

PROJECT TITLE: Environmental Assessment for use of *Wolbachia*-based Incompatible Insect Technique for the suppression of *Aedes aegypti*, *Aedes albopictus*, and *Culex quinquefasciatus* mosquito populations within Hawaii

AMOUNT AWARDED: \$78,000.00

Objectives

- 1) Engage in preliminary project planning and compile available background information
- 2) Complete an EA to evaluate the impacts of using *Wolbachia* IIT for suppressing non-native *Aedes aegypti*, *Aedes albopictus*, and *Culex quinquefasciatus* in Hawaii
- 3) Complete an accompanying CIA for suppressing non-native *Aedes aegypti*, *Aedes albopictus*, and *Culex quinquefasciatus* mosquitoes using *Wolbachia* IIT in Hawaii

Approach

- 1) Post a request for proposals on the State of Hawaii eProcurement system
- 2) Enter into a contract with an environmental consultant in good standing, as verified by Hawaii Compliance Express
- 3) Follow all Chapter 343 requirements to draft, solicit public comments and prepare an environmental assessment for publication

Background

Mosquito-borne disease are considered a significant public health threat to the State of Hawaii. Outbreaks of locally transmitted mosquito-borne disease have occurred on multiple occasion since the introduction of two non-native mosquito vector species, the yellow fever mosquito (*Aedes aegypti*) and the Asian tiger mosquito (*Aedes albopictus*). The most recent outbreaks of mosquito-borne disease include the 2001 outbreak of dengue virus on Maui, the 2011 outbreak of dengue virus on Oahu, and the 2015-16 outbreak of dengue virus on Hawaii Island. In addition to dengue virus, these mosquito species are also capable of transmitting other pathogens of concern, including Zika virus, chikungunya virus, and yellow fever virus.

In addition to these *Aedes* species, the non-native southern house mosquito (*Culex quinquefasciatus*) also represents a significant public health threat. This mosquito is a known vector of West Nile Virus elsewhere in the United States and is a know vector of lymphatic filariasis elsewhere in the Pacific region. Additionally, the primary threat to native Hawaiian birds is the transmission of non-native avian malaria, which is transmitted by the southern house mosquito. In the past, low temperatures at high elevations have

limited the spread of mosquitoes and reproduction of malaria, which has a strict thermal limit. However, climate conditions are changing rapidly enabling mosquitoes to move into areas formerly mosquito-free, posing an imminent extinction risk to the native bird species akikiki and akekee.

Recent advances allow for the possibility to use sterile insect techniques (SITs) to suppress mosquitoes and their associated diseases. A consortium of federal, state and private organizations has been working collaboratively to complete the research, development, and planning necessary to have an SIT tool approved for Hawaii. Specifically, an Incompatible Insect Technique (IIT) that utilizes naturally occurring *Wolbachia* bacteria to stop reproduction of wild *Aedes aegypti*, *Aedes albopictus*, and *Culex quinquefasciatus* mosquitoes. This approach has been utilized by mosquito control programs to suppress mosquito populations elsewhere in the United States and internationally. This IIT approach is regulated as a biopesticide under the Environmental Protection Agency (EPA). A landscape-scale mosquito control program using *Wolbachia* IIT could greatly reduce or eliminate non-native *Aedes aegypti*, *Aedes albopictus*, and *Culex quinquefasciatus* mosquitoes from application areas, and likely reduce the risk of the transmission of mosquito-borne diseases of public health concern.

During public health emergencies and/or mosquito borne disease outbreaks, the *Wolbachia* IIT will provide the Hawaii Department of Health (HDOH) with additional and alternative mosquito suppression method for situations where traditional larvicide/adulticide applications are restricted or refused. It is desirable that the approach be available for potential use in urban, suburban and natural areas across the State. An Environmental Assessment (EA) is needed to acquire the necessary state and federal permits for the eventual use of *Wolbachia* IIT mosquitoes.

Project Summary

A solicitation was posted on the State of Hawaii eProcurement system on December 15, 2022, and closed January 19, 2023. A consultant was selected by the State of Hawaii Department of Health (DOH). A contract has been drafted but remains under review by DOH administration. Hawaii Invasive Species Council funds have been transferred to a DOH trust fund account that will enable their use for the project despite the delay in encumbering them to a contract.