

# COACHELLA VALLEY

## Mosquito & Vector Control District



# 2019 Annual Report



# Coachella Valley Mosquito & Vector Control District

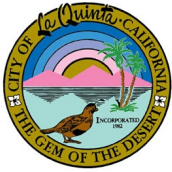
## 2019 Trustees of the Board

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Left to Right: Isaiah Hagerman, Benjamin Guitron IV, Clive Weightman, Gary Gardner, Franz De Klotz, Doug Walker, Dr. Doug Kunz, Bito Larson, Sergio Espericueta, Doug Hassett (Philip Bautista not pictured).



### OUR MISSION

We are dedicated to enhancing the quality of life for our community by providing effective and environmentally sound vector control and vector-borne disease prevention programs.

### OUR VISION

To progress towards a future free of vector-borne disease using proven scientific, technical, and educational strategies, which are financially and environmentally sound.

Dear Stakeholders,

2019 marked an unprecedented year for West Nile and St. Louis encephalitis virus activity in the Coachella Valley. District staff demonstrated their professionalism, skill, and dedication through strategic and responsive surveillance, control, and outreach to successfully reduce the risk of arbovirus transmission to Valley residents and visitors. The District's long commitment to innovation, research, and the development of science based strategies and programs proved invaluable in 2019. The following annual report is a testament to the long hours and hard work accomplished by staff that focused not only controlling mosquitoes but also the many accomplishments that were made to reach our mission in the Coachella Valley protecting residents and visitors from all vector and vector-borne diseases.

The invasive *Aedes aegypti* mosquito continued to expand and disperse throughout the Valley. While conducting over 11,000 property inspections for *Aedes aegypti* sources, our vector control technicians found countless water holding containers with the potential to breed these mosquitoes when not properly maintained by the property owner.

I implore you to remember your personal responsibility protecting your neighborhood and family from this invasive mosquito. While the District continues to expand our efforts and explore new and innovative ways to survey and control this mosquito, each of us must make eliminating breeding sources as routine as buckling up when we get in our cars. If we all do our part and empty containers, scrub the waterline to remove eggs, and properly maintain pools and fountains weekly, we still have the opportunity to reduce and even eliminate mosquitoes from our neighborhoods and communities.

2019 also marked another year of the District's commitment to fiduciary responsibility. This was done through the adoption of a balanced budget, receiving its 11<sup>th</sup> Certificate for Achievement in Excellence in Financial Reporting and earning an outstanding audit for the FY 2018-19.

It is with great pride that I present to you this 2019 annual report, highlighting the outstanding contributions and accomplishments the District's dedicated staff achieved while fulfilling the District's mission to provide effective and environmentally sound vector control and prevention programs throughout the Coachella Valley.

Respectfully,

***Jeremy Wittie, MS***

General Manager

# Mosquito Facts

**1,095,440**

The number of adult mosquitoes in one pound

**2,700** species of mosquitoes worldwide

**56** species in California

**13** species regularly detected in the Coachella Valley

Adult female mosquitoes can live **2-3 weeks**

## 2019 numbers in the Coachella Valley

**4,688** requests for service to individual homes

Calls for service regarding the invasive *Aedes aegypti* first detected in 2016 now total **40.9%** of all requests.

When compared to the most recent 5 year average, virus-positive mosquito pools increased by **428%**

## EPA recommended repellent



In **1957** DEET was developed by the U.S. Department of Agriculture and was registered for use by the general public. Since then over **20,000** compounds have been tested and **none** of them have surpassed DEET for effectiveness or duration of protection.



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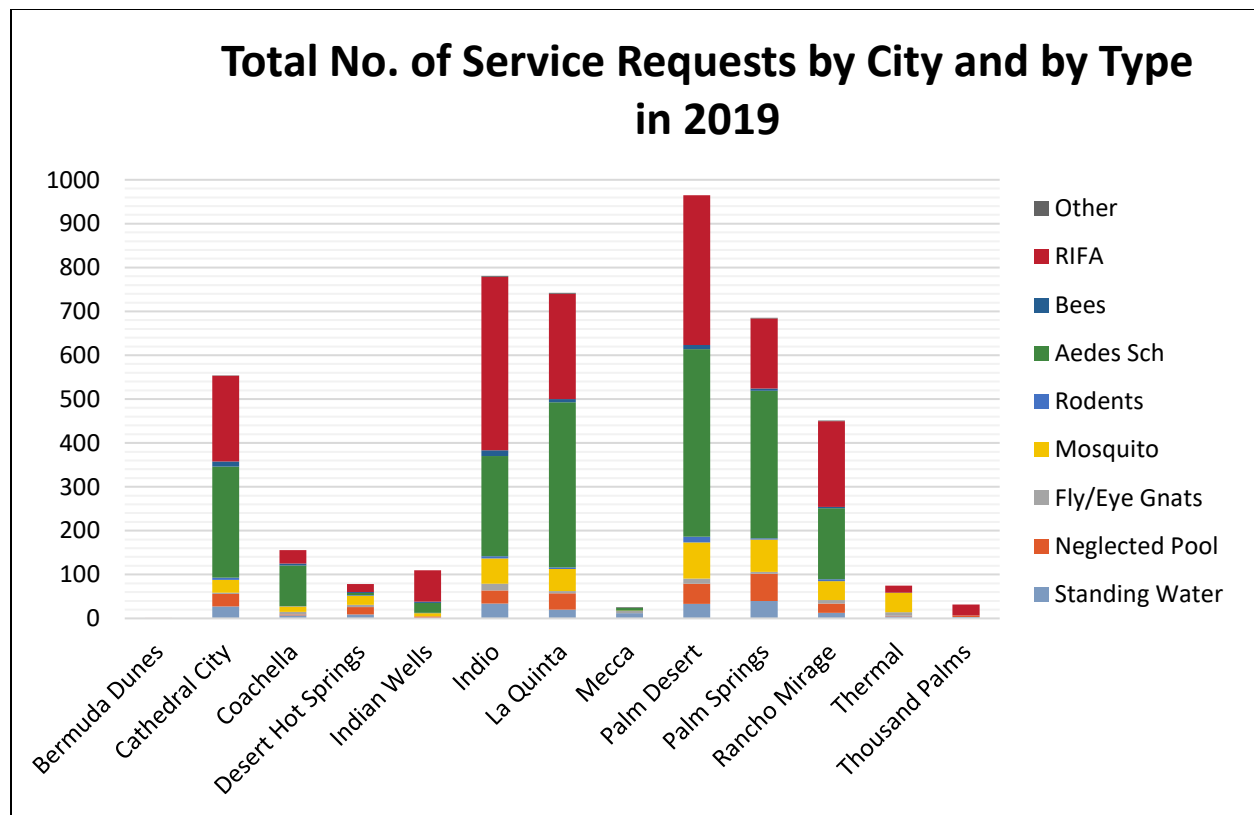
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## INTEGRATED VECTOR MANAGEMENT PROGRAM

The District’s Integrated Vector Management (IVM) program and the Invasive Mosquito Species Response Plan provide guidance to District staff in effectively targeting areas with evidence of virus-infected mosquitoes for immediate control. The public health threats were limited to *Culex*-transmitted viruses such as West Nile virus (WNV) and Saint Louis encephalitis virus (SLEV), as well as arboviruses (viruses transmitted by mosquitoes and other insects) associated with invasive *Aedes aegypti* mosquitoes.

### Service Requests

The District responds to thousands of phone calls and emails from Coachella Valley residents and visitors requesting service or information on red imported fire ants (RIFA), local and invasive mosquitoes, and other pestiferous species. Approximately 4,700 of those requests received inspections by the District’s Vector Control Technicians in 2019. These service requests were 74% higher than in 2018 due to the increase in Invasive *Aedes* service request calls. The cities with most of the service requests included Palm Desert, Indio, La Quinta, and Palm Springs, together equaling 68% of total requests for service in the Coachella Valley.



### Mosquitoes

There are 13 mosquito species detected in Coachella Valley; three of these *Culex tarsalis* (the western encephalitis mosquito), *Culex quinquefasciatus* (the southern house mosquito), and *Aedes aegypti* (the yellow fever mosquito), are considered important vectors of arboviruses. In 2019, the District detected record level West Nile positive virus samples and St. Louis encephalitis positive virus samples. The District detected higher numbers of adult mosquitoes for all vector species compared



to the 5-year average (Figures 3 and 5). As Table 1 summarizes, there was an increase in trapping and testing over the past four years.

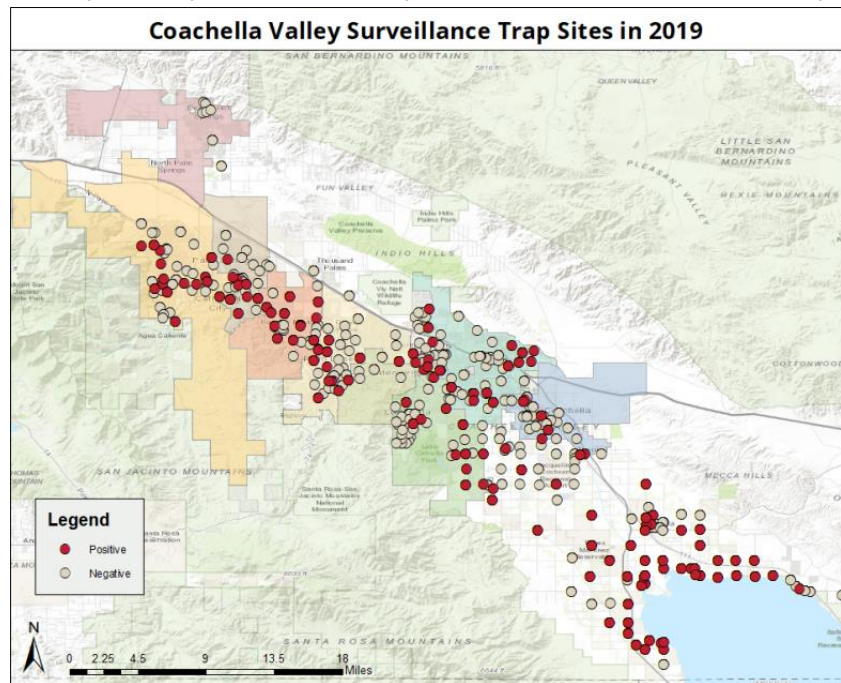
**Table 1.**

Summary of Arbovirus Surveillance in <i>Culex</i> mosquitoes in the Coachella Valley in 2014-2019							
		2014	2015	2016	2017	2018	2019
<b>Female Mosquito Samples</b> ( <i>Culex quinquefasciatus</i> and <i>Culex tarsalis</i> )	Samples tested	2,130	3,903	2,814	5,148	4,337	6,168
	# of mosquitoes	70,884	112,248	66,893	154,510	140,529	218,342
	<b>WNV positive</b>	<b>67</b>	<b>99</b>	<b>19</b>	<b>120</b>	<b>24</b>	<b>513</b>
	<b>SLEV positive</b>	<b>0</b>	<b>37</b>	<b>92</b>	<b>23</b>	<b>56</b>	<b>105</b>

In 2019, the District faced three main challenges. The first was twin foci of sustained presence of WNV in Palm Springs and in the eastern valley, along with regular detections throughout the valley. The second was sustained SLEV presence in the eastern valley. Finally, the District continued to detect the invasive mosquito, *Aedes aegypti* throughout the valley now in all cities. There were no reported cases of people contracting viruses that can be vectored by *Aedes* (such as Zika, dengue, and chikungunya) in the valley or any local transmission of those viruses in California.

**Mosquito Surveillance**

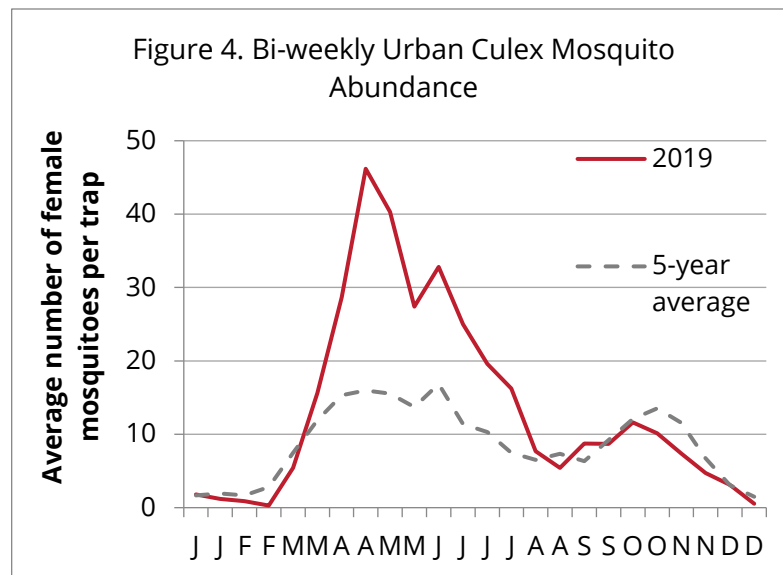
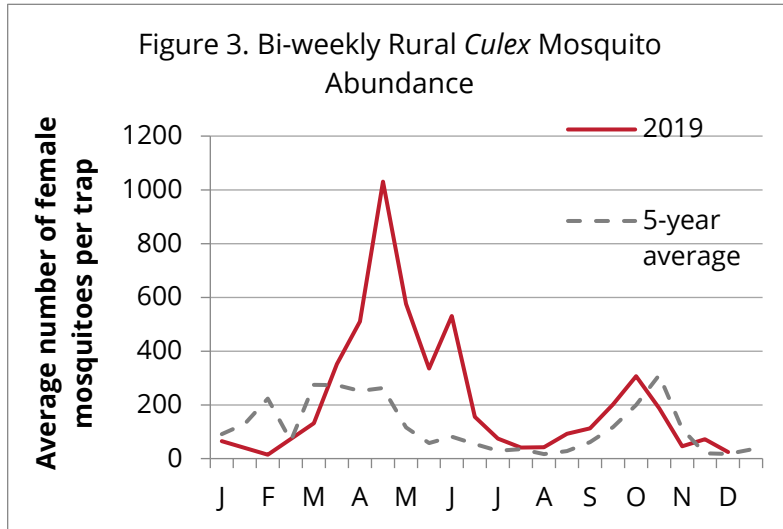
The District uses different types of traps to capture adult mosquitoes. Carbon dioxide (CO<sub>2</sub>) traps (attracting female mosquitoes looking to bite) and gravid traps (attracting egg-bearing mosquitoes) are used to detect *Culex* mosquitoes. To target *Aedes aegypti* mosquitoes, BG traps attract biting mosquitoes while AGO traps attract egg-bearing mosquitoes. The mosquitoes collected in these traps are used to provide population abundance data and for arbovirus surveillance. Mosquito counts from traps are compared with the average abundance of the five preceding years to help determine the risk levels of arbovirus transmission.



The District’s operational effort to control mosquitoes is in large part directed by the distribution of the mosquito population as determined by our surveillance program. In 2019, our District collected more than 620,000 adult mosquitoes as part of our surveillance efforts.

## Rural Zones

The rural habitat of the Coachella Valley includes areas south and east of the incorporated cities comprised of a variety of land types such as farmlands, wetlands, small residential areas, desert, and the Salton Sea shoreline. In 2019, the District set carbon dioxide (CO<sub>2</sub>) traps at 61 locations and gravid traps at 5 locations in rural habitats of the District. These traps collected a total of 413,526 mosquitoes. CO<sub>2</sub> traps are effective at capturing most of the mosquitoes in the Coachella Valley including *Cx. tarsalis*, the most abundant and important vector of WNV in the rural areas. **Figure 3** displays how the population of the *Cx. tarsalis* and *Cx. quinquefasciatus* varied over 2019 in the rural areas compared to the previous 5-year average. **Figure 5** is the species composition in the mosquitoes collected from the rural zones.



effective and specific to collecting *Cx. quinquefasciatus* mosquitoes, the most abundant vector of WNV in urban areas of the District. **Figure 4** displays how the population of the *Cx. tarsalis* and *Cx. quinquefasciatus* varied over 2019 in the urban areas compared to the previous 5-year average. **Figure 6** is the species composition in the mosquitoes collected from the urban zones.

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## Urban Zones

The urban zones of the District include the cities from Palm Springs and Desert Hot Springs in the north and west to La Quinta, Indio, and Coachella in the south and east. In 2015, the District greatly increased the number of traps and trap sites in the urban areas going from 29 traps at 22 locations to 96 traps at 48 locations. These urban traps collected a total of 131,557 mosquitoes. Gravid traps are used more heavily in the urban areas as they are

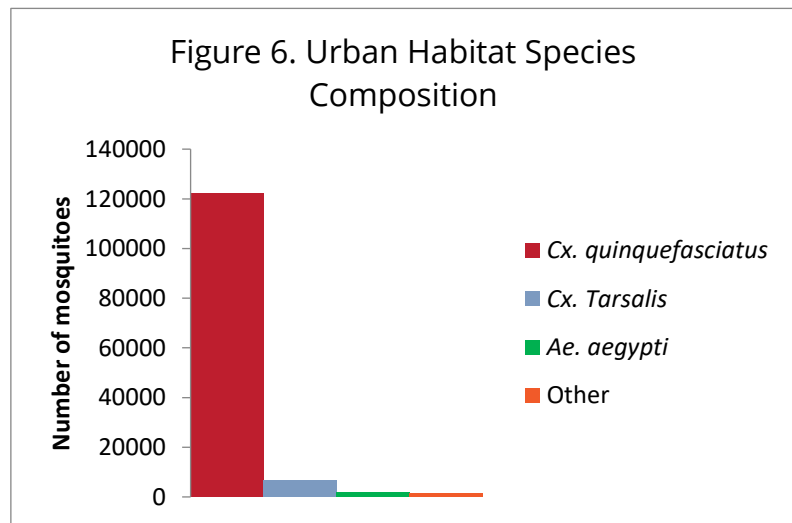
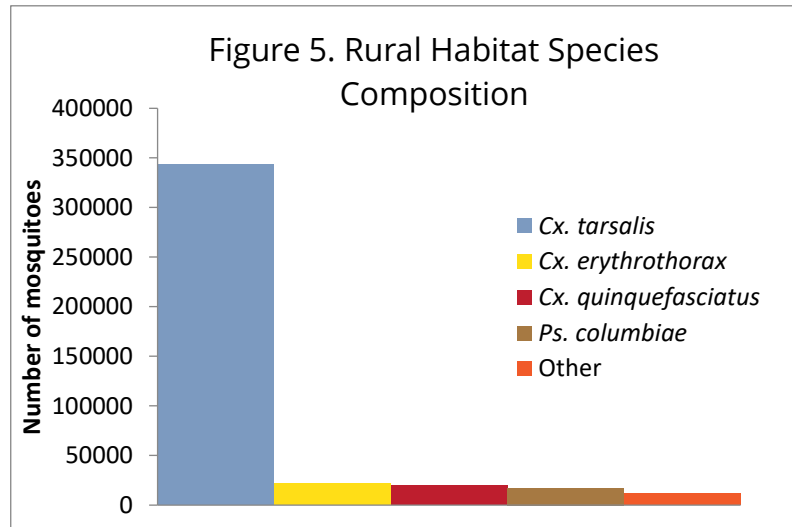


## Arbovirus Distribution

In 2019, WNV was detected most abundantly at the western and eastern ends of the District with additional samples detected throughout the Valley. In May, samples were found to be positive in Indio, Coachella, Thermal, Palm Springs, Mecca, and Northshore. In June and July, detections peaked, with additional detections in Rancho Mirage, Bermuda Dunes, La Quinta, Palm Desert, Oasis, and Cathedral City. Detections continued in August and September, with more positive samples in Palm Springs, Mecca, Oasis, and Thermal and a few in La Quinta, Rancho Mirage, Cathedral City, and Indian Wells. The final WNV positive sample was detected in October from Mecca.

SLEV was more abundant in 2019 than it was in 2018. The first positive sample was detected in the middle of June in Oasis, two weeks earlier than the previous year. Samples were then detected routinely in Oasis until September and in Mecca until November, with the peak of activity in September. Positive SLEV samples were also detected in Thermal (July – October); Indian Wells (September); and Coachella and Northshore (October).

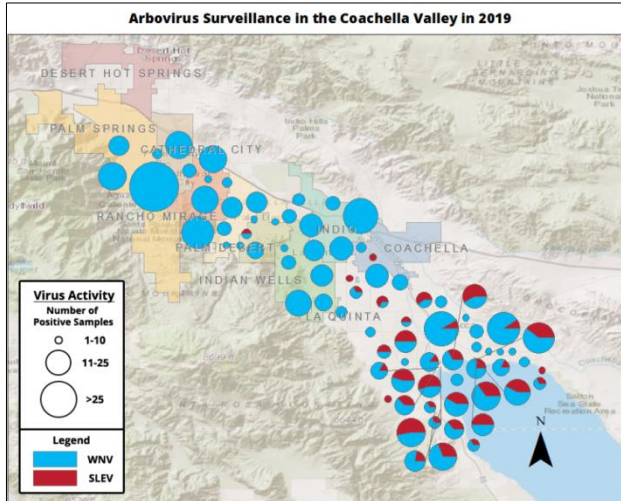
Response to virus included setting an additional 774 traps at 260 locations throughout the season.



Riverside County Department of Public Health reported 8 human cases of WNV infection of residents within the Coachella Valley, which is the highest number of cases since the virus was detected in 2003. Overall, there were fewer human cases in Riverside County (15) than in 2018 (19), which is much lower than the numbers in 2015 (138 cases and 6 deaths). During the period of increased virus activity, the risk level for the area was at epidemic conditions. The District responded with elevated surveillance and control efforts with the objective to prevent further amplification of the virus and potential spreading to neighboring areas. There were no human cases of SLEV infections detected in Riverside County.

## Sequential Trap Project

The rotator or sequential trap is important for determining peak mosquito activity of host-seeking mosquitoes. We typically use the sequential trap prior to using adulticides to decide the best time for treatments. We set a sequential trap along with a weather station on a weekly basis, starting in

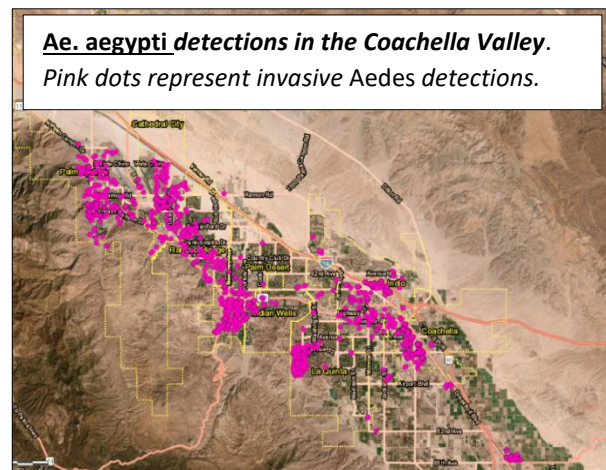


July 2018, to collect mosquitoes from an hour before sunset to an hour after sunrise the following day. Of the 7 different species of mosquitoes collected, the primary species were *Culex tarsalis* and *Psorophora columbiae*. Generally, mosquito activity tends to be at its highest between sunset and two hours after sunset. Any activity after this period varied depending on the season. Mosquito activity also increased when the wind speed declined on windier nights. The results from this collection study will help us better understand nighttime mosquito activity throughout the year in our rural area.

## *Aedes* surveillance

In May 2016, *Aedes aegypti* mosquitoes were detected for the first time in the Coachella Valley. Surveillance efforts for these invasive mosquitoes continued in 2019. BG traps were deployed within cities of known *Aedes* activity on a routine basis. Ovicups, which collect eggs laid by *Aedes* mosquitoes, were deployed throughout the Valley and examined weekly. Autocidal Gravid Ovitrap (AGO), designed to monitor the presence of *Aedes* in areas of prior activity, were also deployed. AGO traps have been advantageous in areas where *Aedes* activity was low and not detectable by BG traps.

*Aedes aegypti* are in nine cities and three communities – in order of first detection, they are Coachella, Cathedral City, Indio, Palm Springs, Palm Desert, Mecca, La Quinta, Indian Wells, Rancho Mirage, Thermal, Bermuda Dunes, and Desert Hot Springs. More *Ae. aegypti* were caught per trap in 2019 compared to 2018, with the peak activity occurring 2 weeks earlier in the season.

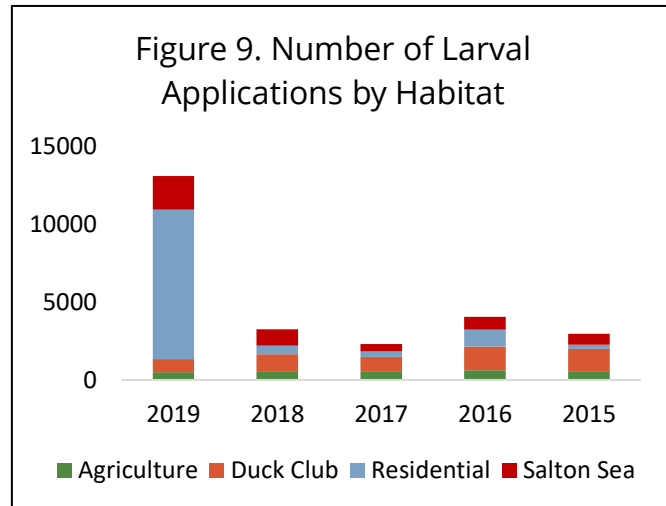


**Comparing Trap Types.** In 2019, CO<sub>2</sub> and gravid traps were used for *Culex* surveillance and BG-sentinel and AGO traps for *Aedes* surveillance in an attempt to simplify trapping routines by using one trap type per mosquito behavior, thereby improving efficiency. An evaluation comparing the efficacy of BG-Sentinel and CO<sub>2</sub>-baited traps in urban areas was conducted in the late summer and fall. The two traps were compared with a modified CO<sub>2</sub> trap that was hung closer to the ground and included a BG lure scent stick. Preliminary results showed the modified CO<sub>2</sub> trap caught more *Ae. aegypti* female mosquitoes than the unmodified CO<sub>2</sub> trap, but not as many as the BG-Sentinel trap.



## Mosquito Control

**Larval Mosquito Control.** Microbial and chemical control are part of the tools used by vector control to reduce or manage mosquito populations by keeping within acceptable levels in addition to physical and biological control strategies. Larval control is the most effective method of mosquito control by targeting mosquito breeding sources thus achieving sustainable reductions of mosquito populations using diverse microbial and chemical control product formulations. Over 22,000 treatments of larval mosquito sources were made in 2019. The majority of these treatments occur in residential neighborhoods with small water sources requiring maximum attention from our field technicians. Increased Salton Sea shoreline and duck clubs mosquito control efforts in 2019 accounted for the high number of acreage and habitat under larval applications.

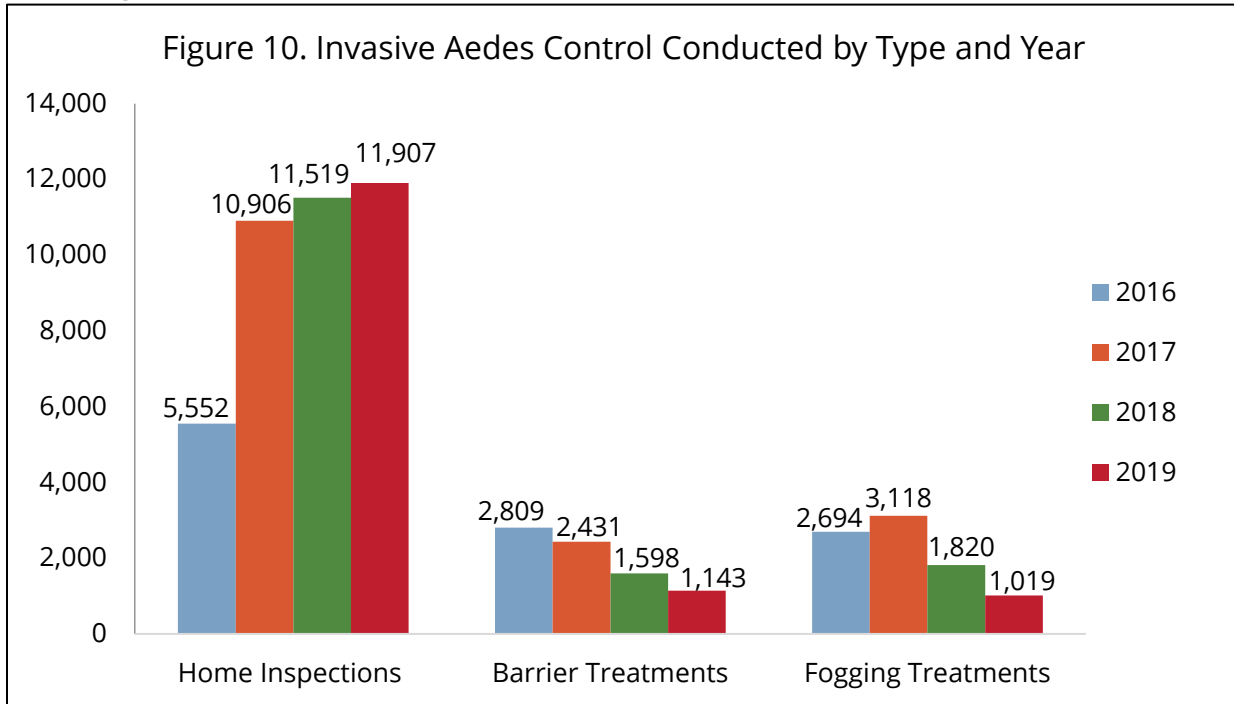


**Adult Mosquito Control.** The District conducts chemical control targeting adult mosquitoes typically when the District's Mosquito Risk Assessment Plan indicates elevated public health threat from arboviruses. Adult mosquito control is routinely performed by applications of control products as ultra-low volume (ULV) or barrier sprays using vector control adulticides registered with US Environmental Protection Agency (US EPA). ULV applications involve delivering a fine mist of the chemical product at specific times onto the targeted flying adult mosquitoes using specialized spray equipment mounted on trucks or helicopter. Barrier applications involve the misting of tall stands of non-flowering vegetation in areas with high counts of mosquitoes or elevated virus activity to control resting mosquitoes with barrier equipment attached to all-terrain vehicles or by backpack carried by field technicians.

The District conducted seven aerial larval treatments in the city of Palm Springs totaling 6,657.5 acres to control *Ae. aegypti* and *Cx. quinquefasciatus* mosquitoes. These treatments reduced mosquito populations within the area targeted. Although the target of these applications is the mosquito larvae, the outcome is shown in fewer adult mosquitoes within a few weeks during and after applications. The District engaged the local communities including city officials, residents, fire fighters, and police and secured a Congested Area Flight Operation Plan approval from the US Federal Aviation Administration earlier in the year to allow the helicopter applications.

**Targeted Mosquito Control for Local *Culex* species.** Adulticide applications were made in both urban and rural areas of the District in response to WNV- and SLE-positive mosquitoes collected throughout the Coachella Valley. These applications included 46 aerial ULV applications, covering 74,031 acres; 135 truck-mounted ULV applications, covering 37,743 acres; and seven barrier spray applications covering 374 acres.

**Targeted Mosquito Control for Invasive *Aedes*.** To determine the spatial extent of *Aedes*, infestation inspections were conducted and control methods for all stages (eggs, larvae, pupae, and adult) were done on properties. Vector Control Technicians were the keystone of this effort. The Invasive *Aedes* Control Team conducted more than 11,900 door-to-door inspections focused on providing help to residents. Technicians educated residents on identifying and eliminating breeding or potential breeding sources. Field technicians also applied barrier and fogging treatments using backpack and hand-held spray equipment on properties with invasive *Aedes*, or that had the potential to breed this mosquito. In 2019, eight truck-mounted low volume applications were conducted in the cities of Cathedral City and Palm Desert targeting the *Aedes* for a total of 2,718 acres. **(Figure 10).**



**Biological Control.** The District uses mosquitofish (*Gambusia affinis*) in permanent bodies of water to control mosquitoes. In 2019, the District produced 31,900 mosquitofish. More than 5,300 fish were stocked in 121 unique sites.

### Product Efficacy and Quality Control

#### Culex mosquitoes

*Resistance assays and semi-field applications* – Pyrethroid-based insecticides are commonly used to control mosquitoes. Mosquito resistance to these products is an increasing concern. Bottle bioassays are conducted annually to monitor adult mosquito populations for potential resistance to pyrethroid products the District uses.

*Culex quinquefasciatus* were used in the monitoring of adult mosquito control products **Aqua-Reslin**, **DeltaGard**, **Merus 3.0**, and **Scourge 18+54**. *Cx. quinquefasciatus* showed strong signs of resistance to Scourge 18+54 and Merus 3.0. To ensure that these products are still effective under field conditions, they were evaluated at regular label rate applications using truck-mounted ULV sprays. The results of these trials indicate that local mosquito populations are exhibiting signs of resistance to select formulations.

District staff evaluated **Evergreen ULV 5-25** (active ingredients: pyrethrin and piperonyl butoxide) during applications in May. Wild-caught mosquitoes experienced a lower percentage of mortality than the colony mosquitoes, demonstrating the presence of pesticide resistance and importance of having a consistent spray output.



*Culex tarsalis* mosquitoes were evaluated using applications of **Merus 3.0** (active ingredient: pyrethrins) using two different rates for use in adult mosquito control applications. Wild-caught

mosquitoes experienced a high percentage of mortality at both rates, demonstrating that a low rate is appropriate for use. This product is approved for use in organic fields.

*Aerial adulticide in Indio* – In late June, West Nile virus had been detected routinely in Indio, despite larviciding and truck ULV adult mosquito control applications. To disrupt the transmission cycle, a combined aerial and truck ULV application was planned. The aerial application covered areas where lakes were absent while the use of the truck allowed for more precise application around man-made lakes. After the application, no virus was detected for 2 weeks. Although virus was detected again in the third week, it was at a lower level. Virus activity was absent at 4 weeks after the treatment, and fewer adult mosquitoes were collected per trap throughout the season.

**Altosid P-35** is a unique granule formulation that states on its label to provide 35 days of residual control in continuously wet conditions. The insect growth regulator (S)-methoprene is immediately activated when wet and released to start controlling adult mosquito emergence. We tested the efficacy of three rates in small microcosm ponds, comparing it with **MetaLarv S-PT** which has the same active ingredient. We found that the MetaLarv S-PT lasted a few more days than the Altosid P-35.

We also examined the use of both products in storm water structures. Catch basins are where the water enters from the street into structures below the surface. Irrigation run-off in a neighborhood can be major contributors to mosquito populations. We found that a middle of the label rate of each product worked well to control larval mosquitoes with the MetaLarv S-PT lasting about 5 days longer than the Altosid P35.

### **Aedes mosquitoes**

*Aerial larvicide applications.* The District conducted a series of aerial applications to control *Ae. aegypti* and *Cx. quinquefasciatus* in Palm Springs. Due to the number of virus-positive samples and the risk of virus transmission to people in the area, the District used aerial larvicide applications for four weeks in July and August (weeks 30-33). Applications were scheduled to occur over two days using VectoBac WDG (a.i.: *Bacillus thuringiensis israelensis*). Evaluations included comparing the treated area with a comparably sized area where aerial applications were not conducted. We had reduced adult mosquitoes per trap beginning the third week of the application, a trend that held until three weeks after the final treatment. While the mosquito populations increased in September, the number of virus-positive samples did not.

*Truck larvicide applications.* In September and October (weeks 38-41), the District conducted truck-mounted applications to reduce the *Aedes* mosquito population in two cities. In Palm Desert, truck-mounted larvicide applications were made using Altosid Liquid Larvicide (a.i.: methoprene). In Cathedral City, in addition to the truck-mounted larvicide, applications of DeltaGard (a.i.: deltamethrin) were made to reduce the adult mosquito population. Ideally, we would see the adult mosquito population in

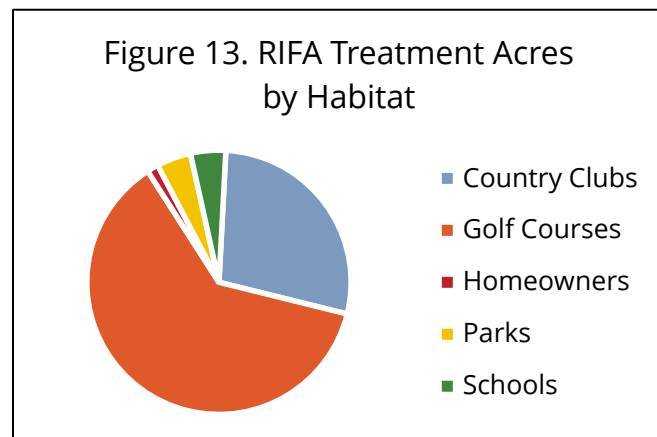


Cathedral City drop faster than the population in Palm Desert where larvicide was used alone.

Department staff examined the ability of the applications to reach the backyards in Palm Desert by placing cups in and outside of the application area. Larvae added to the cups the following week indicated that the equipment did get the control product into front and back yards, including into areas that were obstructed from the open sky. In Cathedral City, caged adult mosquitoes were placed in the front and back yards, and excellent mortality of adult mosquitoes was seen throughout the application area.

Collections of adult *Ae. aegypti* female mosquitoes were lower in the treated area of Palm Desert than in the untreated area. While this trend began before the application, due to effective communication and outreach to the residents of the area, we have not seen the population rebound as quickly as it usually does. The application of adult control product in Cathedral City did not seem to reduce the collections of adult *Ae. aegypti* female mosquitoes compared with the untreated area. This could be due to the application being conducted at night, when the mosquito is thought to be more active during the day.

### Red Imported Fire Ants (RIFA)



Finding RIFA always initiates treatment using bait granules, which contains a toxin, an insect growth regulator (IGR), or a combination of both active ingredients. The chemical bait granules once applied to area with RIFA are taken back to the colony by foraging ants and fed to larval and adult ants killing them, ultimately killing the colony. District field staff carried out more than 2,600 RIFA treatments at private homes, schools, parks, golf courses, and country clubs covering more than 19,000 acres of property.

Golf courses make up the most acreage of properties treated but residential properties (homeowners) represent the most treatments compared to the rest of the property types (**Figure 13**).



## NUISANCE SPECIES

The District conducts a limited program on surveillance and control of nuisance pest species that may have potential to transmit disease or directly cause injury or discomfort of people and their pets or animals. The primary focus of these programs includes surveillance, physical control, and public education. Many of the problems associated with nuisance species can be reduced or eradicated through proper sanitation and management.

**Filth Fly and Eye Gnat Surveillance and Control.** Filth flies surveillance and control is conducted based on community requests and prior chronic problems in the area. The District provides the resident with bottle traps, food lure concentrate, and instructions on how to maintain the trap. The District's eye gnat program consists of responding to service requests, limited golf course control, and rural area control. An egg bait solution is placed in plastic bottles as part of a "trap out" strategy to control eye gnats in areas experiencing infestations.

Fly activity was monitored in a neighborhood in La Quinta on a monthly basis to address the fly complaints in the area. Nine traps were set to determine the fly species and abundance in residential neighborhoods and the nearby farming community. Flies collected inside neighborhoods were less abundant than the traps in the agricultural areas and were at similar levels as in 2018. The different species of flies collected inside and outside the neighborhoods suggest that the fly development sources in the residential neighborhoods are different than the sources outside the neighborhoods.



In 2019, the District received a total of 71 complaints of flies and eye gnats in the Coachella Valley, about 20 fewer complaints compared to 2018, which were fewer than those received in 2017. District staff had pamphlets distributed to residents with fly and eye gnat complaints as part of the best management practices training for agricultural operators, country clubs, golf courses, and HOAs in the District.

**Rodents.** District staff conducts block surveys and rodent inspections of building exteriors and surrounding grounds to determine the level of rodent activity, access points for rodents to enter buildings, food and harborage areas for rodents, and landscape management strategies to limit rodent activity. In 2019, Vector Control Technicians responded to 37 service requests for rodent infestations.

**Bees.** The District conducts Africanized honey bee control and removal on the right-of-way locations or near public schools. The control and removal work is limited to hives or swarms located in non-structural and accessible locations such as trees and bushes in public places where such bees pose an imminent threat to public safety. Technicians do not remove beehives from private property but may offer advice on how to seal and maintain properties to limit likelihood of bees establishing colonies.

**Scorpions.** The bark scorpion, *Centruroides sculpturatus*, is a non-native scorpion that has been documented in Indio, CA since 2014. The bark scorpion's venom is more potent than native Californian scorpions' venom, posing a concern for the residents. Work conducted during 2019 involved a follow-up survey of the community to determine if recommendations for routine collections and to reduce habitat had been followed. Residents retained their understanding of scorpion management, and the community had rock walls in public areas filled in, reducing the habitat for these scorpions.



## RESEARCH

The District has a strong commitment to ensure that its Integrated Vector Management (IVM) program is effective, efficient, and environmentally sound. This is achieved through applied research projects focused on various aspects of the District's IVM program. Projects are typically conducted through collaborative research projects by District staff, university and government scientists who specialize in vector ecology, and private organizations.

### Mosquito Surveillance and Control Applied Research

**USDA Center for Medical and Veterinary Entomology (CMVAE)** – The District worked in collaboration with the USDA-CMAVE on two occasions in 2019. In March, the lab staff and USDA employees examined larvicide sprays using four different hand-held sprayers with seven separate larvicide products. The team also worked in the field at a test plot in Mecca to examine the effectiveness of spatial repellents for mosquitoes and flies in military camps at hot arid climates. Since one of the repellents was effective, a follow-up study was begun in August. The data from this study can provide actionable guidance for our military troops in the field and the public. 2019 was the thirteenth consecutive year of collaboration between the agencies.

**UC Riverside** – Researchers are examining the use of biopesticides with fungi as the active ingredients to control adult mosquitoes in underground storm water systems, such as catch basins. This research used commercially available products already approved to control insects in agriculture settings. The deployment of the bait stations did reduce the mosquito collections within the catch basins, and the mosquitoes are able to fly some distance from the stations (as they are found in untreated basins). Additional work is planned in 2020 to improve the bait stations to understand how many are needed to have an impact on the mosquito population.

### Fire Ant Control Applied Research



Bait particles and rain gauges after irrigation.

**USDA-CMAVE** – Researchers in this study examined the ability of water-resistant fire ant bait to control fire ants, which would allow the District to perform effective treatments in areas where irrigation or moisture are an issue. In 2019, researchers examined several baits with hydramethylnon, one of the active ingredients the District currently uses. The baits showed good control of fire ants in the laboratory. A field study of water-resistant coated product performed as well as the uncoated product when irrigated, indicating that fire ants may pick up the bait in early summer even during normal irrigation.

## ENVIRONMENTAL COMPLIANCE

**Federal and State NPDES.** The District complies with the Clean Water Act by ensuring that applications of control products made to or near waters of the U.S. sites are made under a National Pollutant Discharge Elimination System (NPDES) Permit. On March 1, 2019, the District filed its 2018 annual report for the California NPDES permit. Technicians made 755 larvicide treatments to waters of the U.S. and 15 applications of adulticides near waters of the U.S. No adverse conditions due to applications of vector control products were seen or reported.

Mosquito habitats which are on lands owned by Native American tribes are not subject to California state law. In 2015, the District obtained a federal NPDES permit to make applications at these sites and to comply with the federal regulation. On February 15, 2019, the District provided the EPA with reports of treatments made in 2018 to sites that could be considered waters of the U.S. on property owned by the Agua Caliente Band of Cahuilla Indians, the Cabazon Band of Mission Indians, and the Torres Martinez Desert Cahuilla Indians.

**CEQA.** The California Environmental Quality Act (CEQA) requires public agencies to conduct an environmental review to determine the cumulative impact of their activities on the environment. In 2011, the District concluded that its IVM Program could have negative impacts on the environment if its activities were not mitigated, and therefore adopted a Mitigated Negative Declaration. The District filed its Annual Compliance Report regarding the monitoring performed on February 1, 2019. The District complied with the 18 mitigation measures and concluded that the operation of its IVM Program did not have a significant impact on the environment.

**PESP.** The District is a Bronze-level member of the Environmental Protection Agency's Pesticide Environmental Stewardship Program (PESP). The program encourages members to reduce the risk of pesticide use by educating their staff and public about proper use of pesticides and by examining alternative methods of controlling pests. The District re-submitted its five-year monitoring strategy in 2018 and filed its fifth annual report on March 4, 2019. For the strategy plan, staff tracked source reduction, visits where no pesticide is used, visits where reduced-risk pesticides were used, surveillance activities performed, trainings held for staff, and outreach activities conducted on the topic of integrated vector management.

## PUBLIC OUTREACH

Education and community engagement has long been a cornerstone of the Integrated Vector Management (IVM) program. The District also recognizes the necessity of an online presence in today's fast paced information environment.

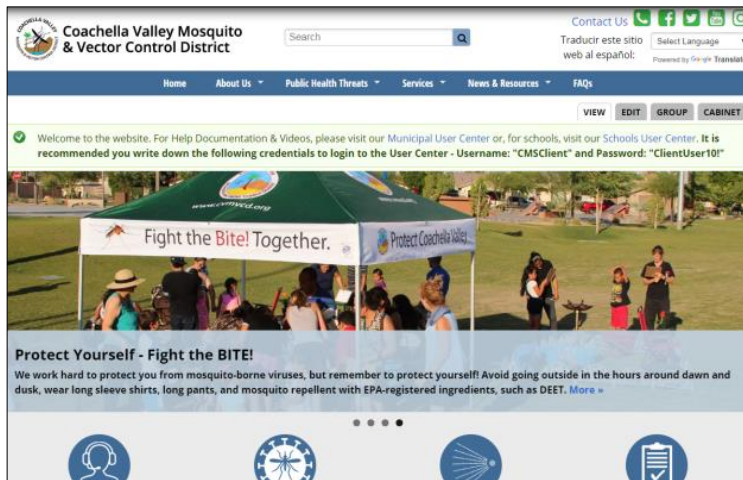
### Digital Outreach

The District revamped the outdated website which was made public on November 1, 2019. The goal was to create a more user friendly design for a more intuitive way for the public to access information. There were over 16,000 visitor sessions logged on the District website in 2019.





Practical methods were developed to grow the District's online educational and outreach resources.



With the unparalleled season, constant media attention allowed the District to utilize the spotlight and in doing so the email notification list grew by 87.8%.

To further support the District's online presence, the Outreach team manages an array of social media platforms. Social media followers increased in 2019 by 456.6%. In addition to Facebook and Twitter, the District now communicates using Instagram and YouTube.

### Publications and Advertising

Nearly 33,000 educational materials and application notification postcards were distributed to residents at events, city offices, community centers, through the mail, or directly at their door. The District also published 26 press releases in 2019, fourteen more than in 2018. These releases generated 49 TV or newspaper news stories, many of which were then shared on the news source's social media platforms for greater reach.

Paid TV, radio, newspaper, and social media spots stayed consistent as in the previous year. When combining each media outlet's reach, the total net reach was over 1 million people. Movie theater advertising on 120 cinema screens was also utilized with 280,000 projected impressions.

### Partnering with the Community and Stakeholders

The District conducted 98 outreach activities in 2019 including; 24 community fairs, 40 student-aged events (science nights, presenting hands on education in classrooms, career days, tours and job shadows), 22 community speeches, and 12 City or Community Council presentations. In all, we had face-to-face contact with about 8,000 community members.



*Local Valley students learning about vectors and vector-borne diseases.*



## LEGISLATIVE RELATIONS

State and federal legislation and regulations can impact IVM Programs in California. The District has made a priority of building and maintaining professional and collaborative relationships with local, state, and federal legislators who serve the constituents of the Coachella Valley. The District thanks our local legislators for their support, which has made our job easier in protecting public health in the Coachella Valley.

### 2019 Mosquito and Vector Control Association of California Legislative Day

On April 3, 48 members representing 21 California mosquito and vector control agencies made their way to the Capitol building to meet with more than 50 legislators and staff to raise awareness and garner support for vector control issues, such as the MVCAC-sponsored bill AB 320 (Chaptered 10/2/2019), authored by Assembly member Bill Quirk (D – Hayward), and intended to codify the CalSurv Gateway tool in statute as the statewide surveillance database to track and predict the emergence of invasive species and mosquito-transmitted virus activity. Trustee Sergio Espericueta, District General Manager Jeremy Wittie, and former Public Information Manager Jill Oviatt, met with Coachella Valley state legislators or their staff; Assemblyman Eduardo Garcia, 56th District, Assemblyman Chad Mayes, 42nd District, Senator Jeff Stone, 28th District.



## INFORMATION TECHNOLOGY

**Outdated Technology.** The District is dedicated to providing the most efficient and updated technology to the public and to the staff that are committed to protecting public health. In 2019, the District website was updated and outdated platforms such as Microsoft Windows 7 will soon be replaced.

**Online Security.** Ransomware is hitting every industry causing revenue and intellectual property losses. Ransomware is a type of malware that prevents a user from using a computer or accessing files until a sum of money is paid. The District committed to training staff with email security awareness by testing and identifying phishing emails. Phishing is the practice of sending emails to obtain sensitive information, such as usernames, passwords and credit card details by posing as a legitimate company, institution, or person.

**Point of interest (POI) or POI Mapping.** This process uses Laboratory samples to 'digitize' a point (an object containing a specified longitude and latitude) on a web map. From the point, parcels are selected around the feature up to a mile. Vector Control Technician teams then process the parcels within a POI and perform inspections. Their actions are color coded making a data collecting map that is a useful and efficient way to mobilize Vector Control Technicians in a specific area.

## HUMAN RESOURCES

The Human Resources Department (HR) ensures fair and equitable practices are used to hire, develop, support and retain a highly qualified staff. HR is dedicated to cultivating a talented, competent, and engaged workforce that is prepared to effectively serve the residents and visitors to the Coachella Valley. The District's staff consists of 59 regular full-time employees and as many as 23 seasonal employees.

### Years of Service

The District's 59 regular full-time employees represent:

- 683 total years of service
- 11.75 average years of service
- 32 employees with 10-19 years of service and 7 employees with 20+ years of service

### Demographics

Department	Filled Positions
Administration	2
Finance	4
Human Resources	3
Information Systems	3
Public Outreach	3
Fleet Maintenance	2
Buildings & Grounds Maintenance	2
Surveillance & Quality Control	10
Control Operations	30
Total	59

Age Group	Male	Female	Total
Under 30	2	1	3
30 – 39	18	5	23
40 – 49	7	7	14
50 – 59	12	2	14
60 & Over	1	4	5
Totals	40 (68%)	19 (32%)	59
Average Age	41.85	45.63	43.07

### Professional Development

The District completed its third year of the Beyond the Bite Academy program. The Academy is designed to support District employees with learning opportunities to build valuable work skills and enhance performance. Classes are designed, developed and facilitated by internal staff. Six employees graduated in December.



*2019 Beyond the Bite Academy graduating class w/GM*

## FACILITIES

The District's Buildings and Grounds Maintenance department is charged with the maintaining, repairing, and upgrading of the District's facilities, property, and special equipment. Major 2019 Buildings and Grounds projects include the Water Well Destruction, Laboratory Environmental Chamber upgrade, Vortex Exhaust Fan VFD Replacement Project, and Asphalt Repair of the District grounds.

**Water Well Destruction Project** - The District's water well became unrepairable. The estimated cost for a new well was over \$100,000 - following the requirements of California Water Well Destruction Standards and Riverside County Department of Environmental Health for well abandonment - the well was destroyed.



*The District's re-branding project included new logo placement on facilities and fleet.*

**Laboratory Environmental Chamber Upgrade** - This project involved the installation of heavy duty desiccant dehumidifiers to each of the three environmental chambers located in the Laboratory. Installation of 240 volt 20 amp rated electrical amp breakers, wiring for the dehumidifiers, and ventilation was installed.

**Vortex Exhaust Fan VFD Replacement Project** - The District's Laboratory building airflow system uses exhaust fans to manage the negative air pressure needed for the Biosafety Level 3 (BSL3) Laboratory and to regulate the airflow throughout the building. The Vortex Exhaust Fan VFD Replacement Project involved the removal and replacement of three variable frequency drives (VFD) for all three vortex exhaust fans.

**District Grounds** - Asphalt repair included removal and replacement of the District's driveways and parking areas at the Indio headquarters. The project estimated to be over 10,000 sf, double seal coat (approximately 123,000 sf) and restriping.

## FLEET

**Re-Branding** - The District's Fleet embarked on a re-branding project which required immense attention to detail. An updated District logo, new colors and fonts were applied to standardize the District's most visual field indicator, District vehicles. The District fleet of vehicle's re-branding project was completed in late October 2019.

**Surpluses** - The District uses a third party hosting site for posting surplus vehicles and equipment, which is free for government agencies. The buyer is charged a percentage of the sale price. Since July 2019, the District has generated \$61,196 utilizing the third-party site.





**New Equipment.** The District's fleet acquired one ARGO Frontier 700 8X8 amphibious eight-wheeler to assist the Operations Department with mosquito activities along the Salton Sea shoreline, duck clubs and agricultural areas. This tool provides Vector Control Technicians with the ability to survey mosquito sources and apply control products, when necessary, in hard to reach habitats of the Coachella Valley.

Four Yamaha UMAX gas powered workhorses were also acquired to assist RIFA activities. Workhorses are the primary transport vehicles for Vector Control Technicians in and around residential properties. Fabricated mounting posts for each Workhorse allow Vector Control Technicians the ability to attach specialized equipment to distribute control products for RIFA at a specific rate. With the help of this equipment, Technicians are able to cover large areas, including schools, parks, and golf courses eliminating hours of time spent by hand-spreading.





## FINANCE

The Finance function of the District involves budgeting, accounting, record keeping, and the control of fixed assets and investments. The objective is to be ethical, fiscally responsible, and law abiding in the stewardship of public funds to achieve the District's mission. The primary goal of the Finance Department is to provide financial administrative support to the District's Board of Trustees and staff in their efforts to reduce the risk of disease transmission by mosquitoes and other vectors for residents and visitors of the Coachella Valley.

### Statement of Net Position: FY 2018-19 (June 30, 2019)

<b>Assets:</b>	
Current Assets	\$ 15,309,779
Capital assets	\$ 10,624,757
<b>Total Assets</b>	<b>\$ 25,934,536</b>
<b>Deferred Outflows of Resources</b>	<b>\$ 1,455,068</b>
<b>Liabilities</b>	
Current Liabilities	\$ 840,037
Non-current Liabilities	\$ 4,814,653
<b>Total Liabilities</b>	<b>\$ 5,654,690</b>
<b>Deferred Inflows of Resources</b>	<b>\$ 118,606</b>
<b>Net Position:</b>	
Net investment in capital assets	\$ 10,624,757
Unrestricted	\$ 10,991,551
<b>Total Net Position</b>	<b>\$ 21,616,308</b>

### Statement of Activities

The Statement of Activities is a summary of FY 2018-19 (June 30, 2019), showing revenue and expenditure/expenses.

<u>Revenue FY 2018-19</u>		<u>Expenditures/Expenses</u>	
Charges for Services - Benefit Assessments	\$ 1,984,134	Salaries & Wages	\$ 4,923,063
Property Taxes	\$ 4,027,484	Employee Benefits	\$ 2,572,204
RDA Property Tax Increment	\$ 4,425,927	Field Operations	\$ 1,273,796
Interest & Miscellaneous	\$ 412,219	Materials, Services & Supplies	\$ 908,054
<b>Total Revenue</b>	<b>\$ 10,849,764</b>	Insurance	\$ 236,018
		Contract Agreements	\$ 90,917
		Depreciation	\$ 631,278
		<b>Total</b>	<b>\$ 10,635,330</b>

For more information on the District's financial position, please see the Comprehensive Annual Financial Report FY 2018/2019, available online at

[https://www.cvmosquito.org/sites/indiocacvm/files/uploads/2019\\_fs\\_cvmvcd.pdf](https://www.cvmosquito.org/sites/indiocacvm/files/uploads/2019_fs_cvmvcd.pdf).

## AWARDS AND COMMITTEES

### Employees of the Year

Congratulations to the **2019 Employees of the Year**:

- Field Operations: Trinidad Haro, Vector Control Technician I
- Field Support: Armando Gaspar, Utility Worker
- Administrative Support: Graciela Morales, Executive Assistant/Clerk of the Board
- Management: Gregorio Alvarado, Field Supervisor

This year, the Employees of the Year were selected by the entire staff by way of anonymous voting. Gregorio Alvarado, Armando Gaspar, Graciela Morales, and Trinidad Haro all earned the respect of their fellow workers and are an asset to the District. The following are examples of comments made by co-workers:

- Trinidad Haro: *"Trinidad has an extremely positive attitude and takes his job seriously. Being called the "mosquito whisperer" tells me how great he is at his job and much he is respected by his co-workers."*
- Armando Gaspar: *"Armando is a great asset to the District. He has an extensive worth of knowledge and ability to repair and reconstruct in a safe manner and according to code."*
- Graciela Morales: *"Graciela is very supportive and gracious every time I've approached her with a question or a problem she will go out of her way to get an answer for me."*
- Gregorio Alvarado: *"His new role as supervisor has suited him well and is a great leader among leaders. He is a great mentor to his subordinates and a good influence to follow."*



*Gregorio, Armando, Graciela, and Trinidad (left to right)*

### Certificate of Achievement for Excellence in Financial Reporting

For the eleventh year in a row, for the fiscal year that ended June 30, 2018, the District received the **Certificate of Achievement for Excellence in Financial Reporting** presented by the Government Finance Officers Association of the United States and Canada (GFOA) for its Comprehensive Annual Financial Report (CAFR). This award is the highest form of recognition in the area of governmental accounting and financial reporting and its attainment represents a significant accomplishment by a government agency and its management.

## 2019 Committees

District staff is dedicated to sharing information and leading educational practices for colleagues, collaborators, and partners of vector control fields.

### Roberta Dieckmann

- MVCAC Integrated Vector Management Committee – Member
- National eXtension Fire Ants Community of Practice – State Leader and Expert Panelist

### Jennifer Henke, M.S.

- MVCAC Regulatory Affairs Committee – Chair
- MVCAC Research Committee – Member
- MVCAC Southern Region IVM Group – Coordinator
- AMCA Science and Technology Committee – Member
- Pacific Branch of the Entomological Society of America – Past President
- NPDES Desert Task Force Advisory Committee – CVMVCD Representative



### Kim Hung, Ph.D., BCE

- MVCAC Vector and Vector-borne Disease Committee – Member
- MVCAC Laboratory Technologies Committee – Member

### David l'Anson

- MVCAC Executive Committee – Treasurer

### Anita Jones, MPA

- CSDA Human Resources & Personnel Expert Feedback Team – Member
- College of the Desert HR Advisory Roundtable – Member

### Edward Prendez

- MVCAC Information Technology Committee – Member
- Municipal Information Systems Association of California – Member

### Jeremy Wittie, M.S.

- MVCAC Executive Committee – President
- MVCAC Legislative Committee – Member
- MVCAC Research Committee – Board Liaison
- MVCAC Southern Region Managers – Member



2019 MVCAC Board of Directors

## LOOKING FORWARD

Thank you for letting us share highlights of the exceptional work that District staff performed while protecting public health in 2019 in the Coachella Valley. We are also grateful to our community members and collaborators who worked with us and supported our efforts. As mentioned in the opening letter, it will take the dedication of the entire community to make the greatest and longest lasting impact in our local mosquito and vector populations.

Some of the important projects taken from the District's strategic plan that staff will be focused on in 2020 include:

- Continuously advance the District's surveillance and control of invasive *Aedes* mosquitoes and partner with homeowner associations and residents in affected neighborhoods to educate and provide them with best management practices to eliminate or reduce mosquito breeding sources.
- Collaborate with researchers to develop novel control strategies focused on Valley mosquito and RIFA issues.
- Partner with Valley cities to ensure implementation of mosquito control best management practices on city-owned land.
- Assess and incorporate the use of unmanned aerial systems for surveillance and control of mosquitoes in areas surrounding the Salton Sea.
- Carry out neighborhood and community level surveys to develop public outreach strategies to drive lasting change in how residents perceive their role in protecting their community from mosquito and vector borne disease.
- Overhaul the District's performance evaluation process.
- Develop and implement a professional development plan for staff communication and collaboration.

On behalf of the entire Coachella Valley Mosquito and Vector Control District team, Trustees and Staff, we look forward to another year of serving our residents to protect them from mosquito and other vector-borne illnesses.





# 2019 Staff Members



**Protecting Public Health Since 1928**

For information about the Coachella Valley Mosquito and Vector Control District, please contact us at  
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Visit us at our website at [www.cvmosquito.org](http://www.cvmosquito.org)