

# SANTA CRUZ COUNTY MOSQUITO & VECTOR CONTROL



AGRICULTURAL COMMISSIONER'S OFFICE

ANNUAL REPORT  
2021



# MANAGER'S STATEMENT

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Thanks to the hard-working team at Santa Cruz County Mosquito & Vector Control, I am pleased to present our 2021 Annual Report.

While the pandemic continued, our staff's dedication and ability to provide full services to the community remained steadfast. Staff completed over 500 service calls (Service Requests) from the public, while maintaining almost 3,500 identified locations that breed mosquitoes throughout the County. Additionally, the laboratory and surveillance team set over 700 mosquito traps in different neighborhoods in the community to monitor for local species that can carry West Nile virus, and invasive species that are making their way through California. Despite the challenges of COVID-19, our staff persevered, preventing vector-borne diseases and protecting public health.

Exciting new changes blossomed over the last year. We recently welcomed a new staff member—Vector Control Specialist for Route 4, Michael Pini. With a background in biology and years spent in City Planning and County Parks, Mike brings both a well-rounded perspective and a sincere commitment to public service.

Additionally, we have incorporated drone technology into our mosquito control program. Using drones, or unmanned aerial systems (UAS) offers many benefits including improved safety and time savings for staff, the ability to reach areas difficult to access on foot, and a minimal footprint on the vegetation and wildlife by the mosquito-breeding source.

Overall, I am thankful for our team and the work they do to keep our community safe. I look forward to the year ahead as we continue to adapt to new changes, protect public health, and serve the beautiful County we live in.



**AMANDA POULSEN**  
**ASSISTANT VECTOR CONTROL MANAGER**  
**(831) 454-2590**



Juan Hidalgo  
Agricultural  
Commissioner

Amanda Poulsen  
Assistant  
Manager

Emma  
McDonough  
Vector Ecologist

Ray Travers  
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Specialist

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Steve Driscoll  
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Stephen Bowling  
Vector Control  
Specialist

Michael Pini  
Vector Control  
Specialist

Carolina  
Tiscareno-Kennedy  
Student Worker

Alex McDonald  
Seasonal Aide

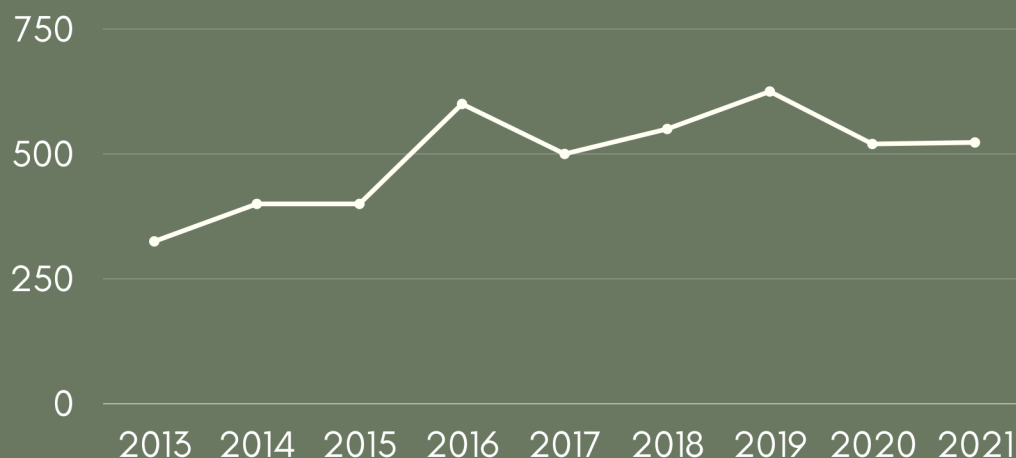
Rudy Ruelas  
Seasonal Aide



# OUR MISSION

Santa Cruz County Mosquito & Vector Control (MVC) is committed to protecting the public from pests capable of transmitting disease or creating a nuisance. Our service, consultation, and education, enable residents to resolve problems and protect themselves with a better understanding of vector biology, behavior, and vector-borne diseases.

MVC was established in 1993 as a County Service Area program within the Agricultural Commissioner's Office in response to public interest in mosquito relief. In August 2005, residents voted to enhance our services to include other vectors, as well as expand our service area to the entire county (446 square miles, population 273,000).



**FIGURE 1.**

MVC's Requests for Service have increased by 58% since 2013.





# FREE SERVICES

## SCCMVC PROVIDES:

- Mosquito control and disease surveillance.
- Mosquito fish for ponds, animal troughs, fountains, and unused pools.
- Tick surveillance and disease monitoring.
- Control of yellow jacket wasps in public areas.
- Rodent Exclusion Inspections for homes and businesses.
- Advice on bees, wasps, ticks, rodents, bats, raccoons, flies, bed bugs, mites, head lice, fleas, and other pests.
- Public Education about vector biology and control.

## 523 SERVICE REQUESTS

MVC responded to 523 requests for service in 2021. Nearly half of the service calls involved mosquitoes (including requests for mosquito-eating fish). A quarter of requests regarded rodents, while ticks, wasps, and other invertebrates made up the remainder. Others included mites, fleas, bedbugs, spiders, and unknown parasites (Fig. 2)



# Mosquito Control

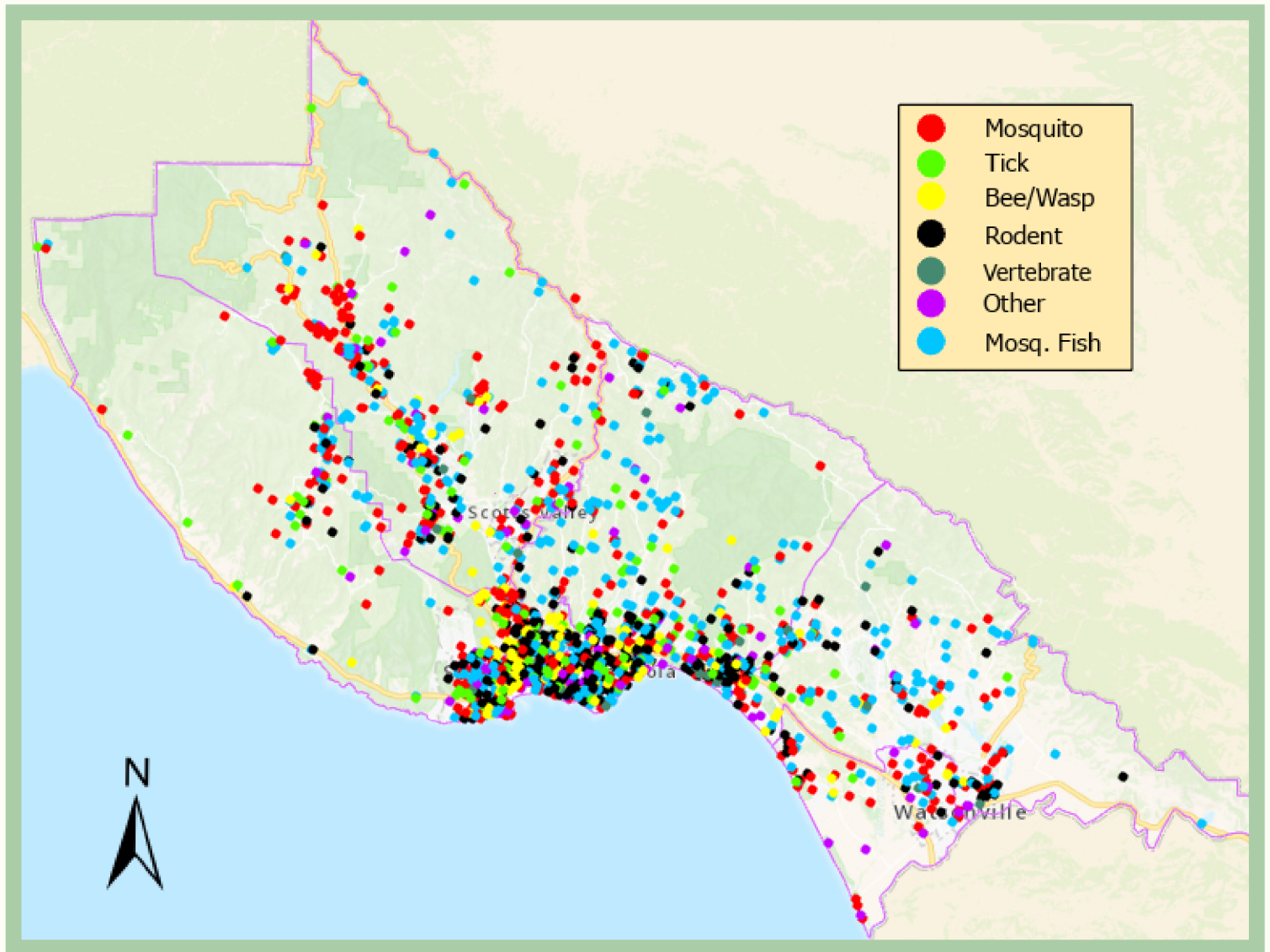
Decisions to control mosquitoes are made based on their species, abundance, potential to vector diseases, proximity to humans, and the presence of natural predators or protected wildlife species.



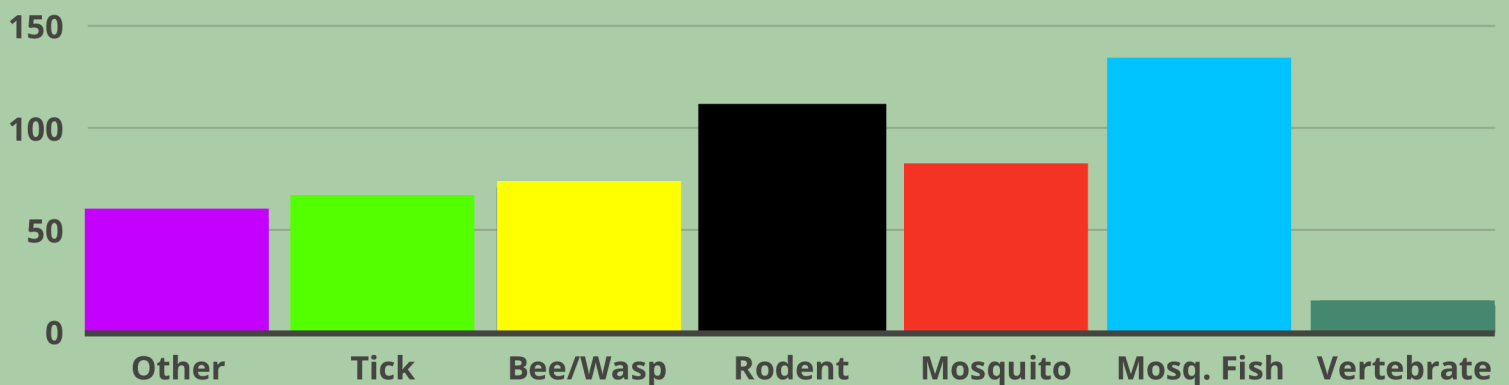
Minimizing mosquito breeding potential is paramount to mosquito control. We provide water management advice to residents, stock mosquito-eating fish for backyard ponds, and consult on new development projects in the County. If mosquito breeding in an area reaches intervention thresholds, we apply low-toxicity larvicides to the water so the mosquito larvae do not develop into adults. When controlling mosquitoes in the larval stage is not feasible, as with adult tree-hole breeding mosquitoes, we employ other methods like applying garlic oil-based sugar bait barrier treatments to shrubbery.

Targeting adult mosquitoes is a last resort for our program, as control of larvae is more selective and efficient. Wide area spraying (the dispersal of products via micro-droplets into the air) is not part of our current program and would require approval by the County Board of Supervisors as part of the Emergency Disease Response Plan.

# 2021 Service Request Types



**Figure 2.** 2021 Service Request Types







## WHERE DO MOSQUITOES COME FROM?

Mosquitoes come from natural and man-made sources of standing water. Unlike natural water sources, man-made containers lack natural predators and are prone to stagnation. This creates a nutrient-rich breeding environment capable of breeding over 1,000 mosquito larvae per square foot. Invasive mosquito species *Aedes aegypti* and *Aedes albopictus* (not yet in our county) prefer to breed in small man-made containers and can transmit life-threatening diseases.

Residential sources of standing water may harbor mosquitoes in even the smallest pockets of water. Drains, planters, fountains, tires, and tarps can become breeding sources for disease-carrying mosquitoes. Septic Tanks with unsealed lids are responsible for mosquito problems in many neighborhoods. They often harbor *Culex pipiens*, human vector of West Nile virus, which readily enters homes and bites only at night.

# THE DANGER OF INVASIVE MOSQUITOES

The Yellow Fever mosquito, Asian Tiger mosquito, and Australian Backyard mosquito (vectors of Zika virus, Dengue, Chikungunya, and Dog Heartworm) are currently established in California. While some of these invasive *Aedes* species remain as near as Merced, Fresno, and Stanislaus counties, none were detected in Santa Cruz county in 2021. In2Care® traps were used in Santa Cruz cemeteries and plant nurseries to monitor for invasive *Aedes* (Fig. 4)

## WEST NILE VIRUS

Santa Cruz had no reported human cases of West Nile virus (WNV) in 2021. WNV activity is typically lower in coastal areas due to lower average temperatures, which are less conducive to the amplification of WNV.

- **150 pools** of mosquitoes were tested and none were positive for WNV or any other mosquito virus.
- **164 blood samples** from sentinel chickens, hosted by Watsonville and San Lorenzo Valley High Schools, tested negative for WNV.
- **66 dead birds** were reported by the public and none tested positive for WNV.



You may find this map at:

<https://cdphdata.maps.arcgis.com/apps/webappviewer/index.html?id=57367199287a4d18a2cecf107854255b>



# 2021 MOSQUITO TRAPPING

Carbon dioxide (CO<sub>2</sub>) baited traps were used to collect adult mosquitoes for population and disease monitoring. Over 700 CO<sub>2</sub>-baited and gravid traps were deployed from April to November 2021, in which a total of 15,928 adult mosquitoes were captured. Weekly trap data enables our staff to focus our mosquito control activity on high-risk areas.

Of the species in our county capable of transmitting West Nile Virus (WNV) to humans, *Culex pipiens* made up 12% (n = 1,944) and *Culex tarsalis* made up 4% (n = 603) of all mosquitoes caught. *Culex erythrothorax*, the Tule mosquito, were the most numerous as they made up 54% (n=8,700) of total mosquitoes caught (Fig. 3). Tule mosquitoes can be a biting nuisance near their marsh sources and spread WNV between birds, but are not considered competent disease vectors to humans.



Figure 4.

## 2021 MOSQUITO SPECIES CAUGHT

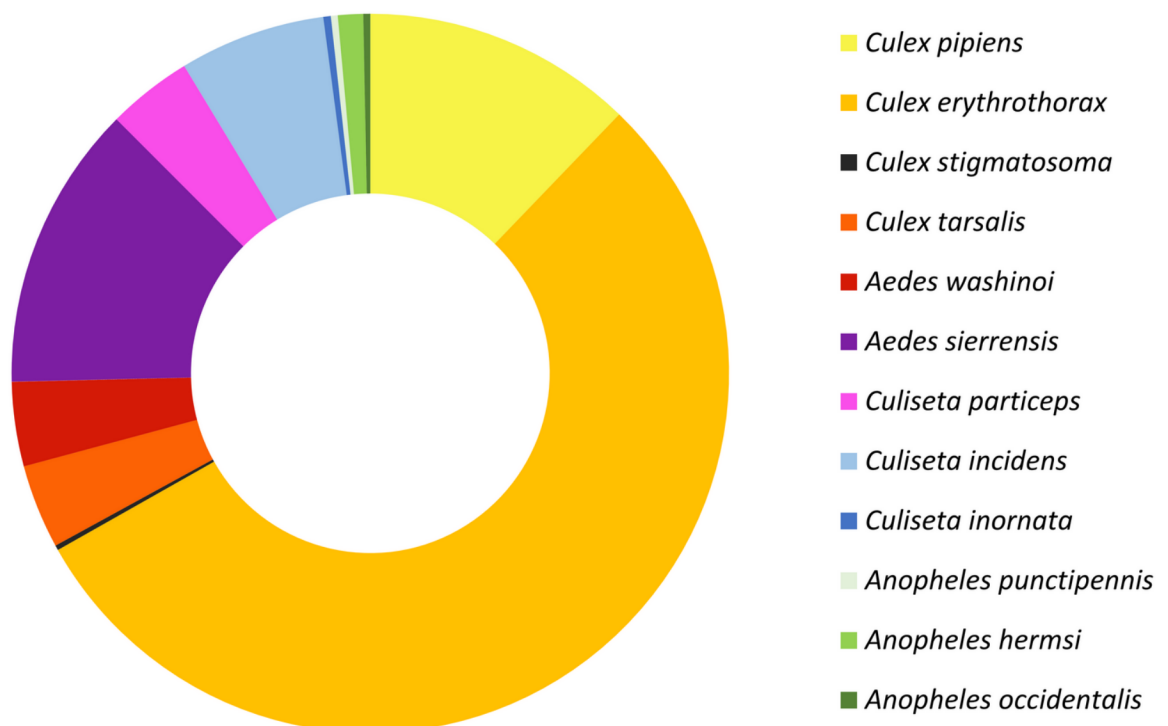


Figure 3.

# TICKS & LYME DISEASE

In 2021, there were 11 confirmed cases of human Lyme disease in Santa Cruz County, making it our most important vector-borne disease. Lyme disease is transmitted by the bite of an infected Western Black-Legged tick, *Ixodes pacificus* (Fig. 5). For an interactive map and more information, please visit the California Department of Public Health site at:

<https://storymaps.arcgis.com/stories/f64d0c19a3ab42cf90e8ce38397e96e0>

MVC provides tick species identification and Lyme testing resources to the public. In light of 2021's social distancing requirements, we expanded our services to include photo ID of ticks sent in via email. Our partners at the California Department of Public Health and UC Davis support us in testing ticks for various pathogens. We post warning signs in public areas of high tick exposure, and sample for species diversity and abundance in recreational areas throughout Santa Cruz County.

Other species of ticks can be found in Santa Cruz County, such as the American Dog tick, and the Pacific Coast tick. These ticks can also transmit diseases such as Rocky Mountain Spotted Fever, Pacific Coast Tick Fever, and Tularemia. Swift removal of the tick is advised, even though these diseases are rarer than Lyme disease. Always check yourself and pets for ticks after being outdoors, hike in the middle of the trail, and use repellents when appropriate.



Fig. 5



# RODENTS, WASPS, & COCKROACHES



## Rodents

Free exterior rodent inspections and consultations are offered for homes, businesses, and new development projects. Rodents and their ectoparasites can spread many diseases to humans including: Plague, Salmonellosis, Tularemia, Rat-Bite Fever, Leptospirosis, Hantavirus Pulmonary Syndrome, and more. Rodent control should be taken seriously as they can also destroy personal property and cause fires by chewing on wires.

Exclusion and sanitation are the foremost means of preventing rodent activity in the home. Twenty one percent of our requests for service in 2021 regarded rodents, primarily rats. Our staff performed 110 rodent inspections this year, an increase of over 300% since 2015.

## Wasps

Yellow Jacket wasps are controlled when they present a danger in public areas. Eight percent of requests for service received in 2021 were for yellow jacket wasps. We can not control honeybees, but do refer residents with wild hives and swarms to beekeepers.



## Cockroaches

We assisted County Public Works, Sewer and Water Division in controlling American cockroach infestations in sewer systems in the county, effectively treating manholes with a growth regulating bait. American cockroaches typically live in sewers and drains; however, they can inhabit structures where food is stored. Cockroaches can contaminate food with bacteria, resulting in food poisoning, dysentery, and diarrhea. Cockroaches can cause childhood asthma and allergies, produce an unpleasant odor, and damage property.



## IN THE LAB:

Pathogen testing was conducted by the UC Davis Arbovirus Research and Training at the University of California, Davis, or the California Department of Public Health, Vector Borne Disease Division in Richmond, California.

- **648** ticks were collected for testing. Several mites, bedbugs, and other insects were identified for the public in our lab.



- Public education on vector biology and control was given to schools, home owners, and businesses.

## INTEGRATED PEST MANAGEMENT

MVC takes an Integrated Pest Management (IPM) approach to mosquito control, minimizing impact on the environment and non-target organisms. When managing breeding sources in our neighborhoods, we use both biological and physical control methods whenever possible. If public health is at risk, our certified Vector Control Technicians apply selective EPA-registered materials, many of which are microbial and OMRI certified organic.

### Here at MVC, we:

- Use Bio-control with mosquito eating fish in contained water features.
- Provide water management techniques to property owners.
- Prioritize the least toxic means of pest reduction.
- Consider disease risk, resident proximity, ecosystem diversity, and environmental safety when treating breeding sources.
- Control mosquitoes in their aquatic larval stage, prior to emergence of the adult stage.
- Use sustainable treatments when mosquitoes exceed public health thresholds.
- Prevent pesticide resistance by rotating products.



# MOSQUITO FISH

**Free**  
Mosquito-  
eating Fish  
are  
available by  
**Delivery!**



**(831) 454-2590**  
640 Capitola Rd.  
Santa Cruz, CA 95076

Monday - Friday  
8:00AM-4:00PM

Mosquito fish (*Gambusia affinis*) provide excellent control of mosquitoes in many situations. Their use in Santa Cruz County pre-dates our program, having been established statewide for several decades.

MVC cooperates with wildlife management agencies by not introducing mosquitofish into natural water bodies where they may compete with native fish and amphibians. They are stocked in yard containers such as fountains, animal water troughs, fishponds, and unmaintained pools.



## FINANCIAL ASPECTS

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For the MVC budget, see the County website:  
<http://www.sccvision.us>, under "Department Budgets" and "Agricultural Commissioner".

SCCMVC provides free services funded by a tax assessment that appears on your property bill. For rates, please visit our website:  
[www.agdept.com/mvc.html](http://www.agdept.com/mvc.html)

## COOPERATION WITH OTHER AGENCIES

- MVC cooperates with the Santa Cruz County Integrated Pest Management Departmental Advisory Group and receives oversight from the CA Department of Public Health and the Agricultural Commissioner.

- MVC applies aquatic larvicides under a National Pollution Discharge Elimination System permit as required in waters of the United States, and reports use to the State Water Resources Control Board (WRCB) and County Agricultural Commissioner. MVC has a Mosquito Management Plan on file with WRCB, state and federal Fish and Wildlife agencies. We comply with Water Quality Control Board requirements for water resource protection.

- Cooperative Agreement with the CA Department of Public Health agreeing to maintain application and calibration records, certifications and continuing education, to follow pesticide labeling and report adverse effects, and be subject to inspections.

