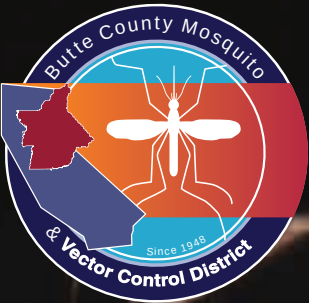


Protect You &
Your Family from
West Nile Virus



FIGHT THE BITE

MOSQUITO 101



SOME FAST MOSQUITO FACTS

A vector is any animal that can **TRANSMIT A DISEASE** to another animal or human, like a mosquito.

Mosquitoes are a vector responsible for spreading **WEST NILE VIRUS**, encephalitis, dog heartworm, malaria, yellow fever, dengue fever and more.

Mosquitoes were around **BEFORE DINOSAURS**—they aren't going away.

Of the 3,500 **SPECIES OF MOSQUITOES** worldwide, 170 are in North America.

Of the 53 different species of mosquitoes in California..... **ONLY FEMALE MOSQUITOES BITE**—they need protein to produce eggs.

Mosquitoes use exhaled carbon dioxide, body odor, temperature and movement to **TARGET HUMANS**, other mammals and birds.

Female mosquitoes **LIVE FROM THREE TO 100 DAYS**, while males live from 10 to 20 days.

Females can **LAY 100 TO 300 EGGS** at one time and 1,000 to 3,000 in a lifetime.

Mosquitos need stagnant water to complete the first three stages of life preceding adulthood—egg, larva and pupa. Remember, **NO STAGNANT WATER, NO MOSQUITOES!**

MOSQUITOES CAN BREED in old tires, storm drains, buckets, untreated pools, flowerpot dishes, birdbaths, pet dishes, kiddie pools, toys and ponds—wherever there is standing water.

Most adult mosquitoes remain **WITHIN ONE MILE** of where they hatched, though a few species can range 20 miles or more.

Populations can be kept from exploding before they become **AIRBORNE THREATS TO PUBLIC HEALTH** by targeting species at larval and pupal stages.

Mosquito bites **KILL MORE PEOPLE** worldwide than any other single disease factor.

FIVE MOSQUITOS OF CONCERN

ENCEPHALITIS MOSQUITO (*Culex tarsalis*)

This mosquito is the primary vector of West Nile virus, Western equine encephalomyelitis virus and St. Louis encephalitis virus. In Butte County, this mosquito breeds year-round and prefers to feed on birds, but will readily settle for humans, horses and cattle. *Culex tarsalis* breeds in a variety of clean and polluted water sources like flooded agricultural lands, ditches, man-made containers, ponds and more.

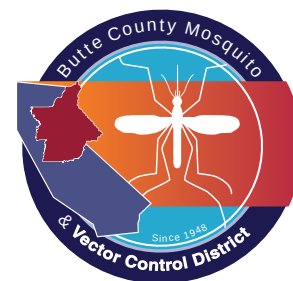


NORTHERN HOUSE MOSQUITO (*Culex pipiens*)

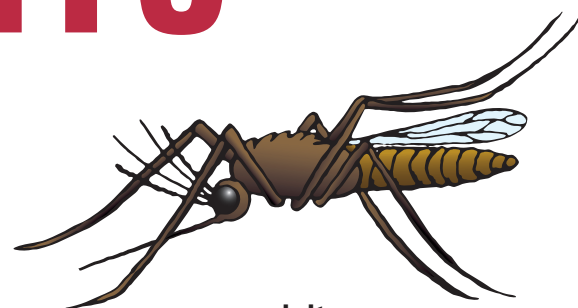
Much like *Culex tarsalis*, the northern house mosquito is a major vector of West Nile virus, Western equine encephalomyelitis virus and St. Louis encephalitis virus. Larvae prefer polluted, foul water high in organic content—water in artificial containers, storm drains, wastewater ponds, sumps, septic tanks, fountains, birdbaths and un-maintained swimming pools. Breeding occurs in the early spring to late fall in Butte County. Birds are their primary target, but they will attack humans and invade their homes.



LIFE CYCLE OF THE MOSQUITO



P U P A : After one to two weeks, the larva transform into pupa, or a "tumbler." The hard, comma-shaped pupa breathes through a pair of trumpet-like appendages in the thorax. The pupa doesn't feed—it is occupied transforming into an adult, which takes about two days. The pupa is aware of its surroundings, actively avoiding perceived threats by reflexively flipping away.

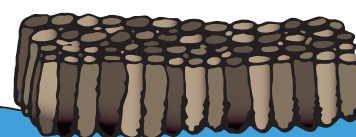


adult mosquito

4

A D U L T : The adult emerges after the submerged pupal shell fills with air and bursts. It rests on the water's surface until its wings dry and stiffen, then flies away. Most adult mosquitoes feed on nectar from plants, flowers or rotting fruit, but females of most species seek blood for protein to produce eggs.

raft of eggs



3

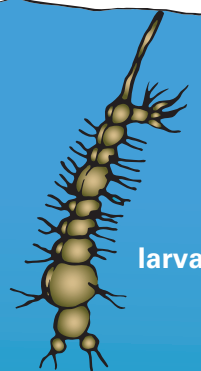


pupa

water's surface

2

L A R V A : each larva, or "wiggler," breathes through a tube in its tail, which breaks the water's surface. Larvae feed on decaying plants and other organic material in the water.



larva

1

E G G : mosquitoes lay eggs in or near water or on flood-prone soil. Water activates the hatching process—the warmer the water and air, the quicker mosquito reaches adulthood. Some species like *Culex pipiens* lay eggs by the hundreds in bundled rafts, while others lay individual eggs. The incubation period of *C. pipiens* can take two days from a laid egg to hatch into larva.

FLOODWATER MOSQUITO (*Aedes melanimon*)

Aedes melanimon is a major pest near larval breeding sources, a vector for West Nile virus and a secondary vector of Western equine encephalomyelitis virus in Butte County. This species is most commonly found in intermittently flooded areas such as duck clubs and wildlife refuges. *Aedes melanimon* are very aggressive, readily feeding on mammals and humans.



WESTERN TREEHOLE MOSQUITO (*Aedes sierrensis*)

Aedes sierrensis is a major nuisance found in the foothill regions of Butte County and the primary vector of dog heartworm. Larvae are generally found in treeholes and containers with leafy material. This species is a very small, aggressive mosquito that usually surfaces in early spring, remaining active into the summer months. *Aedes sierrensis* is a vicious biter, targeting humans and other large mammals.



WESTERN MALARIA MOSQUITO (*Anopheles freeborni*)

Anopheles freeborni is the primary vector of malaria and one of Butte County's most abundant pests. Larvae prefer clear, fresh water in sunlit or partially-shaded pools, while adults are commonly found in rice fields and roadside ditches with grass. This is an aggressive mosquito most active at dawn and dusk.



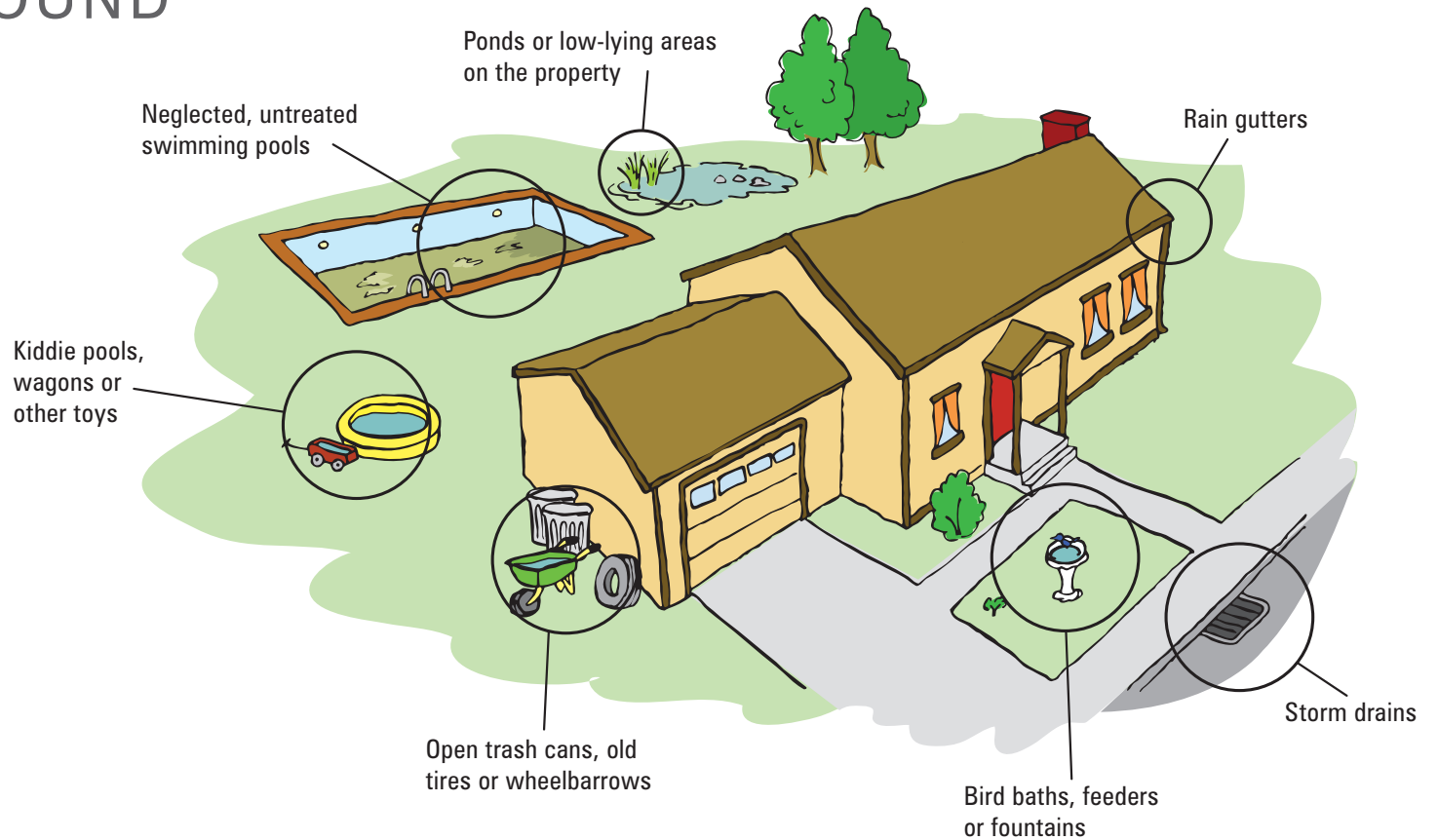
WHAT YOU CAN DO: DRAIN IT!

COMMON MOSQUITO BREEDING GROUNDS AROUND THE HOUSE

Mosquitoes can lay eggs wherever there is standing water. The graphic below illustrates likely breeding grounds in your backyard—be sure to inspect your yard once a week and drain any standing water, keeping these hot spots in mind:

BUT DON'T FORGET ABOUT:

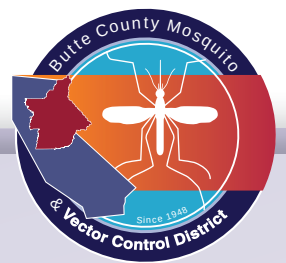
- Plant saucers
- Uncovered boats
- Water bowls for pets
- Leaky hoses
- Rot holes in trees



LEARN THE 7 Ds

A HANDY REMINDER OF HOW TO KEEP YOUR FAMILY SAFE:

- **DRAIN** any standing water that may produce mosquitoes—today's puddle is tomorrow's mosquito nursery.
- **DAWN** and **DUSK** are when mosquitoes are most active, making them good times to stay inside. Remember: when the sun goes up or down, mosquitoes are flying around.
- **DRESS** appropriately—wear long sleeves and pants when outdoors. In Butte County heat it can be hard to imagine extra layers, but they could protect you from bites and disease.
- **DEFEND** yourself by using an effective insect repellant like DEET, Picardin or oil of lemon eucalyptus. Make sure to follow all label instructions.
- **DOOR** and window screens should be in good working condition. Keep doors closed and inspect your screens for holes—this will prevent mosquitoes from entering your home and biting you in your sleep.
- **DISTRICT** personnel are available to address any problems with mosquitoes you are experiencing. Call (530) 533-6038 or visit www.BCMVCD.com for more information.



MOSQUITO ATTRACTANTS

EVER WONDER WHY MOSQUITOES MIGHT BE SINGLING YOU OUT?

The following list will give you an idea. Mosquitoes are attracted to:

DARK CLOTHING: Some mosquitoes can see their victims from a distance. Dark clothing is an initial attractant.

CARBON DIOXIDE: We produce more carbon dioxide when we're hot or have been exercising. Fires or lit candles are also attractants.

LACTIC ACID: We release more lactic acid during and after exercise, or after eating foods high in sodium and potassium.

FLORAL & FRUITY FRAGRANCES: Perfumes, hair products, scented sunscreens, lotions, fabric softeners and dryer sheets.

SKIN TEMPERATURE & PERSPIRATION: When working out or just basking in the sun, skin temperature and humidity around the body increase, luring mosquitoes attracted to even small amounts of water.



WHAT YOU CAN DO: USE REPELLANT REPELLANT SAFETY TIPS

NATURAL REPELLANTS

For those who prefer natural* alternatives to repellants containing DEET, try using the following plants oils:

- CITRONELLA
- LEMON EUCALYPTUS
- CINNAMON
- CASTOR
- ROSEMARY
- LEMONGRASS
- CEDAR
- PEPPERMINT
- CLOVE
- GERANIUM

* Keep in mind, "natural" doesn't necessarily mean "safe." Many people are sensitive to plant oils—be sure to read all instructions and warnings before applying a plant oil-based repellant.

ALWAYS FOLLOW label instructions when using repellant.

APPLY REPELLANTS only to exposed skin or clothing.

DO NOT APPLY repellant over cuts, wounds or irritated skin.

DO NOT SPRAY repellant directly in your face—spray on your hands and then apply to the face. Use repellant sparingly around eyes, mouth and ears.

DO NOT LET CHILDREN handle repellant—adults should apply repellant to children using the hands. Do not apply repellants containing DEET to children younger than two months old.

CONSULT A PHYSICIAN before using products containing DEET in concentrations greater than 30 percent.

USE SEPARATE SUNSCREEN and repellant products because they need to be reapplied at different times.

DO NOT SPRAY aerosolized repellant in enclosed areas—wait until you are outside.

IF YOU OR A MEMBER OF YOUR FAMILY SUFFERS AN ADVERSE REACTION TO REPELLANT, DISCONTINUE USE, WASH AFFECTED AREAS AND CONSULT A PHYSICIAN OR POISON CONTROL CENTER.



WHEN BUTTE COUNTY HEALTH OFFICIALS REPORTED IN 2004 THAT WEST NILE VIRUS HAD STRUCK AN “ELDERLY” LOCAL WOMAN ILL, MARILYN GAMETTE TOOK UMBRAGE AT THE STATEMENT.

“I was certainly not sitting in a rocking chair knitting booties,” Gamette recalled. To the contrary, Gamette’s job as a wildlife rehabilitator for the U.S. Fish and Wildlife Service at the Sacramento National Wildlife Refuge was extremely physical, and in her spare time she hiked, swam and participated in 10k runs “just for fun.”

Gamette was in “tip-top” physical condition when she was diagnosed—the first known and reported case of the mosquito-borne disease in the county—at the age of 64. Gamette said there are healthy and unhealthy people at any age, and feels the oft-repeated statement that West Nile only affects children and the “elderly” is dangerous misinformation.

Gamette’s ordeal began on a Friday when one of her sons remarked she had a strange rash. The fair-skinned woman wrote it off as a minor reaction to sunscreen and said she felt fine until the next morning, when she woke up with a fever of 105. She visited an immediate care facility and said she was

again visited a doctor, they told her she probably had pneumonia. When she finally visited her regular doctor Monday, he suspected and confirmed she had West Nile. Over the weekend, her fever had peaked at 107 degrees and she had “constant nausea, vomiting and diarrhea.” Her blood pressure was very low, and one of her sons—a paramedic—kept her hydrated and barely alive by administering intravenous fluids and alternating between Tylenol and Aspirin to keep her fever in check.

Gamette’s son and doctor treated her at home to avoid secondary infections and monitored her constantly for several days. She couldn’t eat anything other than chicken soup for six weeks, and that was just the beginning of the recovery process.

“I literally had to teach myself to walk again,” she said. “It’s a really odd feeling when your brain is telling you what you need to do and you can’t do it. It’s frustrating, scary, and totally debilitating.”

After some time, Gamette’s condition improved enough to return to work, but she said she lacked her former stamina and has never felt 100 percent since her illness. She said she still has balance, vision and hearing issues and other limitations, although she remains as active as possible.

Gamette said people assume she was infected at the refuge she worked at, but actually she contracted it closer to her Chico

KEPT BARELY ALIVE

WEST NILE VIRUS VICTIM RELATES STRUGGLE AT DEATH’S DOOR

misdiagnosed with a bladder infection and sent home with one dose of Cipro.

The next day, Gamette could barely walk and her fever had worsened. When she

home, when she “slogged up” Rock Creek to rescue a downed eagle as a favor for “some Fish and Game guys who were afraid to go near it.”

IF SHE HADN’T BEEN IN SUCH EXCELLENT HEALTH, SHE LIKELY WOULD NOT HAVE SURVIVED.

Gamette said her doctor told her a year after her initial diagnosis that, if she hadn’t been in such excellent health, she likely would not have survived. Since her West Nile ordeal, Gamette has dedicated herself to educating people about the disease and pressuring authorities to do all they can to abate dangerous mosquitos. In her crusades, which include meeting with government and drug company officials in Sacramento, she’s met and come to know of others who haven’t been so lucky.

“I’m thankful that I can function at the level I can, and realize how lucky I am that we caught it when we did.”

A significant risk in Butte County

Dr. Mark Lungberg discusses the local danger of West Nile virus.

DR. MARK LUNDBERG, A HEALTH OFFICER WITH BUTTE COUNTY PUBLIC HEALTH, SPEAKS IN NO UNCERTAIN TERMS WHEN IT COMES TO THE DANGERS OF WEST NILE VIRUS HERE IN THE NORTH STATE.

“There is a significant risk of infection here in Butte County,” he said. “Every year, there may be people that die from West Nile. There will also be those, even healthy, young people, who have prolonged illness due to virus.

“Some years are worse than others and there’s really no way to predict how severe this or any other year may be. But there are, and there will be, cases every year.”

Lundberg’s unwavering certainty held as he continued, saying it’s not even a matter of if or when; he believes the virus has likely already struck here in 2012. “I expect to see our first case of West Nile in July,” he said. “It is likely people out there are already infected, but don’t even know it yet as the virus is incubating.”

People bitten by West Nile-infected mosquitos may not develop symptoms for several days, or even weeks. While many people have no symp-

oms, people of all ages are susceptible to the more damaging effects of the virus. Dr. Lundberg said it is essential people plan ahead to reduce the risks of exposure.

“I highly recommend people have a plan,” he said. “Keep repellants nearby at all times, and use them often when outside. This is particularly important between the hours of dusk and dawn.

“There are repellents that are proven to work, including those containing DEET, Picaridin and oil of lemon eucalyptus,” he said, adding it’s important to only use established products. “Some people say others work, but these ones are proven to be effective, and I only recommend the proven ones.”

Lundberg also doesn’t recommend relying on bug spray alone.

“In addition to repellents, people need to keep their homes safe by making sure the screens are good and not letting mosquitoes in, and by getting rid of standing water.”

For those who react badly to repellents, Dr. Lundberg said it’s important to protect yourself



with long sleeves and pants. Those who can’t use repellents due to chronic diseases should stay indoors during peak times when mosquitoes are present.

Q&A WITH DISTRICT MANAGER MATT BALL

IF ANYBODY KNOWS THE BUTTE COUNTY MOSQUITO & VECTOR CONTROL DISTRICT inside and out, it's Matt Ball. He's worked with the district since 1996, working his way up from a seasonal employee to district manager in his 17 years with the district.

WHAT ATTRACTED YOU TO THIS LINE OF WORK?

At first, it was a job to help me through college, but it didn't take long for me to realize the importance of organized mosquito control. I was amazed to learn about the history of mosquitoes and mosquito-borne disease and how the industry was founded. I became passionate about the mission of the district and the services it provides.

HOW IMPORTANT IS MOSQUITO MANAGEMENT TO THE SAFETY OF BUTTE COUNTY RESIDENTS?

In my opinion it's vital—mosquito-borne disease has dictated and directed the outcomes of world history, especially in the United States and California. Without organized mosquito and vector control, Butte County residents could expect unbelievably high mosquito populations with increased outbreaks of serious illness. Butte County could quickly become an unpleasant place to live and would likely return to what it was in the past—plagued with mosquitoes and mosquito-borne disease.

WHAT KINDS OF MEASURES DO YOU TAKE TO CONTROL MOSQUITOES?

We follow an Integrated Vector Management program (IVM), an effective and environmentally sensitive approach to vector management that relies on a combination of common-sense practices. The program includes vector surveillance, source reduction or elimination, public education, biological control and chemical control. We try to locate mosquitoes before they become adults and take corrective actions like managing water, draining water, educating the public on how to prevent mosquitoes from breeding and using biological control measures like mosquitofish. If we can't take these actions, or they don't produce favorable results, then our only choice is to make targeted public health pesticide applications.

WHAT IS A MOSQUITOFISH?

A mosquitofish is the common name for *Gambusia affinis*. It is a small, minnow-like fish related to common guppies. They are called "mosquitofish" because mosquito larvae are their primary diet—they can eat 100 to 500 mosquito larvae per day.

HOW CAN SOMEONE PROCURE MOSQUITOFISH?

Residents can obtain free mosquitofish in a number of ways—we place sentinel stock tanks at 10 public pickup spots throughout Butte County, there are two facilities where the fish can be picked up and if residents don't have time to pick up mosquitofish, or need more fish than the tanks can supply for larger mosquito-breeding sources, they can fill out a request online at www.BCMVCD.com or call the office and the fish will be delivered to them.

WHEN SOMEONE REPORTS A GREEN SWIMMING POOL, WHAT STEPS ARE TAKEN?

Once we receive a report, district staff will visit the site and determine if there is a presence of mosquitoes or if the possibility exists to breed mosquitoes. In either case, the District will work cooperatively with the property owner to choose a corrective measure like maintaining or draining the pool or stocking it with mosquitofish. Residents can report unmaintained swimming pools or other possible mosquito-breeding sources by visiting our website or placing a call and residents can remain anonymous.

WHAT PUBLIC HEALTH PESTICIDES ARE USED?

The District utilizes two types of public health pesticides, larvicides and adulticides. All public health pesticides used by the district are registered for use in mosquito control by the California Environmental Protection Agency. Larvicides are designed to target immature mosquitoes while adulticides target adult mosquitoes. The district's larvicides used are extremely target-specific. We use larvicides made from bacterial products, insect growth regulators, surface films like highly-refined petroleum distillates or mineral oils. We use adulticides like pyrethrins, pyrethroids and an organophosphate.

HOW ARE THE PUBLIC HEALTH PESTICIDES APPLIED?

Larvicides are applied by aircraft, power sprayers, back cans, spray bottles or just by hand, while adulticides are applied by aircraft or by vehicle. All public health pesticides are applied at low rates. The droplets are microscopic and normally the rate of application is just over half an ounce of pesticide per one acre of land. A California Department of Public Health study found mosquito control public health pesticide applications are less than one percent of all reported pesticide use.



NOT JUST MOSQUITOES...

OTHER INSECT SERVICES:

THE BUTTE COUNTY MOSQUITO AND VECTOR CONTROL DISTRICT IS ALSO AVAILABLE TO ASSIST IN:

- The removal of Yellow jacket and wasp nests
- Tick and insect identification

MOSQUITOFISH PICKUP:

Mosquitofish, or *Gambusia affinis*, are small fish that consume large amounts of mosquito larvae as part of their diet. Introduced in California in 1922, mosquitofish have become the most efficient biological control of mosquito populations, representing a critical component of the district's integrated vector management program. BCMVCD maintains six fish ponds at the Oroville Headquarters where hundreds of pounds of mosquitofish are produced each year to control mosquito populations in ornamental and artificial ponds and un-maintained swimming pools.

FREE MOSQUITOFISH ARE AVAILABLE AT THE FOLLOWING LOCATIONS:

BCMVCD DISTRICT OFFICE

5117 Larkin Road
Oroville, CA
Phone: 530.533.6038

BCMVCD CHICO SUBSTATION

444 Otterson Drive
Chico, CA
Phone: 530.342.7350
(Note: Mosquitofish are only available at this location by a scheduled appointment)

C BAR D FEEDS

3388 Hwy 32
Chico, CA
Phone: 530.342.5361

MENDON'S NURSERY

5424 Foster Road
Paradise, CA
Phone: 530.877.7341

MAGNOLIA GIFT & GARDEN

1367 East Ave.
Chico, CA
Phone: 530.894.5410

ROSA'S NURSERY

585 Main Street
Hamilton City, CA
Phone: 530.826.0559

FOOTHILL MILL AND LUMBER COMPANY

1698 Wagstaff Road
Paradise, CA
Phone: 530.877.3395

SKYWAY FEED AND SUPPLY

5990 Foster Road
Paradise, CA
Phone: 530.877.1019

THE PINE'S YANKEE HILL

11300 Miller Flat Road
Oroville, CA
(Hwy 70 east of Concow Road)
Phone: 530.534.1265

WILBUR'S FEED

139 Meyers St.
Chico, CA
Phone: 530.895.0569

PARADISE PINES TRUE VALUE HARDWARE

14086 Skyway
Magalia, CA
Phone: 530.873.1008

HARSHBARGER ACE HARDWARE

1626 State Hwy 99
Gridley, CA
Phone: 530.846.3625

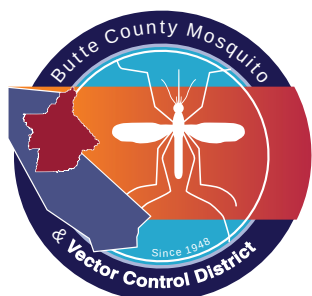
EDUCATION:

PART OF BCMVCD'S MISSION IS TO EDUCATE THE PUBLIC ABOUT VECTOR-BORNE ILLNESSES. UPON REQUEST, DISTRICT PERSONNEL ARE AVAILABLE TO GIVE PRESENTATIONS AT SCHOOLS AND COMMUNITY ORGANIZATIONS. PAST PRESENTATIONS HAVE INCLUDED:

- West Nile virus and you
- Personal protection to prevent West Nile virus
- Mosquito-borne diseases
- Lyme disease
- Yellow jackets and africanized honey bees

PROUDLY
PROTECTING THE
PUBLIC'S HEALTH
SINCE 1948

CONTACT



Butte County Mosquito and Vector Control District Headquarters

ADDRESS: 5117 Larkin Road
Oroville, CA. 95965
PHONE: 530 533 6038 or 530 342 7350
FAX: 530 534 9916
WEBSITE: www.bcmvcd.com

OUR MISSION

THE PRIMARY MISSION OF BCMVCD IS TO SUPPRESS MOSQUITO-TRANSMITTED DISEASE AND REDUCE THE ANNOYANCE LEVEL OF MOSQUITOES AND DISEASES ASSOCIATED WITH TICKS, FLEAS AND OTHER VECTORS THROUGH ENVIRONMENTALLY COMPATIBLE CONTROL PRACTICES AND PUBLIC EDUCATION.