



CONTRA COSTA MOSQUITO & VECTOR CONTROL DISTRICT

ANNUAL 20  
REPORT 08

PROTECTING  
PUBLIC HEALTH  
SINCE 1927



Public health protection

cannot

ebb and flow.



The year saw a resurgence of West Nile virus activity throughout the state of California. Early detection and frequency of the disease in birds and mosquitoes gave us warning that the year would have increased risk of WNV transmission to humans. The concern proved warranted as the number of cases of the most reliably reported form of the disease, West Nile neuroinvasive disease, shot up from 156 in 2007, to 267 in 2008 — an increase of more than 70 percent statewide.

The increased detection of WNV in Contra Costa County, mainly in the eastern portion of the county, was mostly attributed to backyard swimming pools. The downturn in the housing market and subsequent high foreclosure rates resulted in literally hundreds of neglected swimming pools producing mosquitoes in the middle of neighborhoods. This presented a real challenge as the District has historically focused on controlling mosquitoes in public domain areas of the county and required private landowners to conduct mosquito control on their own property. However, with the vast number of vacant residences in WNV "hot spot" areas, the District employed an additional workforce to focus on finding, inspecting, and controlling swimming pools, spas and other stagnant water sources on these vacant properties. This required stronger working alliances with city personnel in various departments, including code enforcement, public works, and law enforcement. The District would like to acknowledge the management and employees of the East County cities of Antioch, Oakley, Brentwood, and Pittsburg for their valuable assistance in locating and eliminating stagnant water sources and educating the public to do the same.

District staff, again, rose to the new challenges and fine-tuned programs to combat the ever present mission of protecting public health from mosquito-borne diseases, such as West Nile virus. New programs, such as the backyard swimming pool crews; increased surveillance and testing of mosquitoes, birds, and sentinel chickens by the Scientific Programs Department; added training workshops and informational presentations by the Public Affairs Department; internal assistance from vertebrate program personnel; emphasis on source reduction projects in hot spot areas by the Environmental Projects Department; and last, but not least, the handling of the increased volume of incoming calls from the public for information and services by the front office staff.

## FOREWARD



District operations and finances continue to be managed prudently and consistently with long range stability kept in mind. Public health protection cannot ebb and flow. The employees and trustees of the Contra Costa Mosquito and Vector Control District consistently strive to deliver high quality services to the residents of Contra Costa County.

Respectfully,

*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



Back Row: Jeff Bennett, Hercules; Richard Means, Pleasant Hill; Angela Micheals, Concord; Russ Belleci, Contra Costa County; Tim McDonough, Pinole; Daniel Pellegrini, Martinez; Richard Head, Oakley; H. Richard Mank, El Cerrito; and Jim Fitzsimmons, Lafayette

Front Row: Soheila Bana, Richmond; Peggie Howell, Clayton; Kaleinani Lau, Danville; Nancy Brownfield, Walnut Creek; Diane Wolcott, Orinda; and Sharyn Rossi, San Ramon *Not pictured: Richard Ainsley, Pittsburg; Jose Saavedra, Antioch; Myrto Petreas, Moraga; James Pinckney, Contra Costa County*

## Administrative & Technical Staff



Standing: Jonathan Rehana, Vertebrate Program Supervisor; Carlos Sanabria, Operations Manager; Damien Clauson, Vector Ecologist; Eric Ghilarducci, Vector Ecologist; Craig Downs, General Manager; Andrew Pierce, Community Affairs Representative; Steve Perkins, Waterfront Mosquito Program Supervisor; Sheila Currier, Inland Mosquito Program Supervisor; Chris Miller, Biologist; Greg Howard, Waterfront Mosquito Program Supervisor; Tina Cox, Accounting & Benefits Specialist; Ray Waletzko, Administrative & Finance Manager; Wayne Shieh, IT Technician

Seated: Allison Lewis, Administrative Secretary; 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; Steve Schutz, Ph.D., Scientific Programs Manager*

## TECHNICIANS, INSPECTORS & AIDES



Vector Control Technicians,  
Inspectors & Mechanic

Back Row: Jeremy Tamargo, VCT; Felipe Carrillo, VCI; John Chase, VCI; Dave Obrochta, VCI; Lawrence Brown, VCT; Steve Fisher, VCT; Tom Fishe, Mechanic; David Wexler, VCT; Tim Mann, VCT; and Joe Hummel, VCT

Front Row: Reed Black, VCI; Josefa Cabada, VCT; Danielle Wisniewski, VCT; Joe Cleope, VCI; and Patrick Vicencio, VCI *Not pictured: Ceaser Gutierrez, VCT; Robert Stultz, VCT; and Jason Descans, VCT*



Vector Control Aides

Standing: Fernando Franco; Mike McCoy; Tony Freitas; Joshua Willis; Greg Dorman; Eric Moutinho; Christopher Doll; Robert Douglas; and Derek DiMaggio

Seated: Navraj Padda; Heidi Budge; Bennie Martinez; Maria Cabada; Jorja Smith and Shaun Redman  
*Not pictured: Jason Wida and James Flannery*

### 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

## INTEGRATED PEST MANAGEMENT (IPM)

disease to humans. Larvicides 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



## West Nile Virus Surveillance

During 2008, West Nile virus was detected in 49 out of 58 counties in California, including 415 human cases (35 more than in 2007) and 32 equine cases. Southern California and the Central Valley were the areas hardest hit. Activity in Contra Costa County was up as well, with four human cases, one seropositive blood donor, 88 positive dead birds, nine positive dead squirrels, 31 positive mosquito samples, 15 positive 'sentinel' chickens in two flocks (Knightsen and Oakley) and three positive horses (Fig. 1). Activity was once again highly focal and largely concentrated in the East county cities of Antioch, Brentwood and Pittsburg (Fig. 2).

WNV activity in CCC

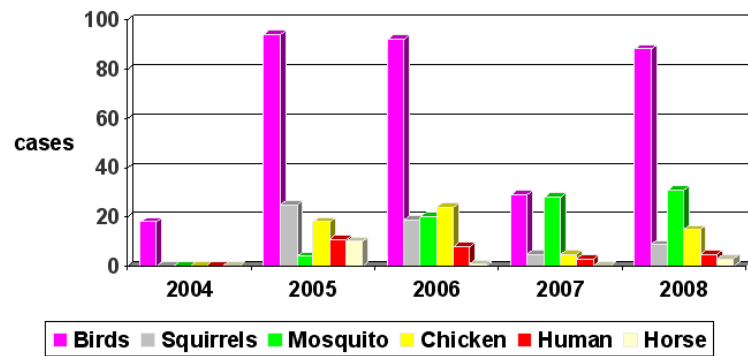


Fig. 1 West Nile virus activity in Contra Costa County, 2004-2008

## Mosquito Population Surveillance

During 2008 we continued to operate 28 New Jersey Light traps and 40-60 carbon dioxide (CO2) traps every week to monitor changes in adult mosquito populations. County-wide, light trap counts of *Culex tarsalis* (encephalitis mosquito) were above average and *Culex pipiens* (northern house mosquito) were average or below for most of the 2008 season (Fig. 4, page 10).

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.

Activity was once again highly focal and largely concentrated in the East county cities of Antioch, Brentwood and Pittsburg (Fig. 2). Foci of WNV activity were strongly correlated with high concentrations of foreclosed properties with swimming pools (Fig. 3), as well as with poorly functioning stormwater drainage systems and new water detention structures.

In 2008, we tested approximately 23,000 mosquitoes, 366 birds, 39 squirrels and 1,200 chicken blood samples for WNV. We also received more than 2,200 dead bird reports from County residents through the statewide WNV hotline (1-877-968-2473). The risk maps generated by these reports accurately predicted areas where people were at higher risk so we could direct our surveillance and control efforts accordingly.

## Mosquito Control Effectiveness

Due to high infection rates in adult mosquitoes, several mosquito adulticiding (fogging) operations were carried out in Antioch, Brentwood, Oakley, and Pittsburg during the summer and fall to reduce the risk of human WNV cases. In every case we saw a decrease to zero in the WNV infection rate (proportion of WNV positive mosquitoes) immediately after fogging, indicating that older, infected females were being eliminated from the population despite continued recruitment (emergence of new individuals) from backyard and underground larval sources that we were unable to locate or treat. Our integrated mosquito control program (combination of larviciding and adulticiding techniques) appeared to be successful at reducing the risk of human cases despite high mosquito infection rates (Fig. 5, page 11).

## Geographic Information System (GIS)

Our staff continued to utilize our computerized mapping system (GIS) as an important component of our integrated vector control program. Merged with our computerized database, GIS was used to assist the District with all of its surveillance and control programs. Again GIS maps proved extremely useful during 2008 for mapping and planning treatments of marshes, sewer and stormwater systems, identifying property owners, and planning and coordinating collaborative source reduction projects with other public agencies by providing a visual representation of the data collected in the field.

As a result of the high foreclosure rate in the county, the past two years have seen a dramatic

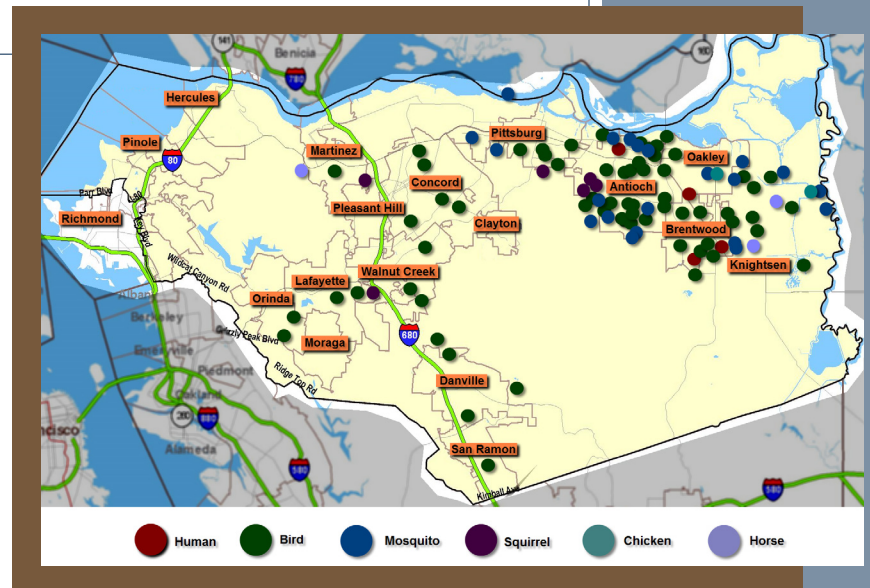


Fig. 2. Map showing locations of positive WNV cases in Contra Costa County during 2008

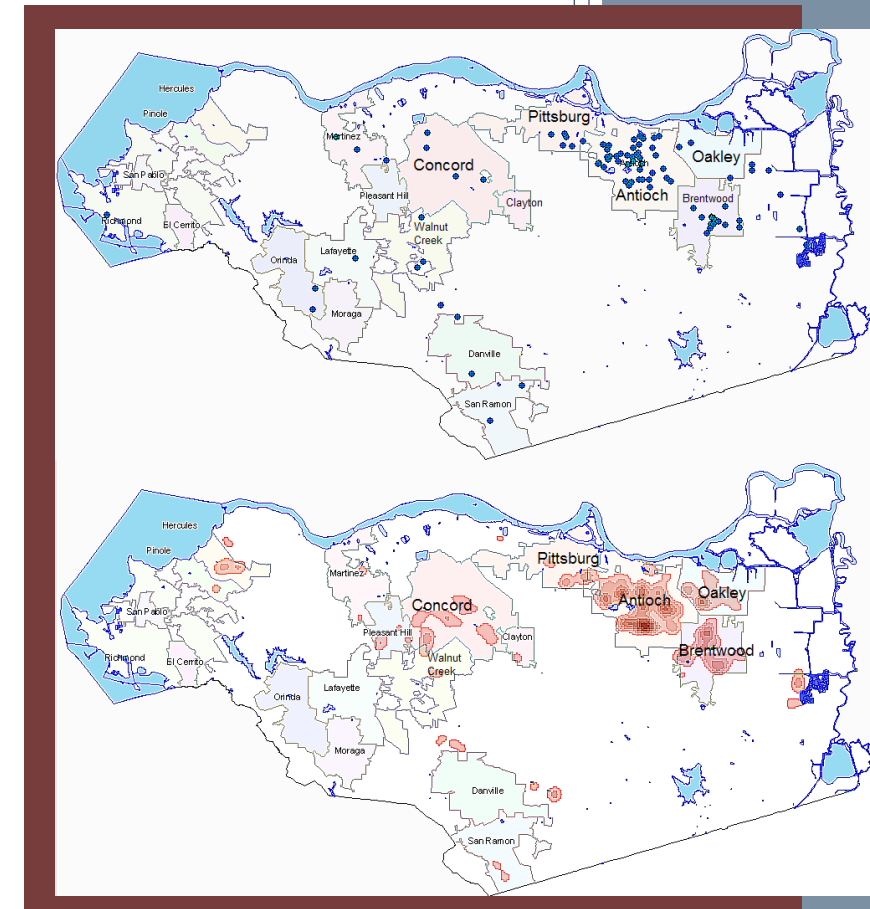
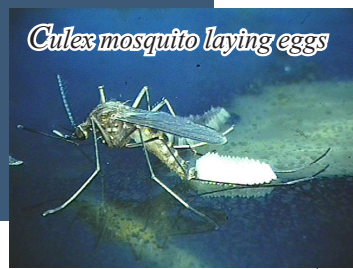


Fig. 3. Relationship between density of foreclosed properties with pools (red areas; bottom picture) and WNV positive birds (blue dots, top picture)

# MOSQUITOES



increase in the number of abandoned residential properties with neglected swimming pools, many of which were found to be breeding mosquitoes. GIS mapping proved extremely useful during 2008 for locating and planning treatments of these properties. Using information from <http://www.foreclosureradar.com>, a pay service, we were able to obtain street addresses of all properties in the county that were in foreclosure, or about to be, that contained a swimming pool.

These locations were combined with our field collected data and mapped. Using the map to visualize areas with the highest density of pools, predictions were made as to where WNV transmission was likely to occur, allowing our field crews to inspect and treat before actual disease transmission was detected.

We also continued to make significant progress on a project initiated last year to review, update and map mosquito source location information in our database, much of which was collected before Global Positioning technology was available.

## Special Projects

In 2008 we continued to examine the effects of microclimate (small differences in temperature) on the occurrence and distribution of WNV in Contra Costa County and the effectiveness of the RAMP test for detection of WNV in squirrels. We also studied the spatial correlation between property foreclosures and WNV activity and participated in a nationwide study by the U.S. Department of Agriculture on mosquito population genetics and vector competence (ability to transmit disease). A report on our 2007 data on the effectiveness of ultra low volume (ULV) fogging for reduction of WNV risk was presented at the 2008 Mosquito and Vector Control Association of California Annual Conference in Palm Springs and we will be presenting reports on West Nile virus surveillance, tick and Lyme disease surveillance and GIS mapping at the 2009 Annual Conference in Burlingame.

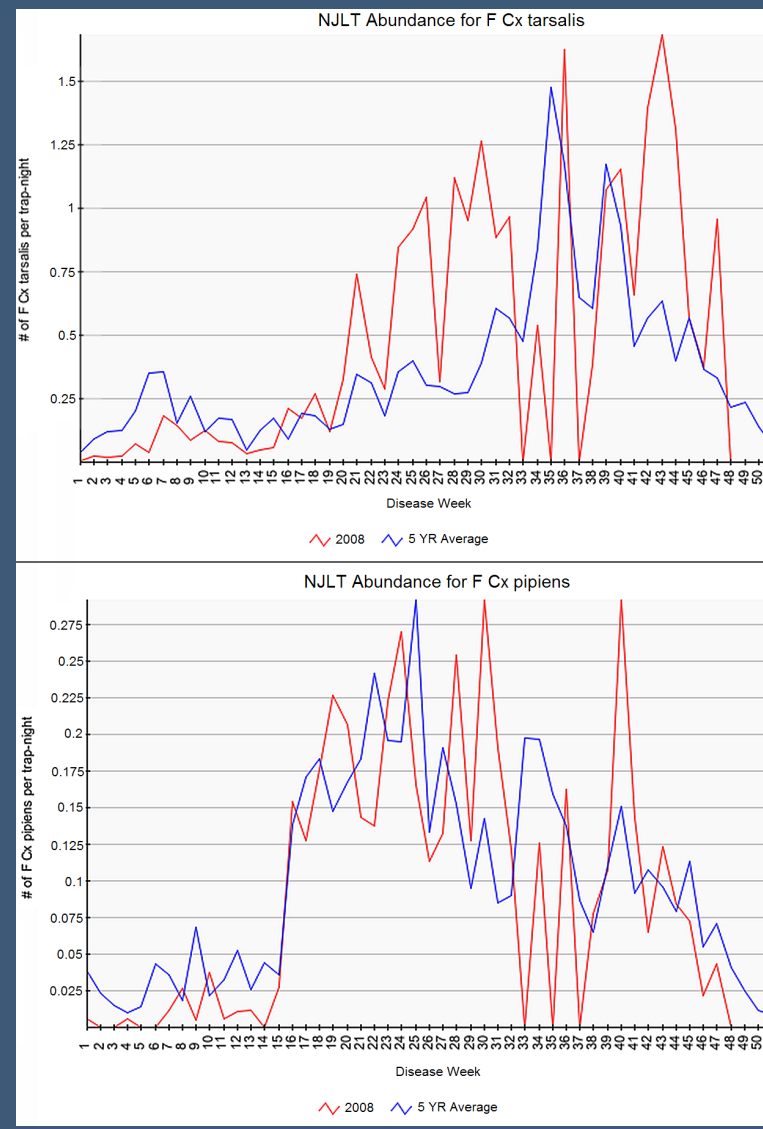


Fig. 4 Countywide average trap counts of two primary West Nile vector mosquito species in 2008

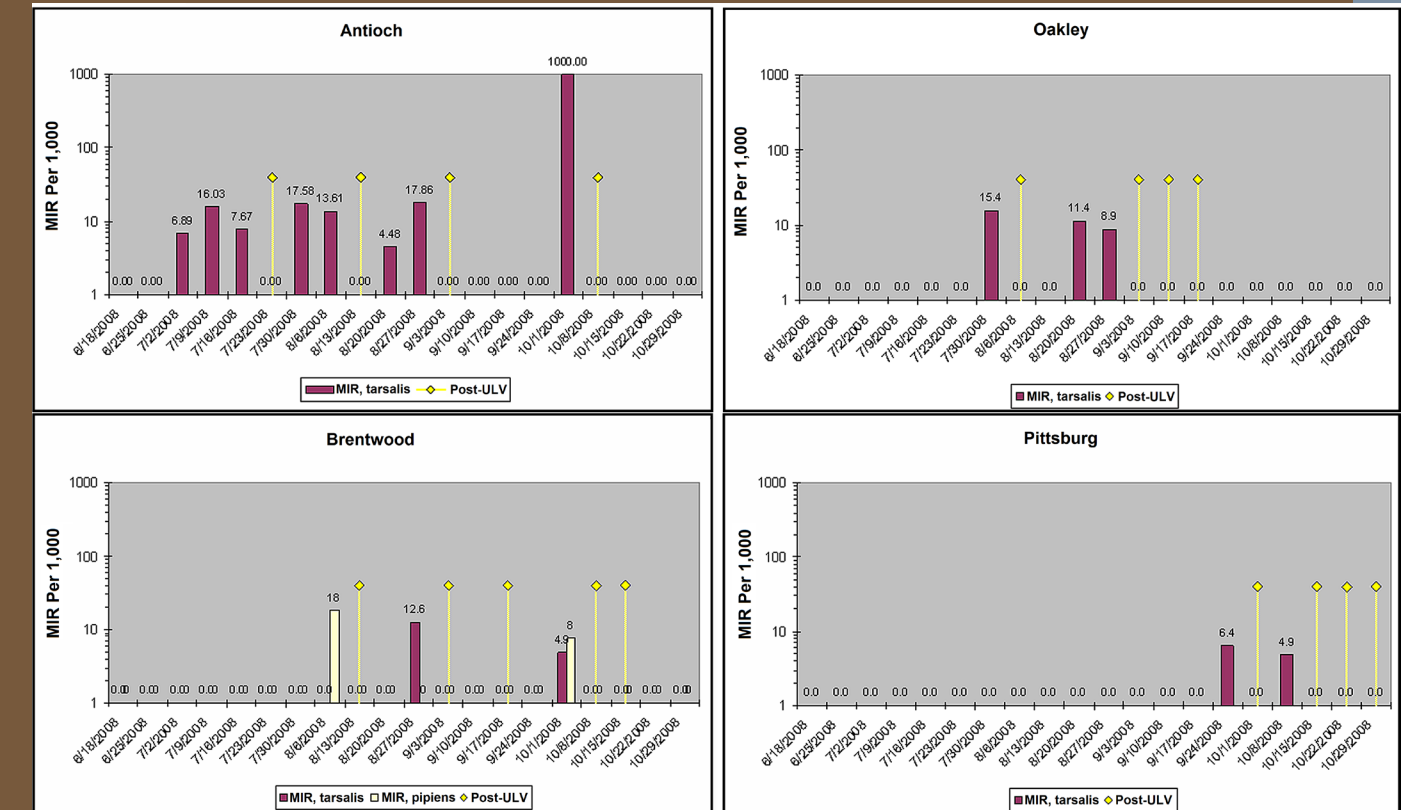


Fig. 5. Estimated WNV infection rates per 1,000 mosquitoes (MIR) in Antioch, Brentwood, Oakley and Pittsburg before and after ULV adulticide treatments.

## In the Field

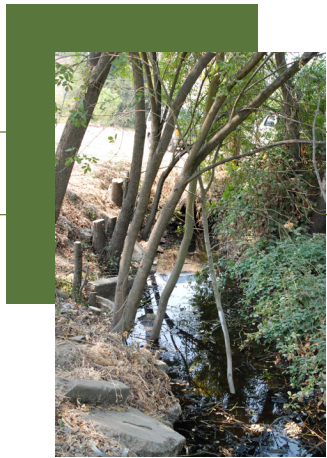
2008 began auspiciously quiet, with below normal rainfall, but more than 2007. During the course of the year, three times as many mosquito service requests were received and responded to compared to the average year. The peak occurred in August with almost 540 phone calls for mosquito service. The majority were complaints about abandoned or unkempt residential swimming pools. The message to the public to assist us in locating these sources was well received. The barrage of mosquito service requests began in March and April as is typical; however, instead of beginning to decline, the volume remained at least double the average per month.

Springtime application of time-release insect growth regulating pellets to the berry and willow thickets on Bethel Island, Bradford Island, Jersey Island, and Holland Tract proceeded as usual.



A newly emerged *Aedes vexans* mosquito rests and dries its wings prior to taking flight

# FIELD OPERATIONS



*Vector Control Technician Josefa Cabada uses a storm drain mister to treat mosquitoes*

The increased residential development on Bethel Island has decreased the amount of mosquito breeding thicket areas. In late February we began to re-check and expand tree hole mosquito treatments in the areas with oak woodlands adjacent to residential areas which have experienced tree hole mosquito problems in the past.

In an effort to expand and improve mosquito control in the municipalities of Contra Costa County, we hired and trained three vector control aides to answer swimming pool related service requests and treat pools that were producing mosquitoes, introducing mosquitofish to extend control until proper pool maintenance was established. We also re-introduced a similar crew of vector control aides whose primary purpose was to inspect and treat mosquito producing catch basins with extended time-release insect growth regulating briquettes. The previous years' catch basin crew had provided much needed assistance to the busy zone technicians. The catch basin crew also continued to expand the use of the storm drain mister, a device utilizing compressed air to blow a cloud of pesticide thorough a storm drain system when the connecting pipes have sunk, thereby trapping water a distance from the catch basin. With the anticipated increase in problem swimming pools, we were prepared for an active year. While the catch basin crew was utilized for other inspections and pesticide treatments until the rains had ceased and the catch basins were observed beginning to breed mosquitoes, the swimming pool crew never really received a respite from the numerous service requests. During May and June, we worked Saturdays to respond to all of the swimming pool service requests in a timely manner.



*Aerial maps are used to locate neglected or abandoned pools, usually revealed by the color green*

In an effort to educate other agencies about mosquito breeding habits, the District provided a presentation to cemetery personnel of Contra Costa County about the potential for container breeding mosquitoes to proliferate in that environment. The District emphasized best management practices and technical assistance by the District. Since eastern Contra Costa County has shown to be warmer and thereby demonstrate the presence of WNV earlier in the year, we elicited the assistance of code enforcement departments of Antioch, Brentwood, and Oakley in May to assist us in locating mosquito producing locations, not just swimming pools. Properties which were of interest to them were also of interest to us. The edu-



*Signs like this dominate neighborhoods with high foreclosure rates*

cation of police officers, fire personnel as well as public works and other city employees about what to look for really helped us bring mosquito populations under control. Once this line of communication was established, we were able to get other departments and agencies involved.

The public's assistance by reporting dead birds to the dead bird hotline helped to focus our efforts in those areas, which did subsequently produce WNV infected mosquitoes.

Despite this early warning, using foreclosure lists, other agencies, and periodic aerial overflights to locate potential breeding sources, we experienced difficulty in locating all of the offending mosquito-producing sources in some areas. This led to having to control the resulting adult mosquito population with multiple ULV fogging operations in areas of Antioch, Brentwood, Oakley, and Pittsburg. The record number of unkempt pools reported to us in 2007 alerted us as a potential key issue for the maintenance of WNV in an area. The home foreclosure crisis only got worse in 2008. Clearly, establishing a swimming pool crew proved essential; the number of swimming pool service requests increased by 300 percent. It seemed that our rate of finding bad pools was good; however, getting these pools corrected was very difficult and time consuming. Tracking down lenders and getting responsible parties to take receipt of the problem continued to be a significant challenge. The rate of increase in finding bad pools greatly exceeded the rate of removal of pools which had been drained or were properly functioning from our list of properties that required periodic re-inspections. The warm weather and incidence of WNV infected mosquitoes persisted well into October, really extending the vector mosquito breeding season.



*Vector Control Technician Josefa Cabada puts mosquitofish into a neglected swimming pool*

Irrigation practices of the agricultural areas of eastern Contra Costa County also continued to require our attention as nuisance flood-water mosquitoes were produced and alarmed adjacent residents. The District had to rely on several helicopter applications of pesticides to these areas to get them treated before the mosquito adults emerged from the watery fields. By communicating with the landowners and irrigators ; we eventually came to an agreement about methods of irrigation that minimize water retention time, as well as notification to the zone technician about irrigation time lines to avoid surprises and eliminate mosquito production. Informational letters were also sent to large landowners in areas of eastern Contra Costa County where flooding can take place for waterfowl hunting. All of the landowners we contacted were very cooperative with our request to delay flooding until a week before the waterfowl season began or to coordinate their flooding operations with the zone technician. Our District works to help and educate our citizens so that we may all be healthy and enjoy the outdoors.



## RATS & MICE



### In the Field

Although most public attention to the District has been for our mosquito program and West Nile virus, the vertebrate vector program personnel have been very busy in their efforts to educate residents and help provide solutions to control rodents and other vectors. In 2008 we received more than 527 service requests related to rodent activity. The City of Walnut Creek residents had the most service requests with a total of 83. This year's total was almost exactly the same as 2007 (520), which is down nearly 20 percent from the 12-year average. The rodent inspections continue to be popular with homeowners who are experiencing rodent presence issues. Efforts have been made to increase awareness of this valuable service available to the residents of Contra Costa County. With the slow-down in new home construction, most rodent service requests have originated in older, established neighborhoods. During rodent inspections, technicians frequently discover mosquito breeding habitats, which are corrected or treated with mosquitocides or turned over to the mosquito zone technician for continued monitoring.



Technicians continue to conduct sewer pulse-baiting operations in areas where rats are occupying the city's sewer system. In above-ground public locations such as parks, creeks, and marinas where rodents have been observed, technicians set up monitoring devices to identify the problem. Once identified, technicians use stationary tamper-resistant bait stations discretely hidden in vegetation and placed to minimize non-target animals from obtaining the bait. The District has assisted city code enforcement personnel in several communities in identification of vector species, enforcement of codes, and abatement of rodent nuisance areas. The program has benefitted from being included in communication efforts with the cities where we have had issues related to the home foreclosure crisis. Cross-trained technicians in this program also provided valuable assistance to the mosquito program by volunteering for evening ULV fogging operations to control adult mosquitoes in West Nile virus control efforts.



*Shown: Rat sitting in tree. Rat activity during daylight hours indicates heavy infestation. The harborage in this yard is ideal and plentiful for rats and mice, which encourages infestation.*

*Picture above: Rat feeding on bird seed. Bird feeders are the #1 attractant for rats and mice to a residential yard. Note the stuffed animal hung in the tree by the homeowner in an attempt to deter the rodents.*

## TICKS & LYME DISEASE



*Western black-legged tick*

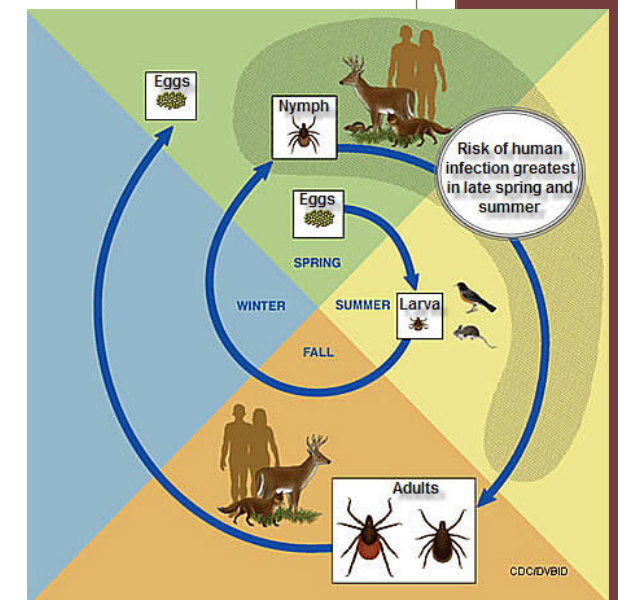
### Ticks and Lyme Disease

Lyme disease is a bacterial infection transmitted by the western black-legged tick (also known as the deer tick). 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 many as 13 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 2008 we collected 168 ticks and tested 129 ticks from two 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 2008, 74 ticks were identified by our staff, of which 37 were western black-legged ticks (the vector of Lyme disease). Twenty-five of those were tested and none were positive for Lyme bacteria.

### Life Cycle of Black-legged Ticks

Black-legged ticks live for two years and have three feeding stages: larvae, nymph, and adult. Tick eggs are laid in the spring and hatch as larvae in the summer. Larvae feed on mice, birds, and other small animals in the summer and early fall. When a young tick feeds on an infected animal, the tick takes bacteria into its body along with the blood meal, and it remains infected for the rest of its life. After this initial feeding, the larvae become inactive as they grow into nymphs. The following spring, nymphs seek blood meals in order to fuel their growth into adults. When the tick feeds again, it can transmit the bacterium to its new host. Usually the new host is another small rodent, but sometimes the new host is a human. Most cases of human illness occur in the late spring and summer when the tiny nymphs are most active and human outdoor activity is greatest. Adult ticks feed on large animals, and sometimes on humans. In the spring, adult female ticks lay their eggs on the ground, completing the life cycle. Although adult ticks often feed on deer, these animals do not become infected. Deer are nevertheless important in transporting ticks and maintaining tick populations.



*Tick lifecycle illustration courtesy of Centers for Disease Control and Prevention*



## SKUNKS



### Skunks

This very popular program has continued to evolve away from a skunk trapping program to a habitat modification program designed to minimize human-animal interactions. The skunk program has continued to experience a decline in the number of service requests from those areas of Contra Costa County that previously had skunk activity, even during what has traditionally been peak season. In 2008 vector control personnel responded to 680 skunk-related service requests. Walnut Creek had the most with 113 service requests. 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 animals trapped 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 skunks. The majority of properties which warranted trapping were due to skunks physically taking up residence versus skunks just passing through. We have seen success and control with property owners taking corrective actions to help curb the vector problems and minimize aggravating or coming in contact with skunks.

### Striped Skunk

*Mephitis mephitis*

The striped skunk belongs to the Mustelidae family (catchers of mice) along with ferrets, mink, and weasels even though skunks are omnivorous. The striped skunk is true to its name, both common and scientific. Its scientific name (*mephitis mephitis*) actually means "noxious gas, noxious gas". And the striped skunk has a very bold white stripe used as a warning to its smelly contents. Each skunk has its own unique coloration pattern. A skunk's first line of defense is their two musk glands located on either side of the anus which spray an extremely smelly yellow foam. But before a skunk sprays, it goes through a series of warning motions. First, it erects its tail and stamps its feet. Then it will hiss. If the intruder has not gone away by then, the skunk will spray. A skunk can spray as far away as 12 feet and as many as eight times.

Species: Mammal.

Enemies: Great horned owls and bobcats.

Diet: Skunks are omnivorous, but they mostly eat insects. They also eat bird's eggs and fruit.

Fun facts: Skunks have poor vision, but their smell and hearing is good. Also, skunks are resistant to snake venom and can survive 10 times the venom needed to kill an animal of the same size. A skunk can spray its musk accurately up to 10 feet and less accurately to about 16 feet.

Source: [www.kaweahoaks.com](http://www.kaweahoaks.com)

## YELLOWJACKETS & AFRICANIZED HONEY BEES



### Yellowjackets

This program is very popular with residents who have discovered an underground yellowjacket nest during their gardening endeavors or just enjoying the outdoors. 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 to make it easy for the technician to locate the nest in the yard, such as a map of the yard with the nest noted on it, some type of marker near the nest, or a tool handle pointed at the nest. Technicians typically respond to a yellowjacket service request the next working day after it is received. In 2008, the District received 585 yellowjacket service requests; this number is about at the 12-year average. Walnut Creek had the most yellowjacket service requests with 121 and Lafayette had 99. Besides food and drink, some patterns on clothes, as well as perfume scents can 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. All yellowjackets are beneficial in that they help to pollinate plants, flowers, and crops.

### Africanized Honey Bees (AHB)

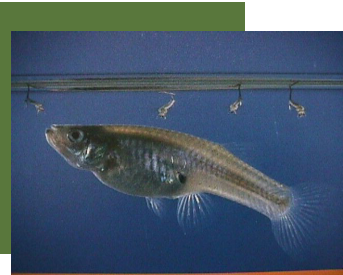
Africanized honeybees, a strain of bees significantly more aggressive than the ordinary European honey bees that pollinate many of our crops, have become established in the southern half of California as far north as Fresno. The District has been conducting surveillance for these bees since 1997, when a swarm of Africanized bees was found on a ship from Central America docked in Crockett. In December 2008, another swarm of 'suspect' bees was found at the same location. A sample of these bees was submitted to the California Department of Food and Agriculture lab in Sacramento for DNA testing to determine definitively whether they were indeed Africanized; they were AHB. We do not believe that any of the bees escaped due to the cold weather and quick action by the port inspectors, the ship's crew, and the Contra Costa County Department of Agriculture to contain and report them.



*Scientific Programs Manager Steve Schutz, Ph.D., and Vector Control Inspector Patrick Vicencio inspect the cargo hold of a ship for Africanized honeybees*

# FISHERIES PROGRAM

*In 2008, approximately 135,000 mosquitofish were placed in Contra Costa County as a biological method of controlling mosquitoes - 125 percent more than in 2007.*



*Mosquitofish (Gambusia affinis)*

The District distributed 134,865 mosquitofish (*Gambusia affinis*) in Contra Costa County. District personnel placed 108,308 mosquitofish, while 26,557 mosquitofish were picked-up by residents and used in their ornamental ponds and horse troughs. The District produced approximately 1.1 million mosquitofish in 2008.

This year the District developed a "pool crew" for locating and treating neglected swimming pools in Contra Costa County. Due to the unusual number of foreclosed homes, the number of neglected pools increased. Our Scientific Programs Department provided locations of possible neglected pools to field personnel. Once pools were located, mosquitofish were stocked (50 to 150 per pool) to eliminate the mosquito population. Where water quality was too poor for survival of mosquitofish, other treatments were applied. This program did experience some difficulties. Some foreclosed properties saw a rotation of real estate agents. On a number of occasions real estate agents attempted to clean up the pool by treating it with chlorine, which killed the mosquitofish. The next inspection found the pool with mosquitoes again so the pools were restocked with mosquitofish and treated. At this point in time the original real estate agent's contract had expired and another agent was listing the property. To inform and help eliminate agents from adding chlorine to the pool, signs were posted on the gate(s) and taped to the back door.

Additional neglected swimming pools were found by the pool crew canvassing neighborhoods on Saturdays. Also, because of the increased media coverage (Wall Street Journal article and "Nightline" TV program), public awareness of neglected swimming pools increased and the public started providing the District with locations of problem pools. To make mosquitofish more accessible and to meet the demand, we worked together with the Antioch Public Works Department and set-up a small mosquitofish holding tank at their maintenance service center for public distribution.

In order to extend our mosquitofish stocking season we are currently maintaining a "cool water" holding system for mosquitofish. In the past we stopped stocking mosquitofish in the field November thru mid-March because the large temperature difference between our production tanks and the field made acclimation difficult. Maintaining mosquitofish at a cooler holding

temperature will allow stocking through winter and into early spring. We are anticipating a continuation of foreclosures and neglected pools in 2009.

In March, the District collaborated with University of California at Davis and the Yolo County Resource Conservation District to produce 4,800 juvenile Sacramento perch. These perch were stocked by U.C. Davis and YCRCDC staff in ponds to develop strategies for using farm ponds and other



*Neglected pool at foreclosed home  
Inset: mosquitoes in pool*



*Construction of a Sacramento Perch recovery pond*

agricultural waterways to assist in the recovery of this California native fish species. The District received \$9,600 for management services. Sacramento-Yolo Mosquito & Vector Control District will monitor ponds and determine if they are useful in mosquito control. As a side note to this project, in September, the California Department of Fish & Game sampled a Sacramento perch during an electro-shocking survey in Snodgrass Slough (Sacramento County). This perch was most likely stocked in August 2005 in an adjacent Slough (Wood Duck Slough). This was one of 500 juvenile Sacramento perch raised at our District and stocked in collaboration with California Department of Fish & Game and U.C. Davis. This is positive reinforcement that restoration efforts may be successful.

In October we stocked 500 Sacramento perch (pond reared) in our greenhouse tanks for use in a future field stocking experiment. Unfortunately, these perch got flexibacter columnaris, a bacterial disease. This disease quickly killed the perch and then spread to the mosquitofish. This disease was

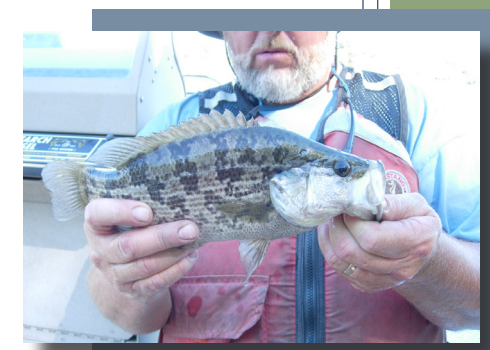


*Cool water holding tank*

very selective. It caused mortality in distinct age classes. The disease attacked fry until they were approximately 2 weeks of age. It also caused significant mortality in mosquitofish estimated at 6 months of age to 18 months. Fish 2 weeks old to approximately 6 months old were not significantly effected. Total loss was estimated at approximately 120,000 mosquitofish. Although the loss was significant, we have restocked the production tanks with juveniles and don't see problems with meeting mosquitofish quantities for 2009.

The District continues to support our California Native Fish Education Program in Randy Monroe's classroom at Foothill Middle School in Walnut Creek. This year the District provided 35 juvenile rainbow trout. These trout were stocked in a 100 gallon aquarium and will allow students to watch them grow and be exposed to a native fish that resides in local creeks. We believe that by exposing students to a variety of aquatic life and their habitats, we can help them to better understand the environment in which they live.

The District has started a pilot project with the East Bay Regional Parks District. This project entails holding warm water game fish for their mobile fish exhibit. We believe that this project will effectively leverage the educational outreach efforts of both Districts and utilize existing equipment.



*Sacramento Perch from Snodgrass Slough*

*In 2008, the District reared approximately 1,100,000 mosquitofish*



# WETLANDS & ENVIRONMENTAL

## PROGRAMS



Wetlands and environmental programs at the District have three main purposes – reducing mosquitoes through “physical control” projects; ensuring that District activities do not damage the natural environment; and ensuring that the activities of other groups do not accidentally create mosquito or other vector habitats.

Wetlands and environmental staff at the District 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 these rules and the acquisition of permits;
- conducting and reviewing scientific research on the environmental impacts of mosquito and other vector control activities.

A major mosquito “source reduction” project completed in 2008 focused on improving drainage and tidal water flow in marshlands at the Tara Hills marshes, near Point Pinole, 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. Marshlands with poor circulation can produce copious

mosquitoes when the water stays still, but are productive wetlands and relatively free of mosquitoes when the water moves. Similar projects were developed in 2008 for implementation in coming years in Hercules, Richmond, Pittsburg, Antioch, and elsewhere in the county.

Mosquito problems can arise not only when homes are built near existing wetlands, but also when wetlands are created or water is



*An underground vault full of water and mosquitoes*

*New houses abut a marsh in Hercules*



impounded near existing homes or work sites. A high priority for the District is ensuring that mosquitoes, rats, or other vectors are not produced when wet areas are created either intentionally or incidentally to other activities.

In recent years, wetlands have been 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 Tiger Salamander. Training District staff to recognize protected species and their habitats, and to avoid harming them, is a responsibility of the environmental staff.



*A California Tiger Salamander*

In addition to their role as habitats, wetlands are also created to provide open space and recreation, as mitigation for wetlands or creeks damaged during construction activities, to protect from flooding, and to remove sediment and contaminants from storm water. In addition, underground utility vaults often hold 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 2008 this involved collaborations throughout the county, including with refinery, railroad, and utility workers; city staff in Hercules, Pittsburg, Antioch, Oakley, and Brentwood; and the County Public Works department.

The District is heavily involved in federal and state regulation of mosquito & vector control, as the District’s Environmental Projects Manager serves as chairman for Legislative and Regulatory Affairs for the American Mosquito Control Association. Significant negotiations this year centered on protection of endangered species from pesticide risks, and negotiating general regional permits for work in creeks. At the same time, District staff conducts scientific research, such as new methods of characterizing adulticide droplet size and estimating drift, that is needed to support reasonable and effective environmental rules. The District issues an annual environmental audit, which reports in detail on the District’s use of pesticides and biocontrol agents (available on the District Web site).



*Long-reach excavator clearing tide marsh channels*

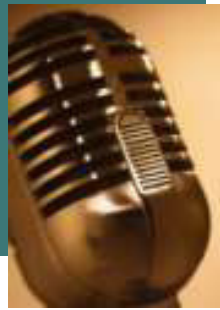
*The District’s Environmental Projects Manager serves as Chairman for Legislative and Regulatory Affairs for the American Mosquito Control Association*



*A storm-water filtration “wetland,” and a frequent mosquito source*



## PUBLIC AFFAIRS & COMMUNITY OUTREACH



The foreclosure crisis and subsequent neglected swimming pools continued to dominate our public relations efforts in 2008. Empowering our constituents to take action, utilizing the media to its fullest extent, and exploring new avenues to awaken the call to action were at the forefront of the District's public affairs and community outreach campaigns.



*Public Affairs Manager Deborah Bass discusses the link between foreclosed homes and West Nile Virus on CNN's "NewsMakers"*

The community affairs representatives reached out to police department personnel in cities that were mired with both West Nile virus and foreclosure activity with the intent that they could assist the District in finding and reporting neglected pools. Specific presentations regarding mosquitoes and West Nile virus were given to the entire Antioch police department and the majority of the Brentwood police department over the course of several days during their pre-shift briefings held as early as 5 a.m. and as late as 7 p.m. The presentations proved highly effective as the District received substantial reports of neglected pools from officers immediately and throughout the season.

True to tradition, the District's public affairs manager worked closely with media to ensure wide spread and timely communication about key vector issues. In addition to typical appearances on KTVUs "Bay Area People" and CNNs "News-makers", the District garnered national attention. The District's protocol of stocking mosquitofish in neglected swimming pools captured the attention of the Wall Street Journal and subsequently ABCs "Nightline". Mosquitofish, hearty guppy-like fish were used to manage the sheer volume of neglected or abandoned pools since their use doesn't require weekly visits to the site and because each fish eats up to 500 mosquitoes daily - an important fact since an abandoned pool can produce more than 1 million mosquitoes and affect residents up to a 5-mile radius. Staff accompanied the Wall Street Journal reporter to many foreclosed homes over a three-day period and the story was published on the front page. Following that story, ABCs "Nightline" reporter and crew spent a day with District staff documenting the use of mosquitofish in neglected swimming pools and highlighting the foreclosure crises in Contra Costa County for a feature story.



*The District received national coverage in feature stories for The Wall Street Journal and ABCs "Nightline". Both stories focused on using mosquitofish in neglected swimming pools found at foreclosed homes.*

*District Community Affairs Representative Nola Woods discusses vector control issues and solutions at the Richmond Senior Faire*

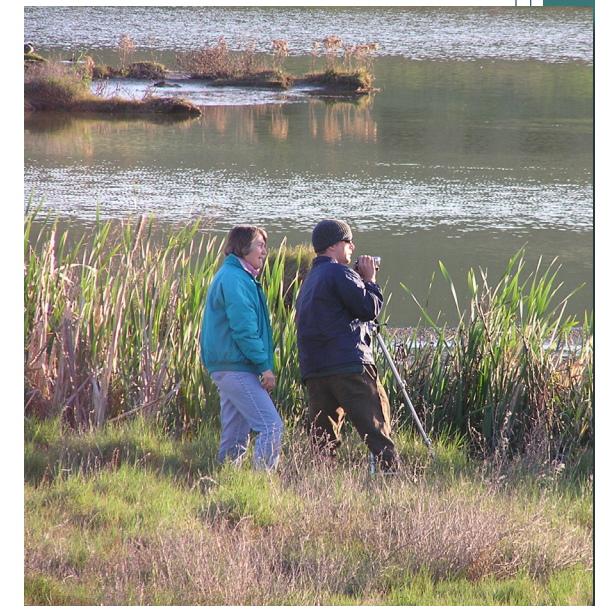


The public affairs department personnel utilized the World Wide Web by creating its own page on the popular video Web site YouTube. Residents in the county as well as worldwide can view informative and educational videos pertaining to vector-related issues on demand. The same videos are also available for viewing on the District's Web site.

The District's online spray notification system proved very successful, boasting a 193 percent increase in subscribers in 2008 and a 303 percent increase since its inception in August of 2007. The e-mail notification system was adapted from an online newsletter service to alert constituents about adult mosquito fogging efforts. Subscribers opt in or out of this free service by simply submitting their e-mail address at the District's Web site. When mosquito fogging or spray activity is set to occur, a notification with detailed information and maps, as well as interactive links to health information and pesticides used is automatically delivered via e-mail. The District already distributes this information on its Web site, through media releases, and via recorded messages on its main phone line.

Public affairs department personnel were approached to largely assist with the production of a 15-minute video highlighting the 20-year restoration effort of the Peyton Slough Wetlands, a wildlife habitat that was once on the Bay Area's Top 10 Toxic Hot Spot list. This environmental wonderland thrives today thanks to the participation of various government agencies including the Contra Costa Mosquito & Vector Control District. Videography and post-production were conducted by department staff and the finished product airs continuously on Contra Costa Television - a local cable station that reaches the entire county. The video has garnered several honors from public relations award competitions and has been used to highlight the cause for wetlands restoration with local and national government officials.

The public affairs department staff is dedicated to ensuring prompt and accurate public health information. Whether working at a local level within Contra Costa County or on a state level with the Mosquito & Vector Control Association of California, District staff is committed to protecting public health through communication and education.



*District Community Affairs Representative Andrew Pierce and Francesca Demgen of URS Corporation tape wildlife at the Peyton Slough Wetlands.*

# FINANCIALS



Revenues	2006/2007	2007/2008
Property Taxes	\$4,187,455	\$4,450,765
Contracts	65,978	84,340
Interest Income	200,455	245,038
Benefit Assessment	1,929,355	1,983,091
Miscellaneous	137,437	87,653
<b>Total Revenues</b>	<b>\$6,520,680</b>	<b>\$6,850,887</b>

Expenditures	2006/2007	2007/2008
Salaries & Wages	\$3,957,021	\$4,288,147
Operations	1,255,273	1,393,557
Capital	355,583	193,051
<b>Total Expenditures</b>	<b>\$5,567,877</b>	<b>\$5,874,755</b>



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