



Protecting People and the Environment

A white pickup truck is shown from a low angle, driving through a field of dense brush and spraying a fine mist from a nozzle in its bed. The truck's headlights are on, and the background is a hazy, green landscape.

2022

VECTOR CONTROL ANNUAL REPORT

WWW.RIVCOEH.ORG

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MESSAGE FROM THE DIRECTOR



Dear Riverside County residents and visitors,

We are pleased to present the 2022 Annual Report for our Vector Control Program. We hope you find this information useful. Our goal is to keep you and your families safe from diseases that can be transmitted by mosquitoes and other organisms, as well as increase your ability to enjoy our outdoor environment.

In addition to our regular activities, we continue to increase our surveillance and control of the Aedes mosquito. This invasive mosquito species can be a voracious day biter. While no local transmission has been confirmed yet, it is capable of transmitting the Zika virus, as well as dengue, chikungunya, and yellow fever.

I invite you to review the report to get specific details on each area of our program. Feel free to reach out to our Vector Control staff if you have any questions, need information on how to reduce mosquito breeding, or to request mosquito larvae-eating fish for appropriate water sources on your property.

Finally, we want to thank you for your interest in keeping your community safe and healthy. Vector control cannot tackle these issues without your help and support. Your diligence in regularly checking for standing water and eliminating these potential mosquito breeding sources is vital in our fight. We wish everyone a safe and healthy 2023!

Jeff Johnson, REHS
Director of Environmental Health

WHO WE ARE

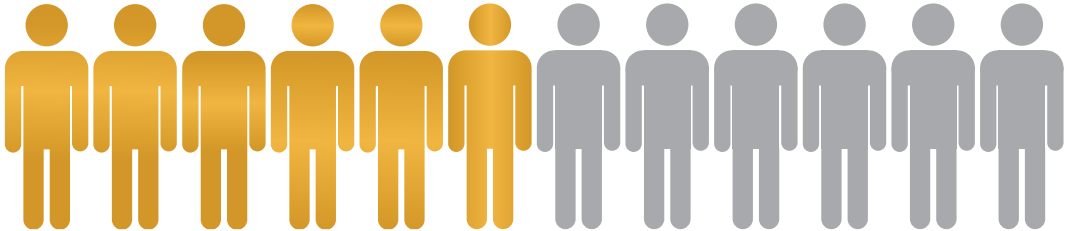
The Riverside County Vector Control Program has been active in surveillance and vector control activities since 1970. Our Program provides vector control services to mid-western Riverside County and the Palo Verde Valley area outside the city limits of Blythe. Services are also provided to contract cities which include Banning, Beaumont, Hemet, Menifee, Moreno Valley, Murrieta, Perris, San Jacinto, Temecula, and Wildomar. The service area is 4,800 square miles with an approximate population of a million people.

Besides the Riverside County Vector Control Program, there are two other vector control districts within Riverside County: Northwest Mosquito and Vector Control District, which provides service to the northwest area of the county, and the Coachella Valley Mosquito and Vector Control District, which provide services to the desert areas of the county.

The vast majority of vector-borne diseases are found in tropical areas of the world. Although Riverside County

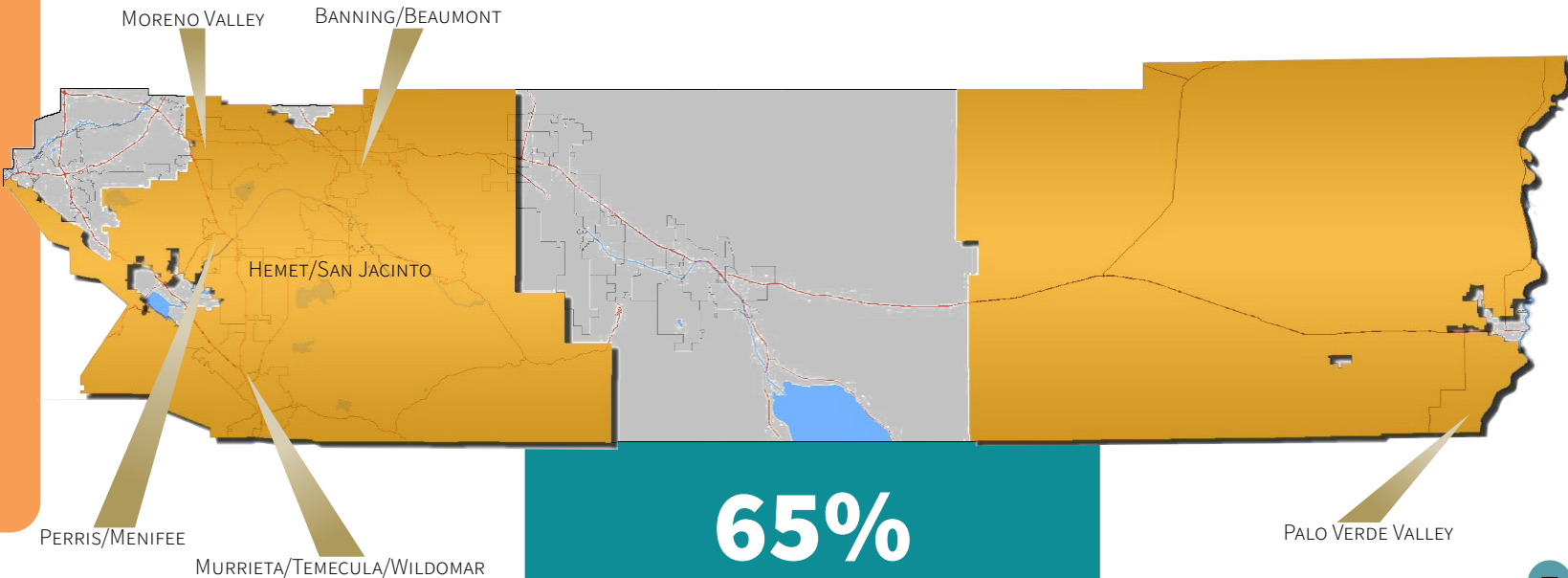
has a more temperate climate, vector-borne diseases exist in this area and can cause serious health problems such as plague, encephalitis, and West Nile virus. The introduction of a new invasive species of mosquito, *Aedes aegypti*, in the past few years has brought with it the threat of additional vector-borne diseases. Monitoring and controlling the presence of these diseases and their vectors is vital to the protection of the health and well-being of residents.

Encephalitis and West Nile virus are mosquito-borne diseases continually detected in Riverside County with most surveillance and control activities being conducted throughout the spring and summer. Plague is endemic in the ground squirrel population of the mountain areas and has been monitored during the summer since 1978. This annual report highlights the efforts of this Program during the year 2022 and its efforts to fight against vectors of disease.



COUNTY POPULATION
SERVICED BY
RIVERSIDE COUNTY
VECTOR CONTROL

51%



65%

COUNTY GEOGRAPHICAL AREA SERVICED BY
RIVERSIDE COUNTY VECTOR CONTROL

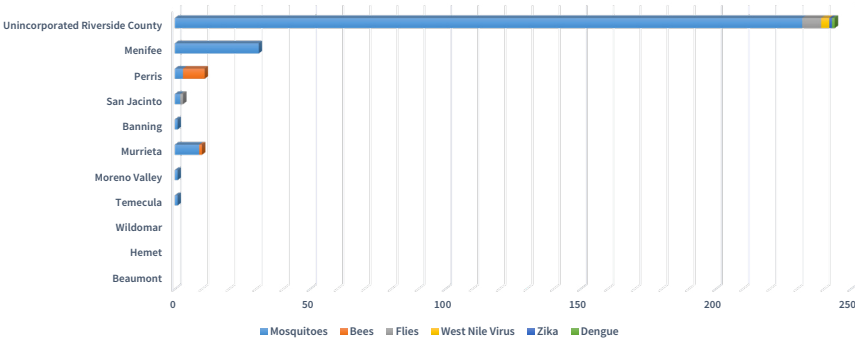
SERVICE CALLS

The Riverside County Vector Control Program responded to 302 service calls (complaints) in 2022. The majority of the service calls addressed mosquitoes and can be attributed to unmaintained backyard swimming pools, spas, and ponds. Mosquito service calls are investigated and mosquito breeding sites are abated using various methods. Property owners are notified of the problem and are encouraged to correct it. If owners refuse to abate the violation, a variety of enforcement actions may be taken.

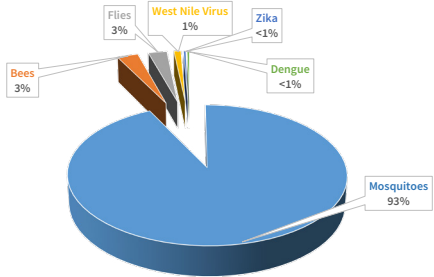


An integrated approach to controlling vectors is applied to all complaints and vector sources. An example of this is introducing mosquito fish to closed bodies of water, like abandoned swimming pools, to feed on mosquito larvae and pupae. Technicians inform members of the public on how to prevent the harborage and proliferation of vectors, including mosquitoes, rodents, and flies. Some complaints are handled by providing an educational brochure. Others require the identification of samples and/or control measures. While non-pesticide methods are preferred, in many instances pesticides are the only effective solution.

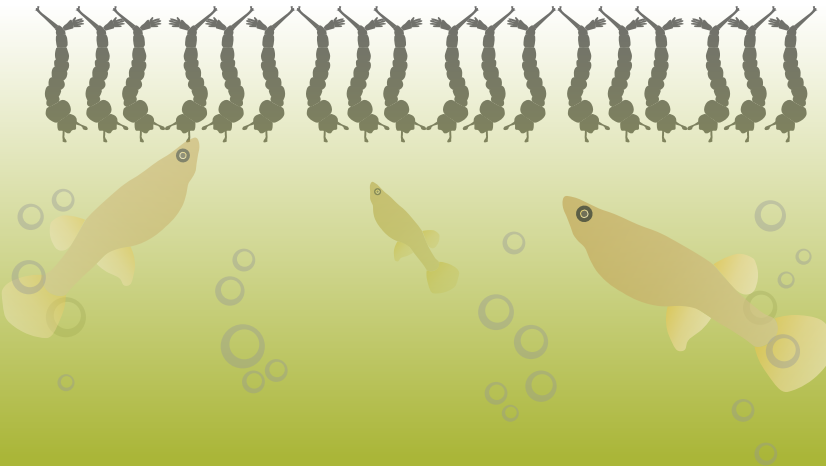
TYPES OF COMPLAINTS BY CITY OR AREA



TOTAL COMPLAINTS BY TYPE



Mosquito complaints involving areas which are not private residences are assigned a source number and serviced on a routine basis to maintain mosquito control. Sources include flood channels, retention basins, ditches, and similar areas which are collection points for water runoff or hold stagnant water for any length of time.



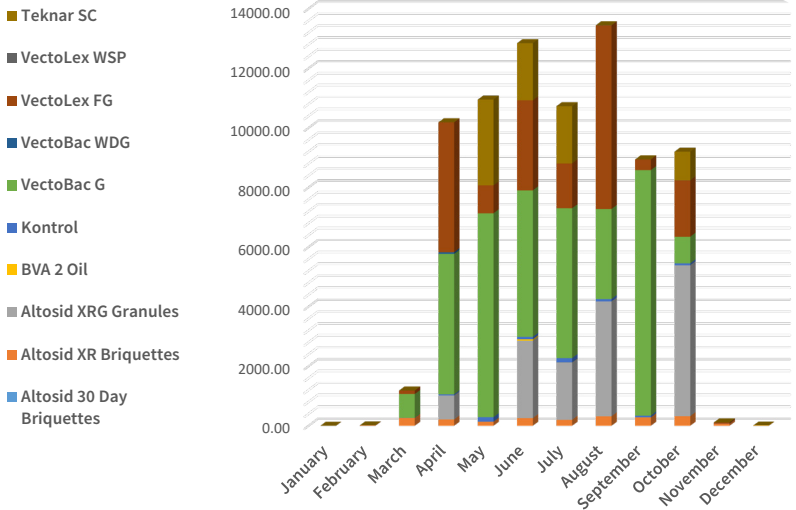
PESTICIDE APPLICATIONS

The Riverside County Vector Control Program has the responsibility of controlling the risk of disease transmission by mosquitoes and other vectors for the residents and visitors of Riverside County.

The goal for mosquito control is to reduce populations at the larval stage to prevent adult mosquitoes from emerging and posing a health risk and nuisance. Various products, such as larvicides and adulticides, are utilized to accomplish this goal.



We utilize the most effective and efficient Best Management Practices to reduce mosquito breeding sources and to minimize the use of pesticides. Our Program has adopted an integrated vector management approach. Use of pesticides is only done on an as-needed basis to accomplish our public safety goals.

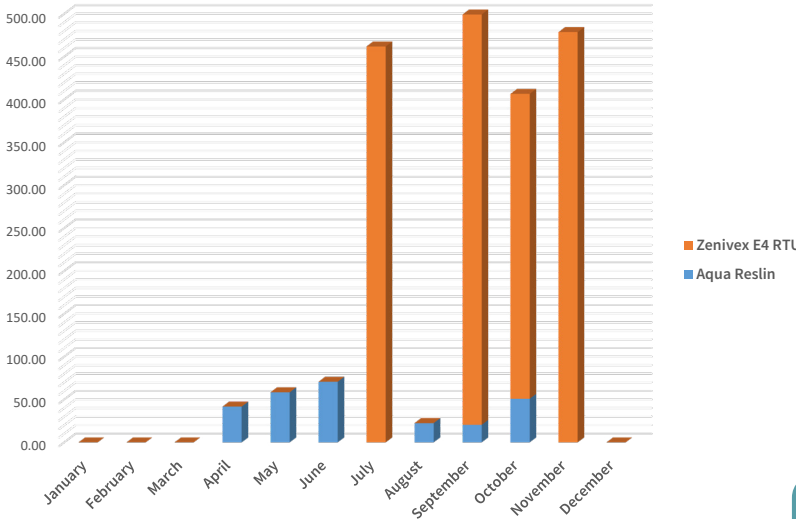


OUNCES OF LARVICIDE USED BY TYPE

LARVICIDE NOUN
: AN AGENT USED TO KILL THE LARVAE, AND IN SOME LIMITED CASES, PUPAE OF MOSQUITOES BEFORE THEY TURN INTO ADULTS

OUNCES OF ADULTICIDE USED BY TYPE

ADULTICIDE NOUN
: AN AGENT USED TO KILL ADULT MOSQUITOES



MOSQUITO-BORNE VIRUS SURVEILLANCE

Mosquito-borne encephalitides are caused by viruses and related diseases which affect the central nervous system of the infected animal or person. The three types of arthropod-borne viruses detected in Riverside County are St. Louis Encephalitis (SLEV), Western Equine Encephalomyelitis (WEEV), and West Nile virus (WNV). These viruses typically cause infection of wild birds and small mammals; however, horses and humans can show clinical conditions to these diseases although they are considered dead-end hosts (i.e., cannot infect a mosquito). The viruses that cause WEEV, SLEV, and WNV are normally transmitted from bird to mosquito to bird, and less commonly from bird to mosquito to man or horse.



**ENCEPHALITIS VIRUS
SURVEILLANCE TRAP (EVS)**

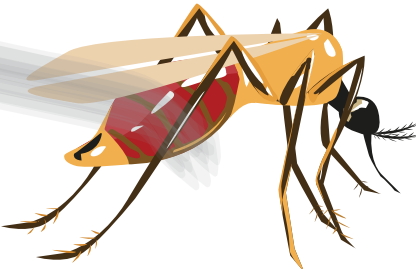


NEW JERSEY LIGHT TRAP

The type of surveillance utilized is live-mosquito trapping. EVS traps are set overnight, then returned to the Riverside County Vector Control Lab the next morning for initial processing. Utilizing microscopes, mosquitoes are identified and grouped by genus and species (e.g., *Aedes aegypti*, etc.). Because female mosquitoes are responsible for human bites and disease transmission, they are attracted to carbon dioxide while they are searching for a blood meal necessary to develop their eggs. The grouped mosquitoes are sent to the Coachella Valley Mosquito and Vector Control District to test for the presence of WNV, SLEV, and WEEV.



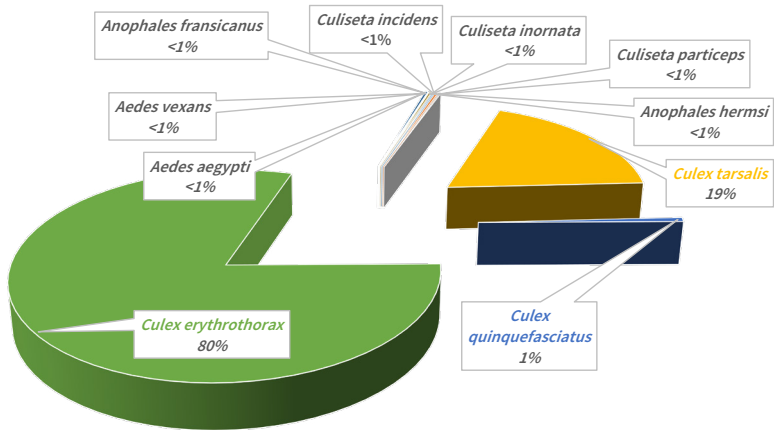
**PROUDLY
MONITORING
ENCEPHALITIS
TOGETHER**



MOSQUITO-BORNE VIRUS SURVEILLANCE

The Riverside County Vector Control Program monitored mosquito populations during 2022 utilizing: one New Jersey light trap route consisting of four traps, and eight EVS-CO₂ trap routes, with four to six traps per route. Over the course of the 2022 season, 105,205 mosquitoes were collected and identified in the portions of Riverside County under the jurisdiction of the Riverside County Vector Control Program.

SPECIES OF MOSQUITOES COLLECTED IN 2022



CULEX TARSALIS, THE “WESTERN ENCEPHALITIS MOSQUITO” AND MAIN VECTOR OF WNV, SLEV, AND WEEV IN CALIFORNIA, MADE UP 19% OF THE MOSQUITOES COLLECTED IN THE WESTERN PORTION OF RIVERSIDE COUNTY.

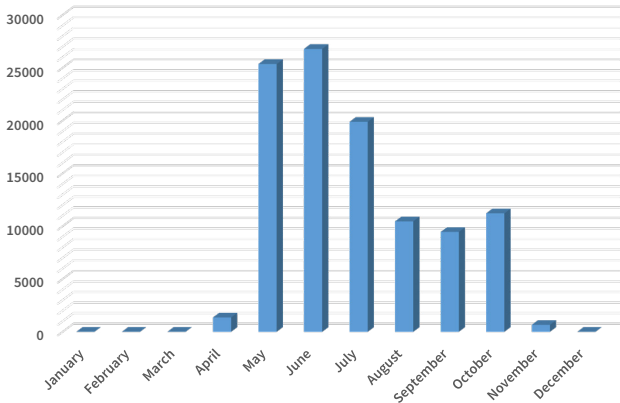
CULEX ERYTHROTHORAX, THE “TULE MOSQUITO” MADE UP 80% OF THE MOSQUITOES COLLECTED.



AEDES AEGYPTI, THE “YELLOW FEVER MOSQUITO” MADE UP <1% OF THE MOSQUITOES COLLECTED.



MOSQUITOES COLLECTED BY MONTH IN 2022



ALL OF THE COLLECTION SITES ARE REGISTERED WITH THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH AND ARE INCLUDED IN THE WEST NILE VIRUS DETECTION AND OVERSIGHT SURVEILLANCE PROGRAM.



MOSQUITO-BORNE VIRUS SURVEILLANCE

A new species of mosquito was discovered in Riverside County in 2015. *Aedes aegypti*, also known as the Yellow Fever Mosquito, is an invasive mosquito not native to California. These black and white striped mosquitoes bite people and animals during the day, both indoors and outdoors. This mosquito prefers to feed on humans, but will feed on other mammals.



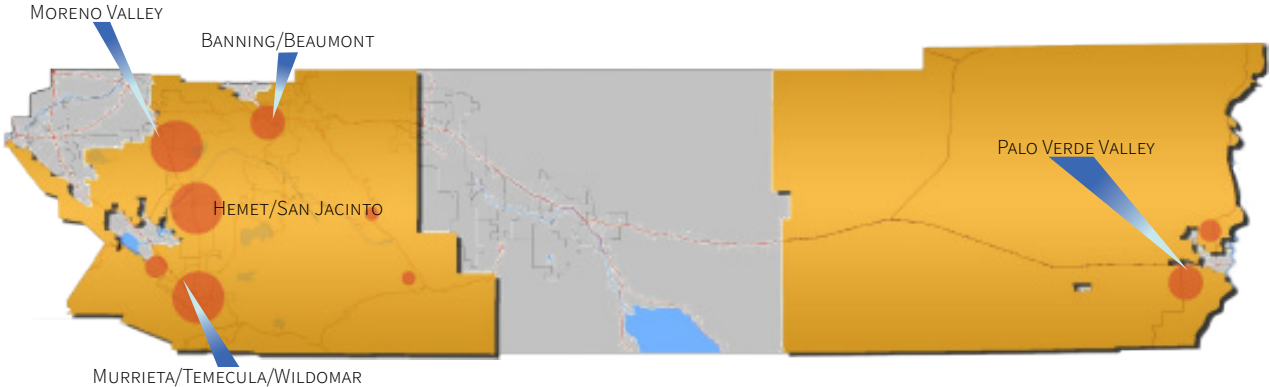
Since its discovery, Riverside County Vector Control has been closely monitoring the distribution of this mosquito. At the end of 2021, *A.aegypti* had been found in every city of Riverside County.

***A.AEGYPTI* ARE CAPABLE OF TRANSMITTING ZIKA VIRUS, YELLOW FEVER, DENGUE, AND CHIKUNGUNYA**

Riverside County Vector Control has several permanent or semi-permanent “source check” locations throughout its service area. These locations have evolved over the years by responding to service calls or by proactively seeking out problem areas.

Aedes aegypti

The females lay their eggs singly in small artificial or natural sources of water. Elimination of standing water is key to control breeding. While eggs can also survive outside of water as well, it is important to scrub all empty containers to remove eggs.



CONTRACT CITIES - 321 sites

- | | |
|---------------|-------------|
| Banning | Murrieta |
| Beaumont | Perris |
| Hemet | San Jacinto |
| Menifee | Temecula |
| Moreno Valley | Wildomar |

UNINCORPORATED AREAS - 102 sites

- | | | |
|---------------|-------------------|-------------|
| Beaumont | Homeland | Mead Valley |
| Blythe | Horsethief Canyon | Menifee |
| Cherry Valley | Idyllwild | Perris |
| Gavilan Hills | Lake Elsinore | Temecula |
| Hemet | Lakeview/Nuevo | Wildomar |

PLAGUE SURVEILLANCE

Plague is a specific disease caused by a bacterium named *Yersinia pestis*. The bacterium that causes plague produces a toxin that causes the destruction of blood vessels. Plague can also attack the lungs leading to pneumonic plague, the most serious form of this disease. It occurs in localized and sometimes devastating epidemics among persons living in crowded conditions.



ORIENTAL RAT FLEA
(vector)

This disease is thought to have been introduced into California in 1900 through the seaport of San Francisco where it was first recorded and again in Los Angeles in 1908. Plague has historically been transmitted by the bite of the Oriental rat flea (*Xenopsylla cheopsis*). The hosts for this flea have been the Norway rat (*Rattus norvegicus*) and the roof rat (*Rattus rattus*).

The infected rats were arriving from Asia where an epidemic was in progress. Outbreaks in domestic rats, rat fleas, and humans followed in San Francisco and Los Angeles.

NORWAY RAT (host)



ROOF RAT (host)



In Riverside County, plague is commonly associated with animal disease outbreaks within populations of California ground squirrels (*Spermophilus beecheyi*). The vector is the squirrel flea (*Oropsylla montana*).

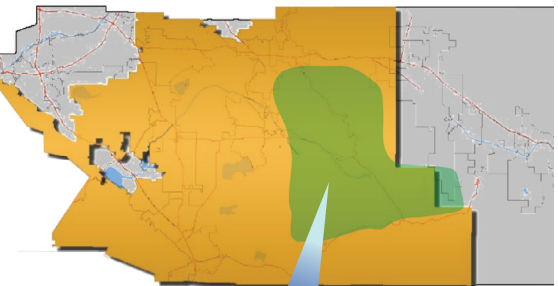
In 1970 during a disease outbreak among California ground squirrels, a boy contracted plague in Silent Valley (an area just south of Banning). Luckily, it was properly diagnosed and he recovered. This incident provided impetus to start our Plague Surveillance Program and eventually establish our Vector Control Program. Plague is endemic in the ground squirrel population of the San Jacinto mountain range and has been monitored during the summer since 1978.



SQUIRREL FLEA (vector)



CALIFORNIA GROUND SQUIRREL (host)

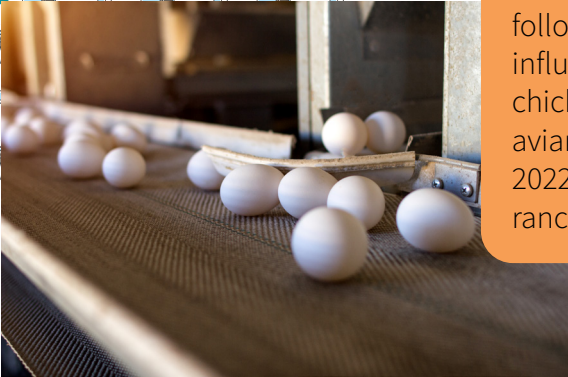


**SAN JACINTO
MOUNTAIN RANGE**

The Plague Surveillance Program is actively involved with the California Department of Public Health when surveillance is conducted in the San Jacinto mountain range.

POULTRY RANCHES

A commercial poultry ranch is any building, structure, enclosure, or premise located within the unincorporated territory of Riverside County, where 1,000 or more domestic fowl are kept for the primary purpose of producing fowl, eggs, or meat for sale, as defined by Riverside County Ordinance No. 565.



The Riverside County Vector Control Program conducted 68 routine inspections of our local poultry ranches. Our department takes every measure necessary to ensure the safety of the flocks within our jurisdiction. Strict bio-security protocols are followed to protect the flocks against avian influenza, also known as bird flu. Avian influenza is a disease found in some populations of wild waterfowl that can infect chickens and a variety of birds, both domesticated and wild. Highly pathogenic avian influenza was detected in wild birds here in Riverside County on October 18, 2022. Fortunately, there were no avian influenza outbreaks within our local poultry ranches.

The maintenance of sanitary conditions on poultry ranches is essential in the control of flies, mosquitoes, and rodents. To ensure sanitary conditions, the goal is to conduct inspections every other month at the 12 poultry ranches located in the western portion of Riverside County. Many aspects of ranch management are investigated during these inspections including manure management, manure disposal, maintenance of watering and feeding devices, timely removal of dead fowl and broken eggs, and other conditions that could result in a vector breeding situation.

PERMITTED POULTRY RANCHES

BEAUMONT RANCH, BEAUMONT

COTTONWOOD PULLET RANCH, SAN JACINTO

CRAMER LAKE RANCH, RIVERSIDE

DEMLER EGG RANCH, SAN JACINTO

FAIRGROW PULLETS, HEMET

GOLDEN FRESH EGG RANCH, CHERRY VALLEY

JONG’S POULTRY FARM INC., RIVERSIDE

MCM JUNIPER FLATS, HOMELAND

MCM LAKEVIEW, LAKEVIEW

MCM SAN TIMOTEO, EL CASCO

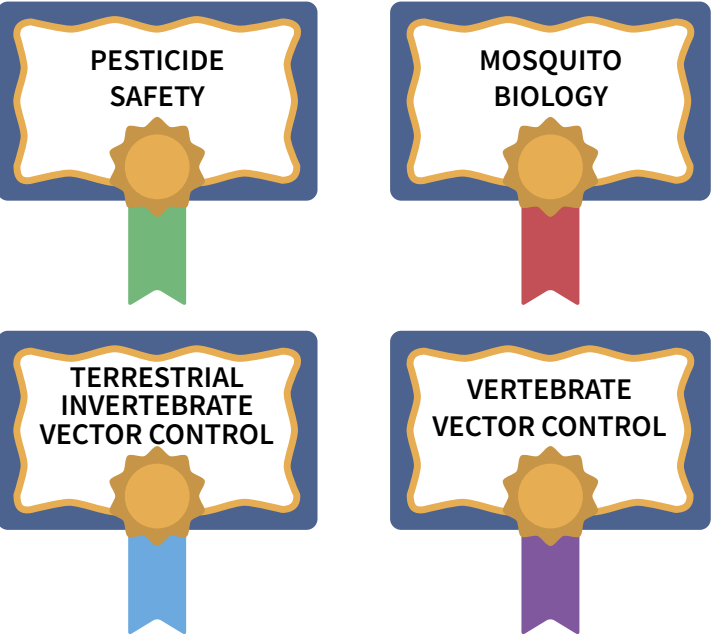
ROMOLAND PULLET RANCH, PERRIS

WINCHESTER RANCH, HEMET



STATE CERTIFICATIONS

In accordance with California Health and Safety Code, every government agency employee who handles, applies, or supervises the use of any pesticide for public health purposes must be certified by the California Department of Public Health. Applicants striving for full certification status must pass all four examinations in the categories of pesticide safety, mosquito biology, terrestrial invertebrate, and vertebrate vector control. In addition, personnel must acquire a set number of continuing education units in all categories. Our program has five fully certified staff and two who are in the process of full certification. In addition, fifty Environmental Health Specialists within Riverside County Department of Environmental Health are classified with “limited” status, meaning they have obtained one or more certifications.



SUPERVISING ENVIRONMENTAL HEALTH SPECIALIST

MIKE HERNANDEZ

ENVIRONMENTAL HEALTH SPECIALIST IV

ENRIQUE RUEDA

ENVIRONMENTAL HEALTH TECHNICIAN II

ANDREA MERRILL

ENVIRONMENTAL HEALTH TECHNICIAN I

DONALD CASS

ALEX GARCIA

MARCLEE FRILLES

DAKOTA HALFORD

VECTOR CONTROL OFFICE ASSISTANT

MARIA OROPEZA

PROGRAM CHIEF

KRISTIN LORGE

Vector Control and the associated discipline, Medical Entomology, are constantly changing. Keeping abreast of these changes would be an impossible task without the aid of memberships in various organizations. Active memberships were maintained with the Mosquito and Vector Control Association of California, the Society of Vector Ecology, and the American Mosquito Control Association in order to keep our Program informed of the current trends of importance in vector control.





Protecting People and the Environment



VECTOR CONTROL OFFICE
ENVIRONMENTAL HEALTH MAIN OFFICE

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