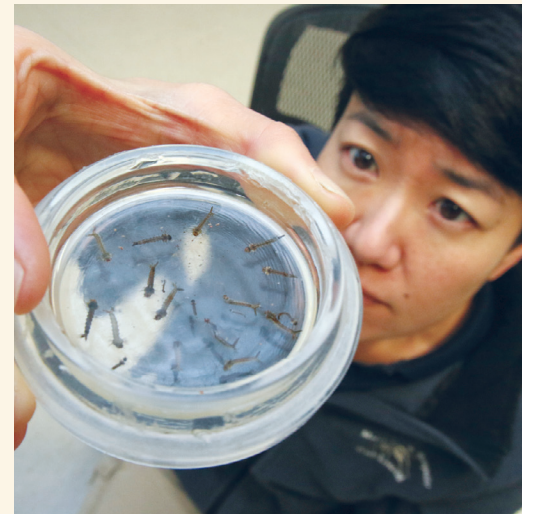


Protecting You from THE BITE



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Fighting the BITE

How Marin/Sonoma Mosquito and Vector Control District protects your health

BY MIKE BLOUNT

Mosquitoes are more than just a nuisance. Not only can their bites cause severe allergic reactions, they can spread debilitating diseases that sometimes can be fatal. In fact, mosquitoes are responsible for more than 1 million deaths per year worldwide.

The Marin/Sonoma Mosquito and Vector Control District is dedicated to protecting public health by monitoring, treating and managing more than 20,000 sources of mosquito production throughout the region. Due to the District's work, Marin and Sonoma counties aren't known for having a mosquito problem. Manager Phil Smith, however, says it is important to remain vigilant to keep the public safe from diseases spread by vectors, such as mosquitoes, ticks and other pests.

"It's a compliment to the diligence of our staff when people think that mosquitoes aren't found in this area, because 100 years ago the District was formed to deal with heavy infestations of salt marsh mosquitoes," Smith says. "Some of the locally found mosquito species have the capability to transmit diseases such as West Nile virus, malaria, St. Louis encephalitis and dog heartworm. Much of our work involves prevention. We are constantly working throughout the District to prevent and control mosquito production."

Smith says any residents who are experiencing a mosquito problem can request service from the District

at no charge. But one way residents can help the District control the mosquito population is to manage or remove any standing water around their homes and workplaces. Places to check for mosquito breeding include old tires, swimming pools, fish ponds and water troughs or dishes for animals.

"Residents can protect themselves from mosquitoes by applying an effective insect repellent when outdoors, wearing long sleeves and pants when mosquitoes are present and limiting outdoor activities during dusk and dawn when mosquitoes are most active," Smith says.

Each year, the District responds to approximately 2,000 calls for service from residents in both counties. Aside from monitoring and controlling the mosquito population, Smith says the District also identifies insects for residents, treats in-ground yellowjacket nests, delivers mosquitofish, surveys ticks for Lyme disease and provides information to the public on how to control other vectors on their property.

"Outreach and education are the frontline strategies of our efforts to control mosquito populations," Smith says. "We participate in fairs and other community events, visit hundreds of classrooms each year, and advertise online, on the radio and in newspapers. Our website also offers a wealth of information about controlling mosquitoes, rodents, yellowjackets and other vectors."



Marin/Sonoma Mosquito and Vector Control District staff monitor 20,000 sources of mosquito production throughout the region. PHOTO BY SCOTT MANCHESTER

“
Much of our work involves prevention. We are constantly working throughout the district to prevent and control mosquito production.
”

PHIL SMITH
Manager of Marin/Sonoma Mosquito and Vector Control District



Know Your Vector



What is a vector?

Any insect or animal capable of transmitting disease or producing discomfort or injury, such as mosquitoes, yellowjackets, ticks and rodents.

23

different species of mosquitoes

live in Marin and Sonoma counties. Each species has unique attributes and breeding areas.

2

salt marsh species *Aedes squamiger* and *Aedes dorsalis*

- » Fly up to 20 miles
- » Extremely aggressive biters

It's Always Tick Season

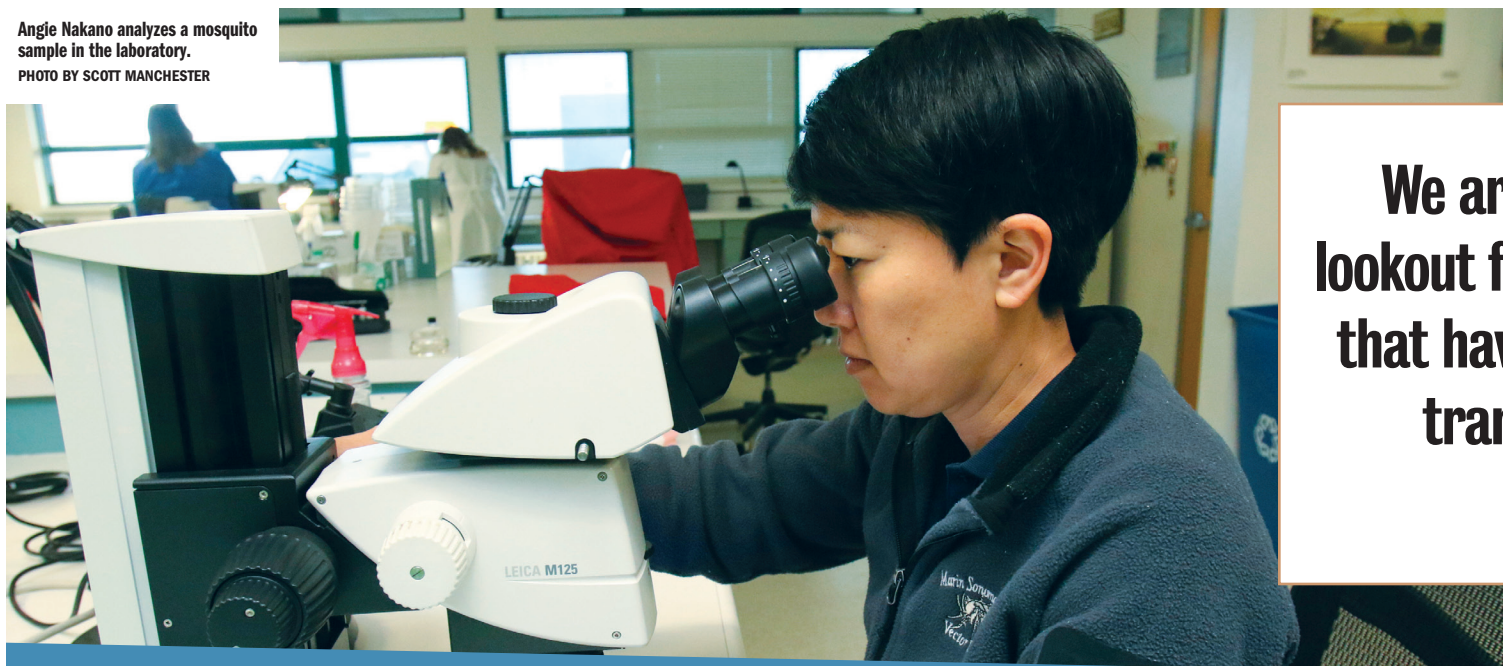
- » Ticks can be found all year in Marin and Sonoma counties, even in the winter.
- » Wear an effective repellent and protective clothing.
- » Always check yourself and your pets for ticks after being outdoors.

Where you'll encounter ticks

Adults are commonly found in high grass and trailside vegetation, while nymphs are found in leaf litter, on logs and wooden benches in natural areas.

Angie Nakano analyzes a mosquito sample in the laboratory.

PHOTO BY SCOTT MANCHESTER



“

We are always on the lookout for invasive species that have the potential to transmit disease.

ANGIE NAKANO
Scientific Programs Manager

”

Global THREAT

What is the Zika virus and how is the District protecting us?

BY MIKE BLOUNT

You’ve probably seen the headlines about the Zika virus. If you’re wondering exactly what it is and how you can protect yourself and your family from it, you’re not alone. In Brazil, the virus has led to illness and possibly thousands of cases of severe birth defects. The outbreak was declared a global public health emergency by the World Health Organization. Although the species that can transmit the virus have not been found in Marin or Sonoma counties, that doesn’t mean that they won’t be here in the future.

According to Marin/Sonoma Mosquito and Vector Control District Scientific Programs Manager Angie Nakano, the Zika virus has been around for quite a while. It was first isolated in 1947 and spread into Asia and Africa by 1950. The virus has slowly made its way into Latin America – most notably Brazil – over the years since it was first discovered.

For most people, the Zika virus causes mild flu-like symptoms for a brief

period. But it has been linked to an increase in the birth defect microcephaly, which results in an infant being born with an abnormally small head and brain. The connection between the Zika virus and microcephaly is not well understood by researchers yet.

According to Nakano, the same two mosquito species that transmit the Zika virus, *Aedes albopictus* and *Aedes aegypti*, can also transmit dengue fever, chikungunya, and yellow fever. Unlike most native species, they prefer humans and are aggressive daytime biters. These mosquitoes lay their eggs in any container that holds water – even one as small as a bottle cap. Should these mosquitoes gain a foothold in our area, there is potential for these diseases to spread.

“The key to preventing exotic diseases from spreading in our area is to keep out the invasive *Aedes* species that can carry them,” Nakano says. “These mosquito species are in other parts of California, and are very hard to remove once they become

established. We are always on the lookout for invasive species that have the potential to transmit disease.”

The Marin/Sonoma Mosquito and Vector Control District works directly with Marin and Sonoma county health organizations and is alerted when any cases of these diseases are reported.

Currently, the only reported cases of Zika virus in the United States have been associated with international travel. Still, Nakano says the best way to help the District provide protection from these threats is to manage water sources around your property and to report mosquito issues.

“Dump any containers holding water or change them every 72 to 96 hours,” Nakano says. “These two species like biting people and can breed easily in a small container of water. We really want to emphasize to residents how important it is to eliminate ALL standing water around the home.”

A Souvenir No One Wants: Zika travel precautions

Protect yourself from mosquito bites when traveling to areas with virus activity:

- » Before traveling, check the CDC’s Travelers’ Health website for information regarding the specific area(s) you will be visiting.
- » Properly use mosquito repellents containing DEET, picaridin or oil of lemon eucalyptus (always read the label carefully).
- » Wear protective clothing such as long sleeves and long pants.
- » Consider treating clothing with permethrin or purchasing clothing pretreated with permethrin.
- » If sleeping conditions are not conducive to protection against mosquitoes, consider sleeping under a bed net.



Jason Sequeira says District staff are in the field on a daily basis responding to requests for service, conducting surveillance and controlling mosquitoes.

PHOTO BY SCOTT MANCHESTER



Protecting THE PUBLIC

Biologists and vector control technicians work together to control mosquitoes

BY MIKE BLOUNT

With nearly 2,300 square miles and 20,000 known sources of mosquito production, it can be a little tricky to track down tiny mosquitoes. To meet this challenge, biologists and vector control technicians work together to ensure that mosquito populations in Marin and Sonoma counties are suppressed.

As a field supervisor, Jason Sequeira makes sure that vector control technicians doing surveillance have access to the areas they need to get to. He also helps them coordinate different projects the District is working on. These projects include partnerships and collaborations with other agencies and organizations to restore and enhance wetland habitat for wildlife while minimizing mosquito production.

Sequeira says that although the public doesn't often see these efforts, vector control technicians are out in the field daily, actively performing surveillance and controlling mosquitoes that can transmit debilitating mosquito-borne diseases such as West Nile virus. The District has traps that use dry ice to lure the adult mosquitoes into a container. They also scoop mosquito larval samples from water sources using a long pole with a dipper cup attached.

Sequeira says mosquito surveillance traps are set throughout both counties every week to monitor mosquitoes. Special surveillance traps

are also set to monitor for invasive mosquito species. In total, more than 1,400 traps are set per year.

Once adult and larval samples are collected by technicians working in the field, they are handed over to biologists in the District laboratory to be identified and analyzed. In 2015, more than 17,000 mosquitoes were sent to the laboratory for virus testing.

Using this surveillance data, the District will adjust its control strategy based upon the species that is found and its stage of development.

This work implements science based, proactive and prudent mosquito control measures to protect our communities from mosquito-borne diseases.

"We help the public on two fronts: We provide services to them to help with their specific problems on their properties and

we protect the health of residents and visitors alike by conducting surveillance and control," Sequeira says.

In response to the threat of invasive mosquitoes, Sequeira states that the District has been monitoring for these species over the last three years and will continue to do so. "We want to protect the public's health. We want to keep everyone safe. That's what we're here for."

We want to keep everyone safe. That's what we're here for.

JASON SEQUEIRA
Field Supervisor

Meet the Biologist



Sarah Brooks is the lead biologist at Marin/Sonoma Mosquito and Vector Control District. As one of the biologists who work for the District, she performs both lab and field work that supports the District's efforts to manage vectors and their threat to public health. Brooks says working for the District is her dream job.

Why did you choose to work at Marin/Sonoma Mosquito and Vector Control District?

I earned my degree in wildlife biology from UC Davis in 1997 and started working for the District in 2004. This job appealed to me because I could use my biology background to help protect public health.

Why is protecting public health important to you?

Having worked at the District for nearly 12 years, I've seen firsthand how vector-borne diseases can affect people. I've also witnessed the emergence of mosquito-borne diseases like West Nile virus and Zika virus, both of which can have serious health implications for people. I feel like the job I do monitoring mosquito and tick populations, and detecting the diseases they carry, plays a vital role in protecting public health.

How do the District biologists work together?

We have different areas of expertise that complement one another, and we work together as a team. We are responsible for identifying and processing mosquito samples, collecting and testing ticks, and conducting vector-related surveillance. We have worked together for over 11 years and really enjoy what we do, so we are excited to use our expertise to continue protecting public health into the future.

The TOOLBOX

Why integrated vector management is the best approach

BY MIKE BLOUNT

Integrated vector management (IVM) is the most efficient, effective and environmentally responsible way to manage and control mosquito populations. IVM consists of five different tools used frequently throughout the year that work in conjunction and support each other. In fact, District staff use several of these tools – if not all of them – every day.

EDUCATION



The Marin/Sonoma Mosquito and Vector Control District educates the public on ways to protect themselves, their families, friends and co-workers from vector-borne diseases through a comprehensive outreach program. The District's public relations department works with local newspapers and radio and television stations to provide information to the public on vector control and managing water sources around their homes and workplaces.

District staff connects with the public through participation in a wide variety of local fairs and community events as well as in-class presentations to school-age children. These types of venues offer the opportunity for the public to ask questions and become more familiar with the District's programs and services.

SURVEILLANCE



Regular surveillance allows the District to gather data and monitor vectors in the area, including mosquitoes, rodents, ticks and yellowjackets. For mosquitoes, the District can obtain information about which of the 23 species of mosquitoes currently in Marin and Sonoma counties are active in a particular area at a given time, and also understand what mosquito control strategies will be the most effective.

Surveillance also allows District staff to monitor for invasive species of mosquitoes and collect and test mosquitoes for vector-borne diseases. Having this information also allows the District to inform the public on ways to reduce vector populations in their area and which personal protection measures to employ.

PHYSICAL CONTROL/ SOURCE REDUCTION



Physical control or source reduction is the manipulation of an environment to reduce vector populations.

Physical control strategies may minimize the need to use a mosquito larvicide and/or adulticide. A few examples of source reduction include: dumping out containers, filling in potholes, promoting effective drainage, controlling vegetation and timing irrigation appropriately.

The District also employs physical control on a larger scale, in collaboration with other agencies. These large-scale projects help to minimize mosquito production while improving habitat conditions for other plants and animals, including endangered species.

MICROBIAL AND CHEMICAL CONTROL



The results of field surveillance help to determine the need, timing and planning of mosquito control applications. Larvicides are materials applied directly to a water source to control mosquito larvae. Larvicides are often used with other mosquito control measures in an IVM program to minimize the number of adult mosquitoes that emerge. This not only reduces disease potential, it minimizes and can eliminate the need for adult mosquito control.

Adult mosquito control (adulticiding) is conducted when it is necessary to reduce adult mosquito populations and/or when emergency control measures are needed to rapidly disrupt or terminate the transmission of disease to humans.

All materials used by the District are EPA-registered public health pesticides and applied by state certified mosquito and vector control technicians in accordance with label requirements and limitations.

BIOLOGICAL CONTROL



Biological control is the use of a living organism to control a particular pest. One of the biological control tools the District uses is the mosquitofish.

Mosquitofish, *Gambusia affinis*, are native to the southern and eastern parts of the United States. They were introduced into California in the early 1920s for the control of mosquito larvae. Mosquitofish continue to be an important component of the Marin/Sonoma Mosquito and Vector Control District's IVM program. Their voracious appetite for mosquito larvae and pupae make these fish an excellent alternative to using pesticides in backyard ponds and other appropriate man-made water features.

Tom Eames was diagnosed with Lyme disease after being bitten by an infected tick. Eames encourages others to thoroughly check themselves, children and animals for ticks after being outdoors.

PHOTO BY SCOTT MANCHESTER



Aware of the RISKS

Man diagnosed with Lyme disease after being bitten by an infected tick

BY MIKE BLOUNT

Repellent 101

Using repellent is a great way to reduce your exposure to vector-borne diseases transmitted by mosquitoes and ticks. Repellents come in different formulations and most can be applied directly to skin. Be sure to always follow the label directions. The following list includes the active ingredients recommended by the Centers for Disease Control and Prevention, which have been tested and proven to protect you against disease carrying insects:

- » DEET
- » Picaridin
- » Oil of lemon eucalyptus
- » IR3535

How to properly remove a tick

- » Do not squish or burn the tick with a match or lighter.
- » Do not twist the tick off of your skin.
- » Use a pair of fine-tipped tweezers to grasp the tick as close to the skin's surface as possible and pull straight out.
- » Apply antiseptic to clean the bite site.
- » If you see any type of reaction or skin rash, contact your physician immediately.

Learn more about ticks at msmosquito.com.



Tom Eames loved being outdoors. He would often go for long walks with his dog around his 30-acre property on Sonoma Mountain. Each time he came back from his walks, he would find five or six ticks attached to his body. Eames, now 63, says he would casually pick them off one by one and continue with his day.

"I was completely unaware of tick-borne diseases," Eames says. "I got bit a lot, but I had no idea about Lyme disease or what to look for at the time."

In 2000, he began experiencing some strange symptoms. He felt pain in his joints and started having trouble remembering things. He had numbness in his feet. But each time he went to the hospital, doctors were unable to diagnose him. It was almost a decade before he would have an answer.

"In 2010, one doctor finally thought to test me for Lyme disease and the test came back positive," Eames says. "If you're lucky, you'll see a red bull's eye ring on your skin and know what to tell your doctor. But if you don't see it, you'll end up going back to your doctor until they can figure it out."

Eames decided to get tested again at Columbia University in New York and the results confirmed his

diagnosis. He had been living with Lyme disease for years. According to the Centers for Disease Control and Prevention, Lyme disease is a tick-borne illness that produces a wide range of symptoms, depending on the stage of infection. These include fever, rash, facial paralysis and arthritis.

Eames began receiving treatment and got better, but some of the symptoms lingered. He continues to feel fatigue and joint pain every day as a result of not being treated earlier.

"If you catch it early in 30 days, you can take antibiotics and it's likely over," Eames says. "But I never got tested for it because it's less common in California and doctors are less aware. If it was detected right away, I wouldn't have some of the complications I have now."

Today, Eames encourages everyone who is outdoors during tick season to regularly

check their body and their pet's body for ticks. He also says to use repellent and not to sleep with your pets.

"Seventy-five percent of the ticks I would take off of my body came from my cat, who would sleep in my bed at night," Eames says. "I was exposed every night because of this. People need to be aware of these things so they can be diagnosed and treated early."

I got bit a lot, but I had no idea about Lyme disease or what to look for at the time.

TOM EAMES
Sonoma County resident

Fighting the Bite on the HOME FRONT

Common backyard breeding sources

Backyards are the #1 source for mosquito production. Anything that can hold water for more than five to seven days has the ability to produce mosquitoes. Maintain, manage or eliminate all types of standing water on a regular basis. Keep in mind that mosquitoes need as little as a 1/2 inch of water to complete their life cycle, therefore some areas may not be as obvious as others.

Uncovered boats

Cover boats with tight-fitting tarps.
Store canoes or kayaks upside down.

Trash bins

Dump any accumulated water.
Keep lids shut tight.

Fountains and birdbaths

Change water weekly.

Potted plants

Don't overwater.
Flush water out of saucers with a hose.

Rain gutters

Remove leaves and debris.

Wading pools, wheel barrows and wagons

Dump standing water.

Pet dishes

Rinse and replace water one to two times per week.
Flush troughs twice a week or stock with mosquitofish.

Low areas

Don't overwater lawns and gardens, allowing water to accumulate.

Leaks

Replace leaking hoses, faucets and pipes.

Buckets, barrels and containers

Dump standing water. Store upside down.

Cover rain barrels with a mosquito-proof screen (fine mesh, 1/16").

Tree holes

Consult an arborist about water in rot holes and stumps.

Tires

Recycle used tires.
Drill drainage holes in tire swings.

Ponds

Stock with mosquitofish.
Clear excess vegetation.

Pools and spas

Maintain even if not in use. Remove standing water on pool and spa covers.
Report neglected pools to the District.

Report sources of standing water in your neighborhood or get help for a mosquito problem around your home: Call **800-231-3236** or visit **www.ms mosquito.com** to submit a free service request.

Learn more about mosquito production sites around your property: Visit **www.ms mosquito.com** to download the District's brochure.

Keeping Marin and Sonoma SAFE



The Marin/Sonoma Mosquito and Vector Control District serves approximately 736,000 residents in a nearly 2,300 square mile service area of Marin and Sonoma counties. Each year, the District responds to over 2,000 requests for service from the public. Help us keep our communities safe from the bite!

Contact Us Today

Our programs and services are supported by property taxes and are provided at no additional charge to all residents in Marin and Sonoma counties.

Our services include:

- » **Mosquito Control & Mosquitofish**
- » **Ground-Nesting Yellowjacket Control**
- » **Rodent Control Advice**
- » **Educational Presentations**



www.ms mosquito.com



**1-800-231-3236 or
707-285-2200**



**595 Helman Lane
Cotati, CA. 94931**

Office hours:
M-F, 7:00 a.m.-3:30 p.m.
(Closed 11:30-12:30 p.m. daily
for lunch)