DAVID Y. IGE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Testimony of
SUZANNE D. CASE
Chairperson

Before the House Committee on
WATER AND LAND

Tuesday, March 23, 2021
8:30 AM
State Capitol, Via Videoconference, Conference Room 430

In consideration of
HOUSE CONCURRENT RESOLUTION 119 / HOUSE RESOLUTION 95 URGING THE DEPARTMENT OF AGRICULTURE, DEPARTMENT OF HEALTH, AND DEPARTMENT OF LAND AND NATURAL RESOURCES TO DEVELOP AND IMPLEMENT A MOSQUITO CONTROL PROGRAM THAT USES WOLBACHIA BACTERIA TO REDUCE BOTH THE RATE OF TRANSMISSION OF MOSQUITO-BORNE DISEASES AND MOSQUITO POPULATION LEVELS THROUGHOUT THE STATE.

House Concurrent Resolution 119 / House Resolution 95 relates to the development of a mosquito control program in Hawaii to address mosquito-borne diseases in humans and animals. **The Department of Land and Natural Resources (Department) supports this Resolution and offers the following comments.**

The Resolution urges for the implementation of a mosquito control program using *Wolbachia* bacteria that 1) reduces the rate of transmission of mosquito-borne diseases, and 2) reduces the population levels of mosquitoes in Hawaii. While *Wolbachia* bacteria has successfully been used around the world including the mainland US to suppress populations of pest mosquitoes, it has not yet been used to reduce the rate of transmission of mosquito-borne diseases in the US. We therefore recommend the title and content of the Resolution be modified to focus on mosquito population suppression and remove references to reducing the rate of transmission of mosquito-borne diseases.

The Department wishes to highlight that mosquitoes are not native to the Hawaiian Islands, and that *Wolbachia* is a naturally occurring bacteria present in 15-70% of all insects and is already present in insect species statewide.

We further recommend that the Resolution include the University of Hawaii as it has also made significant efforts in research toward suppressing mosquito populations.

The Department therefore recommends the following amendments to the Resolution title:

HOUSE CONCURRENT RESOLUTION 119 / HOUSE RESOLUTION 95

URGING THE DEPARTMENT OF AGRICULTURE, DEPARTMENT OF HEALTH, UNIVERSITY OF HAWAII AND DEPARTMENT OF LAND AND NATURAL RESOURCES TO DEVELOP AND IMPLEMENT A MOSQUITO CONTROL PROGRAM THAT USES WOLBACHIA BACTERIA TO REDUCE ~~BOTH THE RATE OF TRANSMISSION OF MOSQUITO-BORNE DISEASES AND~~ MOSQUITO POPULATION LEVELS THROUGHOUT THE STATE

The Department recommends amending page 1, lines 1-2 as follows:

WHEREAS, the control of non-native mosquito populations throughout the State is urgently necessary to protect the health and well-being of the State's residents and animals; and

The Department recommends amending page 2, lines 10-14 as follows:

WHEREAS, various federal and state agencies, including the United States Fish and Wildlife Service, National Parks Service, Department of Agriculture, University of Hawaii, Department of Land and Natural Resources, and Department of Health, have made significant efforts to suppress mosquito populations; and

The Department recommends amending page 2, lines 22-23 as follows:

WHEREAS, *Wolbachia* is a naturally occurring bacteria that is present in ~~approximately fifty~~ 15-70 percent of all insects and is already present in insect species statewide; and

We also recommend that the paragraph on page 2, lines 30-35 referring to the World Mosquito Project be removed. The use of *Wolbachia* strains to suppress breeding in wild mosquito populations only employs the release of male mosquitoes, which do not bite, therefore, this technique would not have any impact on the rate of disease transmission to humans or animals. While *Wolbachia* can also be used to alter how effectively mosquitoes transmit specific diseases, that methodology does not reduce mosquito abundance on the landscape.

Thank you for the opportunity to comment on this measure.

LATE *Testimony submitted late may not be considered by the Committee for decision making purposes.

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

TESTIMONY OF PHYLLIS SHIMABUKURO-GEISER
CHAIRPERSON, BOARD OF AGRICULTURE

BEFORE THE HOUSE COMMITTEE ON WATER AND LAND

TUESDAY, MARCH 23, 2021
8:30 AM
CONFERENCE ROOM 430 & VIA VIDEOCONFERENCE

HOUSE CONCURRENT RESOLUTION NO. 119, URGING THE DEPARTMENT OF AGRICULTURE, DEPARTMENT OF HEALTH, AND DEPARTMENT OF LAND AND NATURAL RESOURCES TO DEVELOP AND IMPLEMENT A MOSQUITO CONTROL PROGRAM THAT USES WOLBACHIA BACTERIA TO REDUCE BOTH THE RATE OF TRANSMISSION OF MOSQUITO-BORNE DISEASES AND MOSQUITO POPULATION LEVELS THROUGHOUT THE STATE.

Chairperson Tarnas and Members of the Committee:

Thank you for the opportunity to testify on House Concurrent Resolution 119 urging the Department of Agriculture, Department of Health ("DOH"), and Department of Land and Natural Resources ("DLNR") to develop and implement a mosquito control program that uses Wolbachia bacteria to reduce both the rate of transmission of mosquito-borne disease and mosquito population levels throughout the state. The Hawaii Department of Agriculture ("Department") respectively opposes this measure and offers the following comments.

The Department is aware of the myriad of problems that mosquitos, and the associated diseases that they vector, pose to native species and the general public. The Department is already working with DOH, DLNR, and the University of Hawaii ("UH") to go through the regulatory review process to import and conduct research using the southern house mosquito, *Culex quinquefasciatus*, with *Wolbachia* bacteria.

Additionally, the Hawaii Revised Statutes ("HRS") Chapter 150A-6.2 contains a provision that allows certain entities, such as UH, to potentially import an unlisted organism, such as *C. quinquefasciatus*, on a case-by-case basis for the purpose of conducting scientific research in a manner that *C. quinquefasciatus* will not be detrimental to agriculture, the environment, or humans, provided the importer can meet permit requirements as determined by the Board of Agriculture. This section of the HRS already allows the Department to meet its mission and comply with the intent of this measure. Should other mosquito control projects be conducted in the future, this same provision could be applied to other mosquito species with *Wolbachia* bacteria.

Provided DOH, DLNR, or the UH has the resources and capability to manage the risks for introduction of mosquito species with *Wolbachia* bacteria, the Department will continue to collaborate and work with said agencies to implement the purpose of this measure.

Because the Department is already working with DLNR, UH, and DOH on a mosquito project and there are no Departmental statutory impediments in the creation or implementation of a mosquito control program utilizing *Wolbachia* bacteria, the Department believes that there is no need for this measure.

Thank you for the opportunity to testify.

DAVID Y. IGE
GOVERNOR OF HAWAII

ELIZABETH A. CHAR, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. Box 3378
Honolulu, HI 96801-3378
doh.testimony@doh.hawaii.gov

Testimony in SUPPORT of HCR 119/HR 95
URGING THE DEPARTMENT OF AGRICULTURE, DEPARTMENT OF HEALTH, AND DEPARTMENT OF LAND AND NATURAL RESOURCES TO DEVELOP AND IMPLEMENT A MOSQUITO CONTROL PROGRAM THAT USES *WOLBACHIA* BACTERIA TO REDUCE BOTH THE RATE OF TRANSMISSION OF MOSQUITO-BORNE DISEASES AND MOSQUITO POPULATION LEVELS THROUGHOUT THE STATE

REPRESENTATIVE DAVID A. TARNAS, CHAIR
HOUSE COMMITTEE ON WATER & LAND
Hearing Date: 3/23/2021 Room Number: 430

Fiscal Implications: No budget implications at this time.

Department Testimony: The Department of Health (DOH) supports House Concurrent Resolution 119/House Resolution 95 and offers the following comments and amendments. DOH has been working closely with Department of Land and Natural Resources (DLNR) and Department of Agriculture (DOA) to further the research and use of *Wolbachia* to suppress mosquito population in Hawaii. Funding for a Wolbachia project was provided to DOH through a Hawaii Invasive Species Council (HISC) grant awarded in August 2019. Because of COVID, work on the project was delayed until recently when we were able to collect Aedes albopictus eggs and sent them to the MosquitoMate lab for rearing of Hawaiian lineage mosquitoes with the Wolbachia bacteria.

Offered Amendments: HCR 119/HR95 urges for the implementation of a mosquito control program that uses *Wolbachia* bacteria to reduce both the rate of transmission of mosquito-borne diseases and mosquito population levels throughout Hawaii. DOH wishes to make a distinction between theses two types of mosquito control programs. The outcomes of these programs are significantly different. Reducing the rate of mosquito-borne disease transmission vs. reducing mosquito population levels, and the way the *Wolbachia* bacteria interacts with the mosquito biologically are significantly different between these two programs. Mosquitoes containing *Wolbachia* to reduce mosquito populations may not be biologically interchangeable with

mosquitoes containing *Wolbachia* to reduce the rate of mosquito-borne disease transmission. Therefore, a distinction between these two types of programs should be established. Wolbachia bacteria has been successful in suppressing mosquito population world-wide and the Mainland US. However, it has not been used to reduce the rate of transmission of mosquito-borne diseases. We recommend that the title of the resolution be amended to remove, "Rate of Transmission of Mosquito-Borne Diseases", as we have only been actively pursuing mosquito suppression at this time.

Thank you for the opportunity to testify on this measure.

LATE *Testimony submitted late may not be considered by the Committee for decision making purposes.

HCR-119
Submitted on: 3/22/2021 12:08:48 PM
Testimony for WAL on 3/23/2021 8:30:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Brian Miyamoto	Hawaii Farm Bureau	Support	No

Comments:

HFB supports.

cgaps
STOP THE SILENT INVASION

COORDINATING GROUP ON
ALIEN PEST SPECIES

The House of Representatives
Committee on Water & Land
Tuesday, March 23, 2021
8:30 a.m., Via Videoconference

Testimony in Support of HCR 119 / HR 95

Aloha Chair Tarnas, Vice Chair Branco, and Members of the Committee,

The Coordinating Group on Alien Pest Species (CGAPS) **strongly supports HCR 119/HR 95,** *Urging the Department of Agriculture, Department of Health, and Department of Land and Natural Resources to develop and implement a mosquito control program that uses Wolbachia bacteria to reduce both the rate of transmission of mosquito-borne diseases and mosquito population levels throughout the state.*

We are faced with the imminent extinction—within our lifetimes—of Hawaii's native honeycreepers such as ʻiʻiwi, ʻapapane, and the kiwikiu. Their available habitat is limited to a few mountaintops where it is too cold for mosquitoes to live and transmit the avian malaria they carry. Yet **there is plenty of habitat that could support native forest birds that is not currently available to them.** Many of the state's lower elevation forests could support native honeycreeper species IF mosquitoes were not able to transmit this deadly bird disease from infected non-native birds like zebra doves, mynah, house sparrows, and others.

Faced with this choice, state and federal agencies have been working together with non-governmental partners to look for possible solutions. Worldwide, agricultural and public health sectors have used sterile insect techniques to control pest populations, and in the past few decades have begun using a naturally-occurring internal bacteria called Wolbachia to help. Different strains of Wolbachia are naturally present in many species of insects, including mosquitoes, where they are passed from female mosquitoes to offspring. When male mosquitoes can be injected with Wolbachia from another insect, then are released to mate with wild female mosquitoes, this makes them "incompatible" and their offspring do not survive past the aquatic stage, thus reducing the number of mosquitoes overall, and the spread of avian malaria in those areas.

The use of this technique to protect bird species is unique to Hawaiʻi. Elsewhere in the world, the Wolbachia technique and genetic modification of mosquitoes is being used to protect people from serious and deadly public health diseases such as Zika, dengue fever, and others. This Resolution is a welcome call for help with this effort, and shines a light on how important it is to control mosquitoes and the diseases they spread. They are much more than just a nuisance. Mahalo for your consideration.

Sincerely,

Christy Martin, CGAPS--Coordinating Group on Alien Pest Species
christym@rocketmail.com
Ph: (808) 722-0995

AMERICAN BIRD CONSERVANCY

Bringing back the birds

22 March 2021

Testimony of *American Bird Conservancy* to
House Committee on Water & Land
Supporting HCR 119, Relating to implementing a Wolbachia-based mosquito control program
Tuesday, March 23, 2021

Aloha Chair Tarnas, Vice-chair Branco, and Members of the Committee,

American Bird Conservancy strongly supports HCR 119, with the included modifications below, to protect Hawai'i's native birds.

American Bird Conservancy (ABC) is a 501(c)(3) national non-profit organization dedicated to the conservation of wild native birds and their habitats throughout the Americas. Because of Hawai'i's overwhelming needs, ABC created a division in 2009 focused on protecting, managing, and restoring critical habitat for some of Hawai'i's most endangered birds. Hawaiian forests are internationally renowned for their unique and precious native species, especially their birds. Tragically, Hawai'i is the avian extinction capital of the world, and our native forests and watersheds provide significant habitat for our remaining native species.

The biggest threat to Hawaiian birds is from non-native avian diseases transmitted by non-native mosquitoes. As global temperatures rise, mosquitoes are invading the last forested strongholds for the honeycreepers. Recent events on Kaua'i provide a dire forecast, where the collapse of six of seven native songbird species has been linked to avian malaria and indicates the effects of climate change are already taking place. Kaua'i's endemic 'Akeke'e and 'Akikiki, both Critically Endangered, have shown recent population declines of 89–98 percent and are projected to become extinct in five to twenty years. Warming temperatures are also increasing the numbers of mosquitoes in lower elevations of Hawai'i and thus the risks of human disease outbreaks. There have been several dengue outbreaks in the state and predictions are that it is only a matter of time before Zika and chikungunya will be spread on the islands by invasive mosquitoes.

HCR 119 is a strong step towards solving this problem, through supporting the use of *Wolbachia* bacteria to reduce mosquito populations and break the avian disease cycle. This method has been successful in reducing mosquito populations at sites across the world and it holds tremendous promise to save Hawai'i's remaining native forest birds, particularly the honeycreepers. ABC and our partners are adapting this safe and proven effective method to work on the mosquito species that transmit diseases to birds in Hawai'i. This resolution would greatly help this effort by urging the State Department of Agriculture, Department of Health, and Department of Land and Natural Resources to develop and implement a *Wolbachia*-based solution to the avian disease crisis.

The resolution could be strengthened with the following changes:

1. Suggest being more specific in the start and changing Pg 1, Ln 3: "of the State's residents and wildlife ~~animals~~".
2. Only nine bird species have gone extinct since the 1980s, so suggest changing Pg 1, Ln 10 to: "Hawaii than anywhere else in the world, with nine ~~ten~~ unique bird"

P.O. Box 249, 4249 Loudoun Avenue ● The Plains, VA 20198
Tel: 540-253-5780 ● Fax: 540-253-5782 ● info@abcbirds.org ● abcbirds.org

3. There are still many native waterbirds at sea level, e.g., Nēnē (Hawaiian Goose), ʻAlae keʻokeʻo (Hawaiian Coot), Koloa maoli (Hawaiian Duck), ʻAlae ʻula (Hawaiian Gallinule), and Aeʻo (Hawaiian Black-necked Stilt); Suggest changing Pg 1, Ln 13 to: "WHEREAS, virtually every individual native forest bird or passerine living"
4. Mosquitoes pose a well-known and acknowledged threat to the survival of Hawai'i's native forest birds. Pg 1, Ln 25 could be changed to: "also pose a ~~potential~~ significant threat to Hawaii's native wildlife,"
5. There is no mention of the importance of Hawai'i's birds to the Hawaiian culture. Suggest adding in the following clause (Pg 2, Ln 10):

   WHEREAS, the birds of the Hawaiian Islands are a unique biological resource and a critical component of Hawaiian culture, warranting conservation and protection; and
6. The University of Hawai'i are important partners in all these efforts. Suggest adding this to Pg2, Ln 13: "Resources, ~~and~~ Department of Health, and University of Hawai'i, have made significant"
7. The *Wolbachia*-based mosquito control program being discussed for Hawai'i would only release male mosquitoes which are non-biting. Thus the section on Pg 2, Ln 30-35, about reducing the released mosquitoes' ability to transmit diseases becomes moot, and could be removed. There will be no females released, so none of the *Wolbachia*-infected mosquitoes will be able to transmit diseases. This is also important because the rate of transmission will only decrease due to reduced mosquito populations, not any physiological effects within the mosquitoes, contradicting the references to "reduced transmission" in the resolution (Pg 1, Title; Pg 2, Ln 27; Pg 2 Ln 35; Pg 3 Ln 7). These sections of the resolution could be removed to increase accuracy.

   Additionally, there are several mosquito species established in Hawai'i. The two that primarily bite humans are *Aedes aegypti* and *Aedes albopictus*, while the primary bird biting species is *Culex quinquefasciatus*. This is important because the disease blocking ability of *Wolbachia* is unknown for *Culex*, so the resolution should not include any blanket language about *Wolbachia* blocking disease transmission in all mosquito species. Specifically, Pg 2, Ln 27-28 could be changed to: "throughout the State would help ~~to prevent the transmission of~~ reduce mosquito populations thereby lowering the rate of mosquito-borne diseases in humans and wildlife; and"

ABC strongly supports HCR 119 for the State to develop and implement the urgent management actions needed to save Hawai'i's forest birds. Mahalo for the opportunity to comment on this critical decision. Please notify us if we can provide additional information and clarification of the points raised above.
Aloha –

Chris Farmer, Ph.D.
cfarmer@abcbirds.org
Hawai'i Program Director
808-987-1779

Teya Penniman
tpenniman@abcbirds.org
Birds, Not Mosquitoes Project Coordinator
808-280-1170

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 HCR 119 and HR 95, URGING THE DEPARTMENT OF AGRICULTURE, DEPARTMENT OF HEALTH, AND DEPARTMENT OF LAND AND NATURAL RESOURCES TO DEVELOP AND IMPLEMENT A MOSQUITO CONTROL PROGRAM THAT USES WOLBACHIA BACTERIA TO REDUCE BOTH THE RATE OF TRANSMISSION OF MOSQUITO-BORNE DISEASES AND MOSQUITO POPULATION LEVELS THROUGHOUT THE STATE.

Committee on Water and Land
Tuesday, March 23, 2021, 8:30 AM
Conference Room 430 Via Teleconference

Aloha Chair Tarnas, Vice Chair Branco, and Members of the Committee:

The Nature Conservancy (TNC) supports HCR 119 and HR 95, urging the Department of Agriculture, Department of Health, and Department of Land and Natural Resources to develop and implement a mosquito control program that uses *Wolbachia* bacteria to reduce both the rate of transmission of mosquito-borne diseases and mosquito populations throughout the state.

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 HCR 119 and HR 95.

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.

HCR-119
Submitted on: 3/22/2021 11:30:09 AM
Testimony for WAL on 3/23/2021 8:30:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Patrick Hart	Individual	Support	No

Comments:

Hawaii's native birds such as the iconic `i`iwi and `akohekohe play incredibly important roles in the culture of the Hawaiian people and in the ecology of native Hawaiian forests. Unfortunately they are declining at a truly alarming rate and are likely to be extinct within our lifetimes due to avian malaria that is being spread by non-native mosquitoes. There are no mosquitoes that are native to the state of Hawaii, and these pests play absolutely no important role to the ecology of our islands. This bill promotes one of the only techniques (Wolbachia method) that can eradicate mosquitoes at the landscape scale and save our birds from extinction. As a Professor of Biology at the University of Hawaii at Hilo, I strongly support the passage of HCR119.

Mahalo!

Patrick Hart

UH Hilo Dept of Biology