



# Annual Report 2025





Daly City

Brisbane

Colma

South San  
Francisco

San Bruno

Pacifica

Millbrae

Burlingame

Hillsborough

San Mateo

Foster City

Belmont

San Carlos

Redwood City

East Palo Alto

Atherton

Menlo Park

Woodside

Half  
Moon Bay

Portola  
Valley

# San Mateo County Mosquito & Vector Control District Annual Report 2025

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Mosquito control in San Mateo County started as early as 1905, when residents requested assistance from entomologists in reducing mosquitoes coming from marshes. In 1916, a formal agreement between cities in the central part of the county resulted in the creation of a mosquito control program. Over the years, the district has expanded to cover the entire county and currently conducts a variety of other vector control services along with mosquito control.

**ON THE COVER:** Vector Control Technician Evan looks at mosquito larvae in a sample bag — Evan was highlighted in a Q&A feature in the San Mateo Daily Journal. Photo credit: Tom Jung/San Mateo Daily Journal

# ABOUT THE DISTRICT





### Manager's Note

2025 was a year that highlighted the biological fact that mosquitoes and other vectors do not stop at county borders. Our staff spent time strengthening relationships and collaborations with local Bay Area districts, as detections of invasive *Aedes* mosquitoes occurred in nearby counties and yellowjacket activity reached record levels throughout the Bay Area.

Despite rigorous surveillance efforts throughout the county, we did not detect *Aedes aegypti* in San Mateo County in 2025. This is while there were several detections in Santa Clara and Alameda Counties. We met with other local districts at the Coastal Invasive Mosquito Symposium in early 2025 to discuss detection, outreach, and control methods. As this invasive mosquito continues to spread in the Bay Area, our staff remain vigilant and are evolving our surveillance methods to hopefully detect this species as early as possible when it again arrives in our district (it was last detected in San Mateo County in 2013-2015).

With no detection in any of 180 tested birds, 2025 was an unusually quiet year for West Nile virus. In addition to dead birds, our staff collected and tested over 5,000 mosquitoes, none of which were positive for West Nile virus.

In the summer months, our staff were kept busy with a record number of yellowjacket service requests. Nearly 1,800 yellowjacket nests were treated and/or removed. This high-activity year was not restricted to our county, as others in the Bay Area also experienced an extremely high number of resident requests for nest treatment/removal. Our yellowjacket nest service is one of the most used and appreciated services our district offers.

Looking forward to 2026, we anticipate beginning construction on the 1415 N. Carolan Ave building project, which will provide us with the space we need to add staff and equipment when invasive *Aedes* eventually re-arrive in San Mateo County. The project will also provide a larger meeting space for the district's 21-member Board of Trustees, and will position us for a strong future continuing to provide excellent services to the residents of San Mateo County.

*Brian Weber*

**District Manager**, San Mateo County Mosquito and Vector Control District

### Our Vision

We are an agency that protects public health through a science-based program of integrated vector management, which is responsive to the community, and prepared to adapt to new challenges.

### Our Mission

To safeguard the health and comfort of the citizens of San Mateo County through a science-based program of integrated vector management.

# Our Goals

**1** **Reduce or eliminate** host-seeking vector populations and maintain consistency in control operations by evaluating vector populations before and after they are carried out.

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**2** **Use scientific methods** to evaluate the distribution of vectors and vector-borne diseases in nature and work toward preventing the occurrence of human cases among district residents.

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**3** **Engage in research and development** to optimize the district's ability to carry out its mission with available resources.

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**4** **Maintain a highly motivated, productive staff** that is aware of, and has access to, the latest materials, technologies, and techniques in vector control.

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**5** **Ensure residents are aware** of the district's integrated vector management program and cooperate with recommendations to reduce populations of vectors and minimize the risk to human health posed by vectors.

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**6** **Ensure that residents are aware** of district services, utilize them as needed, and are satisfied with the service they receive.

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**7** **Cultivate strong, mutually beneficial relationships** with local, state, county, and federal agencies.

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**8** **Conduct** all aspects of district business in a transparent and accountable manner.

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**9** **Adequately maintain** the district's physical assets and keep them up to date with the best technology available.

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**10** **Anticipate and be prepared** to respond to future scientific, operational, and financial challenges.

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**11** **Ensure** that the Board of Trustees operates in an ethical manner, makes sound decisions based on current and complete information, and has the capacity to lead the agency effectively.

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**12** **Ensure** that district finances are adequately managed to provide for long term financial stability and sustainability.

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# Our Board

As an independent special district, the San Mateo County Mosquito and Vector Control District delivers specific services to residents within its boundaries under the guidance of its own Board of Trustees. The district's Board of Trustees is comprised of one person appointed by each city or town as well as one person appointed by the County Board of Supervisors. Each trustee term is two or four years, and trustees are dedicated to governing the district knowledgeably and effectively.

## 2025 BOARD OFFICERS

### President

Mason Brutschy

### Vice President

Kati Martin

### Secretary

Dr. D. Scott Smith

### Assistant Secretary

Donna Rutherford

Board meetings are held at 6pm on the second Wednesday of each month. Regular board meetings are not held in August or December. Special meetings, as well as any schedule changes, will be listed on the district calendar at [www.smcmvcd.org/calendar](http://www.smcmvcd.org/calendar).

## CITY/TOWN ..... REPRESENTED BY

|                                 |                         |
|---------------------------------|-------------------------|
| Atherton .....                  | Mason Brutschy          |
| Belmont .....                   | Chuck Cotten            |
| Brisbane.....                   | Michael A. Goldman, PhD |
| Burlingame .....                | Rena Gilligan           |
| Colma.....                      | Laura Walsh             |
| Daly City .....                 | Glenn R. Sylvester      |
| East Palo Alto .....            | Donna Rutherford        |
| Foster City.....                | Paul Norton             |
| Half Moon Bay .....             | Kati Martin             |
| Hillsborough .....              | Dr. D. Scott Smith      |
| Menlo Park .....                | Catherine Carlton       |
| Millbrae.....                   | Dr. Muhammad Baluom     |
| Pacifica .....                  | Peter DeJarnatt         |
| Portola Valley .....            | Raymond Williams        |
| Redwood City.....               | Kathryn Wuelfing Lion   |
| San Bruno .....                 | Robert Riechel          |
| San Carlos .....                | Ron Collins             |
| San Mateo .....                 | Tolifili Fa             |
| San Mateo County, at Large..... | Dr. Desiree LaBeaud     |
| South San Francisco.....        | Michael Yoshida         |
| Woodside .....                  | Paul Fregulia           |

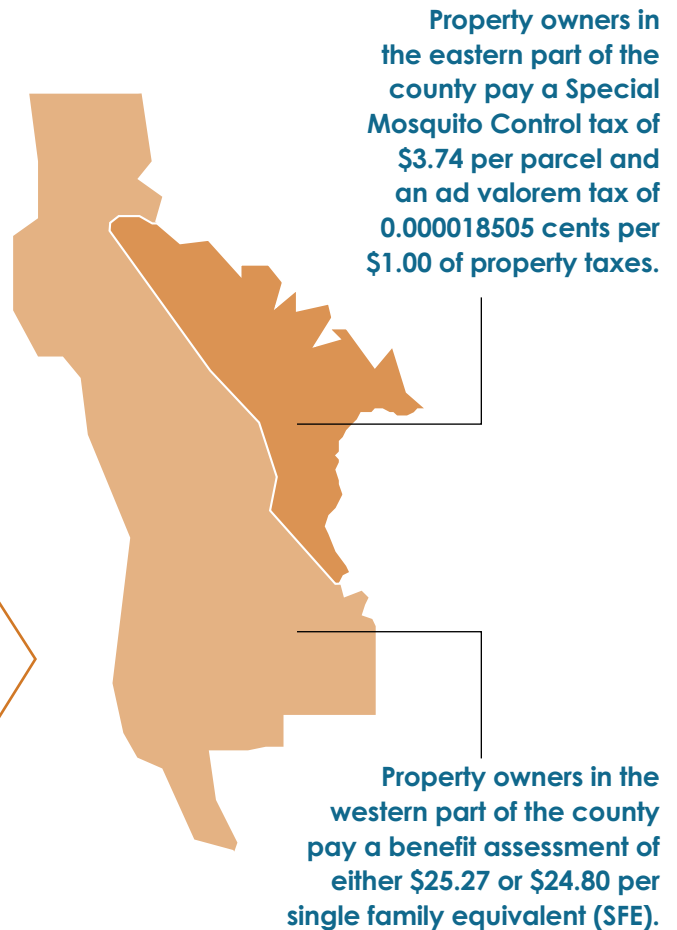
# Our Financials

## Who Pays for Services

County property owners, who pay property taxes and assessments, are typically the source of almost all district revenue. The district's usual top revenue sources – ad valorem property taxes, a special mosquito tax, a benefit assessment, and other tax revenue – provide about 90% of operating revenue.

**In fiscal year 2024-25, total revenue from all sources was \$8.23 million.**

The different tax structures exist based on the district's history of formation and how areas of the county joined the district's service area.



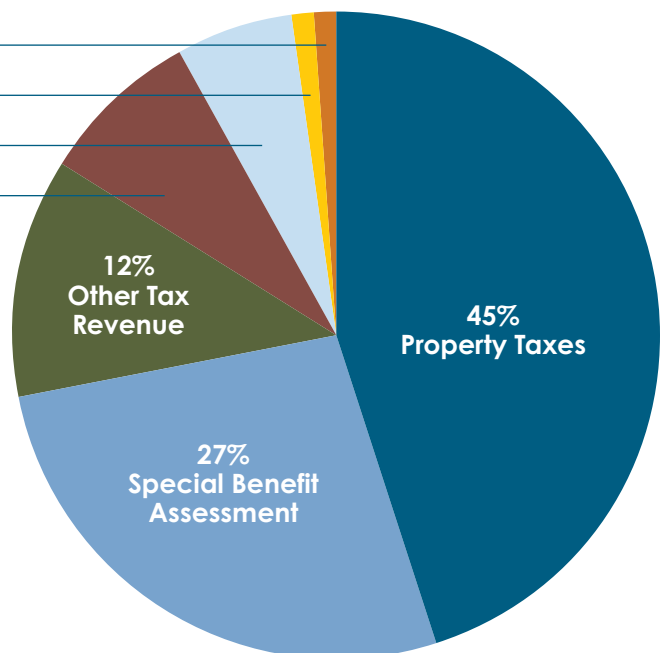
## Revenue Sources for Fiscal Year 2024-25

1% Other Revenue

1% Service Abatement Revenue

6% Special Mosquito Control Tax

8% Investment Earnings



## How Revenue is Used

**Total annual operating expenditures for fiscal year 2024-25 were \$7.38 million.**

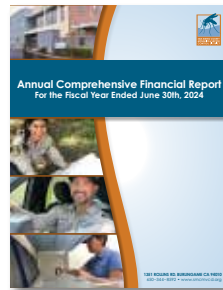
As is typical for local government agencies, most district expenditures were for employee salaries and benefits. The district's integrated vector management program reduces pesticide use but is labor-intensive and requires highly trained staff.

Field staff conduct inspections and choose from a variety of control strategies and tools depending on the conditions present at a given site. Field and laboratory staff monitor vector populations by trapping vectors and identifying the species present.

In 2025, in addition to the Annual Financial Audit, the district published an Annual Comprehensive Financial Report (ACFR), which gives a deeper look into the district finances for fiscal year 2024-25.

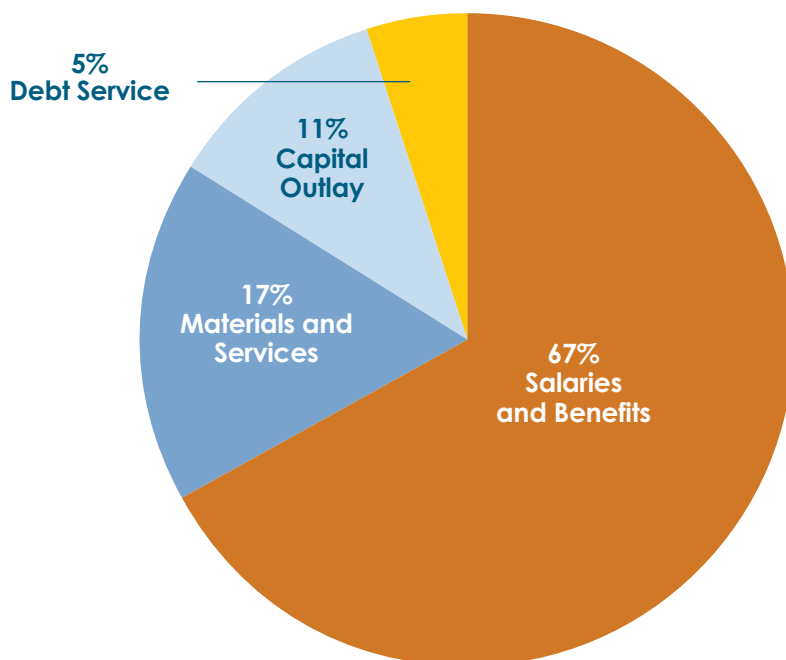


- 21** full-time staff
- 2** part-time staff
- 8** seasonal staff



View the full 2024-25 Annual Comprehensive Financial Report at [www.smcmvcd.org/ACFR](http://www.smcmvcd.org/ACFR).

### Expenditures for Fiscal Year 2024-25



The district was awarded the **Certificate of Achievement for Excellence in Financial Reporting** from the Government Finance Officers Association of the United States and Canada for its annual comprehensive financial report for the fiscal year that ended June 30, 2024.

This is the **seventh** year in a row the district has received this Certificate. The Certificate of Achievement is the highest form of recognition in the area of governmental accounting and financial reporting, and its attainment represents a significant accomplishment by a government agency and its management.

# Our Staff

## Administration



**Brian Weber**  
*District Manager*



**Richard Arrow, CPA**  
*Finance Director*



**Mary Leong**  
*Senior Accountant*



**Devina Walker**  
*Office Administrator*



**Rachel Curtis-Robles, PhD**  
*Communications Director*



**Matthew Nienhuis**  
*Information Technology Director*



**Louis Fernandez**  
*Facility Maintenance Coordinator*

## Laboratory



**Angie Nakano, MS**  
*Laboratory Director*



**Arielle Crews, MS**  
*Vector Ecologist*



**Tara Roth, PhD**  
*Vector Ecologist*



**Theresa Shelton, MS**  
*Vector Ecologist*

## Operations



**Casey Stevenson**  
*Operations Director*



**Ryan Thorndike**  
*Operations Supervisor*



**Stephanie Busam**  
*Vector Control Technician*



**Walter Bruj**  
*Vector Control Technician*



**Eric Eckstein**  
*Vector Control Technician*



**Vanessa Hernandez-Pacheco**  
*Vector Control Technician*



**Sean Jones**  
*Vector Control Technician/Mechanic*



**Kim Keyser**  
*Vector Control Technician*



**Justin Loman**  
*Vector Control Technician*



**Devon MacDonald**  
*Vector Control Technician*



**Evan Ostermann**  
*Vector Control Technician*

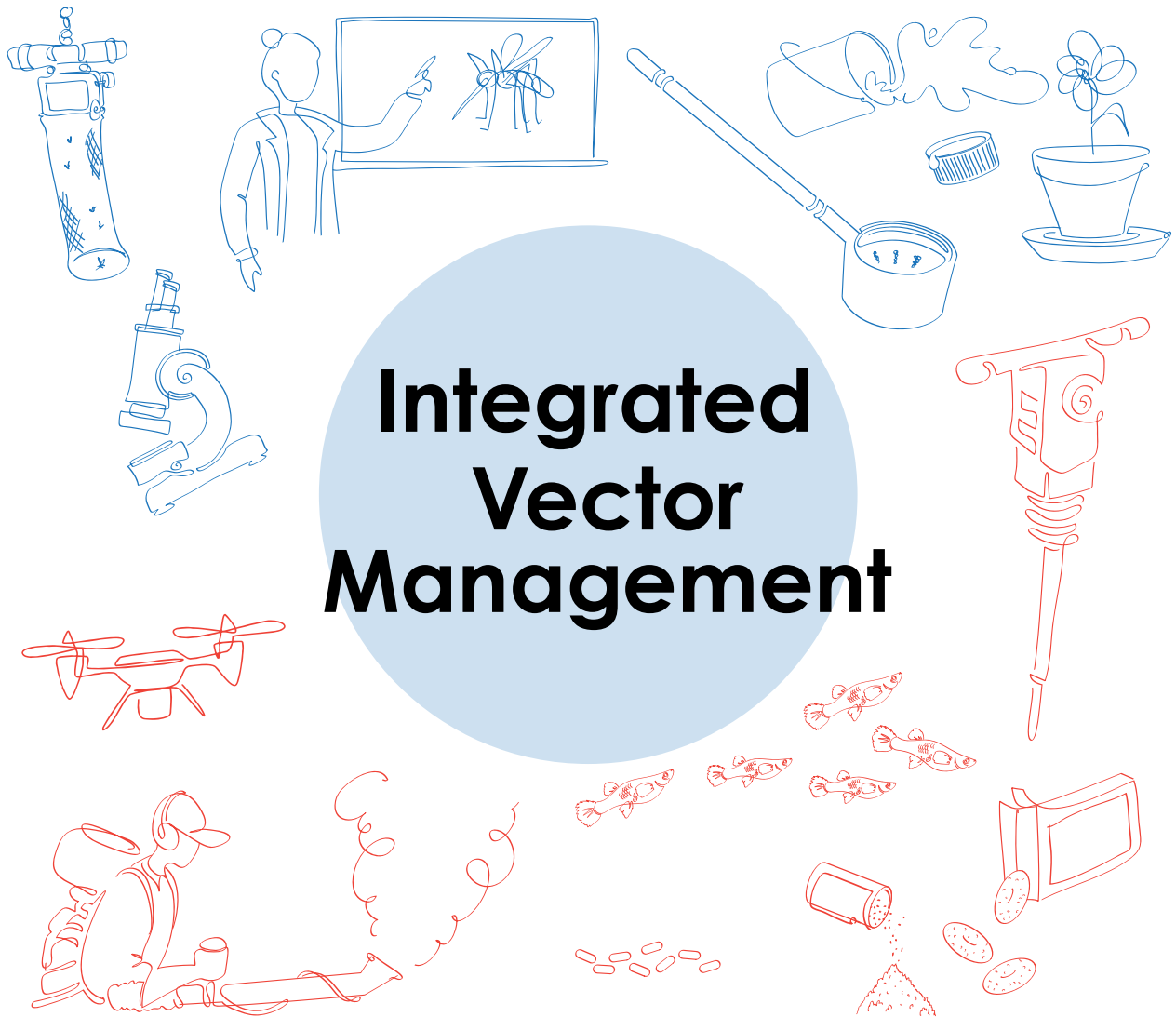
# CORE MOSQUITO CONTROL SERVICES



# INTEGRATED VECTOR MANAGEMENT

Integrated Vector Management (IVM) is core to the district's work. Through a multi-component, science-based program, we can make evidence-based decisions to mitigate vectors and vector-borne diseases in our county. IVM has six core components that support each other for optimal vector control.

Surveillance | Public Education | Preventative Practice



Chemical Control | Biological Control | Physical Control

The district's use of each of these six components is outlined on the following pages

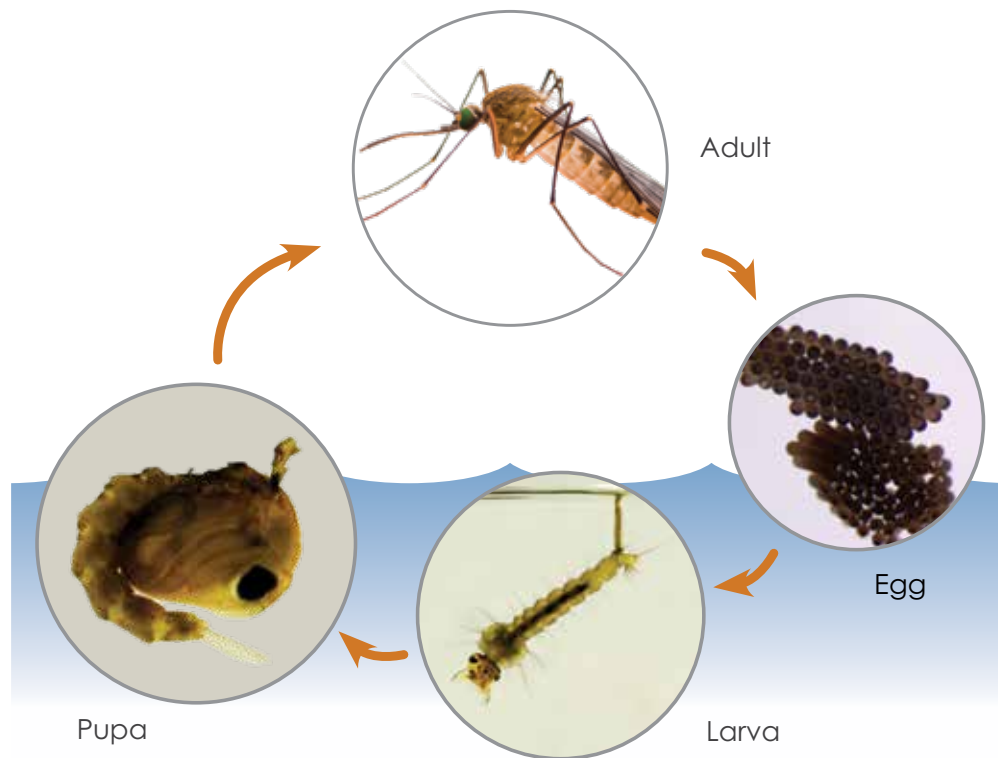
<< Vector Control Technician Vanessa pauses from preparing to support a drone application of larvicide to control mosquitoes in a rural natural area of San Mateo County.

## SURVEILLANCE

**Mosquito abundance and disease surveillance data enable the district to make informed decisions about where to focus resources and what level of intervention is required.**

### Mosquito Life Cycle

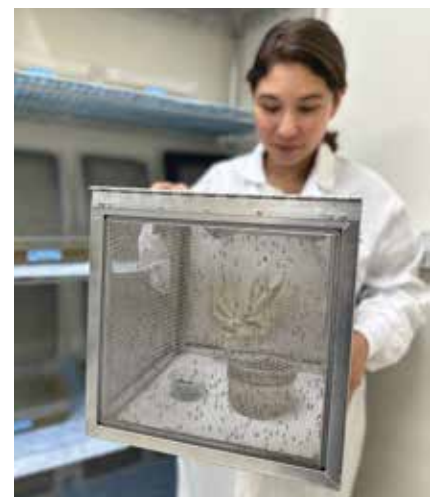
Mosquitoes need water to develop! The first three stages of the mosquito life cycle – egg, larva, and pupa – are spent in the water. Our surveillance focuses heavily on sampling standing water to look for larvae. Preventing the further development of mosquito larvae is the most effective way to reduce mosquito populations.



### District Mosquito Colony

The district maintains a colony of *Culex pipiens* mosquitoes for a variety of purposes. Some larvae are used in public outreach to show residents what larvae look like.

Larvae may also be used to test the effectiveness of larvicides. Adults are used to test effectiveness of adulticiding treatments, including placement in sentinel cages during truck-mounted adulticiding treatments.



**Vector Ecologist Arielle cares for the district's mosquito colony.**

## West Nile Virus

West Nile virus is transmitted through the bite of an infected mosquito. The district conducts surveillance for infected mosquitoes as part of our core work. Mosquitoes become infected by feeding on infected birds. Some species of birds are very sensitive to infection and die—public reports of dead birds are very helpful to our surveillance efforts.

- **Mosquito trapping.** District staff set over 1,632 carbon dioxide-baited traps (designed to capture adult mosquitoes), which collected 13,299 mosquitoes (yes, we counted every single one!) of a variety of species. A total of 5,120 *Culex* mosquitoes (which can transmit West Nile virus) were grouped into 244 pools and tested for West Nile virus and other mosquito-borne pathogens. No detections of West Nile virus in mosquitoes occurred in San Mateo County in 2025.
- **Sentinel chickens.** Chickens do not become ill when infected with West Nile virus, but antibodies can be detected in their blood after an infection. This year, due to concerns of avian influenza potentially affecting backyard chicken flocks, as well as our own flocks, the district did not have any sentinel chicken flocks.
- **Public reports of dead birds.** A total of 578 dead birds were reported by the public; 180 of these appeared to have died within the previous 24 hours and were suitable for testing. West Nile virus was not detected in any of the dead birds tested in 2025.



Vector Control Technician Stephanie prepares to hang a trap to capture mosquitoes.



Vector Control Technician Justin sets a carbon-dioxide baited trap to collect mosquitoes.

### MOSQUITOES

**13,299** trapped & counted  
**5,120** tested  
**0** positive for West Nile virus



### DEAD BIRDS

**578** reported  
**180** testable  
**0** positive for West Nile virus



Seasonal lab staff Sean assisted with grid-trapping for mosquitoes to test for West Nile virus.

## Invasive Species

*Aedes aegypti*, a mosquito that can transmit dengue, chikungunya, yellow fever, and Zika virus, is rapidly spreading through California. In 2024, these mosquitoes were detected in multiple locations in Santa Clara County; and in 2025, they were detected in multiple locations in Alameda County as well as Santa Clara County.

*Aedes aegypti* was detected in San Mateo County in 2013. However, after an intensive effort by district staff, the species was eradicated from the county in 2015.

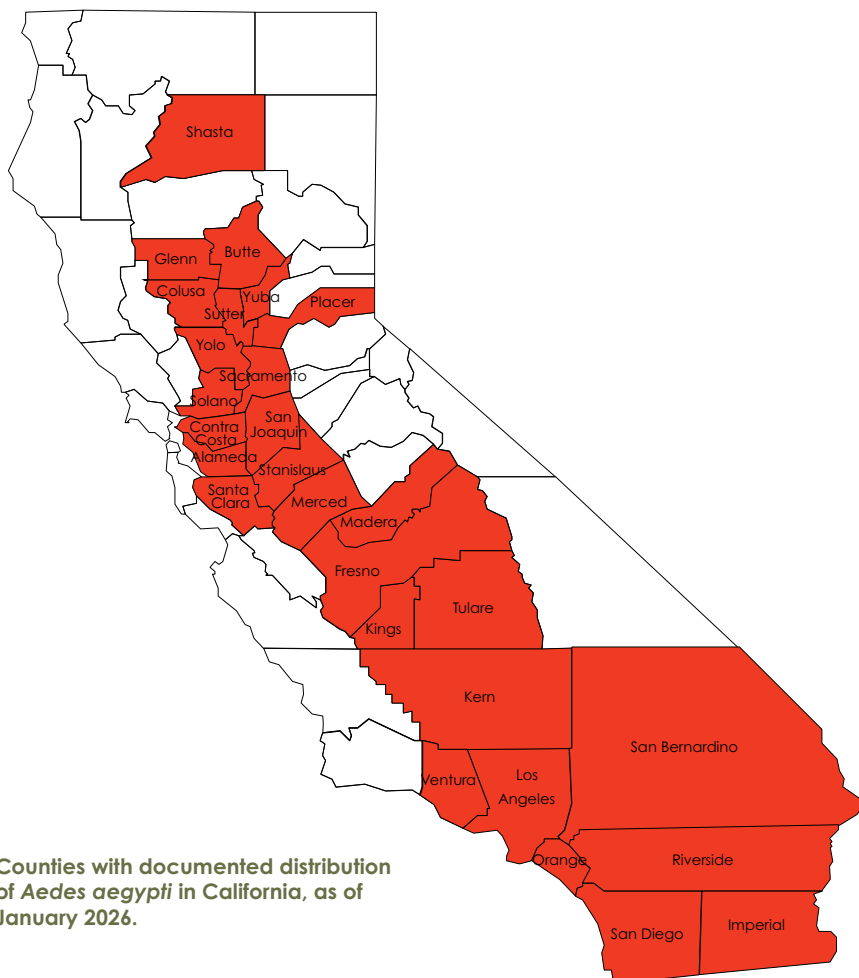
Early detection of the species' presence in San Mateo County is key to control efforts. In 2025, staff set specialized traps for a total of over 13,200 trap-nights (many nights had multiple traps set throughout the county), and no evidence of *Aedes aegypti* invasions were detected.



Invasive *Aedes* mosquitoes have noticeable black and white markings on their bodies and legs.



Actual Size: About ¼ inch long



Counties with documented distribution of *Aedes aegypti* in California, as of January 2026.



*Aedes* traps are simple in design — a dark container with a bit of water encourages females to lay their eggs on a paper in the container. Staff retrieve the papers and inspect for eggs.



Seasonal lab staff Alex was responsible for setting and checking thousands of traps throughout the county for *Aedes aegypti* eggs.

## INVASIVE AEDES SURVEILLANCE

>13,210 ovitrap nights

0 invasive *Aedes* infestations detected





Seasonal lab staff Alex was responsible for inspecting hundreds of ovicup trap papers for invasive *Aedes* eggs.

## PUBLIC EDUCATION AND PREVENTATIVE PRACTICES

Outreach education encourages the public to protect themselves from mosquito bites and prevent mosquito breeding. Preventative practices include integrating strategies into local planning activities to encourage good water management and mosquito-prevention habits.

District staff provided educational presentations and materials at events throughout the county in 2025. We collaborated with San Mateo County Libraries, San Mateo County Parks, San Mateo County Office of Education, and scouting groups to reach children throughout the district. Presentations to adult groups included various town/city meetings, senior groups, and Rotary clubs. Staff also offered district tours - inviting the public to get a behind-the-scenes look at district facilities and operations.

**104**  
school presentations  
in the 2024-2025  
school year,  
with over  
**2,510**  
students  
and teachers  
reached



Vector Ecologist Theresa was the on-screen subject matter expert for an educational video about midges done in collaboration with the City of Foster City communication staff.



Communications Director Rachel presented to a classroom in Spanish as part of 'Education Day' at the American Mosquito Control Association conference in Puerto Rico.



District staff collaborated with San Francisco mosquito control staff to table at the Bay Area Science Festival, which attracted visitors from all across the Bay Area. This attendee recognized our table because he had previously attended our Open House!



Laboratory Director Angie was featured on a news segment about the range expansion of the invasive mosquito *Aedes aegypti*.

## Open House

Our 2025 Open House was held on a Saturday afternoon in June. Staff hosted informational tables about many aspects of the district's work, including several interactive displays.

Over 170 people of varying ages and from throughout the county attended the open house. We hope you'll consider visiting a future open house!



Vector Control Technician Kim shows a banana slug to a young attendee.



Mechanic/Vector Control Technician Sean explains the district's drone to attendees.



Vector Control Technician Eric ready to help children look for mosquito larvae in a hands-on activity.

## PHYSICAL, BIOLOGICAL, AND CHEMICAL CONTROL

**Making the best choice in any mosquito control situation.**

A robust surveillance program is key to quickly detecting mosquito issues. When mosquitoes are detected, we have a variety of tools in our integrated vector management toolbox: physical, biological, and chemical control.

**Physical control** can include altering areas to not hold water where mosquitoes can breed. Drilling holes in old water features, cutting back plants, and eliminating standing water are examples of physical control.

**Biological control** includes our robust mosquitofish program, which provides these voracious little fish to residents with artificial water features or unused swimming pools. In addition, some of the larvicides we use contain bacteria that control mosquito populations without impacting non-target aquatic life.

**Chemical control** is generally reserved for situations in which other methods are non-optimal. Chemical pesticides are all registered with the Environmental Protection Agency and are applied according to label instructions by our certified vector control technicians.



Operations Supervisor Ryan reviews tags for the EPA-registered products district staff use to control mosquitoes.

## Unmanned Aerial Systems (Drones)

In 2025, we continued to strengthen and expand our use of unmanned aerial systems (UAS, also called drones) for mosquito control efforts. The use of drones in our work allows us to have a lower impact in sensitive areas like marshes and impounds.

Many other mosquito control districts throughout the country have already added drones to their control programs, although the exact process varies from area to area. As technology evolves, our staff stay abreast of changes in laws and regulations as we work to use this technology in an effective and responsible way.

The drones are typically used to replace the work we have historically done with Argo amphibious off-road vehicles and helicopters. Although Argos are a critical tool for treating large marshy areas, replacing their use when possible works to further minimize our impact on the environment. More information about the district's drone use can be found in our District Policy Manual online at [www.smcmvcd.org/district-policy-manual](http://www.smcmvcd.org/district-policy-manual).

The process to become certified to use drones in our mosquito control work was intensive. First, key staff studied and passed the Federal Aviation Administration (FAA) Part 107 Knowledge Test. The exam included questions about airspace operating requirements, emergency procedures, and other related topics. These staff were then certified as remote pilots to pilot drones weighing less than 55 pounds under FAA Part 107.

The district owns and uses drones for different purposes. Smaller drones are used for 3-D mapping of natural areas to determine where low-lying areas might result in standing water where mosquitoes can breed. This allows us to precision-apply larvicides to areas based on exactly where the standing water exists. A larger drone is used for carrying and applying mosquito control treatments to the area after it is precisely mapped.

In order to use the larger drone for mosquito control treatments, district staff prepared and submitted a Certificate of Authorization (COA) to the FAA

that allows our public agency to fly a drone weighing over 55 pounds. This COA is essential to our work in larger areas, like marshes and seasonal impounds. A larger drone means more mosquito larvicide can be loaded, and the treatment application can be completed more efficiently, with fewer stops to refill the larvicide. The drone is regularly calibrated for precise application rates of the products we are using.

Because we are using the drone to apply pesticides, staff also had to take an exam for an Unmanned Pest Control Aircraft Pilot Certificate from the California Department of Pesticide Regulation, and the district is registered with the San Mateo County Department of Agriculture.

Before each flight, our remote pilots do a series of safety checks on the drone, file a NOTAM (Notice to Airmen), and, depending on the location, may also call the relevant air control tower or local police department for situational awareness.



Vector Control Technician/Mechanic and FAA-certified remote pilot Sean operates a drone during a mosquito control treatment.

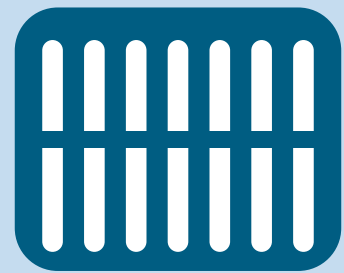
## Catch Basins

Storm drain systems contain “catch basins,” which are designed to catch sediment in water runoff and may have a sump area which is lower than the rest of the drainage system.

During winter months, storm drain systems are flushed out regularly by winter rainstorms. However, during the summer, water may remain in the drain from winter storms, infiltrate into the drain from the surrounding ground, or collect from residents washing cars or overwatering lawns. This underground water stands long enough for mosquitoes to breed in catch basins.

There are over 40,000 catch basins within the district, and each has the potential to produce vast numbers of mosquito larvae. In particular, the *Culex pipiens* mosquito that is a main West Nile virus vector can easily breed in these catch basins. Therefore the district hires seasonal mosquito control technicians to help treat catch basins during the summer months, applying a refined mineral oil in catch basins from right-hand drive Jeeps.

The oil creates a thin layer on standing water and prevents mosquito larvae from surfacing to breathe, eliminating the possibility of larvae completing their life cycle and emerging as adult mosquitoes.

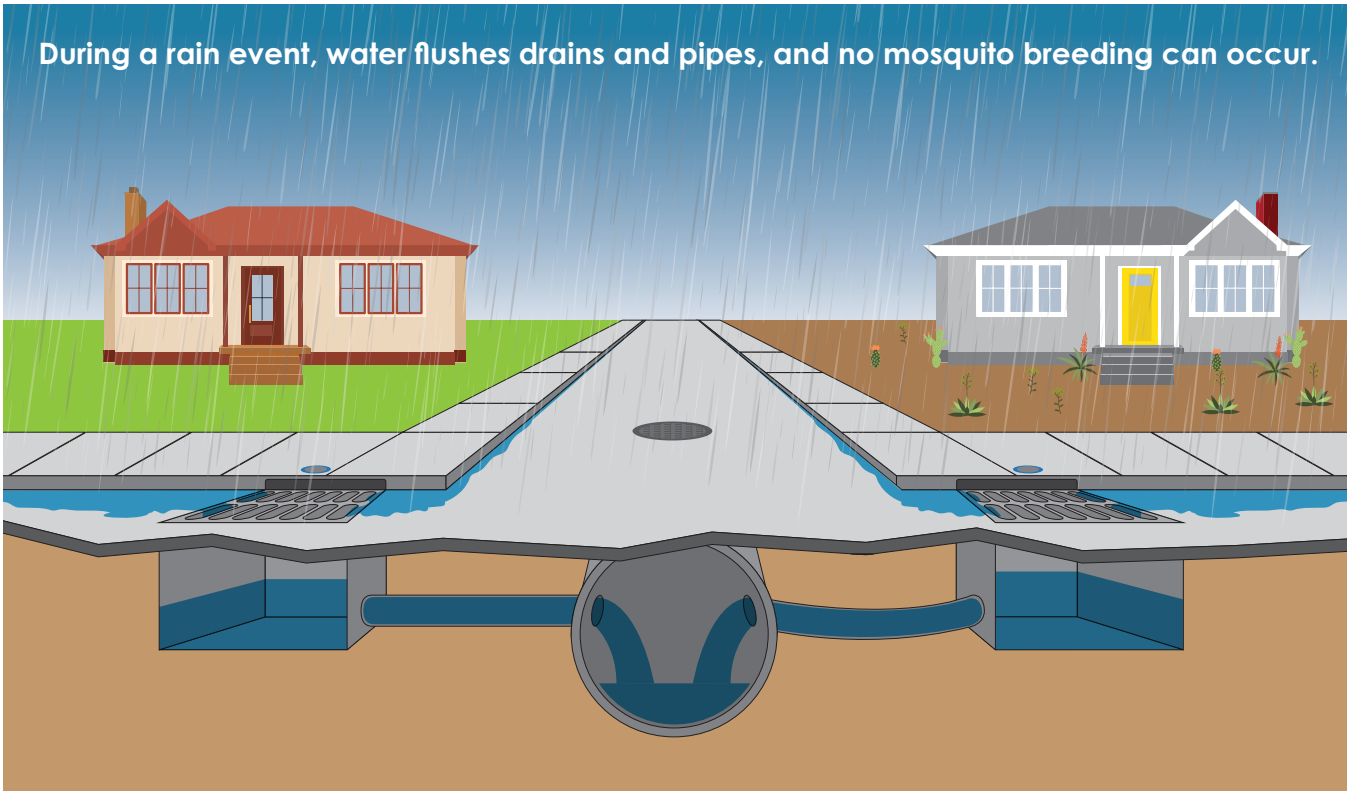


Over the summer of 2025, staff checked and/or treated **34,661 catch basins** throughout the county; many were checked every two weeks. This totaled to **172,725** treatments in the summer of 2025.

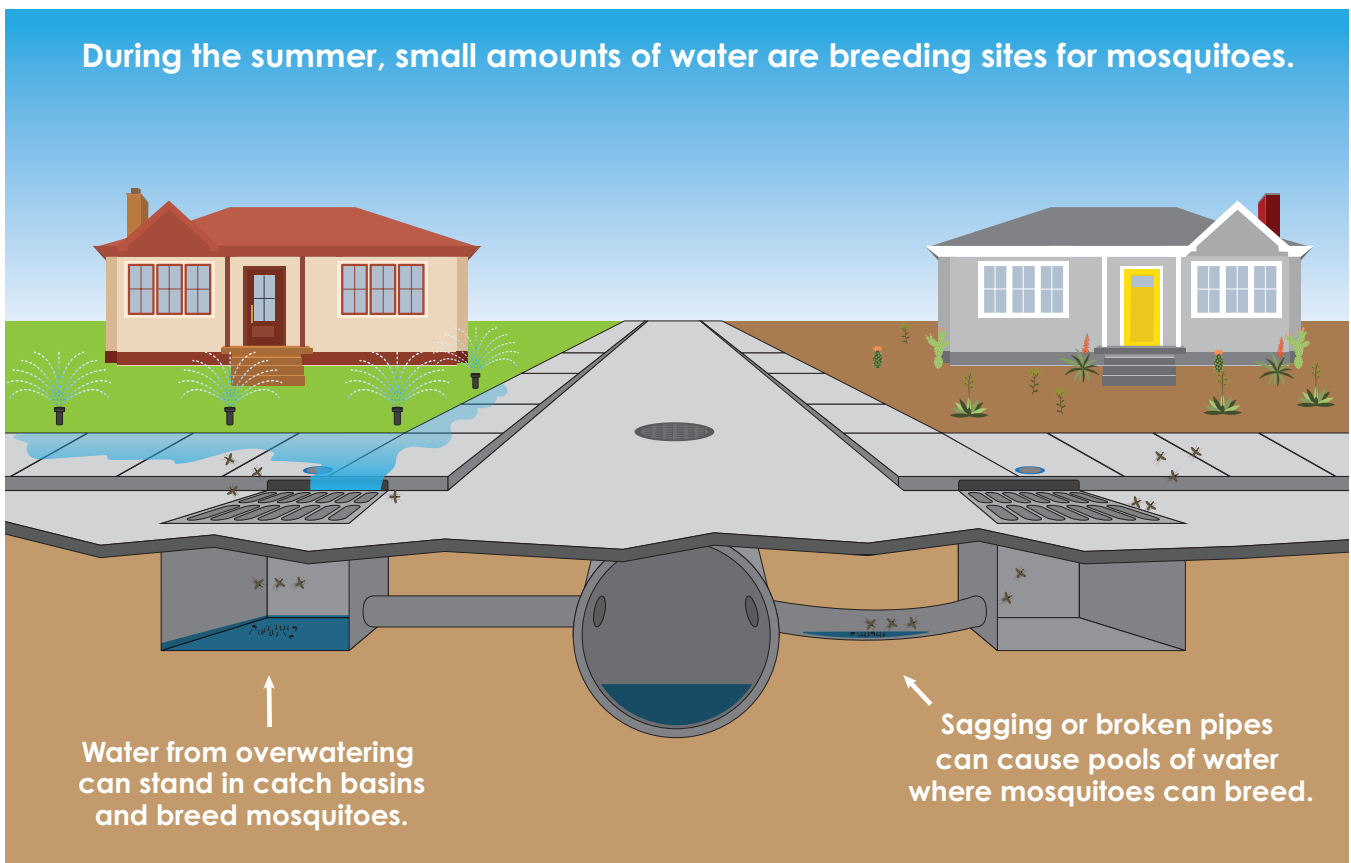


Our 2025 seasonal catch basin drivers were (left to right) Virgil Casanada, Jr., Everst Barillas, Anthony Davino, Ric Peralta, Kyle Yoshida, and Galen Guo.

During a rain event, water flushes drains and pipes, and no mosquito breeding can occur.



During the summer, small amounts of water are breeding sites for mosquitoes.



# RESIDENT SERVICE REQUESTS



# SERVICE REQUESTS

## Resident Services

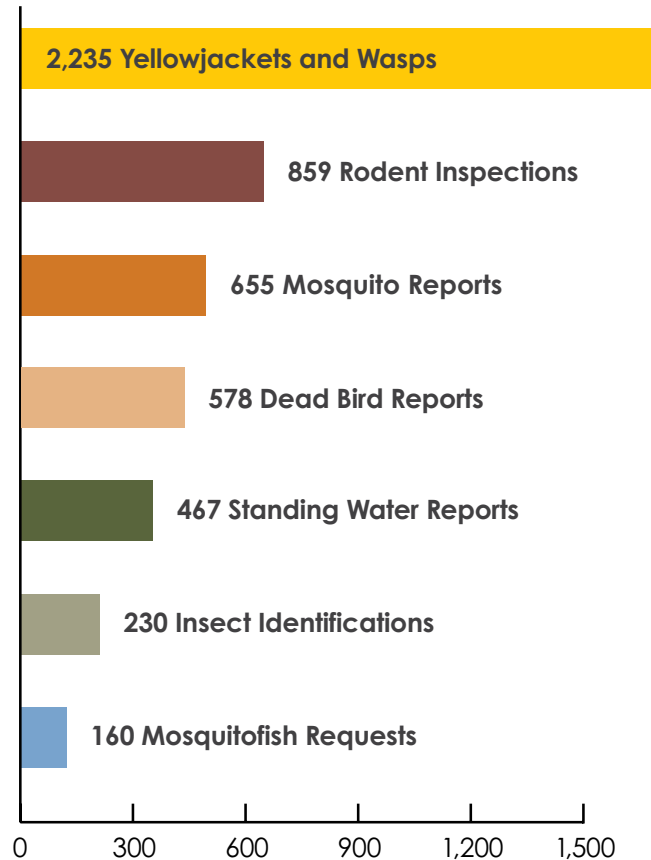
Residents can request a variety of services provided by the district. Staff typically visit the location within one business day to address the issue. If the issue is complex – such as mosquitoes coming from an unknown source – staff work diligently in the surrounding area to find and resolve the issue.

In 2025, the most frequently requested service was removal/treatment of yellowjacket and wasp nests. Yellowjacket activity usually peaks between July and September, resulting in some very busy months for our technicians!

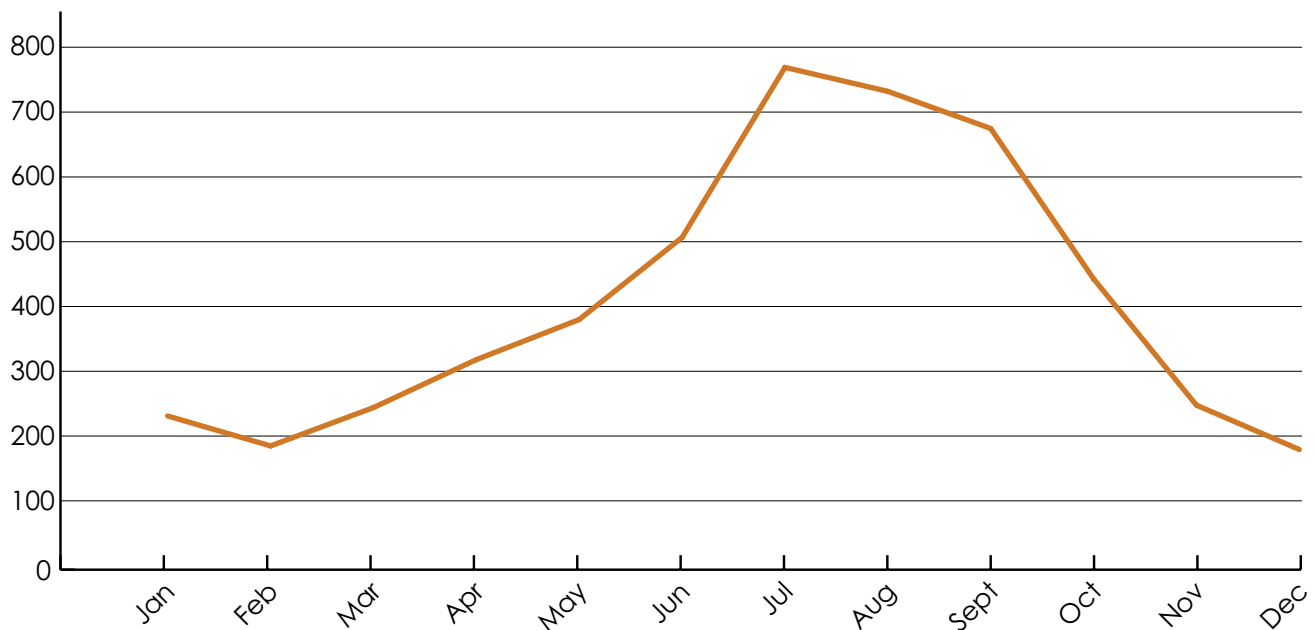
As in previous years, the majority of service requests were received over the summer, with a seasonal peak occurring during late summer as the area's warmest temperatures boosted mosquito populations and allowed yellowjacket and wasp activity to rise, resulting in hundreds of resident service requests during the warmest months of the year.

To submit a service request, visit [www.smcmvcd.org/request-service](http://www.smcmvcd.org/request-service).

## Major Categories of Services Requests in 2025



## Service requests peaked in the warm summer months of 2025



<< Vector Ecologist Tara and Vector Control Technician Walter prepare for visiting multiple houses reporting fleas in their neighborhood.

## Yellowjackets

During the summer months, one of the district's most requested services is the control of yellowjackets on private and public property. 2025 was a record year for yellowjacket requests, with over 2,200 resident requests for assistance controlling yellowjacket and wasp nests.

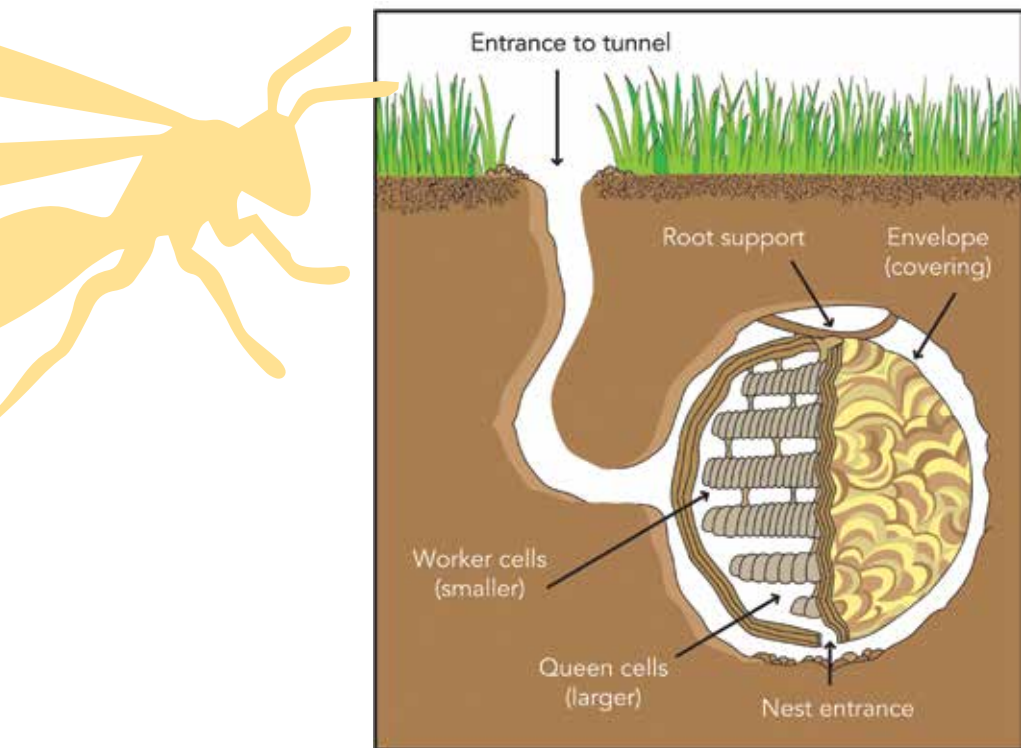
Yellowjackets are medium-sized black wasps with yellow markings. There are several species of yellowjackets: some build nests above ground in trees, or under the eaves of houses, while others build nests below ground in burrows or holes. Yellowjackets are often very aggressive if their nest is disturbed.

The district can treat outdoor yellowjacket nests if the location of the nest is known. Nests are commonly hidden in dense vegetation, wood piles, utility vaults, or rock walls. When a resident knows the location of the nest entrance, they can submit a service request for a technician to visit to treat the nest at [www.smcmvcd.org/request-service](http://www.smcmvcd.org/request-service).

To learn more about yellowjackets and other kinds of wasps, visit [www.smcmvcd.org/yellowjackets-and-wasps](http://www.smcmvcd.org/yellowjackets-and-wasps).



Vector Ecologist Theresa sorts yellowjackets from traps. The district conducted a multi-year assessment of a new-to-market yellowjacket bait.



**The small entrance of a yellowjacket ground nest is deceptive – the narrow opening usually leads to a large nest!** Image courtesy of Marin-Sonoma Mosquito and Vector Control District



Yellowjackets are black wasps with yellow markings that can sting and bite.

## Rodent Inspections

Rodents inspections are a popular service year-round, as residents request professional assistance in identifying how rats and mice may be entering their homes.

Residents can request a district technician visit their property for an inspection that generates a customized report. The report lists possible rodent/wildlife entry points, types of attractants around the property, and tips on modifications that can be made to deter rodents and wildlife from visiting the property and entering the home. Some residents request inspections prior to hiring a private pest control company to conduct the modifications, while others choose to make minor modifications and fixes themselves.

District staff do not conduct any rodent or wildlife trapping on private property, and staff do not provide exclusion work (covering holes in vent screens, fixing structures, etc.). However, our inspection service can be very helpful to residents dealing with a current rodent issue or hoping to prevent a future issue.

To learn more, visit [www.smcmvcd.org/rodent-prevention-and-control](http://www.smcmvcd.org/rodent-prevention-and-control).



Operations Director Casey uses a small mirror to check for a gap where rodents might enter along the bottom edge of a wall.

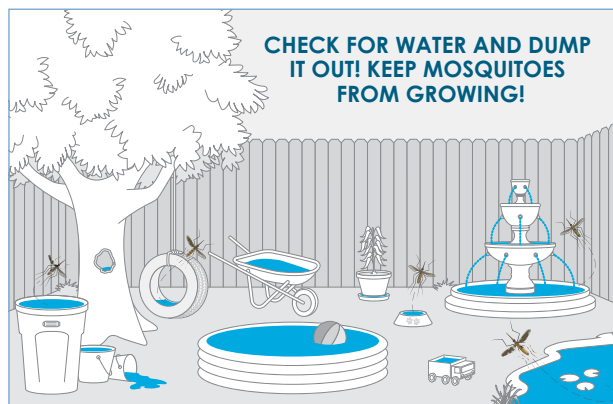


## Mosquitoes and Standing Water

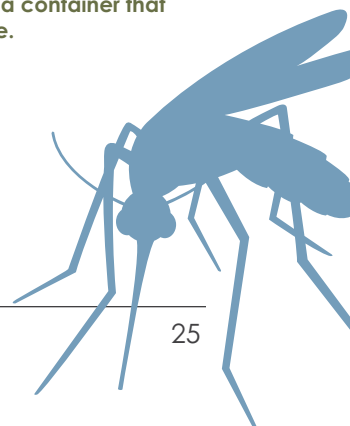
The district's core mosquito control work focuses on known and permanent or recurring standing water sources. When residents notice an usual number of mosquitoes around their home, they can request a technician visit to inspect and determine where the water source may be.

In some cases, the source is a neglected pool or container holding water. In other cases, a broken water or sewer pipe under a building is causing an issue. Land subsidence under buildings is an issue in certain parts of the county as well. In many cases, residents can play an active part in reducing mosquito breeding sites around their homes. Dumping and draining water around the yard at least once a week can drastically reduce mosquito breeding areas.

Our technicians carefully inspect all possible mosquito breeding locations in the area to find the water source and then control the mosquitoes using integrated vector management.



Vector Control Technician Walter dumps standing water from a container that held mosquito larvae.



## Mosquitofish

Mosquitofish (*Gambusia affinis*) are small fresh water fish. These fish are only 1-3 inches long, but they can eat several hundred mosquito larvae a day. The district provides mosquitofish at no cost for control of mosquitoes in ponds, fountains, and abandoned swimming pools on private property. Mosquitofish must NOT be placed in natural water sources where they can reach creeks and other waterways.

A few fish go a long way – many people are surprised that only 4-8 fish are usually provided. Mosquitofish will die if too crowded, and they are efficient at reproducing to fit the space where they are placed.

If you live in San Mateo County, you can submit a service request online or via phone for a technician to deliver mosquitofish to your property.



Vector Control Technician Devon feeds the mosquitofish in the District's on-site tanks.

## Insect Identification

District entomologists can help identify insects and other arthropods and provide information on whether the insect is harmful and how to control it. Samples can be submitted in a variety of ways:

- You may email photos to [info@smcmvcd.org](mailto:info@smcmvcd.org) for our entomologists to review. Not all insects can be identified from a photograph, so save the sample in case we need it later.
- You may drop off a sample at our district office in Burlingame anytime we are open. Call or visit our website to learn what types of samples are accepted: [www.smcmvcd.org/insect-identification](http://www.smcmvcd.org/insect-identification).
- If you'd like a technician to pick up a sample from your house, you can fill out a service request online or call to request a sample pick-up.



Laboratory Director Angie uses a dissecting scope to identify mosquitoes and other insects.

## HIGHLY TRAINED STAFF ARE CRITICAL TO OUR WORK

Our field and laboratory staff maintain Vector Control Technician certifications from the California Department of Public Health. The certification process starts with four separate tests covering extensive material in each of the following categories: **Pesticide Application and Safety, Biology and Control of Mosquitoes in California, Arthropods of Public Health Significance in California,** and **Vertebrates of Public Health Importance in California.** To learn more visit [www.smcmvcd.org/staff-training-and-certification](http://www.smcmvcd.org/staff-training-and-certification).

Certified Vector Control Technicians maintain their certification by completing at least 36 hours of continuing education units (CEUs) every two years.



**In 2025, district staff completed over 440 hours of training.**

## Post-Service Survey Feedback

After a service request is completed, the resident may fill out a survey asking about their experience. Residents are generally very pleased with our services, and many continue to request other kinds of services over subsequent years.

**4.9 ★** Average rating [out of 5]



Based on post-service request survey

## Residents' Remarks

“Very pleased with the inspection and advice we got from the person who came out. Based on his advice we made some changes and I've had no issues since his inspection. Thank you so much!”

“Vector Control folks are terrific! Always prompt, professional, and friendly. Great service to county residents.”

“The person came to our house is very friendly and knowledgeable. She gave me lots of practical suggestions. Thank you!!”



“Employees were very friendly, service oriented, knowledgeable, and prompt.”

“Service was outstanding, timely and responsive. The service technician was very friendly and professional.”

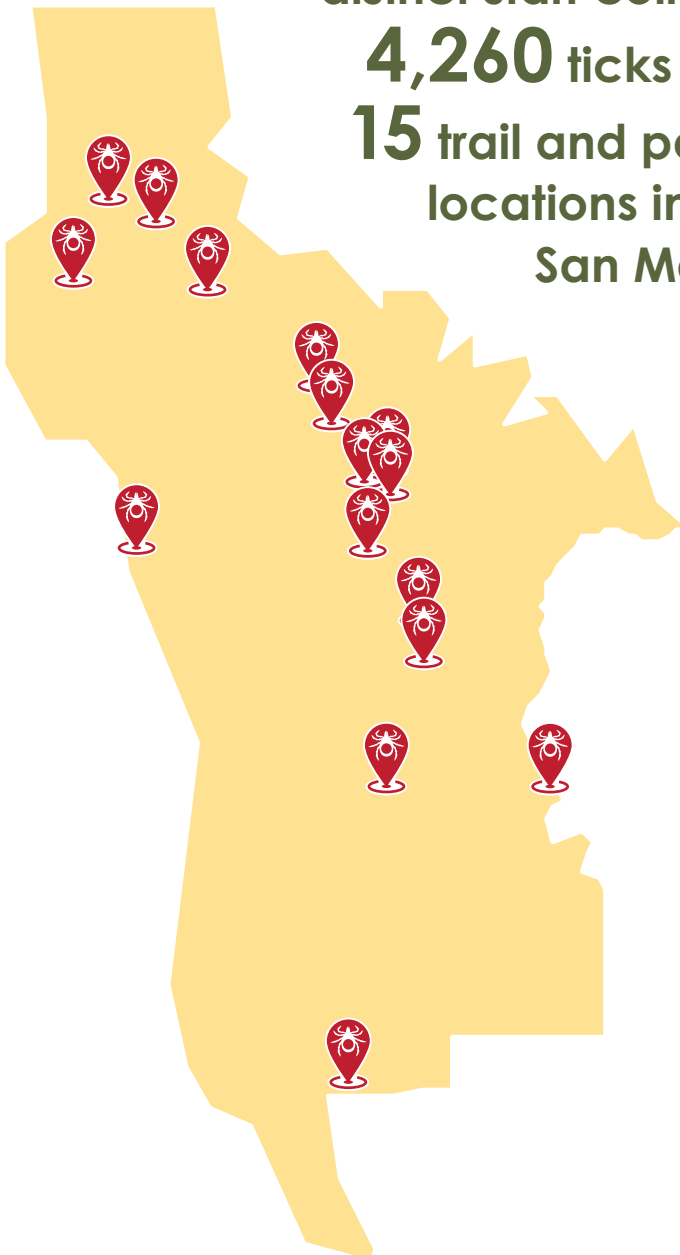
# TICKS



## TICK SEASON

District staff collect ticks from December through June, as ticks collected during these months are most likely to bite humans. Staff use white cloths to drag along trail edges or through forest understories to collect questing ticks – ticks that are actively seeking hosts for blood meals. Ticks are picked off the cloths and returned to the laboratory where they are identified to species and tested for pathogens.

**From October 2024  
through September 2025,  
district staff collected  
4,260 ticks from  
15 trail and park  
locations in  
San Mateo County**



Vector Ecologist Tara checks a cloth after dragging over vegetation to collect ticks.

From May 2024 through January 2025, the district started a program to provide tick-bite prevention kits to residents. Each kit contains a variety of educational materials, repellent samples, and tick removal devices. In conjunction with the roll-out of the program, the district collaborated with a Pacific Southwest Center of Excellence in Vector-Borne Diseases-funded graduate student research project to study knowledge, attitudes, and practices surrounding tick-bite prevention. Residents were invited to participate in a series of three surveys to assess if/how knowledge and confidence changed after receiving a kit. Results from the study will be shared in a future annual report.

# SURVEILLANCE FOR TICKS AND TICK-BORNE DISEASE

Real-time PCR is used to test western black-legged ticks (*Ixodes pacificus*) for three tick-borne pathogens found in California. Associated tick-borne diseases are Lyme disease (specifically the *Borrelia burgdorferi* sensu lato complex, which includes *B. burgdorferi* sensu stricto, the agent of Lyme disease), hard-tick relapsing fever (caused by *Borrelia miyamotoi*), and human granulocytic anaplasmosis (HGA; caused by *Anaplasma phagocytophilum*). All three diseases may be vectored by both nymphal and adult ticks.

Adult ticks are tested in groups, or "pools," of a maximum of five individuals. Nymphal ticks are tested in pools of no more than two ticks each. The results are reported as a minimum infection prevalence, or MIP. This is the standard way of expressing the proportion of vectors tested that are infected with a particular pathogen and assumes that only one tick in a given pool is infected. As prevalence values are highly dependent on the number of ticks collected, we sample 150 or more adult ticks and/or 50 or more nymphal ticks per location, which increases the chance that our sample will represent the true prevalence.

## TICK TESTING RESULTS

A total of 3,378 adult ticks were grouped into 716 pools for testing. In adult ticks, staff determined minimum infection prevalences of:

- ~0.59% for *Borrelia burgdorferi*, agent of Lyme disease
- ~1.12% for *Borrelia miyamotoi*, agent of *Borrelia miyamotoi* disease
- ~0.50% for *Anaplasma phagocytophilum*, agent of anaplasmosis

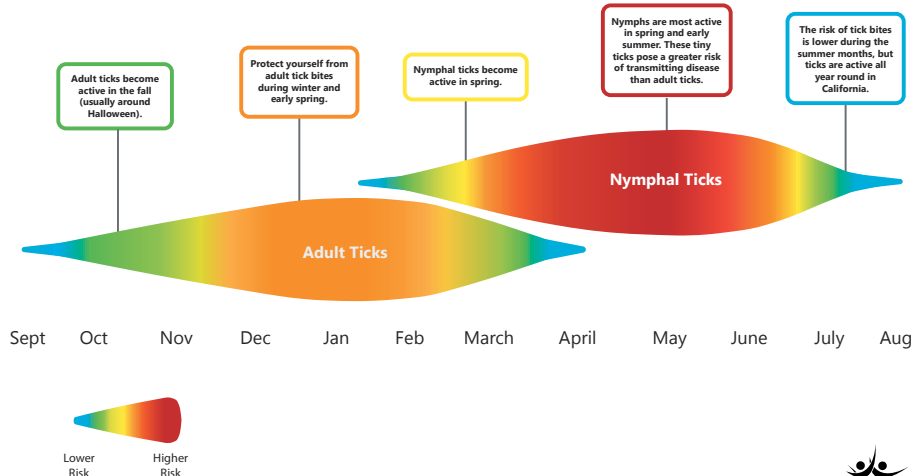
A total of 882 nymphal ticks were grouped into 451 pools for testing. In nymphal ticks, staff determined minimum infection prevalences of:

- ~4.99% for *Borrelia burgdorferi*, agent of Lyme disease
- ~2.61% for *Borrelia miyamotoi*, agent of *Borrelia miyamotoi* disease
- ~1.13% for *Anaplasma phagocytophilum*, agent of anaplasmosis

Checking for and properly removing ticks are important steps to reducing risk. Learn more at [www.smcmvcd.org/preventing-tick-bites](http://www.smcmvcd.org/preventing-tick-bites).

### Seasonal Risk of Exposure to Infected Western Blacklegged (*Ixodes pacificus*) Ticks in California

- Western blacklegged ticks can transmit the bacteria that cause Lyme disease
- Nymphal (immature) ticks pose a higher risk of disease transmission than adult ticks
- Risk of exposure varies throughout California



# TICK PREVENTION AND SAFETY

While the risk of Lyme disease and other tick-borne diseases in San Mateo County is low, protecting yourself from tick bites can help further reduce the risk.

## Avoid Ticks

- Wear long pants and sleeves when hiking.
- Tuck pants into socks or boots, and shirts into pants.
- Wear light-colored clothing so you can more easily see and remove ticks.
- Use an EPA-registered tick repellent. Follow label instructions. Visit [www.smcmvcd.org/epa-registered-insect-repellent](http://www.smcmvcd.org/epa-registered-insect-repellent) to learn more.
- Stay on the trail when hiking. Ticks are often found in brush, tall grass, or leaf litter.

## Check for Ticks

Ticks do not typically bite immediately. They may crawl on the body looking for a spot to bite. After being outdoors, check yourself, your children, your pets, and your gear for ticks. Remember to check your entire body. Laundering your clothes and showering soon after being outdoors can help wash ticks away.

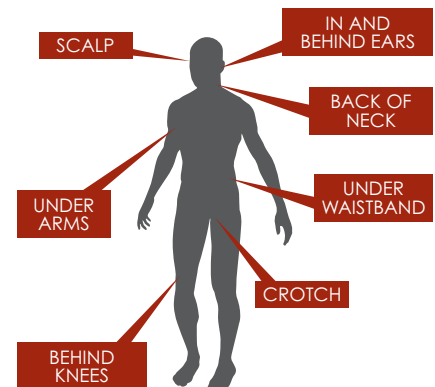
## Properly Remove Ticks

Prompt and proper removal of ticks can reduce chances of infection. In most cases, ticks removed within 24 hours of biting will not transmit disease.

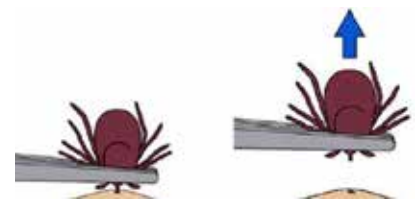
- Use fine-tipped tweezers to grasp the tick near the skin and pull steadily up.
- Do not twist or squish the tick. Do not burn or cover/smother the tick.
- After removing, wash the area with soap and water.
- Report any fever or rash that develops within the next 30 days to a health care professional.



Registered repellents have an EPA registration number on the package. Learn more at [epa.gov/insect-repellents](http://epa.gov/insect-repellents).



Checking for ticks is an important part of tick-bite prevention. After hiking or outdoor activity, checking these particular locations on the body can help you find ticks for early removal.



Use fine-tipped tweezers to grasp the tick perpendicular to its body very near the skin.

## SPECIAL PROGRAMS

### Invasive Cordgrass

*Spartina foliosa*, commonly known as cordgrass, is a native tall grass that grows in coastal salt marshes in San Mateo County. This native species is threatened by a rapidly spreading invasive species of cordgrass, *Spartina alterniflora*. The invasive species threatens key habitats important for shorebirds and other species that make their homes in marshes along the San Francisco Bay. To control the invasive cordgrass, the California Coastal Conservancy's San Francisco Estuary Invasive *Spartina* Project employs biologists focused on identifying and eliminating the invasive cordgrass. The district has assisted seasonally in summers for the past 21 years. In 2025, district staff assisted in treating 56 acres of invasive cordgrass.

The district is uniquely suited to this collaboration because of our airboat, pesticide training, and familiarity with Bair Island from our mosquito control work. Controlling invasive cordgrass not only keeps the bay habitats native, but can also reduce the potential for the invasive cordgrass to create additional mosquito breeding areas that would need control measures and can reduce the potential for floods in areas where cordgrass would otherwise hinder water flow in tidal channels. The control work is physically intense, but also a rewarding way to support the native habitats of our county.

### Rodent Control in Sewers and Creeks

The district oversees contracts between private pest control operators and several local cities and sanitary districts to provide rodent control in sewers and creeks. These control programs use tamper-resistant bait stations and a reduced-risk rodenticide to control commensal rats. The cities of San Mateo and San Carlos also contract directly with the district for rat control services along above-ground public storm control waterways and urban creekways. Between June and October of 2025, the district conducted 480 contracted rodent inspections and deployed 120 bait stations in San Carlos. In San Mateo, the district conducted 1,256 contracted inspections and deployed 314 bait stations.

## PRESENTATIONS AND PUBLICATIONS

District staff presented at the following conferences:

- Mosquito and Vector Control Association of California, January 2025 in Oakland, California
  - » **Angie Nakano, Arielle Crews, Tara Roth, Theresa Shelton.** Lookin' for (*Dermacentor*) ticks in all the wrong places.
  - » **Rachel Curtis-Robles, Kacie Ring, Tara Roth, Angie Nakano, Arielle Crews, Theresa Shelton.** Neighbors love free stuff: using Nextdoor as an outreach platform.
  - » Judith Pierce and **Rachel Curtis-Robles.** Where shall we start? How to build a classroom-based mosquito and vector control curriculum.
- Drone Roundtable Conference, January 2025 in Pasco, Washington:
  - » **Casey Stevenson.** The development of a UAS program in San Mateo County.
- American Mosquito Control Association, March 2025 in San Juan, Puerto Rico
  - » David Wexler and **Casey Stevenson.** An all-encompassing guide to living with the new mandates of EV compliance in California.
  - » **Rachel Curtis-Robles, Andrea McKinney, Judith Pierce.** Una carta de amor: loving and using educational ideas from other districts.
  - » **Rachel Curtis-Robles, Kacie Ring, Tara Roth, Angie Nakano, Arielle Crews, Theresa Shelton.** Neighbors love free stuff: using Nextdoor as an outreach platform.
- Entomological Society of America, November 2025 in Portland, Oregon
  - » **Rachel Curtis-Robles** and Sarah Hamer. If you build it, they will come – Community science as a mutual resource.

**District staff** were co-authors on the following publications:

- **Angie Nakano** was a co-author on Maxwell et al. 2025. Efficacy of rodent pathogen reservoir-targeted topical acaricide treatment strategies to lower the density of host-seeking *Ixodes pacificus* nymphs in California. *Ticks and Tick-borne Diseases* 16 (3): 102479.  
<https://doi.org/10.1016/j.ttbdis.2025.102479>
- **Arielle Crews** was a co-author on Sweil et al. 2025. Exploring metrics of biological diversity to better predict and respond to emerging diseases. *Integrative and Comparative Biology* 65 (2): 376-391.  
<https://doi.org/10.1093/icb/icaf064>
- **Arielle Crews** was a co-author on Lilly et al. 2025. Functional vertebrate group diversity differentially impacts vector-borne pathogen transmission and genetic diversity. *Ecosphere* 16 (6): e70292.  
<https://doi.org/10.1002/ecs2.70292>
- **Angie Nakano** and **Arielle Crews** were co-authors on Broughton et al. 2025. Climate differentially impacts ticks infected and uninfected with *Borrelia burgdorferi*. *Science Advances* 11, eads2181.  
<https://doi.org/10.1126/sciadv.ads2181>
- **Angie Nakano** was a co-author on Egizi et al. 2025. Description of all stages of a new tick species from California, *Haemaphysalis vespertina* (Acari: Ixodidae), with redescription of *H. leporispalustris* Packard, 1869 adults and phylogenetic relationship among related U.S. taxa. *Zootaxa* 5719 (1): 49-72.  
<https://doi.org/10.11646/zootaxa.5719.1.2>

**District staff** were acknowledged in the following publications:

- **Angie Nakano** was acknowledged in Couper et al. 2025. Evolutionary adaptation under climate change: *Aedes* sp. demonstrates potential to adapt to warming. *Proceedings of the National Academy of Science of the United States of America* 122 (2): e2418199122.  
<https://doi.org/10.1073/pnas.2418199122>
- **Arielle Crews** was acknowledged in Barretto et al. 2025. Barcoding quantitative PCR assay to distinguish between *Aedes aegypti* and *Aedes sierrensis*. *Tropical Medicine and Infectious Disease* 10 (8): 230.  
<https://doi.org/10.3390/tropicalmed10080230>
- **Tara Roth** was acknowledged in Foley et al. 2025. Assessing the potential risk of lone star tick, *Amblyomma americanum*, establishment in California. *Ticks and Tick-borne Diseases* 16 (6): 102566.  
<https://doi.org/10.1016/j.ttbdis.2025.102566>

District staff **Angie Nakano** and **Rachel Curtis-Robles** were co-authors on a collaboration led by California Department of Public Health to develop the state's first One Health Implementation Toolkit for Local Jurisdictions.  
<https://www.cdph.ca.gov/Programs/CEH/CDPH%20Document%20Library/CDPH-One-Health-Toolkit-for-LHJs.pdf>

# OUR SERVICES



Mosquito Control



Mosquitofish



Insect and Tick Identification



Rodent Inspections



Yellowjacket Control



Community Education



Disease Surveillance



650-344-8592  
1351 Rollins Road  
Burlingame, CA 94010

Monday-Friday  
8a.m. to 4:30p.m.  
[smcmvcd.org](http://smcmvcd.org)