

2024–2025 Contra Costa County Civil Grand Jury

Contra Costa Mosquito and Vector Control “The Good Guys on Your Side”

Report 2504
May 15, 2025


Approved by the Grand Jury


Peter Appert
GRAND JURY FOREPERSON

Date

5/21/25

Accepted for Filing


Hon. Terri Mockler
JUDGE OF THE SUPERIOR COURT

Date

5/19/25



SUMMARY

Mosquitos are the world's deadliest creatures. According to the Centers for Disease Control and Prevention (CDC), mosquitos kill more people than any other creature on Earth by spreading diseases like malaria, dengue fever, West Nile, yellow fever, Zika, and chikungunya. These diseases kill, sicken, disable, and cause birth defects. Local and national media have reported on the West Nile Virus, which is carried by the common *Culex* mosquito, since 1999, when it was discovered in the United States. But not as well-publicized is that the dangerous disease-carrying mosquitos, *Aedes aegypti*, were first discovered in Contra Costa County in 2022. These small, black mosquitos are recognized by black and white stripes on their backs and legs. They are aggressive daytime biting mosquitoes that can carry dengue fever, Zika, chikungunya, and yellow fever.

And the frightening reality is that these mosquitos are here in California to stay. They are our new neighbors, and they like to bite. Eradication is no longer feasible; suppression is now the only attainable goal.

Luckily, Contra Costa County has a well-run Mosquito and Vector Control District (MVCD). The problem is that county residents largely do not know about the MVCD, or they do not know what services the MVCD provides. The MVCD needs the public's help and support to meet its public health goals.

How can the public help the “good guys”—the MVCD—to do its job? They can identify and report invasive mosquitos. In Martinez in 2022, the *Aedes* danger was quickly eliminated by MVCD because a resident reported *Aedes* mosquitos before they spread to a wide area. So, too, in Antioch, a resident reported unusual day-biting mosquitos. That report was instrumental in the MVCD's large scale effort to curtail the spread of *Aedes* in Antioch in 2024.

But in May 2025, *Aedes* mosquitos were again discovered breeding in Antioch. This illustrates the need for consistent diligence in taking steps to prevent continued growth and spread.

Public awareness is an essential first step in stopping the spread. The MVCD needs residents to report suspected *Aedes* mosquitos and to be at the forefront of the fight by learning how to eliminate breeding in their yards and homes.

City leaders, schools, and other local organizations need to be supportive of the MVCD and assist in that effort. In that way, mosquito and other vector-borne diseases can be controlled before they cause widespread and difficult to stop outbreaks. An ounce of prevention is worth a pound of pesticide!

Mosquitos bite...but they do not have to suck.



Source: Mosquito and Vector Control District

BACKGROUND

Intrigued by news reports of the dangerous and invasive tropical *Aedes* mosquitos in neighboring counties, the Grand Jury undertook to learn more about the MVCD and the local mosquito invasion status. In particular, the Grand Jury sought to know what danger, if any, our county faces, what is being done to mitigate any problems, whether or not the public is aware of the existence and role of the MVCD and the current status of *Aedes* mosquitos.

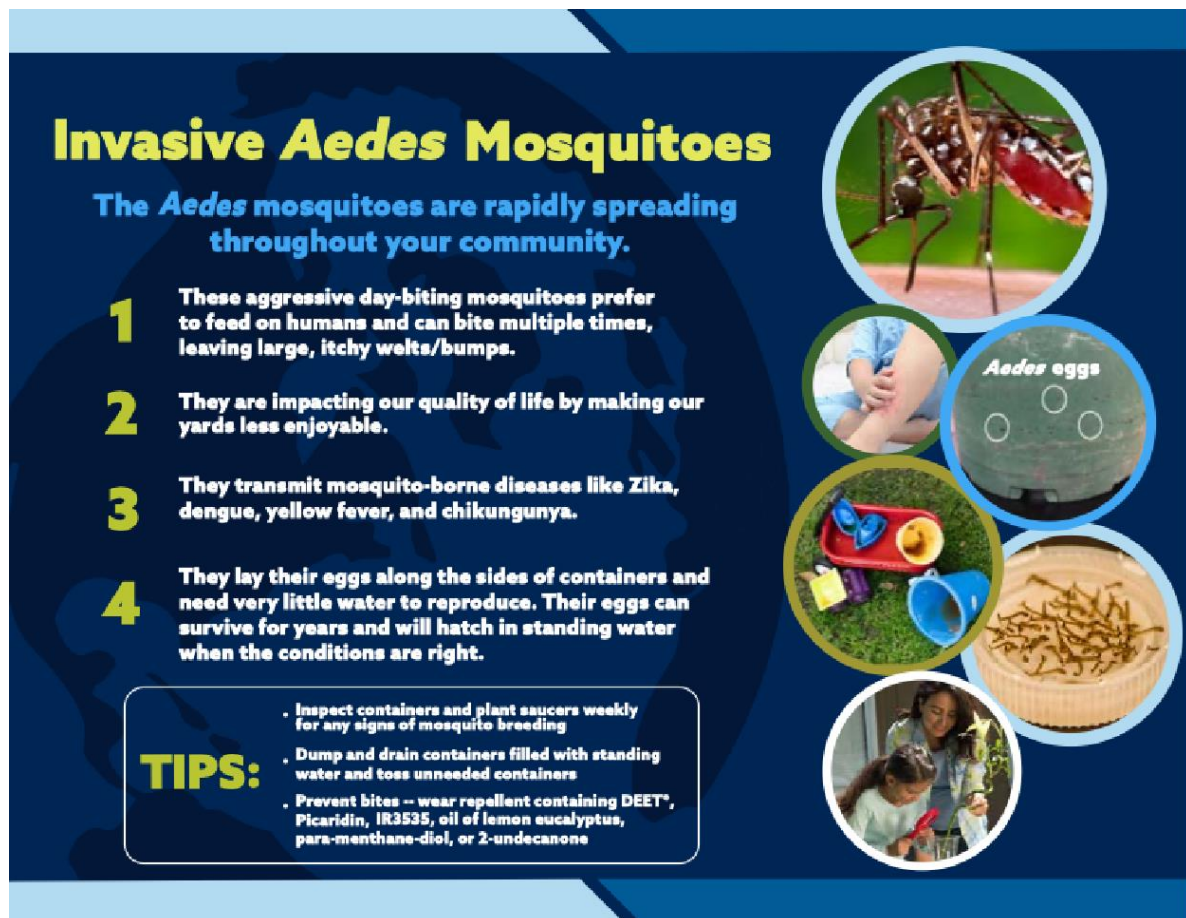
Disease-spreading mosquitos have a long history in the United States. In one year alone, 1793, yellow fever spread by the *Aedes* mosquito killed 10 percent of the population of Philadelphia—5,000 people. As a result, a large-scale government and public eradication effort was undertaken that largely eliminated *Aedes* by the mid-20th century.

However, lack of public commitment and governmental investment allowed *Aedes* varieties to reestablish in the United States. Additionally, microclimate changes are allowing *Aedes* to gain territory and survive in previously inhospitable places, such as Contra Costa County. These mosquitos can spread dangerous diseases to humans, including Zika, dengue fever, chikungunya and yellow fever.

This invasion of *Aedes* is literally hitchhiking north from Southern California, where they are able to live and multiply year-round and have been doing so since 2011. *Aedes* mosquitos require only ¼ inch of water for breeding and they lay and affix ‘armored’ eggs that survive for months **without** water—all of which make it easier for them to spread in residential areas. These small, individual, dry eggs can stick to items such as pots, toys, and even clothes. They can then be moved from place to place, even indoors, by unsuspecting residents.

The *Aedes* mosquitos are unlike native mosquitos. *Aedes* prefer to feed on humans and have adapted to live near humans. These “ankle biters,” as they are commonly called because they fly low and bite around the legs and ankles, are primarily active during the day when people are likely to be outdoors, and they bite aggressively and often.

As the mosquito districts in Southern California are warning residents, we humans are “juice boxes of blood” for these insects and the public absolutely must help in the fight to eradicate their spread. The mosquito districts cannot do it alone.



Source: California Mosquito and Vector Control Association

METHODOLOGY

The Grand Jury used the following investigative methods:

- Reviewed responses to requests for information from the MVCD
- Conducted interviews with employees of mosquito districts and others
- Reviewed MVCD financial reports for 2022, 2023, and 2024
- Conducted online research of government agencies and news articles
- Reviewed MVCD agendas, minutes, and meeting recordings
- Reviewed City of Antioch City Council agendas and videos for the period during their mosquito infestation, September-November 2024
- Reviewed numerous documents and reports from the MVCD, neighboring county mosquito districts, and other state mosquito districts
- Observed two home inspections

DISCUSSION

The Contra Costa Mosquito and Vector Control District

The fight against devastating mosquito-borne diseases in Contra Costa County began in 1926 with the creation of an independent special mosquito district, originally formed to provide mosquito abatement services in response to mosquito overpopulation and encephalitis and malaria outbreaks. It is known today as the MVCD and is a public health agency funded by annual parcel taxes on all properties in Contra Costa County, with additional funding from benefit assessments. It is dedicated to protecting the community from vectors, which are all living organisms that can transmit diseases. In addition to mosquitos, other vectors that the MVCD protects against include rats, mice, ticks, skunks, and ground-nesting yellow jackets. Upon request, MVCD inspectors provide individual residential inspections at no charge, and give educational information regarding the inspection to the residents.

The MVCD uses a decision-making process termed Integrated Vector Management to determine the optimal use of tools for efficient, cost-effective, and sustainable control of vectors. This is an evidence-based approach which includes public education, managing vector habitat, biological control, and chemical control. Vector habitat management includes maintenance of water sources, trapping of vectors that pose health threats, and vegetation management. Biological and chemical control includes using mosquitofish and applying select bacterial and chemical insecticides to reduce mosquitos and rodenticides to control rodent threats. MVCD also actively monitors vector populations and pathogens through trapping, laboratory analysis, and direct visual inspection. Information is shared with the public to encourage reducing or preventing vector habitats on private property.

All MVCD technicians and inspectors are certified in vector control by the California Department of Public Health and renew their certification every two years. Additionally, all MVCD employees complete annual training sessions in vector biology, control products, equipment, safety procedures, vector control innovations, updates to operating procedures, current research topics, laws and regulations relevant to vector control, and instruction on the use of new software and technology. One new state-of-the art operations software, MapVision, facilitates the use of drones (unmanned aircraft) to perform surveillance controls.

The mandated annual audit of the MVCD's budget by an outside firm shows a strong financial position, with an operating surplus (revenues exceeding expenses) of more than \$2 million in each of the past three fiscal years, ending June 2024.

Invasive *Aedes* Mosquitos

The MVCD, as well as the 60+ other mosquito and vector control agencies in California, want the public to be aware of the problems associated with *Aedes* mosquitos. There are no treatments for any of the diseases that can be transmitted by *Aedes*, only supportive care. While dengue, yellow fever, Zika, and chikungunya are not common in the United States, with thousands of international travelers arriving or returning to California each year from areas where these diseases occur, the potential for local transmission is increasing.

One traveler with an active infection in an area with invasive *Aedes* mosquitos can begin the spread of that disease. There have already been 18 locally acquired and spread cases of dengue fever in 2024 in Los Angeles and San Diego counties. Dengue (commonly called break-bone fever) can cause high fever, headache, body aches, nausea and rash, and can be fatal.

Non-native, invasive *Aedes* mosquitos were first detected in Southern California in 2011. They are now established in Southern California and are spreading north. They were detected as far north as Yuba and Sutter counties in 2023.

Although the MVCD provides surveillance, including mosquito traps and laboratory analysis, they cannot monitor everywhere that mosquitos can breed in a county as large as Contra Costa. In order to get the job done, the MVCD must educate the public by instructing County residents on how to monitor their own yards to identify and report invasive mosquitos.

Once invasive mosquitos become established, the danger of mosquito-borne disease increases and the quality-of-life changes. Contra Costa County needs to be as aggressive about stopping infestations as the mosquitos are aggressive about biting. Waiting until people are directly affected is waiting too long, because it would be too late to control the spread of *Aedes*. As the California Department of Health states regarding *Aedes*, “only a small number of mosquitos can be an extreme nuisance.” These mosquitos:

- Bite during the day
- Bite numerous times and will follow people indoors
- Have adapted to live near people
- Use any small container that can hold water, indoors or out, to lay their eggs
- Can carry disease

Aedes mosquitos are not good neighbors!

***Aedes* Discoveries in Martinez, Concord, and Antioch**

Invasive *Aedes* were first discovered in Contra Costa County in Martinez in August 2022 by MVCD inspectors who responded to a service request by a resident. The MVCD then conducted extensive door-to-door inspections and eradication efforts. Under California Health and Safety Code 2053 (a) and (b), the MVCD has legal authority to inspect property and can impose fines and obtain search warrants to inspect property if residents refuse to allow inspections. In Martinez, eight search warrants and the assistance of the Martinez Police were required for just two inspections. Subsequent to the efforts of the MVCD, ongoing surveillance did not detect any *Aedes* mosquitos in Contra Costa County in 2023.

In August 2024, MVCD inspectors in Concord discovered four *Aedes* mosquitos in mosquito traps that MVCD routinely places throughout the county. No additional mosquitos were found upon subsequent trapping and door-to-door inspections, which indicated to the MVCD that the four mosquitos were “hitchhikers” who were accidentally transported from elsewhere.

Then, in September 2024, an Antioch resident requested a mosquito inspection. It was during that inspection that an MVCD inspector collected the first female *Aedes* mosquito identified in Antioch. Further trapping and extensive door-to-door inspections revealed an infestation covering an approximately 1.5 square mile boundary, as opposed to the one quarter square mile boundary in Martinez. It was the largest undertaking to stop a vector of disease to date for the MVCD. And in Antioch, as in Martinez, search warrants were obtained in cases of homeowner resistance.

MCVD uniformed inspectors reported that some residents were resistant and sometimes refused to allow them to enter and inspect their yards. This is not unique to Contra Costa and has been reported by mosquito control inspectors in other counties as well. It was a factor in Martinez and Antioch, which made abatement efforts more challenging in those communities. Increased media coverage of the beneficial role and legal authority of the MVCD to inspect residential yards may assist in obtaining public awareness and support for inspections during infestations.

Aedes are breeding again in Antioch in the same area as previously located. The need for quick response and cooperation from the city and residents is essential to stop the spread.

An Expensive Problem

The effort to stop the spread of *Aedes* in Antioch was the largest vector-control undertaking in Contra Costa County by the MVCD. It included 1,524 service requests, treatment of 298 acres with larvicide, 4,750 individual letters to residents, news releases, and community educational events.

As reported by the Mosquito and Vector Control Association of California (MVCAC), *Aedes* requires unique surveillance and control methods, and also results in more service calls. In areas in Southern California where *Aedes* are more established, agencies have had to increase staff, equipment, traps, and develop additional outreach methods and materials to fight the infestation. If *Aedes* mosquitos become as widespread here as in Southern California, Contra Costa might also face major, expensive eradication efforts such as the pilot programs in Los Angeles and Orange counties to introduce x-ray sterilized male mosquitos in addition to standard eradication efforts. A different project in Fresno County is releasing 20 million male *Aedes* that have been treated with a bacterium that makes them sterile so that when they mate, the females will lay eggs that do not hatch.

According to MVCAC, the ability of *Aedes* to exploit tiny water sources makes reducing populations a labor-intensive task, which is why vector agencies are using media and door-to-door outreach to promote source prevention and elimination by residents.

Residents – The First Line of Defense

The *Aedes* mosquito infestation in Martinez was eliminated because a resident reported the mosquitos before they spread outside of a quarter mile area. And the report of an *Aedes* mosquito in Antioch alerted the MVCD to begin a large-scale eradication effort. Resident requests for

MVCD inspection when they see an unusual, day-biting mosquito are a vital first line of defense in the fight against invasive mosquitos.

In addition to asking residents to report invasive mosquitos, the MVCD also advises the public to dump and scrub any container with standing water, no matter how small, indoors or out. Scrubbing should be done with soap and water and a brush at least once a week.

Residents can be the front-line soldiers in the war against invasive *Aedes* mosquitos.



Source: Public Health Image Library (PHIL), public domain image

Support from the Board of Trustees

The MVCD has a 22-member Board of Trustees comprised of one resident from each Contra Costa County City, appointed by their respective city council, and three appointed by the Contra Costa County Board of Supervisors.

As of April 2025, there is no trustee representing Antioch, San Pablo, or Lafayette on the MCVD Board of Trustees. According to the California Special District Board Member and Trustee Handbook, trustees are more knowledgeable about issues in their cities and how to best reach out to officials to get their attention. Therefore, the MVCD must be able to call upon trustees to provide contacts in their city and influential members of their community. A trustee's job is an important one. They represent their community, ensure delivery of essential local services, function as the General Manager's boss, and make major decisions. Having a trustee from an infested area is a valuable and effective way to influence citizens and public officials. As

residents of the cities they represent, they may also have other connections to assist MVCD in getting access to people, giving presentations, and distributing educational materials.

When *Aedes* began spreading in Antioch in September 2024, the MVCD reached out to the city multiple times to request a presentation. There was no trustee representing Antioch at that time, so the MVCD reached out to a former trustee from Antioch to assist with city contacts. The MVCD was subsequently able to present to the Antioch City Council in November, which gave only a small window of time for aggressive action against *Aedes*. By November, chances to effectively decrease the population of the invasive mosquitos decreased as female *Aedes* lay their eggs and die when the temperature drops.

Gaps in Public Understanding of the Agency's Purpose and Services

According to MVCD employees and public surveys, misinformation about the MVCD, what it does, and how it does it is widespread.

In 2021, the MVCD hired a professional research firm, Wallin Opinion Research, to assess public awareness of the MVCD and its mission. The research firm conducted a live, English and/or Spanish, 400-person telephone poll, using both land and mobile phones that represented a stratified (representative) demographic of the area.

The poll found that only 11 percent of respondents understood the term “vector.” When informed that a vector is any insect or animal that can transmit disease, 66 percent were concerned about disease transmittal by vectors. Significantly, 80 percent did not know that the *Aedes* mosquito strains now exist in Contra Costa County. When asked, 88 percent felt their households’ actions were important to help prevent mosquito and other dangerous vector invasions.

Nearly half, 45 percent, had never heard of the MVCD.

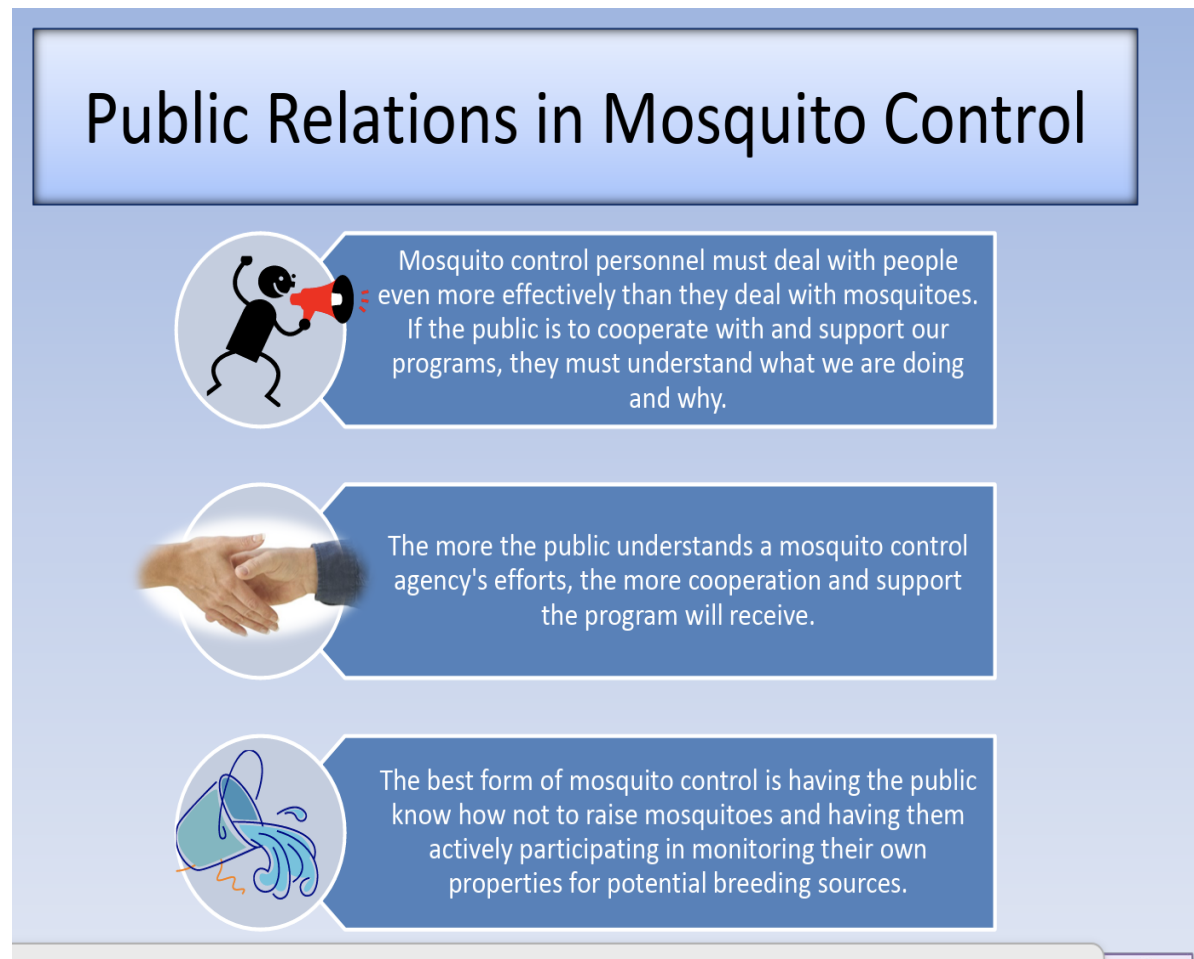
Employees of MVCD were not surprised by the lack of name recognition as they report receiving calls from citizens thinking that the MVCD is an animal control agency. And, conversely, employees of the actual animal control agency report receiving calls that should have been made to the MVCD. A stated goal of the MVCD Five Year Plan is to expand public and other agencies’ understanding of the MVCD and the services it provides, as there seems to be misunderstanding. This has sometimes resulted in missed opportunities for collaboration or for providing a service.

Incomplete content on websites can contribute to this misdirection and lack of proper information. Residents often confuse the MVCD with the County’s Animal Services Department, contacting one for the services provided by the other. At the same time, there is no explanation or link to Animal Services on the MVCD website, even if you type it in the search function. Similarly, there is no explanation or link to the MVCD on the Animal Services website.

Uncertainty about county services may lead to missed opportunities to detect invasive and disease-bearing mosquitos and other vectors if the public does not know which agency to

call. One uncontrolled infected yard can infect a whole neighborhood. Websites need to clearly steer the public to the correct agency.

The MCVD does not actively shine a light on its mosquito services. For example, when called to do a rodent or other vector inspection during mosquito season, the inspector does not leave the MVCD brochure on invasive mosquitos, which gives written information on how to inspect for and report *Aedes* mosquitos. Mosquitos will remain a problem in California, and the public needs to know its role in “taking the bite” out of invasive mosquitos. Inspectors have a major role in educating residents.



Source: California Department of Public Health—www.cdph.ca.org

Agency Relationship with Other Stakeholders

When it comes to invasive mosquitos, waiting until they spread diseases would be a costly, and possibly deadly, mistake. People need to information on how to avoid breeding mosquitos in their yards, and how to recognize and report them to the MVCD.

Partnerships with other government and local agencies, other counties, relevant businesses, and schools in affected areas are useful for disseminating mosquito identification and control information. A working relationship with each city council in Contra Costa County, as well as

with the Board of Supervisors for the many unincorporated areas of the County, is essential for government cooperation when there is a need to publicize an outbreak that can affect public health.

The MVCD meets with and shares information with builders and other stakeholders in new housing developments. Other opportunities include partnering with agencies such as the East Bay Municipal Utility District (EBMUD) and the Contra Costa Water District to include mosquito information in the newsletters sent to residents by these agencies that gives current mosquito alerts and suggestions for individual household mosquito abatement. In 2023, when public awareness of the West Nile virus was needed, the MVCD worked with a vendor to create custom dead bird advertising to educate the public about West Nile virus, and shared the information at events, garden stores and other relevant businesses. The MVCD also has a brochure entitled “Invasive Mosquitoes of California” that can be shared.

Regular public relations meetings with counterparts in neighboring counties are an additional and inexpensive way to increase public awareness. MVCD can collaborate with other districts by comparing news releases and social media communications as well as media sources and ideas. The MVCD’s operating surplus provides a potential source of funding for promotional spending, if necessary, during public health emergencies.

Stakeholders outside of the district include all counties in California where *Aedes* is currently found. The MVCD belongs to the MVCAC, which is advocating wide-scale multi-agency cooperation to work towards new solutions for these difficult to control mosquitos. New techniques such as sterilizing male mosquitos will need wide-scale, multi-agency implementation.

Opportunities to Better Assess Public Communication Efforts

The MVCD Public Affairs department has a staff of three who utilize different avenues to educate the public. They give presentations to city councils, schools, and directly to members of the communities during events such as the Green Footprint Festival in Pittsburg, Bethel Island Boats and Berries Festival and others. They have reached out to local realtors and new housing programs to inform new residents about their services. In 2024 they hosted their first ever Cemetery Workshop on how to mitigate risks from mosquitos at cemeteries.

They also participate in the Mosquito and Vector Control Association’s Legislative Day in Sacramento, and send the MVCD Annual Report to every mayor, city manager, and to each member of the Contra Costa County Board of Supervisors. They have an e-newsletter, Mosquito Bytes, to which the public can subscribe to through a page on the MVCD website, and they mail physical survey cards randomly to 30 county residents each year.

The MVCD also has a social media presence on X, Nextdoor, Facebook, and Instagram. However, the MVCD’s statistics on their social media accounts show that they do not have wide coverage. Contra Costa County has a population of 1.155 million, but the MVCD has only 53 followers on Facebook, 1,432 followers on X, and 209 followers on Instagram. Its most popular

Instagram post received 100 views. They seldom use YouTube, other social media platforms, or radio and TV ads.

Posting on YouTube is a no-cost avenue to reach the public. A San Gabriel Valley Vector Control Agency YouTube public service announcement received 1,563 views. San Joaquin County Vector Control's YouTube on requesting service had 242 views. The California Association for Public Information Officials gave an award to L.A. County for its short, humorous videos that depicted relatable scenarios of people's frustrations during mosquito season.

Other mosquito districts use social media campaigns that are no-cost, community friendly initiatives that can be internally produced. Their websites include videos and games about mosquitos that appeal to children as well as contests for school students of all ages to increase mosquito awareness education. Engaging students and the public in contests to create content is not only cost-effective, it also enlightens and educates through the most currently popular avenues for each age group. World Mosquito Day, in August 2025, and Mosquito Awareness Week, in June 2026, provide opportunities for education efforts.

GovDelivery is a free, opt-in/opt-out email service that sends out public service alerts and is used by other mosquito districts.

People want to know about public health issues that can affect them; but the information needs to be simple, accessible, widespread, and repeated.

Future Concern

Rice will soon be grown on 1,700 acres of land in the Delta region of Contra Costa County (the Webb Tract and the Holland Tract) on land owned by the Metropolitan Water District of Southern California (MWD) and leased to rice farmers. The purpose of growing rice in the Delta is to stop subsidence of the land and is funded by the Delta Conservancy, a state agency (deltaconservancy.ca.gov).

Because rice provides a suitable environment for mosquitos to breed and wherever rice areas interface with urban areas mosquitos often become a public nuisance and create health problems (University of California Pest Management Publication 3465), the MVCD has educated the MWD on the MVCD's expectations regarding mosquito control and cost. The MVCD is also trying to meet with the farmer to do the same.

FINDINGS

F1. The Mosquito and Vector Control District (MVCD) uses state-of-the-art Integrative Vector Management, which includes physical, biological and chemical control of vectors, in addition to vector surveillance and public education.

F2. The MVCD had an excess of revenues over expenditures of more than two million dollars in each of the past three fiscal years.

F3. Awareness by residents of how to identify and report *Aedes* mosquitos can assist in *Aedes* control.

F4. Promotion of the MVCD's residential inspection service will aide in detection of invasive *Aedes*.

F5. Public education in how residents can eliminate *Aedes* eggs in their yards will assist in stopping the spread of invasive *Aedes*.

F6. MVCD uniformed inspectors sometimes encounter a level of misunderstanding regarding their mission, resulting in denial or delay of entry to property.

F7. When residents deny inspections, it delays mosquito identification and eradication efforts.

F8. The Antioch vacancy on the MVCD Board of Trustees contributed to a delay in the MCVD presentation on *Aedes* to the Antioch City Council.

F9. The MVCD website does not explain what activities should be reported to the Animal Services Department as opposed to the MVCD.

F10. The MVCD website does not have a link to the Animal Services Department.

F11. There are no prominent, direct links for reporting mosquitos on the home page of the MVCD website or the Animal Services Department website.

F12. The MVCD does not currently leave their educational "Invasive Mosquito Species of California" identification brochure during home inspections for other vectors.

F13. There are no current marketing partnership agreements with other counties to explore cost-effective public education and awareness.

F14. The MVCD does not currently distribute their existing *Aedes* information through relevant retail establishments and other public agencies unless requested.

F15. As of May 2025, the MVCD social media presence is limited to Facebook (60 followers), Instagram (232 followers), Nextdoor, and 1,432 followers on X.

F16. The MVCD does not cross-market educational or promotional YouTube videos on other social media platforms.

RECOMMENDATIONS

R1. By February 1, 2026, the MVCD Board of Trustees should consider directing the MVCD to explore additional avenues to educate residents on how to recognize and report *Aedes* mosquitos.

R2. By February 1, 2026, the MVCD Board of Trustees should recruit to ensure a complete Board of Trustees.

R3. By February 1, 2026, the MVCD Board of Trustees should consider directing the MVCD to work with the Animal Control Services Agency to provide a link on their websites for reporting suspected *Aedes* mosquitos to the MVCD.

R4. By February 1, 2026, the MVCD Board of Trustees should consider directing the MVCD to offer their existing brochure, “Invasive Mosquito Species of California” to residents during all requested home inspections for vectors.

R5. By February 1, 2026, the MVCD Board of Trustees should consider directing the MVCD to explore the costs of coordinating public information campaigns with neighboring counties during *Aedes* infestations.

R6. By February 1, 2026, the MVCD Board of Trustees should consider directing the MVCD to offer their existing brochure, “Invasive Mosquito Species of California” or other informational material to other public agencies and relevant retail establishments (for example garden and pool stores).

R7. By February 1, 2026, the MVCD Board of Trustees should consider directing the MVCD to provide an opt-in/opt-out email service to send alerts and news releases when *Aedes* infestations are discovered.

REQUEST FOR RESPONSES

Pursuant to California Penal Code § 933(b) et seq. and California Penal Code § 933.05, the 2023-2024 Contra Costa County Civil Grand Jury requests responses from the following governing body within 90 days of the date of the report:

Responding Agency	Findings	Recommendations
Mosquito Vector and Control Board of Trustees	F1-F16	R1-R7

These responses must be provided in the format and by the date set forth in the cover letter that accompanies this report. An electronic copy of these responses in the form of a Word document should be sent by e-mail to ctadmin@contracosta.courts.ca.gov and a hard (paper) copy should be sent to:

Civil Grand Jury – Foreperson
725 Court Street
P.O. Box 431
Martinez, CA 94553-0091

Reports issued by the Grand Jury do not identify individuals interviewed. Penal Code section 929 requires that reports of the Grand Jury not contain the name of any person or facts leading to the identity of any person who provides information to the Grand Jury.

GLOSSARY

CHIKUNGUNYA—The Chikungunya virus is spread by an infected *Aedes* mosquito. Symptoms include fever, joint pain, headache, muscle pain, joint swelling, or rash.

DENGUE FEVER—Dengue (break-bone fever) is a viral infection spread by *Aedes* mosquitoes. Symptoms are high fever, headache, body aches, nausea, and rash. Severe cases can be fatal.

YELLOW FEVER—Yellow fever is spread by infected *Aedes* mosquito and can be a mild febrile illness to severe, sometimes fatal disease. Vaccinations are available.

ZIKA—The Zika virus is spread by the *Aedes* mosquito and can then be spread through sex or to a fetus during pregnancy. Infection during pregnancy can cause birth defects.