

Annual Report 2023





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

Half
Moon Bay

Menlo Park

Woodside

Portola
Valley

San Mateo County Mosquito & Vector Control District Annual Report 2023

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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: Operations Director Casey shows teachers how to use a dipper to sample for mosquito larvae. Read more about our education program on page 16 of this report.

ABOUT THE DISTRICT





Manager's Note

2023 started off with a deluge of water from a series of atmospheric rivers passing over San Mateo County. The resulting flooding and standing water created an environment ripe for the development of mosquitoes. I'm pleased to report that we were able to proactively mitigate mosquito issues due to our District's integrated vector management approach (read more on page 11) and our staff's dedication to finding mosquito breeding sources and larviciding standing water where mosquitoes could breed.

As the COVID-19 pandemic waned, we started to return to pre-pandemic activities. Notably, our annual open house returned in the late summer of 2023 with record attendance (read more on page 17). Our staff look forward to the open house as an opportunity to show the public the many facets of mosquito and vector control in San Mateo County. I hope you will attend one of our future open houses to learn more about what our District does. Also in 2023, our Board of Trustees returned to in-person meetings at our 1351 Rollins Road building after conducting remote meetings for the past few years.

One of our most exciting developments this year has been initiating our Unmanned Aerial Systems (UAS; drone) program. Recognizing the potential of drone technology to improve various programs, we have committed financial and staff resources to develop and integrate these systems into our operations. The drone program is designed to enhance our ability to precisely map and treat mosquito breeding sources. The early stages of the drone program have shown promising results, with successful pilot projects demonstrating improved efficiency and cost-effectiveness (read more on page 19).

District investments in high-interest earning accounts have increased due to policy updates and a partnership with CalCLASS. This has resulted in a boost in revenue, strengthening our financial position and minimizing debt service needed to fund the 1415 N. Carolan Ave project. Architectural plans for the 1415 N. Carolan Ave building project are on schedule, with construction expected to begin in 2025. This project will enhance our operational capacity and enable us to better serve our residents for years to come.

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.

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.

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

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

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.

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

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

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

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

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

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.

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

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.

2023 BOARD OFFICERS	CITY/TOWN	REPRESENTED BY
<p>President Kati Martin</p> <p>Vice President Kathryn Wuelfing Lion</p> <p>Secretary Donna Rutherford</p>	Atherton	Mason Brutschy
	Belmont	Chuck Cotten
	Brisbane	Carolyn Parker
	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	Ed Degliantoni	
San Mateo County, at Large	Dr. Desiree LaBeaud	
South San Francisco	Michael Yoshida	
Woodside	Paul Fregulia	

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.

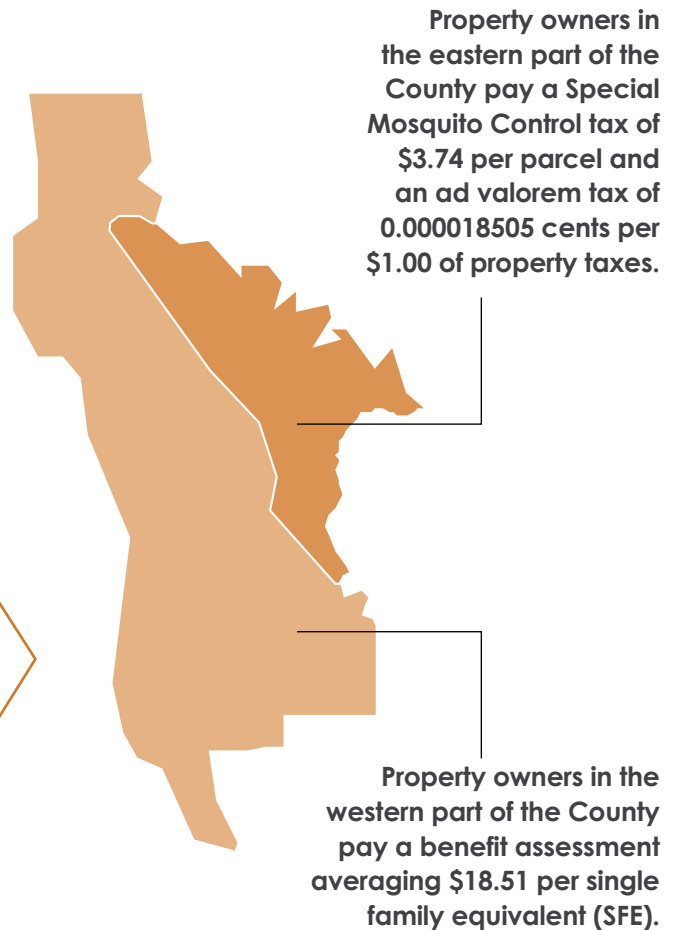


Our Financials

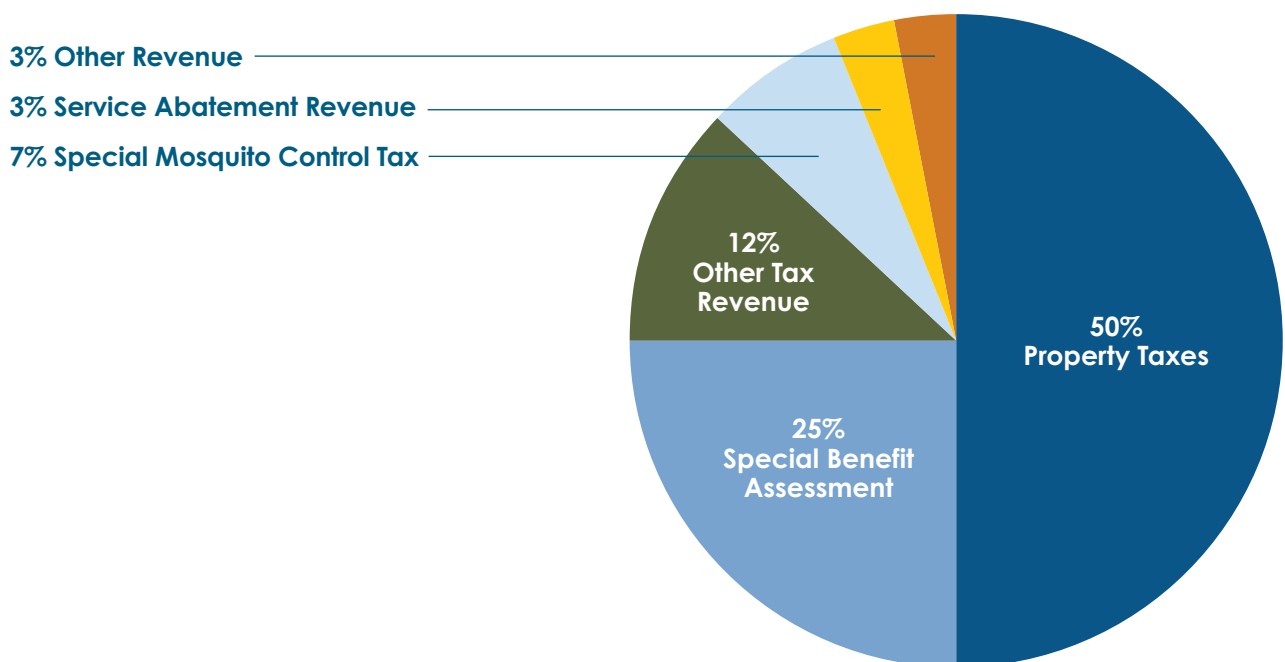
Who Pays for Services

County property owners, who pay property taxes and assessments, are typically the source of almost all District revenue. The District's usual top three revenue sources – ad valorem property taxes, a special mosquito tax, and a benefit assessment – provide about 85% of operating revenue.

In Fiscal Year 2022-23, total revenue from all sources was \$6.85 million.



Revenue Sources for Fiscal Year 2022-23



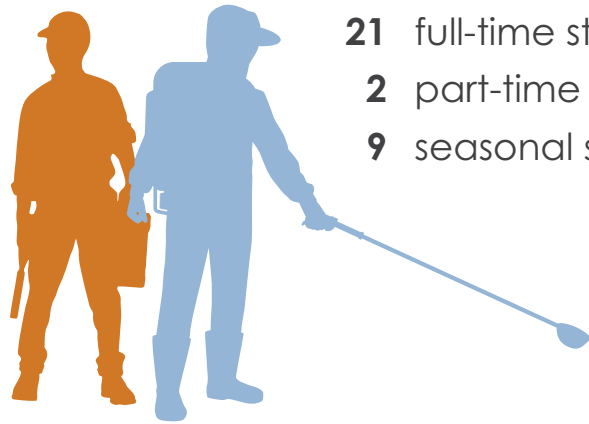
How Revenue is Used

Total annual operating expenditures for FY 2022-23 were \$5.16 million.

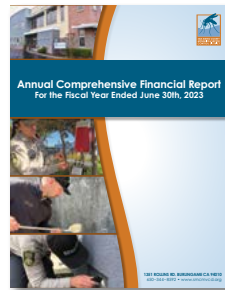
As is typical for local government agencies, most District expenditures were for employee salaries and benefits. The District's integrated vector management program reduces pesticide use but is labor-intensive and requires highly trained staff.

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 2023, 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 2022-23.

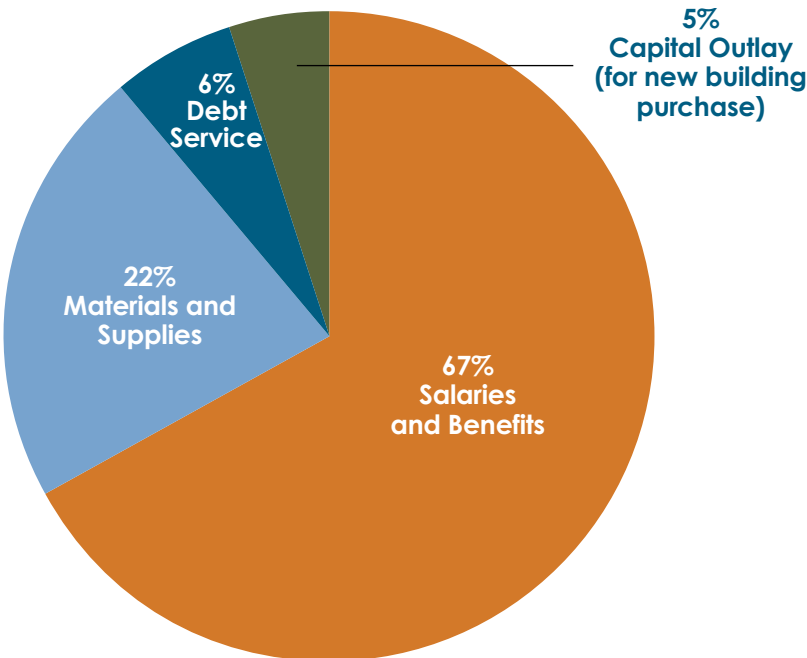


- 21** full-time staff
- 2** part-time staff
- 9** seasonal staff



View the full 2022-23 Annual Comprehensive Financial Report at www.smcvcd.org/ACFR.

Expenditures for Fiscal Year 2022-23



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, 2022.

This is the fifth 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
Accountant



Devina Walker
Office Administrator



Rachel Curtis-Robles, PhD
*Public Health Education
and Outreach Officer*



Matthew Nienhuis
*Information Technology
Director*



Paul Weber
*Facility Maintenance
Coordinator*

LABORATORY



Angie Nakano, MS
Laboratory Director



Arielle Crews, MS
Vector Ecologist



Tara Roth, PhD
Vector Ecologist



Theresa Shelton, MS
Laboratory Technician

OPERATIONS



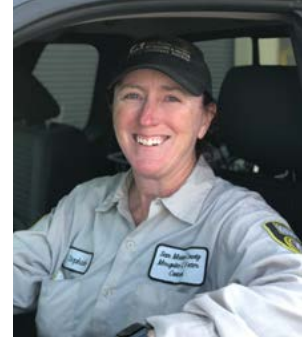
Casey Stevenson
Operations Director



Ryan Thorndike
Operations Supervisor



David Allen
Vector Control
Technician



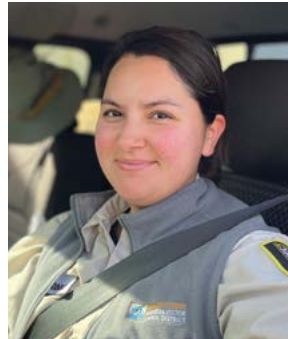
Stephanie Busam
Vector Control
Technician



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

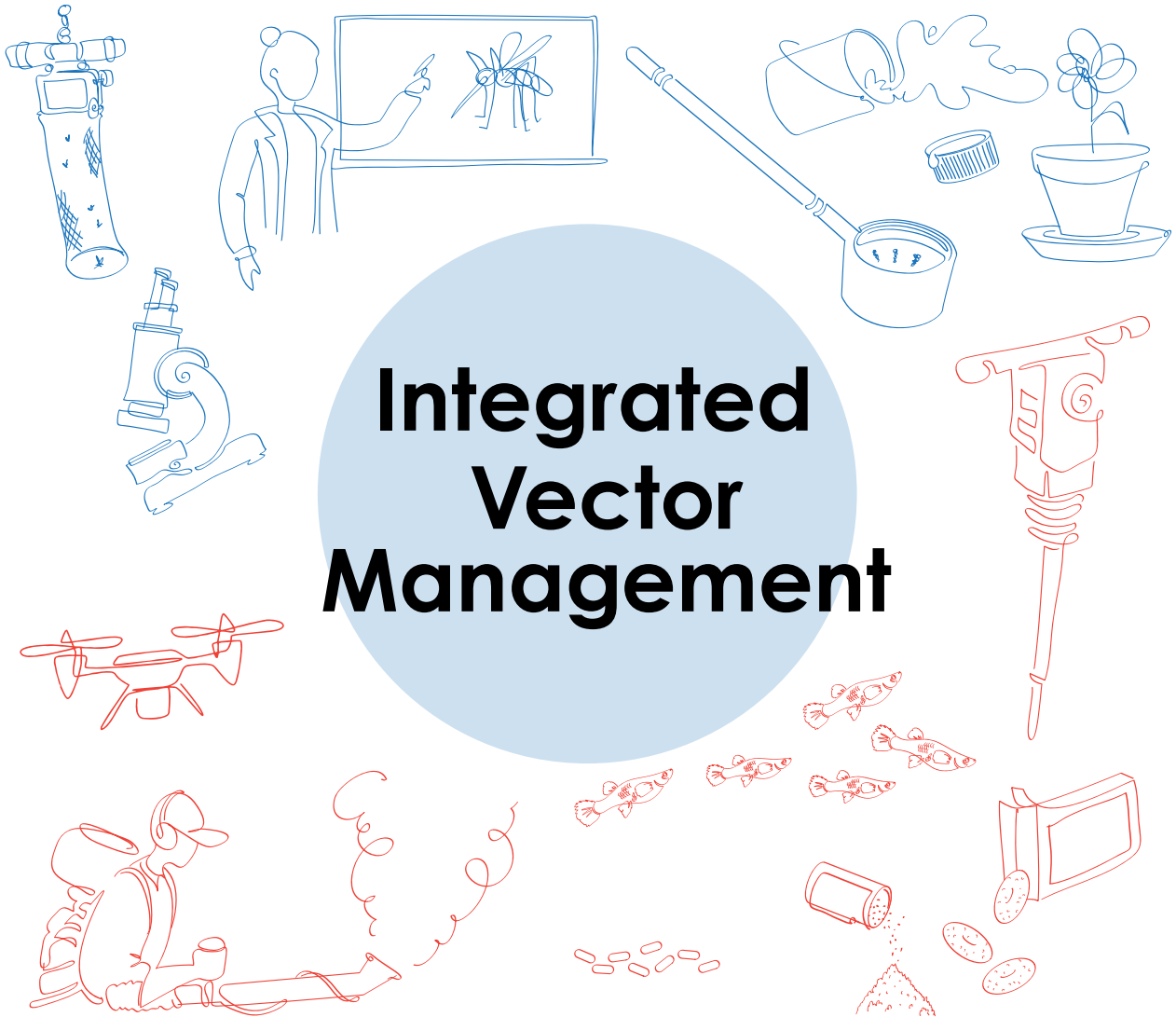
CORE MOSQUITO CONTROL SERVICES



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 Evan checks for mosquito larvae in marshwater using a dipper.

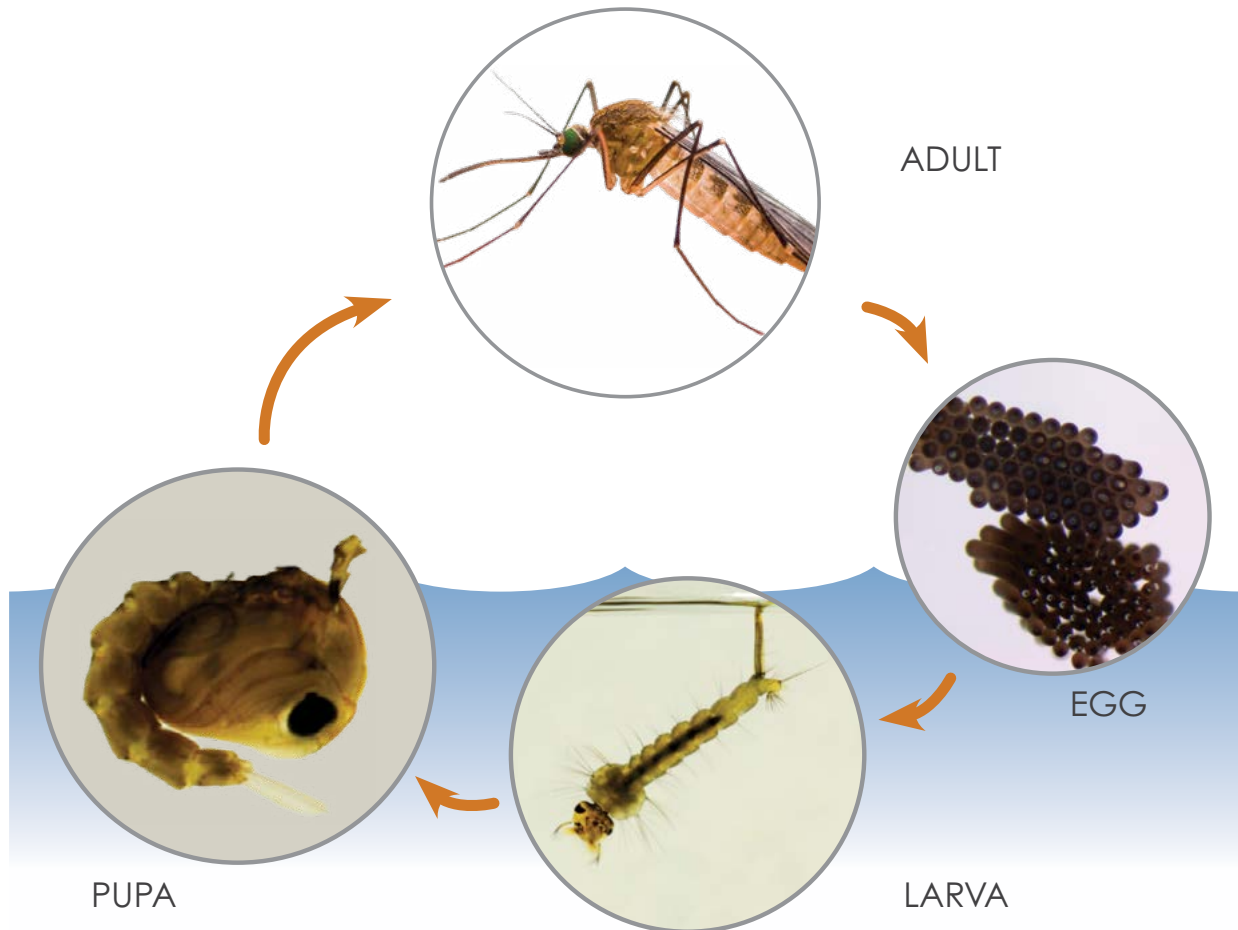
SURVEILLANCE

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.



The District maintains a colony of *Culex pipiens* 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 efficacy of larvicides. Adults are used to test efficacy of adulticiding treatments.

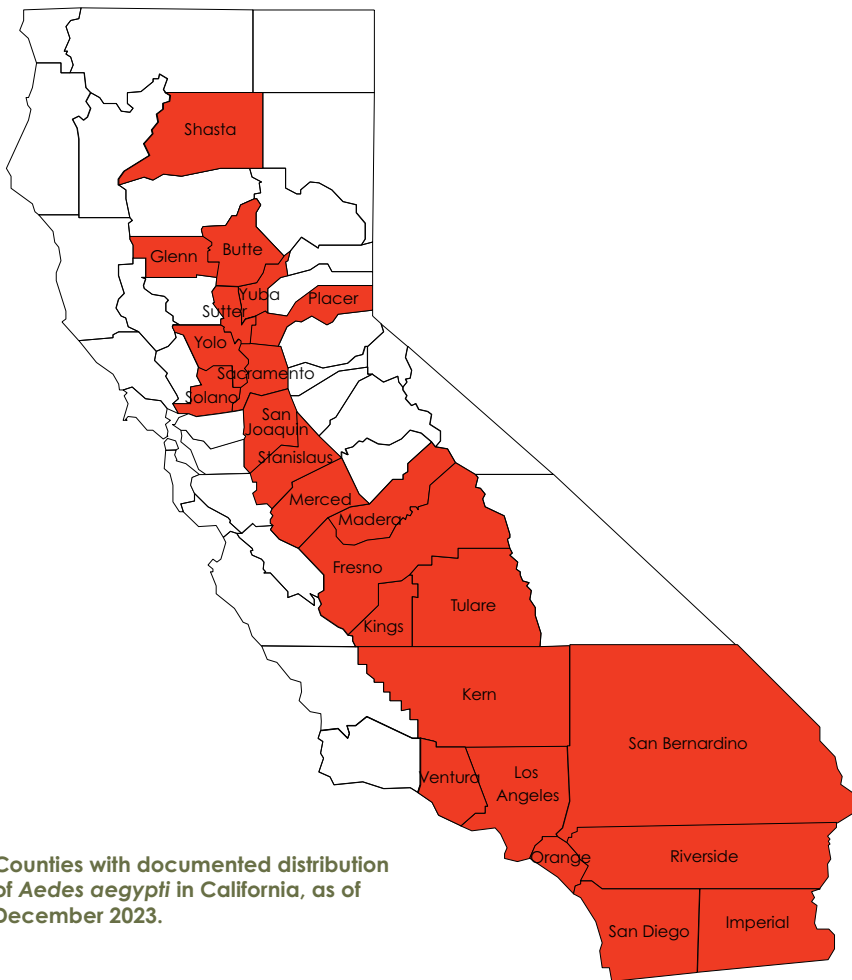
Laboratory Director Angie cares for the District's mosquito colony.

INVASIVE SPECIES

Aedes aegypti, a mosquito that can transmit dengue, chikungunya, yellow fever, and Zika virus, is rapidly spreading through California.

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. Staff set two kinds of traps for a total of over 18,300 trap-nights (many nights had multiple traps set throughout the County), and no evidence of *Aedes aegypti* invasions were detected.



Counties with documented distribution of *Aedes aegypti* in California, as of December 2023.



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



Actual Size: About 1/4 inch long



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 Paola was responsible for setting and checking thousands of traps throughout the County to check for *Aedes aegypti* eggs.

INVASIVE AEDES SURVEILLANCE

>18,000 trap nights

0 invasive *Aedes* infestations detected



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 1,510 carbon dioxide-baited traps (designed to capture adult mosquitoes), which collected 52,872 mosquitoes (yes, we counted every single one!). The 7,175 trapped *Culex* mosquitoes (which can transmit West Nile virus) were grouped into 497 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 2023.
- **Sentinel chickens.** Chickens do not become ill when infected with WNV, but antibodies can be detected in their blood after an infection. This year, District staff maintained 2 flocks of sentinel chickens for disease surveillance. The chickens were tested for WNV and other viruses every two weeks during the summer – a total of 93 tests. No chickens were positive for West Nile virus in 2023.
- **Public reports of dead birds.** A total of 348 dead birds were reported by the public; 84 of these appeared to have died within the previous 24 hours and were suitable for testing. West Nile virus was detected in 15 dead birds in 2023. Cities where positive dead birds were found included: Belmont (1), Burlingame (1), Foster City (1), Redwood City (1 in Redwood City; 3 in Redwood Shores area; 2 on the border of Redwood City and North Fair Oaks), San Carlos (1), and Menlo Park (5).



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



Two flocks of chickens support the District's efforts to detect West Nile virus.

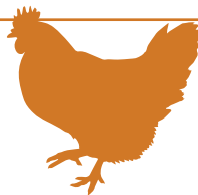
MOSQUITOES

52,872 trapped & counted
7,175 tested
0 positive for viruses



CHICKENS

2 flocks
93 samples tested
0 positive for West Nile virus



DEAD BIRDS

348 reported
84 testable
15 positive for West Nile virus



Laboratory Technician Theresa sets up a PCR panel to test for West Nile virus.

WEST NILE VIRUS ACTIVITY IN 2023, A DEEPER LOOK

Dead birds positive for WNV may indicate residents are at risk of acquiring WNV locally, and public reports of dead birds are helpful to our surveillance program. The public can report dead birds to CDPH Dead Bird hotline by calling **1-877-968-2473** or online at [westnile.ca.gov](https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Imz/Pages/DeadBird.aspx)

Not all birds are able to be tested – birds must have died relatively recently. Testable birds are collected by our District staff and tested for WNV. Since infected birds may have flown in from other areas and do not always indicate locally-infected mosquitoes, our response to finding WNV in a dead bird is multifaceted. We aim to control any mosquitoes in the area (by checking sources of standing water and encouraging residents to dump standing water) and detect any WNV circulating in local mosquito populations (by setting extra mosquito traps and testing those mosquitoes for WNV). If WNV is detected in local mosquito populations, we take additional measures to protect public health, such as mosquito adulticiding, additional WNV surveillance, and intensive public outreach.

Fifteen dead birds tested positive for West Nile virus in 2023.

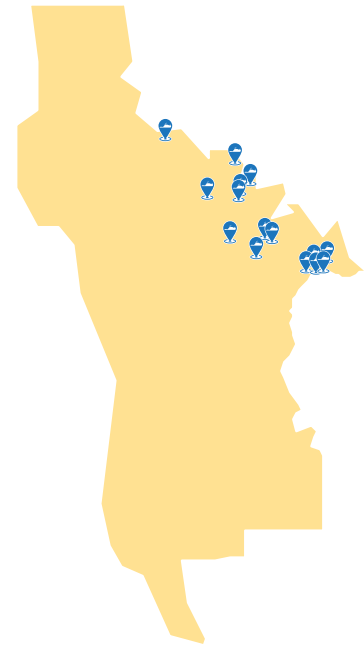
Year	Birds reported	Birds tested	Birds positive for WNV
2013	318	62	0
2014	502	147	21
2015	687	158	23
2016	529	111	15
2017	404	79	1
2018	409	127	5
2019	233	64	0
2020	244	85	1
2021	302	78	0
2022	262	64	0
2023	348	84	15

No West Nile virus positive mosquitoes were detected in 2023.

Year	Mosquitoes tested	Mosquito pools tested	Mosquito pools positive for WNV
2013	3,108	175	0
2014	3,525	436	15
2015	1,125	204	5
2016	717	241	5
2017	6	4	0
2018	1,296	131	2
2019	3,902	119	0
2020	2,350	267	0
2021	3,414	127	0
2022	2,891	159	0
2023	7,175	497	0



Corvids, like crows, ravens, and jays, are more likely to die from West Nile virus than many other kinds of birds. All 15 of the West Nile virus-positive birds in 2023 were American crows.



In 2023, West Nile virus positive birds were found in Belmont (1), Burlingame (1), Foster City (1), Redwood City (1 in Redwood City; 3 in Redwood Shores area; 2 on the border of Redwood City and North Fair Oaks), San Carlos (1), and Menlo Park (5).

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 2023. 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.

123
school presentations
in the 2022-2023
school year,
with over
2,600
students
and teachers
reached



Vector Ecologist Arielle shows curious children a live insect at a library event.



Our booth at the 2023 San Mateo County Fair included a feature of our equipment from throughout the history of the District.



Education Officer Rachel shows students how a mosquito trap works.

REPORT BITING MOSQUITOES

Your reports help us protect public health



650-344-8592
www.smcmvcd.org



Seasonal outreach staff Elizabeth assisted with summer outreach programming, including library and summer school events.

Outreach campaigns included social media graphics, print and online ads in newspapers, and postings on buses.

OPEN HOUSE

We were excited to restart our annual open house, after pausing for a few years due to the COVID-19 pandemic. Our 2023 Open House was held on a Saturday afternoon in August. 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 Stephanie relishes being 'mosquito for a day' during the open house.



Laboratory Technician Theresa displays a stick bug from our educational insect display.



Vector Control Technician Justin shared information about mosquitofish.



Office Administrator Devina welcomed people to our 2023 Open House.



Vector Control Technician Kim shared information about wildlife.



Seasonal staff Elizabeth shared information about EPA-registered insect repellent.

PHYSICAL, BIOLOGICAL, AND CHEMICAL CONTROL

A multi-component approach allows us to control mosquitoes in a variety of situation-dependent ways.

A robust surveillance program is key to quickly detecting mosquito issues. When mosquitoes are detected, we have a variety of tools in our IVM 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 or deepening sections of creeks to help water run, and other methods are examples of physical control. Manual deepening of channels in marshes to allow tide water to freely flow was an important part of mosquito control history; today our staff regularly check Bair Island marshes for larval mosquitoes to prevent mosquito breeding.

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.

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



Vector Control Technician Eric checks an unused trash can for mosquito larvae.



Eric dumps the standing water so that no mosquito breeding can occur – this is a form of physical control.



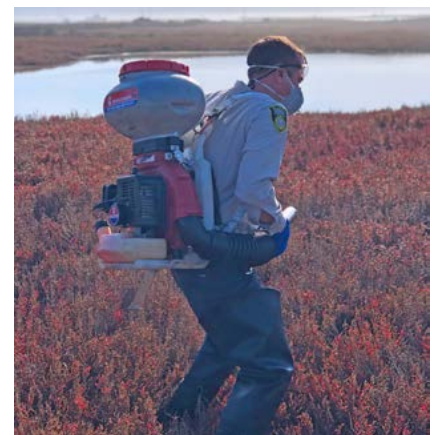
Mosquitofish are small but can eat hundreds of mosquito larvae every day.



Vector Control Technician Justin prepares mosquitofish for a resident.



Operations Supervisor Ryan checks a marsh for signs of mosquito breeding.



Once Ryan confirms that mosquito larvae are present, he prepares to treat the marsh to control the mosquitoes.

UNMANNED AERIAL SYSTEMS (DRONES)

In 2023, 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, we are working 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.

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

After exploring several options, the District purchased two drones. The smaller drone is 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 the area 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 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, 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.

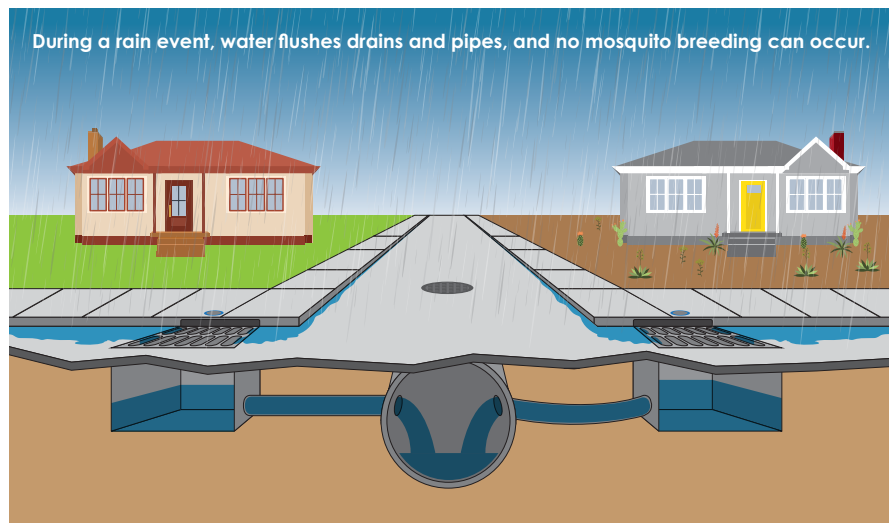
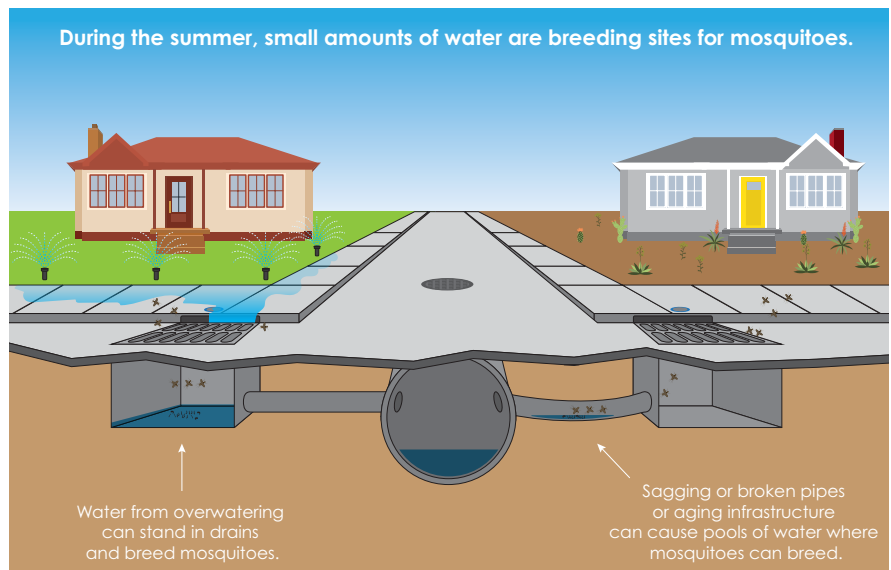
CATCH BASINS

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 prefers to 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.



During the summer of 2023, **34,298 storm drains** were checked every two weeks. Those with water were treated to prevent mosquito breeding, resulting in a total of **293,944 treatments**.

Our seasonal catch basin drivers



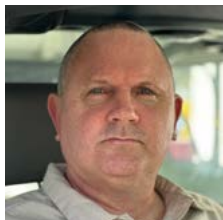
Bill Glasspole



Ric Peralta



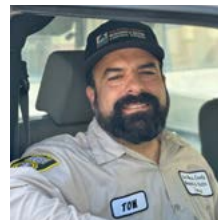
Everst Barillas



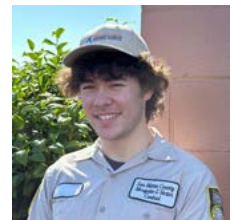
Chris Corbett



Steven Woodall



Tom Altieri



Galen Guo

WATER UNDER HOUSES

From late December 2022 through late January 2023, several 'atmospheric rivers' dropped record amounts of rain on California, including San Mateo County¹. While this weather pattern helped lift California out of a several year drought, it created major flooding issues throughout the state, including in parts of San Mateo County.

In particular, a storm on New Year's Eve 2022-2023 created flooding issues in several neighborhoods in the eastern part of the City of San Mateo. Our staff did neighborhood and door-to-door outreach to help residents check under their homes for standing water. We followed up with homes throughout the next few months to insure that standing water did not breed mosquitoes.

¹ <https://www.nesdis.noaa.gov/news/atmospheric-rivers-hit-west-coast>

Mosquitoes can be a sign of water under your house.

Schedule a visit so our technicians can check!

650-344-8592 • www.smcmvcd.org
Mosquito control is a taxpayer-funded service.

SAN MATEO COUNTY MOSQUITO & VECTOR CONTROL DISTRICT

Outreach on social media encouraged residents to call the District for assistance identifying water under their home.



Outreach to neighborhoods included signs in local parks.



Vector Control Technician Vanessa uses a manhole cover hook to lift a storm drain cover to check for clogs in the pipe.

RESIDENT SERVICE REQUESTS



SERVICE REQUESTS

Resident Services

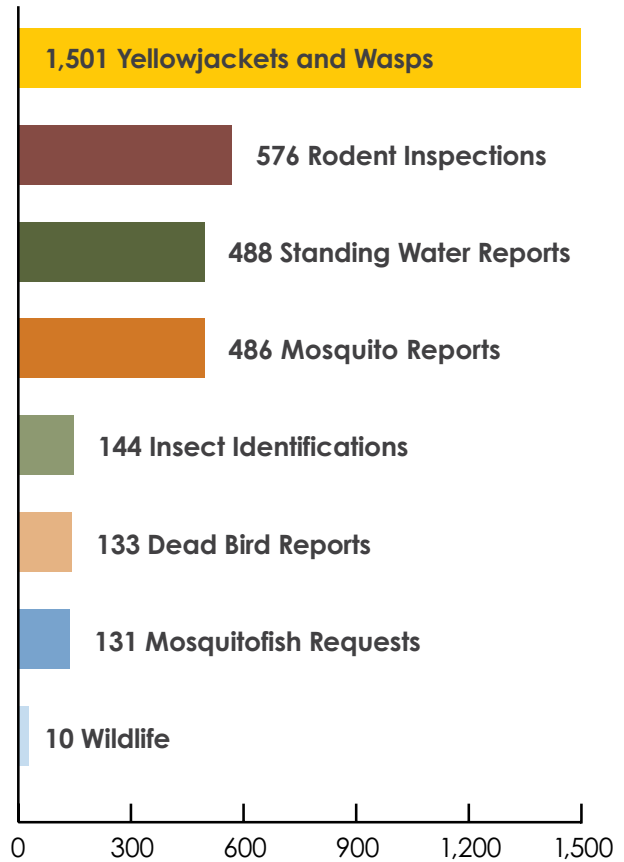
Residents can request a variety of services provided by the District. Staff typically visit the location within one business day to address the issue. If the issue is complex – such as mosquitoes coming from an unknown source – staff work diligently in the surrounding area to find and resolve the issue.

In 2023, 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!

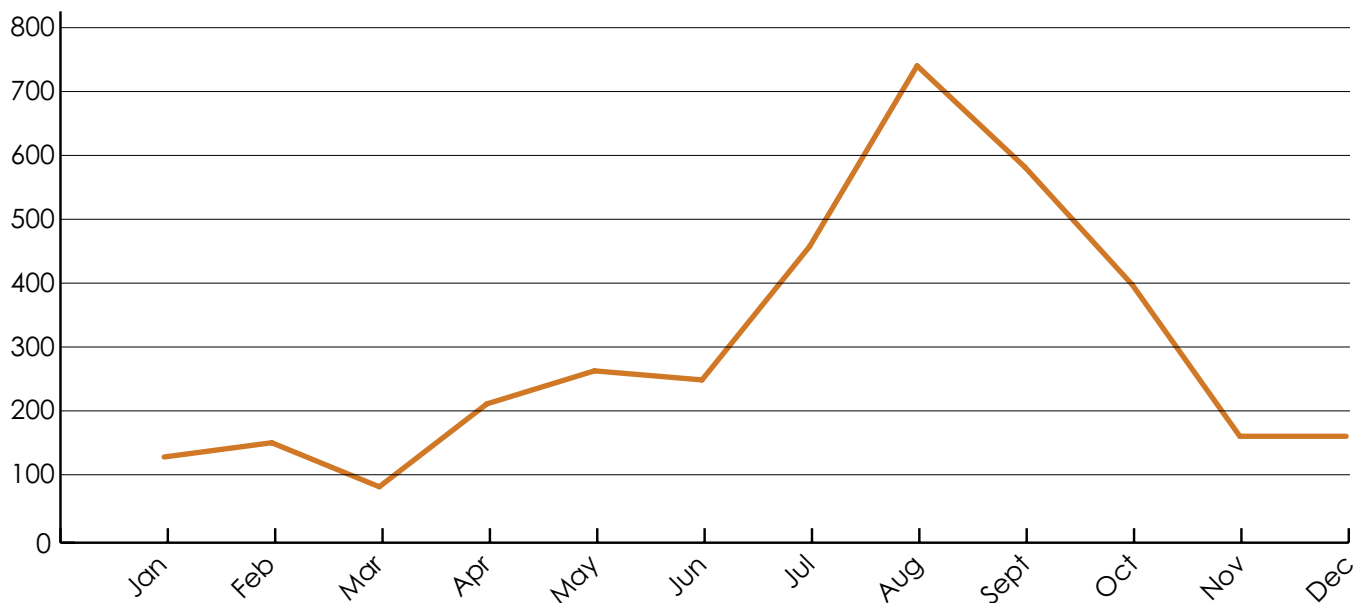
As in previous years, the majority of service requests were received over the summer, with a seasonal peak occurring during late summer as the area's warmest temperatures boosted mosquito populations and allowed yellowjacket and wasp activity to rise, resulting in hundreds of resident service requests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

To submit a service request, visit www.smcmvcd.org/request-service.

Major Categories of Services Requests in 2023



Service requests peaked in the warm summer months



<< Vector Control Technician Devon checks for a gap in a crawlspace vent opening during a rodent inspection at a resident's house.

Yellowjackets

During the summer months, one of the District's most requested services is the control of yellowjackets on private and public property. In 2023, the yellowjacket season was longer than previous years, resulting in yellowjacket activity well into the start of the school year. Many schools requested assistance in reducing yellowjacket numbers at their campuses, and the District created and shared specific information with school principals and facility managers to help with the issue.

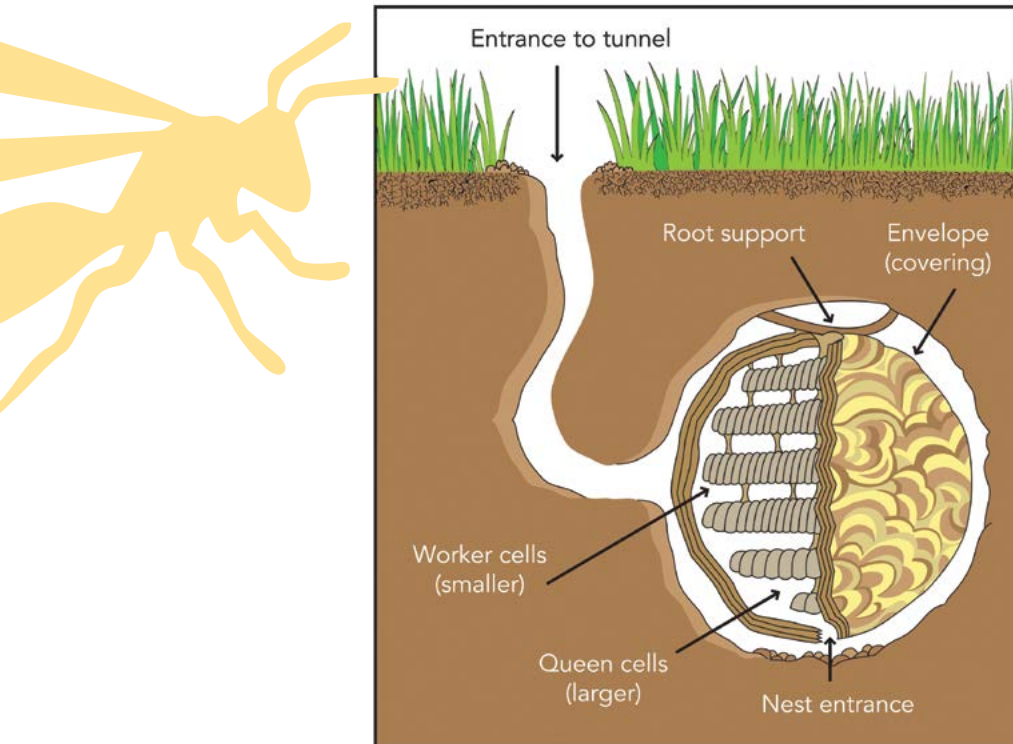
Yellowjackets are medium-sized black wasps with yellow markings. There are several species of yellowjackets: some build nests above ground in trees, or under the eaves of houses, others build nests below ground in burrows or holes. Yellowjackets are often very aggressive if their nest is disturbed.

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.

To learn more about yellowjackets and other kinds of wasps, visit www.smcmvcd.org/yellowjackets-and-wasps.



Operations Director Casey finds the entrance of a yellowjacket nest in the ground to apply an insecticide.



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



Vector Control Technician Walter brought back an interesting aboveground yellowjacket nest that had been built on a succulent stem.

Rodent Inspections

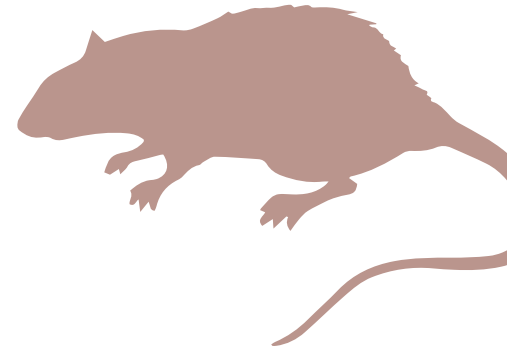
Rodents inspections are a popular service year-round, as residents request professional assistance in identifying how rats and mice may be entering their homes. Residents can request a District technician visit their property for an inspection that generates a helpful, customized report. The report lists 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.



Oils from rat fur are rubbed onto the surfaces they contact – rub marks are a sign that you might need a rodent inspection.

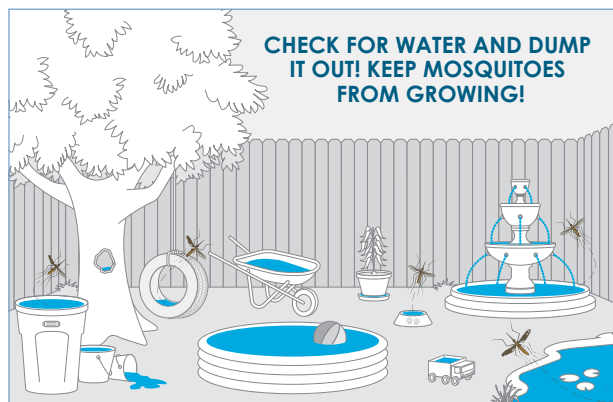


Mosquitoes and Standing Water

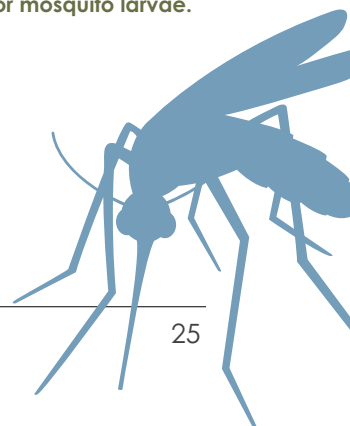
The District's core mosquito control work focuses on known and large standing water sources. When residents notice an usual number of mosquitoes around their home, they can request a technician visit to inspect and determine where the water source may be.

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 sources in the area to find the source and then control the mosquitoes using IVM.



Operations Supervisor Ryan checks a backyard fountain for mosquito larvae.



Mosquitofish

Mosquitofish (*Gambusia affinis*) are live-bearing fresh water fish. These small 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.



Mosquitofish can eat several hundred mosquito larvae a day.

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 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.
- 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.



Vector Ecologist Tara uses a dissecting scope to identify ticks.

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.

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



In 2023, District staff completed over 342 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

“Every vector control representative has been responsive, efficient, knowledgeable, helpful, pleasant, masterful in their craft, courteous, incredibly professional. I look forward to the time when I will need their services again!”

“Thank you for your wonderful public service for the health and safety of our community!”



“Our experience with the staff has always been great. Really great and friendly service. Thank you!!”

“Response was faster than expected and both results and communication were excellent.”

“We received quick response when we requested service. The employees have always been very helpful and accommodating.”

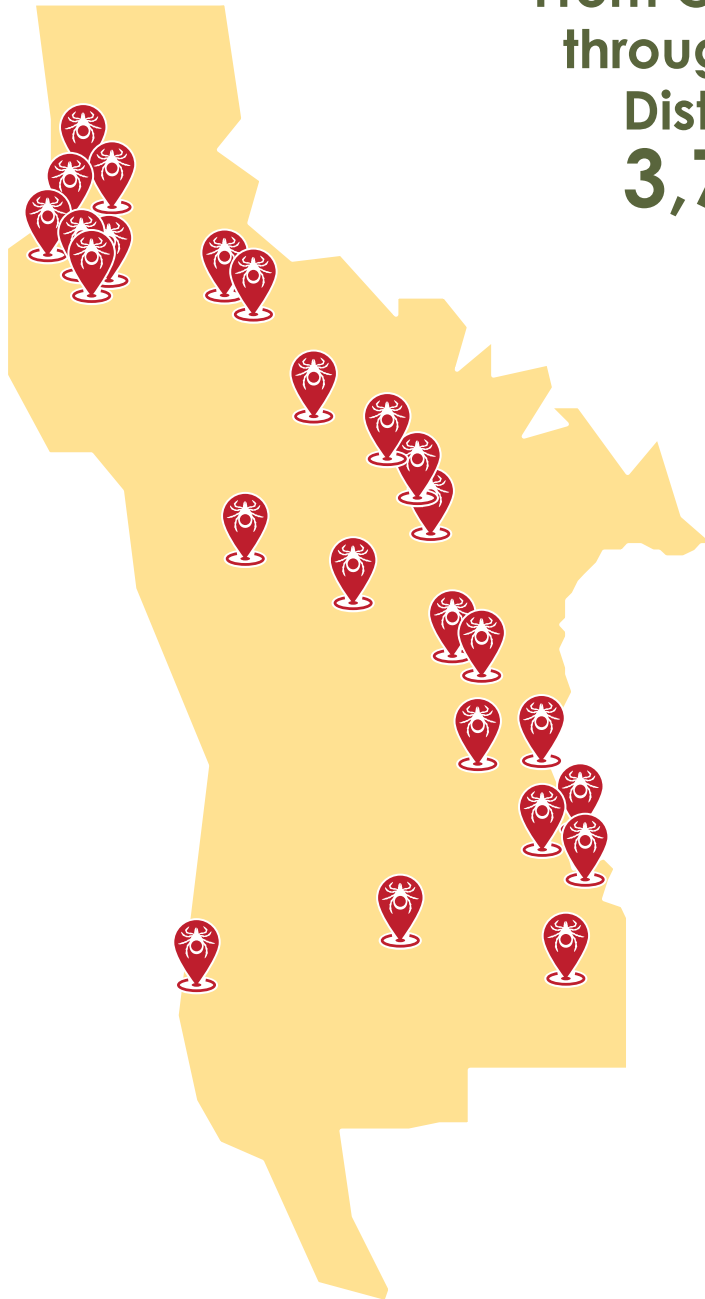
TICKS



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 2022
through September 2023,
District staff collected
3,743 ticks from
26 trail and park
locations in
San Mateo County**



In late 2022, the District started a multi-year project to assess residential backyards for ticks. Given proximity to large open spaces and natural areas (where ticks are more likely to occur), outreach to residents of Pacifica and Hillsborough were a priority for the pilot phase of the project. In addition, any resident of the County can request a check of their backyard for ticks, information about how to reduce ticks in their yard, and general tick bite prevention and safety. Between October 2022 and September 2023, staff visited over 130 residential properties as part of this project.

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. 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 per location, which increases the chance that our sample will represent the true prevalence.

ONCE TICKS WERE COLLECTED

Adult and nymphal ticks were grouped into 922 pools of 1-5 ticks and tested for 3 pathogens.

Based on the testing, staff determined minimum infection prevalences of:

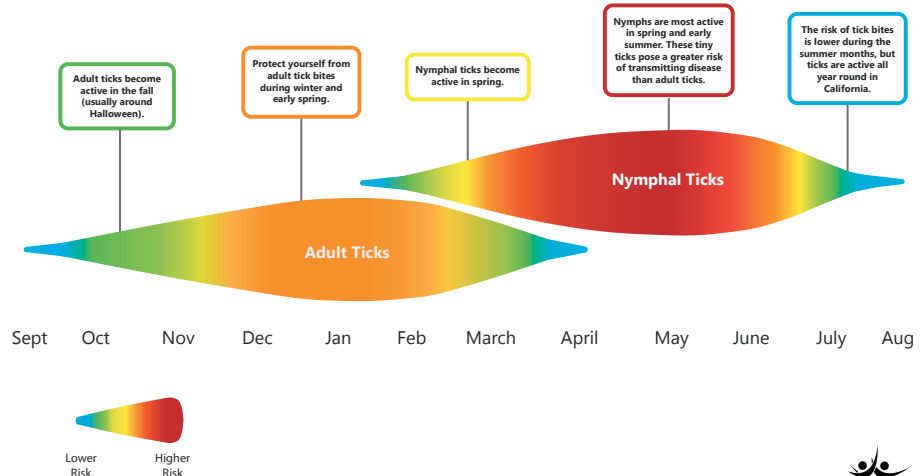
- ~1.36% for *Borrelia burgdorferi*, agent of Lyme disease
- ~0.95% for *Borrelia miyamotoi*, agent of *Borrelia miyamotoi* disease
- ~0.64% for *Anaplasma phagocytophilum*, agent of anaplasmosis

Checking for and properly removing ticks are important steps to reducing risk.

Learn more at www.smcmvcd.org/preventing-tick-bites.

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 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.

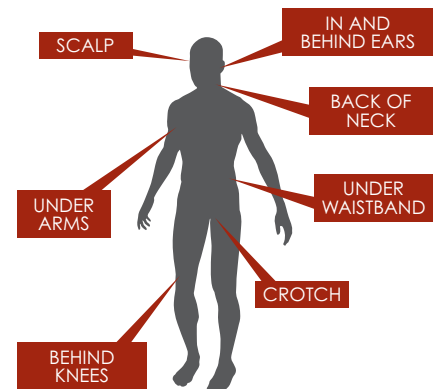
- Use fine-tipped tweezers to grasp the tick near the skin and pull steadily up.
- Do not twist or squish the tick. Do not burn or cover/smother the tick.
- After removing, wash the area with soap and water.
- Report any fever or rash that develops within the next 30 days to a health care professional.



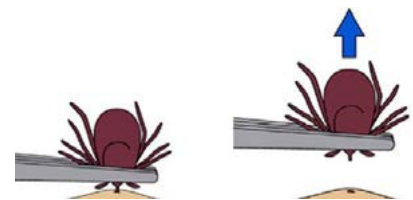
ACTUAL SIZE



Registered repellents have an EPA registration number on the package. Learn more at 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 18 years. In 2023, 36 acres of invasive cordgrass were treated in collaboration with California Coastal Conservancy.

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. 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

In 2008, San Mateo County turned over a large portion of residential rodent control responsibilities to the District. 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 2023, 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

Vector Ecologist Tara Roth presented a talk about tularemia ('Rabbit Fever at the Beach: Surfin' Safari') at the 2023 annual conference of the Society for Vector Ecology.

Laboratory Director Angie Nakano presented a talk entitled 'The San Mateo County MVCD Tick Program' at the 2023 annual conference of the Mosquito and Vector Control Association of California.

Vector Ecologist Arielle Crews co-authored a peer-reviewed publication: Salomon et al. 2023. [Macro-parasites and micro-parasites co-exist in rodent communities but are associated with different community-level parameters](#). *International Journal for Parasitology: Parasite and Wildlife*. 22: 51-19.

District staff were acknowledged in a peer-reviewed publication: Ismail et al. 2023. [Temperature and intraspecific variation affect host-parasite interactions](#). *Oecologia* 204: 389-399.



 **SAN MATEO COUNTY
MOSQUITO & VECTOR
CONTROL DISTRICT**
Protecting public health since 1916

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