

2011 Annual Report



San Mateo County Mosquito and Vector Control District



An Independent Special District Working for You!



Mission Statement

OUR MISSION:

“To safeguard the health and comfort of the citizens of this district through a planned program to monitor and reduce mosquitoes and other vectors.”

Goals

- Prevent the emergence of biting adult mosquitoes by applying control to the larval stage.
- Answer all requests for service from the public within 24 hours.
- Monitor the distribution of vector-borne diseases in nature and prevent the occurrence of human cases among district residents.
- Research new pesticides and methods of control for mosquitoes.
- Enhance surveillance for adult mosquitoes in order to uncover new sites of larval development.
- Increase public awareness of district services with an active educational program.

A Brief History of Mosquito Control in San Mateo County

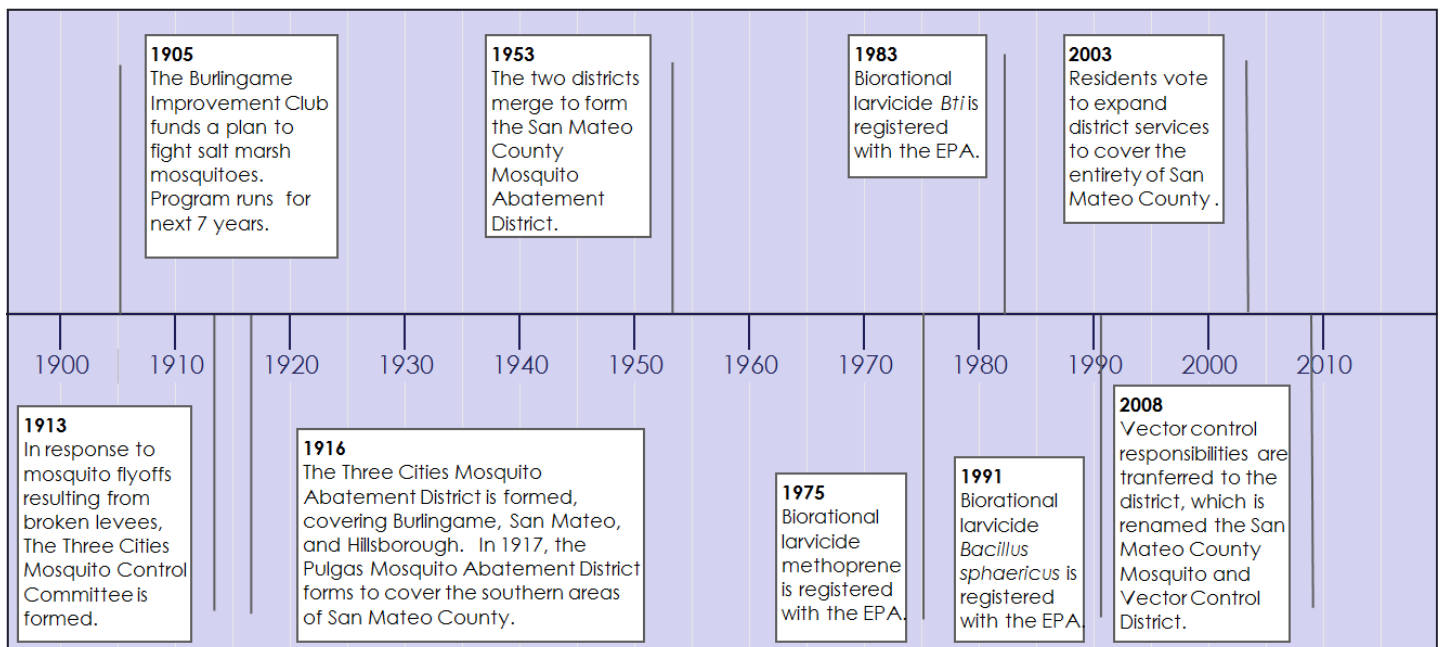




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Governance

The San Mateo County Mosquito Mosquito and Vector Control District is a special purpose district, governed by a Board of Trustees. Trustees are appointed by the elected councils of each city within the district, with an additional representative for the County-at-Large appointed by the County Board of Supervisors. The Board of Trustees consists of individuals dedicated to community service and willing to accrue the knowledge required to effectively govern a public health agency. The current board members possess a variety of skills and expertise in business, government, law, public health, and engineering.

Trustees Tim Frahm of Half Moon Bay, Dr. Lawrence Peterson of Hillsborough, and Ronald Anderson of Foster City retired from the board in 2011. The district also welcomed two new board members, filling the seats of two long-serving trustees who retired in 2010. Donelle O'Connor replaced Robert Blake of Belmont, and Maria Martinucci joined the board to represent Redwood City, in the seat formerly held by Robert Bury.

Board meetings are held on the second Wednesday of each month at the district office, 1351 Rollins Road, Burlingame at 7:00 p.m. These meetings are open to the public, and meeting agendas and minutes are posted on the district website at http://www.smcmad.org/board_meeting.htm.

2011 Board of Trustees

<u>City</u>	<u>Trustee</u>	<u>Years of Service</u>	<u>Position</u>
Atherton	Samuel Lerner	4	Vice President
Belmont	Donelle O'Connor	<1	
Brisbane	Robert Maynard	7	
Burlingame	Barry Meinerth	2	
Colma	(vacant)		
Daly City	Christine Fuller	5	
E. Palo Alto	Donna Rutherford	5	
Foster City	Ronald Anderson	18	
Half Moon Bay	Tim Frahm	6	
Hillsborough	Dr. Lawrence Peterson	25	
Menlo Park	Valentina Cogoni	6	Secretary
Millbrae	Leon Nicholas	14	
Pacifica	John Curtis	7	
Portolla Valley	Joseph Fil	11	Asst. Secretary
Redwood City	Maria Martinucci	1	
San Bruno	Robert Riechel	7	
San Carlos	Betsey Schneider	7	
San Mateo	James Ridgeway	5	
San Mateo - County at Large	James Metz	2	
South San Francisco	Raymond Honan	7	President
Woodside	Richard Tagg	22	

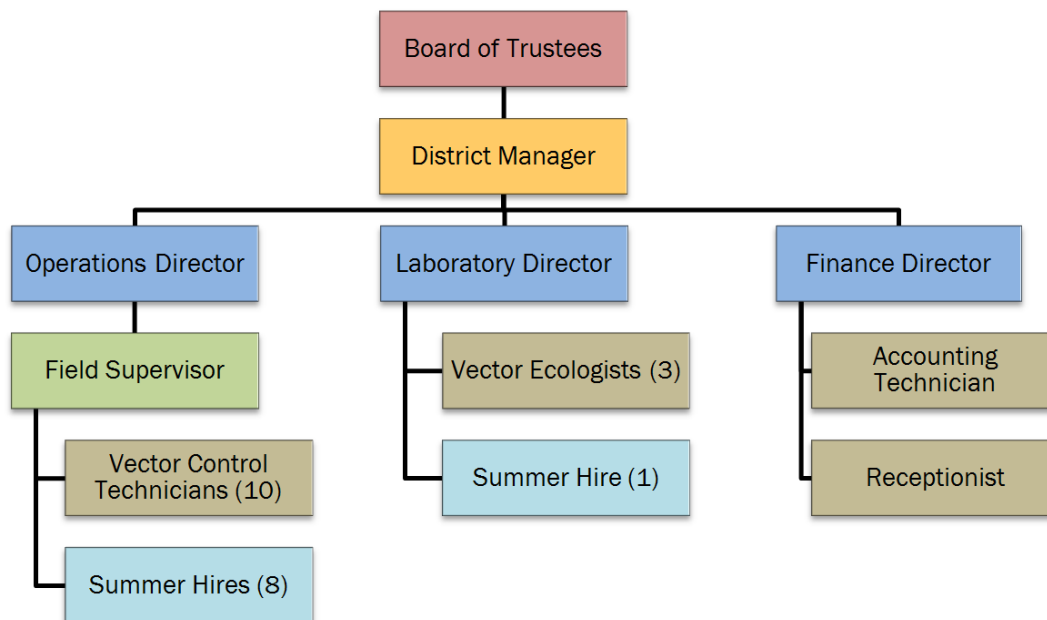


District Personnel and Years of Service

2011 District Personnel

Administration	<u>Years of Service</u>
Robert Gay, M.S., Manager	15
Rosendo Rodriguez, Finance Director	<1
Mary Leong, Accounting Technician	<1
Devina Walker, Receptionist	2
Laboratory	
Chindi Peavey, Ph.D., Laboratory Director	13
Angie Nakano, Vector Ecologist	6
Tina Sebay, Vector Ecologist	7
Theresa Shelton, M.S., Vector Ecologist	3
Operations	
James Counts, Operations Director	39
Richard Chow, Field Supervisor	12
Stephanie Busam, Vector Control Technician	7
Danielle Hern, Vector Control Technician	3
Stanley Kamiya, Vector Control Technician	22
Kimberly Keyser, Vector Control Technician	7
James O'Brien, Vector Control Technician	13
Ben Rusmisl, Vector Control Technician	7
Eric Schultz, Vector Control Technician	7
Casey Stevenson, Vector Control Technician	3
Samantha Wallingford, Vector Control Technician	7
Brian Weber, Vector Control Technician	6

District Organizational Chart

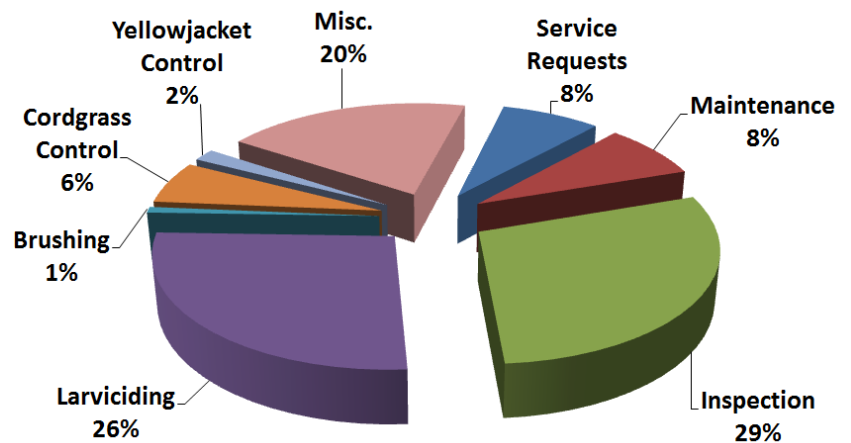




Operational Activities—How Resources are Allocated

As seen in the graph at right, mosquito control operations (Inspection and Larviciding) make up the majority (55%) of work for field personnel. The district uses an Integrated Pest Management (IPM) approach to mosquito control. Under this approach, field staff search for sources of mosquito development, applying control measures only when mosquitoes are found in these places. This approach minimizes the amount of pesticides applied and restricts their application to specific sites where they will be most effective. This approach is labor-intensive and requires skill and experience in knowing where to look for mosquitoes, how to recognize them, and which control method is most appropriate for specific conditions. Description and statistics for the district's mosquito control operations are shown on **pages 7 to 11**.

Breakdown of Man-Hours Spent in Major Operational Categories



Other activities conducted by operational staff include control of invasive cordgrass (described on **page 14**), control of yellowjackets on residential property (see **page 12**), and equipment maintenance and repair.

Equipment Maintenance

Operational staff build, repair and maintain much of the specialized equipment used in in the district's vector control operations. Pictured on the right are Vector Control Technicians Stephanie Busam, Kim Keyser, and Casey Stevenson (**left to right**) repairing mosquito traps. These traps use dry ice (frozen carbon dioxide) to attract adult mosquitoes, and are constructed in-house by district staff. Information on mosquitoes collected in CO₂ traps can be found on **page 8**.



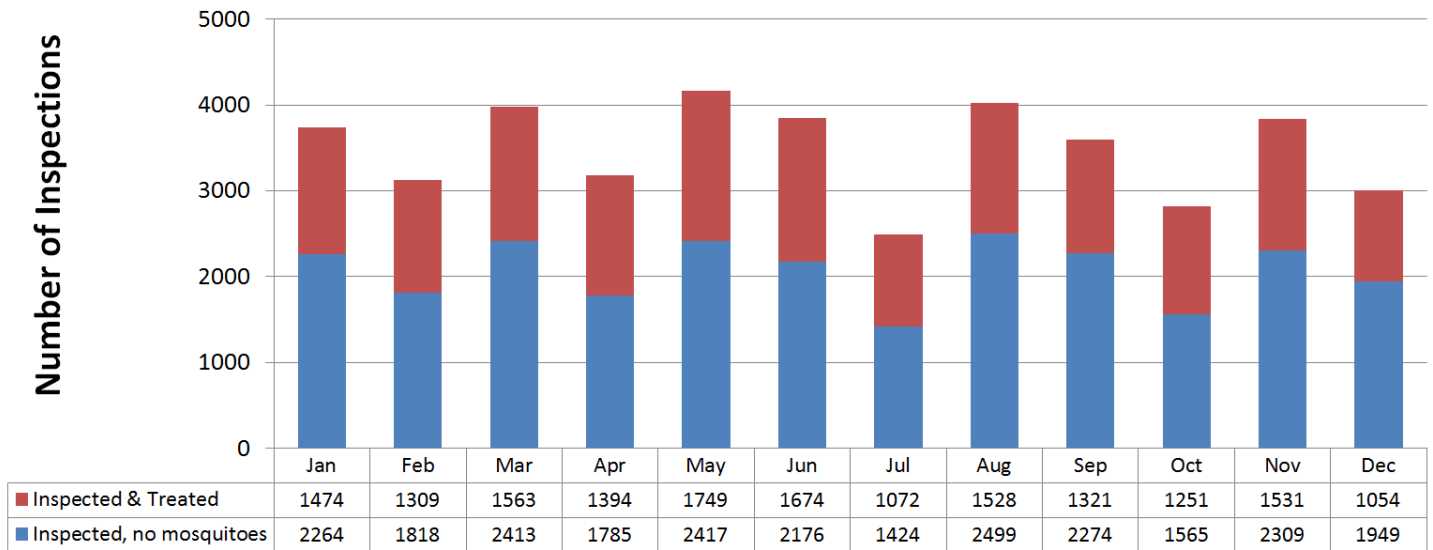
District staff also work on repairing and maintaining vehicles, boats and other customized equipment used in control operations.



Mosquito Control Operations—Surveillance

Surveillance is the process of measuring adult mosquito populations and searching for and monitoring the places where they develop. The district inspects pools of standing water to find the immature stages (larvae) and uses carbon-dioxide baited traps to determine the number of biting adult mosquitoes present. In 2011, district staff inspected 41,813 sources of standing water and deployed 710 CO₂ traps. The graph below shows the number of mosquito sources inspected in 2011 and the proportion in which mosquito larvae were found. Adult mosquito trap data is on **page 8**.

Number of Mosquito Inspections per Month in 2011



Mosquito Control Treatments Applied in 2011

Source Type	2011	5 Year Average
Fishponds & Fountains	15,125	13,662
Containers	8,824	6,331
Neglected Swimming Pools	933	905
Water Under Buildings	214	303
Catch Basins	364,803	294,679
Utility Vaults	6,302	5,125
Ditches & Drainlines	2,106	1,492
Creeks	454	334
Marshes and Impounds	2,469	2,405
Other	504	793
Total	401,734	326,029

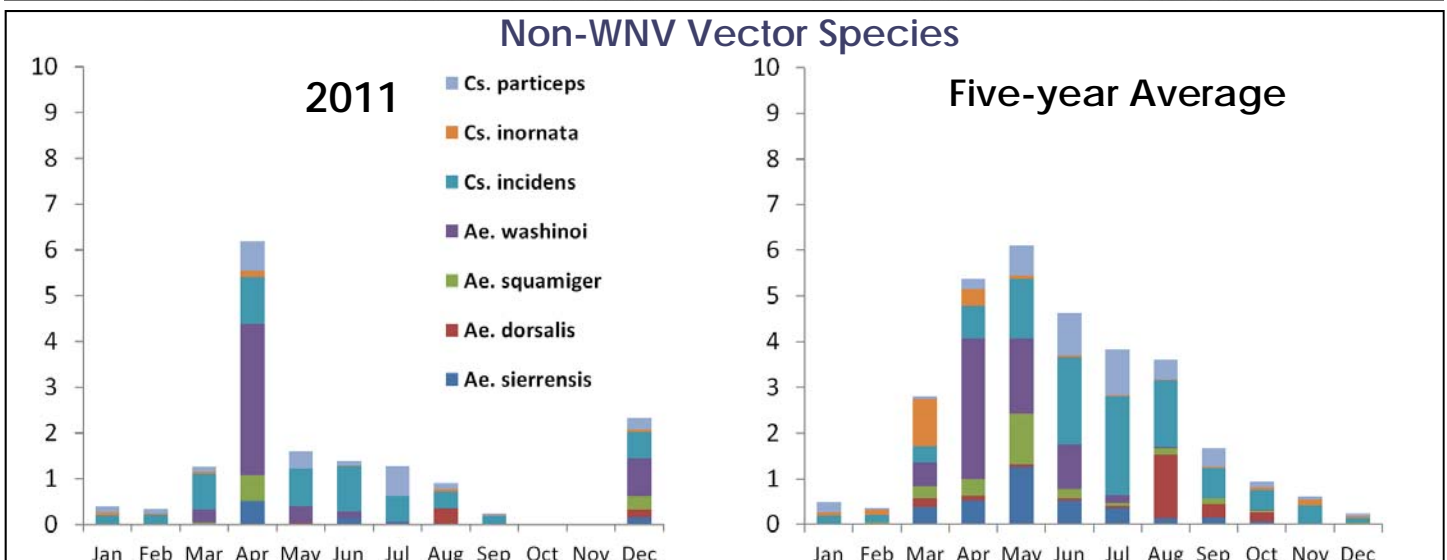
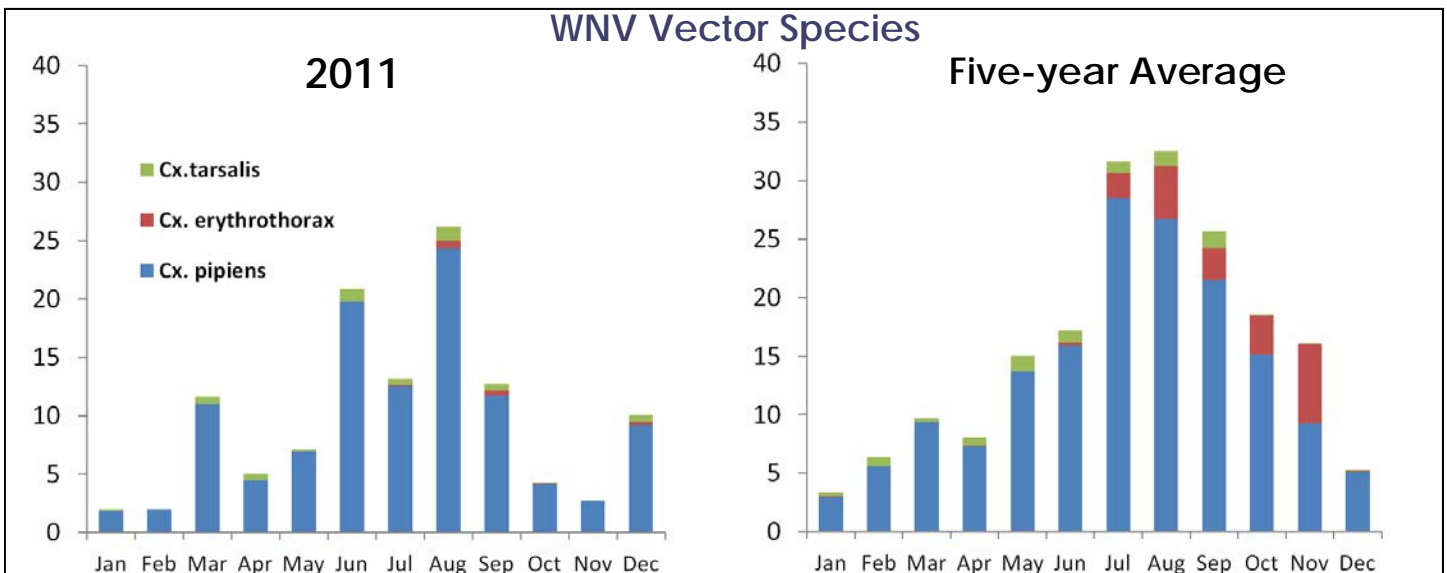




Mosquito Control Activities—Surveillance

The district regularly traps 10 mosquito species in CO₂ traps. Three of these are vectors of West Nile Virus and are most active in the summer. The most common mosquito in San Mateo County is the northern house mosquito, *Culex pipiens*. These mosquitoes develop in storm drains, utility vaults and other underground sources of standing water. In the spring and early summer, much of the control work is focused on marsh-breeding *Aedes* mosquitoes. These mosquitoes do not usually transmit West Nile Virus, but are aggressive biters. Treatments by helicopter and on foot in the salt marshes were successful in controlling *Ae. squamiger*, the mosquito species with the greatest nuisance potential in San Mateo County. Three *Culiseta* species of mosquitoes are also common in the county.

Seasonal Density of Adult Mosquitoes*



*Density = Average number of mosquitoes caught in one night in a CO₂ trap



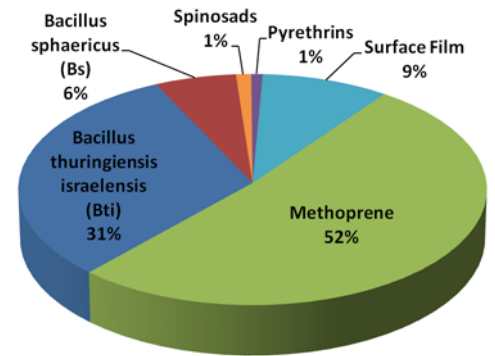
Mosquito Control Operations—Materials

The district uses control products that selectively target mosquitoes and minimally impact the environment.

Bti (*Bacillus thuringiensis israelensis*) and Bs (*Bacillus sphaericus*) are bacteria that kill larval mosquitoes by rupturing their stomach lining. Bacteria in this group occur naturally in nearly all aquatic environments. Bti and Bs are specific to mosquitoes and black flies and do not affect other organisms. Spinosad is an insecticide derived from fermentation of a naturally occurring soil bacterium.

Methoprene is a synthetic hormone that prevents mosquito larvae from developing into adults. This is an insect hormone involved in metamorphosis and does not af-

Percent of Acreage Treated by Specific Control Materials in 2011



Control Material	Acres Treated
Bacteria	
Bacillus sphaericus	215
Bacillus thuringiensis israelensis	1,129
Spinosads	40
Insect Growth Regulators	
Methoprene	1,869
Surface Film	
BVA-2 Oil	336
Golden Bear 1111 Oil	2
Pyrethroids	
Pyrenone Ultra Low Volume Adulticide	30

fect birds, fish, mammals, or amphibians.

BVA-2 and Golden Bear 1111 are highly refined petroleum distillates that form a thin film on the top of the water and kill larvae through suffocation. These surface films break down rapidly in the environment (within 24-48 hours).

Pyrenone is used sparingly by the district to kill adult mosquitoes. In 2011, a small amount was applied under buildings with broken pipes where mosquitoes were breeding.

Mosquito Fish

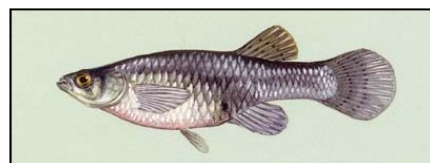
In 2011, mosquito control technicians stocked mosquito fish (*Gambusia affinis*) in 321 sources.

The district provides mosquito fish to county residents with ornamental ponds free of charge. District staff also place fish in isolated water bodies such as neglected swimming pools, troughs, or tanks.

Mosquito fish are never put in natural waterways.

Mosquito Sources Stocked with Fish in 2011

	2011	5 yr avg
Backyard fish ponds	218	404
Horse troughs	24	90
Neglected Swimming Pools	51	31
Tanks, sumps and other containers	28	63
Total	321	588

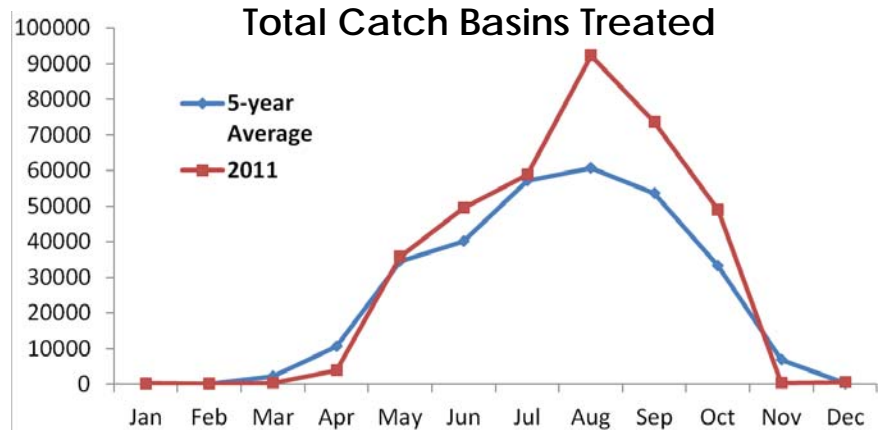


Mosquito Control Operations in Storm Drains

In San Mateo County, the district has identified problem storm drain systems that consistently breed mosquitoes throughout the warmer months. Every year, the district aggressively treats catch basins (CBs) during this breeding season.

Nine seasonal workers were hired to treat catch basins from May to October in 2011. Specially-modified jeeps allow efficient treatment of CBs from the right side of the vehicle.

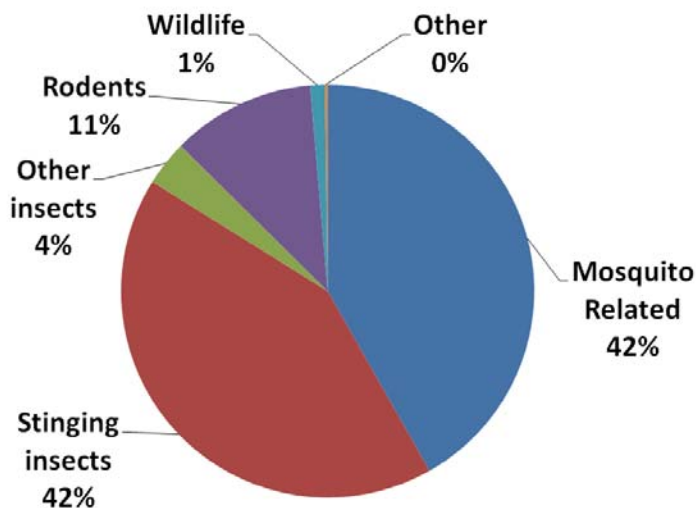
Larvicidal oil BVA-2 was applied to 96% of the catch basins treated in 2011. The remaining catch basins were treated with other mosquito larvicides.



Service Requests

District staff responded to 1,469 service requests in 2011. The two largest categories of calls were related to mosquitoes and stinging insects (primarily underground yellowjacket nest removals), each representing about 42% of calls. This was fewer mosquito service requests and more stinging insect service requests than a typical year. The “other insects” category included requests for identification or advice about termites, flies, stored product pests, or ticks. Residential inspections for roof rats were the predominant type of service call related to rodents, while the wildlife request category included assisting residents with a broad variety of animal issues, including raccoons squirrels, skunks, bats, and pigeons. The “other” category was comprised of uncommon calls that do not fit other descriptions, such as noxious odor complaints and requests to pick up dead animals for disease testing.

Breakdown of 2011 Service Requests by Category



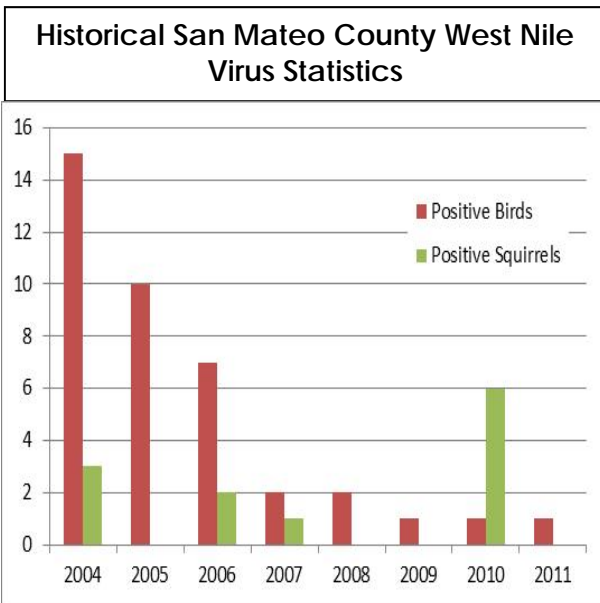
	No. of Requests	5-year Average
Mosquito-related	614	894
Stinging Insects	618	404
Other Insects	52	53
Rodents	165	54
Wildlife	17	11
Other	3	2
Total	1,469	1,418



West Nile Virus Activity

West Nile Virus (WNV) activity in 2011 was very low compared to previous years. Surveillance for West Nile Virus in 2011 included testing of dead birds and squirrels, one flock of sentinel chickens and county-wide monitoring of mosquito populations with CO₂ traps. Only one bird tested positive for WNV in 2011, with a low level of infection indicating prior exposure to the disease. No sentinel chickens, squirrels, horses or humans tested positive for West Nile Virus in San Mateo County in 2011.

Summary of 2011 Dead Bird and Squirrel Reports



	Reported	Tested	Positive
Birds	174	21	1
Squirrels	23	9	0



Sentinel Chicken Flock

The district maintained one flock of ten sentinel chickens located in Portola Valley. Blood was collected from sentinel chickens bi-weekly during May through October. The blood samples are sent to U.C. Davis to be tested for Saint Louis Encephalitis, Western Equine Encephalitis and California Encephalitis, in addition to West Nile Virus. No sentinel chickens have tested positive for virus antibodies in San Mateo County.





Ground Nesting Yellowjackets

In 2011, vector control technicians responded to 515 yellowjacket service calls, treating a total of 405 nests. Control of ground nesting yellowjackets is usually conducted by applying insecticidal dust to the nest entrance. Yellowjackets pick up the dust while entering the entry tunnel and carry it inside where it eliminates the queen and developing larvae. Foams or aerosol sprays are sprayed into the entrance tunnel in some cases.



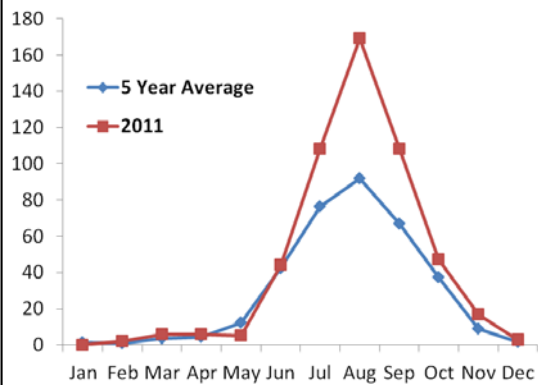
Occasionally, it becomes necessary to dig up the nest and apply insecticides to the entire colony. The district's vector control technicians are trained in yellowjacket behavior and control methods and are properly equipped with bee suits and protective faceguards for dealing with aggressive colonies of yellowjackets. It is not recommended that property owners try this themselves without protective gear.

Beneficial Wasps and Bees

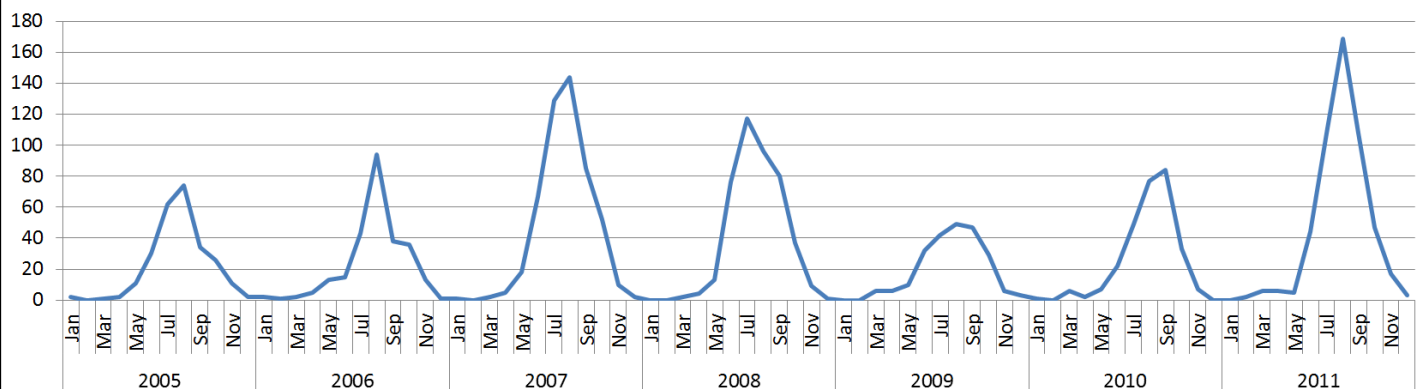
Aside from yellowjackets, other stinging insects such as paper wasps or honeybees are generally not abated by the district. Exceptions have been made when nests are built in areas where they are a public health threat, such as under park benches or in schoolyards. Bees and wasps play a vital role in the environment, and the district makes every attempt to support these beneficial insects.



Yellowjacket Service Calls by Month



Number of Yellowjacket Service Requests Per Month, 2005-2011



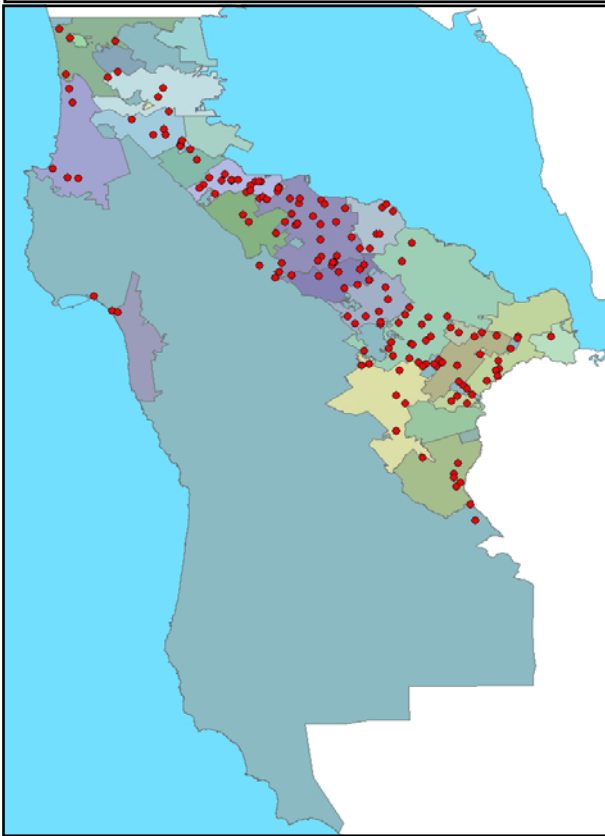


Other Non-Mosquito Vectors



District staff conduct inspections and offer expert advice on management of rodents, raccoons, pigeons, skunks and other urban wildlife in residential dwellings of three units or less. A technician will inspect a property for signs of rat or other wildlife activity and recommend measures to exclude animals from entering the home. Additionally, district staff can provide guidance on the use of traps, baits or wildlife repellents, along with basic information about the biology and ecology of the species. Many wild bird and mammal service requests involve neighborhood-wide problems caused by residents feeding urban wildlife.

Distribution of service requests for rodents in San Mateo County in 2011



The district is also responsible for overseeing contracts between cities and pest control companies for control of rats in sewer systems. The district maintains a database of the results of inspections and tracks rat populations in the urbanized areas of the county.

Service Requests for Non-Arthropod Vectors

	2010	2011
Rodents	174	165
Raccoons	30	12
Pigeons	3	5
Skunks	7	0
Bats	2	0
Feral Cats	1	0
Total	217	182



Service requests for urban wildlife decreased in 2011 compared to 2010, except for pigeons. Wildlife service requests mainly involved rodents in both years.

Control of Invasive Cordgrass

The district has worked under cooperative agreements with the Coastal Conservancy and US Fish & Wildlife Service since 2004 to control invasive cordgrass at Bair Island and other sites along San Francisco Bay. Bair Island is made up of a series of diked marshes that were formerly used for salt production. These ponds are the district’s largest single source of mosquitoes. The goal of restoration at Bair Island is to revert these ponds back to tidal marsh, which would drastically reduce the need for salt marsh mosquito control. However, the dikes surrounding Bair Island could not be breached until invasive cordgrass had been eliminated from the surrounding area.

Because of the district’s efforts in controlling invasive cordgrass, the dikes surrounding pond B3 on Outer Bair Island were able to be opened in 2009. Pesticide applications for mosquito control have been virtually eliminated at this site (almost 500 acres). Dikes surrounding Middle Bair Island are slated to be breached in 2012. This should reduce mosquito production by another 1,300 acres in the future.

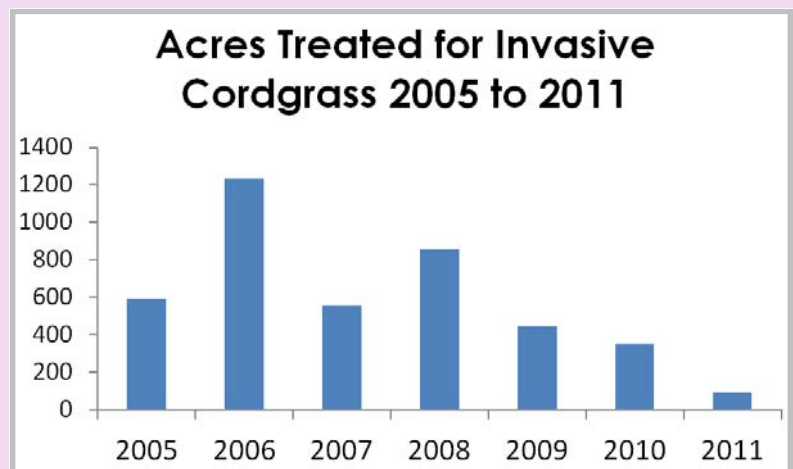


The district’s efforts to remove invasive cordgrass have played an essential role in restoring natural tidal flow to much of Bair Island.

Invasive cordgrass (*Spartina alterniflora*) was introduced to San Francisco Bay in the 1970’s and by 1999 had begun to radically change the face of the tidal shoreline.

This plant spreads aggressively in tidal areas, crowding out native cordgrass, covering mudflats (which are an essential resource for migratory shorebirds) and replacing other plants that naturally occur in the marsh. If left unchecked, this plant can obliterate habitat for endangered species such as the Least Tern and the Salt Marsh Harvest Mouse.

Removal of invasive cordgrass is a high priority for agencies involved in wildlife conservation and restoration of tidal wetlands. The acreage covered by invasive cordgrass has declined steadily due to the district’s control work. In 2006, the peak year for treatment, 1,234 acres were treated. In 2011, 95 acres were treated.





Other Projects

Creek Study



District staff continued work on a two-year study to characterize the quality of creeks in the county using benthic macroinvertebrates as bioindicators. A diverse assemblage and the presence of certain types of invertebrates indicates a healthy creek system. Invertebrates were collected from 20 sites in five creeks: Sanchez Creek in Burlingame, San Mateo Creek and Laurel Creek in San Mateo, Cordilleras Creek in Redwood City and San Francisco Creek in Woodside. Sampling occurred quarterly and continued through the summer of 2011.

Sewer Vault Baiting Study

District staff undertook a field study of the Norway rat activity in sewers in unincorporated areas of Atherton, Woodside and Redwood City. Non-toxic "census" bait blocks were placed in 385 sewers. Two weeks later, the sewers were inspected again for signs of rodent activity. Most of the blocks appeared to be untouched, but seven had gnaw marks and one sewer had droppings, although the bait wasn't eaten. Signs of rats were spread throughout the study area, except a section of Woodside. This work is being carried out to gauge the extent of rat activity in underground sewers and the impact of sewer baiting in reducing rat activity.



McNair School Service Learning Project

In May, district staff worked with science teacher Elizabeth Schar at the Ronald



McNair Academy in East Palo Alto to develop and implement a service learning project on mosquitoes. The two-part exercise was completed by over 300 students in the 6th, 7th and 8th grades. Students were led through a variety of lab activities in which they learned about the mosquito life cycle, observed mosquitoes under the microscope, and searched for mosquito sources around their homes. An important goal of the project was increasing awareness of mosquito control and other district services in the East Palo Alto area.



Public Education and Outreach Events

Educating the public about vectors and district services is one of the most effective ways of preventing the spread of vector-borne disease. Every year, the district takes part in a variety of public education and community outreach events. In 2011, district staff manned booths at seven community festivals, and set up a stand-alone display booth at the San Mateo County Fair.

Festivals and Fairs:

- Portola Valley Earth Day Fair
- Foster City Art and Wine Festival
- San Carlos Hometown Days
- San Mateo County Fair
- Pacifica Fog Fest
- Brisbane Day in the Park
- San Bruno Farmers Market
- Portola Valley Insect Day

School Presentations:

- Carlmont High School biology classes
- Stanford University biology class
- McNair Middle School biology classes

Other Presentations:

- Friendly Acres Homeowner's Association
- CuriOdyssey Museum at Coyote Point
- Pesticide Applicators' Professional Association
- 2011 Spring MVCAC Sacramento Valley Region Continuing Education Session
- 78th Annual Conference of the Mosquito and Vector Control Assoc. of California*



*see back page

Other District Laboratory Outreach Activities



The district provides insect identification and control advice for residents who submit specimens or call with questions. Laboratory staff emphasize Integrated Pest Management techniques for the most effective and long term results. This service increases public awareness of the diversity of insect pests and reduces the amount of ineffectual pesticide use.

In 2011, the entomology lab hosted one seasonal employee, Natalie Clausson. Natalie assisted the lab with a variety of projects, including the rat baiting program in unincorporated areas, designing a database for the sewer rat baiting program, and organization of laboratory materials.



District Financial Statements (Fiscal Year 2010-2011)

Statement of Net Assets June 30, 2011

ASSETS

Cash and investments	\$4,911,836
Receivables	24,371
Capital assets, net	<u>4,592,484</u>
Total Assets	<u>\$9,528,691</u>

LIABILITIES AND NET ASSETS

Current Liabilities	
Accounts payable	\$76,649
Accrued liabilities	53,538
Long Term Liabilities	
Due in more than one year	
Compensated	<u>222,551</u>
Total Liabilities	<u>\$352,738</u>
Net Assets	
Invested in capital assets	\$4,592,484
Unrestricted	<u>4,583,469</u>
Total Net Assets	<u>\$9,175,953</u>

Major Fixed Assets

Buildings

District Headquarters - 1351 Rollins Road, Burlingame, CA
Substation - 890 Barron Avenue, Redwood City, CA

Vehicles

11 Ford Ranger trucks	1 Ford Windstar van
3 F-150 trucks	4 Argo All-Terrain vehicles
1 Vintage Dodge Power Wagon	3 Boats with Trailers
1 Ford Escape Sport Utility Vehicle	

District Financial Statements (Fiscal Year 2010-2011)

Statement of Activities June 30, 2011
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Expenses

Programs	Personal services	(\$2,384,188)
	Services and supplies	(1,034,532)
	Depreciation	(307,199)
Interest Expense		<u>(12,864)</u>
	Total Program Expenses	(\$3,738,783)

Program Revenues

Charges for services		<u>\$284,448</u>
	Net Program Expense	(\$3,454,335)

General Revenues

Property taxes		\$1,581,340
Special mosquito control tax		458,635
Other taxes		200,237
Special benefit assessment		1,396,134
Investment earnings		50,750
Miscellaneous revenue		161,334
Special Item		
	Gain on disposal of capital assets	16,584
	Insurance claim	<u>(340,581)</u>
	Total General Revenues	\$3,524,433

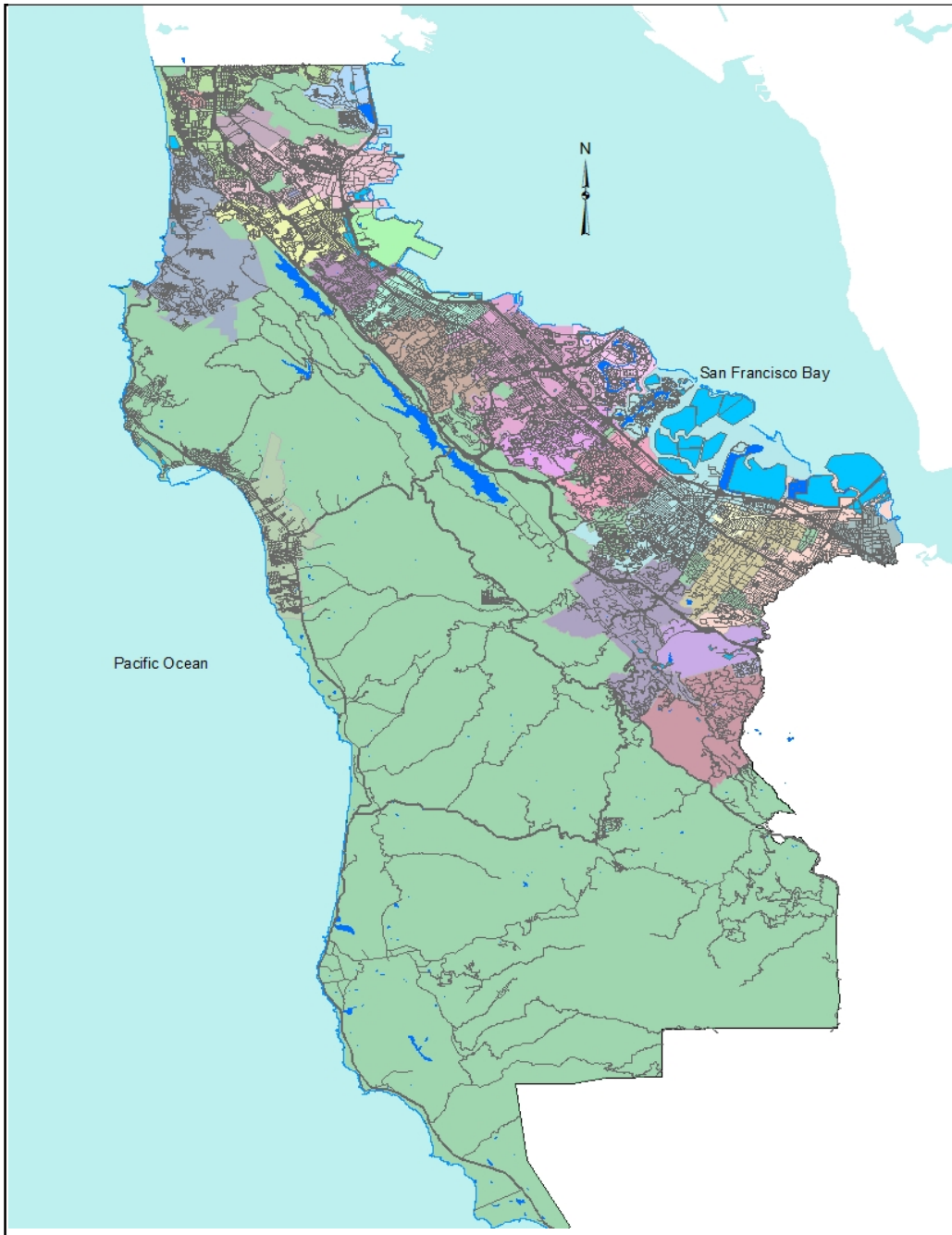
Increase in Net Assets **\$70,098**

Net Assets - Beginning of the Year **\$9,105,855**

Net Assets -End of the Year **\$9,175,953**



District Map



Total Area of San Mateo County: 285,339 acres (450 sq. miles)

Total Population of County: 754,285 (as of Jan 1, 2010)

Incorporated Cities in County: 20 **Unincorporated Communities:** 18

Adjacent Counties: San Francisco County (north) Alameda County (east, across bay)
Santa Clara County (southeast) Santa Cruz County (south)



Business Tagline or Motto

AN INDEPENDENT SPECIAL DISTRICT WORKING FOR YOU!

1351 Rollins Road
Burlingame, CA 94010

Phone: 650-344-8592
Fax: 650-344-3843
website: www.smcmad.org

The San Mateo County Mosquito and Vector Control District is an independent, Special District funded by a property tax voted in by individual cities. Our mission is to safeguard the health and comfort of our citizens through a planned program to reduce mosquitoes and other vectors in an environmentally responsible manner.

	Extension
Robert B. Gay, Manager_____	12
Chindi A. Peavey, Laboratory Director_____	32
Angie Nakano, Vector Ecologist_____	31
Tina Sebay, Vector Ecologist_____	38
Theresa Shelton, Vector Ecologist_____	44
James Counts, Operations Director_____	16

“A VECTOR is any animal that can transmit disease to animals or people.”

Conference Presentations in 2011

Biology and Control of Ticks

Chindi Peavey: MVCAC 79th Annual Conference, Indian Wells

Nuts and Bolts of Applying for and Complying with the NPDES Permit

Chindi Peavey: MVCAC 79th Annual Conference, Indian Wells

Filth Flies in California: Tips on Service Calls from a Forensic Entomology Graduate Student

Angie Nakano: MVCAC 79th Annual Conference, Indian Wells

Assessing the Risk of Sewer System Entry

Tina Sebay: MVCAC 79th Annual Conference, Indian Wells

Using the Data from a Sewer Baiting Program to Look for Patterns in Norway Rat Populations in San Mateo County

Theresa Shelton: MVCAC 79th Annual Conference, Indian Wells

Credits

Contributing Writers:

Chindi Peavey, Angie Nakano, Tina Sebay, Theresa Shelton