



CONTRA COSTA  
**MOSQUITO  
& VECTOR  
CONTROL**  
DISTRICT



annual report **2009**

protecting  
public health  
since 1927



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## *Foreword*

Another year came and went and the Contra Costa Mosquito and Vector Control District's employees and trustees weathered the financial crisis of the state and economy and delivered excellent services to the public we serve. While West Nile virus may have taken a back seat to H1N1 (Swine Flu) in the media, the District's employees and trustees kept focused on protecting the population of Contra Costa County from vector-borne diseases, not to mention providing a better quality of life by reducing the populations of pesky mosquitoes, rats, skunks and yellowjackets. While the state and public agencies were constantly in the headlines with talk about budget issues, furloughs, and personnel and program cuts, the District continued to refine and enhance its programs and services due to years of prudent fiscal planning.

Continuing to deliver at the present level will become more difficult in the future as our team was reduced by two in 2009. Dr. Karl Malamud-Roam, environmental projects manager, took a position at Rutgers University. In his new position, Karl will still be benefitting the District as he is facilitating bringing new important public health products to market. Mr. Tim McDonough, a valued trustee representing the City of Pinole for more than 13 years, resigned. Both Karl and Tim will be missed!

The District remains well positioned to deliver services for the near future and continues to stay vigilant for new diseases and introduced species that can threaten public health. We continually strive to strengthen our services and programs and to increase communication to the public. I encourage all to visit our enhanced Web site at [www.ContraCostaMosquito.com](http://www.ContraCostaMosquito.com) and to provide us feedback or give us a call at (925) 771-6187.

Sincerely,

*Craig Downs*

Craig Downs  
General Manager

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# Principles

## Vision

Healthy people who can live, work, and play in a healthy environment.

## Mission

To protect and promote public health and welfare through Integrated Vector Management services and programs utilizing best management practices and least toxic components by:

### Community Value

Providing essential services to prevent, detect, and suppress public health pests, and to reduce the risk of vector-borne disease transmission to the people who live, work or play within the county.

### Service Area

Serving all of Contra Costa County.

### Public Confidence

Delivering accessible, accountable, efficient, transparent and cost effective services.

### Public Relations

Working closely with all constituents, private and public, to ensure prompt delivery of accurate information, to raise public awareness, and to develop relationships that promote healthy living.

### Environmental Commitment

Meeting or exceeding, federal, state, and local environmental standards, practicing responsible environmental stewardship, enhancing value of wetlands, and considering relevant environmental factors as an integral component of mosquito and vector control.

### Research

Investigating environmental concerns and developing and/or testing new materials, methods and technologies to ensure quality control oversight on all services and programs, while anticipating resurgent and/or newly introduced vectors or vector-borne diseases.

### Interagency Relations

Integrating and communicating District programs and services with other public agencies to ensure cooperative, cohesive, and innovative program delivery.



**Standing:** Richard Head, Oakley; Michael Cory, Danville; Russ Belleci, Contra Costa County; Tim McDonough, Pinole; Chris Cowen, Contra Costa County; Brian Smalley, San Pablo; Daniel Pellegrini, Martinez; Kirk Thill, Brentwood; Jose Saavedra, Antioch; James Pinkney, Alamo; and Richard Mank, El Cerrito. **Seated:** Jim Fitzsimmons, Lafayette; Sharon Rossi, San Ramon; Soheila Bana, El Sobrante; Peggy Howell, Clayton; Diane Wolcott, Orinda; Nancy Brownfield, Walnut Creek; Myrto Petreas, Moraga; and Richard Means, Pleasant Hill.  
**Not pictured:** Richard Ainsley, Pittsburg; Jeff Bennett, Hercules; and Angela Michaels, Concord



**Standing:** Andrew Pierce, Community Affairs Representative; Ray Waletzko, Administrative/Finance Manager; Wayne Shieh, IT Technician; Jonathan Rehana, Program Supervisor; Carlos Sanabria, Operations Manager; Damien Clauson, Vector Ecologist; Greg Howard, Program Supervisor; Allison Lewis, Administrative Secretary; Tom Fische, Mechanic; and Deborah Bass, Public Affairs Manager. **Seated:** Craig Downs, General Manager; Sheila Currier, Program Supervisor; Tina Cox, Accounting/Benefits Specialist; Nola Woods, Community Affairs Representative; and Chris Miller, Fish Biologist.  
**Not pictured:** Eric Ghilarducci, Vector Ecologist, Marta McCord, Clerk/Receptionist, and Steve Schutz, Ph.D., Scientific Program Manager



**Standing:** Danielle Wisniewski, VCT; Steve Fisher, VCI; Josefa Cabada, VCT; John Chase, VCI; Felipe Carrillo, VCI; Dave Obrochta, VCI; David Wexler, VCI; Ceasar Gutierrez, VCT; and Lawrence Brown, VCI **Seated:** Robert Stultz, VCT; Patrick Vicencio, VCI; Tim Mann, VCT; Reed Black, VCI; and Joe Hummel, VCT  
*Not pictured: Jeremy Tamargo, VCT; Joe Cleope, VCI; and Jason Descans, VCT*



**Back Row:** Christopher Doll; Robert Douglas; Derek DiMaggio; Mike McCoy; and Heidi Budge  
**Front Row:** Maria Cabada; Ben Martinez; and Shaun Redman

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# Integrated Vector Management

## Integrated Vector Management

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 vector management”. 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 water sources, we reduce the opportunity for pests to reproduce.

## Chemical Control

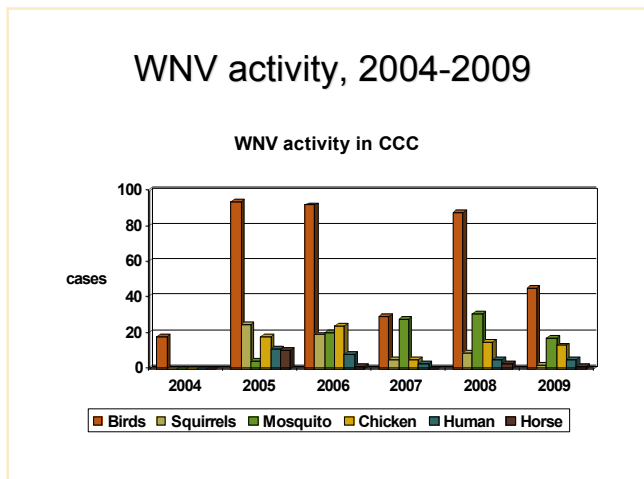
Chemical control is the judicious application of specific chemical compounds (insecticides) that reduce immature and adult mosquitoes. It is applied when biological and physical control methods are unable to maintain mosquito numbers below a level that is considered tolerable or when emergency control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

## Public Relations and Education

The primary objective of our outreach efforts is to educate and inform the public about mosquitoes and vector-borne diseases. Our hope is that residents heed our suggestions and become empowered to make a difference. The District uses strategic campaigns to ensure cost effective and efficient communication. Utilizing a variety of communication vehicles and methods from media participation to electronic newsletters, our award-winning programs are designed to aid in the protection of public health and promote healthy living at its best.

## Mosquito Surveillance and West Nile Virus

During 2009, West Nile virus (WNV) was detected in 42 out of 58 counties in California, with 104 human cases (341 less than in 2008) and 18 equine cases. Southern California and the southern Central Valley region were the areas hardest hit. Activity in Contra Costa County and statewide was down substantially from the previous year, despite an unusually early start to the virus season. Although five human cases were reported (up from four last year), the majority of these individuals could have acquired the virus during boating trips in the San Joaquin Delta, outside the County limits, according to information from the Contra Costa Department of Public Health. In addition to the human cases there were 45 positive dead birds, two positive dead squirrels, 17 positive mosquito samples, 15 positive 'sentinel' chickens in two flocks (Knightsen and Oakley) and one positive horse. Activity was once again highly focal and largely concentrated in Brentwood, where the majority of positive birds were found.

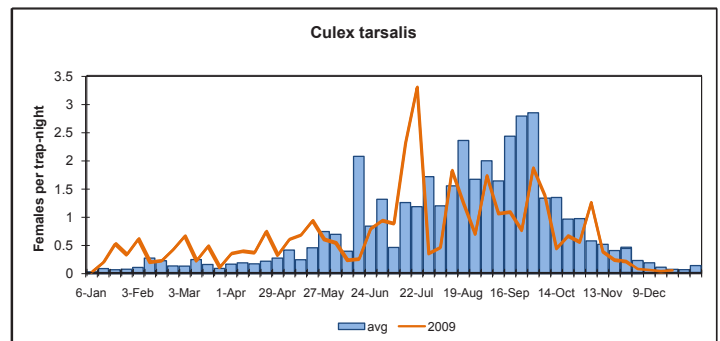
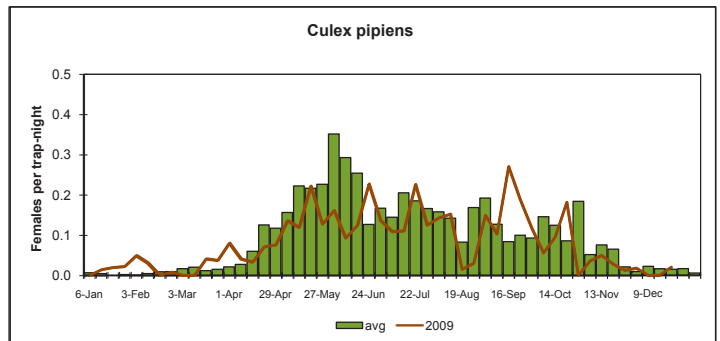


West Nile virus activity in Contra Costa County, 2004-2009.

In 2009 we tested approximately 22,000 mosquitoes, 200 birds, nine squirrels and 700 chicken blood samples for West Nile virus. We also received approximately 1,200 dead bird and dead squirrel reports from County residents through the statewide WNV hotline (1-877-968-2473). The number of calls to the hotline was down about 40-50 percent statewide, which caused some reduction in the sensitivity of the DYCAST computerized risk model. However, the model was still successful at predicting elevated risk in Brentwood several weeks prior to a locally-acquired human case.

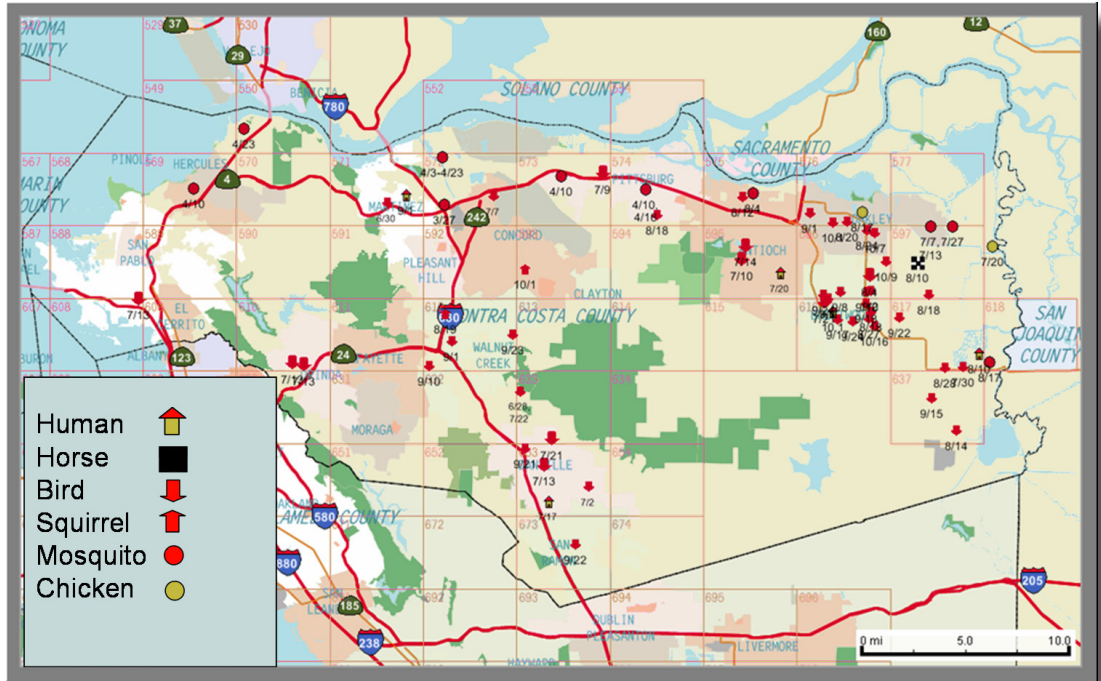
## Mosquito Population Surveillance

During 2009 the District continued to operate 28 New Jersey Light traps and 40-50 carbon dioxide (CO<sub>2</sub>) traps every week to monitor changes in adult mosquito populations. County-wide, light trap counts of *Culex tarsalis* (encephalitis mosquito) and *Culex pipiens* (northern house mosquito) were above average in winter and spring and generally average or below in the summer and fall. 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.



Countywide average trap counts of two primary West Nile vector mosquito species in 2009.





Map showing locations of positive West Nile virus cases in Contra Costa County during 2009.

## Geographic information System

Our staff continued to utilize our computerized mapping system (GIS) as an important component of our integrated vector control program. Merged with our computerized VXS database, GIS was used to assist the District with all of its surveillance and control programs.

## Special Projects

In 2009 we conducted field trials of new larvicide materials, Natular T30 and Natular G, in collaboration with Clarke Mosquito Control. These organic-certified larvicides contain spinosad, a natural compound produced by bacteria. They are classified as 'reduced risk' by the Environmental Protection Agency due to their low toxicity to people and wildlife and their low potential for environmental risk, and therefore should be useful additions to our Integrated Vector Management (IVM) program in the future. Results of these trials will be presented in February 2010 at the Mosquito and Vector Control Association of California (MVCAC) Annual Conference in Sacramento.



Vector Control Technician Ceaser Gutierrez applies Natular T30 granules to a flooded pasture (prime *Aedes* mosquito habitat).



Vector Ecologist Eric Ghilarducci checks for *Culex pipiens* larvae in a storm drain basin that was treated with Natular T30.

## Scientific and Professional Presentations

Laboratory staff presented the following reports at the 2009 MVCAC Annual Conference in Burlingame:

- Economics and Epizootics: Effects of the Foreclosure Crisis on Spatial Distribution of West Nile Virus Activity in Contra Costa County
- Using a Geographic Information System (GIS) as an Important Component of a Comprehensive Integrated Vector Control Program
- Temporal Distribution and Lyme Disease Infection Rates in *Ixodes pacificus* from Contra Costa County
- RAMP WNV Test: Not Just for Corvids Anymore?

Summaries of these presentations have been published in the Proceedings and Papers of the Mosquito and Vector Control Association of California 2009, Vol. 77 No. 1

Dr. Schutz also gave the following presentations at professional training workshops:

- Vector-Related Safety Issues for Crime Scene Investigators (Contra Costa County Crime Scene Investigators Workshop)
- Tabanids: Lord of the Flies (Mosquito and Vector Control Association of California Coastal Region Continuing Education Workshop)

## Mosquito Field Operations

Water was once again in short supply in 2009 for most areas of California, and Contra Costa County fared no better. In this third year of drought, homeowners monitored their water use a little more closely as water agencies increased prices and considered rationing. The rain that did fall didn't create mosquito source problems as it might have in a typical rainfall year. The District conducted only two larvicidal treatments for rainwater ponds and these were adjacent to the waterfront areas. A spring application of Altosid® pellets, a time-released insect growth regulator, by helicopter to the blackberry and willow thickets of Bethel Island, Bradford Island, Jersey Island and Holland Tract helped to keep the springtime mosquito populations low in those areas.

Residents of our county continued to keep West Nile virus top of mind. The District received fewer requests for mosquito services in 2009 than 2008— from three times the yearly average to two times the yearly average. The public's assistance by reporting dead birds to the state's dead bird hotline helped District personnel to focus efforts in those potentially high risk locations. Many of the calls were for unmaintained residential swimming pools. Mosquito-producing swimming pools are the byproduct of home foreclosures. Unfortunately, a large percentage of foreclosed homes include a swimming pool that eventually requires treatment. One unmaintained swimming pool is capable of producing more than one million mosquitoes and affecting residents' health within a five-mile radius. District staff used these facts in a campaign to illustrate the importance of properly maintaining swimming pools, as well as the importance of reporting unmaintained swimming pools to the District. Residents may make reports anonymously.

The steep increase in calls for service began in March and ended with April having the most mosquito-related service requests – 283 in 2009 compared to 230 in 2008. The calls declined as the year progressed. The number of requests for service appeared to be on a record breaking pace similar to 2008, until August when the District received a mere 116 requests for mosquito-related services compared to the 535 requests received in August of 2008.

A spring review of tree hole sources in wooded areas of the county indicated a low priority rating to re-treat the tree holes. Due to the low rainfall for the season, the tree holes held minimal amounts of water. Hiring and training a pool crew – three vector control aides hired solely to respond to unmaintained swimming pools – received a much higher priority. Additionally, the District employed two aides to assist in spraying larger land areas, as well as to treat problem catch basins. Trained aides from the previous season were rehired which proved valuable.

In addition to the long-term Altosid® briquets that are utilized to control mosquitoes in catch basins that do not drain, the District continued its use of the storm drain mister. This device blows an insecticide mist with compressed air through the storm drain system. It's particularly useful when the connecting pipes that have sunk due to the settling of the soils and are trapping water a distance from the catch basin, make it difficult to access any other way.

While natural sources such as rainwater ponds, marshes, pastures and creeks provided significant difficulties, the man-made water-holding features provided our greatest challenge. As in previous years, we solicited the assistance from all code enforcement departments in the county to find mosquito

source locations, not just swimming pools. District staff regularly receive updates from most cities' code enforcement departments regarding unmaintained swimming pools within the city limits. Real estate agents also assisted the District by reporting swimming pools that were in sub-prime condition. Despite these efforts, using foreclosure lists, other agencies' help, as well as aerial overflights to assist

in locating potential mosquito sources, District staff still experienced difficulty locating offending sources in some areas of the county. This required the District to control subsequent adult mosquito populations with multiple ultra-low volume insecticidal fog in areas of Antioch, Brentwood, Oakley and Pittsburg. The record number of neglected swimming pools reported to the District in 2008 emphasized that West Nile virus will always have a foothold in these areas unless the number of neglected pools are reduced. The home foreclosure crisis worsened in 2009. It seems the neglected swimming pool problem will be a challenge for at least a few more seasons. It's important to note that the large number of vacant homes that do not have swimming pools do not escape the potential for mosquito breeding. Many of them have objects such as containers, birdbaths, boats, etc. that hold water for extended periods of time and can produce adult mosquitoes.





*Tree hole mosquitoes, also known as *Aedes sierrensis*, make their home in tree holes such as the one pictured here. Tree hole mosquitoes transmit dog heartworm disease to pets and can be an aggressive, daytime biter to people and animals.*

The random trapping of mosquitoes with EVS CO<sub>2</sub>-baited mosquito traps indicates the District maintains success in finding most mosquito-producing swimming pools; however, getting the pools corrected or treated is at times very difficult and time consuming. Learning whether a home is abandoned or foreclosed and tracking down lenders and getting the responsible parties to take receipt of the problem continue to be burdensome, resulting in swimming pools that require our ongoing attention.

The news that West Nile virus had been detected very early in central and west Contra Costa County locations seemed to invite more residents of those municipalities to take closer note of their surroundings and to report situations of concern. Eleven cities predominantly in the western part of the county had higher service requests for mosquito-related services. Standing water issues

with utility vaults, catch basins and storm water detention basins formed the basis for many of the immature mosquito production problems in these locations. The increased use of underground vaults for utility infrastructure many years ago has provided a habitat that is conducive to promoting adult mosquito production. Due to a lack of maintenance or flawed designs, standing water in underground vaults has continued to be a problem in various municipalities in the county. Difficulties arise when accessing vaults, such as the inability to access it or lift the lid into place. Last year, the District purchased a new magnetic dolly designed to assist staff in lifting these types of lids. This device allows technicians increased leverage and increases safety in the opening of the vault. Technicians use this tool to safely inspect and treat more of these sources safely and with greater frequency to minimize adult mosquito production. District staff shared their success with other vector control personnel in the state who have responded with great interest.

Since the far eastern portion of Contra Costa County has the majority of the county's agricultural production, different mosquito problems are created by inattentive irrigation practices. The flood water mosquitoes produced in these areas, while not considered West Nile virus vectors, cause considerable alarm in the adjacent residential areas. The District continues to increase efforts to work with and educate the landowners and irrigators about mosquito habits, as well as the conditions that contribute to the production of immature mosquitoes. Progress is slow, but some progress is evident over the past couple of years. District personnel spend less time and use less insecticides in most pasture properties. Several ultra-low fogging operations were conducted in Byron, Holland Tract and Knightsen to lower the population of flood-water nuisance mosquitoes in 2009. District personnel work to maintain open lines of communication with the landowners and ask them to report standing water on their property.



*A marsh area in Contra Costa County requiring treatments for mosquitoes.*

“ Mosquito production challenges are nearly year round at the many sewage treatment facilities in the county. Fortunately, the District receives excellent cooperation from all of them. ”

*Carlos Sanabria  
Operations Manager*

Mosquito production challenges are nearly year round at the many sewage treatment facilities in the county. The nutrient-rich water that these plants treat can be prime immature mosquito habitat if allowed to stand for just a few days. Any breakdown or changes of the facilities' system must be reported immediately to the District for treatment of the effluent to minimize adult mosquito production. The water, in addition to being full of nutrients, is generally a few degrees warmer than the surrounding environment and therefore promotes quicker immature mosquito development. The first groups of mosquitoes to test positive in 2009 came from just such an environment. The District receives excellent cooperation from all of the waste water treatment plants in the county.

Oil refineries inherently cause anxiety about mosquito production. Water is used very liberally in this industry for various processes, including cooling and keeping pipes hot with steam jackets, so water is everywhere. Because of the various chemicals present in petroleum and the regulations which govern refineries, all water is contained and then cleaned before being allowed to be poured back into a natural water body. The problem is that from the time the water is used until the water is cleaned can be weeks or months before the entire process is completed. It is during this time that immature mosquitoes begin to colonize this standing polluted water, where very few other organisms can survive, including most that will eat immature mosquitoes. Over the past few years, District personnel have conducted productive discussions with the refinery personnel with regard to their water treatment and storage facilities and the importance of maintenance of these facilities, especially the elimination of vegetation along pond margins.

Treatment strategies on these facilities range from aerial Altosid® pellet application by helicopter to the hand application of Altosid® briquets. Recognizing the importance of getting information to those in a position to make a difference, in late September, District personnel sent informational letters to landowners of parcels more than 15 acres in far east county where flooding for waterfowl hunting is common. All of the landowners contacted were very cooperative with the District's request to delay the flooding until a week before waterfowl hunting season was scheduled to begin or coordinate the flooding operations with the mosquito zone technician. District technicians are called on to help maintain the environment while suppressing the population of vectors through thoughtful consideration of many control techniques. The District remains committed to the people of Contra Costa County.



*Duck club owners can reduce significant mosquito populations when they delay flooding of their duck ponds until one week before waterfowl hunting season.*

## Rats & Mice

Rats and mice are attracted to Contra Costa County by the area's abundance of food and desirable habitat. They pose a risk to public health by their ability to transmit bacterial diseases including leptospirosis and salmonellosis through their feces and urine. As a public health agency, the Contra Costa Mosquito & Vector Control District takes a multi-faceted approach to reducing the risk of these rodents in the county. In 2009, the District's state-certified vector control inspectors found inter-agency partnerships to be more important than ever regarding the prevention of rodent-borne diseases.

Rats and mice pose a risk to public health by their ability to transmit bacterial diseases including Leptospirosis and Salmonellosis through their feces and urine.

While responding to the year's 541 service requests for rat and mouse issues, District inspectors found situations requiring the participation of code enforcement officers, building inspectors, police department supervisors, Contra Costa County Environmental Health Department inspectors and the California Occupational Safety and Health Administration (Cal-OSHA).

The circumstances that required Cal-OSHA's involvement concerned a local school that was suffering from a rat infestation. Upon inspection, the District inspector discovered discarded food, drinks, and wrappers strewn in classrooms and common areas as well as near soda and snack machines. The inspector noted, due to school district budget constraints, the custodians were no longer able to keep up with the volume of the refuse that was attracting the rats, so he recommended a change in practice to remove food from the classrooms and encourage excess litter be deposited in trash cans. The approach to remove the rats and prevent them from returning required a partnership between the District, educators and students. Cal-OSHA conducted a joint inspection with the District and remained at the school to oversee the correction of sanitation issues due to the rodents.

At one of the county's wastewater districts, a District inspector designed and implemented a plan to diminish the number of rats attracted by water at the facility because they were destroying and contaminating equipment by chewing on hoses and wires. The rodent inspection also uncovered mosquito-related issues that prompted a response from a District mosquito inspector. At another wastewater treatment plant, one of the District's rodent inspectors and the environmental projects manager worked together to modify an existing rodent reduction plan to protect the endangered species Salt Marsh Harvest Mouse.

In other areas of the county, unmaintained vegetation and food sources, in part due to continuing home foreclosure issues in the region, drew rats and mice to neighborhoods countywide. This phenomenon prompted residents and business owners to contact the District to request service. Residents of the City of Concord made 86 requests for service, the largest number of requests for any single city. Due largely to a seasonal influx of meadow voles, the city of San Ramon reported the largest increase in service requests with 52 in 2009 - an increase of 33 compared to 2008.

In one city, District inspectors worked with code enforcement inspectors to alleviate rats at home improvement stores with chronic rat problems. In both cases, bird seed proved to be the attractant. In another city, District inspectors worked with police department supervisors to implement an effective rodent abatement plan when rats began accessing patrol cars and chewing on hoses and wiring – rendering the vehicles inoperable.



Meadow Vole (*Microtus pennsylvanicus*).  
(Photo courtesy of [www.hendrix.edu](http://www.hendrix.edu))

City parks across the county remained a haven for rats prompting surveillance and placement of tamper-proof bait stations to gain control of the rodents. Likewise in 2009, the District kept the county's marinas under close surveillance to reduce the rats' ability to damage private boats and dock maintenance buildings. Inspectors worked with harbor masters and boat owners to take necessary steps to avoid the availability of food and access for rats and mice.



*Tamper-proof bait stations are placed at city parks across the county to reduce rat habitats.*

In these coastal areas, as well as at inland creeks and canals, weed abatement removed habitat options and proved beneficial in the effort to reduce rodent activity. Since overgrown vegetation and some specific plant species are known to harbor rats and mice, District inspectors also worked closely with residents and managers of town home communities who requested service. In these cases, inspectors often found evidence of bird seed, pet food and landscaping that can attract rats, mice and other rodents. Inspectors recommended maintenance and landscaping practices that are less likely to draw the rodents to the properties.

In the eastern part of Contra Costa County, an area particularly hard hit by the housing foreclosure crisis, abandoned construction sites with partially built and completed residential and commercial buildings attracted a growing rat population in 2009. This prompted the District to conduct a roof rat surveillance and baiting program. The program revealed evidence the roof rats are more

efficient at adapting to environmental changes in East County because they are less selective in their food preferences and they are highly adept at scavenging and climbing. Norway rats were the primary rats in the area previously, but the program revealed they are more limited in their abilities and don't adapt to the changes as easily.

Countywide sewer baiting remained an important tool in 2009 in reducing rat activity in many downtown areas that feature businesses, shops, and restaurants. In a waterfront city, inspectors tried a new approach to conducting sewer baiting and surveillance in high traffic areas by visiting the area prior to regular business hours. This method gave inspectors better access to the increasing number of nocturnal rodents at a time when they would be more active, while pedestrians would be absent from the areas that are usually busy with visitors during the day. The change in methodology proved successful and is just one example of the District's ever-changing efforts to work with residents and local agencies to protect the health of the people of Contra Costa County.



*Bird food is the number one attractant for rats and mice to a property.*

## Ticks & 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 long as 14 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 2009 we collected 221 ticks and tested 130 ticks from two locations; one from the hills near San Ramon 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 2009, 109 ticks were identified by our staff, of which 57 were Western black-legged ticks, the vector of Lyme disease. Thirty nine of those were tested and one from Moraga was positive for Lyme bacteria.

### Ticks of Contra Costa County

There are three species of common human-biting ticks in Contra Costa County.

- Western black-legged tick
- Pacific Coast tick
- American dog tick

Of these three, only the Western black-legged tick (*Ixodes pacificus*) is known to transmit Lyme disease in California. Adult females of the species are about 1/8" long and reddish-brown in color. Males are slightly smaller and brownish-black.



Western black-legged tick  
(*Ixodes pacificus*).



Vector Ecologist Eric Ghilarducci collects ticks for Lyme disease testing by dragging a cloth flag through the grass.

\* Editor's note: As of April 1, 2010, the District no longer provides tick testing services. To learn more about our services regarding ticks or to view a list of companies that provide tick testing services, please see <http://contracostamosquito.com/ticks.htm> or contact the District at 925-771-6187 for more information.



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## Skunks

Contra Costa County is home to two types of skunks: the Striped and Spotted Skunk and both are capable of transmitting rabies.

County residents that have evidence of skunk habitation on their property can contact the District for free inspection and advice from a state-certified vector control inspector. The service includes an inspection that may result in monitoring the property for signs that the skunk has taken up residence, as well as detailed information on how to remove the skunk and prevent it from returning. The District uses an integrated approach of education, advice, and trapping when necessary to control skunks in Contra Costa County.

In 2009, District employees responded to 718 requests for service, an increase compared to the 697 service requests in 2008. The city of Walnut Creek once again had the largest number of service requests with 106, followed closely by Concord with 96 and Antioch with 93. The city of Martinez experienced the largest increase with an additional 22 service requests compared to 2008. The most common issue found in these areas was the availability of food and water. Inspectors discovered pet food left out overnight, bird seed and fallen fruit left scattered on the ground, and water bowls left out for domestic pets and wildlife. They educated residents to reduce the risk of skunks by removing these temptations in the evening hours. In cases where residents heeded the information, skunk activity decreased.

Key to the inspectors' approach in 2009 was actively working with homeowner's association managers and landscape supervisors. By educating these community leaders about skunk prevention methods including habitat modification, they implemented new practices and disseminated information to residents. In one example, inspectors educated management about how to reduce the risk of skunks by removing potential sources of food, water, and habitat. Managers then put out flyers to the residents with information and directives on making the community less attractive to skunks. As a result, inspectors found less skunk activity in subsequent inspections. The District's public affairs department also contributed to the effort by providing informational articles on skunk prevention to the associations, including the Greenbrook and Crow Canyon Country Club communities. Property managers distributed the articles through community newsletters to inform residents about methods to remove skunk attractants.

In some areas though, it can be difficult to remove those attractants. In 2009, District inspectors worked with residents in particularly challenging areas that back up to open spaces and greenbelts. They advised the residents to alter landscaping or remove vegetation when possible to make the property less conducive to skunks. Open fields and nearby hillsides made exclusion measures trickier, but inspectors found residents complied with recommendations more often than not.



*Striped skunks are common in Contra Costa County.*

Structural breaches at residences, businesses, and schools frequently required trapping to remove skunks that had set up dens under the structures. Traps were also used in locations where skunks persisted even after homeowners applied the inspector's advice. The District provided cylindrical traps to control the skunks. These specially designed humane traps reduce the likelihood of trapping non-target animals. Once the skunk or skunks were removed, inspectors recommended specific repairs designed to prevent a reoccurrence of skunk activity.

Through this multi-faceted approach of controlling skunk activity, the District works daily to protect public health by reducing the citizens' exposure to these vectors capable of transmitting rabies.

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## *Yellowjackets*

Nothing brings the fun of outdoor dining to a screeching halt like the arrival of yellowjackets. A carefree meal can turn into a cautious nibble in order to avoid the flying scavengers bobbing around our food and face. And, yellowjackets don't generally want the leftovers; they want the same prime morsels we want. It pays to be aware of its presence and intentions; woe to he who ventures into the yard with work to do and unwittingly disturbs an underground yellowjacket nest! Ironically, some yellowjackets are considered beneficial insects because they are insect predators that actively hunt and eat garden insect pests. These predatory yellowjackets are not the ones that are interested in your hamburger or soft drink, they are interested in a live, moving insect to feast on. The scavenger yellowjacket is the one which usually nests underground in an abandoned burrow or rotted tree root.

All yellowjacket wasps can sting repeatedly and will do so to defend themselves. During the act of stinging, the yellowjackets secrete a pheromone that alerts other yellowjackets in the area that an antagonist is present and should be attacked. This aggressive response can be very dangerous to individuals who might be allergic to the yellowjacket venom.



*Yellowjackets are beneficial for our yards since they eat garden pests and help pollinate plants.*

The Contra Costa Mosquito & Vector Control District offers a free service to county residents to treat ground-nesting yellowjacket nests on their property. Aerial nests on trees or on structures cannot be treated by District personnel. A private pest control company must be called for those types of control efforts. A technician will typically respond to the service request by the next working day. Residents who call for this type of service are asked to leave a map of the property with the location of the nest noted on the map or to place a distinct marker, such as a shovel or rake in the vicinity or pointing to the nest location. Locating a yellowjacket nest can be a very time-consuming endeavor. The District technician will usually treat the nest with an insecticidal dust while wearing a protective bee suit to prevent being stung. The area should be avoided for the rest of the day while the insecticide affects all of the returning yellowjackets that were out foraging while the nest was being treated. The following day, the nest may be covered with some dirt and crushed to prevent a recurrence. Residents can take steps to prevent interacting with yellowjackets by tightly covering garbage containers, maintaining compost piles, keeping a lid on open soft drinks and by not swatting at loitering yellowjackets. Swatting threatens yellowjackets and prompts other yellowjackets to come to their aid. If it seems that every year yellowjackets are colonizing your yard, it can be beneficial to place pheromone-baited yellowjacket traps in the area during early spring in an attempt to capture the yellowjacket queens before they establish a nest.

In 2009, the District saw a 36 percent decrease in the number of yellowjacket service requests in comparison with 2008. The 377 calls were the lowest number of yellowjacket calls the District received in the past six years. The decline could be attributed to weather, natural cycles and a combination of other factors that are unknown. It appeared that in general, the eastern cities of Contra Costa County rose slightly, while the areas that typically contribute the largest numbers of calls experienced a significant decline.

## Africanized Honey Bees

Contra Costa County's first detection of Africanized honey bees was in July of 1997 and the second was in December of 2009. Both incidents involved imported bees that hitched a ride on cargo ships and the bees were intercepted before they could escape and establish new colonies. As the lead agency for these aggressive bees, the District responds to public complaints of honey bee swarms and new hives in potentially hazardous locations. The District receives approximately 30 service requests related to honey bees every year. In 2009, the District received 19 calls about honey bees compared to 29 calls in 2008 and 38 in 2007. Most calls are due to the presence of a honey bee swarm passing through or resting in a neighborhood. These swarms are generally not a threat as the bees are simply in search of a new hive location, but they can look rather alarming and may sting if provoked.

Since Africanized honey bees have not colonized in Contra Costa County to date, the District advises homeowners who observe a swarm in their neighborhood not to disturb the hive and let the bees leave on their own. In any case, homeowners should ensure their home has no deficiencies that will allow bees to colonize, such as gaps or holes in the exterior of their homes or missing screens that might allow the bees to find harborage in the walls. District personnel work to educate individuals about the value of bees as pollinators and the difficulties that bee colonies have trying to survive in our county. District staff provides homeowners with contact information for local beekeepers who have agreed to retrieve feral bee swarms or hives. District employees always strive to leave the hive intact.

Currently, Africanized honey bees are established as far north as Fresno, California; however, the bees can be unwittingly transported into our county as evidenced by the previous incidents, or they may continue to move north into our county on their own. Either way, our District remains poised to respond and protect public health from this sometimes fatal vector.



*Honeybee swarms are generally not dangerous, though they will protect their hive.*

## Fisheries

The District distributed 140,885 mosquitofish (*Gambusia affinis*) in Contra Costa County. District personnel placed 115,402 mosquitofish, while 25,483 were picked up by residents. The District produced approximately 1.3 million mosquitofish in 2009.

The District started research in late December 2008 on the California Roach fish (*Lavinia symmetricus*), a California cyprinid (minnow family- *Cyprinidae*) native to creeks. This is a continuation of research aimed at finding a California native fish species that can be used for mosquito control.



*California Roach fish spawning tank.*

Three different tanks were set-up to mimic a flowing creek. Lighting and temperature were set up to simulate late spring and early summer conditions since roach typically spawn in April through early July. No spawning activity, eggs or larvae were observed during this trial. The failure to spawn may have been due to several factors including several outbreaks of *leanea* (an external parasite), stocking densities too high, or improper water flow over spawning substrate. We will continue to work with the roach fish and refine the spawning protocol.

## Fisheries



*Blackfish eggs on spawning material.*

The District is also working with Sacramento blackfish (*Orthodon microlepidotus*). This is also a California native cyprinid. We have been successful in spawning this species and currently are rearing several thousand larvae in our greenhouse. Spawning began May 18, 2009 and ended July 17. Temperature ranged from 24.5



*Blackfish brood stock.*



*The East Bay Regional Parks District's Mobile Fish Exhibit.*

C to 26.5 C with natural lighting. Rearing of the larval blackfish is less labor intensive as the larvae feed on single-celled algae at first feeding and are easy to train to feed on commercial food. This species is not cannibalistic so production should be more efficient as compared to Sacramento perch. At approximately sixty days, blackfish can eat all growth stages of *Culex pipiens* mosquitoes, including pupae. To evaluate the effectiveness of blackfish to control mosquito larvae we stocked them in five abandoned pools. Each pool was stocked with 60 blackfish approximately 65 millimeters in length. Pools were checked 14 days later for mosquito

breeding and presence of fish. In one of the pools, blackfish died within 10 minutes of stocking (possibly due to high chlorine levels). The four other pools were producing mosquitoes. Blackfish were also observed. Failure to control mosquito larvae may have been due to preference of these fish for other prey items in the pools. In 2010, our plans include a larger scale experiment involving gut content analysis of blackfish to see what type of prey they are feeding on.

The District completed a pilot project with the East Bay Regional Parks District. This project entailed holding warm water game fish for their mobile fish exhibit. The goal of this project was to effectively leverage the educational outreach efforts of both Districts and utilize existing equipment and employee expertise. The project went well, but due to budgetary concerns we are currently re-evaluating this joint effort.

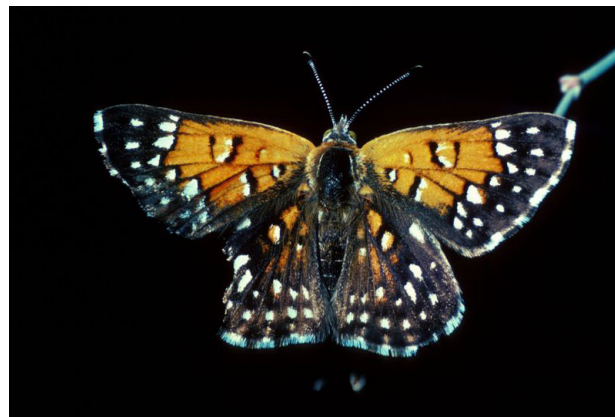
## Wetlands + Environmental Programs

Wetlands are a valuable part of Contra Costa County's ecosystem. They offer both land-dwelling and aquatic creatures essential habitat to thrive. For that reason, the Contra Costa Mosquito & Vector Control District strives to preserve these wetlands without mosquitoes capable of causing a nuisance or transmitting disease.

Maintaining wetlands without mosquitoes has been at the forefront of the District's programs since opening its doors in 1927. To that end, in 2009 the District continues to conduct wetland and environmental programs with three main purposes: using "physical control" to reduce mosquitoes; ensuring District activities are respectful of the natural environment; and working with other groups to prevent accidental creation of mosquito or other vector habitats.

In 2009, using "physical controls" included using bi-directional tidal gates to rehabilitate the Peyton Slough Wetlands near Martinez allowing tidal waters to flow back into the freshwater wetlands for the first time in more than 100 years. The creation, installation and functional usage of the gates mark the culmination of 20 years of work on the Peyton Slough wetlands by members of a multi-agency partnership. Those organizations included the Contra Costa Mosquito & Vector Control District, Rhodia Incorporated, San Francisco Regional Water Quality Control Board, Mt. View Sanitary District, the City of Martinez, San Francisco Bay Conservation and Development Commission, the California State Lands Commission, the California Department of Fish and Game, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration and other local, regional, and statewide agencies. The gates are specially designed to return the natural ebb and flow of tidal waters to the 200 acre marshland. Tidal gates help improve the natural environment in this wetlands ecosystem.

Part of the District's effort to ensure our activities are respectful of the natural environment included work to protect an endangered species in the Antioch Dunes in 2009. The rare Lange's Metalmark Butterfly, *Apodemia mormo langei*, is known almost exclusively to the Antioch Dunes National Wildlife Refuge. The location of the dunes, however, is bordering a "hot spot" for West Nile virus activity. The risk of West Nile virus required the District to use ultra-low volume adulticide to kill the nearby infected mosquitoes. To facilitate success in vector control efforts while protecting the endangered species, the District worked with the California Department of Fish and Game to ensure the insecticide did not impact the butterflies. The delicate operation required great care and effort. In addition to assigning extra staff to the project, monitoring weather conditions, pesticide drift, and sentinel mosquitoes during application were critical and required the team to be ready to abort the operation at a moment's notice.



The rare Lange's Metalmark Butterfly, *Apodemia mormo langei*, is known almost exclusively to the Antioch Dunes National Wildlife Refuge.

When working with other agencies and organizations to prevent the creation of mosquito and other vector habitats, the District is often called to assist companies along Contra Costa County's waterfront. One such case in 2009 involved the Mirant Corporation. The District worked with Mirant as the corporation replaced a dewatering pump at the company's Antioch facility. Because of its location near wetlands, the maintenance project had the potential to impact the nearby ecosystem. District supervisors assisted Mirant to prevent a negative impact on the marsh and community.

The District remains very involved in federal and state regulation of mosquito and vector control issues. In 2009, the United States Environmental Protection Agency determined the need for a National Pollutant Discharge Elimination System permit regarding ULV adulticide residue in natural water sources. This permit was not previously in existence. The new permit requirement prompted mosquito control districts throughout the state to enter into negotiations with the USEPA as well as the California Environmental Protection Agency to determine the testing protocols for the permit. California districts are working to ensure that the permits' requirements ensure accurate results and cost-effective testing protocols that provide continued effective mosquito control and continue to protect public health.

For information on Wetlands, visit <http://contracostamosquito.com/PDFwetland.htm>

To view the District's award-winning video "Peyton Slough Wetlands, Crown Jewel of Contra Costa County", visit <http://contracostamosquito.com/peyton.html>.

## Public Affairs & Community Outreach

The ongoing foreclosure crises continued to be at the forefront of the District's outreach efforts. A noteworthy effort was a partnership with Realtors of Contra Costa County that proved beneficial. District staff provided targeted presentations designed to educate these professionals about the health hazards of neglected swimming pools and how easy it is to make a difference with a simple phone call. It's a triple-win situation for the Realtors, the District, and of course to the residents of Contra Costa County.

Once reported, District technicians tend to the swimming pool, treat it and add mosquitofish as warranted. Of course, many pools remain green and look neglected, but they don't produce mosquitoes while in our care. Most Realtors, prior to our presentation, "shocked" their swimming pools with chemicals to whip it into shape for a potential buyer. This approach sounds entirely reasonable and helpful, but shocking a pool ironically creates a worse situation. In shocked pools, Mosquitoes return quicker and produce even more mosquitoes because the water is more suited to them. The solution is to maintain the pool regularly with chemicals and filtration or use mosquitofish as a longer term solution to an unoccupied home.

Swimming pools are of major concern because they are capable of producing more than 1 million mosquitoes and can affect neighborhoods up to a file mile radius. Their discreet existence makes them hard to find and research rarely uncovers the true and current owner.

Other outreach efforts for the year included 68 presentations, fairs, events, booths, information tables, and library displays. Audiences were varied and included such entities and people as city and county personnel, teachers, homeowners associations, boy scouts, garden clubs and more. See the word cloud below for more.

District staff worked with mass media for the greatest reach and efficiency. There were 21 television news stories and guest spots on shows such as Bay Area People and CNN Newsmakers. Newspapers stories and Web site posts resulted in 41 pieces. Three stories about District news were covered in Newsweek Magazine, the Baltimore Sun, and the Los Angeles Times. We participated in three radio station broadcasts and there were 23 Web sites and blogs that posted our news.

The District's online presence was boosted in August with the introduction of Mosquito Bytes, an online newsletter. Articles outline current vector issues, helpful and healthful tips, as well as links to current issues. Subscribers can simply click on an icon to opt in to receive automatic e-mails. Our online products also include our Online Spray Notification and media releases. To date, the District boasts a total of nearly 1,000 subscribers to these products. The District received a Bronze Anvil Award from the Public Relations Society of America's Northern California chapter for the notification that allows subscribers such as residents, leaders, and media to learn of fogging or spraying efforts in the county. The notifications illustrate the exact location of the spray efforts and the products used to control mosquitoes, as well as a plethora of related links. This is the official communication for fog and spray efforts by the District, but the same information is listed on the District's Web site, on a phone recording, and in a media release.

Future communication efforts include social media and television videos produced by the District. As of this writing, the District tweets important announcements and health information at [www.twitter.com/ccmosquito](http://www.twitter.com/ccmosquito). Understanding the popularity and lure of videos as opposed to print, the District is developing a Vector TV program dedicated to bringing information about the District to a new level. Our goal is to continue to find and utilize new and innovative communication methods to capture the attention of our residents and impart important and significant health information, and deliver it a way that is convenient and meaningful.



The District provided outreach to these organizations in 2009.

# Financial Statement



Revenues	2007/2008	2008/2009
Property Taxes	\$4,450,765	\$4,308,005
Contracts	84,340	78,215
Interest Income	245,038	145,234
Benefit Assessment	1,983,091	1,992,563
Miscellaneous	87,653	80,232
<b>Total Revenues</b>	<b>\$6,850,887</b>	<b>\$6,604,249</b>
Expenditures	2007/2008	2008/2009
Salaries & Wages	\$4,288,147	\$4,502,340
Operations	1,393,557	1,409,522
Capital	193,051	793,561
<b>Total Expenditures</b>	<b>\$5,874,755</b>	<b>\$6,705,423</b>

## ABOUT CONTRA COSTA MOSQUITO & VECTOR CONTROL DISTRICT

Early in the 1900s, Northern California suffered through epidemics of encephalitis and malaria, and severe outbreaks of saltwater mosquitoes. At times, parts of Contra Costa County were considered uninhabitable resulting in the closure of waterfront areas and schools during peak mosquito seasons. Recreational areas were abandoned and Realtors had trouble selling homes. The general economy suffered. As a result, residents established the Contra Costa Mosquito Abatement District which began service in 1927.

Today, the Contra Costa Mosquito and Vector Control District continues to protect public health with environmentally sound techniques, reliable and efficient services, as well as programs to combat emerging diseases, all while preserving and/or enhancing the environment.



**Protecting Public Health Since 1927**  
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