a commercial for-profit organization (Linda Tellington-Jones, Tellington TTouch Training) and university (Dr. Irene Pepperburg, Harvard University). Mr. Lingenfelser suggested that Ms. Madson might qualify for an importation permit for research. In his recommendation, Mr. Lingenfelser stated that "it would be best to include documentation or affiliation with a non-profit, commercial business, research group, etc., to clarify your eligibility to use the bird." Ms. Madson misconstrued Mr. Lingenfelser's recommendation to mean that she should establish her own non-profit research organization in order to obtain the importation permit for research. She later submitted an application for a permit for research using the "Vasa Project," a Hawaii-based non-profit organization that she created as her affiliated non-profit organization.

In September 2019, Ms. Putnam assumed the role of Acting Land Vertebrate Specialist for PQB and the supervision of Ms. Madson's petition for administrative rule-making, pursuant to HRS § 91-6; and her import permit applications for ESA and research, pursuant to chapter 4-71 HAR.

At the Board's April 14, 2020 meeting, Ms. Madson's petition for rule amendment and her permit applications for ESA and research were originally reviewed by the Board. At this meeting, PQB acknowledged there was a "lack of technical information typically generated by [an] advisory review" to properly advise the Board on the rule amendment request. On August 7, 2020, PQB informed Ms. Madson by letter that her permit request for the purpose of ESA was "disapproved". There was no mention in the August 7, 2020 letter from PQB regarding Ms. Madson's original request for a rule amendment or for her import permit application for research, pursuant to chapter 4-71 HAR. (Attachment 1).

Subsequently, Ms. Madson was informed of the Board's denial of her import permit application for research via email by PQB staff. The email failed to provide any mention of Ms. Madson's request for a rule amendment. At this time, due to Governor Ige's COVID-19 emergency proclamation to maintain public safety, members of the public were not allowed to attend the Board's meeting. Due to the possibility that an email did not meet administrative notice requirements, PQB requested that Ms. Madson's petition for research be reconsidered for review. The Board, on its own motion, re-heard Ms. Madson's request for a research permit at its meeting on December 15, 2020. Ms. Madson was able to attend virtually. The Board denied Ms. Madson's request to import an RB animal for scientific research at the December 15th meeting. (Attachments 2 and 3).

At its December 15, 2020 meeting, the Board expressly deferred action on Ms. Madson's request for rule-making to withdraw *C. vasa* from the RB animal list and place it on the CA list to enable PQB to complete an advisory review. Notably, Jonathan Ho HDOA/PQ represented that PQB would complete the technical review by February 2021 and also stated because PQB failed to notify Madson in writing of its decision on her petition for a rule amendment to reclassify *C. vasa* within the requisite 30-day timeframe, she had obtained the right to seek automatic rule-making on the matter. Indeed, HRS § 91-6, provides in relevant part:

> ...Upon submission of the petition, **the agency shall within thirty days either deny the petition in writing, stating its reasons for the denial or initiate proceedings in accordance with section 91-3.**

Thus, the only request of Ms. Madson's which is pending at this time is her original petition for the initiation of administrative rulemaking and rule amendment to Chapter 4-71, Hawaii Administrative Rules (HAR) to change the list placement of the Vasa Parrot, *Coracopsis vasa*, from the List of restricted Animals (Part B) to the List of Conditionally Approved Animals. Significantly, Ms. Madson has not contested the Board's August 7th

and December 15th denials of her permit applications for ESA and research and does not desire additional consideration of these permit applications. Because PQB failed to act on her petition for rule-making in a timely manner (or at all) it is bound to initiate rule-making proceedings in accordance with HRS § 91-3.

PQB NOTES: *On February 2, 2021, Ms. Madson provided a technical review in support of her request to initiate administrative rule-making and rule amendment to reclassify the Vasa parrot entitled, "Review of the potential invasiveness of the Vasa parrot (Coracopsis vasa) as compared to other species within the Psittacidae family," by Phillip Greenwell, M.S., a wildlife biologist with field experience in avian invasiveness in island ecosystems and parrot biology and behavior. In addition to the information previously provided by Ms. Madson, the review provides literature-based references and personal field experience in drawing conclusions on the possibility of establishment and threat of invasiveness when compared to other parrot species. The review supports Ms. Madson's statements as listed below, while also mentioning the low possibility of invasiveness. Please see attachment 4 for Mr. Greenwell's Review and attachment 5 for his CV.*

II. Information Provided by the Petitioner in Support of the Reclassification Petition

The vast majority of parrot species are already included in the list of Conditionally Approved animals, pursuant to HAR § 4-71-6.5:

FAMILY Psittacidae

Agapornis (all species in genus)
Alisterus· (all species in genus)
Amazona (all species in genus)
Anodorhynchus (all species in genus)
Aprosmictus (all species in genus)
Ara (all species in genus)
Aratinga (all species in genus except~- nana astec)
Bolborhynchus lineola
Cacatua (all species in genus)
Callocephalon fimbriatum
Calyptorhynchus (all species in genus)
Cyanoliseus patagonus
Cyanoramphus (all species in genus)
Deroptyus accipitrinus
Eclectus roratus
Elophus roseicapillus
Enicognathus (all species in genus)

Vasa Parrot, *Coracopsis vasa* Advisory Subcommittee
Madson, Lise

Eunymphicus cornutus
Leptosittaca branickii
Melopsittacus undulatus
Neophema (all species in genus)
Nymphicus [holandicus) hollandicus
Pionus (all species in genus)
Platycercus (all species in genus)
Poicephalus (all species in genus)
Polytelis (all species in genus)
Probosciger aterrimus
Psephot.us · (all species in genus)
Psittacula alexandri
Psittacula cyanocephala
Psittacula·cterbiana
Psittacula eupatria
Psittacula himalayana
Psittacula roseata
Psittacus erithacus
Purpureicephalus spurius
Pyrrhura (all species in genus)
Tanygnathus (all species in genus)

Ms. Madson is not a natural scientist by trade but has graduate degree in law and was a practicing judge. While she provided information she obtained from secondary sources about the basic biology, reproductive biology and behavior, geographic distribution, potential for invasiveness, and damage to the environment in her petition for rule-making, she prefers to rely on the information included in the technical report prepared by Phillip Greenwell, M.S. (Wildlife Management and Conservation) who has field experience in the management, control, and assessment of avian invasive species in island environments and is better suited to gauge the accuracy and relevancy of the information. (Attachments 4 and 5). Ms. Madson sought Mr. Greenwell's review largely to provide PQB with the technical information it admitted it was lacking during the April 14, 2020 Board meeting to enable it to move forward with her petition for rule-making.

Of note, Mr. Greenwell's review includes a risk assessment of invasiveness for *C. vasa* in Hawaii using guidelines provided by the World Organization of Animal Health (OIE). The OIE guidelines for assessing the risk of non-native animals becoming invasive are the gold standard for evaluating the potential for a species' invasiveness around the world and are recommended for use in the Convention on Biological Diversity (CBD). Mr. Greenwell also draws elements for his review from the *Hawaiian Pacific Weed Risk Assessment*, which provides modified assessment protocols for alien plant species.

While key excerpts of Mr. Greenwell's review are provided below, PQB and the Board are urged to consider the review in its entirety. *C. vasa* is native to Madagascar. There are no known feral colonies of the species outside its native range.

- Primarily the route of establishment is very restricted. There is a limited breeding population within North America, and there have been no exports of this species from its native habitat since 1993. It is highly unlikely sufficient numbers would be imported to found a potential feral colony.

- The pathway of invasion is strictly control or restricted. All imports must pass through the Hawaiian Department of Agriculture for approval. It is possible to therefore limit both numbers and sex of the species to ensure a suitably biased demographic (i.e. all males). Health and security are also similarly governed so risk of accidental escape or the introduction of pathogens or parasites is also controlled.

- Unlike other parrot species (with the exception of one other species, the Eclectus parrot) Vasa parrots have a complex polygynandrous breeding system. To successfully rear young females depend on multiple attending males to feed her intensely across the breeding season. Unless a large founding population is simultaneously introduced then it is unlikely that the correct sex ratio will be achieved in Hawai'i. It is possible that multiple males are required to help provide the nourishment to the rapidly developing chicks (one of the fastest development times in psittacines). Lack of food of suitable quantity or quality can stunt or limit growth during this critical development time. It has been proposed that food availability might be an ecological constraint, one which applied selective pressures towards this unusual reproductive system in *Coracopsis* species.

- Unlike the other psittacines established in the state vasa parrots are obligate secondary nest cavity users. This means that birds do not excavate nests or modify/enlarge existing holes, but must find appropriately sized cavities to nest in. The other species currently feral in the state (Cockatoos, Amazons and conures) are all adept at modifying existing cavities. No gnawing/chewing behaviour has been observed in Vasa parrots, indeed they are generally a non-destructive species and one of the few larger species that may be maintained in planted flights in captivity. Therefore suitable nest sites are likely to be a limited resource for this species (particularly given the number of other psittacine species in the state competing for the nesting sites).

- Unless a large consignment of birds is released simultaneously into the habitat then smaller localised escapes of individual are unlikely to establish viable populations, given the constraints of founder population dynamics. Genetic bottlenecks and inbreeding are likely to reduce fitness in species with low founder populations. Immigration of unrelated individuals is required to sustain genetic diversity and of course this would be controlled by import permits.

- Changes to the basal metabolic rate in this species requires a greater quantity and/or quality of food to accommodate for these changes. It is possible that these changes are associated with breeding and parental behaviours, particularly as the development of the young is fast, and again can be referred to the breeding system with multiple males delivering food to the female. Given the nutritional requirements for successful reproduction, it is unlikely that in a novel habitat with unfamiliar food resources that a foundling population will find sufficient material to meet calorific and dietary needs.

- Despite the rapid development of the young birds, Vasa parrots nest only once in their native habitat. Clutch size is also small, approximately 4 eggs.

- This species was intentionally released/introduced into an alien environment (Reunion Island) and the population failed to establish. It is unknown how many individuals were released, or the processes involved, but it is important to note that they have been purposely released without success of establishment.

Mr. Greenwell concludes that the introduction of the vasa parrot does not represent a threat of invasion in the state of Hawaii, in its own right, or, when compared to other Psittacidae members. *C. vasa's* low potential for invasiveness is based on its life characteristics and other attributes. Given the species' unusual breeding system, unique dietary requirements, and obligate cavity nesting needs, it appears unlikely that a wild population could become established, even in the unlikely situation where multiple birds were imported in the future. Indeed, a review of the literature shows that the species has not ever successfully established a feral population outside its native habitat of Madagascar, even when an intentional attempt to colonize *C. vasa* was made. In addition, the species is not particularly popular in the pet trade due to what many find an undesirable appearance, and as a result, it is imported into the United States in low numbers. These factors provide strong support for the State of Hawaii to transfer *C. vasa* from the "restricted animal" to the "conditionally approved" animal list, where the vast majority of Psittacidae—several of which have a greater potential for invasiveness--are placed. The reproductive biology, social structure and unique dietary requirements of *C. vasa* are similar to that of the eclectus parrot, which is on the "conditionally approved" list of Psittacidae, providing additional support of transfer of *C. vasa.*

In reviewing Mr. Greenwell's review as a whole it does not appear there are any identifiable negative environmental consequences to importing this organism into Hawaii that are different from those associated with a large number of parrot species that are already on the Conditionally Approved list. There are no known negative potential impacts to native or endemic species given the quarantine requirements for all parrots. There is no evidence to suggest that the impact of importing the Vasa parrot is greater than that of the many Conditionally Approved parrots, and much evidence suggesting that the impact of importing the Vasa parrot would be less than that of many parrots that are already on the Conditionally Approved list.

Vasa Parrot, *Coracopsis vasa*
Madson, Lise

Advisory Subcommittee

III. Proposed List Placement

Ms. Madson is proposing to change the placement of the Vasa Parrot, *C. vasa,* from the List of Restricted Animals (Part B), and to be placed on the List of Conditionally Approved Animals. Ms. Madson is proposing the following amendments to achieve this:

1. Section 4-71-6.5, List of Restricted Animals (Part B)

   Removes Scientific Name: "*Coracopsis vasa*" and Common Name: "Parrot, Vasa".

2. Section 4-71-6.5, List of Conditionally Approved Animals

   Adds Scientific Name: "*Coracopsis vasa*" and Common Name: "Parrot, Vasa".

IV. Advisory Subcommittee Review

May we request your recommendation and comments by **Friday, March XX, 2021**. You may fax your response to me at (808) 832-0584 or e-mail to: noniponimoi.k.putnam@hawaii.gov.

1. **I recommend approval ___ / ___ disapproval of the preliminary review of the vasa parrot, *Coracopsis vasa*, an animal on the List of Restricted Animals (Part B), for placement on the List of Conditionally Approved Animals for individual possession; Madson.**

Comments:

Signature:_____ Date:_____

Print
Name:_____

DAVID Y. IGE
Governor

JOSH GREEN
Lt. Governor

PHYLLIS SHIMABUKURO-GEISER
Chairperson, Board of Agriculture

MORRIS M. ATTA
Deputy to the Chairperson

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 South King Street
Honolulu, Hawaii 96814-2512
Phone: (808) 973-9600 FAX: (808) 973-9613

August 7, 2020

Ms. Lise Madson
[redacted]

Subject: **Permit Application Disapproval**

Aloha Ms. Madson,

I regret to inform you that your import permit request received on July 10, 2019 for (1) Vasa Parrot, *Coracopsis vasa*, for the purpose of emotional support is disapproved.

The Plant Quarantine Branch considers the importation of an animal for emotional support to be equivalent to individual possession or personal use of an animal. The Vasa Parrot, *Coracopsis vasa*, is currently on the Hawaii Department of Agriculture's List of Restricted Animals (Part B). Per the Hawaii Administrative Rules (HAR) §4-71-6.5(b), individual possession or personal use are not approved purposes for the importation of an animal on the List of Restricted Animals (Part B).

HAR §4-71-6.5(b) states:

> "... the introduction of animals on the lists of conditionally approved or restricted animals is allowed as follows: ...(3) Animals on Part B of the list of restricted animals, for the purposes described in subsection (b)(2) herein or for private and commercial use, including research, zoolgical parks, or aquaculture production.... ."

This letter formally closes your application. If you have any questions or concerns, please feel free to contact our Land Vetebrate Specialist at (808) 832-0566.

Sincerely,

Jonathan K. Ho
Acting Manager
Hawaii Department of Agriculture
Plant Quarantine Branch

COPY

EXHIBIT 1

Department of Agriculture
STATE OF HAWAII

DRAFT
(Unapproved)

Minutes of the Board of Agriculture
December 15, 2020

CALL TO ORDER – The meeting of the Board of Agriculture was called to order on December 15, 2020 at 9:04 a.m. a.m. by Board of Agriculture Chairperson, Phyllis Shimabukuro-Geiser. The meeting was conducted virtually via Zoom due to the current risk of exposure to COVID-19.

Members Virtually Present:

Phyllis Shimabukuro-Geiser, Chairperson, Board of Agriculture
David Smith for Suzanne Case, Chairperson, Board of Land and Natural Resources, Ex Officio Member
Dr. Nicholas Comerford, Dean of the College of Tropical Agriculture & Human Resources University of Hawaii, Ex Officio Member
Mary Alice Evans, Ex Officio Member
Diane Ley, Hawaii Member
Vincent Mina, Maui Member
Fred Cowell, Kauai Member
Randy Cabral, Member-at-Large
Joe Tanaka, Member-at-Large
En Young, Member-at-Large

Others Virtually Present:[1]

18082697130
18085219500
18087571677
Adrian Kamali'i
Andrew Goff
Anonymous (2)
Arumugaswami
Becky Azama, HDOA/PQ
Brandi Ah Yo, HDOA/ARMD
Brian Kau, HDOA/ARMD
Bryan Yee, DAG
Calla
Chelsea Jensen
Cindy Evans
Darwin Inman
Dave Corrigan
Elisabeth
EO
Ferrell Daste
Gail and Clarence Baber

[1] The identification of the public members is based on their sign-in name, but are not verified.

EXHIBIT 2

George Nitta
Harrison Goo
Heath Williams, HDOA/Chair
James Tallman
James Toma, DOH
Janelle Saneishi, HDOA/Chair
Jodi Kimura Yi, DAG
Jonathan Ho, HDOA/PI
Joyce Wong, HDOA/ARMD
Kairee Lima
Keith Otsuka, HDOA/QAD
Kevin Hoffman, HDOA/PI
Kimberli Yoshimoto
Laksmi Abraham
Leo Obaldo, HDOA/QAD
Lise Madson
Michael Iosua
Mimi
Morris Atta, HDOA/Chair
Murakamiws
Noni Putnam, HDOA/PI
Patricia Tummons
Pegs Drewry
Peter Fay
Ray Maki
Roy Hasegawa, HDOA/ARMD
Sean Lester
Shaydee J
Shelley Choy, HDOA/QAD
Shirley Kinoshita
Stephanie Salmons
Thomas Walsh
Trenton Yasui, HDOA/PI
W Rudner
Yuki Lei Sugimura, Maui County Councilmember

II. APPROVAL OF MINUTES FROM 10/27/20 MEETING

Motion to Approve 10/27/20 Minutes: Mina/Cowell

Board Members Ley, Young and Smith were not in attendance at the 10/27/20 meeting and asked to be recused from the vote. Board Member Cabral was not in attendance when the vote was taken.

Public comments: None

Vote: Approved 6-0

III. INTRODUCTIONS

None.

IV. COMMUNICATIONS FROM DIVISIONS AND ADMINISTRATION

A. AGRICULTURAL RESOURCE MANAGEMENT DIVISION

1. Request for Consent to Assignment of General Lease No. S-6005; Vene Luangraj, Lessee/Assignor, to Thoune Hongphao, Assignee; TMK: 1st Div/5-6-006:033; Lot 5, Kahuku Agricultural Park, Koolauloa, Kahuku, Island of Oahu, Hawaii

Roy Hasegawa, HDOA/ARMD, presented testimony as submitted.
Staff Recommendation: Approval

Motion to Approve: Evans/Cabral

Public Testimony: None

Discussion:
Board Member Mina questioned whether 3% gross proceeds would be added to the current rent. Mr. Hasegawa answered that additional rent is only due if the gross proceeds is higher than the base rent. Board Member Mina voiced concern about the economic hardship on the farmer. Mr. Hasegawa said he has a young manager and the farm is up and running.

Vote: Approved, 10-0

2. Request to (1) Rescind Prior Board Action Approving Assignment of General Lease No. S-4877; Toshio Sugita and Kenneth Y. Ibara, Lessee/Assignor, to Gail K. Okimoto, Assignee; and (2) Consent to Assignment of General Lease No. S-4877; Toshio Sugita and Kenneth Y. Ibara, Lessee/Assignor, to Glory Herb Hawaii, LLC, Assignee; TMK: 1st Div/8-5-005:009, Puea, Waianae, Island of Oahu, Hawaii

Roy Hasegawa, HDOA/ARMD, presented testimony as submitted.
Staff Recommendation: Approval

Motion to Approve: Evans/Tanaka

Public Testimony: None

Discussion:
Board Mina asked and Mr. Hasegawa confirmed that Glory Herb is certified organic. Board Member Young questioned if procedurally, when a prior action is rescinded, an agreement with

the current assignee was required. Mr. Hasegawa explained that in 2014, staff drafted the assignment to Ms. Okimoto, however, an agreement on the consideration could not be reached. Currently, Mr. Ibarra wishes to assign the lease to Glory Herb and in order to proceed, the current assignment to Ms. Okimoto must be rescinded. before the lease can be assigned to Glory Herb.

Board Member Smith asked if the current lessee was selling their position to a new lessee. Mr. Hasegawa answered in the affirmative. Ms. Cindy Evans, former Hawaii Island State Representative compared the transaction to selling a spot at the boat harbor and asked whether the State would get anything from the sale and if there had been discussion on charging for transactions like assignments of lease. Ms. Linda Murai answered that the only charge for an assignment or any kind of documented action is a $30 fee per document if the transaction closes/records. The amount is set by administrative rules. Board Member Mary Alice Evans clarified that the consideration is for improvements that the prior lessee has invested in the lot and pointed out that the difference between the boat harbor slip and the ag lease is that the current lessee has invested sweat equity and cash and the monetary consideration is for improvements or inventory that is being transferred. Mr. Brian Kau added that the division does a consideration analysis and if it shows that the assignor has invested more or equivalent to the consideration fee, the department does not take advantage of any kind of participation. However, when the tenant makes a huge profit, the department will take part of the profit to discourage land banking.

Vote: Approved, 10-0

3. Request for Consent to Assignment of General Lease No. S-5501; Doris E. Naki and Naki Farms LLC, Lessor/Assignor, to Naki Farms LLC, Assignee; TMK: 1st Div/4-1-010:029, Waimanalo Farm Lots, Koolaupoko, Waimanalo, Island of Oahu, Hawaii

Roy Hasegawa, HDOA/ARMD, presented testimony as submitted.
Staff Recommendation: Approval

Motion to Approve: Cabral/Evans

Public Testimony: None

Vote: Approved, 10-0

4. Request for Approval to Sublease Between the Hamakua Agricultural Cooperative, Lessee/Sublessor, and Jason DeLuz, Sublessee; General Lease No. S-7008, TMK: 3rd Div/4-3-005:013(por), Lot Nos. W02, W03, W04, W06, and W07; General Lease No. S-7009, TMK: 3rd Div/4-3-005:014(por), Lot Nos. 15 and 18; General Lease No. S-7011, TMK: 3rd Div/4-3-0005:018(por), Lot Nos. W01 and W09, Hamakua Pohakuhaku and Kemau 1st, Hamakua, Island of Hawaii

Joyce Wong, HDOA/ARMD, presented testimony as submitted.
Staff Recommendation: Approval

Motion to Approve: Ley/Tanaka

Public Testimony: None

Discussion:
Board Member Mina asked who maintained the roads leading into Ag Park and if there were any issues going in and out of the area. Ms. Wong replied that she does not know of any issues and it is up to the Co-op to do the maintenance.

Vote: Approved, 10-0

5. Request for Approval to Sublease Between the Hamakua Agricultural Cooperative, Lessee/Sublessor, and Rose Cypret, Sublessee; General Lease No. S-5551, TMK: 3rd Div/4-6-003:001, 002, and 014(por), Lot 26, Honokaia, Hamakua, Island of Hawaii

Joyce Wong, HDOA/ARMD, presented testimony as submitted.
Staff Recommendation: Approval

Motion to Approve: Ley/Mina

Public Testimony: None

Discussion:

Board Member Cabral asked how the lease rent was determined. Ms. Mural replied that lease rents for the sublessees are determined by the Co-op and lease rents for the general leases are determined by an independent appraiser.

Board Member Ley asked if there was a set percentage of pasture leases vs. vegetable and fruit crop leases. Mr. Kau answered that when the Hamakua leases were reviewed, the parcels were assessed for diversified or pastoral ability. ARMD determined the best use for the land. He added, if a person leases a diversified parcel and runs cattle, if approved, the tenant has made a choice and the division would not necessarily adjust the rent to a pasture rate if it had been determined the parcel could support diversified ag.

Vote: Approved, 10-0

6. Request for Approval of Settlement and Amendment of the Reopened Annual Rental for General Lease No. S-5586; Big Island Dairy LLC, Lessee; TMK: 3rd Div/3-9-001:0001 & 002, 3-9-002:007 & 0008, 4-1-001:006 and 4-1-005:001; O'okala, North Hilo, Island of Hawaii

Linda Murai, HDOA/ARMD, presented testimony as submitted.
Staff Recommendation: Approval

Motion to Approve: Evans/Comerford

Public Testimony: None

Discussion:

Board Member Evans questioned if the dairy was closed and if they would retain the lease until the 2028 rent reopening. Ms. Murai answered in the affirmative and added that they are in the process of selling the herd.

Board Member Ley questioned, and Ms. Murai confirmed that Big Island Dairy (BID) would continue to pay the lease even if they are no longer in business. She also questioned the nature of the disagreement on the claims. Ms. Murai answered one was the timeliness of the notice and the second was the amount of the new annual rent. She clarified the reopening amount started on 6/4/2018 but BID was not notified until 12/2019. The reason for the delay was that the appraisals are requested as a group rather than piecemeal as a cost saving measure. Board Member Ley asked about the concern over the new lease rent. Ms. Murai replied that they signed a letter of agreement which included the spreadsheet and made a payment to catch up on back rents.

Board Member Ley asked if the lessee was required to let them know that they are seeking to assign the lease. Ms. Murai explained that although not a requirement, the lessee usually informs the division that they are seeking to assign the lease. When they have a purchase agreement, the lessee will submit the application and purchase agreement to ARMD so that they can qualify the intended lessee/farmer and complete the assignment. In BID case, the division is in communication with the lessee.

Board Member Evans asked, and Ms. Murai acknowledged that BID had complied with Department of Health's Notice of Violation conditions.

Board Member Smith questioned the negotiations on the lease rents and asked why it took so long to figure out the increase. Ms. Murai again explained the appraisal process and that the result of the negotiations was the settlement which waived the lease rent. She added that delayed notification does not absolve the lessee from paying rent. Board Member Smith noted that they lost money trying to save money.

Vote: Approved, 10-0

7. Request for Approval to Award Leases to Various Awardees and Back-up Positions; TMK Nos. 1st Div/8-5-034:001, 3rd Div/1-5-116:011, 4th Div/1-9-002:001, 013, 020 and 045, Islands of Oahu, Hawaii, and Kauai S/B Big Island Dairy

Linda Murai, HDOA/ARMD, presented testimony as submitted.
Staff Recommendation: Approval

Motion to Approve: Cowell/Evans

Public Testimony: None
Discussion:

Board Member Young questioned the process for generating interest in the parcels. He voiced concern that there are so many displaced farmers and wondered why they would not want to relocate. Ms. Murai answered that they place a disposition ad in the newspaper as required by rules, which includes only the TMK. Soil analysis is not included; however, staff is available to answer questions. The division also maintains a database of interested farmers and farmers are informed when lots become available.

Board Member Young commented regarding the ARMD agenda, he respects the work done on the strategic plan document and would like to see what kind of progress is being made on the metrics per the strategic plan.

Board Member Ley acknowledged that big island staff has been helpful when connecting producers affected by lava flows with DOA staff by connecting those wanting to stop farming due to age and health with farmers who were affected by the lava flows. She encouraged looking into other sectors and to modernize communication by using press releases and social media to reach out into the community.

Board Member Mina stated that Sharon Hurd does a good job disseminating information. He also questioned the infrastructure, water meters and size of the lots. Ms. Murai was not sure but stated that the applicants must do their due diligence before signing the lease.

Board Member Young agreed with Board Member Mina and added that it should be easy and transparent for farmers to know what they are getting into. As to the designation of the lot, he said that there a lot of new containerized growing systems which do not need to adhere to the designations of pastoral or diversified ag.

Ms. Murai explained that during the award process, the applicant/awardee is given the right of entry for 6 months. They can go onto the lot and see if the conditions (water, soil, electricity) are favorable. They have no obligation to move forward with the long-term lease.

Vote: Approved, 10-0

B. PLANT INDUSTRY DIVISION

Plant Quarantine Branch

1. Request to: (1) Allow the Importation of One Vasa Parrot, *Coracopsis vasa*, an Animal on the List of Restricted Animals (Part B), by Permit, for Research, by Lise Madson; and (2) Establish Permit Conditions for the Importation of One Vasa Parrot, *Coracopsis vasa*, an Animal on the List of Restricted Animals (Part B), for Research, by Lise Madson.

Noni Putnam, HDOA/PQ, presented testimony as submitted.
Staff Recommendation: Based upon the recommendations and comments of the Advisory Subcommittee on Land Vertebrates, and the Advisory Committee on Plants and Animals' motion to move this request to the Board without a recommendation to approve or disapprove this request, in conjunction with the applicant's recent changes to the request that were not reviewed by either the Subcommittee or Committee, the PQB is not making a recommendation on this request.

Motion to approve the importation of one Vasa parrot to research purposes subject to proposed permit conditions. Evans/Smith

Public Testimony:
Ms. Lise Madson, resident of Mountain View, HI, Applicant

Discussion:
Board Member Evans asked whether the bird would be pinioned. Ms. Madson explained that pinioning is removing part of the wing including the bone and is illegal in some countries. She feels wing trimming is enough. Pinioning is done for birds who are loose. This bird is microchipped and will be kept in a locked double door system. There is a low risk of escape and no danger exists if it does escape.

Board Member Comerford asked the research value of a one animal experiment. Ms. Madson replied that it is an under-researched bird. When asked whether she would be a researcher or a research technician, she replied that under TTOUCH, she would work on a book directly in association with Linda Tellington-Jones, as a professional legacy. With Alex studies, she would collect data to be interpreted. Board Member Comerford said that it appeared she would be a research technician and when asked if she published anything, she replied, "no". Board Member Comerford asked how much is related to research and how much support animal. Ms. Madson replied 100% to both. Emotional support animal (ESA) was denied by PQB because ESA's are considered personal not private. Board Member Comerford voiced disappointment that the committee did not make a recommendation to the board.

Board Member Mina said that based on her passion and research, normally he would have a tendency to vote in favor of similar projects, but he was not supportive of bringing in an invasive species.

Board Member Tanaka asked why the animal was restricted. Mr. Ho replied that PQB was unable to find specific reference or any details as to why the bird was placed on the restrictive list Part B. Results of internet research found that the bird is rare in cultivation, does not seem to be established outside of its native range, is difficult to breed, and eats fruits and seeds in its native range.

Board Member asked how to un-restrict. Mr. Ho answered to make the change on the next request.

Chair referred to the submittal which stated that a letter/resume should contain information on the source of funding, be peer reviewed, be conducted by an approved institution, meet IACUC requirements. She questioned whether the criteria had been met. Mr. Ho replied that when the submittal was presented to committee, there was a lot of discussion regarding the research component and collaboration with University researchers.

Chair asked whether the subcommittee and review by P&A approved having research done in a residence vs. research facility. Mr. Ho said there were no specific concerns regarding the facility. Ms. Madson replied that research in a home environment provides greater security. If the animal is in a different facility, there is a need to safeguard against theft and it is cost prohibitive.

Board Member Young asked if the research would continue for the life of the parrot. Ms. Madson replied that with the Alex Foundation, the research would have to be completed, written, and peer reviewed. For the African Gray, the Alex Studies went for 30 years. When asked how long a parrot lives, she said probably 40 years. If something happened to her, conservationists would look after the bird, if not pinioned.

Board member Young commented that staff and subcommittees specialize in specific areas and asked if the Board is required to think about allowing research in terms of direct benefit to the agricultural sector. Mr. Ho replied that there is no requirement that the research be beneficial to agriculture.

Chair added that Dr. Sheila Conant stated if a bird is permitted to come in it would set a precedent for Division of Forestry and Wildlife (DOFAW). Mr. Smith commented that the DOFAW list restricts all parrots, so the entire family was put on list. He added that it looked like a pet parrot and questioned whether research was being asserted as a rationale to bypass the list banning the importation of parrots.

Board Member Mina said that he does not want to see precedent set to abuse the system.

Board Member Evans said that she did not believe that the importation of one parrot poses any threat to Hawaii agriculture.

Mr. Ho said that the DOFAW list restricts interisland movement of birds (movement of wild life). Ms. Madson's bird is not wild, therefore, they come before PQ for import purposes for research. A lot of the discussion in P&A was regarding whether the research was valid. Conditions that

PQ drafted for the Vasa Parrot would require that every other applicant come before the board for administrative approval.

Board Member Evans restated her motion: Motion to approve request to import one Vasa parrot for research purposes subject to conditions on 23-27 pages.

Vote: Failed, 2-7 (Chair did not vote)

DAG Yee advised that a motion to disapprove was required.

Motion to disapprove the request for import for research purposes: Smith/Tanaka

Board Member Young spoke in support of disapproval. He commented that it is up to DOFAW and DOA to gauge threat level of individual bird but felt that the department should be more proactive about research rather the reactive. If research is going to be allowed, the board should be able to make an informed decision by looking at the full research design and having the opportunity to look at the validity.

Board Member Smith said he is voted against the project because he felt the research component was not viable.

Vote: Approved, 9-1 (Motion to disapprove the request for import for research purposes)

2. Resubmittal of a Request for Review of the Petition from Lise Madson to Initiate Administrative Rule Making and Rule Amendment to Chapter 4-71, Hawaii Administrative Rules (HAR), to Change the List Placement of Vasa Parrot, *Coracopsis vasa*, From the List of Restricted Animals (Part B) to the List of Conditionally Approved Animals.

Jonathan Ho HDOA/PQ, presented testimony as submitted.

Staff did not make a recommendation as it was their understanding that the Board wants to conduct a full review and see everything going through the process before making a recommendation. Referring to Board Member Smith's prior question, ESA's are not allowed if on the restricted Part B list, however, if approved, ESA could be a conditionally approved animal—individual possession is allowed.

Board Member Evans questioned if the review had been completed and if not completed, she would recommend deferral.

Mr. Ho replied that the branch did not notify the petitioner in writing within the 30-day timeframe, resulting in automatic rulemaking. The board can initiate rulemaking immediately. The Board can deny and direct PQ to go through the review process and provide information.

Chair stated if the Board denies the petition, the Board could direct PQ to route the petition through the review process and come back to the Board at another meeting or could deny but

say the Board would consider if the petition is moved through the subcommittee and P&A review process.

Board Member Evans said she wanted to defer because there is a lack of sufficient reasons for denial.

Motion to defer making a decision and direct Branch to go through the review process and make a recommendation for or against at a subsequent Board Meeting. Evans/Tanaka

Public Testimony:

Ms. Lise Madson testified on the procedural history of her request as submitted. She encouraged moving from the Restricted Part B list to conditionally approved based on the time elapsed since initial request was made.

Board Member Cabral asked how long the review would take. Mr. Ho replied that the earliest would be February for a full review.

Vote: 10-0

V. OLD BUSINESS

1. Discussion and Decision Making on the Delegation of Authority to the Chairperson.

The Quality Assurance Division (QAD) was not able to present at the last meeting due to time limitations.

Leo Obaldo, HDOA/QAD, presented as submitted. QAD did not request any additional delegations to the Chair.

Board Member Mina asked if weights and measures of gas stations were included. Chair replied that Measurement Standards performs those duties. She added that many states consider weights and measures important to agriculture which is the reason why it falls under DOA. The farmers and consumers rely on the accuracy of the weight because it determines price.

Board Member Cabral said that he thought the discussion would be about placing items on the agenda as part of the delegation. He said he was asked by a Big Island constituent farmer for something to be placed on the agenda. Chair had indicated that it was the Chair's prerogative to approve the agenda item. The issue was whether it was in the Board's purview to place something on the agenda. Chair explained that the Board Members have the authority to request items be placed on the agenda. Sometimes, when the department is handling confidential information or is involved in a negotiation, the Chair can deny the item being placed on the agenda.

DAG Yee clarified that a Board Member can request an item be placed on the agenda. However, it is the prerogative of the Chair to approve placing the item on the agenda. Chair asked Board member Cabral if the item could be discussed at the next Board Meeting in Executive Session.

Board Member Evans said that she thought the agenda item would lead to delegating some items that were brought to the Board on a regular basis to the Chair. She questioned whether there would be a recommendation of items that could be delegated to the Chair. Chair answered that at the Board Meeting on October 27, 2020, motions to approve delegations were reflected in the minutes. For divisions that requested delegation, action was taken.

DAG Yee explained that the larger agenda items is whether items should be delegated. QAD is not recommending action.

2. Department of Agriculture's response to Coffee Leaf Rust.

Comments were made on the written report detailing the Department's response to Coffee Leaf Rust (CLR)

Board Member Cowell thanked the Department for enacting quarantine. Industry is still confused on how the quarantine is being done but they are working through it. The industry has questions regarding propagating rust resistant coffee grown in the State and will be going back to PQ. Another aspect industry is looking at is moving toward approval of systemic fungicides.

Board Member Cabral commented on the good work being done by the Department. Chair said updates would continue if Board desires.

Board Member Mina asked about research being done using beneficial fungicides. The beneficial fungal network provided by nature should be addressed and he would like the department to look at biological applications.

Dr. Hoffman said he has not heard about research using beneficial fungi but can bring it up to collaborators as an area to explore. USDA has formed a cross functional working group and they are working on mitigation strategies and guidelines on ways to respond to the disease.

Public testimony:
Mr. George Nitta Jr. (Shirley Kinoshita) testified on the benefits of Ethanol to kill the virus. He will provide contact information for staff to contact him.

3. Discussion regarding South Maui Gardens and hemp licensee updates.

Ms. Shelley Choy, HDOA/QAD presented the South Maui Gardens (SMG) Hemp Producer Update as submitted in the written presentation.

Mr. James Toma, Department of Health, Noise Section supervisor, reported on what he observed at South Maui Gardens. He stated that according to Chapter 46, Community Noise Control, allowable levels of noise control are based on the zoning of the property. The property is agriculture zoned therefore 70 db, 24/7 is allowed. Inside the property line, readings were in the high 50's. A second reading taken at night with fans running at 50% was in the low 50's; in both cases well within 70 db.

Mr. Toma said that for DOH to regulate noise, it requires specialized equipment, experience, and training. They take certification classes and the equipment must be ANSI certified, which is the standard that the industry uses. If the Department of Agriculture wanted to enforce noise rules, they would need to buy equipment and get training.

He also commented on low frequency noise and official standards to regulate noise. In reference to a statement that DOH rules are archaic, he said the rules work except when zoning is mixed or when the use of the land is not appropriate to the zoning. A lot of the information presented was based on residential zoning. There are no rules in the States regulating low frequency. The information presented was from Europe and he was not able to verify the numbers that were presented as there were no jurisdictions which enforced the levels. In terms of health effects, they have not found conclusive research that shows low frequency causes certain conditions. He said that at higher levels, 90 db+, physical conditions could result, but there is not enough research for DOH to act.

He acknowledged that the bill identifies hemp farms but stated that the reality is that if it is put into place, other people who have issues with ag may come forward and want their issues addressed. He gave the examples of coffee mills running 24/7 for months during harvest season and windmills on ag land. He stated that although the bill is specific, it might open the door for other issues in the future.

Chair reiterated that there would be no action or decision making at the meeting; information is for the board only.

Board Member Ley commented that it looked like the parties had come together to address concerns and asked if the Department could bring in mediation services.

DAG Bryan Yee asked that questions be restricted to Mr. Toma's presentation since public comments still needed to be heard.

Board Member Young asked if anything that the Department of Health regulated was also regulated by another state department. Mr. Toma said none that he could think of.

Public Comments:

Chair stated that approximately 69 written communications were received from the public.

Mr. Sean Lester, 31-year Maui resident, said he believes that SMG is not utilizing the land correctly. He voiced displeasure with Mr. Toma's comments and asked for a working group to find solutions.

Ms. Gayle Baber, hemp and food farmer in Kohala, stated that the land use issue between SMG and the neighbors is isolated and is creating an expense for existing license holders. She agreed with Mr. Toma about broader land use issues and farmers should not be penalized when most of the licensees are compliant. The Hawaii Hemp Farmers Association suggests a Hemp Advisory Board be created.

Maui Councilmember, Yuki Lei Sugimura said that the community is in her jurisdiction and she has had communication with the community and visited the site with Representative Kyle Yamashita. The community and SMG have not been able to find a solution. She asked if there was a mediator who could hear both sides. The neighbors feel sound decibels are agonizing. SMG provides jobs and must figure out how to live with the community. She felt a mediator could help.

Mr. Peter Fay commented that dbc is not regulated in Hawaii. It is regulated in England and Sweden. He stated that the 70 db limit for ag land is dba and there is no regulation for dbc noise. He added that Mr. Toma measured both dba and dbc levels. He said he believes that the community gave the board the science that they asked for.

Shaydee J, Kaneohe resident commented regarding amount of water being used for hemp.

James Tallman, Director of Hemp Division for SMG. He stated that experts were consulted as to design, rules and regulations before growing hemp. SMG grows in greenhouses as consumers want hemp grown without insects, contaminants and mold. They do not use pesticides or fungicides. Rule changes would put them out of business. They oppose 24" fans, and it would take 16-32 fans which would be louder. He could not find information on the 30 dbc frequency. Lowering db to 50 at night would cause mold issues and destroy crop.

Thomas Walsh, President of Operations, SMG was available to answer questions.

Ray Maki, President of the Hawaii Hemp Farmers Assoc., stated that it was one complaint that triggered the events. He requested that rules regarding nuisance be directly related to existing state laws.

Board Discussion:
Chair said the request for a mediator or working group would be taken up in January's meeting and that the Department would need to also consider the resource requirement.

Board Member Ley referred to the USDA funded, Hawaii Agricultural Mediation Program which could take the department out of the loop at no cost. She said they have a representative on Maui and are quasi housed under the department. Board Member Ley also questioned whether the department was planning to create a program now that USDA has superseded the State Program. Chair answered that the Board would be coming back in January because of a motion passed at the September Board Meeting. The motion stated that the Department work on addressing nuisance concerns and make recommendations to the board on any proposed changes to the interim rules adopted in September or whether to abide with the interim rules

passed in September. The request for the informational update was requested by Board Member Mina.

DAG Yee concurred that the agenda item was to present information to board for their consideration in January, to receive feedback, if any, and to inform the public of the information that exits currently. Action would be contemplated in January.

Chair noted that the Department has used Hawaii Mediation Program, sometimes at no cost, but if their budget is exhausted, then there is a fee for their services.

Board Member Mina asked if Mr. Walsh lived on the property. Mr. Walsh answered that he lives next to the greenhouse with the fans. Board Member Mina echoed the call for mediation services.

Board Member Mina questioned if the Board had until June to make changes. DAG Yee answered that the Board passed the interim rules which last for 2 years unless permanent rules are passed sooner. The January deadline for nuisance issues was self-imposed. He confirmed that the interim rules could be adjusted until June 2022.

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VI. NEW BUSINESS

None

VII. ADJOURNMENT OF MEETING

The meeting was adjourned at 1:49 p.m.

Respectfully submitted,

Jan Ferrer
Board Secretary

DAVID Y. IGE
Governor

JOSH GREEN
Lt. Governor

PHYLLIS SHIMABUKURO-GEISER
Chairperson, Board of Agriculture

MORRIS M. ATTA
Deputy to the Chairperson

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 South King Street
Honolulu, Hawaii 96814-2512
Phone: (808) 973-9600 FAX: (808) 973-9613

January 15, 2021

Ms. Lise Madson
[redacted]

Subject: **Hawaii Board of Agriculture Permit Application Disapproval**

Aloha Ms. Madson:

I regret to inform you that your import permit request, received on June 17, 2019, for (1) Vasa Parrot, *Coracopsis vasa*, for the purpose of research, was denied by the Hawaii Board of Agriculture (Board) at its meeting on December 15, 2020. A motion that was made to approve your request failed; 2 to 7 (Chair did not vote). A second motion to deny your request was made, and it carried; 9 to 1. The Board has discretion to allow research projects on a case by case basis, and in this instance the board determined that the proposed research plan was not sufficient to merit issuance of a permit.

The Hawaii Administrative Rules §4-1-33 allows a person whose application for the issuance of a permit that has been denied by the Board to file a written request for a contested case hearing, provided that the request for a hearing is filed with the Board within thirty days of the date of mailing of the letter informing the applicant of the denial of the application. If you wish to file a request for a contested case hearing with the Board, please mail your contested case hearing request with a return receipt request to:

Hawaii Department of Agriculture
1428 S. King Street
Honolulu, HI 96814

Also, on December 15, 2020, the Board on its own motion, rereviewed your petition received on July 22, 2019, to change the list placement of the Vasa Parrot, *C. vasa*, from the Restricted Animals List (Part B), to the List of Conditionally Approved Animals and deferred the request by a vote of 10-0. The Board directed the Plant Quarantine Branch (PQB) to go through the full review process and to bring the request back before

EXHIBIT 3

the Board to make a final determination. The PQB is currently working on your petition and will present its findings at a future Board meeting. We will keep you informed of the review progress, including the date and time of the Advisory Committee on Plants and Animals, and Board meetings, respectively, once they have been determined.

Sincerely,

Phyllis Shimabukuro-Geiser

Phyllis Shimabukuro-Geiser, Chairperson
Hawaii Board of Agriculture

Review of the potential invasiveness of the Vasa parrot (*Coracopsis vasa*) as compared to other species within the Psittaciadae family

By Phillip Greenwell[1]

Context. This review has been requested by L.M of Hawaii after her request to import one male vasa parrot (*Coracopsis vasa*) was declined, in part based on the risk of potential invasiveness of the species. Due to the author's experience across the disciplines of invasive species management and parrot biology and behaviour L.M requested a review of the Vasa parrot as a potential invasive species, particularly in comparison to other members of the parrot family (Psittacidae).

At present, in the State of Hawaii, the vast majority of parrot species are "conditionally approved" for importation under State administrative rules, Hawaii Administrative Rules §4-71-6.5 (2006), meaning they can be imported for individual possession, business, government agencies, or institutions. In contrast, the Vasa parrot, along with just three other species within the Psittacidae family, is listed as a "restricted animal" under HAR §4-71-6.5, and its importation into the State is subject to heightened restriction.

L.M. has requested a detailed analysis of the literature evaluating *C. vasa's* potential for invasiveness in its own right, and, as compared to other members of the Psittacidae family with an aim towards determining whether its current status on the Hawaii State list of restricted species is warranted, particularly when compared to almost all other Psittacidae members, which are "conditionally approved".

In performing this evaluation, the author has endeavoured to submit an unbiased review. Having worked directly with invasive alien avian species—particularly in island environments--monitored them in the wild and viewed the negative interactions first-hand, and then witnessed the subsequent reversal in the decline of endemic species once the removal of the alien avian invader is successful, he understands the need for stringent control and the use of a precautionary approach to managing potential risk species.

Upon analysis, the author finds that the Vasa parrot's potential for invasiveness is low when compared to many other parrot species (e.g. *Amazona* or *aratinga* species). As noted in detail below, *C. vasa* has been found to possess several unique reproductive and behavioral traits that would likely impede the establishment of wild populations. Significantly, and as borne out by the literature, there are no documented wild populations of *C. vasa* known to exist outside its native range of Madagascar. These findings strongly suggest that the species' potential for invasiveness is low and that heightened restriction is not warranted, particularly when

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[1] Phillip Greenwell holds a Master of Science in Wildlife Management and Conservation and a Bachelor of Science in Animal Behaviour. Mr. Greenwell has had several papers published in peer-reviewed journals on wildlife management, invasive species management, and psittacine behaviour, which are his principal areas of research. He has contributed towards the Pest Status report of an invasive parrot species in Western Australia for the Department of Conservation and Land Management, and undertook in-situ invasive avian species (*Acridotheres tristis*) control in the Seychelles. He has also acted as a reviewer for the Journal of Veterinary Behaviour. A former university lecturer, he continues to undertake guest lectures in higher education establishments on invasive species management, discussing the impacts on islands in particular, presenting case studies on brown tree snakes (*Boiga irregularis*), myna birds (*Acridotheres tristis*) and grey squirrels (*Sciurus carolinensis*) to detail the complexities of invasive species research and control. He can be reached at Lieu dit Salce, Saint Georges, France, 0033 679011669, phillgreenwell@gmail.com. See C/V attached, for additional details.

EXHIBIT 4

compared to other parrot species. At present the eclectus parrot genus is on the conditionally approved list; this genus possibly closest matches the complexities of the vasa parrot in regards to a complex social structure, unique dietary needs and habitat similarities. To this author there seems to be insufficient grounds to justify placing one species on the conditionally approved" "animals list and not the other.

Methodology & Structure: What follows is a detailed literature review of the species followed by a response to a set of questions recommended by the OIE (World Organisation for Animal Health) in determining invasive potential of alien species.

While it is not a full-blow risk assessment, per se, elements of this report have been drawn from the *Hawaiian Pacific Weed Risk Assessment Risk Assessment* (itself derived from the Copp, et al. (2005). *Risk identification and assessment of non-native freshwater fishes: concepts and perspectives on protocols for the UK)* modified for alien plant assessments, frameworks developed by the International Union for the Conservation of Nature (IUCN) and its affiliated partners, World Organisation for Animal Health (*Guidelines for assessing the risk of non-native animals becoming invasive*), published peer-reviewed articles and material devoted to wild or captive research of the species.

Behaviours or traits deemed relevant by the author have been clearly separated and then discussed in context both of invasive potential, control of feral populations or in relation to other members of the parrot family currently permitted into the state of Hawai'i. Source material is also listed.

Evaluation of the literature research is then discussed in the context of attributes that may or may not support the vasa parrot becoming an invasive species, particularly in relation to other psittacines.

In addition to the foregoing, the author has also reviewed HAR § 4-71-6.5, and the lists of conditionally approved animals and restricted animals.

Ecological and Biological characteristics of relevance in the evaluation of the Vasa parrot (*Coracopsis vasa*) as a potential alien invasive species.

Attribute	Detail	Relevance	Sources
Distribution	No export for past 28 years from country of origin	There have been no exports of this species from its native country since 1993, according to CITES. Trade in many species increases the risk of establishing feral populations, and an increased captive pool for breeding. The restrictions in place on the export of C. vasa will likely ensure that no country will be able to import this species in quantity, thereby reducing the risk of invasion pathway.	https://cites.org/sites/default/files/eng/com/ac/19/E19-08-4.pdf White et al. (2012) Psittacine reintroductions: Common denominators of success. Biological Conservation; 148.
	No feral populations of this species recorded.	It is important to note that this species has no known feral populations existing, unlike many of the species listed on the conditionally approved list. Low export numbers (ergo founding populations), unique breeding strategy and nutritional requirements are likely to be limiting factors.	BirdLife International. 2018. Coracopsis vasa. The IUCN Red List of Threatened Species 2018
	Failed introduction attempt to Reunion Island.	Of equal importance to note C. vasa was intentionally released on the island of Reunion, outside of its natural distribution range. Though details are lacking it appears that an intentional release of this species failed, despite similar climate and within a similar geographic region from the original habitat. Many parrot (re)introduction attempts fail for multiple reasons, despite every effort from conservation planners. In general, the extant population is in decline, and listed as Least Concern on the IUCN Red List.	
Social/ Group structure	Flock size is variable, noted as between 4-15 individuals	The majority of avian invasive species form flocks numbering hundreds of individuals. Three avian species feature in the IUCNs list of Top 100 invasive species, the Common Indian Myna, European Starling and the Red-Vented Bulbul. All three species	Foreshaw, J.M.(2006). Parrots of the World: an identification guide. Princeton University Press.

		show small body size/weight, opportunistic feeding regimes, are highly gregarious and form large flocks and roost communally. The red-fronted parakeet (*Aratinga erythrogenys*) also follows this trend, currently listed as an injurious species by the HDOA. A comprehensive review of alien psittacines in Europe showed that of the majority of the 12 species established across the union, only the ring-neck parakeet was documented having a negative impact. The other species were deemed to have a neutral impact. This list included the Red-fronted parakeet, currently a species listed as invasive in Hawai'i. However it is occasionally seen in larger flocks (up to 40 individuals) during feeding, though it is data-deficient in regards to numbers. Flock size depends on whether in breeding season or not, and appears to exhibit migration within its habitat, potentially in search of food resources. Though small flocks are observed in the day, larger groups may congregate at night, with 100s of individuals recorded. There is one doctoral theses suggesting the species may be an agricultural pest species on maize and wheat in its native habitat, though this information is deficient.	Safford et al. (2015) Birds of Madagascar. Bloomsbury Press. O Martin et al. (2014) Research and conservation of the larger parrots of Africa and Madagascar: a review of knowledge gaps and opportunities. OSTRICH, 85(3): 205–233 Global Invasive Species Database, http://www.iucngisd.org White et al. (2019) Assessing the ecological and societal impacts of alien parrots in Europe using a transparent and inclusive evidence-mapping scheme. NeoBiota 48: 45-69. Bollen, A. (2004) Fruit-frugivore interactions in a Malagasy littoral forest: a community-wide approach of seed dispersal. PhD theses, University of Antwerp
Mating system (wild)	Polygynandry	For a population to become invasive, a potential breeding population must live past the process of establishment and find suitable mates. The majority of avian invasive species (where the pathways of invasion are known) are monogamous and generally derived from either large-scale escapes/introductions/releases or a slower process of smaller numbers being released (i.e. pet or zoo escapes). The observed mating system of the vasa parrot is highly unusual amongst the aves taxa and even more so in the psittacine family.	Ekstrom et al. Unusual sex roles in a highly promiscuous parrot: the Greater Vasa Parrot Caracopsis vasa Clegg et al. Genetic consequences of sequential founder events by an island-colonizing bird. Proceedings of the

		Unlike the vast majority of the psittacine family, the Vasa parrot is a polygynandrous breeder. A breeding female (in this species the female is dominant to the male) will mate with multiple males. These males feed the female and clutches of young are of mixed paternity. It is possible that the quantity of food that is delivered to the female is required to sustain the fast growth of the chicks, one of the fastest developing of the psittacine family. Males will mate with, and feed, multiple females also. The unusual sex ration of this species may also have implications on founder population dynamics. Studies on founder populations in birds tend to look at monogamous species, and in addition studies have suggested that populations needed between 30 and 100 founding individuals to ensure sufficient genetic diversity of the new population. In populations based on single founding pair, it took many generations for a group to establish, and it is only through subsequent immigrants from nearby islands that prevented inbreeding and the loss of genetic diversity/fitness.	National Academy of Sciences Jun 2002, 99 (12) 8127-8132 Grant PR et al. A population founded by a single pair of individuals: establishment, expansion, and evolution. Genetica. 2001;112-113:359-82.
Breeding behaviour	Males play no role in the incubation or feeding of the young. The female solicits feeding from multiple males. Females are relative conspicuous at the nest, calling loudly.	Multiple individuals are required to successfully rear a single clutch in the wild, possibly due to the rapid development of the chicks in the nest (see below). This would enable control of a breeding propagule easier to manage than multiple pair-groupings. Males are not able to be caught using nest-site traps, which have been used to confine the female in the nesting cavity in the wild. However no female was able to escape from this capture method, ensuring a demographically imbalanced (i.e. male only/non-breeding) population could be attained if a free living population were established (upon identification of nesting locations).	Randrianaina A.L. (2004) Contribution a l'etude bio-eco-ethologique de perroquet *Coracopsis vasa drouhardi* pendant le period de reproduction dans la region de Morondava. University of Antananarivo, Madagascar. Wilkinson, R. & Birkhead T.R. (1995) Copulation behaviour in the Vasa parrots Coracopsis vasa and C. nigra. Ibis.

	The 'song' of the females is suggested to be an indicator of fitness in the species. Longer songs attracted more males than shorter songs. Playback of songs at different volumes attracted males to the area (louder broadcasts attracted more males).	During studies on this species, of which there are few, nest sites were located with relative ease by field researchers due to the loud vocalisations emitted by the female. Given the above information of nest attendance by multiple males, monitoring and control of the species would be easier than in monogamous species. It would appear that males are attracted by artificial broadcasting of the females song, the louder the playback the greater number of males attracted. This behaviour, albeit noted during the breeding period, would appear a relatively easy way to maintain breeding populations if a feral population were to become established. Nesting occurs almost exclusively in tree hollows. Suitable nesting cavities are required by the Vasa parrots, most commonly in trees (occasionally banks/cliffsides). It appears that existing hollows are utilised, with no observation of birds constructing their own hollows or making alterations to the site. Existing trees with cavities of an appropriate depth and width are a limited resource in most environments for large bodied obligate cavity nesting birds. Females broadcast their song from highest trees in vicinity of nest. Singing from a high and exposed position, in dead or living trees, aids in the attenuation of the song into the surrounding landscape. This behaviour would aide in the easy identification of the species, particularly during the breeding period and help identify nests within the vicinity of the broadcast tree. Breeding occurs once during the wet season in Madagascar, and only a single clutch is raised during the period, unlike some smaller psittacine species which may raise two or more broods in one reproductive season. Females defend territories around nesting sites from congeners. Territories are estimated, on average, to be 10,000m2.	de la Parra-Martínez, S.M., Renton, K., Salinas-Melgoza, A. et al. Tree-cavity availability and selection by a large-bodied secondary cavity-nester: the Military Macaw. J Ornithol 156, 489–498 (2015).

Incubation, Rearing and Weaning	Approximately 3-5 eggs are recorded in the wild, average 4 in captivity. Once chicks hatch attending males make multiple hourly visits to the female at the nest. Weaning is recorded as between 6-10 weeks.	The Vasa is considered to have one of the shortest incubation periods of all the parrot family, with estimates between 17-19 days. On average 165 feeding visits from males to female were recorded **each hour** once chicks hatched with between 3-5 males bring food. It would suggest that in respect to successful raising of young, and therefore subsequent population growth, multiple males are required to feed the female. The likelihood of achieving a suitably balanced feral breeding population in Hawai'i is unlikely given the low number of this species in captivity to provide the necessary founding population.	Jordan, R. & Pattison, J. (1999) *African Parrots*. Hancock House, Surrey, U.K. Randrianaina A.L. (2004) Contribution a l'etude bio-eco-ethologique de perroquet *Coracopsis vasa drouhardi* pendant le period de reproduction dans la region de Morondava. University of Antananarivo, Madagascar.
Behaviour	Birds fly high with a conspicuous slow and deep wingbeat, similar in silhouette of a raptor. Birds are noted to remain relatively calm and approachable whilst feeding in the wild.	The large size of the species, its distinctive colour and above-canopy flight make the species easy to spot in the field. Approachability in the field would ensure control measures and observations would be easier to undertake than 'flightier' species.	Foreshaw, J.M.(2006). Parrots of the World: an identification guide. Princeton University Press.
Morphology / Physiology	Breeding individuals are easily recognised in comparison to young or non-breeding individuals by the	Females lose the feathers on their head, beak colour changes from light to dark and prolapses may be observed from the cloaca in males.	Lovegrove et al. The allometry of parrot BMR: seasonal data for the Greater Vasa Parrot, *Coracopsis vasa*, from Madagascar. *J Comp Physiol B* **181**, 1075–1087 (2011).

	physiological changes that become apparent during the breeding season. Basal Metabolism Rate changes during breeding season.	During breeding the Vasa parrot, unique amongst its tribe, exhibits up-regulation of its basal metabolic rate, having the highest recorded BMR for a bird of any size to date. It is suggested that the costs of a high summer BMR may be met by the unusual cooperative breeding system, in which groups of males feed the female and share paternity. This may also be needed to meet the nutritional requirements of fast-developing chicks. In the context of invasiveness, without multiple males attending a female it is unknown whether sufficient calories can be transferred to the female and thereby the chicks. This is further compounded by the species environmental naivety, lack of knowledge/experience of food sources of varying nutritional quality and calorific richness of Hawaiian plants. In this regard it could be considered unlikely that vasa parrots would adapt with sufficient speed to the novel environment to permit rapid expansion through breeding, and would be less likely than most of other parrot species to succeed at establishment.	
Habitat	1.5 Forest-subtropical/Tropical Dry 1.6 Forest-Subtropical/Tropical Moist Lowland 2.1 Savanna-Dry 3.5 Shrubland-Subtropical/Tropical Dry	A lowland species with an upper elevation limit of 1000 meters. This species utilises a range of habitats and is not dependent on any single one, making it a generalist in regard to habitat use. Given the anthropogenic changes within the state for urbanisation and agricultural pursuits it could be considered that this mosaic of habitat structure lends itself to potential invasion by many alien species. Similar habitat types can be found within the state of Hawaii, ensuring that at a basic level the climate and habitat is suitable for the survival of members of the parrot family in general. Recorded as scare in rainforest areas and more common in degraded, plantation and cultivated areas.	BirdLife International. 2018. Coracopsis vasa. The IUCN Red List of Threatened Species 2018: e.T22685261A131279943. O Martin et al. (2014) Research and conservation of the larger parrots of Africa and Madagascar: a review of knowledge gaps and opportunities. OSTRICH, 85(3): 205–233 Safford et al. (2015) Birds of Madagascar. Bloomsbury Press.

	4.5 Grassland-Subtropical/Tropical Dry 14.1 Artificial/Terrestrial-Arable Land 14.3 Artificial/Terrestrial - Plantations		
Diet	Recorded as granivorous & frugivorous; a possible seed disperser (*C. nigra*) and seed predator.	There is little documented in the way of the wild diet of the Vasa parrot other than a mix of grain, fruit and flowers. A study in 2004 suggested that a close relative, the lesser vasa (or black parrot) Coracopsis nigra, showed dietary flexibility and was able to sample fruits that were not at a palatable stage to other species. Both species exhibited a mixed frugivorous and granivorous diet depending on season and habitat. Despite the study recording this behaviour in the congener of the Vasa, there were no documented observations of the Vasa engaging in similar behaviours. In fact when both species were observed there appeared to be no competition between the two species for food items.	Bollen, A. (2004) Fruit-frugivore interactions in a Malagasy littoral forest: a community-wide approach of seed dispersal. PhD theses, University of Antwerp Tella et al. (no date) Parrots as overlooked seed dispersers. The Ecological Society of America Randrianaina A.L. (2004) Contribution a l'etude bio-eco-ethologique de perroquet *Coracopsis vasa drouhardi* pendant le period de reproduction dans la region de Morondava. University of Antananarivo, Madagascar.
Captivity	Rarely kept and bred in the USA, low stock	The vasa parrot has always been an avicultural rarity. Its sombre colour and low price (during the period of mass exports of parrot	Silva, T. (1991) Psittaculture: Breeding, Rearing and

	in Europe. No export from country of origin.	species) resulted in low interest by breeders and pet owners, thereby curbing the current availability of captive bred birds. Birds bred in the USA command high prices due to this rarity. The scarcity of Vasa parrots in Northern America suggests it would be highly unlikely that the vasa parrot would be imported into Hawai'i in numbers sufficient enough to cause concern of establishment. Certainly wild exports are unlikely to recommence. Anecdotal evidence suggests that vasa parrots do not readily revert to wild-type diets once raised on a commercial feed type (in the submission by LM, who spoke with breeders/owners of the species). However, Silva (1991) records that in captivity they will readily eat anything offered, with one specimen surviving for 52 years from 1830 in London Zoo, a time when parrot needs were poorly understood	Management of Parrots. Silvio Mattacchione & Co., Canada

Guidelines for assessing the risk of non-native animals becoming invasive

(from the World Organisation of Animal Health)

Prior to exploring the parameters used to develop our understanding of potential invasiveness, it is worthwhile to discuss pathways of invasion for this species. Evidently there is no risk of natural dispersion to the archipelago, nor from the mainland United States due to geographic isolation and distance from potential sources. Intentional import appears to be the sole route for this species to arrive in the state. This pathway is naturally well regulated with processes in place to prevent escape during transit, to ensure animal health and security, to reduce opportunities of escape etc. Given that the HDOA can decline or dictate import requests, it seems entirely feasible that further requested imports could be single-sex groupings only to further reduce the risk of establishment and colonisation. Species that have become invasive generally have done so through an initial large founder colony event (i.e. mass imports at one time), or a slower influx of new members (escape or release of individuals). Small founder groups are inherently at risk of loss of genetic diversity and therefore fitness.

a) Biological factors: What are the feature of the animals that may affect the probability of establishment and spread of the animals?

– history of invasiveness elsewhere; ***Coracopsis vasa*** **has not been documented as a feral or invasive species in any country. Indeed, attempted release of a non-native propagule of this species failed on the isle of Reunion, which is climatically and geographically close to the natural habitat.**

– number and size of releases or escapes (propagule pressure); **Imports are likely to be very low, within the single figures, due to the scarcity, expense and lack of interest in this species. Therefore propagule pressure can be considered very low.**

– reproductive biology and capacity (fecundity, age of sexual maturity, breeding frequency, gestation length, etc.); **In the opinion of the researcher, it is the reproductive biology of the species that limits its potential as an invasive species, requiring an unusual sex ratio for successful reproduction, appropriately sized nesting cavities, a single breeding attempt per season in its natural habitat and high dietary needs for chick development. Full-nest mortality has been observed in the wild due to lack of food resulting in starvation (cause unknown) and also stunted growth and development in captivity when protein-poor diet was accidentally withheld from a colony.**

– diet; **The vasa parrot is considered predominantly frugivorous or granivorous depending on the habitat. A congener, the smaller *Coracopsis nigra*, is able to utilise underripe fruits and tolerates high tannin levels in food items, though this has not been observed in *C. vasa*.**

– whether the animals under consideration are wild or domesticated; **As with the majority of parrot species *C. vasa* is considered a non-domesticated species, and retains much of its wild-type behaviours.**

– whether the animals under consideration are generalist or specialised species; **Based on the life history and biological traits it could be determined that *C. vasa* is a generalist species, utilising a range of habitats in the native range.**

– range of tolerance and adaptability to environment and climate; **The vasa parrot is uniquely a species of the tropics, and associated habitat structures, including dry forest and moist forest. As a large bird this species is adapted to move across different biomes but within the constraints of <1000 meters and within the associated temperatures and humidity of the tropics.**

– dispersal mode and capacity; **Able to transverse large areas across biomes to large wing span and deep flight pattern, exhibits a degree of migration in native state.**

– longevity; **Data deficient for wild individuals. In captivity several decades are feasible. No record of predator species observed feeding on this species.**

– density dependence. **Unknown/ Data deficient, though dependent on pre-existing cavities for nesting**

b) Receiving environment: What are the features of the receiving environment that may affect the probability of establishment and spread of the animals? Examples of the kind of inputs that may be required are:

– climate match with the species native environment; **Using the IUCN biome index Hawaii has several biomes that match that of *C. vasa*, though it is unknown whether humidity, precipitation etc. are also compatible. Given that other tropical parrot species have established feral populations within the state it is reasonable to assume that climate would not be a limiting factor in establishment.**

– presence of suitable food source; **Unknown, though *Coracopsis nigra* and *Coracopsis vasa* have been noted as being an agricultural pest of cereals (maize and wheat) in the natural habitat.**

– presence of suitable breeding sites; **Unknown, though with no native cavity-constructing species in the state and the fact that tree hollows are a limited natural resource in general then this may be a limiting factor in establishment success.**

– geographical and environmental characteristics; **Unknown**

– presence of predators, competitors, parasites and pathogens. **Unknown, though documented that chick mortality has been due to heavy parasite load in one observed instance in the wild.**

c) Containment factors: What are the management factors that may affect the probability of establishment and spread? **All the following suggested questions have been issued in the request to import submission by L.M, giving detail the management of the individual upon arrival. In the case of further requests then similar caveats can be placed accordingly .**

Examples of the kind of inputs that may be required are:

– security capacity for housing, handling and transportation;

– intended use of the imported animals (e.g. pets, zoological collections, live food or bait, research etc.);

– the nature and frequency of human-assisted animal movements;

– live animal disposal practices (euthanasia, release, rehoming, etc.).

Review and Evaluation

Factors that may hinder the establishment of the species in the state of Hawai'i

There are several factors that are likely to reduce the risk of vasa parrots from establishing a feral population and therefore potentially becoming an invasive species, particularly in relation to other parrot species which are either on the Conditionally Improved list or that have feral populations in the state. These are as follows:

- Primarily the route of establishment is very restricted. There is a limited breeding population within North America, and there have been no exports of this species from its native habitat since 1993. It is highly unlikely sufficient numbers would be imported to found a potential feral colony.
- The pathway of invasion is strictly control or restricted. All imports must pass through the Hawaiian Department of Agriculture for approval. It is possible to therefore limit both numbers and sex of the species to ensure a suitably biased demographic (i.e. all males). Health and security are also similarly governed so risk of accidental escape or the introduction of pathogens or parasites is also controlled.
- Unlike other parrot species (with the exception of one other species, the Eclectus parrot) Vasa parrots have a complex polygynandrous breeding system. To successfully rear young females depend on multiple attending males to feed her intensely across the breeding season. Unless a large founding population is simultaneously introduced then it is unlikely that the correct sex ratio will be achieved in Hawai'i. It is possible that multiple males are required to help provide the nourishment to the rapidly developing chicks (one of the fastest development times in psittacines). Lack of food of suitable quantity or quality can stunt or limit growth during this critical development time. It has been proposed that food availability might be an ecological constraint, one which applied selective pressures towards this unusual reproductive system in *Coracopsis* species.
- Unlike the other psittacines established in the state vasa parrots are obligate secondary nest cavity users. This means that birds do not excavate nests or modify/enlarge existing holes, but must find appropriately sized cavities to nest in. The other species currently feral in the state (Cockatoos, Amazons and conures) are all adept at modifying existing cavities. No gnawing/chewing behaviour has been observed in Vasa parrots, indeed they are generally a non-destructive species and one of the few larger species that may be maintained in planted flights in captivity. Therefore suitable nest sites are likely to be a limited resource for this species (particularly given the number of other psittacine species in the state competing for the nesting sites).
- Unless a large consignment of birds is released simultaneously into the habitat then smaller localised escapes of individual are unlikely to establish viable populations, given the constraints of founder population dynamics. Genetic bottlenecks and inbreeding are likely to reduce fitness in species with low founder populations. Immigration of unrelated individuals is required to sustain genetic diversity and of course this would be controlled by import permits.

- Changes to the basal metabolic rate in this species requires a greater quantity and/or quality of food to accommodate for these changes. It is possible that these changes are associated with breeding and parental behaviours, particularly as the development of the young is fast, and again can be referred to the breeding system with multiple males delivering food to the female. Given the nutritional requirements for successful reproduction, it is unlikely that in a novel habitat with unfamiliar food resources that a foundling population will find sufficient material to meet calorific and dietary needs.
- Despite the rapid development of the young birds, Vasa parrots nest only once in their native habitat. Clutch size is also small, approximately 4 eggs.
- This species was intentionally released/introduced into an alien environment (Reunion Island) and the population failed to establish. It is unknown how many individuals were released, or the processes involved, but it is important to note that they have been purposely released without success of establishment.

Factors that may aid in the establishment of the species in the state of Hawai'i.

Though it is far from certain the following may aid in the species becoming invasive, it could be hypothesised that there are factors or attributes that could enable them to do so. These are as follows:

- Birds have large wingspans, cover large areas and are known to locally migrate in search for food sources, similar to many macaw and cockatoo species.
- Like many parrot species, they have been observed eating agricultural crops (wheat and maize) in their native range, with a degree of dietary plasticity depending on the habitat.
- Similar habitat types are likely to exist in Hawai'i, ensuring a suitable environment and climate, applicable to most of the parrot family.

Factors which would aid in the control of an established feral or invasive population

It is in this context that the vasa parrot is present several attributes that would make control of this species relatively easy, particularly in relation to the other species currently in feral or invasive populations in the state.

- Females are very easy to find, observe and trap at suitable nest sites.
- Males can be lured with playback of female song.
- Tame and approachable when feeding.
- Sit in exposed situations in during the day.
- Roost communally at night
- Very readily identified by silhouette, flight and size.
- The species is often caught either as a caged bird or as a food item in its native habitat, suggesting that trapping or hunting does not pose great difficulty in this species.

Conclusion

It is in the opinion of this researcher that the introduction of the vasa parrot does not represent a threat of invasion in the state of Hawaii, in its own right, or, when compared to other Psittacidae members. *C. vasa's* low potential for invasiveness is based on its life characteristics and other attributes. Given the species' unusual breeding system, unique dietary requirements, and obligate cavity nesting needs, it appears unlikely that a wild population could become established, even in the unlikely situation where multiple birds were imported in the future. Indeed, a review of the literature shows that the species has not ever successfully established a feral population outside its native habitat of Madagascar, even when an intentional attempt to colonize *C. vasa* was made. In addition,

the species is not particularly popular in the pet trade due to what many find an undesirable appearance, and as a result, it is imported into the United States in low numbers. These factors provide strong support for the State of Hawaii to transfer *C. vasa* from the "restricted animal" to the "conditionally approved" animal list, where the vast majority of Psittacidae—several of which have a greater potential for invasiveness-- are placed. The reproductive biology, social structure and unique dietary requirements of *C. vasa* are similar to that of the eclectus parrot, which is on the "conditionally approved" list of Psittacidae, providing additional support of transfer of *C. vasa*.

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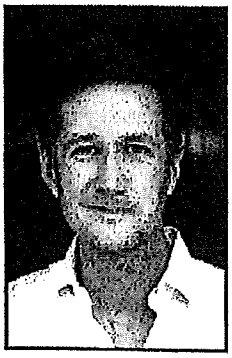

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Reviewer for the *Journal of Veterinary Behaviour*, 2018 on psittacine husbandry and welfare in zoological collections.

Education

2015. Bristol City College **Certificate in English Language Teaching (CELTA)**	Modules: -Developing teaching skills and professionalism -Planning and Resource management -Language analysis and awareness
2012-2013 University of the West of England **Postgraduate Certificate in Education (HE)**	Modules: -Learning and Teaching in Higher Education -Investigating Academic & Professional Practice in Higher Education -The Practice of Teaching in Higher Education
2008-2009 Reading University, Berkshire **MSc Wildlife Management & Conservation**	Modules: Vertebrate Pest Management; Ex-Situ Conservation; Mammal Conservation; Species & Habitat Conservation Thesis: ***Aviculture, the Pet Trade & Conservation.***
2003- 2006 Bishop Burton College, E. Yorkshire **BSc (Hons) Animal Behaviour & Training** **FdSc Animal Management & Behaviour**	Modules: Counselling & Behaviour Modification; Animal Communication, Advanced Animal Training. Dissertation: ***Plumage Maintenance and Preening Behaviour.*** Major Project: ***Impact of Introduced Rainbow Lorikeet on native flora & fauna in Western Australia.*** Project undertaken in conjunction with Dept. Environment & Conservation, Western Australia.

EXHIBIT 5

Employment

2018- Farmer of Speciality cut-flowers, St. Georges, France

-Providing sustainable, locally grown and seasonal specialty cut flowers to businesses in the Toulouse metropolitan area. Undertaking wedding and event work.

2015-2018- English Language Teacher, Self-employed, Toulouse, France

-Teaching English to business professionals. Maintaining training programmes and developing varied lesson plans and course evaluations.

2011-2015- Higher Education Lecturer & Programme Manager in Animal Behaviour & Welfare, Hartpury College campus, University of the West of England

-Programme Manager for FdSc Animal Behaviour & Welfare Students. Lecturing students in practical and theoretical skills, including: *Animal Behaviour, Management of Zoological & Aquaria Collections, Ethics & Welfare* and *Companion Animal Training & Behaviour*. Preparation of course modules, exam writing and module evaluations.

2010-2011- Higher Education and Further Education Lecturer, Askham Bryan College

-Teaching and supporting students across a range of programmes. Leading modules such as *Wildlife Management and Conservation, Animal Behaviour, Aquatics* and *Animal Training*. Preparation of course modules, exam writing and module evaluations.

2010- Environmental and Conservation Officer, Green Island Foundation, Seychelles (Contract)

-Project manager: mynah bird eradication. Assisted Seychelles Flycatcher Project Officer in monitoring and habitat surveys. Managed rat re-invasion protocol. Monitoring & supplementary feeding of Endangered Seychelles Magpie Robin. Stakeholder liaison and facilitation of conservation workshops.

2007-2008- Higher Education Lecturer, Bridgewater College

-Lecturing HE BSc students in Animal Management. Subjects include *Animal Nutrition, Biodiversity and conservation, Applied Animal Husbandry & Habitat, Aquatics* and *Environmental Enrichment*. Preparation of course modules, exam writing and module evaluations

2000-2003- Bird Section Leader, Wingham Wildlife Park

-Feeding, management, aviary landscaping and maintenance of a wide range of species, predominantly Psittaciformes and Passeriformes.
-Organising volunteers and staff, delivering education talks to visitors, school and university groups.

1997-1999- General Keeper, Penscynor Wildlife Park, South Wales

-Assisting in the husbandry of a mixed collection at a local wildlife park. Involved with zoological horticulture and design of exhibits.

References on Request

UNIVERSITY of HAWAI'I® HILO

April 21, 2021

To whom it may concern

I am an Avian Ecologist and Professor of Biology at the University of Hawaii at Hilo. I have been conducting research on the ecology and conservation of native Hawaiian forest birds for the past 30 years (please see attached CV for a list of research projects and publications). It was recently brought to my attention that the vasa parrot (*Coracopsis vasa*), native to Madagascar, is listed as a "restricted animal" under HAR 4-71-6.5 whereas all other parrot species except for three are listed as "conditionally approved" for importation into the state of Hawaii. While I am not generally in favor of importing non-native bird species to the state, I do believe that there is no good biological reason for the vasa parrot to have a "restricted" listing while many other parrot species that have far greater potential for invasion are less restricted.

Philip Greenwell recently conducted a comprehensive literature review of the potential invasiveness of the vasa parrot relative to other parrot species. I have read his review, along with many of the articles he cited, and agree with his conclusion that the vasa parrot represents a far lower threat of becoming invasive in Hawaii than practically any other parrot species. There are a number of reasons for this, including 1) the vasa parrot has never been observed to have established a feral population outside its native Madagascar, 2) it is an obligate cavity nester so would be very unlikely to find suitable nest sites, 3) it has an unusual polygynandrous breeding system that would make it difficult for any escaped individual to successfully reproduce, 4) they are primarily found in disturbed and fragmented habitats so would have extremely low potential to invade any of our remaining forested areas, and 5) these parrots are generally not favored as pets and thus are relatively rare outside their native habitat. Taken together, these factors make it extremely unlikely that vasa parrots could successfully establish a breeding population in Hawaii and provide strong support for the state to move this bird from the "restricted animal" to the "conditionally approved" category.

Sincerely,

Patrick Hart
Professor, Department of Biology, University of Hawaii at Hilo
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pjhart@hawaii.edu, 808-932-8172

http://LOHElab.org

ManuMinute on Hawaii Public Radio

DAVID Y. IGE
Governor

JOSH GREEN
Lt. Governor

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 South King Street

APPENDIX D

PHYLLIS SHIMABUKURO-GEISER
Chairperson, Board of Agriculture

MORRIS M. ATTA
Deputy to the Chairperson

1. **Person Responsible:** Lise Madson, [redacted]

2. **Safeguard Facilities and Location:** Madson residence, [redacted].

3. **Method of Disposition:** Due to the uniqueness of the parrot, if the parrot were to die, it's body would be donated to the University of Hawaii at Hilo Biology Department for use or dissection and be kept frozen until use, and would be cremated after their use, to prevent any chance, however slim of spread of disease or contamination.

4. **Proposed Use/Project:** The Petitioner will maintain the animal for individual possession as a domestic animal companion for personal home use and enjoyment. The Petitioner will keep the animal indoors at her personal residence and will not allow the animal to fly freely in the wild. When the animal is not under the Petitioner's direct supervision and observation, the animal will be maintained in a secure cage or aviary. The Petitioner will provide regular veterinary check-ups and veterinary care to prevent disease. The Petitioner has no plans to breed the animal. Upon the animal's death, the Petitioner will responsibly dispose of its remains as stated above. The Petitioner's proposed use is similar to that of a "pet".

5. **Information Provided by Petitioner in Support of Reclassification Petition:**

The vast majority of parrot species are already included in the list of Conditionally Approved animals, pursuant to HAR § 4-71-6.5:

FAMILY Psittacidae

Agapornis (all species in genus)
Alisterus· (all species in genus)
Amazona (all species in genus)
Anodorhynchus (all species in genus)
Aprosmictus (all species in genus)
Ara (all species in genus)
Aratinga (all species in genus except~- nana astec)

Bolborhynchus lineola
Cacatua (all species in genus)
Callocephalon fimbriatum
Calyptorhynchus (all species in genus)
Cyanoliseus patagonus
Cyanoramphus (all species in genus)
Deroptyus accipitrinus
Eclectus roratus
Elophus roseicapillus
Enicognathus (all species in genus)
Eunymphicus cornutus
Leptosittaca branickii
Melopsittacus undulatus
Neophema (all species in genus)
Nymphicus [holandicus) hollandicus
Pionus (all species in genus)
Platycercus (all species in genus)
Poicephalus (all species in genus)
Polytelis (all species in genus)
Probosciger aterrimus
Psephot.us · (all species in genus)
Psittacula alexandri
Psittacula cyanocephala
Psittacula·cterbiana
Psittacula eupatria
Psittacula himalayana
Psittacula roseata
Psittacus erithacus
Purpureicephalus spurius
Pyrrhura (all species in genus)
Tanygnathus (all species in genus)

Petitioner is not a natural scientist by trade, but has graduate degree in law and was a practicing judge. Petitioner prefers to rely on the information included in the technical report prepared by Phillip Greenwell, M.S. (Wildlife Management and Conservation) who has field experience in the management, control, and assessment of avian invasive species in island environments and is better suited to gauge the accuracy and relevancy of the information. (Attachments 4 and 5). Petitioner sought Mr. Greenwell's review largely to provide PQB with the technical information it admitted it was lacking during the April 14, 2020 Board meeting to enable it to move forward with her petition for rule-making. Dr. Patrick Hart, Ph.D., an avian biologist and ecologist of the Biology Department of the University of Hawaii, Hilo Campus, confirms and supports the findings of Ms. Greenwell's review.

Of note, Mr. Greenwell's review includes a risk assessment of invasiveness for *C. vasa* in Hawaii using guidelines provided by the World Organization of Animal Health (OIE). The OIE guidelines for assessing the risk of non-native animals becoming invasive are the gold standard for evaluating the potential for a species' invasiveness around the world and are recommended for use in the Convention on Biological Diversity (CBD). Mr. Greenwell also draws elements for his review from the *Hawaiian Pacific Weed Risk Assessment*, which provides modified assessment protocols for alien plant species.

While key excerpts of Mr. Greenwell's review are provided below, PQB and the Board are urged to consider the review in its entirety. *C. vasa* is native to Madagascar. There are no known feral colonies of the species outside its native range.

- Primarily the route of establishment is very restricted. There is a limited breeding population within North America, and there have been no exports of this species from its native habitat since 1993. It is highly unlikely sufficient numbers would be imported to found a potential feral colony.

- The pathway of invasion is strictly control or restricted. All imports must pass through the Hawaiian Department of Agriculture for approval. It is possible to therefore limit both numbers and sex of the species to ensure a suitably biased demographic (i.e. all males). Health and security are also similarly governed so risk of accidental escape or the introduction of pathogens or parasites is also controlled.

- Unlike other parrot species (with the exception of one other species, the Eclectus parrot) Vasa parrots have a complex polygynandrous breeding system. To successfully rear young females depend on multiple attending males to feed her intensely across the breeding season. Unless a large founding population is simultaneously introduced then it is unlikely that the correct sex ratio will be achieved in Hawai'i. It is possible that multiple males are required to help provide the nourishment to the rapidly developing chicks (one of the fastest development times in psittacines). Lack of food of suitable quantity or quality can stunt or limit growth during this critical development time. It has been proposed that food availability might be an ecological constraint, one which applied selective pressures towards this unusual reproductive system in *Coracopsis* species.

- Unlike the other psittacines established in the state vasa parrots are obligate secondary nest cavity users. This means that birds do not excavate nests or modify/enlarge existing holes, but must find appropriately sized cavities to nest in. The other species currently feral in the state (Cockatoos, Amazons and conures) are all adept at modifying existing cavities. No gnawing/chewing behaviour has been observed in Vasa parrots, indeed they are generally a non-destructive species and one of the few larger species that may be maintained in planted flights in captivity. Therefore suitable nest sites are likely to be a limited

resource for this species (particularly given the number of other psittacine species in the state competing for the nesting sites).

- Unless a large consignment of birds is released simultaneously into the habitat then smaller localised escapes of individual are unlikely to establish viable populations, given the constraints of founder population dynamics. Genetic bottlenecks and inbreeding are likely to reduce fitness in species with low founder populations. Immigration of unrelated individuals is required to sustain genetic diversity and of course this would be controlled by import permits.

- Changes to the basal metabolic rate in this species requires a greater quantity and/or quality of food to accommodate for these changes. It is possible that these changes are associated with breeding and parental behaviours, particularly as the development of the young is fast, and again can be referred to the breeding system with multiple males delivering food to the female. Given the nutritional requirements for successful reproduction, it is unlikely that in a novel habitat with unfamiliar food resources that a foundling population will find sufficient material to meet calorific and dietary needs.

- Despite the rapid development of the young birds, Vasa parrots nest only once in their native habitat. Clutch size is also small, approximately 4 eggs.

- This species was intentionally released/introduced into an alien environment (Reunion Island) and the population failed to establish. It is unknown how many individuals were released, or the processes involved, but it is important to note that they have been purposely released without success of establishment.

Mr. Greenwell concludes that the introduction of the vasa parrot does not represent a threat of invasion in the state of Hawaii, in its own right, or, when compared to other Psittacidae members. *C. vasa's* low potential for invasiveness is based on its life characteristics and other attributes. Given the species' unusual breeding system, unique dietary requirements, and obligate cavity nesting needs, it appears unlikely that a wild population could become established, even in the unlikely situation where multiple birds were imported in the future. Indeed, a review of the literature shows that the species has not ever successfully established a feral population outside its native habitat of Madagascar, even when an intentional attempt to colonize *C. vasa* was made. In addition, the species is not particularly popular in the pet trade due to what many find an undesirable appearance, and as a result, it is imported into the United States in low numbers. These factors provide strong support for the State of Hawaii to transfer *C. vasa* from the "restricted animal" to the "conditionally approved" animal list, where the vast majority of Psittacidae—several of which have a greater potential for invasiveness--are placed. The reproductive biology, social structure and unique dietary requirements of *C. vasa* are similar to that of the eclectus parrot, which is on the "conditionally approved" list of Psittacidae, providing additional support of transfer of *C. vasa.*

In reviewing Mr. Greenwell's review as a whole it does not appear there are any identifiable negative environmental consequences to importing this organism into Hawaii that are different from those associated with a large number of parrot species that are already on the Conditionally Approved list. There are no known negative potential impacts to native or endemic species given the quarantine requirements for all parrots. There is no evidence to suggest that the impact of importing the Vasa parrot is greater than that of the many Conditionally Approved parrots, and much evidence suggesting that the impact of importing the Vasa parrot would be less than that of many parrots that are already on the Conditionally Approved list.

PQB NOTES: *On February 2, 2021, Ms. Madson provided a review of the potential invasiveness of the vasa parrot compared to other species in the family Psittacidae by Mr. Phillip Greenwell. In addition to the information already provided by Ms. Madson, the review also uses literature-based references in drawing conclusions on possible establishment and threat of invasiveness. The report supports Ms. Madson's statements as listed below, while also mentioning the low possibility of invasiveness. Please see attachment 3 for Mr. Greenwell's Review and attachment 4 for his CV.*

5. Abstract of Organism:

a. Common Name: Greater Vasa Parrot; Scientific Name *Coracopsis vasa*.

b. Organism's Life History

Please see Review provided by Phillip Greenwell, *Review of the potential invasiveness of the Vasa parrot (Coracopsis vasa) as compared to other members of the Psittaciadae family*, for more detailed information.

6. Effects on Environment:

Negligible. Please see Review provided by Phillip Greenwell, *Review of the potential invasiveness of the Vasa parrot (Coracopsis vasa) as compared to other members of the Psittaciadae family*, for more detailed information.

7. Biosecurity: Petitioner will keep animal indoors at her personal residence. At all times when the animal is not under her direct personal observation and supervision the animal will be kept in a secure cage or aviary. Petitioner will not allow the animal to fly freely outdoors in the wild. Petitioner will provide regular veterinary maintenance and care to prevent disease. Petitioner has no plans to breed the animal. Petitioner will contact the DOA/PQB in the unlikely event of an accidental escape into the wild.

8. Alternatives:

N/A.

IV. Proposed List Placement

Ms. Madson is proposing to change the placement of the Vasa Parrot, *C. vasa,* from the List of Restricted Animals (Part B), and to be placed on the List of Conditionally Approved Animals. Ms. Madson is proposing the following amendments to achieve this:

1. Section 4-71-6.5, List of Restricted Animals (Part B)

   Removes Scientific Name: "*Coracopsis vasa*" and Common Name: "Parrot, Vasa".

2. Section 4-71-6.5, List of Conditionally Approved Animals

   Adds Scientific Name: "*Coracopsis vasa*" and Common Name: "Parrot, Vasa".

V. Proposed Import Permit Conditions

1. The restricted article(s), one (1) Vasa Parrot, *Coracopsis vasa*, shall be used for individual possession, for a domestic animal companion for personal home use and enjoyment, a purpose approved by the Board of Agriculture (Board), and may be bred, sold, given away, or transferred in Hawaii. Release into the environment is prohibited.

2. The permittee, Lise Madson, 18-1989 Nau Nani Road, Mountain View, Hawaii, 96771, shall be responsible and accountable for all conditionally approved article(s) imported, from the time of their arrival to their final disposition.

3. The conditionally approved article(s) shall be imported only through the port of Honolulu, as approved by the Board. Entry into Hawaii through another port is prohibited.

4. Each shipment of the conditionally approved article(s) shall be accompanied by a copy of the PQB permit and permit conditions for the article(s), and an invoice, packing list, or other similar PQB approved document listing the scientific and common names of the article(s), the quantity of the article(s), the shipper, and the permittee for the article(s).

5. The conditionally approved article(s) shall be permanently marked with a unique identification code e.g. metal leg band, metal wing band, computer chip, etc.

6. At least four sides of each parcel containing the conditionally approved article(s) shall be clearly labeled in plain view with "Live Animals" and "This Parcel May be Opened and Delayed for Agriculture Inspection", in 1/2" minimum sized font.

7. The conditionally approved article(s) shall comply with all pre-entry and post-entry animal heath requirements of the HDOA, Division of Animal Industry (DAI).

8. The conditionally approved article(s) shall be maintained indoors at all times and when not under the direct supervision or observation of the permittee, will be kept in a cage, aviary or other enclosure that prevents escape into the environment.

9. The permittee shall immediately notify the PQB chief verbally and in writing under the following circumstances:

   a. If any escape or release involving the conditionally approved article(s) under this permit occurs. If the article(s) escape or are found to be free from confinement, the HDOA may confiscate or capture the article(s) at the expense of the permittee, pursuant to the Hawaii Revised Statutes (HRS), §150A-7(c).

   b. If a shipment of the conditionally article(s) is delivered to the permittee without a PQB "Passed" stamp, tag or label affixed to the article, container or delivery order that indicates that the shipment has passed inspection and is allowed entry into the State. Under this circumstance, the permittee shall not open or tamper with the shipment, and shall secure as evidence all restricted article(s), shipping container(s), shipping document(s) and packing material(s) for PQB inspection.

10. It is the responsibility of the permittee to comply with all applicable requirements of municipal, state, or federal law pertaining to the restricted article(s).

11. The permittee is responsible for costs, charges, or expenses incident to the inspection, treatment or destruction of the restricted article(s), as provided in Act 173, Session Laws of Hawaii 2010, section 13, including, if applicable, charges for overtime wages, fixed charges for personnel services, and meals.

12. Any violation of the permit conditions may result in citation, permit cancellation, and enforcement of any or all of the penalties set forth in HRS §150A-14.

13. A cancelled permit is invalid and upon written notification from the PQB chief, all restricted article(s) listed on the permit shall not be imported. In the event of permit cancellation, any restricted article(s) imported under permit may be moved, seized, treated, quarantined, destroyed, or sent out of State at the discretion of the PQB chief. Any expense or loss in connection therewith shall be borne by the permittee.

14. The permit conditions are subject to cancellation or amendment at any time due to changes in statute or administrative rules restricting or disallowing import of the restricted article(s) or due to Board action disallowing a previously permitted use of the restricted article(s). The permit conditions are further subject to amendment to conform to more recent Board approved permit conditions for the restricted article(s), as necessary to address scientifically validated risks associated with the restricted article(s).

15. The permit conditions are subject to amendment by the PQB chief to require disease screening, quarantine measures, and/or to place restrictions on import from certain points of origin, as appropriate, based on scientifically validated risks associated with the restricted article(s), as determined by the PQB chief, as necessary to prevent the introduction or spread of disease(s) and/or pests associated with the restricted article(s).

16. The permittee shall agree in advance to defend and indemnify the State of Hawaii, its officers, agents, and employees for any and all claims against the State of Hawaii, its officers, agents, or employees that may arise from or be attributable to any of the conditionally approved article(s) that are introduced under this permit. This permit condition shall not apply to a permittee that is a federal or State of Hawaii entity or employee, provided that the state or federal employee is a permittee in the employee's official capacity.

VI. Advisory Subcommittee Review

May we request your recommendation and comments by **Friday, March XX, 2021**. You may fax your response to me at (808) 832-0584 or e-mail to: noniponimoi.k.putnam@hawaii.gov.

1. **I recommend approval ___ / ___ disapproval of the preliminary review of the vasa parrot, *Coracopsis vasa*, an animal on the List of Restricted Animals (Part B), for future placement on the List of Conditionally Approved Animals for individual possession for a domestic animal companion for personal home use and enjoyment; Madson.**

Comments:

2. I recommend approval ___ / ___ disapproval to allow the importation of one vasa parrot, *Coracopsis vasa*, an animal preliminarily approved for placement on the List of Conditionally Approved Animals, by permit, for individual possession for a domestic animal companion for personal home use and enjoyment by Lise Madson.

Comments:

3. I recommend approval ___ / ___ disapproval to establish permit conditions for the importation of one vasa parrot, *Coracopsis vasa*, an animal preliminarily approved for placement on the List of Conditionally Approved Animals, for individual possession for a domestic animal companion for personal home use and enjoyment by Lise Madson.

Comments:

Signature:_____Date:_____

Print
Name:_____

[redacted]
Temporary Mailing Address:
[redacted]
(Cell)

RESEARCH INTERESTS

Greater Vasa Parrots, including tool use, and evolution; TTOUCH for rehabilitation of Vasa Parrot; Bonding between Vasa Parrots and people; The Effects of the long term well-being of animals that are hand fed or bottle raised, including Vasa parrots, other parrots, horses, dogs and cattle.

EDUCATION

CERTIFICATE, University of Reno, Courts of Special Jurisdiction, 2000
JURIS DOCTOR, ENVIRONMENTAL LAW speciality, Lewis and Clark College Northwestern School of Law, 1993
BACHELOR OF SCIENCE, University of Wyoming, Major in Sociology, Minor in Psychology, 1990.
Attended University of Massachusetts, Animal Science classes, 1983-1984
Attended Bel-Rea Institute of Animal Technology, 1987

PROFESSIONAL EXPERIENCE

Assistant to Linda Tellington-Jones, TTOUCH.com, 2016 to present
Co-founder World Para-Reining, a non-profit in Texas, 2014 to present
Writer and Media: Adopt Oregon Mustangs, World Para Reining, contributor to TOUCH media 2009 to present
Justice of the Peace, 2006 to 2012, Baker County, Oregon.
Lawyer, 1993 to present.
Teaching Assistant and Instructor, University of Wyoming, 1989-1991
CSU Veterinary Teaching Hospital, 1980-1981
Denver Zoo, Volunteer, 1987

HONORS AND AWARDS

Honors Student at the University of Wyoming

Many Scholarships, including for first year of Law School

Kentucky World Para Reining Champion 2014

USPEA Paralympic Selection Trials ranked 19th overall, 2012

MEMBERSHIPS AND AFFILIATIONS

Oregon State Bar, 1993 to present
Federal Bar, 1995 to present
United State Para Equestrian Association 2009 to present
TTOUCH Community Member 2017 to Present