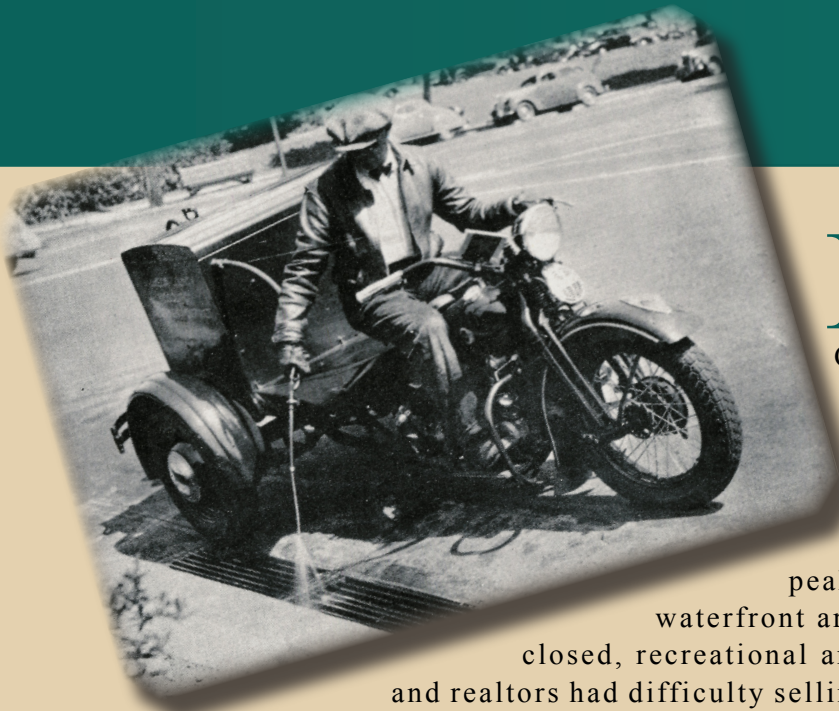




2007 Annual Report



Contra Costa Mosquito &
Vector Control District



In 1926, residents rallied together to form the Contra Costa Mosquito Abatement District to relieve severe outbreaks of salt-water marsh mosquitoes. During peak mosquito season, waterfront areas and schools were closed, recreational areas were abandoned, and realtors had difficulty selling homes. Some areas in the county were declared uninhabitable.

For more than 80 years, the District has steadfastly surveyed and treated thousands upon thousands of mosquito breeding sources throughout the county, while considering, maintaining, and even enhancing the environment. Currently, the District provides services to control mosquitoes capable of transmitting several diseases, as well as services for other vectors and their associated diseases.

Today, our county is not only habitable, but encompasses a rich diversity of economic, agricultural, and recreational amenities. The mosquito-borne disease West Nile virus illustrates the importance of our organization as a public health entity and reminds us that mosquito control is as important today as it has ever been.

What's a vector?

Any insect or other arthropod, rodent or other animal of public health significance capable of causing human discomfort, injury, or capable of harboring or transmitting the causative agents of human disease.



Foreword

I am pleased to submit the 2007 Annual Report for the Contra Costa Mosquito & Vector Control District. This District continues to be the lead agency in Contra Costa County for the detection and suppression of threats to public health from disease-transmitting pests and non-disease transmitting pests which disrupt public activities. This is accomplished through area-wide, responsive services and programs. This report outlines the work performed by the District to accomplish these objectives.

West Nile virus (WNV) is now considered to be endemic in the county and again was our primary public health concern in 2007. Statewide, it was of such great concern that on August 2, 2007, Governor Arnold Schwarzenegger declared a state of emergency in Kern, Colusa, and San Joaquin counties to prevent the spread of this mosquito-borne disease. This was the first time such a declaration was made regarding WNV in California. There were 378 human cases statewide with only three reported in Contra Costa County.

Due to continued strong property growth in the county, our revenues remained adequate to combat this disease and to deliver all our services at a very high level. However, the housing market slump that developed during 2007 and the associated high foreclosure rates in some areas of the county present us with new operational challenges and a projected revenue slow down in the near future. Neglected property maintenance resulted in mosquito production in swimming pools, spas, and other water features at an unprecedented rate.

The Board of Trustees and employees continue to plan for the future, to improve on our programs, and to be prepared for the next “imported” disease or disease vector that could be a threat to the health and welfare of the residents of Contra Costa County.

Respectfully,

Craig Downs

Craig Downs
General Manager



Principles

Vision

To be the lead agency in Contra Costa County for the detection and suppression of threats to public health from disease-transmitting pests, and non-disease-transmitting pests which disrupt public activities.

Mission

To protect public health and welfare through area-wide, responsive services and programs by:

Community Value

Providing essential District services to detect and suppress public health pests, and to reduce the chance of disease transmission and discomfort to the people who live, work, or enjoy outdoor activities within Contra Costa County

Service Area

Providing field services and administrative programs throughout the county, including all incorporated cities and unincorporated communities

Public Confidence

Delivering accessible, accountable, efficient and cost effective services to the public in all communities within the county

Community Awareness

Informing community leaders and public “customers” regularly about programs and services; linking educational programs to schools, public agencies, nonprofit organizations and private industry

Environmental Commitment

Complying with, by meeting or exceeding, federal, state, and local environmental standards that affect service programs

Research

Developing and/or testing new materials, methods, and technologies to ensure quality control oversight on all services and programs, while anticipating resurgent and/or new introduced vectors, or vector-borne diseases

Support Programs

Integrating District programs and services with other related regional, state, and federal public health agencies to ensure cooperative, cohesive program delivery

BOARD OF TRUSTEES

Standing: H. Richard Mank, El Cerrito; Jim Pinckney, Contra Costa County; Ronald Tervelt, Clayton; Tim McDonough, Pinole; Richard Ainsley, Pittsburg; Daniel Pellegrini, Martinez; Richard Head, Oakley; Russ Belleci, Contra Costa County; and Jeff Bennett, Hercules



Seated: Jose Saavedra, Antioch; Myrto Petreas, Moraga; Jim Fitzsimmons, Lafayette; Angela Micheals, Concord; Richard Means, Pleasant Hill; and Diane Wolcott, Orinda

Not pictured: Nancy Brownfield, Walnut Creek; Heather Gibson, Contra Costa County; Kaleinani Lau, Danville; and Jeannette Mahoney, Richmond

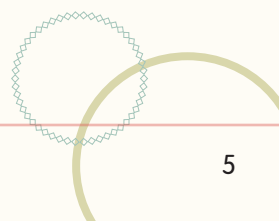


ADMINISTRATIVE STAFF

Standing: Andrew Pierce, Community Affairs Representative; Allan Pfuntner, Program Supervisor; Wayne Shieh, IT Technician; Carlos Sanabria, Operations Manager; Ray Waletzko, Administrative & Finance Manager; Tina Cox, Accounting & Benefits Specialist; Jonathan Rehana, Program Supervisor; and Deborah Bass, Public Affairs Manager

Seated: Nancy Thurman, Administrative Secretary; Marta McCord, Clerk/Receptionist; Nola Woods, Community Affairs Representative; and Craig Downs, General Manager

Not pictured: Karl Malamud-Roam, Ph.D., Environmental Projects Manager; Chris Miller, Biologist; and Tom Fishe, Mechanic



Technicians, Inspectors & Aides



Vector Control Technicians & Inspectors

Standing: Joe Hummel, VCT; Sheila Currier, VCI; Felipe Carrillo, VCI; David Wexler, VCT; Steve Fisher, VCT; Lawrence Brown, VCT; Jeremy Tamargo, VCT; Dave Obrochta, VCI; John Chase, VCI; and Jason Descans, VCT **Seated:** Tim Mann, VCT; Ceaser Gutierrez, VCT; Joe Cleope, VCI; Reed Black, VCI; and Patrick Vicencio, VCI **Not Pictured:** Danielle Peters, VCT and Bob Stultz, VCT



Vector Control Aides

Standing: Duane Burlison, Mike McCoy, Jim Van Duesen, James Flannery, Robert Strongman and Mike Rosel **Front Row, Seated:** Josefa Cabada, Chris Downs, Valentin Quintero, Ben Martinez and Derek DiMaggio

Integrated Pest Management

INTEGRATED PEST MANAGEMENT (IPM)

Mosquito and vector control is based on scientifically planned management tactics and control strategies that reduce the abundance of target pests in a timely manner. This method is commonly referred to as “integrated pest management” or “IPM.” This comprehensive program incorporates several basic methods: mosquito and vector surveillance, biological control, physical control, chemical control (larvicides and adulticides), and public relations and education.

MOSQUITO AND VECTOR SURVEILLANCE

The District closely monitors mosquito activity and weather, and detects arbovirus activity by testing mosquitoes, sentinel chickens, and wild birds for the presence of pathogens.

BIOLOGICAL AND PHYSICAL CONTROL

Biological and physical control is the prudent manipulation of biological and physical control elements in a manner that achieves acceptable control levels without damaging wildlife or the environment. Biological control elements are living predators, parasites or pathogens that can be used to achieve desired reductions in pest population levels. The most successful biological tool against immature mosquitoes in California is the mosquitofish, *Gambusia affinis*. Physical control or environmental manipulation is achieved by altering the ecological components of the pest’s environment, such as standing water. By manipulating breeding sources, we reduce the opportunity for pests to reproduce.

CHEMICAL CONTROL

Chemical control is the judicious application of specific chemical compounds (insecticides) that reduce immature and adult mosquitoes. It is applied when biological and physical control methods are unable to maintain mosquito numbers below a level that is considered tolerable or when emergency control measures are needed to rapidly disrupt or terminate the transmission of disease to humans. Larvicides

IPM is an ecosystem-based strategy which focuses on long term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and nontarget organisms, and the environment.

U.C. Statewide Integrated Pest
Management Project

target mosquito larvae and pupae. Adulticides are chemicals that specifically target adult mosquitoes.

PUBLIC RELATIONS AND EDUCATION

The primary objective of a public relations campaign is to educate and inform the public about mosquitoes and vector-borne diseases. The District uses strategic campaigns to ensure cost effective and efficient communication.

Mosquitoes

Over the past few years West Nile virus appears to have settled into a stable geographic distribution, with the highest incidence of human cases each summer in the central plains and Rocky Mountain states and the Central Valley of California (all areas where *Culex tarsalis*, one of the primary vector mosquito species, is abundant). During 2007, West Nile virus (WNV) was detected in 51 out of 58 counties in California, including 378 human cases (100 more than in 2006) and 28 equine cases (Fig. 1). In contrast with the statewide trend, activity in Contra Costa County was down, with three human cases, 29 positive dead birds, five positive dead squirrels, 28 positive mosquito samples, five positive ‘sentinel’ chickens in a single flock and no positive horses (Fig. 2). Activity was highly focal and concentrated in the East county cities of Antioch and Oakley (Fig. 3), unlike in 2006, when virus activity was highest in central county. Foci of WNV activity were associated with poorly functioning storm water drainage systems in Antioch and with ‘green’ swimming pools on foreclosed and abandoned residential properties in Oakley. As in previous years, warm overnight temperatures were associated with increased risk of WNV transmission; below average temperatures for most of the summer as well as our enhanced mosquito control efforts were probably responsible for the lower overall levels of virus activity in 2007 versus 2006.

In order to provide the earliest possible warning of West Nile virus activity, we have been operating an enhanced surveillance program for the past four years. In 2007, we submitted approximately 35,000 mosquitoes, 325 birds and

1,200 chicken blood samples for virus testing. We also received more than 2,000 dead bird reports from County residents through the statewide WNV hotline (1-877-968-2473). These reports are used by the California Department of Health Services to create risk maps that have proved very helpful in providing an early warning of areas where people are at higher risk so we can direct our surveillance and control efforts accordingly.

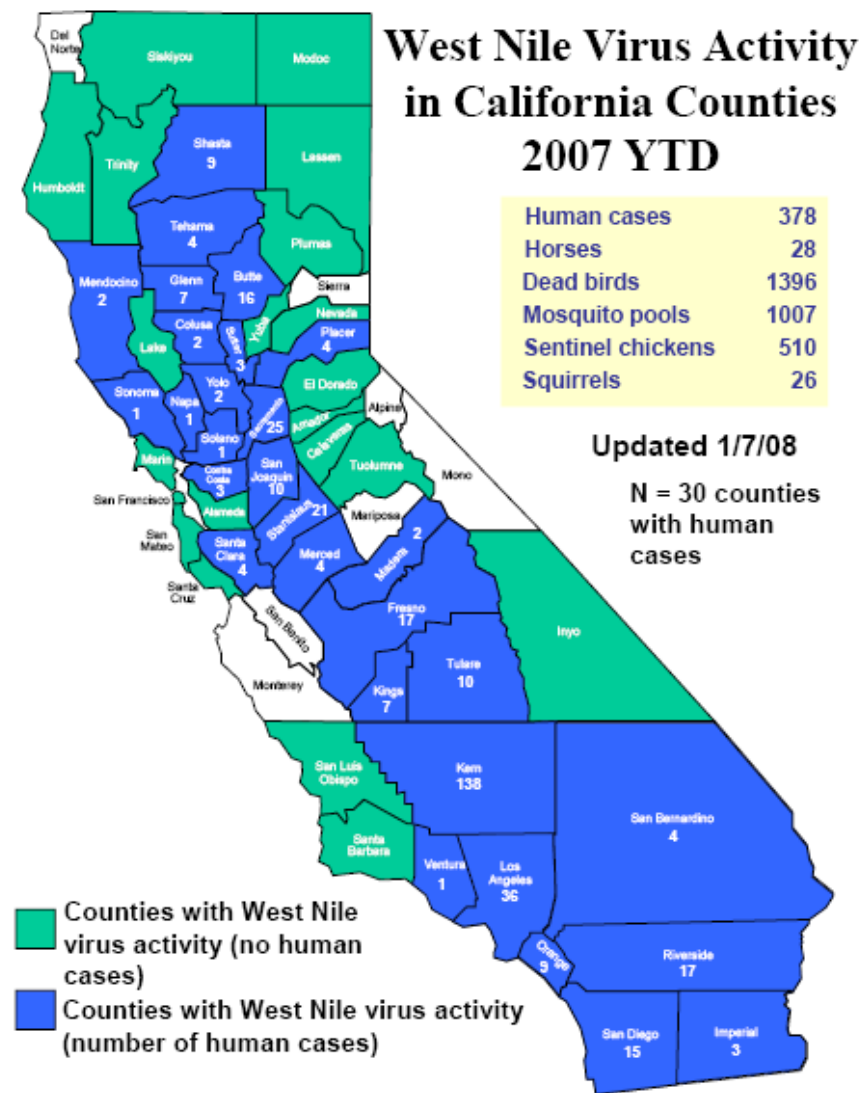


Fig. 1. Statewide WNV activity in 2007 (map courtesy of California Department of Public Health)

MOSQUITO POPULATION SURVEILLANCE

During 2007, we continued to operate 28 New Jersey Light traps and 40-80 carbon dioxide (CO₂) traps every week to monitor changes in adult mosquito populations. County-wide, light trap counts of the two primary WNV vectors *Culex tarsalis* (encephalitis mosquito) and *Culex pipiens* (northern house mosquito) were below average for most of the 2007 season.

In addition to conducting adult mosquito surveillance, we also identified and counted nearly 3,000 samples of mosquito larvae, containing between one and several hundred larvae each, submitted by our field inspectors, technicians and aides.

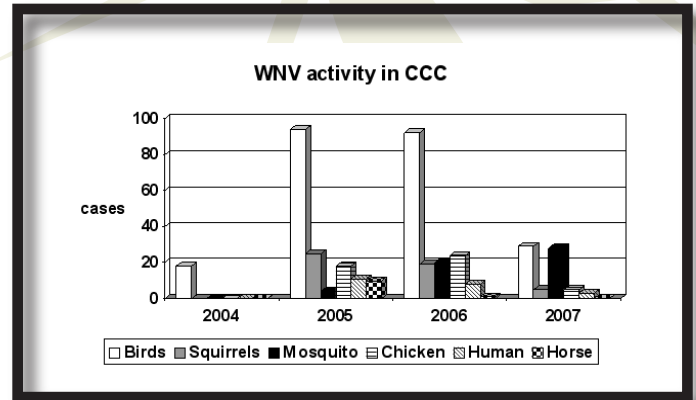
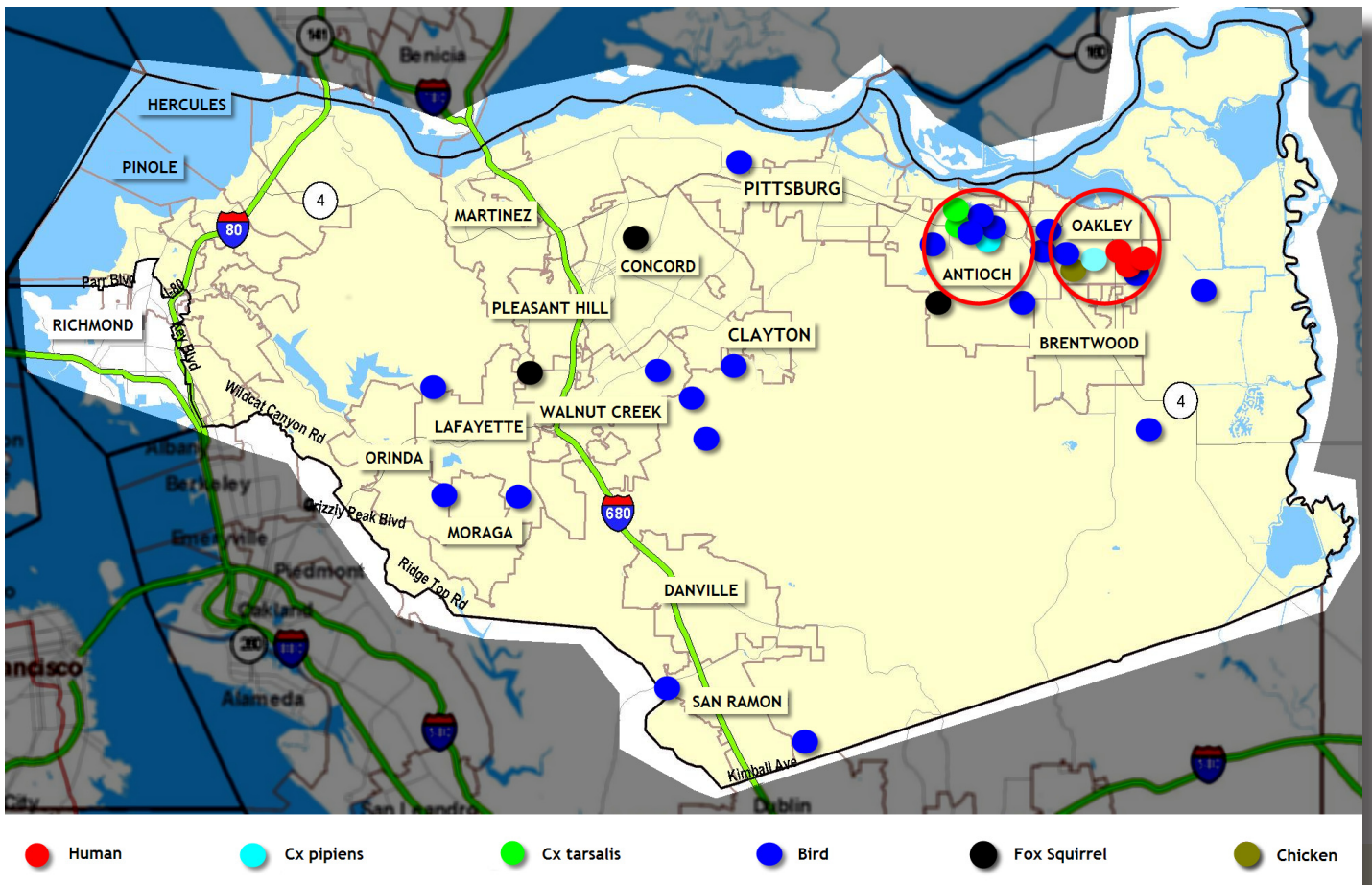


Fig. 2. WNV activity in Contra Costa County, 2004-2007



2007 WEST NILE VIRUS POSITIVES

Fig. 3. Map showing locations of positive WNV cases in Contra Costa County during 2007

Mosquitoes

continued

MOSQUITO CONTROL EFFECTIVENESS

Due to high infection rates in adult mosquitoes, several mosquito adulticiding (fogging) operations were carried out in Antioch and Oakley during late summer/early fall to reduce the risk of human WNV cases. Although fogging did not always result in large reductions in adult mosquito trap counts, we saw a rapid decrease in the infection rate (proportion of WNV positive mosquitoes) in both cities, indicating that older, already infected female mosquitoes were being eliminated despite continued recruitment (emergence of new individuals), probably from underground larval sources that were inaccessible for standard larviciding operations. To address this, a new underground larvicide misting system was employed late in the season which proved extremely effective at reducing trap counts at a time when they were increasing elsewhere in the county. This integrated control program (combination of larviciding and adulticiding techniques) appeared to be successful at reducing the risk of human cases despite initially high mosquito infection rates (Fig. 1).

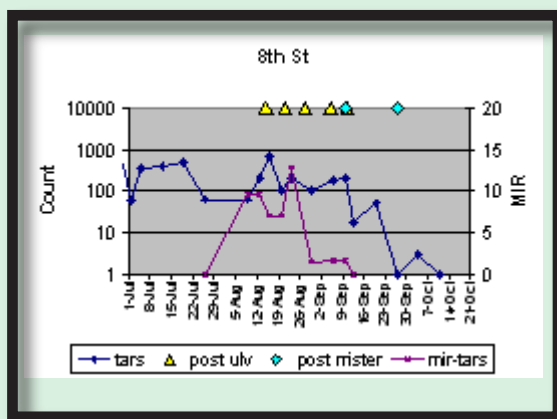


Fig. 1. *Culex tarsalis* counts in carbon dioxide traps (Count) and estimated WNV infection rates per 2,000 mosquitoes (MIR) in Antioch, before and after adulticide treatments and underground larvicide misting.

GEOGRAPHIC INFORMATION SYSTEM (GIS)

Our staff continued to improve and enhance our computerized mapping system (GIS) and integrate it

with our computerized database to assist the District with all of its surveillance and control programs. GIS maps proved extremely useful during 2007 for mapping and planning treatments of marshes, sewer and storm water systems, identifying properties with poorly maintained or abandoned swimming pools, and planning and coordinating collaborative source reduction projects with other public agencies. A project was also initiated to review, update and correct mosquito source location information in our database, much of which was collected before Global Positioning technology was available. A second GIS workstation was acquired and set up during 2007 which will eventually be transferred to the Operations program for routine mapping and data analysis.

SPECIAL PROJECTS

In 2007 we continued to examine the effects of micro climate (small differences in temperature) on the occurrence and distribution of WNV in Contra Costa County and also investigated the efficacy of ultra-low volume (ULV) adulticiding and underground larvicide misting systems for reduction of West Nile virus risk. A report on our 2006 data was presented at the 2007 Mosquito and Vector Control Association of California Annual Conference in Fresno, and published in the MVCAC “Proceedings and Papers”.



Scientific Programs Staff: Mike McCoy, Vector Control Aide; Steve Schutz, Scientific Programs Manager; Eric Ghilarducci, Vector Ecologist; and Damien Clausen, Vector Ecologist



CCMVCD technicians fog for adult mosquitoes capable of transmitting West Nile virus

WHAT ARE THE RISKS OF SPRAYING OR FOGGING TO RESIDENTS OF CONTRA COSTA COUNTY?

The risks to the public and to the environment from the pesticides used are very low. Mosquito adulticides are applied as ultra-low volume (ULV) sprays. ULV applications involve small quantities of active ingredient in relation to the size of the area treated, typically less than one ounce per acre, which minimizes exposure and risk to people and the environment.

SPRAYING OR FOGGING NOTIFICATION

The Contra Costa Mosquito and Vector Control District notifies residents of any adulticiding (the ground or aerial application of pesticides to kill adult mosquitoes) that may occur within a residential area. The purpose of adulticiding is to reduce adult mosquito populations when they have been identified as carriers of disease, such as West Nile virus, or when there are high numbers that cause a nuisance. Residents who wish to receive notification or inquire about possible adulticiding in their neighborhood can employ several options:

- * Log onto the District's Web site at www.ccmvcd.dst.ca.us to sign up for free, automatic e-mail notifications. The notifications include maps of areas to be treated, links to pesticides and product labels, contact information, time of treatment, and much more.
- * Check the District Web site for the most current information and specific maps regarding dates, times, and locations of adulticiding.
- * Call the District office at (925) 771-6187 for a recorded message with details of the application.

The health and safety of Contra Costa residents is the District's primary concern. Protecting public health and providing cost-effective services have been at the forefront of the District's mission for more than 80 years.

IS THERE ANYTHING I NEED TO DO WHEN YOU FOG OR SPRAY?

No. There is nothing people need to do because the District is fogging or spraying for adult mosquitoes. All of the products used are registered with the Environmental Protection Agency for the use of protecting public health and applied by certified and trained technicians.



Q: Why can't you notify residents sooner when you fog or spray for adult mosquitoes?

A: We have a very comprehensive response plan that relies on real-time data about mosquito populations, virus transmission, and weather conditions. Once we determine that there is risk to the public, we act promptly in order to protect their health.

Rats & Mice

IN THE FIELD

Even though most public attention to the District has been for the mosquito program and West Nile virus, the vertebrate vector technicians have been very busy in their efforts to control rodents and other vectors. In 2007, we received over 520 service requests related to rodent activity resulting in a 20 percent decrease from the 12-year average.

The rodent inspections continued to be popular with homeowners who experienced rodent presence issues. With the slow-down in new home construction, most rodent service requests originated in older established neighborhoods. Technicians



A Norway rat runs to find cover. When rats are seen during the day, it generally means a high infestation has driven the rats to forage for food during daylight hours; a very risky endeavor for rats.

continued to conduct sewer pulse-baiting operations in areas where rats occupied the city's sewer system. In above ground public locations such as parks, creeks, and marinas where rodents had been observed, technicians set up monitoring devices to identify the problem. They then set out stationary tamper-resistant bait stations discretely hidden in vegetation and placed to minimize non-target animals from obtaining the bait.

The District also assisted city code enforcement personnel in several communities in identifying vector species, enforcing codes, and abating rodent nuisance areas.

RODENT-BORNE DISEASES

In 2007, we continued to conduct surveillance for diseases carried by rodents and other vectors. These include hantavirus, a potentially fatal respiratory (lung) disease mainly spread through the droppings and urine of deer mice. Infected mice have been found throughout California, including here in Contra Costa County, although fortunately human cases are rare. In 2007, we trapped and tested two deer mice (*Peromyscus maniculatus*) and 27 pinyon mice (*P. truei*) from two locations in Mount Diablo State Park (Fig. 1). All the mice were negative for hantavirus. The Contra Costa Mosquito and Vector Control District has free pamphlets available on how to control mice and other rodents and reduce the risk of hantavirus.



Fig. 1 Vector Ecologist Eric Ghilarducci anesthetizes a mouse prior to taking a blood sample.

Ticks & Lyme Disease

Lyme disease is a bacterial infection transmitted by the western black-legged tick (also known as the deer tick) (Fig. 1). While Lyme disease is rare in Contra Costa County (on average there are two to four human cases reported per year), it can cause serious complications if not treated promptly. The District monitors the risk of Lyme disease by collecting and testing black-legged ticks from several locations that we have been monitoring for as long as 12 years. On average, only one or two in a hundred black-legged ticks test positive, although we have found a few locations where the rate is higher, and these tend to change over time. In 2007, we collected and tested 225 ticks from three locations; none tested positive.

We also identify and test ticks brought in by members of the public who have been bitten. If the ticks are reasonably intact and not dried out, we can test them in our own laboratory free of charge. If they are in poor condition, a more sensitive test is required and county residents have the option of sending the tick to a private laboratory for a fee of \$65. In 2007, 133 ticks were identified by our staff, of which 47 were western black-legged ticks (the vector of Lyme disease). Forty of those were tested and none were positive for Lyme bacteria.



Fig. 1. A questing (host-seeking) female western black-legged tick in Lafayette



Q: How do ticks get on you? Do they hop, jump, fly, or drop out of trees?

A: None of the above. Ticks 'quest' (see picture below) to find their hosts. They simply crawl to the top of a blade of grass or plant and wait for an unsuspecting animal or person to brush by or come into contact with them. That's why it's a good idea to keep the edges of walking paths mowed or removed of vegetation. It's also a good idea to tuck your pants into your socks, as well as to wear light colored clothing for better tick detection.

Q: What can be done to keep from getting Lyme disease?

A: Lyme disease is preventable:

- * Avoid areas where ticks live. When walking in areas with high grass or leaf litter:
- * Stay in the middle of trails; avoid grassy areas, contact with logs, tree trunks and fallen branches or tree limbs.
- * Tuck pants into boots or socks, and shirt into pants.
- * Wear light-colored clothing and long-sleeved shirts so ticks can be more easily seen.
- * Use a repellent registered for use against ticks.
- * Thoroughly check yourself and others for ticks for up to three days after activities in tick-infested areas.
- * Keep grass along trails, buildings, and camping areas mown.

Skunks

In the past year the skunk program experienced a decline in the number of service requests from those areas of Contra Costa County that previously had skunk activity. The areas of skunk activity that remain throughout the county appear to be concentrated to properties adjacent to open spaces and areas located in the eastern part of the county where some development continues. Skunks trapped in these concentrated areas resulted in less repetitive actions due to the inspections and education for the property owners. The new cylindrical traps continue to function well and catch a minimum of non-target animals.

Homeowners are very cooperative in performing exclusion work, vegetation removal and harvesting of ripe fruit to minimize attractiveness to the skunks. The majority of properties that warranted trapping was due to skunks physically taking up residence versus skunks just passing through the area. We have seen much success and control with property owners taking the corrective actions noted on their initial inspection reports. This helps curb vector problems and minimizes the likelihood of coming in contact with skunks.



Striped skunk



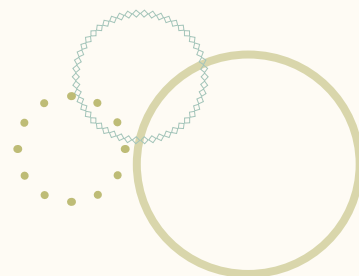
Q: What does your service for skunks include?

A: Skunks are vectors because they can be carriers of rabies which may infect people and animals. The Contra Costa Mosquito & Vector Control District maintains the rabies risk reduction program to protect public health.

The District loans skunk traps, when warranted, to residents whose homes indicate skunk activity, such as property damage, an established den, or evidence of skunk invasion. Trapping is only done when an inspection indicates that it is necessary. Technicians provide guidelines and exclusion methods to aid residents in skunk control. Skunks that are trapped are removed and euthanasia is performed. As required by law, skunks cannot be relocated since they have the potential to carry and spread rabies.

Q: Why do you have a service for them and not raccoons?

A: Raccoons do not generally carry rabies on the west coast. Also, they are protected by law and may not be trapped or relocated. They are considered a “fur-bearing animal” by the California Fish & Game Department.



Yellowjackets

The uninvited guests no one wants to have at their barbeque are the yellowjackets. These winged scavengers can make every bite of your food an adventure in eating, making sure each bite is only food and does not include a hungry competitor who will sting you to protect its interests. The District's yellowjacket program is very popular with residents who have discovered an underground nest during their gardening endeavors or while enjoying the outdoors. Yellowjackets can and do sting repeatedly when threatened or if they sense an alarm pheromone produced by other threatened yellowjackets in the area. Yellowjacket stings, besides being very painful, can be life-threatening to those individuals who are allergic to the venom.

The Contra Costa Mosquito & Vector Control District offers a free service to treat ground-nesting yellowjacket nests. The nests need to be marked by the homeowner in some way to make it easy for the technician to locate, typically by placing a flag on it, or pointing at it with a tool handle. A map of the yard also works well. Technicians typically respond to a yellowjacket service request the next working day following the request.

In 2007, the District received approximately 600 yellowjacket service requests, which is slightly above the 12-year average. Besides food and drink, some patterns on clothes and perfume scents can also be attractive to yellowjackets. Residents can take steps to minimize contact with yellowjackets by tightly covering garbage containers, maintaining compost piles, and keeping soft drinks covered when outdoors. Placing a commercial yellowjacket trap out in the yard during late winter and early spring can bring benefits later by capturing and removing yellowjacket queens before they establish a nest. People should also be aware that not all yellowjackets are scavengers; the aerial nest species typically are insect predators, beneficial insects which hunt and eat other insect prey that may be living in the landscaping or garden plants.



Yellowjackets, while seemingly a pest to some people, are actually very beneficial insects.

- * They cross pollinate simply by their feeding habits.
- * They eat pest insects in your

garden; thereby allowing your fruits and vegetables to flourish.

There are four types of yellowjacket species in Contra Costa County. Two species make their nests high off of the ground and two species make their home in the ground, usually in an old gopher hole or similar space.

The District offers services for the in-ground nesting yellowjackets only since they are more aggressive to people. All yellowjackets are beneficial to our environment. The District only treats nests that are detrimental to public health. ◆

ARE THEY HERE YET?

Africanized Honey Bees (AHB) are a cross between European Honey Bees and African Bees and can be very aggressive and even dangerous. To date, AHB have not colonized in northern California. Should this occur, the District is the lead agency in Contra Costa County to respond.

Fisheries Program



The District distributed approximately 67,000 mosquitofish (*Gambusia affinis*) in Contra Costa County. More than 48,000 were placed by District personnel while 19,000 were picked up by residents. The District produced over 1 million mosquitofish averaging approximately 3,000 fry per day. We are currently increasing our brood stock population with fish that are not stocked in the field. We anticipate that in 2008 the use of mosquitofish will increase due to the rate of foreclosures and non-maintained swimming pools in Contra Costa County.

The District purchased eight, 265 gallon grow-out tanks. These additional tanks will be used to grow out mosquitofish fry as well as holding and possibly spawning Sacramento perch (*Archoplites interruptus*).

In 2007, the District received two grants. The first grant was for the production of Sacramento perch for a mitigation site on Sherman Island (Parcel 11 in Reclamation District No. 341). This grant was provided by the California Department of Water Resources and the California Department of Fish & Game (through Hanson Engineering, Sacramento, California). The cost for producing Sacramento perch larvae and juveniles for stocking was \$20,000 for labor and materials. More than 290,000 larvae

were produced for this project. For a more detailed description of this project see "Production of Sacramento Perch for Parcel 11 Final Report" from the District.



New 265 gallon grow-out tanks

The second grant was to develop an Aquatic Insect and Invertebrate Collection and Identification Guide and distribute to three educational institutions. The District received \$5,212 for the purchase of equipment and materials for this project. Progress on this project has been slower than anticipated due to difficulty in staining and mounting specimens on slides. Completion of this project is estimated to be at the end of March 2008.



Associate Fisheries Biologist Mike Dege with the California Department of Fish and Game takes water quality measurements while acclimating Sacramento perch.

The District continues to conduct research on Sacramento perch and their use in controlling mosquito larvae. We conducted one experiment at the Discovery Bay Wastewater Treatment Plant in Discovery Bay. Six experimental wetland ponds were constructed to determine the removal rates of copper and pharmaceuticals from treated wastewater. These ponds were planted with cattails and bullrush and supplied with a constant flow of wastewater.



Discovery Bay Wastewater Treatment Plant

This environment provides the perfect habitat for mosquito larvae. Mosquitofish were stocked in all but one pond while perch were stocked in two of the ponds. The only pond that bred mosquito larvae was the one stocked with only perch. Upon reviewing water quality parameters (collected by our YSI water quality meter), we determined that dissolved oxygen levels were too low for extended periods of time for Sacramento perch to survive. While perch failed in this situation, the mosquitofish thrived and once again proved to be a very valuable asset to mosquito



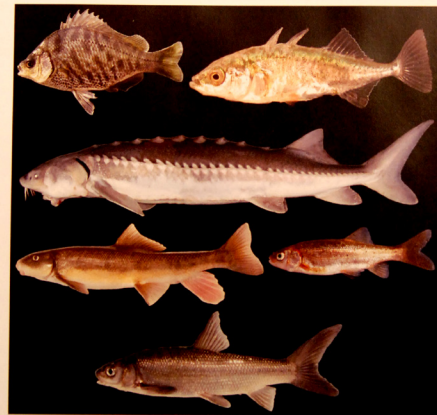
Female Sacramento Perch

control. For a more detailed description of this project see “Use of Sacramento Perch for Mosquito Control in Experimental Wastewater Treatment Ponds” from the District.

The District continues to support our “California Native Fish Education Program” in Randy Monroe’s classroom at Foothill Middle School located in Walnut Creek. We have provided both adult and juvenile Sacramento perch as well as assistance in maintaining equipment. This small outreach program allows students to observe California native fish in aquaria. In this program we also provide information on the mosquito life cycle and how we use fish to control mosquito populations. We believe that exposing students to our methods of controlling mosquitoes helps them to better understand mosquito habitats and control in their community. ♦

California Native Fish Education Program

Identification Guide



Funding for this Project Provided by Contra Costa County Fish & Wildlife Committee & the Contra Costa Mosquito & Vector Control District

California Native Fish Cover Page

Sherman Island mitigation site, May 8, 2007

Wetlands & Environmental Programs

THE DISTRICT'S wetlands and environmental programs reduce vector production and help other District programs in several ways:

- ◆ Performing field work to reduce mosquito and other vector production through improved water movement, predator access, vegetation thinning, and other source-reduction activities;
- ◆ Assisting landowners to improve their land and water management practices and thus ensure long-term control of mosquitoes and other vectors;
- ◆ Ensuring the District's compliance with environmental laws and regulations;
- ◆ Representing the District and other vector control agencies with regulators and legislators in the development of rules and the acquisition of permits;
- ◆ Conducting and reviewing scientific research on the environmental impacts of mosquito and other vector control activities.

One major mosquito source-reduction project for

2007 focused on improving drainage and tidal water flow in marshlands at the Tara Hills marshes, near Point Pinole,



Fig. 1. An excavator clearing a drainage channel in Tara Hills

where the District was the lead agency in a channel maintenance program in collaboration with Contra Costa County Flood Control District and East Bay Regional Park District (Fig. 1).

Another project was in the Concord Naval Weapons Station (Fig. 2), where repairs and improvements were made to a bridge that was installed by the District to enhance tidal flows

where originally a small culvert had drained the marsh. These areas of poor circulation can produce copious mosquitoes when the water stays still, but are productive wetlands and relatively free of mosquitoes when the water moves.



Fig. 2. Bridge over new tidal channel, Concord Naval Weapons Station

A high priority for the District is ensuring that mosquitoes, rats, or other vectors are not produced unintentionally when wetlands are created or restored. In recent years, wetlands have been frequently created or restored in Contra Costa County to provide natural habitats for

many species, including many that are endangered or threatened, such as the California red-legged frog (Fig. 3). In addition, wetlands are created to provide open space and recreation, as mitigation for wetlands or creeks damaged during construction activities, to protect from flooding, and to clean sediment from storm water. Unfortunately, many of these otherwise desirable projects produce unacceptable numbers of mosquitoes and rats. Thus, the District's Wetlands Program works with wetlands proponents, designers, and managers to ensure that their plans do not pose a threat to public health and comfort. In 2007, this involved collaborations throughout the county, including with refinery staff in Avon and Martinez; City staff in Pleasant Hill, Pittsburg, Antioch, and Oakley; the County flood control department, City of Pleasant Hill staff, and railroad staff.

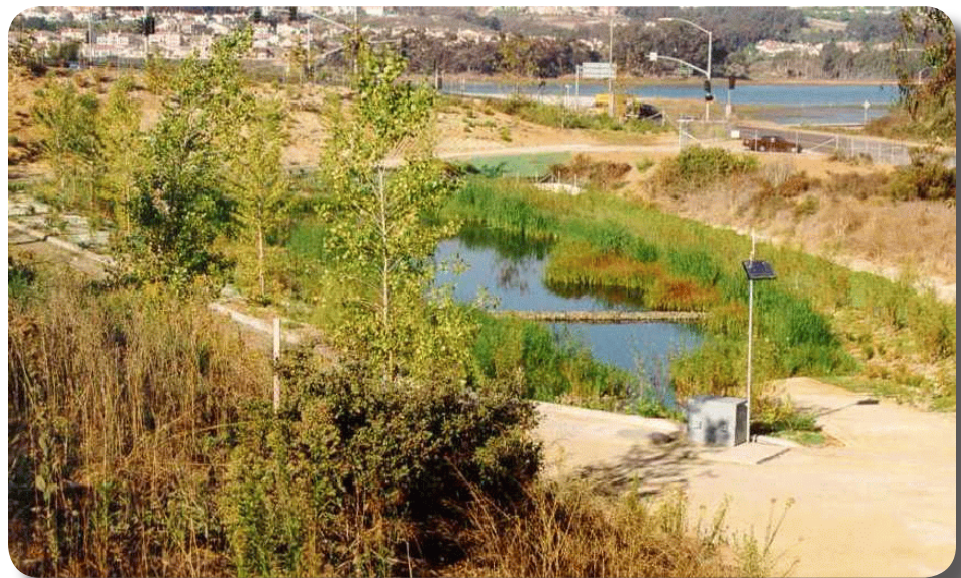


Fig. 3. A California Red-Legged Frog

and vector control, as the District's Environmental Projects Manager, Karl Malamud-Roam, again served as Chairman for Legislative and Regulatory Affairs for the American Mosquito Control Association. Significant negotiations this year centered on protection of aquatic species and rodents from pesticide risks, negotiating a general regional permit for tide marsh work, and regulation of biological control. At the same time, District staff is heavily involved in providing scientific research needed to support reasonable and effective environmental rules, such as new methods of characterizing adulticide droplet size and estimating drift. ♦

Training District staff to recognize protected species and their habitats is a responsibility of the Environmental staff, which in 2007 set up a training program to protect the California red-legged frog, once made famous by Mark Twain, and now endangered. Issuing an annual environmental audit, which reports in detail on the District's use of pesticides and biocontrol agents (available on the District Web site), is another of our charges.

In 2007, the District was heavily involved in federal and state regulation of mosquito



A storm water detention pond and sometimes a mosquito source.



The public affairs department met the challenges of communicating to the more than 1 million residents in Contra Costa County with a comprehensive campaign to educate them about vector-borne diseases, especially West Nile virus. At the heart of our program was communication concerning neglected swimming pools, also known as “green” pools, brought to the forefront by the home foreclosure crises. Home foreclosures in Contra Costa County increased 200 percent in 2007. District technicians’ swimming pool and spa surveillance and treatments increased 210 percent. And with each neglected swimming pool capable of producing hundreds of thousands of mosquitoes with the ability to affect residents up to a five-mile radius, foreclosed homes not only created an economic crisis, but a public health risk as well.

Residents who are in the foreclosure process often do not have the resources nor the commitment to maintain their swimming pools properly. In the majority of cases properties stay vacant for months and in some cases, more than a year. Even with the vast homes in the foreclosure process or foreclosed upon, locating the properties with neglected pools

proves difficult. Once they are located, it’s often not known who is responsible for the upkeep of the property. In any case, if the homes are vacant and access is available, technicians inspect and treat the pools accordingly and immediately in order to protect residents’ health.



Vector Control Technician Steve Fisher gives important information regarding West Nile virus to a Contra Costa County resident during a door-to-door campaign to locate neglected swimming pools.



Vector Control Technician Jeremy Tamargo treats a neglected swimming pool for mosquitoes capable of transmitting West Nile virus at a foreclosed home in Contra Costa County.

C o m m u n i t y

- ◆ District Open House
- ◆ Vector Awareness Week activities and mosquito repellent giveaway
- ◆ Eleven fairs and events
- ◆ Storm Water Management workshop
- ◆ Penny Saver mailbox insert. Reach: every household in Contra Costa County, 421,000+

Outreach

Mosquitoes thrive in flower pot saucers that retain water.



The quest to locate potential mosquito-producing sources resulted in a collaboration with the Contra Costa Association of Realtors. Realtors supplied District personnel with foreclosed home addresses that were merged with other surveillance data. Tailored presentations regarding mosquitoes and West Nile virus were given to Realtors at all of their regularly scheduled marketing meetings throughout the county. Needless to say, our community affairs representatives were greeted with quizzical expressions because of their unusual presence at the meetings, but 20 minutes later, Realtors were armed with important health and reporting information about neglected swimming pools. Realtors were asked to report neglected pools and other potential mosquito sources to the District.

District outreach was also directed toward Contra Costa County residents with an appeal to report neglected or abandoned swimming pools and other mosquito sources.

Working closely with the media enabled wide-spread communication to all county residents. More than 100 communications were with media personnel in print, radio, and television, including national coverage in all media.

SWIMMING POOLS...

- * if neglected, can produce hundreds of thousands of mosquitoes.
- * if properly maintained, will not produce mosquitoes.
- * if neglected and then treated with a one-time shock of bleach, will still produce mosquitoes, and will kill mosquito-fish placed by technicians. Consistent chlorination and filtration is needed for proper, long-term maintenance. Shocking a pool only once with bleach provides mere temporary relief. Mosquitoes will return.
- * can be damaged if left dry. Consult a swimming pool expert for advice.
- * that are neglected can be reported to the District anonymously.
- * that produce mosquitoes can affect residents up to a five-mile radius.
- * should be drained into a sanitary sewer drain. Contact your local wastewater treatment authority for proper protocol.
- * with mosquitoes drained into the street can disperse mosquitoes underground throughout the community and make them nearly impossible to control.



O u t r e a c h H i g h l i g h t s

- ◆ Several videos aired on Contra Costa Television
- ◆ City proclamations for Vector Awareness Week and West Nile virus
- ◆ Several advertisements in the "Penny Saver"
- ◆ Several advertisements in Contra Costa Times
- ◆ Web site communication
- ◆ Farmers' Markets
- ◆ Six-week Bay Area radio campaign
- ◆ Cemetery Maintenance workshop
- ◆ Presentations to 82 various clubs and groups including rotaries, city and county entities, homeowner's associations, garden clubs, wildlife clubs, retirement clubs, safety fairs, boy and girl scouts, seniors, and many more.

Financials

REVENUES	2005/2006	2006/2007
Property Taxes	\$3,467,844	\$4,187,455
Contracts	86,384	65,978
Interest Income	106,203	200,455
Benefit Assessment	1,792,418	1,929,355
Miscellaneous	247,895	137,437
Total Revenues	\$5,700,744	\$6,520,680
EXPENDITURES		
Salaries & Wages	\$3,312,050	\$3,957,021
Operations	1,246,918	1,255,273
Capital	235,052	355,583
Total Expenditures	\$4,794,020	\$5,567,877

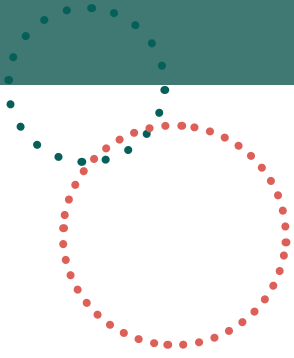
Special District vs. County Entity

Did you know the District is a **SPECIAL DISTRICT** and not a county entity?

How Independent Special Districts work - they are:

- * Formed by local residents to provide local services
- * Sanctioned by the State of California Government Codes
- * Entities that can be the most economical means of providing public service
- * Independent, self-governed agencies governed by a board of directors
- * Operated as non-profit organizations
- * Responsible directly to the people: Accountable - Accessible - Efficient

Credits

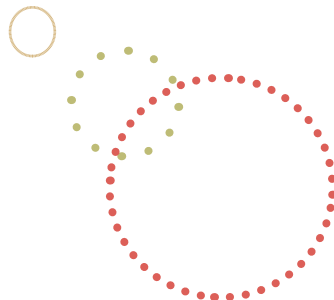


EDITOR/GRAPHIC DESIGN:

Deborah Bass

CONTRIBUTING WRITERS:

Deborah Bass,
Craig Downs,
Eric Ghilarducci,
Karl Malamud-Roam, Ph.D.,
Chris Miller,
Carlos Sanabria,
Steve Schutz, Ph.D.
and Ray Waletzko





155 Mason Circle • Concord, CA 94520
(925) 685-9301 www.ccmvcd.dst.ca.us