

Subject: BLNR Meeting 7/14/23 Agenda Item C-1: **Oppose**

Aloha,

This testimony is in regards to item C-1 DOFAW Request for Approval of a Management Plan for Kīpahulu State Forest Reserve.

I am **strongly opposed** to the request for approval of a Management Plan that involves planned biopesticide mosquito releases anywhere in Hawaii, including Kīpahulu State Forest Reserve on Maui. Although the Management Plan involves numerous critical actions on the forest reserve, such as ungulate control and fencing; there is only brief mention to control mosquitoes on the reserve on page 52. <https://dlnr.hawaii.gov/wp-content/uploads/2023/07/C-1.pdf>

This is insufficient detail for the public to evaluate the proposed management plan which we can assume involves the Incompatible Insect Technique (IIT) as a mosquito control method. The public has voiced numerous concerns about the release of lab bred mosquitoes. The Environmental Assessment for Maui is being challenged in environmental court to seek a ruling to require an Environmental Impact Statement. No further actions should be taken to release biopesticide mosquitoes at Kīpahulu State Forest Reserve while the need for further study of the risks is actively being litigated.

Since spring 2022, as a veteran in National Security and Investigations for over 30 years, I have been investigating the science in depth behind the use of Wolbachia infected lab bred mosquitoes. The size, scope and species proposed (Culex q - southern house mosquito) has NEVER been done anywhere in the world with the stand-alone Incompatible Insect Technique (IIT) to suppress the mosquito population as a conservation effort to save native birds from avian malaria.

After studying thousands of pages of scientific papers, environmental assessments, government documents, funding, and grants related to Wolbachia as well as consulting with experts; what stands out from all this research is that Wolbachia bacterium strains are still being discovered and its impacts are yet to be fully understood. Its influence on other life forms; including humans, native birds, arthropods and filarial worms' reproductive cycle and pathogen infection (either to block or promote) is **still in process** of being vetted.

We are awaiting results of grants researched out of Penn State University thru NIH including WOLBACHIA-INDUCED ENHANCEMENT OF HUMAN ARBOVIRAL PATHOGENS. "A SOBERING REMINDER THAT THE PATHOGEN INHIBITORY EFFECTS RESULTING FROM WOLBACHIA INFECTION IN SOME INSECTS CANNOT AND SHOULD NOT BE GENERALIZED ACROSS VECTOR-PATHOGEN SYSTEMS. UNDERSTANDING THE GENERAL ARE CRITICAL FOR ESTIMATING HOW LIKELY WOLBACHIA-BASED CONTROL STRATEGIES ARE TO FAIL OR **MAKE THINGS WORSE**, FOR IDENTIFYING POTENTIAL POINTS WHERE WOLBACHIA-BASED CONTROL IS LIKELY TO BREAK DOWN IN THE FIELD, AND

FOR PLANNING RISK MITIGATION STRATEGIES IN THE CASE OF UNFORESEEN HARMFUL OUTCOMES. IN THIS RESEARCH, WE WILL INVESTIGATE THE HYPOTHESIS THAT WOLBACHIA-INDUCED MODULATION OF THE MOSQUITO HOLOGENOME CAN LEAD TO INCREASED ARBOVIRUS INFECTION/TRANSMISSION IN SOME VECTOR-PATHOGEN SYSTEMS OF HUMAN IMPORTANCE."

<https://govtribe.com/award/federal-grant-award/project-grant-r01ai116636>

Wolbachia has the potential to increase pathogen infection

"Mosquitoes infected with the bacteria Wolbachia are more likely to become infected with West Nile virus and more likely to transmit the virus to humans, according to a team of researchers."

"The results suggest that caution should be used when releasing Wolbachia-infected mosquitoes into nature to control vector-borne diseases of humans."

<https://www.sciencedaily.com/releases/2014/07/140710141628.htm>

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/>

Antibiotic Resistance

As protocol, lab bred mosquitoes are treated with antibiotics prior to being injected with Wolbachia. Use of this method over time can lead to antibiotic resistance with unknown effects on the environment and can cancel out effectiveness of treatment for diseases in which Wolbachia is implicated. The endosymbiont Wolbachia rebounds following antibiotic treatment <https://pubmed.ncbi.nlm.nih.gov/32639986/>

Previous mosquito control projects in California and Cayman Islands using Genetically Modified (GM) mosquitoes (which have some parallels to IIT method with Wolbachia to include the use of antibiotics) have not renewed contracts. "Cayman Island officials were set to renew their contract. But data from the trials indicated serious problems, leading the territory's environmental health minister to tell the Edmonton Journal, the scheme wasn't getting the results we were looking for. There was further concern that the released mosquitoes could be spreading antibiotic resistance or make mosquito-borne diseases worse by lowering individual immunity.

Modified Mosquitoes Fail to Beat Malaria

<https://www.pressreader.com/canada/edmonton-journal/20181126/281951723871847>

"British biotechnology company Oxitec is withdrawing its application to release billions of genetically engineered mosquitoes in California, according to a recent update from the California Department of Pesticide Regulation."

<https://beyondpesticides.org/dailynewsblog/2023/05/efficacy-and-health-issues-stop-release-of-genetically-engineered-mosquitoes-in-california-florida-continues/>

There are parallels between GM and Wolbachia techniques. Biologically Wolbachia lab infected mosquitoes are not GM mosquitoes, but the study designs, math, and adherence to protocol apply to both situations. The main biological difference is there is slower horizontal transfer of mutations of the GM mosquito than with horizontal transfer of Wolbachia. This means Wolbachia has the potential to have greater adverse impact on the environment, which necessitates the need for a full scope Environmental Impact Statement (EIS). Horizontal gene transfer between Wolbachia and the mosquito *Aedes aegypti* <https://bmcgenomics.biomedcentral.com/articles/10.1186/1471-2164-10-33>

Lack of Bio-Security

There has been no documentation offered to the public outlining risk analysis conducted on the security vulnerabilities for lab bred mosquitoes that can be utilized as bio-weapons against a population (intended) nor details of quality control mechanisms for accidental transmission of pathogens (unintended). This includes failure to discuss how they will deal with accidental female escape, wind drift, or how male lab bred culex q. mosquitoes released into the wild can pass pathogen to biting females thru mating and shared feeding/water sources. We have no idea how these lab mosquitoes will be quality controlled and tested.

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 are patents developed in 2014 involving drones that transport and release mosquitoes. It mentions in the patent these drones can be co-opted for bio-weapons military programs. <https://patents.google.com/patent/US8967029B1/en>

Although proponents of IIT mosquito control emphasize male mosquitoes are harmless since they don't bite, we come to find male lab bred mosquitoes can pass pathogens to wild biting females thru mating and shared feeding/water sources.

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>

There is no mention in the Final Maui Environmental Assessment 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. No documented assurances have been made to the public that lab suppliers will be testing mosquitoes for human or avian diseases to ensure that they are pathogen-free prior to shipping to Hawaii.

The science and tech industry in the United States, to include Silicon Valley and Academia, has been heavily infiltrated by the Chinese Communist Party (CCP). Due to the deterioration of relations between the US and China, among other adversaries, mosquito releases 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 Bill and Melinda Gates Foundation, also connected to the CCP, have openly discussed support of human depopulation. This is the same foundation that has been funding ongoing research of *Wolbachia* (World Mosquito Program and numerous grants) and GM mosquitoes (Oxitec) since 2002. Gates Foundation has also funded research developing anti-malaria vaccines.

<https://www.npr.org/sections/goatsandsoda/2022/09/21/1112727841/a-box-of-200-mosquitoes-did-the-vaccinating-in-this-malaria-trial-thats-not-a-jo>

Wolbachia Has Been Implicated in Human Disease

Wolbachia is NOT harmless to humans. It effects filarial worms that cause human disease such as river blindness and is implicated in Elephantiasis. These diseases effect 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>

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/>

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](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 Maui 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."

Verily Life Sciences

Verily's registrant representatives listed in the Department of Agriculture Import Application https://hdoa.hawaii.gov/wp-content/uploads/2018/05/HDOA-Mosquito-Request-PA_Final-6.8.21.pdf are co-authors of Mark Release Recapture of Male *Aedes aegypti* use of **Rhodamine B** to Estimate Movement, Mating and Population Parameters for an Incompatible Male Program
https://www.researchgate.net/publication/345648051_Title_Mark-release-recapture_of_male_Aedes_aegypti_Diptera_Culicidae_use_of_rhodamine_B_to_estimate_movement_mating_and_population_parameters_in_preparation_for_an_incompatible_male_program

Rhodamine B has implications on land and aquatic lifeforms.
<https://www.sciencedirect.com/science/article/abs/pii/S0045653521025522>

Rhodamine B (RhB) is among the toxic dyes due to the carcinogenic, neurotoxic effects and ability to cause several diseases for humans. Has Rhodamine B been used in Hawaii's MMR studies? <https://pubmed.ncbi.nlm.nih.gov/33857893/>

As a potential supplier of lab bred mosquitoes it should be noted 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.

Additional concerns not adequately addressed

The Maui Final Environmental Assessment failed to provide adequate detail as required by HEPA; failure to identify the Wolbachia strain planned for use in this project 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 untrammled, 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 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.

I am opposed to request for approval of a Management Plan that involves planned biopesticide mosquito releases anywhere in Hawaii, including Kīpahulu State Forest Reserve on Maui until a full scope Environmental Impact Study is completed.

Respectfully,

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