From: thorne abbott
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] In support
Date: Saturday, March 18, 2023 10:57:42 PM

I support the issuance of a FONSI for the Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui and the implementation of the project.

Mahalo!
Thorne Abbott
(808) 344-1595
For additional information visit http://www.CoastalZone.com

From: Alice Abellanida
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Walbochia Mosquitos
Date: Monday, March 20, 2023 5:08:47 AM

I am strongly opposed to this experiment. There have been no long term studies to determine what kind of effects there would be on the environment. I demand an Environmental Impact study, or better yet, stop this experiment completely!

Alice Abellanida
Waianae

Sent from my Verizon, Samsung Galaxy smartphone
Get Outlook for Android

From: Marie Achterhof
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] I support Wolbachia IIT
Date: Wednesday, March 22, 2023 11:38:03 AM

I support Wolbachia IIT to save native Hawaiian forest birds

From:	Tim Albares
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Sunday, March 19, 2023 9:07:58 PM

Aloha,

My name is Tim Albares, and I support Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

I am in full support of this project. I see it as a zero-impact and low cost method to save our Hawaiian Forest Birds. I am aware of the fact that many years of research has shown this method to be safe and effective. Therefore, a full EIS is an unnecessary waste of invaluable time. The clock is ticking. What manu we do have left will likely go extinct in my lifetime if nothing is done. Some, like the kiwikiu, will be gone in only a few years. This is our chance to stand up for what is right!

As someone who has worked for the Maui Invasive Species Committee and volunteered with the Maui Forest Bird Recovery Project I have had unique experiences in Native Hawaiian Forests. I have seen kiwikiu and 'akohekohe. I have heard their calls. They are a pillar of Hawaiian Culture and a vital part of the native forest ecosystem. Mosquito-borne avian malaria must be stopped, and the approval of IIT/the authorization of FONSI are the best path forward. I dream of a Hawaii where a helicopter ride is not required for someone to see a kiwikiu - I long for a Hawaii that prioritizes the restoration of our native forests - And I would be proud of a Hawaii that approves this project.

Mahalo for Considering my Voice,

-Tim Albares

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] leka no BLNR Kawehilani Ortiz Alboro
Date: Thursday, March 23, 2023 9:01:12 AM
Attachments: leka no BLNR Kawehilani Ortiz Alboro

A design titled "leka no BLNR Kawehilani Ortiz Alboro" was shared with you by 4291901399@k12.hi.us.

1/20/23

Waipuna lau e BLNR,

ʻO Kawehilani Ortiz Alboro koʻu inoa. He 10 oʻu makahiki. Hele au i Ke Kula Kaiapuni ʻo Nāhiʻenaʻena. Aia au ma ka papa 4. ʻO Kaunaʻoa kaʻu kumu. Noho au i Lahaina.

Kākoʻo au i kēia hana no ka mea ʻaʻole maikaʻi nā makika no nā manu no ka mea ka manawa nahu nā makika i ka manu kiʻi i ka maʻi nā manu a laila make lākou. I nā make nā manu a pau ʻaʻole e loaʻa i nā manu Hawaiʻi i koe.

A he nui loa nā manu hawaiʻi no mākou no ka mea he mau hawaiʻi .A me ʻaʻole e loaʻa i na mea kanu Hawaiʻi i koe pū. A ʻaʻole loa maikaʻi kēlā. A pono nā manu Hawaiʻi no nā kumulaʻau Hawaiʻi. A hiki nā makika ke puʻu make i nā holoholona like loa. Kēlā no ke aha kakoʻo au ai kēia hana.

MAI IĀ,

KAWEHILANI ORTIZ ALBORO

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From: Alicia
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] STOP mosquitoe release
Date: Tuesday, March 21, 2023 10:36:17 AM

Mind boggling the idiotic things the technocrats think up. You really KNOW how wrong this is but going to try anyway? Why no EIS?
Why risk releasing a pest into our paradise? Whoever behind this needs their head examined.
Sent from my iPhone

From: Anne A
To: DLNR.BLNR.Testimony
Cc: Eva Ross
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Wednesday, March 22, 2023 7:39:27 AM

Releasing hundreds of thousands of genetically modified mosquitoes is a bad idea, costly, and the powers that be will want a bio-weapons lab on Maui to produce them. NOT a good idea. Look what happened with Lyme "Disease" and more recently in Wuhan!!!!!!! You do not know the consequences for animals, humans or the land!!!!

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Sincerely,

Maui Resident, Anne Allison

From: IMihauilele Alvarez (via Canva)
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Leka Kākoʻo -2[BLNR]/Imihauilele Alvarez
Date: Wednesday, March 22, 2023 9:45:34 AM
Attachments: Leka Kākoʻo -2[BLNR]Imihauilele Alvarez

lMihauilele Alvarez would like you to take a look at the design titled "Leka Kākoʻo -2[BLNR]/Imihauilele Alvarez"

3/22/23

ʻAnoʻai me ke aloha e BLNR,

ʻO au ʻo Imihauilele Alvarez. He keiki au ma ke Kula Kaiapuni ʻo Nāhiʻenaʻena. ʻO Kaunaʻoa Garica koʻu kumu. A he 10 oʻu makahiki.

Kākoʻo au kēia hana me ka Wolbachia a me nā makika no ka mea inā ʻaʻole nui nā makika ʻaʻole e make a maʻi ana nā manu e like me ka ʻākohekohe a me ke kiwikiu. He 200 a ʻemi mau Kiwikiu ma Maui. A ke nahu ʻia ka manu mai ka makika i 9 lā e make ana ka manu.

Manaʻo au e holo pono ʻana kēia hana me nā makika. Ua hele mākou i ka huakaʻi e ʻike i nā manu Hawaiʻi. Nani nā manu a mākou i ʻike ai. Ua maʻi kekahi o nā manu i ka malaria. Mahalo e BLNR.

Me ke aloha,

Imihauilele Alvarez

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AMERICAN BIRD CONSERVANCY

Bringing back the birds

22 March 2023

Testimony of American Bird Conservancy to Board of Land and Natural Resources, Agenda Item C2: Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

Aloha Chair Dawn Chang and Members of the Board of Land and Natural Resources,

American Bird Conservancy **strongly supports DLNR-DOFAW's request that the Board,**

1) approve the final environmental assessment titled "Suppression of invasive mosquito populations to reduce transmission of avian malaria to threatened and endangered forest birds on East Maui";
2) authorize DLNR Chairperson Chang to issue a Finding of No Significant Impact for the project;
3) authorize DLNR Chairperson Change to publish the Finding of No Significant Impact for the Final Environmental Assessment in the Office of Planning and Sustainable Development, Environmental Review Program's "The Environmental Notice".

American Bird Conservancy's mission is to protect wild birds and their habitats. We have been active in Hawai'i for over 15 years, working to protect and restore bird populations across the state, nearly all of which are on the US and State of Hawai'i Endangered Species list. We work on endangered birds across the western hemisphere and the situation in **Hawai'i presents the most significant bird extinction threat ABC has encountered**. If action is not taken quickly to suppress invasive mosquitoes, several honeycreepers will go extinct in the next few years, and a total of 12 species are likely to follow in the coming decade. The honeycreepers are found only here – they arrived as Kaua'i and Ni'ihau were emerging, and are uniquely, irreplaceably Hawaiian. This is a true extinction emergency.

The Final Environmental Assessment contains a detailed analysis of the proposed project and addresses, and as detailed in Attachment B (Submission to Board of Land and Natural Resources, March 24, 2023, Item C-2) and Appendix G (Final Environmental Assessment), the **proposed project will have no significant effect on the environment** according to the 13 factors considered in accord with HEPA HAR Chapter 11-200.1. This analysis was as rigorous and intensive as it would be for an Environmental Impact Statement, so there is no justifiable cause to prepare an EIS. It is worth emphasizing that the proposed action would protect the Hawaiian honeycreepers on Maui, so would have a tremendous benefit to the environment (factors 2 and 9). Suppressing mosquitoes and halting the spread of avian malaria is the only management action that can save these Hawaiian birds and result in these ecosystem level benefits.

There were a substantial number of public comments submitted on the Draft Environmental Assessment, the **majority of public comments supported the proposed management action**. There

were also several suggestions to improve this action that were thoroughly addressed and incorporated (Appendix H, Final Environmental Assessment). Appendix H also went into more depth and clarification for the major concerns that were submitted, and explained how the Final Environmental Assessment addressed these.

ABC, along with experts from across Hawai‘i and the world, was involved in the September 2016 To Restore a Mosquito Free Hawai‘i workshop (Hawai‘i Volcanoes National Park), which evaluated options to control invasive mosquitoes in the state. This group identified the *Wolbachia*-based, biopesticide approach as the best path to prevent the extinction of forest birds in Hawai‘i. The group also identified outreach and community engagement as critical to advancing the effort. ABC has been a leader in the Birds, Not Mosquitoes partnership, actively engaging community leaders, elected officials, and other stakeholders. **There is broad support and strong demand that we find and implement a solution quickly to prevent the loss of these biologically and culturally important species.**

The extensive testing and safe implementation of this technique for human health provides a foundation and invaluable opportunity to implement a similar solution for a conservation purpose. *Wolbachia*-based, Incompatible Insect Technique mosquito control for human health has been approved for several other mosquito species elsewhere in the United States (*Aedes albopictus* in California and Kentucky; *Ae. aegypti* in California, Texas, and Florida, with amendments to add Puerto Rico and the U.S. Virgin Islands; and *Ae. polynesiensis* in American Samoa). Decades of research have developed tools to protect human health, and they now **provide hope and the possibility of breaking the avian disease cycle and saving these birds from extinction.**

We are racing time, and successful application of this management tool will prevent the extinction of multiple species of invaluable and irreplaceable honeycreepers. They are integral components of our forests, indicating overall ecosystem health and serving as pollinators, seed dispersers, and predators. Their beauty, behaviors, and spiritual connotations are woven into mele, hula, and ‘ōlelo no‘eau, and iconic Hawaiian materials created through featherwork. These birds are found nowhere else in the world, and we have a kuleana to protect them. **American Bird Conservancy applauds the efforts of the Division of Forestry and Wildlife to save these bird and protect our ecosystems.**

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

From: Zettelyss Amora
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] OPPOSE!!!!! BLNR Meeting 3/24/23 9:15am Agenda Item C-2
Date: Wednesday, March 22, 2023 10:17:21 AM

Subject: BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

--

"Matter is Energy, Energy is Light, we are all Light beings"
---Albert Einstein---

"If you want to find the secrets of the Universe think in terms of energy, frequency, and vibration." Nikola Tesla---

Bruce S. Anderson, Ph.D.
2376 Oahu Avenue
Honolulu, HI 96822

March 23, 2023

Board of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Board Members,

Re: **Wolbachia for Mosquito Control to Address Hawai'i's Forest Bird Extinction Crisis.**

The use of *Wolbachia* bacteria to suppress mosquito populations has been found to be effective around the world. Mosquitoes common in Hawai'i pose the greatest threat to our native forest birds because they transmit avian malaria. As the climate warms, mosquitoes carrying avian malaria are moving upslope into the last refugia for Hawai'i's forest birds. These mosquitoes also transmit a multitude of diseases that pose a serious threat to human health, including dengue fever and other serious outbreaks we have had in Hawaii.

As Director of Health, I lead a successful effort to control an outbreak of Dengue fever in 2001. The Department of Health employed all the proven methods of mosquito control at the time, including the use of insecticides and the elimination of breeding sites. We found the use of insecticides was practically useless as mosquito populations rebounded almost immediately after application. There was no vaccine available then nor is there today. The only method we found to be effective was the elimination of mosquito breeding sites. Those included discarded tires, bromeliads, cut bamboo and other plants, along with hundreds of other vessels containing water that served as breeding sites. Fortunately, with the assistance of vector control specialists from the Centers for Disease Control, our epidemiologists and vector control specialists with strong public support were able to control the population of infected mosquitoes and confine the outbreak to East Maui and a few other wet areas on other islands.

If we had known that mosquitoes infected with *Wolbachia* bacteria suppressed the breeding of both *Aedes* mosquitoes, the major vectors of Dengue, we would have certainly considered employing that method of control. Since then, *Wolbachia* has been found to be very effective in controlling dengue outbreaks in Australia, Asia, other Pacific Islands, and Florida where Dengue is a recurring epidemic and kills hundreds of people every year.

There is an epidemic of avian malaria in Hawai'i today. Of the more than 50 species of native forest birds that once lived in our forests, only 17 remain, some with fewer than 500 individuals left. Without swift action, these endangered species will be extinct in the next ten years. **The release of *Wolbachia*-infected mosquitoes can suppress mosquito populations and will help save our native forest birds. They will also help to prevent the spread of Dengue, Zika and other mosquito-borne diseases that impact humans.**

There is no single silver bullet for mosquito disease control, and different communities may prefer different approaches. The development of multiple approaches is crucial and the prospect of controlling mosquito-borne diseases using innovative technologies such as Wolbachia is promising both for controlling avian malaria and for controlling diseases that cause illnesses and deaths among us. Hopefully, we will continue to see these new technologies developed and safely used to save the lives of birds and humans in Hawai‘i.

I strongly support employing using *Wolbachia* for mosquito control to address Hawai’i’s forest bird extinction crisis, and I support DLNR’s proposed strategy to prevent their extinction on Maui and Kauai.

Respectfully submitted,

Bruce S. Anderson, Ph.D., MPH

Bruce S. Anderson, Ph.D.
2376 Oahu Avenue
Honolulu, HI 96822

March 10, 2023

Board of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Board Members,

Re: **Wolbachia for Mosquito Control to Address Hawai'i's Forest Bird Extinction Crisis.**

The use of *Wolbachia* bacteria to suppress mosquito populations has been found to be effective around the world. Mosquitoes common in Hawai'i pose the greatest threat to our native forest birds because they transmit avian malaria. As the climate warms, mosquitoes carrying avian malaria are moving upslope into the last refugia for Hawai'i's forest birds. These mosquitoes also transmit a multitude of diseases that pose a serious threat to human health, including dengue fever and other serious outbreaks we have had in Hawaii.

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I strongly support employing using *Wolbachia* for mosquito control to address Hawai'i's forest bird extinction crisis, and I support DLNR's proposed strategy to prevent their extinction on Maui and Kauai.

Respectfully submitted,

Bruce S. Anderson, Ph.D., MPH

From: Connie Arthur
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Item C-2 - Wolbachia
Date: Monday, March 20, 2023 10:23:33 PM

Dear Natural Resource People,

My name is Constance Arthur, and I am a resident of Hawaii, I live with my husband in Waikoloa.

I am writing again in support of the Wolbachia program for mosquitoes, to reduce the mosquito population in Hawaii. We NEED this!!

Hawaii can NOT afford to lose more bird species which are incredibly vulnerable to Avian malaria whose vector is mosquitoes. This program is already in existence in other parts of the world, and it is proven effective!

PLEASE allow this program to go into effect, we all thank you for it!

Constance Arthur
808-895-1083

From:	Aukuna
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Subject: OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date:	Tuesday, March 21, 2023 12:24:42 AM

“DLNR’s Proposed Strategy to prevent Bird Extinction on Maui & Kauai” I DO NOT accept the Environmental Assessment’s Anticipated Finding of No Significant Impact (DEA-AFONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).

The amount of mosquitos will change. This has an unforeseen impact.

Aloha,
Austin

From: Kyhl Austin
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] SUPPORT for Agenda Item C-2
Date: Saturday, March 18, 2023 3:22:00 PM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

My name is Kyhl Austin. I live in Mōʻiliʻili, Oʻahu and am an entomology Ph.D. student at the University of Hawaiʻi at Mānoa. I am writing to express my **STRONGLY SUPPORT** Agenda Item C-2, DLNR-DOFAW's request for Board approval of the submitted Final EA and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI).

As an entomologist, I have firsthand experience with the extreme dangers mosquitoes pose to our native birds, watersheds, and entire ecosystems. For the first time ever, we have a tested and effective method for controlling mosquito populations and saving our native forest birds, some of which are most assuredly going to become extinct in the next 5 years if this FONSI is not issued.

I believe the proposed conservation action to implement the Incompatible Insect Technique is the most promising and effective tool we have ever had to protect our most vulnerable native bird species. If no action is taken, species will become extinct. Hawaii is already the extinction capital of the world. We cannot allow it to have even more extinctions when an effective solution is so close at hand. I believe the prepared Environmental Assessment is thorough, well-researched, and realistic in its goals and approaches.

I urge you to please **SUPPORT** agenda item C-2 and approve the Final Environmental Assessment and authorize the Chairperson to issue a Finding of No Significant Impact.

Mahalo for your time,
Kyhl Austin

--
Kyhl A. Austin
University of Hawaiʻi at Mānoa
Ph.D. Student, Rubinoff Lab
Gilmore Hall 607
3050 Maile Way
Honolulu, HI 96822-2271

From: Courtney Avichouser
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] OPPOSE Agenda Item C2
Date: Wednesday, March 22, 2023 12:02:08 AM

I OPPOSE Approval of the Final Environmental Assessment.

I OPPOSE authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI).

The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).

Courtney A

From:	Steven Baca
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachi ITT EA & issue FONSI
Date:	Wednesday, March 22, 2023 7:07:48 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds. Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Steven Baca

From: Jon Baca
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia ITT EA & issue FONSI
Date: Wednesday, March 22, 2023 6:50:57 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

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Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Jon Baca

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Lehiwa Balagso-Leka Iā BLNR
Date: Wednesday, March 22, 2023 8:54:31 AM
Attachments: Lehiwa Balagso-Leka Iā BLNR

A design titled "Lehiwa Balagso-Leka Iā BLNR" was shared with you by 4291800186@k12.hi.us.

3/22/23

Waipunalau me ke kākoʻo nui e BLNR ,

ʻO Lehiwa Balagso koʻu inoa. He 11 oʻu mau makahiki. Noho au ma Lahaina, Maui. He haumāna wau ma Ke Kula Kaiapuni ʻo Nāhiʻenaʻena. Aia wau ma ka papa 5.

Kākoʻo wau i kēia pāhana BLNR no ka mea inā hoʻohana ʻoukou i ka koʻohune wolbachia a hoʻokomo i loko o nā makika kāne, ke hui pū nā makika wahine me nā makika kāne ʻaʻole e ola ana nā hua. A inā ʻaʻole ola nā pēpē ʻaʻole e make ana nā manu Hawaiʻi.

Noho kekahi o nā manu i loko o nā pahu ma Maui Bird Conservation Center no ka mea loaʻa iā lākou i ka maʻi malaria manu a ʻaʻole hiki ke hoʻi i ka nāhelehele. Ua hele mākou i ka Maui Bird Conservation Center a ua aʻo mākou e pili ana i nā palila, nā ʻalalā, nā akikiki, a me nā kiwikiu. Ua noiʻi mākou e pili ana i nā manu Hawaiʻi a ua koho wau i ka mamo.

Mahalo nui no ke kākoʻo ʻana i nā manu Hawaiʻi a me ka ʻāina nani o Hawaiʻi. Aloha nui loa wau i nā manu Hawaiʻi. A makemake wau e lilo i kānaka e like me ʻoukou e hoʻōla i nā manu Hawaiʻi.

♥ Me Ke Aloha, ♥

Lehiwa Balagso

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From:	Daniel Bark
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Thursday, March 23, 2023 8:30:12 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

With an estimated count of less than 300 wild birds left, Kiwikiu need your help now. This is all we have left- without your vote to approve, these birds will go extinct. That is not hyperbole, the stakes, as I'm sure you know, are that high.

I can still remember the first time I heard native birds singing in the high elevation forest. It was an amazing experience that I wish everyone in the state could experience. Being up there with such special birds changes your perspective- it connects you deeply with the history of the islands. It is scary to imagine walking through our native forests, with only silence as company.

The generations who came before us paved the way for the extinction crisis these birds face, but the story is not yet finished. This crisis may have been created by our transportation of mosquitos to the islands, but now we have a chance to change the course of history. Wolbachia has already proven to work in multiple states on the mainland, and is in effect throughout the world. Any controversy surrounding these practices has been stirred up by misinformation, and distrust of scientific institutions.

The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

I look forward to a time where I can take my own children to Maui to see Kiwikiu playing and singing throughout the forests. I imagine we will look out and remember what you did here today, and know that without you, these precious birds would no longer exist.

Mahalo for the opportunity to provide testimony,

Daniel Bark

From:	lydia Bark
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Thursday, March 23, 2023 8:34:43 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Lydia Bark

From: C B
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Oppose Agenda item C2 - request extensive EiS
Date: Tuesday, March 21, 2023 7:53:17 AM

This was done in Europe during WW2 and worked opposite what was expected and spread malaria to innocent populations.

We need to stop and make an extensive Environmental Impact study not only on species but on public health spread.

Cynthia Bartlett
8087215161
Hawaii voter
--
Cynthia Bartlett
cbartlett808@gmail.com
808-721-5161

From: kara bernarda
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Monday, March 20, 2023 1:09:46 AM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”

I’m opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I’m opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

From: Kallie Barnes
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & Issue FONSI
Date: Wednesday, March 22, 2023 8:57:42 AM

Aloha,

I support board approval of the Maui NPS Wolbachia IIT Environmental Assessment and Board authorization of the Chairperson to issue a finding of no significant impact.

I work propagating and outplanting native plants to improve habitat for all of Hawaii‘s native inhabitants, but particularly the birds. It's a boost to morale to know that there are creatures out there depending on our work; I can‘t imagine what a hit our conservation community will take if we continue to lose these species that give us hope and fuel us. We need to do all that we can to save the last of these species, no excuses. Please move forward with Wolbachia IIT as soon as possible.

Me ka ‘oia‘i‘o,

Kallie

--
Kallie Barnes
Propagation Field Technician, Three Mountain Alliance

Email: kallieb@hawaii.edu
Cell: (808)796-6753
PO Box 52
Hawai‘i National Park, HI 96718

ThreeMountainAlliance.org

From: Laura M Beamer
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Laura Beamer Testimony on agenda item C2
Date: Thursday, March 23, 2023 4:41:10 AM

To whom it may concern,

My name is Laura Beamer and I would like to verbally testify the following:

My name is Laura Beamer and I believe we must act swiftly to protect our island's precious native birds. My ancestors have told me firsthand how they've seen the steady depletion of these endemic species over the years. I refuse to accept that future generations of Hawai'ians will have to deal with even more extinctions. Hawaii's Department of Land and Natural Resources and the National Park Service prepared an Environmental Assessment that is thorough and outlines the proper procedure to implement Incompatible Insect Technique (mosquito birth control) in Hawai‘i. The Board of Land and Natural Resources should agree with the finding of no significant impact and vote to approve this imperative IIT technique to save Hawaiian birds before it's too late.

--

Laura Beamer -
404-938-1146
LM.Beamer@gmail.com

From: John Begg
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] specie introduction to Hawaii
Date: Wednesday, March 22, 2023 9:08:06 AM

I object to any and all foreign species introduction to any and all of the Hawaiian Islands.

Inform yourself by reading "Cured" by Jeffrey Rediger, MD. It's human susceptibility to infection that makes disease happen more than exposure to it. This principle alone is ignored by Big Pharma who has propagandized everything holistic in favor of chemical allopathy.

I reside on the Big Island where the introduction of the mongoose debacle only caused mongoose to thrive and have become their own nuisance and didn't resolve any issues.

Instead try by beginning to control the out-of-control people, toxic fast foods consumption, alcohol, prescription drugs, and destructive military, and commercial tourism and recreation industries!

John P Begg
14-388 Pakaka Road 1647
Pahoa, HI 96778-1647
808-936-8271

From: Marcella Bell
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Request for Approval of the Maui NPS Wolbachia IIT
Date: Thursday, March 23, 2023 7:42:43 AM

Hello,

Mahalo for your time today. I am emailing to say that I support Wolbachia IIT to save forest birds on Maui. Protecting Hawai'i's native birds from mosquito-born illness is critical to the future health of the islands.

Thank you,
Marcella Bell
(Mountain View, HI)

--
Be kind, for everyone you meet is fighting a hard battle.
-Ian Maclaren

From: Erin Bell
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for 03/24 meeting
Date: Wednesday, March 22, 2023 9:12:29 AM

I SUPPORT, Agenda Item C-2 on the proposed use of the Wolbachia Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kaua‘i and Maui.

Avian malaria is being spread by invasive southern house mosquitoes, and is moving up the mountain due to climate change. This has been and is going to cause extinction of the native Hawaiian honeycreepers. We cannot stand by and lose any more native species. We need action and the Incompatible Insect Technique can suppress mosquito populations and help save our native forest birds. This method is backed by proven science and is currently being used in several states throughout the United States and countries throughout the world.

Please SUPPORT the mosquito control efforts touched upon in agenda item C-2.

Mahalo,
Erin Bell

From:	Ashley Bell
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Wednesday, March 22, 2023 9:16:01 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. Globally, natural resources are dwindling and ecosystems are being decimated by harmful human impacts. With this initiative, we have a chance to help so many endemic birds from going extinct. Mosquitos are another invasive, introduced species to our islands that are wreaking havoc in our forests. Hawai'i's delicate ecosystems and the plants and animals within need our help more than ever. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these

birds to extinction forever.

In our family, the i'iwi is very special. My late father in law loved i'iwi and would often take the family out to the slopes of Mauna Kea at Keanakolu in the hopes of spotting or at least hearing them bouncing through the canopy. Because of this, our family spread his ashes in that very area because it meant so much to him. It breaks my heart that there is a chance this species may not survive due to human negligence. Some populations of native honeycreeper numbers are dangerously low and are on the verge of extinction. We have the power to help change that. It's the very least we can do seeing as their demise comes directly from the our hands as humans. My hope is that wolbachia will be released in all habitats where our endangered birds are, regardless of what island is. I really hope Hawai'i island will be following suit with Maui on the positive possibilities of the wolbachia.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Ashley Bell-Rose

From:	Meghan Huber
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Monday, March 20, 2023 4:29:25 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Meghan can Bergeijk

Sent from my iPhone

From: Gabriella Berman
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony in favor of wolbachia mosquitos
Date: Tuesday, March 21, 2023 5:44:37 AM

To whom it may concern,

Wolbachi mosquitos MUST be released in Hawai'i to combat the near extinction of our native birds. This is NOT an experiment and is based on the most current available scientific standards. This is also the last chance that we have to protect our native birds. Mosquito borne avian malaria has had an enormous negative effect and will drive our native birds to extinction if we do not take an action. Wolbachia mosquitos have been proven to be safe both in laboratory experiments and in regions where they have been deployed in the past. Other alternatives would involve poison which is harmful to humans and animals alike and would not be effective enough to save the birds. I urge you to take action and to disregard fear mongering based in misinformation. Please allow wolbachia mosquitos to be released in Hawai'i and save our native birds.

Thank you for your consideration.

Gabriella Berman, MS
JD candidate & PhD student
Miami Law
Rosenstiel School for Marine, Atmospheric, and Earth Sciences

From: Laura Berthold
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for March 24th BLNR meeting Re: agenda item C-2
Date: Sunday, March 19, 2023 8:27:35 PM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

I, Laura Berthold, **SUPPORT** Agenda Item C-2, DLNR-DOFAW's request for Board approval of the submitted Final EA and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI).

I am a conservation biologist on Maui and have been working with these forest birds for nearly 15 years- within the proposed project area. The protection of these birds is important for the native ecosystem, Hawaiian culture, and for biodiversity.

I strongly support the EA as written and the described action. I do not think a further Environmental Impact Statement is needed for this project. The circumstances are dire and swift action is needed. This is a well described project with valid data and methods.

Avian malaria, a disease transmitted by invasive southern house mosquitoes, is driving the extinction of our forest birds. Due to climate change mosquitoes and malaria are being found higher and higher in elevation. I am seeing this first hand from my experience with working with these birds in the wild. I have seen the changes of where I used to see and hear these birds-certain parts of the forest have become quiet. I have literally watched individual birds die from this disease.

Without mosquito control, several species of honeycreepers will become extinct in the next ten years. The Incompatible Insect Technique can suppress mosquito populations and help save our native forest birds.

Please **SUPPORT agenda item C-2. Approve the Final Environmental Assessment** and authorize the Chairperson to issue a Finding of No Significant Impact.

Mahalo nui!
Laura Berthold
Maui Forest Bird Recovery Project
Ornithological Research/Logistics Senior Technician
2465 Olinda Road, Makawao, HI 96768
(808) 269-9381- cell

From: Matt
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Wolbachia mosquitoes
Date: Friday, March 17, 2023 5:51:33 PM

Dear BLNR board,

I have read and heard much about the damage that avian malaria is doing to our native birds and the possibility of using Wolbachia mosquitoes to prevent further damage. From my understanding, the risks are very, very, very small and the rewards are tremendous. Please approve the finding of no significant impact.

Thank you,
Matt Binder
Waimea, Big Island

From:	David Kalla
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Mosquitoes - don"t do it
Date:	Wednesday, March 22, 2023 9:38:49 AM

Aloha,

I have been aware of genetic modification of mosquitoes since 2011. A friend of mine is a geneticist and has shared that these modified mosquitoes have been developing since then, possibly before then, and have been used in other countries.

Although I don't have any data on the outcome of such usage I know that Google was a major funder in this mission. If we haven't learned by now that they want to cause great harm to us by getting our consent for bullshit science to "help" humanity... The time is now.

This is an MRNA mosquito according to my geneticist friend who has been working with vector biologists on the islands already. This MRNA technology is what they put in the vaccine.

From my awareness this is continuing the genetic modification of humans. This is not about saving birds. The scientists are under the illusion that these things are helpful.

Please do everything you can to stop this horror from coming to Maui and being spread quickly everywhere else... It's time for people to stop believing their bullshit.

Thank you

Allison Birdsall 808-785-7218

From: Erin Bishop
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda item C-2
Date: Wednesday, March 22, 2023 9:52:55 PM

Aloha,

I strongly support the approval EA FONSI for the suppression of invasive mosquitoes in an effort to save our critically endangered honeycreepers.

Mahalo

Sent from my iPhone

From:	Eric B
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 10:30:03 PM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm strongly opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public and could have serious secondary impacts on the environment and human health.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Mahalo,
Eric Bjerke
Honokaa, HI

From:	Beryl Blaich
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Hope for Our Birds: Support for Acceptance of EA and for Issuance of a FONSI
Date:	Wednesday, March 22, 2023 6:16:03 PM

March 22, 2023

Aloha, Chairperson Chang and members of the Board of Land and Natural Resources:

I am thrilled (actually, given hope in a time of despair!) about the possible use of Incompatible InsectTechnique to suppress the avian malaria which is and will continue to decimate our amazing, diverse, unique and endangered honeycreepers.

I am extremely grateful to FWS, to DLNR- DOFAW and to the many other partners and individuals within Birds, Not Mosquitoes for their dedicated work in every facet of this project.

Please unanimously approve the Environmental Assessment “Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui.”

Please authorize Chairperson Chang to issue a finding of no significant impact. (FONSI)

I am very happy for East Maui, but I write with eager expectancy for ITT use soon here in the forests of Kaua’i.

Respectfully,

Beryl Blaich

PO Box 1434

Kīlauea, HI 96754

808-346-9589

From: Aleix Blasco Stanger
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Saturday, March 18, 2023 6:28:29 PM

Aloha Board Members,

I am submitting testimony to strongly urge the approval of the Final Environmental Assessment (EA) titled "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui." The Final Environmental Assessment demonstrates a high degree of scientific rigor and thoroughness in regard to the proposed action.

Honeycreepers are a unique group of forest birds found only in Hawai‘i, which once had more than 50 species. Today, only 17 species remain, some with fewer than 500 individuals left. Without immediate action, several species of Honeycreepers will become extinct in the next ten years, and at least one is projected to go extinct potentially this year or next. Avian malaria, a disease transmitted by invasive southern house mosquitoes, is driving the extinction of our forest birds. Furthermore, as the climate warms, mosquitoes carrying avian malaria are moving upslope into the last refugia for Hawai‘i’s forest birds. The Incompatible Insect Technique can suppress mosquito populations and help save our native forest birds.

Our native Honeycreepers are foundational to the culture, forests, and ecosystems of Hawai’i. We have already lost dozens of forest bird species due to avian diseases transmitted by non-native mosquitoes, among them iconic species like the Kaua’i ‘ō’ō, featured in mahiole and ‘ahu ‘ula, and the spectacular Kaua’i ‘akialoa, a pollinator of ‘ōhi’a lehua and insect eater. We are grieving the loss of their song, the loss of their beauty and the loss of their presence.

As pollinators, seed dispersers, and insect eaters, our native birds are essential for our forests and without action or delayed action, these species have no chance of survival.

The incompatible insect technique or mosquito birth control provides us with a glimmer of hope and opportunity to save the last remaining Honeycreepers from extinction. This method has been used successfully worldwide for vector control for human diseases and gives us a powerful tool to address the main cause for the decline of our Honeycreepers: avian malaria transmitted by the Southern House Mosquito. Neither the disease nor the vector is native to the Hawaiian islands and the mosquitoes have invaded the highest elevation of our island, decimating our Honeycreeper populations every day. Our forest birds evolved in a mosquito-free Hawai’i and a single bite of an infected mosquito can be enough to kill an ‘i’iwi.

The question to consider for our forests and for our ecosystem: How many more native forest bird species can we afford to lose, before the environmental impact will lead to the collapse of our native Hawaiian forests and watersheds?

Mahalo for reading my testimony,

Aleix Blasco

From:	Irena
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Subject: BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 6:45:18 AM

Aloha BLNR,

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public. As a former environmental engineer I am gravely concerned.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Mahalo for your consideration, and for doing the pono thing to require an EIS and not just moving from expediency, as Mother Earth reflects has never and is not working out well.
Aloha ʻāina, mālama ʻāina.

Mahalo,
Irena Bliss
Haʻikū

From: Leif Bogen
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] IIT
Date: Wednesday, March 22, 2023 4:41:28 PM

Aloha Chair and Board Members,
I strongly support Agenda Item C-2. Four species of honeycreepers, the ʻakikiki, ʻakekeʻe, kiwikiu, and ʻākohekohe, will likely go extinct in the next few years without control of mosquitoes across the landscape.

Incompatible Insect Technique (IIT) was developed for agricultural pest and human disease control decades ago, and it went through rigorous vetting and regulatory approvals to be applied safely. It has been used successfully around the world to reduce populations of mosquitoes. Please allow the project to move forward.

Thank you for your time and consideration.

Leif Bogen
325 Lanakila Rd
Kapaa, HI 96746

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From:	Jacqueline Bosman
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date:	Tuesday, March 21, 2023 4:14:06 PM

Aloha,

Hawaii resident and former native plant gardener here to state that I DO NOT Accept DLNR's Proposed Strategy to prevent Bird Extinction on Maui & Kauai.
The Environmental Assessment's Anticipated Finding of No Significant Impact (DEA-AFONSI) is a guess at that. We need more information not a guess. What happens when we guess wrong and nature is impacted and we all suffer in the long run? Who is thinking this through and what is the real concern here?
The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health.
I, along with many others, demand an Environmental Impact Statement (EIS).
I hope my concern along with many others in Hawaii and from afar to the proposed islands, are taken in to serious consideration.

Best,
Jacqueline

From:	traceybrazil
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 2:38:11 AM

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

This is an uncontrolled experiment that is impossible to stop once put into motion. Protect our islands and block this proposal.

Mahalo for your kokua.

Sent from my T-Mobile 5G Device

From: J Breckel
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Wolbachia bacteria are safe.
Date: Tuesday, March 21, 2023 8:00:39 AM
Attachments: image.png

Hello,

I've had the privilege of working three times with Hawaii's native flora and fauna (Oahu; native plants and Hawaii Volcanoes National Park; nēnē). I am asking you to trust the scientific literature and utilize the naturally occurring Wolbachia bacteria to save the kiwikiu, 'akeke'e, 'akikiki, and ʻākohekohe from extinction. Please take a stand and do this before it's too late. There are no valid reasons for not doing this.

Thank you,
Jenna Breckel

From: Brines, Emily M
To: DLNR.BLNR.Testimony
Subject: Wolbachia
Date: Thursday, March 23, 2023 8:17:18 AM

Please support using Wolbachia as a method to lower mosquito populations. This will help lower rates of avian malaria and protect populations of our native forest birds. This technology has been used around the world for human diseases, and the main difference here is using it to protect our native birds. They need intervention to prevent approaching extinction. We have the ability to act now in a way that would make an incredible positive impact on the forest birds so please support this intervention.

Protecting these birds is so important- to have populations for future generations to enjoy, be able to see, and connect to their past is invaluable. Loss of biodiversity in any capacity is detrimental to the careful balance of the ecosystem- please support the use of this technology!

Thank you,

Emily

From: Brittni Brooks
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Save the birds!
Date: Wednesday, March 22, 2023 8:42:47 PM

Aloha BLNR,

I'm a concerned resident of Kauai. I'm writing this email to support any and all measures to save native Hawaiian birds from extinction.

Wolbachia does not hurt people, or any animals that eat mosquitoes. The process doesn't create anything new in the environment because it's already naturally occurring. It is not an experiment since it is already being safely used with good results in the mainland US (California, Texas), Mexico, Singapore, and Australia to stop the spread of mosquito-borne diseases that sicken humans. In fact, 15 different countries, including the U.S. are already using Wolbachia to decrease mosquito populations. It's safe for everyone because it is natural, non-GMO, and safer than pesticides.

Mosquitoes are killing the Hawaiian forest birds by spreading diseases like avian malaria and avian pox. The native birds have no resistance because they were protected by the islands' isolation until ships brought mosquitoes in the 1800s. Just one bite can kill a native bird. Only the birds living high in the mountains still survive. Time is running out because world temperatures are rising and as it warms in higher elevations the mosquitoes move higher. The birds have no safe place left to go!

The best shot at saving these species from oblivion is Wolbachia bacteria which is found naturally occurring in the world all around us, including Hawaii, and is already and in all types of insects. If mosquitoes have Wolbachia that doesn't match they can mate but won't make offspring because they are incompatible. So the plan is to send out these male mosquitoes that are incompatible with the females in the wild, watch their populations decrease, and SAVE THE BIRDS.

Thank you for your time,

Brittni

From: River Brown
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia ITT EA & issue FONSI
Date: Wednesday, March 22, 2023 6:38:35 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds. Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
River Brown

From:	Sammie Buechner
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Request for Approval of the Maui NPS Wolbachia IIT Environmental Assessment (EA)
Date:	Wednesday, March 22, 2023 6:04:58 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2 on the proposed use of the *Wolbachia* Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kaua‘i and Maui.

I believe our extinction crisis will go down in history as one of the most preventable losses of biodiversity in modern times. We have known the greatest threats to Hawaiian birds for decades, and have failed to use our knowledge and available tools to prevent the situation that we are currently in.

I believe the proposed conservation actions are the last hope for many species that cannot be found anywhere else in the world. It would be tragic to look back at this moment in 10-15 years and say that we missed the chance to save some incredible species and all the benefits they provide to the islands.

Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui!

Sammie Buechner
--
Sammie Buechner
USGS—Pacific Island Ecosystem Research Center
C: (608) 695-9004

From: Melina Cabrera (via Canva)
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Leka Manu ‘A’ole Makika 2 (BLNR)-Melina Cabrera
Date: Wednesday, March 22, 2023 9:45:38 AM
Attachments: Leka Manu ‘A’ole Makika 2 (BLNR)-Melina Cabrera

Melina Cabrera would like you to take a look at the design titled "Leka Manu ‘A‘ole Makika 2 (BLNR)-Melina Cabrera"

3/23/23

‘Ano‘ai e BLNR,

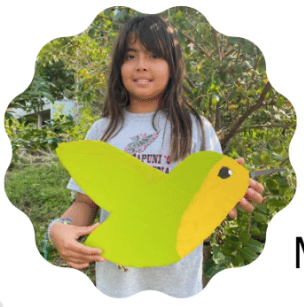
‘O Melina Cabrera ko‘u inoa. He haumana wau ma Ke Kula Kaiapuni ‘o Nāhi‘ena‘ena ma Lahaina. Aia wau ma ka papa 4. Noho wau i Lahaina, Maui.

Ua hana mākou i ka pāhana e pili ana i nā manu Hawai‘i. Ua pena mākou i nā pahu e like me ka manu i koho ‘ia. Ua koho wau ka Maui ‘Alauahio. A makemake mākou e a‘o i ka lehulehu e pili ana i kēia mau manu.

Inā ‘a‘ohe makika ma Hawai‘i ‘a‘ole e lo‘a‘a ana ka hapanui o nā ma‘i ma Hawai‘i e like me ka ma‘i malaria manu. Ma mua, ua hiki nā manu e hele i nā wahi he nui a puni o Hawai‘i. A kēia manawa, aia lākou e noho nei ma nā pahu no ka malama pono ‘ana iā lākou. Inā nahu ‘ia nā manu e nā makika, e make ana lākou i 9 lā. A kēlā kekahi o nā kumu, kako‘o au i kēia pāhana me nā makika.

Pono mākou e hana kēia no ka mea inā ‘a‘ole e make ana nā manu pakahi ma ko mākou mau lima. Inā make nā manu a pau, ‘a‘ole e lo‘a‘a ana nā mea kanu ‘ōiwi, ‘a‘ole e lohe ana i nā mele nani. Ke make nei nā manu he nui ma Hawai‘i e like me nā ‘Akohekohe a me nā Kiwikiu. A eia nā manu i make a halapohe, ‘o ia ho‘i nā ‘Ākepa a me nā Mamo.

Ua hele au i ka huaka‘i i Maui Bird Conservation Center. A ua ‘a‘o au i nā mea he nui. Kaumaha au ke make nei nā manu akā mana‘o au hiki iā 'oukou ke ho‘opololei i kēia! E like me ka ‘ōlelo a nā kupuna "He ‘Ali‘i Ka Manu". Mahalo no ka heluhelu ‘ana i ka‘u leka.



Me ke aloha,

Melina Cabrera

Open in Canva

You received this email because Melina Cabrera shared a design with you. If this was sent to you by mistake, please contact support.

canva

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Canva®, 110 Kippax St, NSW 2010, Australia

From: Kellyna Campbell
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15 am Agenda Item C-2: Oppose
Date: Monday, March 20, 2023 6:18:03 AM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Warmest Regards,

Kellyna Campbell

From: Megan C
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] In support of item C-2
Date: Wednesday, March 22, 2023 10:41:35 PM

Aloha,

I am writing in support of item C-2. I support Wolbachia IIT to save Native Hawaiian forest birds because native birds are an irreplaceable part of our island ecosystems.

Thank you,
Megan Canniff

From:	Zachary Cappelletti
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 6:49:18 PM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”

I’m opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I’m opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

From: Lisa Carter
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony re: support for approval of environmental assessment
Date: Wednesday, March 22, 2023 3:03:13 PM

To the members of the Board of Land and Natural Resources:

I urge the Board to approve the Final Environmental Assessment (EA) titled “Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui.”

The southern house mosquito is an invasive species in Hawai'i whose population is responsible for the spread of avian malaria in endangered and threatened native birds. This project has identified a way to suppress the mosquito population and reduce the spread of avian malaria without any negative impacts to the ecosystem outside of limited acoustic disturbance.

Social-media driven disinformation is pushing people to oppose this program and/or demand further reviews. We don’t have time for paranoia and conspiracy theories to confuse our public process. Endemic Hawaiian birds are at imminent risk of extinction, and we must take action now.

Please approve this assessment so we can move forward with saving the manu nahele of Hawai'i.

Thank you,

Elizabeth Carter

From: Kepano Carvalho
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Written Testimony: AGENDA FOHE MEETING OF THE BOARD OF LAND AND NATURAL RESOURCES - Regarding Wolbachia Support
Date: Monday, March 20, 2023 10:12:01 PM

ʻAnoʻai me ke aloha,

I am in support of the release of Wolbachia in ihe attempt of working to prevent the impacts of invasive mosquitos on the endemic birds of Hawai'i.

Our manu are integral to our culture and identity as native Hawaiians and losing them would be losing a part of our cultural identity. Being that we've lost so much due to the effects of colonization and the mismanagement of our resources at the hands of various haole through time, we should take any and every opportunity to right the wrongs of the past.

As a Kānaka maoli, I have an extreme vested interest in the overall health, preservation, and perpetuation of our native species, and especially our bird species whom we hold in the highest regard.

Please, please, please consider the approval of Wolbachia to help prevent the impacts of invasive mosquitos on our manu, they have no time left.

Extinction is forever. In the words of our Queen Liliʻuokalani:

"Never cease to act because you may fear you may fail."

Mahalo,

Kepano Carvalho

From:	Jordi Ceramics
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 1:30:28 AM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”

I’m opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia*bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I’m opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Jordi

March 23, 2023

MEETING OF THE BOARD OF LAND
AND NATURAL RESOURCES
Agenda Item C-2

March 24, 2023, 9:15 a.m.

VIA VIDEOCONFERENCE
1151 Punchbowl St. Room 132

Re: TESTIMONY IN STRONG SUPPORT OF APPROVING THE FINAL ENVIRONMENTAL ASSESSMENT AND THE CHAIRPERSON ISSUEING A FINDING OF NO SIGNIFICANT IMPACT FOR THE "SUPPRESSION OF INVASIVE MOSQUITO POPULATIONS TO REDUCE TRANSMISSION OF AVIAN MALARIA TO THREATENED AND ENDANGERED FOREST BIRDS ON EAST MAUI".

Aloha e Chair Chang and Members of the Board of Land and Natural Resources,

Please accept these comments submitted by the Center for Biological Diversity (Center) in **strong support of Agenda item C-2,** which would approve the final environmental assessment (EA) and allow the chair to issue a finding of no significant impact (FONSI) for the "suppression of invasive mosquito populations to reduce transmission of avian malaria to threatened and endangered forest birds on east maui."

The Center is a non-profit 501(c)(3) membership corporation dedicated to the protection of native, threated, and endangered species and the habitats they depend on to survive. Through science, policy, and environmental law, the Center is actively involved in endangered forest bird protection issues throughout Hawai'i. The Center has more than 88,000 members throughout the United States, including Hawai'i, with a direct interest in ensuring the conservation of our struggling Hawaiian forest bird species and the healthy habitat they need to survive.

Hawaiian forest birds, one of the most imperiled group of birds in the world, are in crisis. Sadly, 68% of Hawai'i's known endemic bird species have gone extinct since the arrival of humans due to habitat loss, disease, and the introduction of invasive predators. Of the remaining 37 surviving endemic species, 33 are currently listed under the ESA, although 9 of these have not been observed recently and are thought by scientists to be extinct.

P.O. Box 710, Tucson, AZ 85702-0710 tel (520) 623.5252 fax (520) 623.9797 BiologicalDiversity.org

Whereas forest birds in Hawai‘i use to be found from sea level to the tree line across all major islands, now the majority of our forests have fallen silent. With the introduction of invasive mosquitoes and mosquito borne diseases such as avian malaria and avian pox, Hawaiian forest birds have been forced out of lower elevations, where mosquito prevalence and disease proliferation are higher, into high elevation disease-free areas.

Hawaiian forest birds are highly susceptible to avian malaria. In fact, even one of the most abundant of our forest birds, the threatened the ‘i‘iwi is one of the most vulnerable species, with an extremely low resistance to avian malaria and an average 95 percent mortality rate. The combination of low resistance and high mortality means that nearly every ‘i‘iwi that comes into contact with avian malaria dies from the disease. Therefore, conservation of remaining high elevation disease-free habitat and mosquito eradication in East Maui is of utmost importance for the continued survival of not only critically endangered kiwikiu and ‘ākohekohe, but also the threatened ‘i‘iwi, ‘alauahio, ‘amakihi, and ‘apapane.

Warmer temperatures associated with climate change further exacerbate the eminent danger of avian malaria facing our forest birds. Mosquitoes are temperature-limited species that historically could not survive at higher elevations in Hawai‘i due to cooler temperatures. Unfortunately, due to climate change, temperatures at high elevations in Hawai‘i are increasing at a disproportionately greater rate than at mid and low elevations. This warming allows mosquitoes to expand their range into higher elevations, bringing with them avian malaria and avian pox. Furthermore, the virus that causes avian malaria survives better in warmer temperatures, meaning warmer high elevation habitats will no longer be safe refugia from the disease. As warmer temperatures facilitate the spread of mosquitoes and avian malaria, our forest birds already limited disease-free habitat contracts. This is having a devastating impact, sliding our beloved, culturally revered, and ecologically irreplaceable forest birds into extinction.

It is our kuleana to act. Landscape-scale mosquito control in critical forest bird habitat via the proven and safe method detailed in this EA known as the Incompatible Insect Technique (IIT) must be implemented without delay. This proposed action, which has previously been used successfully to control mosquitoes which vector human diseases in other parts of the world, will suppress mosquito populations in habitat essential to our forest birds survival. This will give our birds a fighting chance and allow their populations to recover.

Mahalo for this opportunity to provide testimony in **support of Agenda Item C-2. Please approve the submitted Final EA and authorize a FONSI. We don’t have time to waste. Extinction is forever.**

/s/ Maxx Phillips
Maxx Phillips, Esq.
Hawai‘i Director and Staff Attorney
Center for Biological Diversity

1188 Bishop Street, Suite 2412
Honolulu, Hawai‘i 96813
(808) 284-0007
MPhillips@biologicaldiversity.org

From: Amy Kurisko Chadwick
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Experimental mosquitos.
Date: Wednesday, March 22, 2023 8:03:35 AM

Aloha,

I am opposed to the final approval of this experimental project.
A final environmental assessment must be completed.
Releasing new organisms into a very fragile environment that is Maui would be a mistake.
Studies need to be done.
Our environment is not to experiment on.
Do not continue forward with a FULL and FINAL environmental assessment.

Best,

Amy Chadwick
Lahaina, HI

From:	Yvonne Chan
To:	DLNR.BLNR.Testimony; Yvonne Chan; Yvonne Chan
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Wednesday, March 22, 2023 2:19:20 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

The introduction of invasive species, particularly mosquitoes, has had a devastating impact on the fragile ecosystems of Hawaii, and has led to the decline and extinction of many native bird species. Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, the use of Wolbachia IIT is a safe and environmentally friendly approach that does not involve the use of harmful chemicals or genetic modification. The method uses naturally occurring bacteria, Wolbachia, which prevents the transmission of mosquito-borne diseases like avian malaria and pox. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Yvonne Chan

To whom it may concern,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.

"Of 41 species and subspecies of honeycreepers known since historic times, 17 are thought to be extinct and 14 are federally listed as endangered" (Atkinson, 2009). There are many factors causing great decline such as "habitat loss, invasive plants, non-native predators, and introduced diseases" (Paxton, 2018). However, the largest contributor to manu deaths is the mosquito which carries avian malaria that can kill a honeycreeper with just *one* bite. Now, there are experiments being conducted in Maui that will hopefully control the population of mosquitos which will protect the sacred manu. But the public needs to be more aware of the dire situation at hand.

If these manu are gone, not only will we lose a scientific masterpiece, we will also lose a piece of our culture. The feathers of the honeycreepers were collected to adorn our Aliʻi in, since it was believed to enrich them with mana. There are also hundreds of mele written about the manu who soared through the sky unlike any human could. In addition, most moʻolelo about the history of Hawaiʻi is told through descriptions of the land and its creatures. Therefore, the

honeycreepers deserve their own day in order to raise awareness so we can reverse the damage caused to their populations to keep a symbol of our culture and a marvelous animal.

Sincerely,

Allison Chang

References

Atkinson, C. T., & Lapointe, D. A. (2009). Introduced Avian Diseases, Climate Change, and the Future of Hawaiian Honeycreepers. *Journal of Avian Medicine and Surgery*, *23*(1), 53-63. JSTOR. http://www.jstor.org/stable/27670709

Paxton, E. H., Laut, M., Better, J. P., & Steve J. Kendall. (2018). Research and management priorities for Hawaiian forest birds. *The Condor*, *120*(3), 557-565. https://doi.org/10.1650/CONDOR-18-25.1

From:	Ryan Chang
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & Fonsi
Date:	Thursday, March 23, 2023 4:29:40 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Recently I went to try to look for the kiwikiu and ‘akohekohe on the island of Maui. After spending a whole day, listening and looking we couldn‘t see or find any. Back in 2013 on the island of Kaua'i I was lucky enough to see ‘I‘iwi on my hike through the 'Alaka'i swamp. Fast forward to 2022 of November, there isn't even a call of an ‘I‘iwi that I heard. It is troubling to me that these species are disappearing within my lifetime. I urge you to move quickly with whatever steps are needed to put into place the use of the IIT. This technique will buy these birds some time so that we can figure out some permanent measures we need to take in the future. We cannot let our birds go extinct!

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ‘Ākohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawai‘i’s native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the

ecology of Hawai‘i. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Ryan Chang

From: Aryana Channe
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony re: BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Wednesday, March 22, 2023 9:37:25 PM

I am submitting testimony on the subject below:

Subject: BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not

been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

The outcome is admittedly unknown. How would the experiment be reversed or remediated should the experiment result in detrimental consequences. One infamous example of negative ecological impact of an introduced specie, which failed miserably, is the introduction of mongoose in Hawaii (https://outforia.com/hawaiian-mongoose/).

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Sincerely,
Aryana Channe

From: Eva Chapko
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C - 2
Date: Wednesday, March 22, 2023 11:06:43 PM

Kind lawmakers,
This is to support agenda item C-2. Please save these native birds. It will help humans as well. Thank you.
Sincerely,
Eva L. Chapko

From: Saxony Charlot
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Tuesday, March 21, 2023 6:58:42 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I have worked and volunteered in the conservation of Hawai'i's ecosystems since 2015 and **I SUPPORT Agenda Item C-2** on the proposed use of the *Wolbachia* Incompatible Insect Technique (IIT) to prevent the extinction of the endangered Hawaiian honeycreepers living on Kaua'i and Maui.

Hawai'i leads the world in bird extinctions. Not only have we lost countless individual species, but also the only bird family (Mohoidae, the 'ō'ō birds) in the world in modern history. Many of Hawai'i's birds have gone extinct or become endangered directly due to mosquito-borne disease.

Wolbachia IIT provides a safe, well tested, and effective means to suppress mosquito populations. As climate change rages on, there will be little to no high elevation refugia for these birds—what they currently rely on to survive—since warming temperatures push mosquitoes higher into our forests.

The statistics are grim without landscape-level mosquito control. A single mosquito bite carrying avian malaria can be lethal to some Hawaiian honeycreepers. These manu are what remain of a long evolutionary legacy; Hawaiian Honeycreepers originated some 6-7 million years ago—for comparison, modern humans have been around maybe only 300,000 years. Given that human influence is the cause of these birds becoming endangered and extinct, it is our responsibility to protect those who are still here. There is decades of research backing the use of *Wolbachia* IIT. Some of these honeycreeper species have only 1-10 years before they are predicted to be lost forever—unless there is swift and effective action. We do not have the luxury of time to debate whether or not this safe and effective method of mosquito control should be implemented.

Hawai'i is already known as the extinction capital of the world. It is up to us—now, not later—to decide the fate of what birds we have left and whether we let them survive or perish.
Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2 and approve *Wolbachia* IIT EA and issue a FONSI to save our birds.

Mahalo nui for the opportunity to submit testimony,

Saxony Charlot

From:	Nahonilaanela Chaul
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Wednesday, March 22, 2023 11:01:27 PM

Aloha,

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

As a Kanaka Maoli, I've had only a handful of experiences with getting to see these beautiful birds in their natural habitats. Hardly ever did I get to see one, but when I did I was absolutely delighted. It's known today that getting to see them is not only an amazing experience but a privilege because of how depleted their populations have become. I look back and remember the times my Kupuna have taken me on these trails to see them and want to know that one day, when I have my own children, I can take then here on my home island and to go and see these birds thriving. Just like my family did.

So with that said, I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Mahalo Nui Loa for hearing my testimony,

Nahonilaanela Chaul.

From: melissachimera@gmail.com
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony in Support of the Final Environmental Assessment for the "Suppression of Invasive,Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and,Endangered Forest Birds on East Maui"
Date: Wednesday, March 22, 2023 10:25:12 AM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

I am submitting testimony in **support** of Agenda Item C-2 for the Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui."

As you know, Avian malaria, a disease transmitted by invasive southern house mosquitoes, is driving the extinction of our forest birds. Without swift action, several species of honeycreepers will become extinct in the next ten years. For Kiwikiu, it could be as soon as 2027.

The Incompatible Insect Technique (IIT) can suppress mosquito populations and help save our native forest birds. Wolbachia is a naturally-occurring bacteria in insect species in Hawai'i – such as the native wēkiu and fruit flies, and the non-native mosquitoes (including the southern house mosquito and Asian tiger mosquito). This approach has been researched, developed, and applied specifically for improving public health, for over 50 years, with no reported negative health or environmental impacts.

As such, I urge you to consider a Finding of No Significant Impact, since one of the criteria for this finding includes proposed actions which are not likely to have significant negative effects.

We have no time to waste. As both a conservationist and artist dedicated to conserving and showcasing our unique biological treasures, our children and indeed the wider world deserves our every effort in halting the demise of our Hawaiian forest birds.

Just imagine a future in which our children might know and play with these in the

coastal ilima shrublands and lowlands once more, as documented in the Hawaiian language newspapers of the recent past. Isn't that future worth fighting for?

Sincerely,

Melissa Chimera

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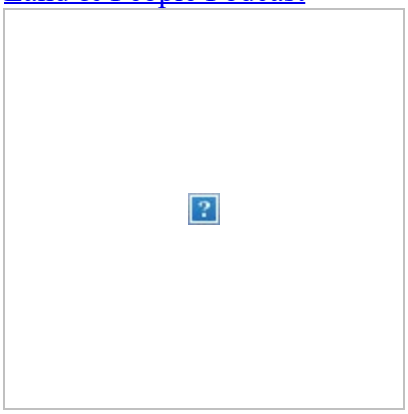
Melissa Michelle Chimera
P.O. Box 532
Honoka`a, Hawai`i 96727 USA
www.melissachimera.com
Instagram * FB
Land & People Podcast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From:	Jon Ching
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Testimony for Agenda Item C2 - March 24, 2023
Date:	Wednesday, March 22, 2023 11:21:22 AM

Dear Chair Designate Chang and Board of Land and Natural Resources members,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Wolbachia IIT is currently the only hope we have to suppress avian malaria spread by invasive mosquitoes, which is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. Some of these ancient birds could go extinct in the next 2-5 years, so this is the only and last chance to save them.

Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are a treasure to Hawai'i and indeed the world, being found nowhere else in the universe. They are also incredibly important to Native Hawaiian culture and the ecology of Hawai‘i. Many native plants rely on them and thus the rest of the ecosystems of which they are part. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Jon Ching

Aloha e Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

I am an ʻŌiwi graduate student currently pursuing a Master's degree in Environmental Management at UH Mānoa, and I am a kupa of Waiakoa and Wailuku. I am a proud graduate of Kamehameha Schools Maui, and also received a B.S. in Wildlife Conservation and Management at Cal Poly Humboldt. I speak not only from my Western Academic accreditations, but also from personal experience of the inextricable interwovenness of the places and birds that this EA authorization covers with my identity as ʻŌiwi.

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native Hawaiian forest birds across the state. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds. Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose whole species. Extinction is forever and Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE** the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Brissa Kamakaniokekai Christophersen

From: michelle clark
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Support
Date: Wednesday, March 22, 2023 10:54:42 AM

Aloha Chair and Board Members,
I strongly support Agenda Item C-2. Four species of honeycreepers, the ʻakikiki, ʻakekeʻe, kiwikiu, and ʻākohekohe, will likely go extinct in the next few years without control of mosquitoes across the landscape.

Incompatible Insect Technique (IIT) was developed for agricultural pest and human disease control decades ago, and it went through rigorous vetting and regulatory approvals to be applied safely. It has been used successfully around the world to reduce populations of mosquitoes. Please allow the project to move forward.

Thank you for your time and consideration.

Mahalo,
Michelle Clark
325 Lanakila Rd.
Kapaʻa HI 96746

From: Megan Levin
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Wolbachia
Date: Wednesday, March 22, 2023 5:42:12 PM

Aloha,

I am writing to urge you to please approve the use of the wolbachia technique to control the spread of avian disease.

Mahalo for your consideration.

Megan Conley

Nu'uanu, Oahu

March 23, 2023

RE: Approval of the Maui NPS Wolbachia IIT Environmental Assessment.

Aloha Chair Person Chang and Members of the Board,

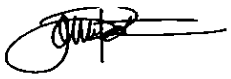
Conservation Council for Hawai'i (CCH), is the oldest non-profit environmental organization in the State of Hawai'i. Our main goal is to save the native Hawaiian species and eco-systems for the future generations. Hawai'i has too many species listed on the endangered species list. Hawaii's endemic species are precious and occur nowhere else in the world.

We, at CCH are in great support for Wolbachia IIT. Without swift action, several species of native birds will become extinct in the wild as soon as this year. Avian malaria, a disease transmitted by invasive southern house mosquitoes (Culex quinquefasciatus), is the primary threat driving the extinction of our forest birds.

There is growing evidence for the effectiveness and safety of use of Wolbachia. Wolbachia mosquitoes have been released in South America, Asia, and Oceania, in areas with more than 10 million people (as of June 2022). Results indicate that locations where Wolbachia is in use at a high level, both dengue and chikungunya have been significantly reduced. We believe that there is ample evidence that these techniques are safe for use in Hawai'i to protect our native birds and public health.

CCH thank you for your leadership and support for this multi-agency request to approve this thorough environmental assessment.

Respectfully,



Jonnetta Peters
Executive Director

Telephone/Fax: 224.338.6511 | email: info@conservehi.org
web: www.conservehawaii.org | P.O. Box 2923, Honolulu, HI 96802

President: Colleen Heyer | Vice President: Sunshine Woodford | Secretary: Karl Magnacca
Treasurer: Sunshine Woodford | Directors: Randall Bartlett, Steven Lee Montgomery, Bret Nainoa Mossman, Michael Nakachi, Lisa Hinano Rey | National Wildlife Federation Region 12 Director: Rachel Sprague
National Wildlife Federation Pacific Region Associate Director: Les Welsh
Executive Director: Jonnetta "Jonee" Peters

Kō Hawai'i leo no nā holoholona lōhiu – Hawai'i's voice for wildlife | State Affiliate of the National Wildlife Federation

From: Amy Cook
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support of Agenda Item C-2, FONSI for Mosquito Suppression Protocol
Date: Tuesday, March 21, 2023 10:22:02 AM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2, DLNR-DOFAW's request for Board approval of the submitted Final EA and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI).

I believe the proposed conservation action to implement the Incompatible Insect Technique is safe and effective and critical to the preservation of our remaining honey creepers.

I believe the prepared Environmental Assessment was thorough and reflects both the letter and spirit of the laws requiring said assessment. Mosquitos are harmful introduced species and suppression of their numbers through this method is safe for our communities and forests and has been proven effective.

Please **SUPPORT agenda item C-2. Approve the Final Environmental Assessment and authorize the Chairperson to issue a Finding of No Significant Impact**.

Mahalo nui!
Amy Cook
Hilo, HI

From: Lauren Craft
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support for agenda item C-2
Date: Wednesday, March 22, 2023 4:44:13 AM

Dear Board Members,

Please help the native forest birds. I am not a Hawaii resident, but I am a birder and bird photographer. I have visited Hawaii many times with the main purpose of seeing the native forest birds. Hakalau Forest is the most magical place on earth to me.

I got to see an Akikiki in the Alakai Swamp when they seemed to be making a come back about 10 years ago. I had no idea that little bird, just bopping around the forest looking for food, would be one of the last of his kind.

These places, along with Haleakala, are lifeboats for these little amazing birds that are uniquely adapted to their environment, and found no place else on earth.

Mosquitoes aren't native and are decimating the birds with disease they are not adapted to. Please adopt the program to reduce the mosquito population with the Wolbachia mosquitoes. This has been successfully used in many places. Reducing mosquitoes with also help with human and animal health by reducing reservoirs for diseases such as Dengue, Zika, and Heartworm.

These birds are Hawaiian treasures. So many have already gone extinct. These are the last ones, and are in desperate need of help to survive, so they aren't lost forever.

Whenever I leave the Big Island, and look back to the slopes of Mauna Kea from the plane, I think of how amazing it is that these little birds, in a relatively postage stamp sized forest preserve in the middle of the huge Pacific Ocean, have evolved to be the only ones of their kind and live their lives with their families in a beautiful forest of native trees. It is up to us to save them. We are the only ones who can make that happen.

Sincerely,
Lauren Craft DVM

From: Lisa Cali Crampton
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] testimony in support of Agenda Item C-2
Date: Wednesday, March 22, 2023 10:38:55 PM

Aloha Board Members,

I am submitting testimony in favor of item C-2: DLNR-DOFAW's request for board approval of the Final Environmental Assessment (EA) titled "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui."

I am the Project Manager for the Kaua'i Forest Bird Recovery Project, where I have led forest bird research and conservation since 2010. There are six honeycreeper species - four endemic - on Kaua'i, including the critically endangered endemic honeycreepers 'akikiki and 'akeke'e.

As I testified at the previous meeting this month, these honeycreeper species have declined catastrophically on Kaua'i. Only 650 'akeke'e and 40 'akikiki remain in the wild, all on Kaua'i. Even the more "common" honeycreepers are now scarce; we can go all day without seeing an 'anianiau or 'i'iwi. Our forests are silent. The situation is no better on Maui, where the kiwikiu numbers only about 100 individuals. Without immediate and decisive action, the 'akikiki, 'akeke'e, and kiwikiu will go extinct this decade, with others disappearing shortly thereafter.

The cause of this terrible situation is the climate-change-driven advance by the invasive southern house mosquito (*Culex*) and the deadly disease it carries, avian malaria, into the high elevation forests occupied by these species. Most honeycreeper species are highly susceptible to avian malaria and die quickly after being bitten by an infected mosquito.

We as a scientific, human health, and conservation community have spent many hours analyzing the data and examining all the possible options to address these declines and prevent extinction of these species. We have concluded that the best tool to prevent their extinction is landscape-level mosquito control achieved through the Incompatible Insect Technique, IIT. This technique takes advantage of a bacteria species, *Wolbachia*, that occurs naturally in insect species throughout Hawai'i, including *Culex* mosquitoes. When the strain of *Wolbachia* carried by a male differs from that carried by a female, this renders them incompatible in that his sperm cannot fertilize her eggs, so there are no offspring. Without offspring, the mosquito population crashes and less disease transmission occurs. This safe and effective tool has been used globally to control human mosquito-borne diseases like Zika and Dengue, with no reported negative health or environmental impacts.

Both Environmental Assessments and Environmental Impact Statements involve rigorous analysis of the potential environmental and cultural impacts of proposed actions, as required

by federal and state regulations. An EA is prepared when the proposed action is not likely to have significant negative effects, as in the case of the East Maui EA.

This tool will give Hawai'i's honeycreepers a chance not only to recover but once again thrive, allowing our forests to flourish, since these birds provide essential services like pollination and insect control. The honeycreepers are also integral to the spiritual, emotional, and cultural fabric of Hawai'i. But it is more than that. Saving these species is our kuleana, our duty.

To me, witnessing their extinction is not an option, not when we have the opportunity to use a safe and effective tool to save them, IIT mosquito control. I could not bear to face my family and my community if I told them we had given up at this juncture.

The birds have been losing their voices. I urge you all to give the birds a voice by approving the Final Environmental Assessment and authorizing the Chairperson to issue a finding of no significant impact (FONSI) for this effort.

Mahalo for your attention to this matter,

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

From: Kristen Dahl
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Tuesday, March 21, 2023 7:08:23 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I wholeheartedly **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

It is alarming, the rate at which we are losing native Hawaiian forest birds. We have already lost so many. Do not let our last surviving endemic forest birds disappear from Hawai'i, and the world, forever.

Avian malaria spread by invasive mosquitoes (*Culex quinquefasciatus*) cannot be allowed to extirpate our precious endangered native forest birds across the archipelago. Specifically, Kiwikiu and ʻĀkohekohe on Maui have experienced **drastic** (~90%) population declines exacerbated by climate warming which result in the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. A similar (if not worse) situation exists on Kaua'i. Currently, there are hardly any forest refuges left that are safe from mosquitoes carrying this devastating disease. No doubt, many things have caused our endemic birds to decline in number over recent decades (& human history here), but **malaria will cause extinction** of these diverse fauna if nothing is done (and indeed, if climate change does not continue on its current trajectory). Extinction is forever. You will not get a do-over.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. The transinfection of mosquitos with the maternally-inherited, endosymbiotic bacteria *Wolbachia* is an extremely promising biocontrol approach. Unlike traditional pesticides, Wolbachia IIT is a safe and species-specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes (and the diseases they carry) with **no negative impacts** to people or the environment. Elsewhere in the United States, this mosquito control technique has been approved and used for several other mosquito species (*Aedes albopictus* in California and Kentucky; *Ae. aegypti* in California, Texas, and Florida, with amendments to add Puerto Rico and the U.S. Virgin Islands; and *Ae. polynesiensis* in American Samoa).

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

To quote Dr. Chris Farmer of American Bird Conservancy, "We are racing time, and successful application of this management tool will prevent the extinction of multiple species of invaluable and irreplaceable honeycreepers. They are integral components of our forests, indicating overall ecosystem health and serving as pollinators, seed dispersers, and predators. Their beauty, behaviors, and spiritual connotations are woven into mele, hula, and ʻōlelo noʻeau, and iconic Hawaiian materials created through featherwork. These birds are found nowhere else in the world, and we have a kuleana to protect them."

I, along with countless other citizens and experts, urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save our forest birds.

Mahalo for your consideration and the opportunity to provide testimony,

Kristen Dahl, Ph.D.

From: meganemilydalton@yahoo.com
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Written testimony to support approval of Wolbachia mosquito technique
Date: Tuesday, March 21, 2023 6:34:54 PM

Aloha,

I am writing to urge the Board of Land and Natural Resources to approve the final Environmental Assessment entitled, "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui." Please also issue a Finding of No Significant Impact (FONSI).

As an avian biologist who spent many years in Hawai`i working with and admiring the incredible avifauna native to these islands, I cannot state strongly enough how important this action would be for the survival of the remaining Hawaiian Honeycreepers. So many species before, some in the last 40-50 years, have gone extinct due to several factors, with one of the main drivers of extinction being the spread of avian diseases via invasive mosquitos. If the Wolbachia method, which has proven to be safe and effective in several other parts of the world, is allowed to be implemented in Hawai`i, then we can give the remaining honeycreepers an actual fighting chance at survival. It is indeed one of the only things that can prevent the imminent extinctions of four species in particular: the kiwikiu, `akohekohe, akeke`e, and akikiki, who are currently on the brink.

There is no reason why Wolbachia-affected mosquitos would pose any threats to the safety of Hawaii's human population or the environment. As you must already know, mosquitos were not originally found in Hawai`i, and I think it's safe to say that people would most certainly enjoy less of them around in terms of their personal comfort. Because there are no predicted adverse effects, I believe we have a moral and ethical obligation to do everything in our power to prevent the ongoing extinction of these island's native avifauna. Too many have been lost already. Please, let's save these birds that are part of Hawaii's unique heritage, species that are found no where else on earth, and whose beauty, song and simple presence enhance our world and our appreciation of it.

Mahalo for your time and much aloha,

Megan Dalton

From: Erin Datlof
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda 2: Approval of Final EA for mosquito suppression
Date: Tuesday, March 21, 2023 6:50:45 PM

Dear BLNR,

In regards to Agenda 2 for the March 24th 2023 meeting, the final approval for the Environmental Assessment “Suppression of Invasive Mosquito populations to Reduce the Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui,” I ask that the board approve and Issue a Finding of No Significant Impact.

Hawaii’s forest birds are in dire need of help to prevent their extinction from mosquito vectored disease. Projects in other parts of the world have shown success with Wolbachia altered mosquitos. Please help take the first step to saving these birds by approving the EA and issuing the Finding of No Significant Impact.

Respectfully,
Erin Datlof
--
-Erin

Hawai'i Island Plant Extinction Prevention Program
Pacific Cooperative Studies Unit
19 E. Kāwili St.
Hilo, HI 96720

(808) 295-8689

From:	Naomi Davis
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui.
Date:	Wednesday, March 22, 2023 1:35:15 PM

This is a request to approve the Final Environmental Assessment in order to help save our native bird populations.
Thank you,
Naomi Davis

From: Dianne DeLorenzo
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Wednesday, March 22, 2023 10:50:03 PM

March 22, 2023

To the Members of the Board:

I am writing in support of the proposed Wolbachia program to protect native Hawaiian birds from additional harm due to avian malaria.

Let me take you back more than 20 years ago when I took my first hike in Kokee. Forest birds were plentiful: the beautiful Elepaio, Amakihi, Akikiki, Apapane, and I'iwi were easily seen and heard. They twirled through native trees and shrubs feeding on insects and nectar. On subsequent hikes in the years that followed I would see additional treasures including the Puaiohi and Anianiau. But looking through my birding notes is bittersweet. Ten years ago, far fewer birds were still present. Today, the forest is quiet and those beautiful Hawaiian birds are absent from the trails.

Climate change is real. Extinction is real. This project is needed as soon as possible. Please vote in favor of this proposal and additional actions to save Hawaii's remaining forest birds.

Respectfully yours,

Dianne DeLorenzo
3011 Laua'e Place
Koloa, HI 96756

From:	Ian De Vries
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 at 9:15am Agenda Item C-2: OPPOSE
Date:	Tuesday, March 21, 2023 5:55:42 PM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned bio-pesticide mosquito releases on Maui.

We need more information and more studies of how this will impact the people BEFORE we launch any bio insects. This project is an experiment on our island home, and the outcome is admittedly unknown.

The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. **This plan may actually impact human health.**

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health.

I demand an Environmental Impact Statement (EIS) and further studies that prove that we the people will not be guinea pigs for bio-terrorism experiments.

Me Ke Aloha
Ian

Ian DeVries
Makawao, HI 96768

Sent with Proton Mail secure email.

Ian DeVries
(949) 279-7441
DeVries Enterprises, Inc.
President

From: Beth de Young 2
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Item C # 2 - In support
Date: Sunday, March 19, 2023 2:12:30 PM

To: DLNR Board,

Your responsibility to protect our native ecology makes it imperative that you vote to approve this item.

Even with a vote in support, the limited area involved and the many challenges make success in eliminating Avian Malaria unknown. However, without this only proven, safe technology deployment on a limited basis, our remaining native bird populations are sure to be decimated and become extinct under your stewardship.

In my lifetime many of our native birds have gone extinct and the remains of these native birds only exist in drawers in the Bishop museum instead of singing in forests in Koke'e' and on Hawaii Island that I experienced in my life. While this applies to Maui, success could save Koke'e and Hawaii Island birds in the future.

Climate change and warming temperatures make your vote in support URGENT!

Mahalo for your kokua and wisdom in executing your kuleana.

Born and raised Hawaii Island resident, taxpayer, voter

Beth Roney Deyoung

From: Julia Diegmann
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Strong Support for agenda item C-2
Date: Friday, March 17, 2023 1:44:08 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I am submitting testimony in strong support of agenda item C-2. Please approve the final environmental assessment and issue a finding of no significant impact.

Our native Honeycreepers are foundational to the culture, forests, and ecosystems of Hawai'i. We have already lost dozens of forest bird species that used fill our forests with their song. In addition to their cultural significance, these birds are essential to our forests as pollinators, seed dispersers, and insect eaters. Without action or delayed action, these species have no chance of survival and we are risking the loss of our biocultural heritage.

The findings of the Environmental Assessment for East Maui show that the proposed measure is a viable and safe approach to stabilize and recover populations of critically endangered Hawaiian forest birds. The incompatible insect technique has been used successfully worldwide for vector control for human diseases and gives us a powerful tool to address the main cause for the decline of our Honeycreepers: avian malaria transmitted by the Southern House Mosquito. Neither the disease nor the vector is native to the Hawaiian islands and the mosquitoes have invaded the highest elevation of our island, decimating our Honeycreeper populations every day.

The question to consider for our forests and for our ecosystem: How many more native forest bird species can we afford to lose, before the environmental impact will lead to the collapse of our native Hawaiian forests and watersheds?

Mahalo nui!

- Dr. Julia Diegmann Kalāheo, Kaua'i

From: Paulo Ditzel
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony Wolbachia
Date: Wednesday, March 22, 2023 9:52:14 AM

Hello!

Wolbachia might not be the ideal solution, but it's the only chance we have right now. Delaying this, or waiting for a better solution to come along will automatically make us lose the fight. And it won't be just us who lose, it's all future generations. Extinction is forever.
Mosquito control is NECESSARY.

Cheers,
Paulo Coelho Ditzel

From:	Stephen Dorris
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Attempting to Use untested Biological methods
Date:	Wednesday, March 22, 2023 2:03:01 AM

I Stephen Dorris I am opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on MauiThis project is an experiment on our Island Home. The Final Environmental Assessment does not address the serious risk of this plan or the concerns of th public . I am opposed to the authorization for the chairperson to issue a Finding of No Significante Impact (FONSI) The scope , risk , and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment and puplic health, I Demand an Environmental Impact Statement (EIS). I do not except the use of untested Biological elements, a GMO bacteria or any untested bacteria to be released via GMO mosquitoes or any mosquito of any kind into the environment of Maui Hawaii . No telling what will be the result on humans or any other living organisms .
The history of most of, if not all attempts to introduce biological elements into this fragile environment of Hawaii have always produced unfavorable conditions and have resulted in many know and unknown un correctable conditions.These attempts to manipulate and transform our environment in Hawaii was never accurately perceived or predicted by any Scientific research or testing, nor is there been any adequate Scientific research or testing on this project and proposal to eradicate Avian Malaria via bacteria infected mosquitos
I believe this to be in error and not of any benefit to the Island or People of Maui Hawaii
Do not do this under any circumstances at any time .
Stephen Dorris

From: Jacob Drucker
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony in favor of mosquito suppression on East Maui
Date: Thursday, March 23, 2023 4:12:07 AM

Dear Board of Land and Natural Resources,

I am writing to urge your vote in favor of DOFAW and DLNR's suppression of mosquitoes on East Maui, and elsewhere in Hawaii, using *Wolbachia* bacteria as population control. The Final Environmental Assessment should leave no question that this decision would come at no risk to Hawaii's people, land, and wildlife, while voting against this action would have detrimental effects, contributing to the erasure of a fundamental component of Hawaii's biodiversity and identify, its native forest birds.

Silver bullets are exceedingly rare in conservation. We can't prevent climate change at a scale to prevent upslope spread of mosquitoes into the remaining Hawaiian forests. We can't outplant fast enough to make up for the habitat lost by centuries of development. Predator control is a constant uphill battle. But this single measure of mosquito suppression will turn the tide of extinction that has plagued Hawaii since the late 1800's.

I worked with forest birds in the Alakai plateau on Kauaii in 2016 and can testify first hand how dramatic the effect of avian malaria can be, particularly as it moves into higher elevations with climate change. Six years since I worked in the Alakai, one focal species, 'Akikiki, is extinct in the core of its range.

Please don't mess this up.

Sincerely,
Jacob Drucker

--
Jacob Drucker (he/him)
Ph.D. Candidate, Committee on Evolutionary Biology
Field Museum | University of Chicago
jrdrucker@uchicago.edu | +1.917.647.3211

From: Jacob Drucker
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony in favor of mosquito suppression on East Maui
Date: Wednesday, March 22, 2023 3:51:44 PM

Dear Board of Land and Natural Resources,

I am writing to urge your vote in favor of DOFAW and DLNR's suppression of mosquitoes on East Maui, and elsewhere in Hawaii, using *Wolbachia* bacteria as population control. The Final Environmental Assessment should leave no question that this decision would come at no risk to Hawaii's people, land, and wildlife, while voting against this action would have detrimental effects, contributing to the erasure of a fundamental component of Hawaii's biodiversity and identify, its native forest birds.

Silver bullets are exceedingly rare in conservation. We can't prevent climate change at a scale to prevent upslope spread of mosquitoes into the remaining Hawaiian forests. We can't outplant fast enough to make up for the habitat lost by centuries of development. Predator control is a constant uphill battle. But this single measure of mosquito suppression will turn the tide of extinction that has plagued Hawaii since the late 1800's.

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Please don't mess this up.

Sincerely,
Jacob Drucker

--
Jacob Drucker (he/him)
Ph.D. Candidate, Committee on Evolutionary Biology
Field Museum | University of Chicago
jrdrucker@uchicago.edu | +1.917.647.3211

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

As late Dr. Emmett Aluli says - "The health of the land is the health of the people and essentially, the health of the nation." Our native forest cannot survive without our native birds and vice versa. Without our forests, we will not have wai (fresh water) and our people, our nation will perish, along with all of our amazing and one of a kind native species. In my short life of 33 years I have seen a drastic change in our forest and with that our native birds. As a mother and an ʻāina educator, I want to ensure that our keiki and future generations have the opportunity to build relationships with our native birds and our native forests for the benefit of all. As a part of my job, we have the opportunity to bring students, teachers and some community members to the forests of Hakalau - one of the few places where many of our dear native birds can still be seen today. I have seen the profound impact that this experience has had on all those who have had the fortune to spend time there. Many of these students work in conservation today and if not make decisions with our environment in mind. This however; isnʻt an experience that future generations will have if climate change trends continue and temperatures rise, as our native birds wonʻt have a place to live if they get pushed into even higher elevation and above the tree line on Mauna Kea (the situation on other islands is even worse as their mountains are lower) That being said, many of our birds are in grave danger of extinction - we have already lost 77 species and only have few left. Our native species are what made our ancestors - Polynesians, native Hawaiians. If we lose just one species, we lose a part of our culture, a part of who we are. Mosquitos are threatening MANY species, and this is a threat that can be controlled while we still have the time.

By supporting this bill and helping to suppress mosquitos, this will give our manu a chance. This will also give students, teachers, and community members on other islands like Maui and Kauaʻi the opportunity to build relationships with these unique native species and then be further inspired to perpetuate this land that we call home with righteousness. Spending time with our native species in the forest helps to bring our people together, it is something that we share in common, something that we can enjoy and celebrate together and build connections to one another. In this time of great divide within our communities let us give our people the chance to become one while also ensuring the survival of our species, our culture and language as well as the replenishment of our most important resource - wai, our freshwater.

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawai‘i. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Melanie Leilā Dudley & Makahanaloa Frazier

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Kauwilla: leka kaoʻo #2
Date: Wednesday, March 22, 2023 8:54:33 AM
Attachments: Kauwilla leka kaoʻo #2

A design titled "Kauwilla: leka kaoʻo #2" was shared with you by 4291800665@k12.hi.us.

Ke aloha nui e BLNR,

1/23/23

ʻO Kauwila Dudoit koʻu inoa. 11 oʻu mau makahiki. He keiki kane au ma ke Kula Kaiapuni ʻo Nāhiʻenaʻena. Aia au ma ko Kumu Kaunaʻoa papa ma ka papa 5. A no Lahaina, Maui mai au.

Kakoʻo au i kēia hana me ka Walbachia. He koʻohune ka Walbachia e kau ma loko o nā makika kane no laila ʻaʻole hiki lākou ke hanai i nā pēpē hou. Kakoʻo au i kēia hana, no ka mea, inā aʻole hoʻokuʻu ia e hana kēia hana, make ana nā manu. ʻO kekahi mau kumu au e kakoʻo nei i kēia hana, ʻoia hoʻi aia nā ʻAkohekohe me nā Kiwikiu, wale no ma Haleakalā ma Maui. He 145 a ʻemi mai o nā Kiwikiu, a me 1,150 ʻo nā ʻAkohekohe. Kekahi kumu aʻe ʻo ia hoʻi ka make ana nā manu i 9 lā mai hokahi nahu a ka makika. A i ka wā kahiko ua pono ia nā manu e hana i nā Aliʻi mau lae a no ko Kamehameha Nui ua pono ia 450,000 mau hulu o ka ʻŌʻo. He manu i make ai ka ʻŌʻo. No laila ua ʻōlelo kekahi ʻōlelo Noʻeau he Aliʻi ka manu.

He nīnau kaʻu, hiki i ka Wolbachia ke hele i loko nā manu? Weliweli nā makika no nā mea hiki ʻia ke hana. A ua hana koʻu papa i kekahi pāhana manu. Ua pono au e pena a me kahakiʻi i kaʻu manu. Ua koho au i ke Koaʻe kea e kahakiʻi a me pena. Ua aʻo ʻia iaʻu i ka waiwai ʻo ko mākou mau manu. Mahalo no ka hoʻolohe ana. MAHALO!

Me ke aloha,

Kauwila Dudoit

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From:	Sara Crow
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] biopesticide mosquito releases on Maui
Date:	Wednesday, March 22, 2023 6:11:39 AM

To whom it may concern,

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Warmly,

Sara Duncan

From: Amy Durham
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] I support the use of Wolbachia on Maui
Date: Wednesday, March 22, 2023 8:13:54 AM

I support the use of Wolbachia on Maui. We can eradicate malaria for our forest kupuna. This is our only shot! Please please consider our voices.

Amy Durham
Master of Science Student
Tropical Conservation Biology and Environmental Science (TCBES)
University of Hawai'i at Hilo

From: Alex Dutcher
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] written testimony Agenda Item C-2
Date: Monday, March 20, 2023 9:39:29 AM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

I wholeheartedly support Agenda Item C-2, DLNR-DOFAW's request for Board approval of the submitted Final EA and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI).

I believe the proposed conservation action to implement the Incompatible Insect Technique has been proven to be a safe and effective method of mosquito suppression elsewhere in the world, and the implementation plan is thorough and well thought out. We are almost out of time to save Hawaii's disappearing forest birds, and this plan is our last chance to do so. I urge you to please consider what the scientific community is telling you and use your best judgement and rationality.

I believe the prepared Environmental Assessment provides a fair and rigorous assessment of all the potential harms and benefits of this plan, and the risks are extraordinarily limited. The potential benefits, however, are incredibly hopeful for the future of Maui's forest birds. .

Please **SUPPORT agenda item C-2. Approve the Final Environmental Assessment and authorize the Chairperson to issue a Finding of No Significant Impact**.

Mahalo nui!

Alex Dutcher

--
Science Director & Co-Owner
Hallux Ecosystem Restoration LLC
Kaua'i, HI

From: anne earhart
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony supporting agenda item C-2 from Anne Earhart
Date: Tuesday, March 21, 2023 8:16:06 AM

To Chair Designate Chang and members of the Board of Land and Natural Resources,

I'd like to offer my support for Agenda Item C2 the request for board approval of the Final EA . I ask that the Chairperson be authorized to issue a finding of no significant impact of this project.

As you well know, the clock is ticking on the extinction of these forest birds. Avian malaria is advancing upslope as climate change warms our islands. The Incompatible Insect Technique has been researched and used specifically for improving public health with no reported negative health or environmental impacts.

The EA and EIS have involved rigorous analysis of environmental and cultural impacts and it is time to let the project trials go forward.

These are the last hours for these birds and I hope that we will be able to help them since we are the ones that have caused their problems through climate change. I realize that this is a novel technique but believe that this is a well thought out and researched project and I hope that you will approve this Final EA.

Respectfully,
Anne Earhart

From: Jessica Egerer
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Approve Maui NPS Wolbachia
Date: Thursday, March 23, 2023 7:24:35 AM

To whom it may concern,

I am writing in SUPPORT of the wolbachia ITT being utilized in Maui in attempts to aid the endemic forest birds. It is important for this technique to be given the opportunity to make a difference for the birds that are so important to Hawaii's ecosystems. My name is Jessica, I am an aviculturist and conservationist from Michigan. I am writing to raise my voice for those who can only sing.

Thank you for your time,

Jessica Egerer

From: Hawaii Wildlife Center
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda item C-2 Wolbachia Incompatible Insect Tech.
Date: Saturday, March 18, 2023 4:09:50 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I STRONGLY SUPPORT, Agenda Item C-2 on the proposed use of the *Wolbachia* Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on the islands of Kaua‘i, Maui and Hawai‘i.

It is past time to reverse the extinction crisis in Hawai‘i. It is tragic that Hawai‘i is recognized as the extinction capital of the world. This loss of unique biodiversity is not only detrimental to our island ecosystem but also to the planet.

The conservation action to save the last remaining 17 species of honeycreepers that are teetering on the brink of extinction is at a crisis point. There is no down side to the management actions to reduce and control invasive mosquitos in Hawai‘i. The benefits of this technology go beyond protecting our invaluable biodiversity to human health benfits as well.

Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui!
Linda Elliott

Biologist, Hāwī, HI

From: Claire Engle
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Please don't release them
Date: Wednesday, March 22, 2023 3:00:40 PM

We may one day look back on this, just like we do on the mongoose….
But mongoose don't bite people like mosquitoes do.

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I demand an Environmental Impact Statement (EIS).

Chairperson and Members
Board of Land and Natural Resources

Iokepa Ernst-Poai
Hanahauoli School
Honolulu, HI 96822

Friday, March 24, 2023, 10:00 am

Testimony in Support of a Finding of No Significant Impact for the "Suppression of Invasive Mosquito Populations to Reduce the Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui."

Dear Chairperson Dawn Ching and Members of the Board,

My name is Iokepa. I am in first grade at Hanahau'oli School. At school, I studied a native bird called the i'iwi. Many of our native birds are threatened, critically endangered, or extinct. I went on a trip with Kumu Bret Mossman to observe our birds at Kaulana Manu. I was sad to learn that mosquitos are killing many of our native birds.

I watched the video and read the plan to: (1) reduce the mosquito population and (2) reduce the spread of avian malaria. I thought it was important that this plan was used around the world with no problems. Our native birds are dying. Being sad will not help. We need action now. This plan is our best hope.

I heard a lot of people talk about this plan and it can be confusing. They make it sound like the plans that have failed before, like the mongoose. I learned that the mongoose was introduced to stop the rats. But instead, the mongoose killed many of our Hawaiian birds. I also heard people say this plan will introduce a lab-created mosquito dangerous to humans. But I learned in school it is important to research and not make things up. Science says this has worked in many other places. Please support this plan.

Thank you for your time.

Sincerely,
Iokepa Ernst-Poai

From: Keith Evans
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] For March 24 BLNR mtg agenda - please SUPPORT agenda item C-2
Date: Sunday, March 19, 2023 12:31:13 PM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2, DLNR-DOFAW's request for Board approval of the submitted Final EA and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI).

I think we can all agree that the situation facing Hawaii's native forest birds is dire, and that we must do something, safe and effective, as soon as possible in order to save those birds that remain for future generations.

The proposed Incompatible Insect Technique (IIT) has been successfully used globally for over 50 years. In each case, scientists have researched and analyzed the results and found that the method has no significant negative health or environmental impacts. Furthermore, this technique is the only hope left to save several species of the birds in the short time remaining before extinction.

Currently on the table is a vote on the acceptance of an Environmental Assessment (EA) for use of the IIT method to control avian malaria on Maui (and subsequently, Kauai). The EA was performed by accredited experts of The National Park Service and DLNR-DOFAW. As is the case for every other known use of this technique, the EA found that there will be no negative impacts to the health, environment, plants, animals, or people of Hawaii.

Given these facts, and the desperate plight of the birds, please SUPPORT agenda item C-2, and approve the Final Environmental Assessment and authorize the Chairperson to issue a Finding of No Significant Impact.

Mahalo nui for your consideration,

Keith Evans
Princeville

From:	Kevin Faccenda
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Comment re: Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui
Date:	Sunday, March 19, 2023 9:20:57 PM

Re: "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

Board members,

I strongly support Agenda Item C-2, DLNR-DOFAW's request for Board approval of the submitted Final EA and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI).

Using the wolbachia IIT is essential to prevent further honeycreeper extinctions in a lineage of birds already decimated by extinctions. If another species goes extinct while we have the technology to prevent such an extinction, it would be truly tragic.

Thank you,
Kevin Faccenda

From: Sarah Farquharson
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Sunday, March 19, 2023 10:28:32 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds. Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds. Please help save our manu.

Mahalo for the opportunity to provide testimony,

Sarah Farquharson

From: Victoria Felt
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Thursday, March 23, 2023 6:02:51 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

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Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Victoria Felt

--
Thank you,

Victoria Felt

Knots In The Pines
Adventure Wedding Photographer and Planner

From: Kevin Fernandez
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Mosquito test
Date: Wednesday, March 22, 2023 7:31:59 AM

Aloha, I Am TOTALLY AGAINST THIS TEST. WE ARE NOT YOUR CRASH TEST CRASH DUMMIES. Mahalo, Kevin

From:	Kim
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] support for mosquito control - incompatible insect technique
Date:	Sunday, March 19, 2023 7:05:10 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT the proposed use of the *Wolbachia* Incompatible Insect Technique to reduce mosquito populations and prevent the extinction of the endangered Hawaiian honeycreepers living on Kauaʻi and Maui (A**genda item C-2**).

I hate looking in my Hawaii bird book and seeing that half of the birds described have only historical drawings instead of pictures because there are too few birds left to get a picture and/or they are thought to be extinct already.

- Honeycreepers are a unique group of forest birds found only in Hawaiʻi, which once had more than 50 species.
- Today, only 17 species remain, some with fewer than 500 individuals left.
- Without swift action, several species of honeycreepers will become extinct in the next ten years.
- Avian malaria, a disease transmitted by invasive southern house mosquitoes, is driving the extinction of our forest birds.
- A single bite by an infected mosquito can kill an ʻiʻiwi (and critically endangered forest bird species).
- The Incompatible Insect Technique can suppress mosquito populations and help save our native forest birds.

Please **SUPPORT** the mosquito control efforts described in agenda item C-2.

Mahalo,
Kimi Fettke

FINCH RESEARCH NETWORK

March 22nd, 2023

To the members of the Board of Land and Natural Resources,

The Finch Research Network, a 501(c)(3) nonprofit dedicated to the study and conservation of finches and their habitats globally, would like to take this time to highlight the severity and importance of the request you'll be receiving today from the DLNR-DOFAW regarding Hawai'i's forest bird extinction crisis. Their work in conducting a successful Environmental Assessment and subsequent request for authorization and to issue a finding of **no significant impact** for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui" is vital and necessary for the lives of these forest birds.

We are writing to you today in **SUPPORT** of Agenda Item C-2 and for your **APPROVAL** of these findings.

The Hawaiian honeycreepers are a very diversified group of finches, and as such, have garnered the attention of our organization and members (many of whom are based on the mainland). We are astonished at the rapid pace these species are headed towards extinction, and are working with partners in Hawai'i to ensure these extinctions do not take place.

We would like to emphasize the value in the two tools that are being presented on today - both the use of mosquito control through Incompatible Insect Technique, and through captive care of two of the most endangered honeycreepers (the ʻakikiki and kiwikiu). These are the only tools left in the so-called tool-box, and if we don't employ them, we are guaranteed to lose these birds forever.

Extinctions of Hawaiian birds and birdlife have proceeded at an incredibly rapid pace since contact with Europeans first took place in 1778, and now only 17 of the 50+ species of honeycreepers that used to exist on the island are holding on today.

We hope you will not take this matter lightly, and do all you can to help save these birds that are ʻohana, kūpuna, and ʻaumākua to Native Hawaiians. These birds are only found here and nowhere else in the world. We must do what we can to save them before it is too late.

Thank you for your work,

Matt Young and Nathan Goldberg

Finch Research Network
https://finchnetwork.org

PO Box 5431 • Cortland, New York 13045 • info@finchnetwork.org

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai‘i 96850

In Reply Refer to:
01EPIF00-2023-Inv

Ms. Dawn Chang
Chairperson
Board of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Subject: U.S. Fish and Wildlife Service Support of Collaborative Efforts to Prevent Forest Bird Extinction in Hawai‘i

Dear Chairperson Chang and Board:

The iconic and endangered Hawaiian forest birds are an important cultural and biological resource, yet are facing an extinction crisis. Currently, most Hawaiian forest birds are found only at high elevations, where climate restricts the range of mosquitoes and transmission of the avian malaria - but the changing climate is allowing mosquitoes to move into these high elevation refugia. With already small population sizes and little to no resistance to malaria, extinction of these endemic birds is imminent: three forest bird species are in danger of extinction in as little as two years, and nine additional forest bird species are at risk of extinction in the near future.

The mission of the Service is to work with others to conserve, protect, and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people. In association with our mission, the Service is charged with the implementation of the Endangered Species Act (ESA) and works with partners to support the conservation and recovery of listed species in the wild. In the Hawaiian Islands, threats to listed species are often compounded by the synergistic effects between climate change and invasive species – challenges that require new and expanded tools if we are to preserve biodiversity in Hawai‘i. Preventing the extinction of Hawaiian forest birds will require a comprehensive strategy that includes landscape-level mosquito control, translocation of birds to other islands, establishment of captive populations, and developing next generation tools that increase the scope or efficacy of these actions.

Existing conservation efforts will not be enough to prevent the extinction of Hawaiian forest birds – new tools that can control invasive mosquito populations in remote and sensitive habitats are critical to the survival of these species. Both the Service and the Hawai‘i Department of

Land and Natural Resources (DLNR) are part of a coalition of partners in the Birds Not Mosquitoes Working Group, and together have supported the development of a *Wolbachia* based biopesticide[1] in *Culex* to suppress mosquito populations in Hawai‘i. Specifically, the Service and the DLNR are co-leads on the implementation of this biopesticide on priority conservation areas on the island of Kaua‘i to address mosquito populations that are impacting endangered and threatened forest birds.

The Service has reviewed and evaluated the information pertaining to this *Wolbachia* based biopesticide. Based on the information available to us we find this biopesticide is consistent with other incompatible insect technology (IIT) tools used to control mosquitoes for public health, which have been shown to be highly effective. We further anticipate the likelihood for non-target and environmental effects from the use of this technology in Hawai‘i are negligible. Therefore, we remain supportive of efforts to advance this IIT tool for conservation.

Efforts are currently underway by several state and federal resource management agencies and non-governmental partners related to public engagement, environmental compliance, and infrastructure that facilitate the use of IIT tools for conservation use in Hawai‘i. We appreciate your consideration and support of these collective efforts and look forward to continuing to work closely with the Hawai‘i Department of Agriculture, the Hawai‘i Department of Land and Natural Resources, the National Park Service, and other non-governmental organizations to carry out these conservation actions to protect Hawaiian forest birds from extinction.

If you have any questions regarding this letter or how IIT and other forest bird conservation projects align with the Service’s conservation strategy, please contact me at Michelle_Bogardus@fws.gov or by telephone at 808-792-9400.

Sincerely,

Michelle Bogardus
Pacific Islands Fish and Wildlife Office
Assistant Field Supervisor

[1] Biopesticide: certain type of pesticide derived from natural materials such as animals, plants, bacteria, and minerals. (U.S. Environmental Protection Agency)

March 24, 2023 Public Meeting

State of Hawai‘i – Department of Land & Natural Resources

Board of Land & Natural Resources

Public Written Testimony of Olan Leimomi Fisher

Regarding <u>SUPPORT</u> of Agenda Item C2:

Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

Aloha mai e members of the Board,

Like many of us lucky enough to call Hawai‘i our home, I love and appreciate the native plants and animals that make this place so unique and beautiful – and I especially love our surviving native manu who have already endured so much and continue to fight for their lives with increasing threats to their existence. As we all know, increasing temperatures have allowed southern house mosquitos to access our wao akua – spreading fatal diseases to our precious & endangered native honeycreepers. Scientists are estimating that the endemic ‘akikiki only has two years left before extinction, with kiwikiu, ‘akeke‘e, and ‘ākohekohe only having five to ten years before extinction. **Our precious manu are in <u>dire</u> need of your kōkua as soon as possible, and years of scientific research has proven that Wolbachia and the Incompatible Insect Technique can help significantly alleviate this problem.** Please **<u>APPROVE</u>** this final Environmental Assessment and issue a finding of **No Significant Impact** to save these beautiful animals before it's too late.

Mahalo nui for all your support & aloha for our native manu!

Aloha manu, aloha nō,

Olan Leimomi Fisher, Pūpūkea, O‘ahu

From: kapulei flores
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] support agenda item C-2
Date: Wednesday, March 22, 2023 12:17:15 AM

Aloha,

I SUPPORT, Agenda Item C-2.

Hawai‘i is already known as the extinct capitol for many of our native species, but especially for our native birds. We have lost so many and continue to see the decline in our native bird populations from the mountain to the sea. Now more than ever it is beyond important to do everything we can do to save our native birds which includes prioritizing their native natural habitats, native food sources, and understanding their importance in our ecosystem. It is not an option of whether or not we should prioritize making a safe natural and native environment for our native birds to thrive, it is an urgency before we watch our remaining species go extinct right in front of our eyes. Someday, our children and grandchildren will look back at this point in our history. I hope that they will be able to say that we stepped up to the challenge and saved Hawai‘i’s honeycreepers through swift, scientifically informed action. **I urge you to please SUPPORT the mosquito control efforts outlined agenda item C-2.**

Mahalo Nui

From:	Hillary Foster
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Testimony in support of Agenda Item C-2 on the proposed use of the Wolbachia Incompatible Insect Technique
Date:	Wednesday, March 22, 2023 9:14:38 AM

I SUPPORT, Agenda Item C-2 on the proposed use of the Wolbachia Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kauaʻi and Maui.

Avian malaria is being spread by invasive southern house mosquitoes, and is moving up the mountain due to climate change. This has been and is going to cause extinction of the native Hawaiian honeycreepers. We cannot stand by and lose any more native species. We need action and the Incompatible Insect Technique can suppress mosquito populations and help save our native forest birds. This method is backed by proven science and is currently being used in several states throughout the United States and countries throughout the world.

Please SUPPORT the mosquito control efforts touched upon in agenda item C-2.

Mahalo,
Hillary Foster

--
Hillary Foster, M.Sc. (she/her)
Data & GIS Senior Technician
Maui Forest Bird Recovery Project
2465 Olinda Road, Makawao, HI 96768
(808) 573-0280
www.mauiforestbirds.org

From: andy@fhnp.org
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Suppression of Invasive Mosquito Populations
Date: Sunday, March 19, 2023 7:55:58 AM

Dear Board and Chair,

I am writing to express my support for the Birds Not Mosquitoes program, and urge you to vote in favor of a finding of no significant impact on the environmental assessment of the proposed actions.
I have had the wonderful opportunity to volunteer with several conservation organizations on Maui, including Maui Forest Bird Recovery Project, The Nature Conservancy, Auwahi Forest Restoration Project, Keālia Pond National Wildlife Refuge, ReTree Hawaii and currently am serving as co-president for the Friends of Haleakalā National Park. As such I have witnessed the rapid decline in forest bird populations as well as the severe reduction in native habitat. Urgent action is needed to preserve the ecological health and biodiversity of Hawaii!

Andrew Fox MD

From:	Carol
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Mtg 3/24/23 9:15am Item C-2: Oppose Biopesticide Mosquito Release
Date:	Tuesday, March 21, 2023 8:30:02 PM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I am a former BBC journalist, live TV co-host, Maui homeowner and part-time Maui resident who is STRONGLY OPPOSED to the planned biopesticide mosquito releases on Maui. I demand that a detailed, full-scope Environmental Impact Statement (EIS) is completed documenting the impacts on our native birds, environment, and public health.

To paraphrase the Dalai Lama: "Anyone who thinks they're too small to make a difference has never shared a bed with a mosquito." Now think what a difference the planned annual release in Maui could make of more than 40 billion lab-raised mosquitoes that have been modified by the addition of the bacteria, Wolbachia. What could possibly go wrong? Humans have already done a fine job of releasing invasive species in Maui. Mongoose to kill the rodents in the sugarcane fields. Diurnal mongoose to kill nocturnal rats and mice. Oops! Then three male and six female Axis deer from South Asia were introduced to Maui in 1959. Now more than 60,000 of them are on the island and have devastated pasture forage and vegetation.

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. Per the U.S. Department of the Interior Strategy, "Wolbachia IIT is a novel tool for conservation purposes and its degree of efficacy in remote forest landscapes is unknown." This statement admits the DBQ project is an experiment on Hawaii's people, wildlife, and 'aina with unknown outcomes. Human disease vectors are involved and informed consent of the public is required. Releasing Wolbachia mosquitoes on Maui is very likely to open a Pandora's Box of serious unintended consequences, causing irreparable harm to the island.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of Wolbachia bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I demand an Environmental Impact Statement (EIS).

Yours sincerely,

Caroline Frantzis.

From:	Wendy Frazell
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 8:38:04 AM

Hello,

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Wendy Frazell
808-319-8463

From:	Mark Frazer
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Tuesday, March 21, 2023 9:13:55 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Mark Frazer

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

As a fisherman and member of the Makahanaloa Fishing Association in Hilo Palikū, Hawai‘i island, I see the importance of our ma uka lands and the connection between ma uka and our ocean. If our forests are not in balance, neither is our ocean. Our forest cannot be in balance without our native birds. This could cause a detrimental cascade effect that would threaten the ecology of our native ecosystems. As a native Hawaiian, it brings me to tears thinking of all that we have lost due to the introduction of foreigners, invasive species and disease. This is your kuleana as the state of Hawai‘i to remedy the many mistakes you have made to save our bird species. This is a small humble request that I urge you to pay attention and listen to.

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ‘Ākohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawai‘i’s native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

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Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Nick Frazier, Board Member of the Makahanaloa Fishing Association

From: Lila Fried
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for 3/24 meeting on invasive mosquito suppression
Date: Wednesday, March 22, 2023 4:04:02 PM

To the Board of Land and Natural Resources,

This is my testimony on the Environmental Assessment, "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui."

As a conservation biologist who has worked with some of Hawai'i's most endangered flora and fauna, I want to stress my full support of the invasive mosquito suppression plan put forth by DLNR DOFAW. Incompatible Insect Technique is proven to be a safe and effective method for reducing the transmission of mosquito-borne diseases and is already being utilized across the world. The Environmental Assessment is thorough and outlines the proper procedure to implement Incompatible Insect Technique in Hawai'i.

BLNR Should agree with the finding of no significant impact and vote to approve the plan. Time has nearly run out for birds like 'Akohekohe and Kiwikiu; If this plan is not immediately enacted, we are all but certain to lose them forever.

Mahalo for your consideration.

Sincerely,
Lila Kono Kim Fried

From: justin N
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Thursday, March 23, 2023 6:13:21 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

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Wolbachia IIT is currently the only tool of hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to

save Maui forest birds.

Mahalo for providing testimony,
Justin Fujimoto

Sent from my iPhone




3/22/23

Welina mai e BLNR,

ʻO Kaunaʻoa Garcia koʻu inoa. No Lānaʻi mai au. Noho wau ma Waikapū, Maui. He kumu au ma ke Kula Kaiapuni ʻo Nāhiʻenaʻena ma Lahaina. Aʻo au i nā keiki ma ka papa 4 me 5. He Hawaiʻi au a he pilina paʻa koʻu mau kūpuna me ka ʻāina a me nā meaola a pau o Hawaiʻi! He kuleana koʻu e kōkua a hōʻike aku i koʻu mau manaʻo e kākoʻo iā ʻoukou e hoʻopakele i ko kākou manu Hawaiʻi. E kaʻana pū ana kaʻu mau haumāna i ko lākou manaʻo ma kā lākou mau leka ponoʻī.

I kēia makahiki, ua koho mākou e aʻo e pili ana i ko kākou manu Hawaiʻi. He pāhana nui kēia no kaʻu mau haumāna. Ua koho lākou pākahi i kekahi manu e noiʻi ai a aʻo mai i nā mea like ʻole o ia mau manu. Ua aʻo mākou i nā meaʻoiaiʻo mānaʻonaʻo e pili ana i ka nui o nā manu i koe ma nā lāhulu like ʻole. Ua aʻo pū mākou e pili ana i nā poʻiiʻa e hōʻemi pū i ka nui o lākou a ʻo ka makika ka mea puʻumake nui. Ma muli o ko mākou ʻike no kēia pilikia nui me nā makika, he kuleana ko mākou e kōkua i nā manu a me nā poʻe e hoʻāʻo nei e kōkua pū iā lākou.

No laila, kākoʻo nui kaʻu mau haumāna a me iaʻu iā ʻoukou me ka hōʻemi ʻana i ka nui o nā makika me ke koʻohune wolbachia. Maopopo iaʻu i ka hopena inā ʻaʻohe mea e hana ai a kōkua aku i nā manu, he mau manu halapohe hou aku! ʻAʻole au makemake e ʻike i kēlā hopena no ko kākou manu Hawaiʻi ma koʻu wā e ola ana. ʻO ia ke kumu e hoʻāʻo nui ana mākou e kōkua me kēia leka kākoʻo.

ʻO ka ʻōlelo noʻeau, "He aliʻi ka manu," ʻo ia ka manaʻo o koʻu mau kūpuna. Ma ia ʻōlelo noʻeau nō e hoʻomaopopo ʻia i ka waiwai o ko kākou manu Hawaiʻi. Ua kau ʻia i ka hano o lākou i luna loa me nā aliʻi o ka lani a pēlā i pūlama pū ʻia lākou. Pono nā kānaka a pau e ʻike i ko lākou waiwai. ʻAʻohe manu, ʻaʻohe mea kanu. ʻAʻohe mea kanu, ʻaʻohe ʻai. ʻAʻohe ʻai, ʻaʻohe kānaka. Pili nā mea a pau kekahi i kekahi a pēlā i ola pono ai nā mea a pau ma kēia honua nei ma Hawaiʻi! Nui koʻu mahalo iā ʻoukou no ka mea pono nō e hana i kā ʻoukou e hana ana me nā makika e kōkua nui i ko kākou mau manu Hawaiʻi a me nā lāhulu ʻane halapohe ʻē aʻe ma Hawaiʻi i kēia manawa! MAI HOʻOPAU MANAWA! Kākoʻo piha kaʻu mau haumāna a me iaʻu iā ʻoukou e hana i ka pono no ko kākou manu Hawaiʻi!

Me ke aloha,

Kauna'oa Garcia

Kula Kaiapuni ʻo Nāhiʻenaʻena
Kumu Kaiapuni
Papa 4/5




3/22/23

Greetings NPS and DLNR,

My name is Kauna'oa Garcia. I am from Lāna'i. I live in Waikapū, Maui. I am a teacher at Nāhi'ena'ena Hawaiian Immersion School in Lahaina. I teach kids in the fourth and fifth grade. I am Hawaiian and my ancestors had a strong relationship with the land and all of the living organisms of Hawai'i! It is my responsibility to help and express my thoughts to support you folks to protect our Hawaiian birds. My students will also share their opinions with their own letters.

This year, we chose to learn about our Hawaiian birds. This is a big project for my students. Each of my student's chose a bird to research and learn everything about these birds. We learned a lot of shocking facts about the number of birds that are left in various species. We also learned about the predators that are contributing to their demise and mosquitoes being one of the main threats. Due to our knowledge about this big problem with mosquitoes, we have a responsibility to help the birds and the people who are trying to also help them.

Therefore, my students and I support you folks with controlling the number of mosquitoes using the wolbachia bacteria. I know the result if nothing is going to be done to help the birds, there will be more birds who will go extinct! I don't want to see that fate for our Hawaiian birds in my lifetime! That is the reason we are going to try to help with this letter of support.

The wise saying, "The birds are chiefs," is the belief of my ancestors. In this wise saying indeed is the understood importance of our Hawaiian birds. They were placed in a position of honor up above like the chiefs of the heavens and that's how they were also cherished. Everyone needs to see their importance. If there are no birds, there will be no plants. If there are no plants, there will be no food. If there are no food, there will be no people. Everything is closely related to each other and that's how everything lived in harmony in Hawai'i! Many thanks to you folks because there is an urgent need to do what you will be doing with the mosquitoes to help our Hawaiian birds and the other endangered species in Hawai'i now! DON'T WASTE TIME! My students and I fully support you folks to do the right thing for our Hawaiian birds!

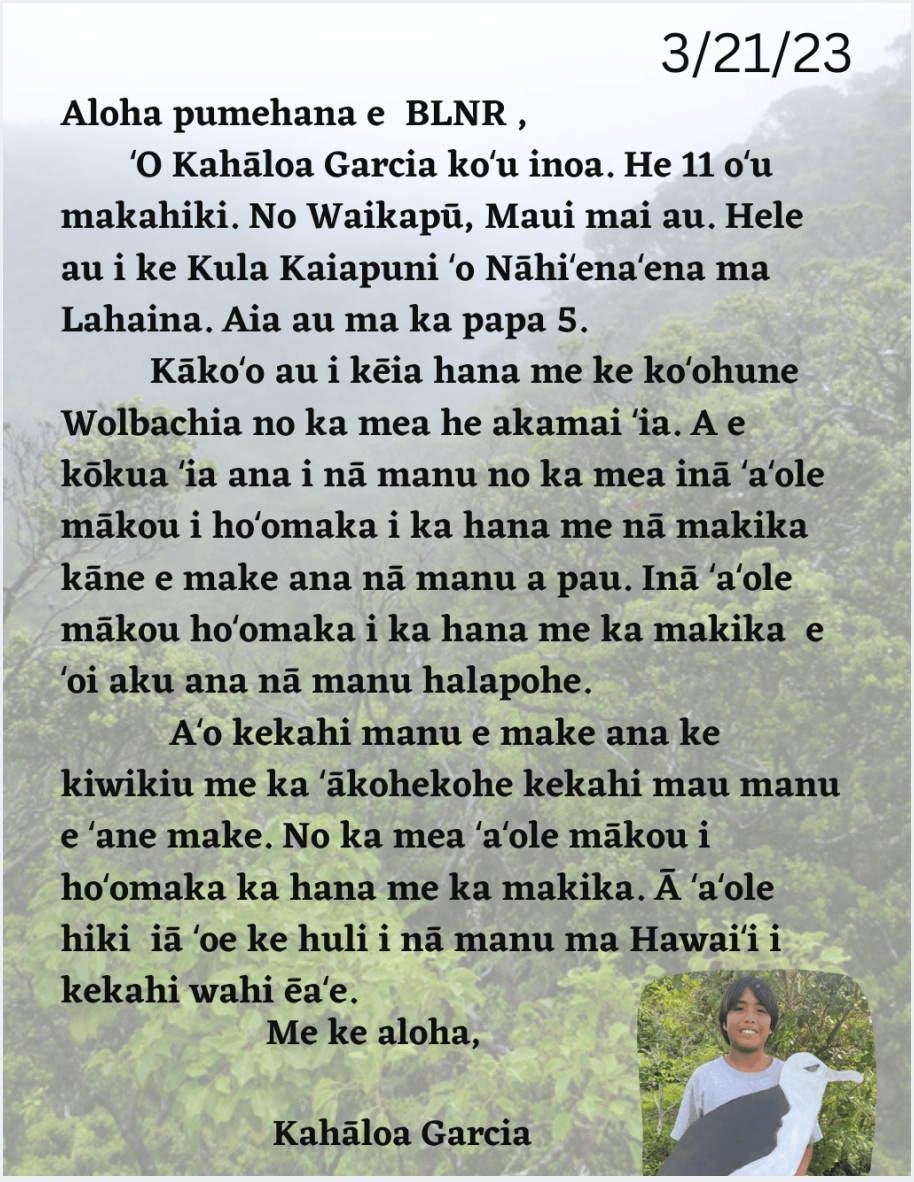
Me ke aloha,

Kauna'oa Garcia

Kula Kaiapuni 'o Nāhi'ena'ena
Kumu Kaiapuni
Papa 4/5

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] LEKA IĀ BLNR Kahāloa
Date: Wednesday, March 22, 2023 8:54:19 AM
Attachments: LEKA IĀ BLNR Kahāloa

A design titled "LEKA IĀ BLNR Kahāloa" was shared with you by 4291800079@k12.hi.us.



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From: Kaunaoa Garcia (via Canva)
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Leka Kākoʻo 2 (BLNR) - Nā Manu Hawaiʻi (Kaunaʻoa)
Date: Wednesday, March 22, 2023 8:53:52 AM
Attachments: Leka Kākoʻo 2 (BLNR) - Nā Manu Hawaiʻi (Kaunaʻoa)

Kaunaoa Garcia would like you to take a look at the design titled "Leka Kākoʻo 2 (BLNR) - Nā Manu Hawaiʻi (Kaunaʻoa)"

3/22/23

Welina mai e BLNR,

ʻO Kaunaʻoa Garcia koʻu inoa. No Lānaʻi mai au. Noho wau ma Waikapū, Maui. He kumu au ma ke Kula Kaiapuni ʻo Nāhiʻenaʻena ma Lahaina. Aʻo au i nā keiki ma ka papa 4 me 5. He Hawaiʻi au a he pilina paʻa koʻu mau kūpuna me ka ʻāina a me nā meaola a pau o Hawaiʻi! He kuleana koʻu e kōkua a hōʻike aku i koʻu mau manaʻo e kākoʻo iā ʻoukou e hoʻopakele i ko kākou manu Hawaiʻi. E kaʻana pū ana kaʻu mau haumāna i ko lākou manaʻo ma kā lākou mau leka ponoʻī.

I kēia makahiki, ua koho mākou e aʻo e pili ana i ko kākou manu Hawaiʻi. He pāhana nui kēia no kaʻu mau haumāna. Ua koho lākou pākahi i kekahi manu e noiʻi ai a aʻo mai i nā mea like ʻole o ia mau manu. Ua aʻo mākou i nā meaʻoiaiʻo manaʻonaʻo e pili ana i ka nui o nā manu i koe ma nā lāhulu like ʻole. Ua aʻo pū mākou e pili ana i nā poʻiiʻa e hōʻemi pū i ka nui o lākou a ʻo ka makika ka mea puʻumake nui. Ma muli o ko mākou ʻike no kēia pilikia nui me nā makika, he kuleana ko mākou e kōkua i nā manu a me nā poʻe e hoʻāʻo nei e kōkua pū iā lākou.

No laila, kākoʻo nui kaʻu mau haumāna a me iaʻu iā ʻoukou me ka hōʻemi ʻana i ka nui o nā makika me ke koʻohune wolbachia. Maopopo iaʻu i ka hopena inā ʻaʻohe mea e hana ai a kōkua aku i nā manu, he mau manu halapohe hou aku! ʻAʻole au makemake e ʻike i kēlā hopena no ko kākou manu Hawaiʻi ma koʻu wā e ola ana. ʻO ia ke kumu e hoʻāʻo nui ana mākou e kōkua me kēia leka kākoʻo.

ʻO ka ʻōlelo noʻeau, "He aliʻi ka manu," ʻo ia ka manaʻo o koʻu mau kūpuna. Ma ia ʻōlelo noʻeau nō e hoʻomaopopo ʻia i ka waiwai o ko kākou manu Hawaiʻi. Ua kau ʻia i ka hano o lākou i luna loa me nā aliʻi o ka lani a pēlā i pūlama pū ʻia lākou. Pono nā kānaka a pau e ʻike i ko lākou waiwai. ʻAʻohe manu, ʻaʻohe mea kanu. ʻAʻohe mea kanu, ʻaʻohe ʻai. ʻAʻohe ʻai, ʻaʻohe kānaka. Pili nā mea a pau kekahi i kekahi a pēlā i ola pono ai nā mea a pau ma kēia honua nei ma Hawaiʻi! Nui koʻu mahalo iā ʻoukou no ka mea pono nō e hana i kā ʻoukou e hana ana me nā makika e kōkua nui i ko kākou mau manu Hawaiʻi a me nā lāhulu ʻane halapohe ʻē aʻe ma Hawaiʻi i kēia manawa! MAI HOʻOPAU MANAWA! Kākoʻo piha kaʻu mau haumāna a me iaʻu iā ʻoukou e hana i ka pono no ko kākou manu Hawaiʻi!

Me ke aloha,

Kauna'oa Garcia
Kula Kaiapuni ʻo Nāhiʻenaʻena
Kumu Kaiapuni
Papa 4/5

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March 22, 2023

Dear Board of Land and Natural Resources:

I write to support the Environmental Assessment entitled Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui.

I am an annual visitor to Hawaii. As much as I always enjoy the natural lushness and beauty of the islands, I have also always been keenly aware of that most of the plants and birds on the islands are not indigenous and that many of the remaining native bird species are in danger of extinction.

Thus, I have taken an interest in efforts to preserve and support native bird populations in Hawaii. As the daughter of a professor of ecology, who myself once spent a summer working with him on an EPA Environmental Impact Statement, I am well aware of the scientific rigor involved in conducting an Environmental Assessment. I have reviewed this one and believe it provides compelling documentation that there will be no negative impacts from the proposed program to suppress invasive mosquitos that transmit Avian Malaria. Using Wolbachia bacteria to control mosquito populations has been done for over 50 years with no negative environmental impact.

I urge the Board to approve it and for the Chair to issue a finding of "No Significant Impact" to support of the preservation of native Hawaiian birds.

Hawaii's forest birds represent the largest percentage of native bird species in the world that are found only in Hawaii. Therefore, preserving them is vital to the preservation of biodiversity on Earth. Furthermore, preservation of Hawaii's native birds in native forests is essential to the preservation of Hawaii's native ecology.

Yours truly,
Dr. Colleen Getz

22 March 2023

Dear Board of Land and Natural Resources:

I am writing in support of the Final Environmental Assessment entitled Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui.

I am professor emeritus of Evolution, Ecology, and Behavior at the University of Illinois. I researched and wrote Environmental Impact Statements for the U.S. Environmental Protection Agency and the Army Corps of Engineers. I am therefore aware of the importance of Environmental Assessments and the extensive and meticulous research that necessarily support their findings.

As an ecologist I have long been disturbed by the extinction of native bird species on the Hawaiian Islands. Very few native species remain and avian malaria, transmitted by mosquitoes, represents an existential threat to many of them. Unless swift action is taken, several more species will become extinct within the next few years.

Controlling mosquito populations that spread avian malaria represents the best opportunity to stabilize populations of endangered Hawaiian forest birds. The proposed Incompatible Insect Technique, using the Wolbachia bacteria, has been studied, developed and used for more than 50 years. There have been no negative environmental consequences reported.

The assessment under consideration finds no negative impacts from the Incompatible Insect Technique to suppress invasive mosquitos that transmit avian malaria. I urge the Board to approve it and for the Chair to issue a finding of "No Significant Impact" in support of the preservation of native Hawaiian birds.

Yours truly,

Dr. Lowell L. Getz
Professor Emeritus
University of Illinois

From: Maren Gimpel
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Please APPROVE Maui NPS Wolbachia
Date: Wednesday, March 22, 2023 12:41:53 PM

To whom it may concern,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Mahalo,
Maren Gimpel

From: ANNA GIUNTA
To: DLNR.BLNR.Testimony
Cc: Anna Giunta-Togo
Subject: [EXTERNAL] Oppose agenda item C2-mosquito release on any hawaiian island
Date: Wednesday, March 22, 2023 11:54:50 AM

This concerns our safety.
“DLNR’s Proposed Strategy to prevent Bird Extinction on Maui & Kauai” I DO NOT accept the Environmental Assessment’s Anticipated Finding of No Significant Impact (DEA-AFONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).

Anna Giunta

From: Brett Gobar
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] OPPOSITION TO BIO MOSQUITOS
Date: Monday, March 20, 2023 12:44:45 PM

Please consider Hawaii's failures when you brought in ;

MONGOOSE
AXIS DEER
KUDZO VINE ...GLYCINE

From: Noah Gomes
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA and issue FONSI
Date: Thursday, March 23, 2023 8:06:30 AM

Aloha Chair Designate Chang, and distinguished members of the BLNR,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

My name is Noah Gomes. I am from Wahiawā on Oʻahu and live in Hilo on Hawaiʻi. I am part-Hawaiian.

I completed my M.A. thesis research at UH Hilo on traditional Hawaiian bird hunting, a subject which was poorly researched prior to my studies. This gives me a unique insight into this issue and its significance to native Hawaiians.

Native Hawaiians have a long and storied history with our native birds as food, clothing, and in our religion. Unfortunately, our relationship with our native birds has grown weak over the last century as they have gradually gone extinct, disenfranchising our people from this part of our heritage. Millions of native birds and dozens of species have disappeared due to introduced disease. Native Hawaiians have not had access to them as a resource in a very long time. We want that to change.

I dream of a more independent Hawaiʻi. One in which native Hawaiians can thrive and reclaim their position on this land. One in which we are economically independent. One in which we are able to supply ourselves with our own food. One in which our land and people can live sustainably in perpetuity.

In order for this future to happen we must make the financial and social steps that are absolutely necessary to get us there. This means stabilizing our ecosystems from further degradation. With the constant loss of native species we have been experiencing in Hawaiʻi for the last 250 years, it is currently impossible to sustain ourselves on the resources these islands naturally provide. We need action **now**.

We are out of time with this issue. If we do not act **immediately** we will lose at least four more of our native bird species **forever**.

The Wolbachia IIT EA for East Maui shows no significant impact on environment or culture. A full EIS is not needed for this project, all it will serve to do is delay time and resources to save these species. By the time an EIS concludes it will be too late to take action. There are only about 130 Kiwikiu remaining. A single hurricane could wipe them out easily.

Some may argue that we can just take these remaining birds into captivity until conditions become more stable for them in the future. While this is possible, it is also the absolute last option we should take. It is incredibly difficult and expensive to reintroduce species into the wild, and there is not a guarantee that it will work. Our best shot is to help them in their habitat.

The Wolbachia solution is our best chance at saving these species, maintaining their presence on the landscape to perform important ecological functions, and ensuring the long term stability of Hawaiian ecosystems. This is an opportunity I wish that we had 30 years ago. I hope that 30 years from now I wont be wishing that we had seized it. This is our opportunity to make a real difference.

I strongly urge you to APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save our forest birds.

Mahalo nō for your time and consideration,

Noah J. Gomes

From: donna grabow
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Item C2 on the agenda
Date: Tuesday, March 21, 2023 7:43:53 AM

Aloha,

I oppose the approval to issue a Finding of No Significant Impact (FONSI).

The mosquitoes that are being bred in the laboratories, are fed human blood.

I DO NOT accept the Environmental Assessment's Anticipated Finding of No Significant Impact (DEA-AFONSI). The scope, risks, and experimental nature of the plan require more detailed documentation of the impacts to our native birds and ***PUBLIC HEALTH****.*

From: Debra Greene
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] OPPOSE Agenda item C2 BLNR meeting 3-24
Date: Thursday, March 23, 2023 3:32:34 AM

Please oppose the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui.

This is a disaster waiting to happen. Have we not learned from previous man-made interventions gone awry? Nature is far more intelligent than humans. Don't mess with her.

The project is an experiment on our island home, and the outcome is unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the community.

Please stop it!

Sincerely,

Debra

Debra Greene, PhD
debra@debragreene.com

From: Makani Gregg
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA and issue FONSI
Date: Tuesday, March 21, 2023 6:54:51 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I fully and whole heartedly **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths. So let's do something about this.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment. Hawaiʻi needs to take action in helping to prevent species extinct today and yesterday.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression. Let's work smart here.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have. So let's not pass this up and approve!

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds!!!!

Mahalo for the opportunity to provide testimony,

Toni Makani Gregg
13-470 Pohoiki Road
Pahoa 96778

From: Charlotte Gruneau
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Wednesday, March 22, 2023 6:58:43 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Charlotte Gruneau

From: Aunty Leilei
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15 am Agenda Item C-2: OPPOSE
Date: Wednesday, March 22, 2023 10:03:40 PM

To whom it may concern,

I am opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui.

Have we not learned anything from the destruction caused by the introduction of the mongoose to Hawaii? Brought here to solve the sugar plantations' rat problem, they only killed and endangered our native birds and sea turtles. These mosquitoes have the potential to do as much or more damage.

We have a delicate ecosystem in our islands. We must not disrupt it by releasing these biopesticide mosquitos with no idea how much disruption they too may cause.

Because we are an isolated island state, any mad scientist experiments gone afoul here would be easier to contain than experiments in the continental US. But that is not a good reason to use our island environment as an experimental lab. There is too much at risk should the mosquitoes infect humans or other animals. And what is the plan if they do? How do we round up billions of mosquitos?

I am opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). I demand an Environmental Impact Statement. (EIS).

Please decide on the side of caution. Please protect our islands and people.

Thank you for this opportunity to voice my concerns.

Sincerely,

Robin Leilani Gusiich-Batara

From: jack.hagarty@gmail.com
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support for Item C2
Date: Wednesday, March 22, 2023 9:57:48 PM

Aloha,

I am writing in support of item C2. This is an important thing that needs to be done to prevent Maui's endangered forest birds from going extinct.

Thank you,
Jack - Kihei resident

From:	L Harbo
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Testimony in support of March 24 Agenda Item, approval of EA and finding of NSI for suppression of mosquitoes
Date:	Thursday, March 23, 2023 8:15:36 AM

March 23, 2023

Aloha BLNR Board members,

We are writing to provide full and enthusiastic support for a finding of No Significant Impact regarding the proposed mosquito suppression program on the island of Maui. Many of our native bird populations are suffering tremendous losses and facing extinction due to the impacts of avian malaria transmitted by the invasive mosquito population. Rapid die off birds and reduction in the breeding population may lead to irreversible consequences if action isn't taken soon. Suppressing the mosquito population through the method proposed should reduce their impact on some of our most critically endangered native forest birds.

Please issue a finding of No Significant Impact, and approve the environmental assessment so that the mosquito suppression program may proceed. Immediate action is necessary, and the underlying science is sound.

Mahalo for your time and attention to this important matter.

Sincerely and with Aloha,

Lora Harbo and David Liebersbach
Ma'alaea, Maui

From: Main Gmail
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C2
Date: Wednesday, March 22, 2023 6:54:29 PM

Aloha,

Mahalo for the opportunit to provide testimony on Adenda Item C. Now is the time to act to save what remains of Hawaii's native birds. As an extinction crisis is upon us, this is a unique opportunity to take a step towards preventing greater species loss.

The Department of Land and Natural Resources' Environmental Assessment is thorough and outlines the proper procedure to implement Incomplete Insect Technique in Hawai'i. It has addressed any potential impacts and would not create any significant impacts per HRS 343. Rather, it would support species conservation and protect the remaining avian inhabitants of Hawai'i. Based on this, the Board should agree with the Findings of No Significant Impact and vote to approve.

Mahalo,
Sera Harris

From: Tanya Hayes
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date: Wednesday, March 22, 2023 12:40:31 PM

DLNR's Proposed Strategy to prevent Bird Extinction on Maui & Kauai"

I DO NOT accept the Environmental Assessment's Anticipated Finding of No Significant Impact (DEA-AFONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).

Best Regards,

Tanya Hayes

From: Tess Hebebrand
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony to Save the Forest
Date: Thursday, March 23, 2023 5:26:17 AM

Aloha,

I am writing this testimony in support of using the Wolbachia technique for controlling the spread of avian disease.

I have spent many years studying and caring for native Hawaiian forest birds. I know how important they are to our ecosystem and culture. This is a crucial step in protecting our forests and the animals that live there. We have no other way to slow the spread of mosquitoes and the diseases that they carry.

Tess Hebebrand

From:	Barbara Heindl
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Testimony for Action item C2: Request approval of Final EA and Authorization for Invasive Mosquito Suppression
Date:	Wednesday, March 22, 2023 11:03:57 AM

Hello,

Please accept this email as my support for approving action item C2 for the March 24th meeting: Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”.

The effects of non- native mosquitoes on Hawaii's native wildlife is well documented. Likewise, while this method has not been used in Hawaii, it has been used with great success in reducing mosquito populations elsewhere (Texas, California, Mexico, Singapore, Australia). This EA is extensive and discusses the proposal well and clearly illustrates the options and their risks, including what happens if we do nothing... the loss of some of the most rare species on earth. Other conservation management techniques to bolster native bird populations are a waste of time and money without large-scale mosquito control efforts to reduce avian malaria on the landscape.

The approval of this EA is critical in the next steps to protecting Hawaii's native birds, not just on Maui, but on the rest of the Hawaiian chain. On Kaua'i, species like the Akikiki and Akeke'e are at critically low numbers and have decreased in population sizes precipitously in a manner that is so glaringly obvious to anyone who has worked with them over the last decade or longer. Forests that less than 20 years ago were still vibrant with the songs and calls of native birds are now growing silent. Now is our only opportunity to keep them from blinking out of existence.

Please approve the final EA for and issue a "Finding of no significant impact" in regards to this method of mosquito suppression on Maui and pave a way forward for mosquito suppression on other Hawaiian islands. Please do not let our last few remaining native forest birds go the way of the O'O and Po'ouli.

Sincerely,

Barbara Heindl
--
PCSU IEP GIS and Environmental Planning Specialist

From: Claudia Herfurt
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C2
Date: Tuesday, March 21, 2023 8:21:36 AM

Hello,

I strongly object to the DLNR's Proposed Strategy to prevent Bird Extinction on Maui & Kauai" I DO NOT accept the Environmental Assessment's Anticipated Finding of No Significant Impact (DEA-AFONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).

Please stop messing with our God given environment. It woks in perfect harmony without our interference.

Sincerely,
Claudia Herfurt
Kauai

From: Reynald
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL]
Date: Wednesday, March 22, 2023 12:58:03 PM

We are total support of this action to protect our endangered beautiful birds in Hawaii.

Lorraine Hermanson

From: Aram Higa-Parker
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony concerning
Date: Monday, March 20, 2023 10:33:01 AM

I am submitting my testimony to say that Native species should be at the forefront of protection by the state. The BLNR should agree with the findings of no significant impact, vote to approve and implement incompatible insect techniques. Thus, eradicating or at the very least suppressing the invasive mosquito population from putting strain on the population of Native Hawaiian avian species. I am in full support of the actions outlined on Agenda Item C-2, using means to control the mosquito population in order to protect our native bird species.

From: whalemail@waypt.com
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] The future of Our Forest Birds
Date: Saturday, March 18, 2023 2:21:50 PM

Aloha,

I write children's nature books and have worked with more young people than I can count, taking them out into the forests, streams and oceans to learn how they can protect and enjoy the natural world. My work includes calling attention to Hawaiian Forest Birds and I write to you to urge approval of the DLNR/DOFAW's call for Suppression of Invasive Mosquito Populations to reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds of East Maui.

I urge you to think future so that our young ones can look forward to a healthier forest on Maui and all our islands.

Mahalo,

Ron Hirschi
PO Box 22
Poulsbo, WA 98370

From: hirsh99
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS) - NOT RELEASE GMO MOSQUITOS IN HAWAII, EVER!
Date: Wednesday, March 22, 2023 11:50:15 AM

DLNR's Proposed Strategy to prevent Bird Extinction on Maui & Kauai" I DO NOT accept the Environmental Assessment's Anticipated Finding of No Significant Impact (DEA-AFONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentationof the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).

Also, I will not EVER agree to the Release of gmo mosquitoes anywhere in the world as this is also a human delivery system for vaccines. I do not ever want a vaccine inadvertently put into me via a mosquito. This is yet another attempt by the Globalists to reduce and control the world's population.

Thank you for your consideration,

Heidi Hirsh
3721 Kanaina Ave
Honolulu HI 96815

From: Susan Horie
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Sunday, March 19, 2023 8:59:35 PM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Susan Horie
808 938-7071

From: HannahHousman
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Wednesday, March 22, 2023 11:52:41 AM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui.
Please do not approve this experiment on our island. These biopesticide mosquitoes should not be considered as an option; they pose a serious threat to our sensitive environment! We only have this island—our home.. this release of infected mosquitoes risks killing off our endangered birds and even harming humans! There are countless ways this type of experiment can go wrong. Do not play around with our home!!!

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement**

Hannah Housman, Wailuku

From: Nicole N
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C-2
Date: Wednesday, March 22, 2023 6:50:55 PM

Aloha,
I support Wolbachia IIT to save Native Hawaiian forest birds. They are a vital part of the ecosystem and need to be protected from harmful invasive mosquitos.

Mahalo
Nicole Imanaka
--
Sent from my iPhone

From: jeanette imler
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support for Maui NPS Wolbachia Incompatible Insect Technique
Date: Monday, March 20, 2023 8:40:41 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to

save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Jeanette Imler

From: Ariel Imoto
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE East Maui NPS EA & issue FONSI
Date: Tuesday, March 21, 2023 6:12:07 PM

Dear Chair Designate Chang and Members of the Department of Land and Natural Resources,

I am writing to express my strong support for the Board's approval of the final Environmental Assessment (EA) and the Chairperson's issuance of a Finding of No Significant Impact (FONSI) for the project, "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui," Agenda Item C-2. This comprehensive, well-researched EA highlights the urgent need for action to prevent native bird species extinction and offers in-depth information on the project's processes to safeguard and preserve East Maui's unique, fragile ecosystems, and critically endangered native bird species.

The proposed action of using the innovative and novel Incompatible Insect Technique (IIT) would directly address the primary cause of native forest bird decline, avian malaria, by suppressing the invasive mosquitoes responsible for spreading the disease.

The EA has thoroughly considered the potential consequences of this project, providing detailed analyses on various environmental factors such as threatened and endangered wildlife and plant species, wilderness character, acoustic environment, and visitor use and experience. Moreover, the interdisciplinary team has consulted with scientific experts, environmental planners, and relevant agencies to ensure a comprehensive understanding of the potential impacts and benefits of the project. And lastly, it has been prepared consistently with the National Environmental Policy Act (NEPA) and the Hawai‘i Environmental Policy Act (HEPA), ensuring compliance for project implementation on both federal, state lands, and consideration of any private landowners.

It is important to consider the alternative of taking no action, which would mean not implementing the proposed mosquito suppression strategy. While ongoing conservation and management activities would continue, the primary threat to native forest birds, avian malaria, would persist unabated as the mosquitoes that carry this disease would remain uncontrolled. As a result, the already dwindling populations of kiwikiu, ‘ākohekohe, and other vulnerable species would continue to decline, potentially leading to their extinction in the near future.

By implementing the proposed mosquito suppression project, we have an opportunity to save these unique and endangered bird species and protect the delicate ecosystems of East Maui.I urge all relevant parties to support this crucial EA and assist in preserving our native birds for future generations.

Sincerely,

Ariel Imoto

From:	shelley jacobs
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 6:47:04 AM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Thank you very much,

Shelley Jacobs
Kula, HI

From: Kristina Jennings
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia
Date: Thursday, March 23, 2023 8:03:23 AM

I support board approval of Wolbachia ITT. This has been thought through carefully and the plan does not negatively affect humans or other birds and species other than mosquitoes.
Mahalo!
Kristina Jennings

From: Sydney Mina Jensen
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C-2
Date: Tuesday, March 21, 2023 4:27:13 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Agenda Item C-2 on the proposed use of the Wolbachia Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kauaʻi and Maui.
Avian malaria, a disease transmitted by invasive southern house mosquitoes, is driving the extinction of our forest birds. A single bite by an infected mosquito can kill an ʻiʻiwi (a critically endangered forest bird species). As the climate warms, mosquitoes carrying avian malaria are moving upslope into the last refugia for Hawaiʻi's forest birds. Without swift action, several species of honeycreepers will become extinct in the next ten years. The Incompatible Insect Technique can suppress mosquito populations and help save our native forest birds.

This is our last chance to save our amazing and unique birds that are found nowhere else in the world. Extinction is forever. We need to save our birds from mosquitoes that transmit avian malaria before it is too late.

Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui,
Sydney Mina Jensen
Hawaiʻi Island Resident

From: Dawn Jernaill
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda item C-2 March 24/2023
Date: Wednesday, March 22, 2023 11:09:29 AM

To whom it may concern.

I am writing in support of this action to control avian malaria and effort to protect our precious endangered native birds while we still have a chance. Please approve final EA and issue a finding of no significant impact.

Mahalo,
Dawn Jernaill

From: Ann Johnson
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Letter of Support for Agenda Item C-2 on the proposed use of Wolbachia
Date: Thursday, March 23, 2023 3:12:38 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2 on the proposed use of the Wolbachia Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kauaʻi and Maui.

Hawai'i is my home. Growing up here, my heart is heavy to think that our precious native birds could be lost forever, and that my children and future grandchildren may not be able to hear them and enjoy watching them in our native forests. Mahalo nui for the opportunity to comment on this important issue. I speak on behalf of the birds who have no voice, no voice to ask for help. Please find it in your hearts to make a difference, and to help save them. Their lives are in your hands, and they are running out of time.

Finding ways to help save species from extinction is incredibly challenging. With those challenges come many personal and political issues, difficulties that may even cause division. Today, I am asking you to put all of that aside. Consider all the facts, pros and cons. As a scientist/researcher, I believe this is one of the safest options available to help save our precious birds that are such an important part of our home and Hawaiian culture.

I understand people may be hesitant about things they are unfamiliar with. Wolbachia is a non-GMO and already exists in many arthropods in Hawai'i. Looking at previous studies, its use in other places around the world for disease mitigation, and the fact that chances are, many, though unaware, may have already been exposed to Wolbachia through other arthropods in Hawai'i. I feel this may be the best way to help the birds. To my knowledge, this is the safest method available we have to help.

Time is of the essence as every wasted moment moves them closer to extinction. If nothing is done to help them, ***we are choosing to let them be lost forever.***

We, however, still have a small window of opportunity. That small bit of time to save many species is still here within our grasp. ***Now is the time to take action!***

I urge you to please take this final opportunity to save our native birds from extinction. They have no voice to cry for help. Please be their voice & change the course of what could be their inevitable history. ***We are their last and only hope***.

Please SUPPORT the mosquito control efforts touched upon in agenda item C-2. Please take a stand for our native species and make a difference for them, for our aina, for our culture, and for our future.

Mahalo for your time and consideration.

Sincerely,

Ann Tanimoto-Johnson

From: simeon johnson
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support letter for Agenda Item C-2 (proposed use of Wolbachia)
Date: Thursday, March 23, 2023 3:19:12 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2 on the proposed use of the *Wolbachia* Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kauaʻi and Maui.

As a native Hawaiian, I urge you to please choose to support saving our native birds from the brink of extinction. We have lost so much of our land and culture, as well as the countless lives of our Hawaiian endemic species. Please take action and prevent any further loss. As a father, I so want my children to have the same opportunities to be able to go into the forest and enjoy some of our last native birds. If we don't step up and save them now, they will be lost forever.

Please don't stand by and watch their extinction. Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2. We're their last hope.

Mahalo nui,
Simeon Johnson

From: Stillpoint Photography LLC
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] invasive mosquito suppression testimony
Date: Friday, March 17, 2023 8:14:22 PM

Aloha,

I am writing to express my strong support for the proposed suppression of invasive mosquito population project on East Maui. As indicated in the EA, this project would not result in the introduction of any new species to the island; would only release male mosquitoes; Wolbachia cannot be transferred between animal species, to humans, or from male to female mosquitoes; and will not release genetically modified organisms. The southern house mosquito is an invasive species in Hawaii whose population is responsible for the spread of avian malaria in endangered and threatened native birds. This project has identified a way to suppress the mosquito population in order to reduce the spread of avian malaria without any negative impacts to the ecosystem outside of limited (in amount and duration) acoustic impact.

Mahalo for your consideration,

Warren Johnson
Paia, HI 96779

From: Bridget Judd
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support for item C-2
Date: Wednesday, March 22, 2023 8:49:41 PM

Aloha,

I support the request to issue a finding of no significant impact for the "Suppression of Invasive Mosquito populations to reduce transmission of avian malaria to threatened and endangered forest birds on east maui." This is a huge step in the right direction for our beloved manu Hawai'i.

By controlling invasive mosquitoes that spread avian malaria we are giving our native forest birds a chance. Mosquitos are the most deadly threat to our native birds and with this approval we can use the safe and effective tools to work to reduce mosquitos across the landscape.

I approve of landscape level mosquito control to help protect our manu Hawai'i.

Mahalo,
Bridget Judd

From: Teresa Kaholoaa
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony: Wolbachia technique
Date: Wednesday, March 22, 2023 9:26:09 PM

Aloha,
This is my testimony stating that I am in support of using the Wolbachia technique for controlling the spread of avian disease.

Mahalo,
Ululani Kaholoaa

From:	Rachael Kaiser
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Wednesday, March 22, 2023 6:09:32 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

From:	Maui Satsang
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Subject: BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 4:28:32 PM
Attachments:	pmc-graphic-share.png

Aloha,

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

There is a better way…

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

We should find other ways to help Avian malaria. There are natural ways to treat it in humans. There is just not as much money backing up the the natural cures, even though they are better for everyone involved.

No one wants to get bit by a pesticide mosquito.
Thank you for seeing past the money and supporting nature and our health as well.

Kalyani Lynn

Traditional herbal medicines for malaria
nlm.nih.gov

The Cure for Malaria Could be in Your Backyard - Center for Tropical and Emerging Global Diseases
ctegd.uga.edu

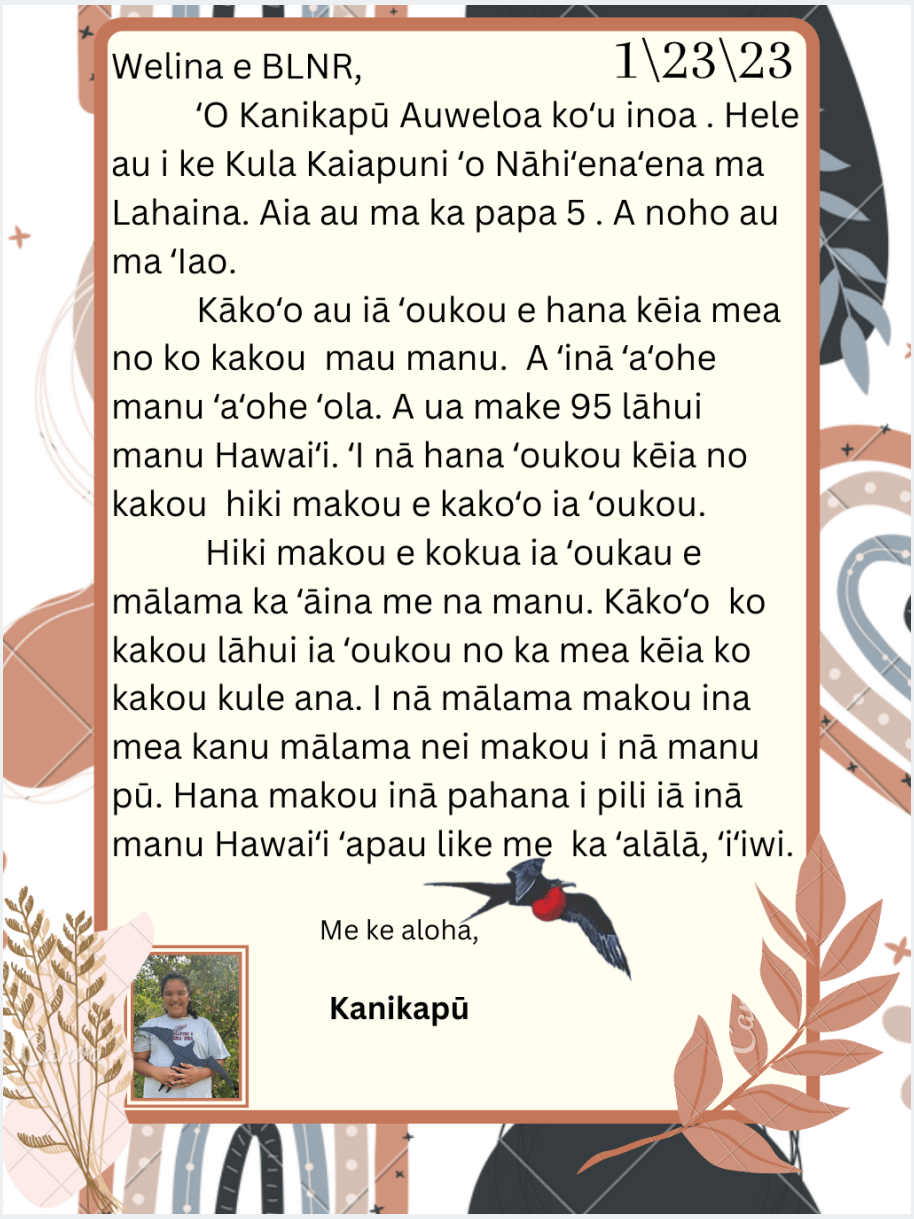
From: kaleialoha kaniaupio-Crozier
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Email Testimony
Date: Wednesday, March 22, 2023 11:41:59 PM

I am in support of using the Wolbachia method for controlling the spread of avian disease. Our native Hawaiian forest birds are precious and unique to Hawai‘i and its culture. Our children of Hawai‘i shouldn’t have to learn about birds that once existed in their home; they should be able to educate their children and the next generation about our birds by experiencing them for themselves. I, Kaleialoha, will continue to advocate for the betterment of our ‘āina, its natural resources, and people of Hawai‘i. A healthy Hawai‘i needs our native birds. Mahalo.

Na‘u nō me ka ha‘aha‘a,
na Kaleialoha Kaniaupio-Crozier

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Ka‘u leka nō BLNR- Kanikapū Auweloa
Date: Wednesday, March 22, 2023 9:49:13 AM
Attachments: Ka‘u leka nō BLNR- Kanikapū Auweloa

A design titled "Ka‘u leka nō BLNR- Kanikapū Auweloa" was shared with you by 4221800159@k12.hi.us.



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From: nancykanna@gmail.com
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Please APPROVE Final EA for East Maui and authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI)
Date: Wednesday, March 22, 2023 10:14:01 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I am submitting testimony in strong support of agenda item C-2. Please approve the final environmental assessment and issue a finding of no significant impact.

Our native Honeycreepers are foundational to the culture, forests, and ecosystems of Hawai'i. We have already lost dozens of forest bird species that used fill our forests with their song. In addition to their cultural significance, these birds are essential to our forests as pollinators, seed dispersers, and insect eaters. Without action or delayed action, these species have no chance of survival and we are risking the loss of our biocultural heritage.

The findings of the Environmental Assessment for East Maui show that the proposed measure is a viable and safe approach to stabilize and recover populations of critically endangered Hawaiian forest birds. The incompatible insect technique has been used successfully worldwide for vector control for human diseases and gives us a powerful tool to address the main cause for the decline of our Honeycreepers: avian malaria transmitted by the Southern House Mosquito. Neither the disease nor the vector is native to the Hawaiian islands and the mosquitoes have invaded the highest elevation of our island, decimating our Honeycreeper populations every day.

The question to consider for our forests and for our ecosystem: How many more native forest bird species can we afford to lose, before the environmental impact will lead to the collapse of our native Hawaiian forests and watersheds?

Without healthy, balanced watersheds our island's greatest wealth—its water--will no longer be able to support life as we live it today. Thank you for your consideration.

Mahalo nui!
Nancy Kanna
Hanapepe, Kauai, HI

From: Elizabeth Sancho
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] In Support of Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui
Date: Monday, March 20, 2023 11:22:14 AM

March 20, 2023

Department of Land and Natural Resources
PO Box 621
Honolulu, HI 96809

RE: Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui

To Whom it May Concern:

We are the 4th grade students at Kanuikapono Public Charter School on Kaua'i. We live in Anahola, Kapa'a, Koloa, Wailua, and Princeville.

We strongly support the suppression of the mosquito population of East Maui. We have learned a lot about the native birds of all of our islands and we know that we must all work together now to save these fragile populations. The birds on all of our islands are equally important. Anastasia says that it is important for the birds to stay alive because they keep our forest alive. Violet says that we need the 'elepaio because it helps the forest by eating the bugs that don't belong in the trees. Justine and Ozzie want you to know that the main predators of the native birds are rats and cats and it is important to control those populations. Halia wants you to know some good news. The 'elepaio has shown some resistance to avian malaria which is transmitted by mosquitoes. Elijah says that there are only 500 puaiohi left on Kaua'i. Solomon wants you to know that there are only 950 akeke'e left on Kaua'i. Saaral wants you to know that the akikiki have pinkish legs and feet and even their beak is pink. Armando says that the 'elepaio eats insects from old koa trees. Breeani wants you to know that the 'apapane's colors range from grayish brown to yellow-brown in color. Dante says that the predators to the akeke'e are rats, owls, cats, and barn owls, too. Mehana wants you to know that 'elepaios are known for their singing because it is so beautiful. Owen says, "Did you know that the akikiki bird pokes around tree bark looking for insects while calling softly to its friends." Mililani wants you to know that the 'apapane lays two to four eggs. Naviah says that the 'apapane can be found on all of the main Hawaiian islands. Sy wants you to know that the i'iwi are losing their habitats. Russden says that the i'iwi is a special bird because of its bright red feathers. Lehua wants you to know that the 'anianiau only weighs 9-10 grams. Lilah says that the 'akikiki is gray and white and not as bright and colorful as other native forest birds but equally important. Those were some facts that we learned in our research.

We want to share with you why these birds are important to us personally. Violet enjoys going up to Koke'e on Kaua'i and actually seeing these birds. She wants her

grandkids to be able to see them as well. Breeani wants the birds to stay alive so that she can go up to Koke'e and see them, even take a picture. She has never seen them yet and really wants to see them. Lilah wants these native birds to stay alive because they have pretty songs. Mehana doesn't want these birds to become extinct because they are so cute. Halia doesn't want them to go extinct because their songs and chirps are pretty. Naviah doesn't want these birds to go extinct because these birds are fabulous and they cannot be found anywhere else in the world. Anastasia doesn't want these birds to go extinct because the other half of her family live in Michigan and they have never seen birds like this before. She would like her family to see these birds one day. Lehua wants these birds to survive because they are so important to our forests up in Koke'e. Violet also doesn't want them to go extinct because they are special to our island of Kaua'i.

Please use your voice to help suppress the invasive mosquito population. Please tell your colleagues as well. Mahalo nui loa!

Sincerely,
Auntie Elizabeth Sancho and Hui Liko, the 4th Grade
Kanuikapono Public Charter School
Anahola, Kaua'i, Hawai'i

From:	Andonis Kapsalis
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 8:33:56 AM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

From: ï»¿Fred Karlson
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Mosquito Pesticide on Maui
Date: Monday, March 20, 2023 4:06:41 AM

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Fred Karlson

Aloha mai kakou,

My name is Mele Ana Kastner. I am a conservation worker on the island of O‘ahu. I am submitting written testimony in support of the suppression of invasive mosquito populations to reduce transmission of avian malaria to threatened and endangered forest birds on East Maui.

The conservation community has given Hawai‘i the title of “extinction capital of the world.” Day in and day out, hundreds of dedicated workers on these islands hike into our forests, climb our mountains, trudge through marshes and and comb our beaches in order to protect our precious ecosystems. Our native species, plant and animal alike, are our islands‘ treasured heirlooms. Our birds hold a special place in our islands. They represent hundreds of thousands of years of evolution and diversification. We have pollinators and seed spreaders, fly-catchers and soaring hunters. Throughout our shared history with our native birds, they have guided us, inspired us and captured our imaginations. The live forever in our mo‘olelo and our mele.

Though immortal in our memory, in our reality our forest birds are in grave peril. Invasive species and habitat loss have decimated our bird populations across the island chain. Mosquitoes and the diseases they carry will be the final nail in the proverbial coffin should they continue unchecked. Mosquitoes were accidentally introduced to the islands in the early 1800s when mosquito larva-infested water was dumped into a stream in Maui off a merchant ship. Since that day, these invasive and prolific insects have run wild, extending their range deep into our forests. Hawaiian exosystems did not evolve in the presence of mosquitoes; none of our endemic birds or insects prey upon them at any stage of their life cycle. As temperatures continue to rise with climate change, mosquitoes will be able to reach higher into the mountains where our forest birds take refuge. Our birds, none of whom have any natural immunity against avian malaria, are completely at the mercy of these invaders unless we act now. At this moment we have a carefully researched and proven-effect means to control the mosquito population and protect our birds. By introducing male mosquitoes inoculated with *Wolbachia*, we can protect our forest bird populations by reducing mosquito distribution and slowly reducing their population.

Some birds only live in our songs and stories. So many birdsongs have been lost due to mosquito-borne illnesses. Will we let the kiwikiu, the ‘alauhio, the ‘i‘iwi, and all the other honeycreepers and fly-catchers we have left disappear without giving them a fighting chance? Let‘s work together so that in eight generations our descendants can still hear the buzz of an ‘amakihi or see the bright crimson flash of an ‘apapane. Let‘s choose to save our birds.

From: Caitlin Kawaiaea
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Item C-2
Date: Wednesday, March 22, 2023 7:55:15 PM

Aloha,

I hope this email finds you in good spirits. I want to send my testimony to consider the impacts of your committed decisions.

I personally worked on the Kipahulu mosquito monitoring project and we've monitored for mosquito populations that transmit avian malaria. We confirmed presence of mosquitoes larva and adult mosquitoes in the same location as our east Hawaii forest birds.

And traveling between the two locations we surveyed there were significantly less forest birds where there were a larger presence of culex mosquitoes. Our forest birds are critical to the health and existence of our remaining native forests.

I hope you keep my words in mind when determining your next course of action.

Me ke aloha,
Kili Kawaiaea

From: Erika K
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda item C-2
Date: Tuesday, March 21, 2023 9:11:44 PM

Aloha,

I support the use of IIT to save our native forest birds. Avian malaria has decimated our native forest bird populations, and critically endangered birds like the kiwikiu and ʻākohekohe are drawing ever nearer to extinction. Wolbachia is a sage method to control mosquitoes on a landscape-level, and could mean the difference between seeing these species go extinct in our lifetime. These manu hold both ecological and cultural significance, and their loss would negatively impact both the forests who need them and the people who love them. I urge you to please consider supporting this initiative while we still have the opportunity to prevent more extinctions.

Mahalo,
Erika Kekiwi

From:	Mary Lu Kelley
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Please approve the Final Environmental Assessment (EA) to save our native forest birds
Date:	Monday, March 20, 2023 10:58:40 PM
Importance:	High

Aloha.

Extinction is forever. Hawaii has lost enough of its native forest birds, please support this way to save them!

Will we look back at this point in our history, and be able to say that we stepped up to the challenge and saved
Hawai‘i’s honeycreepers through swift, scientifically informed action.

Please do the right thing. Approve the Final Environmental Assessment (EA) titled "Suppression of Invasive Mosquito
Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui.”

Thank you,
Mary Lu Kelley
Kapa’a, HI

From: Naia Kelly
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Introducing modified mosquitos to Hawaii
Date: Wednesday, March 22, 2023 12:14:05 PM

To Whom It may Concern;

I am a resident of Maui and considering the absolute train wreck of a situation we find ourselves in with regards to what is being sprayed on us by Bayer/Monsanto, Mahi Pono and others on our islands already, I cannot see any sense in introducing another foreign, relatively untested in the environment species.

This concept has been unsuccessful in FL and Brazil and is making the mosquitos in some areas harder to kill. How about we reduce the feral cat population and maybe our birds and bats will rebound instead of putting another GMO into the mix?

Frankly we literally are sick to death from being a petri dish for the world's big Agra and others. NO MORE MESSING WITH NATURE IN HAWAII.

Introducing mongoose didn't do a thing to eliminate the rats because nobody did their homework. Let these untested, potentially harmful experimental solutions be tried elsewhere.

Mahalo,

Naia Kelly
208 Mauna Pl
Kula 96790

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Leka Kākoʻo 2 (BLNR) - Kamaehu Keo
Date: Wednesday, March 22, 2023 8:54:22 AM
Attachments: Leka Kākoʻo 2 (BLNR) - Kamaehu Keo

A design titled "Leka Kākoʻo 2 (BLNR) - Kamaehu Keo" was shared with you by 4291800491@k12.hi.us.

3/20/23

Waipunalau e BLNR,

ʻO Kamaehu Keo koʻu inoa. He 10 oʻu makahiki. Noho wau ma Lahaina. Hele wau i Ke Kula Kaiapuni ʻo Nāhiʻenaʻena. Aia wau ma ka papa 5 me Kumu Kaunaʻoa. Aʻo ʻo Kumu Kaunaʻoa iā mākou e pili ana i nā manu Hawaiʻi. Aia koʻu kula ma Lahaina.

Ua hana mākou i kekahi pāhana me nā manu a ʻo kaʻu manu ka ʻAlalā. Aia he 120 ʻAlalā i koe. Ua ʻike wau i nā ʻAlalā ma ka Maui Bird Conservation Center ma Makawao! A ua ʻike wau i nā ʻĀkikiki, nā ʻAlalā, nā Palila, a me nā Kiwikiu! He kiuke loa nā manu.

Kākoʻo wau iā ʻoukou e hoʻomaka i kēia pāhana wolbachia no ka mea inā hana ʻoukou i ka wolbachia, e ola ana nā manu. A inā nahu kekahi makika i kekahi manu, make lākou i 9 lā. A inā make nā manu he nui e halapohe ana lākou. A inā halapohe lākou e kaumaha ana mākou no ka mea aʻohe manu. Inā aʻohe manu aʻohe kumu lāʻau, a pono mākou i nā kumu lāʻau. A inā aʻohe manu aʻohe ʻai. No laila, kākoʻo wau iā ʻoukou e hoʻomaka me ka pāhana wolbachia.

Me ke aloha,

Kamaehu Keo

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From:	Sylvia Hamilton Kerr
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] In Opposition to the Approval of the Final Environmental Assessment for the Mosquito Release Plan.
Date:	Wednesday, March 22, 2023 4:00:48 PM

To Whom it May Concern:

I am vehemently opposed to the release of mosquitoes in our island home on many levels.

I cannot believe that after so many disasters in the history of Hawaii, when various species have been imported, creating massive and untold problems here, anyone would still think this idea is remotely worthy of being considered.

How many disasters have we experienced in the past, trying similar idiotic ideas, only to find out that the experiment was ill considered? Countless.

Hawaii is traditionally Hawaiian land. It was stolen by force from it's rightful people. Is the Hawaiian Nation even being consulted as to how they feel about another invasive species being introduced? I would bet they are not.

I suspect that the people who have come up with this idiocy have something to gain by implementing it. And again, the people of Hawaii will be left to deal with the potentially disastrous consequences.

The consequences of this science experiment are utterly unknown. And the consequences of the consequences, even more so.

How do we know that we won't have super harmful health outcomes to humans, animals, birds and other life forms?

These health outcomes could be life long and affect not only the individuals who are made sick but also their care givers.

STOP playing God. It never ends well.

From: Christiane Keyhani
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Birds Not Mosquitoes
Date: Saturday, March 18, 2023 11:55:01 PM

Aloha,

My name is Christiane Keyhani, I was born and raised on Maui. I am in support of birds not mosquitoes. We have lost more than 77 species of bird in Hawaii and are the capital of endangered and extinct species. This needs to come to a stop. After these incredible natives species are gone it's over. We need to take action to save our native birds now. Mosquitoes in Hawaii are introduced, invasive, and the main threat facing our birds. Now that we have the science to control the mosquito population, it's time to get rid of them, before it's too late for an our vulnerable and irreplaceable native birds. It's our kuleana to protect these bird. Please.

Mahalo,
Christiane

From: Mele Khalsa
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] testimony in support of item C2
Date: Thursday, March 23, 2023 7:30:57 AM

I **SUPPORT** this initiative to save native birds from extinction. I believe we have a kuleana to protect the creatures around us from the impacts that we humans have caused by unintentionally bringing invasive species to these islands. Mosquitoes are invasive and they have no place here in Hawai'i. In my lifetime I have watched the manu nahele become more and more rare. When I was a keiki I remember walking through the native forests seeing and hearing beautiful native birds all around. Now the forests are quiet, the glimpses of the birds are less frequent. I don't want to see more of these special creatures go extinct in my lifetime, so that is why I **SUPPORT** this initiative.

I also **TRUST** that this project is **SAFE**. This kind of mosquito release has happened many times in many places to suppress human diseases. I am filled with **HOPE** that this technology can be used to save our birds. I **TRUST** that this is **SAFE, EFFECTIVE**, and has gone through all the necessary regulatory steps. Let's not delay this any further by demanding an unnecessary EIS.

Mahalo,

Mele Khalsa

From:	Madeliefste M
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 9:48:48 AM

To whom it may concern:

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”

We are opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

We are opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **We demand an Environmental Impact Statement (EIS).**

Ilse Menger/Taur Kiggins
Paia, HI 96779

Virus-free.www.avast.com

From: Lumielk
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR meeting
Date: Monday, March 20, 2023 12:08:44 PM

Sirs:

As a Kama'aina on O'ahu, I am very concerned that this project has gone so far as to actually seem like a
reality to you. It is completely devoid of consideration for all life forms in these islands and is being pushed
forward without a Final Environmental Assessment.

I wish to record my comment on agenda C-2 at your next BLNR Meeting, 3/24/23, 9:15am to vote on Agenda Item C-2.
I am strongly and unequivocally opposed to the approval of this mosquito release plan.

Furthermore, I call for an Environmental Impact Statement that looks **thoroughly** into horizontal and vertical impacts
on both avian and human populations.

Wishing you the good judgement and conscience to do the right thing,

Lumiel Kim
lumielk@protonmail.com

Sent with Proton Mail secure email.

From:	Rachel Kingsley
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Request for Approval of Final EA and Support of Proposed Actions to Suppress Non-native Mosquito Populations
Date:	Thursday, March 23, 2023 8:50:53 AM

Aloha,
I am writing today in SUPPORT of Agenda Item C-2, the proposed actions to suppress non-native mosquito populations, and request the approval of the final environmental assessment and authorization for the chairperson to issue a finding of no significant impact for the "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui."
I believe these proposed conservation actions are needed, safe, effective, and provide a glimmer of hope for our native forest bird species that are suffering. We have known that avian malaria has been a problem for our native birds for decades. Until now we have not had the opportunity to use a tool that could save them like the Incompatible Insect Technique. This technique has been used around the world for human purposes. It has been very well-researched and is known to be effective. I strongly believe that this is our chance to help the birds now when they need it the most. I believe that the Environmental Assessment has provided a well-thought-out plan to help save the birds and addressed concerns that have been submitted. We need to act and we need to do it now. I ask you to please SUPPORT agenda item C-2 and approve the final environmental assessment and authorize the Chairperson to issue a finding of no significant impact.
Mahalo nui,
Rachel Kingsley

--
Rachel Kingsley
Hawaiian Forest Bird Outreach and Education Associate
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 Cell Phone: (808)348-7898
alalaproject.org mauiforestbirds.org

From: Ulu Knecht
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Please approve mosquito Wolbachia birth control
Date: Thursday, March 23, 2023 1:35:50 AM

Dear Members of the Board of Land and Natural Resources,

I am writing in support of Agenda Item C-2 on the proposed use of the Wolbachia Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian birds.

Mahalo,

Uluwehi Knecht

From: joshdkramer@yahoo.com
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Request to APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Tuesday, March 21, 2023 5:14:02 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Tehcnique (IIT) Environmenatal Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

As someone who worked with native Hawaiian avian species for 11 years on the Maui, the Big Island, and Kauai, I have a strong understanding of the state of the impact of avian malaria on endemic hawaiian avian species. Avian malaria and the invasive mosquitoes who carry the disease are the greatest threat to the survival of hawaiian forest birds of all status levels. While many groups are making dramatic impacts on creating more pristine habitat for the birds to survive, the forests will not be safe if they have mosquitoes spreading avian malaria.

Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control and has been used successfully in oher parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment as supported by decades of peer-reviewed science. Preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for opening the opportunity to provide testimony,
Josh Kramer

Former Facility Supervisor at Maui Bird Conservation Center

From: Cody Lane
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C-2 Testimony
Date: Wednesday, March 22, 2023 7:21:40 AM

Hello BLNR members,

I am writing to you to express my utmost support for the East Maui Mosquito Suppression Environmental Assessment and for the board to authorize a FONSI. This will be a crucial step in moving forward with this effort to save several endangered honey creepers from extinction.

Best regards,
Cody Lane

From: AnneMarie LaRosa
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL]
Date: Wednesday, March 22, 2023 6:05:38 PM

Aloha, I have been involved in invasive plant control and biological control of pests in Hawaii for over 40 years. I believe in the work that is, and has been done. These efforts are carefully researched, planned and executed. The decimation of our native forest birds is a tragedy. I remember seeing 'i'iwi regularly in my yard in Volcano in the 1980"s. Now, they are so rare. OUr ecosystems are so fragile and, unfortunately, human interventions are a necessary part of responsible resource management.

I am writing to say that I fully support DLNR's proposal to prevent extinction of native forest birds, some of which are close to extinction, by using mosquito birth control, or Incompatible Insect Technique (IIT), to suppress mosquito populations.

I am confident in the scientific work, the EA and the conservation organizations involved in this project and I strongly encourage the BLNR to support and help to execute this project. Specifically I support agenda item C-2 and encourage BLNR to approve the EA.

Thank you for considering this project. I hope you will find it in your hearts and minds to approve it.

Anne Marie LaRosa
Volcano Hawaii

From:	Trevor Latorre
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Support Final EA for Suppression of Invasive Mosquitoes
Date:	Wednesday, March 22, 2023 9:52:31 AM

Aloha mai,

O au o Trevor La Torre. No Kaloko uka ma Kona mai au. He mahi maile a kahu holoholona.

I am writing to express my support for the final EA and hope the BLNR acts swiftly to address the decline in our native bird population. Because of the elevation of my farm, I live in a native forest dominated by ohia. A large part of my work revolves around managing this forest for invasive species so that my forestry crop (maile) can thrive and be accessible to those who need. Iiwi, amakihi, apapane, and io are the primary pollinators and seed dispersers of this forest. Should their decline be further allowed, the economic impact to my ohana would be detrimental and would likely result in a reduction of maile supply for the lei market, which would further increase the already high cost for lei maile. Our elected and appointed officials love to wear lei maile at every occasion, regardless of whether it's appropriate or if their work directly relates to enhancing our native forests. They would very likely support initiatives that would increase the maile supply. Protecting our native birds is one such action.

Ke aloha nui
Trevor

From: Katherine Lauck
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Written testimony re: Agenda Item C-2
Date: Saturday, March 18, 2023 3:30:15 PM

Dear Board of Land and Natural Resources,

I am writing in **SUPPORT of Agenda Item C-2**. I worked for the Kauai Forest Birds Recovery Project for two seasons as they worked to establish captive breeding populations of 'Akikiki and 'Akeke'e and agree that the science shows that Wolbachia-based mosquito birth control methods are the last, best hope for the remaining native honeycreepers of Kauai and Maui. Mosquitos do not belong on any of the Hawaiian islands, and the Wolbachia technique will reduce their numbers significantly without pesticide. I hope you **SUPPORT C-2** and move with all speed to reduce/remove mosquitoes from Kauai and Maui.

Best,
Katherine Lauck

--
Katherine (Katie) Lauck
they

PhD student
Karp Lab, UC Davis
kslauck@ucdavis.edu

My working day may not be your working day. Please do not feel obligated to respond to this email outside of your normal working hours.

From:	Tyler Lausten
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Maui Forest Birds
Date:	Wednesday, March 22, 2023 7:16:02 PM

Please **consider approval** of the Final Environmental Assessment (EA) titled"Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui."

I grew up on Maui but have been absent for ten years. I need to see these birds!!! Please help save them for all!

Tyler Lausten

--

Tyler Lausten
TL Surf
(808)268-3579

From:	Nicole Busto
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Sunday, March 19, 2023 8:34:29 PM

To Whom it May Concern,

I'm strongly opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui.
This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI).
The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Sincerely,
Nicole LeClaire

Maui Nutritional Therapy
Nicole LeClaire NTP, CGP
808-463-7783

From:	Marlies Lee
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] No bio pesticides mosquitoes
Date:	Monday, March 20, 2023 9:59:31 AM

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Not again, no, we will not subject our islands to chemical experiments!

Mahalo
Marlies Lee

Sent from my iPhone

From: Marion Lee
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Environmental Impact Statement (EIS)
Date: Wednesday, March 22, 2023 11:21:07 AM

We the people of every island of Hawaii demand an EIS before you release these millions of mosquitoes which also feed on animal & human blood. It may very well carry toxic viruses which would sicken and even kill people. Please do an EIS before you even release the mosquitoes this Friday. That's very irresponsible of your State Department if you go ahead.
If Hawaii human tragedy occurs, your Agency will be subject to a large class action lawsuit. And the death blood of many will be on your hands!
Sincerely,
A very concerned citizen.

Sent from my iPhone

Nene Research and Conservation

Nene.org

Mar 20, 2023

Aloha mai kākou, my name is Jordan Lerma. I was born in Hilo and raised in Keaau. I attended Kamehameha Schools and graduated from St. Mary's College of California with a degree in Public Finance and Economics. For the past six years, I have been working as a field biologist at Cascadia Research Collective, studying native species in and around Hawai‘i. Today, I offer my testimony in strong support of Agenda Item C2.

Honorable Chairperson Chang and members of the Board of Land and Natural Resources, you are entrusted with the responsibility of approving a novel approach to combat one of the gravest threats facing Hawai‘i's forest birds, particularly the endangered Hawaiian honeycreepers. These unique birds possess immense cultural and ecological value, as they play a vital role in pollinating native species like ‘ōhi‘a. Their extinction would not only disrupt our fragile ecosystem but also deprive future generations of the chance to form connections with these extraordinary creatures.

I have no doubt that this committee has already examined testimonies and data from experts familiar with the IIT process and are aware of its success in other parts of the world.

The more pressing concern is our willingness to rely on science and data when making crucial decisions. It is disheartening that the burden lies on the same scientists who advocate for these solutions, as they also bear witness to the extinction of these native species. These committed professionals work diligently, setting traps, reconstructing predator fences, banding birds, only to face criticism as forest bird populations continue to decline.

While there is no guaranteed solution, we must establish the precedent that the process of science—learning, measuring, and experimenting—is the only way to adapt to these threats. Inaction and the failure to utilize available tools will only accelerate the extinction of native species that are not only essential to our islands' biodiversity but also deeply connected to our cultural identity.

This is not to say that we should dismiss the concerns of community members who passionately oppose this action. Nonetheless, we must assess the data and distinguish it from misinformation that fosters fear and apprehension. We must base our decisions on the pursuit of truth inherent in scientific inquiry.

I implore you to listen to the science and data and set a precedent that the State can take the necessary actions to address this crisis. By doing so, we can safeguard our islands' invaluable biodiversity and preserve the cultural heritage that these native species represent for generations to come. Together, let us take a stand against extinction, embrace innovative solutions, and protect the legacy of Hawai‘i's unique and cherished forest birds.

Mahalo nui for your time and consideration.

Best Regards,
Jordan Lerma

From: Emily Leucht
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for in Support of Agenda Item C-2
Date: Thursday, March 23, 2023 8:07:02 AM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

My name is Emily Leucht and I SUPPORT, Agenda Item C-2, DLNR-DOFAW's request for Board approval of the submitted Final EA and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI).

I have worked in native species education and forest restoration for over ten years. In that time I have come to know many of these honeycreeper species well enough to know them by call. I have also watched as some of their populations have plummeted. Avian malaria, which is transmitted by the southern house mosquito, is a driving pressure for the decline in population of these unique birds. With climate change less and less of our upland forests will be sanctuaries away from these disease transmitting mosquitoes. Without swift action we could lose some of these birds by as early as 2027.

The Incompatible Insect Technique is the best chance we have to save our honeycreepers, so I urge you to approve the final EA with FONSI. This approach has been researched, developed and applied for improving public health for over 50 years without negative health or environmental impacts. In addition Wolbachia is a naturally occurring bacteria found in insects native to Hawai'i as well as the southern house mosquito. I believe in the work of the countless scientists in Hawai'i and across the globe that have put their time and research into ensuring the safety and effectiveness of this technique.

Without our swift action our forests will become that much quieter as more of our unique fauna go extinct. I urge you to do what you can to protect our native honeycreepers, so my mo'opuna and yours will be able to listen to these special birds for years to come.

Please SUPPORT agenda item C-2. Approve the Final Environmental Assessment and authorize the Chairperson to issue a Finding of No Significant Impact.

Thank you for taking the time to consider testimonies.

Me ke mahalo nui,

Emily Leucht

From: Tyler Lewis
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BioPesticide Mosquitos
Date: Wednesday, March 22, 2023 8:58:08 PM

Aloha Council,

One major upside to living in Maui Paradise is that we have very few pests and poisonous species.

What could be worse than more mosquitos buzzing around?

Imagine enjoying a nice hike in Makawao forest and having extra bugs try to bite you, or a sun bath at Iao, until you get a bunch of invasive mosquitos on you.

Aside from personal concern:

How will this affect Tourism?
Mosquitos especially have a bad reputation for carrying horrible diseases.
Now Tourists will be scared to travel here in case they get some extra mosquito bite.

This could profoundly affect our economy!

Please say No to extra bugs.
Please consider the impacts thoroughly,
Please No need RUSH IN to big choices.

More Mosquitos will make us all buggered out and pesky.
No Thanks.

I am opposed to agenda C-2 and kindly request that you terminate the possibility of more mosquitos and Maui at your earliest convenience.

Mahalo for your time Council,

-Tyler Lewis
Maui Resident 5 years

From: leslie lexier
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] biopesticide mosquito releases
Date: Tuesday, March 21, 2023 4:16:25 PM

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Signed,
Leslie Lexier BSN, RN

Sent from Mail for Windows

From: Tina Lia
To: DLNR.BLNR.Testimony
Cc: DLNR.CO.PublicDLNR
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Testimony Agenda Item C-2: Oppose
Date: Wednesday, March 22, 2023 11:21:23 PM
Attachments: 2023_0324_Testimony_Tina_Lia_Attachments.pdf

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

We're opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment[1] does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission[2,3,4], increased pathogen infection[5], evolutionary events[2], population replacement[6], or accidental release of females[6]. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria[5] and West Nile virus[7]. Scientific studies document these risks.

An Environmental Risk Assessment for this biopesticide has not been conducted by the EPA to determine the environmental, ecological, and human health risks; and the significant environmental consequences of the project have not been adequately studied. **This plan may actually cause the extinction of endangered native birds, and it could impact human health**.

Landscape level control of *Culex quinquefasciatus* mosquitoes using this Incompatible Insect Technique (IIT) has never been done before. Even with *Aedes* mosquitoes, the largest project area was 724 acres[8]. Federal documentation connected to this project confirms that "although used world-wide for human health, *Wolbachia* IIT is a novel tool for conservation purposes and its degree of efficacy in remote forest landscapes is unknown."[9] Additionally, the species planned for use in this project, *Culex quinquefasciatus*, has never been used for a stand-alone IIT field release.[8] It is inaccurate to state that *Wolbachia* IIT is being used for mosquito suppression globally. The majority of countries using *Wolbachia* mosquitoes through the World Mosquito Program[10] are using the method of population replacement, not suppression[11]. These are two entirely different techniques.

This project may have also been improperly segmented per HAR § 11-200-7[12] (replaced 2019). The revised rule, HAR § 11-200.1-10[13] – Multiple or phased actions, provides:

A group of actions shall be treated as a single action when:

(1) The component actions are phases or increments of a larger total program;

(2) An individual action is a necessary precedent to a larger action;

(3) An individual action represents a commitment to a larger action; or

(4) The actions in question are essentially identical and a single EA or EIS will adequately address the impacts of each individual action and those of the group of actions as a whole.

On June 17, 2022, Board of Land and Natural Resources Chairperson Suzanne D. Case signed an exemption notice for "Mosquito Control Research Using *Wolbachia*-based Incompatible Insect Technique."[14] The Final Environmental Assessment, dated March 24, 2023, states that the Department of Land and Natural Resources filed the exemption notice "to conduct limited import of male mosquitoes for preliminary transport trials and mark release recapture studies."[1]

The Hawaii Environmental Policy Act (HEPA) Citizen's Guide (2014)[15] states: "A proposed action must be described in its entirety and cannot be broken up into component parts, which if each is taken separately, may have minimal impact on the environment. Segmenting a project generally is forbidden." Because the project has been improperly segmented in this way, there have been no details or analysis of the preliminary trials or the mark release recapture studies. There has been no disclosure as to what type of mosquito is being transported, where the mosquitoes are being transported from, and whether or not the mosquitoes are being tested for pathogens prior to transport. We demand that all actions of the mosquito project – including trial imports, mark release recapture studies, and field releases – be addressed in one Environmental Impact Statement.

The Advisory Committee on Plants and Animals' recommendation to approve import and release of *Culex quinquefasciatus* mosquitoes[16] should be null and void due to the conflicts of interest of committee members pursuant to HRS 84-14[17]. The Ethics Guide for State Board and Commission Members[18] states that members must not take official action affecting a business in which they have "financial interest." "Financial interest" in a business includes "employment." Whether a business can be a government agency is unstated. The following members of the Advisory Committee on Plants and Animals unanimously voted (7/0) on June 9, 2022 to recommend approval of the import permit[16]:

- Darcy Oishi, Committee Chairperson, Hawaii Department of Agriculture (HDOA)
- Dr. Maria Haws, Professor of Aquaculture, Pacific Aquaculture & Coastal Research Center, University of Hawaii at Hilo
- Cynthia King, Entomologist, Division of Forestry & Wildlife, Department of Land & Natural Resources (DLNR), Ex Officio Member Designated Representative

- Gracelda Simmons, Environmental Management Program Manager, Hawaii Department of Health, Ex Officio Member Designated Representative

- Thomas Eisen, Planner, Environmental Review Program, Department of Business, Economic Development and Tourism, Ex Officio Member Designated Representative

- Joshua Fisher, Wildlife Biologist, U. S. Fish and Wildlife Service (USFWS)

- Dr. Samuel Ohu Gon III, Senior Scientist and Cultural Advisor, The Nature Conversancy – Hawaii (TNC)

Of the seven voting members' agencies, only those of Thomas Eisen and Darcy Oishi are not partner agencies in *Birds, Not Mosquitoes*. As employees of partner agencies, Dr. Maria Haws (University of Hawaii), Cynthia King (DLNR), Gracelda Simmons (Hawaii Department of Health), Joshua Fisher (USFWS), and Dr. Samuel Ohu Gon III (TNC) all have conflicts of interest.

Both Dr. Samuel Ohu Gon III[19] and Cynthia King[20] are also members of the *Birds, Not Mosquitoes* steering committee. The purpose of the steering committee, as stated in the National Fish and Wildlife Foundation Hawaii Conservation Business Plan[21], includes coordinating permits for this project. These are additional conflicts of interest, particularly for Dr. Samuel Ohu Gon III, who, with his vote, has taken official action affecting a business in which he has financial interest.

The Final Environmental Assessment (EA) does not address the concern of accidental pathogen introduction. The U.S. Department of the Interior Strategy for Preventing the Extinction of Hawaiian Forest Birds[9] confirms that The Nature Conservancy has contracted with mosquito lab Verily Life Sciences. There is no mention of this contract in the EA. No documented assurances have been made that Verily Life Sciences will be testing mosquitoes for human diseases or avian diseases to ensure that they are pathogen-free prior to shipping to Hawaii.

As this project involves the interstate transport of *Culex* mosquitoes, a known vector of poultry diseases, we are concerned about impacts to local poultry farms and egg production in Hawaii. Has the USDA inspected the Verily Life Sciences insectary? There is no mention in the EA of a USDA permit (e.g., OV VS 16-6 permit from APHIS) for the interstate transport of poultry pathogen vectors by a California shipper. The USDA Animal and Plant Health Inspection Service (APHIS)[22] states:

> "The Veterinary Services, Organisms and Vectors (OV) Permitting Unit regulates the importation into the United States, and interstate transportation, of organisms and vectors of **pathogenic diseases** of livestock and **poultry**.
>
> The Code of Federal Regulations, in 9 CFR, §122.2[23], mandates that '**no organisms or vectors shall be** imported into the United States or **transported from one State** or Territory or the District of Columbia **to another State** or

Territory or the District of Columbia **without a permit**.' "

Given that interstate transport of the vector (live *Culex)* is occurring from Maui to Verily Life Sciences' lab in South San Francisco, California[24], and those *Culex* may contain a highly contagious poultry pathogen, namely avian pox virus[25], this movement needs a federal permit. Additionally, the return trip from California to Hawaii[24] would require a federal permit. Lab mosquitoes are blood-fed from sources that are not identified in the EA, potentially including bird blood. These mosquitoes could be transporting avian pathogens back to Hawaii.

Even though male mosquitoes don't bite, male *Culex* mosquitoes are known to spread viruses to female mosquitoes through mating (e.g., St. Louis encephalitis virus[26]), as has been shown for dengue virus in *Aedes albopictus*[27].

The EA's assertion that released mosquitoes pose no risk to human health is based on unsound science. The 2010 article by Popovici et al.[28] cited in the EA has been discredited by the EPA. The EPA Human Studies Review Board met in 2018[29], and the following question was posed:

> "Is the research described in the published article 'Assessing key safety concerns of a *Wolbachia*-based strategy to control dengue transmission by Aedes mosquitoes' scientifically sound, providing reliable data for the purpose of contributing to a weight of evidence determination in EPA's assessment of the risks to human health associated with releasing *Wolbachia*-infected mosquitoes?"[30]

The Board's response states: "The Board concluded that the research described in the article by Popovici et al. was not scientifically sound and does not provide reliable data to contribute to a weight of evidence determination for assessment of human health risks due to release of *Wolbachia*-infected mosquitoes."[30]

The Hawaii Department of Agriculture has applied for an EPA Emergency Exemption[8] for use of the mosquitoes without going through regulatory safety processes. The EPA application is still under review, and the biopesticide mosquitoes have not been approved for emergency release. The Board of Land and Natural Resources cannot approve this Final Environmental Assessment and declare before the public that there is a Finding of No Significant Impact (FONSI) when there is still a possibility that the EPA will deny the Emergency Exemption due to safety concerns. This biopesticide cannot be approved for release when its safety is still under review by the EPA.

Additional concerns not adequately addressed in the Final Environmental Assessment: lack of adequate detail as required by HEPA[15]; failure to identify the *Wolbachia* strain planned for use in this project; failure to identify and describe the mark release recapture study as a proposed action; failure to adequately identify the mosquito packages planned for release into the environment; failure to adequately address the effects on the environment from the release of biodegradable packages with an unknown decay rate; failure to identify biosecurity protocols; failure to

adequately address viewscape impacts, noise disturbances to forest bird breeding and nesting, and significant environmental consequences, including impacts to the untrammeled, natural qualities of the wilderness character; failure to adequately address the potential negative impacts of introducing an invasive species to the islands; failure to identify the origin of biopesticide mosquitoes for this project as Palmyra Atoll[8]; failure to identify the origin of *Wolbachia* bacteria for the project as Kuala Lumpur in Malaysia[8]; failure to identify the strain of *Wolbachia* bacteria planned for import in connection with this project that does not exist on these islands[31,32]; failure to address the concerns of tropical disease and vector expert Dr. Lorrin Pang (private citizen) regarding the serious risks of this project[33]; failure to adequately study or address the impacts to endangered native Hawaiian hoary bats, native dragonflies, and endangered native damselflies; failure to study and address biopesticide wind drift; failure to adequately address Environmental Justice (human health impacts of this project have not been adequately studied, and the proposed action would impact ethnographic resources and traditional cultural practices); failure to conduct a feasibility study to provide a detailed analysis that considers all of the critical aspects of the proposed project in order to determine the likelihood of it succeeding; and failure to establish, under the precautionary principle, that the proposed activity will not result in significant harm.

Further, per HRS §171-4 (d)[34], BLNR Chair Dawn N.S. Chang and Board Member Vernon Char must recuse themselves from participating in any discussion or voting in this matter, given that they have clear conflicts of interest. Chang is employed by the DLNR[35], a lead agency in the mosquito project. Char is employed by a law firm[36] whose clients include The Nature Conservancy[37], another lead partner in the project.

Hawaii Unites has launched a petition to "Demand an Environmental Impact Statement for the Experimental Mosquito Release on Maui"[38] which has received more than 2,500 signatures. We have yet to receive a response from any of the decision makers.

We're opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. The subject action will have a significant effect. **We demand an Environmental Impact Statement (EIS).**

Mahalo,
Tina Lia
Founder and President
Hawaii Unites
HawaiiUnites.org

REFERENCES:

"Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian

Malaria to Threatened and Endangered Forest Birds on East Maui" (State of Hawaii Department of Land and Natural Resources, 3/24/23) https://dlnr.hawaii.gov/wp-content/uploads/2023/03/C-2-1.pdf

"*Wolbachia* infection in wild mosquitoes (Diptera: Culicidae): implications for transmission modes and host-endosymbiont associations in Singapore" – Huicong Ding, Huiqing Yeo, Nalini Puniamoorthy (BMC, 12/9/20) https://parasitesandvectors.biomedcentral.com/articles/10.1186/s13071-020-04466-8

"*Wolbachia* Horizontal Transmission Events in Ants: What Do We Know and What Can We Learn?" – Sarah J. A. Tolley, Peter Nonacs, Panagiotis Sapountzis (Frontiers in Microbiology, 3/6/19) https://www.frontiersin.org/articles/10.3389/fmicb.2019.00296/full

"The Intracellular Bacterium *Wolbachia* Uses Parasitoid Wasps as Phoretic Vectors for Efficient Horizontal Transmission" – Muhammad Z. Ahmed, Shao-Jian Li, Xia Xue, Xiang-Jie Yin, Shun-Xiang Ren, Francis M. Jiggins, Jaco M. Greeff, Bao-Li Qiu (National Center for Biotechnology Information, National Library of Medicine, 2/12/15) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4347858/

"*Wolbachia* Can Enhance *Plasmodium* Infection in Mosquitoes: Implications for Malaria Control?" – Grant L. Hughes, Ana Rivero, Jason L. Rasgon (PLOS Pathogens, 9/4/14) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4154766/

"*Wolbachia*-mediated sterility suppresses *Aedes aegypti* populations in the urban tropics" – The Project Wolbachia – Singapore Consortium, Ng Lee Ching (medRxiv, 6/17/21) https://www.medrxiv.org/content/10.1101/2021.06.16.21257922v1.full

"*Wolbachia* Enhances West Nile Virus (WNV) Infection in the Mosquito *Culex tarsalis*" – Brittany L. Dodson, Grant L. Hughes, Oluwatobi Paul, Amy C. Matacchiero, Laura D. Kramer, Jason L. Rasgon (PLOS Neglected Tropical Diseases, 7/10/14) https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0002965

HDOA EPA Application for Emergency Exemption https://hawaiiunites.org/wp-content/uploads/2023/02/EPA-HQ-OPP-2022-0896-0002_content.pdf https://www.regulations.gov/document/EPA-HQ-OPP-2022-0896-0002

U.S. Department of the Interior Strategy for Preventing the Extinction of Hawaiian Forest Birds https://www.fws.gov/sites/default/files/documents/DOI%20Strategy%20for%20Preventing%20the%20Extinction%20of%20Hawaiian%20Forest%20Birds%20%28508%29.pdf

World Mosquito Program: Global progress https://www.worldmosquitoprogram.org/en/global-progress

World Mosquito Program: How our method

compares https://www.worldmosquitoprogram.org/en/learn/how-our-method-compares

. HAR § 11-200-7 https://casetext.com/regulation/hawaii-administrative-rules/title-11-department-of-health/subtitle-1-general-departmental-provisions/chapter-200-environmental-impact-statement-rules-repealed/subchapter-5-applicability-repealed/section-11-200-7-multiple-or-phased-applicant-or-agency-actions-repealed

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. HDOA Request to Import and Establish Permit Conditions for Southern House Mosquito (6/28/22) https://hawaiiunites.org/wp-content/uploads/2023/02/2022_0628_HDOA_Request_to_Import_and_Establish_Permit_Conditions_for_Southern_House_Mosquito.pdf

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. Advisory Committee on Plants & Animals Meeting - June 9, 2022 https://www.youtube.com/watch?v=Wt_Jbygvek4

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. The Constructed Environment: 2023 Conference: Plenary Speakers: Sam Gon https://constructedenvironment.com/2023-conference/program/sam-gon

. Facebook: Birds, Not Mosquitoes: Get to know Birds, Not Mosquitoes (4/22/22) https://www.facebook.com/BirdsNotMosquitoes/photos/a.106335221571876/315991167272946/

. National Fish and Wildlife Foundation Hawaii Conservation Business Plan (3/2021) https://www.nfwf.org/sites/default/files/2021-09/HI%20Business%20Plan%20%28August%202021%29.pdf

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. 9 CFR, §122.2 https://www.ecfr.gov/current/title-9/chapter-I/subchapter-E/part-122

. Board of Land and Natural Resources Meeting

3/10/23 https://www.youtube.com/watch?v=u8oyjKaDTGg

5. Detection and molecular characterization of *Avipoxvirus* in *Culex* spp. (Culicidae) captured in domestic areas in Rio de Janeiro, Brazil – Carolina Soares van der Meer et al. (Nature, Scientific Reports, 8/5/22) https://www.nature.com/articles/s41598-022-17745-4

6. Venereal Transmission of St. Louis Encephalitis Virus by *Culex quinquefasciatus* Males (Diptera: Culicidae) – Donald A. Shroyer (Journal of Medical Entomology, 5/1990) https://academic.oup.com/jme/article-abstract/27/3/334/2220754?login=false

7. Sexual transmission of dengue viruses by Aedes albopictus – L. Rosen (NIH National Library of Medicine, 9/1987) https://pubmed.ncbi.nlm.nih.gov/3661831/

8. Assessing key safety concerns of a Wolbachia-based strategy to control dengue transmission by Aedes mosquitoes – Jean Popovici et al. (2010) https://www.epa.gov/sites/default/files/2018-04/documents/4g._popovici_article.pdf

9. April 24-26, 2018 Meeting of the Human Studies Review Board https://www.epa.gov/osa/april-24-26-2018-meeting-human-studies-review-board

10. April 24-26, 2018 EPA Human Studies Review Board Meeting Report https://www.epa.gov/sites/default/files/2018-07/documents/final_hsrb_report_from_april_2018.pdf

11. HDOA Request to Import Southern House Mosquitoes for Immediate Field Release (6/9/22) https://hdoa.hawaii.gov/wp-content/uploads/2018/05/DLNR-Culex-quinquefasciatus-PA-All-Docs.pdf

12. University of Hawaii at Mānoa Request to: (1) Determine if the Establishment of the Southern House Mosquito, Culex quinquefasciatus, a Vector of Avian Influenza in Hawaii, Constitutes an Ecological Disaster;…(4) Determine the Probable Impact on the Environment if the Southern House Mosquito, Culex quinquefasciatus, an Unlisted Insect, Inoculated with a Foreign Wolbachia Bacteria Species, is Accidently Released;… (6/8/21) https://hdoa.hawaii.gov/wp-content/uploads/2018/05/HDOA-Mosquito-Request-PA_Final-6.8.21.pdf

13. Wolbachia Mosquitoes in Hawaii: Unsettled Science (Part 2) (7/21/22) https://mailchi.mp/12fb7ffe5f31/saturday-song-circle-in-paia-12pm-2pm-15015381

14. Hawaii Revised Statutes HRS §171-4 https://www.capitol.hawaii.gov/hrscurrent/vol03_ch0121-0200d/HRS0171/HRS_0171-0004.htm

15. Dawn N.S. Chang Financial Disclosure filed

1/2/23 https://hawaiiethics.my.site.com/public/s/hsecm-fd-public/a0i6R00000Y0Yv4QAF/fd2023010909

5. Vernon Char Financial Disclosure filed 6/1/22 https://hawaiiethics.my.site.com/public/s/hsecm-fd-public/a0i6R00000TQdsNQAT/fd2022010431

7. Char Sakamoto Ishii Lum & Ching Attorneys at Law (Present and Former Clients: The Nature Conservancy) http://lawcsilc.com/Clients.html

8. Petition: Demand an Environmental Impact Statement for the Experimental Mosquito Release on Maui https://www.change.org/Maui_Mosquito_Experiment_EIS

SECTION 166.20(a)(2): DESCRIPTION OF PESTICIDE REQUESTED

- **Common Chemical Name (Active Ingredients):** *Wolbachia pipientis*, wAlbB (DQB strain)

- **Trade Name:** DQB Males
  EPA Reg. No.: Unregistered

- **Confidential Statement of Formula:** Attached to this submission

- **Formulation:**
  wAlbB contained in live adult male *Culex quinquefasciatus* mosquitoes (DQB strain) active ingredient < 0.3%*
  *percent (w/w) of adult male mosquitoes

- **Mosquito and Wolbachia source:**

The DQB line of mosquitoes was developed through transfection of *Wolbachia pipientis* wAlb*B* isolated from *Ae. albopictus* KLP strain mosquitoes originating from Kuala Lumpur, Malaysia into *Culex quinquefasciatus* Palmyra strain mosquitoes originating from Palmyra Atoll. Prior to transfection, the naturally occurring wPip infection was removed from the Palmyra strain through antibiotic treatment using tetracycline and rifampicin as described in Pike & Kingcombe 2009 following the feeding protocol outlined in Dobson and Rattanadechakul 2001. Methods for DQB line generation are substantively similar to those outlined in MRID 51788911 with non-significant changes to account for Culex egg morphology. The DQB line was not created using genetic modification and the mosquitoes are not genetically modified organisms.

Table 1. Taxonomic designation of the *Wolbachia* present in the DAB line of *Ae. aegypti.*

Kingdom	Bacteria
Phylum	Proteobacteria
Class	Alphaproteobacteria
Order	Rickettsiales
Family	Rickettsiaceae
Genus	*Wolbachia*
Species	Pipientis
Clade	Supergroup: B
Strain	DQB: (**D**ebug) (*Culex* ***q****uinquefasciatus*) (wAlb**B**) DQB contains

Within *Culex quinquefasciatus*, the strain of incompatible bacterium will be *Wolbachia wAlbA, Wolbachia wAlbB,* or *Wolbachia wPip4.* These *Wolbachia* bacterium are not present within the corresponding species of Hawaii's established mosquito population. The presence of this bacterium will make these males sexually incompatible with the wild, established female mosquitoes. Once imported, the male, sexually incompatible males will be released according to EPA and HDOA label directions to suppress the population of the established mosquito populations. Based on the prior use of this technology in California, Florida, and Kentucky, there are no data to suggest releases of these male mosquitoes to have a negative impact on agriculture, the environment, or public health and safety. Existing wild-type bacteria strain that may be imported is wPipV, which is already found on all of the main Hawaiian islands.

DISCUSSION:

1. Persons Responsible:

DLNR Chairperson, Suzanne Case
DOFAW Administrator, David Smith
DOFAW Entomologist, Cynthia King
Department of Land and Natural Resources – Oahu
1151 Punchbowl Street, Honolulu, HI 96813

DLNR-DOFAW, Hawaii Invertebrate Program Captive Propagation Facility - Oahu
779 Ulukahiki Street, Kailua, Honolulu, HI 96813, (808) 266-7989

DLNR Waimano Baseyard – Oahu
2680 Waimano Home Road, Pearl City, HI 96782, (808) 266-7989

Kaua'i Branch Manager, Sheri Mann, Division of Forestry & Wildlife, 3060 Eiwa Street Rm. 306, Lihue, HI 96766. (808) 274-3433

O'ahu Branch, Division of Forestry & Wildlife, 2135 Makiki Heights Drive, Honolulu, HI 96822. (808) 973-9778

Maui (& Moloka'i) Branch, Division of Forestry & Wildlife, 1955 Main Street, Room 301, Wailuku, HI 96793. (808) 984-8100

Hawai'i Branch, Division of Forestry & Wildlife, 19 E. Kawili Street, Hilo, HI 96720. (808) 974-4221

2. Locations and Safeguards:

All mosquitoes for import will originate from Hawaii biotypes collected from

- *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*.
- *Wolbachia wPip4* imported in *C. quinquefasciatus*. This strain does not currently exist in Hawaii. It naturally exists in parts of Europe, Asia, the Middle East, and Africa, and is bidirectionally incompatible with strain *wPip5*. Strain *wPip5* is the most common strain in *C. quinquefasciatus* in Hawaii (Atkinson, C. T., W. Watcher-Weatherwax, and D. A. LaPointe. (2016) Genetic diversity of *Wolbachia* endosymbionts in *C. quinquefasciatus* from Hawaii, Midway Atoll and American Samoa. Technical Report HCSU-074).

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. <u>Persons Responsible</u>:

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

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

DAVID Y. IGE
GOVERNOR OF
HAWAI'I

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STATE OF HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAI'I 96809

EXEMPTION NOTICE

Regarding the preparation of an environmental assessment under the authority of Chapter 343, HRS and Section 11-200.1-17, HAR

Project Title:	Mosquito Control Research Using *Wolbachia*-based Incompatible Insect Technique
Project Location:	Maui (2) 2-3-005:004: Waikamoi Preserve (2) 2-4-016:004: Waikamoi Preserve (2) 1-2-004:013: Hanawi Natural Area Reserve (2) 2-3-005:001: Haleakala National Park (2) 1-8-001:007: Haleakala National Park (2) 1-3-001:003: Haleakala National Park (2) 1-7-004:016: Haleakala National Park (2) 1-6-001:001: Haleakala National Park (2) 1-6-001:002: Haleakala National Park (2) 1-2-010:001: Haleakala National Park Kauai (4) 1-4-001:003: Alakai Wilderness Preserve (4) 1-4-001:013: Kokee State Park
Chapter 343 Trigger(s):	Use of State Funds and Lands
Project Description:	The main objective of this project is to initiate research to inform incompatible insect technique applications for the control of invasive *Culex quinquefasciatus* mosquitoes which are the primary vector of avian malaria. The disease threatens the survival of remaining endangered forest bird species where they persist in high elevation montane forest habitat on Maui and Kauai. Male mosquitoes which have been given an incompatible strain of *Wolbachia* bacteria are to be released on the landscape, and upon release those males will breed with wild female mosquitoes. As a result of those pairings, the wild female mosquitoes will lay eggs which will not hatch, and no offspring will be produced. When releases of incompatible male mosquitoes are completed consecutively, the approach results in the suppression of mosquito populations at a landscape-scale. If releases are halted, mosquito

	populations will gradually return to pre-release levels as wild female and male mosquitoes migrate back into the treated area from surrounding forest habitat. Initial research will contribute to EPA registration of male *Culex quinquefasciatus* mosquitoes with *Wolbachia* as a biopesticide, as well as determine the minimum number of male mosquitoes that must be released in each area to ensure population suppression. This project may be funded by Federal sources.
Consulted Parties:	U.S. Fish and Wildlife Service
Authorization:	November 13, 2015, Land Board submittal (C-6). Delegation of Authority to the Chairperson or their authorized representative to declare exempt from the preparation of an Environmental Assessment those Department actions which are included in the Department-wide exemption list when the Board of Land and Natural Resources has delegated the authority to conduct those actions.
Exemption Class & Description:	**Exemption Classes:** **General Exemption Type 5** *Basic data collection, research, experimental management, and resource and infrastructure testing and evaluation activities that do not result in a serious or major disturbance to an environmental resource.* PART 1 13. Research that the Department declares is designed specifically to monitor, conserve, or enhance native species or native species' habitat. 16. Research to identify, monitor, control, or eradicate introduced species. Date of Agency Exemption List: November 10, 2020.
Determination:	The Department of Land and Natural Resources declares that this project will likely have minimal or no significant impact on the environment and is therefore exempt from the preparation of an environmental assessment under the above exemption classes.

DLS Suzanne Q. Case Jun 17, 2022

Suzanne D. Case, Chairperson
Board of Land and Natural Resources

Date

Signature:

Email: david.g.smith@hawaii.gov

From: **Fretz, Scott** scott.fretz@hawaii.gov
Subject: RE: MRR Study: Makawao Forest Reserve
Date: February 9, 2023 at 2:30 PM
To: Tina Lia tinalia@live.com

SF

Aloha Ms. Lia:

Thank you for your follow up inquiry. You are correct that an exemption was filed for the MRR study. However, after further review and scheduling, it is our intention to carry out the MRR study as part of the actions described and analyzed in the EA. The MRR study will be done using IIT mosquitoes, as described in the EA.

Scott

_____
J. Scott Fretz, PhD
Maui Branch Manager
Hawaii Department of Land and Natural Resources
Division of Forestry and Wildlife
685 Haleakala Highway
Kahului, Hawaii 96732
Phone (808) 984-8107
Cell (808) 227-3403
FAX (808) 984-8114
email: Scott.Fretz@hawaii.gov

From: Tina Lia <tinalia@live.com>
Sent: Thursday, February 2, 2023 3:04 PM
To: Fretz, Scott <scott.fretz@hawaii.gov>
Subject: [EXTERNAL] MRR Study: Makawao Forest Reserve

Aloha Dr. Fretz,

Thank you for your message explaining that the DLNR does not intend to initiate the mark-release-recapture (MRR) study until the EA has received final approval. It had been my understanding that the MRR study was not part of the proposed action in the EA. It was not mentioned nor described as part of the proposed action. Rather, the EA states that "DLNR filed an **exemption notice** regarding the preparation of an environmental assessment under the authority of Chapter 343, Hawaii Revised Statutes (HRS) and Section 11-200.1-17. HAR, to conduct limited import of male mosquitoes for preliminary transport trials and **mark release recapture studies**."

When I asked about the MRR study at the virtual public meeting for the EA on January 5, 2023, Chris Warren said that the study would happen in the western project area. The project area map shows Makawao Forest Reserve to be the westernmost parcel.

Following is the question I posed and the response (26:25 marker):

Q: (Tina Lia) “Regarding the mark-release-recapture study mentioned in the environmental assessment, why is the study necessary, and when and where will it be occurring? Will incompatible mosquitoes be released as a part of that study?”

A: (Chris Warren) "Yeah, that's great. You know, the mark-release-recapture study is part of the initial field trials, and we would learn really critical things during those trials that would make sure that this method is as efficient as it possibly can be. And at the moment, **we are discussing not using IIT mosquitoes for this at all**. It would be, you

know, again only male mosquitoes released in a small area, likely in the **western portion of the project area** that is more readily accessible but still away from places that people access on a regular basis."

I found his answer concerning because the release of compatible male mosquitoes, rather than the incompatible ones, is something that is not mentioned or evaluated in the EA. Providing potential male mates could increase the mosquito population, which could have adverse impacts to forest birds. This is at odds with the EA which specifically states, "This project would release only male mosquitoes with a different strain of *Wolbachia* bacteria to that occurring in southern house mosquitoes in East Maui."

Could you please clarify which is the environmental review document that covers the mark-release-recapture study? Is it the EA exemption notice or the draft EA? The draft EA makes it seem that the exemption notice covers the MRR study, but your answer implies that the MRR study is covered by the EA. Also, the EA is only for the release of incompatible mosquitoes, whereas compatible mosquitoes are being discussed for release in the western project area as part of the MMR.

Thank you for taking the time to respond to these concerns.

Aloha,
Tina Lia
tinalia@live.com
(808) 298-6335

> On Feb 2, 2023, at 11:06 AM, Fretz, Scott <scott.fretz@hawaii.gov> wrote:
>
> Aloha Ms. Lia:
>
> Thank you for your inquiry. The actions proposed for the mark-release-recapture study are covered in the Environmental Assessment (EA) that was published on December 23, 2022. We do not intend to initiate the study until the EA has received final approval. Therefore, no decisions have been made regarding the Makawao Forest Reserve as a study site.
>
> Scott
>
> _____
> J. Scott Fretz, PhD
> Maui Branch Manager
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> Division of Forestry and Wildlife
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> email: Scott.Fretz@hawaii.gov
> ---
>
> **From:** Tina Lia <tinalia@live.com>
> **Sent:** Monday, January 30, 2023 1:39 PM
> **To:** Fretz, Scott <scott.fretz@hawaii.gov>
> **Subject:** [EXTERNAL] MRR Study: Makawao Forest Reserve

Aloha Mr. Fretz,

I'm writing inquire about the Mark-Release-Recapture (MRR) study for the State of Hawaii's multi-agency *Birds, Not Mosquitoes* project "Mosquito Control Research Using Wolbachia-based Incompatible Insect Technique." Can you confirm that the Makawao Forest Reserve is a release site for the MRR study? If so, have signs been posted notifying the public of the MRR study being conducted?

Mahalo,
Tina Lia
tinalia@live.com
(808) 298-6335

Parasites & Vectors

RESEARCH Open Access

Wolbachia infection in wild mosquitoes (Diptera: Culicidae): implications for transmission modes and host-endosymbiont associations in Singapore

Huicong Ding†, Huiqing Yeo† and Nalini Puniamoorthy*

Abstract

Background: *Wolbachia* are intracellular bacterial endosymbionts found in most insect lineages. In mosquitoes, the influence of these endosymbionts on host reproduction and arboviral transmission has spurred numerous studies aimed at using *Wolbachia* infection as a vector control technique. However, there are several knowledge gaps in the literature and little is known about natural *Wolbachia* infection across species, their transmission modes, or associations between various *Wolbachia* lineages and their hosts. This study aims to address these gaps by exploring mosquito-*Wolbachia* associations and their evolutionary implications.

Methods: We conducted tissue-specific polymerase chain reaction screening for *Wolbachia* infection in the leg, gut and reproductive tissues of wild mosquitoes from Singapore using the *Wolbachia* surface protein gene (*wsp)* molecular marker. Mosquito-*Wolbachia* associations were explored using three methods—tanglegram, distance-based, and event-based methods—and by inferred instances of vertical transmission and host shifts.

Results: Adult mosquitoes (271 specimens) representing 14 genera and 40 species were screened for *Wolbachia*. Overall, 21 species (51.2%) were found positive for *Wolbachia*, including five in the genus *Aedes* and five in the genus *Culex*. To our knowledge, *Wolbachia* infections have not been previously reported in seven of these 21 species: *Aedes* nr. *fumidus*, *Aedes annandalei*, *Uranotaenia obscura*, *Uranotaenia trilineata*, *Verrallina butleri*, *Verrallina* sp. and *Zeugnomyia gracilis*. *Wolbachia* were predominantly detected in the reproductive tissues, which is an indication of vertical transmission. However, *Wolbachia* infection rates varied widely within a mosquito host species. There was no clear signal of cophylogeny between the mosquito hosts and the 12 putative *Wolbachia* strains observed in this study. Host shift events were also observed.

Conclusions: Our results suggest that the mosquito-*Wolbachia* relationship is complex and that combinations of transmission modes and multiple evolutionary events likely explain the observed distribution of *Wolbachia* diversity across mosquito hosts. These findings have implications for a better understanding of the diversity and ecology of *Wolbachia* and for their utility as biocontrol agents.

Keywords: *Wolbachia*, *Wolbachia* surface protein gene, Reproductive endosymbiont, Tissue-specific polymerase chain reaction, Transmission modes, Host-endosymbiont association

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Background

Wolbachia are intracellular endosymbiotic bacteria that alter host reproduction [1]. They are widespread in arthropods, infecting a wide range of insect, crustacean, and nematode species [2, 3]. In some cases, *Wolbachia* exist in a mutualistic relationship with their hosts [4–6]. However, *Wolbachia* are most often recognised as reproductive manipulators that bias the sex ratio of the host offspring towards the production of more infected females [7, 8]. This reproductive manipulation is commonly achieved through four phenotypes—male killing [9], feminisation [10, 11], parthenogenesis [12, 13], and cytoplasmic incompatibility [14, 15]—which increase the endosymbiont's reproductive success [16]. Owing to their strong influence on host reproduction, an increasing amount of research is being dedicated to exploring the impacts of reproductive endosymbionts on host population dynamics and evolution [17, 18], especially in medically important insects such as mosquitoes. The promising use of *Wolbachia* to alter both mosquito reproduction [19] and arboviral transmission [20] has prompted the deployment of novel *Wolbachia*-infected mosquitoes for population replacement and suppression [21].

Several countries, including Singapore, have started to employ *Wolbachia* as biocontrol agents of mosquitoes by releasing infected mosquitoes [22–24]. However, the presence of naturally occurring endosymbionts in wild mosquito populations has not been adequately assessed. The release of mosquitoes artificially infected with *Wolbachia* might have a profound impact on closely interacting wild mosquito populations through various transmission modes. For instance, horizontal transmission of an introduced *Wolbachia* strain may result in manipulation of the reproductive biology of non-target species, which could potentially result in an unintentional population crash, opening up niches for other vector species [25]. Another possible effect of this type of biocontrol method is the increased likelihood of co-infections with other naturally occurring *Wolbachia* strains or other endosymbionts, such as *Cardinium*, *Rickettsia*, and *Spiroplasma*. These co-infections may result in a synergistic effect on mosquito host fitness and future transmission of endosymbionts [26–29]. Without a detailed characterisation of *Wolbachia* prevalence and diversity among wild mosquitoes, the ecological risk of releasing artificially infected mosquitoes might be overlooked. Therefore, bearing the precautionary principle in mind, it is important to investigate the natural occurrences of *Wolbachia*.

There is also a need to discern the main mode of infection transmission among mosquitoes. Although *Wolbachia* are mainly thought to be vertically transmitted [15, 30], there have been accounts of horizontal transmissions into wild populations through parasitism [31, 32], or through proximity to infected individuals [33]. *Wolbachia* may not be strictly localised in germline tissues, as they have also been detected in somatic tissues such as the gastrointestinal tract and haemolymph [34–36]. The detection of *Wolbachia* in the gastrointestinal tract suggests that they could be horizontally transmitted through uptake from the environment or host sharing [34, 37, 38], whereas their detection in non-gastrointestinal somatic tissues, such as those of jointed appendages, could indicate horizontal bacterial genome integration into the host genome [36]. Currently, detection of *Wolbachia* in mosquitoes is mostly achieved through conventional polymerase chain reaction (PCR) methods using DNA extracted from an entire individual or its abdomen [39–47]. This limits our ability to identify the site of endosymbiont infection within an individual (tissue tropism). Tissue-specific screening of *Wolbachia* is necessary to provide insights and infer the extent of vertical and horizontal transmission.

It has been proposed that host mitochondrial DNA (mtDNA) and *Wolbachia* are maternally co-transmitted within the cytoplasm [17, 48], which suggests a congruency between host mtDNA and *Wolbachia* phylogenies—a consequence of cytoplasmic hitchhiking driven by endosymbiont transmission [17]. In insect systems such as bedbugs where vertical transmission has been established to be the main mode of transmission, *Wolbachia* exhibit clear patterns of cophylogeny with their hosts, with few instances of host shifting or multiple infections within a single host species [49, 50]. In contrast, cophylogeny is not apparent among nematodes and bees, and numerous acquisitions of *Wolbachia* infections through horizontal transmission as well as losses have been shown in these diversified host lineages [51, 52]. The modes of *Wolbachia* transmission among mosquitoes have not been well established, nor has the extent of multiple infections within mosquito hosts or host shifting of these bacteria.

There is presently no comprehensive analysis of the evolutionary associations between *Wolbachia* and their mosquito host species. An understanding of host-endosymbiont associations will not only further our ability to discern the mode of transmission which influences *Wolbachia* diversity, but will also allow for an evaluation of *Wolbachia* host specificity, speciation, and their ability to establish in new hosts. All of this is key to understanding the diversity and ecology of *Wolbachia*, and their utility in biocontrol methods.

This study has three major research objectives. First, to examine the prevalence and diversity of *Wolbachia* among wild mosquitoes from Singapore. Second, to determine the tissue tropism of *Wolbachia* infection

in mosquitoes using a tissue-specific PCR screening method. Finally, to reconstruct the evolutionary associations between *Wolbachia* and their mosquito hosts to provide a basis for an understanding of host-endosymbiont evolution.

Methods

Adult mosquito collection and identification

Mosquito samples were collected from 12 localities across Singapore between March 2018 and November 2019 (Fig. 1a). Three methods were employed to collect the samples: CO_2-baited Centers for Disease Control and Prevention traps, sweep-netting using hand-held fan traps, and larval sampling [53]. For the latter, dipping was carried out at streams and ponds and pipettes were used to collect larvae from various microhabitats, including tree holes, plant axils, and artificial containers. Thereafter, the field-collected larvae were reared to adults in an incubator maintained at 26 °C and 70% relative humidity, under a 12:12-h (day:night) photoperiod. Larvae were fed with pulverised fish food (TetraMin Granules) daily. Mosquitoes were identified using relevant taxonomic keys and descriptions [54–59]. A subset of individuals from commonly sampled species was selected and preserved in phosphate-buffered saline solution at – 80 °C for subsequent dissection step.

Tissue-specific dissection

Tissue-specific dissection was carried out on each adult mosquito sample to isolate the leg, gut, and reproductive tissues (Fig. 1b–d). To prevent the contamination of tissues with bacteria on the external surface of the mosquito, the leg was removed first before isolating the gut and reproductive tissues. All dissection equipment and microscope slides were thoroughly wiped with 70% ethanol before commencing dissection of the next sample. Dissected tissues were individually placed into a 96-well plate on ice to prevent DNA degradation.

DNA extraction, PCR amplification, and sequencing

DNA extraction of each dissected tissue was performed using 7 µl of QuickExtract DNA Extraction Solution (Lucigen, Madison, USA) in a thermocycler (Eppendorf, Hamburg, Germany) with the following protocol: 65 °C for 18 min, followed by 98 °C for 2 min, ending with cooling on ice for at least 10 min. All dissected tissues were screened for *Wolbachia* infections following single-primer PCR protocols described by Martin et al. [26] with slight modifications to the cycle conditions. The *Wolbachia* surface protein gene (*wsp*) general primers, wsp81F (5′-TGGTCCAATAAGTGATGAAGAAAC TAGCT-3′) and wsp691R (5′-AAAAATTAAACGCTA CTCCAGCTTCTGCAC-3′), were used in this study [60]. In addition, a fragment of the cytochrome c oxidase subunit I (*cox*1) gene of the mosquito hosts was also amplified using primers LCO1498 (5′-GGTCAACAA ATCATAAAGATATTGG-3′) and HCO2198 (5′-TAA ACTTCAGGGTGACCAAAAAATCA-3′) [61]. This served to confirm host identity and acted as an internal control. We used DNA from known *Wolbachia*-infected *Nasonia* specimens as positive controls for this study.

All PCR procedures were performed in reaction mixtures consisting of 12.5 µl of GoTaq G2 Green Mastermix (Promega, Madison, USA), 1 µl of 1 mg ml^{-1} bovine

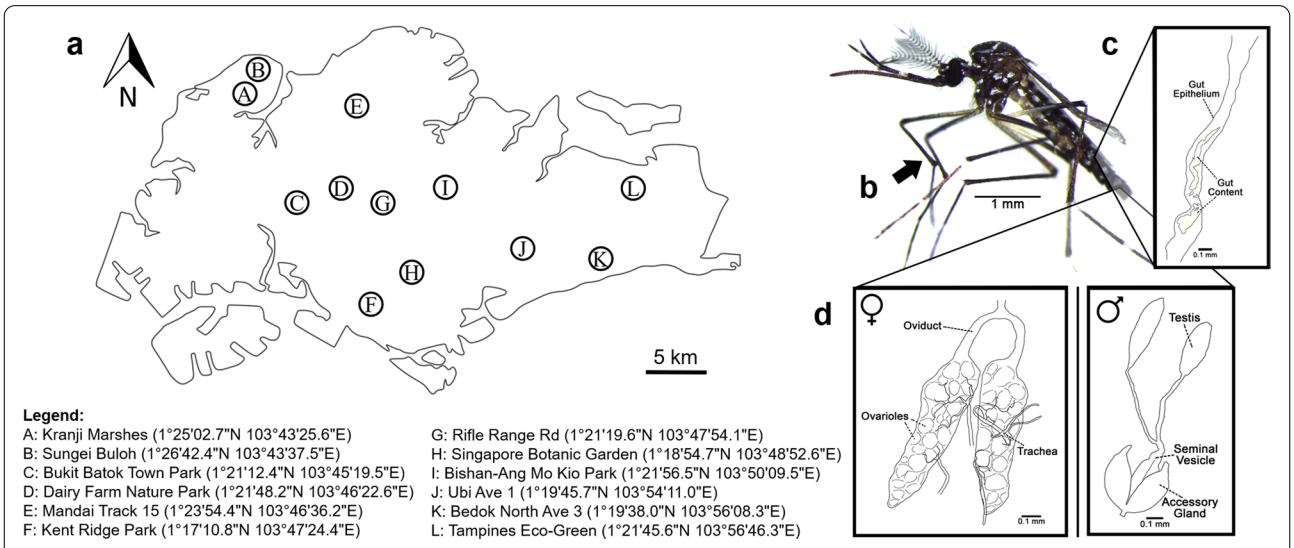

Fig. 1a–d Map of sampling sites and diagrammatic images of *Aedes aegypti* and its dissected tissues. **a** Various mosquito collection localities across Singapore and their respective coordinates, **b** mosquito leg, **c** gut, **d** female reproductive tissue (*left*) and male reproductive tissue (*right*)

serum albumin, 0.184 µl of 25 mM magnesium chloride, 1.5 µl of extracted DNA, and 1.5 µl each of 5 µM *wsp* forward and reverse primers for *Wolbachia* PCR screens or 1.0 µl each of 5 µM LCO1498 and HCO2198 primers for *cox*1 PCRs. Double-distilled water was used to top up the reaction mixture to a final volume of 25 µl. PCR amplification of positive and negative controls was also conducted simultaneously.

PCR conditions were as follow: 94 °C for 5 min, followed by 35 cycles of 95 °C for 30s, 55 °C for 45s, and 72 °C for 1 min, with a final elongation step of 72 °C for 10 min. Amplicons were separated by gel electrophoresis on 2% agarose gel stained with GelRed (Biotium, Fremont, USA) and visualised under a ultraviolet transilluminator (Syngene, Cambridge, UK). PCR products were purified using SureClean Plus (Bioline, London, UK) following the manufacturer's protocol. Samples were sequenced by First Base Laboratories (Axil Scientific, Singapore), using a 3730XL DNA Analyzer (Applied Biosystems, Waltham, USA). Obtained sequences were edited and aligned using Geneious Prime (version 2019.2.3) (https://geneious.com). Similarities with publicly available sequences were assessed using the Basic Local Alignment Search Tool (BLAST) [62].

Statistical analyses

To test if there were significant differences in *Wolbachia* infection across the different mosquito tissues, Cochran's Q-test was carried out. As a follow-up, McNemar's post hoc test was employed to identify the tissue pairs that differed significantly in infection. Individuals for which the internal control (*cox*1 gene) was not amplified successfully for any of the three dissected tissues were excluded from this statistical analysis. The effect of sex on host infection was also tested using binary logistics regression with sex as a categorical dependent variable and infection outcome as a binary independent variable. Logistic regression was conducted on a subset that only included species that had a roughly similar representation of both sexes, i.e. for every species included, the number of individuals of the less common sex was proportionally at least 60% of the number of individuals of the more common sex. This was to prevent a biased analysis due to a dataset with unequal representation of the sexes. Statistical significance was determined as $P < 0.05$. All statistical analyses were performed in R version 3.6.2 [63] with packages nonpar [64], rcompanion [65], and ISLR [66].

Sequence analyses

Multiple alignment of consensus sequences was carried out using the ClustalW algorithm with default settings (gap penalty = 15, gap extension penalty = 6.66) [67], in software MEGA X [68]. Mosquito *cox*1 sequences generated in this study were aligned with 61 reference *cox*1 barcodes of identified local mosquitoes from Chan et al. [53]. For *wsp* sequences, the generated sequences were aligned with 54 available *wsp* sequences of known *Wolbachia* strains obtained from GenBank [69]. Short sequence reads (< 500 base pairs) were excluded.

Neighbour-joining (NJ) phylogenetic trees for mosquito hosts and *Wolbachia* were reconstructed using the sequenced *cox*1 gene fragment and the *wsp* gene, respectively. *cox*1 sequences from previous publications were not included because a comparison of the genetic relationships between the hosts was not the aim of this research. Instead, 54 *wsp* sequences from GenBank were included in the construction of the *Wolbachia* NJ tree. The NJ tree reconstruction was performed with the Kimura two-parameter model as the nucleotide substitution model in MEGA X [68]. Internal gaps were treated as indels and terminal gaps as missing for *wsp* sequences. Bootstrap probabilities were estimated by generating 1000 bootstrap replicates. We designated two biting midge species, *Culicoides asiana* (KJ162955.1) and *Culicoides wadai* (KT352425.1), as outgroups for the host NJ tree construction. Due to the lack of an appropriate endosymbiont outgroup [51], the *Wolbachia* NJ tree was midpoint rooted.

When possible, *Wolbachia* strains were classified into supergroups and putative strains using 97% bootstrap probability as a threshold [60]. *Wolbachia* surface protein sequences that did not have 97% bootstrap support were evaluated on a case-by-case basis. For example, sequences which clustered closely together and had a relatively high support value (> 90%) were deemed as originating from the same putative strain.

Putative strains which were infectious to only one host species were categorized as 'specialists' and those which infected two or more hosts as 'generalists'. Then, the standardised phylogenetic host specificity (SPS) score of each generalist strain was calculated by adapting the method outlined by Poulin et al. [70] and Kembel et al. [71]. SPS measures the degree of phylogenetic relatedness among host species infected by the same endosymbiont strain. It also tests for significance by comparing it with null models generated with 999 replicates of random host-endosymbiont associations. A positive SPS value with a high *P*-value ($P > 0.95$) indicates a high degree of host flexibility where *Wolbachia* infect hosts which are phylogenetically even. A negative SPS value with low *P*-value ($P < 0.05$) suggests a low degree of host flexibility where the infected hosts are phylogenetically clustered together. SPS scores were calculated using R package picante [71].

Evolutionary analyses of the mosquito-*Wolbachia* relationship

Three distinct methods were used to explore the evolutionary associations between mosquito hosts and their *Wolbachia* endosymbionts. The analyses were carried out using pruned phylogenies where each species is represented by a single individual.

First, using the software TreeMap 3.0 [72], a tanglegram was created between host and endosymbiont NJ trees to visualise mosquito-*Wolbachia* associations. A tanglegram is useful as a pictorial representation of the interactions between two phylogenies [73]. TreeMap also seeks to minimise the entanglement between the two trees to provide a clearer visualisation of the phylogenetic relationship between host and endosymbiont [72].

Second, ParaFit Global test, a distance-based method, was employed to quantitatively estimate congruence between the host and endosymbiont phylogenetic trees by comparing genetic distances among infected host species and the *Wolbachia* strains [74]. The null hypothesis for this test states that the associations between host and endosymbiont trees are random, whereas the alternative hypothesis suggests that there are strong associations between hosts and parasites, which are indicated by phylogenetic distances. Significance was tested by comparing the observed associations between host and endosymbiont with randomised associations generated with 5000 permutations. The respective host-endosymbiont associations which contributed significantly to the ParaFit Global statistics were also identified by performing a Parafit Link test. ParaFit tests were performed with the Cailliez correction to correct for negative eigenvalues generated [75] using R package ape [76].

Third, an event-based analysis was performed in Jane 4.0 [77] to map out potential evolutionary events of the endosymbiont in relation to the host phylogeny [78]. Five evolutionary events were considered: co-speciation (host and endosymbiont speciate simultaneously), duplication (intra-host speciation), duplication with host shift (endosymbiont host shifts), loss (host speciates but endosymbiont fails to establish in one of the new lineages), failure to diverge (host speciates and endosymbiont remains in both lineages). As each event is expected to have differing likelihoods, default cost values were attached to each of the events. Jane 4.0 determined the best reconstruction of evolutionary events by minimising the overall cost. The following cost-scheme regime was used with 100 generations and a population size of 300: co-speciation = 0, duplication = 1, duplication with host shift = 2, loss = 1, and failure to diverge = 1 [79]. As a follow-up, random tip mapping (randomisation of host-endosymbiont associations) was carried out for 50 iterations, to determine if the overall cost of reconstruction was significantly lower than expected by chance. If 5% or fewer of the random solutions have costs lower than the reconstructed coevolution phylogeny, there is support for the coevolution of the hosts and endosymbionts through co-speciation.

Results

Prevalence of *Wolbachia* in wild-caught mosquitoes

A total of 271 adult mosquitoes, representing 40 species and 14 genera, were collected from 12 localities in Singapore (Fig. 1a). Overall, infection prevalence was moderate with 119 out of 271 (43.9%) individuals screening positive for *Wolbachia* (Table 1). In total, 21 (51.2%) species were positive for *Wolbachia*. According to our knowledge, *Wolbachia* infection in seven of these species is reported here for the first time (Table 1). *Wolbachia* were detected in all genera except for *Aedeomyia*, *Anopheles* and *Mimomyia* (i.e. 11 out of 14 genera; 78.6%). Five out of the seven *Aedes* species collected (71.4%) were positive for *Wolbachia*, while in the genus *Culex*, five out of 16 species (31.3%) were positive. Some of the screened species in the genera *Aedes* and *Culex* that were positive for *Wolbachia*, such as *Aedes albopictus* and *Culex quinquefasciatus*, are medically important vector species.

The infection rates varied across the mosquito species. Notably, there was variation in the percentage of infection between species that are epidemiologically related. For instance, *Wolbachia* infection was not detected in *Aedes aegypti*. However, infection was moderately high (56.8%) for *Aedes albopictus*. There was also a difference in the infection rate of two closely related species, *Culex pseudovishnui* (86.4%) and *Culex vishnui* (0%) [53].

Locality did not seem to play a role in the *Wolbachia* infection of mosquito hosts. Among species that have a wide range across Singapore, the percentage of infection was consistent in populations across different habitats. For example, the infection percentage was consistently high for *Cx. pseudovishnui*, while consistently low for *Malaya genurostris*. Based on our results, species identity was a better predictor of infection status than locality.

Based on a data subset containing 153 individuals (45.8% males) representing 12 mosquito species, sex was a significant explanatory variable, and there was a significantly lower infection prevalence in males than females (odds ratio 0.434; binary logistics regression: $Z = -2.48$, $df = 151$, $P = 0.013$).

Tissue tropism of *Wolbachia* infection in mosquitoes

Among the 159 successfully amplified *cox*1 sequences, *Wolbachia* infection was mainly observed in the reproductive tissues. Among the reproductive tissues of 159 dissected individuals, 42.1% ($n = 67$) were infected. Percentage infection was lower in the gut (5.7%, $n = 9$) and leg (3.1%, $n = 5$) tissues. The difference in

Table 1 Percentage infection of *Wolbachia* in 40 mosquito species collected from 12 Singapore localities

Mosquito species	Localities												Total	Infection (%)	Supergroup
	BN	BA	BB	DF	KR	KJ	M	RR	SBG	SBL	T	U			
Aedeomyia catastica	–	0/1	–	–	–	–	–	–	–	–	–	–	0/1	0.0	–
Aedes aegypti	0/1	–	–	–	–	–	–	–	–	–	–	0/13	0/14	0.0	–
Aedes albolineatus	–	–	–	–	–	–	0/3	–	–	–	–	–	0/3	0.0	–
Aedes albopictus	–	–	–	6/10	6/10	3/6	6/11	–	–	–	–	–	21/37	56.8	A, B
Aedes annandalei[a]	–	–	–	–	3/4	–	8/9	–	–	–	–	–	11/13	84.6	A
Aedes nr. *fumidus*[a]	–	–	–	–	–	–	–	–	–	6/10	–	–	6/10	60.0	A
Aedes gardnerii	–	–	–	–	–	–	1/1	–	–	–	–	–	1/1	100.0	A
Aedes malayensis	–	–	–	1/2	13/16	0/2	–	–	–	–	–	–	14/20	70.0	A
Anopheles barbirostris complex	–	–	–	0/2	–	–	0/2	–	–	–	–	–	0/4	0.0	–
Anopheles lesteri	–	–	–	–	–	0/2	–	–	–	–	–	–	0/2	0.0	–
Anopheles sinensis	–	0/12	–	–	–	–	–	–	–	–	–	–	0/12	0.0	–
Armigeres kesseli	–	–	–	–	3/3	–	–	–	–	–	–	–	3/3	100.0	B
Coquillettidia crassipes	–	–	–	2/2	6/7	4/4	–	–	–	–	–	–	12/13	92.3	B
Culex (*Lophoceramyia*) spp.[c]	–	–	–	–	0/1	0/2	1/9	–	–	–	0/2	–	1/14	7.1	B
Culex bitaeniorhynchus	–	–	–	–	0/1	–	–	–	–	–	–	–	0/1	0.0	–
Culex brevipalpis	–	–	–	0/1	–	–	0/2	–	–	–	–	–	0/3	0.0	–
Culex nigropunctatus	–	–	–	–	–	0/1	0/2	–	–	–	–	–	0/3	0.0	–
Culex pseudovishnui	–	–	–	–	11/12	–	4/4	–	3/5	1/1	–	–	19/22	86.4	B
Culex quinquefasciatus	–	5/8	–	–	–	–	–	–	–	–	–	–	5/8	62.5	B
Culex sitiens	–	–	–	–	–	–	–	–	–	2/4	–	–	2/4	50.0	B
Culex sp.	–	–	–	–	–	–	0/2	–	–	–	–	–	0/2	0.0	–
Culex tritaeniorhynchus	–	–	–	–	–	2/5	–	–	–	0/1	0/1	–	2/7	28.6	UC[b]
Culex vishnui	–	–	–	–	–	–	0/2	–	–	–	0/3	–	0/5	0.0	–
Malaya genurostris	–	–	2/4	–	0/1	4/13	–	–	0/1	–	–	–	6/19	31.6	B
Mansonia dives	–	–	–	–	–	–	0/2	–	–	–	–	–	0/2	0.0	–
Mansonia indiana	–	–	–	–	–	3/3	–	–	–	–	–	–	3/3	100.0	B
Mimomyia luzonensis	–	–	–	–	–	0/1	–	–	–	–	–	–	0/1	0.0	–
Tripteroides sp.	–	–	–	–	0/7	–	½	–	–	–	–	–	1/9	11.1	UC[b]
Uranotaenia obscura[a]	–	–	–	2/4	–	–	2/2	1/1	–	–	–	–	5/7	71.4	A
Uranotaenia sp.	–	–	–	1/2	–	–	–	–	–	–	–	–	1/2	50.0	A
Uranotaenia trilineata[a]	–	–	–	–	–	–	1/1	–	–	–	–	–	1/1	100.0	B
Verrallina butleri[a]	–	–	–	–	–	1/1	–	–	–	–	–	–	1/1	100.0	UC[b]
Verrallina sp.[a]	–	–	–	–	–	–	–	1/5	–	–	–	–	1/5	20.0	UC[b]
Zeugnomyia gracilis[a]	–	–	–	1/2	–	–	1/13	1/4	–	–	–	–	3/19	15.8	B
Total	0/1	5/21	2/4	13/25	42/62	17/40	25/67	3/10	3/6	9/16	0/6	0/13	119/271	43.9	

BN Bedok North Avenue 3, *BA* Bishan-Ang Mo Kio Park, *BB* Bukit Batok Town Park, *DF* Dairy Farm Nature Park, *KR* Kent Ridge Park, *KJ* Kranji Marshes, *M* Mandai Track 15, *RR* Rifle Range Road, *SBG* Singapore Botanic Garden, *SBL* Sungei-Buloh, *T* Tampines Eco-Green, *U* Ubi Avenue 1

[a] Species in which, according to our knowledge, *Wolbachia* infection has not been previously reported

[b] *Wolbachia* infections that were unclassified (*UC*) with respect to supergroup [60] because their DNA sequences were either too short (< 400 base pairs), or there were alignment issues during the phylogenetic analyses

[c] *Culex* (*Lophoceramyia*) comprises seven unique species, which were not identified here

percentage infection across the three dissected tissues was statistically significant (Cochran's Q-test: $Q = 109.5$, $df = 2$, $P < 0.0001$). The percentage of infection in the reproductive tissues was significantly higher than in the gut (McNemar's post hoc test: $P < 0.0001$) and leg tissues (McNemar's post hoc test: $P < 0.0001$), but the difference in percentage of infection between the gut and leg tissues was not significant (McNemar's post hoc test: $P = 1.0$). Notably, the amplicon size of *wsp* in the gut and leg tissues tended to be shorter than 400 base pairs.

Wolbachia diversity among mosquito fauna from Singapore

Following Zhou et al. [60], all *wsp* sequences obtained in this study can be broadly classified into A and B *Wolbachia* supergroups. Out of 21 infected species, six were infected with supergroup A, ten with supergroup B, and one species, *Ae. albopictus*, was infected with both supergroups (Fig. 2). Infection of the remaining four species (*Culex tritaeniorhynchus*, *Tripteroides* sp., *Verrallina butleri*, and *Verrallina* sp.) was unclassified due to short sequences (< 400 base pairs) or sequence alignment issues during sequences analyses. The analysed *wsp* sequences were also clustered into 12 putative strains: 'Wol 1' to 'Wol 12'. Four (Wol 1, Wol 2, Wol 3, and Wol 8) out of the 12 putative strains could be matched to previously typed strains [60, 80]. *Wolbachia* strains from this study are also closely related to those isolated from other insect groups (Fig. 2). For instance, Wol 9 and Wol 10 are closely related to the *Wolbachia* strains harboured by *Drosophila* spp. (bootstrap value > 99%).

Host specificity of *Wolbachia* strains

The degree of host specificity varied across the 12 putative strains. Seven out of the 12 strains (Wol 2, Wol 4, Wol 5, Wol 6, Wol 8, Wol 10, and Wol 12) were considered as specialists. These strains were host specific and were only detected in one host species each (Fig. 3). The remaining five strains were considered as generalists as they were found in more than one host. Amongst the generalists, Wol 3 was found in the highest number of host species, i.e. three, *Coquillettidia crassipes*, *Mansonia indiana*, and *Culex sitiens*. The SPS scores revealed that Wol 1 had the lowest degree of host flexibility (SPS test: $Z = -1.41$, $P = 0.049$). Wol 7 had the highest degree of host flexibility, but this was not statistically significant (SPS test: $Z = 0.07$, $P = 0.779$) (Table 2).

Evolutionary relationship between mosquitoes and *Wolbachia*

We recorded 18 counts of mosquito-*Wolbachia* associations in wild-caught mosquitoes from Singapore. A visualisation of these associations using a tanglegram showed patterns of broad associations (Fig. 3). For instance, the clade which consists of *Aedes* species was observed to be mostly associated with *Wolbachia* supergroup A. In contrast, other species, especially the clade representing various *Culex* species, had numerous associations with *Wolbachia* supergroup B.

The distance-based quantitative test showed that mosquito and *Wolbachia* phylogenies were weakly congruent at the global level (ParaFit Global test: ParaFit Global = 0.006, $P = 0.048$). Among the numerous

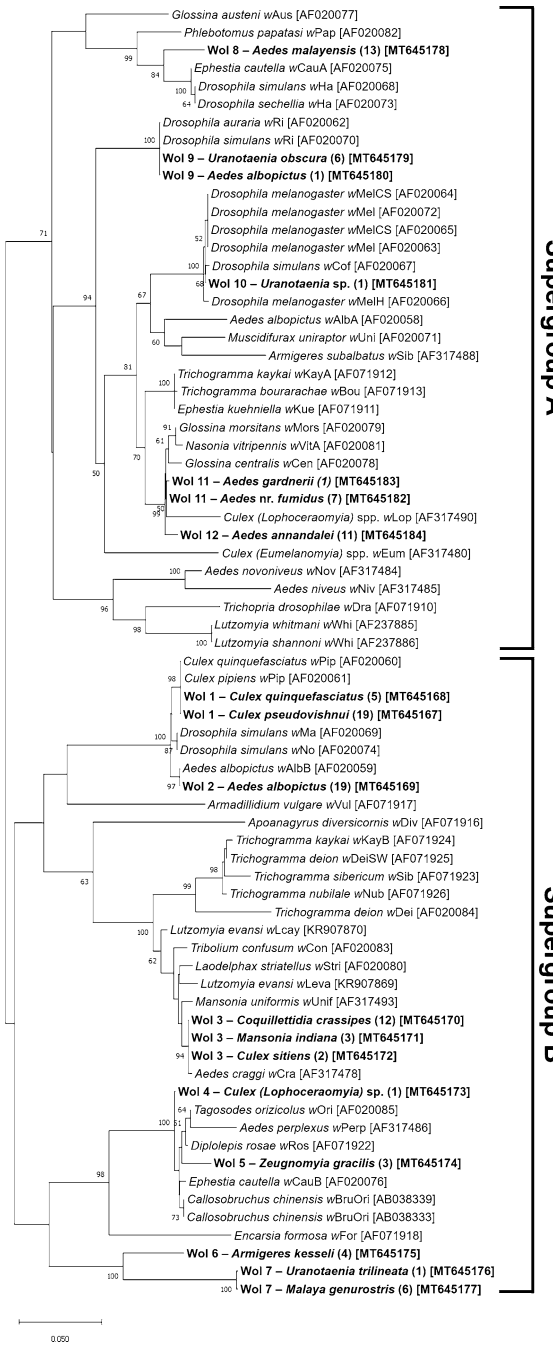

Fig. 2 *Wolbachia* neighbour-joining (NJ) tree constructed with the *Wolbachia* surface protein gene (*wsp*). All analysed sequences generated from this study (*bold*) were broadly classified into *Wolbachia* supergroups A or B and clustered into 12 putative strains ('Wol 1'–'Wol 12'). The number of sequences of each putative strain is indicated *within parentheses*. Also included are 54 sequences obtained from GenBank. Taxa are labelled as the host from which the *Wolbachia* strain was isolated, followed by the strain name. The NJ tree was mid rooted due to a lack of appropriate outgroups [45]. Bootstrap probability (generated with 1000 replicates) higher than 50% is indicated on the tree. Genbank accession number of each sequence is indicated *within brackets*

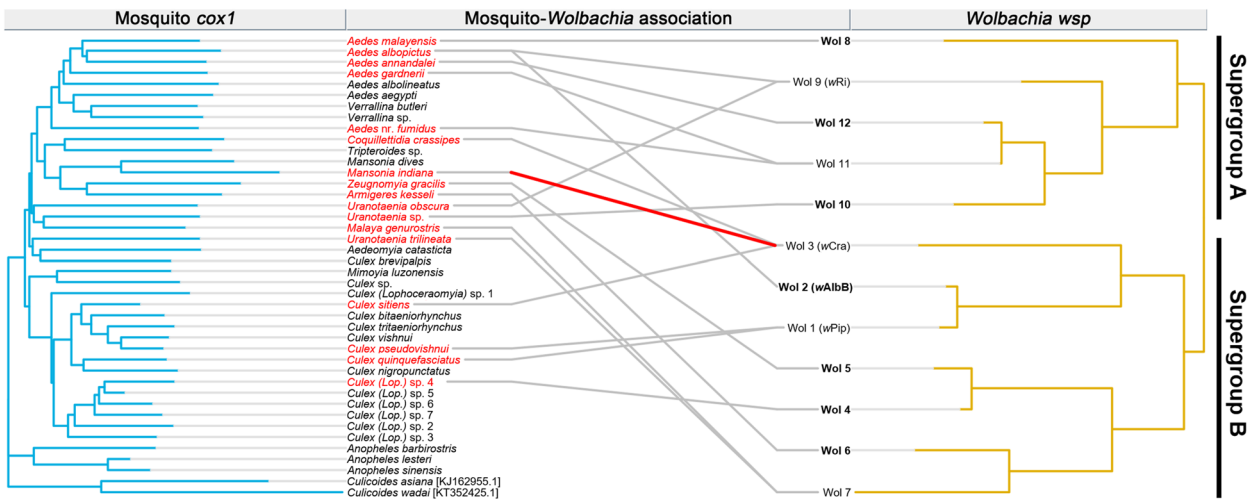

Fig. 3 Tanglegram of mosquito *cox*1 NJ tree compared to the *Wolbachia* endosymbiont NJ tree. Mosquito host species that harboured *Wolbachia* infection are indicated in *red*. Specialist *Wolbachia* strains are in *bold*. *Grey lines* represent the associations between hosts and endosymbionts. A *red line* indicates the host-endosymbiont association that was significant in the Global ParaFit test of congruence between host and endosymbiont phylogenies (Parafit Link test: ParaFit Link = 0.045, $P = 0.029$)

Table 2 Standardised phylogenetic host-specificity (*SPS*) scores of putative *Wolbachia* generalists

Putative *Wolbachia* strain	No. of infected hosts	Phylogenetic host-specificity score	SPS score	*P*-value
Wol 1	2	0.281	− 1.41	0.049*
Wol 3	3	0.391	− 0.162	0.421
Wol 7	2	0.281	0.068	0.779
Wol 9	2	0.281	− 0.234	0.249
Wol 11	2	0.281	− 0.817	0.157

* $P < 0.05$

host-endosymbiont links, only the association between *Mansonia indiana* and Wol 3 was statistically significant (ParaFit Link test: ParaFit Link = 0.045, $P = 0.029$) (Fig. 3).

The event-based analysis between mosquito and *Wolbachia* phylogenies resulted in a reconstructed output of one co-speciation event, three counts of duplication, seven counts of duplication with host shift, 29 losses, and six counts of failure to diverge, amounting to a total cost of 52 (Fig. 4). Interestingly, the number of duplications with a host shift and losses was much greater than co-speciation events. Notably, multiple host shift events tend to follow after loss events occurring earlier in the evolutionary history of the endosymbiont. For example, we see instances of consecutive host shifts to new hosts that were not previously infected (Fig. 4, red arrows). Additionally, based on random tip mapping, 14% of the random solutions had lower costs than the reconstructed output. Overall, there was support for multiple host shift events and losses of *Wolbachia* among the mosquitoes, and no clear signal for mosquito-*Wolbachia* cophylogeny.

Discussion

Detection of *Wolbachia* infection and distribution in wild mosquitoes

In this study, the PCR-based *Wolbachia* screening method had a high positive detection rate with 86.3% of all sequenced amplicons having successful BLAST matches to *Wolbachia*. This suggests that the conventional PCR method used is adequate for *Wolbachia* detection. Even if the study had been carried out without the additional DNA sequencing step, observed amplicon bands would likely have indicated true positives.

Our results indicate that *Wolbachia* are widespread across members of the family Culicidae. To our knowledge, *Wolbachia* infections have not been previously reported in seven of the mosquito species collected in this study. Overall, the percentage infection of screened individuals was 43.9%, which was largely congruent with percentages reported in past studies from the Oriental region, i.e. 31% infection in Malaysia [81], 26.4% in Sri Lanka [39], and 61.6% in Thailand [82]. At the species level, previous studies reported *Wolbachia* infection in 40% of all tested mosquito species in India [83], 18.2% in Sri Lanka [39], 51.7% in Taiwan [84], and between 28.1% and 37.8% in Thailand [82, 85]. Our study showed that 51.2% of all tested species were infected with *Wolbachia*,

Fig. 4 Least-cost evolutionary reconstruction between mosquito (*black*) and *Wolbachia* (*blue*) phylogenies achieved using Jane 4.0. In total, one co-speciation event (*open circle*), three counts of duplication (*grey dot*), seven counts of duplication with host shift (*black dot* with an *arrow* pointing outwards), 29 losses (*dotted line*), and six counts of failure to diverge (*squiggly line*) were mapped out. *Red arrows* indicate periods where multiple host shifts occurred in succession

which is generally higher than the percentage reported in most studies. This was likely due to the broad range of species tested, including those from the genera *Malaya*, *Verrallina*, and *Zeugnomyia* [85]. It is also possible that infection prevalence may vary across geographical regions.

Wolbachia detection in three medically important mosquito genera, *Culex*, *Anopheles*, and *Aedes*, was highly consistent with that of past studies. These genera are responsible for the transmission of vector-borne diseases such as filariasis, malaria and arboviral diseases [86]. Within the genus *Culex*, *Wolbachia* infection has been reported to be variable across its member species [39, 46, 82, 84]. In this study, infections were observed only in five out of 16 *Culex* species. We noticed moderately high *Wolbachia* infection in *Cx. quinquefasciatus* (62.5%), which is a member of the *Culex pipiens* complex responsible for the transmission of filariasis in Singapore [86, 87]. Surprisingly, no *Wolbachia* infection was observed in *Cx. vishnui*–which has been found to harbour Japanese encephalitis virus in Southeast Asia [89]–although it is closely related to *Cx. pseudovishnui* [88] in which the rate of *Wolbachia* infection was high. However, studies in India and Thailand showed a reverse pattern, with *Wolbachia* infection present in *Cx. vishnui* but not in *Cx. pseudovishnui* [39, 85]. As the two species are morphologically similar [53], DNA barcoding was conducted to aid morphological identification, and thus avoid any misidentification. The results lend further support to possible variation in infection prevalence between geographically distant populations.

We did not detect *Wolbachia* in any of the wild-caught *Anopheles* species (18 individuals representing three species), many of which are potential malaria vectors [86]. This is largely consistent with previous reports from different countries [39, 90, 91]. The absence of *Wolbachia* in *Anopheles* mosquitoes is thought to be due to the unsuitability of *Anopheles* reproductive tissues for *Wolbachia* establishment [84, 85]. However, there have been recent reports of *Wolbachia* detected in wild *Anopheles* mosquitoes from West Africa [42, 92, 93] and Malaysia [94]. Knowledge of natural *Wolbachia* infections in *Anopheles* mosquitoes is important for malaria control strategies [93], hence more wild-caught *Anopheles* samples should be screened in Singapore to determine more accurately their infection status.

Wolbachia were not detected in *Ae. aegypti*, the primary vector of dengue in Southeast Asia [87]. Conversely, *Wolbachia* infection was moderately high in the secondary vector *Ae. albopictus*. These results are highly consistent with those of past studies, which reported an absence of infection in wild *Ae. aegypti* [21, 95], but found stable infection in wild *Ae. albopictus* [96]. Although *Ae. aegypti* and *Ae. albopictus* belong to the same subgenus, *Stegomyia*, and occupy similar ecological niches [97], they are rarely found in the same locality, [43, 98, 99], as also observed in this study. This could imply a certain degree of competitive exclusion between the two species, preventing them from occupying the same space. There is evidence that symbionts may influence a host's resource acquisition and specificity, which may ultimately lead to competitive exclusion between closely related host species with differing symbiont infections [100, 101]. However, research on *Wolbachia*-induced competitive exclusion is scarce except for a few studies on heterogonic gall wasps [102], grasshoppers [103], and gall-inducing aphids [104]. Given the widespread influence of *Wolbachia*, future research should explore potential cases of *Wolbachia*-induced competitive exclusion between closely related species of mosquitoes as this may have major implications for an understanding of their symbioses and speciation.

Additionally, although *Ae. aegypti* is frequently artificially infected with *Wolbachia* for biocontrol purposes [105–109], our findings suggest that infected *Ae. aegypti* might not be stably maintained in the wild. This may be advantageous for vector population suppression as the cytoplasmic-incompatibility effect of any artificially introduced *Wolbachia* strain will likely be fully manifested in the uninfected native population [21]. However, this also implies that this type of biocontrol method may have low long-term effectiveness if the infection cannot be naturally sustained in the wild population. The detection of natural *Wolbachia* infection in wild *Ae. aegypti*, therefore, has huge implications for vector control programmes [21]. Not only does it inform the selection of a suitable *Wolbachia* strain prior to its field release, but it can also be used to gauge the long-term effectiveness of a specific vector control programme.

Interestingly, the sex of the mosquitoes had an effect on their *Wolbachia* infection status. This could be an artefact of various *Wolbachia*-induced reproductive phenotypes, such as parthenogenetic and male-killing ones, resulting in offspring that are largely female [15]. If this were true, over multiple generations with vertical *Wolbachia* transmission, one should observe an increasing proportion of females that are infected. Hence, the phenomenon observed here could be a consequence of reproductive manipulation by *Wolbachia* and vertical transmission.

While we were unable to statistically test for the effects of locality on infection status due to uneven and small sample sizes of the respective species across different localities, our results suggest that mosquitoes found in localities across Singapore have roughly equal chances of harbouring *Wolbachia*. This also suggests that underlying physiological factors and phylogenetic relatedness in mosquitoes contribute more to their infection by *Wolbachia* than the habitat in which they are found.

The reproductive effect of *Wolbachia* can be masked or enhanced by other reproductive endosymbionts such as *Cardinium*, *Rickettsia*, and *Spiroplasma* [7, 26–29]. Unfortunately, we were unable to detect these

endosymbionts due to a high degree of false positives with the PCR-based screening methods used here (Additional file 1). This was likely due to using primers that are not optimised for screening mosquito-specific endosymbionts [110–112]. As a result, co-infections with various reproductive endosymbionts, which would have provided greater insights into the synergistic effects of co-infections on mosquito evolution, could not be identified among the wild mosquitoes examined here. There is, hence, a need to develop and optimise alternative screening methods, such as multilocus sequence typing (MLST) techniques, especially for the detection of *Cardinium*, *Rickettsia*, and *Spiroplasma* in mosquitoes.

Tissue tropism of *Wolbachia* infection in mosquitoes

Wolbachia were detected mainly in the reproductive tissues, which agrees with results from studies across multiple insect groups [15, 84, 113], and suggests that *Wolbachia* are mainly vertically transmitted. Interestingly, through the course of this study, there was significant variation in reproductive traits (testis and ovary length) across and within species. These reproductive traits did not vary significantly with *Wolbachia* infection status, even after accounting for phylogenetic relatedness (see Additional file 2).

Infection in the gut and leg tissues was detected, albeit infrequently. This is not surprising, as previous studies have also detected *Wolbachia* in those tissues [34–36, 114]. Interestingly, the nucleotide sequences from gut and leg infections tend to be shorter in length. Considering that *Wolbachia* are unlikely to survive extracellularly for a long period of time [35], the small amplicon size suggests potential horizontal integration of the *Wolbachia* genome into the host genome for a few species. This phenomenon has been observed in several *Wolbachia* hosts [115, 116], and mosquito species such as *Ae. aegypti* and *Cx. quinquefasciatus* [117, 118]. A recent study showed that horizontal integration of the *Wolbachia* genome into the host genome can have implications for sex determination and evolution. This is evident in the common pillbug *Armadillidium vulgare*, and results in the formation of a new sex chromosome [119]. Researchers have also proposed that horizontal gene transfer between an endosymbiont and host can result in evolutionary innovation where new functional genes arise in both host and bacteria [117, 118].

Future research should explore the relative importance of each transmission method with relation to host-endosymbiont ecology and evolution. Tissue-specific screening methods such as those used here can be used in other arthropods, especially when the mode of transmission is not clear. Currently, most *Wolbachia* screening is conducted on ground specimens or specimens in their entirety [39–41]. In these cases, researchers are unable to determine tissue tropism of *Wolbachia* infection, which could provide clues to its mode of transmission. Thus, adopting tissue-specific screening methods would enable researchers to verify or refute the commonly reported assumption that *Wolbachia* is transmitted vertically [15, 30].

Diversity and host-specificity of *Wolbachia* strains

Not only does the *wsp* molecular marker allow successful detection of *Wolbachia* infection across numerous taxa, it also enables strain genotyping and evolutionary comparison between detected *Wolbachia* strains [60]. In this study, *Wolbachia wsp* sequences were clustered into 12 putative *Wolbachia* strains falling within supergroup A or B. This is consistent with the results of previous studies that looked at *Wolbachia* infections in mosquitoes [39, 80, 85]. Each mosquito host species was only infected by strains belonging to supergroups A or B, with the exception of *Ae. albopictus*, which harboured both. Infection with more than one strain (superinfection of wild *Ae. albopictus* with *Wolbachia* supergroups A and B) has been previously reported, and this phenomenon was commonly observed to be fixed in the examined populations due to strong cytoplasmic incompatibility effects [120, 121]. This suggests stable vertical transmission of both strains in *Ae. albopictus*. Additionally, only four out of 12 putative strains were identified as previously typed *Wolbachia* strains reported by Zhou et al. [60] and Ruang-Areerate et al. [80]—Wol 1, Wol 2, Wol 3, and Wol 8 were identified as *w*Pip, *w*AlbB, *w*Cra, and *w*Ri strain, respectively.

Host specificity is thought to be a characteristic of the ancestral *Wolbachia* strain, with host flexibility reported mainly in *Wolbachia* supergroups A and B [122]. In our study, we found a combination of specialists and generalists, with more of the former. A study of mosquitoes from Taiwan showed a similar pattern [84]. In beetles, a mixture of *Wolbachia* supergroup A host-specific and host-flexible strains within a population has also been reported [49]. While our estimates of specialists and generalists might vary with greater sampling effort, the higher numbers of specialists observed can be explained by the process of reciprocal selection between host and endosymbiont over evolutionary time [123]. This is also known as Red Queen dynamics, where the endosymbiont constantly adapts to its host to ensure continued establishment in the same host [124]. An alternative, generalist strategy can also be maintained in a population. It ensures survival in an environment where resources (i.e. hosts) are rarely found [123]. However, there are generally more instances of

host specialists than generalists across numerous parasitic and endosymbiotic taxa [125–127].

The SPS scores revealed that host flexibility among the generalists varied greatly. Understanding *Wolbachia* host specificity has huge implications, especially for the optimisation of *Wolbachia* biocontrol strategies. Not only should researchers select strains that can effectively limit pathogen replication [128], they should also select strains for their host specificity. This is not possible without the screening of a wide variety of species or closely related species, which was achieved in this study. Using a host-specific strain will decrease the likelihood of host shift to non-target species, and thereby minimise the overall ecological risk of a strategy.

Evolutionary relationships between mosquitoes and *Wolbachia*

Host-*Wolbachia* relationships are often understudied and limited to a few taxa [52]. Studies have shown that the evolutionary associations between *Wolbachia* and their insect hosts do vary across taxa [49–52, 129]. Likewise, our exploratory analyses of mosquito hosts and their *Wolbachia* infection support such a complex relationship, with neither co-speciation nor host shifting fully accounting for evolutionary association in these lineages.

Based on the tanglegram, a broad association pattern between mosquitoes and *Wolbachia* strains was observed (Fig. 3). *Aedes* mosquitoes tended to be associated with *Wolbachia* supergroup A, while other mosquito species, particularly of the genus *Culex*, were largely associated with *Wolbachia* supergroup B. This showed that closely related *Wolbachia* strains are likely to establish themselves in related hosts. There might have been radiation of *Wolbachia* in these clades after their respective initial establishment. Nevertheless, the observed variations in host-endosymbiont associations make us question the mosquito-*Wolbachia* association pattern.

The ParaFit analysis showed weak support for congruency between host and endosymbiont phylogenies. Among the 18 host-*Wolbachia* associations, only the link between *Mansonia indiana* and Wol 3 showed a significant association (Fig. 3). This was interesting considering that Wol 3 was largely host flexible. Given that this was the only significant association, it is worth carrying out further genus-specific study on *Mansonia* spp. to elucidate coevolutionary patterns within a group of closely related mosquito species. It is possible that the degree to which *Wolbachia* co-evolve with their mosquito hosts varies across different taxonomic levels [74]. The analyses carried out thus far suggest that mosquito-*Wolbachia* associations are likely random at higher taxonomic levels, and that mosquito-*Wolbachia* co-speciation occurs at finer phylogenetic resolution (i.e. similar to patterns seen in diffuse coevolution).

The event-based analysis performed in Jane 4.0 (Fig. 4) indicated that co-speciation events were infrequent as compared to other evolutionary events. We noticed a greater proportion of host shifts and numerous losses. Interestingly, the least cost coevolutionary reconstruction indicated multiple consecutive host shifts occurring near the tips of the cladogram. This suggests that co-speciation does not fully explain the evolutionary associations between mosquito hosts and *Wolbachia*. Instead, recent host shifting through horizontal transmission seems to promote *Wolbachia* diversification. This lends greater support to the idea that horizontal transmission between distantly related species is possible [32, 33, 130].

Furthermore, losses, which represent endosymbiont extinction events that occurred upon host speciation, seem to dominate the evolutionary history of *Wolbachia*. Extinction events are believed to be frequent in host-endosymbiont systems [123], due to either evolution of resistance in the host or declining host population size, which result in the inability of highly specialised endosymbionts to establish themselves [131, 132]. Additionally, losses could potentially influence endosymbiont evolution through the creation of vacant niches [131]. The observed losses followed by host shifts in the mosquito-*Wolbachia* relationship are possible consequences of vacant niche exploitation by generalists. Perhaps this enabled successful endosymbiont invasion due to minimal intra-strain competition. If this were true, horizontal *Wolbachia* transmission and losses may play a bigger role in accounting for *Wolbachia* diversity than previously thought.

As this was an exploratory study, we were unable to determine the exact mechanism behind the diversity and evolutionary associations of *Wolbachia*. The presence of numerous specialists could be a sign of mosquito-*Wolbachia* coevolution since coevolution is fundamentally reciprocal selection between host and endosymbiont which gives rise to micro-evolutionary changes [133]. The numerous host shifts and losses might have, however, blurred the effects of vertical transmission over a long evolutionary period [52]. Thus, co-speciation might have occurred within smaller clades of *Wolbachia* and mosquitoes, but at higher taxa levels, horizontal transmission and loss events are more likely the prominent force driving *Wolbachia* evolution.

Strengths, limitations, and future directions

The three distinct methods employed here to explore evolutionary associations have both strengths and limitations. The tanglegram allows for clear visualisation of host-endosymbiont association without taking into

account any evolutionary relationships, but there have been calls for careful interpretation of the results generated using this method as the degree of entanglement may not necessarily represent phylogenetic congruence [134]. The Global ParaFit test seeks to address this limitation by testing for global congruency with an unbiased, statistical approach [74]. The event-based method enables the evaluation of potential evolutionary events that might have occurred throughout an endosymbiont's evolutionary history such as co-speciation, duplication, and host shifting. This last method, however, cannot fully differentiate a topological congruence from an evolutionary event [135]. Without knowledge of the time of divergence for both symbiont and host, a co-phylogenetic pattern may be better explained by ecological factors (as compared to co-speciation) given that bacterial lineages often evolve faster than their hosts [136, 137], and the high likelihood of host shifts among closely related species [133].

The *Wolbachia wsp* gene has been shown to provide well-resolved phylogenies [60], and this study provides an exploratory snapshot of the evolutionary associations between mosquito hosts and their *Wolbachia* endosymbionts. There is, of course, a potential caveat, since only a single gene was used to construct the respective phylogenetic trees. To obtain a more accurate phylogeny, future studies could adopt MLST [17, 51], or whole-genome shotgun sequencing [52]. The former could potentially characterise putative *Wolbachia* strains that cannot be distinguished with *wsp* gene primers.

Notwithstanding their limitations, the employment of various analytical methods allows for a comprehensive examination of the evolutionary associations between *Wolbachia* and mosquito hosts which are presently lacking in the literature. The scope of future studies that examine the evolution of medically important vector species could be narrowed to the Aedini tribe, as this would provide greater statistical power for the examination of mosquito-endosymbiont associations.

Conclusion

To our knowledge, this is the first study to examine *Wolbachia* infections in wild mosquitoes in Singapore. We detected 12 putative strains of *Wolbachia* among 40 mosquito species, and recorded infections in seven species for which, to our knowledge, *Wolbachia* infections have not been previously reported. By employing a tissue-specific PCR screening method, we were able to observe that the *Wolbachia* infections were preferentially located in the reproductive tissues, which provides support for vertical transmission as the main mode of infection transmission. However, even if *Wolbachia* infection is mainly transmitted vertically, this is unlikely to fully explain the observed diversity of *Wolbachia* and why closely related *Wolbachia* lineages were found in distantly related mosquito species. Hence, this study also served as an exploratory study which examined mosquito-*Wolbachia* evolutionary associations across a wide range of host mosquito species through three evolutionary analyses. Overall, we propose that the evolutionary associations between mosquito hosts and *Wolbachia* are consequences of both vertical and horizontal transmission and various evolutionary events.

Supplementary information

Supplementary information accompanies this paper at https://doi.org/10.1186/s13071-020-04466-8.

Additional file 1: Table S1. Polymerase chain reaction (PCR) screening of *Cardinium*, *Rickettsia*, and *Spiroplasma* in wild mosquitoes from Singapore.

Additional file 2: Figure S1. Weighted reproductive tissue length across various mosquito species.

Abbreviations

BLAST: Basic Local Alignment Search Tool; *cox*1: Cytochrome c oxidase subunit I gene; MLST: Multilocus sequence typing; mtDNA: Mitochondrial DNA; NJ: Neighbour joining; PCR: Polymerase chain reaction; SPS: Standardised phylogenetic host specificity; *wsp*: *Wolbachia* surface protein gene.

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Authors' contributions

HY and NP designed the research. HD and HY collected the mosquitoes from the field. HY identified the mosquito samples. HD performed the DNA extraction and PCR. HD and HY carried out the sequence analyses. HD, HY, and NP interpreted the results and wrote the manuscript. All the authors read and approved the final draft of the manuscript.

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Availability of data and materials

The datasets generated and/or analysed during this study are available in the Dryad repository, https://doi.org/10.5061/dryad.zs7h44j63. Sequence data that support the findings of this study have been deposited in Genbank with the accession codes MT645167–MT645184.

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Opinion

Wolbachia Can Enhance *Plasmodium* Infection in Mosquitoes: Implications for Malaria Control?

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The symbiotic bacterium *Wolbachia* is an attractive agent for vector-borne pathogen control. It has long been studied for its ability to manipulate host reproduction and spread into arthropod populations [1]. These properties, coupled with the recently identified ability to inhibit diverse pathogens [2–6], open avenues for its use in controlling vector-borne disease. Numerous *Wolbachia*-based control strategies are being investigated (reviewed in [7–9]), with some studies having progressed to field trials [10,11]. However, a worrying trend is emerging whereby *Wolbachia* infections have been demonstrated to enhance rather than suppress pathogens in some systems [12–18]. *Plasmodium* parasites, which are the causal agent of malaria, seem particularly prone to *Wolbachia*-mediated pathogen enhancement [13–16].

Wolbachia-based strategies have been proposed to control malaria [19]. *Anopheles* mosquitoes (the vectors of human malaria parasites) are not naturally infected by *Wolbachia* [20,21], but artificial transfer of this bacterium between species can be accomplished in the laboratory (reviewed in [22]). Pathogen interference phenotypes appear to be most prominent when *Wolbachia* is transferred into a novel host [16,23]. Given that *Anopheles* are for the most part naturally uninfected by *Wolbachia* (but see [24]), they can be considered an open niche for infection and a prime mosquito genus for *Wolbachia*-based control strategies. However, the main impediment for developing a control strategy is the difficulty in creating a stable artificial infection in *Anopheles* [19]. While examining *Plasmodium* interference in a stably infected host is the gold standard, a more convenient system is to transiently infect mosquitoes by intrathoracic microinjection. Using this system, the infection persists during the lifetime of the transinfected individual but is not transmitted to its offspring. Transient infection allows the rapid assessment of *Wolbachia*-host interactions without the need for generating stable artificial infections [5]. It is uncertain how representative transient infections are of stable inherited associations; however, similarities in tissues tropism and fitness costs incurred upon the host between stable and transiently infected *Anopheles* mosquitoes are evident [5,14,25]. Furthermore, both types of infection have been shown to inhibit the human malaria parasite *Plasmodium falciparum* [5,25]. However, studies using transient infection models have found that *Wolbachia* can enhance certain *Plasmodium* species [13,14].

The *Plasmodium* interference phenotype is therefore not universal, but context dependent. While *P. falciparum* is suppressed by the *w*AlbB strain of *Wolbachia* from *Aedes albopictus* [5,25], transient infections have shown the opposite effect on rodent malaria parasites. *Anopheles gambiae* transiently infected with *w*AlbB exhibited enhanced *P. berghei* development at the oocyst stage [14]. Similarly, *w*AlbB increased the number of *P. yoelii* oocysts in *An. stephensi*, although the phenotype was modulated by temperature [13]. At a temperature optimal for parasite development, *Wolbachia* increased parasite intensity compared to uninfected controls, but at warmer temperatures, *Wolbachia* inhibited *Plasmodium* development [13].

While *P. falciparum* is a major parasite in sub-Saharan Africa, four other parasites also cause human malaria worldwide: *P. malariae*, *P. ovale*, *P. knowlesi,* and *P. vivax* (the etiological agent of the most prevalent form of relapsing malaria). To our knowledge, the effect of *Wolbachia* on these other human *Plasmodium* parasites is unknown. The question is relevant for two reasons. First, the precedent that a particular *Wolbachia* strain can inhibit one parasite yet enhance another has already been documented [5,14], indicating that effects on parasites can be species-specific. Troublingly, *P. malariae*, *P. ovale*, *P. knowlesi*, and *P. vivax* are phylogenetically more closely related to rodent malaria parasites, which are enhanced by *Wolbachia* infections [13,14], than they are to *P. falciparum* (Figure 1) [26,27]. Second, many human *Plasmodium* parasites occur in sympatry and are transmitted by the same vectors. A case in point is *P. falciparum* and *P. vivax*, both of which occur in sympatry over large stretches of the Asian continent where they are both transmitted by *An. stephensi* [28,29]. Any potential control strategy devised in regions where more than one parasite species occurs needs to thoroughly investigate the effect of *Wolbachia* on all parasite species transmitted by the vector, as well as other pathogens such as filarial worms or arboviruses (both as single infections and in the context of coinfections) to ensure that *Wolbachia*-infected mosquitoes do not inadvertently enhance transmission of secondary pathogens.

While difficult, forecasting the long-term evolutionary response in this tripartite relationship between *Wolbachia*, *Plasmodium,* and *Anopheles* is very important. Natural *Wolbachia*–mosquito associations in which the symbiont and the host have tightly coevolved exist and may provide powerful models for studying the long-term evolutionary effects of *Wolbachia*

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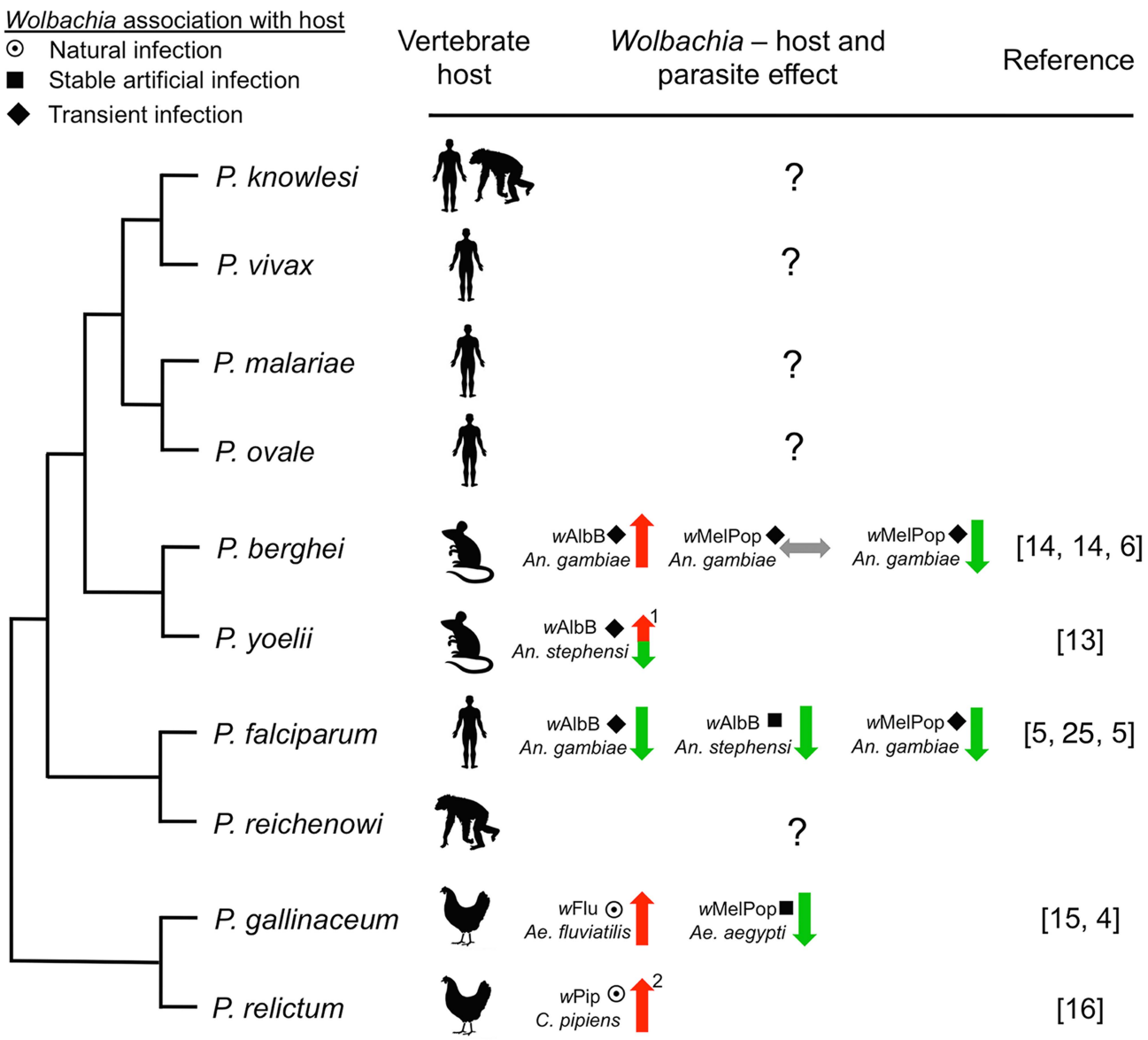

Figure 1. Representative phylogenetic dendrogram of *Plasmodium* parasites, their vertebrate hosts, and the influence of *Wolbachia* infection on parasite development within the mosquito vector. The protective effect of *Wolbachia* is variable and dependent on the *Wolbachia* strain and the insect host background, suggesting that complex tripartite interactions influence the effect on *Plasmodium*. The type of association between *Wolbachia* with the vector may also influence *Plasmodium*. Only one human malaria parasite (*P. falciparum*) has been assessed, while the effect of *Wolbachia* infection on the other four human parasites is unknown. Arrows indicate suppression (green), enhancement (red), or no effect (grey) of *Plasmodium*. The type of association within the host is depicted by symbols (target: natural infection, square: stable artificial infection, diamond: transient artificial infection). Numbers indicate: (1) the phenotype is temperature sensitive, (2) *Wolbachia* infection also increases insect life span [31], which has implications for pathogen transmission. Phylogeny was reconstructed based on work from Carlton et al. [26] and Martinsen et al. [27].
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infections. The evidence currently available suggests that natural *Wolbachia* infections can also enhance malaria parasite development within the mosquito. *Aedes fluviatilis* naturally infected with the *w*Flu *Wolbachia* strain had a significantly higher number of *P. gallinaceum* oocysts compared to an *Ae. fluviatilis* line which had been cleared of the *Wolbachia* infection [15]. *Ae. fluviatilis* is not, however, a natural vector of *P. gallinaceum*, and it is well known that the outcome of experiments using such laboratory models can differ significantly from those of natural mosquito–*Plasmodium* combinations (e.g., Boete [30]). Recent studies carried out in *Culex pipiens* mosquitoes, which are naturally infected with the *w*Pip *Wolbachia* strain and transmit the avian malaria parasite *P. relictum*, have also demonstrated *Plasmodium* enhancement. In this natural system, *Wolbachia* protects the mosquito host against the detrimental fitness effects incurred by *Plasmodium* infection [31] and increases the susceptibility of *C. pipiens* to *P. relictum*, with *w*Pip-infected mosquitoes having a higher prevalence of *Plasmodium* sporozoites in the salivary glands [16]. These studies show that the

Plasmodium-inhibiting properties of *Wolbachia* are far from universal; certain mosquito–*Wolbachia*–*Plasmodium* combinations and experimental conditions transform *Wolbachia*-infected mosquitoes into better vectors of malaria parasites. This is worrisome for the general implementation of *Wolbachia*-based control strategies.

Given that *Wolbachia*-based control strategies will use stable transinfected mosquitoes, the key question is whether stable and natural infections will behave in the same way. The stable transfer of *Wolbachia* into the host likely alters many aspects of host homeostasis, as evidenced by the novel phenotypes induced by infection [32–34], and as such, these associations likely differ from natural associations where *Wolbachia* and its host have coevolved. Another question is whether stable artificial infections will evolve over time. Theory and empirical studies show that these maternally transmitted bacteria will tend to evolve towards mutualistic associations with their host [35–38]. However, the evolutionary outcomes of pathogen interference or enhancement are harder to predict. A more complete mechanistic understanding of how *Wolbachia* infection modulates *Plasmodium* parasites is critical to address these important evolutionary questions and to evaluate if they are likely to occur in timescales relevant for disease control.

To date, two stable artificial *Wolbachia* transinfections have been assessed for their effect on *Plasmodium*. First, an *Aedes aegypti* line infected with *w*MelPop had inhibited *P. gallinaceum* infection [4]; *Ae. aegypti* is not, however, the natural vector of this parasite. Second, and more recently, the *w*AlbB strain was stably transferred into *An. stephensi*, one of the main vectors of human malaria in Asia [25]. This groundbreaking work demonstrated that stable artificial infections in epidemiologically relevant malaria vectors are feasible, and that *P. falciparum* can be inhibited by *Wolbachia* within its natural vector. If the severe fitness effects induced by *Wolbachia* in *Anopheles* can be overcome [25], then this approach is highly promising.

The work by Bian and colleagues [25] dramatically enhances the prospect for the use of *Wolbachia* in a malaria control strategy, but many questions still remain. What are the effects of *Wolbachia* on the other four species of *Plasmodium* parasites that infect humans? How relevant are transient infection models? Do some strains of *Wolbachia* enhance pathogens in a field context? What are the long-term evolutionary consequences of novel *Wolbachia*-host associations on *Plasmodium* development within the insect host? What are the mechanisms behind pathogen interference and enhancement of *Wolbachia* on *Plasmodium* parasites, and are the mechanisms of enhancement seen in rodent and avian model systems relevant to human malaria parasites? How influential are environmental variables on pathogen inhibition phenotypes? While many of these questions may be difficult to answer in the short term, assessing the relevance of transient infections would seem within the grasp of the scientific community. Although challenging, understanding the evolutionary consequences of novel *Wolbachia* associations on pathogen transmission and identifying the mechanisms behind *Wolbachia* modulation of *Plasmodium* is critical for developing effective control strategies and assessing their long-term feasibility. Insights from non-Anopheline systems where *Wolbachia* naturally infects the vector may be useful in this regard [16,31,39].

In conclusion, *Wolbachia*-based control of vector-borne pathogens is a promising novel strategy that has many advantages over other conventional and contemporary control methods. The development of a stable infection in *Anopheles* means the prospect of *Wolbachia*-based control of malaria can now be entertained [25], but many important questions need to be resolved before this idea can become a reality. While the concerns raised here focus on *Plasmodium*, these issues are relevant for *Wolbachia* control of any vector-borne pathogen [18]; we suggest that transinfected mosquitoes intended for release into nature should be assessed for inhibition (or lack thereof) of all relevant pathogens circulating in the system.

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38. Carrington LB, Hoffmann AA, Weeks AR (2010) Monitoring long-term evolutionary changes following *Wolbachia* introduction into a novel host: the *Wolbachia* popcorn infection in *Drosophila simulans*. Proc Biol Sci. 277: 2059–2068.
39. Hughes GL, Samuels SK, Shaikh K, Rasgon JL, Vardo-Zalik AM (2014) Discrimination of the *Plasmodium mexicanum* vectors *Lutzomyia stewarti* and *Lutzomyia vexator* by a PCR-RFLP assay and *Wolbachia* infection. J Vector Ecol 39: 224–227.

From:	Wynter Lim
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Request for Approval of the Maui NPS Wolbachia IIT Environmental Assessment (EA)
Date:	Wednesday, March 22, 2023 8:42:30 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to

save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Wynter,

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Waiʻihi Lindsey (BLNR)
Date: Wednesday, March 22, 2023 8:54:16 AM
Attachments: Waiʻihi Lindsey (BLNR)

A design titled "Waiʻihi Lindsey (BLNR)" was shared with you by 4291800681@k12.hi.us.

3/20/23

Aloha e BLNR,

ʻO Waiʻihi Lindsey koʻu inoa. No Lahaina, Maui wau. He 10 oʻu makahiki. Noho wau ma ʻŌmaʻopio ma Kula. Hele wau i ke Kula Kaiapuni ʻo Nāhiʻenaʻena ma ka papa 5. ʻO Kaunaʻoa Garcia kaʻu kumu.

Kākoʻo wau iā ʻoukou e hana kēia pāhana me nā makika no ka mea ʻaʻole wau makemake i nā manu e halapohe. A ke hana nei kaʻu papa i kekahi pāhana no nā manu, a o ka maui ʻākepa kaʻu manu i koho ai. Aloha wau i nā manu a ʻaʻole makemake i nā makika.

Ma hope o ka nahu ʻana o nā makika i nā manu, he 9 wale mau lā a make, a he kaumaha loa kēlā. A e kaumaha loa ana ʻia i nā halapohe nā manu no ka mea he mea nui nā manu no ka ʻāina. A kēlā nā kumu kākoʻo au iā ʻoukou a me kā ʻoukou pāhana.

Me ke aloha,

Waiʻihi Lindsey

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From:	Jill
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Approve Maui NPS Wolbachia IIT EA and issue FONSI
Date:	Thursday, March 23, 2023 6:09:14 AM

Good day Chair Designate Change and members of the Board of Land and Natural Resources.

I'm writing in regard to plead with you to approve the Final EA and issue no significant impact regarding Suppression of Invasive Mosquito Population to reduce the transmission of avian malaria to threatened and endangered forest birds.

Mosquito control will save numerous native species and curb the spread of avian malaria. We are out of time and will lose many more amazing birds. Hawaii will not be Hawaii without these native birds. Give our birds a fighting chance! The forests are growing silent, we need to act now. Wolbachia IIT is currently the only hope we have.

Mahalo for taking the time to read my testimony.
Jill Lippert

From: gj l
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] OPPOSE Agenda Item C2
Date: Wednesday, March 22, 2023 4:58:27 PM

Aloha!

Please consider my opposition to DLNR's strategy for preventing bird extinction on Kaua'i and Mau'i.

Certainly, the suggestion that there would be "no significant Impact (DEA-AFONSI)" upon the environment is premature and unfounded, for there has yet been any comprehensive bona fide scientific study and documentation of the likely effects upon the native birds and wildlife and the local human population.

Mahalo nui!

Gary Loscocco
1742 Young St Apt 201
Honolulu HI 96826

From: anne de Lovinfosse, Phd
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] GMO MOSQUITO
Date: Monday, March 20, 2023 6:14:09 AM
Attachments: PastedGraphic-1.tiff

I am against the release of non tested GMO mosquito on the environment. I demand a full scale environmental impact study.
Thanks you

From: Samantha Loving-Urabe
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] In Support of Item C-2
Date: Wednesday, March 22, 2023 12:45:11 PM

To whom it may concern,

I support Wolbachia IIT to save Native Hawaiian forest birds.

Mahalo,
Sam Loving-Urabe

From: Sara Lowell
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Tuesday, March 21, 2023 4:08:23 PM

To whom it may concern;

I am writing to express my strong support for DLNR's propose program to stop the threats posed on Hawaii's prized endemic forest birds by avian malaria. Drastic times call for drastic measures and the Incompatible Insect Technique (IIT) can suppress mosquito populations and help save our native forest birds. We know that avian malaria, which is driven by the climatic shifts caused by a human induced climate change, is a death sentence for our native honeycreepers. We hope that not only will this program be rolled out, but rolled out in the swiftest of timelines. These birds have a ticking time bomb facing them, and every day that passes is a day that more birds can become infected.

Thank you for to the State of Hawaii, DLNR, and the programs partners for taking this ambitious and cutting edge approach to stopping extinction.

Sara Lowell
Kauai

From: Leinani Lozi
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Wednesday, March 22, 2023 10:21:34 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds. Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Leinani Lozi

From: Mandee Lynn
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Thursday, March 23, 2023 5:03:04 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

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Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever. These birds cannot speak for themselves, who will save them from their certain decimation by mosquito if not for us?

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

From:	Makana Mahuna
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Testimony
Date:	Tuesday, March 21, 2023 8:17:03 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Makana Mahuna

From:	Jessica Main-Villines
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 3:36:11 PM

I Jessica MainVillines am **opposed** to the approval of this Final Environmental Assessment for the mosquito release plan and that you want an **Environmental Impact Statement:**

We do not want to be the test subject of your trials. We don't welcome testing on our lands, air or water.

Stop denying us the basic human right to live in a peaceful within and on our lands it is our god given right.

You people in office have proven time and time again that you don't have our best interest at hearts. You disregard our feelings, ignore testimony and do whatever you can to stop us from being heard.

Action speaks louder than words, we are done being silenced and your test dummies

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

--

Jessica Main-Villines

Sustainable Water Innovation
1110 Nuuanu Ave
Honolulu Hi 96817
1(808) 431-3244
contact@sustainablewaterinnovation

From: Korina Makaokalani
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Wednesday, March 22, 2023 8:49:42 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to

save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Korina Makaokalani

Sent from my iPhone

From: Sally Jo Manea
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support for Item C-2, Agenda for March 24, 2023
Date: Monday, March 20, 2023 11:05:27 AM

Re: Final Environmental Assessment (EA) titled "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui."

I am in full support of this mosquito reduction program. Please vote to accept the Environmental Assessment.

Hawaiian native birds are at critical risk of extinction. Every possible effort is needed to slow this process. This methodology has been tested and found to be effective and safe.

Mahalo for the opportunity to testify.

Sincerely,
Sally Jo Keahi Manea
Kapa`a, Kaua`i.

From: JoAnna Maney
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] In support of the Wolbachia technique
Date: Thursday, March 23, 2023 8:52:52 AM
Attachments: image0.png

Aloha board members,

I am writing in support of the Wolbachia technique to mitigate invasive mosquito populations. Since the beginning of human history birds have captured our imagination, inspiring stories, art, melding into our traditions, religions, and philosophies. The earliest depictions of birds can be found on Neolithic cave walls and lining Egyptian tombs. Humanity across the globe has worshipped them, adorned ourselves with their feathers, relied upon them for food, looked to their engineering in our own quest for flight, and now we are watching their numbers decline rapidly. This is nowhere more apparent than here in Hawai'i, the extinction capital of the world. As our understanding of the role of birds in the workings of our planet has increased we have begun to realize just how integral they are to the health of the environmental systems that sustain us all. You do not need to be a "bird person" to appreciate the value of their natural ability to disperse seeds, keeping the forests healthy and thereby the watersheds healthy—systems vital to our own survival.

When the popular series, The White Lotus, aired in 2021, the opening credits featured artwork that prominently showcased the beautiful 'i'iwi. This bird, perhaps above all native wildlife, represents Hawai'i to the rest of the world. It is distinct, unique, stunning, and only found here. I question whether we could even continue to call Hawai'i "paradise" without these iconic birds and yet their fate is precarious due to the spread of mosquito-borne disease.

In the past several years, I have witnessed interest in native birds surge among the community as evidenced by social media posts, participation and volunteerism in ecosystem restorations, environmental cleanups, and the creation of beautiful works of art, clothing, and household goods. You can see the level of support the community has in social media groups like, "Birds of Hawai'i, the Past and the Present," which has global following of 40,000 people across multiple social media platforms. Facebook groups "Native Hawaiian Birds" and "Hawaii Bird Lovers" have a combined total of over 15,000 members. Many small businesses, like my own, have sprung up with a goal of donating a percentage of profits to local conservation efforts. These people dream of seeing native birds flourishing in healthy native forests. And now we are faced with an opportunity to help make that happen.

Hawai'i's birds are all on a declining trajectory and have been for a long time and that decline is directly tied to human activity, including the introduction of invasive plants and animals and in the rapid advancing of climate change that is allowing mosquitoes to climb higher into the mountains and invade the last havens of island forest birds. Humans brought mosquitoes to Hawai'i almost 200 years ago and we have to be the ones to do the work to get rid of them now. One of the most lovely things about our species is our ability to solve complex problems and this comes into no greater light than we solve problems that we ourselves created. This is just such an opportunity. The science is sound, the evidence of success can be seen in our own country on the mainland, as well as globally. We can be confident in moving forward. This may be our only chance to save these beautiful creatures that are so valuable to Hawaiian culture, Hawaiian history, and Hawaiian identity. Time is running out.

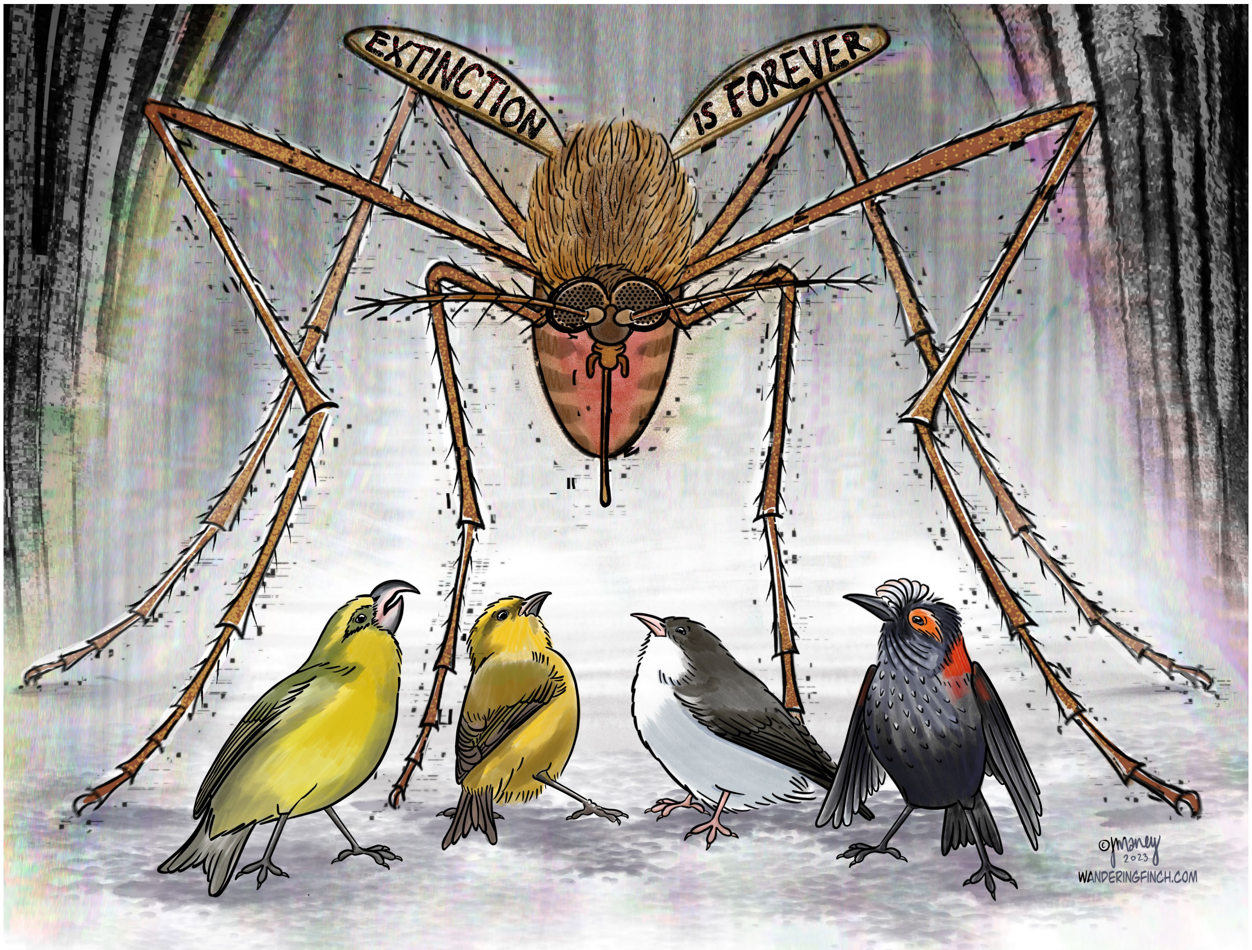
The concerns of the opposition have been thoroughly addressed by the local science community here as well as by the combined studies of the global science community. However we continue to hear the same fearful speculations and pronouncements repeated in opposition. In response, I would like to remind the board that the introduction of mongoose was not, in fact, the result of a measured and studied biocontrol but rather the whim of one farmer. Not the same thing at all. I'd also like to remind the board that nothing new is being created in the Wolbachia technique because this bacteria already exists in the environment naturally. There is no gene altering taking place. There is no chance of creating a new type of mosquito. These are the same mosquitoes that have spread all over the world and we would be using the same method to mitigate their numbers as other countries all over the world are currently using. The fear manufactured around something that is already being used on the mainland US, is a waste of our energy, resources, and time. The Wolbachia Incompatible Insect Technique is more of an increase in understanding than it is a technical advancement. This is science at its most elegant and most beautiful. This is humanity learning more about the natural world around us and how things already work and using that knowledge to protect what is vulnerable. This is, to my mind, the ultimate endeavor of science, to protect what is vulnerable.

No matter the decision arrived at today, this Wolbachia technique, the same used currently to protect human populations on the mainland from mosquito-borne disease, will likely come here eventually. We are all now acutely aware of the nature of epidemics and while we don't have any outbreaks of deadly, human infecting, mosquito-borne illness, we have in the past, including dengue fever as recently as 2016. It's merely a matter of time until something like that appears again. Wouldn't it be better to already have effective mosquito reducing methods in place to prevent the human suffering, loss of life, impact on the local economy and workforce, as well as the heavy cost of additional emergency health measures that are required during such an outbreak? We have been given an opportunity to head that off. There will always be those members of the community whose fear of doing something new is greater than their fear of doing nothing at all, but if we as a species embraced that kind of fear we would never have progressed to the places we are now.

So often it is easier to put a complicated decision like this off for a later date, I beg the board to resist that temptation. Requesting an unnecessary, redundant, and time consuming EIS (Environmental Impact Statement) will surely seal the fate of multiple species at this point. Let's not make that mistake. No further study is needed because the effectiveness has already been established. Meanwhile the clock is ticking on some very special creatures who mean a great deal to Hawaiian history, Hawaiian culture, and Hawaiian identity. We need immediate action, the sooner the better. We know what works. A wealth of proof lies before you in the form of real world success stories from across the globe. Now is the time to make the decision to move forward.

Mahalo for your time and consideration,
Joanna Maney

(Attached photo Copyright 2023 Joanna Maney)



From: Lauren Manning
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony to save Native Hawaiian forest birds
Date: Wednesday, March 22, 2023 2:41:07 PM

To whom it may concern,

I am writing in support of item C-2. I support Wolbachia IIT to save Native Hawaiian forest birds.

Thank you,
Lauren

From: Benjamin Marantz
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] OPPOSE mosquito release plan!
Date: Tuesday, March 21, 2023 6:47:03 AM

I strongly oppose mosquito release plan without a proper EIS.

Sincerely, Benjmain Marantz
73-4464 Kohanaiki Rd. #5C
Kailua Kona HI 96740

From:	Nathan Marchand
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 9:22:17 PM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of Wolbachia bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I demand an Environmental Impact Statement (EIS).

From:	hawaii.rr.com - Serge
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] March 24 BLNR Meeting / Request for board approval of the Final EA for East Maui and authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI)
Date:	Tuesday, March 21, 2023 8:47:01 PM

Aloha,

I am please asking you to support/accept the East Maui Environmental Assessment on their proposed action to save Hawaii's native Honeycreepers from extinction. Immediate action is absolutely required, and after researching the proposed method and discussing it with biologists and field experts, I am of the opinion that it is the best way to move forward in order to save our birds.

If you have any questions and/or would like further testimony, please don't hesitate to contact me to let me know.

Thank you.

Serge Marcil
4121 Rice Street, Unit 207
Lihue, Kaua'i
(c) (808) 212-6473
(e) smarcil@hawaii.rr.com

From: Jenny Marion
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] In favor of the Wolbachia mosquito control project
Date: Wednesday, March 22, 2023 8:51:57 PM

I am writing to voice my support of the Wolbachia mosquito control project to protect our remaining Hawaiian forest birds. There is very little time left to act on this, and since this technology is already proven and used in other places around the world, the project should move forward immediately before we lose any more native Hawaiian bird species.

Thank you very much,
Jenny Marion
2373 Palolo Ave. #A
Honolulu, HI 96816
jenny.marion@outlook.com

Sent from Mail for Windows

From:	Allie Marsh
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Supporting Agenda Item C-2 + Hawai"i"s Native Birds
Date:	Wednesday, March 22, 2023 1:16:19 PM

Dear Board of Land and Natural Resources of Hawai'i,

My name is Allie Marsh and I live in Kaka'ako. I am writing to voice my support of Agenda Item C-2 in using the Wolbachia Incompatible Insect Technique to save the critically-endangered Kiwikiu, 'Akeke'e, 'Akikiki, and ʻĀkohekohe birds from extinction. These birds are beautiful and if science shows a way to save them without harming other aspects of the natural environment, it sounds like a total win-win situation. Birds bring so much joy to our world and if we are able to protect these species from extinction, I believe it's our duty to do so.

Very respectfully,
Allie Marsh

From: Sybil Martin
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] No
Date: Thursday, March 23, 2023 8:30:05 AM

If you wish to destroy this island and all of the life upon it, choose the unnatural bioengineered mosquitoes. If you wish to preserve life here, never allow these bio weapons to be released, ever!!!!!

From:	Kelly Martinson
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] TESTIMONY: Action item C2: Request approval of Final EA and Authorization for Invasive Mosquito Suppression
Date:	Thursday, March 23, 2023 5:25:52 AM

To whom it may Concern,

Please accept this email as my support for approving action item C2 for the March 24th meeting: Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”.

The effects of avian malaria, spread by non-native mosquitos, on Hawaii's native wildlife are well documented. Likewise, while this method has not been used in Hawaii, it has been used with great success in reducing mosquito populations elsewhere (Texas, California, Mexico, Singapore, Australia). This EA is extensive and discusses the proposal well and clearly illustrates the options and their risks, including what happens if we do nothing... the loss of some of the most rare species on earth. Other conservation management techniques to bolster native bird populations are a waste of time and money without large-scale mosquito control efforts to reduce avian malaria on the landscape.

The approval of this EA is critical in the next steps to protecting Hawaii's native birds, not just on Maui, but on the rest of the Hawaiian chain. On Kaua'i, species like the Akikiki and Akeke'e are at critically low numbers and have decreased in population sizes precipitously in a manner that is so glaringly obvious to anyone who has worked with them over the last decade or longer. Forests that less than 20 years ago were still vibrant with the songs and calls of native birds are now growing silent. Now is our only opportunity to keep them from blinking out of existence.

Please approve the final EA for and issue a "Finding of no significant impact" in regards to this method of mosquito suppression on Maui and pave a way forward for mosquito suppression on other Hawaiian islands. Please do not let our last few remaining native forest birds go the way of the O'O and Po'ouli.

Sincerely,

Kelly Martinson
Wildlife Biologist

From:	Koa
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA and Issue FONSI
Date:	Thursday, March 23, 2023 7:48:58 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **strongly support** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native Hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

This was a call to action and brought to light that now the biggest battle for forest birds is not habitat loss or predation…it is mosquitoes. Until mosquitoes are removed from the landscape, there is no inch of native forests where endangered birds can survive into the future. We are running out of options and Wolbachia is one of the last tools available in time to save these birds from disappearing forever.

The No Action Alternative is that these birds go extinct and we lose a piece of our culture; These birds are kūpuna turned into ʻaumākua and they are holding on waiting for us to figure something out. The ʻakikiki on Kauaʻi is already projected to go extinct in the wild by the end of next year. Two Hawaiian forest birds have already gone extinct in my 31 years on this earth and **I refuse** to let the remaining 17 do the same.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently one of the last tools we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Koa Matsuoka

From: Richard May
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Incompatible Insect Technique
Date: Saturday, March 18, 2023 2:12:18 PM

This input is provided to support DOFAW in the request for approval of their finding of no adverse impact in application of the Incompatible Insect Technique in the East Maui forest areas which provide the sole remaining habitat for multiple highly endangered Honeycreepers (Drepanididae). I have visited the areas in question over a period of years, and have seen the reduction in numbers and withdrawal of several species from otherwise ideal habitat. The correlation with the arrival and upward spread of mosquitos (especially Culex quinquefasciatus) is nearly perfect. The once widespread I`iwi, which is extraordinarily susceptible to avian malaria, serves as an indicator that we must heed. IIT offers the single good option for saving these species in East Maui, and can serve as an excellent step for application in other areas. I have watched several of our Honeycreepers and other passerines disappear in the time since I first hiked and observed forest birds here in 1967. That saddens me, but at that time, we did not have any tools to understand the issues or to combat the upward spread of mosquitos and their deadly load of malaria. We understand now, and we have an effective tool at our hands. Future generations will not think kindly of us if we squander this 11th hour opportunity to save these unique species.

Richard M, May, Jr
President, Friends of the Oahu National Wildlife Refuges
Member, Hawaii Bird Records Committee
(808) 375-2439

Sent from Mail for Windows

From: Clemens Mayer
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Wednesday, March 22, 2023 2:33:42 PM

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds. Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Clemens Mayer

From:	Michael McLaughlin
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Support Item C-2 - Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui
Date:	Tuesday, March 21, 2023 6:08:11 PM

Dear Board of Land and Natural Resources,

I urge you to support Item C-2 during your March 24 meeting. I write from Florida where we have successfully decreased harmful mosquito populations by introducing Wolbachia-infected male mosquitoes. This was done to protect people from the Zika virus, but will also work to protect the kiwikiu, 'akeke'e, 'akikiki, and ʻākohekohe from avian malaria. Save native Hawaiian birds, get rid of mosquitoes instead!

Sincerely,

Michael

From: Brittni Brooks
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Saturday, March 18, 2023 9:24:18 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I am writing today to express my support for Agenda Item C-2 proposing the use of the *Wolbachia* Incompatible Insect Technique (IIT) to prevent the extinction of the endangered Hawaiian honeycreepers living on Kauaʻi and Maui. I also support the establishment of viable populations of 2 extremely at risk honeycreeper species - the ʻakikiki and kiwikiu - at conservation breeding centers in Hawaiʻi until the threat of mosquitoes and avian malaria has been lowered.

Extinction is forever. There should be no more excuses or delay.

Invasive mosquitoes are the greatest immediate threat to the existence of the Hawaiian honeycreepers. If action is not taken as possible, we will lose these birds to extinction forever. The extinction of honeycreepers would impact our native forests, since honeycreepers are pollinators of native species such as ʻōhiʻa. Hawaiʻi residents rely on healthy native forests to help gather rain and collect the freshwater that we need to live in Hawaiʻi.

I believe the proposed conservation actions is the best hope for preventing the extinctions of our honeycreepers on Maui and Kauaʻi. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they spread.

Someday, our children and grandchildren will look back at this point in our history. I hope that they will be able to say that we stepped up to the challenge and saved Hawaiʻi's honeycreepers through swift, scientifically informed action.

Mosquitoes don't belong in Hawaiʻi. Native forest birds do.

I urge you to please SUPPORT the mosquito control efforts outlined agenda item C-2.

Mahalo nui for the opportunity to provide testimony,

Brittni Megdal

From: Annie Meyer
To: DLNR.BLNR.Testimony; DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia
Date: Wednesday, March 22, 2023 1:12:22 PM

To whom it may concern,
I SUPPORT board approval of Wolbachia ITT.
Let's give these birds a chance.

Thank you,
Annie Meyer

From:	Ashley Michaud
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date:	Tuesday, March 21, 2023 5:47:18 AM

Hello,

I am an EA writer & I OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)

"DLNR's Proposed Strategy to prevent Bird Extinction on Maui & Kauai" *I DO NOT accept the Environmental Assessment's Anticipated Finding of No Significant Impact (DEA-AFONSI). The scope, risks, and experimental nature of the plan* ***require detailed, comprehensive studies and documentation*** *of the* ***impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).***

Kind Regards,
Ashley Michaud
iphoneAsh@hotmail.con

From: shayla@shaylamassage.com
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Wednesday, March 22, 2023 10:38:52 PM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Thank you
Shayla Middleton
Kihei, Maui

Sent from my iPhone

From: meredith miller
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Fwd: Mosquito Suppression to prevent Avian Malaria in Maui Forest birds
Date: Tuesday, March 21, 2023 8:49:03 PM

Subject: Mosquito Suppression to prevent Avian Malaria in Maui Forest birds

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I wholeheartedly **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. These forest birds don't have the time left for any unnecessary delays to mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have to preserve these forest birds and to prevent extinction.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a**

FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Meredith Miller, M.A.

From:	Jackie Jurgensen
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE MAUI NOS WOLBACHIA
Date:	Tuesday, March 21, 2023 8:18:59 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Jackie Milligan

From: Don Mitchell
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C-2
Date: Tuesday, March 21, 2023 6:35:18 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2 on the proposed use of the *Wolbachia* Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kaua'i and Maui.

I spent January, 1984 studying niche partitioning by honeycreepers in Ohia trees in the rainforest on Mount Haleakala. Honeycreepers were in danger then and various human-induced pressures have continued to cause the further dramatic declines in numerous honeycreeper species. Mosquito-borne illness is one of the chief factors leading to the potential extinction of several of the honeycreeper species.

I believe the proposed conservation actions are an important step toward preserving this unique group of birds.

Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui!

Donald R. Mitchell
Principal Biologist
Vice President/Corporate Secretary
Southwest U.S. Operations Manager
ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

California Small Business for Public Works (SB-PW)
215 North 5th Street, Redlands, California 92374
Ph: 909.307.0046 ◆ Cell: 909.754.6939 ◆ Fax: 909.307.0056
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Rocklin ◆ Redlands ◆ Santa Ana ◆ San Diego ◆ Chico
San Luis Obispo ◆ Flagstaff, AZ ◆ Santa Fe, NM
Join My LinkedIn Network
https://www.linkedin.com/in/don-mitchell-6b29a71a

Ethical behavior is doing the right thing when no one else is watching- even when doing the wrong thing is legal.
— Aldo Leopold

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Native birds of Hawai‘i have been experiencing extinctions and population declines driven by avian malaria for nearly the past 200 years, that have only accelerated over the past 20 years. With Hawai‘i standing as the bird extinction capital of the world, this is evidenced by the reduction of what were originally more than 50 honeycreeper species endemic to the Hawaiian Islands to just 17 that remain, and more than half are listed as Endangered or Threatened species.

Two species on Maui – the kiwikiu, and ‘ākohekohe – are on the edge of extinction, with extinction predicted within the next decade if conservation action is not taken. This truly is an ecological crisis. But with the research advancements for Wolbachia IIT, there is a safe option for landscape-scale mosquito control that can change this trajectory. Wolbachia is a naturally-occurring bacteria that is already present across the landscape in up to 60% of insects. This approach relies upon Wolbachia-infected male mosquitoes that are **incapable** of producing viable offspring after mating with a wild-type female, thus suppressing the mosquito population. This technique is NOT genetically modified and would NOT result in the introduction of new species. Male mosquitoes do not bite or transmit disease, and female mosquitoes are not released.

Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment. Successful IIT projects have resulted in mosquito population declines of 90 percent or more. Beyond supporting conservation, Wolbachia IIT can also lead to positive public health impacts, with the reduction of mosquito populations that can vector human disease.

The EA that has been conducted thoroughly analyzed all potential impacts of the implementation of Wolbachia IIT for East Maui, with thoughtfulness towards safeguarding the health and well-being of both the forest birds and people of Maui. It is made clear, through research supported by decades of peer-reviewed science, that there are no significant negative environmental or cultural impacts that will result. I believe this report provides ample evidence that is sufficient to warrant moving forward with the Wolbachia IIT as planned. Compliance has been demonstrated with NEPA and HEPA

Wolbachia IIT is currently the only hope we have to avert further extinctions of these culturally and ecologically significant species. We cannot afford any delays.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Stephanie Mladinich

From: Cheryl Moore
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15 am Agenda Item C-2: Oppose
Date: Wednesday, March 22, 2023 10:55:16 PM

C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

My name is Cheryl Maliikapu Moore and I am a resident on the island of Maui. I am writing this testimony to oppose the approval of the Final Environmental Assessment for the planned biopesticide mosquito release plan on Maui. This untested experiment is a potential threat to the environment and the people of Maui. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health. Therefore, I believe it is irresponsible to release biopesticides without the appropriate studies.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Mahalo nui,

Cheryl Maliikapu Moore
23 Ai Street
Makawao, HI 96768
951.265.8696

From: Candy Moreno
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Oppose BioPesticide Mosquitoes
Date: Wednesday, March 22, 2023 11:51:07 AM

To Whom it may Concern,

Please have a care for our island and its people. Do not make our island the restive for this experiment . Do not mess w/our ecosystem. We encourage people not to wear sunscreen so as not to contaminate our waters; why would we willingly introduce a bio pesticide mosquito?
If the mosquitoes are excessive educated the people to walk their property and empty any free standing water from rain . Much better way to control mosquitos.

Please for the love of this island and its people do not pass this!

Sincerely Candy Moreno

Sent from my iPhone

From: Mike Morimo
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Native Hawaiian birds need a chance against mosquitoes
Date: Wednesday, March 22, 2023 6:54:37 PM

The native birds of Hawaii should be treasured. They are only found here. They are a part of what makes Hawaii special. Doing what you can to help them is the right thing to do for people that live here. Give them a chance against introduced threats like the diseases spread by mosquitoes shallowing their only home.

Mike Morimoto

From: Roy Morris
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Written Testimony - Supporting suppression of mosquito populations
Date: Wednesday, March 22, 2023 9:08:19 PM

Hello,

I would like to express my support regarding the agenda item C-2 the approval of the Final Environmental Assessment and Finding of No Significant Impact (FONSI).

Many of these endemic birds face extinction or drastic population declines due to disease spread by mosquitoes. Some of these species may be few in number but they are a part of the character of Hawaiian forests. Observing these birds can truly be a life changing experience that would completely vanish with this declines. These birds have exceptional songs and calls that resonate within the forests they reside, losing these sound scapes would also degrade the character of these epic Hawaiian landscapes.

I hope this work will be approved and prevent these songs from vanishing in the forests and becoming only archived recordings. Thank you.

Roy Morris
(585) 307-2227

From: Richelle-Ann Moskvichev
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony
Date: Thursday, March 23, 2023 5:28:51 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2 on the proposed use of the *Wolbachia* Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kauaʻi and Maui.

I believe our extinction crisis is real and needs to be addressed. We are blessed on these islands to have unique and beautiful forest birds. They serve both ecological and cultural significance and cannot be replaced once they are gone. They have been threatened by both anthropogenic and natural entities, and I believe intervention is needed to save the 17 species that remain.

As a young person born and raised on Oahu; I have dedicated my career to study climate change's affect on Hawaii and how we can be resilient to it. The native birds are one of my favorite groups of animals, so much so that I got a tattoo of an I'iwi, Apapane, and Ohia Lehua flowers just this January.

Although there is a stigma against using biocontrol for invasive species, I believe that monitored and conscious applications can work successfully. Using Wolbachia has been tested in other places and has worked. As the climate warms, mosquitoes carrying avian malaria are moving upslope into the last refuge for Hawaiʻi's forest birds.

Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui,

Richelle M.

From:	Kialoa Mossman
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Written Testimony for Maui NPS Wolbachia IIT
Date:	Tuesday, March 21, 2023 5:35:01 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Sincerely,

Kialoa Mossman

From: Erika Murphy
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda item C2
Date: Wednesday, March 22, 2023 1:33:21 PM

The Environment Assessment is thorough and outlines the proper procedure to implement Incompatible Insect Technique in Hawai'i
BLNR should agree with the finding of no significant impact and vote to approve.

As a Caribbean resident, birder, native reforested and environmentalist I strongly implied you to protect the endangered birds for future generations and the health of the whole ecosystem. They deserve our care and protection. The ultimate endeavor of science is to protect the vulnerable. Please protect the birds.

Thank you,
Erika Murphy
St. Croix, USVI

From: Lisa Murphy
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony
Date: Thursday, March 23, 2023 7:34:06 AM

I fully support the Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui.

The research is solid and we must act immediately.

Thank you for the opportunity to comment.

Aloha,
Lisa Murphy
Ma'alaea, Maui, Hawaii

From:	Nicole Nakata
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Monday, March 20, 2023 8:20:46 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I strongly **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the not only a monumental threat to the survival of threatened and endangered native hawaiian forest birds across the State, but also to native forest ecosystems at large. Climate change is exacerbating this threat by allowing the spread of mosquitoes into higher and higher elevations. Hawaii's native forests are at risk from the threat of avian malaria, no matter how remote.

As someone who enjoys learning about and being immersed in Hawaiian native flora and fauna, it is devastating to know that if we do nothing, future generations will not be able to experience the joy of seeing and hearing Native Hawaiian honeycreepers.

Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawai‘i. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Nicole N.

Sent from my iPhone

From: Michael Neal
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Approval of Final Environmental Assessment
Date: Friday, March 17, 2023 4:26:58 PM

Aloha,
I am in favor of the approval.
As a docents for the Nature Conservancy leading hikes into Waikamoi for many years and working with the Forest Bird Recovery Project as a photographer and volunteer, I have seen firsthand the moving of the Mosquito population (with avian malaria) into the higher elevations of Maui.
Please give the native birds a chance.
Mahalo,
Michael Neal
808-344-0625

From: Alissa Nelson
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Conserving native Hawaiian birds
Date: Wednesday, March 22, 2023 3:49:51 PM

Aloha,

I encourage the use of innovative and effective means of mosquito control to protect our unique native bird populations. We do not exist independent of the ʻāina, and thus we must preserve the creatures that are uniquely of this place to protect this place.

I appreciate your consideration and hope that you choose to suppress non-native mosquitoes to support the health of our native birds.

--
Alissa Nelson MA, MSW/MPH
808-631-8579

From: Ilana Nimz
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] SUPPORT, Agenda Item C-2
Date: Tuesday, March 21, 2023 8:05:44 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2 on the proposed use of the *Wolbachia* Incompatible Insect Technique (IIT) to prevent the extinction of the endangered Hawaiian honeycreepers.

I know firsthand that Hawaii's extinction crisis is at a critical point, and action taken NOW will be one of the best steps towards preventing the loss of important and unique forest birds. With only a handful of species remaining of the once diverse and thriving honeycreepers, we have a moral obligation to preserve these animals in perpetuity.

Prompt action is dire for the preservation of our forest birds. Climate change is warming the islands, which expands the range of mosquitoes and shrinks the habitats for forest birds. Endangered birds are being lost daily, and extinction for several species is rapidly approaching.

The proposed conservation actions are the most logical and well-researched actions to take to prevent more extinctions. The IIT is expected to have a profound positive impact on endangered birds and the native ecosystem. Avian malaria carried by mosquitoes is the main cause of forest bird extinctions, and with the tools and technology we have today, specifically IIT, we can address this problem thoughtfully and effectively.

Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui!
Ilana Nimz

--
Ilana Nimz
Winged Ambassadors Education Partnership Coordinator
Oikonos Ecosystem Knowledge
P.O. Box 1918
Kailua, HI 96734 USA
oikonos.org/education

Oikonos Ecosystem Knowledge
Kure Atoll Conservancy
State of Hawaii Division of Forestry and Wildlife
Hawaii Pacific University

From: Ana Lucía OConnor
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Oppose, agenda item C 2, must have EIS
Date: Thursday, March 23, 2023 7:47:42 AM

OPPOSE Approval of the Final Environmental Assessment.
I OPPOSE authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI).

Ana O'Connor

From: Kari Odo
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support Item C-2
Date: Wednesday, March 22, 2023 8:44:40 PM

Please save the birds. Support item C-2

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From: 00reedier-locked@icloud.com
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Upcoming BLNR meeting about mosquito release decision
Date: Sunday, March 19, 2023 11:40:00 AM

Aloha,
I am writing to provide comment on the upcoming topic to make a decision about mosquito release to "save the native forest birds". The method being offered by all the government agencies supports this proposal. What do the people of East Maui, especially the Kanaka maoli, from this land think about this proposal? Does it benefit them the local community? In the early 2000s, avian malaria on the island of Hawaii, was an issue among researchers saving native forest birds. Locals from the community were not or rarely involved in the scientific communities efforts. Management of these kupuna should involve the families and local communities of that aina. Once the mosquitoes are released and the families/community members remain, will you then ask them about a long term plan? Please do an EIS and address how the real issues such as diverted water or cats/mongoose/rats/predators are not a higher priority threat to address. If more water was released into the streams, would it result in less stagnant ponds for mosquitoes to breed. Living streams flowing and reducing mosquito habitat might is a higher priority threat to address. Please consider a long term plan and involve the local families input. Access to these resources, just to visit them is important. Increase family members visitation cultural rights to the Hawaiian birds. What does a scientist offer that a families input should not matter? This temporary fix only benefits the temporary scientists that work on the issue. For a long term fix, please involve more long term resident coordination and visitation. Are these birds so special that they should only be viewed by special people? Who determines who views the Hawaiian birds, Hawaiians? When we transport iwi, a whole Hawaiian delegation performs protocol. Can multiple Hawaiian cultural practitioners working with native birds be hired with the funds? At least as much practitioners should be working on the project as scientist, what efforts were made to include there comments? What do the hunting and gathering community members from East Maui think about this short term experiment? Thank you board for your hard decision to make and recommendations to help better manage Hawaiians.

Mahalo,
Oiwi no ka aina

From: Rae Okawa
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for Agenda Item C-2 BLNR Meeting 24Mar2023
Date: Wednesday, March 22, 2023 10:58:07 AM

Agenda Item:

Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

Testimony:

I wanted to share my **strong support** of this action. You will undoubtedly hear from many experts in this area who are much more qualified than I am to address the safety and efficacy of this measure. I just wanted to share that I believe that this is a necessary action to continue the fight against extinction of our native bird species. I was born and raised on Oahu, went away for college and grad school, and have been back in our islands working in conservation for over a decade. Hawaii is a special place. Please continue to listen to the science and the experts, and push through any hysteria caused by misinformation and fear tactics. You all are in charge of our most precious resources and have such a kuleana on your shoulders. I support this agenda item and support your continued fight to save our native species from vanishing forever. Mahalo nui.

Best,
Rae Okawa

From: Kurt Ongman
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Approve Maui NPS Wolbachia
Date: Wednesday, March 22, 2023 12:13:23 PM

To whom is may concern,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

I write today in shear desperation. Much of my life has been dedicated to the conservation of rare and enigmatic wildlife. PLEASE give Hawaii's enigmatic avifauna the opportunity to heal from mosquitos and mosquito borne illnesses alien to Hawaii.

Mahalo

Kurt Ongman

From:	Brialyn Onodera
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Thursday, March 23, 2023 7:19:45 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Brialyn

--

Brialyn Onodera, EMBA
Mechanical Engineer
Daniel K. Inouye Solar Telescope
National Solar Observatory
22 Ohi`a Ku Street
Makawao, HI 96768

Summit: (808) 727-8187

From:	Brigitte Otto
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date:	Wednesday, March 22, 2023 7:29:07 PM

I **OPPOSE approval of the Final Environmental Assessment.** I **OPPOSE authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI)**.

The scope, risks, and experimental nature of the plan **require detailed, comprehensive studies and documentation** of the impacts to our native birds, wildlife, environment, and public health. I demand **an Environmental Impact Statement (EIS)**.

Sincerely,
Brigitte Otto

From: Cody Pacheco
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Wednesday, March 22, 2023 4:13:28 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

I urge you to APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds. E ola e na manu ʻōiwi!

Mahalo for the opportunity to provide testimony!

- Cody Pacheco

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Leka Kākoʻo 2 BLNR
Date: Wednesday, March 22, 2023 9:49:17 AM
Attachments: Leka Kākoʻo 2 BLNR

A design titled "Leka Kākoʻo 2 BLNR" was shared with you by 4291900367@k12.hi.us.

3/21/23

Welina mai e BLNR.

ʻO Kalawaiʻanui Pagatpatan koʻu inoa. He 9 oʻu makahiki. Hele au i ke Kula Kaiapuni ʻo Nāhiʻenaʻena. No Lahaina mai au. Aia au ma ka papa 4.

Kākoʻo au i ka ʻoukou hana no ka mea ke hoʻomake nei nā makika i nā manu Hawaiʻi. A i nā he makika kāne me kēia koʻohune wolbachia, ʻaʻole hiki ke loaʻa nā makika wahine i ka pēpē. Pono nā manu Hawaiʻi hou no ka mea loaʻa nā manu liʻiliʻi i koe ma Hawaiʻi. He 200 wale nō a ʻemi mai o nā kiwikiu ma Maui.

Inā nahu nā makika wahine i nā manu Hawaiʻi e make ana i 9 mau lā. A i nā ʻaʻohe manu ʻaʻohe kumulāʻau. A i nā ʻaʻohe manu ʻaʻohe ʻāina ka mākou. He mau mea nui na manau ia mākou no ka mea he aliʻi ka manu. Mahalo no ka heluhelu ana i kaʻu leka.

Me ke aloha, Kalawaiʻanui Pagatpatan

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From:	Jill Michelle Palmer
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] agenda item C-2
Date:	Wednesday, March 22, 2023 6:42:38 AM

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Jill Palmer

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Leka 2 Kalehua Paltin-Vierra (Pāhana Manu)
Date: Wednesday, March 22, 2023 8:54:32 AM
Attachments: Leka 2 Kalehua Paltin-Vierra (Pāhana Manu)

A design titled "Leka 2 Kalehua Paltin-Vierra (Pāhana Manu)" was shared with you by 4291800144@k12.hi.us.

3/21/23

Aloha e BLNR,

ʻO Kalehua Paltin-Vierra koʻu inoa. He 11 oʻu makahiki. No Maui mai au a noho au ma Nāpili. Hele au i ke Kula Kaiapuni ʻo Nāhiʻenaʻena ma Lahaina.

Kākoʻo au iā ʻoukou a me kēia pāhana me ke kau ana i ka wolbachia ma nā makika kāne no ka mea inā ʻaʻole kekahi i noʻonoʻo no kēia e make ana nā manu Hawaiʻi i 2 makahiki mai nā makika. A ʻo ia kekahi pilikia nui a pēlā e halapohe ana kekahi hui o nā manu Hawaiʻi. Inā e halapohe ana kekahi manu mai ka hui, e halapohe ana nā manu Hawaiʻi a pau.

He ʻoiaiʻo nō kēia manaʻo, inā nalowale nā manu , e nalowale ana i kekahi ʻāpana o Hawaiʻi. Inā make nā manu e kaumaha loa ana no ka mea ua ʻike pū au i nā manu ma mua oʻu a ua nani loa lākou. A ke hoʻopau ʻoukou i kēia pāhana hiki ke kū ka hapa nui o nā pilikia me nā manu Hawaiʻi. A inā ʻaʻohe manu Hawaiʻi i koe e like me nā iʻiwi, nā palila a pēlā aku, ʻaʻole e loaʻa ana i nā mea kanu Hawaiʻi ma nā wahi like ʻole. No laila inā holo kēia pāhana e maikaʻi pū ana nā manu!

Mahalo no ka hana nui ʻana no kēia mau manu. He kōkua nō nā manu Hawaiʻi he kōkua ia no nā kānaka a he kōkua ia no nā mea kanu. A mahalo iā ʻoukou, ua hiki paha nā manu ke ola i mau makahiki. ʻO ʻoukou nā kumu e ola ana nā manu i kēia mua aku.

Me ke aloha,

Kalehua Paltin-Vierra

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From:	N.Pang
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds in Kauai
Date:	Sunday, March 19, 2023 1:06:52 PM

It is pertinent to address the plight of the akikiki, akeke'e, puaiohi, amakihi, anianiau, elepaio, apapane, and iiwi near extinction staus in Kauai. With the threat of malaria and other mosquito-borne diseases, immediate action must be
taken since the mosquito have expanded to higher elevations due to global warming. With the new technology recently discovered to incapacitate the female mosquito from reproducing, makes sense of limiting the mosquito population.

Further delay will endanger these birds forever.

The webinar initiated through the Nature Conservancy demonstrated such promise for our precious birds' survival.

Sincerely,
Naomi F. Pang
94-571 Holaniku St.
Mililani, Hawaii 96789
n.pang001@gmail.com

From:	Amy Parsons
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Wednesday, March 22, 2023 11:26:06 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

It's unacceptable to continue to allow avian malaria to decimate Hawaii's native birds.

Mahalo,

Amy Parsons

From: Deborah Pate
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Monday, March 20, 2023 8:08:38 AM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

I am writing to your board to support Agenda Item C-2.

Please support the DLNR-DOFAW's request for Board approval of the submitted Final EA and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI). This approach has been used on the mainland and other locations around the world and continues to be used with no impact to the environment. People who understand the "Incompatible Insect Technique" should welcome the suppression of mosquitoes especially if it will save our forest birds from extinction. This technique is safe and effective.

The Environmental Assessment has been done. Do we want to hold the record for the most extinct birds in the world? I think not. Especially when there is a safe solution. I only hope that we have not waited too long to implement the incompatible insect technique.

Please support agenda item C-2. Approve the Final Environmental Assessment and authorize the Chairperson to issue a Finding of No Significant Impact.

Deborah Pate

4100 Queen Emma's Dr. #37

Princeville, HI 96722

From:	Ariel Patterson
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI
Date:	Wednesday, March 22, 2023 6:39:10 PM

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo nui loa,

Ariel Patterson

From: JULIE PAUL
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Wednesday, March 22, 2023 8:44:41 AM

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.
I DO NOT agree to be a part of this experiment. The residents of Maui deserve an Environmental Impact Statement.

Aloha,
Julia Paul
Haiku, Maui

From: Jeremy Pauli
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Item C-2
Date: Wednesday, March 22, 2023 6:35:09 PM

Dear board members,

My name is Jeremy Pauli and I have been visiting Hawai'i for many years. I am writing in strong support of the use of wolbachia mosquitoes to reduce mosquito populations on east Maui. The kiwikiu and 'akohekohe are unique pieces of a fragile endemic ecosystem and they will go extinct, possibly within the next year, if more time is wasted. Wolbachia mosquitoes have been used successfully to lower mosquito populations in multiple locations from Indonesia to Mexico, from Singapore to California. Mosquitoes are not native to Hawai'i and getting rid of them can only improve the ecosystems of each island. The kiwikiu, the 'akohekohe and the aina of Hawai'i needs your help.

Thank you for time,

Jeremy D Pauli

Sent from my iPhone

From: Heidi Pay
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Bio mosquitoes
Date: Wednesday, March 22, 2023 9:20:09 AM

This is a far too dangerous of an experiment and environmental disaster to displace Hawaii with. The repercussions of this measure can be huge. The outcome is unpredictable. The citizens here already don't trust their government, and now they are releasing bio weapons? The corruption NEEDS to stop.

From: Rachael Pecoraro
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] SUPPORT Agenda Item C-2
Date: Tuesday, March 21, 2023 10:28:18 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Agenda Item C-2 on the proposed use of the Wolbachia Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kauaʻi and Maui.

Avian malaria, a disease transmitted by invasive southern house mosquitoes, is driving the extinction of our forest birds. A single bite by an infected mosquito can kill an ʻiʻiwi (a critically endangered forest bird species). As the climate warms, mosquitoes carrying avian malaria are moving upslope into the last refuge for Hawaiʻi's forest birds. Without swift action, several species of honeycreepers will become extinct in the next ten years. The Incompatible Insect Technique can suppress mosquito populations and help save our native forest birds.

This is our last chance to save our amazing and unique birds that are found nowhere else in the world. Extinction is forever. We need to save our birds from mosquitoes that transmit avian malaria before it is too late.

Please SUPPORT the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui,
Rachael Pecoraro
Hawai'i Island resident

From:	Shakira perelman
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 11:56:14 PM

This is essential that this release of mosquitos gets stopped!
RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”

I’m opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I’m opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**
With grave concern,
Shakira Perelman

From: Jae Won Perez
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Monday, March 20, 2023 8:11:14 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I am submitting testimony in strong support of agenda item C-2. Please approve the final environmental assessment and issue a finding of no significant impact.

Our native Honeycreepers are foundational to the ecosystems of Hawai'i. In addition to their cultural significance, these birds are essential to our forests as pollinators, seed dispersers, and insect eaters. Without action or delayed action, these species have no chance of survival and we are risking the loss of our biocultural heritage.

The incompatible insect technique has been used successfully worldwide for vector control for human diseases and will allow us to to address the main cause for the decline of our Honeycreepers: avian malaria transmitted by the Southern House Mosquito. The disease nor the mosquito is native to the Hawaiian islands and the mosquitoes have invaded our Honeycreeper populations.

How many more native forest bird species are we willing to lose, before the impact lead to the collapse of our native Hawaiian forests and watersheds?

Mahalo nui!

Jae Won Perez

--
Kind regards,
Jae Won Perez

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From:	Tammy Ash Perkins
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 at 9:15am Agenda Item C-2: OPPOSE
Date:	Monday, March 20, 2023 8:22:44 AM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned bio-pesticide mosquito releases on Maui.

We need more information and more studies of how this will impact the people BEFORE we launch any bio insects. This project is an experiment on our island home, and the outcome is admittedly unknown.

The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. **This plan may actually impact human health.**

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health.

I demand an Environmental Impact Statement (EIS) and further studies that prove that we the people will not be guinea pigs for bio-terrorism experiments.

Me Ke Aloha
Tammy

Tammy Ash Perkins
Makawao, HI 96768

Sent with Proton Mail secure email.

From: Jared Pirkle
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Monday, March 20, 2023 9:56:44 AM

Aloha,

My name is Jared Pirkle and I support Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA) and Board authorization of the Chairperson to issue finding of no significant impact (FONSI).

I am in full support of this project. I see it as a zero-impact and low cost method to save our Hawaiian Forest Birds. I am aware of the fact that many years of research has shown this method to be safe and effective. Therefore, a full EIS is an unnecessary waste of invaluable time. The clock is ticking. What manu we do have left will likely go extinct in my lifetime if nothing is done. Some, like the kiwikiu will be gone in only a few years. This is our chance to stand up for what is right!

Mahalo.

From:	Ann Pitcaithley
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Opposition to the Approval of the Final Environmental Assessment for the Biopesticide Mosquito Release Plan Maui
Date:	Monday, March 20, 2023 7:05:17 AM

To: BLNR
From: Ann Pitcaithley, Maui

I am in extreme opposition to the approval of the release of biopesticide mosquitos in Maui without a thorough environmental impact statement.
The state has presented an oversimplified Environmental Assessment rather than conducting a thorough Environmental Impact Statement, which would include a detailed analysis of the risks associated with this plan. Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Thank you, Ann Pitcaithley, Maui

From: Sharon Pollock
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] For March 24 BLNR mtg agenda - please SUPPORT agenda item C-2
Date: Sunday, March 19, 2023 2:08:44 PM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2, DLNR-DOFAW's request for Board approval of the submitted Final Environmental Assessment (EA) and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI).

I think we can all agree that the situation facing Hawaii's native forest birds is dire, and that we must do something, safe and effective, as soon as possible to save those birds that remain for future generations.

The proposed Incompatible Insect Technique (IIT) has been successfully used globally for over 50 years. In each case, scientists have researched and analyzed the results and found that the method has no significant negative health or environmental impacts. Furthermore, this technique is the only hope left to save several species of the birds in the short time remaining before extinction.

Currently on the table is a vote on the acceptance of an EA for use of the IIT method to control avian malaria on Maui (and subsequently, Kauai). The EA was performed by accredited experts of The National Park Service and DLNR-DOFAW. As is the case for every other known use of this technique, the EA found that there will be no negative impacts to the health, environment, plants, animals, or people of Hawaii.

Given these facts, and the desperate plight of the birds, please SUPPORT agenda item C-2, and approve the Final Environmental Assessment and authorize the Chairperson to issue a Finding of No Significant Impact.

Mahalo nui for your consideration,

Sharon Pollock
Princeville

From: Kiane Prietto
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] SUPPORT OF SUPPRESSION OF INVASIVE MOSQUITO
Date: Friday, March 17, 2023 4:38:09 PM

SUBJECT: REQUEST APPROVAL OF FINAL ENVIRONMENTAL ASSESSMENT AND AUTHORIZATION FOR THE CHAIRPERSON TO ISSUE A FINDING OF NO SIGNIFICANT IMPACT FOR THE SUPPRESSION OF INVASIVE MOSQUITO POPULATIONS TO REDUCE TRANSMISSION OF AVIAN MALARIA TO THREATENED AND ENDANGERED FOREST BIRDS ON EAST MAUI.

C. II DIVISION OF FORESTRY AND WILDLIFE

DATE: March 24, 2023

TIME: 9:15 A.M.

Aloha nō,

My name is Kiane Prietto and I am from Waimanalo, Oʻahu. I grew up seeing pictures of our native manu but never once seeing one until I moved to Hawaii island in my late 20ʻs. People have shared with me in these small communities of seeing the native birds frequent from mauka to makai. Once the Alala could be heard on the edge of every forest and I grew up without any of those experiences. Our native birds have evolved in isolation over millions of years, resulting in a unique diversity of species found nowhere else in the world. Today they face extinction and along with it will fall our native ecosystems.

Hawaiian native birds include a variety of species of honeycreepers, thruses, doves, and geese. Some of the most well known and iconic species include the Nēnē, ʻIʻiwi, ʻApapane, ʻAkohekohe, etc. Unfortunately, all of these species are threatened and/or highly endangered due to habitat loss, introduced predators, and disease spread by mosquitoes. Please support the current conservation efforts that are underway to protect and restore these unique beautiful birds by any means. Hear what DOFAW has to share in both of their proposed conservation tools: habitat protection through mosquito control using the incompatible insect technique and securing populations of the critically endangered ʻakikiki and kiwikiu in captivity.

Mahalo for taking the time to read through my email.

i lā maikaʻi,

Kiane Prietto
ʻĪnana Program Director

kiane@purplemaia.org

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From: Michael L Quisenberry
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Save the birds!
Date: Saturday, March 18, 2023 11:59:15 AM

Release the modified mosquitos please!
Aloha,
Michael Quisenberry

From: Kayden Radhe
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose!!!
Date: Tuesday, March 21, 2023 11:25:45 PM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health.

I demand an Environmental Impact Statement (EIS).

Kayden Radhe
Blue Bottle Love, FoundHer
kayden@lovblu.com
808.280.0136 C
808.876.0009 O

www.bluebottlelove.com

From: Isidro Ramos
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony
Date: Wednesday, March 22, 2023 11:07:39 AM

I support wolbachia IIT to save native Hawaiian forest birds.
As an elementary teacher in Hawaii, the importance of native animals being a part of our curriculum is crucial. Without these native animals, we would have to start teaching our students about the extinction of Hawaiian birds which is not something I'd be excited to teach about because it occurred during our lifetime.

From: STICK (via Canva)
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Nā paukū-The paragraphs Kamakana Ramos
Date: Wednesday, March 22, 2023 9:46:03 AM
Attachments: Nā paukū-The paragraphs Kamakana Ramos

STICK would like you to take a look at the design titled "Nā paukū-The paragraphs Kamakana Ramos"

3/23/23

Welina mai e BLNR,

ʻO Kamakana Ramos koʻu inoa. He 10 oʻu makahiki. A hoihoi au i ka moʻolelo i pili i nā manu Hawaiʻi. ʻAia au ma ke Kula Kaiapuni ʻo Nāhiʻenaʻena. Noho au ma Pukalani.

Noʻonoʻo wau pono mākou e hoʻomaka i ka hana e hoʻopau i ka hānau ʻia ʻana o nā makika. ʻO ke kumu e hoʻomaka i kēia hana no ka mea ke hoʻomake nei nā makika i nā manu like ʻole. ʻO kekahi o nā manu, ʻane halapohe, ʻo ia hoʻi e pau ana no laila ʻo kēlā ke kumu e hoʻomaka i kēia hana i kēia manawa. He mea nui nā manu no ka pae ʻāina o Hawaiʻi no ka me he mau mele nani a he mau noʻeau i pili iā lākou. A ʻaʻole i hiki ke ʻike i kēia mau manu i na wahi eʻaʻe koe ʻo nā pae ʻāina o Hawaiʻi

Me ke aloha,

Kamakana Ramos

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From: elizabeth ramsey
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Final Environmental Assessment 3/24/2023
Date: Wednesday, March 22, 2023 9:51:45 AM

Dear BLNR members,

Please approve the Final East Maui Environmental Assessment to be reviewed March 24, 2023.
Mosquito birth control and/or incompatible insect techniques are important mitigation strategies for our threatenend native bird population.
The birds and the forests and trees MATTER!

SUPPORT agenda item C-2
Please

In appreciation for your work, your concern
for our natural resources, our 'aina and our bird and forest kin,
Thank you,

Elizabeth Ramsey
kuualoha11@yahoo.com
808-987-7437

P.O. Box 1087
Volcano, HI 96785

From:	Siarah Ranon
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Approve Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Monday, March 20, 2023 8:08:17 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo,
Siarah Ranon

From: Juhl Rayne
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] c-2 oppose the approval -mosquito
Date: Monday, March 20, 2023 8:58:46 AM

aloha,
RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”

I’m opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I’m opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

nothing like this has EVER went right!!! you know that from history,
mahalo,
Juhl Rayne

From: Kate Reimann
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support agenda item C-2
Date: Wednesday, March 22, 2023 7:07:14 PM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

I support Agenda Item C-2, DLNR-DOFAW's request for Board approval of the submitted Final EA and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI).

I believe the proposed conservation action to implement the Incompatible Insect Technique is crucial to protecting our native endangered birds and one of the best courses of action to ensure their survival.

I believe the prepared Environmental Assessment provides the most accurate assessment possible given its rigorous analysis. We are a "birding" household because of my 12-year old son's deep love and appreciation for birds, but especially Hawaiian species. His concern for these species has driven us to take up causes like this, to ensure their futures through the best means of protection, and at this time, agenda item C-2 is the best means to accomplish this.

Please **SUPPORT agenda item C-2. Approve the Final Environmental Assessment and authorize the Chairperson to issue a Finding of No Significant Impact**.

Thank you very much,

Kate Reimann

kate reimann
248.462.5552

From: Paul Munter Reimann
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for the protection of Hawaii"s bird species
Date: Wednesday, March 22, 2023 7:13:49 PM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2, DLNR-DOFAW's request for Board approval of the submitted Final EA and for the Chairperson to be authorized to issue a finding of no significant impact (FONSI).

I believe the proposed conservation action to implement the Incompatible Insect Technique is an important step to take to improve the chances of endangered Maui species such as the Kiwikiu and Akohekohe. This could really improve conditions for these species and help to further the population away from extinction.

I believe the prepared Environmental Assessment, having been rigorously prepared by many researchers, is accurate and that the *Wolbachia* bacteria will not have any other undesirable impacts. This is an important and crucial step to preserve the native species of Maui for future generations such as myself. I am a 7th grader at Le Jardin Academy on Oahu and have passion for birds and bird photography. I would be crushed if I learned I would never be able to see a Kiwikiu because be didn't take this action to preserve the species. Here is a link to my personal blog about birds and school project website for the conservation of Puaiohi on Kauai.
https://paulmunterreimann.wixsite.com/my-site
https://paulmunterreimann0.wixsite.com/the-plight-of-the-pu

Please **SUPPORT agenda item C-2. Approve the Final Environmental Assessment and authorize the Chairperson to issue a Finding of No Significant Impact**.

Mahalo nui!

Paul Munter Reimann, Le Jardin Academy, Oahu

From: Christian Reynolds
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda item C-2
Date: Tuesday, March 21, 2023 7:21:49 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I am submitting this testimony in support of agenda item C-2. The approval of this process is pivotal in the recovery of our native forest birds.

The implementation of the altered male mosquitoes has already been proven effective and safe by several other states and nations. In turn, the benefits of the program's implementation hold much ecological and cultural significance. The native forest cannot function without the honeycreepers, the vast majority of which have already met their demise due largely to the avian malaria carried by these invasive mosquitoes. In order to preserve such an important part of the islands, I ask that this program please be allowed to do its work. Mahalo.

From: Sasha Robinson
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia
Date: Wednesday, March 22, 2023 2:21:24 PM

To whom it may concern,
I SUPPORT board approval of Wolbachia ITT.
Let's give these birds a chance.

Thank you,
Sasha Robinson

From: Kim Rogers
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Monday, March 20, 2023 1:19:22 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I am submitting testimony in strong support of agenda item C-2. Please approve the final environmental assessment and issue a finding of no significant impact.

I enthusiastically support landscape-scale mosquito control in critical forest bird habitat (via a proven safe method known as the Incompatible Insect Technique) to save Hawaii's remaining honeycreepers. This show of support is an acknowledgement of endemic forest birds' critical role in the protection and preservation of our native ʻōhiʻa forests and watershed. Sadly, the loss of these birds would mean yet another loss of Hawaiian culture. We cannot let our forests go silent on our watch.

Saving Hawaii's endemic forest birds is THE conservation crisis of our day—right now, not tomorrow. This is our kuleana. We cannot wait for another generation—or, even, year—to fix it. By then, it'll be too late.

In full transparency, I work for Kaua'i Invasive Species Committee and these thoughts and testimony are wholly my own.

Thank you for your time.

Mahalo,
Kim

Kim Steutermann Rogers
Anahola, HI 96703

Kim Steutermann Rogers
Read: kimsrogers.com
Call: 808.634.6667
Social: @kimsrogers
Email: kimsrogers@mac.com
P.O. Box 823
Anahola, HI 96703

From:	Steven Rose
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Thursday, March 23, 2023 8:17:56 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Steven Rose

From:	Karen Rowland
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date:	Wednesday, March 22, 2023 10:56:08 AM

To Whom It May Concern:

"DLNR's Proposed Strategy to prevent Bird Extinction on Maui & Kauai" is flawed and *I DO NOT accept the Environmental Assessment's Anticipated Finding of No Significant Impact (DEA-AFONSI). The scope, risks, and experimental nature of the plan* ***require detailed, comprehensive studies and documentation*** *of the* ***impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).***

Thank you,

Karen Rowland

(808) 640-6981

From: Daniel Rubinoff
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] support for agenda item c-2, controlling mosquitoes with Wolbachia
Date: Wednesday, March 22, 2023 1:19:37 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I am writing in strong support of the incompatible Insect technique using Wolbachia for invasive mosquito control in Hawaii. I am a professor of Entomology with over 30 years of experience in genomics, though I do not work on this project and have no professional stake in it.

I am writing because it is good science and the risk of a negative impact is incredibly small. The risk of doing nothing is incredibly high, as the last Hawaiian Honeycreepers and other native birds are on their last legs. I urge you to issue a finding of no significant impact for this project. The science on which it is based is neither terribly new nor controversial in scientific circles, or other countries. The application has already been proven in other places, and the danger it poses is truly minimal (essentially, there is no demonstrated danger). Unfortunately, there are folks who don't have a background in science or in entomology who fear what they don't understand. While it's regrettable that misinformation has spread, science is based on fact and experimentation and these aspects of the proposal have already been demonstrated repeatedly in other places to be a good bet with essentially no risk.

There are many decisions for which the opinions of everyone should be considered equally, having to do with civic issues and management. But in this case, it is a scientifically sound proposal and the opponents are not using facts to support their positions. Considering scientific facts and opponents' misinformation as equally valid 'sides' to a story is not a viable basis for making decisions about actions as critical and clear as the one before you regarding mosquito control. History will judge us for how we've acted to conserve what's left of Hawaiian Biodiversity. You, as board members, have a chance to make a critical decision to try and save what remains of one of Hawaii's most iconic Native Species. Please don't be swayed by misplaced fears or think that more time is needed. Now is our last chance, and the risks couldn't be lower for acting or higher for delaying. Future generations will thank you for marking a turning point in the extinction crisis facing these incredible islands.

Sincerely,

Daniel Rubinoff

From: SaiFon
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] PLS NO MOSQUITTOS~
Date: Wednesday, March 22, 2023 2:03:27 PM

THERE ARE ALREADY enough mosquitoes here~ PLS STOP!!TY:0)

From:	Moriah Salado
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Please SUPPORT the mosquito control efforts touched upon in agenda item C-2.
Date:	Thursday, March 23, 2023 12:07:51 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2 on the proposed use of the *Wolbachia* Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kaua‘i and Maui.

I believe our extinction crisis ….

I believe the proposed conservation actions….

Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui!
Moriah
Salado

Sent from my iPhone

From:	Sita Santos
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Wednesday, March 22, 2023 9:19:57 PM

To Whom it May Concern,

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I am a local Haiku resident & **I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui.** This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia*bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

I stand against this initiative to release these infected mosquitoes in Hawai'i.

Kiara Silverstein Santos

From: Amber S
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Mosquito Control testimony
Date: Sunday, March 19, 2023 12:06:04 PM

Aloha,
Listen to the science! This is truly the last chance for these birds. Please allow wolbachia to be used in east Maui. The time is now. Before its too late. Over 70 birds have been lost and extinct due to your inaction. Take action now.

Regards.

From: Amber Saychek
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Written testimony Mosquito control
Date: Sunday, March 19, 2023 12:05:04 PM

Aloha,
Listen to the science! This is truly the last chance for these birds. Please allow wolbachia to be used in east Maui. The time is now. Before its too late. Over 70 birds have been lost and extinct due to your inaction.

Regards.

From: Sandra Schachat
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] C-2 testimony: avian malaria
Date: Thursday, March 23, 2023 8:49:11 AM

To whom it may concern,

I am an entomologist at the University of Hawai‘i at Mānoa and I am writing to voice my support for agenda item C-2 for tomorrow's meeting: Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui.”

Immediate action is needed to save various honeycreeper species from extinction. As an entomologist working on flies I know that *Wolbachia* is a safe control method that will not cause harm to humans or ecosystems. As a biologist in Hawai‘i, I am very often saddened to think about the many species here that have become extinct and are in critical danger of extinction. The *Wolbachia* intervention in Maui gives us hope of preserving invaluable honeycreeper species for future generations.

Thank you very much for your consideration.

Sincerely,
Sandra

--
Sandra R. Schachat, Ph.D.
Schmidt Science Fellow
Rubinoff Lab, UH Mānoa
http://www.neuration.net

From: SCHOOL BUS
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Oppose Agenda Item C2: Must have environmental impact statement (EIS)
Date: Tuesday, March 21, 2023 10:39:26 PM

I OPPOSE Approval of the Final Environmental Assessment.
I OPPOSE authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI).
The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).

From: Hailey Schurz
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Mosquito Control Testimony
Date: Sunday, March 19, 2023 11:18:15 PM

Aloha,

I am submitting my testimony to say that Native species should be at the forefront of protection by the state. The BLNR should agree with the findings of no significant impact; vote to approve and implement incompatible insect techniques. Thus, eradicating or at the very least suppressing the invasive mosquito population from putting strain on the population of Native Hawaiian avian species.

Pleadingly,
Hailey Schurz of Waimānalo, O'ahu

From: Christa Seidl
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Approve FONSI for Maui EA (approve Wolbachia IIT)
Date: Thursday, March 23, 2023 6:39:38 AM

Good morning,

I SUPPORT board approval of Wolbachia IIT. This will help protect the ecologically and culturally valuable birds of our islands. I trust the years of hard work and science that have led to Wolbachia IIT being considered as a tool for mosquito and disease suppression. I am convinced it is currently one of the best and safest option for the suppression of an invasive mosquito in Hawaii.

Please vote in favor of approving Wolbachia IIT in Hawaii. Thank you,

Christa Seidl
Maui Co. resident

From: Erin Stephany
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Wednesday, March 22, 2023 5:46:37 AM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”

Dear lovers of life ~

I’m opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I’m opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Mahalo for helping to heal our home.

~Elfina

From: Nicole
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] save native birds
Date: Thursday, March 23, 2023 8:05:15 AM

---

please consider the use of wolbachia mosquitos in saving the critically endangered native hawaiian birds such as ʻi'iwi, ʻapapane and more.

i recently got to tour the hakalau forest on the big island- a prime example of people turning ranches back into native forests- and hearing the native hawaiian birds there just sent chicken skin down my arms.
if the birds go extinct, then the plants follow. do not let this happen.
allow the scientists to do their job and fund them!
mahalo nui loa

aloha~
nicole seu
808-779.7855-mobile
www.studio3511.com
facebook.com/studio3511
yelp!
Instagram/venmo: @studio3511

Sent from iPhone

published! click below for a few featured weddings....
basic invites
pacific weddings
hawaii bride and groom
inspired by this
pretty my party

From: Claudia Shaughnessy
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C-2
Date: Wednesday, March 22, 2023 4:16:02 PM

Hi there,

I just wanted to show my support of Item C-2. Although I'm not a resident of Hawaii, I strongly believe it is critical that we protect native species and support biodiversity. Biodiversity is an important factor of a healthy and resilient ecosystem, which is needed now more than ever as we face climate change impacts.

Please consider the treatments to save Hawaiian native birds, especially those that are endemic.

Regards,

Claudia
--
Claudia Shaughnessy, student
BCIT BSc Ecological Restoration Program
claudianessy@gmail.com

From: Kalaheo PTSA
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Strong SUPPORT to approve agenda item C-2
Date: Tuesday, March 21, 2023 9:05:49 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

The Kalāheo Elementary School PTSA strongly supports DLNR-DOFAW's proposed management actions to prevent the imminent extinctions of forest birds in Hawai'i.

Please approve the East Maui EA titled: "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui."

Our school community cares deeply about our precious native Honeycreepers who play a vital role in our forest ecosystem, keeping the forest healthy and laying the foundation for our watersheds. Our children have been learning about the threat of avian malaria to our forest birds and the proposed actions to save them with their science teacher Crystal Kalauawa. The Kalāheo 4th grade students have also written and submitted testimony in support and are participating in the Hawaiian Honeycreeper Day advocacy project.

We already have lost dozens of forest bird species which not only played a crucial role as pollinators, seed disperser and insect eaters, but were also extremely important to the native Hawaiian culture. Today, we are seeing alarming population declines in our endemic Honeycreepers on Maui and Kaua'i – kiwikui, 'ākohekohe, 'akikiki, 'akeke'e – due to avian malaria, placing us at the brink of losing yet another part of our unique biocultural heritage.

The proposed plan by the "Birds Not Mosquitoes" partnership to use Wolbachia Incompatible Insect Technique to suppress mosquito populations is well-researched and has been used successfully worldwide. It targets the mosquitos responsible for the spread of avian malaria, does not impact humans or any other species, and may be one of the last hopes these birds have.

The Kalāheo Elementary School PTSA is confident in the scientific work and research carried out by the involved state and federal agencies, the conservation projects and their partners and strongly encourages the BLNR to support and help to execute this project on Maui, Kaua'I, and the State of Hawai'i.

On behalf of Kalāheo Elementary School PTSA,

Julie Shaw, President

From: Ralph Sherman
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Oppose agenda item C2
Date: Monday, March 20, 2023 1:01:17 PM

Are you out of your minds? This plan is dangerous and ill advised.

From:	Katie Shiroma
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Sunday, March 19, 2023 7:03:51 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Katharine Shiroma

From: David Shormann
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date: Tuesday, March 21, 2023 10:31:00 AM

Aloha,
I am writing to oppose approval of the Final Environmental Assesment. I OPPOSE authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI).

The scope, risks, and experimental nature of the mosquito release plan Require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).

I demand a full EIS because there are so many unknowns, and risks, including accidental female mosquito release, and unknown impacts to native birds, wildlife, environment, and public health.

It would be more reasonable to put more effort into reducing populations of invasive mammals like cats, mongoose, and pigs.

Mahalo,
David E. Shormann, PhD
www.diveintomath.com
surfengineers.com

U.S. Patent 10,858,088. Click here to read.
Read my latest research published in PLOS ONE Journal.
Blog: drshormann.com
Instagram: @dshormann, @diveintomath
Proverbs 4:13

From: Cyndi Simon
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia
Date: Wednesday, March 22, 2023 12:29:07 PM

To whom it may concern,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Mahalo,
Cyndi Simon

From:	Kathleen Simon
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia
Date:	Wednesday, March 22, 2023 12:36:25 PM

To Whom it May Concern,
I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Mahalo,
Kathleen Simon

From:	Melissa Simon
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia
Date:	Wednesday, March 22, 2023 12:24:37 PM

To whom it may concern,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Through my work with Kauai and Maui Forest Bird Recovery Projects, I have seen firsthand the devastating impacts that invasive mosquitoes have on native Hawaiian birds. These birds are crucial to ecosystem health and have no chance of survival without human intervention. I am writing today to implore you to approve the use of wolbachia on the landscape. We are running out of time.

Mahalo,
Melissa Simon

From: Bonnie Slater
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23
Date: Wednesday, March 22, 2023 11:17:18 AM

I, Bonnie Slater am opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**
--

Bonnie Slater
(cell) 303-550-6290

doulasofmaui@gmail.com
doulasofmaui.com
Birth Doula / Trainer

From:	mghsmart
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] OPPOSITION to Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date:	Tuesday, March 21, 2023 6:55:06 PM

I DO NOT accept the Environmental Assessment's Anticipated Finding of No Significant Impact (DEA-AFONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS) regarding DLNR's proposed strategy to prevent bird extinction on Maui & Kauai.

Mary Smart
Mililani Town, HI

From: Bart Smith
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Mosquito Release
Date: Sunday, March 19, 2023 8:51:51 PM

Dear Sirs

You are making a huge mistake and I have heard that you will be held accountable by law suits that will come out of your personal pockets
not the pockets of the tax payers.

Before you do this, you should remove the Peacock Grouper and the Mongoose and other introduced species that end up causing
harm to the environment because you couldn't see far enough down the road to the unintended outcomes.

Best Wishes
Dr. Robert B. Smith

From: Sophia Smith
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Testimony
Date: Wednesday, March 22, 2023 6:21:34 PM

I am writing to express my support for the use of the Wolbachia Incompatible Insect Technique on Maui. As a lifelong resident of Hawaii, I have seen firsthand the degradation of our native species and ecosystems, and I wish we could go back in time to prevent so many extinctions- but of course, that is impossible. What is possible is the prevention of more extinctions of our incredible and unique native birds by using this Wolbachia Incompatible Insect Technique to prevent the further spread of avian malaria, which is killing our native birds. There are decades of research supporting this method, all pointing to successful reduction of mosquitoes, and therefore reduction in avian malaria, and an increase in the chance of survival of our native species.

As a young scientist and emerging professional, I sincerely hope this Wolbachia Incompatible Insect Technique will be allowed to be conducted. If not, our birds that are vital to Hawaii's culture and ecosystems will die, and people like me who want to dedicate their lives to the preservation of these species will be incredibly discouraged.

Please approve the Maui NPS Wolbachia Incompatible Insect Technique and issue a FONSI to not only save these birds, but send a positive message to young emerging scientists like me that hope is not lost, and our government is willing to work with us to save these species.

Mahalo for the opportunity to submit testimony,
Sophia Smith

From: Jewley Smith
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL]
Date: Wednesday, March 22, 2023 7:47:47 AM

I am a concerned resident of haiku hawaii. I am deeply disappointed in our government representatives for allowing this to happen. .Our community is not a science experiment. The animals on maui are not science experiments. You claim that it is to combat avian malaria but you have no idea the effects. It will have other indigenous and native species in hawaii. You have no idea the effects it will have on the humans. You should expect legal by the citizens of hawaii, because that is what is going to happen.

The governments function is to people its people. I have not spoken to 1 person who thinks this is a good idea.

Rethink your actions before its to late

From: James Smithers
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia
Date: Wednesday, March 22, 2023 12:29:16 PM

To whom it may concern,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Mahalo,
James Smithers

From: mineluvss
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Sunday, March 19, 2023 8:57:20 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Jasmine Soriano

Sent from my iPhone

From: Fred Spanjaard
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Pls Oppose BioPesticide Mosquitoes!!!
Date: Wednesday, March 22, 2023 4:07:31 PM

Aloha,

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Mahalo,
Fred

Fred Spanjaard
Global Media Productions
808-875-8820 office
808-283-5365 cell
www.globalmediaproductions.com

From:	Jennifer"s
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] SubjectSubject: BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Monday, March 20, 2023 5:01:44 AM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”

I’m opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia*bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I’m opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I demand an Environmental Impact Statement (EIS).: BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”

I’m opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia*bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I’m opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I demand an Environmental Impact Statement (EIS).

Jennifer Starr

Sent from my iPhone

From: Amelie Sterling
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Wednesday, March 22, 2023 9:32:22 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds. Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Amelie Sterling

From: Kaci Stokes
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony in Support of Item C-2
Date: Thursday, March 23, 2023 6:19:58 AM

Aloha,

I am writing in support of Item C-2 to employ the Wolbachia Incompatible Insect technique. This technique has proven to be effective and can save our native birds. Hawai‘i has suffered from far too many extinctions already. Please don't let our beloved forest birds become just another name on the list of species we've failed to save.

Me ka mahalo nui,
Kaci

Kaci Stokes (she/her)
University of Hawai‘i at Mānoa
Natural Resources and Environmental Management
stokesk@hawaii.edu

From: Kaleiheana-A-Pohaku Stormcrow
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Wednesday, March 22, 2023 7:53:16 PM

Aloha e Chair Designate Chang and members of the Board of Land and Natural Resources,

As a Kanaka ʻŌiwi wildlife biologist and ecologist, I strongly SUPPORT the Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Our endemic forest birds—who are found nowhere else in the world and have evolved over millions of years to pollinate our native plants—are in drastic decline due to avian malaria, which is spread by invasive mosquitoes. As an ʻŌiwi cultural practitioner, I consider honeycreepers an ancestor. They are highly esteemed in our culture and are vital to the ecology of our forests. If already rare, threatened, or endangered plants lose their avian pollinators, it could cause an extinction vortex that would be impossible for the ecosystem to recover from. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Avian malaria is the greatest threat to the survival of what remains of our native Hawaiian forest birds, many of which have already gone extinct. Presently, on Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines due to the spread of mosquitoes into high elevation forests because of climate warming. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

Even the most pristine of Hawaiʻi's native forests are unsafe for forest birds if mosquitoes are present, and spreading avian malaria. Wolbachia IIT utilizes natural bacterias present as a safe and effective form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science that have concluded there are no significant negative environmental or cultural impacts. Therefore, preparing a full EIS is not only unwarranted, but also a waste of time and resources that should be used to save our forest birds who have very little time left if we stall on implementing this tool. Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Wolbachia IIT is currently the only hope we have. My heart cannot handle another forest bird going extinct in my lifetime.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Kaleiheana-a-Pōhaku Stormcrow
Graduate Assistant/Avian Wildlife Tech, Price Lab
Department of Natural Resources and Environmental Management
University of Hawai'i Mānoa
pronouns: they/them

From: Kiera Strohm-Herman
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Written testimony, Agenda Item C-2
Date: Wednesday, March 22, 2023 3:20:34 PM

Aloha,

I am writing in support of Haleakala National Park's plan to help our native forest birds by attempting to control mosquitoes in our native forest habitat here on Maui. Please approve their EA and allow this work to go forward. The continued existence of our endemic birds requires this assistance from us.

Mahalo for your work and for your consideration on this matter,

Aloha,
Kiera

Kiera Strohm-Herman
449 Kealaloa Ave
Makawao HI 96768

From: halo and swan
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Wednesday, March 22, 2023 5:19:57 AM

STOP THIS INSANE ENVIRONMENTAL MEDDLING!
IT IS CRIMINAL. I AM OPPOSED TO THIS BIOPESTICIDE RELEASE.

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui.

Subject: BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

From:	Aimee Szabo
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Thursday, March 23, 2023 8:36:55 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Aimee Szabo
63 Puakea Pl.
Kula, Hawaii 96790
808-878-1070
aimee.szabo@hotmail.com

From: L. Szabo
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Mosquito control testimony
Date: Thursday, March 23, 2023 7:26:59 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Louis Szabo
63 Puakea Place
Kula, HI 96790

From: Sandra Tailor
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] OPPOSE Agenda item C2
Date: Wednesday, March 22, 2023 1:32:30 PM

DLNR's Proposed Strategy to prevent Bird Extinction on Maui & Kauai" I DO NOT accept the Environmental Assessment's Anticipated Finding of No Significant Impact (DEA-AFONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentationof the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).
Sandra Tailor

From: Takamori, Kellie
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support Wolbachia IIT
Date: Wednesday, March 22, 2023 3:49:34 PM

I support mosquito control using Wolbachia IIT to save forest birds in Maui. It's the only hope to suppress avian malaria transmission and native bird extinction.

From: Jared Taylor
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C2
Date: Wednesday, March 22, 2023 7:00:51 PM

Aloha,

Mahalo for the opportunity to testify on agenda item C2. The Department of Land and Natural Resource's Environmental Assessment is thorough and outlines the proper procedure to implement Incompatible Insect Technique (mosquito birth control) in Hawai'i. Based on this, the Board should agree with the Findings of No Significant Impact and vote to approve.

Mahalo,
Jared Taylor

From: Teasy
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Thursday, March 23, 2023 8:38:15 AM

To Whom It May Concern,

Please help save Hawaiian Honeycreepers!
For a long time, the birds we love have been suffering under the invasive mosquitos. They are such an important and amazing part of Hawaii's ecosystem. Thus, mosquito birth control must start sooner than better!
Please take the necessary steps to right the wrongs of the past by suppressing and eliminating mosquito populations.
We don't want to lose more Hawaiian bird species we love!

Mahalo!
Teasy

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Ko Nālei'a'ala Teruya leka no BLNR
Date: Wednesday, March 22, 2023 9:45:33 AM
Attachments: Ko Nālei'a'ala Teruya leka no BLNR

A design titled "Ko Nālei‘a‘ala Teruya leka no BLNR" was shared with you by 4062100873@k12.hi.us.

3/22/23

Ke aloha nui e BLNR,

‘O Nālei‘a‘ala Teruya ko‘u inoa. He 9 o‘u makahiki. Hele wau i ke Kula Kaiapuni ‘o Nāhi‘ena‘ena. Aia au ma ka papa 4. ‘O Kumu Kauna‘oa ka‘u kumu. No Lahaina, Maui mai wau.

Kāko‘o wau i kēia hana BLNR no ka mea ke hui pū ‘ia nā makika kāne me nā makika wahine, ‘a‘ole hiki ke loa‘a i nā pēpē ke kau ia i ke Ko‘ohune ‘o Wolbachia ma loko o nā makika kāne. A inā loa‘a ‘ia nā pēpē, e ‘oi aku ‘ana ka lehulehu ‘o nā makika.

Pono kekahi mau manu e noho ma ka pahu manu no ka mea ma‘i paha mai ka Avian malaria a i ‘ole ‘a‘ole makaukau e ho‘i i ka nāhelehele ‘o uka. Ua huaka‘i mākou i Maui Bird Conservation Center a ua a‘o nui mākou no nā ‘alalā, palila, kiwikiu, a me nā ‘akikiki. Ua noi’i pū mākou no nā manu Hawai‘i e ‘ane halapohe ana. Ua koho wau i ka ‘ō’ū.

He mea nui nā manu a "he ali‘i nā manu" no ka mea kanu lākou i nā ‘ohi‘a lehua ke inu lākou ka wai mai ka pua. A ua ho‘ohana nā ali‘i i ko lākou hulu no nā ahu‘ula. A pono kākou a pau e mālama i nā manu no ka mea inā ‘a‘ohe manu, ‘a‘ohe ‘āina. Mahalo no ka ho‘olohe ‘ana mai. A hui hou

Me ke aloha,

Nālei‘a‘ala Teruya

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The Nature Conservancy
Hawai'i and Palmyra

The Nature Conservancy, Hawai'i and Palmyra
923 Nu'uanu Avenue
Honolulu, HI 96817

Tel (808) 537-4508
Fax (808) 545-2019
nature.org/HawaiiPalmyra

Testimony of The Nature Conservancy
In Support of Agenda Item C-2, "Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the 'Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui'."

Hawai'i Board of Land and Natural Resources
March 24, 2023, 9:15 AM
Kalanimoku Building, 1151 Punchbowl St., Room 132 and via Teleconference

Aloha Chair Chang and Board Members:

The Nature Conservancy (TNC) of Hawai'i and Palmyra strongly **supports** the Hawai'i Department of Land and Natural Resources' (DLNR) proposal to prevent the extinction of endangered native forest birds by suppressing populations of the invasive *Culex quinquefasciatus* mosquito on Maui. **We ask the Board to approve the Final Environmental Assessment (EA) and authorize the Chairperson to issue a Finding of No Significant Impact to allow DLNR and partners to move forward this critical project.**

Native Hawaiian forest birds are imperiled by the spread of avian malaria which is carried into their last remaining habitat and transmitted to the birds by invasive mosquitoes. This disease caused waves of extinctions after it was introduced in the early 1900s and the continued impacts have been tracked for decades by researchers and land managers alike. Recently, the Maui Forest Bird Recovery Project released data on its 2021 Moloka'i, Hawai'i Forest Bird Survey Report, which showed zero confirmed detections of 'i'iwi, and 'amakihi confirmed detections were only confined to one transect that was monitored. These results in Moloka'i, where even the more common native forest bird species are disappearing or having their ranges shrunk, show what could be in store for islands with higher elevations without a concerted effort to protect the birds.

Historically, pesticide application and management of breeding habitat were the only options for controlling mosquitoes, neither of which are appropriate for controlling mosquitoes in the forest habitat where Hawai'i's endemic forest birds persist. But now there is hope with an approach called Incompatible Insect Technique (IIT) which leverages naturally occurring bacteria within the *Culex* mosquitoes and releases of "incompatible" male mosquitoes to suppress *Culex* populations. Note, male mosquitoes are nectar feeders and do not bite humans or wildlife, nor are mosquitoes important for native species or ecosystem function in Hawai'i.

We are excited to have an option for saving our birds from mosquito-borne disease that is safe for animals and humans alike. Decades ago, IIT was developed for agricultural pest and human disease control, and it went through rigorous vetting and regulatory approvals to be applied safely in human-inhabited areas. This project is proposing to release incompatible male *Culex*

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Founders: Samuel A. Cooke Herbert C. Cornuelle

mosquitoes in the remote mountain forests of our islands, starting on Maui. Most people will not even see the released male mosquitoes as they will not interact with humans.

IIT is a good option for disrupting the avian malaria disease crisis imperiling Hawai‘i’s endemic forest birds: it is specific to only one species of mosquito, it does not introduce toxicants to the environment, and the removal of introduced mosquitoes will not impact the native food web in Hawai‘i’s forests. Furthermore, this action would not introduce any new organisms to Hawai‘i. Wolbachia, the genus of intracellular bacteria naturally occurring in *Culex quinquefasciatus,* prevents reproduction when mating male and female mosquitoes carry incompatible strains.

We agree with DLNR that an EA is appropriate for this project as there is no significant environmental impact expected with IIT suppression of *Culex quinquefasciatus*. TNC is confident that the risks and impacts assessed by DLNR and the National Park Service (NPS) in the East Maui Mosquito Suppression EA are comprehensive of this project, and we encourage you to support this strategy. The NPS has also issued a Finding Of No Significant Impact for the East Maui EA in compliance with the National Environmental Policy Act (NEPA), the national equivalent to the Hawaii Environmental Policy Act (HEPA).

If we do not act now, we will see the extinction of multiple native bird species within ten years, and as soon as one year. TNC, DLNR and many members of Hawai‘i’s conservation community have dedicated significant time and resources to provide safe habitat for Hawai‘i’s native forest birds through management of preserves including fencing, ungulate removal, weed control, native tree restoration, and predator control. Avian malaria vector control through mosquito suppression is the key piece that can reverse the downward population trends our birds are experiencing while keeping them in their forest home. Please **support and approve issuance of a Finding of No Significant Impact for the East Maui EA** before it is too late for our birds.

Mahalo for your support and stewardship of Hawai‘i’s natural resources.

The Nature Conservancy of Hawai‘i and Palmyra 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.

From:	Naneaikealaula Thomas
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Wednesday, March 22, 2023 4:11:23 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

I urge you to **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds. **E ola e na manu ʻōiwi!**

Mahalo for the opportunity to provide testimony,

Nanea Thomas

Subject: BLNR Meeting 3/24/23 9:15am Agenda Item C-2: **Oppose**

Aloha,

This testimony is in regards to item C-2 Request Approval of Final Environmental Assessment (EA) and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I am **strongly opposed** to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases anywhere in Hawaii. I have been involved with submitting testimonies since spring of 2022 and it is clear this project is being fast tracked with no regard for numerous legitimate concerns. There are issues with security, conflict of interest, lack of proper study, permitting, and this project is undoubtedly an experiment which can have serious consequences that are **irreversible**.

My background spans over 30 years in National Security and Investigations as a Subject Matter Expert. According to the Final EA there has been no risk analysis conducted on the security vulnerabilities for lab bred mosquitoes that can be utilized as bio-weapons against a population (intended) nor any mention of quality control for accidental transmission of pathogens (unintended).

Intended entomological warfare involves infecting insects with a pathogen and then dispersing the vectors over target areas. Invasive insects can also be deployed into a country en masse to take out crops and cripple a food supply. In New York the Plum Island lab was involved in the development of offensive bioweapons that led to Lyme's disease outbreaks. Japan's biological warfare unit (Unit 731) was deployed against China during World War II. The unit deployed plague-infected fleas and cholera-infected flies to take out the Chinese. https://citizens.news/694097.html

"We recommend careful invigilation of the international borders, airports, and seaports by the trained scientists to identify any accidental and/or deliberate import of alien arthropod vectors. Therefore, it is well advised to take seriously the possibility that arthropod could be used to attack people. Moreover, future research priorities should also includes high-throughput molecular diagnostics of diseases, identification of vectors, phylogenetic studies to understand the origin and distribution of the pathogen and vector strains. A rapid action team of trained scientist and health workers equipped with modern sophisticated diagnostic tools and suitable vector extinguishers should be appointed by the state and/or central health authorities to counter act any such emergency". Bioterrorism on Six Legs by Dr. Manas Sarkar.

There is no mention in the Final EA on how lab batches will be quality controlled or tested for unintended pathogens upon arrival to Hawaii or if lab employees in contact with these mosquitoes will go thru security clearance screening and training. Our

science and tech industry in the United States has been heavily infiltrated by the Chinese Communist Part (CCP). Due to the deterioration of relations between the US and China, among other adversaries, this project should not move forward until sound security protocols are adequately implemented. https://www.justice.gov/opa/pr/harvard-university-professor-and-two-chinese-nationals-charged-three-separate-china-related

The U.S. Department of the Interior Strategy for Preventing the Extinction of Hawaiian Forest Birds confirms that The Nature Conservancy has contracted with mosquito lab Verily Life Sciences. There is no mention of this contract in the EA. No documented assurances have been made that Verily Life Sciences will be testing mosquitoes for human or avian diseases to ensure that they are pathogen-free prior to shipping to Hawaii. As this project involves the interstate transport of Culex mosquitoes, a known vector of poultry diseases, there is concern about impacts to local poultry farms and egg production in Hawaii. Has the USDA inspected the Verily insectary? There is no mention in the Final EA of a USDA permit (e.g. OV VS16-6 permit from APHIS) for the interstate transport of poultry pathogen vectors by a California shipper.

According to APHIS: The Veterinary Services, Organisms and Vectors (OV) Permitting Unit regulates the importation into the United States, and interstate transportation, of organisms and vectors of pathogenic diseases of livestock and poultry.

The Code of Federal Regulations, in 9 CFR, §122.2, mandates that “no organisms or vectors shall be imported into the United States or transported from one State or Territory or the District of Columbia to another State or Territory or the District of Columbia without a permit”.

Given that interstate transport of the vector (live Culex) is occurring from Maui to Verily's lab in South San Francisco, CA and those Culex may contain a highly contagious poultry pathogen, such as avianpox virus, movement between states needs a federal permit. Lab mosquitoes are blood fed, the EA makes no mention of what type of blood or how they would mitigate risk transporting avian pathogens back to Hawaii.

The Bill and Melinda Gates Foundation have openly discussed support of human depopulation; this is the same foundation that funded original research of Wolbachia mosquitoes in 2003. There are too many coincidences and not enough objective analysis of the big picture ecology by the BNM steering partners whom have been myopically focused on saving the birds at all costs. This lack of careful study and observation could instigate increased rates of extinction due to multiple potential secondary impacts.

Wolbachia is NOT harmless to humans. It effects filarial worms that cause human disease such as river blindness which effects tens of millions of people each year. According to the CDC website, “There is a promising treatment using doxycycline that kills the adult worms by killing the Wolbachia bacteria on which the adult worms depend in order to survive”. https://www.cdc.gov/parasites/onchocerciasis/treatment.html
.

“For decades, people have blamed a parasitic nematode worm for a disease that has blinded at least 250,000 people now living in Africa and South America. But the real culprit may be the ubiquitous Wolbachia, bacteria that colonize many hundreds of species, including the worm indicted in river blindness. Researchers now report that **Wolbachia stimulate the severe immune system response that slowly robs people of their vision**”. https://www.science.org/content/article/worms-may-not-act-alone-river-blindness

Even though male mosquitoes do not bite, **male Culex mosquitoes are known to spread viruses to female mosquitoes through mating**. Venereal Transmission of St. Louis Encephalitis Virus by Culex quinquefasciatus Males (Diptera: Culicidae) – Donald A. Shroyer (Journal of Medical Entomology, 5/1990)
https://academic.oup.com/jme/article-abstract/27/3/334/2220754?login=false

Anti-Wolbachia therapy for onchocerciasis & lymphatic filariasis: Current perspectives
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6755775/

Efficacy of 2- and 4-week rifampicin treatment on the Wolbachia of Onchocerca volvulus
https://pubmed.ncbi.nlm.nih.gov/18679718/

Wolbachia Enhances West Nile Virus (WNV) Infection in the Mosquito Culex tarsalis
https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0002965

Wolbachia Can Enhance Plasmodium Infection in Mosquitoes: Implications for Malaria Control? https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4154766/

Horizontal gene transfer between Wolbachia and the mosquito Aedes aegypti
https://bmcgenomics.biomedcentral.com/articles/10.1186/1471-2164-10-33

Science is recently discovering **detection of Wolbachia genes in humans**:
Detection of Wolbachia genes in a patient with non-Hodgkin's lymphoma
https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(14)00040-8/fulltext
Wolbachia 16S rRNA and fbpA genes were twice detected over 5 days in the blood of a patient with high fever. The patient was given fluoroquinolones and the fever resolved. Four weeks later, he was diagnosed with non-Hodgkin's lymphoma and received R-CHOP (Rituximab, Cyclophosphamide, Doxorubicin, Vincristine, Prednisolone) treatment resulting in complete remission. This is the first report of detection of Wolbachia genes from the blood of human patients with non-Hodgkin's lymphoma.

The EA’s assertion that released mosquitoes pose no risk to human health is based on unsound science. The 2010 article by Popovici et al. cited in the EA has been discredited by the EPA. The EPA Human Studies Review Board met in 2018, and the following question was posed:

“Is the research described in the published article ‘Assessing key safety concerns of a Wolbachia-based strategy to control dengue transmission by Aedes mosquitoes’ scientifically sound, providing reliable data for the purpose of contributing to a weight of evidence determination in EPA’s assessment of the risks to human health associated with releasing Wolbachia-infected mosquitoes?”

The Board’s response states: “The Board concluded that the research described in the article by Popovici et al. was not scientifically sound and does not provide reliable data to contribute to a weight of evidence determination for assessment of human health risks due to release of Wolbachia-infected mosquitoes.”

Since Verily Life Sciences is the most likely sole source candidate to provide lab bred mosquitoes, there are several issues that should be considered by voting members of this committee in committing tax payer funds to a vendor on a project of this size and scope.

Verily Life Sciences is a relatively new corporation (incorporated in 2015). A sole source provider producing up to 40 billion mosquitoes per year on Maui alone should have much more established past performance in the Incompatible Insect Technique IIT methodologies intended for use in Hawaii.

Verily had recent leadership shake up and layoffs of 15% of staff in January 2023. Verily's owners are: Larry Page and Brin Sergey, the Soros Foundation, Silver Lake and Temasek. Verily raised 3.5 billion dollars of private equity money between 2017 and 2022 and could have direct exposure to the collapse of Silicon Valley Bank, the "go to" bank for the life science startups.

Verily had a colony collapse with mosquitoes in 2017, the titer levels of Wolbachia were a key cause for this reproductive collapse. https://www.nature.com/articles/s41587-020-0471-x#Sec19

It is undetermined whether Verily has perfected a sound method of sex sorting for Culex quinquefasciatus so that females do not escape. The company has dozens of patents for sieving apparatuses for pupae separation that are as recent as 2023 and going back NO further than 2018.

Landscape level control of Culex mosquitoes using this Incompatible Insect Technique (IIT) **has never been done before**. Even with Aedes mosquitoes, the largest project area was 724 acres. Federal documentation connected to this project confirms that “although used world-wide for human health, Wolbachia IIT is a novel tool for conservation purposes and its degree of efficacy in remote forest landscapes is unknown.” Additionally, the species planned for use in this project, Culex quinquefasciatus, **has never been used for IIT**.

The Advisory Committee on Plants and Animals’ recommendation to approve import and release of Culex quinquefasciatus mosquitoes should be null and void due to the

conflicts of interest of committee members pursuant to HRS 84-14. The Ethics Guide for State Board and Commission Members states that members must not take official action affecting a business in which they have "financial interest." "Financial interest" in a business includes "employment." Whether a business can be a government agency is unstated. The following members of the Advisory Committee on Plants and Animals unanimously voted (7/0) on June 9, 2022 to recommend approval of the import permit:

- Darcy Oishi, Committee Chairperson, Hawaii Department of Agriculture (HDOA)
- Dr. Maria Haws, Professor of Aquaculture, Pacific Aquaculture & Coastal Research Center, University of Hawaii at Hilo
- Cynthia King, Entomologist, Division of Forestry & Wildlife, Department of Land & Natural Resources (DLNR), Ex Officio Member Designated Representative
- Gracelda Simmons, Environmental Management Program Manager, Hawaii Department of Health, Ex Officio Member Designated Representative
- Thomas Eisen, Planner, Environmental Review Program, Department of Business, Economic Development and Tourism, Ex Officio Member Designated Representative
- Joshua Fisher, Wildlife Biologist, U. S. Fish and Wildlife Service (USFWS)
- Dr. Samuel Ohu Gon III, Senior Scientist and Cultural Advisor, The Nature Conversancy – Hawaii (TNC)

Of the seven voting members' agencies above, only Thomas Eisen and Darcy Oishi are not partner agencies in Birds, Not Mosquitoes. As employees of partner agencies, Dr. Maria Haws (University of Hawaii), Cynthia King (DLNR), Gracelda Simmons (Hawaii Department of Health), Joshua Fisher (USFWS), and Dr. Samuel Ohu Gon III (TNC) all have conflicts of interest.

Both Dr. Samuel Ohu Gon III and Cynthia King are also members of the Birds, Not Mosquitoes steering committee. The purpose of the steering committee, as stated in the National Fish and Wildlife Foundation Hawaii Conservation Business Plan, includes coordinating permits for this project.

The Hawaii Department of Agriculture has applied for an EPA Emergency Exemption for use of the mosquitoes without going through regulatory safety processes. The EPA application is still under review, and the biopesticide mosquitoes have not been approved for emergency release. The Board of Land and Natural Resources cannot approve this Final Environmental Assessment and declare before the public that there is a Finding of No Significant Impact (FONSI) when there is still a possibility that the EPA will deny the Emergency Exemption due to safety concerns. This biopesticide cannot be approved for release when its safety is still under review by the EPA.

Additional concerns not adequately addressed in the Final Environmental Assessment: lack of adequate detail as required by HEPA; failure to identify the Wolbachia strain planned for use in this project; failure to identify and describe the mark release recapture study as a proposed action; failure to adequately identify the mosquito packages planned for release into the environment; failure to adequately address the effects on the environment from the release of biodegradable packages with an unknown decay rate; failure to identify biosecurity protocols; failure to adequately address viewscape impacts, noise disturbances to forest bird breeding and nesting, and significant environmental consequences, including impacts to the untrammeled, natural qualities of the wilderness character; failure to adequately address the potential negative impacts of introducing an invasive species to the islands; failure to identify the origin of biopesticide mosquitoes for this project as Palmyra Atoll; failure to identify the origin of Wolbachia bacteria for the project as Kuala Lumpur in Malaysia; failure to identify the strain of Wolbachia bacteria planned for import in connection with this project that does not exist on these islands; failure to address the concerns of tropical disease and vector expert Dr. Lorrin Pang (private citizen) regarding the serious risks of this project; failure to adequately study or address the impacts to endangered native Hawaiian hoary bats, native dragonflies, and endangered native damselflies; failure to study and address biopesticide wind drift; failure to adequately address Environmental Justice (human health impacts of this project have not been adequately studied, and the proposed action would impact ethnographic resources and traditional cultural practices); failure to conduct a feasibility study to provide a detailed analysis that considers all of the critical aspects of the proposed project in order to determine the likelihood of it succeeding; and failure to establish, under the precautionary principle, that the proposed activity will not result in significant harm.

Further, per HRS §171-4 (d), BLNR Chair Dawn N.S. Chang and Board Member Vernon Char **must recuse themselves** from participating in any discussion or voting in this matter, given that they have clear conflicts of interest. Chang is employed by the DLNR, a lead agency in the mosquito project. Char is employed by a law firm whose clients include The Nature Conservancy, another lead partner in the project.

I am opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, security risks, and experimental nature of the plan require detailed, comprehensive studies, and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Mahalo for your service,

Donna Thompson
Kamuela, HI
sharkgss@protonmail.com

From: Caroline Thow
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C-2
Date: Thursday, March 23, 2023 6:48:55 AM

Aloha,

I am writing in to request that BLNR please SUPPORT the mosquito control efforts described in item C-2 by approving the Final Environmental Assessment and Finding of No Significant Impact.

This is a critical step towards ensuring the conservation of Hawai'i's unique native wildlife, including two endemic bird species found only on Maui and at risk of extinction in the next 5 to 10 years: the 'akohekohe and kiwikiu. Incompatible Insect Technique is a method of mosquito control which has been used for decades all across the world and uses naturally occurring bacteria already found in Hawai‘i, and does not require the application of pesticide or genetic modification. It is a tested, well researched, and safe technique to control mosquitoes and prevent further extinctions due to avian malaria.

I dream of a mosquito free Hawai‘i where Hawaiian keiki can enjoy the beautiful native birds their ancestors had close relationships with. Without mosquito control, we will lose these cultural and biological jewels of the forest. We have already lost all but 17 of the over 59 honeycreepers that once called Hawai'i home. Please support this action so kiwikiu and 'akohekohe are not added to the list of species we lost due to invasive species and disease.

Mahalo,
Cara Thow

From: Matthew (Matt) Toenies
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Saturday, March 18, 2023 6:21:14 PM

Aloha Board Members,

I am submitting testimony to strongly urge the approval of the Final Environmental Assessment (EA) titled "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui." The Final Environmental Assessment demonstrates a high degree of scientific rigor and thoroughness in regard to the proposed action.

Honeycreepers are a unique group of forest birds found only in Hawai‘i, which once had more than 50 species. Today, only 17 species remain, some with fewer than 500 individuals left. Without immediate action, several species of Honeycreepers will become extinct in the next ten years, and at least one is projected to go extinct potentially this year or next. Avian malaria, a disease transmitted by invasive southern house mosquitoes, is driving the extinction of our forest birds. Furthermore, as the climate warms, mosquitoes carrying avian malaria are moving upslope into the last refugia for Hawai‘i’s forest birds. The Incompatible Insect Technique can suppress mosquito populations and help save our native forest birds.

Our native Honeycreepers are foundational to the culture, forests, and ecosystems of Hawai’i. We have already lost dozens of forest bird species due to avian diseases transmitted by non-native mosquitoes, among them iconic species like the Kaua’i ‘ō’ō, featured in mahiole and ‘ahu ‘ula, and the spectacular Kaua’i ‘akialoa, a pollinator of ‘ōhi’a lehua and insect eater. We are grieving the loss of their song, the loss of their beauty and the loss of their presence.
As pollinators, seed dispersers, and insect eaters, our native birds are essential for our forests and without action or delayed action, these species have no chance of survival.
The incompatible insect technique or mosquito birth control provides us with a glimmer of hope and opportunity to save the last remaining Honeycreepers from extinction. This method has been used successfully worldwide for vector control for human diseases and gives us a powerful tool to address the main cause for the decline of our Honeycreepers: avian malaria transmitted by the Southern House Mosquito. Neither the disease nor the vector is native to the Hawaiian islands and the mosquitoes have invaded the highest elevation of our island, decimating our Honeycreeper populations every day. Our forest birds evolved in a mosquito-free Hawai’i and a single bite of an infected mosquito can be enough to kill an ‘i’iwi.
The question to consider for our forests and for our ecosystem: How many more native forest bird species can we afford to lose, before the environmental impact will lead to the collapse of our native Hawaiian forests and watersheds?

Mahalo for reading my testimony,
--
Matt Toenies
(he/him)
><(((°>
"Now we face the question whether a still higher 'standard of living' is worth its cost in things natural, wild and free." -- Aldo Leopold, 1949

From: adriane fowler truluck
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C-2 March 24 meeting
Date: Wednesday, March 22, 2023 5:06:16 PM

Regarding Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui:

I am writing today to express strong support for the approval of this EA. My family and I are very concerned about our native birds and have been following this issue very closely. Hawaii desperately needs this action to eradicate invasive mosquitoes and give our highly endangered native birds a fighting chance at survival. I just returned home from a visit to Kokee State Park, where two kinds of manu are expected to become extinct within the next year or two due to mosquito-borne avian malaria. This is heartbreaking. We must do better to care for the aina and Hawaii's unique species, and this is a tool that has minimal impacts and potential for major positive effects to that end.
This action will allow for the use of incompatible male mosquito control techniques which are neither novel nor experimental; this method is proven and has been used for decades in locations across the world. This is a critical opportunity for saving more than a dozen of our imperiled native birds, using a naturally occurring bacteria already found in Hawai‘i, which does not require the application of pesticide or genetic modification.
All mosquitoes in Hawai‘i are non-native or invasive and controlling their populations in this way will have no non-target effects and will only positively affect native wildlife and our communities.
Mahalo nui for your time and support of this critical action. This is an important step for returning to a mosquito free Hawai‘i.

With warm aloha,

Adriane Truluck
Honolulu HI

From:	Josephine Tupu
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & Issue FONSI
Date:	Thursday, March 23, 2023 8:01:03 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA) and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria disease spread by mosquitoes is the greatest threat to the survival of all native Hawaiian forest birds across the State of Hawai'i. Historically, more than 50 honeycreepers lived in Hawai'i, filling the forest from mauka to makai with their songs. They are significant to Hawaiian culture. They contribute tremendously to restoring native forests by pollinating and dispersing native seeds and balancing forest health. Unfortunately, only 17 Hawaiian honeycreepers species remain today, with many closer to extinction. Two of the most endangered species, the Kiwikiu and ʻĀkohekohe experienced drastic population declines, coinciding with the increase of warming climate, influencing the increased spread of mosquitoes into high-elevation forest reserves that were previously too cold for mosquitoes and avian malaria to survive.

If native Hawaiian forest birds continuously decline without immediate action to save them from extinction, it will reciprocate through drastic changes in native forest structure and a decline in native plant populations. Consequently, non-native birds and invasive species will outcompete native habitats, reducing biodiversity and natural resources, and can result in economic impact.

The EA is a step to determine if a project will cause significant adverse effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts would occur.** Therefore, preparing a full EIS is not only unwarranted but also a waste of precious time and resources that should be used to save our forest birds. Kiwikiu could go extinct as soon as 2027. Actions need to be taken to suppress mosquitoes population and avian malaria disease in forest bird habitats as quickly as possible, or we will lose these native birds to extinction forever.

Please support and approve the **Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds. Your decisions today can change the future of our native Hawaiian forest birds and the survival of these treasured species of Hawaiian culture.

Mahalo for the opportunity to provide testimony, and I hope this will illuminate more solutions for our native biodiversity and ecosystem in Hawai'i.

Mahalo nui,
Josephine Tupu

From: Canva User
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Leka kakoʻo i BLNR - Kanaʻi Vasquez-Keahi
Date: Wednesday, March 22, 2023 8:54:17 AM
Attachments: Leka kakoʻo i BLNR - Kanaʻi Vasquez-Keahi

A design titled "Leka kakoʻo i BLNR - Kanaʻi Vasquez-Keahi" was shared with you by 4291800516@k12.hi.us.

3/22/23

Welina mai e BLNR,

ʻO koʻu inoa ʻo Kanaʻi Vasquez-Keahi. He 11 oʻu makahiki. Hele au ma ke Kula Kaiapuni ʻo Nāhiʻenaʻena.

Kākoʻo au i kēia hana no ka mea ʻaʻole makemake au e ʻike i nā manu e halapohe ai no ka mea he mea nui nā manu no ka ʻāina.

I nā ʻaʻohe manu ʻaʻohe mea kanu a inā ʻaʻohe manu ʻaʻohe ʻai, kākoʻo au i ka ʻoukou hana me ka wolbachia. He mea nui nā manu iā mākou. Pono mākou i nā manu no ka mea hōʻola ia nā manu i nā mea kanu.

Maiā,

Kanaʻi Vasquez-Keahi

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From:	Melissa Verbena
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Item C-2: Do not approve this Agenda item without more research!
Date:	Wednesday, March 22, 2023 7:22:59 AM

AlOha,
I'm writing in regard to agenda item C-2 at the BLNR Mar 24th meeting. I want to protect us from rushing into unknown consequences by not adequately studying what impact BioPesticide Mosquitoes may have to our land, water, people flora & animals.

I want an Environmental Impact Statement. I feel this further step is absolutely needed. The current DLNR Assessment is not enough! Take the steps to do this needed further research

Thank you,
Melissa Verbena
Makawao

From: Lorraine "Mamo" Waianuhea
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Thursday, March 23, 2023 12:38:34 AM

Aloha kākou,

My name is Lorraine Waianuhea. My ʻohana are from Kōhala, and I grew up between Oregon, Āliapaʻaki, Honomū and Hilo. I strongly support the Maui NPS Wolbachia IIT EA, and the finding of no significant impact (FONSI).

Although my name is Lorraine, I have always been called "Mamo" by family and friends. One of my earliest memories is of visiting the Bishop Museum and seeing Kamehameha's golden ʻahuʻula (feathered cloak) made from feathers of the now extinct mamo bird. The display explained how only a few feathers were collected from each bird before it was released unharmed to regrow its yellow plumes. Sharing my name with the mamo drew me to conservation and the plight of Hawaiian forest birds at a young age. Later, I would learn that avian malaria contributed to the extinction of the mamo, and that the disease remains the greatest threat to our living forest birds.

In 2019, I served as a field technician on a project where we collected blood samples from birds across Hawaiʻi so they could be tested for avian malaria. It was a life changing experience to work with forest birds so closely, and especially to observe ʻakikiki, ʻakekeʻe, kiwikiu, and ʻākohekohe. My kuleana (responsibility) to give back to the birds has led to my current work as a PhD student at UH Mānoa where I study the *Culex* mosquito that spreads avian malaria in Hawaiʻi. By studying the community of symbiotic microorganisms that live inside mosquitoes, I hope to increase our collective understanding of mosquito biology and contribute data that will support mosquito suppression for hawaiian bird conservation. This work is motivated by a deep respect for our birds as beloved kupuna, ʻaumakua, elders and teachers. More than anything, I want our forest birds to thrive, so that future generations of Hawaiʻi will have the opportunity to learn from them as I have.

Today, the lives of Maui forest birds rest in your hands. For the first time in the two-hundred years since *Culex* mosquitoes were introduced to Hawaiʻi, we have a safe and promising tool (Wolbachia IIT) available to us to suppress avian malaria. The Maui NPS EA is built upon decades of peer-reviewed scientific research and concluded with a finding of no significant impact. An unnecessary EIS could delay the potential benefits of Wolbachia IIT for years, which is essentially the nail in the coffin for our forest birds who are running out of time.

There is an ʻōlelo noʻeau which states, *i ka wā mamua, ka wā mahope*. Moving forward into our future requires us to look behind into our past. We must remember

the fate of the mamo and so many other birds we have already lost. Let them give us the courage to take decisive action before it is too late for the species we have left.

I urge you to please approve the EA and issue a FONSI to save forest birds on Maui.

Mahalo for the opportunity to provide testimony,
Lorraine “Mamo” Waianuhea

From: Deborah Ward
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony C.1 Deborah Ward in SUPPORT
Date: Wednesday, March 22, 2023 1:14:26 PM

Aloha, Chair and BLNR members,
RE: Support of C.2. Final EA FONSI
I am a forty year member the Sierra Club, and have hiked and participated in service trips on every island. I have personally experienced the demise of our native bird population over these years, and am horrified that it seems to be accelerating. I am in full support of the efforts to suppress invasive mosquito populations through the use of a naturally occurring bacteria called Wolbachia. I am have read extensively on this subject, and believe there will be no unexpected negative consequences. I certainly hope that though this effort, the native bird populations can be stabilized. Thank you for the opportunity to testify.
Deborah J. Ward
P.O. Box 918
Kurtistown HI 96760

From: Sherilyn Wells
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Looks like the Wolbachia science is already compromised. Re: New testimony AND resubmitting prior re calling FOR FULL EIS. AGAINST FONSI for Agenda Item C2 - proposed release of Wolbachia mosquitoes (biopesticide mosquito experiment). Co-Op...
Date: Thursday, March 23, 2023 7:08:08 AM
Attachments: image.png
image.png
image.png
image.png

Health ▾ Tech ▾ Enviro ▾ Society ▾ Quirky ▾

New tool for combating mosquito-borne disease: Insect parasite genes

Date: February 27, 2017

Source: Vanderbilt University

Summary: Discovery of the genes the insect parasite Wolbachia uses to control its hosts' reproduction provides a powerful new tool for enhancing biological control efforts for mosquito-borne diseases like dengue, Zika and malaria.

Share:

RELATED TOPICS

Health & Medicine

- Infectious Diseases
- HIV and AIDS
- Genes
- Viruses

FULL STORY

Wolbachia **is the most successful parasite the world has ever known. You've never heard of it because it only infects bugs: millions upon millions of species of insects, spiders, centipedes and other arthropods all around the globe.**

"You've never heard of it because it only infects bugs.."
Just brought to my attention - the presence of Wolbachia genes in humans. This counteracts the previous statements that it does not infect humans, yes?

https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(14)00040-8/fulltext

People who are found to be infected with *O. volvulus* (river blindness) ... (Ivermectin) kills the adult worms by killing **the *Wolbachia* bacteria on which the adult worms depend in order to survive**.

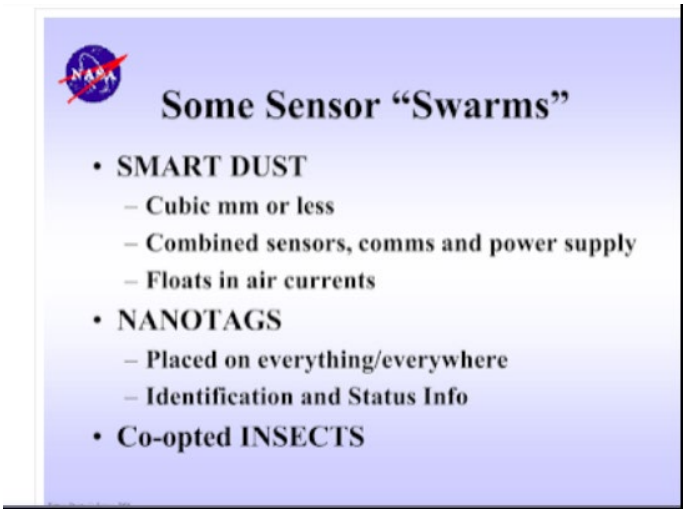
Sent with Proton Mail secure email.

------- Original Message -------
On Thursday, March 23rd, 2023 at 6:39 AM, Sherilyn Wells <votetrees@protonmail.com> wrote:

> Please see attached for current submission.
> Please see below for prior submission.
>
> IN FAVOR of FULL EIS.
>
> AGAINST FONSI for Agenda Item C2 re Mosquito/Wolbachia project.

Sent with Proton Mail secure email.

------- Original Message -------
On Tuesday, March 7th, 2023 at 11:35 PM, Sherilyn Wells <votetrees@protonmail.com> wrote:

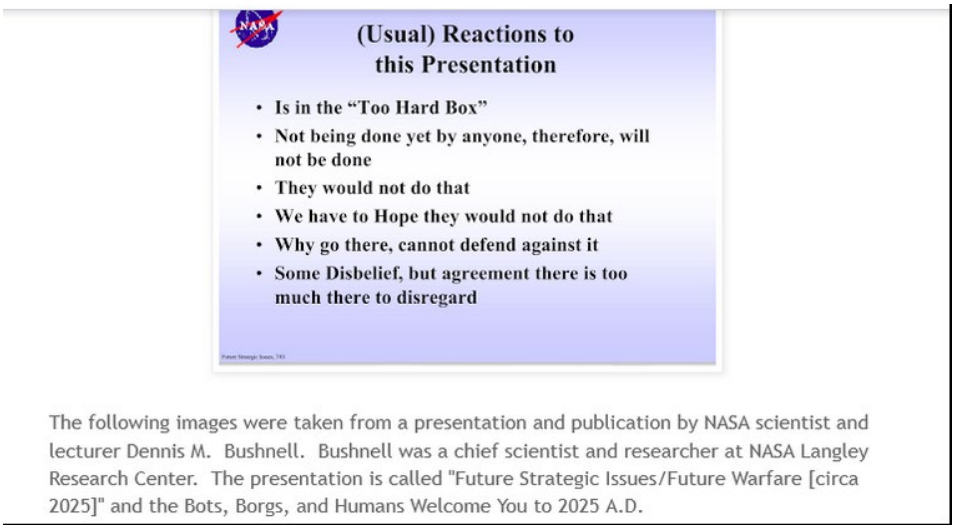


The image above is from a **NASA slideshow on warfare**. **Notice "Co-opted Insects."** The **NASA slide that preceded this slide can be seen further down in this email**.
It describes the reactions people are likely to have to the above information..AND the title of the presentation is "welcoming" us to 2025. Not too far off.. interesting coincidence/confluence?

As to the proposed Mosquito Release/Experiment: I strongly **OPPOSE** this action.
An Environmental Impact Statement is a necessity for such a dramatic meddling with the balance of our island ecosystem(s), with so much potential for unintended (because it's insufficiently studied!!) negative consequences to avian, human, animal, insect, and ??? populations. As the NASA slide shows, innovative deployment of insects as a tool of war is already under investigation and since Bill Gates and his Foundation have a link to both the Covid-19 situation and to the Wolbachia studies, we have additional reasons to suspect that all is not as it is might seem (is made to seem?).
I have a background that lends support to my position on this issue:
I am a former co-president of the Washington (State) Environmental Council, a statewide organization coordinating/representing dozens of local groups, including on issues and testimony before our state government. I have contributed language that was added to legislation in Washington State when we were adopting, then amending, the Growth Management Act, a comprehensive plan for our future that looked at ALL elements of development, resource preservation, environmental health, etc.
As part of that GMA process, I had the opportunity to read and contribute data and suggestions to many EISs. I could tell the difference between an EIS that was a genuine investigation into impacts and an EIS that was prepared for a foregone conclusion promoted by vested interests colluding with corrupted agencies/institutions. But, bad as some of those EISs were (and they were forced to improve before being accepted), at least there **WAS** an EIS.
Why is this even an issue of debate, when it's so clearly needed?
We need to stand meaningfully behind all the times we Hawai'ians speak reverently of "the aina," to breathe life into those words with actions that actually DO protect this land, DO honor the sacred responsibility of caring for it with the best of our minds/knowledge and the best of our hearts/integrity.
I am also a former Board Member of the Washington Toxics Coalition, which spearheaded successful efforts to raise public (and legislative) awareness about the insidious effects of substances, many in common use. It was surprising how many times products snuck onto the market, only to have multiple toxic/negative effects due to so many unforeseen

interactions/mechanisms. For instance, controlled-environment-lab results didn't translate into uncontrollable-real-world-environments with their vastly more complex set of influences; additive, cumulative, and/or synergistic effects when encountering other chemicals were not considered; safe exposure data was often much too liberal, as effects were subsequently observed at much lower thresholds than were originally devised, etc., etc. All of these points could just as easily be applied to this Mosquito Plan/Experiment.

So, between these two organizations I gained extensive experience in evaluating whether a proposal merited additional study before any further decisions were made. Rarely have I seen a proposal for which a full-scale EIS was not only appropriate, but a CRITICAL next step, as this Mosquito Release proposal before you.
Now to return to the point made by the first image in this email - Let me suggest one avenue you have obviously not considered in the far too cavalier conclusion that this doesn't merit an EIS. **The use of "co-opted" insects as part of a new human warfare strategy** - this concept was part of a Future Strategic Issues, Future Warfare presentation by NASA scientist Dennis M. Bushnell, at the NASA Langley facility (Langley being CIA, of course).



We have all witnessed, in these last few years, what happens when there is suppression/censorship of alternative professional viewpoints, when no critical debate is allowed (analogous to in-depth study of an issue from all sides). Thanks to dogged efforts by people and professionals who simply would not be silenced, who stood up for humanity at great cost to themselves.. and who are now being proved right, over and over again as the truth emerges, we have an analogous lesson to THIS issue. We need to see this issue from every possible angle before we proceed or before we call a halt. If we have learned only one lesson from the Covid-19 situation, it is that vigorous analysis and questioning and study benefit everyone and might just avert another (mosquito-based) monumental act of stupidity, of destruction, as SOME humans imagine we are clever enough to anticipate how a complex ecosystem will adapt to elements that ultimately will themselves evolve.
We are increasingly made aware that the gain-of-function, lab origins of Covid-19 give it the status of a bioweapon. As the attached image taken from a slideshow given by NASA scientist Dennis M. Bushnell reveals - insects are part of the new warfare strategy. Who's to say that this Mosquito Plan is not being deployed in similar fashion, given the evidence that people completely without conscience will set about decimating populations while smiling into the camera and assuring all of us that nothing is amiss. A failure to do an appropriate analysis makes such an uncomfortable viewpoint more, rather than less, likely.

Mahalo for what I hope is your decision to reconsider your apparent fast-tracking of this proposal and to insist upon excellence in the analysis contained within the EIS you mandate.
Sherilyn Wells
68-1921 Lina Poepoe St

Waikoloa, Hawaii 96738

Adding my previous comments to this current testimony:

> On Friday, July 15th, 2022 at 1:59 PM, Sherilyn Wells <votetrees@protonmail.com> wrote:
>
> > **To: Suzanne D. Case, Chairperson Board of Land and Natural Resources**
> > **From: Sherilyn Wells, resident, Big Island of Hawaii, 360-441-7098, votetrees@protonmail.com**
> >
> > **The Hawaii Department of Agriculture is fast-tracking a release of Wolbachia-laden mosquitoes with virtually no significant environmental review. This is a shocking failure of responsibility to safeguard our island environment, including plants, animals, humans, soil microorganisms, etc.**
> >
> > **I urge the BLNR to require a full EIS, including the topics mentioned below.**
> >
> > **(1) First of all, what/who is the source for these mosquitoes? See information below on Gates Foundation, Oxitec, and Wellcome.**
> >
> > **(2) There are medical research articles, some dating back decades, pointing to the potential for the Wolbachia bacterium to affect human health.**
> >
> > > ***Didier Raoult, in Goldman's Cecil Medicine (Twenty Fourth Edition), 2012***
> > >
> > > ***Wolbachia Species***
> > >
> > > ***Wolbachia bacteria are endosymbionts of arthropods and nematodes. They were known to be present in filarial worms, but it was later shown that they may play a role in human disease.***
> > >
> > > ***These bacteria manipulate the fertility of their host.***
> > >
> > > ***https://embryo.asu.edu/pages/wolbachia***
> > >
> > > ***Wolbachia evolved ways to jump across host species and establish relatively stable associations maintained through vertical transmission. Wolbachia are capable of manipulating the reproduction of infected hosts in a remarkable way.***
> > > ***https://www.frontiersin.org/articles/10.3389/fevo.2015.00153/full***
> >
> > **(3a) As stated above, this bacterium is particularly implicated re the reproductive capacity of its hosts, including (although not limited to) the testes and ovaries, which it often targets in the species it**

infects.

Curiously, these are also among the particular tissues which SARS-CoV-2's spike protein is partial to inhabiting/infecting, according to Japanese research which confirmed the spike protein was not confined to the injection site.

(3b) Is there any possibility of cross-function amplification or symbiotic interaction of Wolbachia and spike proteins (or SARS-CoV-2), found in the same tissues?

(4) We must also consider the possibility that GAIN OF FUNCTION research could have been carried out, adding to the list of potential impacts from the modified mosquitoes and Wolbachia.
Have either of these organisms (mosquito OR Wolbachia bacterium) undergone any gain-of-function alteration that could render them more pathogenic? An in-depth review of potentially relevant research articles is warranted, to the degree that content of such "secretive" research can be ascertained.

Since the Gates Foundation has been involved in funding mosquito, Wolbachia, and vaccine experimentation, it is worth taking the time for Hawai'i to study whether there has been any cross-application of findings.

Specifically, Gates has already linked the use of Wolbachia to coincide with provision of vaccines. Could there be undisclosed connections/symbiotic performance anticipated between the two actions?

Here it suggests that the bacterium be used in infected mosquitoes as an adjunct to Yellow Fever vaccines:

> ***"Although the YFV vaccine is safe and effective, it does not always reach populations at greatest risk of infection and there is an acknowledged global shortage of vaccine supply.***
> ***The introgression of Wolbachia bacteria into Ae. aegypti mosquito populations is being trialed in several countries (www.worldmosquito.org) as a biocontrol method against dengue, Zika and chikungunya.***
>
> ***Here, we studied the ability of Wolbachia to reduce the transmission potential of Ae. aegypti mosquitoes for Yellow fever virus (YFV).***
> **https://gatesopenresearch.org/articles/3-161**

"Genetically modified mosquitoes are showing promise in controlling other vector-borne diseases, so we look forward to exploring their use alongside complementary interventions for malaria."

(5) Obviously, there has already been some alteration of mosquitoes and Wolbachia already, as Bill Gates reveals:

> ***Unfortunately, the type of mosquito that carries dengue, Aedes aegypti, doesn't naturally get Wolbachia, but one group of scientists discovered a way to infect them with it. Now, in partnership with other researchers around the world, they're raising a colony of Wolbachia mosquitoes to be released in hopes that they will breed with wild mosquitoes.***
> ***https://www.gatesnotes.com/Health/Why-I-Gave-Blood-to-Defeat-Dengue-Mosquito-Week***

The Gates Foundation has donated to (1) Oxitec, which does mosquito research, and to (2) research involving the Wolbachia bacterium. And, through GAVI and other organizations, it has played a major role in the vaccination of certain populations (some of whom sued the Foundation after extensive disability, damage, and death occurred).

Proof of Gates Foundation involvement with Wolbachia, alteration of mosquitoes, etc.:
https://www.gatesfoundation.org/about/committed-grants/2020/09/INV019029
https://www.worldmosquitoprogram.org/en/about-us/our-story

AND Wellcome Trust partnered with Gates multiple times, including for "exploring synergies between human and animal infections."

> **https://www.gatesfoundation.org/about/committed-grants/2014/05/opp1109338**
> **http://www.eliminatedengue.com/progress/index/view/news/1088**

Bill Gates-Funded Biotech Firm Claims GMO Mosquito Project a 'Success,' But Critics Cite Lack of Proof

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Wellcome Trust and the Bill & Melinda Gates Foundation stand to profit handsomely from their investments in drug companies researching solutions for the pandemic.
Some say that raises critical questions around conflicts of interest, transparency and accountability.
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(6) Since the executive branch of our federal

government has close connections the the Ukraine, where 46 biolabs have now been confirmed (many, if not all, established with U.S. help), it is incumbent upon us to discover whether using mosquitoes as a vector for transmitting the organism(s) responsible for future pandemics is being researched here in the U.S. and/or abroad. Since Covid-19 revealed that this very type of research has already taken place, it is critical to explore this issue.

(7) Since Rickettsia and Wolbachia are considered sufficiently similar that they have been co-studied in a variety of research AND since some of the organisms that are on the List of Select Human Pathogens are Rickettsia (Section 4-71A-23), it is also worth examining Wolbachia in much greater depth.

> ***"We also focus on the emergence of Rickettsia as a diverse reproductive manipulator of arthropods, similar to the closely related Wolbachia, including strains associated with male-killing, parthenogenesis, and effects on fertility."***
> **…….**
>
> **Phylogenetic analysis suggests multiple transitions between symbionts that are transmitted strictly vertically and those that exhibit mixed (horizontal and vertical) transmission.**
> ***Rickettsia* may thus be an excellent model system in which to study the evolution of transmission pathways. We also focus on the emergence of *Rickettsia* as a diverse reproductive manipulator of arthropods, similar to the closely related *Wolbachia*, including strains associated with male-killing, parthenogenesis, and effects on fertility.**
>
> **https://royalsocietypublishing.org/doi/10.1098/rspb.2006.3541**

From:	Sherilyn Wells
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Full support for ("joining in") Donna Thompson testimony. Fw: BLNR Meeting 3/24/23 9:15am Testimony Agenda Item C-2: Oppose
Date:	Thursday, March 23, 2023 8:13:01 AM
Attachments:	D Thompson BNLR C2 Testimony 24 March 2023.pdf

I stand in full support of all statements made in the excellent submission by Donna Thompson of Kamuela.
Sherilyn Wells
Big Island - Waikoloa
Sent with Proton Mail secure email.

------- Forwarded Message -------
From: sharkgss <sharkgss@protonmail.com>
Date: On Thursday, March 23rd, 2023 at 7:15 AM
Subject: BLNR Meeting 3/24/23 9:15am Testimony Agenda Item C-2: Oppose
To: blnr.testimony@hawaii.gov <blnr.testimony@hawaii.gov>, dlnr@hawaii.gov <dlnr@hawaii.gov>

Aloha,

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the “Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui”.

Please find my written testimony in opposition attached regarding item C-2

Mahalo,
Donna Thompson
Kamuela, HI

Sent with Proton Mail secure email.

From: Sherilyn Wells
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] New testimony AND resubmitting prior re calling FOR FULL EIS. AGAINST FONSI for Agenda Item C2 - proposed release of Wolbachia mosquitoes (biopesticide mosquito experiment). Co-Opted Insects as per NASA"s presentation???
Date: Thursday, March 23, 2023 6:42:40 AM
Attachments: image.png
image.png
DLNR Wolbachia Mosquito FIS Required Testimony 3.doc

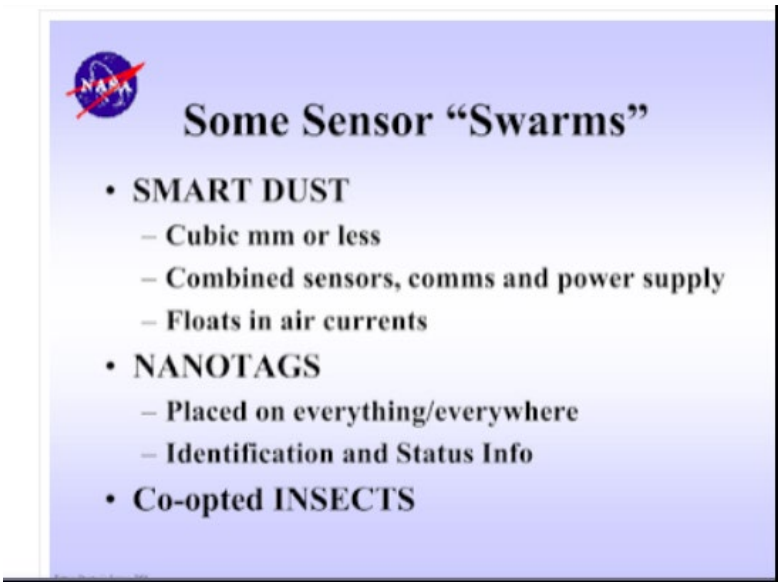
Please see attached for current submission.
Please see below for prior submission.

IN FAVOR of FULL EIS.

AGAINST FONSI for Agenda Item C2 re Mosquito/Wolbachia project.

Sent with Proton Mail secure email.

------- Original Message -------
On Tuesday, March 7th, 2023 at 11:35 PM, Sherilyn Wells <votetrees@protonmail.com> wrote:

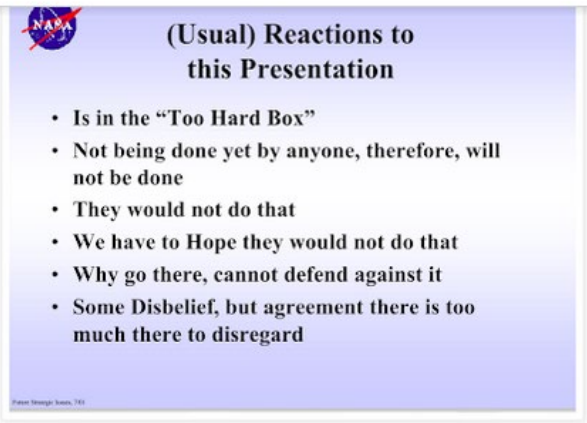


The image above is from a **NASA slideshow on warfare**. **Notice "Co-opted Insects."** The **NASA slide that preceded this slide can be seen further down in this email**. It describes the reactions people are likely to have to the above information..AND the title of the presentation is "welcoming" us to 2025. Not too far off.. interesting coincidence/confluence?

As to the proposed Mosquito Release/Experiment: I strongly **OPPOSE** this action. **An Environmental Impact Statement is a necessity** for such a dramatic meddling with the balance of our island ecosystem(s), with so much potential for unintended (because it's insufficiently studied!!) negative consequences to avian, human, animal, insect, and ??? populations. As the NASA slide shows, innovative deployment of insects as a tool of war is already under investigation and since Bill Gates and his Foundation have a link to both the Covid-19 situation and to the Wolbachia studies, we have additional reasons to suspect that all is not as it is might seem (is made to seem?). I have a background that lends support to my position on this issue:

I am a former co-president of the Washington (State) Environmental Council, a statewide organization coordinating/representing dozens of local groups, including on issues and testimony before our state government. I have contributed language that was added to legislation in Washington State when we were adopting, then amending, the Growth Management Act, a comprehensive plan for our future that looked at ALL elements of development, resource preservation, environmental health, etc.
As part of that GMA process, I had the opportunity to read and contribute data and suggestions to many EISs. I could tell the difference between an EIS that was a genuine investigation into impacts and an EIS that was prepared for a foregone conclusion promoted by vested interests colluding with corrupted agencies/institutions. But, bad as some of those EISs were (and they were forced to improve before being accepted), at least there **WAS** an EIS.
Why is this even an issue of debate, when it's so clearly needed?
We need to stand meaningfully behind all the times we Hawai'ians speak reverently of "the aina," to breathe life into those words with actions that actually DO protect this land, DO honor the sacred responsibility of caring for it with the best of our minds/knowledge and the best of our hearts/integrity.
I am also a former Board Member of the Washington Toxics Coalition, which spearheaded successful efforts to raise public (and legislative) awareness about the insidious effects of substances, many in common use. It was surprising how many times products snuck onto the market, only to have multiple toxic/negative effects due to so many unforeseen interactions/mechanisms. For instance, controlled-environment-lab results didn't translate into uncontrollable-real-world-environments with their vastly more complex set of influences; additive, cumulative, and/or synergistic effects when encountering other chemicals were not considered; safe exposure data was often much too liberal, as effects were subsequently observed at much lower thresholds than were originally devised, etc., etc. All of these points could just as easily be applied to this Mosquito Plan/Experiment.

So, between these two organizations I gained extensive experience in evaluating whether a proposal merited additional study before any further decisions were made. Rarely have I seen a proposal for which a full-scale EIS was not only appropriate, but a CRITICAL next step, as this Mosquito Release proposal before you.
Now to return to the point made by the first image in this email - Let me suggest one avenue you have obviously not considered in the far too cavalier conclusion that this doesn't merit an EIS. **The use of "co-opted" insects as part of a new human warfare strategy** - this concept was part of a Future Strategic Issues, Future Warfare presentation by NASA scientist Dennis M. Bushnell, at the NASA Langley facility (Langley being CIA, of course).



The following images were taken from a presentation and publication by NASA scientist and lecturer Dennis M. Bushnell. Bushnell was a chief scientist and researcher at NASA Langley Research Center. The presentation is called "Future Strategic Issues/Future Warfare [circa 2025]" and the Bots, Borgs, and Humans Welcome You to 2025 A.D.

We have all witnessed, in these last few years, what happens when there is suppression/censorship of alternative professional viewpoints, when no critical debate is allowed (analogous to in-depth study of an issue from all sides). Thanks to dogged efforts by people and professionals who simply would not be silenced, who stood up for humanity at great cost to themselves.. and who are now being proved right, over and over again as the truth emerges, we have an analogous lesson to THIS issue. We need to see this issue from every possible angle before we proceed or before we call a halt. If we have learned only one lesson from the Covid-19 situation, it is that vigorous analysis and questioning and study benefit everyone and might just avert another (mosquito-based) monumental act of stupidity, of destruction, as SOME humans imagine we are clever enough to anticipate how a complex ecosystem will adapt to elements that ultimately will themselves evolve.
We are increasingly made aware that the gain-of-function, lab origins of Covid-19 give it the status of a bioweapon. As the attached image taken from a slideshow given by NASA scientist Dennis M. Bushnell reveals - insects are part of the new warfare strategy. Who's to say that this Mosquito Plan is not being deployed in similar fashion, given the evidence that people completely without conscience will set about decimating populations while smiling into the camera and assuring all of us that nothing is amiss. A failure to do an appropriate analysis makes such an uncomfortable viewpoint more, rather than less, likely.

Mahalo for what I hope is your decision to reconsider your apparent fast-tracking of this proposal and to insist upon excellence in the analysis contained within the EIS you mandate.
Sherilyn Wells
68-1921 Lina Poepoe St
Waikoloa, Hawaii 96738

Adding my previous comments to this current testimony:

> On Friday, July 15th, 2022 at 1:59 PM, Sherilyn Wells <votetrees@protonmail.com> wrote:

To: Suzanne D. Case, Chairperson Board of Land and Natural Resources
From: Sherilyn Wells, resident, Big Island of Hawaii, 360-441-7098, votetrees@protonmail.com

The Hawaii Department of Agriculture is fast-tracking a release of Wolbachia-laden mosquitoes with virtually no significant environmental review. This is a shocking failure of responsibility to safeguard our island environment, including plants, animals, humans, soil microorganisms, etc.

I urge the BLNR to require a full EIS, including the topics mentioned below.

(1) First of all, what/who is the source for these mosquitoes? See information below on Gates Foundation, Oxitec, and Wellcome.

(2) There are medical research articles, some dating back decades, pointing to the potential for the Wolbachia bacterium to affect human health.

> ***Didier Raoult, in Goldman's Cecil Medicine (Twenty Fourth Edition), 2012***
>
> ***Wolbachia Species***
>
> ***Wolbachia bacteria are endosymbionts of arthropods and nematodes. They were known to be present in filarial worms, but it was later shown that they may play a role in human disease.***
>
> ***These bacteria manipulate the fertility of their host.***
>
> ***https://embryo.asu.edu/pages/wolbachia***
>
> ***Wolbachia evolved ways to jump across host species and establish relatively stable associations maintained through vertical transmission. Wolbachia are capable of manipulating the reproduction of infected hosts in a remarkable way.***
> ***https://www.frontiersin.org/articles/10.3389/fevo.2015.00153/full***

(3a) As stated above, this bacterium is particularly implicated re the reproductive

capacity of its hosts, including (although not limited to) the testes and ovaries, which it often targets in the species it infects.

Curiously, these are also among the particular tissues which SARS-CoV-2's spike protein is partial to inhabiting/infecting, according to Japanese research which confirmed the spike protein was not confined to the injection site.

(3b) Is there any possibility of cross-function amplification or symbiotic interaction of Wolbachia and spike proteins (or SARS-CoV-2), found in the same tissues?

(4) We must also consider the possibility that GAIN OF FUNCTION research could have been carried out, adding to the list of potential impacts from the modified mosquitoes and Wolbachia.
Have either of these organisms (mosquito OR Wolbachia bacterium) undergone any gain-of-function alteration that could render them more pathogenic? An in-depth review of potentially relevant research articles is warranted, to the degree that content of such "secretive" research can be ascertained.

Since the Gates Foundation has been involved in funding mosquito, Wolbachia, and vaccine experimentation, it is worth taking the time for Hawai'i to study whether there has been any cross-application of findings.

Specifically, Gates has already linked the use of Wolbachia to coincide with provision of vaccines. Could there be undisclosed connections/symbiotic performance anticipated between the two actions?

Here it suggests that the bacterium be used in infected mosquitoes as an adjunct to Yellow Fever vaccines:

> ***"Although the YFV vaccine is safe and effective, it does not always reach populations at greatest risk of infection and there is an acknowledged global shortage of vaccine supply.***
> ***The introgression of Wolbachia bacteria into Ae. aegypti mosquito populations is being trialed in several countries (www.worldmosquito.org) as a biocontrol***

> ***method against dengue, Zika and chikungunya.***
> ***Here, we studied the ability of Wolbachia to reduce the transmission potential of Ae. aegypti mosquitoes for Yellow fever virus (YFV).***
> **https://gatesopenresearch.org/articles/3-161**

"Genetically modified mosquitoes are showing promise in controlling other vector-borne diseases, so we look forward to exploring their use alongside complementary interventions for malaria."

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Wellcome Trust and the Bill & Melinda Gates Foundation stand to profit handsomely from their investments in drug companies researching solutions for the pandemic. Some say that raises critical questions around conflicts of interest, transparency and accountability.
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(6) Since the executive branch of our federal government has close connections the the Ukraine, where 46 biolabs have now been confirmed (many, if not all, established with U.S. help), it is incumbent upon us to discover whether using mosquitoes as a vector for transmitting the organism(s) responsible for future pandemics is being researched here in the U.S. and/or abroad. Since Covid-19 revealed that this very type of research has already taken place, it is critical to explore this issue.

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> ***"We also focus on the emergence of Rickettsia as a diverse reproductive manipulator of arthropods, similar to the closely related Wolbachia, including strains associated with male-killing,***

parthenogenesis, and effects on fertility."
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Phylogenetic analysis suggests multiple transitions between symbionts that are transmitted strictly vertically and those that exhibit mixed (horizontal and vertical) transmission.
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https://royalsocietypublishing.org/doi/10.1098/rspb.2006.3541

DLNR Wolbachia Mosquito Proposal

EIS MUST BE REQUIRED

OPPOSE AGENDA ITEM C2

NO TO FONSI

You only get one chance to NOT make an irreversible mistake (insufficient study).

Far too much could be at stake to bypass sufficient investigation: Has research/biowarfare weaponization of these specific microorganisms and insects taken place?

Testimony 3/23/23
Sherilyn Wells
Big Island

This is the prologue any citizen regrets having to write, BUT.. let's get real. Covid-19 revelations, still underway as I write, have become the visible tip of a much larger government/science corruption iceberg, giving the public cause to question intent and data (about ANY major project) far more broadly.

The public's once naïve regard for our government agencies and respect for the "science" that they use to justify their actions will never be the same, thanks to Fauci (Collins, Birx et al), sociopathic Gain of Function research (biowarfare), censorship of medical/scientific dissent, prostitution of science under the influence of those funding the research, fraud, malfeasance, collusion, conflict of interest due to financial gain, etc… and the shocking toll that those failures and the venal malice underlying them took/continue to take on the public those government agencies were tasked to protect and prioritize.

March 22, 2023

Horowitz: They knew: FOIA document shows government anticipated mass vaccine injuries, then observed them from day one

Daniel Horowitz

The U.S. Food & Drug Administration (FDA) questionably authorised emergency use of both the Pfizer and Moderna mRNA Covid-19 injections for use among children aged 6 months and above despite quietly published documents published by the UK Government confirming the Covid-19 Vaccine was and is killing children.

The data provided by the Office for National Statistics proved children were 82 to 303x more likely to die following Covid-19 vaccination than children who have not had the Covid-19 vaccine at the time.

8.1. Vaccine safety surveillance results

A summary of the number of vaccines administered in 2021, the number of adverse events reported, and the rates of adverse events is provided in Table 14.

Table 14: Numbers of vaccines administered, and adverse events reported, with rate of adverse events, for non COVID-19 vaccines and COVID-19 vaccines, 2021.

Vaccine type	Number of vaccines administered in 2021	Number of adverse events reported to WAVSS	Rate of adverse events per 100,000 doses
Non COVID-19	1,808,050	200	11.1
COVID-19	3,948,673	10,428	264.1

SALIENT/PERTINENT ISSUE:

ARE INSECTS and MICROORGANISMS THE SUBJECT OF WEAPONIZATION/BIOWARFARE RESEARCH? Yes.

https://www.youtube.com/watch?v=IlounGf1zK8

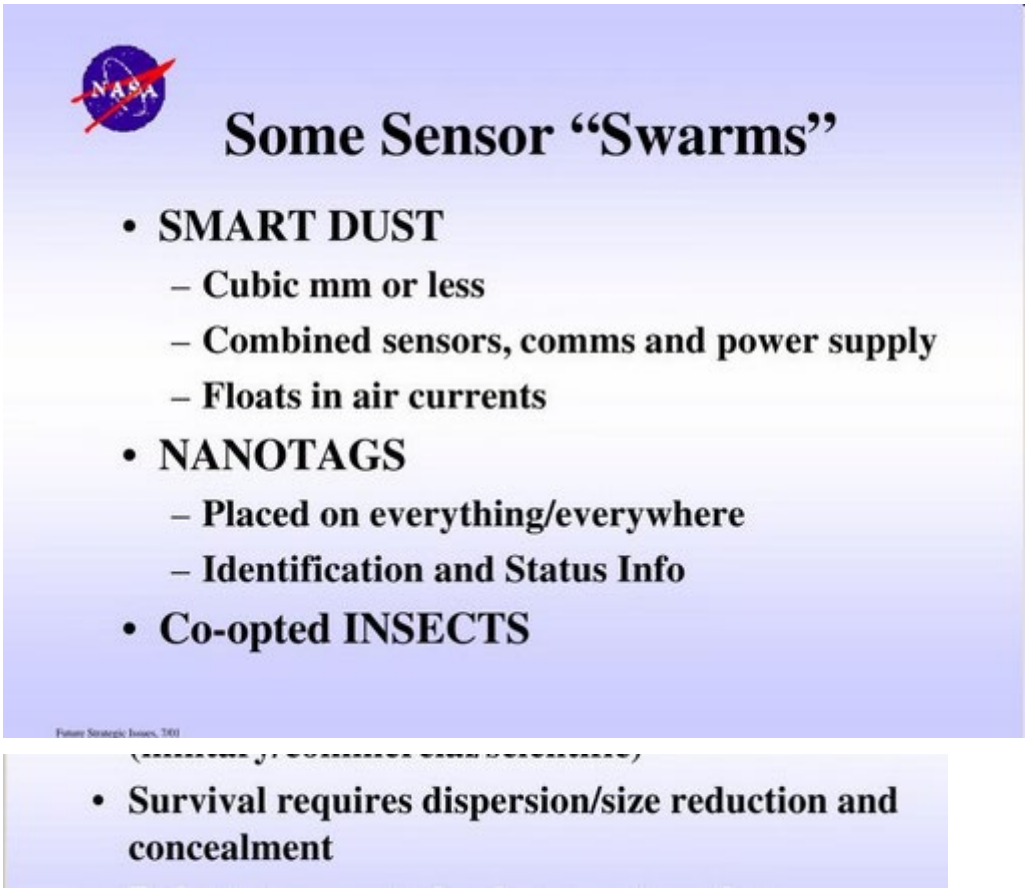
DARPA's Wegrzyn on Gene-Altered Mosquitoes to Counter Infectious Diseases, Future Enemies

Defense & Aerosp... 18.3K subscribers Subscribe 17 Share

Renee Wegrzyn, PhD, a program manager at the Defense Advanced Research Projects Agency, discusses her work on gene editing to combat

infectious diseases or counter future enemies that may employ genetically modified insects as weapons with Defense & Aerospace Report Editor Vago Muradian at the DARPA-D60 Symposium in September 2018 to commemorate the agency's 60th anniversary.

Also see "CoOpted Insects" slide in the NASA scientist Dennis Bushnell's Future Warfare presentation –

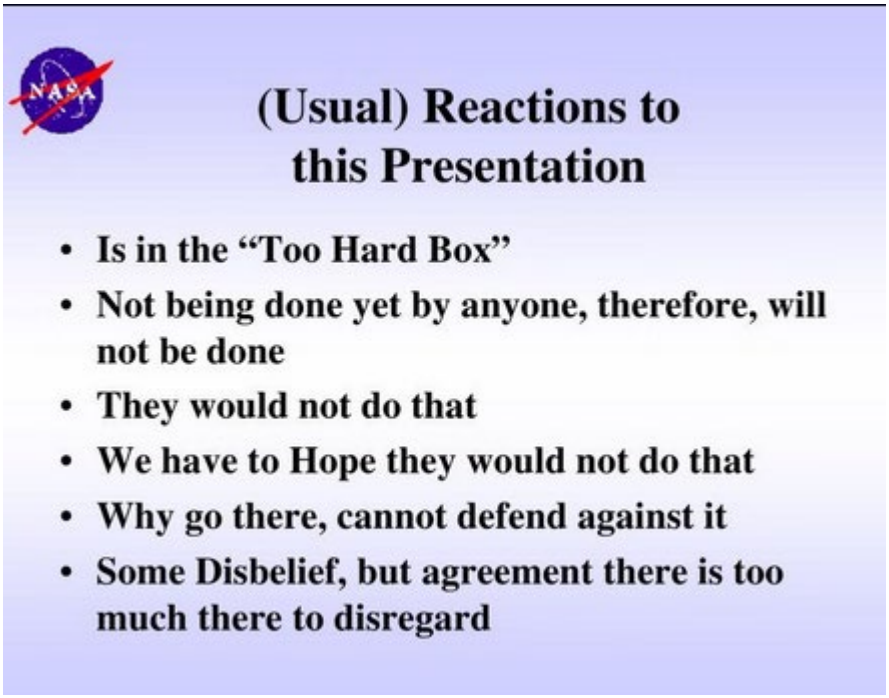


Often "Fingerprintless" Bio Archipelago

- Bacteriological
- Viruses
- Prions
- Parasites
- Fungi
- Carcinogens
- Toxins
- Hormones/Regulators
- Fatal-to-disabling
- Short-to-long time scales
- Anti-flora/fauna/functional
- Direct and (undetectable) Binary
- Natural, Genomic
- Bio-Hacking

"Natural Warfare"

- **Sensors:**
  - Utilize insitu plants/animals/insects as sensor platforms/instruments to indicate presence/movement/characteristics
- **Weapons/Munitions:**
  - Utilize animals (e.g. urban rats)/insects as "delivery systems"/munitions ("feeding," swarming, biting, poisoning)



https://archive.org/details/FutureStrategicIssuesFutureWarfareCirca2025/mode/2up

The authors argue that the insects used to deliver the viral agents might be perceived as means of delivery in terms of the (Biological Weapons) Convention.

"Because of the broad ban of the Biological Weapons Convention, any biological research of concern must be plausibly justified as serving peaceful purposes. The Insect Allies Program could be seen to violate the Biological Weapons Convention, if the motivations presented by DARPA are not plausible. This is particularly true considering that this kind of technology could easily be used for biological warfare," explains Silja Vöneky, a law professor from Freiburg University.

https://www.sciencedaily.com/releases/2018/10/181009102511.htm

Science News *from research organizations*

A step towards biological warfare with insects?

Date: October 9, 2018

Source: Max-Planck-Gesellschaft

Summary: A project by a research agency of the US Department of Defense could easily be misused for developing biological weapons, according to researchers.

Share:

RELATED TOPICS

Plants & Animals

- Biotechnology and Bioengineering
- Agriculture and Food
- Biotechnology

FULL STORY

Owing to present-day armed conflicts, the general public is well aware of the terrifying effects of chemical weapons. Meanwhile, the effects of biological weapons have largely disappeared from public awareness.

DARPA Revector Program to Alter Human Skin Biomes to Reduce Mosquito Attraction to Humans Reaches Second Phase

Finabel - 15 March 2022 - News

SOURCE: © GETTY IMAGES

A new project to provide long-term protection from mosquito-borne illnesses by genetically engineering people's skin bacteria has been launched by the US Department of Defense (DOD). The goal of the programme is to give US

LATEST POPULAR

What can we learn from East Palestine?

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https://www.chemistryworld.com/news/darpa-wants-to-genetically-engineer-soldiers-skin-bacteria-to-protect-them-from-mosquitoes/3010506.article

Genetically engineer/alter the human skin biome… what could possibly go wrong (evolve, mutate) once time and environmental factors affect the system?

Therefore, TWO CRITICAL questions MUST be answered (investigated by an EIS) before proceeding any further with the Wolbachia/Mosquito proposal is:

Is there evidence that research/biowarfare weaponization of these specific microorganisms and insects taken place?

AND

How might additive, cumulative, synergistic effects take place with existing programs involving insects, microorganisms, and humans?

Accordingly –

Please prove to us that the DLNR has not become a "captured agency," that its initials don't stand for Department of Let's Not Review..

> ***https://definitions.uslegal.com/c/captured-agency/***
> ***Captured agency refers to a government agency unduly influenced by economic interest groups directly affected by its decisions. It shapes its regulations and policies primarily to benefit its favored client groups at the expense of less organized and often less influential groups rather than design them in accordance with some broader or more inclusive conception of the public interest.***

Impeaching the "witness" – take a hard look at who's doing the funding (besides DARPA).

Just as in the Covid situation, in which "charitable" foundations donated to research organizations and then profitted handsomely (rather like the early missionaries, who "came to Hawai'i to do good and did very well indeed"), a couple of more notorious "charitable grant" players reappear in the Wolbachia Mosquito research playbook:

Gates Foundation

Wellcome Trust

???

FORBES > INNOVATION > HEALTHCARE

Bill Gates: Some People Think Eradicating Mosquitoes With Genetics Is Scary, But I Don't Think It Will Be

Matthew Herper Former Staff

I cover science and medicine, and believe this is biology's century.

Initially, Gates was talking about a less radical technology: infecting mosquitoes with Wolbachia, a bacteria, to keep them from becoming infected with dengue or the Zika virus. He gave this as an example of research and development that seemed high-risk, but which seems to have worked. But Jay Walker, a founder of Priceline.com and curator of TedMed, asked Gates about the much more controversial gene drive, which some have fretted could be "the next weapon of mass destruction." Gates acknowledged the fears, but said that he does not share them..The new technology, called a gene drive, uses advances in molecular biology to mimic something that has existed in nature for some time. Recently, scientists have turbocharged this process. Using CRISPR-Cas9, a gene from bacteria that can be used

to easily edit DNA, they have created genes that aggressively push themselves into a subject's genome

An article in the BMJ (British Medical Journal) calls out Gates and Wellcome for covering their ultimate agendas (and financial interests) under the cloak of charity and public-spirited research, failing to reveal large conflicts of interest.

Feature » Investigation

Covid-19, trust, and Wellcome: how charity's pharma investments overlap with its research efforts

BMJ 2021 ; 372 doi: https://doi.org/10.1136/bmj.n556 (Published 03 March 2021)
Cite this as: *BMJ* 2021;372:n556

How likely is it that a research organization/foundation (e.g., doing Wolbachia/mosquito research) being generously supported by these two entities will find that no harm or unintended consequences are taking place re the object of research?

Could this be ethically comparable to the virologists who suddenly altered their testimony on SARS-CoV-2 origins and then received large grants from Fauci?

CORONAVIRUS

Top virologists who changed tune on COVID-19 lab leak theory received millions in NIH grants

by Gabe Kaminsky, Investigative Reporter | | March 02, 2023 10:58 AM

Thanks to such precedents being publicly exposed, "Science" MUST now be questioned, even peer-reviewed and published "science," unfortunately, based on a careful examination of the potential for conflicts of interest. After all, an EIS is designed to look into the social elements/background, too – anything of consequence re the project.

Mohga Kamal-Yanni, a policy adviser to UNAIDS and other organisations who recently co-wrote a paper citing problems with the Gates Foundation's influence in the pandemic, says that Wellcome's investments raise critical questions around transparency and accountability.5

Yet charities such as Gates and Wellcome—and even drug companies—have generally been praised in the news media during the pandemic for their efforts to solve the public health crisis, with relatively little attention paid to their financial interests and with few checks and balances put on their work.

https://www.bmj.com/content/372/bmj.n556

09/07/21 • COVID • BIG PHARMA › VIEWS

New Documentary on WHO Exposes Widespread Corruption, Massive Funding by Bill Gates

"TrustWHO," a documentary film produced by Lilian Franck, reveals the clandestine influences — including Bill Gates's role as No. 1 funder — controlling the World Health Organization, to the peril of public health.

We are reassured by certain experts that this Wolbachia/mostquito experiment is harmless.. however, many of these researchers and organizations are generously funded by the Gates Foundation and Wellcome Trust in particular.

A tiny bit of historical/moral/ethical background on the Wellcome Trust (formerly Burroughs Wellcome), uncovered by Tom Fitton of Judicial Watch:

*"The omitted evidence by Oxford of Rhodes' 1895 Privy Council appointment directly implicates … in the **2nd Boer War concentration camp atrocities** where **over 60,000 whites and blacks (incl. over 14,000 mostly white children of French, German and Dutch descent) were murdered in the camps**.*

The omission also implicates the Crown, Privy Council, Henry de Worms (a Rothschild cousin) and the Rothschilds banking fortune in

> ***the human vaccine experimentation carried out by Burroughs Wellcome (Wellcome Trust today) in those 2nd Boer War concentration camps..”***

The same Wellcome organization which conducted vaccine experiments in the 2nd Boer War concentration camps researched – in 2018 – vaccine confidence - how to encourage uptake of vaccination. SO timely, given the subsequent emergence of Covid-19, yes?

> ***“..120,000 respondents in 126 countries to assess how societal-level trust in science is related to vaccine confidence. In countries with a high aggregate level of trust in* science, people are more likely to be confident about vaccination..”**
> **https://pubmed.ncbi.nlm.nih.gov/34002053/**

And what was Fauci’s mantra, even as the harm magnified? “Trust the science.”
Former CDC Director Redfield testified before Congress that they found evidence of Covid-19 as early as September 2019. In October 2019, Gates Foundation et al run a respiratory virus pandemic simulation – Event 201.
https://www.centerforhealthsecurity.org/our-work/exercises/event201/

SO - WE the Public are being asked to Trust The Science in this Assessment re Wolbachia-laden mosquitoes, but .. no. FAR TOO MUCH IS POTENTIALLY AT STAKE. There needs to be a MUCH broader, deeper examination of this issue.

Since Wolbachia affects the reproductive system of its hosts, could there be potential additive, cumulative, synergtistic effects in combination with the Covid-19 injection’s spike protein and lipid nanoparticles that now broadly “infect” the body, especially the ovaries, according to a Japanese biodistribution study of Pfizer’s product (a finding in contradiction to the original “scientific” assertion that those elements would remain in the injection site)?

(https://childrenshealthdefense.org/defender/mrna-technology-covid-vaccine-lipid-nanoparticles-accumulate-ovaries/ .

Re the nanoparticles/spike protein, it appears that significant reproductive effects are occurring post-injection, according to the analysis by 3000+ professionals assessing the Pfizer court-ordered document release, so could exposure to an additional microorganism – Wolbachia - that specifically favors host-females reproductive system, result in an unanticipated interaction? -

https://dailyclout.io/miscarriages-in-covid-19-vaccinated-mothers-as-reported-in-vaers/) -

> ***The secret to the over-achieving bacterium's success is its ability to hijack its hosts' reproduction. Biologists have known that* Wolbachia *have had this power for more than 40 years but only now have teams of biologists from Vanderbilt and Yale Universities identified the specific genes that confer this remarkable capability.***
>
> ***The two universities have applied for a patent on the potential use of these genes to genetically engineer either the bacterial parasite or the insects themselves to produce more effective methods for controlling the spread of insect-borne diseases like dengue and Zika and for reducing the ravages of agricultural pests.***
>
> ***This achievement is described in the journal* Nature *in a paper titled "Prophage WO Genes Recapitulate and Enhance* Wolbachia*-induced Cytoplasmic Incompatibility" and in a companion article titled "A* Wolbachia *deubiquitylating enzyme induces cytoplasmic incompatibility" in* Nature Microbiology *published online on Feb. 27.***
>
> ***"We've known for decades that one of the secrets to* Wolbachia*'s success is that it interferes with host reproduction in order to spread itself through females***
>
> ***https://www.sciencedaily.com/releases/2017/02/170227120400.htm***

I am appending my previous testimony on this issue as well, which I will resend in a separate email – votetrees@protonmail.com

You only get one chance not to make an irreversible mistake (insufficient study). Please don't screw this up (sorry for the blunt language)…

From: scott werden
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for March 24, 2023 meeting, agenda item C(2)
Date: Friday, March 17, 2023 7:05:03 PM

Aloha,

I am writing in regards to agenda item C(2) before this board, on March 24, 2023, which is a hearing on "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I am a former research scientist (Geophysics) with a PhD so I feel comfortable in evaluating research proposals.

I have studied the proposed technique for Culex mosquito abatement using the Wolbachia technique and the logic for its use and the methodology appear to be sound and well thought out. My only concern is that it may not be enough to save the species threatened by avian malaria, but at this point it is the most viable tool and should be tried. I see no obvious detriment to people or the ecosystem by implementing the proposed program.

Hawai'i has lost almost 50% of its endemic bird species to extinction since contact in 1778, and about 30% are currently threatened, some critically. It is incumbent upon us to do what we can to prevent further loss of wildlife. Once gone, the ancient forests will be silent. I spend considerable time in our koa and 'ohi'a forests and it is a truly amazing experience to hear how alive the forests are, but only above 5000' which is the upper limit for mosquitoes. As the planet warms, the mosquitoes will go higher and higher and at some point there will be no forest high enough for the vulnerable birds to escape to. We are racing the clock here.

I urge the board to find in favor of the proposal and to move this project forward in an expeditious manner.

Mahalo nui loa,

Scott Werden
PO Box 345
Ha'iku, HI 96708

scott.werden@gmail.com

From: Patrycja Wietrzychowska Ohara
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Thursday, March 23, 2023 6:56:10 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Endemic birds of Hawai'i are found nowhere else on the earth. Since human colonization 71 birds have been confirmed lost (out of at least 113 endemic species). Of the 42 extant endemic taxa, 31 are federally listed, but 10 of these have not been observed in as many as 40 years and are of unknown status. **The responsibility of our generation is to protect and preserve the remaining species.**

On March 7th 2023 I experienced first hand the forest birds' extinction crisis, while hiking with my husband on popular Kaulana Manu Nature on the Big Island. That day we saw a dead 'i'iwi lying on the ground right on the trail. We were both shocked and very sad to see this beautiful bird lifeless. It made us realize how serious the present situation of the Hawaiian honeycreepers is.

At least two endangered bird species on East Maui, kiwikiu and 'ākohekohe are expected to become extinct within two to fifteen years if avian malaria is left unchecked. Four additional Hawaiian honeycreepers: the threatened 'i'iwi, Maui 'alauahio, Hawai'i 'amakihi, 'apapane are also affected by avian malaria.

I am a mother of two boys: 6 and 3 years old who are passionate about Hawaiian wildlife. The moments when I see them the happiest are when they are hiking in the forest, climbing trees, hearing nene flying over in the mornings and in the evenings, spotting 'io on the sky, observing 'apapane flying between 'ohi'a trees, playing with the waves in the ocean, watching whales, observing green sea turtles. In their young hearts they feel a deep connection to nature already and it gives them pure joy**. It also makes them good and kind people. Nothing else can replace these precious experiences**.

I believe that The Incompatible Insect Technique (IIT) can suppress mosquito populations and help save our native forest birds. *Wolbachia* is a naturally-occurring bacteria in insect species in Hawai'i – such as the native wēkiu and fruit flies, and the non-native mosquitoes (including the southern house mosquito and Asian tiger mosquito). The approach of using *Wolbachia* within mosquitoes has been researched, developed, and applied specifically for improving public health, for over 50 years, with no reported negative health or environmental impacts.

The Environmental Assessment (EA) concluded that no significant negative environmental or cultural impacts will occur. Preparing a full Environmental

Impact Statement is not necessary and it would be a waste of precious time and resources that should be used to save our forest birds.

My 6 years old son told me that he is hoping that the decision makers won't leave the mosquito problem to be as it is, because all the native forest birds will die. And his words really touched me, because he was right.

So on behalf of my children, I want to ask you to take the proposed conservation actions: **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI,** because they are our only hope at this moment.

Mahalo nui for the opportunity to provide testimony,
Patrycja Ohara

Attachment:

Photo of a dead 'i'iwi found on the ground while hiking in Kaulana Manu Trail on the Big Island, 3/7/2023

From:	Evelyn Wight
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Testimony for Mar 24 meeting
Date:	Wednesday, March 22, 2023 9:27:38 AM

Aloha,
I am writing to say that I fully support DLNR's proposal to prevent extinction of native forest birds, some of which are close to extinction, by using mosquito birth control, or Incompatible Insect Technique (IIT), to suppress mosquito populations.

I am confident in the scientific work, the EA and the conservation organizations involved in this project and I strongly encourage the BLNR to support and help to execute this project.

Specifically I support agenda item C-2 and encourage BLNR to approve the EA and FONSI.

Evelyn Wight
Volcano, Hawaii

From: The Wildlife Society - Hawaii Chapter
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] In support or 3/24 agenda item C-2
Date: Monday, March 20, 2023 11:38:47 AM

The Wildlife Society (TWS), Hawaii Chapter is testifying in SUPPORT of Agenda Item C-2 on the proposed use of the Wolbachia Incompatible Insect Technique to suppress invasive mosquito populations and prevent the extinction of threatened and endangered Hawaiian honeycreepers living on Maui. We SUPPORT the approval of the Final Environmental Assessment (FEA) and Finding of No Significant Impact for the actions described in this FEA.

TWS, Hawai‘i Chapter is composed of wildlife professionals within the State of Hawai‘i. TWS Hawai‘i Chapter is dedicated to the conservation and preservation of flora and fauna endemic to the Hawaiian Islands. The protection of these birds is important for the native ecosystem, Hawaiian culture, and for biodiversity.

Avian malaria is being spread by invasive southern house mosquitoes, and is moving up the mountain due to climate change. This has been and is going to cause extinction of the native Hawaiian honeycreepers. We cannot stand by and lose any more native species. We need action and the Incompatible Insect Technique can suppress mosquito populations and help save our native forest birds.

Please SUPPORT the mosquito control efforts described in item C-2 by approving the Final Environmental Assessment and Finding of No Significant Impact.

From: Deborah Lucas
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Mosquito release
Date: Wednesday, March 22, 2023 4:54:44 PM

I have one BIG question - WHY? Didn't you learn from the mongoose fiasco that you don't mess with an established, natural bio system??
What are you thinking, and you even admit that this release is experimental!!!! With no environmental impact study.
This is absolute idiocy and if the potential results did not have a likely effect on Native birds, the sacred aina, and probably humans it would be laughable.
But all humor dissolves in the face of what could be a tragic outcome.
Please make such decisions with intelligent thought and extensive research.

Sincerely,

Deborah Wiseman

From:	Melissa Wolfson
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Testimony for agenda item C-2
Date:	Tuesday, March 21, 2023 8:38:33 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Melissa Wolfson
Kapa'a, Kauai, HI

From:	Jeff Wood
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Approve Maui NPS Wolbachia IIT EA and issue FONSI
Date:	Wednesday, March 22, 2023 6:56:02 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds. Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Jeffery Wood

--
Regards,
Jeff Wood
949-903-0282

From: Heather Grace
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Wednesday, March 22, 2023 2:33:21 PM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia*bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed,

comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Sincerely,
Heather Wright

Sent from my iPhone

From: Barb
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] No mosquitoes !!!
Date: Tuesday, March 21, 2023 2:12:46 PM

Do not mess with mother nature!

Sent from my iPhone

From: liat_bearden@yahoo.com
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support for Wolbachia IIT
Date: Tuesday, March 21, 2023 3:52:07 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT, Agenda Item C-2 on the proposed use of the *Wolbachia* Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kaua‘i and Maui.

Our birds here in Hawaii are in danger from the Avian Malaria. Birds are an important natural resource for our unique State and we need to act in order to protect them. I've read up on this technique and I support it. Let's get those Incompatible Insects out there and let's start cutting down the mosquito population! This will not only protect the birds but it may prevent the human mosquito born illnesses like West Nile and Dengue fever as well. As a life-long resident of Hawaii island, I know well how scary Dengue Fever has been for us in past decades.

Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui!
Liat Bearden

From: B F
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for Thursday, March 23, 2023
Date: Tuesday, March 21, 2023 11:00:53 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **strongly support** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI). From a human perspective I really relish the idea of less mosquitoes. I went trough the Dengue Fever outbreak and unfortunately had to use chemicals. As the Climate warms there may be new pathogens in the environment and some of them will use the mosquito to infect us. As the climate changes there will be more mosquitoes!

No matter how pristine Hawai‘i’s native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds. Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawai‘i. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Noel Bobilin
Fern Forest, Hawaii

From: corrina carnes
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support for approval of IIT EA
Date: Tuesday, March 21, 2023 12:36:46 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save our forest birds.

Mahalo for the opportunity to provide testimony.

Corri Carnes
Omao, Kauai

From: corrina carnes
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Support for approval of IIT EA
Date: Tuesday, March 21, 2023 12:36:46 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save our forest birds.

Mahalo for the opportunity to provide testimony.

Corri Carnes
Omao, Kauai

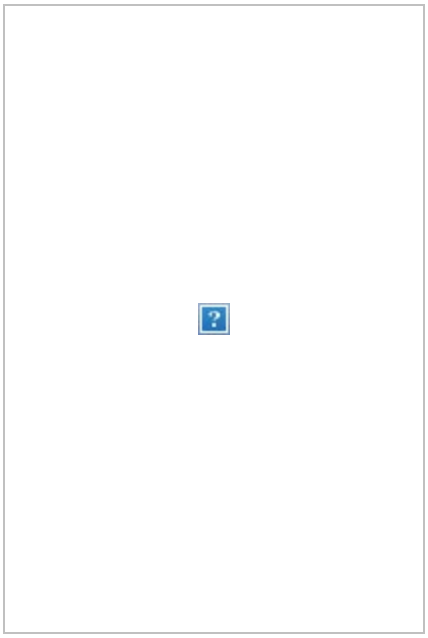
From:	Chuck Chimera
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] Testimony in Support of the Final Environmental Assessment for the "Suppression of Invasive,Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and,Endangered Forest Birds on East Maui".
Date:	Tuesday, March 21, 2023 3:28:35 PM

Dear Chair Designate Chang, and members of the Board of Land and Natural Resources,

I am submitting testimony in **support** of Agenda Item C-2 for the Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui".

Over the course of my career as a botanist in Hawaii, I've had the privilege of working in some incredible, and remote places set aside to protect Hawaii's rare plants and animals, and despite being a "plant nerd" have fallen in love with charismatic, and breathtakingly beautiful forest birds like the 'i'iwi, the 'ākohekohe, the kiwikiu, and so many more. When I first began my career in conservation as a volunteer at Haleakala National Park over 30 years ago, I had no idea how lucky I was to be able to walk across the street from park housing into the neighboring Waikamoi Preserve and see these birds in person, and still abundant and seemingly protected from all of the dangers awaiting them at lower elevations.

What has happened to their numbers in the ensuing three decades is truly alarming and disheartening. In spite of the best efforts and dedication of my colleagues in conservation, these rare forest birds have continued to decline in numbers, even in their remote mountain refuges, largely due to avian malaria carried by mosquitoes, and the effects of climate change that allow mosquitoes to survive at higher elevations. I will never forget that feeling of profound sadness when I learned of the death of the last known Po‘ouli in captivity in 2004. I and my artist wife mourned it as if we had lost a beloved family member, and I am continually reminded of its absence by my wife's haunting painting hanging in my office, created from photographs of the last surviving individual.



The thought of I, my wife, and my 10-year old son, never getting to see, or hear 'i'iwi and the other remaining forest birds again, has almost left me with a feeling of despair, until I learned of the Wolbachia Incompatible Insect Technique to release non-biting male mosquitoes to reduce the number of these disease-carrying insects in our forests. I understand that this technique has already been safely used around the world to protect humans from diseases like dengue and the Zika virus and could save many of our remaining endangered forest birds from extinction. As a scientist well-versed in technical publications and peer-reviewed literature, I have read through and am impressed by the thoroughness and rigor of the prepared Environmental Assessment, and feel that it more than adequately addresses any associated concerns and supports the contention that the proposed mosquito release is not likely to have significant negative effects. On the contrary, the benefits of this technique, if successful, will be celebrated by generations to come, and the only regret may be that it was not available earlier to save those rare species like the Po‘ouli that have already been lost.

I therefore urge you to act now, while there is still time, and support agenda item C-2. Please approve the Final Environmental Assessment and authorize the Chairperson to issue a Finding of No Significant Impact. I and my family wholeheartedly thank you for your time and consideration.

Mahalo,

Chuck Chimera

Honokaa

From: Romero,Cozette
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Tuesday, March 21, 2023 1:47:26 PM

Aloha,

My name is Ashley Romero and I am submitting testimony in strong support of Agenda item C-2.

Hawaii's native Honeycreepers are foundational to the culture, forests, and ecosystems of Hawai'i. We have already lost a great deal of these forest bird species due to avian diseases transmitted by non-native mosquitoes. Every time we lose a bird species we lose an ecosystem service, a valuable part of our community, a beautiful native creature, a unique creation of an incredible number of years of evolution, and a piece of Hawaiian culture. Right this moment one of our native forest birds on Kaua'i 'akikiki is going extinct in the wild. Two native birds on Maui, the kiwikiu and the 'akohekohe are predicted to also go extinct within the next few years if nothing is done **immediately**. As pollinators, seed dispersers, and insect eaters, they are essential for our forests and without action or delayed action, these species have **no chance** of survival.

The incompatible insect technique or mosquito birth control provides us with a last glimmer of hope and opportunity to save the last remaining Honeycreepers from extinction. This method has been used successfully worldwide for vector control for human diseases and gives us a powerful tool to address the main cause for the decline of our Honeycreepers: avian malaria transmitted by the Southern House Mosquito. Neither the disease nor the vector is native to the Hawaiian islands and the mosquitoes have invaded the highest elevation of our island, decimating our Honeycreeper populations every day. Our forest birds evolved in a mosquito-free Hawai'i and a single bite of an infected mosquito can be enough to kill an 'i'iwi.

It is solely the fault of human beings for the declines and extinctions of our native birds. Introducing predators, plants, and disease to these islands has been a death sentence to our native species. If we continue to let native species go extinct, we risk the collapse of our entire ecosystem.

We have the tools to make this situation better and as a professional who grew up in Hawai'i, and has worked in Hawai'i's native forests for over 6 years now, I have seen firsthand the type of dire situation we are in. Please do your part to protect Hawai'i's native bird species, its ecosystems, and its culture and support IIT and other mosquito control techniques. Please support Agenda item C-2.

All the best,

Ashley

From:	Jasmin Curiel
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & Issue FONSI
Date:	Tuesday, March 21, 2023 3:03:07 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever. This issue is vitally important to the health and future of our forests and native avian species of Hawaii.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Jasmin Curiel

From: Alison Evan
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Question for you?
Date: Tuesday, March 21, 2023 3:20:27 PM

Dear Sirs,
I'm writing to you today in opposition to C2 mosquito release experiment.

Dr. Lorin Pang agrees that this is not a good idea.
We must see an environmental impact statement- at minimum .
We have a very delicate ecosystem and this could be detrimental- you do not know. We do not know either .

Why risk it ?
This appears to be a for-profit proposition on behalf of the governments gain.
If you live here or have children living here on Maui or Kauai you surely know that this is a terrible idea.
This could impact our island, our quality of life and our balance for generations to come.
The damage could be irreversible

Please vote no,
Thank you
Malama aina

Alison
Sent from my iPhone

From:	Friends of Hawaiian Islands NWR
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] SUPPORT Agenda Item C-2
Date:	Tuesday, March 21, 2023 12:17:17 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

Friends of Hawaiian Islands National Wildlife Refuge (FoHI) is expressing SUPPORT, Agenda Item C-2 on the proposed use of the *Wolbachia* Incompatible Insect Technique (IIT) to prevent the extinction of the endangered Hawaiian honeycreepers living on Kaua‘i and Maui.

As representatives of the Hawaiian Islands National Wildlife Refuge in Papahānaumokuākea Marine National Monument, forest birds in the Main Hawaiian Islands may seem outside our purview. But, islands free of predators and mosquitoes are why the endangered and endemic species like the Nihoa Finch, Nihoa Millerbird and Laysan Finch still thrive on these islands. As the atolls subside with sea level rise, these birds will need to be translocated to high islands, and places with mosquitoes are not an option.

Forests of the main Hawaiian Islands should also be a refuge for the endemic songbirds that inhabit them. Avian malaria is the main reason forest bird populations are going extinct, and introduced mosquitoes are the vector. Loss of a species is devastating, and preventable. The research and technology to stop avian malaria from impacting Hawaii's forest birds is available and accessible.

The proposed conservation actions to use IIT is critical to preserving our revered and valued forest birds. Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui!

-Board members of Friends of Hawaiian Islands National Wildlife Refuge
(Ilana Nimz, Chair; Barry Stieglitz, Secretary; Lauri Leach, Treasurer; Yuki Reiss, Member; Nicole Galase, Past Chair)
Friends of Hawaiian Islands National Wildlife Refuge
PO Box 235253, Honolulu, HI 96822
(424) 262-0656
hinwrfriends@gmail.com
@FriendsOfHINWR

From:	Claire Bear
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date:	Tuesday, March 21, 2023 1:24:26 PM

I OPPOSEapproval of the Final Environmental Assessment. I OPPOSE authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI).

The scope, risks, and experimental nature of the plan Require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I Demandan Environmental Impact Statement (EIS).

Sincerely,

Michelle Galarza
Haiku

Sent from my iPhone with love Chelle

From: tehere gibbs
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Tuesday, March 21, 2023 11:37:40 AM

Dear Chair and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Just a month ago I had an amazing opportunity to volunteer at Maui Bird Recovery Center where i had the honor and privilege of seeing and hearing for the first time in my life, a pair of kiwikiu manu alive and well from the wild in captivity and paired for reproduaction until their forest is safe without the high numbers of souther house mosquito‘s.

Learning the history of these last remaining species at risk made this moment even more significant. These kiwikiu in particular made such a remarkable empression on me, i will remember this meeting for rest of my life. Their energy spoke outloud, without words for human ears to hears, and with eyes staring back they said, ”Here i am, your kumu o nā kumu lā‘au, your kūpuna kahiko, your ‘amakua. You have the mana to save us, rise to our fading call, rise in Unity, our lives depend on YOU now.”

We must do ALL that we can for the sake of these special birds of Hawaii’s, who not only have been here for during the birth of these islands but also who we thank for our lush unique floral from their nature in dispersing seeds across and between islands, adapting with and pollinating them. We owe our time and effort to these extraordinary birds who took their time and effort into beautifying these islands.

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ‘Ākohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawai‘i’s native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to the ecology of Hawai‘i and

Native Hawaiian culture. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Tehere Meryl Myra Gibbs
--
Sent from Gmail Mobile

From:	Ray Guinto
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Tuesday, March 21, 2023 12:32:01 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Ray Mark Guinto

From: Gonnie Heggen
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date: Tuesday, March 21, 2023 11:34:59 AM

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

*I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. *This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. *I demand an Environmental Impact Statement (EIS).*

Gonnie Heggen
PO Box 941
Captain Cook HI96704

Sent from my iPad

From:	Cathe L Herbert
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date:	Tuesday, March 21, 2023 12:51:49 PM

I **OPPOSE approval of the Final Environmental Assessment.** I OPPOSE authorization **for the Chairperson to issue a Finding of No Significant Impact (FONSI)**.

The scope, risks, and experimental nature of the plan **Require detailed, comprehensive studies and documentation** of the impacts to our native birds, wildlife, environment, and public health.
I Demand an **Environmental Impact Statement (EIS)**.

* It is foolish to think nothing bad will come of the plan. All you have to do is look at the history of things in the past to know something WILL go wrong!

PLEASE ~ Protect the 'Āina from BioPesticide Mosquitoes!

Mahalo,
Cathe Herbert

From:	J. Hoecker
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] OPPOSE Agenda Item C2 : MUST have Environmental Impact Statement (EIS)
Date:	Tuesday, March 21, 2023 2:35:45 PM

I OPPOSE Approval of the Final Environmental Assessment. I OPPOSE authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI).

The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. It is extremely important to require an Environmental Impact Statement (EIS) at the very least.

Aloha,
Jessica Hoecker

From: aleysia@hawaii.edu
To: DLNR.BLNR.Testimony
Cc: Aleysia-Rae Kaha
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Tuesday, March 21, 2023 3:18:12 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Aleysia kaha

Sent from my iPhone

From: aleysiarae@gmail.com
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Tuesday, March 21, 2023 3:13:27 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Aleysia Kaha

Sent from my iPhone

From: Nicole Logan
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] I SUPPORT Agenda Item C-2
Date: Tuesday, March 21, 2023 12:08:30 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I SUPPORT Agenda Item C-2 on the proposed use of the Wolbachia Incompatible Insect Technique to prevent the extinction of the endangered Hawaiian honeycreepers living on Kauaʻi and Maui.
Avian malaria, a disease transmitted by invasive southern house mosquitoes, is driving the extinction of our forest birds. A single bite by an infected mosquito can kill an ʻiʻiwi (a critically endangered forest bird species). As the climate warms, mosquitoes carrying avian malaria are moving upslope into the last refugia for Hawaiʻi's forest birds. Without swift action, several species of honeycreepers will become extinct in the next ten years. The Incompatible Insect Technique can suppress mosquito populations and help save our native forest birds.

This is our last chance to save our amazing and unique birds that are found nowhere else in the world. Extinction is forever. We need to save our birds from mosquitoes that transmit avian malaria before it is too late.

Please **SUPPORT** the mosquito control efforts touched upon in agenda item C-2.

Mahalo nui,
Nikki Logan
Hawaiʻi Island Resident

From: Alexandra Poleshaj
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Oppose agenda C2
Date: Tuesday, March 21, 2023 3:02:25 PM

I OPPOSE Approval of the Final Environmental Assessment.
I OPPOSE authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI).
The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. I Demand an Environmental Impact Statement (EIS).

Alexandra Love

From:	Auli"i Mahuna
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Tuesday, March 21, 2023 1:16:55 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Hawai'i is the "Endangered Species Capitol" of the world, which is a very unfortunate claim to fame for an island chain with one of the highest concentrations threatened of native species. These native species hold great significance to kānaka maoli, such as myself, and are a reminder of our resistance and persistence against all odds.

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
ʻAuli'i Mahuna

From: Shay Maney
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Item C-2
Date: Tuesday, March 21, 2023 1:42:28 PM

I'm writing to submit testimony in support of item C-2.

The Wolbachia incompatible insect technique will save the native Hawaiian forest birds from mosquito-borne disease. It's been used to great success in other countries and mainland states.

Delaying the use of this technique is unnecessary and a waste of what little precious time the endemic birds have. The kiwikiu, 'akeke'e, 'akikiki, and the 'ākohekohe are especially vulnerable right now, and may even die out within the next few years if nothing is done.

There is no chance of adverse effects on the environment, as the Wolbachia virus already exists in nature, and again, has been used in other places to help combat diseases affecting humans.

If we can do this for ourselves, we can do it for the little birds of the islands.

From: Kevin Maruyama
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony
Date: Tuesday, March 21, 2023 11:23:11 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native Hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have and we must do what is right to preserve the Kiwikiu and ‘Ākohekohe population.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

This is a staff email account managed by Hawaii Department Of Education School District. This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the sender.

From: Trevor
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Oppose
Date: Tuesday, March 21, 2023 1:22:45 PM

I **OPPOSEapproval of the Final Environmental Assessment.** I **OPPOSE authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI)**.

The scope, risks, and experimental nature of the plan **Require detailed, comprehensive studies and documentation** of the impacts to our native birds, wildlife, environment, and public health.
I **Demandan Environmental Impact Statement (EIS)**.
Sincerely,
Trevor McCammack

From: Megan McElligott
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Written Testimony for 3/24/2023 Agenda Item C-2
Date: Tuesday, March 21, 2023 12:13:14 PM

To whom it may concern:

Regarding agenda item C-2, I am writing to support the Environmental Assessment for the "Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui." Native Hawaiian flora and fauna are important, not only for the health of their ecosystems, but culturally as well. BLNR should agree with the finding of no significant impact and vote to approve the plan.

The Environmental Assessment is thorough and outlines the proper procedure to implement the method of Incompatible Insect Technique in Hawaii. This method of infecting male mosquitoes with Wolbachia has been effectively used in other parts of the world, and our remaining native birds need this effort to prevent further extinction.
Thank you for your time.

Sincerely,
Megan McElligott

From: Kalei Meyer
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] WOLBACHIA testimony
Date: Tuesday, March 21, 2023 11:59:45 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Kalei Meyer

From:	jerry miller
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] I am opposed to The BLNR releasing mosquito"s
Date:	Tuesday, March 21, 2023 1:16:02 PM

I am strongly against the release of mesquito's by the BLNR. There has been no EIS done , to show what the impact's are to our fragile ecosystem here in Hawaii. This is the same mentality that brought the mongoose here. Have you the Government not learned anything from your past mistakes !!!!!This could effect us economically , and socially . thank you Jerry Miller

From:	John Morey
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] OPPOSE Agenda Item C2 - we must have Environmental Impact Statement (EIS)
Date:	Tuesday, March 21, 2023 12:38:37 PM

Board Members:

Please act responsibly and with integrity. Please consider the damage that could be done without proper due diligence.

I OPPOSE approval of the Final Environmental Assessment. I OPPOSE authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI).

The scope, risks, and experimental nature of the plan Require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. We must have an Environmental Impact Statement (EIS).

From: Romero,Cozette
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for agenda item C-2
Date: Tuesday, March 21, 2023 1:47:26 PM

Aloha,

My name is Ashley Romero and I am submitting testimony in strong support of Agenda item C-2.

Hawaii's native Honeycreepers are foundational to the culture, forests, and ecosystems of Hawai'i. We have already lost a great deal of these forest bird species due to avian diseases transmitted by non-native mosquitoes. Every time we lose a bird species we lose an ecosystem service, a valuable part of our community, a beautiful native creature, a unique creation of an incredible number of years of evolution, and a piece of Hawaiian culture. Right this moment one of our native forest birds on Kaua'i 'akikiki is going extinct in the wild. Two native birds on Maui, the kiwikiu and the 'akohekohe are predicted to also go extinct within the next few years if nothing is done **immediately**. As pollinators, seed dispersers, and insect eaters, they are essential for our forests and without action or delayed action, these species have **no chance** of survival.

The incompatible insect technique or mosquito birth control provides us with a last glimmer of hope and opportunity to save the last remaining Honeycreepers from extinction. This method has been used successfully worldwide for vector control for human diseases and gives us a powerful tool to address the main cause for the decline of our Honeycreepers: avian malaria transmitted by the Southern House Mosquito. Neither the disease nor the vector is native to the Hawaiian islands and the mosquitoes have invaded the highest elevation of our island, decimating our Honeycreeper populations every day. Our forest birds evolved in a mosquito-free Hawai'i and a single bite of an infected mosquito can be enough to kill an 'i'iwi.

It is solely the fault of human beings for the declines and extinctions of our native birds. Introducing predators, plants, and disease to these islands has been a death sentence to our native species. If we continue to let native species go extinct, we risk the collapse of our entire ecosystem.

We have the tools to make this situation better and as a professional who grew up in Hawai'i, and has worked in Hawai'i's native forests for over 6 years now, I have seen firsthand the type of dire situation we are in. Please do your part to protect Hawai'i's native bird species, its ecosystems, and its culture and support IIT and other mosquito control techniques. Please support Agenda item C-2.

All the best,

Ashley

From:	Brittany Roy
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date:	Tuesday, March 21, 2023 1:48:33 PM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources,

I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

Avian malaria spread by invasive mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Native Hawaiian honeycreepers are incredibly important to Native Hawaiian culture and the ecology of Hawaiʻi. If action is not taken to suppress mosquitoes and avian malaria in forest bird habitat as soon as possible, we will lose these birds to extinction forever.

Wolbachia IIT is currently the only hope we have.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Brittany Roy

From: Aimee Sato
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] APPROVE Maui NPS Wolbachia IIT EA & issue FONSI
Date: Tuesday, March 21, 2023 11:36:34 AM

Aloha Chair Designate Chang and members of the Board of Land and Natural Resources,

My name is Aimee Sato, and I **SUPPORT** Board approval of the Maui NPS Wolbachia Incompatible Insect Technique (IIT) Environmental Assessment (EA), and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI).

My mountain is Ko'olau. My water source is the Palikea spring of 'Āhuimanu. I was born and raised in Hawai'i from immigrant parents. Although this is the only home that I know, I still can only say it has been my home for 30 years, 1 more year in the belt by the end of this month as my birthday nears. Now lets compare this or how long your family has called these islands your home to the native Hawaiian forest birds...where they have called this place home for OVER 5 MILLION years. These birds are not found anywhere else on the planet and are a shining example of adaptive radiation. The rains, winds, climate, and plants of Hawai'i uniquely crafted these beings over generations. Who are we to not do our best to protect them? If it is as easy as utilizing naturally occurring bacteria to rid of a pest to birds and also humans.

As residents of Hawai'i who drink the waters and inhale the air that is all made possible by our forests, will we sit by and let mosquitoes kill the treasures of our forests?

Avian malaria spread by non-native mosquitoes is the greatest threat to the survival of threatened and endangered native hawaiian forest birds across the State. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths.

No matter how pristine Hawaiʻi's native forests are, they are not safe for forest birds if they have mosquitoes spreading avian malaria. Unlike traditional pesticides, Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. Wolbachia IIT has been used successfully in other parts of the world to suppress mosquitoes and the diseases they carry with no negative impacts to people or the environment.

The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

I urge you to please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,
Aimee Sato

From: Emma Stierhoff
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Pleas approve final EA for Mosquito Suppression on Maui
Date: Tuesday, March 21, 2023 11:10:31 AM

Aloha,

My name is Emma Stierhoff, and I am writing to urge you to approve the Final Environmental Assessment for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui". Too many native birds have already faced extinction as a result of introduced diseases spread by mosquitos. We must take the necessary steps to prevent more native birds from meeting the same fate. Mosquito suppression is a key tool in the fight against diseases like avian malaria. Such efforts only encourage conditions that already naturally exist to benefit our native birds. Thus, in addition to approving the Environmental impact assessment, I also implore the Chairperson to issue a Finding of No Significant Impact.

Maui's forest birds are quickly losing high altitude, mosquito-free refugia, which will have deleterious impacts on their populations if we fail to act quickly. These efforts cannot wait, so please take the steps today that will allow the necessary mosquito suppression efforts to move forward by approving this Environmental Impact Assessment.

Mahalo nui,
Emma Stierhoff

--
Emma Stierhoff (she/her)
Graduate Assistant & Master of Science Student
Tropical Conservation Biology and Environmental Science
University of Hawai‘i at Hilo

From: philippa swannell
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Testimony for Birds Not Mostquitos - mosquito control
Date: Tuesday, March 21, 2023 1:57:19 PM

Please, please can we move forward now with the Wolbachia mosquito control project. I feel this is well overdue. I am an active volunteer and committee member of Friends of Hakalau Forest and avid bird/nature lover. Doing all we can to save the native Hawaiian birds goes hand in hand with preserving important Hawaiian cultural heritage and in many ways more important because if we are protecting the birds, we are protecting the forests which ultimately protect us as a species.

It is my belief that those people who have taken the time to educate themselves on this subject are all for it and those who are apposing it are doing so for all the wrong selfish reasons, without fully understanding a. the extensive work that has gone into the project to ensure that it is safe and viable and b. are not aware or refuse to believe how devastating the mosquito populations are on the already fragile native bird species.

Can we stand by and watch yet more precious natural and cultural Hawaiian treasures disappear, literally before our eyes, and still live with ourselves?

Please stop talking about it and get on with it!! Got any better ideas?

Kind regards,

Pippa swannell
p_swannell@hotmail.com
Find me on Instagram:
@amazingcritterpix
@swannellart

From:	Julia Wurst
To:	DLNR.BLNR.Testimony
Subject:	[EXTERNAL] BLNR Meeting 3/24/23 9:15am Agenda Item C-2: Oppose
Date:	Sunday, March 19, 2023 10:22:04 PM

To Whom it May Concern:

RE: C-2 Request Approval of Final Environmental Assessment and Authorization for the Chairperson to Issue a Finding of No Significant Impact for the "Suppression of Invasive Mosquito populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui"

I'm opposed to the request for approval of the Final Environmental Assessment for the planned biopesticide mosquito releases on Maui. This project is an experiment on our island home, and the outcome is admittedly unknown. The Final Environmental Assessment does not adequately address the serious risks of this plan or the concerns of the public.

Sufficient research has not been conducted to assess the risks of horizontal transmission, increased pathogen infection, evolutionary events, population replacement, or accidental release of females. The Final Environmental Assessment attempts to minimize the possibility of *Wolbachia* bacteria causing mosquitoes to become more capable of spreading diseases like avian malaria and West Nile virus. The significant environmental consequences of the project have not been adequately studied. This plan may actually cause the extinction of endangered native birds, and it could impact human health.

I'm opposed to the authorization for the Chairperson to issue a Finding of No Significant Impact (FONSI). The scope, risks, and experimental nature of the plan require detailed, comprehensive studies and documentation of the impacts to our native birds, wildlife, environment, and public health. **I demand an Environmental Impact Statement (EIS).**

Mahalo,
Julia Wurst
Makawao, HI

Sent from my iPhone

Chris Yuen
P.O. Box 5
Ninole, HI 96773
Email: chrisyuenz@hotmail.com

March 22, 2023

Aloha Chair Dawn Chang and Members of the Board of Land and Natural Resources:

Please approve the EA for the Maui mosquito suppression project. This is the most important action the Board can take to reverse the decline to extinction of our precious forest birds on Maui. The DOFAW staff submittal shows that the EA meets the criteria for a finding of no significant impact, relying on the best scientific information.

There is opposition calling for an EIS. An EIS is not a magic bullet that reveals flaws in a project. It doesn't change science. It primarily creates more procedural requirements. And I suspect if an EIS comes to the same conclusions as the EA, the opposition will not go away.

Requiring an EIS will only cause a delay, which our native forest birds—especially the kiwikiu and ʻākohekohe--cannot afford. It will also signal doubts about the project that may hurt its chances for funding from the Legislature and private and federal partners.

It's OK for members of the public to raise questions and concerns. The common theme I hear in these concerns is that some well-intentioned human interventions in nature have turned out badly. In Hawai'i, the mongoose is Exhibit "A". We have learned from mistakes. Now any project like this is thoroughly vetted. In the past decades many species have been introduced after going through this kind of review. They have not created unexpected problems. And this project does not introduce a new species, and the strain of *Wolbachia* that would be released is already present on Maui in another mosquito species. The safety of this project is not just reviewed by the state DOH, DLNR, and DOA. The EPA will have to issue a special permit for this project to go through.

It's OK to raise concerns, but you must also look at the answers. These are given thoroughly in Appendix "H" to the EA and were also discussed in the March 10 briefing.

While scientists sometimes make mistakes, we shouldn't forget that the life expectancy, comfort, and prosperity that we enjoy today—so advanced from even a hundred years ago—come from scientifically- based interventions in nature. Antibiotics, chlorination of drinking water, high-yielding crops, anesthesia, and, yes, vaccines, have saved hundreds of millions of lives. Each comes with some problems but they have been tremendously beneficial to humanity.

Three human actions created this problem for our native birds: the introduction of mosquitoes, the introduction of avian malaria, and global climate change which is allowing mosquitoes to invade the last refuges. These problems will not go away by themselves. The birds need our help, and they need it now.

From: Cherlyn Zane
To: DLNR.BLNR.Testimony; DLNR.BLNR.Testimony
Subject: [EXTERNAL] Wolbachia testimony
Date: Wednesday, March 22, 2023 8:08:18 PM

Aloha,

I would like submit my full support for the use of Wolbachia to help save the remaining native manus. As a Native Hawaiian, my connection to these manu represent our connection to our ancestors. I trust in our Native scientists/biologists that they would not have come to this decision lightly and that they have expended all other ideas to save our manu. Our Native scientists/biologists are our experts. Believe and trust in their decision as I do, as a Native Hawaiian.
Please save our manu before it's too late.

Sincerely,

Eleu Zane
Sent from my Verizon, Samsung Galaxy smartphone
Get Outlook for Android

From: luka zavas
To: DLNR.BLNR.Testimony
Subject: [EXTERNAL] Agenda Item C-2 | APPROVE East Maui Final EA and Issue FONSI
Date: Thursday, March 23, 2023 6:45:06 AM

Dear Chair Designate Chang and members of the Board of Land and Natural Resources

I STRONGLY SUPPORT Agenda Item C-2, Board approval of the Final Environmental Assessment (EA) for East Maui, and Board authorization of the Chairperson to issue a finding of no significant impact (FONSI). Without swift action, several species of honeycreepers will become extinct in the next ten years. With the ʻakikiki estimated to go extinct in the wild as soon as this year.

Avian malaria, a disease transmitted by invasive southern house mosquitoes, is driving the extinction of our forest birds. A single bite by an infected mosquito can kill an ʻiʻwi. This decline of the Hawaiian honeycreepers due to avian malaria has been documented for over 60 years. On Maui, Kiwikiu and ʻĀkohekohe have experienced drastic population declines coinciding with climate warming and the spread of mosquitoes into high elevation forest reserves that were previously too cold for mosquitoes and avian malaria. The devastating consequences of mosquitoes and avian malaria to Kiwikiu were experienced during the attempted reintroduction to Nakula in 2019, where all necropsies showed that avian malaria was the primary cause of Kiwikiu deaths. We are the last generation that can do something to save the honeycreepers and not let them disappear from our forests.

DLNR is working with biologists, biotechnology experts, wildlife managers, and public health specialists to use the best available science to inform their decision on which conservation tools to implement. This group has identified that the *Wolbachia* Incompatible Insect Technique is the best tool to help them achieve our goal of preserving these birds. Wolbachia IIT is a safe and species specific form of landscape-scale mosquito control. *Wolbachia* use in mosquitoes has been implemented in at least ten countries worldwide to reduce human disease transmission, with no reported negative health or environmental impacts.
The fundamental purpose of an EA is to determine if a project will cause significant negative effects that would require the preparation of an Environmental Impact Statement (EIS). **The Wolbachia IIT EA for East Maui is supported by decades of peer-reviewed science. It concluded that no significant negative environmental or cultural impacts will occur. Therefore, preparing a full EIS is not only unwarranted, but also a waste of precious time and resources that should be used to save our forest birds.** Kiwikiu could go extinct as soon as 2027. They cannot afford any unnecessary delays to successful mosquito and avian malaria suppression.

Mahalo nui members of the Board of Land and Natural Resources for everything you do to mālama Hawaiʻi and all her inhabitants. I support and trust DLNR and the partners working to bring *Wolbachia* Incompatible Insect Technique to Hawaiʻi.

I implore you all to do the same and please **APPROVE the Maui NPS Wolbachia IIT EA and issue a FONSI** to save Maui forest birds.

Mahalo for the opportunity to provide testimony,

Lukanicole Zavas