April 23, 2026

Department of Land and Natural Resources
Division of Forestry and Wildlife
Attn: Forestry Program
1151 Punchbowl St. Room 325
Honolulu, HI 96813
forestry@hawaii.gov

RE: Makawao Forest Reserve Management Plan

Hawai‘i Unites is a 501(c)(3) nonprofit organization dedicated to the conservation and protection of our environment and natural resources. We are opposed to the following Action Item for Threatened and Endangered (T&E) Species Management as stated in the Makawao Forest Reserve Management Plan[1]:

> “Support forest bird enhancement and protection through planned mosquito biocontrol releases (*Wolbachia*).”

Current “mosquito biocontrol releases (*Wolbachia*)” in use by the DLNR and their *Birds, Not Mosquitoes* agency partners include the release of millions of *Wolbachia*-bacteria-infected mosquitoes on our fragile ecosystems on Maui and Kaua‘i. No studies have been done on the potential significant impacts of these projects or on the serious risks to the health of our islands’ people, wildlife, and ‘āina. No environmental impact statement (EIS) has been completed for any island. Hawai‘i Unites’ court case[2] to stop the mosquito releases on Maui and require an EIS brought forth several significant concerns, including:

- Accidental release of female mosquitoes that bite, breed, and spread disease (EPA guidelines[3] allow for the release of one female for every 250,000 males; just one female released can produce 160,000 more females through breeding of the generations in her lifespan; 3,103 females are allowed to be released weekly on Maui[4] – up to 6,000 mosquitoes released twice weekly per acre in the 64,666-acre project area: 6,000 x 2 x 64,666 = 775,992,000 mosquitoes divided by 250,000 equals 3,103 females weekly)
- Peer-reviewed studies showing *Wolbachia* bacteria can cause increased pathogen infection[5] and disease-spreading capability[5,6] in mosquitoes
- Horizontal transmission[7] of *Wolbachia* bacteria to wild mosquitoes and other insect vectors of disease
- Population replacement of wild mosquitoes with lab-altered mosquitoes (as few as three females released[8] can cause population replacement)
- Wind drift of released mosquitoes to unintended areas
- Lack of documented biosecurity protocols and pathogen screenings for the imported mosquitoes

- Risks to the health of people and animals, and the potential for the plan to cause the extinction of the native birds it is meant to protect

Tropical disease and vector expert Dr. Lorrin Pang testified[9] as an expert witness in our case[10] and affirmed that this mosquito experiment has not been studied enough for the State of Hawai‘i and its agency partners to move forward. Dr. Pang has decades of experience as a leader in mitigating mosquito-borne diseases. He has authored over 75 publications in peer-reviewed medical journals, over 40 of which are focused specifically on mosquito-borne illnesses.

The mosquitoes currently being released in the millions on Maui and Kaua‘i are experimental. Southern house mosquitoes lab-infected with *Wolbachia* bacteria have never been documented as used for stand-alone field release anywhere in the world. The 64,666-acre East Maui project area (which includes the Makawao Forest Reserve) is the largest *Wolbachia* mosquito release of any kind globally to date, and Kaua‘i’s 59,204-acre project area is the second largest.

Alarmingly, the *Birds, Not Mosquitoes* (BNM) agency partners releasing these lab-altered mosquitoes have admitted in their Kaua‘i EA[11] that the plan does not even include monitoring the effects of the experimental mosquitoes on forest birds:

> “Monitoring the response of forests bird to mosquito suppression via the Incompatible Insect Technique (IIT) mosquito control is outside the scope of the proposed action of this EA.”

Mass release of these mosquitoes began on Maui in November 2023. The DLNR and their partnering agencies have produced no data on the results of these mosquito releases. There has been no indication that the plan is even working for its intended purpose (reduction of wild southern house mosquito populations, reduction of avian malaria transmission, conservation of threatened and endangered honeycreeper forest bird populations). Deviations from the approved plan have also been occurring since the initial phase of this program. Mosquitoes are being released by helicopter rather than by drone, exacerbating concerns about noise disturbances, disruptions to wildlife habitat, and the potential for collisions, accidents, and wildland fires. The helicopter longline release system described in the environmental assessment is not the system being used, and helicopters appear to be flying closer to the tree canopy than the approved distance, increasing the potential for adverse impacts.

As of February 2025, mosquitoes are now also being mass released on Kaua‘i. Additionally, aerial spraying of Bti larvicide on Maui and Kaua‘i in combination with the aerial release of bacteria-infected mosquitoes is now occurring. This combination of products is not part of the approved plans, and no studies have been done on the impacts of these activities to our environment. The agencies involved have not addressed concerns about potential data falsification due to the use of two different mosquito suppression products within each project area.

The State of Hawai‘i Department of Health (HDOH) is a partner in the *Birds, Not Mosquitoes* (BNM) multi-agency partnership that has been releasing these mosquitoes on Maui and Kaua‘i. The BNM partnership announced in its newsletter that an HDOH statewide environmental assessment (EA) will be published early this year. The BNM website confirms that the statewide phase of the avian malaria mosquito program is being planned and that the HDOH is preparing the statewide EA in cooperation with BNM partner the State of Hawai‘i Department of Land and Natural Resources (DLNR). The plan is to expand the programs to all islands, releasing not only mosquitoes for the avian malaria narrative but also mosquitoes for a human disease narrative.

The DLNR's final EA[4] for the Maui avian malaria mosquito releases states that ground release of mosquitoes using cars, trucks, or ATVs is being planned and that, similar to the proposed action for the avian malaria project, "the regulatory path to obtain approval is defined and approvals are in place to use the approach to control mosquitoes of public health concern."

On 6/28/22, the State of Hawai‘i Board of Agriculture (HBOA, currently referred to as BAB) approved[12] the addition of three mosquito species to the List of Restricted Animals, Part A: for Research and Exhibition. These three mosquito species are:

- the Southern House Mosquito (*Culex quinquefasciatus*), which transmits avian malaria parasitic disease to birds and West Nile virus to both birds and humans; transmits elephantiasis, St. Louis encephalitis, and Western equine encephalitis to humans; is a potential vector of Zika virus; and transmits avian pox and heartworm;
- the Asian Tiger Mosquito (*Aedes albopictus*), which transmits dengue fever, chikungunya, and Zika virus to humans; and
- the Yellow Fever Mosquito (*Aedes aegypti*), which transmits dengue fever, chikungunya, Zika virus, and yellow fever to humans.

The Hawai‘i Department of Health's Senate Ways and Means Committee Budget Presentation[13] references "protocols that more aggressively respond to imported cases of arboviruses such as dengue or zika" under Environmental Health Administration. If the HDOH moves forward with publishing a statewide EA, the State of Hawai‘i Department of Health will become the lead agency for all programs releasing lab-altered mosquitoes on all islands. The HDOH Director of Health has not yet responded to the following questions from the community[14] sent by our organization on February 13, 2026:

- What islands are being targeted for release of mosquitoes for the avian malaria program?
- What specific mosquitoes would be released "to control mosquitoes of public health concern" (what is the biopesticide product name, and what species are the mosquitoes)?
- Where would mosquitoes be released "to control mosquitoes of public health concern" (what islands and what areas on each island)?
- How would mosquitoes be released "to control mosquitoes of public health concern" (what release mechanisms would be used, and would they be released from vehicles, drones, helicopters, and/or on foot)?

- What specific public health concerns would be used to justify mosquito releases (which diseases and what circumstances)?
- Who would fund the HDOH mosquito release program "to control mosquitoes of public health concern"?
- Who would be the HDOH's partners in the mosquito release program "to control mosquitoes of public health concern"?
- How would the HDOH mosquito releases (avian malaria and human disease) align with the "One Health" framework promoted by the World Economic Forum, World Health Organization, Gates Foundation, and your *Birds, Not Mosquitoes* multi-agency partnership?
- Will the HDOH take responsibility for all risks associated with the import of mosquitoes as invasive species?
- Will the HDOH take responsibility for all risks associated with the accidental or intentional release of female mosquitoes that bite, breed, and spread disease?
- Will the HDOH take responsibility for horizontal transmission of bacteria, increased pathogen infection and disease-transmitting capability in mosquitoes, and population replacement?
- How will the HDOH prevent wind drift of mosquitoes to unintended areas?
- What pathogens will the HDOH's imported mosquitoes be screened for?
- How will the HDOH assure that imported mosquitoes don't transmit bacteria and/or pathogens to wild mosquitoes?
- What are the biosecurity protocols for the HDOH's imported lab-bred mosquitoes?
- What mitigation measures does the HDOH have in place for the imported mosquitoes if something goes wrong?
- Mosquitoes have a history of use in biological warfare programs. How will the HDOH assure that imported mosquitoes will not be used as bioweapons and/or in acts of bioterrorism?
- Does the HDOH statewide EA allow for the sale of lab-bred mosquitoes directly to consumers in Hawai'i?
- HDOH's BNM partners have stated their intention to expand[15,16] the mosquito release programs to include "next-generation tools" such as mosquito gene drives and precision-guided Sterile Insect Technique (pgSIT) CRISPR gene-edited mosquitoes, along with the production of mosquitoes in the DLNR's Hawai'i lab[16] and release of mosquitoes on the islands "into perpetuity" (forever). Does the HDOH support these goals, and will the statewide EA open the door for these specific objectives?

Over two years into the BNM mosquito release programs and with no data or safety studies produced publicly to date, HDOH cannot expect the people of Hawai'i to trust the BNM partnership to drastically expand the mosquito releases – covering all islands and focused not only on avian malaria but now also on human disease.

No studies have been done to evaluate the direct, indirect, and cumulative impacts of these mosquito releases. Lab-altered mosquitoes, and the bacteria that *Wolbachia* lab-altered mosquitoes are infected with, are life forms, and there is no way for these experimental projects to be self-contained. Mass release of these foreign organisms could negatively impact human health, animal health, and the environment as a whole. These imported mosquitoes may even cause the extinction of endangered species these BNM agencies are responsible for protecting.

Hawai‘i Unites strongly opposes the exploitative use of sacred lands of the Hawaiian Islands as testing grounds for the profit-motivated biotech industry to execute these open-air lab-altered mosquito experiments. The people of Hawai‘i are overwhelmingly opposed to this reckless agenda, and we will continue speaking out to protect the health of these islands.

We ask that the State of Hawai‘i Department of Land and Natural Resources Division of Forestry and Wildlife amend the Makawao Forest Reserve Management Plan to remove any Action Item for Threatened and Endangered (T&E) Species Management that includes the release of *Wolbachia*-bacteria-infected mosquitoes and/or lab-altered mosquitoes of any kind in the Makawao Forest Reserve or in any other location in the East Maui project area. All mosquito control efforts and funding must focus on more environmentally sound approaches like habitat and stream flow restoration for conservation and public health approaches that focus on community education and source reduction through elimination of standing water breeding sites.

Mahalo,
Tina Lia
Founder
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References

1. Makawao Forest Reserve Management Plan 2025 – State of Hawai‘i Department of Land and Natural Resources Division of Forestry and Wildlife https://dlnr.hawaii.gov/forestry/files/2025/12/DRAFT-Makawao-FR-Management-Plan-Partner-Review.pdf

2. Hawaii Unites and Tina Lia v. Board of Land and Natural Resources, State of Hawai’i, and Department of Land and Natural Resources, State of Hawai’i (5/8/23) https://hawaiiunites.org/wp-content/uploads/2023/05/2023_0508_Hawaii_Unites_and_Lia_v_BLNR_and_DLNR.pdf

3. EPA Emerging Mosquito Control Technologies https://www.epa.gov/regulation-biotechnology-under-tsca-and-fifra/emerging-mosquito-control-technologies

DLNR 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
"There is an EPA reviewed value of 1 female release per 250,000 males with the MosquitoMate product. A similar value is likely to be estimated for Culex quinquefasciatus given that similar automation, engineering and machine learning technology is being applied to sex sorting."

4. Final Environmental Assessment: Suppression of Invasive Mosquito Populations to Reduce Transmission of Avian Malaria to Threatened and Endangered Forest Birds on East Maui EA-FONSI (4/8/23)
https://files.hawaii.gov/dbedt/erp/Doc_Library/2023-04-08-MA-FEA-Suppression-of-Mosquitoes-on-East-Maui.pdf
"The project area includes approximately 64,666 acres…"
"Based on current estimates, we expect to release between 50 and 6,000 incompatible mosquitoes per acre per treatment (which would occur up to twice per week) depending on elevation and local temperature and capture data gathered during monitoring."

5. "*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://pmc.ncbi.nlm.nih.gov/articles/PMC4154766/

6. "*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

7. "*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, 03/06/19)
https://www.frontiersin.org/journals/microbiology/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, 02/12/15)
https://pmc.ncbi.nlm.nih.gov/articles/PMC4347858/

8. "*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

9. Transcript of Hearing 7/21/23: Plaintiffs' Motion for Temporary Restraining Order and Preliminary Injunction https://hawaiiunites.org/wp-content/uploads/2024/01/HIUnitesvBLNR072123Audio.pdf

10. Plaintiffs' Motion for Temporary Restraining Order and Preliminary Injunction (6/20/23) https://hawaiiunites.org/wp-content/uploads/2023/06/2023_0620_Hawaii_Unites_and_Lia_v_BLNR_and_DLNR_Plaintiffs_Motion_for_TRO_Preliminary_Injunction_Filed_All_Documents.pdf

11. Final Environmental Assessment for Use of *Wolbachia*-based Incompatible Insect Technique for the Suppression of Non-native Southern House Mosquito Populations on Kaua'i EA-FONSI (10/13/23) https://files.hawaii.gov/dbedt/erp/Doc_Library/2023-10-23-KA-FEA-Wolbachia-based-Suppression-of-Mosquitoes-on-Kauai.pdf
"Monitoring of birds is beyond the scope of this EA."

12. Minutes of the Board of Agriculture (6/28/22): Approval of the Board of Agriculture's Proposed Order Amending Chapter 4-71, Hawaii Administrative Rules, "Non-Domestic Animal Import Rules," to add the Asian Tiger Mosquito, *Aedes albopictus*, Yellow Fever Mosquito, *Aedes aegypti*, and the Southern House Mosquito, *Culex quinquefasciatus*, to the List of Restricted Animals, Part A, Pursuant to HAR §4-71-4.2 for the Hawaii Department of Land and Natural Resources and Hawaii Department of Health https://dab.hawaii.gov/wp-content/uploads/2022/09/2022-06-28-BOA-Minutes-Final.pdf

13. State of Hawai'i Department of Health Senate Ways and Means Committee Budget Presentation https://www.capitol.hawaii.gov/sessions/session2026/testimony/Info_Testimony_WAM_01-15-26_HTH.pdf

14. Letter Sent by Hawai'i Unites to Dr. Kenneth Fink, Director of Health, State of Hawai'i Department of Health: Regarding HDOH Planned Statewide Release of Lab-Altered Mosquitoes (2/13/26) https://hawaiiunites.org/wp-content/uploads/2026/02/2026_0213_Hawaii_Unites_HDOH_Dr._Kenneth_Fink.pdf

15. U.S. Department of the Interior Strategy for Preventing the Extinction of Hawaiian Forest Birds (12/15/22) https://www.fws.gov/sites/default/files/documents/DOI%20Strategy%20for%20Preventing%20the%20Extinction%20of%20Hawaiian%20Forest%20Birds%20%28508%29.pdf

"Although IIT is considered the technique most likely to control mosquitoes using available technology, more effective tools are on the horizon that may be developed to help in the conservation of Hawaiian species. Examples of these new tools could include gene drives, precision-guided Sterile Insect Technique, and improving malaria resistance in birds."

16. "Hawaiian Forest Bird Conservation Strategies for Minimizing the Risk of Extinction: Biological and Biocultural Considerations" – Eben H. Paxton, Megan Laut, Stanton Enomoto, Michelle Bogardus (USGS, UH Hilo, April 2022)
(Technical Report HCSU-103: Appendix VI. Wolbachia IIT Implementation Outline, pages 80-85)
https://dspace.lib.hawaii.edu/server/api/core/bitstreams/8b60e14e-0935-4b61-8339-4107fce3ce91/content
"While this genetic Sterile Insect Technique is being developed currently in Hawai'i's *Culex*, it may be some time before regulatory and public sentiment shift in this direction. This timeline also depicts a long-term buildout of the DLNR insectary."
"The state has been funded to develop a small-scale insectary that will be equipped with a containment biobubble to maintain tool efficacy and meet both federal and state permitting requirements regarding an Arthropod Safety Level 2 (ASL-2) facility."
"Option 5: University of California San Diego (UCSD) precision-guided sterile insect technique (pgSIT) developed, Production by Hawaii DLNR"
"It's important to note that additional sterile insect technique tools (i.e., Genetic pgSIT) are simultaneously being developed. A *Culex* pgSIT Hawai'i line is in development at UCSD and is projected to be completed in 2023. The probability of developing a usable Hawai'i pgSIT line is high; however, genetically engineered mosquito field trials have not been initiated in the United States to date, although some are under review for public health."
"It is also important to note that current research and development proposals for tool development do not include funding for the application and continued monitoring that would be needed to ensure success of an IIT program into perpetuity."