

**PROGRESS REPORT**  
**USDA-ARS Area-Wide Pest Management Project**  
**Delta Region Area-wide Aquatic Weed Project (DRAAWP)**  
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DRAAWP Collaborators of the District include:

USDA-Agricultural Research Service, Exotic and Invasive Weeds Research Unit  
UC Davis – Department of Entomology and Nematology

The San Joaquin County Mosquito and Vector Control District (District) has been a collaborator on the project since its inception in 2014. Since that time, the District has provided annual data on mosquito control actions at sites adjacent to canals and sloughs in the Delta regions of San Joaquin County. This information helped guide site selection and data interpretation for the project team's studies on gaging establishment of the water hyacinth plant hopper for biocontrol of water hyacinth, and determination of the effects of aquatic weed control as it relates to mosquito breeding. This project is consistent with the District's goal to utilize the most advanced administrative and operational technology available; continue to provide stewardship for public funds by stressing efficiency in our operations; educate the public regarding the health implications of disease transmitting pests; provide services consistent with an awareness and concern for environmental protection, and maintain a safe and effective public health pest management program.

**OBJECTIVE 1: Monitor and assess aquatic weed/insect infestation in the southern Sacramento / San Joaquin River Delta area and to assist USDA, ARS, and CDBW in priority setting for weed management efforts in that area.**

Mosquito monitoring for the 2017 mosquito season began in early March using CO2 traps to collect adult mosquitoes. West Nile virus-positive (WNV+) mosquito pools (50 mosquitoes per pool) were detected in 241 pools of which 60 (24%) of those pools were collected from the Delta region of San Joaquin County. This compares to 191 WNV+ pools of which 45 pools (24%) were collected from the Delta region in 2016. In 2015, the District detected 208 WNV+ pools, including 93 pools (45%) collected from the Delta region. Mosquitoes collected near water hyacinth congested areas that test positive for WNV, warrant lab staff to inspect the water hyacinth site to determine if the hyacinth is

harboring adult mosquitoes and /or to determine the presence of mosquito larvae. Part of this project is to identify sites where water hyacinth plants have been treated with herbicides, so that mosquito monitoring at various time points following the herbicide application can be performed. The District has realized an increase in mosquito breeding following herbicide treatments to control water hyacinth in these specific areas. This has historically been the case when the herbicide treatments do not transpire prior to the month of August. As this condition transpires, naturally occurring predators such as mosquito fish cannot survive, due to the dissolved oxygen levels created in the water. The District monitors these areas closely for characterization of the potential increase in mosquito breeding in the herbicide treated water hyacinth. This study has in essence confirmed the need to conduct herbicide applications during the early part of water hyacinth growing season in order to prevent large decaying plant masses.

**OBJECTIVE 2: To assess and manage mosquito populations in areas infested with aquatic weeds in cooperation with USDA-ARS and UC Davis.**

In 2015, the District provided Rakim Turnipseed, a former Pathways Ph.D Student Trainee with USDA-ARS, information and access to sites along canals and non-navigable sloughs so that he could sample water hyacinth and other weeds in backwaters for the presence of mosquito larvae. In addition, the District provided him with 1,000 adult mosquitoes for studies of adult mosquito preferences among aquatic weeds in field cages.

The District lab continues to rear and supply *Culex pipien* mosquitoes for an egg laying study in aquatic vegetation conducted by Maribel Portilla, graduate student in the Department of Entomology and Nematology - Sharon Lawler's lab, at UC Davis. This study is conducted to determine the relationship between aquatic weed diversity and mosquito development. The objective is to determine if adult mosquitoes prefer to lay eggs in water with decaying matter following herbicide applications as compared to actively growing plants. Approximately 20,000 lab reared *Culex pipiens* larvae have been provided by the District for this study.

**OBJECTIVE 3: To assist the USDA-ARS on the field rearing and release of new biological control agents for use against various aquatic weeds infesting the Delta.**

The introduction of plant-hoppers, *Megamelus scutellaris*, to designated water hyacinth growing areas is an additional tool to the comprehensive approach to the control of water hyacinth. The District continues to assist USDA-ARS in maintaining a colony of plant-hoppers by providing an area at our Stockton facility to rear the plant-hoppers. The District's Assistant Entomologist worked with ARS biologist to ensure fresh water is added to plant hopper rearing tank and monitors water hyacinth growth and feeding habitats of the plant hoppers.