



Annual Report 2022





Daly City

Brisbane

Colma

South San
Francisco

San Bruno

Pacifica

Millbrae

Burlingame

Hillsborough

Foster City

San Mateo

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 2022

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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 past 118 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 Walter treats a storm drain to prevent mosquito larvae from developing. Treating storm drains prevents *Culex pipiens*, the main West Nile virus vector in our County.

ABOUT THE DISTRICT





Manager's Note

Detections of invasive *Aedes aegypti* mosquitoes in nearby counties – Contra Costa County and Santa Clara County – in 2022 were a reminder of the threat of reintroduction of this species to our County. Invasive *Aedes* were last found in our County in 2013, but through close collaborations with the community, we eradicated it in 2015. Despite our eradication status, our ongoing detection program remains in place each year. Although we did not find *Aedes aegypti* in our County in 2022, we assessed our existing surveillance program, protocol, and outreach information. Read more about *Aedes aegypti* on page 14 of this report.

Throughout the 2021-2022 school year and into the summer of 2022 (in collaboration with San Mateo County's Big Lift program), staff visited over 150 classrooms totaling more than 3,000 students ranging from preschool to high school classes. The school program focused on educating students about the mosquito life cycle, the importance of dumping water from backyard sources, what mosquito larvae look like, and encouraging students to tell their parents/guardians to contact the District regarding mosquito issues at home. The program has been very well-received by teachers. Read more about our outreach program on page 15 of this report.

In order to develop the building acquired in 2021 at 1415 N. Carolan Ave, the Board and staff acknowledged the significance of enlisting the services of an architect proficient in architectural design and planning. We identified an architect with remarkable skills and experience with government clients and shared a common vision and values for our project. With their innovative perspective and expertise, we are confident the architect will play a crucial role in shaping and implementing our project, guaranteeing its accomplishment and satisfying the requirements of all stakeholders involved. Also, in 2022, the District received the Certificate of Achievement for Excellence in Financial Reporting from the Government Finance Officers Association (GFOA) for our Comprehensive Annual Financial Report for the fiscal year ending June 30, 2021. This significant recognition is a testament to the staff's and Board of Trustees' commitment to fiscal transparency and sustainability.

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 citizens 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.

2022 BOARD OFFICERS	CITY/TOWN REPRESENTED BY
<p>President Kati Martin</p> <p>Vice President Kathryn Wuelfing Lion</p> <p>Secretary Donna Rutherford</p> <p>Assistant Secretary Ross Graves</p>	AthertonMason Brutschy
	BelmontWade Leschyn
	Brisbane.....Carolyn Parker
	BurlingameRena Gilligan
	Colma.....Laura Walsh
	Daly City.....Glenn R. Sylvester
	East Palo AltoDonna Rutherford
	Foster City.....Paul Norton
	Half Moon BayKati Martin
	HillsboroughDr. D. Scott Smith
	Menlo ParkCatherine Carlton
	Millbrae.....Dr. Muhammad Baluom
	PacificaPeter DeJarnatt
Portola Valley.....Raymond Williams	
Redwood City.....Kathryn Wuelfing Lion	
San BrunoRobert Riechel	
San CarlosRoss Graves/Ron Collins	
San MateoEd Degliantoni	
San Mateo County, at Large.. Claudia Mazzetti/Dr. Desiree LaBeaud	
South San Francisco.....Michael Yoshida	
WoodsidePaul 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 smcmvcd.org/calendar.

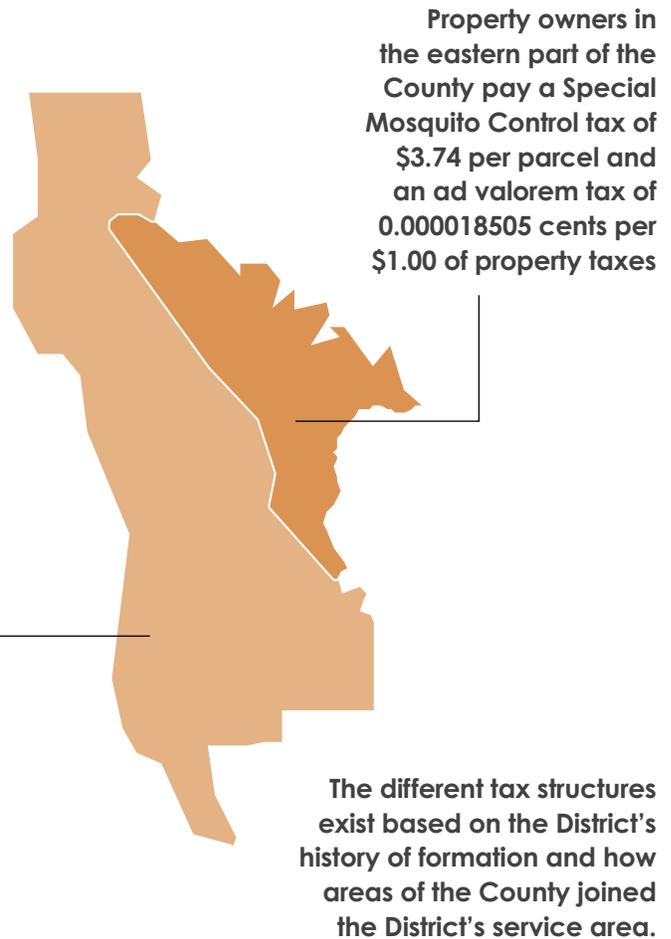


Our Financials

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 80% of operating revenue. Fiscal Year 2021-22 was an atypical year due to the financing to purchase a new building.

In Fiscal Year 2021-22, total revenue from all sources was \$10.1 million, including a one time Capital Lease financing in the amount of \$3.8 million for the purchase of a new building.



Revenue Sources for Fiscal Year 2021-22

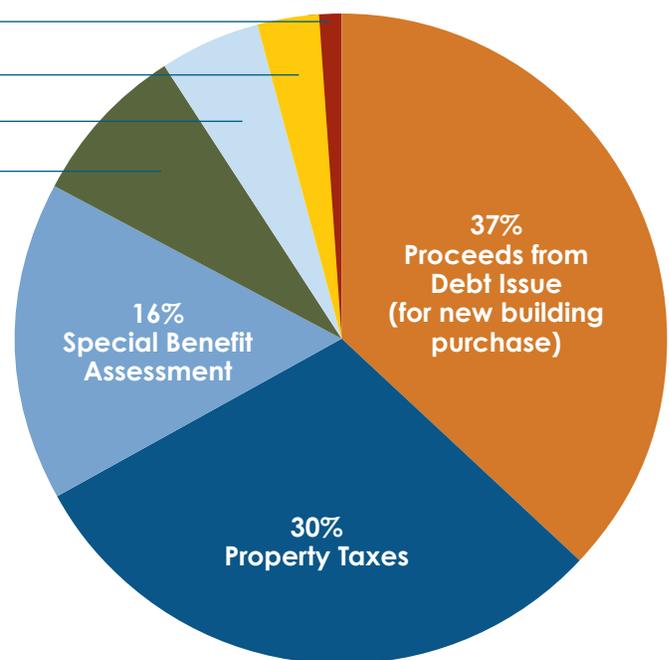
1% Other Revenue

3% Service Abatement Revenue

5% Special Mosquito Control Tax

8% Other Tax Revenue

Investment Earnings were negative in FY 2021-22



How Revenue is Used

Total annual operating expenditures for FY 2021-22 were \$12.6 million.

In 2022, the District purchased a building near the District's existing property and headquarters.

As is typical for local government agencies, apart from the building purchase, 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.

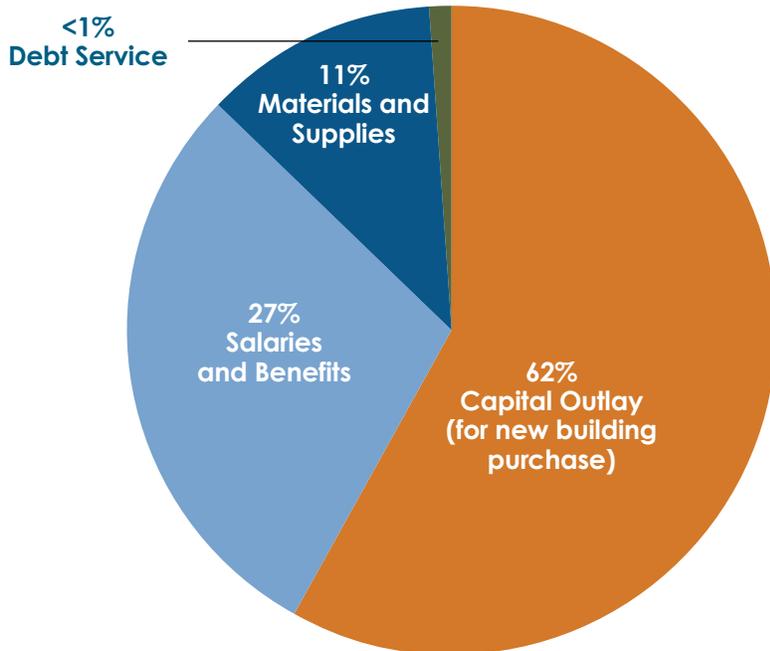
Field staff conduct inspections and choose from a variety of control strategies and tools depending on the conditions present at a given site. Field and Laboratory staff monitor vector populations by trapping vectors and identifying the species present.

In 2022, 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 2021-22. The ACFR for FY 2021-22 can be found on the District website at www.smcmvcd.org/ACFR.



View the full Annual Comprehensive Financial Report at www.smcmvcd.org/ACFR

Expenditures for Fiscal Year 2021-22



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



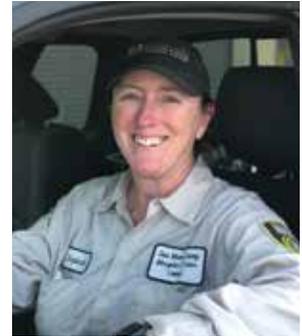
Casey Stevenson
Operations Director



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



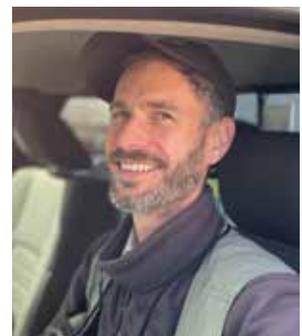
Kim Keyser
Vector Control Technician



Justin Lowman
Vector Control Technician



Devon MacDonald
Vector Control Technician



Evan Ostermann
Vector Control Technician

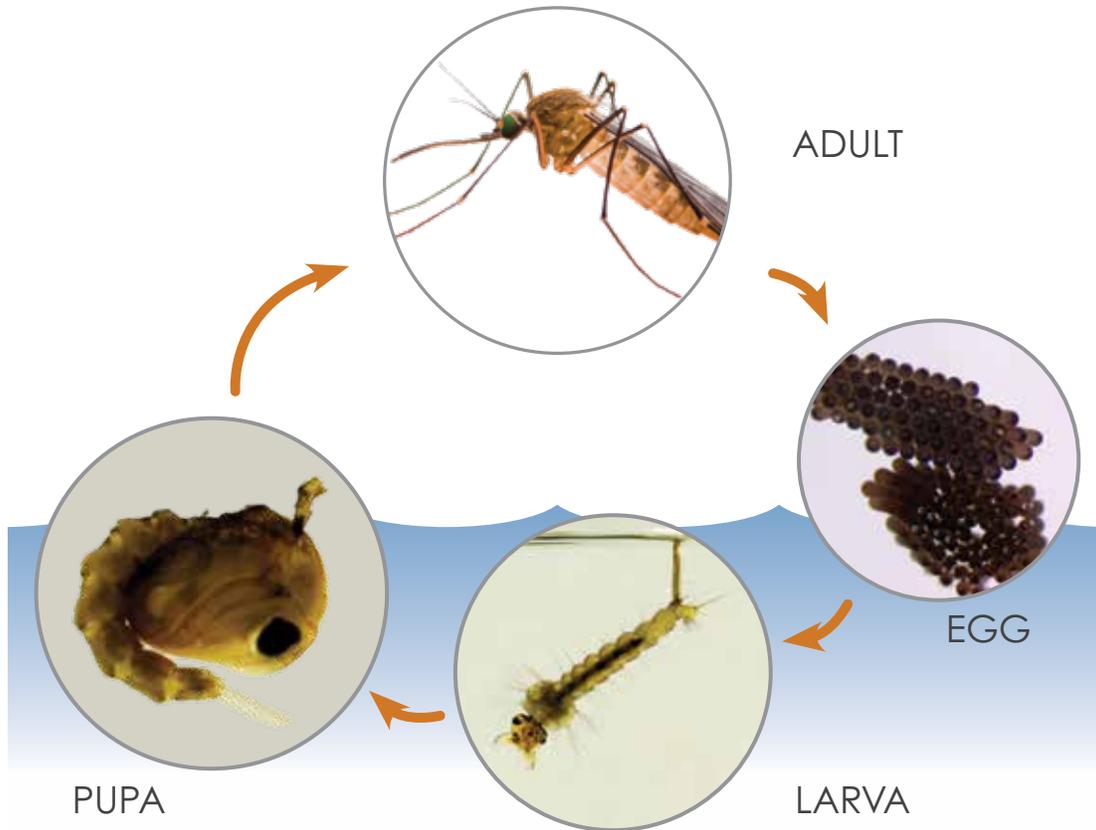
CORE MOSQUITO CONTROL SERVICES



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.

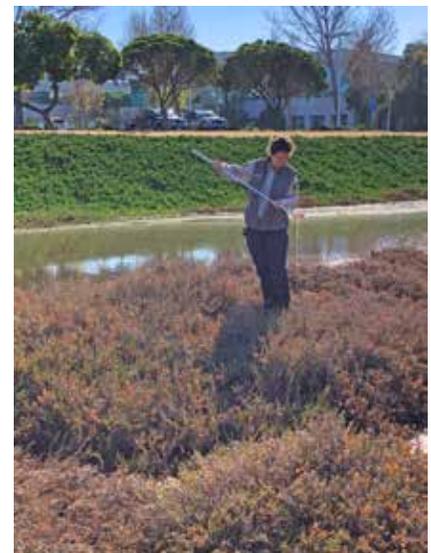
Our surveillance focuses heavily on sampling standing water to look for larvae. Preventing the further development of mosquito larvae is the most effective way to reduce mosquito populations.



Laboratory Director Angie tests a mosquito larvicide for effectiveness.



Vector Control Technician Evan checks for mosquito larvae in a container in a backyard.

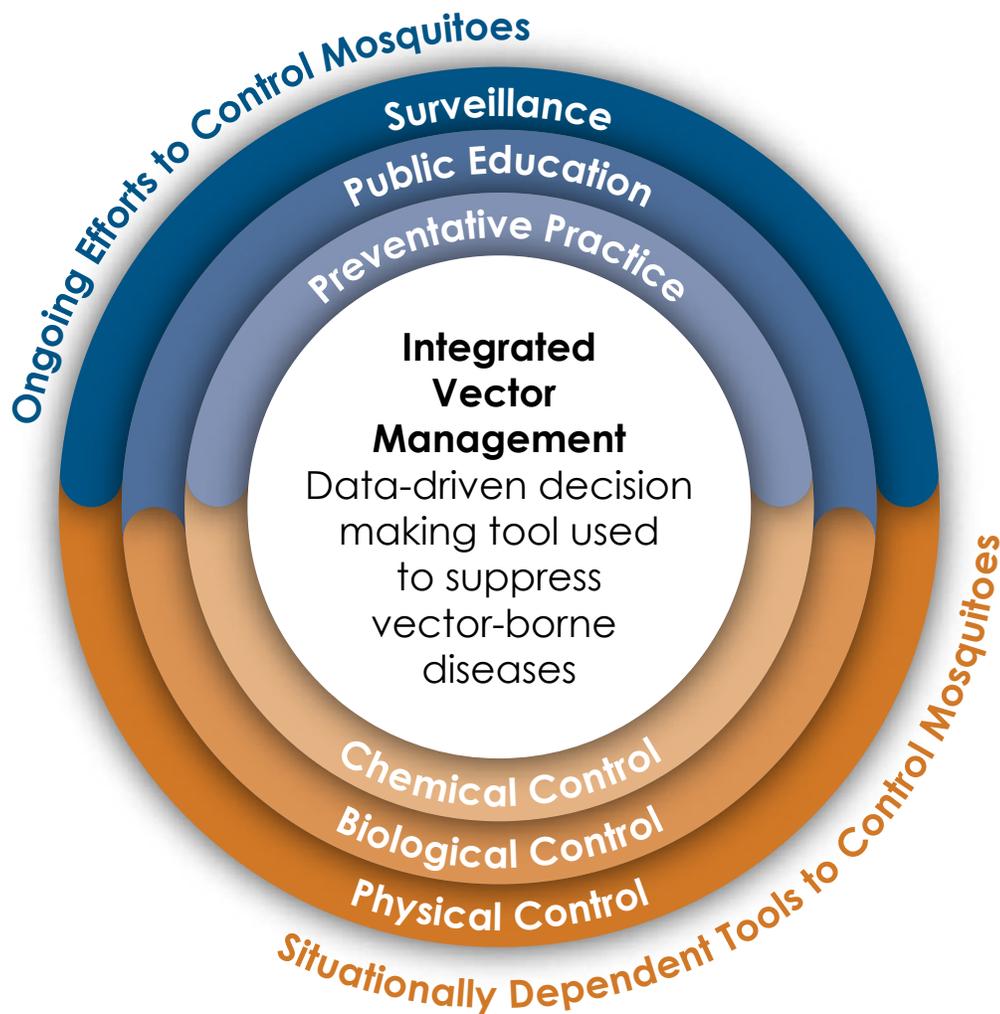


Vector Control Technician Kim checks for mosquito larvae in an area that holds water during the winter season.

<< Vector Control Technician David checks for mosquito larvae in a wetland area.

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.



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

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

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 1,470 carbon dioxide-baited traps (designed to capture adult mosquitoes), which collected 45,309 mosquitoes (yes, we counted every single one!). 2,890 mosquitoes were grouped into 158 pools for testing for West Nile virus and other mosquito-borne pathogens. No detections of West Nile virus occurred in San Mateo County in 2022.
- **Sentinel chickens.** Chickens do not become ill when infected with WNV, but antibodies can be detected in their blood after an infection. District staff maintained 2 flocks of surveillance chickens. The chickens were tested for WNV and other viruses every two weeks during the summer – a total of 182 tests. No chickens were positive for West Nile virus in 2022.
- **Public reports of dead birds.** A total of 262 dead birds were reported by the public; 59 of these appeared to have died within the previous 24 hours and were suitable for testing. No WNV was detected in any samples.



Vector Control Technician Stephanie sets a carbon-dioxide baited trap to capture adult mosquitoes to test for West Nile virus.



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

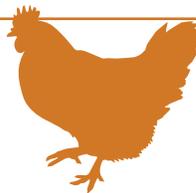
MOSQUITOES

45,309 trapped & counted
2,890 tested
0 positive for viruses



CHICKENS

2 flocks
182 samples tested
0 positive for West Nile virus



DEAD BIRDS

262 reported
59 testable
0 positive for West Nile virus



Vector Ecologist Theresa sets up a PCR panel 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. Although we did not detect *Aedes aegypti* in San Mateo County in 2022, it was detected for the first time in 2022 in Santa Clara County, Santa Cruz County, and Contra Costa 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.



Distribution of *Aedes aegypti* in California, as of December 2022.

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 15,000 trap-nights (many nights had multiple traps set throughout the County) and no evidence of *Aedes aegypti* was detected.



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 laboratory staff Grace Shaw was responsible for setting and checking dozens of traps throughout the County to check for *Aedes aegypti* eggs.

INVASIVE AEDES SURVEILLANCE

>15,000 trap nights

0 invasive *Aedes* detected



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 2022. 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.

155
school presentations
in the 2021-2022
school year,
with over
3,300
students
and teachers
reached



Vector Control Technician Vanessa tabled an informational booth at several events in 2022.



Our informational booth at the San Mateo County Fair.

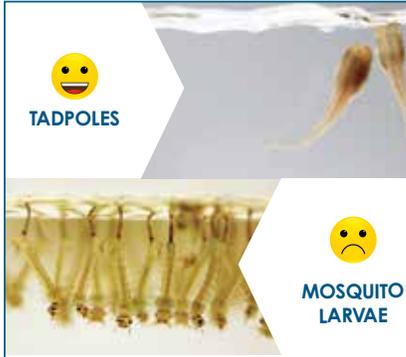


Viewing and drawing live larvae is part of the school presentation for upper elementary students.

ONE MOSQUITO IS ONE TOO MANY
Report even just **ONE** mosquito.



 650-344-8592
www.smcmvcd.org



DUMP OUT STANDING WATER TO PREVENT MOSQUITOES!
Not sure if you have tadpoles or larvae in your yard? Our experts can check! Call 650-344-8592

 www.smcmvcd.org

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

PHYSICAL, BIOLOGICAL, AND CHEMICAL CONTROL

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

A robust surveillance system 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 issues 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 unkept 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 only applied 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.



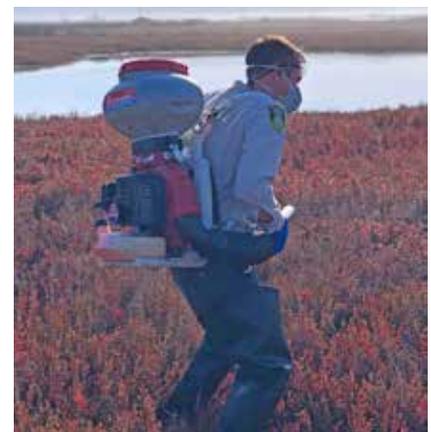
Mosquitofish are small but can eat hundreds of mosquito larvae every day.



Vector Control Technician and Mechanic Sean 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.

CATCH BASINS

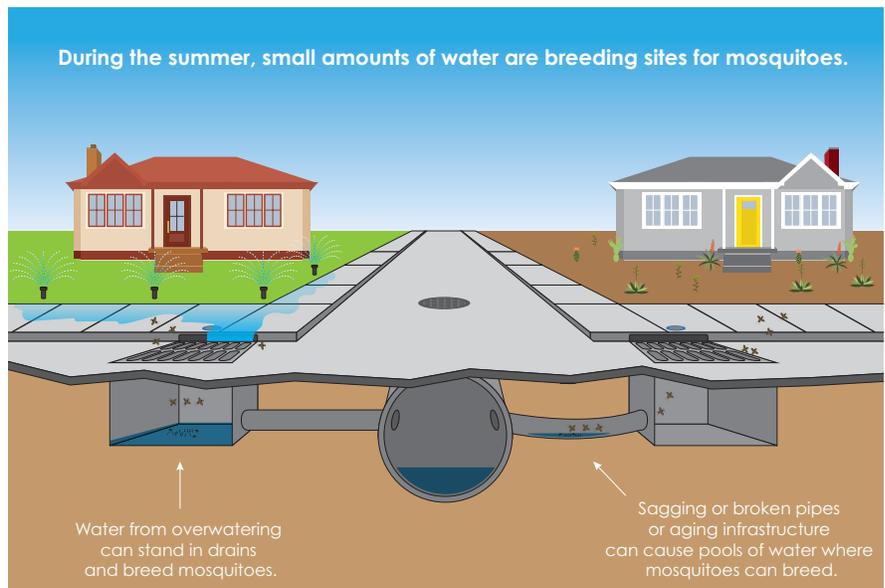
Storm drain systems contain “catch basins,” which are designed to catch sediment and may have a sump area which is lower than the rest of the drainage system.

During winter months, storm drain systems are flushed out regularly by winter rainstorms. However, during the summer, water collects in the basins when residents water their lawns or wash their cars. This underground water stands long enough for mosquitoes to breed in catch basins.

There are over 34,000 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 2022, **34,298 storm drains** were checked every two weeks. Those with water were treated to prevent mosquito breeding, resulting in a total of **243,904 treatments**.



Our seasonal catch basin drivers



Bill Glasspole



Ric Peralta



Everst Barillas



Aleksy Leschyn



Chuck McAllister



Fabian Garfias

RESIDENT SERVICE REQUESTS



SAN ANTONIO
MOSQUITO & WEED
CONTROL DISTRICT

SAN ANTONIO
MOSQUITO & WEED
CONTROL DISTRICT

SERVICE REQUESTS

Resident Services

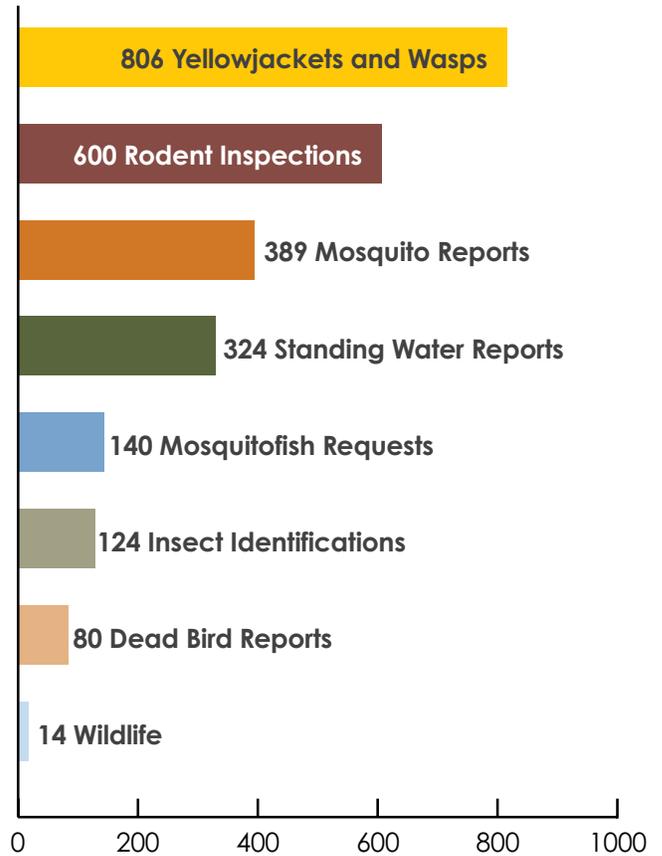
Residents can request a variety of services provided by the District. Staff typically visit the location within one business day to address the issue. If the issue is complex - such as mosquitoes coming from an unknown source - staff work diligently in the surrounding area to find and resolve the issue.

In 2022, 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!

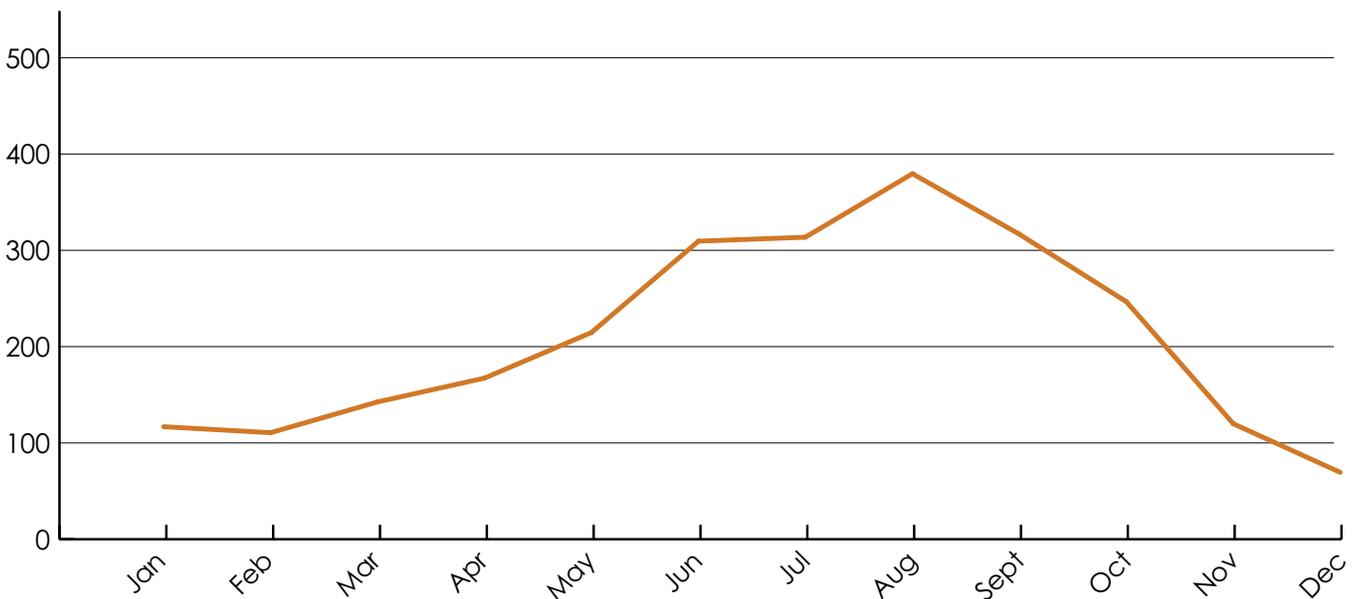
As in previous years, the majority of service requests were received over the summer, with a seasonal peak occurring during late summer as the area's warmest temperatures boosted mosquito populations and allowed yellowjacket and wasp activity to rise, resulting in hundreds of resident service requests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

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

Major Categories of Services Requests in 2022



Service requests peaked in the warm summer months



<< Vector Control Technician Devon checks for water in the far corner of a crawl space by peering through the screened vent.

Yellowjackets

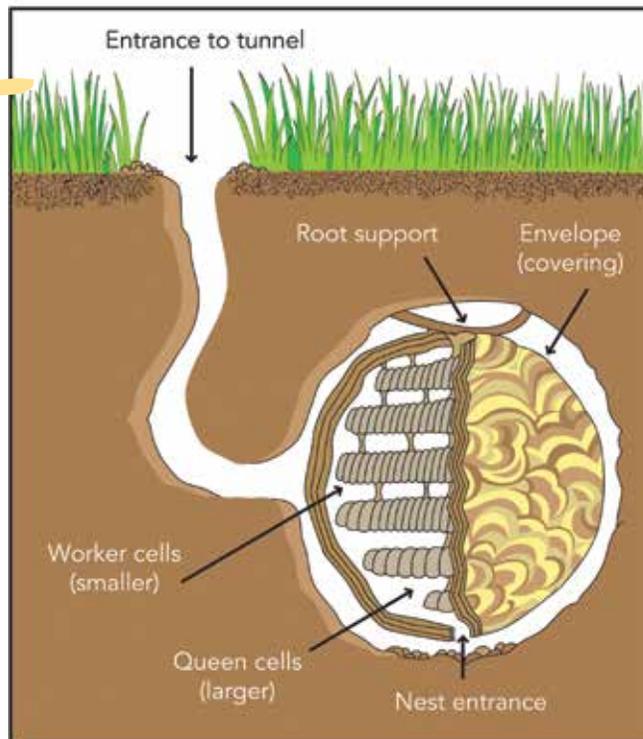
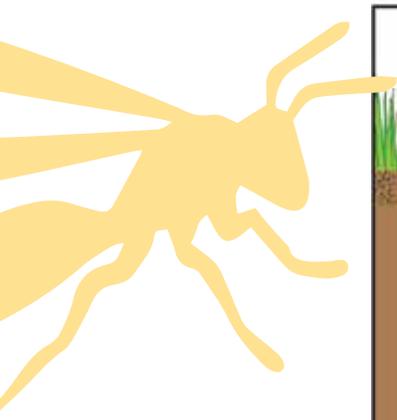
During the summer months, one of the District's most requested services is the control of yellowjackets on private and public property. Yellowjackets are medium-sized black wasps with yellow markings. There are several species of yellowjackets: some build nests above ground in trees, or under the eaves of houses, other 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



This small yellowjacket larva is likely just one of thousands in a large yellowjacket nest.



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



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



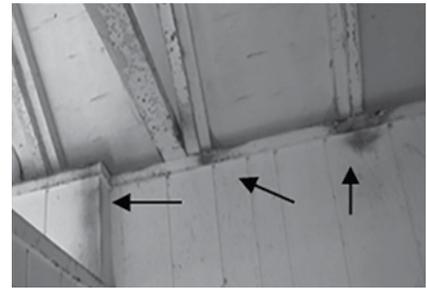
Operator Supervisor Ryan trims vegetation to access an underground yellowjacket nest.

Rodent Inspections

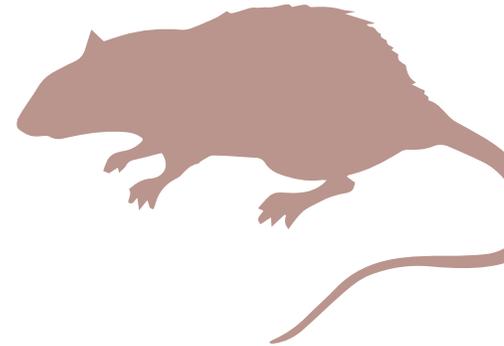
Rodents inspections are a popular service year-round, as residents request professional assistance in identifying how rats and mice may be entering their homes. Residents can request a District technician visit their property for an inspection that generates a helpful, customized report. The report lists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

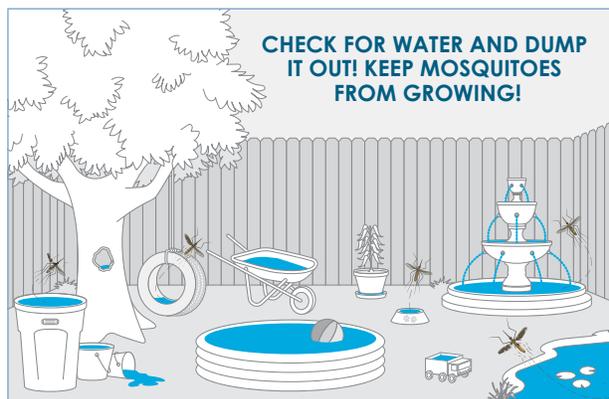


Mosquitoes and Standing Water

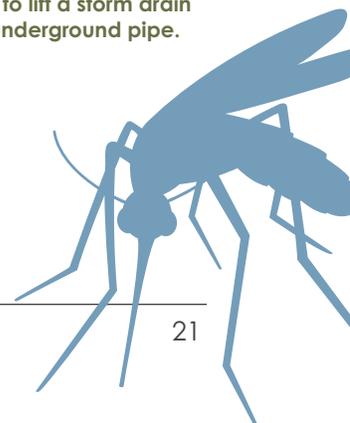
The District's core mosquito control work focuses on known and large standing water sources. When residents notice an usual number of mosquitoes around their home, they can request a technician visit to inspect and determine where the water source may be.

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 Director Casey uses a specialized magnet to lift a storm drain cover to check an underground pipe.

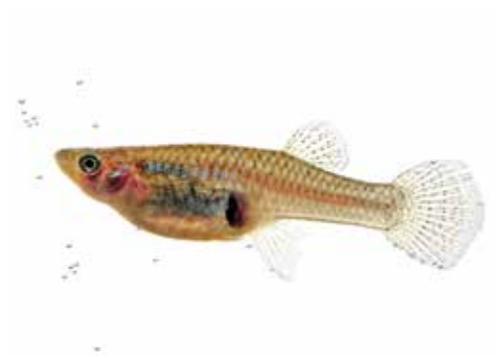


Mosquitofish

Mosquitofish (*Gambusia affinis*) are live-bearing fresh water fish. These small fish are only 1-2 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 2022, District staff completed over 280 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

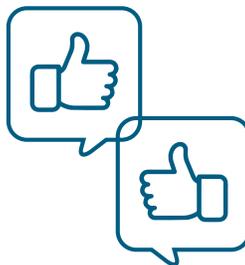
Residents' Remarks

“Every vector control employee I have encountered has been friendly, knowledgeable and enthusiastic about their work.”

“Awesome services and website, excellent employees- thanks for all you do to keep us all healthy and safe.”

“Excellent and timely service!”

“Very prompt and good service.”



“Great job! We really appreciated the information and help!”

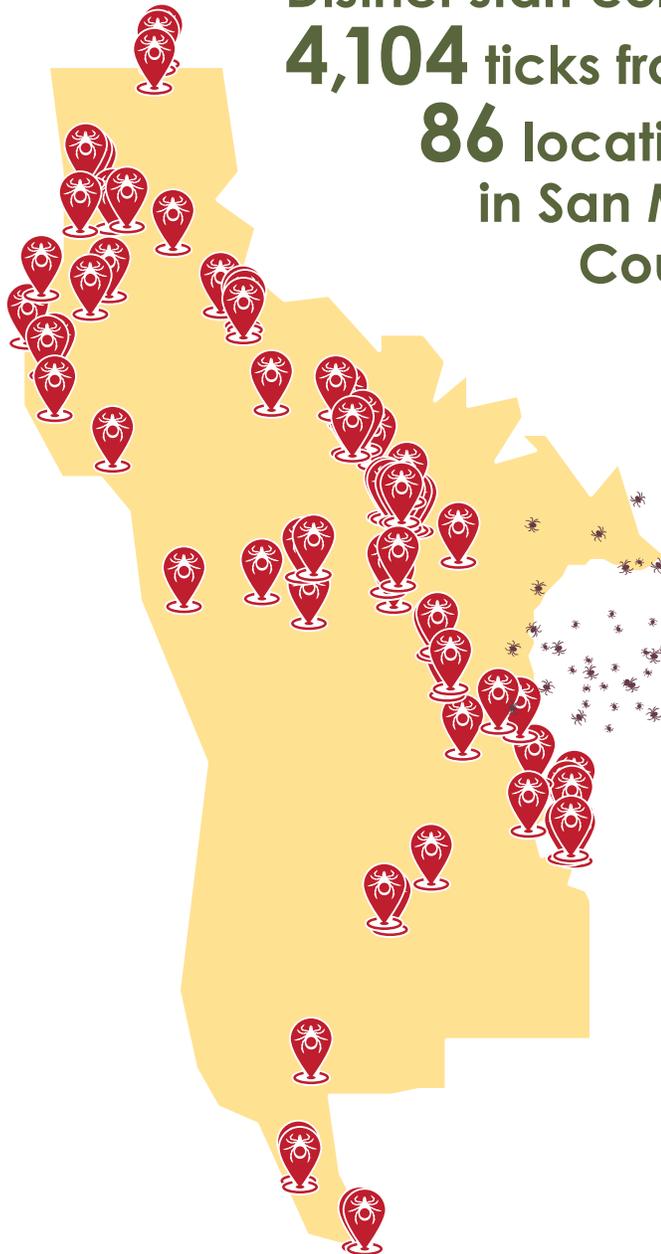
TICKS



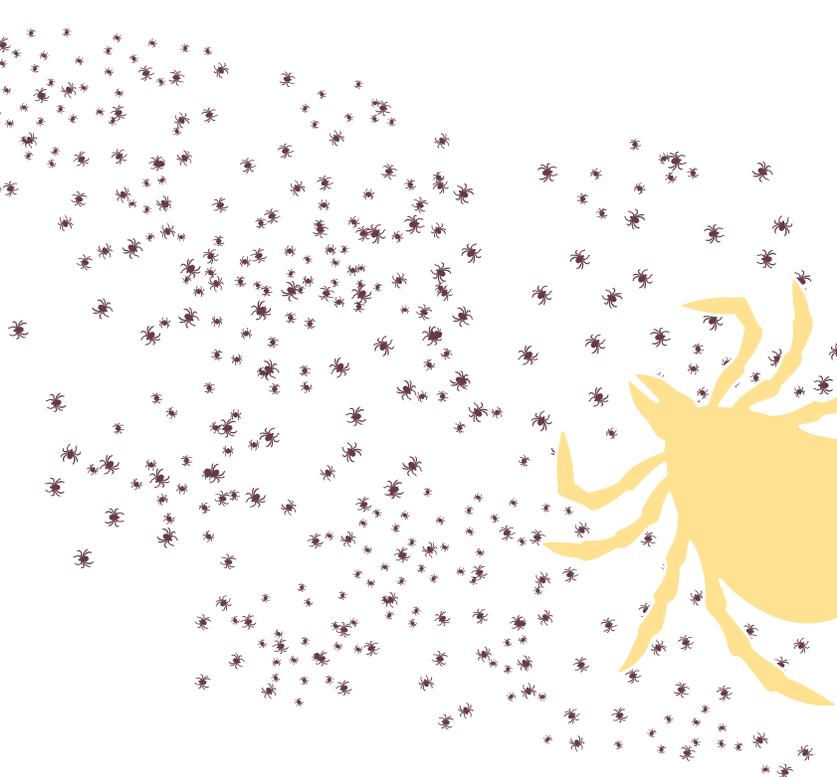
TICK SEASON

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 2021
through September 2022,
District staff collected
4,104 ticks from
86 locations
in San Mateo
County**



Vector Ecologist Arielle picks ticks off a white cloth after collecting questing ticks from along a trail edge.



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 982 pools of 1-5 ticks and tested for 3 pathogens.

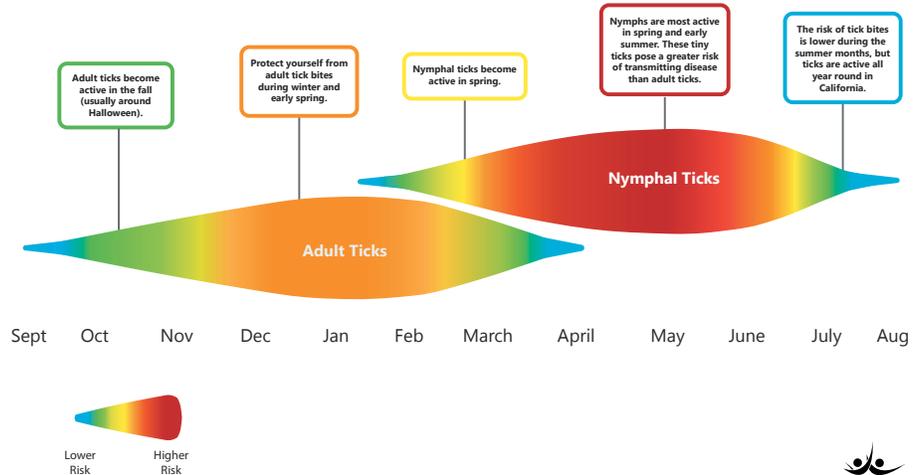
Based on the testing, staff determined minimum infection prevalences of:

- ~0.98% for *Borrelia burgdorferi*, agent of Lyme disease
- ~1.2% for *Borrelia miyamotoi*, agent of *Borrelia miyamotoi* disease
- ~0.5% for *Anaplasma phagocytophilum*, agent of anaplasmosis

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

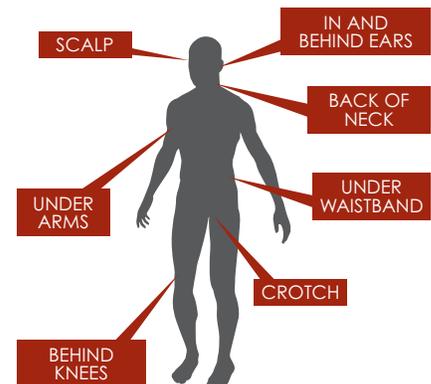
PROPERLY REMOVE TICKS

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.

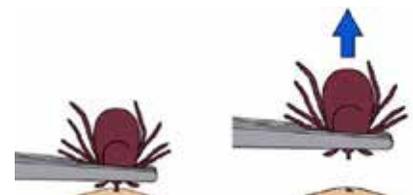
- Use fine-tipped tweezers to grasp the tick near the skin and pull steadily up.
- Do not twist or squish the tick.
- After removing, wash the area with soap and water.
- Report any fever or rash that develops within the next 30 days to a health care professional.



Registered repellents have an EPA registration number on the package. Learn more at epa.gov/insect-repellents



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

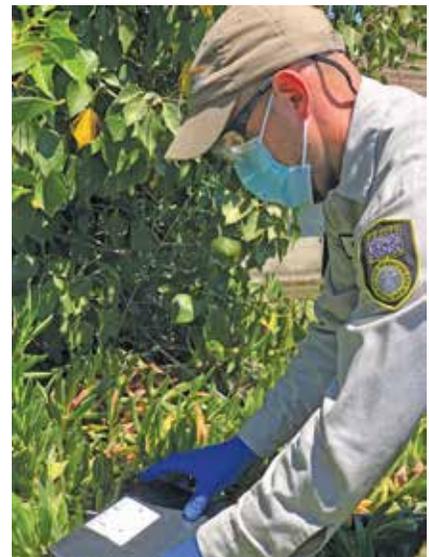
RODENT CONTROL IN SEWERS AND CREEKS

In 2010, 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 2022, 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. This work totaled 229 technician-hours for 2022.

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.

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.



Vector Control Technician Eric checking a tamper-proof bait station.



Operations Supervisor Ryan is one of our boat pilots.



36 acres of
invasive cordgrass
were treated in
collaboration with
California Coastal
Conservancy

2022 HAPPENINGS

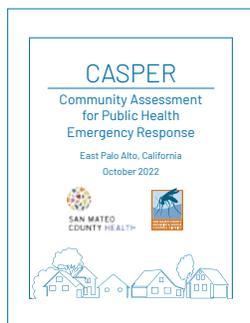


In summer 2022, the District was pleased to have Janelle, a local high school student, intern as part of the Youth Empowerment, Entrepreneurship, and Employment program that is a collaboration

among the San Mateo County Office of Education, Youth Leadership Institute, and Peninsula Conflict Resolution Center.

Janelle assisted with youth outreach programs; her roles included preparing materials and assisting with presentations and activities about the mosquito life cycle.

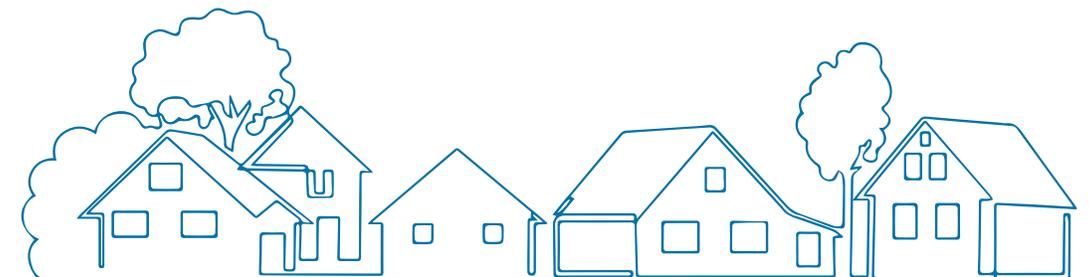
CASPER SURVEY



In October of 2022, the District together with San Mateo County Health conducted a Community Assessment for Public Health Emergency Response (CASPER) survey in East Palo Alto. The survey included questions about

vector control, climate change, emergency preparedness, and health-related issues.

176 households were randomly select in East Palo Alto to participate in the survey. Results will be published in a separate report.



PUBLICATIONS

In 2022, District staff co-authored the following publications:

- Arielle Crews was a co-author on 'Local Community Composition Drives Avian *Borrelia burgdorferi* Infection and Tick Infestations' (*Vet Sci* 2022, 9(2), 55)
- Tara Roth, Arielle Crews, and Angie Nakano co-authored 'Five Years of Surveillance for Tularemia Serovar B (*Francisella tularensis holarctica*) (Olsufjev) (Thiotrichales: *Francisellaceae*) Including Two Human Cases at an Endemic Site in San Mateo County, CA' (*J Med Ent* 2022, 59(5), 1787)

District staff presented at two 2022 conferences:

- At the 2022 MVCAC Annual Meeting:
 - Angie Nakano (co-authors Tara Roth and Theresa Shelton) presented 'The Trials and Tribulations of an Itch Mite Investigation'
 - Tara Roth (co-authors Arielle Crews and Angie Nakano) presented 'Surveillance for Type B Tularemia Coinciding with Two Human Cases of the Disease at an Endemic Site in San Mateo County, CA.'
 - Arielle Crews (co-authors Tara Roth, Theresa Shelton, Angie Nakano) presented a poster entitled 'Utilizing Conventional PCR and Sanger Sequencing to Enhance Surveillance.'
- At the 2022 Entomological Society of America Annual Meeting, Tara Roth presented 'Sun, Surf and Tick-borne Disease: Tularemia on the California Coast.'

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.
www.smcmvcd.org