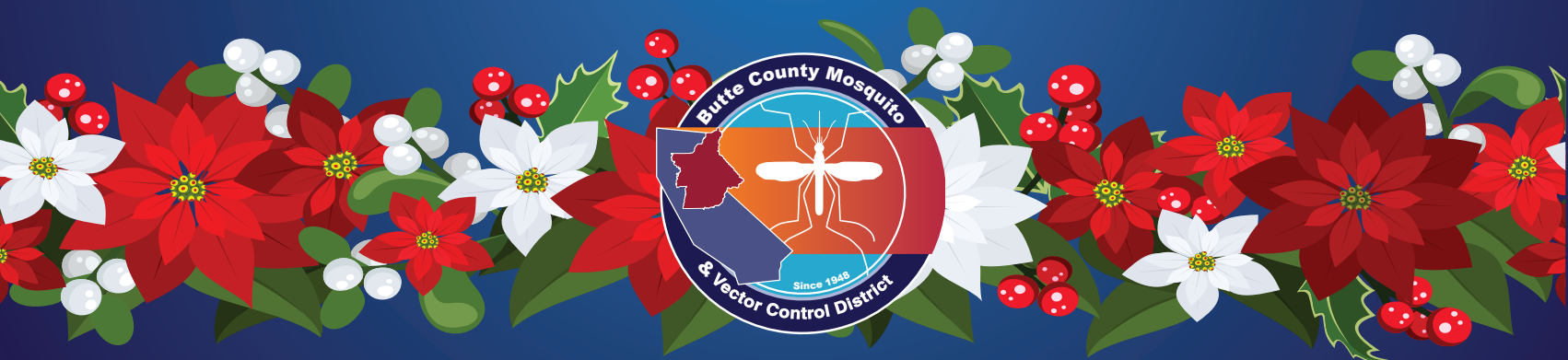




***BUTTE COUNTY MOSQUITO  
AND  
VECTOR CONTROL DISTRICT***

[WWW.BCMVCD.COM](http://WWW.BCMVCD.COM)



***2012 ANNUAL REPORT***

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### **Contact Information**

***Butte County Mosquito  
and Vector Control District  
5117 Larkin Road, Oroville, California 95965  
(530) 533-6038 (530) 342-7350  
Fax (530) 534-9916  
Visit us on the web at [www.BCMVCD.com](http://www.BCMVCD.com)***

## BCMVCD Jurisdiction



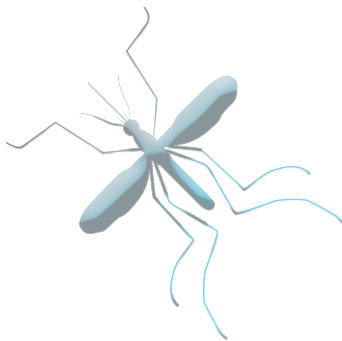
## History

The Butte County Mosquito Abatement District was formed in June of 1948. The District covers 1600 square miles, and includes all of Butte County, except the small areas served by the Durham and Oroville Mosquito Abatement Districts, which were formed earlier. The District also includes the Hamilton City area of Glenn County. In April of 1994, "Vector Control" was added to the District name to reflect the additional disease surveillance and information now provided.



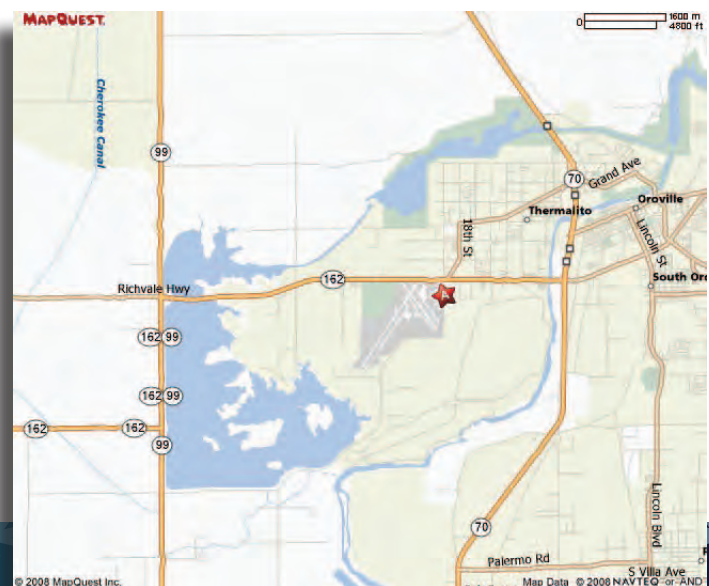
## Mission

The mission of BCMVCD is to primarily suppress mosquito-transmitted disease and to also reduce the annoyance levels of mosquitoes and diseases associated with ticks, fleas and other vectors through environmentally compatible control practices and public education.



## Main Office Location

5117 Larkin Road  
Oroville, CA. 95965



## Foreword

It is with great pleasure that I submit the 2012 Annual Report for the Butte County Mosquito and Vector Control District. The District had a very successful year serving the residents of Butte County and Hamilton City by utilizing an integrated vector management (IVM) approach that included public education and outreach, vector surveillance, reduction of breeding grounds by physical and cultural control by altering the environment and/or management practices, and by using sound biological and chemical control methods. This report outlines the work conducted by the District to accomplish its primary goal of protecting public health.

The prevention of vector-borne disease outbreaks remains the District's primary goal and it's most important responsibility to the public. West Nile virus (WNV) is now considered to be endemic in the state of California and remains the District's largest public health concern. The state observed an increase in WNV infections from 158 in 2011 to 451 in 2012. Butte County's human infection rate has also increased from 3 in 2011 to 10 in 2012. Butte County has had confirmation of 103 WNV human infections with 7 fatalities since the virus's arrival in 2004. Since 2003 when WNV first appeared in California, 3597 human infections with 126 fatalities have been confirmed.

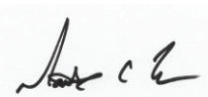
The extraordinary efforts to combat WNV epidemic in California should be credited to the combined efforts of more than 60 mosquito and vector control districts and local health departments, working in close cooperation with the California Department of Public Health and numerous other agencies indirectly related to mosquito and vector control.

With the continued economic recession and the decline of the housing market, the District is continuing to see an increase in the number of vacant homes with abandoned swimming pools, spas, and other water features that breed mosquitoes. The District continues to aggressively control catch basins, storm drains, and retention/ detention ponds and works in partnership with other local agencies and governments to maintain improper functioning utilities that could and have bred mosquitoes. Regardless of drought conditions, the over watering of landscaped yards and environments continues to add to the mosquito breeding problems in urban mosquito sources and extends the length of our mosquito season. In addition to urban mosquito breeding problems, the District continues surveillance and control in agricultural, rural, and wetland areas that breed mosquitoes.

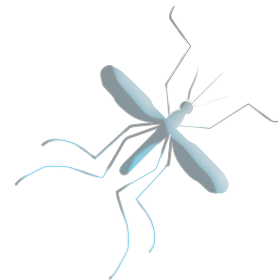
"The Mission of the Butte County Mosquito and Vector Control District is primarily to suppress mosquito-transmitted disease and to also reduce the annoyance levels of mosquitoes and diseases associated with ticks, fleas, and other vectors through environmentally compatible control practices and public education." To achieve this goal the District provides continual surveillance of mosquitoes and other vectors to ascertain the threat of disease transmission and annoyance levels and then uses integrated pest management methods to keep mosquitoes and other vectors below those levels. The District continues to work in cooperation with property owners, residents, social groups, and other governmental agencies to minimize mosquito breeding and to reduce the threat of mosquito-transmitted diseases.

The Board of Trustees and employees continue to plan for the future and search for better ways to improve our programs to be prepared for future disease outbreaks that would be a threat to the health of Butte County and Hamilton City residents. We look forward to providing our services to you in the future and if you have any questions or need more information please visit our website at [www.BCMVCD.com](http://www.BCMVCD.com) or call us at 530-533-6038 or 530-342-7350.

Respectfully,



Matthew C. Ball  
District Manager



## **Board of Trustees**

Back row, left to right: Secretary Tom Anderson, Vice President Charles Bird, Dan Hutfless, President Dr. Albert Beck, Gordon Andoe, Dr. Larry Kirk, Bo Sheppard.

Front row, left to right: Terry Mallan, Allan K. Seefeldt, Jack Bequette, Assistant Secretary Jerry Ann Fichter.



## **Staff**

Back row, Left to right: Del Boyd, Pilot; Pete Gibson, Mechanic; Phillip Henry, MVCS; Shane Robertson, MVCS; Jim Richards, MVCS; Aaron Goff, MVCS; Bill Kunde, Regional Supervisor; Aaron Lumsden, MVCS; Glen Williams, MVCS.  
Front row, left to right: Don Lasik, MVCS; Beth Vice, MVCS; Ryan Rothenwander, MVCS; (MVCS: Mosquito and Vector Control Specialist)

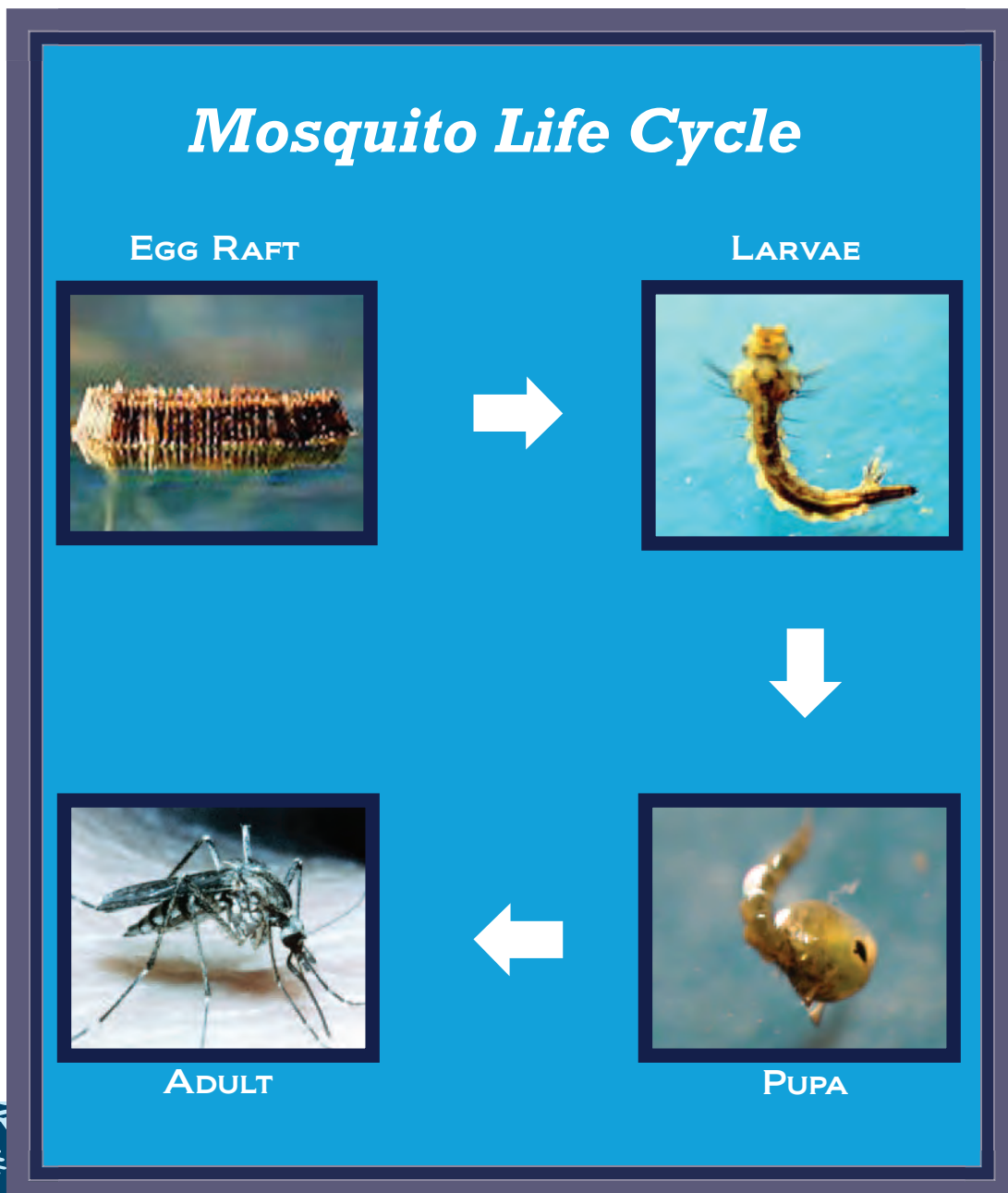
## **Administrative Staff**

Left to right: Doug Weseman, Public Information Officer; Jodi Sneeringer, Office Assistant; Eric Gohre, Entomologist; Matt Ball, District Manager; Dan Moench, Assistant Manager; Darlene Starkey, Office Manager



## ***Mosquito Biology and Development***

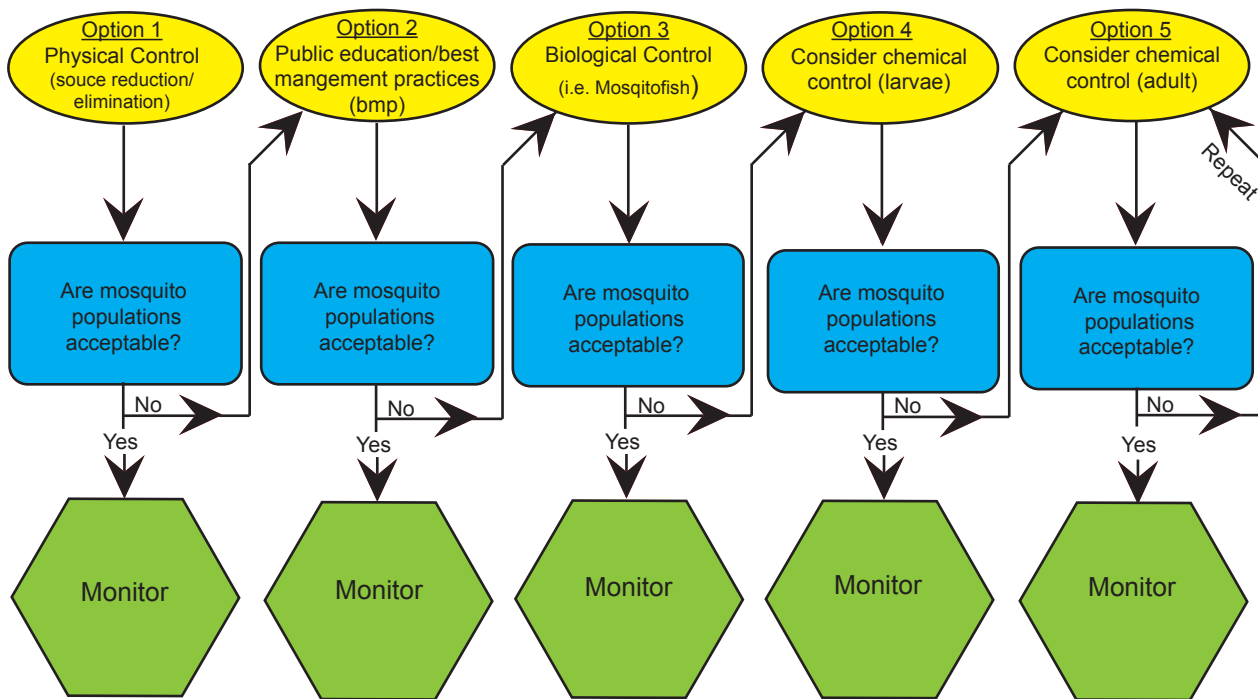
There are approximately 3,500 species of mosquitoes distributed worldwide. In California there are 53 species of mosquitoes and 25 of these are commonly found in Butte County. Mosquitoes, like other animals, must have water, food and some protection from the elements to survive. Mosquitoes undergo complete metamorphosis with four different life stages, egg, larva, pupa, and adult. Mosquito eggs and pupa are unable to feed. Larvae and adults however must feed to survive. Adult female mosquitoes need a blood meal to produce eggs, while adult male mosquitoes feed on plant nectar and juices. The time it takes for a mosquito to develop from an egg to an adult varies with different species and environments. Generally, it takes 3-5 days under optimal conditions for a mosquito to complete it's life cycle. The adult then lives between three weeks and one year. Some egg species have been known to survive for over fifty years. Female mosquitoes can have up to three or four broods of eggs in their lifetime.



# Integrated Vector Management (IVM) Program

Integrated Vector Management (IVM) is an effective and environmentally sensitive approach to vector management that relies on a combination of common sense practices. The District's IVM program uses current, comprehensive information on the life cycles of vectors and their interaction with the environment. This information, in combination with available vector control methods, is used to manage vector nuisance and public health threats by the most economical means and with the least possible hazard to people, property, and the environment. The District's IVM program includes public education/best management practices, physical control (source reduction and/or elimination), biological control, chemical control, and monitoring.

Each time one of the District's state certified Mosquito and Vector Control Specialists locates a mosquito breeding source the site is accessed and the flow chart below is followed. If the mosquito breeding source can be eliminated then the flow chart stops and the source is monitored.



Dipping a wetland source



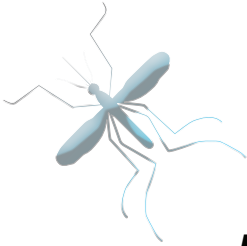
Identifying mosquitoes

## **Physical Control / Source Reduction and/or Elimination**

The best method of mosquito control is source elimination (the complete removal of standing water). All mosquitoes need water to breed, unfortunately water is vital to keep lawns green, to grow crops, to sustain life, and to provide habitat for other aquatic insects and animals. District Mosquito and Vector Control Specialists actively work with property owners, land managers, and municipalities to reduce the amount of water needed for irrigation, to observe or consider best management practices, to actively participate in the design of new developments, and the overall reduction of standing water on a property.



*Mosquito and Vector Control Specialist finding mosquito larvae in a cemetery flower vase*



## **Public Education/ Outreach and Best Management Practices**

The District's mission is to protect residents from mosquitoes and other vectors that transmit disease. Public education and information is an important part in the success of combating diseases such as West Nile virus and Lyme disease. The District's education program consists of public appearances at local city and county fairs, participation in the state Mosquito and Vector Awareness week, and presentations at schools and local civic groups. In addition to the above, the public education and outreach strives to find new and more effective ways of better educating the public by arming residents with knowledge to prevent mosquito bites and reduce or eliminate mosquito-breeding through informational pamphlets, website information, best management practice manuals, repellent suggestions, one on one interaction, and homeowner safeguards.

In 2010, the District and the Board of Trustees adopted a final version of a Best Management Practices (BMP) to Reduce Mosquitoes manual. The manual provides property owners with tools and techniques to minimize mosquito populations through the proper use of land management practices while reducing the use of pesticides. The BMP's contained in the manual are assembled from a number of sources including scientific literature, state and inter-agency documents, and from experienced vector control professionals. The BMP manual includes general guidance to all properties that can, have, and will breed mosquitoes. A copy of the BMP manual can be viewed on the District's website at [www.BCMVCD.com](http://www.BCMVCD.com). The manual has successfully been used to reduce mosquito populations/public health threats without the need of additional pesticides.



## **2012 Public Education**

In 2012 the Butte County Mosquito and Vector Control District's (District) Public Education Department had a very successful public outreach campaign.

The District again teamed up with Stott Advertising for a county wide billboard advertising campaign. The billboards utilized the District's 2012 public outreach theme "Mosquitoes Are A Dish For Mosquitofish". The artwork for the billboards was created by the District's Assistant Manager Dan Moench. The billboards were placed in Chico, Gridley, Oroville, and Paradise and rotated throughout these cities during mosquito season.

With the help of the Chico News and Review, the District produced an eight page color insert titled "Fight the Bite". The insert was placed in the Chico News and Review that was distributed on June 28th, 2012. The insert had the potential to reach an audience of over 53,000. The purpose of this insert was to educate residents, as well as others on how to protect themselves and their families from mosquitoes and West Nile virus. With extremely high elevated risks of WNV throughout the county, state and U.S., this insert couldn't have come at a better time.

The District also continued its dog and cat heartworm prevention campaign at veterinarian offices throughout the county. These offices were randomly chosen to receive heartworm prevention brochures, brochure holders and a wooden mosquito model.

The District again observed the American Mosquito Control Associations (AMCA) "Mosquito Control Awareness Week" by holding an open house at the District Headquarters.

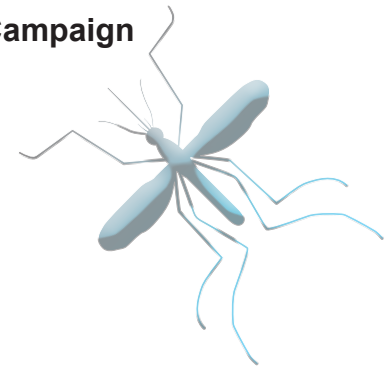
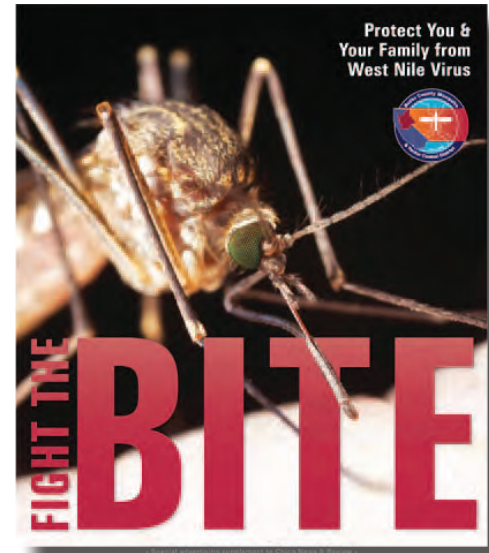
The District also continued its public information displays at the Butte County Fair in Gridley, Silver Dollar Fair in Chico, Gold Nugget Days in Paradise, Feather Fiesta Days in Oroville, Berry Creek Berry Festival, Salmon Festival in Oroville, the Gridley Expo, Red Suspenders Day in Gridley, Senior Fair in Chico, Childrens Fair in Chico, and the Community Health and Safety Fair in Oroville. The District also continued its school education programs and service group presentations throughout the County, as well as its "Report Standing Water" campaign.



*Public Awareness Banner*

## 2012 Public Education Highlights

- Chico News and Review “Fight The Bite” Insert
- Billboard Advertising Throughout the County
- Butte County Fair, Gridley (Booth)
- Silver Dollar Fair, Chico (Booth)
- Gold Nugget Days, Paradise (Booth)
- Feather Fiesta Days, Oroville (Booth)
- Berry Creek Berry Festival (Booth)
- Salmon Festival, Oroville (Booth)
- Senior Fair, Chico Area Recreation and Parks (Booth)
- Chico Association of Realtors, Chico (Presentation)
- Red Suspenders Day, Gridley (Booth)
- K-6 Classroom Presentations Throughout the County
- Butte County Agencies/Businesses “Report Standing Water” Campaign
- Chico Home and Garden Show, Chico (Booth)
- Gridley Expo, Gridley (Booth)
- Rotary Club, Gridley (Presentation)
- Community Health and Safety Fair, Oroville (Booth)
- City of Chico Management Staff, Chico (Presentation)
- AMCA National Mosquito Control Awareness Week, Open House at District Office



*District tour group*



*Feather Fiesta Days, Oroville*



*Salmon Festival, Oroville*



*Billboard advertising*



*Butte County standing water outreach campaign*



*School presentation, Chico*



*Butte County Fair, Gridley*

## GIS/GPS System

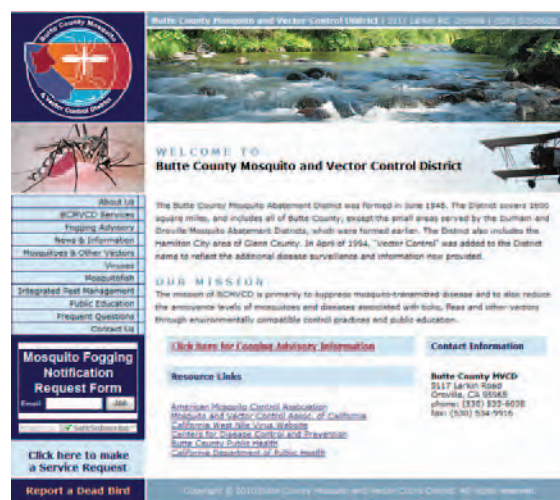
Over the past three years the District has formed a close partnership with the CSUC Geographic Information Center (GIC) in Chico, CA. to create a new geographic information system (GIS) for the District. GIS is a system that captures, stores, analyzes, manages, and presents data that is linked to a location (spatial data). In 2010 the District went “live” with the new system. This system took the place of the current system which utilizes map books, handwritten reports, and outdated handheld electronic devices called “Timewands”. The new system consists of a laptop computer for each Mosquito and Vector Control Specialist, including seasonal workers, that runs ESRI Corporations ArcMobile software and a GPS unit that connects to the laptop computer. The new GIS system also includes a data management server that is housed at the GIC in Chico and a new in-house computer that runs ESRI’s ArcGis version 9.2. This computer is used to manage source data collected from the laptops in the field and is also used as a link to the District’s Office Managers computer and the Microsoft Access database that it controls. The new system increases accuracy, facilitates user friendly reporting, minimizes data manipulation and corruption, and maximizes time efficiency.

## WWW.BCMVCD.COM

The District’s website continues to be an important tool in educating the public about mosquitoes and other vectors and the practices of the District. On the website the user can make a service request, sign up for email notification of upcoming fogging operations, and view maps of where the District will be fogging and where the District has fogged in the past. The user can also view Board of Trustee agendas and minutes, read the latest news that affects the District and their constituents, and view information on viruses and other diseases that are transmitted by mosquitoes and other vectors such as ticks. Visitors to the website may also be interested in the mosquitofish page, as well as, the services page which lists the locations in Butte County and Hamilton City where residents can pick up free mosquitofish. The services page also includes yellowjacket and wasp nest removal, tick and insect identification, and a public education section where interested parties can find out how to request the District come to their school or service group for a presentation. The website also has links to the pesticide labels and MSDS sheets for the public health pesticides that it uses, as well as, a frequently asked questions page and a “contact us” page.



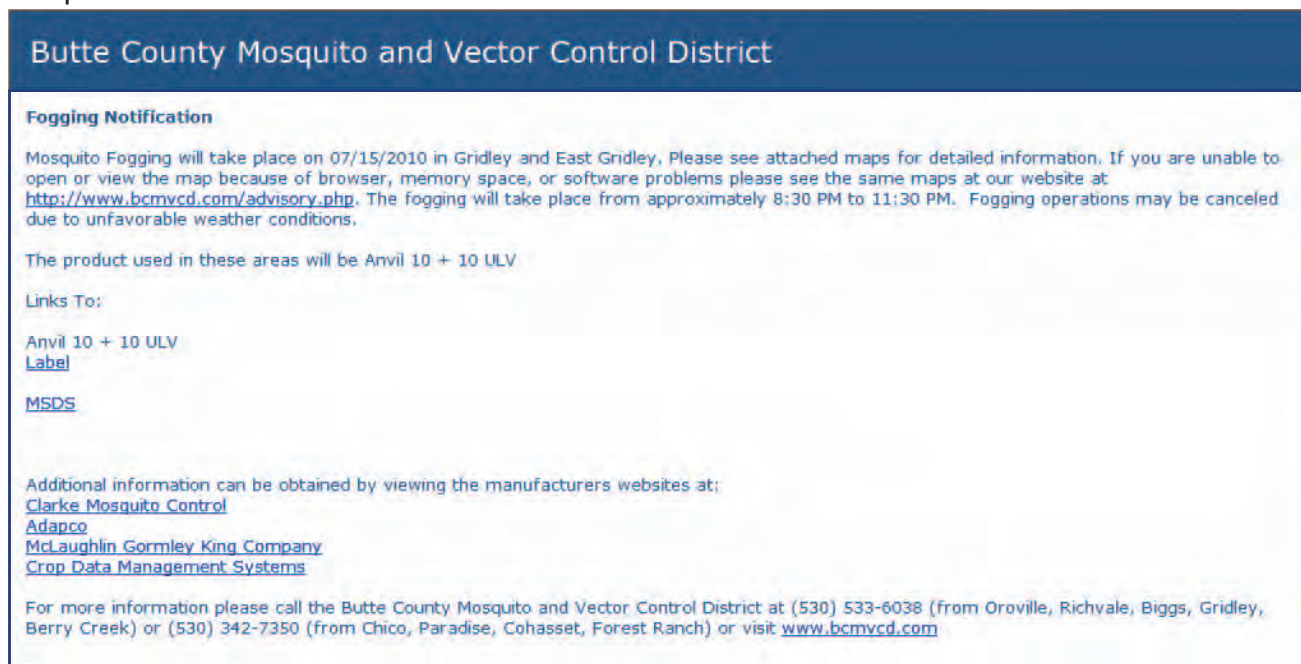
Laptop mounted inside vehicle



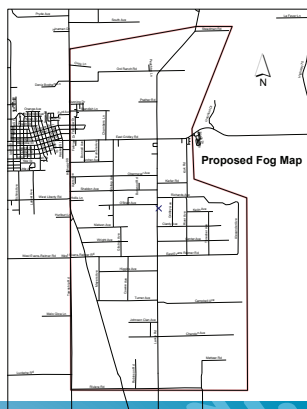
District website home page

## Email Notification System

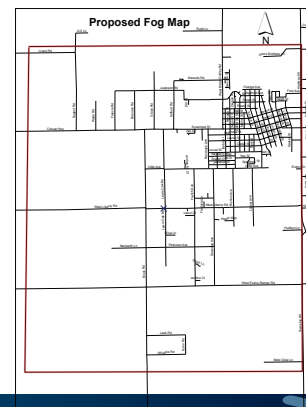
In 2011 the District continued to improve the mosquito fogging notification system. The email notification system was created to meet public concerns and expectations, to enhance media coverage, and to help inform other agencies that need to know when and where the District is mosquito fogging. The Chico Enterprise Record uses these fogging notifications in their newspaper to inform their readers of the planned fogging operations. To meet these needs the District used Constant Contact software, modeled after the award winning Contra Costa Mosquito and Vector Control District's email notification system, to compose and send out the fogging notifications via email. These email notifications are sent out, in most cases, 30 plus hours before a fogging operation takes place. The notifications include maps of the areas to be fogged, links to the labels and material safety data sheets of the public health pesticides used, the dates and times of the fogging operations, and a link to the District website. The public can sign up for email notifications on the District website, [www.BCMVCD.com](http://www.BCMVCD.com). The District website also has the fogging notifications, as well as links to the public health pesticides. The District also makes phone calls to notify residents and agencies that do not use email or have access to a computer.



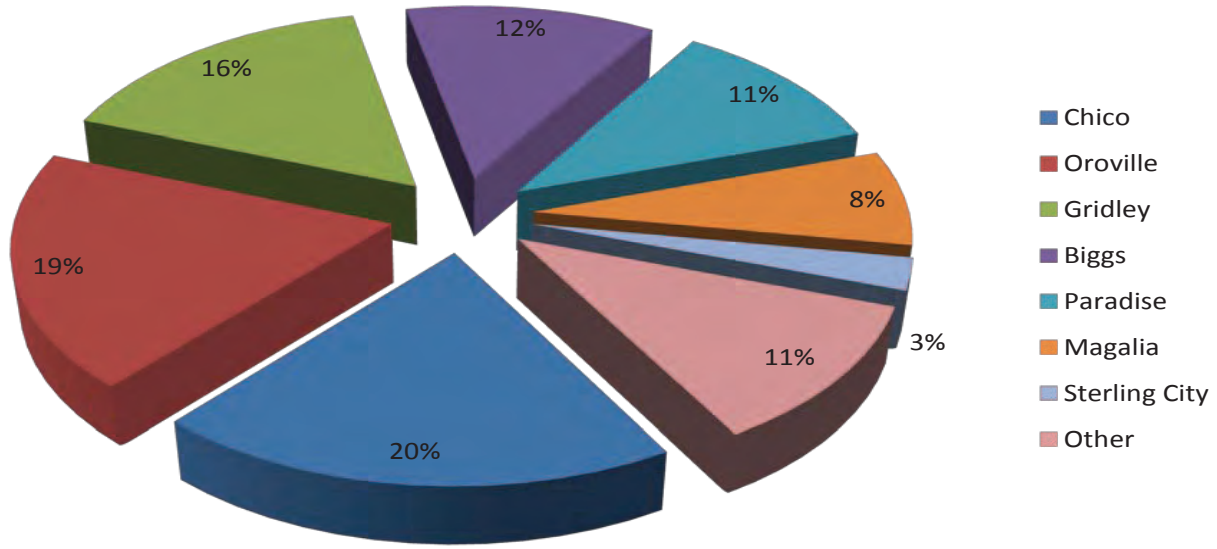
Example of Constant Contact email notification



Sample Fogging Maps



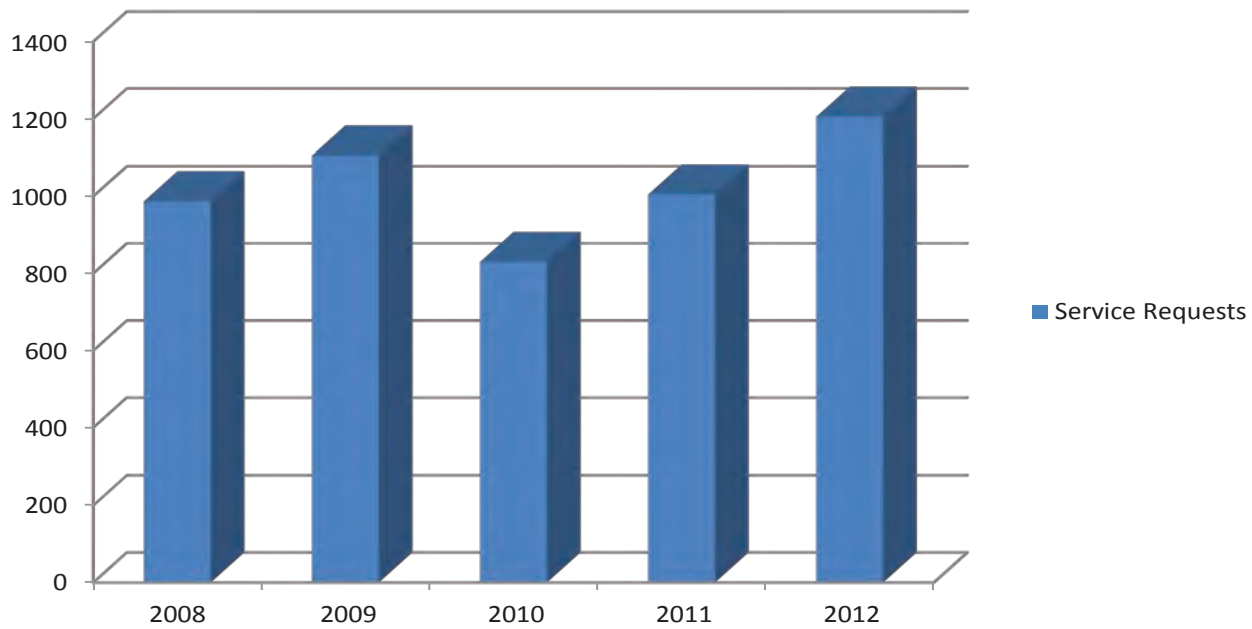
## 2012 Service Request Percentages



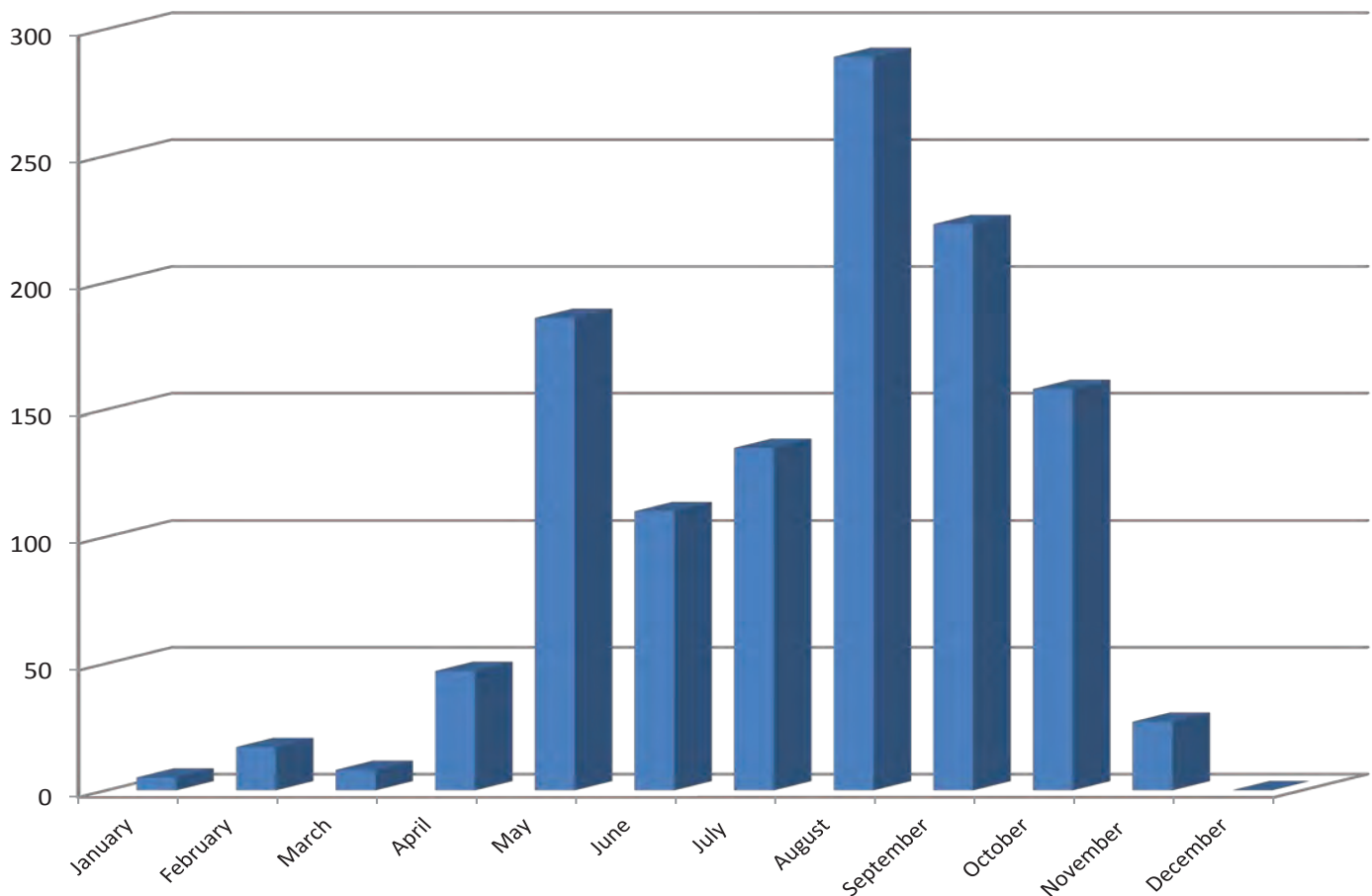
## 2012 Service Requests

Area	# of Requests	Percentages
Bangor	5	0.41
Berry Creek	24	1.99
Biggs	146	12.12
Brush Creek	1	0.08
Butte City	2	0.17
Cherokee	1	0.08
Chico	240	19.92
Clipper Mills	2	0.17
Dayton	9	0.75
Durham	2	0.17
Forbestown	7	0.58
Forrest Ranch	2	0.17
Gridley	193	16.02
Hamilton City	4	0.33
Honcut	29	2.41
Lake Madrone	3	0.25
Magalia	92	7.63
Nelson	7	0.58
Nord	4	0.33
Oroville	231	19.17
Palermo	24	1.99
Paradise	134	11.12
Richvale	10	0.83
Sterling City	31	2.57
Yankee Hill	2	0.17
<b>Totals</b>	<b>1205</b>	<b>100.00</b>

## Annual Service Requests



## 2012 Service Requests by Month



## **Vector and Vector-Borne Disease Surveillance**

The definition of a vector is any animal capable of producing discomfort or injury, including, but not limited to, mosquitoes, flies, other insects, ticks, mites, and rats but not including domestic animals according to the California State Health and Safety Code, Section 2002(K). Surveillance of vectors is a vital component of the District's Integrated Vector Management (IVM) Program and a considerable amount of time and effort is devoted to conducting vector surveillance. The District's surveillance program consists of a scientific approach for locating vector populations usually focusing on mosquito-breeding sources, monitoring mosquito populations, and mosquito-borne disease. Data collected from the surveillance program is analyzed to determine maximum and minimum risk periods of public exposure to mosquito-borne disease, evaluates control efforts, and seasonal changes in relative abundance of mosquito species. Surveillance data is collaborated in the District's database which provides historical information on mosquito dynamics and mosquito-borne disease within the District.

The District utilizes an extensive surveillance program for both adult and immature (larval) mosquitoes. Throughout Butte County and the Hamilton City area of Glenn County, the District uses 26 New Jersey light traps, 21 gravid traps, over 40 CO2 traps, and 7 sentinel chicken flocks to monitor adult mosquito populations and virus activity. District Mosquito and Vector Control Specialists monitor larval mosquito populations throughout the entire District on a daily basis utilizing a standard one-pint dipper. District Mosquito and Vector Control Specialists spend the majority of their day inspecting standing water such as rice, wetlands, storm drains, ponds, ditches, swimming pools, bird baths, fountains and other man made containers for larvae.

The District utilizes an entomology department (Lab) that is staffed with an Entomologist and a Lab Assistant. The District's entomology department is responsible for the identification of the trapped mosquito collections and reporting the population numbers to the California Department of Public Health. The Lab conducts virus testing on live mosquitoes, dead wild birds, and sentinel chicken flocks. These tests are the District's eyes to monitor and detect mosquito-borne viruses in and around the county. The Lab also conducts scientific pesticide trials to monitor the chemicals effectiveness on targeted mosquitoes and to assess the possible effects on non-targets and trials on new chemical methodology and/or new chemicals. The Lab is also at your service to identify ticks, arachnids, and other insects/arthropods of public health significance.



*Entomologist Eric Gohre checking a CO2 trap*

### **Did You Know?**

Most adult female mosquitoes live 2-3 weeks. Some species that over-winter in garages, culverts and attics can live as long as 6 months.



# Virus Surveillance

## 2012 Virus Surveillance Report

The District monitors for Western equine encephalitis (WEE), St. Louis encephalitis (SLE), California encephalitis (CE), and West Nile virus (WNV) activity by collecting blood samples from sentinel chicken flocks strategically placed throughout the District, collecting live mosquitoes trapped throughout the District, and collecting dead wild birds District wide.

### Sentinel Chicken Flocks

Annually the District maintains seven sentinel chicken flocks of eleven birds each. The flocks are located in Palermo, Honcut, Gridley, Biggs, South Chico, West Chico, and Hamilton City. Bi-weekly blood samples are taken from the sentinel chickens by the entomology staff and sent to U.C. Davis for testing. The blood sample is tested for SLE, WEE, CE and WNV. In 2012, 43 sentinel chickens from 6 of the 7 District flocks tested positive for WNV.



### Mosquito Pools

Each week the District's entomology staff strategically places traps known as encephalitis virus surveillance (EVS) or carbon dioxide traps (CO2) around the District. Traps are posted overnight and retrieved the next morning and the collections are returned to the Lab for identification. The entomology staff will identify and sort the trapped mosquitoes and pool the collections for virus testing. A pool consists of 1 to 50 adult female mosquitoes of the same specie. Pooled mosquitoes are transferred to numbered vials and sent to the Center for Vector-Borne Disease Research (CVBDR) at the University of California, Davis. At the CVBDR lab the pools are tested for WEE, SLE, CE, and WNV. In 2012 the District sent 179 mosquito pool samples with 27 returning positive for WNV. This is the highest number of WNV positive mosquito pools ever recorded in the District service area.



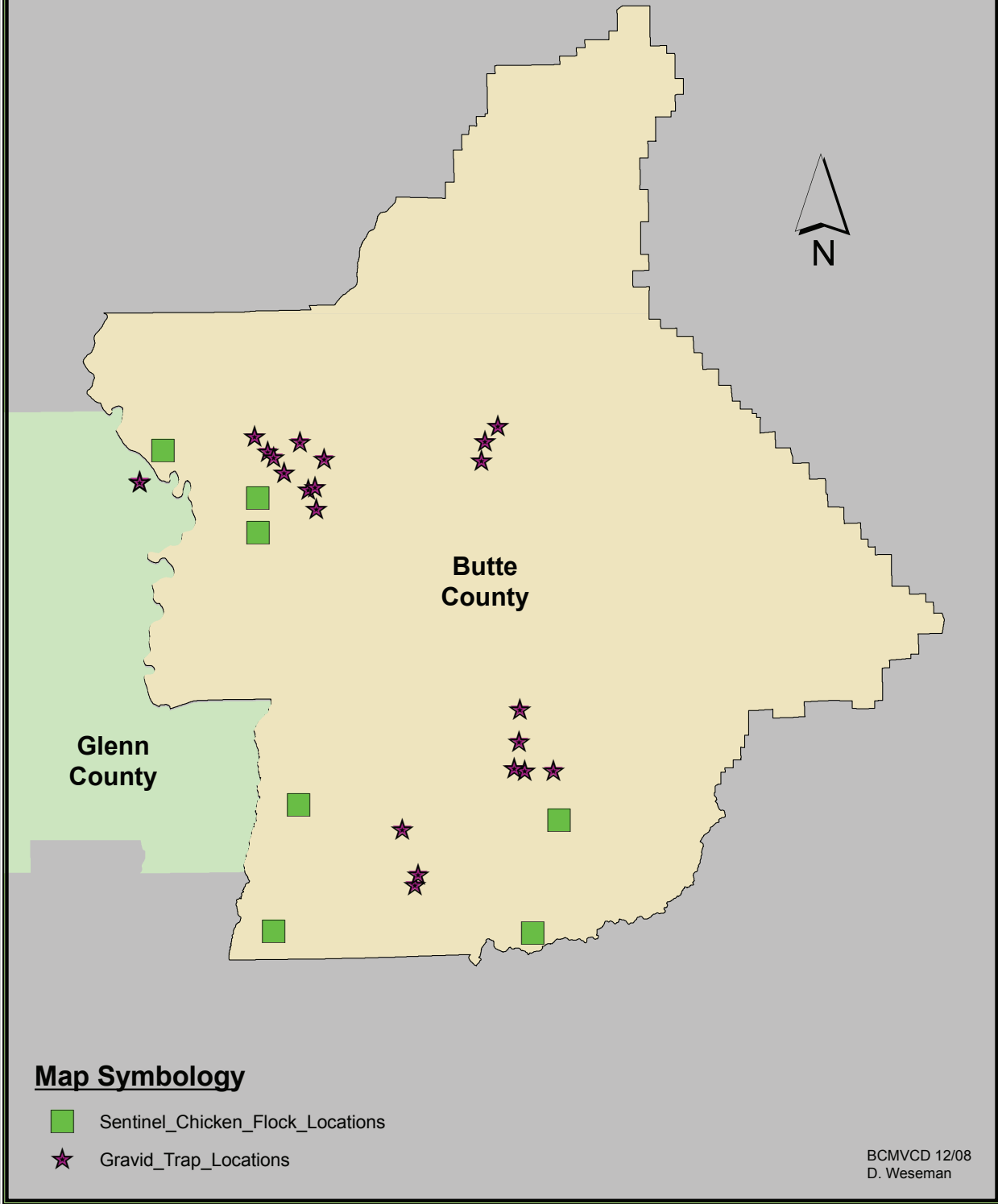
### Dead Bird Surveillance and Testing

For more than nine years the District has participated in the California Department of Public Health's (CDPH) WNV dead bird testing program. County residents participate in the program by calling CDPH's dead bird hotline (1-877-WNV-BIRD) each time they find a dead bird in the District or by submitting an online form at one of these two websites, ([www.westnile.ca.gov](http://www.westnile.ca.gov)) or ([www.BCMVCD.com](http://www.BCMVCD.com)). After a dead bird has been reported, CDPH notifies the District and District staff retrieves the bird and submits it for WNV testing.

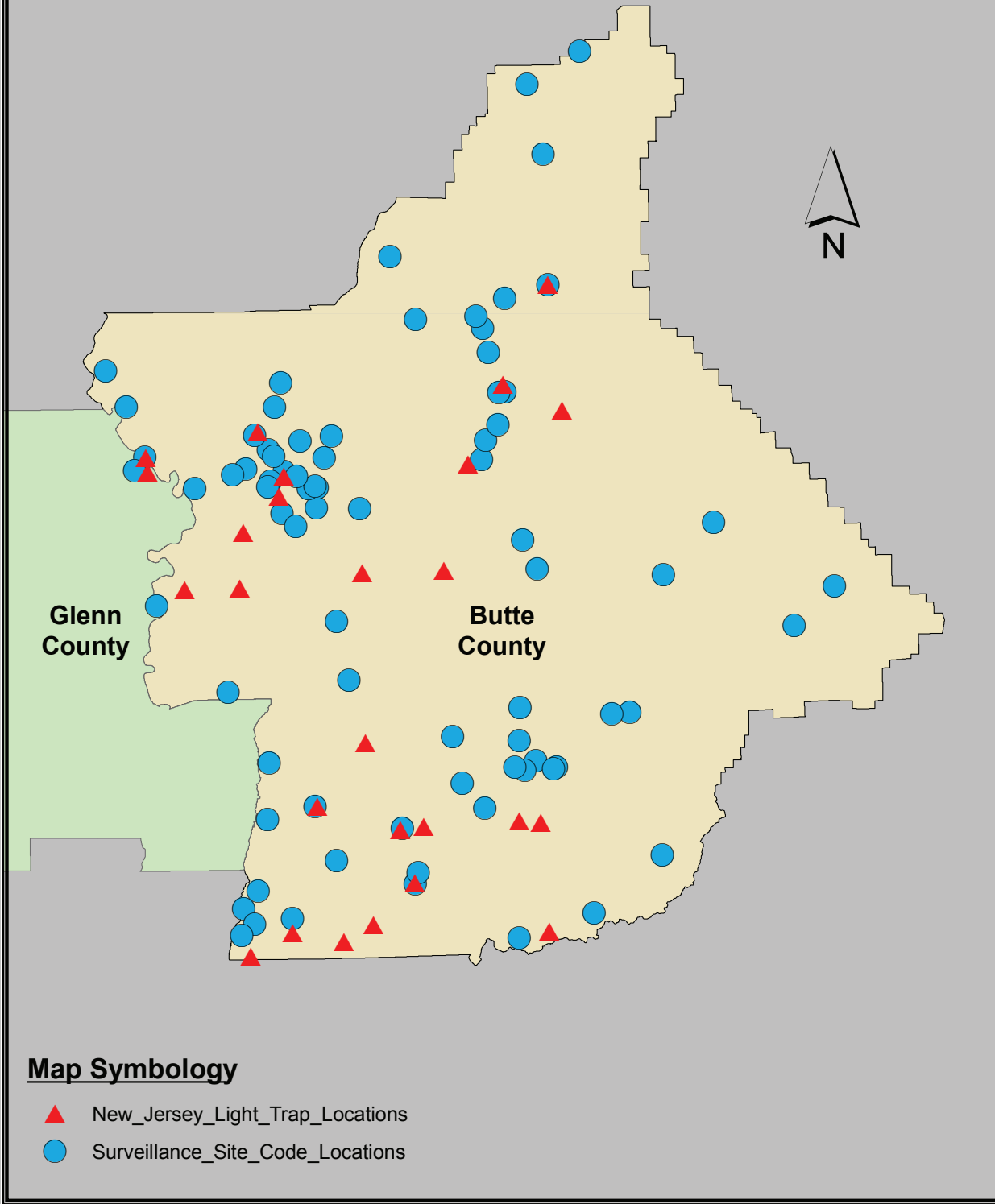
## Butte County West Nile Virus Statistics

Year	Humans	Horses	Dead Birds	Mosquito Pools	Sentinel Chickens	Squirrels
2004	7	18	118	1	50	0
2005	25	7	79	4	15	0
2006	34	0	40	1	49	1
2007	16	0	27	5	32	0
2008	5	0	38	5	31	0
2009	2	0	13	5	36	0
2010	1	1	6	7	7	1
2011	3	0	0	1	20	0
2012	10	2	53	27	43	2
<b>Total</b>	<b>103</b>	<b>28</b>	<b>373</b>	<b>56</b>	<b>283</b>	<b>4</b>

# BCMVCD Sentinel Chicken Flock and Gravid Trap Locations



# BCMVCD New Jersey Light Trap Locations and Surveillance Site Code Locations

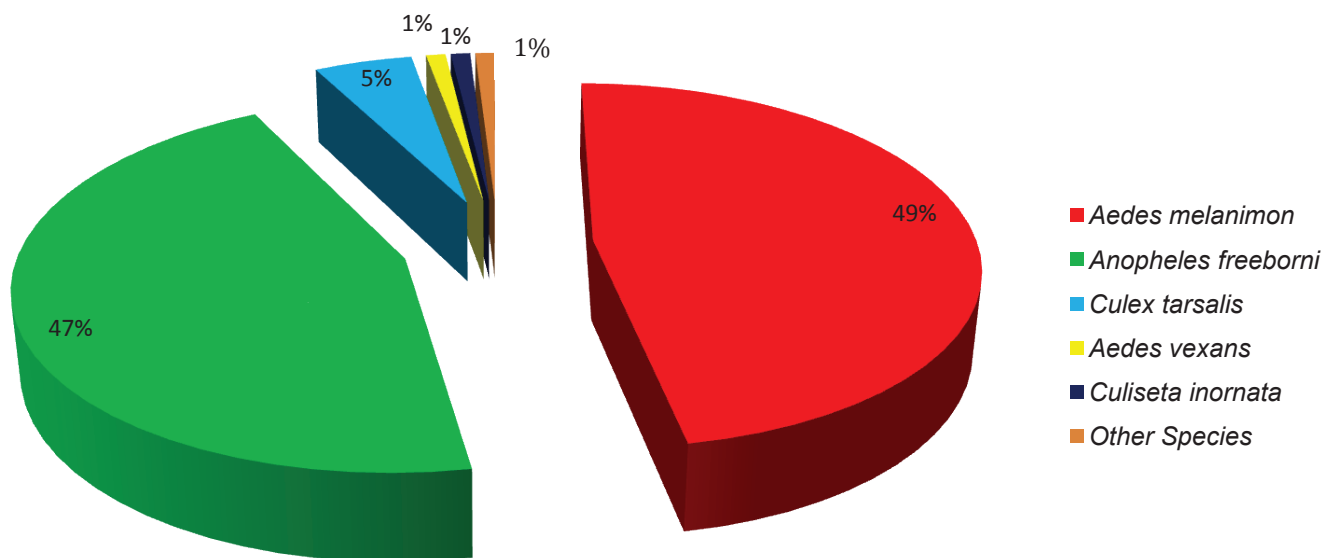


## 2012 New Jersey Light Trap Collections (Females Only) March 2012 - November 2012

Ranking	Mosquito Species	Number Collected	% (Rounded)
1	<u><i>Aedes melanimon</i></u>	172,603	48%
2	<u><i>Anopheles freeborni</i></u>	164,761	41%
3	<u><i>Culex tarsalis</i></u>	17,523	8%
4	<u><i>Aedes vexans</i></u>	2,972	1%
5	<u><i>Culiseta inornata</i></u>	2,717	1%
6	<u><i>Culex pipiens</i></u>	2,029	1%
7	<u><i>Culiseta incidens</i></u>	331	0%
8	<u><i>Aedes nigromaculis</i></u>	67	0%
9	<u><i>Aedes Sierrensis</i></u>	60	0%
10	<u><i>Aedes washinoi</i></u>	52	0%
11	<u><i>Aedes punctipennis</i></u>	19	0%
12	<u><i>Anopheles franciscanus</i></u>	11	0%
13	<u><i>Culex stigmatosoma</i></u>	11	0%
14	<u><i>Culex erythrothorax</i></u>	1	0%

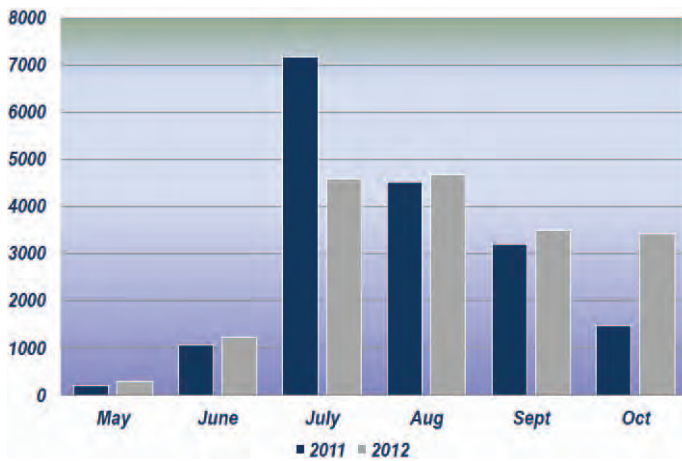
Total Identified = 353,157

100.00%

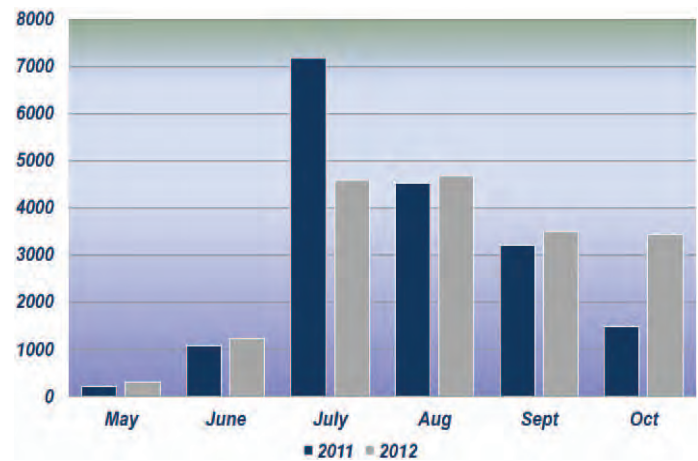


# New Jersey Light Trap Seasonal Fluctuation of Vector-Borne Disease Vectors

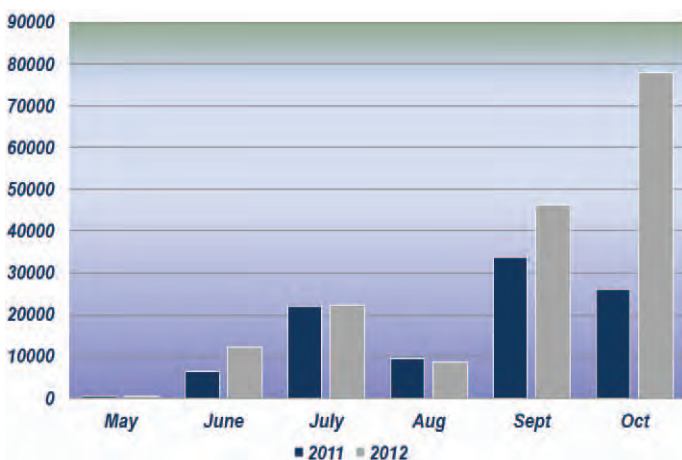
## *Culex tarsalis*



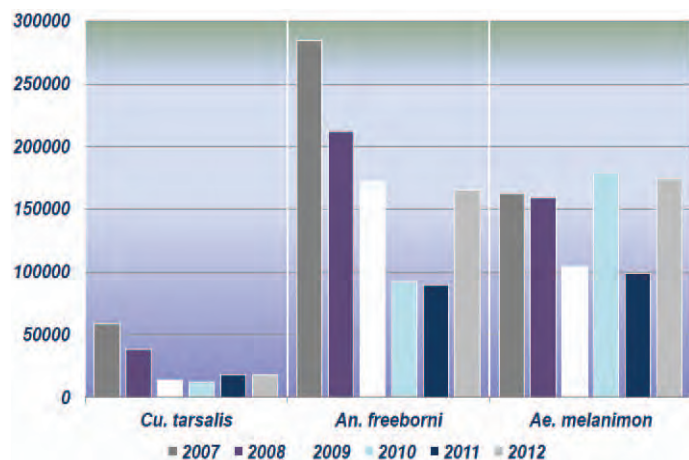
## *Anopheles Freeborni*



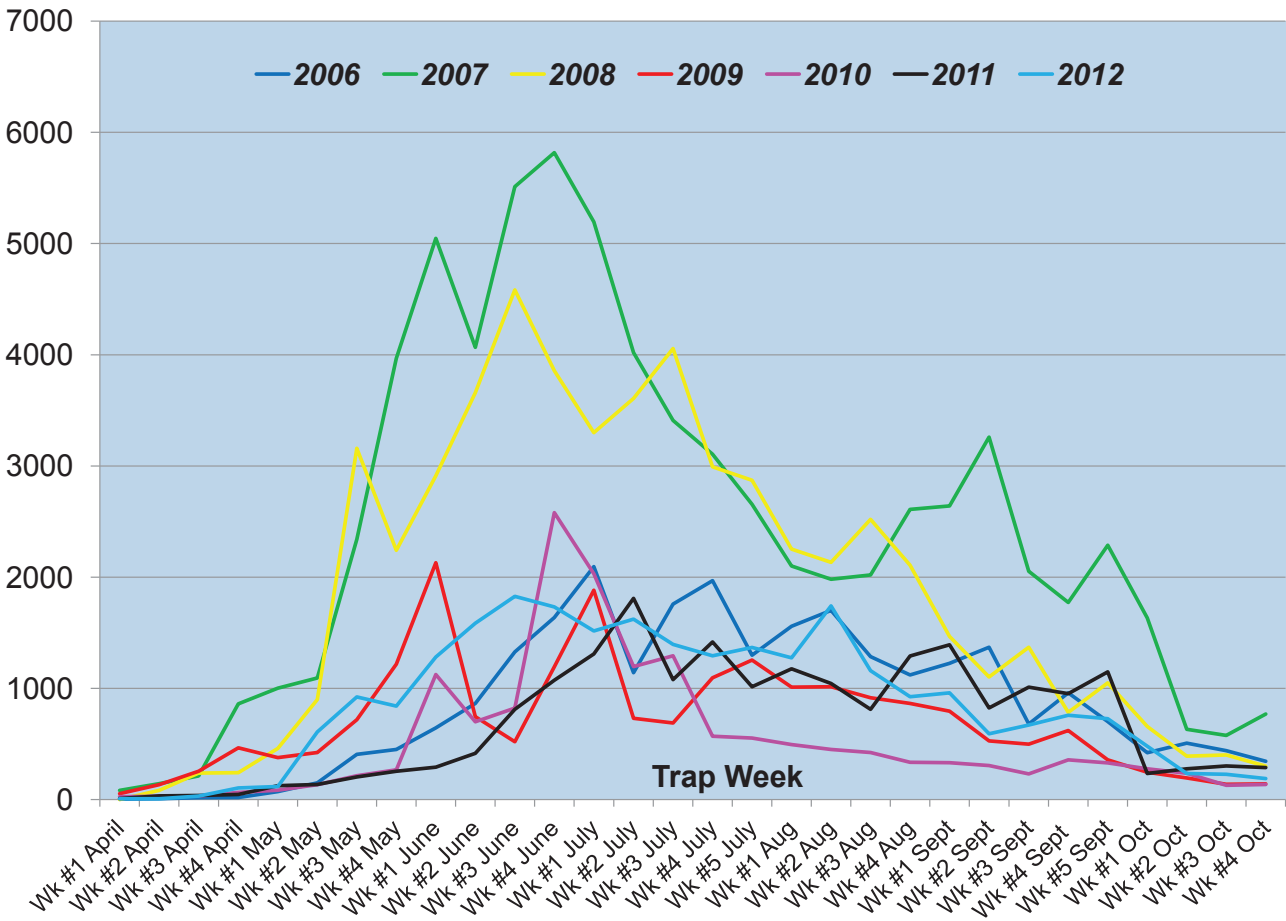
## *Aedes melanimon*



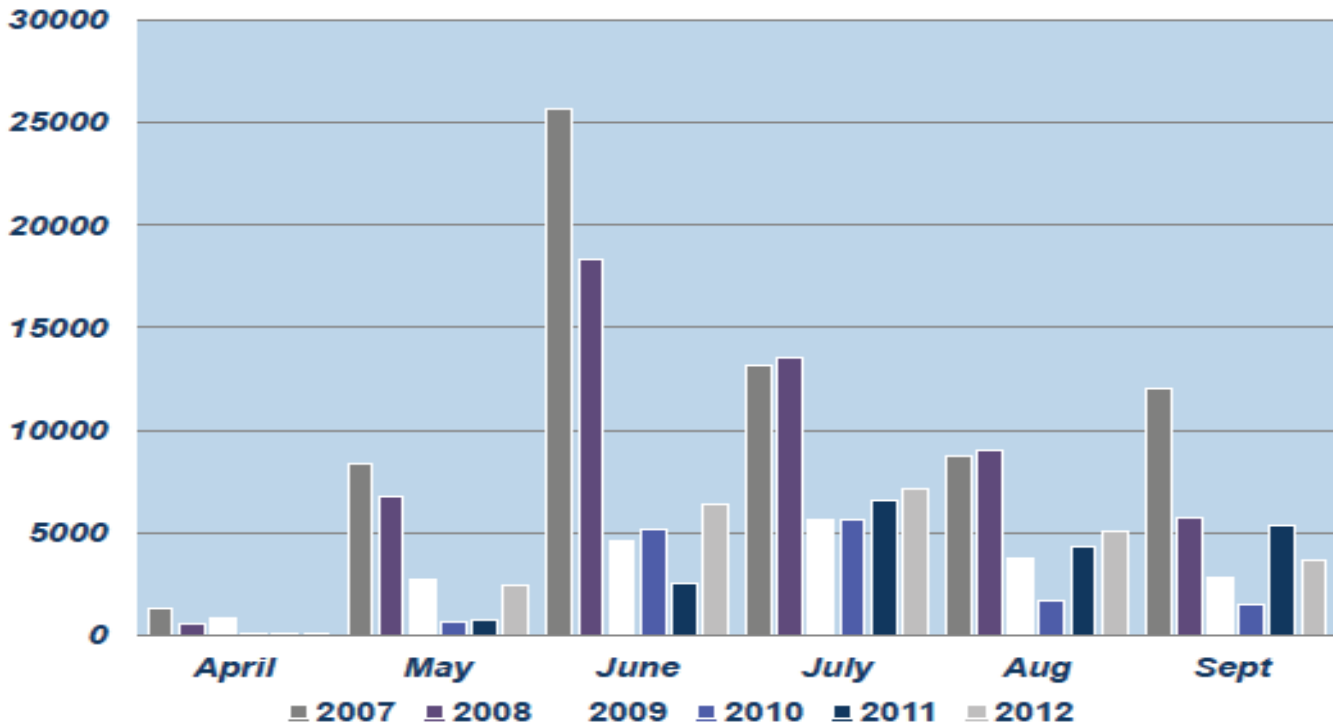
## Annual Total Female Mosquitoes



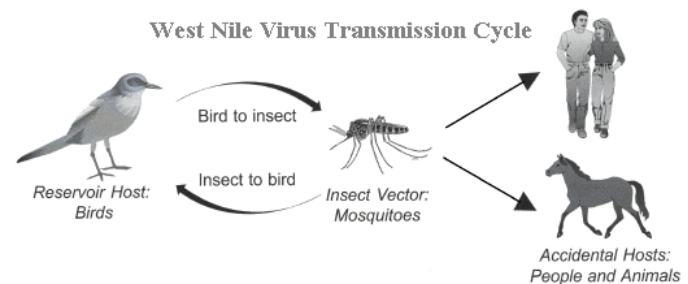
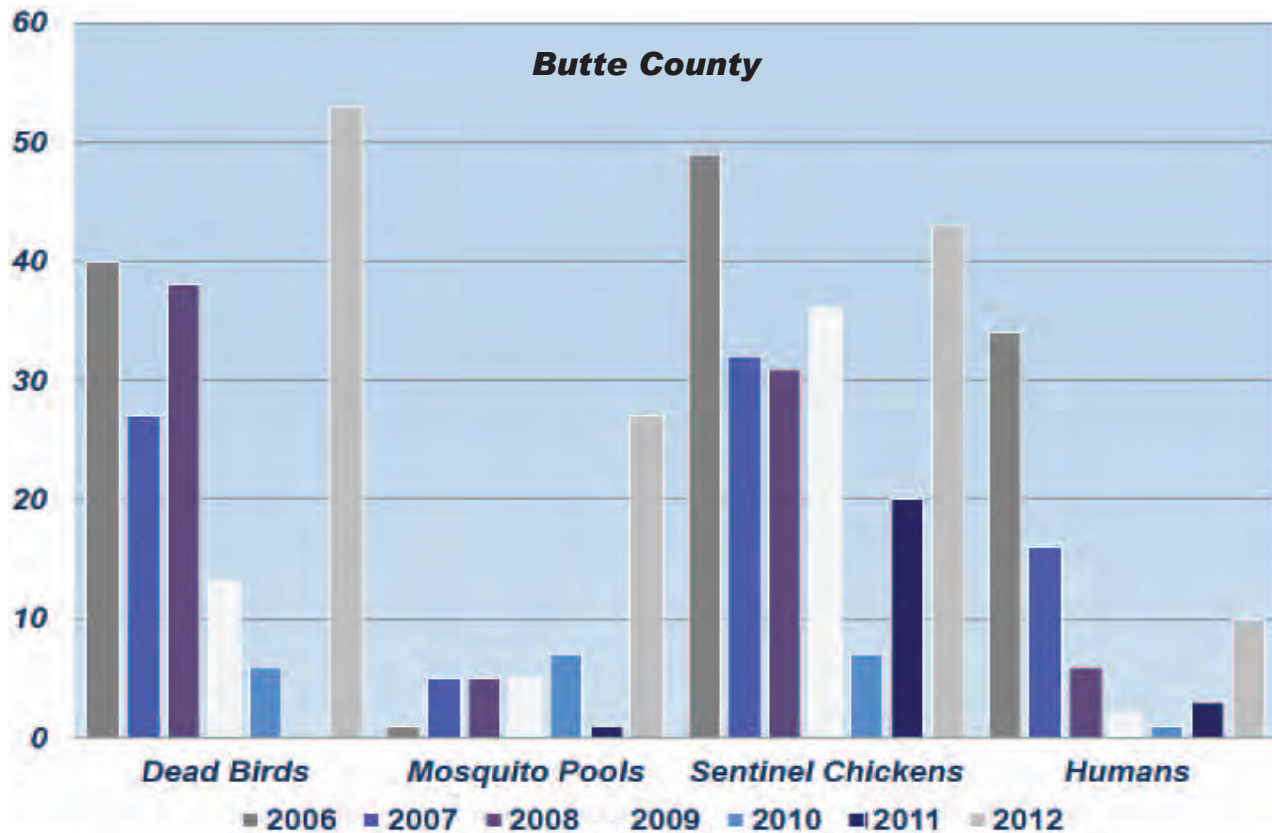
## Gravid Trap Fluctuation by Week



## Gravid Trap Fluctuation by Month



## West Nile Virus Activity



## West Nile Virus Symptoms

### Serious Symptoms in a Few People

About one in 150 people infected with West Nile virus (WNV) will develop severe illness. The severe symptoms can include high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness, and paralysis. These symptoms may last several weeks, and neurological effects may be permanent. WNV infection can be fatal.

### Milder Symptoms in Some People

Up to 20 percent of the people who become infected will display symptoms including fever, headache and/or body aches, nausea, vomiting, and sometimes swollen lymph glands or a rash on the chest, stomach, and back. Symptoms can last as little as a few days to several weeks.

### No Symptoms in Most People

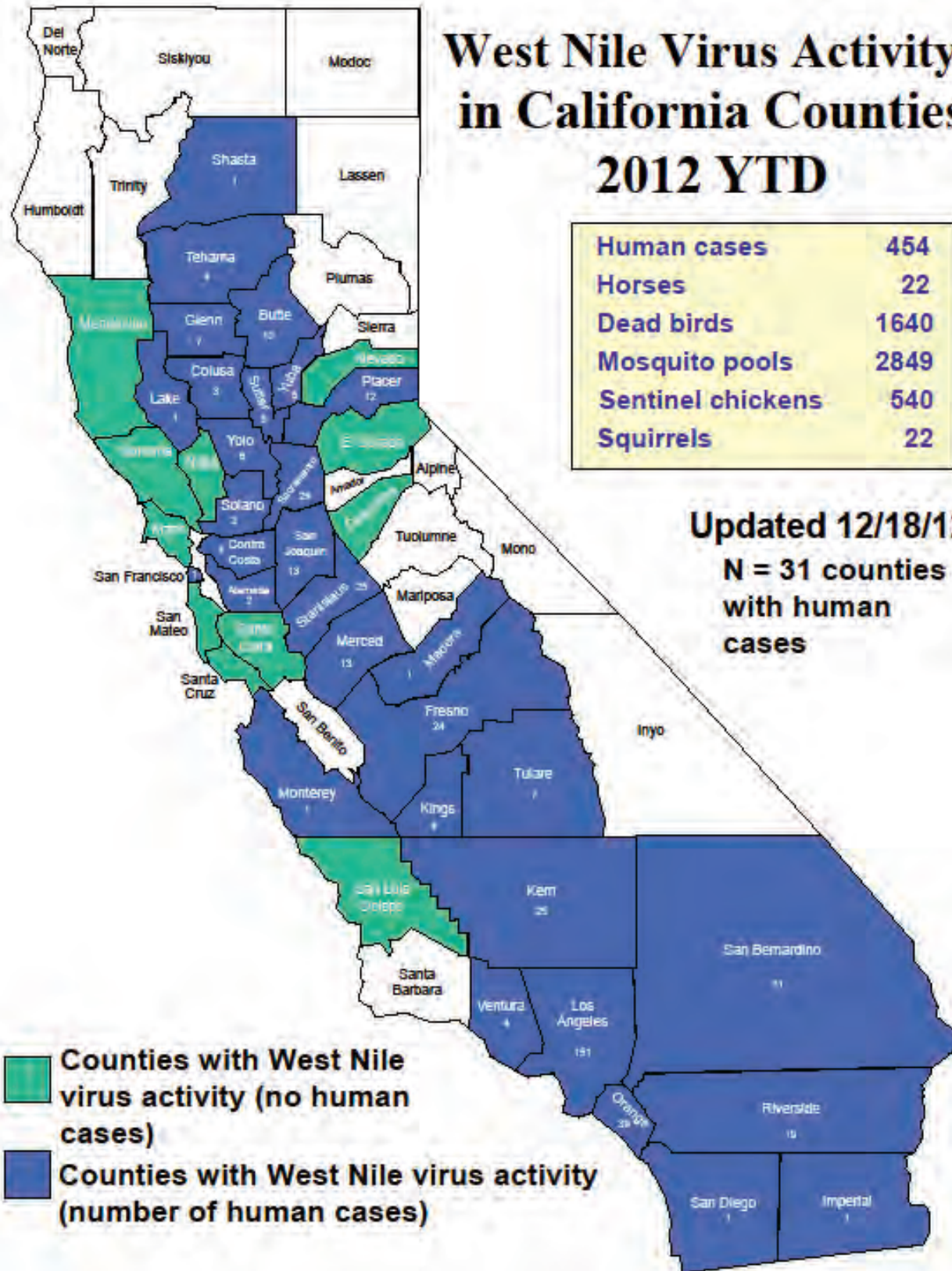
Approximately 80 percent of people (about 4 out of 5) who are infected with WNV will not have any symptoms at all.

# West Nile Virus Activity in California Counties 2012 YTD

Human cases	454
Horses	22
Dead birds	1640
Mosquito pools	2849
Sentinel chickens	540
Squirrels	22

Updated 12/18/12

N = 31 counties  
with human  
cases





## **Biological Control**

Biological control is the intentional use of mosquito pathogens, parasites or predators to reduce the size of target mosquito populations to tolerable levels. The most popular and successful biological tool that is used by the District is the mosquitofish, *Gambusia affinis*. The District has tried other biological control methods and will continue to fully explore any new options that come along, but the most effective biological tool the District currently uses is the mosquitofish. Butte County Mosquito and Vector Control District maintains six fishponds at the Oroville Headquarters. These ponds produce hundreds of pounds of mosquitofish each year. The mosquitofish are routinely stocked and planted by District Mosquito and Vector Control Specialists to control mosquito populations in sources such as irrigation ditches, industrial, ornamental and artificial ponds, un-maintained swimming pools, semi-permanent and permanent urban sources, and at times in rice fields and wetlands. Mosquitofish are omnivorous and have a voracious appetite for mosquito larvae. The flattened head and protruding mouth enable the fish to readily prey on surface feeding mosquito larvae and pupae. A large female can consume up to 500 larvae per day! All ages, sexes, and sizes of these fish eat mosquito larvae, other small aquatic invertebrate insects, and algae. The fish are visual predators and feed during daylight hours.

Due to insecticide resistance and environmental concerns associated with chemical control methods, biological control methods are expanding as an effective tool used in the control of mosquitoes.

**Mosquitofish (Gambusia Affinis) 2012**

<b>Mosq. Breeding Source Treated</b>	<b>Ibs. of Fish Planted</b>	<b>Acres Treated</b>	<b>Apps. Made</b>
Stock Pond	0.83	1.04	5.00
Dredger Pit/ Ponds	2.00	5.14	9.00
Irrigation (Canal, Ditch, Pond,)	32.77	68.12	111.00
Sump	0.91	0.36	5.00
Irrigation Tailwater/Leaks	0.11	0.21	2.00
Managed Wetlands	77.50	1316.50	31.00
Seepage	1.04	2.03	9.00
Water Trough	6.93	22.86	39.00
Field Drain	51.59	82.70	126.00
Dist. Grounds/Fish Ponds	117.00	4.40	45.00
Residential Fish Pond	11.42	16.57	147.00
Swimming Pool/Ornamental/Spa	12.79	16.15	102.00
Residential Misc. Container	8.80	0.74	137.00
Public Domain/Flood Control	0.14	1.13	11.00
Freeway/Road Drain	0.55	0.35	7.00
Sewage Ponds	1.25	5.25	5.00
Service Requests	2.46	3.27	6.00
Retention Detention/Ponds	0.63	1.18	5.00
Industrial Commercial	0.15	0.30	1.00
Misc. Container/Storage Bins	17.06	2.95	95.00
Natural Sources/Wildlife Area	4.75	77.10	4.00
Channel/Depressions	0.20	0.40	2.00
Pond, Seepage, Slough, Creek	21.95	44.56	76.00
Sentinel Fish Tanks	571.00	1142.00	97.00
Large Area/Many Source Type	2.00	0.04	4.00
<b>Annual Totals</b>	<b>945.83</b>	<b>2815.35</b>	<b>1081.00</b>



*Mosquitofish eating mosquito larvae*

### **Did You Know?**

Most adult female mosquitoes live 2-3 weeks. Some species that over-winter in garages, culverts and attics can live as long as 6 months.

## Mosquitofish Pick Up Locations

Skyway Feed and Supply  
5990 Foster Road  
Paradise 877-1019

Foothill Mill and Lumber Company  
1698 Wagstaff Road  
Paradise 877-3395

Mendon's Nursery  
5424 Foster Road  
Paradise 877-7341

Paradise Pines True Value Hardware  
14086 Skyway  
Magalia 873-1008

C Bar D Feeds  
3388 Hwy 32  
Chico 342-5361

Magnolia Gift & Garden  
1367 East Avenue  
Chico 894-5410

Wilbur's Feed & Seed  
139 Meyers Street  
Chico 895-0569

The Pine's Yankee Hill  
11300 Miller Flat Road  
Oroville 534-1265  
Hwy 70 just east Concow Road

Rosa's Nursery  
585 Main Street  
Hamilton City 826-0559

Harshbarger Ace Hardware  
1626 Highway 99  
Gridley 846-3625

District Office  
5117 Larkin Road  
Oroville 533-6038

Chico Substation (By Appointment)  
444 Otterson Drive  
Chico 342-7350

\*Mosquitofish are not to be planted in creeks, streams, and rivers.



*"Mosquitofish Available Here" sign*



*"Seigning" a pond*



*Mosquitofish Eating mosquito larvae*

## **Chemical Control**

Chemical control is the use of target specific insecticides to reduce immature and adult mosquito populations. These chemicals are only applied when physical control, public education, and biological control methods are unable to keep mosquito populations tolerable or when emergency control measures dictate the use of chemicals to rapidly terminate or disrupt the transmission of disease to humans. There are two categories of chemicals used by the District, larvicides and adulticides. Larvicides target mosquito larvae and pupae. Adulticides target adult mosquitoes. The chemicals used by the District are registered with the United States Environmental Protection Agency (EPA), as well as the California Environmental Protection Agency (CAL EPA). The District relies mainly on larviciding as the primary means of chemical mosquito control. However, there are limitations to larviciding as a main control strategy. In Butte County where mosquito breeding occurs over large areas, the practical application of larvicides is not feasible and periodic adulticiding is necessary to protect nearby communities from the attack of adult mosquitoes. Also, there are areas that are environmentally sensitive and limit the use of larvicides. In these areas peripheral adulticiding is the only available option.



*Ag-Cat treating a wetland for mosquito larvae*



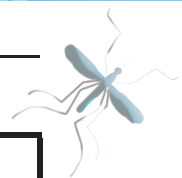
*Power spraying a pond*



*Droplet testing the foggers*



*"Back canning"*



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Materials	Amount of Materials	Acres Treated	# of Applications
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**Larvicides**

Abate 4E	0.04 gal.	6.00	6
Altosid XR Briquettes	11.17 lbs.	0.20	46
Altosid SR-20	0.13 lbs.	16.10	10
Agnique	1.99 lbs.	8.74	71
Golden Bear	645.59 gal.	228.49	722
Natular G	280.03 lbs.	46.67	1
Skeeter Abate	1 lbs.	0.57	2
Vectobac 12AS	1679.55 gal.	23873.86	436
Vectobac G	88167.65 lbs.	9875.10	226
Vectolex CG	14 lbs.	0.93	1
Vectolex WDG	10 lbs.	30.00	15
Vectolex WSP	291.56 lbs.	394.73	999
		<b>34,481.38</b>	<b>2535</b>

**Adulticides**

Anvil 10 + 10	617.44 gal.	192821.70	1700
Aquahault	680.09 gal.	127800.80	27
Kontrol	69.61 gal.	6891.15	162
Pyrethrin 5%	1.65 gal.	254.00	5
Pyrethrin 12%	105.84 gal.	43551.71	6
		<b>371,319.36</b>	<b>1900</b>

**Barrier Spray**

Suspend	12.40 gal.	39.21	183
		<b>39.21</b>	<b>183</b>

**Yellow Jacket Control**

Drione	1 lbs.	0.99	11
Knox Out 2 FM	0.15 gal.	0.45	38
		<b>1.44</b>	<b>49</b>

**Herbicides**

Aquamaster	1.18 gal.	1.92	11
Round Up pro Max	3.48 gal.	5.66	28
Dimension	0.3 gal.	0.87	1
		<b>8.45</b>	<b>40</b>

**Aircraft Spraying**

Total Acres Treated	<b>204,858.20</b>
Total Acres Rice	<b>24,180.84</b>
Managed Wetlands	<b>9,921.77</b>
Total Acres ULV	<b>170,755.51</b>



## Going Green

In an effort to reduce its “carbon footprint” the District continually looks for ways to “go Green”. One of the first steps in doing this was the purchase of an electric powered Zap pickup. This pickup is currently being used as a yard utility vehicle at the District headquarters in Oroville. This pickup is used for many applications where a gas powered pickup or a forklift were used in the past. Additionally, the pickup is used during mosquito season in urban areas for larval surveillance and control. The District has also purchased an electric powered forklift for its Chico substation. Another step in the District’s going green plan was the purchase of four bicycles. The four bikes are used mainly in Chico to treat storm drains. These bikes are especially handy in the downtown Chico area where parking and accessibility can be an issue. The Mosquito and Vector Control Specialist’s that ride the bikes can triple their days workload, reaching many more mosquito populations in much less time.



Electric “Zap” truck



Checking standing water for mosquito larvae

## Programmatic Environmental Impact Report

In 2011, the District completed its Programmatic Environmental Impact Report (PEIR). The District held a public hearing to receive comments on the District’s Draft PEIR on February 9, 2011. After receipt of comments from the State of California Department of Public Health, and from trustees, the draft PEIR was revised and a Final PEIR was available for review between February 10, 2011 & August 5, 2011. Upon conclusion of the second review period and a second public hearing on August 10, 2011 the District’s Board of Trustees adopted the District’s Final PEIR report compiled by Westech Company with changes and mitigations. This report will be used as an educational component for the District. Residents can view the EIR on the District’s website at [www.BCMVCD.com](http://www.BCMVCD.com).



Granular testing



Droplet testing

## Tick Surveillance

Tick surveillance in Butte County is done primarily because of the diseases that ticks can transmit. In the United States ticks are known to transmit 14 human illnesses. The two that infect humans most often are Lyme disease and Rocky Mountain Spotted Fever (RMSF). Lyme disease is an infectious disease caused by a bacterium known as a *Borrelia burgdorferi*. People get Lyme disease when a tick infected with the Lyme disease bacterium attaches and feeds on them. The tick that is responsible for spreading Lyme disease in Northern California is the Western Black-legged tick. RMSF is a bacterial disease caused by the bacterium, *Rickettsia*. Transmission of the RMSF bacteria is primarily from the Pacific Coast Tick. Both of these ticks can be readily found in Butte County.

District tick surveillance consists of “flagging” and identifying. “Flagging” is where a 3 x 2 piece of thick, fibrous cloth, is dragged along the edge of a trail or dirt road. The ticks attach themselves to the cloth while they are “questing” for a blood meal. Like a mosquito, the female tick needs a blood meal to lay her eggs. Once the ticks are attached to the cloth they are identified, counted, and recorded. This information can lead to risk assessment warnings to residents in areas high in tick activity.



Tick “flagging”



Locating tick on the “flag”



Western Black Legged tick



California State Parks caution sign

## ***Yellow Jacket Surveillance***

Yellowjackets are medium sized black and yellow wasps (sometimes black and creme) that are often confused with honey bees, paper wasps, mud daubers, and other wasps. Yellowjackets are social insects that are considered beneficial. They can feed on garden pests and pollinate crops through daily foraging. Yellowjackets can become a public health concern because of their territorial behavior and their affinity for human food and drinks. Yellowjackets can restrict or prevent outdoor activities in areas such as campgrounds, picnic areas, and backyards.

The District will respond to reports of high yellowjacket activity. Mosquito and Vector Control Specialists will then inspect the area and decide if control is appropriate. Control measures may include placing traps or bait, treating nests with an approved insecticide, or physically removing the nest. All pesticide applications are made by state-certified technicians using materials that are registered for use by the Environmental Protection Agency.



*Locating the nest entrance*



*"Dusting" the nest*



*110 pound nest that was dug up*



*Size comparison between queen (L) and worker (R)*

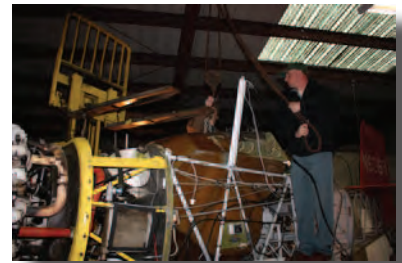
## ***District Shop***

At the Oroville facility, the District employs one full time Mechanic and one seasonal Shop Assistant. The District's shop provides the maintenance and repairs for 30 vehicles, 3 forklifts, 1 backhoe, 3 ATV's, 2 amphibious Tritons, 1 nurse truck and 4 utility trailers. Additionally, the shop is responsible for the maintenance and repairs to the District's electric ULV foggers, gas ULV foggers, back cans, power sprayers, small engines such as chain saws, weed eaters, lawn mowers, etc. and other mechanical items. The shop is also responsible for repairing and installing improvements to the District facilities and grounds when and where necessary. Often the shop will repair the District's security system, lighting fixtures, plumbing fixtures, and other items as needed.



## ***District Air Operations***

At the Oroville facility, the District employs one full time Pilot II. On average the planes make applications to over 150,000 acres each year. During down time, the 3 planes receive repairs and technological improvements such as new instruments and instrument panels, installation of new technology (altimeter, Satloc, Ag-Nav), repainting, replacing engine parts, and routine annual maintenance. The Pilot II also is responsible for renting a passenger plane and providing aerial surveillance flights over seasonally flooded wetlands and duck clubs for the District's Mosquito and Vector Control Specialists.



## ***District Administration***

Greeted by a nice smile and a pleasant tone, professional and courteous customer service is the number one priority for the District's administration staff. The District employs one full time Office Manager and one full time Office Assistant. The tasks of the administrative personnel involve serving the residents of Butte County and Hamilton City, as well as, the employees of the District. Accounting, budgeting, responding to telephone inquiries, maintaining public records, coordinating policies, and reporting to the Board of Trustees are just a few of the many duties the department performs.





## **2012 Butte County Mosquito and Vector Control District Board of Trustees**

<b>Name</b>	<b>Title</b>	<b>Area Represented</b>	
Albert Beck	Board President	County District 1	Bill Connelly
Dan Hutfless	Board Trustee	County District 2	Larry Wahl
Charles Bird	Board Vice President	County District 3	Maureen Kirk
Jack Bequette	Board Trustee	County District 4	Steve Lambert
Allan Seefeldt	Board Trustee	County District 5	Kim Yamaguchi
Bo Sheppard	Board Trustee	City of Biggs	Mark Sorenson
Larry Kirk	Board Trustee	City of Chico	David Burkland
Jerry Ann Fichter	Board Assistant Secretary	City of Gridley	Rob Hickey
Terry Mallan	Board Trustee	Town of Paradise	Town Council
Tom Anderson	Board Secretary	Hamilton City	Bd of Supervisors
Gordon Andoe	Board Trustee	City of Oroville	City Council

## **2012 Butte County Mosquito and Vector Control District Employees**

<b>Name</b>	<b>Title</b>
Matt Ball	Manager
Dan Moench	Assistant Manager
Del Boyd	Pilot II
Darlene Starkey	Office Manager
Eric Gohre	Entomologist II
Bill Kunde	Regional Supervisor
Doug Weseman	Public Information Officer
Pete Gibson	Mechanic
Jim Richards	MVCS
Beth Vice	MVCS
Phillip Henry	MVCS
Shane Robertson	MVCS
Don Lasik	MVCS
Aaron Goff	MVCS
Glen Williams	MVCS
AAaron Lumsden	MVCS
Ryan Rothenwander	MVCS
Jodi Sneeringer	Office Assistant
Kurtis Upton	MVC Assistant Seasonal
Patrick Self	Shop Assistant Seasonal
Zac Baroni	MVC Assistant Seasonal
Eric Dillard	MVC Assistant Seasonal
Dusty Alger	MVC Assistant Seasonal
Richard Roelofson	MVC Assistant Seasonal
John Fox	MVC Assistant Seasonal
Anthony Visconte	MVC Assistant Seasonal
Melissa Murphy	Lab Assistant Seasonal
Frank Lopez	MVC Assistant Seasonal
Jerry Mambretti	MVC Assistant Seasonal
Shane Cassity	MVC Assistant Seasonal

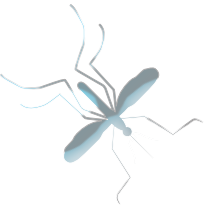
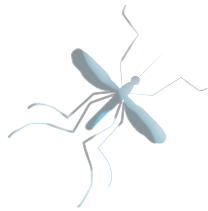
### **Board Member Retires After 10 Years**

Dan Hutfless has just completed 10 years of service as a Trustee for the District. Dan announced at the October meeting that he wished to step down. The District's Board and staff would like to thank Dan for his commitment and dedication over the past 10 years. Dan was a valued member of the Board and District and he will be missed. Thank you Dan for a job well done!



Dan Hutfless

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Butte County Mosquito and Vector Control District				
For The Year Ended June 30, 2012				
				Variance
		Budgeted	Actual	Favorable
				(Unfavorable)
<b>Revenue</b>		\$ 2,438,000	\$ 2,907,468	\$ 469,468
<b><u>SALARIES &amp; BENEFITS</u></b>				
Salaries		\$ 1,316,000	\$ 1,236,958	\$ 79,042
Workers Compensation		\$ 36,000	\$ 34,000	\$ 2,000
FICA & U I		\$ 113,000	\$ 108,990	\$ 4,010
Health Insurance		\$ 295,000	\$ 250,904	\$ 44,096
PERS		\$ 218,000	\$ 232,045	\$ (14,045)
	<b>TOTAL</b>	\$ 1,978,000	\$ 1,862,897	\$ 115,103
<b><u>SERVICES &amp; SUPPLIES</u></b>				
Gas & Oil		\$ 110,000	\$ 81,140	\$ 28,860
Repairs & Parts-Airplane		\$ 13,000	\$ 3,553	\$ 9,447
Repairs & Parts		\$ 25,000	\$ 22,875	\$ 2,125
Office Supplies		\$ 15,000	\$ 13,094	\$ 1,906
Education & Publicity		\$ 20,000	\$ 18,520	\$ 1,480
Insecticides		\$ 461,000	\$ 354,048	\$ 106,952
Expendable Equipment		\$ 20,000	\$ 14,005	\$ 5,995
Communications		\$ 13,000	\$ 11,610	\$ 1,390
Travel		\$ 10,000	\$ 8,268	\$ 1,732
Utilities		\$ 18,000	\$ 16,047	\$ 1,953
Special Services		\$ 85,000	\$ 67,589	\$ 17,411
Trustee Allowance		\$ 12,000	\$ 11,500	\$ 500
General Insurance		\$ 70,000	\$ 66,820	\$ 3,180
Employee Trng & Dues		\$ 7,000	\$ 15,246	\$ (8,246)
District Fees and Permits		\$ 30,000	\$ 27,193	\$ 2,807
Miscellaneous		\$ 10,000	\$ 11,198	\$ (1,198)
Research Supplies		\$ 26,000	\$ 21,745	\$ 4,255
Alternate Technology		\$ 4,000	\$ 835	\$ 3,165
Special Discretionary		\$ 10,000	\$ 6,035	\$ 3,965
Gambusia		\$ 2,000	\$ 1,564	\$ 436
	<b>TOTAL</b>	\$ 961,000	\$ 772,885	\$ 188,115
<b><u>CAPITAL OUTLAY</u></b>				
Bldg & Improvements		\$ 20,000	\$ 9,882	\$ 10,118
Vehicles		\$ 50,000	\$ 19,956	\$ 30,044
Spray Equipment		\$ 23,000	\$ 20,292	\$ 2,708
Aircraft		\$ 13,000	\$ 6,573	\$ 6,427
Office Equipment		\$ 2,000	\$ -	\$ 2,000
Laboratory Equipment		\$ 2,000	\$ -	\$ 2,000
Shop Equipment		\$ 2,000	\$ -	\$ 2,000
Education & Publicity		\$ 2,000	\$ -	\$ 2,000
Miscellaneous		\$ 1,000	\$ -	\$ 1,000
Communications		\$ 20,000	\$ 10,000	\$ 10,000
	<b>TOTAL</b>	\$ 135,000	\$ 66,703	\$ 68,297
Appropriation for contingencies		\$ 737,400	\$ -	\$ 737,400
<b>Grand Total</b>		\$ 3,811,400	\$ 2,702,485	\$ 1,108,915
Excess(Deficiency) of				
Revenue over Expenditures		\$ (1,373,400)	\$ 204,983	\$ 1,578,383
Fund Balance 2011			2,977,840	
Fund Balance 2012			3,182,824	

**Butte County Mosquito and Vector Control District  
Balance Sheet  
Governmental Funds  
For The Year Ended June 30, 2012**

**Assets**

Cash and Investments	2,663,817
Accounts receivable	51,879
Interest receivable	8,410
Loan Receivable - State Prop 1A	159,533
Inventories	505,039
<b>Total Assets</b>	<u><u>3,388,678</u></u>

**Liabilities and Fund Balance**

<b>Liabilities</b>	
Accounts payable	13,687
Accrued Salaries and Benefits	32,634
Deferred revebue - State Prop 1A	159,533
<b>Total Liabilities</b>	<u>205,854</u>

<b>Fund Balance</b>	
Nonspendable:	
Reserved for imprest cash	11,500
Reserved for inventories	505,039
Committed to:	
General Reserve	250,000
Aircraft Engine	350,000
Capital outlay	550,000
Assigned to:	
Research	20,000
Vector borne Disease	100,000
Unassigned, reported in:	
General Fund	1,396,285
<b>Total Fund Balance</b>	<u>3,182,824</u>
<b>Total Liabilities and Funds Balance</b>	<u><u>3,388,678</u></u>

**Reconciliation of the Balance Sheet of Governmental Funds  
to the Statement of Net Assets:**

Capital assets used in governmental activities are not financial resources and, therefore, are not reported in the funds	2,889,844
State Prop 1A recognized as revenue	159,533
Long term liabilities are not due in the current period and, therefore, are not reported in the governmental fund.	
<b>Net Assets of Governmental Activities</b>	<u>(2,579,114)</u>
	<u>3,653,087</u>



5117 Larkin Road  
Oroville, CA. 95965

•  
(530) 533-6038

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[www.BCMVCD.com](http://www.BCMVCD.com)