

Protecting Public Health Since 1921

2006 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 nearly 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

West Nile virus was our main focus again in 2006. The virus was most active in the north central part of Contra Costa County, especially along the I-680 corridor. Seven of the eight human cases recorded in the county were in this area from Martinez to Pleasant Hill. Two of the cases were fatal.

District personnel expended an unprecedented level of effort to reduce the risk of West Nile virus to the public. In addition to adding seasonal staff, field personnel put in over 1,000 hours of overtime. It was not unusual for employees to work from 7 a.m. until 4 p.m. providing larval control of mosquitoes, then returning at dusk to fog for adult mosquitoes in high risk areas. Our laboratory personnel processed record numbers of mosquito and bird samples. The ability of the lab to provide same-day results allowed us to promptly address areas of higher risk. Our Public Affairs Department excelled in working with the media to keep the public informed, while our administrative staff processed the requests and information from the public and provided the support needed to keep the District running smoothly.

Many thanks go out to the public and other government agencies that partnered with us in the fight against West Nile virus. One huge success was the dead bird reporting system that allowed us to identify potential areas of West Nile virus high risk. Contra Costa residents called in over 3,500 reports of dead birds, which was the second highest county total in the state.

Our board produced and adopted a new Five Year Plan (2006-2010). The plan's focus is on finances, personnel projections, needs due to county growth, and control of emerging diseases. Long range financial projections show the District is well positioned to protect the public from vector-borne diseases for the near future, barring any legislative raids on existing revenues.

The District continues to improve its delivery of services to accomplish its mission to protect public health. We strive to be responsive to new science, information and technologies, and to be innovative in the detection and suppression of vector-borne threats to public health.

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: Jim Pinckney, Contra Costa County; Jim Fitzsimmons, Lafayette; Dick Vesperman, San Ramon; Jon Elam, Brentwood; Daniel Pellegrini, Martinez; Diane Wolcott, Orinda; and Ronald Tervelt, Clayton

Seated: Richard Head, Oakley; Nancy Brownfield, Walnut Creek; Heather Gibson, Contra Costa County; Jeannette Mahoney, Richmond; Kaleinani Lau, Danville; Tim McDonough, Pinole; Myrto Petreas, Moraga; and Richard Means, Pleasant Hill

Not pictured: Russ Belleci, Contra Costa County; H. Richard Mank, El Cerrito; Johnny Poon, Hercules; and Jose Saavedra, Antioch



ADMINISTRATIVE STAFF

Standing: Damien Clauson, Laboratory Assistant; Ray Waletzko, Administrative & Finance Manager; Carlos Sanabria, Operations Manager; Tina Cox, Accounting & Benefits Specialist; Craig Downs, General Manager; Nancy Thurman, Administrative Secretary; Allan Pfunter, Program Supervisor; Eric Ghilarducci, Vector Ecologist; and Steve Schutz, Ph.D., Scientific Programs Manager

Seated: Jonathan Rehana, Program Supervisor; Marta McCord, Clerk/Receptionist; Nola Woods, Community Affairs Representative; and Deborah Bass, Public Affairs Manager

Not pictured: Karl Malamud-Roam, Ph.D., Environmental Projects Manager; Chris Miller, Biologist; Tom Fische, Mechanic; and Michael Yeater, Information Technology Technician

Technicians, Inspectors & Aides

In The Field



Vector Control Technicians & Inspectors

Standing: Steve Fisher, VCT; Stephen Perkins, VCI; Sheila Currier, VCI; Lawrence Brown, VCT; David Wexler, VCT; Danielle Peters, VCT; Nancy Harden, VCT; David Obrochta, VCI; John Chase, VCI; Jeremy Tamargo, VCT **Kneeling:** Bob Stultz, VCT; Felipe Carrillo, VCI; Reed Black, VCI; Tim Mann, VCT; and Patrick Vicencio, VCI **Not Pictured:** Joe Cleope, VCI and Jason Descans, VCT



Vector Control Aides

Standing: Marcelino Molina; Jim Davis; Luis Moreno and Joe Hummel
Sitting: Jim Van Duesen; Sharyn Galloway and Manual Raya **Not pictured:** Daniel Yoon

MOSQUITOES

With Contra Costa County experiencing a much stronger presence of West Nile virus in 2006, the majority of service requests the District handled revolved around neglected or 'green' swimming pools. While it is lawful to maintain a green pool, it is illegal to breed mosquitoes. Most residents who had swimming pools in this condition were eager to correct the problem. *Culex tarsalis* and *Culex pipiens*, both known vectors of West Nile virus, were found throughout the county. Areas that bred immature mosquitoes in both larval and pupal stages were treated using both biological control and bio-rational pesticides. Water sources that were plagued with blockages from debris (both natural and man-made) were cleared by technicians, allowing the flow of water to continue and ceasing mosquito-breeding potential. The assistance of various city code enforcement officers and help from several Public Works departments throughout the county have created beneficial partnerships with the District; thereby eliminating previously undetected breeding sources, as well as existing problems.



RATS & MICE

In 2006, much of the county saw a significant decrease in the number of rodent service requests. While some cities saw a reduction in rodent activity in sewers, other areas experienced an upswing. The latter can be attributed to new construction in lieu of an aging sewer system. Such activities displace the rodent populations. As projects become completed and structures are repaired, activity typically declines. City Parks and Recreation departments have stepped up their efforts to help alleviate rodent problems by thinning or removing dense vegetation; an ideal source of harborage. Tamper-resistant bait stations placed in inconspicuous areas throughout creeks, marinas and other public land areas have also aided with rat and mouse population reduction. The District has increased efforts to educate communities by door tagging homes with rodent prevention and control information. Once again, various city government entities have cooperated with the District by removing debris in numerous locations.

SKUNKS

Public education played a key role within the skunk program in 2006. Measures that were taken by residents, based on inspections that did not merit a trap being loaned, resulted in many areas becoming far less impacted by skunks. Other sites throughout the county that required service for possible skunk invasions often resulted in technicians finding evidence of non-target animals. These situations presented an opportunity for the technician to discuss various measures with the resident in an effort to prevent possible skunk issues from ever occurring. In locations that had skunk activity, the most common culprits were food sources, usually pet foods, and the availability of shelter.

Learn about
District activity
for each
city or town in
Contra Costa
County.

Visit our website
at
www.ccmvcd.dst.ca.us
to view our
detailed
Field Annual
Report

Surveillance & Control Mosquitoes



With West Nile virus activity so prevalent in Contra Costa County in 2006, the District's vector control technicians' efforts in regard

to mosquito population reduction were a high priority. Weekend work was often mandatory during periods of elevated virus activity and with the District hiring seasonal aides to nearly double our workforce, the challenge to reduce the risk of this mosquito-borne illness was met head on.

The District continues to acquire knowledge of this relatively new virus and continues to alter tactics and establish new ones to combat West Nile virus. One example was changing the emphasis of mosquito control in some areas. In 2006, the District examined and inspected catch basins throughout the county with more scrutiny; thereby locating new and previously unknown basins. It was quickly determined that these areas produced the majority of disease-transmitting mosquitoes. "Urban drool" or the overuse of irrigation that runs off onto pavement and eventually drains into catch basins was a particular reason this mosquito surveillance was reinforced. When these storm water systems are in poor condition, they hold water and eventually breed mosquitoes.

An approach toward trapping adult mosquitoes for virus surveillance was also expanded in 2006. Encephalitis virus surveillance (EVS) traps that collect adult mosquitoes were



Steve Schutz, Ph.D., tests efficacy of adulticiding efforts along the waterfront in Contra Costa County

placed not only along the perimeter of Contra Costa County, but all along the 680 corridor that encompasses Martinez, Pleasant Hill, Concord, Walnut Creek, Danville and San Ramon. This fixed 'trapline' was deemed quite beneficial since many yielded infected mosquitoes, discovered as a result of surveying the progression of the virus in terms of micro-habitats. Throughout the relatively short history of West Nile virus in Contra Costa County, the District has carefully monitored its progression from the rural Eastern areas into predominantly inland urban locations.

2006 saw a late wet spring and with that, technicians quickly dispensed throughout the county searching for areas that could be holding rainwater. More aerial surveillance also occurred this past year. With a long rainy season, more green growth is prominent in low areas which may shield standing water when observing on land. From above however, these locations are much easier to find. Four days of over flights were conducted and documented with a video camera for reference of previously undetected sources. The District was also able to locate neglected swimming pools that had previously gone unnoticed. For the first time, aerial ultra-low-volume (ULV) fogging was performed along the waterfront from Pittsburg to Martinez

in an effort to bring down the exceptionally large number of *Culex tarsalis* mosquitoes that the marshes were producing. This species is known to carry West

Nile virus. Warming temperatures quickly followed and technicians often dedicated weekends conducting inspections and educating residents about potential backyard sources, including neglected swimming pools. Items in yards that hold standing water, as well as green swimming pools, can be a primary mosquito breeding ground in urban areas.

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 such activity is to reduce adult mosquito populations that have been identified as carriers of West Nile virus by means of the District's surveillance program. We utilize the county telephone notification system that automatically places a call to residents informing them of when and where adulticiding will occur. Information is posted, if possible, 24 hours in advance before activity is conducted. Residents who wish to inquire about possible adulticiding in their neighborhood can employ several options:

- * Check our website at www.ccmvcd.dst.ca.us for the most current information and specific maps regarding dates and locations of adulticiding.
- * Call the District office at (925) 685-9301 for a recorded message of when and where adulticiding will take place.
- * Ensure your phone number is a listed number so that the telephone notification system can contact you.



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

The health and safety of Contra Costa residents are of tremendous importance to

the District. Protecting public health and providing free services is at the forefront of why we have been in existence for nearly 80 years. The public also plays an integral role by doing their part to protect themselves and their community. The Dead Bird Hotline serves as a key element in the detection of West Nile virus activity. Since dead birds are often the first indicator of the virus being present, it is important that residents continue to call the hotline to report dead birds and their locations. Not all birds can be collected for testing, but simply reporting them to the toll free number (1-800-WNV-BIRD) provides crucial information to our surveillance and control efforts. If many birds are reported from one particular location, then that area is investigated and surveyed in much greater detail and considered a potential 'hot spot' of virus activity.



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. Some of this data is not available until late in the afternoon. Once we determine that there is risk to the public, we act promptly in order to protect public health.

Scientific Programs



WEST NILE VIRUS SURVEILLANCE

During 2006, West Nile virus (WNV) was detected in 54 out of 58 counties in California, resulting in 272 human cases (six fatal) and 57 equine cases.

In Contra Costa County, there were eight human cases (two fatal), 90 positive dead birds, 19 positive dead squirrels, 20 positive mosquito samples,

24 positive 'sentinel' chickens and a single positive horse. Most of the cases in 2006 occurred in the central part of the County (Fig. 1) unlike in 2005, when virus activity was highest in east county. We did not detect any WNV activity until late June (the first positive bird), and activity did not reach high levels until late July and early August when a heat wave kept overnight low temperatures well above average. Warm temperatures increase the reproductive rate of the virus within the vector mosquitoes, increasing the risk that they will transmit disease to birds, horses, and people.

In order to provide the earliest possible warning of West Nile virus activity, we have continued to expand our surveillance efforts over the past three years (Fig. 2). In 2006, we submitted more than 45,000 mosquitoes, 389 birds, 41 tree squirrels and 1,200 chicken

blood samples for virus testing. We also received over 3,500 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 statewide risk maps that have proved very helpful in determining where people are at higher risk and how the District should direct our surveillance and control efforts.

MOSQUITO POPULATION SURVEILLANCE

During 2006, we operated 28 New Jersey Light traps throughout the County (up from 18 in 2005) and as many as 90 carbon dioxide (CO2) traps (up from 40 in 2005) every week to monitor changes in adult mosquito populations. Although we conduct surveillance for all 23 mosquito species known to occur in Contra Costa County, only two, the northern house mosquito and the encephalitis mosquito, are known to be important vectors (carriers) of West Nile virus. County-wide, numbers of the northern house mosquito were well below average for most of the 2006 season (Fig. 3). Due to the relocation of some of our traps in the waterfront area to areas with higher encephalitis mosquito populations, county-wide counts of that species appeared to be well above average, although in parts of the county away from the waterfront, counts were for the most part average or only slightly above average (Fig.4). In addition to adult mosquito surveillance, we also identified and counted over 3,400 samples of mosquito larvae submitted by our field inspectors and technicians.

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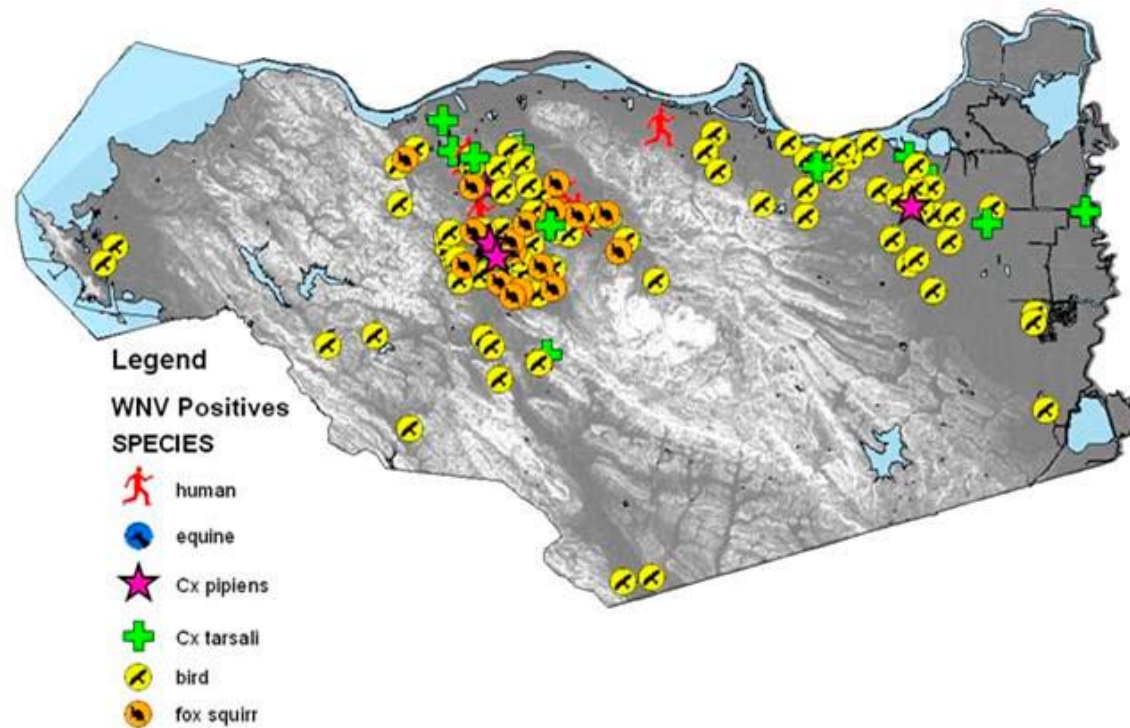


Fig. 1. Map showing location of positive West Nile virus cases in Contra Costa County during 2006

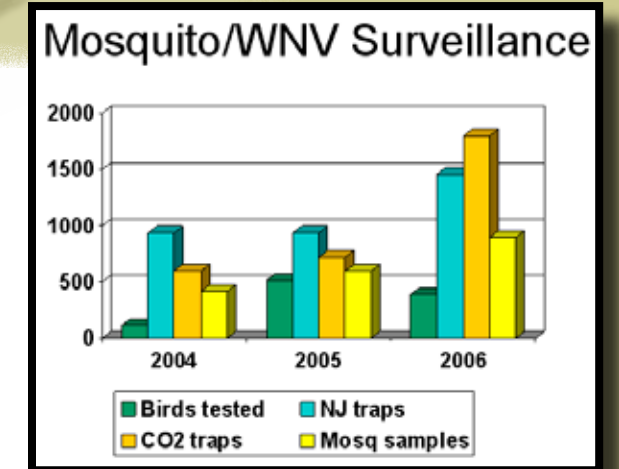


Fig. 2. West Nile virus surveillance samples processed by CCMVCD lab, 2004-2006

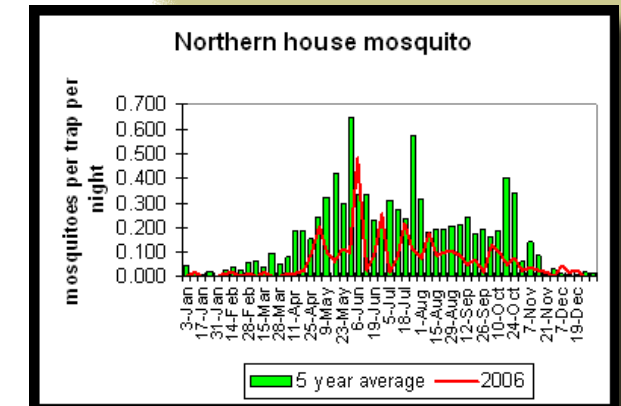


Fig. 3. Countywide average trap counts of the northern house mosquito, a West Nile virus vector mosquito species, in 2006

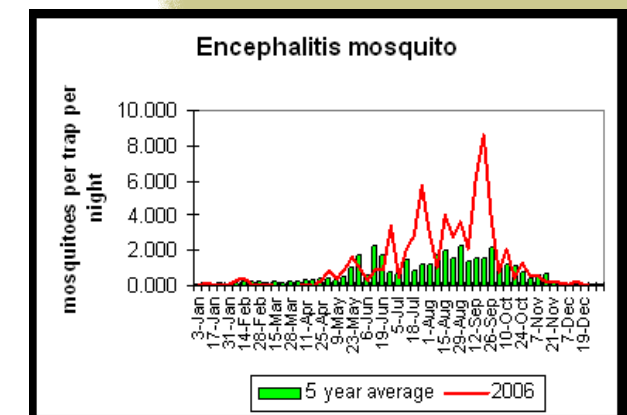


Fig. 4. Countywide average trap counts of the encephalitis mosquito, a West Nile virus vector mosquito species, in 2006

Scientific Programs

continued

MOSQUITO CONTROL EFFECTIVENESS

The lab periodically conducts field studies to monitor how effective our control activities are. These include 'cage tests' where known numbers of mosquitoes are placed in special cages outdoors in an area being treated by fogging (Fig. 1). These tests help us to determine how effectively the fog is reaching the areas we target by either truck or aircraft-based equipment. We also submitted adult encephalitis mosquitoes to a University of California laboratory to be tested for resistance to the botanical (plant-based) materials we use for adult mosquito control. No resistance was detected. The lab also processed over 226 sets of larval mosquito samples collected before and after larvicide treatments to help our field crew monitor the effectiveness of our larval control program.



Fig. 1. Cage used to test effectiveness of fogging

GEOGRAPHIC INFORMATION SYSTEM (GIS)

Our vector ecologist has led the effort to develop a computerized mapping system (GIS) to assist the District with all of its surveillance and control programs. Among the accomplishments in 2006 were creating a field version of the GIS map that can be loaded on individual laptop computers and used by our technicians in the field; adding all of our mosquito surveillance data as an interactive map overlay; mapping of sewer and stormwater systems to assist rodent and mosquito control; analyzing the distribution of WNV activity; and mapping and determining areas to be treated for mosquito control.

SPECIAL PROJECTS

In 2006, we continued two applied research projects that were started in 2005. These were:

1. Evaluation of a rapid test for detection of West Nile virus in tree squirrels.
2. Examination of the effects of microclimate (small differences in temperature) on the distribution of WNV in Contra Costa County.

Reports on our 2005 data have already been published in the "Proceedings and Papers of the Mosquito and Vector Control Association of California", and our 2006 results will be presented at statewide and national scientific conferences in 2007. We have also initiated two new studies to determine whether ticks and tree hole mosquitoes are secondary carriers of West Nile virus.

RODENT-BORNE DISEASES

Although a lot of our attention over the past couple of years has been directed towards West Nile virus, we also 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 2006, we trapped and tested deer mice at 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 Lab staff Eric Ghilarducci and Damien Clausen collect blood samples from rodents for hantavirus testing

Service requests for rodent issues within the county decreased slightly in comparison to 2005. Technicians responding to a service request will inspect the property and provide residents with a detailed report outlining rat and mouse presence, points of entry, as well as education in exclusion, trapping and monitoring for future activity. The

Rats & Mice



Fig. 2 Vector Control Inspector Nancy Harden places bait for rats in city sewers

roof rat, the Norway rat and the house mouse are all species found within Contra Costa County and are all susceptible of carrying bacterial disease.

IN THE FIELD

District technicians conducted sewer pulse-baiting projects (Fig. 2) that proved to be effective in controlling rats that occupied city sewer systems. Tamper-resistant bait stations were placed in public areas (Fig. 3) such as parks, creeks, and marinas in an effort to control Norway and roof rat populations. These bait stations are kept well hidden from public view and work very well to keep non-targeted animals from entering. In 2006, the District assisted city code enforcement in several communities to enforce codes and abate rodent nuisance areas. Residents who collect large amounts of debris on their property often break city code enforcement policies which can carry a monetary fine. Currently, the District can administer citations in Concord, Danville, Pittsburg, and Richmond.



Fig. 3 Vector Control Inspector Nancy Harden checks a bait station for rat activity

Ticks & Lyme Disease



Fig. 1. Female Western black-legged tick

Lyme disease is a bacterial infection transmitted by the Western black-legged tick (*Ixodes pacificus*), 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),

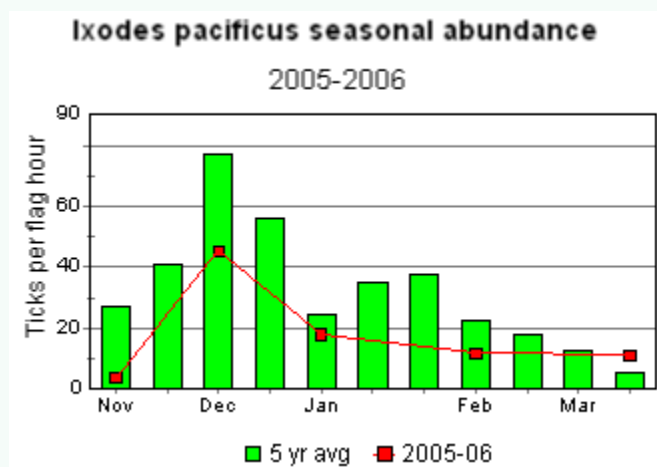
it can cause serious complications if not treated promptly. The District monitors the risk of Lyme disease by collecting and testing black-legged ticks from several locations that we have been monitoring for as long as 12 years. These include Bollinger Canyon Rd., San Ramon; Springhill Rd., Lafayette; and the Bear Creek area of Briones Regional Park. The adult Western black-legged tick population was below average for most of the season, except during the last half of March where counts slightly exceeded the average. An unusually high number of days with rainfall during the collecting season limited the number of possible collection days; thus reducing the numbers of ticks collected. The graph below shows the average number of ticks that were collected from these locations.

On average, only one or two in a hundred black-legged ticks test positive for Lyme disease, although we have found a few locations where the rate is higher, and these tend to change over time. In 2006, we collected and tested 132 ticks from three locations; the highest infection rate was in the Bollinger Canyon area in San Ramon where three out of 58 ticks tested positive (just over 5 percent).

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 or dead, a more sensitive test is required and county residents have the option of allowing us to send the tick to a private laboratory for a fee of \$60 (our cost). Out of 54 ticks tested for residents in 2006, only one was positive for Lyme bacteria (just below 2 percent).



A Western black-legged tick waits on a blade of grass for a person or animal to pass by



Yellowjackets

Paradoxically, some yellowjackets are actually considered to be beneficial since they feed abundantly on garden insect pests. However, in late summer and early fall when their populations peak, the ground-nesting yellowjackets' feeding habits can become a problem to humans as they seek meat and sugar, which of course are also consumed by people. Yellowjackets can sting repeatedly and will do so if they sense they are in danger. This threat is presented when people swat at them hoping they will disperse, causing them to release pheromones that alert other yellowjackets that there is a hazard. Naturally, this causes them to react aggressively. Yellowjacket stings can be life-threatening for those people who are allergic to their venom.

The Contra Costa Mosquito and Vector Control District offers a free service to remove ground-nesting yellowjackets if needed. There are four species that reside in the county, two of which nest above ground and two that nest in-ground. Ground nests, often constructed in old rodent burrows and ground holes, can be difficult to locate and are sometimes discovered accidentally when a person steps on one, presenting a threat toward the yellowjackets and causing them to

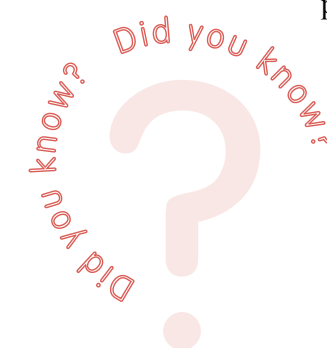


Yellowjackets entering their groundnest

react accordingly. Residents who place a service request for yellowjackets are asked to mark the nest by placing a distinct marker, such as a flag or shovel, where the ground nest is located so our technician can find and treat the nest.

In 2006, the District saw a slight overall decline in service requests in comparison to 2005. As the summer months proceeded and temperatures rose significantly, the service requests increased as well. When people cook meat outdoors and leave containers of sugar-laden liquids, such as soft drinks exposed, their presence serves as an attractant to yellowjackets, which can create problems when they come into contact with people. Surprisingly, what people wear and place on their skin can attract yellowjackets as well. Deodorant, perfume and brightly colored shirts are just a few examples.

Technicians typically respond to service requests by the next working day. Residents can take steps to avoid contact with yellowjackets by tightly covering garbage containers, maintaining compost piles, and keeping lids on soft drinks.



Swatting at or killing yellowjackets prompt them to release a pheromone that "calls" to other yellowjackets for help. Fellow yellowjackets then come to the aid of their comrade.

When yellowjackets visit you at your barbecue, they are simply looking for food. Don't swat at them; ignore them. Make them your first guest by placing a meal for them in the far corners of your yard; thereby attracting them to that meal and not yours.

Skunks

THE CONTRA COSTA MOSQUITO & VECTOR CONTROL DISTRICT maintains a rabies risk reduction program by loaning skunk traps 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 the animal is subsequently humanely euthanized. According to the California Fish and Game department, skunks cannot be relocated since they have the potential to carry and spread rabies.

In 2006, the District saw an increase in service requests from Contra Costa County residents. This can be attributed to a higher number of young off-spring that survived by evading predators during peak skunk season (May and June). If they are not trapped or have not succumbed to predation,



Striped skunk

they will re-establish themselves in previously occupied dens. County-wide, every couple of years in any given city, the potential for a spike in skunk survival rates exists.

Within the last few years, the skunk program at the District has grown considerably to meet the demands of increased skunk activity. With urban development occurring in previously open areas, construction has



Skunk trap

driven animals, including skunks, from previously uninhabited areas toward residential locations in search of food and shelter. The program has evolved from a period when traps were left with residents regardless of whether a skunk was present on the property or not; to having technicians carefully evaluate each individual property or area of concern and conducting public education to the property owner. If necessary, a trap is left with the resident.

The District has found great success since it started utilizing smaller and more durable cylindrical-style traps that help to eliminate non-target animals from entering. The traps are humane and pose no danger whatsoever to animals or humans and prevent trapped animals from injuring themselves.

The skunk program offers landowners, home owners associations and businesses the option to purchase a trap to be kept on the property year-round if approved by our technicians. Proper trap placement and immediate notification of trapped skunks to the District are strictly enforced. Overall, residents and business owners alike have cooperated immensely with the District by creating environments to situate these traps so that children and pets cannot tamper with them.

The District emphasizes preventative measures residents can take versus merely trapping the animals. The use of skunk traps is limited to people who have taken all the necessary precautions to avoid skunk harborage, but to no avail.

Africanized Honey Bees

Locally, Africanized Honeybees (AHB) were introduced into Contra Costa County on July 21, 1997. At that time, United States Department of Agriculture inspectors found a small swarm of AHBs on a ship from Guatemala that was docked in Crockett, here in Contra Costa County. Inspectors sprayed the swarm, but some bees dispersed. Although there has been no evidence to prove that those bees survived, it is possible that AHBs could arrive within the county at any time either by migration or by hitch-hiking in a ship, truck, etc. from a colonized area. At the present time, AHB migration through California has occurred in 17 counties, all of which are located in the central to southern portion of the state.

AHBs look and behave almost exactly like the European Honey Bee (EHB) that currently resides in the United States. The one and very distinguishing difference between the two species is the incredibly aggressive and defensive behavior of the AHBs. In some instances, these hostile insects have seriously stung and sometimes killed pets, livestock and humans. Other notable differences include AHBs responding much quicker to disturbances, attacking for a longer period, and following a victim further distances than EHBs.

Like yellowjackets, AHBs also contribute positively to the environment by providing about 80 percent of pollination required for crop production. They also



An Africanized honey bee nest found inside a barbecue

- Maintain alertness when participating in all outdoor activities
- Teach children to be cautious and respectful to all bees
- Listen for prominent buzzing, indicating a nest or swarm
- Examine your work area before using power equipment or other loud devices, which can disturb a nearby nest
- Use care when entering sheds or buildings where bees may rest

produce honey and wax.

Coexistence between these hybrid bees and humans is possible. If an encounter occurs, leave the area quickly protecting your face and mouth. Seek shelter where most of the bees cannot enter, such as a car, house, or other building.

In 2006, all District service requests were the result of European honeybee swarms and nests.

No calls resulted in the discovery or treatment of AHBs. All swarms and nests are tested by the District to learn if any are Africanized by measuring the length of their average wingspan. If their span is less than 9 mm, then they are suspected of being Africanized. Residents are encouraged to simply leave a nest alone if it does not present a danger or threat.



A young boy stands near an Africanized honey bee nest found in his home.

Fisheries Program

The District distributed over 54,198 mosquitofish (*Gambusia affinis*) in Contra Costa County and continues to conduct research on California's only native centrarchid, the Sacramento perch (*Archoplites interruptus*). This species shows some potential as an alternative biological control agent of mosquito larvae.

This year the District spawned and reared Sacramento perch for both field stockings and experiments. Currently, the District is the only agency producing Sacramento perch and has become



Sherman Island mitigation site

a source for this species. We provided five agencies with Sacramento perch in 2006. By providing Sacramento perch to other agencies, we will gain more information on how this species exists in different environments. Listed below is a list of the contact person(s) and agencies.

Dr. Bradd Bridges and Rene Reyes, Bureau of Reclamation. The District provided 25,000 eggs for early-life history studies.

Christopher Swann, Ranger Supervisor, Lafayette Recreation Area, East Bay Municipal Utility District. The District stocked a total of 40,000 larvae (in three stockings). Stockings were conducted to learn if a population could be established in Lafayette Reservoir.

Michael Dege, Environmental Scientist, California Department of Fish and Game. One hundred ninety-seven (one-year-old) Sacramento perch were stocked in a 14-acre mitigation site on Sherman Island. Stocking was conducted to establish a population at this site.

Christopher Wilkinson and Cassandra Enos, Department of Water Resources. Three hundred and four (five-month-old) Sacramento perch were stocked in Blacklock Restoration site to establish a population.

Patrick Crain, Staff Research Associate, University of California, Davis. Three hundred ninety-three (one-year-old) perch were stocked in Redfish Lake. Stocking was conducted to evaluate survival of Sacramento perch in a site that has a large population of largemouth bass (*Micropterus salmoides*).

The District continues to conduct experiments on the efficacy of Sacramento perch for use in mosquito control. In July, a mesocosm experiment was conducted to compare Sacramento perch to mosquitofish in their ability to control mosquito larvae in an environment with an abundance of other prey items. This study was conducted over 21 days with water temperature ranging from 22.2°C to 29.4°C. Two hundred-gallon tanks were stocked with 100 amphipods (*Hyalella azteca*), 100 *Daphnia magna* and 100 mosquito larvae (*Culex* sp.). Sacramento perch 68-day post hatch



Sacramento perch stocked in Blacklock

(averaging 24 mm TL) and mosquitofish 28-32 days of age (averaging 23 mm TL) were used in this study. Three fish per tank were used for each treatment with three replicates. In the control tanks, no fish were stocked. Four days after mosquito larvae were stocked, adults started to emerge from the control tanks. Emergence of adult mosquitoes in the control tanks continued for another 17 days. No adult mosquitoes emerged from the tanks stocked with Sacramento perch or mosquitofish. Preliminary results show that Sacramento perch averaging 24 mm (TL) are comparable to mosquitofish of approximately the same size. While these results are promising, the natural environment is much more diverse in food items, which may effect the level of control. Future studies will be aimed at providing more prey items such as chironomid midge larvae (suggested preferred prey of Sacramento perch) or using natural sites in the field.

The District received an \$1,800 grant from the Contra Costa County Fish and Wildlife Committee. This grant provided funds to purchase a 100-gallon aquarium, chiller and filter equipment. This aquarium was originally going to be used for the California Department of Fish and Game's sponsored "Trout in the Classroom" program. Funds for this project became available May 2006, but



Randy Monroe and a 100-gallon tank

because trout eggs would not be available until February 2007, the District decided to develop a "California Native Fish Education Program" rather than allow the aquarium to sit empty for five months (September through January). The District designed an eight-page, color fish identification guide describing four species of California native fish. The goal of this program was to show students species of fish that are native to Contra Costa County. The 100-gallon aquarium was set-up in science teacher Randy Monroe's classroom at Foothill Middle School in Walnut Creek in September 2006. Four hundred identification guides were distributed to students. Seven species of California native fish reside in this aquarium for students to observe. In February 2007, a 30-gallon aquarium and chiller were set up for

hatching rainbow trout eggs. Participation in education programs like these demonstrates the District's commitment to the Contra Costa community, as well as to the natural environment.



Blacklock fish stocking sites

Wetlands & Environmental Programs

THE DISTRICT'S WETLANDS AND ENVIRONMENTAL PROGRAMS reduce vector production and assist other programs in four major areas: 1) assisting landowners to improve land and water management practices and thus ensure long-term control of mosquitoes and other vectors; 2) ensuring the District's compliance with environmental laws and regulations; 3) representing the District and other vector control agencies to regulators and legislators in the development of these rules and acquisition of permits; and 4) conducting and reviewing scientific research on the environmental impacts of mosquito and other vector control activities. During 2006, the District was heavily involved in federal regulation of mosquito and vector control, as the District's environmental projects manager again served as chairman for Legislative and Regulatory Affairs for the American Mosquito Control Association.



Mirant (PG&E) Marsh, Pittsburg

The major mosquito "source reduction" projects for 2006 focused on improving water flow in marshlands at the Mirant power plant in Pittsburg, where the District completed a multi-year channel maintenance program (see photo), and in Point Pinole Regional Park where the District worked with the East Bay Regional Park District to remove and recycle creosote-coated timbers that had blocked channels in tidal marshlands. These areas can produce copious mosquitoes when the water stays still, but are relatively free of mosquitoes while the water moves.

Another District priority is ensuring that mosquitoes, rats, or other vectors are not produced unintentionally when wetlands are created or restored. In addition to restoring natural habitats for many species, wetlands are created for a variety of reasons, including open space and recreation, mitigation for wetlands or creeks damaged during

construction activities, flood reduction, and cleaning 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 2006, this involved collaborations throughout the county, including with refinery staff in Concord, housing developers in Pittsburg, Caltrans engineers along the Route 4 bypass, the County flood control department, City of Pleasant Hill staff, and railroad workers throughout the county.

District staff worked with federal and state regulators and legislators this year on many topics, but the most significant were water pollution, storm water detention, pesticide risk assessments, and endangered species protection. The District ensures compliance with existing environmental

rules through staff training, permit acquisition and management, and an annual environmental audit. At the same time, District staff is heavily involved in negotiating improvements in these rules and in supporting the scientific research needed to justify change. Specifically, as the representative of the American Mosquito Control Association, the District's environmental projects manager was a lead negotiator with USEPA this year on new risk assessments and risk management strategies for chemicals used to control adult mosquitoes and rodents.

Public Affairs & Community Outreach

THE PUBLIC AFFAIRS DEPARTMENT works year-round to inform and educate the public about District services and the vectors in their communities by offering free presentations and access to essential literature. The department strives to provide the public with knowledge and education to reduce vectors while understanding the potential health risks that are associated with them. Working extensively with the media regarding West Nile virus activity, notifying residents of District responses, and providing overall education are integral parts of the public affairs department at the District.

Efforts to reach and inform the public in 2006 included over 60 presentations, booths at local events and fairs, and setting up informative library displays. Sixteen presentations at senior centers throughout the county were also given. The District currently offers three complete presentations, which include "West Nile Virus" (also available in Spanish), "Rodent Prevention," and a "General Presentation" that details vectors and their habitats and delves greater into detail regarding services the District provides to county residents free of charge. A four-page, full-color West Nile Virus newspaper insert was once again published, reaching every household in the county.



Community Affairs Representative Nola Woods provides mosquito education to students at one of the many outreach events in 2006.

Other outreach efforts in 2006 included over 250 media interviews/communications that were given due to increased West Nile virus activity in the county and the human cases that occurred. Past District surveys revealed that residents prefer to get their information from media outlets; thus our efforts to prioritize this form of communication. The majority of the news stories that developed from these interviews resulted in favorable support from the community regarding how the District operates in the fight against disease-transmitting mosquitoes.

District staff appeared on several television shows including "Bay Area People" and CNN local "Headline News." The public affairs manager strives to communicate on a local and state-wide level to ensure consistent and current crucial information is disseminated.

Contra Costa Television (CCTV) once again proved an instrumental resource for the District. The collaboration produced several educational programs that featured District staff, including "Integrated Pest Management"; "West Nile Virus"; English and Spanish versions of "Get Ready, Get Healthy"; and public service announcements about West Nile virus that starred Lindsay Wagner of "Bionic Woman" fame. In all, over 200 segments were aired in an effort to educate residents and protect their health. CCTV also displayed text information on their channel for residents to obtain notification of District spray efforts within their communities.



Public Affairs Manager Deborah Bass responds to a television reporter's question

REVENUES	2004/2005	2005/2006
Property Taxes	\$3,027,105	\$3,467,844
Contracts	76,485	86,384
Interest Income	44,639	106,203
Benefit Assessment	1,674,818	1,792,418
Miscellaneous	42,749	247,895
Total Revenues	\$4,865,796	\$5,700,744
EXPENDITURES		
Salaries & Wages	\$2,867,996	\$3,312,050
Operations	1,166,966	1,246,918
Capital	536,997	235,052
Total Expenditures	\$4,571,958	\$4,794,020

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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





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