2013

San Joaquin County Mosquito & Vector Control District

Annual Report

A n n u a l R e p o r t

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SAN JOAQUIN COUNTY
MOSQUITO & VECTOR CONTROL DISTRICT

1999 - 2013

1993-1998

1955-1992

SAN JOAQUIN COUNTY
MOSQUITO & VECTOR
CONTROL DISTRICT

Protection Through Prevention

Cover photo courtesy of M.J. Higgins. Page 4, and page 17 photo of mosquito & tick courtesy of Courtesy of James Gathany

Forward

On behalf of the Board of Trustees and staff of the San Joaquin County Mosquito and Vector Control District, I am pleased to submit the 2013 Operational and Fiscal Year Report. This report includes information on District administration and operations during the past year.

Financially, the District experienced a 4.35% improvement in revenues from that of the previous year due to a slight rebound in property values and a substantial decrease in real estate foreclosures in the County. However, local property taxes earmarked for the District continue to be diverted to the State of California's Educational Revenue Augmentation Fund (ERAF). Although the State's elimination of local municipal redevelopment projects provided some change in distribution of certain revenues, it did not make up for the property tax shift to ERAF. These revenue diversions have prompted the District to continue implementing the Mosquito, Vector, and Disease Control assessment approved by local landowners in 2005. This nominal charge generates a revenue stream that helps address vector-borne disease surveillance and control, community education and outreach activities, and related vector control program operations.

Operationally, field and laboratory staffing levels were maintained to meet the challenges of West Nile virus. 2013 West Nile virus activity was less than that of 2012, when compared to human and dead bird reported cases; however, the number of infected mosquitoes collected from the field were on par with that of the previous year. The District placed emphasis on detecting virus in local mosquito populations and using that information to manage their populations to the lowest level possible. The District requires land owners and water managers to prevent the development of mosquitoes on property under their control. This practice is imperative, as the District is experiencing a decline in the effectiveness of certain mosquito control products. In addition, current State and Federal regulations limit how mosquito control can be implemented in and over aquatic sites.

Although the District has realized a decrease in the number of foreclosed and vacant homes with swimming pools, the need to ensure those listed pools are maintained requires periodic inspections. The District increases its staffing during the summer to inspect and treat these pools to reduce mosquito populations in the urban and suburban areas of San Joaquin County.

Surveillance and control measures were implemented per the District's integrated pest management (IPM) plan and the California Mosquito-Borne Disease Surveillance and Response Plan. These plans have been the cornerstone of our efforts to detect and respond to West Nile virus since its first detection in San Joaquin County in 2004. For 2014, the District will expand our surveillance system to include specific trapping systems used to collect new invasive mosquito species such as *Aedes egypt*i (the Yellow Fever mosquito) and *Aedes albopictus* (the Asian Tiger Mosquito). We will continue to refine diagnostic work in the laboratory, and test the effectiveness of our control products. Public education is invaluable to ensuring landowners and water managers operate their property in a manner that does not create a public nuisance. We must also examine our revenue sources and budget expenditures to remain as fiscally sound as possible.

Mosquito and vector control is an important service of public health protection. We must remain vigilant in our effort to stay the course in fighting the spread of West Nile virus in our County. In addition, we must be prepared for invasive mosquito species capable of spreading mosquito-borne viruses that potentially could threaten our community. Organized mosquito control activities are an essential service the residents of San Joaquin County have come to expect. States and local communities are challenged to develop and maintain essential mosquito and vector control programs, especially in tight budgetary times. To this extent, the Board of Trustees and staff should be commended for their continued dedication and hard work in providing a quality mosquito and vector control program for the residents and visitors of San Joaquin County.

Respectfully submitted,

Eddie Lucchesi

Eddie Lucchesi, Manager

Board of Trustees

Mission Statement

Adopted by the Board of Trustees
On May 21, 1996

San Joaquin County Mosquito and Vector Control District provides comprehensive vector surveillance and control services to enhance the public health and quality of life for the residents and visitors of San Joaquin County. As a locally controlled independent agency we seek to fulfill our mission through the following commitments:

- To utilize the most advanced administrative and operational technology available;
- To provide stewardship for public funds by stressing efficiency in our operations;
- To encourage citizen participation in achieving our mission;
- To educate the public regarding the health implications of disease transmitting pests;
- To provide services consistent with an awareness and concern for environmental protection;
- And lastly, to provide and maintain a safe and effective public health pest management program.

The District's Board of Trustees meets on the third Tuesday of each month at 1:00 p.m. at the District's office: 7759 S. Airport Way Stockton, CA 95206

District Overview

San Joaquin County Mosquito and Vector Control District is an independent special district. The District's operations are funded by San Joaquin County property taxes, a special tax and a benefit assessment. The District is governed by an eleven member Board of Trustees, seven representing each incorporated city and four representing the county at large. The Board employs a manager who oversees program functions, hires and supervises staff. The staff consists of full and part-time employees to facilitate the daily district operations.

1932 - San Joaquin County health officials enlisted the aid of Civilian Conservation Corps to remove brush along streams to reduce mosquito producing stagnant water.

1942 - Local citizens organized a petition signed by 3,800 residents to form a district.

1945 - The Board of Supervisors form the Northern San Joaquin County Mosquito Abatement District.

1955 -

A second district, the San Joaquin Mosquito Abatement District, was formed for the remaining portion of the county. Due to the growing concern of encephalitis in the county, demands for mosquito control continued to increase.

Mosquito Abatement vehicle parked next to a mosquito development source (circa 1957)

1980 - By mutual consent of their governing bodies, the two independent districts combined to form San Joaquin County Mosquito Abatement District.

1992–1993 - The District expanded its mission to include two other vectors, ticks and feral bees. To reflect the newly adopted tasks, the District changes it's name to San Joaquin County Mosquito & Vector Control District.

"Vector" Defined

According to the California State Health and Safety Code, Section 2002(K): "Vector" means any animal capable of producing discomfort or injury, including, but not limited to arthropods (mosquitoes, flies, fleas, lice, ticks, mites, etc.), small mammals (rabbits, rodents, etc.) and other vertebrates, but not including domestic animals.

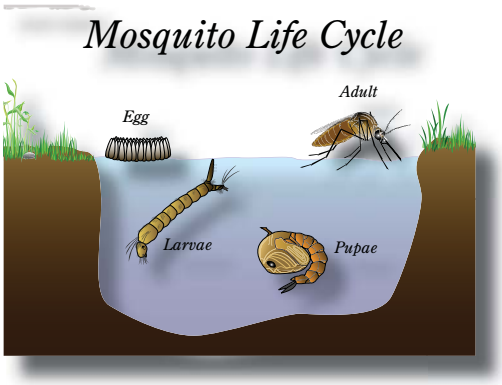
Vectors can transmit infectious organisms that cause human and animal diseases. These diseases can be serious and sometimes fatal. Arthropods, particularly haematophagous insects, are the major group of vectors transmitting diseases (vector-pathogen) including encephalitis (mosquito-virus), malaria (mosquito-protozoan), typhus (flea/lice-bacterium), plague (flea-bacterium), dog heartworm (mosquito-roundworm), and Lyme disease (tick-bacterium). Encephalitis-causing viruses transmitted by arthropods are called arboviruses (Arthropod-borne viruses). The California Arbovirus Surveillance Program emphasizes forecasting and monitoring activity of St. Louis encephalitis (SLE), western equine encephalomyelitis (WEE), and West Nile virus (WNV). These viruses are maintained in the wild bird-mosquito cycles, and therefore are not dependent upon infections of humans or domestic animals for their persistence. Infections of humans and domestic animals by these viruses are transmitted by bites of infected mosquitoes that have fed on infected wild birds. WNV is currently of most concern in San Joaquin County. It was first detected in San Joaquin County in 2004 and reached epidemic levels in 2005, 2006, 2007, 2008, 2012 and 2013

There are 17 mosquito species found in San Joaquin County. Three of them are of major public health concern: *Culex tarsalis* is the principal vector of WEE, SLE and WNV; *Culex pipiens* is the vector of WNV, and SLE; and *Anopheles freeborni* is the vector of malaria.

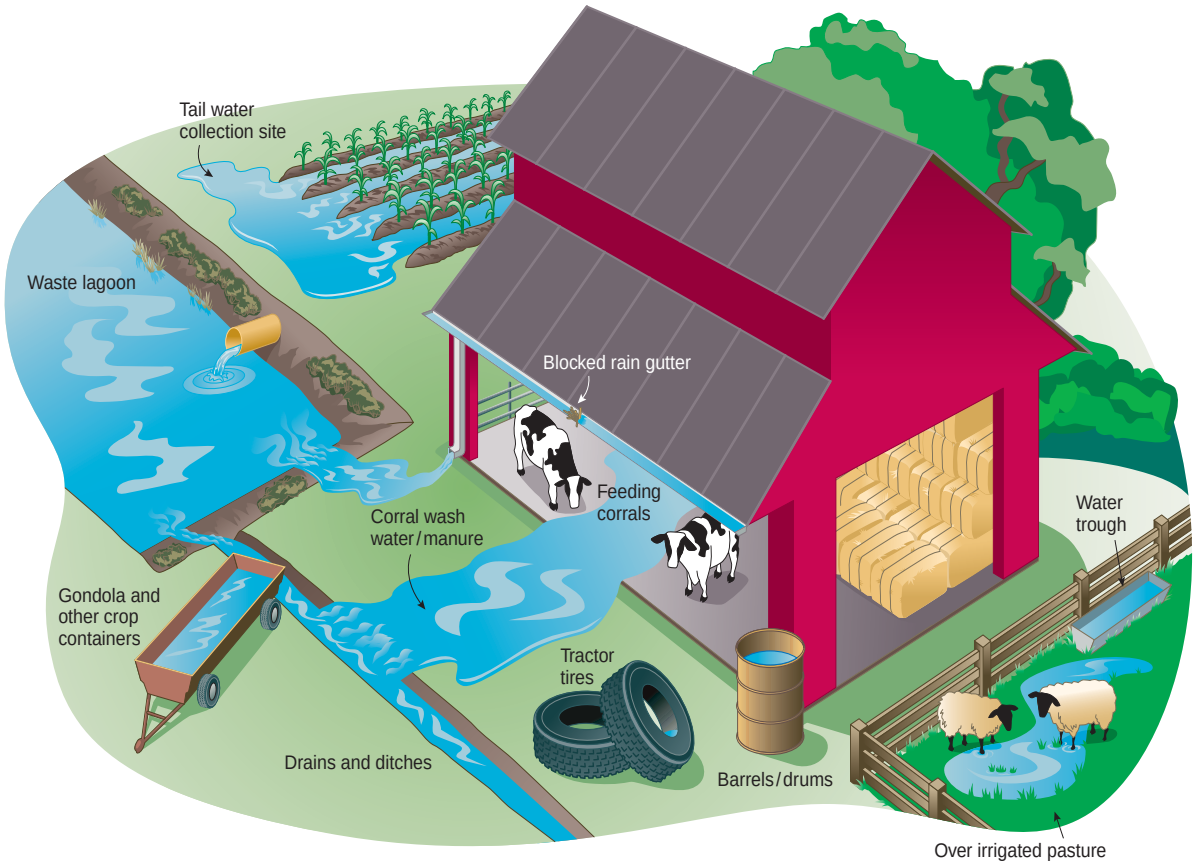
Mosquitoes of San Joaquin County

1. ***Culex tarsalis***
   Western Encephalitis mosquito
2. ***Culex pipiens***
   Northern House mosquito
3. ***Culex stigmatosoma***
   Banded foul water mosquito
4. ***Culex erythrothorax***
   Tule mosquito
5. ***Anopheles freeborni***
   Western malaria mosquito
6. ***Anopheles franciscanus***
   No common name
7. ***Anopheles punctipennis***
   Woodland malaria mosquito
8. ***Aedes nigromaculis***
   Irrigated pasture mosquito
9. ***Aedes melanimon***
   No common name
10. ***Aedes dorsalis***
    No common name
11. ***Aedes sierrensis***
    Western treehole mosquito
12. ***Aedes washinoi***
    No common name
13. ***Aedes vexans***
    Inland flood water mosquito
14. ***Culiseta incidens***
    Cool-weather mosquito
15. ***Culiseta inornata***
    Large winter mosquito
16. ***Culiseta particepts***
    No common name
17. ***Orthopodomyia signifera***
    No common name

Mosquito Development



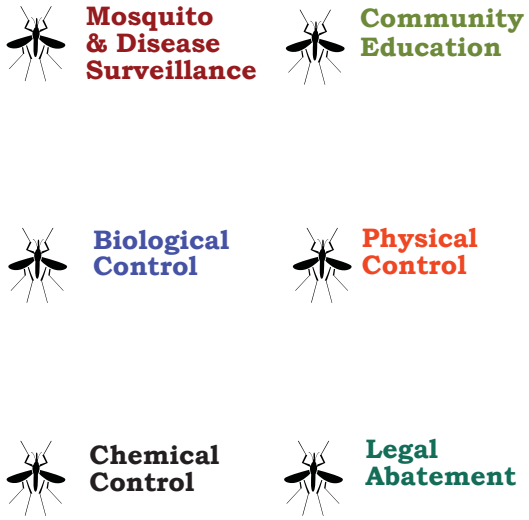
Mosquitoes complete a full metamorphosis: egg, larva, pupa, and adult. Water is critical to the mosquito's life cycle. Egg rafts are laid on still or standing water. Each raft contains 100 - 300 eggs. The eggs hatch to larvae. The larvae grow through 4 instars, shedding their outer skin as they grow to the next stage. Once the larvae reach the 4th stage (or instar), they then transform to pupae. The pupal stage is the equivalent of the cocoon, where the adult insect body develops. Once development is complete, the pupae hatch off the water as adult mosquitoes. The adult female then needs to take a "blood meal" to provide necessary nutrients to her eggs. In warmer weather, mosquitoes complete a full metamorphosis, on average, in seven to ten days. Mosquito development around residential properties is the primary source for urban mosquitoes. Residential mosquito development sites include: neglected swimming pools and spas, ornamental ponds, leaking and broken pipes / faucets / sprinklers, tires, buckets, clogged rain gutters, bird baths, and boats. Below are additional areas that mosquito develop in on a farm. In rural areas, agricultural water management is crucial in the reduction of mosquito development.



Integrated Pest Management

District operations are based on a concept that utilizes several different approaches to vector control. The concept is referred to as Integrated Pest Management, or IPM. The District's definition of IPM is "a sustainable approach, or plan, to managing public health pests and vectors, by combining biological, chemical, legal, natural and physical control tactics in a way that minimizes economic, health and environmental risks." IPM can also be considered as a systematic approach to public health pest management, which combines a variety of surveillance and control practices. With regards to implementing a plan to control vectors, IPM can be defined as socially acceptable, environmentally responsible and economically practical protection of the public's health and well being. In the spirit of IPM, Integrated Mosquito Management (IMM), is a process that is directly related to the specific control of mosquitoes.

Components of IPM



Since the need for mosquito control was recognized in the early twentieth century, increased knowledge of mosquito biology has driven the formulation of a variety of methodologies designed to successfully reduce both mosquito nuisance levels and mosquito-borne disease transmission. As the technologies and knowledge base from which these methodologies were derived have matured, they have been increasingly seen as mostly complimentary or synergistic in nature, providing optimal control as part of an overall strategy. IMM has been developed to encourage a balanced usage of cultural and insecticidal methodologies and habitat manipulations in order to minimize adverse environmental impacts. IMM is knowledge-based and surveillance-driven, and when properly practiced is specifically designed to accomplish the following:

1. Protect human, animal and environmental health.
2. Promote a rational use of pesticides.
3. Reduce environmental contamination to soil, ground water, surface water, pollinators, wildlife and endangered species.
4. Utilize natural biological controls to conserve and augment other control methods.
5. Use target specific pesticides to the extent possible.
6. Emphasize the proper timing of applications.
7. Minimize pesticide resistance problems.

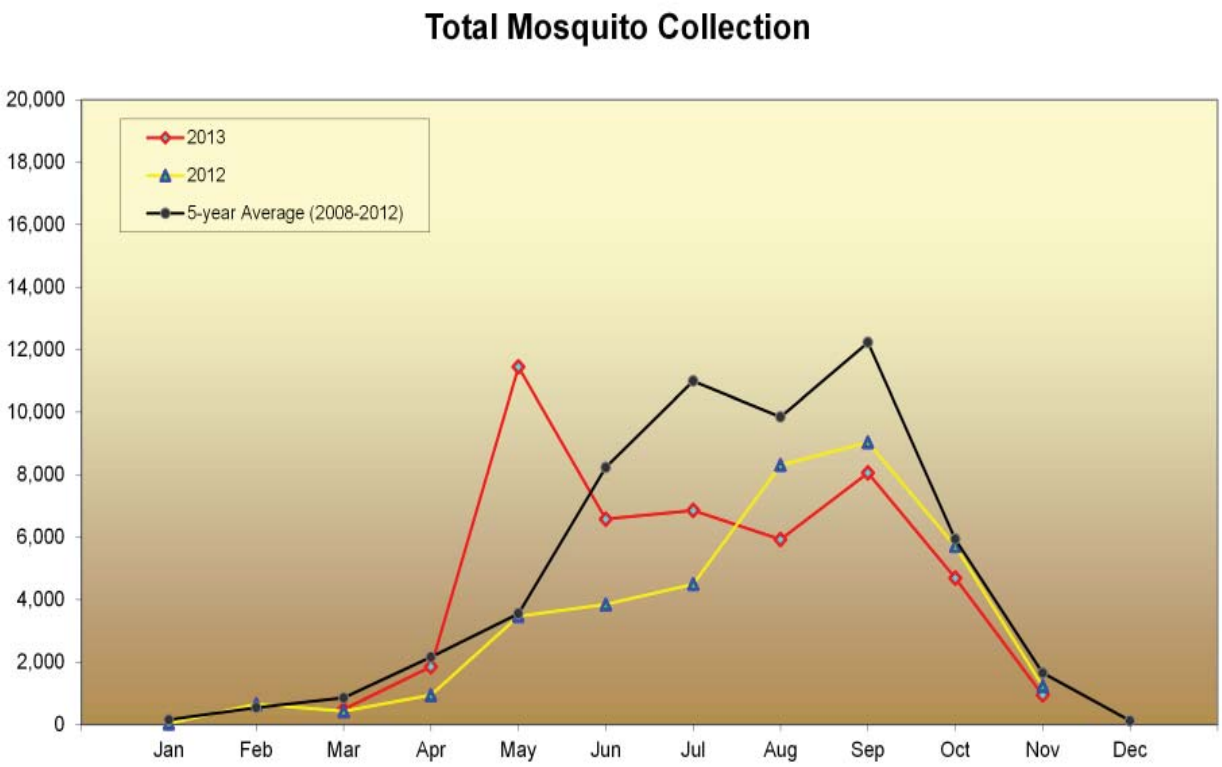
Mosquito Population Surveillance

Mechanical traps are used extensively throughout the District. Upon placement, the traps run for 24 hours prior to collection. Contents of the traps are analyzed each week. Each trap's contents indicate the population in a specific area along with information about the mosquito species distribution. The data are submitted to the California Vector Borne Disease Surveillance Gateway for compilation with other vector control agency data.

Encephalitis Virus Surveillance (EVS) Trap

Collected Mosquitoes from the (EVS) Trap

Dr. Shaoming Huang identifying mosquitoes



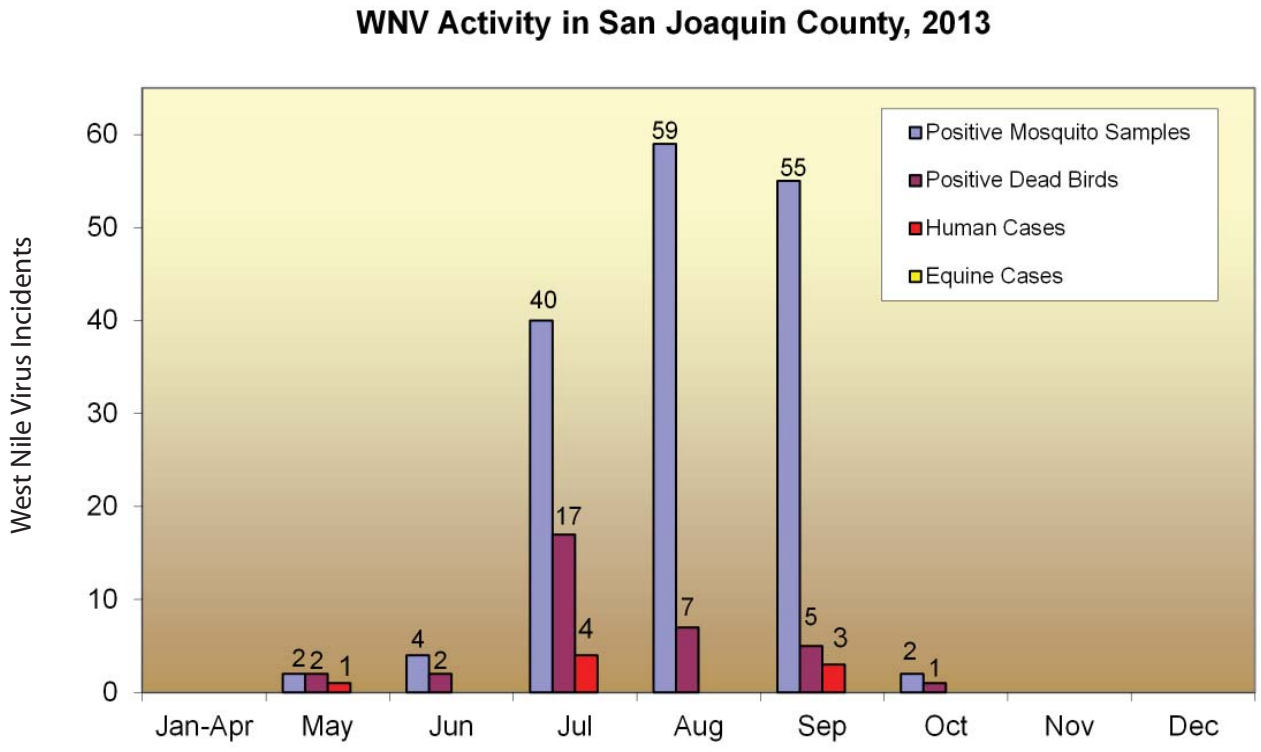
Mosquito-Borne Disease Surveillance

Following a strong West Nile virus (WNV) activity year in 2012, California experienced moderate WNV activity in 2013. There were 371 human cases with 14 fatalities in 2013 as comparison to 471 human cases and 18 fatalities in 2012. San Joaquin County experienced a similar trend in 2013 with 8 human cases reported, whereas 13 human cases were reported in 2012. Risk assessment showed that WNV activity in San Joaquin County reached epidemic planning levels in 2013, 2012, 2005-2008 and emergency levels in 2009-2011.

In combination with mosquito population surveillance, early detection of mosquito borne diseases is critical to developing an effective control response. Several surveillance methods are used to test for encephalitis viruses. These methods include testing wild birds (including dead birds) and groups of mosquitoes for viruses within their bodies.

The District collects mosquitoes in various types of traps to target specific mosquito species that are vectors of encephalitis viruses. The trap types are referred to as Encephalitis Virus Surveillance (EVS) traps and gravid traps. These collected mosquitoes are tested in groups of 5 - 50 for the presence of viruses. For 2013, there were 1,686 mosquito samples tested for diseases, resulting in 163 collections being positive for WNV. May of 2013 is the earliest month that WNV was detected in mosquitoes since the arrival of WNV in San Joaquin County in 2004.

The District received 426 dead bird reports from residents through the statewide WNV hotline (1-877-968-2473). The reports are used by the California Department of Public Health to create statewide risk maps. These maps assist the District in targeting areas for additional mosquito control efforts. The District tested 91 dead birds, of which 34 tested positive for recent WNV infections.



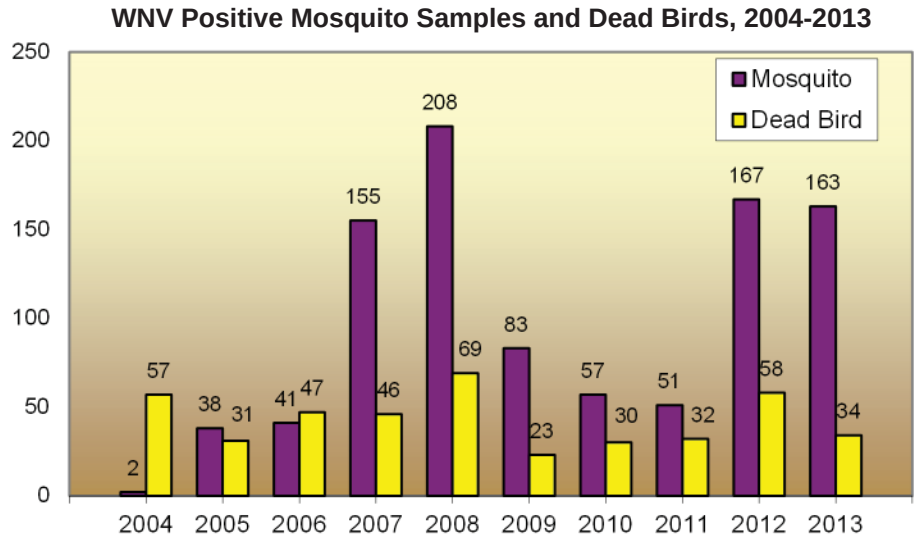
Mosquito-Borne Disease Surveillance

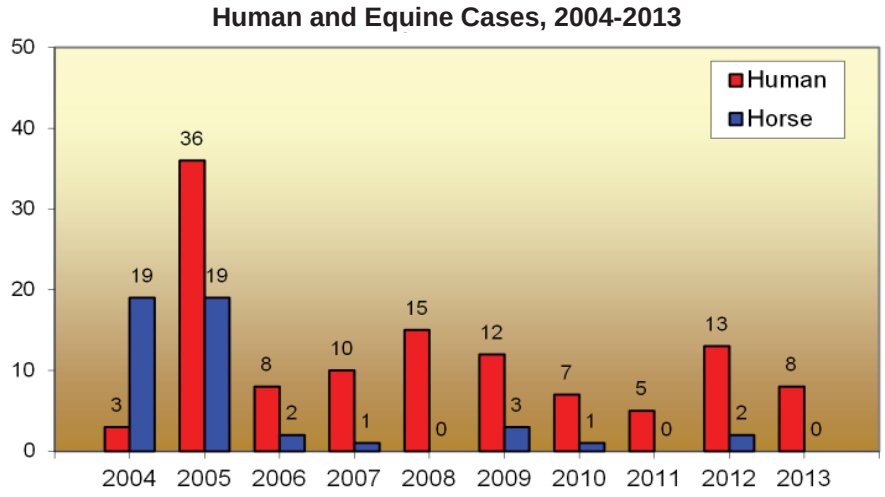
Summary of WNV Activity in San Joaquin County, 2004-2013

West Nile virus was first detected in San Joaquin County in 2004 with 3 human cases, followed by intensive amplification with 36 human cases and 19 horse cases in 2005. WNV activity subsequently decreased to relatively low to moderate levels. This pattern generally agrees with what has been seen nationally.

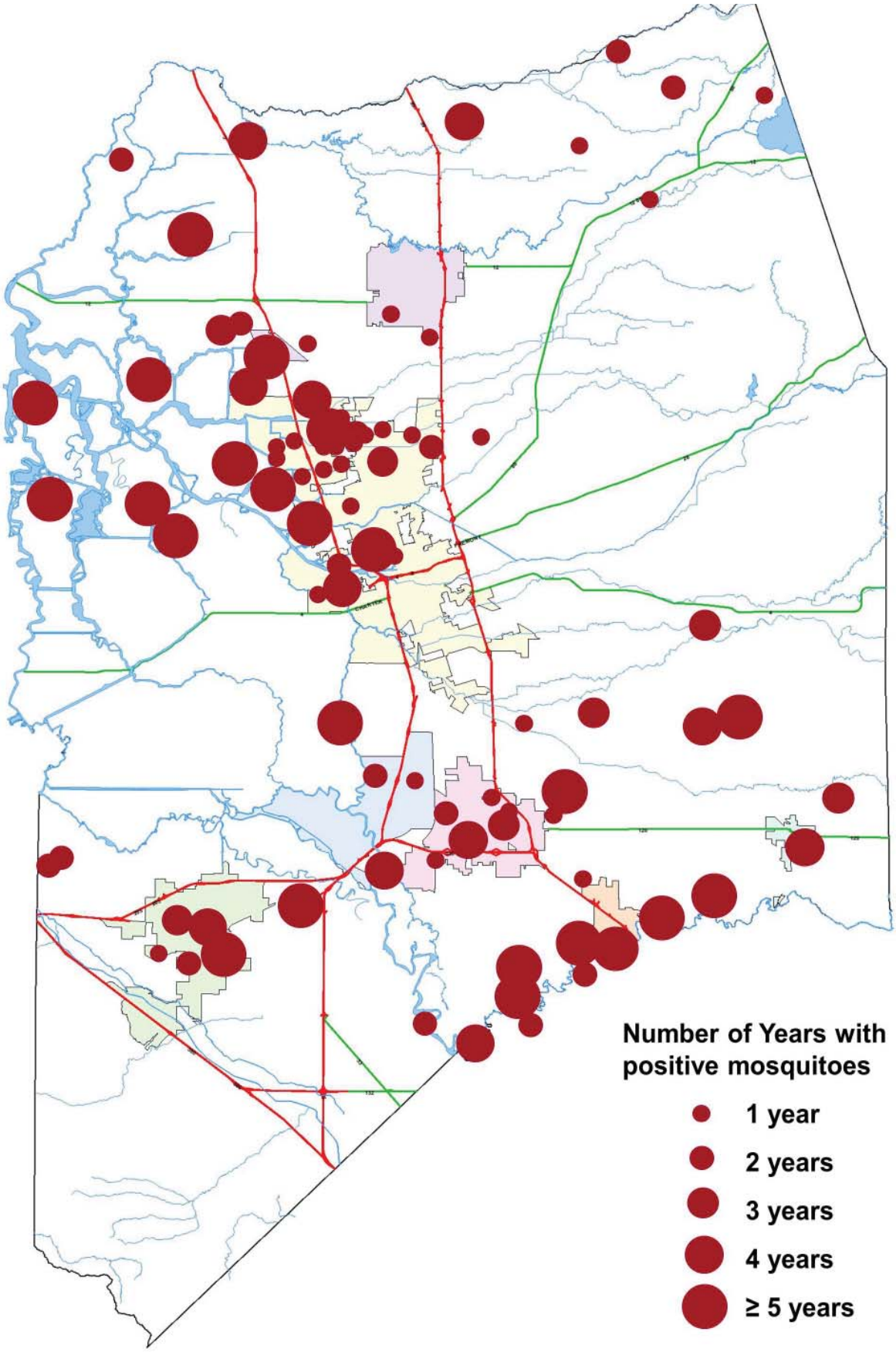
From 2004 to 2013, a total of 14,991 mosquito pools of nine mosquito species were tested by VecTestTM, RAMP® and/or RT-PCR. There were 975 positive mosquito pools (6.50%) that were of Cx. tarsalis (394), Cx. pipiens (570), Cx. erythrothorax (7) and Ae. vexans (4).

Geographic mapping indicate that hot zones of WNV activity in mosquitoes are located in the Delta area, north Stockton, Manteca, Tracy and our southern border. Dead birds and mosquitoes are earliest indicators of WNV activity in San Joaquin County. The District will continue to employ sensitive methods to monitor WNV activity in dead birds and mosquitoes.

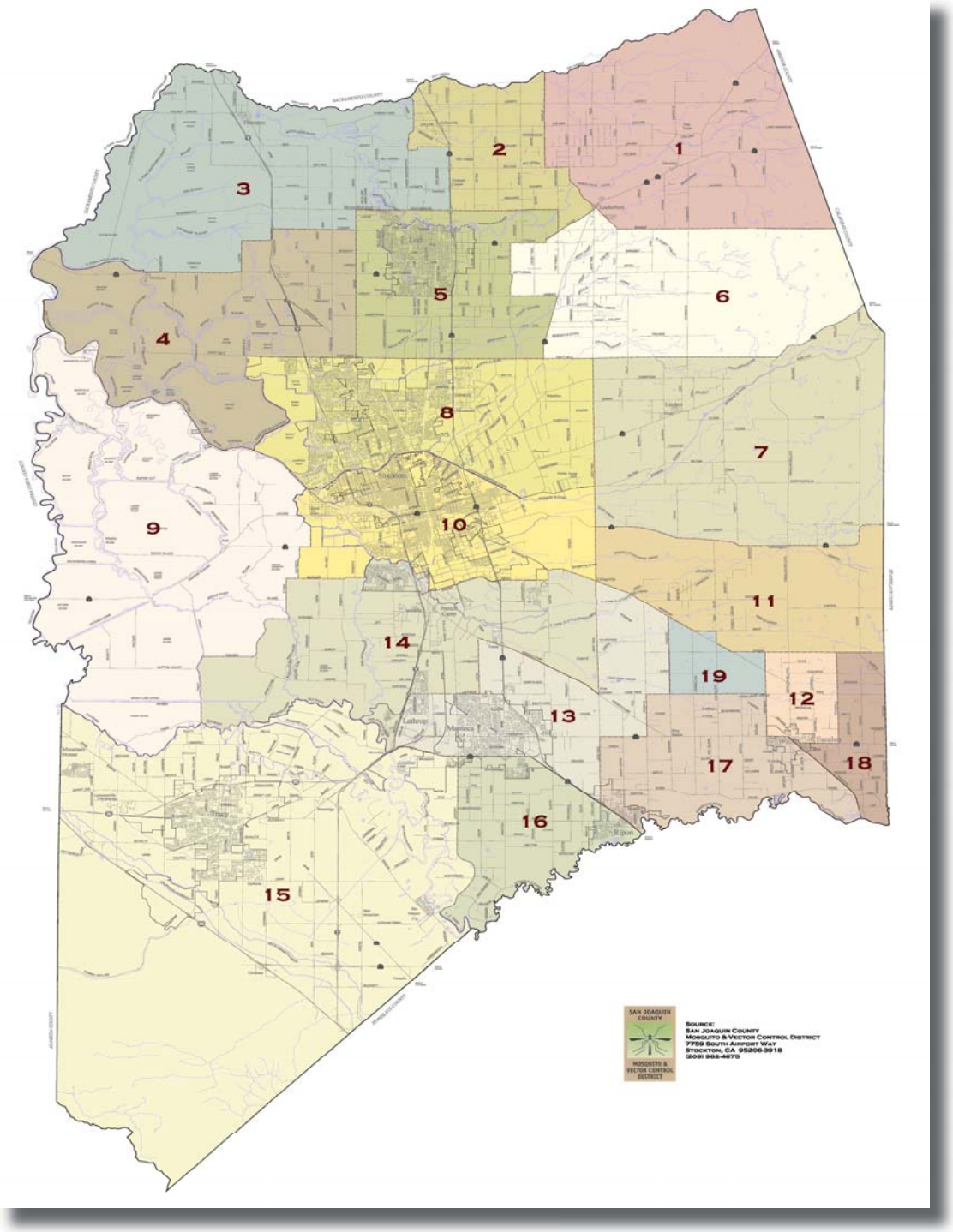




Geographic Distribution of WNV Activity in Mosquitoes
San Joaquin County 2004 - 2013



Operational Zone Map



The District is divided into 19 operational zones, each staffed with a state certified mosquito control technician. Zones are grouped into one of three regions under the direction of a regional supervisor. There are a total of 115 mosquito source types categorized by agricultural, natural, residential, and industrial/commercial sources. Examples include: field crops, animal waste ponds, irrigation ditches, natural drains, treeholes, containers, septic tanks, ornamental ponds, roadside ditches, railroad borrow pits, tires, storm water retention ponds, and catch basins.

Public Outreach

Public outreach promotes the physical control of mosquito development by teaching the life cycle of mosquitoes, water management and disease prevention. Through a strategy developed by the District, we consistently develop methods to reach the public with our messages. Through news releases, spray alerts, website posting, paid newspaper, radio and television ads, educational material distribution, and informational booths, we strive to respond to the public's demand of timely and accurate information.

Ag Venture Booth in Lodi

The landscape for mosquito control is a constantly changing environment as new technology and legislation challenges us to provide protection from mosquito borne illness. Communication is key in developing community support to reduce mosquito populations and the diseases they carry.

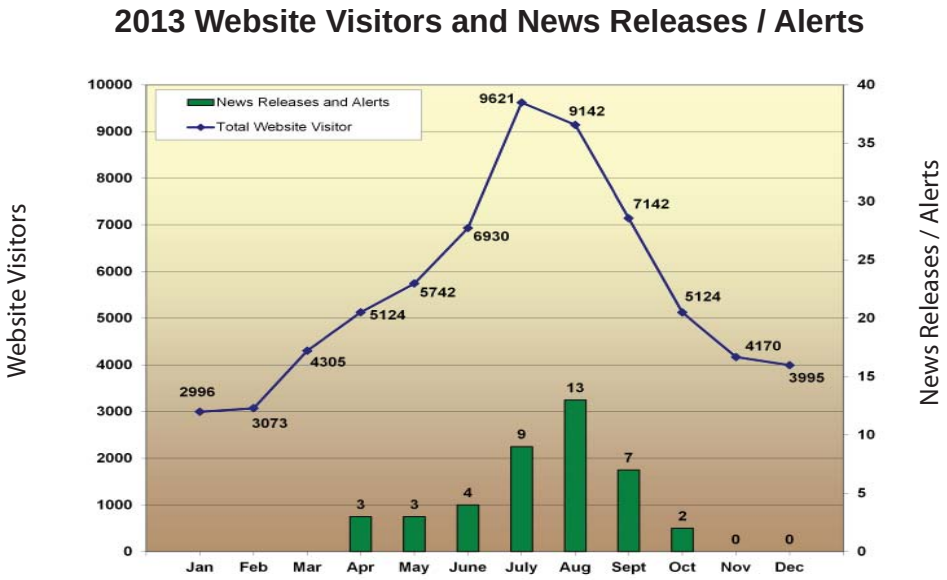
The information provided below is a synopsis of the public outreach efforts.

The District sent a total of 5 news releases and 35 news alerts. News releases include new information and news alerts inform the public of ongoing situations including West Nile virus activity or continued adult mosquito control operations. As a result, we interviewed 3 times with radio, 10 times with newspaper reporters and 8 times with television reporters.

Presentations:
- Fifth and sixth grade elementary students: 40 presentations with 72 classes in attendance
- Third grade students participating in the Ag Venture program: 42 presentations with 1146 students in attendance
- High school Future Farmers of America/Ag. Biology classes: 3 presentations on agricultural water management
- Other presentations provided by request included the following: California Association of Pest Control Advisors (CAPCA), Stockton Realtors Association, Lodi Parks and Recreation Department.

In additional to the above, the following are the most notable outreach activities that the District performed during 2013:
- 182 contacts were made during the District's fifth mosquitofish giveaway held throughout San Joaquin County.
- A large scale media campaign to increase mosquito awareness, educate individuals on West Nile Virus and encourage mosquito prevention around properties included radio, newspaper and television. Radio: 353 ads ran on KATM and 161 KHKK; 92. The radio ads were shared with Eastside and Turlock Mosquito Control Districts. Television commercials aired on KCRA 3 for a total of 569 commercials shared with Sac/Yolo and Placer Mosquito and Vector Control District.
- Educational Booths at: Earth Day, Senior Awareness Day at Micke Grove Park, Safety Day at Lodi Costco, Joe Serna's Charter School Health Fair, and San Joaquin County Fair, Lodi Grape Festival, and Ansel Adams Elementary school science night.

The District website is posted with all news releases and adult mosquito control news alerts. GovDelivery is designed to bring website users to the District's website, www.sjmosquito.org for further information. To the right is a line graph synopsis of the total visitors to the website and a bar graph showing the number of news releases and alerts sent by the District. The website had 67,364 total visitors for the entire year, which is a 17,000 visitor increase over 2012.



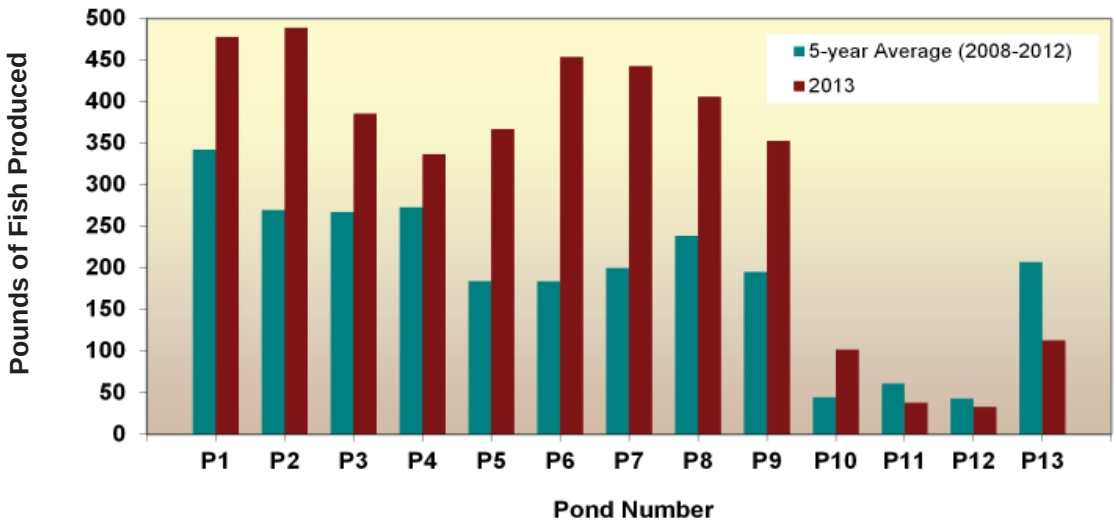
Biological Control

Biological mosquito control is one of the mainstays in protecting the public from mosquitoes and the transmission of mosquito-borne diseases. Biological mosquito control agents include a wide variety of pathogens, parasites and predators. The primary biological control agent used by the District is *Gambusia affinis*, the mosquitofish.

Mosquitofish are small live-bearing minnows closely related to the common guppy. These fish are a vivacious consumer of mosquito larvae and pupae and can survive in varying water temperatures. Because mosquitofish are surface feeders, they are extremely efficient mosquito predators. Mosquitofish have been said to consume upwards of 80-100 mosquito larvae per day, and are capable of quickly populating a source if conditions are favorable. The fish are placed in a variety of permanent and semi-permanent fresh water habitats such as neglected swimming pools, water troughs, rice fields, and wetlands.

The District's White Slough Fish Rearing Facility is located at the City of Lodi's waste water treatment plant. The facility consists of thirteen rearing ponds and four above ground tanks. The ponds are capable of rearing 3,500 - 4000 pounds of fish per year.

Mosquitofish Production



Mosquitofish Planting Sites / Pounds Planted

	Fish Origination Site	Island & Duck Club Flooding	Wildlife & Ecological Reserves	Sewers, Retention & Private Ponds	Rice Fields	Fish Ponds, Swim Pools, Water Troughs	Miscellaneous
2013	White Slough	1411.5 lbs.	258.5 lbs.	58.4 lbs.	365.4 lbs.	543 lbs.	377.9 lbs.
	Wild Fish	0 lbs.	0 lbs.	0 lbs.	0 lbs.	0 lbs.	0 lbs.
5 Yr. Avg. 2008-2012	White Slough	897.46 lbs.	273.38 lbs.	19.712 lbs.	383.22 lbs.	517.63 lbs.	207.5 lbs.
	Wild Fish	20.8 lbs.	1 lbs.	1.87 lbs.	1.5 lbs.	175 lbs.	14.1 lbs.

Physical Control

The term physical control refers to making an environmental or physical change to a mosquito-breeding source by physical or mechanical means. Physical control is also known as “source reduction”. Ultimately, physically changing the mosquito-breeding source can make the site less suitable for mosquito production.

Landowners and land managers have a responsibility to minimize mosquito production on their lands and play a key role in reducing mosquito populations throughout the District. The implementation of mosquito prevention Best Management Practices (BMPs) can reduce or eliminate the ability of aquatic sites of producing mosquitoes. BMPs are defined as actions landowners can take to reduce or eliminate mosquito production from water sources on their property in an environmentally and fiscally responsible manner, and to reduce the potential for transmission of disease from mosquitoes to humans.

In 2012, the California Department of Public Health and the Mosquito and Vector Control Association of California updated a manual of BMPs titled “BEST MANAGEMENT PRACTICES FOR MOSQUITO CONTROL IN CALIFORNIA” (http://www.westnile.ca.gov/resources.php), which has been adopted by the District and is used as the standard set of recommendations for property owners to reduce or eliminate mosquito breeding sources on their property.

Each mosquito breeding source and property is unique, and the BMPs listed in this manual will apply to some properties, but not others. After evaluating their property, the District works with the landowner to implement applicable BMPs to reduce or prevent future mosquito breeding as well as to manage existing mosquitoes at that site.

Mosquito Control Best Management Practices At-A-Glance:

- Eliminate artificial mosquito sources.
- Ensure man-made temporary sources of surface water drain within four days (96 hours) to prevent development of adult mosquitoes.
- Control plant growth in ponds, ditches, and shallow wetlands.
- Design facilities and water conveyance and/or holding structures to minimize the potential for producing mosquitoes.

Clearing weeds from a municipal drain improves water flow and decreases mosquito habitat.

Chemical Control

Chemical control of mosquitoes is the application of natural or man-made compounds (insecticides) to reduce mosquito populations to tolerable levels. Chemical control methods are applied to obtain immediate control when physical and biological control methods fail to maintain mosquito numbers below a tolerable level or during an epidemic of mosquito-borne disease when immediate control measures are needed.

The District follows accepted principles of proper pesticide usage which includes: 1) Using pesticides as a last resort to complement biological, physical or natural controls; 2) Applying pesticides in a manner that minimizes harm to non-target organisms; 3) Using pesticides to treat specific sites where mosquitoes (which are causing annoyance or creating a public health problem) are breeding; 4) Applying pesticides selectively to the proper life stage of the mosquito; 5) Applying pesticides in a manner that will minimize personal hazard to the applicator and other persons in the vicinity; 6) Applying pesticides in accordance with federal and state laws and regulations.

The District is signatory to a National Pollution Discharge Elimination System (NPDES) permit for applications of larvicides to surface waters. The permit is granted by the State Water Resources Control Board, which reviews the District's mosquito control activities in local waterways.

Larvicides may be applied to water in which larvae or pupae are developing. Pastures, septic tanks, irrigation ditches, animal waste ponds, creeks, sloughs, catch basins, and roadside ditches are examples of areas the District's technicians regularly inspect and treat to reduce mosquito populations.

Adulticides may be applied as space sprays, mists, or fogs to kill adult mosquitoes and as a residual insecticide on surfaces likely to be contacted by adult mosquitoes.

Herbicides are used to reduce mosquito habitat and provide better access for larvicide treatment, and biological control.

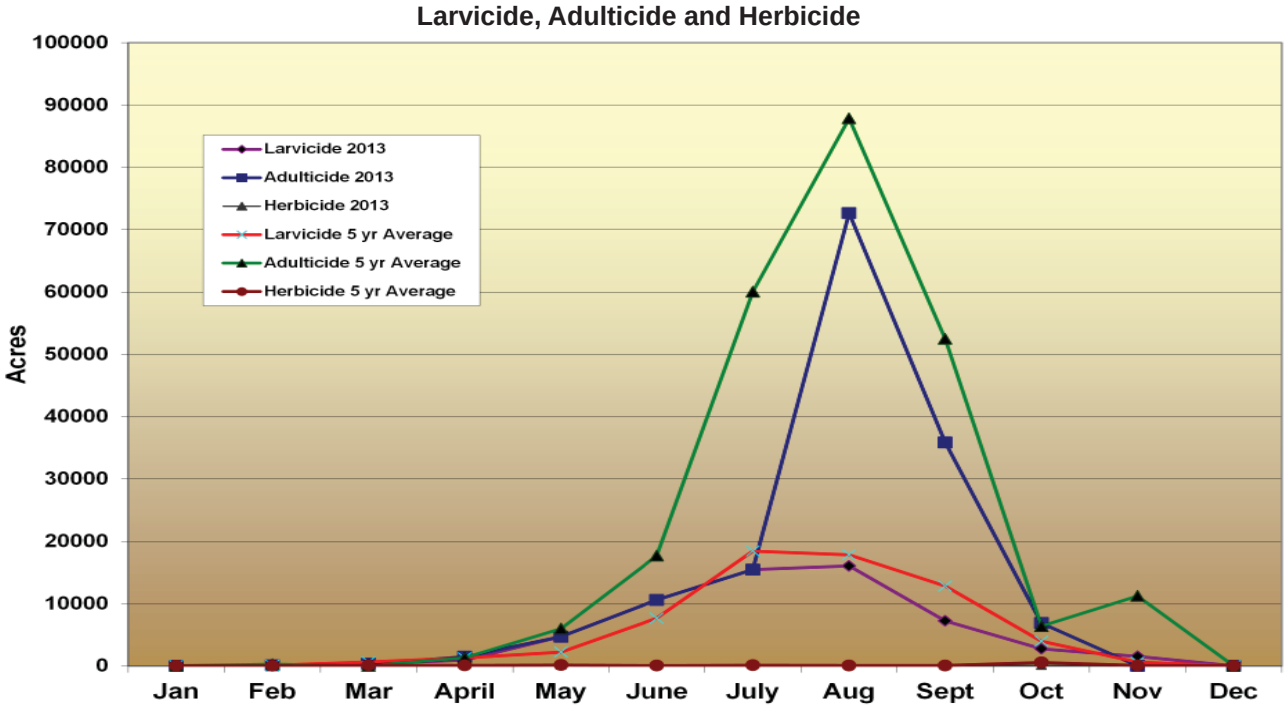
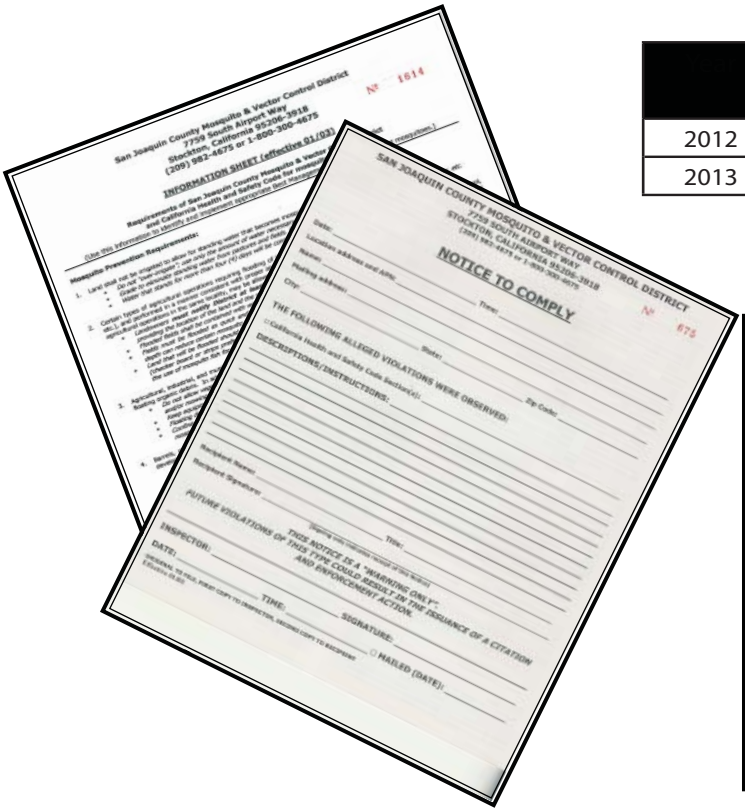


Table is in acres treated	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Larvicide 2013	2	91	341	926	4696	10591	15443	16037	7228	2747	1536	6
Larvicide 5 yr. avg.	34	93	632	1278	2209	7646	18423	17835	12805	3962	593	19
Adulticide 2013	2	91	341	1481	4696	10591	15443	72643	35842	6872	2	0
Adulticide 5 yr. avg.	13	275	3	1313	5974	17686	60026	87840	52469	6384	11229	1
Herbicide 2013	8	57	126	148	79	77	227	73	44	70	5	11
Herbicide 5 yr. avg.	25	17	114	84	135	49	108	68	68	559	59	44

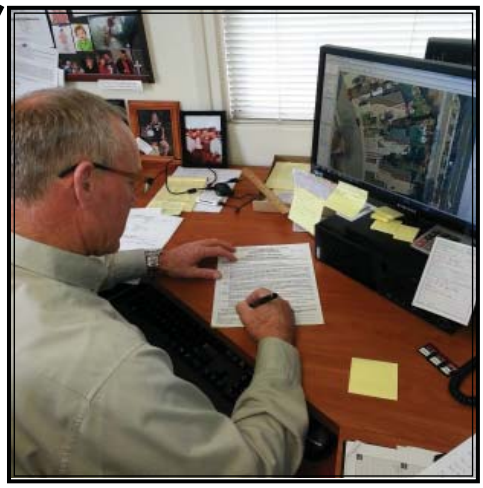
Legal Abatement

The District incorporates local, state and federal statues to regulate excessive mosquito breeding on private and public lands. Using provisions of the California Health and Safety Code, the District can legally require property owners to reduce or eliminate mosquito breeding when it becomes a public nuisance.

Abatement of mosquitoes generally follows a three step process, whereby the owner of mosquito-producing land is: 1) contacted and requested to take steps to prevent the occurrence of mosquito development and provided an "Information Sheet", 2) if corrections do not take place, a "Notice to Comply" is issued, and 3) if the condition persists, and the problem is not corrected, the District can initiate legal abatement proceedings per §2060 of the California Health and Safety Code.



	Information Sheet	Notice to Comply	Citation
2012	48	4	0
2013	39	5	0



Mosquito Control Supervisor Brain Heine completing a "Information Sheet"

The District provided mosquito prevention Best Management Practices (BMPs) handouts for the reduction of mosquitoes to residential, agricultural, commercial, and industrial property owners. The following handout is available from the District: *Best Management Practices for Mosquito Control in California - 2012

* *Many are provided during routine inspections, visitors to the District's Office, and during presentations and District events.*

Ticks & Tick Borne Disease

The most common ticks found in San Joaquin County are: the American dog tick, *Demacentor variabilis*; the Pacific Coast tick, *Demacentor occidentalis*; and the Brown dog tick, *Rhipicephalus sanguineus*. The Pacific Coast tick is one of the most widely distributed ticks in California. Occasionally, the Western black legged tick, *Ixodes pacificus* is also found in the County.

The District conducts surveillance for ticks in parks and river areas of the County that are known habitats. Surveillance for adult ticks is typically performed during the months of November through April when ticks are most abundant. *Ixodes pacificus* is the primary species targeted during surveillance due to its ability to carry Lyme disease. During the year, surveillance was conducted mainly along waterways and riparian areas. Ticks may be submitted by local veterinary hospitals and the general public for identification. One hundred and thirty-seven ticks were received from local veterinarian offices for identification.

Lyme disease is a serious illness that if left untreated, can have severe long term complications. Initial symptoms of Lyme disease may include a spreading rash which may be accompanied by fever, aches and fatigue. Possible future complications of the heart and/or nervous system may occur, as well as severe arthritis.

Tick Surveillance Data

Tick Surveillance Site / Species	Ixodes pacificus		Demacentor variabilis		Demacentor occidentalis		Rhipicephalus sanguineus		Total	
	female	male	female	male	female	male	female	male	female	male
Camanche Spillway	0	0	0	0	0	0	0	0	0	0
Camanche Reservoir	0	0	0	0	0	0	0	0	0	0
Carnegie Off Road Park	0	0	0	0	4	8	0	0	4	8
Honda Trails/Stouffer Park (Ripon)	0	0	0	0	0	0	0	0	1	0
Lodi Lake	0	0	0	0	0	0	0	0	0	0
Oak Grove Park	0	0	1	0	0	0	0	0	0	0
Mountain House Nature Trail	0	0	0	0	0	0	0	0	0	0

Ticks adhere to the felt flag. A historical record of the location, date and species are recorded. If the tick is a Western black legged tick, it will be tested for Lyme.

Ixodes pacificus
Western Black-legged Tick

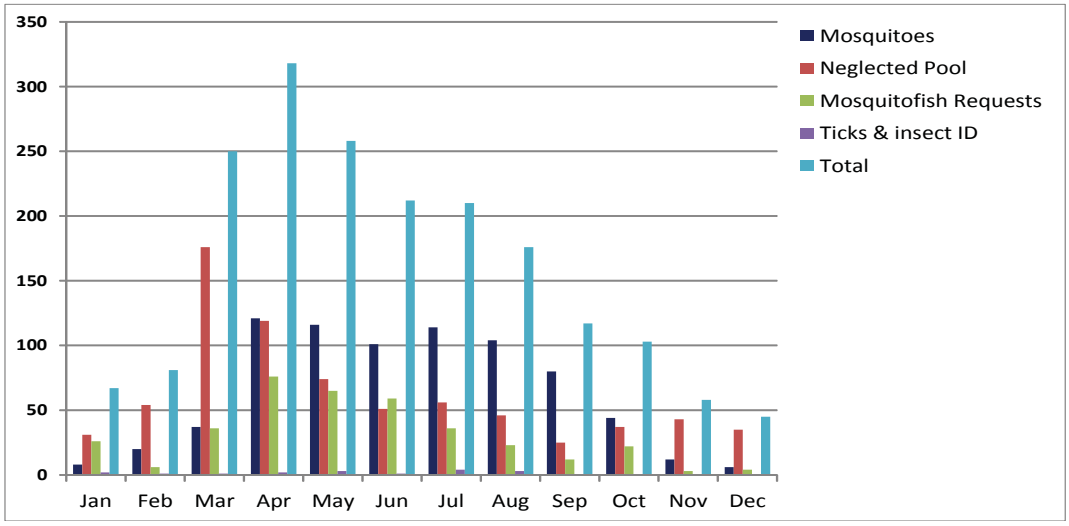
Appendix

Request for Service

The general public is encouraged to contact the District to request service. These requests generally are either to report a mosquito-related problem, request mosquitofish, inquire about information on ticks, insect/ vector identification, or to request a property inspection. There is no charge for these services. San Joaquin County residents can call the District at (209) 982-4675 or 1-800-300-4675 or request service at the District's web site www.sjmosquito.org. The District usually is able to respond within 24 to 48 hours. During the year the District responded to 1895 service request calls.

	Mosquitoes		Ticks / Other		Fish		Property Inspection (Pools)	
	2013	2012	2013	2012	2013	2012	2013	2012
January	8	8	2	0	26	3	31	71
February	20	24	1	1	6	15	54	101
March	37	15	1	6	36	69	176	140
April	121	51	2	11	76	35	119	162
May	116	122	3	18	65	85	74	139
June	101	139	1	3	59	200	51	112
July	114	116	4	6	36	60	56	74
August	104	147	3	4	23	48	46	100
September	80	127	0	4	12	19	25	62
October	44	59	0	0	22	17	37	38
November	12	11	0	0	3	6	43	73
December	6	11	0	0	4	0	35	118
Total	763	830	17	17	368	557	747	1190

2013 Service Request Distribution



Financial

SAN JOAQUIN COUNTY MOSQUITO AND VECTOR CONTROL DISTRICT

Statement of Revenues, Expenditures and Changes in Fund Balance - Governmental Funds

For the year ended June 30, 2013

	General Funds
Revenues	
Property taxes	$ 3,698,005
Property assessments	2,827,244
Reimbursements and rebates	157,072
Investment income	16,395
Other revenues	14,929
Total revenues	6,713,645
Expenditures	
Operating	
Salaries and benefits	3,546,724
Services and supplies	3,178,717
Capital outlay	100,720
Total expenditures	6,826,161
Excess (deficiency) of revenues over expenditures	(112,516)
Fund balance, beginning of year	10,521,361
Fund balance, end of year	**$10,408,845**

District Staff

District Staff	Position	Years of service as of December 31, 2013
Anderson, Tiffany	Mosquito Control Technician I	9
Andres, Scott	Mosquito Control Technician II	29
Azevedo, Steve	Mosquito Control Technician I	18
Bennett, Morgan	Mosquito Control Technician I	9
Capuccini, Richard	Mosquito Control Technician I	30
Corrales, Michael Jr.	Mosquito Control Technician I	5
De La Vega, Sumiko	Laboratory Technician II / Microbiologist	1
Devencenzi, Aaron	Public Information Officer	19
Duke, Steve	Mosquito Control Technician I	7
Durham, Janine	Mosquito Control Technician I	8
Durham, Robert	Mosquito Control Supervisor	27
Edwards, Greg	Mosquito Control Technician I	7
Fritz, John	Assistant Manager	1
Heine, Brian	Mosquito Control Supervisor	30
Hiers, Chris	Mosquito Control Technician I	6
Hopkins, Deanna	Mosquito Control Technician II	14
Hopkins, Norm	Mosquito Control Technician I	9
Huang, Shaoming	Entomologist	4
Iverson, Mary	Laboratory Technician I	16
Jucutan, Martin	Mosquito Control Technician I	1
Keith, Dennis	Mosquito Control Technician I	29
Lucchesi, Ed	Manager	28
Meidinger, Don	Mosquito Control Technician II	38
Moniz, John	Mechanic I	4
Morgan, Michelle	Secretary	5
Mortenson, Fred	Mosquito Control Technician I	31
Nicholas, Emily	Bookkeeper / Administrative Assistant	11
Nienhuis, Keith	Mosquito Control Supervisor	26
Nolin, Larry	Mosquito Control Technician I	29
Pfeifer, Roy	Mosquito Control Technician I	15
Pope, Emily	Mosquito Control Technician I	4
Ryan, Ted	Fish Hatchery Assistant	2
Sarale, Joseph	Mosquito Control Technician I	6
Smith, David	Assistant Entomologist	8
Vana, David	Mechanic II	18
Vignolo, John	Fish Facility Manager	24

SAN JOAQUIN COUNTY
MOSQUITO
& VECTOR
CONTROL DISTRICT

Protection Through Prevention

7759 S. Airport Way
Stockton, CA 95206

209.982.4675 or
1.800.300.4675

www.sjmosquito.org