FY 2025-26

ENGINEER'S REPORT

San Diego County Vector Control Program

Mosquito, Vector & Disease Control Assessment

MAY 2025
Final Report

Engineer of Work:

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Introduction

Overview

The San Diego County Vector Control Program ("VCP" or "Program") exists within the County of San Diego's Department of Environmental Health and Quality[1] ("DEHQ"). VCP is responsible for vector and vector-borne disease surveillance and control services in all 18 incorporated cities and the unincorporated areas of San Diego County. For this report, a vector is an organism, such as a mosquito, tick, or rodent, that can spread disease to humans. Eye gnats are also included in the definition of a vector. VCP has been reducing and controlling mosquitoes and protecting the county against vector-borne diseases for over 40 years. In 1989, the Board of Supervisors assumed the powers of a Vector Control District to better serve the entire county. VCP is managed by County staff and is governed by the San Diego County Board of Supervisors ("Board").

VCP's core services include:

1. Early detection of public health threats through comprehensive vector surveillance, communication and collaboration with public health agencies, and rapid detection of vector-borne pathogens.
2. Control and reduction of mosquitoes that transmit diseases to humans by implementing integrated vector management strategies to prevent the spread of vector-borne diseases.
3. Disseminating vector and vector-borne disease information to provide County residents and property owners with tools for prevention, protection, and reporting of vectors that transmit diseases.
4. Appropriate and timely response to vector-related customer complaints and to prevent the spread of mosquito-borne diseases to residents.
5.

[1] The Department of Environmental Health (DEH) was reorganized and renamed to the Department of Environmental Health and Quality (DEHQ) effective January 15, 2021.

Since 1989, funding for VCP was primarily from a service charge levied against all parcels in the county. When Proposition 218 was passed in 1996, it froze the service charge at $3.00 for the Coastal Region and $2.28 for the Inland Region. This service charge provided limited funding that was not sufficient for the level of mosquito and other vector control services desired. In 2005, a new benefit assessment for improved vector control services was approved by property owners within the County of San Diego. This new assessment was first levied in the fiscal year 2005-06 and has continued annually thereafter. This Engineer's Report ("Report") defines the benefit assessment, which provides funding for select mosquito and other vectors disease surveillance and control services throughout the San Diego County ("Assessment Area"). It also provides funding for necessary equipment, capital improvements, services, facilities, and other operating expenses for mosquito and vector control programs that would be funded for fiscal year 2025-26.

Assessment Formation

To allow property owners to ultimately decide whether funding should be provided for improved mosquito, vector and disease control services, the Board authorized the initiation of proceedings for a benefit assessment in 2005. The assessment was named the Mosquito, Vector and Disease Control Assessment (the "Assessment"). In May of 2005, VCP conducted an assessment ballot proceeding pursuant to the requirements of Article XIIID of the California Constitution ("The Taxpayer's Right to Vote on Taxes Act") and the Government Code. During this ballot proceeding, owners of property in the Assessment Area were provided with a notice and ballot for the proposed benefit assessment. A 45-day period was provided for balloting. A public hearing to conclude the balloting period was conducted on June 22, 2005. The final balloting result was 61.46% weighted support from ballots returned. (Weighted support in excess of 50% is required for the establishment of a new benefit assessment.)

As a result of this support by property owners, the Board gained the authority to approve the levy of the assessments for fiscal year 2005-06 and to continue to levy them in future years. The Board approved Resolution No. 05-017 on July 13, 2005, which levied assessments for fiscal year 2005-06. The authority granted by the ballot proceeding was for a first-year assessment rate of $8.55 per single family equivalent benefit unit, increased each subsequent year by the San Diego Area CPI (Consumer Price Index) not to exceed 5% per year.

Assessment Description

Prior to the Assessment, VCP provided a "baseline" level of mosquito, vector, and rat surveillance and control services in the county. The services funded by the continuation of the Assessment consist of expanded and improved services, as listed below, over and above the prior baseline level of services.

The Assessment Area, which is coterminous with the county boundaries, includes only those properties that may request and/or receive direct and more frequent service, that are located within the scope of the vector surveillance area, that are located within flying or traveling distance of potential vector sources monitored by VCP, and that will benefit from a reduction in the amount of vectors reaching and impacting the property as a result of the enhanced vector surveillance and control. The Assessment Diagram included in this report shows the boundaries of the Assessment Area.

The following is an outline of the primary programs, projects, services, and improvements (collectively "Services") most of which are funded by the Mosquito, Vector and Disease Control Assessment:

- Mosquito surveillance
- Mosquito control through treatment of mosquito breeding sources and adult mosquitoes
- Public education and outreach through the media and presentations to various community, school, and business groups
- Emergency response to disasters and recovery efforts; vector control and surveillance actions
- Guidance to property owners for control and remediation of habitat or vegetation supporting mosquito breeding
- Distribution of mosquito fish for backyard fishponds and other appropriate habitats
- Mosquito-borne, rodent-borne and tick-borne disease surveillance
- Surveillance for endemic and emerging vectors and vector-borne diseases
- Response to service requests and complaints regarding mosquitoes, rat or mouse infestations, fly breeding on poultry ranches, and eye gnats.
- Identification of mosquitoes, ticks, and other arthropod vectors submitted by the public

As used within this Report, the following terms are defined:

"Vector" means any animal capable of transmitting the causative agent of human disease. "Vector" also includes eye gnats. (Title 6, San Diego County Code of Regulatory Ordinances Section 64.202(h)).
"Vector Control" means any system of public improvements or services that is intended to provide for the surveillance, prevention, abatement and control of vectors as defined in subsection (h) of Section 64.202 of the San Diego County Code of Regulatory Ordinances.

VCP operates under the authority of the Mosquito Abatement and Vector Control District Law of the State of California law. The following are excerpts from the Mosquito Abatement and Vector Control District Law of 2002, codified in the Health and Safety Code, Section 2000, et seq. which serve to summarize the State Legislature's findings and intent regarding mosquito abatement and other vector control services:

2001.(a) The Legislature finds and declares all of the following:

(1) California's climate and topography support a wide diversity of biological organisms.

(2) Most of these organisms are beneficial, but some are vectors of human disease pathogens or directly cause other human diseases such as hypersensitivity, envenomization, and secondary infections.

(3) Some of these diseases, such as mosquito-borne viral encephalitis, can be fatal, especially in children and older individuals.

(4) California's connections to the wider national and international economies increase the transport of vectors and pathogens.

(5) Invasions of the United States by vectors such as the Asian tiger mosquito and by pathogens such as the West Nile virus underscore the vulnerability of humans to uncontrolled vectors and pathogens.

(b) The Legislature further finds and declares:

(1) Individual protection against the vector-borne diseases is only partially effective.

(2) Adequate protection of human health against vector-borne diseases is best achieved by organized public programs.

(3) The protection of Californians and their communities against the discomforts and economic effects of vector-borne diseases is an essential public service that is vital to public health, safety, and welfare.

(4) Since 1915, mosquito abatement and Vector Control Districts have protected Californians and their communities against the threats of vector-borne diseases.

(c) In enacting this chapter, it is the intent of the Legislature to create and continue a broad statutory authority for a class of special districts with the power to conduct effective programs for the surveillance, prevention, abatement, and control of mosquitoes and other vectors.

(d) It is also the intent of the Legislature that mosquito abatement and vector control districts cooperate with other public agencies to protect the public health, safety, and welfare. Further, the Legislature encourages local communities and local officials to adapt the powers and procedures provided by this chapter to meet the diversity of their own local circumstances and responsibilities.

Further the Health and Safety Code, Section 2082(a) specifically authorizes the creation of benefit assessments for vector control, as follows:

A district may levy special benefit assessments consistent with the requirements of Article XIIID of the California Constitution to finance vector control projects and programs.

Legal Analysis

Proposition 218

This assessment was formed consistent with Proposition 218, The Right to Vote on Taxes Act, which was approved by the voters of California on November 6, 1996, and is now Article XIIIC and XIIID of the California Constitution. Proposition 218 provides for benefit assessments to be levied to fund the cost of providing services, improvements, as well as maintenance and operation expenses to a public improvement which benefits the assessed property.

Proposition 218 describes several important requirements, including a property-owner balloting, for the formation and continuation of assessments, and these requirements were satisfied by the process used to establish this assessment. When Proposition 218 was initially approved in 1996, it allowed for certain types of assessments to be "grandfathered" in, and these were exempted from the property–owner balloting requirement.

> *Beginning July 1, 1997, all existing, new, or increased assessments shall comply with this article. Notwithstanding the foregoing, the following assessments existing on the effective date of this article shall be exempt from the procedures and approval process set forth in Section 4:*
> *(a) Any assessment imposed exclusively to finance the capital costs or maintenance and operation expenses for sidewalks, streets, sewers, water, flood control, drainage systems or vector control.*

Vector control was specifically "grandfathered in," underscoring the fact that the drafters of Proposition 218 and the voters who approved it were satisfied that funding for vector control is an appropriate use of benefit assessments and therefore confers special benefit to property.

Silicon Valley Taxpayers Association, Inc. v. Santa Clara County Open Space Authority

In July of 2008, the California Supreme Court issued its ruling on the Silicon Valley Taxpayers Association, Inc. v. Santa Clara County Open Space Authority ("SVTA vs. SCCOSA"). This ruling is the most significant legal document in further legally clarifying Proposition 218. Several of the most important elements of the ruling included further emphasis that:

- Benefit assessments are for special benefit to property, not general benefits[2]

[2] Article XIII D, § 2, subdivision (d) of the California Constitution states defines "district" as "an area determined by an agency to contain all parcels which will receive a special benefit from the proposed public improvement or property-related service."

- The services and/or improvements funded by assessments must be clearly defined
- Special benefits are directly received by and provide a direct advantage to property in the Assessment Area

This Engineer's Report is consistent with the SVTA vs. SCCOSA decision and with the requirements of Article XIIIC and XIIID of the California Constitution because the Services to be funded are clearly defined: the Services are available to all benefiting property in the Assessment Area; the benefiting property in the Assessment Area will directly and tangibly benefit from reduced mosquito and vector populations; reduced risk of the presence of diseases; increased safety of property and other special benefits; and such special benefits provide a direct advantage to property in the Assessment Area that is not enjoyed by the public at large or other property. There have been a number of clarifications made to the analysis, findings and supporting text in this Report to ensure that this consistency is well communicated.

Dahms v. Downtown Pomona Property

On June 8, 2009, the 4th Court of Appeal amended its original opinion upholding a benefit assessment for property in the downtown area of the City of Pomona. On July 22, 2009, the California Supreme Court denied review. On this date, Dahms became good law and binding precedent for assessments. In Dahms, the court upheld an assessment that was 100% special benefit (i.e., 0% general benefit) on the rationale that the services and improvements funded by the assessments were directly provided to property in the assessment district. The court also upheld discounts and exemptions from the assessment for certain properties.

Bonander v. Town of Tiburon

On December 31, 2009, the 1st District Court of Appeal overturned a benefit assessment approved by property owners to pay for placing overhead utility lines underground in an area of the Town of Tiburon, CA. The court invalidated the assessments on the grounds that the assessments had been apportioned to assessed property based, in part, on relative costs within sub-areas of the assessment district instead of proportional special benefits.

Beutz v. County of Riverside

On May 26, 2010, the 4th District Court of Appeal issued a decision on the Steven Beutz v. County of Riverside ("Beutz") appeal. This decision overturned an assessment for park maintenance in Wildomar, California, primarily because the general benefits associated with improvements and services were not explicitly calculated, quantified and separated from the special benefits.

Golden Hill Neighborhood Association v. City of San Diego

On September 22, 2011, the San Diego Court of Appeal issued a decision on the Golden Hill Neighborhood Association v. City of San Diego appeal. This decision overturned an assessment for street and landscaping maintenance in the Greater Golden Hill neighborhood of San Diego, California. The court described two primary reasons for its decision. First, like in Beutz, the court found the general benefits associated with services were not explicitly calculated, quantified and separated from the special benefits. Second, the court found that the City had failed to record the basis for the assessment on its own parcels.

Compliance with Current Law

This Engineer's Report is consistent with the requirements of Article XIIIC and XIIID of the California Constitution and with the SVTA decision because the Services to be funded are clearly defined; the Services are available to and will be directly provided to all benefiting property in the Assessment District; and the Services provide a direct advantage to property in the Assessment District that would not be received in absence of the Assessments.

This Engineer's Report is consistent with Dahms because, similar to the Downtown Pomona assessment validated in Dahms, the Services will be directly provided to property in the Assessment District. Moreover, while Dahms could be used as the basis for a finding of 0% general benefits, this Engineer's Report establishes a more conservative measure of general benefits.

This Engineer's Report is consistent with Bonander because the Assessments have been apportioned based on the overall cost of the Services and proportional special benefit to each property. Finally, the Assessments are consistent with Beutz and Greater Golden Hill because the general benefits have been explicitly calculated and quantified and excluded from the Assessments.

Assessment Continuation

In each subsequent year for which the assessments will be continued, an Engineer's Report must be prepared to establish the Services to be funded by the Assessments for the fiscal year, to determine the assessments for each parcel in the Assessment Area, and to make other findings. After the Engineer's Report has been prepared, it will be reviewed by the Board and a public hearing will be held. A notice of the intent to continue the assessments for the next fiscal year and the date when the Board will hold the public hearing will be published in a local newspaper. At the annual public hearing, members of the public can provide input to the Board prior to the Board's decision on continuing the services and assessments for the next fiscal year. After the conclusion of the public hearing, the Board may take action, by resolution, to approve the Engineer's Report and the levy of the assessments for the upcoming fiscal year. If the Board approves the continuation of the assessments, they will be included and collected with property tax bills.

This Engineer's Report was prepared by SCI Consulting Group ("SCI") to describe the continued Services to be funded by the benefit assessment for fiscal year 2025-26, to establish the estimated costs for those Services, to determine the special benefits and general benefits received by property from the Services, and to apportion the assessments to lots and parcels within the Assessment Area based on the estimated special benefit each parcel receives from the Services funded by the benefit assessment.

Since the initial Single-Family Equivalent (SFE) assessment rate of $8.55 in 2005, the rate has been reviewed and adjusted as needed annually. The rate proposed for fiscal year 2025-26 is $12.36. The proposed rate is below the maximum authorized rate allowed of $14.82.

Certificates

1. The undersigned respectfully submits the enclosed Engineer's Report and does hereby certify that this Engineer's Report, and the Assessment and Assessment Diagram herein, have been prepared by me.

Engineer of Work, License No. C52091

2. I, the County Auditor of the County of San Diego, California, hereby certify that Assessment Roll and Assessment Diagram for fiscal year 2025-26 were filed with me on _____, 2025.

County Auditor, County of San Diego

General Description of the Program and Proposed Services

About the Vector Control Program

The Vector Control Program ("VCP" or "Program") operates within the County of San Diego Department of Environmental Health and Quality ("DEHQ") and monitors disease-carrying organisms such as mosquitoes, ticks, and other harmful pests including flies and rats. VCP reduces mosquito populations using an integrated vector management strategy that encompasses public education, surveillance and monitoring, disease diagnostics, source reduction, and source treatment. In addition, VCP provides property inspections and advice for the control of mosquitoes, domestic rats, flies, and other vectors for properties throughout the Assessment Area. VCP also conducts surveillance and tests for diseases carried by certain insects, ticks, and small mammals. Public education and outreach activities are conducted to increase prevention and protection against mosquitoes that can carry viruses like Zika, dengue, chikungunya, and West Nile (WNV) as well as ticks and rodent vectors. In recent years, following their detection in San Diego County, there has been an increased focus on monitoring and controlling invasive *Aedes* mosquitoes that can vector diseases like Zika, dengue, and chikungunya.

VCP provided a nominal level of services with the limited funding available prior to the Assessment. The Assessment provides additional funding to improve mosquito, vector, and disease control services for all properties in the Assessment Area. These services are over and above the nominal level of services that would be provided in absence of the Assessment.

Description of the Vector Control Program

This year, VCP successfully provided property owners services and protection from vector-borne diseases. The diseases of most concern are: West Nile virus (WNV), Western Equine Encephalitis (WEE), Saint Louis Encephalitis (SLE), and malaria, which can all be transmitted by endemic mosquitoes, as well as dengue, Zika, and chikungunya transmitted by non-native invasive *Aedes* mosquitoes like *Ae. aegypti*; plague, transmitted by fleas; Hantavirus Pulmonary Syndrome (HPS), transmitted by certain species of wild mice; and tick-borne diseases including Lyme disease, tularemia, and rickettsial diseases. With the expansion of the range and numbers of invasive *Aedes* mosquitoes, VCP has focused efforts on comprehensive responses to invasive *Aedes* and the prevention of local transmission of dengue and other *Aedes*-transmitted illnesses. In addition, WNV activity remains a concern with 129 infections and 12 fatalities in California in 2024 reported by the California Department of Public Health.

VCP continued to reduce the potential for the spread of diseases and the impact that vectors have on property through ongoing educational outreach, vector surveillance activities, diagnostics, source reduction, source treatment, and abatement. These efforts also minimize the nuisance impact that vectors can have on property and residents. To fulfill this purpose, VCP takes necessary steps to control mosquitoes, monitor vectors, and perform other related vector control services.

Currently, VCP provides vector surveillance and control services as well as information on how to protect oneself and property from vectors and the diseases they carry. These services are further defined as follows:

- Respond to mosquito problems as well as other potential disease-carrying vectors in the Assessment Area.
- Reduce mosquito populations by the application of larvicide to control mosquito larvae via helicopter, boat, truck, backpack blowers, and by hand in the Assessment Area.
- Reduce risk of local mosquito-borne disease transmission in the event of an elevated public health risk by utilizing U.S. Environmental Protection Agency-approved public health insecticides.
- Participate in emergency response and recovery vector surveillance and control activities within the Assessment Area.
- Monitor adult mosquito abundance using a variety of traps to assess public health risks and allocate control efforts.
- Collect and test mosquitoes for mosquito-transmitted viruses such as WNV, SLE, WEE, Zika, dengue, and chikungunya.
- Monitor for new and emerging vectors.
- Conduct routine aerial searches for neglected “green swimming pools” on properties in the Assessment Area to identify and stop mosquito breeding occurring in backyard sources.
- In egregious cases of non-compliance or non-response with education and abatement of mosquito breeding and/or rodent harborage, take enforcement action to resolve the issues. Enforcement action may include Official Notice letters, Inspection and Abatement warrants, Forcible Inspection and Abatement warrants, and/or Notice and Order to Abate.
- Detect vector-borne pathogens and evaluate their risk to public health using molecular tools and science-based methods.
- Assist property owners and tenants in the control of rats through onsite inspection, advice, the issuance of a rat control starter kit and public education.
- Monitor rodent hantavirus reservoir species, such as deer mice, through trapping and testing in the Assessment Area.
- Survey and identify arthropod and rodent-borne diseases such as Lyme disease and plague found in parks, campgrounds, on trails and other locations.

- Conduct a twice-yearly trapping program for rodents in ports of entry to test for the presence of plague or hantavirus.
- Educate property owners about the risks of diseases carried by mosquitoes, ticks, and small mammals, and emphasize personal protection as well as individual responsibility by providing educational programs on vectors and vector-borne disease abatement at schools, businesses and community group meetings and events.
- Develop and distribute informative materials and brochures that describe what county residents, employees, and property owners in the Assessment Area can do to protect themselves from vector-borne diseases and keep their homes and property free of mosquitoes and other vectors.
- Maintain Program websites (SDFightTheBite.com and SDVector.com) with up-to-date WNV activity, hantavirus detections, and other emerging disease information, ultra-low volume insecticide application activity, aerial larvicide application schedules, mosquito fish distribution locations, press releases and any other pertinent vector related information to support the protection of public health in San Diego County.
- Continue methods to distribute vector control information via digital, outdoor, and social media, such as Facebook (@SDFightTheBite).

VCP protects the public from vector-borne disease and mosquito nuisance, while protecting the environment, using an Integrated Vector Management (IVM) strategy. The five core components of IVM include:

1. Early detection of public health risks through comprehensive vector surveillance and monitoring.

2. Control and reduction of vectors that transmit diseases to humans or create public nuisance using the most efficient, effective, and environmentally sensitive means of vector source control.

3. Source treatment (i.e. biological and chemical controls.)

4. Dissemination of information to provide county residents and property owners with tools for prevention, protection, and reporting of vectors that transmit diseases.

5. Detection of vector-borne pathogens.

Figure 1: **Summary of Services and Performance Measures**

Core Function	Performance Measure
Perform comprehensive vector surveillance to detect vector disease risks to public health	1. Maintain appropriate levels of surveillance for early detection of disease ▪ Set an average of 10 or more Gravid Traps per week for mosquito surveillance during peak mosquito season ▪ Set 30 or more CO_2 traps per week for mosquito surveillance during mosquito season ▪ Set 10 or more BG Sentinel, or other *Aedes*-specific traps per week for mosquito surveillance during peak season for invasive Aedes mosquitoes ▪ Test for hantavirus or plague at 50 or more locations throughout the year ▪ Test for rodent-borne diseases at ports-of-entry twice yearly 2. Sample 40 or more different locations for the presence of tick-borne diseases, including Lyme and tularemia
Protect public health by reducing vectors or exposure to vectors that transmit diseases to humans	~~3.~~ Work with agencies and other owners of mosquito breeding sources as they manage their property to reduce mosquito breeding. 4. Reduce risk of rodent-borne diseases ▪ Treat rodent burrows where plague and high numbers of fleas are detected to eliminate fleas and stop the spread of disease ▪ Provide guidance to property owners to exclude mice and rats and remove attractants from buildings to prevent rodent infestations. ▪ Protect the environment by using comprehensive integrated vector management strategies and the "lightest touch" effective methods for vector control

Core Function	Performance Measure
	▪ Train staff to implement best management practices for vector control and environmental protection ▪ Assess emerging technologies and control methods and implement when appropriate ▪ Work collaboratively with private, city, state, and federal environmental and wildlife agencies to implement comprehensive vector control measures 5. Fly Control ▪ Inspect commercial poultry ranches annually for fly-breeding prevention practices ▪ Review annual proposals for the prevention and control of fly breeding on commercial poultry ranches
Disseminate vector-related public health information to provide residents and property owners with empowering tools for active involvement in prevention, protection and reporting	6. Increase awareness of vector-borne disease prevention and control ▪ Conduct outreach presentations to communities, schools, organizations, and business groups throughout the county ▪ Create and maintain informative webpages containing vector prevention strategies, resources, and up-to-date vector information for the public ▪ Share informative press releases and County News Center stories when vector-borne diseases are detected ▪ Distribute educational materials throughout the assessment area ▪ Conduct outreach campaigns to raise awareness of potential vector-borne diseases
Provide in-house laboratory testing for timely identification of vector-borne pathogens and vector analysis	7. Enhance capabilities to detect and analyze vectors and vector-borne pathogens to augment effective control measures ▪ Develop and optimize tests for detecting and analyzing vectors and vector-borne pathogens ▪ Rapidly identify pathogens in vectors retrieved from the field ▪ Analyze mosquito vectors to determine optimal public health pesticides for control

Core Function	Performance Measure
Prevent and control vector-borne diseases through timely response to complaints or requests for service	8. Respond to complaints or requests for service about mosquitoes, rats/mice, eye gnats and flies by contacting at least 97% of requestors within 3 business days and resolve within 21 business days of receipt 9. Investigate aerially identified green swimming pools and spas within 21 days of identification

Mosquito-borne Virus Strategic Response Plan

The purpose of the Mosquito-borne Virus Strategic Response Plan (MBVSRP) is to implement integrated, risk-based responses designed to promote safe and livable communities. The MBVSRP is based on criteria established by the California Department of Public Health (CDPH) California Mosquito-borne Virus Response Plan and guidance from the Centers for Disease Control and Prevention (CDC). The MBVSRP establishes a coordinated response to mosquito-borne viruses within the county. The MBVSRP is evaluated regularly to address changing conditions and public health risks.

In the summers of 2008, 2015, and 2016, VCP increased its level of response consistent with the MBVSRP. This heightened level of response was due to an increasing number of WNV-positive dead birds, mosquito batches, and the occurrence of human infections. Surveillance and control efforts were also increased. This included helicopter flyovers looking for neglected green swimming pools and stagnant water, as well as door-to-door inspections for mosquito breeding sources in the neighborhoods of human cases. Small mosquito breeding sources such as watering cans, pooling irrigation water (overspray), and decorative water features were identified in yards throughout the county.

In response to the detection of invasive *Aedes* mosquitoes in San Diego County, VCP developed the MBVSRP based on guidance from CDPH and the CDC and in consideration of local conditions. The MBVSRP contains a detailed risk analysis that leads to actions VCP will take in response to conditions ranging from travel-associated *Aedes*-transmitted disease detection to sustained local transmission of *Aedes*-transmitted viruses such as Zika, dengue, and chikungunya.

The knowledge gained from previous years aids in the implementation of the MBVSRP for the upcoming year. This information is used for adapting to changing environmental conditions within the county. These environmental conditions may include previously unidentified breeding sources for mosquitoes, such as neglected green swimming pools, underground basins, or utility vaults.

VCP implements its Integrated Vector Management Strategy in a manner that protects the public from mosquito-borne diseases. The details of this implementation are included in the next three sections:

- Mosquito-borne Disease Surveillance
- Mosquito Control
- Public Education/Outreach

Mosquito-Borne Disease Surveillance

Mosquito-borne disease surveillance is conducted throughout VCP Assessment Area, especially in areas near known historical breeding sites, at or near complaints and service requests (including green pools), and from a wide range of locations, to assess mosquito species diversity, abundance, and disease prevalence. Various types of mosquito traps are strategically placed to measure mosquito levels throughout the county. Treatment strategies are based on the results of the surveillance and are tailored for each unique situation.

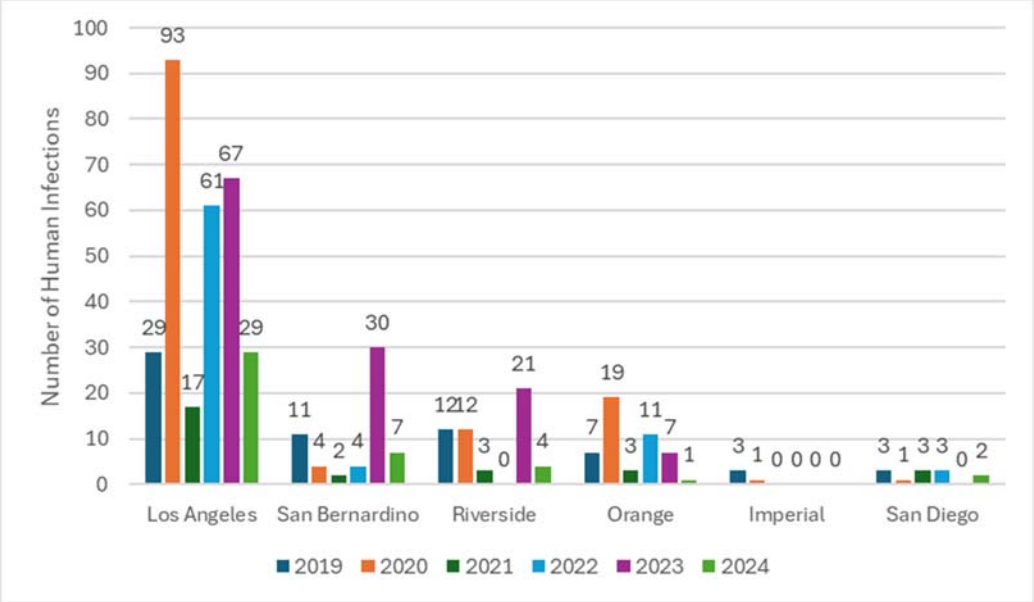
Of the world's more than three thousand mosquito species, more than 50 species live in California, and at least 30 have been identified in San Diego County, although some species have not been seen in several decades. Seven species of mosquitoes found in San Diego County (*Culex tarsalis, Culex quinquefasciatus, Culex erythrothorax, Anopheles hermsi, Culex thriambus, Culex restuans* and *Aedes sierrensis*) can transmit different diseases such as WNV, SLE, WEE, malaria, and heartworm. Two invasive *Aedes* species found in the county, *Aedes aegypti and Aedes albopictus,* first detected in 2014 and 2015*,* respectively, can transmit viruses such as dengue, Zika, and chikungunya. Fortunately, *Aedes albopictus* has not been detected in the county for the last several years and San Diego County has now been designated free of *Aedes albopictus* by the California Department of Public Health*.* However, a third invasive *Aedes* species, *Aedes notoscriptus*, was detected in 2018 and is thought to be able to transmit other, less common diseases. VCP conducts surveillance and testing of mosquitoes that could transmit WNV, SLE, WEE, dengue, Zika, and chikungunya. VCP also collects and tests for WNV in dead corvid and raptor birds that are reservoirs for WNV.

VCP has identified nearly 1,600 chronic mosquito breeding water sources throughout the county. Mosquitoes from these sources can affect properties within the Assessment Area.

In addition to transmitting diseases, mosquitoes can negatively impact workers on farms and businesses, recreation and tourism industries, real estate values, and the public-at-large. Mosquitoes are therefore recognized as a public nuisance. The California legislature has found that the protection of "Californians and their communities against the discomforts and economic effects of vector-borne diseases is an essential public service that is vital to public health, safety and welfare." (Health and Safety Code section 2001 (b)(3)).

WNV was first discovered in San Diego County in 2003. The California Department of Public Health reported 155 human infections of WNV diagnosed in San Diego County from 2003-2024. In 2014, the County experienced its first fatality from the disease. In 2015, 44 human infections were diagnosed in the county with six fatalities. In 2024, there were no locally-acquired human infections but 2 cases linked to travel outside of the county, one of which was fatal, were reported. Figure 2 shows the number of human WNV infections in Southern California counties from 2019 to 2024.

Figure 2: Human WNV Infections in Southern California 2019-2024



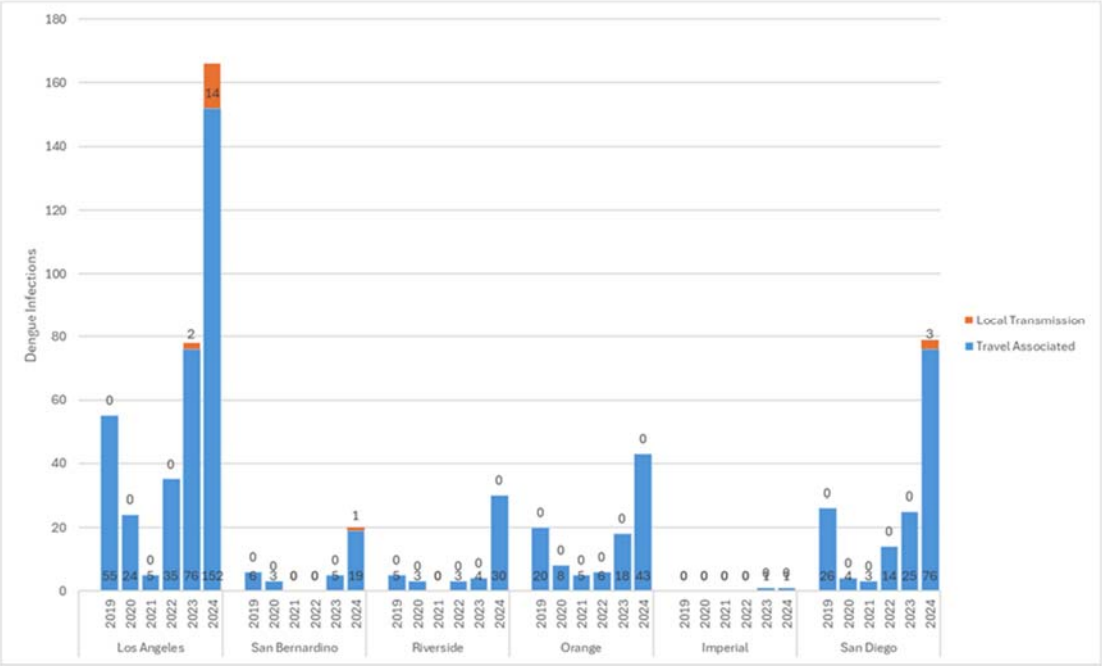
VCP continues to do surveillance throughout the Assessment Area to further define the distribution and abundance of mosquito species and to inform outreach and control efforts.

Since its initial detections in South County in 2014, *Aedes aegypti* has spread to many parts of the county. This has made the monitoring and investigation of tropical diseases

that can be transmitted by this mosquito, such as dengue, chikungunya, and Zika, a high priority for VCP. In 2024, VCP investigated 76 cases of dengue in county residents that were contracted outside of the country, which was more than four times the number cases investigated in 2023. Furthermore, the first 3 confirmed locally acquired cases of dengue were also reported. VCP rapidly mounted a thorough and comprehensive response to these disease reports to prevent additional transmission within the county.

Figure 3 demonstrates the number of dengue infections in the Southern California region. The first local transmission of dengue in California was identified in 2023 in Los Angeles County. In 2024, local transmission of dengue occurred in Los Angeles, San Bernardino, and San Diego Counties. Human dengue infection counts for San Diego County are based on figures reported by the County of San Diego's Health and Human Services Agency.

Figure 3: Dengue Virus Infections (travel-associated and locally acquired) in Southern California 2019-2024

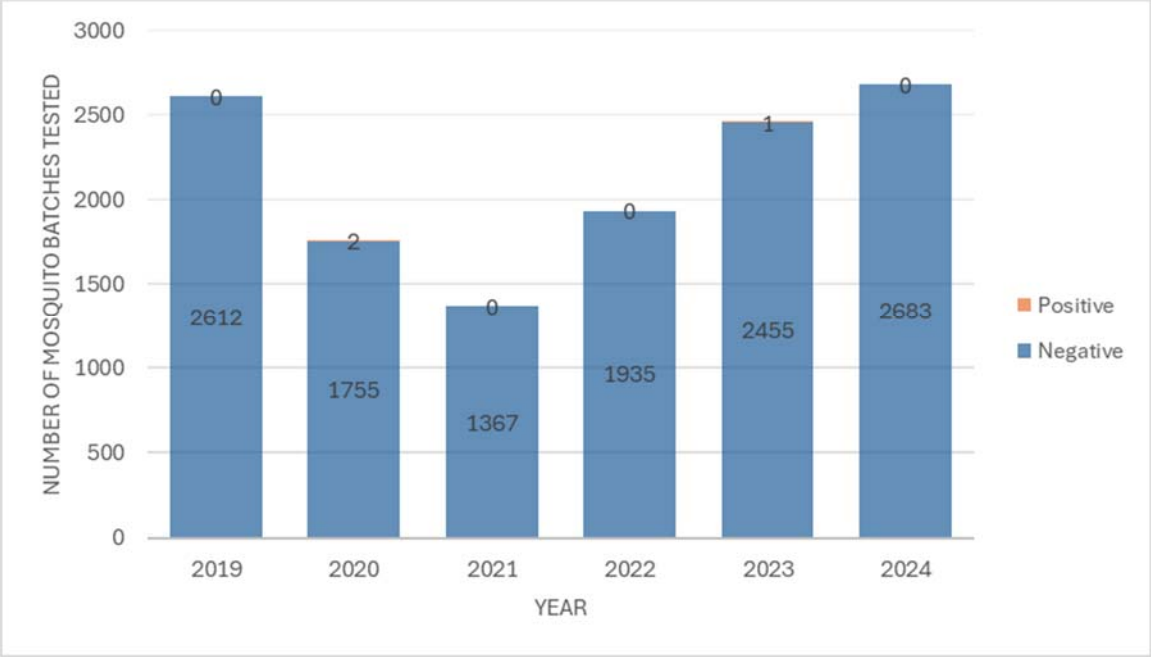


Mosquito Testing

In addition to testing corvids and raptors for WNV, testing mosquitoes for WNV and other viruses is used to assess the risk to public health and determine the scope of interventions required.

Mosquitoes are grouped into batches of up to 50 for testing. WNV detection in mosquitoes peaked in 2016 with 99 of 657 (15%) batches testing positive for the virus. In 2024, 2,683 batches of mosquitoes representing 22,941 mosquitoes were tested, with none testing positive for WNV (Figure 4). The number of mosquito batches tested in 2024 increased 9% over the number tested in 2023 (2,683 vs 2,456).

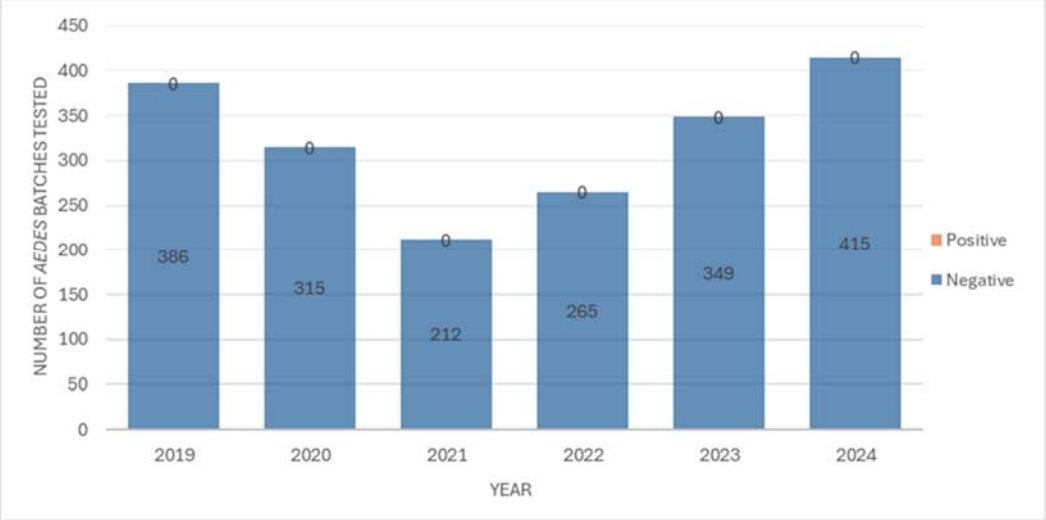
Figure 4: Adult Mosquito Testing During 2019-2024



In response to the emerging spread of invasive *Aedes* species and tropical diseases they can spread, testing these mosquito species for diseases began locally in 2016. VCP lab staff subsequently optimized a dengue virus assay to test four different dengue serotype viruses at once in mosquito samples. This test greatly enhanced testing efficiency and assists in making time-critical operational decisions. In recognition of this accomplishment, the program received an award from the National Association of Counties in 2020 for developing this test. Additional efficiencies and enhancements in 2023 were achieved by the laboratory implementing another multiplex test to detect several other diseases caused by chikungunya, dengue, and Zika viruses, vectored by *Aedes aegypti*, to be tested concurrently, which further reduces the amount of reagents and time required to perform each test.

In 2024, lab staff tested 415 batches of *Aedes* mosquitoes (totaling 1,380 mosquitoes) for chikungunya, dengue, and Zika virus. No mosquito batches were positive for these viruses. This is approximately 19% more batches tested than in 2023 (415 vs 349) (Figure 5).

Figure 5: Testing Invasive Aedes Mosquitoes for Dengue, Zika, Chikungunya 2029-2024



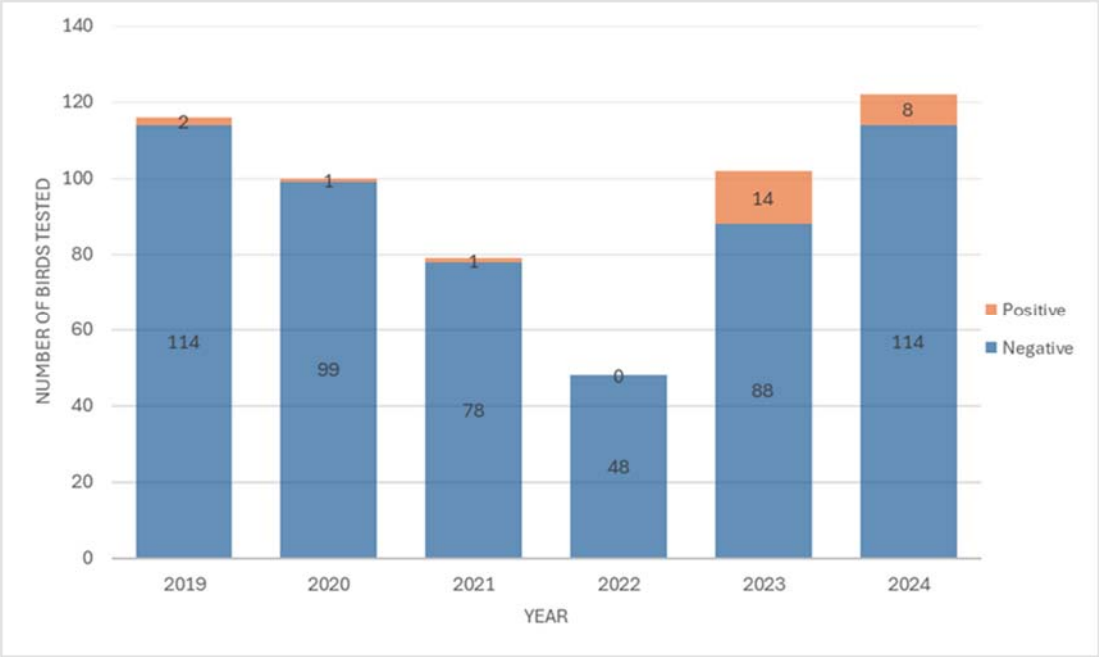
Aerial Surveillance

Unmaintained swimming pools, spas, and ponds can become significant mosquito breeding sources in residential neighborhoods. To locate these previously unidentified breeding sources, VCP analyzes aerial images. Once these mosquito breeding sources are identified, VCP inspects and treats them, if needed. In 2024, 246 unmaintained pools were identified and investigated throughout the county. In addition, VCP conducted a pilot project to identify recalcitrant green pools early in the season and encourage the property owner to fix the problem without a technician inspection. The program was very successful with all properties identified fixing the problems themselves, preventing mosquito breeding, and reducing Program costs.

Dead Bird Testing

Dead bird testing is an invaluable surveillance tool used to detect WNV activity and can be an early indicator of WNV activity in the region. VCP requests that residents report dead crows, ravens, jays, hawks, and owls to them. These WNV-susceptible birds are tested for WNV in the fluid from the birds' eyes and/or internal organs. In 2024, 114 birds were tested, with 8 positive for WNV (Figure 6). WNV detection in birds peaked in 2008 when 563 of 815 (69%) birds tested positive for the virus.

Figure 6: Dead Bird Surveillance 2019-2024



Disease Investigations

The Vector Control Program investigates reports of mosquito-borne disease in county residents whether acquired outside or within the County to determine what measures may be necessary to prevent disease spread. In 2024, VCP investigated 86 probable and confirmed cases of mosquito-borne diseases and took proactive actions to prevent their spread to others. This represents an almost five times increase over 2023. Four of the cases necessitated adulticide treatments to prevent local transmission of dengue. These adulticide events required immediate and substantial staff response to inform affected residents and prevent the potential for disease transmission. Although most of the cases were associated with residents who became infected while traveling to a foreign country, three of the cases were acquired locally and necessitated a rapid and intense response from VCP to prevent further spread. This included door-to-door and truck-applied treatments to knock down mosquito numbers to levels that would not support continued transmission. Fortunately, no further locally-acquired cases were detected following these treatments.

Mosquito Control

To control mosquitoes, VCP monitors approximately 1600 mosquito breeding sources throughout the county. Sources include privately and publicly held lands with rivers, streams, marshlands, lagoons, ponds, and various other human-made and natural sources of standing water. The owners of land containing mosquito breeding sources can often be determined using Geographic Information Systems (GIS) databases. This enables VCP to identify and educate property owners regarding their responsibility to manage water on their property(ies) so that they don't breed mosquitoes. Chronic mosquito breeding sources are evaluated during the winter so that plans can be formulated to treat these locations during the mosquito breeding season later in the year.

To achieve the County's goal of reducing or eliminating mosquito breeding sources countywide, VCP first seeks voluntary compliance of property owners to eliminate mosquito breeding sources on their properties. If voluntary compliance cannot be obtained, VCP will work with property owners, public agencies, and municipalities to ensure appropriate abatement and remediation is taken to protect public health. Formal progressive enforcement action is pursued if voluntary compliance cannot be achieved.

VCP's objective is to provide assessment properties a consistent level of mosquito surveillance, control, testing, and outreach such that all properties would benefit from equivalent reduced levels of mosquitoes and other vectors.

The County also communicates with other government agencies, such as Marine Corps Base Camp Pendleton, to support mosquito control efforts on the base to reduce the number of mosquitoes that can travel from the base to nearby residential areas in the Assessment Area. It is through these cooperative efforts that in 2014, staff on the Naval Base San Diego alerted VCP to its first detection of invasive *Aedes aegypti* mosquitoes in the county.

Physical Control

VCP guides property owners to physically alter mosquito habitat (breeding sites) when possible so that the habitat is less likely to produce mosquitoes. Physical mosquito control methods primarily target mosquitoes in their immature stages. It may include removing vegetation or sediment, interrupting water flow, rotating stored water, pumping and/or filling sources, improving drainage and water circulation systems, and installing, improving, or removing culverts, tide gates, and other water control structures in wetlands. VCP directs property owners to coordinate water management efforts under the guidance of federal and state regulatory agencies.

Mosquito Biological Controls

Mosquitofish, *Gambusia affinis*, are one of VCP's biological control agents used against mosquitoes. Mosquitofish are not native to California but have been widely established in the state since the early 1920s and now inhabit most natural and constructed water bodies. VCP maintains a population of mosquitofish in tanks and ponds and also periodically collects mosquitofish from natural water bodies located in the Assessment Area. It provides the mosquitofish free to property owners to control mosquito breeding in artificial containers such as ornamental fishponds, rain barrels, horse troughs, and unmaintained swimming pools and spas. The free fish are available at several distribution locations throughout the Assessment Area as well as the VCP office. These locations are published on the SDFightTheBite.com website.

When field inspections determine the presence of mosquito eggs or larvae in a water source, if mosquito fish or physical control methods are not appropriate treatment modalities, larvicides are applied to the source in strict accordance with label instructions. Over 94% of the larvicides consist of natural biological materials that are organically registered or have organic active ingredients as well as other insecticides approved by the U.S. Environmental Protection Agency to control mosquito populations.

Starting in November of 2011, pesticides applied for vector control to waters of the United States by VCP must be in accordance with the Statewide National Pollutant Discharge Elimination System (NPDES) Permit for Biological and Residual Pesticide Discharges to Waters of the United States from Vector Control Applications. VCP received a Notice of Authorization from the State Water Resources Control Board (SWRCB) to operate under the Statewide permit. The first annual report covering November and December 2011 was submitted in February 2012 and annually thereafter.

Order 2014-0038 EXEC amended the NPDES Monitoring and Reporting Program and replaced visual, physical, and chemical monitoring requirements with reporting of visual observations, monitoring and reporting of pesticide application rates, and reporting of non-compliant applications.

Order 2014-0106-DWQ amended the Statewide NPDES Permit for Biological and Residual Pesticide Discharges to Waters of the United States from Vector Control Applications and did the following: (1) adds to the permit all larvicides and adulticides that are currently registered by California Department of Pesticide Regulations (DPR) using the same active ingredients; (2) includes additional receiving water limitations and receiving water monitoring triggers for newly added active ingredients; and (3) includes a provision for reopening the permit to include new active ingredients that DPR registers for vector control.

On March 1, 2016, the SWRCB reissued the Vector Control Permit with Water Quality Order 2016-0039-DWQ which became effective on July 1, 2016. The updated Order included the addition of minimum risk pesticides which are pesticides exempted from the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requirements when used only in the manner specified by federal regulations.

In 2024, VCP made over 6,000 larvicide applications in treatment areas to the waters of the United States under the SWRCB permit. No adverse incidents were observed in any of the treatment areas.

Depending on time of year, water temperature, organic content, mosquito species present, larval density, and other variables, larvicide applications may be repeated at intervals ranging from weekly to annually. Larvicides included in the Notice of Authorization from the SWRCB include the following active ingredients:

- *Bacillus thuringiensis* subspecies *israelensis*
- *Lysinibacillus (Bacillus) sphaericus*
- Methoprene
- Mineral oil
- Spinosad

Aerial Mosquito Larvicide Application

Beginning in 2004, VCP implemented an aerial mosquito larvicide application program. Aerial application of mosquito larvicide is the best method for treating areas inaccessible by land or too large for treatment by land. There are three criteria that need to be met before a source can be considered a candidate for aerial application:

- Breeding source must be a proven mosquito breeding location
- Breeding source must be inaccessible or too large to treat from the ground
- Breeding source must be in proximity to a significant “at risk” human population

Aerial larvicide applications are especially useful in marshy areas and ponds that have thick stands of cattails and other vegetation within the Assessment Area, that are near residents or businesses, and breed mosquitoes. VCP contracts with a helicopter application service to apply larvicides to water bodies where the mosquito larvae grow. Larvicides are made from bacteria or bacterial products that, when applied in accordance with the manufacturer's label, are specific to treat mosquito larvae. This results in the efficient elimination of larvae before they can develop into biting adults. Mosquito data was regularly evaluated and larvicides were applied to mosquito breeding locations from April through September in 2024, as needed. The number of locations treated in a specific aerial application event varies according to individual site conditions. As discussed previously, starting in November of 2011, pesticide application to waters of the United States is conducted in compliance with the Statewide NPDES Permit. Aerial mosquito larvicide control efforts reduce the risk of mosquito-borne disease in the Assessment Area as well as numbers of nuisance biting mosquitoes.

Adult Mosquito Control

If surveillance or inspections reveal that adult mosquitoes are present in conditions that create the potential for an elevated risk to human health (e.g., a risk for disease transmission), control measures may be necessary to eliminate adult mosquitoes. In situations where sufficient levels of disease-infected adult mosquitoes or mosquitoes capable of transmitting a specific disease are found to create an elevated public health risk, aerosolized application of a chemical adulticide to control adult mosquitoes to prevent disease transmission may be used in accordance with adopted strategic response plans. The County's *Mosquito-borne Virus Strategic Response Plan* includes criteria customized to the vector species and diseases detected to determine when and where adulticide use is warranted. Adulticide applications may also be warranted to control mosquitoes in situations when disease has not been detected but mosquitoes that are capable of producing human discomfort or injury and constitute a public nuisance as defined in Section 3480 of the California Civil Code are present.

Adulticides included in the Notice of Authorization from the SWRCB include, but are not limited to, the following active ingredients:

- Pyrethrins
- Piperonyl butoxide
- Resmethrin
- Deltamethrin
- Lambda-cyhalothrin
- d-phenothrin (Sumithrin)
- Prallethrin

- Permethrin

Public Educational Outreach

General Summary

VCP conducts public educational outreach to teach residents about vectors and vector-borne diseases within the county. An educational campaign emphasizes prevention, protection, reporting, and behavioral change. Social media (e.g., Facebook, X, Nextdoor) is used to notify the public of media releases and scheduled aerial larvicide treatments. VCP proactively initiates media releases though the County Communications Office and identifies VCP as a local resource for vector-borne disease information. Two interlinked websites provide information and enable property owners to report concerns and request services: SDVector.com and SDFightTheBite.com.

Health education, outreach, and raising awareness in the Assessment Area are all integral parts of the MBVSRP. A proactive approach is used to educate people within the Assessment Area about the risks of WNV and other mosquito-borne diseases, and preventive measures they can take to protect themselves and their communities. Strategies include conducting educational presentations for high-risk groups such as seniors, conducting presentations at schools, staffing informational displays at health fairs, science fairs, and community fairs, and collaborating with different county and city departments and organizations.

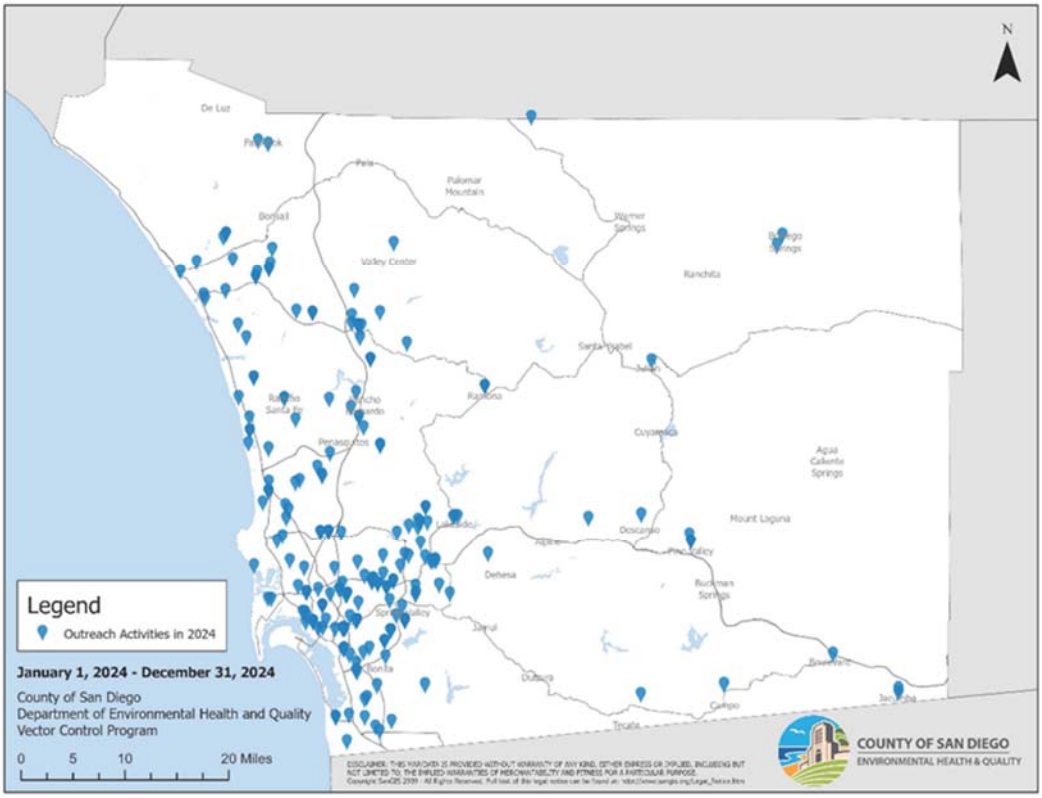
A similar proactive approach is used for educating the public about diseases transmitted by rats, ticks, and mice. Educational presentations and tabletop displays are used and pamphlets are distributed to people within the Assessment Area by VCP. Rat control starter kits are provided to property owners during site inspections and consultations. These kits include educational information that focuses on exclusion, baiting, and trapping.

Outreach Events

To inform the public about vector-borne diseases and prevention, VCP attended 73 events, including community fairs, health fairs, and STEM fairs, gave 75 presentations to schools, program stakeholders, and other members of the public, and delivered outreach materials to over 70 locations reaching all five County of San Diego supervisorial districts (Figure 7).

VCP also utilizes media releases, press conferences and media events to help deliver vector-borne disease prevention information.

Figure 7: Outreach Activity Locations 2024



Educational Materials

VCP distributes educational materials covering WNV and general mosquito prevention, including brochures, tip cards, reminder stickers, and magnets. Since 2014 when invasive *Aedes aegypti* was detected in the county, VCP began providing materials that address the risks posed by invasive *Aedes* mosquitoes. In addition, activity books, temporary tattoos, and stickers are distributed with the goal of educating children and their parents and families. VCP also distributes materials covering rats, ticks, hantavirus, and plague. These materials are used to educate the public, give them tools to stay safe from vectors and vector-borne diseases, and to inform residents how to access VCP services. Educational materials including brochures, pamphlets, and tip cards are distributed in English, Spanish, and in other languages spoken by limited English-speaking residents, including Arabic, Chinese, Korean, Persian, Somali, Filipino, and Vietnamese. These translated materials help VCP to provide important public health information to the more than 400,000 county residents whose primary language is not English.

In 2024, VCP distributed over 20,000 educational materials containing information about mosquitoes and mosquito-transmitted diseases and over 11,000 materials containing information about other vectors and vector-borne diseases. Materials were handed out at outreach events and during inspections and distributed to retail businesses, public libraries, public health and recreation centers, County public counters, rain barrel distributors, and schools. For customer convenience, VCP also maintains an electronic brochure library on its website to allow visitors to read and download many of its educational brochures.

Website and Social Media

VCP maintains the Vector Control website, SDVector.com, and the County's mosquito prevention website, SDFightTheBite.com, and incorporates Google Translate to support translation into more than 90 languages. These websites provide valuable up-to-date information about personal protection and elimination of mosquito breeding sources around properties as well as specific information on the prevention of the spread of WNV and dengue. In addition, information about WNV activity and invasive *Aedes* mosquito activity in the Assessment Area, is continually updated. The SDVector.com website also contains information about positive detections of other vector-borne diseases including tularemia and hantavirus.

In 2024, VCP regularly posted informational messages on its social media accounts (e.g., Facebook, X, and Nextdoor) to promote educational messages of how to prevent vector-borne diseases. These messages included reminders to prevent mosquito breeding, advice on rat exclusion, tips for preventing mosquito and tick bites, and official announcements of larvicide applications. Posts regularly received thousands of views and were shared by residents and other agencies.

Media Campaign

A *Fight the Bite* media campaign to inform county residents how to prevent mosquito breeding at home and to stay safe from mosquito borne diseases like WNV and dengue ran during the fall of 2024. The campaign utilized internet advertising to specific at-risk populations, with an emphasis on underserved communities and international travelers, through web browser and mobile device ads, social media posts on Facebook, X, and Nextdoor, posters at bus stops and businesses, and freeway billboards to promote *Fight the Bite* messages. The digital portion of the campaigns was conducted in County of San Diego threshold languages: English, Spanish, Arabic, Vietnamese, Filipino, Chinese, Persian, Korean, and Somali.

The media campaign ran from August to November of 2024 and received over 34 million total views, with over 7 million total digital views delivered resulting in over 37,000 visits to Vector Control Program webpages.

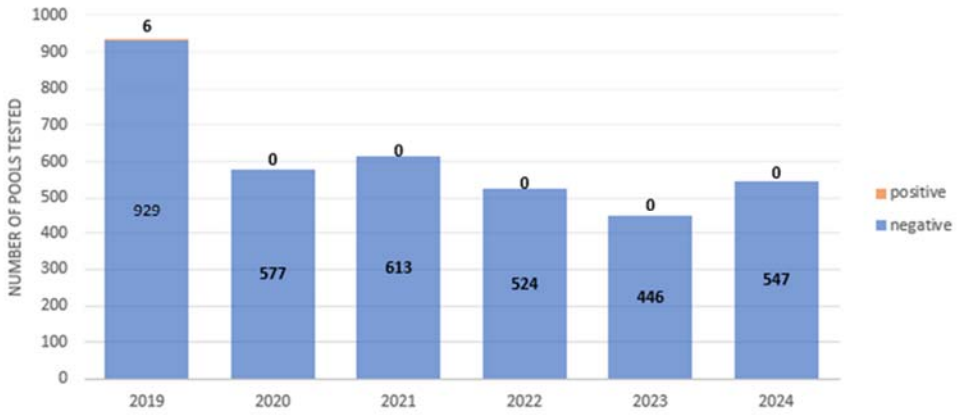
Tick Borne Diseases

Tularemia

Tularemia is a disease caused by the bacterium *Francisella tularensis*. It is typically found in smaller mammals, particularly rabbits. The primary vectors for this disease are the Pacific Coast Tick and the American Dog Tick. Both ticks are members of the *Dermacentor* genus. These ticks are commonly found in rural or undeveloped areas of the Assessment Area. They contract *F. tularensis* when they feed on infected animals and transmit the bacteria to the next animal or person on which they feed. This disease can also be transmitted by direct contact with an infected animal.

Tick surveillance conducted for tularemia over the past six years is shown in Figure 6. Tick populations vary from year to year; in 2024, 547 pools of *Dermacentor* genus ticks (up to 10 ticks/pool) were tested. None of these ticks tested positive for tularemia (Figure 8).

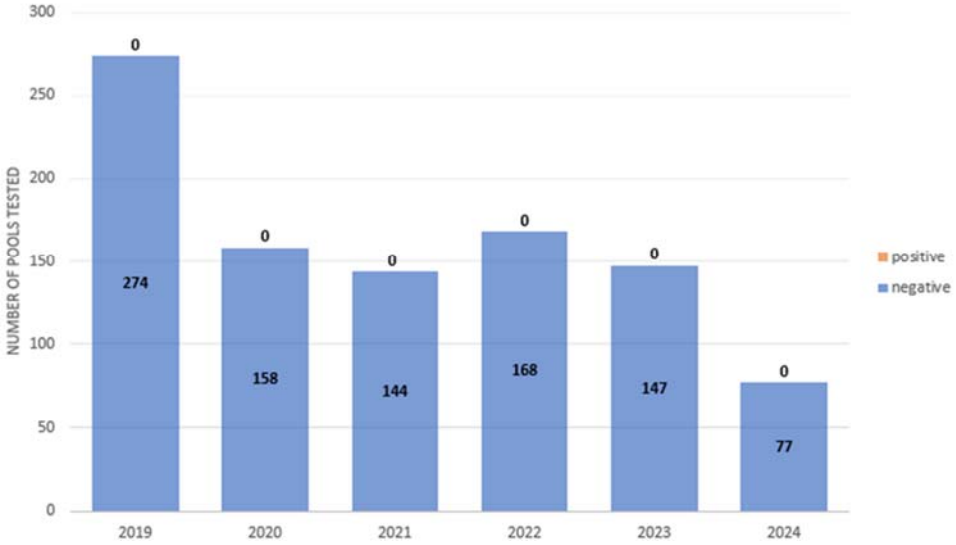
Figure 8: Tularemia Surveillance 2019-2024



Lyme Disease

Lyme disease, caused by the bacterium *Borrelia burgdorferi*, was detected in ticks in 1994 and 1995 in San Diego County. The primary vector for this disease is *Ixodes pacificus* or the Western Blacklegged Tick that is commonly found in rural or undeveloped areas of the Assessment Area. Ticks are collected in areas throughout the County and tested for *B. burgdorferi* (Figure 9). In 2024, 77 batches of *Ixodes* ticks were tested for Lyme disease; all were negative. As part of its prevention efforts, VCP continues to test ticks and to actively distribute information about tick identification, disease prevention and personal protection. Additionally, when human cases are identified, VCP investigates for potential vector sources. Fortunately, investigations of cases of Lyme disease often point to out-of-county sources as being the likely origin of exposure.

Figure 9: Lyme Disease Surveillance 2019-2024

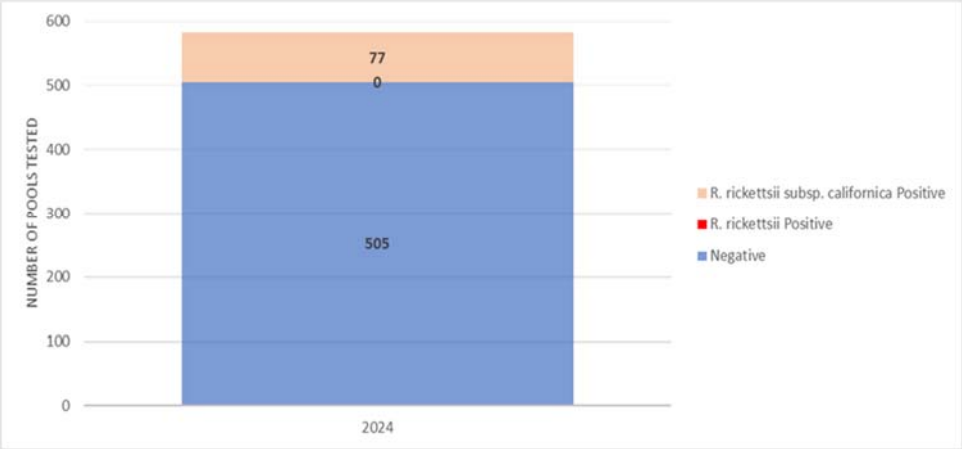


Spotted Fever Group Rickettsioses

Spotted fever rickettsioses (SFGR) are caused by spotted fever group bacteria and are spread by the bite of an infected tick. Rocky Mountain spotted fever (RMSF) and Pacific Coast tick fever (PCTF) are two SFGR that have been identified in California and are caused by *Rickettsia rickettsii* and *Rickettsia rickettsii* subsp. *californica*, respectively. In California, RMSF may be vectored by the American dog tick (*Dermacentor similis),* the Pacific Coast tick (*Dermacentor occidentalis)* and the Brown Dog tick (*Rhipicephalus sanguineus)*, while PCTF may be vectored by the Pacific Coast tick.

Starting in 2024, tick testing for SFGR began in VCP's laboratory. This innovation allows for the in-house detection of *Rickettsia rickettsii* and *Rickettsia rickettsii* subsp. *californica*, which allows for improved surveillance and understanding of these diseases. In 2024, 582 batches of *Dermacentor* ticks were tested for SFGR. In 2024, no batches tested positive for *R. rickettsii* and 77 batches tested positive for *Rickettsia rickettsii* subsp. *californica* (Figure 10).

Figure 10: Spotted Fever Group Rickettsia Surveillance 2024



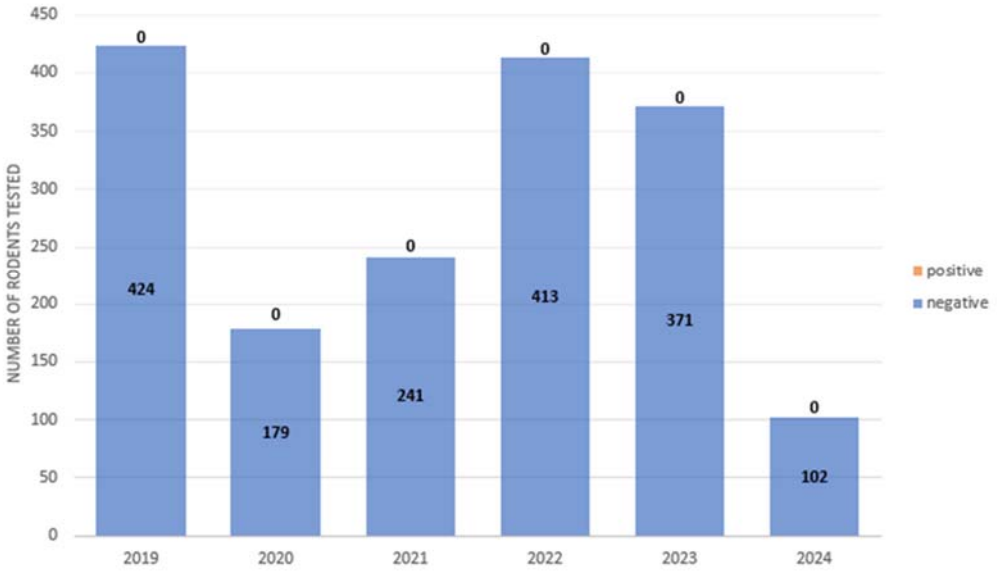
Rodent Borne Disease Surveillance

Plague

Plague is caused by the bacterium *Yersinia pestis* and is transmitted by the bite of infected fleas and direct contact with infected rodents that act as reservoirs for the disease. People and pets are vulnerable to infection when visiting areas abundant with rodents and fleas such as campgrounds or other rural areas. Ground squirrels are potential disease reservoirs in the County and are routinely tested at campgrounds by combing for fleas and collecting blood samples for plague testing. VCP also tests rodents collected at County ports-of-entry for plague. This testing occurs where freight is received by boat, plane, or truck from foreign points of origin.

In 2024, 102 rodents (mostly ground squirrels) were tested for plague. None of these samples tested positive (Figure 11). Whenever positive cases are detected, precautionary notices are posted in the affected area to inform the public, and in some cases (depending on flea levels), burrows are dusted with insecticide to reduce flea populations. Due to the potential of plague exposure in the county, VCP continues to distribute information about disease prevention and personal protection measures.

Figure 11: Plague Surveillance 2019-2024

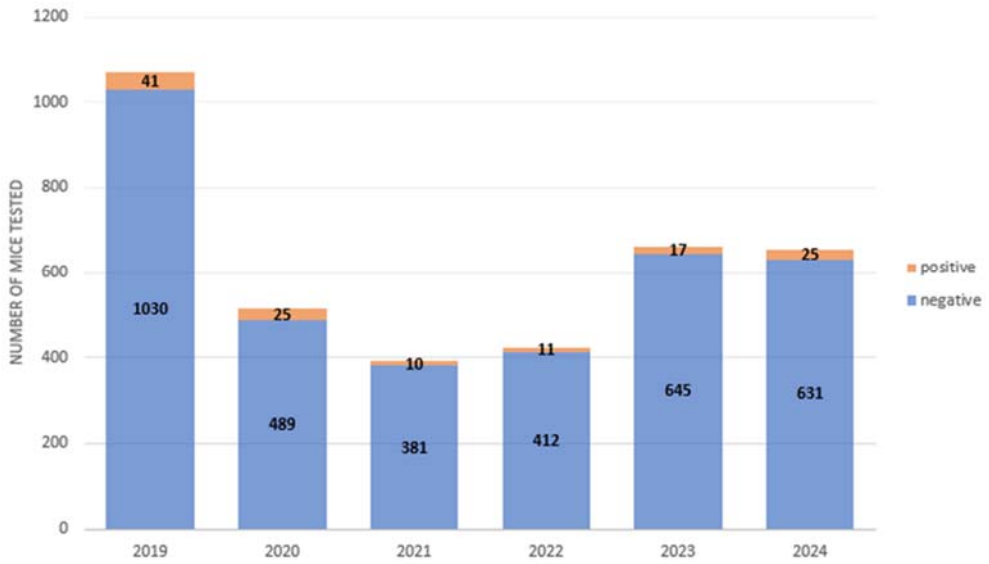


Hantavirus

Hantaviruses occur in wild mice and voles within the Assessment Area. In 2004, the first locally acquired human case of hantavirus pulmonary syndrome (HPS) was reported from the east county community of Campo. People typically develop HPS by inhaling hantaviruses in aerosolized particles of wild mouse droppings and urine. Most human cases occur when people occupy cabins or clean other small, enclosed structures where infected wild mice have been present long enough to leave droppings.

VCP routinely tests wild mice and voles from numerous locations in the Assessment Area. Blood samples are collected from these trapped rodents and tested within the Vector laboratory with results available in as little as 48 hours, which allows for timely deployment of prevention awareness campaigns. In 2024, 656 samples were collected, of which 25 tested positive (Figure 12).

Figure 12: Hantavirus Surveillance 2019-2024



Outreach efforts for hantavirus include creating media releases for positive detections, posting informational videos on the County News Center, providing links to resources on VCP website (SDVector.com), and developing educational materials that discuss the presence and risk of hantavirus with emphasis on proper cleaning techniques for rodent droppings to avoid exposure to the disease.

Rodent and Fly Inspections

Rodents

Common rodents found in the county include the Norway rat (*Rattus norvegicus*), and the roof rat or black rat (*Rattus rattus*). These rats are specifically included in the rodent prevention program for VCP. Native rats and mice such as the big-eared woodrat (*Neotoma macrotis*) and the deer mouse (*Peromyscus maniculatus*) do not commonly enter human-occupied dwellings; however, prevention advice is offered for these as well.

In addition to being unsanitary, rodents harbor and may transmit a variety of organisms that are capable of infecting humans. Rodent urine may contain the bacteria that cause leptospirosis, and their feces may contain *Salmonella* spp. bacteria. Infected rat fleas may transmit plague and murine typhus.

Rats can also cause significant property damage, including damage to woodwork and electrical wiring in buildings, potentially resulting in short circuits and fires. Rats are commonly known to chew hoses, belts, and wires in automobiles, potentially causing accidents. VCP assists property owners with their rat control efforts by providing inspections and consultations. VCP inspects the exterior of structures to educate property owners about structural features that may allow rats or mice to enter structures. During these inspections and consultations, a rat control starter kit is provided to the property owner. These kits include an enclosed rat station, a rat snap trap, and an educational pamphlet with helpful information for control measures focusing on exclusion and elimination. VCP webpage (SDVector.com) provides information about domestic rat control. This site also enables the public to request an exterior inspection online or submit a complaint.

VCP educates the public on how to prevent and handle rodent infestations through presentations on rat control to homeowners and community groups and by distributing educational materials at community events. The Program primarily relies on public education and public cooperation for domestic rat control. When appropriate, VCP collaborates with other regional agencies to address domestic rat activity and harborage. In 2024, VCP responded to 1,407 complaints and service requests from residents about rats and mice.

Flies

VCP's fly abatement program operates under the authority of the San Diego County Code of Regulatory Ordinances, Title 6, Chapter 3, Division 4: Prevention and Control of Fly Breeding on Commercial Poultry Ranches. VCP implements this ordinance in unincorporated areas and works to guide farmers to control fly breeding on commercial poultry farms. There were12 commercial poultry ranches that fell under the scope of the ordinance in 2024. VCP reviews and approves fly breeding prevention plans that are prepared by each rancher every year. The poultry ranch operator is required to follow this plan in the management of manure and other potential fly breeding sources. This can help reduce the number of flies generated by the ranch. Routine and complaint-based inspections, along with potential enforcement measures, are used to ensure the prevention and abatement of flies which may constitute a risk to public health and welfare. In 2024, there were no complaints of flies from commercial poultry farms.

Throughout the Assessment Area, the Program also provides education about fly exclusion and control. In 2024, the VCP received 30 service requests concerning nuisance flies.

Eye Gnat Program

Eye gnats are small, shiny black flies approximately 1/16 inch in size. They breed in organically rich soil and are normally found in low numbers in many parts of the county. To produce their eggs, eye gnats feed on proteins in body secretions such as mucus from the eyes and nose. In large numbers, they can be an annoyance to both people and animals.

In past years, residents in Jacumba and Escondido submitted complaints about eye gnats impacting their quality of life due to large eye gnat populations generated from nearby agricultural activities, specifically organic farms where traditional pesticides cannot be used. In response to community concerns, research was conducted by the University of California Cooperative Extension, San Diego County, to understand the dynamics of the increased eye gnat populations in Jacumba and Escondido, which resulted in the development of eye gnat population reduction best management practices.

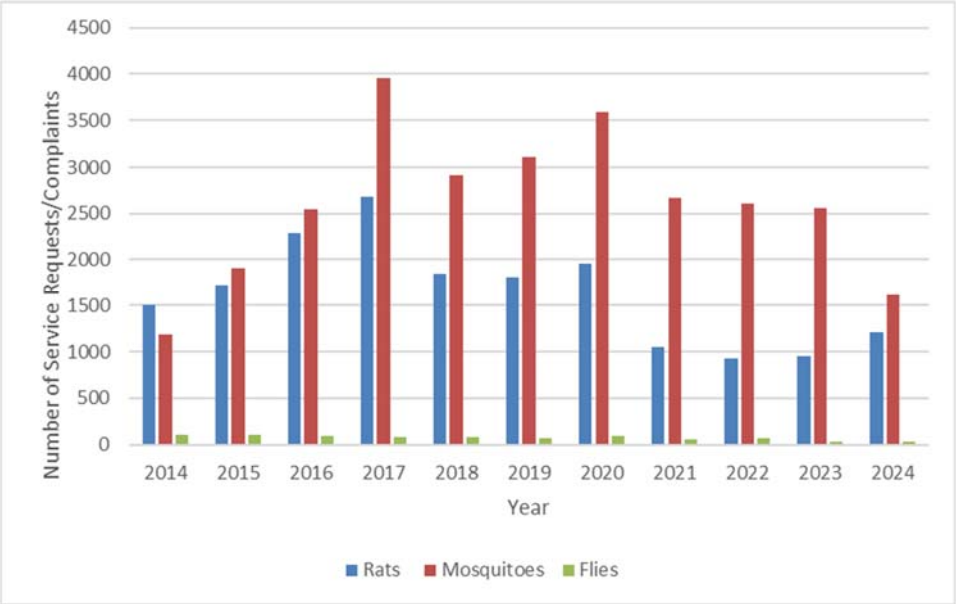
On December 5, 2012, the County of San Diego Board of Supervisors approved ordinances amending Title 6 of the San Diego County Code relating to vector control to establish a county-wide (incorporated cities and unincorporated area) Eye Gnat Program and the County Administrative Code to establish an Eye Gnat Abatement Appeals Board. The amendments added eye gnats to the definition of a vector in Chapter 2 of Division 4 of Title 6 of the San Diego County Code, thereby allowing abatement actions to be taken when it is determined that eye gnats associated with an organic commercial farm are causing a nuisance to the public. The amendments apply to all land within the San Diego region that supports the development, attraction, or harborage of eye gnats, including organic farms. A Negative Declaration was prepared and adopted by the Board of Supervisors for this project and is on file with the Department of Environmental Health and Quality (DEHQ) as Environmental Review Number 12-00-001. The ordinances became effective on January 4, 2013. Modifications to the eye gnat program to clarify for commercial organic growers and their customers how the County intends to implement the Eye Gnat Program and to resolve litigation in San Diego Superior Court Case No. 37-2013-00030966 was adopted by the Board of Supervisors on March 20, 2013. Those amendments went into effect on May 10, 2013. The eye gnat program is complaint-driven and seeks voluntary compliance before escalating into enforcement. Staff conduct routine surveillance, respond to complaints, conduct farm inspections, and monitor eye gnat traps in potentially affected communities.

Response/Customer Service

VCP responds to service requests throughout the Assessment Area. Any property owner, business, or resident of a property in the Assessment Area may contact VCP to request vector control related services or inspections. A VCP field technician will promptly respond to a service request to evaluate the situation and to provide appropriate surveillance and control services. VCP responds to all service requests in a timely manner, regardless of location, within the Assessment Area.

In 2024, VCP responded to 1,611 complaints or service requests involving mosquito nuisance and breeding (Figure 13). Complaints involved major mosquito breeding sources and smaller or intermittent backyard sources, including those related to invasive *Aedes* mosquitoes. In addition, VCP responded to 1,215 complaints or service requests relating to domestic rats and a total of 30 complaints or service requests regarding flies from private residences.

Figure 13: Vector Control Service Requests 2014-2024



Performance goals for customer service were achieved in 2024. Goals include initial contact with requestors or complainants within 3 days and inspections and investigations completed within 21 days. The 2024 performance is outlined below:

Performance Goal	2024 Results
Initial Contact – 97% within 3 days	99.5% within 3 days (average 1 day)
Completion of Service Requests/Complaints – 97% within 21 days	98.6% within 21 days (average 6 days)

Disease and Diagnostic Laboratory

An in-house disease and diagnostic laboratory was added to the Program in July 2010. This lab provides advanced diagnostics to detect vector-borne pathogens in a wide variety of samples ranging from mosquitoes and ticks to birds, rodents, and other animals. Having this in-house testing aids VCP in making timely decisions to help protect public health from vector-borne illness.

The laboratory tests for WNV, SLE, and WEE in mosquito samples, Lyme and tularemia in tick samples, and plague and hantavirus in mammal samples. In 2016 due to the spread of invasive *Aedes* mosquitoes, the viruses that cause the tropical diseases dengue, chikungunya, and Zika were added to routine diagnostics. In 2024, tests for spotted fever rickettsioses were added to routine diagnostics of *Dermacentor* spp. ticks. Overall testing by the laboratory of vector specimens in 2024 increased over 20% when compared to 2023.

Efforts Planned for 2025

Equity and Underserved Communities

The Program evaluated the vector control issues affecting underserved communities in the region and established a need for community engagement and prioritizing mosquito-borne disease issues. To address community needs, a community-focused Vector Community Champion program was developed to help community voices spread messaging on mosquito-borne disease prevention. The Vector Community Champion is planned to continue and expand in 2025, as the initiative helps create a stronger foundation for a sustainable mosquito prevention initiative in communities throughout the region.

Sustainability and New Vector Control Approaches

The Program completed its Program Environmental Impact Report (PEIR) for the Integrated Vector Management Program in 2024. This PEIR examined the environmental effects of the existing Program as well as potential enhanced vector control methods and materials. Based on scientific evidence and expert guidance, these new vector control methods and over 35 best management practices were incorporated into the Program to enhance its ability to counter new and emerging vector risks while concurrently safeguarding the environment. Looking forward in 2025, the PEIR will help VCP stay environmentally-responsible as the program evaluates the use of new technologies, such as the use of drones for surveillance and/or control.

Pesticide Susceptibility Testing

As part of the Program's Integrated Vector Management program, in 2024, the VDDL examined genetic determinants of pesticide resistance in select mosquito species. This work will be expanded to include additional disease-carrying mosquito species to help inform VCP in selecting the most efficacious pesticides to use across different mosquito populations.

The Program has also started an insectary to rear and maintain colonies of mosquitoes for pesticide resistance testing. Laboratory assays will characterize the susceptibility of different mosquito species to insecticides and will initially focus on primary disease vector species. Colony mosquitoes can also be used in field trials to perform cages tests to evaluate pesticides and equipment applications under field conditions. Results will inform VCP on the occurrence, distribution, and severity of insecticide resistance of various species within the County and enable VCP to take appropriate measures to continue to combat mosquitoes and mosquito-borne diseases effectively.

Enforcement

VCP uses an educational approach as the primary means to encourage responsible parties to comply with eliminating vectors, vector breeding, and vector harborage. However, when necessary to protect public health or to correct a public nuisance, VCP will take enforcement action. Efforts and pilot projects, such as automated workflows in project management software and using new GPS mapping tools to discover green pools are continuously underway to update and streamline enforcement procedures to support efficient and effective use of resources.

Leveraging Emerging Technology

VCP monitors emerging technologies for possible use in the Program's operations. Emerging technologies have the potential to increase Program efficiencies and contain costs while performing core functions. Efforts planned include expanding the evaluation and use of extended larvicide release stations to minimize environmental impacts and 3D printing to enhance mosquito trap designs. Drone technologies to detect cryptic potential mosquito breeding sites and apply larvicide will also continue to be explored. Furthermore, a remote imaging project for green pool identification was tested and, compared to traditional identification methods, yielded improved efficiency and cost savings.

In 2024, in collaboration with the San Diego County Public Health Laboratory, VCP genetically sequenced WNV samples using Next-Generation sequencing technology. This collaborative project examined West Nile viruses in mosquito and bird populations and showed changes in WNV over time, indicating new virus introductions into San Diego County and giving clues as to how to best prevent the spread of this virus. Additional collaborations with researchers are planned in 2025 to further advance insights into vectors and vector pathogens and how to best protect public health.

Outreach

Public participation in preventing mosquito breeding is essential to reducing mosquitoes and preventing mosquito-borne disease transmission. VCP will build upon the successes of prior media campaigns to direct the public to SDFightTheBite.com and supporting websites so that they can learn how to prevent vectors and protect themselves from vector borne diseases. Development of web content will continue to prioritize readability and accessibility to maximize public response and engagement with the Program. Remote outreach techniques, including virtual presentations, expanded online resources, and STEM learning modules for schools, will continue to be used to reach populations that cannot access in-person outreach services. In addition, a range of methods besides in-person events, such as technician service calls, will continue to be integrated into Outreach efforts to enhance the distribution of outreach educational materials.

Emergency Preparedness and Response

VCP successfully used a system based on the Incident Command System (ICS) to coordinate complex responses to potential disease transmission risks. The ICS is a nationally recognized, standardized, and scalable command and control system that is used to coordinate responses to a wide range of emergencies and situations. VCP used this approach in several disease responses and found it facilitated communication and response to these operations. In 2024, these responses included four time-sensitive adulticide responses to control mosquito populations and prevent the spread of dengue. Due to the complexity of these responses and the timelines required for them to be conducted, the use of the ICS structure was a crucial part of the VCP's ability to protect public health. Another example included VCP's aggressive response to large-scale flooding in the south county region, which led to historically high levels of mosquito breeding.

VCP plans to continue to enhance its response capabilities to vector disease threats, both existing and emerging, so that it is prepared to work seamlessly with other agencies that may be required in a large-scale response.

Estimate of Cost

Figure 14: Cost Estimate for Fiscal Year 2025-2026

Mosquito, Vector and Disease Control Assessment Estimate of Cost Fiscal Year 2025-26		***Total Budget***
Vector Control Services and Related Expenditures		
Vector Control and Disease Prevention Operations		**$9,981,608**
Technicians	$5,466,811.84	
Laboratory/Research/Testing	$1,363,123.30	
Public Relations	$796,936.33	
Administration	$2,354,736.73	
Supplies		**$4,655,431**
Utilities, Insurance, Office	$347,304.00	
Materials and Supplies	$962,604.00	
Information Technology	$332,423.00	
Laboratory Equipment	$183,000.00	
applications/larvacides	$2,252,000.00	
Vector Habitat Remediation	$550,000.00	
Public Relations Literature	$25,000.00	
Journals/Books/References	$3,100.00	
Capital Equipment and Fixed Assets		**$632,561**
Total Vector Control Services and Related Expenditures		**$15,269,600**
Total Additional Expenditures		
Reserve/Contingency Funds		($1,555)
Incedental Costs[2:] County Collection, Levy Administration, and Other I		$769,170
Total Benefit of Services and Related Expenses		$16,037,215
SFE Units		961,000
Benefit received per Single Family Equivalent Unit		$16.69
Less:		
Contributions from other Sources		($2,453,022)
Contributions from Trust Fund		$ (1,706,233)
Total Revenue from Other Sources[1]		($4,159,255)
Net Cost of Vector Control, Fixed Asset Equipment, Operation		**$11,877,960**
Total Mosquito, Vector & Disease Control Services and Incidentals (Net Amount to be Assessed)		**$11,877,960**

Budget Allocation to Property		
Total SFE Units[3]	Assessment per SFE[4]	Total Assessment[5]
961,000	$12.36	$11,877,960

Notes:
1. As determined in the following section, at least 7% of the cost of the Services must be funded from sources other than the assessments to cover any general benefits from the Services. Therefore, out of the total cost of Services of $16,037,215 VCP must contribute at least $1,122,605 from sources other than the assessments. VCP will contribute over $4,159,255 which is well over the estimated general benefits.
2. Incidental Costs include allowance for uncollectible assessments from assessments on public agency parcels, County collection charges, and assessment administration costs.
3. SFE Units means Single Family Equivalent benefit units. See method of assessment in the following Section for further definition.
4. The assessment rate per SFE is the total amount of assessment per Single Family Equivalent benefit unit.
5. The proceeds from the assessments will be deposited into a special fund for the Assessment. Funds raised by the assessment shall be used only for the purposes stated within this Report. Any balance remaining at the end of the fiscal year, June 30, must be carried over to the next fiscal year. The assessment amounts are rounded down to the even penny for purposes of complying with the collection requirements from the County Auditor. Therefore, the total assessment amount for all parcels subject to the assessments may vary slightly from the net amount to be assessed.

Method of Assessment

This section of the Report explains the benefits to be derived from the Services provided for property in VCP and the methodology used to apportion the total assessment to properties within the Mosquito, Vector and Disease Control Assessment Area.

The Mosquito, Vector and Disease Control Assessment Area consists of all Assessor Parcels within the County, as defined by the approved boundary description (boundary will be coterminous with the County of San Diego).

The method used for apportioning the assessment is based upon the proportional special benefits to be derived by the properties in the Assessment Area over and above general benefits conferred to the public at large or real property in the Assessment Area. Special benefit is calculated for each parcel in the Assessment Area using the following process:

1. Identification of total benefit to the properties derived from the Services
2. Calculation of the proportion of these benefits that are special vs. general
3. Determination of the relative special benefit within different areas within the Assessment Area
4. Determination of the relative special benefit per property type and property characteristic
5. Calculation of the specific assessment for each individual parcel based upon special vs. general benefit, location, property type and property characteristics

Discussion of Benefit

In summary, the assessments can only be levied based on the special benefit to property. This benefit is received by property over and above any general benefits. This special benefit is received by property over and above any general benefits from the additional Services. With reference to the engineering requirements for property-related assessments, under Proposition 218, an engineer must determine and prepare a report evaluating the amount of special and general benefit received by property within the Assessment Area resulting from the improvements or services provided by a local agency. That special benefit is to be determined in relation to the total cost to that local entity of providing the service and/or improvements.

Proposition 218 as described in Article XIIID of the California Constitution has confirmed that assessments must be based on the special benefit to property:

> *"No assessment shall be imposed on any parcel which exceeds the reasonable cost of the proportional special benefit conferred on that parcel."*

The below benefit factors, when applied to property in the Assessment Area, confer special benefits to property and ultimately improve the safety, utility, functionality, and usability of property in the Assessment Area. These are special benefits to property in the Assessment Area in much the same way that storm drainage, sewer service, water service, lighting, sidewalks, and paved streets enhance the safety, utility and functionality of each parcel of property served by these improvements, providing them with more utility of use and making them safer and more usable for occupants.

It should also be noted that Proposition 218 included a requirement that existing assessments in effect upon its effective date were required to be confirmed by either a majority vote of registered voters in the Assessment Area, or by weighted majority property owner approval using the new ballot proceeding requirements. However, certain assessments were excluded from these voter approval requirements. Of note is that in California Constitution Article XIIID Section 5(a) this special exemption was granted to assessments for sidewalks, streets, sewers, water, flood control, drainage systems and vector control. The Howard Jarvis Taxpayers Association explained this exemption in their Statement of Drafter's Intent:

> *"This is the "traditional purposes" exception. These existing assessments do not need property owner approval to continue. However, future assessments for these traditional purposes are covered."* [3]

Therefore, the drafters of Proposition 218 acknowledged that vector control assessments were "traditional" and therefore acknowledged and accepted use.

The Legislature also made a specific determination after Proposition 218 was enacted that vector control services constitute a proper subject for special assessment. Health and Safety Code section 2082, which was signed into law in 2002, provides that a district may levy special assessments consistent with the requirements of Article XIIID of the California Constitution to finance vector control projects and programs. The intent of the Legislature to allow and authorize benefit assessments for vector control services after Proposition 218 is shown in the Assembly and Senate analysis the Mosquito Abatement and Vector Control District Law where it states that the law:

> *Allows special benefit assessments to finance vector control projects and programs, consistent with Proposition 218.* [4]

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[3] Howard Jarvis Taxpayers Association, "Statement of Drafter's Intent", January 1997.

[4] Senate Bill 1588, Mosquito Abatement and Vector Control District Law, Legislative bill analysis

Therefore, the State Legislature unanimously found that vector control services are a valuable and important public service that can be funded by benefit assessments. To be funded by assessments, vector control services must confer special benefit to property.

Mosquito and Vector Control Is a Special Benefit to Properties

As described below, this Engineer's Report concludes that mosquito and vector control is a special benefit that provides direct advantages to property in the Assessment Area. For example, if approved, the assessment would provide reduced levels of mosquitoes and other vectors on property throughout the Assessment Area. Moreover, the assessment will reduce the risk of the presence of diseases on property throughout the Assessment Area, which is another direct advantage received by property in the Assessment Area. Additionally, the assessment will fund Services that improve the use of property and reduce the nuisance and harm created by vectors on property throughout the Assessment Area. These are tangible and direct special benefits that will be received by property throughout the specific area covered by the Assessment.

The following section, Benefit Factors, describes how and why vector control services specially benefit properties in the Assessment Area. These benefits are particular and distinct from its effect on property in general or the public at large.

Benefit Factors

In order to allocate the assessments, the assessment engineer identified the types of special benefit arising from the aforementioned Services and that would be provided to property in the Assessment Area. The following benefit factors have been established that represent the types of special benefit to parcels resulting from the Services to be financed with the assessment proceeds. These types of special benefit are as follows:

Reduced mosquito and vector populations on property and as a result, enhanced desirability, utility, usability, and functionality of property in the Assessment Area.

The assessments will provide enhanced services for the control and abatement of nuisance and disease-carrying mosquitoes. These Services will materially reduce the number of vectors on properties throughout the Assessment Area. The lower mosquito and vector populations on property in the Assessment Area are a direct advantage to property that will serve to increase the desirability and "usability" of property. Clearly, properties are more desirable and usable in areas with lower mosquito populations and with a reduced risk of vector-borne disease. This is a special benefit to residential, commercial, agricultural, industrial, and other types of properties because all such properties will directly benefit from reduced mosquito and vector populations and properties with lower vector populations are more usable, functional, and desirable.

Excessive mosquitoes and other vectors in the area can materially diminish the utility and usability of property. For example, prior to the commencement of mosquito control and abatement services, properties in many areas in the state were considered to be nearly uninhabitable during the times of year when the mosquito populations were high.[5] The prevention or reduction of such diminished utility and usability of property caused by mosquitoes is a clear and direct advantage and special benefit to property in the Assessment Area.

The State Legislature made the following finding on this issue:

> *"Excess numbers of mosquitoes and other vectors spread diseases of humans, livestock, and wildlife, reduce enjoyment of outdoor living spaces, both public and private, reduce property values, hinder outdoor work, reduce livestock productivity; and mosquitoes and other vectors can disperse or be transported long distances from their sources and are, therefore, a health risk and a public nuisance; and professional mosquito and vector control based on scientific research has made great advances in reducing mosquito and vector populations and the diseases they transmit."* [6]

Mosquitoes and other vectors emerge from sources throughout the Assessment Area, and with an average flight range of two miles, mosquitoes from known sources can reach all properties in the Assessment Area. These sources include standing water in rural areas, such as marshes, pools, wetlands, ponds, drainage ditches, drainage systems, tree holes and other removable sources such as old tires and containers. The sources of mosquitoes also include numerous locations throughout the urban areas in the Assessment Area. These sources include underground drainage systems, containers, unattended swimming pools, leaks in water pipes, tree holes, flower cups in cemeteries, over-watered landscaping and lawns and many other sources. By controlling mosquitoes at known and new sources, the Services will materially reduce mosquito populations on property throughout the Assessment Area.

A continuing source of mosquitoes is unattended neglected swimming pools:

> *"Anthropogenic landscape change historically has facilitated outbreaks of pathogens amplified by peridomestic vectors such as Cx. pipiens complex mosquitoes and associated*

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[5] Prior to the commencement of modern mosquito control services, areas in the State of California such as the San Mateo Peninsula, Napa County, Lake County, areas in Marin and Sonoma Counties and many other areas in the State had such high mosquito populations or other vector populations that they were considered to be nearly unlivable during certain times of the year and were largely used for part-time vacation cottages that were occupied primarily during the months when the natural vector populations were lower.

[6] Assembly Concurrent Resolution 52, chaptered April 1, 2003

commensals such as house sparrows. The recent widespread downturn in the housing market and increase in adjustable-rate mortgages have combined to force a dramatic increase in home foreclosures and abandoned homes and produced urban landscapes dotted with an expanded number of new mosquito habitats. These new larval habitats may have contributed to the unexpected early season increase in WNV cases in Bakersfield during 2007 and subsequently have enabled invasion of urban areas by the highly competent rural vector Cx. tarsalis. These factors can increase the spectrum of competent avian hosts, the efficiency of enzootic amplification, and the risk for urban epidemics."[7]

Increased safety of property in the Assessment Area

The Assessments will result in improved year-round proactive Services to control and abate mosquitoes and other vectors that otherwise would occupy properties throughout the Assessment Area. Mosquitoes and other vectors are transmitters of diseases, so the reduction of mosquito and vector populations makes property safer for use and enjoyment. In absence of the assessments, these Services would not be provided, so the Services funded by the assessments make properties in the Assessment Area safer, which is a distinct special benefit to property in the Assessment Area.[8] This is not a general benefit to property in the Assessment Area or the public at large because the Services are tangible mosquito, vector, and disease control services that will be provided directly to the properties in the Assessment Area and the Services are over and above what otherwise would be provided by VCP or any other agency.

This finding was confirmed in 2003 by the State Legislature:

"Mosquitoes and other vectors, including but not limited to, ticks, Africanized honey bees, rats, fleas, and flies, continue to be a source of human suffering, illness, death, and a public nuisance in California and around the world. Adequately funded mosquito and vector control, monitoring and public awareness programs are the best way to prevent outbreaks of West Nile Virus and other diseases borne by mosquitoes and other vectors."[9]

Also, the Legislature, in Health and Safety Code Section 2001, finds that:

"The protection of Californians and their communities against the discomforts and economic effects of vectorborne diseases is an essential public service that is vital to public health, safety, and welfare."

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[7] Riesen William K. (2008). Delinquent Mortgages, Neglected Swimming Pools, and West Nile Virus, California. Emerging Infectious Diseases. Vol. 14(11).

[8] By reducing the risk of disease and increasing the safety of property, the proposed Services will materially increase the usefulness and desirability of certain properties in the Assessment Area.

[9] Assembly Concurrent Resolution 52, chaptered April 1, 2003

Reductions in the risk of new diseases and infections on property in the Assessment Area

Mosquitoes have proven to be a major contributor to the spread of diseases such as WNV, among others. A highly mobile population combined with migratory bird patterns can introduce new mosquito-borne diseases into previously unexposed areas.

> *"Vector-borne diseases (including a number that are mosquito-borne) are a major public health problem internationally. In the United States, dengue and malaria are frequently brought back from tropical and subtropical countries by travelers or migrant laborers, and autochthonous transmission of malaria and dengue occasionally occurs. In 1998, 90 confirmed cases of dengue and 1,611 cases of malaria were reported in the USA and dengue transmission has occurred in Texas."* [10]
>
> *"During 2004, 40 states and the District of Columbia (DC) have reported 2,313 cases of human WNV illness to CDC through ArboNET. Of these, 737 (32%) cases were reported in California, 390 (17%) in Arizona, and 276 (12%) in Colorado. A total of 1,339 (59%) of the 2,282 cases for which such data were available occurred in males; the median age of patients was 52 years (range: 1 month--99 years). Date of illness onset ranged from April 23 to November 4; a total of 79 cases were fatal."* [11] *(According to the Centers for Disease Control and Prevention on January 19, 2004, a total of 2,470 human cases and 88 human fatalities from WNV have been confirmed).*

A study of the effect of aerial spraying conducted by the Sacramento-Yolo Mosquito and Vector Control District (SYMVCD) to control a WNV disease outbreak found that the SYMVCD's mosquito control efforts materially decreased the risk of new diseases in the treated areas:

> *After spraying, infection rates decreased from 8.2 (95% CI 3.1–18.0) to 4.3 (95% CI 0.3–20.3) per 1,000 females in the spray area and increased from 2.0 (95% CI 0.1–9.7) to 8.7 (95% CI 3.3–18.9) per 1,000 females in the untreated area. Furthermore, no additional positive pools were detected in the northern treatment area during the remainder of the year, whereas positive pools were detected in the untreated area until the end of September (D.-E.A Elnaiem, unpub. data). These independent lines of evidence corroborate our conclusion that actions taken by SYMVCD were effective in disrupting the*

[10] Rose, Robert. (2001). Pesticides and Public Health: Integrated Methods of Mosquito Management. Emerging Infectious Diseases. Vol. 7(1); 17-23.

[11] Center for Disease Control. (2004). West Nile Virus Activity --- United States, November 9--16, 2004. Morbidity and Mortality Weekly Report. 53(45); 1071-1072.

WNV transmission cycle and reducing human illness and potential deaths associated with WNV. [12]

The Services funded by the assessments will help prevent on a year-round basis the presence of vector-borne diseases on property in the Assessment Area. This is another tangible and direct special benefit to property in the Assessment Area that would not be received in absence of the assessments.

Protection of economic activity on property in the Assessment Area

As demonstrated by the SARS-CoV-2 outbreak and outbreaks of Avian Flu, outbreaks of pathogens can materially and negatively impact economic activity in the affected area. Such outbreaks and other public health threats can have a drastic negative effect on tourism, business, and residential activities in the affected area. The assessments will help to prevent the likelihood of such outbreaks in the Assessment Area.

Mosquitoes hinder, annoy and harm residents, guests, visitors, farm workers, and employees. A vector-borne disease outbreak and other related public health threats would have a drastic negative effect on agricultural, business, and residential activities in the Assessment Area.

The economic impact of diseases is well documented. According to a study prepared for the CDC, economic losses due to the transmission of WNV in Louisiana was estimated to cost over $20 million over approximately one year:

The estimated cost of the Louisiana epidemic was $20.1 million from June 2002 to February 2003, including a $10.9 million cost of illness ($4.4 million medical and $6.5 million nonmedical costs) and a $9.2 million cost of public health response. These data indicate a substantial short-term cost of the WNV disease epidemic in Louisiana. [13]

Moreover, a study conducted in 1996-97 of La Crosse Encephalitis (LACE), a human illness caused by a mosquito-transmitted virus, found a lifetime cost per human case at $48,000 to $3,000,000 and found that the disease significantly impacted lifespans of those who were infected. Following is a quote from the study which references the importance and value of active vector control services of the type that would be funded by the assessments:

[12] Carney, Ryan. (2008), Efficiency of Aerial Spraying of Mosquito Adulticide in Reducing the Incidence of West Nile Virus, California, 2005. Emerging Infectious Diseases, Vol 14(5)

[13] Zohrabian A, Meltzer MI, Ratard R, Billah K, Molinari NA, Roy K, et al. West Nile Virus economic impact, Louisiana, 2002. Emerging Infectious Disease, 2004 Oct. Available from http://www.cdc.gov/ncidod/EID/vol10no10/03-0925.htm

The socioeconomic burden resulting from LACE is substantial, which highlights the importance of the illness in western North Carolina, as well as the need for active surveillance, reporting, and prevention programs for the infection. [14]

The Services to be funded by the assessments will help prevent the likelihood of such outbreaks on property in the Assessment Area and will reduce the harm to economic activity on property caused by existing mosquito populations. This is another direct advantage received by property in the Assessment Area that would not be received in the absence of the assessments.

Protection of Assessment Area's agriculture, tourism, and business industries.

The agriculture, tourism and business industries will benefit from reduced levels of harmful or nuisance mosquitoes and other vectors. Conversely, any outbreaks of emerging vector-borne pathogens such as WNV could also materially negatively affect these industries. Diseases transmitted by mosquitoes and other vectors can adversely impact business and recreational functions.

A study prepared for the United States Department of Agriculture in 2003 found that over 1,400 horses died from West Nile virus in Colorado and Nebraska and that these fatal disease cases created over $1.2 million in costs and lost revenues. In addition, horse owners in these two states spent over $2.75 million to vaccinate their horses for this disease. The study states that "Clearly, WNV has had a marked impact on the Colorado and Nebraska equine industry." [15]

Pesticides for mosquito control impart economic benefits to agriculture in general. Anecdotal reports from farmers and ranchers indicate that cattle, if left unprotected, can be exsanguinated by mosquitoes, especially in Florida and other southeast coastal areas. Dairy cattle produce less milk when bitten frequently by mosquitoes [16]

[14] Utz, J. Todd, Apperson, Charles S., Maccormack, J. Newton, Salyers, Martha, Dietz, E. Jacquelin, Mcpherson, J. Todd, Economic And Social Impacts Of La Crosse Encephalitis In Western North Carolina, Am J Trop Med Hyg 2003 69: 509-518

[15] S. Geiser, A. Seitzinger, P. Salazar, J. Traub-Dargatz, P. Morley, M. Salman, D. Wilmot, D. Steffen, W. Cunningham, Economic Impact of West Nile Virus on the Colorado and Nebraska Equine Industries: 2002, April 2003, Available from

https://www.aphis.usda.gov/animal_health/nahms/equine/downloads/wnv2002_CO_NB.pdf

[16] Jennings, Allen. (2001). USDA Letter to EPA on Fenthion IRED. United States Department of Agriculture, Office of Pest Management Policy. March 8, 2001.

The assessments will serve to protect the businesses and industries and the employees and residents that benefit from these businesses and industries. This is a direct advantage and special benefit to property in the Assessment Area.

Reduced risk of nuisance and liability on property in the Assessment Area

In addition to health-related factors, uncontrolled mosquito and vector populations create a nuisance for the occupants of property in the Assessment Area. Properties in the Assessment Area, therefore, will benefit from the reduced nuisance factor that will be created by the Services. Agricultural and rangeland properties also benefit from the reduced nuisance factor and harm to livestock and employees from lower mosquito and vector populations.

Agricultural, range, golf course, cemetery, open space, and other such lands in the Assessment Area contain large areas of mosquito and vector habitat and are therefore a significant source of mosquito and vector populations. In addition, residential and business properties in the Assessment Area can also contain significant sources.[17] It is conceivable that sources of mosquitoes could be held liable for the transmission of diseases or other harm. For example, in August 2004, the City of Los Angeles approved new fines of up to $1,000 per day for property owners who don't remove standing water sources of mosquitoes on their property.

The Services will serve to protect the businesses and industries in the Assessment Area. This is a direct advantage and a special benefit to property in the Assessment Area.

Improved marketability of property

As described previously, the Services will specially benefit properties in the Assessment Area by making them more useable, livable, and functional. The Services also make properties in the Assessment Area more desirable, and more desirable properties also benefit from improved marketability. This is another tangible and direct special benefit to property which will not be enjoyed in absence of the Services.[18]

[17] Sources of mosquitoes on residential, business, agricultural, range and other types of properties include removable sources such as containers that hold standing water.

[18] If one were to compare two hypothetical properties with similar characteristics, the property with lower mosquito infestation and reduced risk of vector-borne disease will clearly be more desirable, marketable and usable.

Benefit Finding

In summary, the special benefits described in this Engineer's Report and the improved Services in the Assessment Area directly benefit and protect the real properties in the Assessment Area in excess of the assessments for these properties. Therefore, the assessment engineer finds that the cumulative special benefits to property from the Services are reasonably equal to or greater than the proposed annual assessment amount per benefit unit.

General vs. Special Benefit

Article XIIIC of the California Constitution requires any local agency proposing to increase or impose a benefit assessment to "separate the general benefits from the special benefits conferred on a parcel." The rationale for separating special and general benefits is to ensure that property owners subject to the benefit assessment are not paying for general benefits. The assessment can fund the special benefits to property in the Assessment Area but cannot fund any general benefits. Accordingly, a separate estimate of the special and general benefit is given in this section.

In other words:

Total Benefit	=	General Benefit	+	Special Benefit

There is not a widely accepted or statutory formula for general benefit from vector control services. General benefits are benefits from improvements or services that are not special in nature, are not "particular and distinct" and are not "over and above" benefits received by other properties. General benefits are conferred to properties located "in the district,"[19] but outside the narrowly drawn Assessment Area and to "the public at large." SVTA vs. SCCOSA provides some clarification by indicating that general benefits provide "an indirect, derivative advantage" and are not necessarily proximate to the improvements and services funded by the assessments.

[19] SVTA vs. SCCOSA explains as follows:

A formula to estimate the general benefit is listed below:

General Benefit	=	**Benefit to Real Property Outside the Assessment District**	+	**Benefit to Real Property Inside the Assessment District that is Indirect and Derivative**	+	**Benefit to the Public at Large**

Special benefit, on the other hand, is defined in the state constitution as "a particular and distinct benefit over and above general benefits conferred on real property located in the district or to the public at large." The SVTA v. SCCOSA decision indicates that a special benefit is conferred to a property if it "receives a direct advantage from the improvement (e.g., proximity to a park)." In this assessment, the overwhelming proportion of the benefits conferred to property is special, since the advantages from the mosquito, vector and disease control/protection funded by the Assessments are directly received by the properties in the Assessment Area and are only minimally received by property outside the Assessment Area or the public at large.

OSA observes that Proposition 218's definition of "special benefit" presents a paradox when considered with its definition of "district." Section 2, subdivision (i) defines a "special benefit" as "a particular and distinct benefit over and above general benefits conferred on real property located in the district or to the public at large." (Art. XIII D, § 2, subd. (i), italics added.) Section 2, subdivision (d) defines "district" as "an area determined by an agency to contains all parcels which will receive a special benefit from a proposed public improvement or property-related service." (Art. XIII D, § 2, subd. (d), italics added.) In a well-drawn district — limited to only parcels receiving special benefits from the improvement — every parcel within that district receives a shared special benefit. Under section 2, subdivision (i), these benefits can be construed as being general benefits since they are not "particular and distinct" and are not "over and above" the benefits received by other properties "located in the district."

We do not believe that the voters intended to invalidate an assessment district that is narrowly drawn to include only properties directly benefiting from an improvement. Indeed, the ballot materials reflect otherwise. Thus, if an assessment district is narrowly drawn, the fact that a benefit is conferred throughout the district does not make it general rather than special.

Proposition 218 twice uses the phrase "over and above" general benefits in describing special benefit. [Art. XIIID, sections 2(i) & 4(f)]. There currently are some mosquito and vector-related services being provided to the Assessment Area. Consequently, there currently are some mosquito control related benefits being provided to the Assessment Area and any new and extended service provided by the Assessment Area would be over and above this baseline. Arguably, all of the Services to be funded by the assessment therefore would be a special benefit because the additional Services would particularly and distinctly benefit and protect the Assessment Area over and above the previous baseline benefits and service.

Nevertheless, arguably some of the Services would benefit the public at large and properties outside the Assessment Area. In this report, the general benefit is conservatively estimated and described and then budgeted so that it is funded by sources other than the assessment.

In the 2009 Dahms case, the court upheld an assessment that was 100% special benefit on the rationale that the services funded by the assessments were directly provided to property in the assessment district. Similar to the assessments in Pomona that were validated by Dahms, the Assessments described in this Engineer's Report fund mosquito, vector and disease control services directly provided to property in the Assessment Area. Moreover, as noted in this Engineer's Report, the Services directly reduce mosquito and vector populations on all property in the Assessment Area. Therefore, Dahms establishes a basis for minimal or zero general benefits from the assessments. However, in this report, the general benefit is more conservatively estimated and described, and then budgeted so that it is funded by sources other than the assessment.

Calculating General Benefit

Without this assessment, the Assessment Area would lack the funds to extend the additional Services to the Assessment Area. The only additional service that is being provided is the vector control program assessment-funded Services. Consistent with footnote 8 of SVTA v. SCCOSA, and for the reasons described above, the Assessment Area has determined that all parcels in the Assessment Area receive a shared direct advantage and special benefit from the Services. The Services directly and particularly serve and benefit each parcel, and are not a mere indirect, derivative advantage. As explained above, Proposition 218 relies on the concept of "over and above" in distinguishing special benefits from general benefits. As applied to an assessment proceeding concurrent with the annexation this concept means that all vector control services, which provide direct advantage to property in the Assessment Area, are over and above the baseline and therefore are special.

Nevertheless, the Services may provide a degree of general benefit, in addition to the predominant special benefit. This section provides a conservative measure of the general benefits from the Assessments.

Benefit to Property Outside the Assessment Area

Properties within the Assessment Area receive almost all of the special benefits from the Services because the Services funded by the Assessments will be provided directly to protect property within the Assessment Area from mosquitoes and vector-borne diseases. However, properties adjacent to, but just outside of, the boundaries may receive some benefit from the Services in the form of reduced mosquito populations on property outside the Assessment Area. Since this benefit is conferred to properties outside the Assessment Area boundaries, it contributes to the overall general benefit calculation and will not be funded by the assessment.

A measure of this general benefit is the proportion of Services that would affect properties outside of the Assessment Area. Each year, the Assessment Area will provide some of its Services in areas near the boundaries of the Assessment Area. By abating mosquito populations near the borders of the Assessment Area, the Services could provide benefits in the form of reduced mosquito populations and reduced risk of disease transmission to properties outside the Assessment Area. If mosquitoes were not controlled inside the Assessment Area, more of them would fly from the Assessment Area. Therefore, control of mosquitoes within the unprotected areas provides some benefit to properties outside the Assessment Area, but within the normal travel range of vectors, in the form of reduced mosquito populations and reduced vector-borne disease transmission. This is a measure of the general benefits to property outside the Assessment Area because this is a benefit from the Services that is not specially conferred upon property in the assessment area.

The mosquito potential outside the Assessment Area is based on studies of mosquito dispersion concentrations. Mosquitoes can travel up to two miles, on average, so this destination range is used. Based on studies of mosquito destinations, relative to parcels in the Assessment Area average concentration of mosquitoes from the unprotected areas on properties within two miles of the Assessment Area is calculated to be 6%.[20] This relative vector population reduction factor within the destination range is combined with the number of parcels outside the Assessment Area and within the destination range to measure this general benefit and is calculated as follows:

Criteria

- Mosquitoes may fly up to 2 miles from their breeding source.
  - 233,032 parcels within 2 miles of, but outside of the Assessment Area, may receive some mosquito and disease protection benefit
- 6% portion of relative benefit that is received
- 1,034,810 Parcels in the Assessment Area

Calculations

Total Benefit = 233,032 parcels * 6% = 13,982 parcels equivalents

Percentage of overall parcel equivalents = 13,982 / 1,062,777 = **1.32 %**

Therefore, for the overall benefits provided by the Services to the Assessment Area, it is determined that 1.32% of the benefits is received by the parcels within two miles of the Assessment Area boundaries. Recognizing that this calculation is an approximation, this benefit will be rounded up to 1.5%.

[20] Tietze, Noor S., Stephenson, Mike F., Sidhom, Nader T. and Binding, Paul L., "Mark-Recapture of Culex Erythrothorax in Santa Cruz County, California", Journal of the American Mosquito Control Association, 19(2):134-138, 2003.

Benefit to Property *Inside* the Assessment Area that is *Indirect and Derivative*

The "indirect and derivative" benefit to property within the Assessment Area is particularly difficult to calculate. As explained above, all benefit within the Assessment Area is special because the mosquito and disease control services in the Assessment Area would provide direct service and protection that is clearly "over and above" and "particular and distinct" when compared with the level of such protection under current conditions. Further the properties are within the Assessment Area boundaries and this Engineer's Report demonstrates the direct benefits received by individual properties from mosquito and disease control services.

In determining the Assessment Area, VCP was careful to limit it to an area of parcels that would directly receive the Services. All parcels directly benefit from the surveillance, monitoring and treatment that will be provided on an equivalent basis throughout the Assessment Area in order to maintain the same improved level of protection against mosquitoes and other vectors and reduced mosquito and vector populations throughout the area. The surveillance and monitoring sites are spread on a balanced basis throughout the area. Mosquito and vector control and treatment are provided as needed throughout the area based on the surveillance and monitoring results. The shared special benefit - reduced mosquito levels and reduced presence of vector-borne diseases - are received on an equivalent basis by all parcels in the Assessment Area. Furthermore, all parcels in the Assessment Area directly benefit from the ability to request service from VCP and to have a VCP field technician promptly respond directly to the parcel and address the owner's or resident's service need. The SVTA vs. SCCOSA decision indicates that the fact that a benefit is conferred throughout the Assessment Area does not make the benefit general rather than special, so long as the Assessment Area is narrowly drawn and limited to the parcels directly receiving shared special benefits from the service. This concept is particularly applicable in situations involving a landowner-approved assessment-funded extension of a local government service to benefit lands previously not receiving that particular service. We therefore conclude that, other than the small general benefit to properties outside the Assessment Area (discussed above) and to the public at large (discussed below), all of the benefits of the Services to the parcels within the Assessment Area are special benefits and it is not possible or appropriate to separate any general benefits from the benefits conferred on parcels in the Assessment Area.

Benefit To The Public At Large

With the type and scope of Services to be provided to the Assessment Area, it is very difficult to calculate and quantify the scope of the general benefit conferred on the public at large. Because the Services directly serve and benefit all of the property in the Assessment Area, any general benefit conferred on the public at large is small. Nevertheless, there is some indirect general benefit to the public at large.

The public at large uses the public highways, streets, and sidewalks, and when traveling in and through the Assessment Area they will benefit from the Services. A fair and appropriate measure of the general benefit to the public at large therefore is the amount of highway, street, and sidewalk area within the Assessment Area relative to the overall land area. An analysis of maps of the Assessment Area shows that approximately 2.0% of the land area in the Assessment Area is covered by highways, streets, and sidewalks. This 2.0% therefore is a fair and appropriate measure of the general benefit to the public at large within the Assessment Area.

Summary of General Benefits

Using a sum of the measures of general benefit for the public at large and land outside the Assessment Area, we find that approximately 3.5% of the benefits conferred by the Mosquito and Disease Control Assessment may be general in nature and should be funded by sources other than the Assessment.

General Benefit =

1.5 % (Outside the Assessment Area)

\+ 0.0 % (Inside the Assessment Area - indirect and derivative)

\+ 2.0 % (Public at Large)

=3.5 % (Total General Benefit)

Although this analysis supports the findings that 3.5% of the assessment may provide general benefit only, this number is doubled by the Assessment Engineer to 7% to conservatively ensure that no assessment revenue is used to support general benefit. This additional amount allocated to general benefit also covers general benefit to parcels in the Assessment Area, if it is later determined that there is some general benefit conferred on those parcels.

The proposed Mosquito, Vector and Disease Control Assessment total budget for mosquito and vector abatement, disease control, capital improvement and incidental costs is $16,037,215. Of this total budget amount, VCP will contribute approximately $4,159,255, or 26% of the total budget from sources other than the Mosquito, Vector and Disease Control Assessment. This contribution more than offsets any general benefits from the Mosquito, Vector and Disease Control Assessment Services.

Zones of Benefit

In SVTA v. SCCOSA, the court noted that a local agency-wide assessment district is appropriate under the right conditions: “Thus, if an assessment district is narrowly drawn, the fact that a benefit is conferred throughout the district does not make it general rather than special. In that circumstance, the characterization of a benefit may depend on whether the parcel receives a direct advantage from the improvement (e.g., proximity to a park) or receives an indirect, derivative advantage resulting from the overall public benefits of the improvement (e.g., general enhancement of the district's property values).” The court therefore acknowledged the appropriateness of a District-wide assessment so long as each parcel receives a direct advantage from the assessment-funded improvement or service. As demonstrated in this Report, each parcel in the Assessment Area receives a direct advantage and special benefit from the Services.

VCP's mosquito, vector, and disease control programs, projects and services that will be funded by the Assessments will be provided in all areas within the County. Since the Services will be provided throughout the county and will result in reduced vector populations and the other special benefits for property throughout the County, the boundaries of the Assessment Area have been drawn to match the boundaries of the county. Parcels of similar type in the Assessment Area would receive similar mosquito and vector abatement services and benefits on a per parcel and land area basis. VCP is currently developing tools to evaluate and confirm that special benefit is consistent throughout the Assessment District. The results will be incorporated into the Engineer’s Reports in subsequent years.

Method of Assessment

As previously discussed, the Assessments fund enhanced, comprehensive, year-round mosquito and vector control, disease surveillance and control Services that will reduce mosquito and vector populations on property and will clearly confer special benefits to properties in the Assessment Area. These benefits can partially be measured by the property owners, guests, employees, tenants, pets, and animals on property in the Assessment Area who will enjoy a more habitable, safer, and more desirable place to live, work or visit. Therefore, the apportionment of benefit is partially based the population density of parcels. It should be noted that many other types of “traditional” assessments also use parcel population densities to apportion the assessments. For example, the assessments for sewer systems, roads and water systems are typically allocated based on the population density of the parcels assessed.

Moreover, assessments have a long history of use in California and are in large part based on the principle that any benefits from a service or improvement funded by assessments that is enjoyed by tenants and other non-property owners ultimately is conferred directly to the underlying property.[21]

With regard to benefits and source locations, the Assessment Engineer determined that since mosquitoes and other vectors readily fly from their breeding locations to all properties in their flight range and since mosquitoes are actually attracted to properties occupied by people or animals, the benefits from mosquito and vector control extend beyond the source locations to all properties that would be a "destination" for mosquitoes and other vectors. In other words, the control and abatement of mosquito and vector populations ultimately confers benefits to all properties that are a destination of mosquitoes and vectors, rather than just those that are sources of mosquitoes.

Although some primary mosquito and vector sources may be located outside of residential areas, residential properties can and do generate their own, often significant, populations of mosquitoes and vector organisms. For example, storm water catch basins in residential areas are a common source of mosquitoes. Since the typical flight range for a female mosquito on average is 2 miles, most homes in the Assessment Area are within the flight zone of many mosquito sources. Moreover, there are many other common residential sources of mosquitoes, such as miscellaneous backyard containers, neglected swimming pools, leaking water pipes and tree holes. Clearly, there is a potential for mosquito sources on virtually all types of property. More importantly, all properties in the Assessment Area are within the destination range of mosquitoes and most properties are actually within the destination range of multiple mosquito source locations.

[21] For example, in *Federal Construction Co. v. Ensign (1922) 59 Cal.App. 200 at 211*, the appellate court determined that a sewer system specially benefited property even though the direct benefit was to the people who used the sewers: "Practically every inhabitant of a city either is the owner of the land on which he resides or on which he pursues his vocation, or he is the tenant of the owner, or is the agent or servant of such owner or of such tenant. And since it is the inhabitants who make by far the greater use of a city's sewer system, it is to them, as lot owners or as tenants, or as the servants or agents of such lot owners or tenants, that the advantages of actual use will redound. But this advantage of use means that, in the final analysis, it is the lot owners themselves who will be especially benefited in a financial sense."

Because the Services will be provided throughout the Assessment Area with the same level of control objective, mosquitoes can rapidly and readily fly from their breeding locations to other properties over a large area, and because there are current or potential breeding sources literally everywhere in the Assessment Area, the Assessment Engineer determined that all similar properties in the Assessment Area have generally equivalent mosquito "destination" potential and, therefore, receive equivalent levels of benefit throughout the Assessment Area.

In the process of determining the appropriate method of assessment, the Assessment Engineer considered various alternatives. For example, a fixed assessment amount per parcel for all residential improved property was considered but was determined to be inappropriate because agricultural lands, commercial property and other property also receive benefits from the assessments. Likewise, an assessment exclusively for agricultural land was considered but deemed inappropriate because other types of property, such as residential and commercial, also receive the special benefit factors described previously.

A fixed or flat assessment was deemed to be inappropriate because larger residential, commercial, and industrial properties receive a higher degree of benefit than other similarly used properties that are significantly smaller. (For two properties used for commercial purposes, there is clearly a higher benefit provided to a property that covers several acres in comparison to a smaller commercial property that is on a 0.25-acre site. The larger property generally has a larger coverage area and higher usage by employees, customers, tourists, and guests that would benefit from reduced mosquito and vector populations, as well as the reduced threat from diseases carried by mosquitoes and other vectors. This benefit ultimately flows to the property.) Larger commercial, industrial, and apartment parcels, therefore, receive an increased benefit from the assessments.

In conclusion, the Assessment Engineer determined that the appropriate method of assessment apportionment should be based on the type and use of property, the relative size of the property, its relative population and usage potential, and its destination potential for mosquitoes. This method is further described below.

Assessment Apportionment

The special benefits derived from the Mosquito, Vector and Disease Control Assessment are conferred on property and are not based on a specific property owner's occupancy of property or the property owner's demographic status, such as age or number of dependents. However, it is ultimately people who do or could use the property and who enjoy the special benefits described above. Therefore, the opportunity to use and enjoy the region within the Assessment Area without the excessive nuisance, diminished livability or the potential health hazards brought by mosquitoes, vectors, and the diseases they carry is a special benefit to properties in the county. This benefit can be in part measured by the number of people who potentially live on, work at, visit or otherwise use the property, because people ultimately determine the value of the benefits by choosing to live, work and/or recreate in the area, and by choosing to purchase property in the area.[22]

In order to apportion the cost of the Services to property, each property in the Assessment Area is assigned a relative special benefit factor. This process involves determining the relative benefit received by each property in relation to a single-family home, or, in other words, on the basis of Single Family Equivalents (SFE). This SFE methodology is commonly used to distribute assessments in proportion to estimated special benefit. For the purposes of this Engineer's Report, all properties are designated a SFE value, which is each property's relative benefit in relation to a benchmark parcel in the Assessment Area. The benchmark property is the single family detached dwelling on a parcel of less than one acre. This benchmark parcel is assigned one Single Family Equivalent benefit unit or one SFE.

The calculation of the special benefit apportionment and relative benefit to properties in the Assessment Area from the Services is summarized in the following equation:

$$\textbf{Special Benefit (per property)} = \sum f\,\textbf{(Special Benefits)} * \sum f\,\textbf{(Property Specific Attributes}^{1}\textbf{)}$$

[1]Such as use, property type, size, as well as vector-specific attributes such as destination potential and population potential.

[22] . It should be noted that the benefits conferred upon property are related to the average number of people who could potentially live on, work at or otherwise could use a property, not how the property is currently used by the present owner.

Residential Properties

Certain residential properties in the Assessment Area that represent a single residential dwelling unit are assigned one Single Family Equivalent or 1.0 SFE. Traditional houses, zero-lot line houses, and townhomes are included in this category.

Single family residential properties in excess of one acre receive additional benefit relative to a single-family home on up to one acre, because the larger parcels provide more area for mosquito sources and Assessment Area vector services. Therefore, such larger parcels receive additional benefits relative to a single-family home on less than one acre and are assigned 1.0 SFE for the residential unit and an additional rate equal to the agricultural rate, described below, of 0.002 SFE per one-fifth acre of land area in excess of one acre. Mobile home parcels on a separate parcel and in excess of one acre also receive this additional acreage rate.

Other types of properties with residential units, such as agricultural properties, are assigned the residential SFE rates for the dwelling units on the property and are assigned additional SFE benefit units for the agricultural-use land area on the property.

Properties with more than one residential unit are designated as multi-family residential properties. These properties, along with condominiums, benefit from the services and improvements in proportion to the number of dwelling units that occupy each property, the average number of people who reside in each property, and the average size of each property in relation to a single-family home in San Diego county. This Engineer's Report analyzed San Diego county population density factors from the 2000 U.S. Census as well as average dwelling unit size for each property type. After determining the Population Density Factor and Square Footage Factor for each property type, an SFE rate is generated for each residential property structure, as indicated in Figure 12 below.

Figure 15: San Diego County Residential Assessment Factors

	Total Population	Occupied Households	Persons per Household	Pop. Density Equivalent	SqFt Factor	Proposed Rate
Single Family Residential	1,562,129	513,948	3.04	1.00	1.00	1.00
Condominium	250,673	93,642	2.68	0.88	0.79	0.70
Duplex, Triplex, Fourplex	189,407	73,620	2.57	0.85	0.62	0.53
Multi-Family Residential, 5+ Units	622,092	270,015	2.30	0.76	0.52	0.40
Mobile Home on Separate Lot	88,674	41,225	2.15	0.71	0.47	0.33

Source: 2000 U.S. Census, San Diego County and property dwelling size information from the San Diego County Assessor data and other sources.

The SFE factor of 0.40 per dwelling unit for multi-family residential properties applies to such properties with 20 or fewer units. Properties with more than 20 units typically offer on-site management, monitoring and other control services that tend to offset some of the benefits provided by the Services. Therefore, the benefit for properties with more than 20 units is determined to be 0.40 SFE per unit for the first 20 units and 0.10 SFE per each additional unit in excess of 20 dwelling units.

Commercial/Industrial Properties

Commercial and industrial properties are generally open and operated for more limited times relative to residential properties. Therefore, the relative hours of operation can be used as a measure of benefits since residents and employees also provide a measure of the relative benefit to property. Since commercial and industrial properties are typically open and occupied by employees approximately one-half the time of residential properties, it is reasonable to assume that commercial land uses receive one-half of the special benefit on a land area basis relative to single family residential property.

The average size of a single-family home with 1.0 SFE factor in San Diego County is 0.20 acres. Therefore, a commercial property with 0.20 acres receives one-half the relative benefit, or a 0.50 SFE factor.

The SFE values for various commercial and industrial land uses are further defined by using average employee densities because the special benefit factors described previously are also related to the average number of people who work at commercial/industrial properties.

To determine employee density factors, this Engineer's Report utilizes the findings from the San Diego Association of Governments Traffic Generators Study (the "SANDAG Study") because these findings were approved by the State Legislature which determined the SANDAG Study to be a good representation of the average number of employees per acre of land area for commercial and industrial properties. As determined by the SANDAG Study, the average number of employees per acre for commercial and industrial property is 24. As presented in Figure 13, the SFE factors for other types of businesses are determined relative to their typical employee density in relation to the average of 24 employees per acre of commercial property.

Commercial and industrial properties in excess of 5 acres generally involve uses that are more land intensive relative to building areas and number of employees (lower coverage ratios). As a result, the benefit factors for commercial and industrial property land area exceeding 5 acres is determined to be the SFE rate per fifth acre for the first 5 acres and the relevant SFE rate per each additional acre over 5 acres. Institutional properties that are used for residential, commercial or industrial purposes are also assessed at the appropriate residential, commercial or industrial rate.

Figure 13 below lists the benefit assessment factors for business properties.

Agricultural/Other Properties

Utilizing research and agricultural employment reports from UC Davis and the California Employment Development Department and other sources, this Engineer's Report calculated an average employee density of 0.05 employees per acre for agriculture property, 3.0 for golf courses, 0.01 for rangelands and timber and 1.2 for cemeteries. Since these properties typically are a source of mosquitoes and/or are typically closest to other sources of mosquitoes and other vectors, it is reasonable to determine that the benefit to these properties is twice the employee density ratio of commercial properties. The SFE factors per 0.20 acres of land area for these types of property are also shown in Figure 13.

Figure 16: Commercial/Industrial Benefit Assessment Factors

Type of Commercial/Industrial Land Use	*Average Employees Per Acre* [1]	*SFE Units per 1/5th Acre* [2]	*SFE Units per Acre After 5*
Commercial	24	0.500	0.500
Office	68	1.420	1.420
Shopping Center	24	0.500	0.500
Industrial	24	0.500	0.500
Self Storage or Parking Lot	1	0.050	
Golf Course	3.00	0.125	
Cemetery	1.20	0.050	
Agriculture	0.05	0.002	
Rangeland, Dry Farming and Timber	0.01	0.0004	

[1] Source: San Diego Association of Governments Traffic Generators Study, University of California, Davis and other sources.

[2] The SFE factors for commercial and industrial parcels indicated above are applied to each fifth acre of land area or portion thereof. (Therefore, the minimum assessment for any assessable parcel in these categories is the SFE Units listed herein.)

Vacant Properties

The benefit to vacant (undeveloped) properties is determined to be proportional to the corresponding benefits for similar type developed properties. However, vacant properties are assessed at a lower rate due to the lack of active benefits, as measured by use by residents, employees, customers, and guests. A measure of the benefits accruing to the underlying land is the average value of land in relation to improvements for developed property. An analysis of the assessed valuation data from the County of San Diego found that 50% of the assessed value of improved properties is classified as land value. Since vacant properties have very low to zero population/use densities until they are developed, a 50% benefit discount is applied to the valuation factor of 0.50 to account for the current low use density and potential for harm or nuisance to the property owner or his residents, employees, customers, and guests. The combination of these measures results in a 0.25 factor. It is reasonable to assume, therefore, that approximately 25% of the benefits are related to the underlying land and 75% are related to the day-to-day use of the property. Using this ratio, the SFE factor for vacant parcels is 0.25 per parcel.

Other Properties

Article XIIID stipulates that publicly owned properties must be assessed unless there is clear and convincing evidence that those properties receive no special benefit from the assessment.

All properties that are specially benefited are assessed. Publicly owned property that is used for purposes similar to private residential, commercial, industrial, or institutional uses is benefited and assessed at the same rate as such privately owned property.

Other public properties such as watershed parcels, parks, open space parcels are determined to, on average, receive similar benefits as a single-family home. Therefore, such parcels are assessed an SFE benefit factor of 1. Miscellaneous, small, and other parcels such as roads, right-of-way parcels, and common areas typically do not generate significant numbers of employees, residents, customers or guests and have limited economic value. These miscellaneous parcels receive minimal benefit from the Services and are assessed an SFE benefit factor of 0.

Church parcels, institutional properties, and property used for educational purposes typically generate employees on a less consistent basis than other non-residential parcels. Therefore, these parcels receive minimal benefit and are assessed an SFE factor of 1.

Duration of Assessment

The Assessment was levied for fiscal year 2005-06 and continued every year thereafter, so long as mosquitoes and vectors remain in existence and the San Diego County Vector Control Program requires funding from the Assessment for its Services. As noted previously, the Assessment and the continuation of the Assessment were approved by property owners in an assessment ballot proceeding, the Assessment has been continued to be levied annually after the San Diego County Board of Supervisors approved an annually updated Engineer's Report, budget for the Assessment, Services to be provided, and other specifics of the Assessment. In addition, the Board of Supervisors must hold an annual public hearing to continue the Assessment.

Appeals and Interpretation

Any property owner who feels that the assessment levied on the subject property is in error, as a result of incorrect information being used to apply the foregoing method of assessment, may file a written appeal with the Chief of the San Diego County Vector Control Program or their designee. Any such appeal is limited to correction of an assessment during the then current Fiscal Year or, if before July 1, the upcoming fiscal year. Upon the filing of any such appeal, the Chief or their designee will promptly review the appeal and any information provided by the property owner. If the Chief or their designee finds that the assessment may need modification, a request for the appropriate changes to the assessment roll shall be submitted to the County Auditor and Controller in accordance with their guidelines, County Board of Supervisors Policy B-42, and State law, including the California Revenue and Taxation Code. If any such changes are approved after the assessment roll has been filed with the County of San Diego for collection, the County is authorized to correct the assessment in accordance with County Board of Supervisors Policy B-42, and State law, including the California Revenue and Taxation Code. Any dispute over the decision of the County shall be referred to the Board. The decision of the Board shall be final.

Assessment

Whereas, the Board of Supervisors contracted with the undersigned Engineer of Work to prepare and file a report presenting an estimate of costs of the continued Services, a diagram for a benefit assessment district, an assessment of the estimated costs of the Services, and the special and general benefits conferred thereby upon all assessable parcels within San Diego County - Mosquito, Vector and Disease Control Assessment.

Now, therefore, the undersigned, by virtue of the power vested in me under Article XIIID of the California Constitution, the Government Code and the Health and Safety Code and the order of the Board of Supervisors of San Diego County, hereby make the following determination of an assessment to cover the portion of the estimated cost of the Services, and the costs and expenses incidental thereto to be paid by the Mosquito, Vector and Disease Control Assessment.

The amount to be paid for the services and improvements and the expenses incidental thereto, to be paid by the San Diego County Vector Control Program for the fiscal year 2025-26 is generally as follows:

Figure 17: Summary Cost Estimate Year 2025-2026

Vector & Disease Control Services	$14,637,039
Fixed Asset & Capital Equipment	$632,561
Reserve/Contingencies	-$1,555
Incidentals	$769,170
TOTAL BUDGET	$16,037,215
Less:	
District Contribution & Current Rev.	($4,159,255)
Net Amount To Assessments	$11,877,960

An Assessment Diagram is hereto attached and made a part hereof showing the exterior boundaries of the Assessment Area. The distinctive number of each parcel or lot of land in the Assessment Area is its Assessor Parcel Number appearing on the Assessment Roll.

I do hereby determine and apportion the net amount of the cost and expenses of the Services, including the costs and expenses incidental thereto, upon the parcels and lots of land within the Mosquito, Vector and Disease Control Assessment, in accordance with the special benefits to be received by each parcel or lot, from the Services, and more particularly set forth in this Engineer's Report.

The assessment determination is made upon the parcels or lots of land within the assessment area in proportion to the special benefits to be received by the parcels or lots of land, from the Services.

The assessment will be annually adjusted. The amount of the adjustment will be tied to the Consumer Price Index for the San Diego Area as of December of each succeeding year (the "CPI"), with a maximum annual adjustment not to exceed 5%. Any change in the CPI in excess of 5%, shall be cumulatively reserved as the "Unused CPI" and can be added to the annual change in the CPI for years in which the CPI change is less than 5%. The maximum authorized assessment rate is equal to the maximum assessment rate in the first fiscal year the assessment was levied adjusted annually by the minimum of 1) 5% or 2) the change in the CPI plus any Unused CPI as described above.

The change in the CPI from December to December was 3.12% and the Unused CPI carried forward from the previous fiscal year is 3.03%. Therefore, the maximum authorized assessment rate for fiscal year 2025-26 is increased by 5.00% which equates to $14.82 per single family equivalent benefit unit. The estimate of cost and budget in this Engineer's Report proposes assessments for fiscal year 2025-26 at the rate of $12.36, which is less than the maximum authorized assessment rate.

Each parcel or lot of land is described in the Assessment Roll by reference to its parcel number as shown on the Assessor's Maps of the County of San Diego for the fiscal year 2025-26. For a more particular description of the property, reference is hereby made to the deeds and maps on file and of record in the office of the County Assessor of the County of San Diego.

I hereby place opposite the Assessor Parcel Number for each parcel or lot within the Assessment Roll, the proposed amount of the assessment for the fiscal year 2025-26 for each parcel or lot of land within the Mosquito, Vector and Disease Control Assessment Area.[23]

Dated: May 2, 2025

Engineer of Work

By _____

[23] Each parcel has a uniquely calculated assessment based on the estimated level of special benefit to the property as determined in accordance with this Engineer's Report.

Assessment Diagram

The Mosquito, Vector and Disease Control Assessment Area includes all properties within the boundaries of the San Diego County.

The boundaries of the Mosquito, Vector and Disease Control Assessment Area are displayed on the following Assessment Diagram. Indian reservation land, as a Sovereign Nation, is excluded from the Assessment Area. Also, federally owned lands that receive minimal to no services are depicted with a two-tone diagonal line shade.

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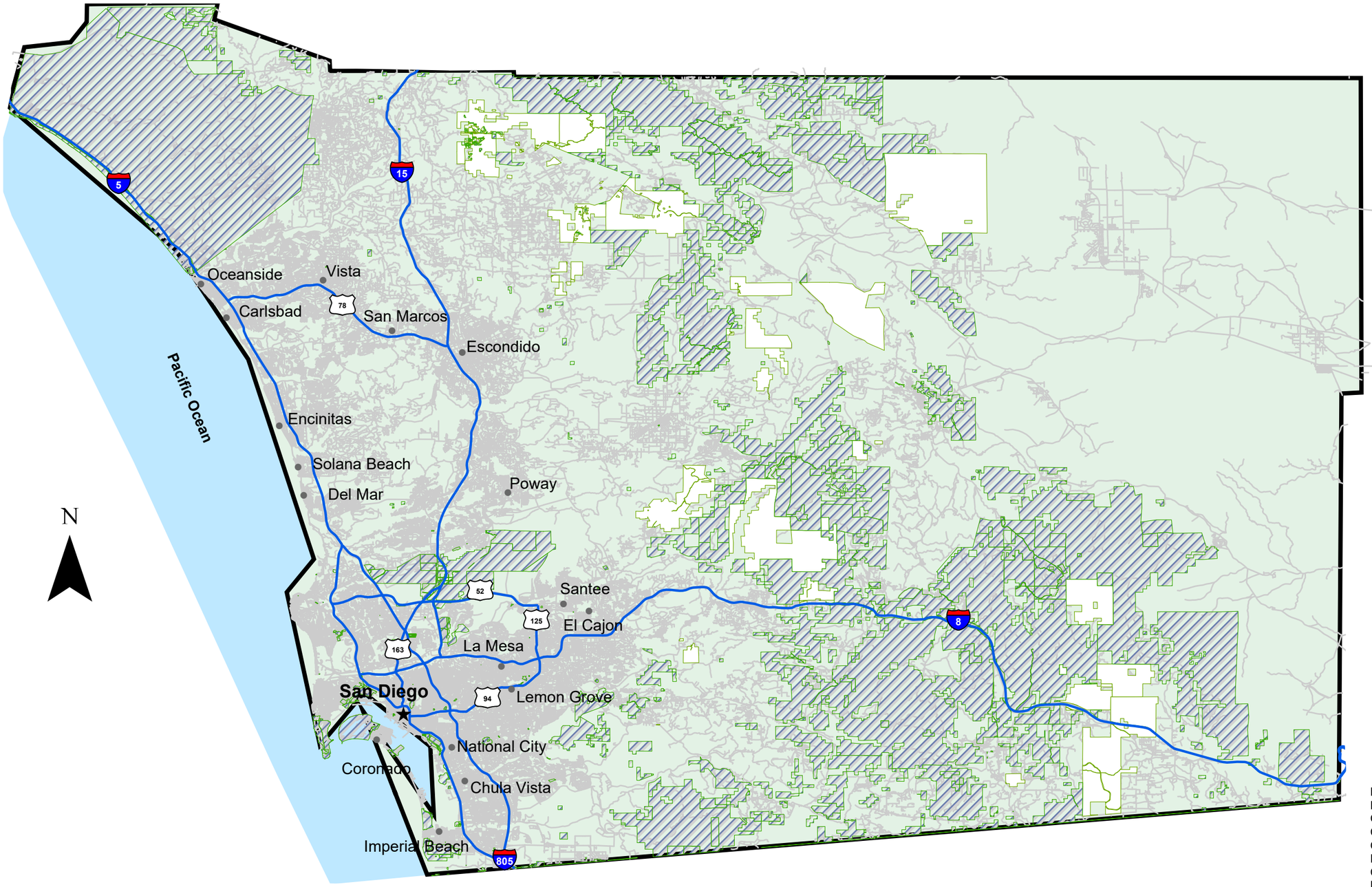

FILED THIS _____ DAY OF _____, 2025 AT THE HOUR OF _____ O'CLOCK __.M. IN THE OFFICE OF THE COUNTY AUDITOR OF THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AT THE REQUEST OF THE BOARD OF SUPERVISORS OF THE SAN DIEGO COUNTY VECTOR CONTROL PROGRAM.

_____
COUNTY AUDITOR, COUNTY OF SAN DIEGO

I CERTIFY THAT THIS ASSESSMENT DIAGRAM WAS PREPARED BY ME, AS PART OF THE VECTOR CONTROL PROGRAM MOSQUITO, VECTOR AND DISEASE CONTROL ASSESSMENT ENGINEER'S REPORT I PREPARED FOR THE COUNTY OF SAN DIEGO FOR FY 2025-26.

_____
JOHN BLISS, ENGINEER

Note:
REFERENCE IS HEREBY MADE TO THE MAPS AND DEEDS OF RECORD IN THE OFFICE OF THE ASSESSOR OF THE COUNTY OF SAN DIEGO FOR A DETAILED DESCRIPTION OF THE LINES AND DIMENSIONS OF ANY PARCEL SHOWN HEREIN. THOSE MAPS SHALL GOVERN FOR ALL DETAILS CONCERNING THE LINES AND DIMENSIONS OF SUCH PARCELS. EACH PARCEL IS IDENTIFIED IN SAID MAPS BY ITS DISTINCTIVE ASSESSOR'S PARCEL NUMBER.

Legend

- Incorporated Cities
- City of San Diego
- Freeways
- Federally Owned Lands
- American Indian Reservations
- San Diego County Vector Control Program Assessment Boundary

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COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH VECTOR CONTROL PROGRAM
MOSQUITO, VECTOR AND DISEASE CONTROL ASSESSMENT

Assessment Roll

Reference is hereby made to the Assessment Roll in and for the assessment proceedings on file in the office of the Chief of the of the San Diego Mosquito and Vector Control Program, as the Assessment Roll is too voluminous to be bound with this Engineer's Report.