COACHELLA VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT

MOSQUITO-BORNE VIRUS SURVEILLANCE AND EMERGENCY RESPONSE PLAN

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I. INTRODUCTION

Since 1969, California has had a mosquito-borne disease surveillance program in place to monitor mosquito abundance and encephalitis virus activity. The District began routine mosquito surveillance in the early 1980s. The present program was established in 1990 through a cooperative effort by the Arbovirus Research Group at the School of Public Health, UC Berkeley (now the Davis Arbovirus Research and Training, UC Davis), and the Coachella Valley Mosquito and Vector Control District (the District).

The District's mission is to protect public health with our communities through proven scientific, educational, and sustainable vector control programs. This mission is accomplished through an ongoing mosquito surveillance and control program. Intensive control measures may be applied to reduce the potential for virus transmission to people by suppressing infected mosquito populations while infectious viremia persists in vertebrate hosts, thus breaking the cycle by preventing new vector infections.

This document describes an enhanced surveillance and response program for the Coachella Valley dependent on the level of risk of mosquito-borne virus transmission to humans. The Mosquito-borne Virus Surveillance & Response Plan generated by California Department of Health Services, Mosquito & Vector Control Association of California, and University of California, is the core of this document; however, some necessary adjustments were made in benchmark ratings relative to the conditions in the Coachella Valley.

Guidelines for adult mosquito surveillance, processing mosquitoes for arbovirus detection, and testing dead birds and equines, as well as information regarding compounds approved for mosquito control in California are part of the California State Mosquito-Borne Virus Surveillance & Response plan.

II. BACKGROUND INFORMATION

Mosquito-borne viruses belong to a group of arthropod-borne viruses referred by us as arboviruses (for **ar**thropod-**bo**rne). From 15 mosquito-borne viruses known to occur in California, to date, only St. Louis encephalitis virus (SLEV), western equine encephalomyelitis virus (WEEV), and West Nile virus (WNV) have caused significant outbreaks of human disease. These viruses are maintained in nature in wild bird-mosquito cycles, and therefore they do not depend upon infections of humans or domestic animals for their persistence.

Surveillance includes the monitoring of immature and adult mosquito abundance and detecting virus activity by testing (a) adult female mosquitoes, (b) sentinel chickens and wild birds, (c) horses, and (d) humans for infection. Surveillance must include not only the monitoring of mosquito-borne viruses known to exist in California, but also the detection of newly introduced viruses.

III. MOSQUITO SURVEILLANCE OBJECTIVES

Mosquito control is the only practical method of protecting people and animals from WNV, SLEV, and WEEV infections. Larvae and pupae (immature stages) of *Culex tarsalis* and *Culex quinquefasciatus* can be found throughout the Coachella Valley in a wide variety of aquatic sources, ranging from urban retention basins to irrigated agricultural lands, Salton Sea marshes and duck club habitats.

A. MOSQUITO SURVEILLANCE

Surveillance includes monitoring of immature and adult mosquito abundance in the Coachella Valley throughout the year. To monitor mosquito larvae, "dippers" or long-handled ladles are used to collect samples from known and new water sources. At that time, the number of larvae and pupae per "dip" is estimated. These data are used to determine larval control measures. The records of the number and developmental stages of larvae, source size treated, product name, and amount used, with the control effectiveness data can provide an early warning tool for forecasting the size of the adult population.

Mosquito adult surveillance in the Coachella Valley is conducted by setting 53 gravid traps and 95 BG-Sentinel II traps on a weekly basis and setting an additional 58 CO_2 traps on a bi-weekly basis. Adult mosquito abundance is a key factor when evaluating the risk of disease transmission. **Guidelines for mosquito surveillance are summarized in Appendix A of the California Mosquito-Borne Virus Surveillance and Response Plan – April 2026.**

B. MOSQUITO INFECTIONS

Early detection of virus activity may be accomplished by testing *Culex tarsalis* and *Culex quinquefasciatus*, the primary vectors of SLEV, WEEV, and WNV in the Coachella Valley for virus infection. Sampling of other mosquito species may be necessary to detect the introduction of viruses that do not have a primary avian-*Culex* transmission. Mosquitoes are trapped by using carbon-dioxide-baited traps and using gravid traps baited with water with enriched organic content and the females are then pooled in groups up to 50 for testing at the District. **Procedures for processing mosquitoes for virus infection are summarized in Appendix C of the California Mosquito-Borne Virus Surveillance and Response Plan – April 2026.**

C. DEAD BIRDS

Dead birds are reported to CDPH, then either brain or eye tissue is sampled and tested at the District Laboratory for WNV. The dead bird testing algorithm is provided **in Appendix E of the California Mosquito-Borne Virus Surveillance and Response Plan – April 2026.**

D. EQUINE INFECTIONS

Equine disease due to WEEV and WNV is not a sensitive indicator of epizootic (infections only in animals) WEEV and WNV activity in California. The reason for this is the widespread vaccination of equines. If confirmed cases do occur, it is a strong indication that WEEV or WNV is active in the region. California Department of Agriculture (CDFA) and CDPH annually

contact veterinarians to ensure equine vaccinations. Besides WEEV and WNV, other mosquito-borne viruses may also cause encephalitis in horses, and consequently, testing of equine specimens by CDPH has been expanded to include other viruses. **See Appendix F of the California Mosquito-Borne Virus Surveillance and Response Plan – April 2026.**

E. HUMAN INFECTIONS

In general, human cases are not a sensitive surveillance indicator of virus activity because most human infections (>99%) have no, or only mild, symptoms. When severe encephalitis cases do occur, rarely are arboviruses suspected, and sera generally are not sent to CDPH for testing. Communication with key hospitals and local health officials has been enhanced in the last year. However, rapid detection and reporting of confirmed human cases is crucial to local mosquito control agencies in planning and expanding emergency control activities to prevent additional infections. **(See Appendices G and H of the California Mosquito-Borne Virus Surveillance and Response Plan – April 2026.**

F. DATA ANALYSIS AND INTERPRETATION

1. All weather reports received from state and local agencies that can affect mosquito breeding will be reviewed and analyzed by the District staff. Weekly and biweekly mosquito occurrence reports received from the District laboratory and the CDPH – VBDS statewide will be used for forecasting purposes. For websites related to weather conditions refer to **Appendix K of the California Mosquito-Borne Virus Surveillance and Response Plan – April 2026.**

2. Reports from the District laboratory, CDPH – VBDS, and UCD on virus isolations in mosquito pools, confirmed human cases and horse cases of encephalitis will be used for operational program planning.

G. PUBLIC INFORMATION AND EDUCATION

Residents, farmers, and duck club owners can play an important role in reducing the number of adult mosquitoes by eliminating standing water that may support the development of immature mosquitoes. Farmers and ranchers can ensure that irrigation practices do not allow standing water for extended periods, and duck club owners can work with mosquito control agencies to determine appropriate flooding schedules. Education regarding personal protective measures will help reduce exposure to mosquitoes (insect repellents, protective clothing time of the exposure to mosquitoes). Equally important is the education of the medical community to recognize the symptoms of WEEV, SLEV, and WNV and request proper laboratory testing for their confirmation. Public health officials need to be alerted if a mosquito-borne viral disease is detected, especially if the public health risk is high.

The level of public information and education depends on the conditions and required response.

Level 1: During a normal mosquito-breeding season, routine public education will be conducted.

Level 2: Emergency planning and enhanced public education will be conducted. This includes posting messages on the symptoms of encephalitis, public information about pesticide applications, and recommendations about avoiding mosquito bites.

Level 3: Full-scale media campaign is required at this level. Coordinate with CDPH in a regional emergency response in conjunction with California Office of Emergency Services in informing County Board of Supervisors, Local Health Departments, city, and county officials.

IV. MOSQUITO CONTROL OBJECTIVES

Mosquito control in California is conducted by over 80 local agencies, including mosquito and vector control districts, environmental health departments, and county health departments.

The Coachella Valley Mosquito and Vector Control District is a Special District and public agency that operates under the California Health and Safety Code, section 2270 (2000). The District currently serves 2400 square miles and is governed by an 11-member board of Trustees, nine representing the incorporated cities and two from Riverside County at large.

The District's mission is to reduce the risk from disease carried by mosquitoes and other vectors for residents in the Coachella Valley. **See Appendix I and J of the California Mosquito-Borne Virus Surveillance and Response Plan – April 2026** for compounds approved for mosquito control in California and application methods.

A. LARVAL CONTROL

This strategy prevents producing another generation of mosquitoes capable of transmitting disease. Control of larvae is target-specific and covers a defined area. Larval mosquito control includes environmental manipulation, biological control, and chemical control.

Environmental manipulation decreases habitat availability for immature mosquitoes. It may include water management, such as conservative crop irrigation in the Coachella Valley in date and citrus orchards, removal of standing water in the urban areas, re-circulation of water at fish farms, and water disposal through evaporation, such as at duck clubs.

Biological control uses natural predators, parasites, or pathogens to suppress immature stages of mosquitoes. In the Coachella Valley, mosquitofish, *Gambusia affinis*, are the most widely used biocontrol agent. These fish are released annually in a variety of habitats, mostly in abandoned pools.

Chemical control presently includes products that are highly specific and have minimal impact on non-target organisms. These products include microbial control agents, such as *Bacillus thuringiensis israelensis* (Bti), *Lysinibacillus sphaericus* and spinosad. Microbial products control mosquito larvae within 24 - 48 hours, and Bti is used in short-term habitats, such as irrigated dates and citrus orchards. Microbial products with a longer residual, such as *Lysinibacillus sphaericus*, are mostly used in permanent habitats of *Culex tarsalis* where penetration of the product is not an issue, or is applied by air to force the granules through the dense vegetation. Products based on the microbial-derived spinosad toxins are an effective tool to control immature mosquitoes; at the doses used to control mosquitoes, there is little danger of non-target impacts. Spinosad-containing products come in a variety of formulations; some work quickly within 48 hours, and others have a residual effect of up to 180 days. Insect growth regulators, such as Methoprene and pyriproxyfen, are widely in use in permanent breeding sources of *Culex tarsalis*, for instance, salt marshes along the Salton Sea and duck club ponds. Lightweight oils and monomolecular surface films are also used, but have the drawback of suffocating non-target surface breathing aquatic organisms as well. These surface products are primarily used against sources with large numbers of pupae.

B. ADULT CONTROL

Adult mosquito control may be required as an additional measure to control populations of infected mosquitoes and reduce the risk of transmission to people. Adult mosquito control products may be applied by ground-based equipment and airplanes or helicopters. Many factors need to be considered when selecting a pesticide and the target area for adult mosquito control treatments. These factors may include (1) efficacy against the target species or life cycle stages, (2) pesticide resistance (3) pesticide label requirements, (4) availability of pesticide and application equipment, (5) environmental conditions (6) cost, and (7) toxicity to non-target species, including humans. The products most likely used for adult mosquito control in the Coachella Valley include organophosphates, pyrethrin and pyrethroids. The two organophosphates that the District can use to control adult mosquitoes are malathion and naled. The pyrethrins and pyrethroids include active ingredients such as resmethrin, sumithrin, etofenprox, lambda-cyhalothrin, permethrin, prallethrin, deltamethrin, and esfenvalerate. These products may be applied with a synergist such as piperonyl butoxide (PBO). The District conducts routine evaluations of the effectiveness of the active ingredients against multiple mosquito populations to use the most effective suite of products.

V. RESPONSE LEVELS

The California Mosquito-borne Virus Surveillance and Response Plan is based on conditions that exist at three response levels identified as normal season, emergency planning, and epidemic conditions. Six risk factors that are analyzed to determine the appropriate response level include:

- Environmental conditions (wetland surface water area, rainfall, and temperature)
- Adult mosquito vector abundance
- Virus isolation rates from mosquitoes
- Infection rates in wild or domestic animals
- Human cases of mosquito-borne viruses
- Proximity of detected virus activity to urban or suburban regions

Sentinel chicken seroconversions should be used in areas where they are available. Each of these factors is rated on a scale of 1 to 5, with 5 representing conditions indicative of a high risk of human infection with a mosquito-borne virus. An average rating is determined for the six factors and is correlated with the response level as follows:

Level 1: Normal Season (1.0 to 2.5)
Level 2: Emergency Planning (2.6 to 4.0)
Level 3: Epidemic Conditions (4.1 to 5.0)

Tables 1 – 3 provide worksheets to assist in determining the appropriate rating for each of the risk factors. The term “average” refers to averages over non-epidemic years in a specific region, such as that within the boundaries of a local mosquito and vector control district. Averages typically are determined for the preceding five-year period. The roles and responsibilities of key agencies involved in carrying out the surveillance and response plan are outlined in “Key Agency Responsibilities.”

VI. MOSQUITO-BORNE VIRUS RISK ASSESSMENT TABLES

Table 1. West Nile virus

WNV Surveillance Factor	Assessment Value	Benchmark	Value	
1. Environmental conditions Favorable environmental conditions in the Coachella Valley for virus multiplication or transmission Consider ambient temperature and rainfall for prior 2-week period	1	Temperature ≤ 56°F		
	2	Temperature 57 - 65°F		
	3	Temperature 66 - 72°F		
	4	Temperature 73 – 79°F		
	5	Temperature > 79°F		
			Cx tars	*Cx quinq*
2. Adult *Culex tarsalis and Culex quinquefasciatus* abundance Determined by trapping adults, enumerating them by species, and comparing numbers to those previously documented for an area for the prior 2-week period.	1	Vector abundance well below average (<50%)		
	2	Vector abundance below average (50–90%)		
	3	Vector abundance average (90–150%)		
	4	Vector abundance above average (150–300%)		
	5	Vector abundance well above average (>300%)		
3. Virus isolation rate in *Culex tarsalis and Culex quinquefasciatus* mosquitoes Tested in pools of 50. Test results expressed as minimum infection rate (MIR) per 1,000 female mosquitoes tested for the prior 2-week period	1	MIR / 1000 = 0		
	2	MIR / 1000 = 0–1.0		
	3	MIR / 1000 = 1.1–2.0		
	4	MIR / 1000 = 2.1-5.0		
	5	MIR / 1000 > 5.0		
4. Dead bird infection Number of birds that have tested positive (recent infections only) for WNV during the prior 90 days.	1	No WN positive dead bird within 150 miles of District		
	2	WN positive dead bird within 150 miles of District		
	3	One WN positive dead bird in California		
	4	One WN positive dead bird in Coachella Valley.		
	5	Multiple WN positive dead bird reported in Coachella Valley		
5. Human cases Do not include this factor in calculations if no cases are detected in region	3	One or more human infections within 150 miles of District.		
	4	One human infection in Coachella Valley		
	5	Multiple human infections in Coachella Valley.		
			Cx tars	*Cx quinq*
<u>Response Level / Average Rating:</u> Normal Season (1.0 to 2.5) Emergency Planning (2.6 to 4.0) Epidemic (4.1 to 5.0)		**TOTAL**		

Table 2. Western Equine Encephalomyelitis virus

Table 2. WEEV Surveillance Factor	Assessment Value	Benchmark	Value
1. Environmental conditions Favorable environmental conditions in the Coachella Valley for virus multiplication or transmission Considers ambient temperature and rainfall for prior 2-week period	1	Cumulative rainfall and runoff well below average	
	2	Cumulative rainfall and runoff below average	
	3	Cumulative rainfall and runoff average	
	4	Cumulative rainfall and runoff above average	
	5	Cumulative rainfall and runoff well above average	
2. Adult *Culex tarsalis* abundance Area of North and West Shore in last 5 years = female mosquitoes /trap night/ month	1	Vector abundance well below average (<50%)	
	2	Vector abundance below average (50–90%)	
	3	Vector abundance average (90–150%)	
	4	Vector abundance above average (150–300%)	
	5	Vector abundance well above average (>300%)	
3. Virus isolation rate in *Culex tarsalis* mosquitoes Tested in pools of 50. Test results expressed as minimum infection rate (MIR) per 1,000 female mosquitoes tested	1	MIR / 1000 = 0	
	2	MIR / 1000 = 0–1.0	
	3	MIR / 1000 = 1.1–2.0	
	4	MIR / 1000 = 2.1-5.0	
	5	MIR / 1000 > 5.0	
4. Proximity to urban or suburban regions (score only if virus activity detected) Risk of outbreak is highest in urban areas because of high likelihood of contact between humans and vectors.	1	Virus detected in rural area	
	3	Virus detected in small town or suburban area	
	5	Virus detected in urban area	
5. Human cases Do not include this factor in calculations if no cases found in region or in agency.	3	One or more human cases within 150 miles of District	
	4	One human case in Coachella Valley.	
	5	More than one human case in Coachella Valley.	
Response Level / Average Rating: Normal Season (1.0 to 2.5) Emergency Planning (2.6 to 4.0) Epidemic (4.1 to 5.0)		**TOTAL**	
		AVERAGE	

Table 3. St. Louis Encephalitis virus

Table 3. SLEV Surveillance Factor	Assessment Value	Benchmark	Value	
1. Environmental conditions Favorable environmental conditions in the Coachella Valley for virus multiplication or transmission. Considers ambient temperature for prior 2-week period.	1	Temperature ≤ 56°F		
	2	Temperature 57 - 65°F		
	3	Temperature 66 - 72°F		
	4	Temperature 73 – 79°F		
	5	Temperature > 79°F		
			Cx tars	*Cx quinq*
2. Adult *Culex tarsalis and Culex quinquefasciatus* abundance Area of North and West Shore in last 5 years = female mosquitoes /trap night for prior 2-week period.	1	Vector abundance well below average (<50%)		
	2	Vector abundance below average (50–90%)		
	3	Vector abundance average (90–150%)		
	4	Vector abundance above average (150–300%)		
	5	Vector abundance well above average (>300%)		
3. Virus isolation rate in *Culex tarsalis and Culex quinquefasciatus* mosquitoes Tested in pools of 50. Test results expressed as minimum infection rate (MIR) per 1,000 female mosquitoes tested for the prior 2-week period	1	MIR / 1000 = 0		
	2	MIR / 1000 = 0–1.0		
	3	MIR / 1000 = 1.1–2.0		
	4	MIR / 1000 = 2.1-5.0		
	5	MIR / 1000 > 5.0		
4. Human cases Do not include this factor in calculations if no cases are detected in region	3	One or more human infections within 150 miles of District		
	4	One human infection in Coachella Valley.		
	5	Multiple human infections in Coachella Valley.		
			Cx tars	*Cx quinq*
<u>Response Level / Average Rating:</u> Normal Season (1.0 to 2.5) Emergency Planning (2.6 to 4.0) Epidemic (4.1 to 5.0)		**TOTAL**		
		AVERAGE		

VII. CHARACTERIZATION OF CONDITIONS AND RESPONSES
Normal Season
Risk Rating: 1.0 – 2.5

Conditions:
• Average or below average rainfall; average seasonal temperatures • Mosquito abundance at or below five-year average (key indicator = adults of vector species) • No virus isolations from mosquitoes • No recently infected arbovirus positive dead birds • No human cases
Response Activities by Role:
General Manager • With Laboratory Manager, Operations Manager, and Public Information Manager, establish and maintain routine communication with local office of emergency services personnel; obtain Standardized Emergency Management System (SEMS) training • Ensure adequate emergency funding with Administrative Finance Manager
Laboratory Manager • With General Manager, Operations Manager, and Public Information Officer establish and maintain routine communication with local office of emergency services personnel; obtain Standardized Emergency Management System (SEMS) training • With Public Information Manager, send routine notifications to physicians and veterinarians
Operations Manager • With General Manager, Laboratory Manager, and Public Information Manager establish and maintain routine communication with local office of emergency services personnel; obtain Standardized Emergency Management System (SEMS) training • Coordinate routine mosquito larval control • Comply with National Pollutant Discharge Elimination System permit if applying pesticides to waters of the United States • Inventory pesticides and equipment
Public Information Manager • Conduct routine public education (eliminate standing water around homes, use personal protection measures) • Release routine press notices • Send routine notifications to physicians and veterinarians
Vector Ecologist • Conduct routine mosquito and virus surveillance activities • Evaluate pesticide resistance in vector species

Emergency Planning
Risk Rating 2.6-4.0

Conditions:
• Temperature and rainfall above average • Adult mosquito abundance >5-year average (150-300% above normal) • One or more virus isolations from mosquitoes (MIR / 1000 is <5) • Evidence of recent infection in 1-5 wild birds within the District • One human case within 150 miles of District • If WEEV, viral activity in small towns or suburban area
Response Activities by Role:
Laboratory Manager • Coordinate epidemic response in consultation with General Manager • Review candidate pesticides for availability and susceptibility of vector mosquito species • Identify any special environmental compliance concerns in affected area and communicate with Lead District staff • Provide assistance to County Public Health on investigations of cases of human disease
Operations Manager • Review epidemic response plan • Increase surveillance and control of mosquito larvae • Coordinate localized chemical control of adult mosquitoes • Contact commercial applicators in anticipation of large scale adulticide applications
Public Information Manager • Review epidemic response plan • Enhance public education (include messages on signs and symptoms of encephalitis; seek medical care if needed; inform public about pesticide applications if appropriate) • Enhance information for public health providers • Ensure notification of key agencies of presence of viral activity, including the office of emergency services
Vector Ecologist • Review epidemic response plan • Increase adult mosquito surveillance • Increase number of mosquito pools tested for virus • Review candidate pesticides for availability and susceptibility of vector mosquito species

Epidemic Conditions
Risk Rating 4.1-5.0

Conditions:
• Rainfall, temperature, wetland surface area well above average • Adult vector population extremely high (>300% above normal) • Virus isolates from multiple pools of mosquitoes (MIR /1000 > 5.0) • Increased seroprevalance rates in wild bird populations or die-off of susceptible species (more than 5) • One or more human cases in District • In the case of WEEV, virus detection in urban or suburban areas
Response Activities by Role:
General Manager and Administrative Finance Manager: • Ensure adequate emergency funding • Determine whether a declaration of a local emergency should be considered by the County Board of Supervisors (or Local Health Officer) • Determine whether a declaration of a "State of Emergency" should be considered by the Governor at the request of designated county or city officials
Administrative Finance Manager: • Ensure state funds and resources are available to assist epidemic control efforts.
Laboratory Manager: • Coordinate epidemic response. • Coordinate with County Public Health to conduct investigations of cases of human disease • Coordinate the response with the local Office of Emergency Services or if activated, the Emergency Operation Center (EOC) • Request public health exemptions from FIFRA (40 CFR 166) and emergency tolerance exemptions (40 CFR 176) • With Operations Manager and Vector Ecologist, accelerate adult mosquito surveillance and control • Ensure remaining environmental compliance requirements are met.
Operations Manager: • With Laboratory Manager and Vector Ecologist, initiate mosquito surveillance and control in geographic regions without an organized vector control program • Continue enhanced larval surveillance and control of immature mosquitoes • Accelerate adult mosquito control as appropriate
Public Information Manager: • Conduct full-scale media campaign • Alert physicians and veterinarians to expect cases • Continue mosquito education and control programs until mosquito abundance is substantially reduced and no additional human cases are detected

Vector Ecologist:

- With Laboratory Manager and Operations Manager, initiate mosquito surveillance and control in geographic regions without an organized vector control program
- Broaden geographic coverage of adult mosquito surveillance and arbovirus testing.

VIII. PROGRAM SUPPORT

A. Key Agency Responsibilities

1. Local Mosquito and Vector Control Agencies

- Acquire and interpret regional weather data
- Monitor abundance of immature and adult mosquitoes
- Collect and submit mosquito pools for virus isolation
- Pick up suitable dead birds and test for WNV
- Update the VectorSurv Gateway weekly to record all mosquito samples and birds that are tested
- Conduct routine control of immature mosquitoes
- Conduct control of adult mosquitoes when needed
- Comply with NPDES permit if applying pesticides to or near water of the United States
- Educate public on mosquito avoidance and reduction of mosquito sources
- Coordinate with local Office of Emergency Services personnel
- Communicate regularly with neighboring agencies

2. Mosquito and Vector Control Association of California

- Coordinate purchase of sentinel chickens
- Receive, track, and disburse payment for surveillance expenses
- Coordinate surveillance and response activities among member agencies
- Serves as spokesperson for member agencies
- Establish liaisons with press and government officials

3. California Department of Public Health

- Provide and maintain Vector Control Technician Certification program
- Maintain a WNV information hotline, 1-877-WNV-BIRD, and a website (http://westnile.ca.gov).
- Test sentinel chicken sera for viral antibodies
- Coordinate surveillance for human infections and conduct epidemiological investigations of cases of human disease
- Coordinate and oversee testing and acquisition of human specimens for virus and antiviral antibodies.
- Distribute a weekly bulletin summarizing surveillance test results
- Report weekly surveillance results to the CDC ArboNET surveillance system.
- Immediately notify local vector control agency and public health officials when evidence of viral activity is found
- Coordinate and participate in regional emergency response in conjunction with California Emergency Management Agency
- Provide oversight of local jurisdictions without defined vector-borne disease control program
- Maintain inventory of antigens, antisera, and RNA assays to detect exotic viruses
- Provide confirmation of tests done by local agencies

4. **University of California at Davis, Davis Arbovirus Research and Training (DART)**
   - Conduct research on arbovirus surveillance, transmission of mosquito-borne pathogens, and mosquito ecology and control
   - Provide support for testing mosquito and dead bird samples for endemic and exotic arboviruses
   - Provide a panel of tests for a wide range of viruses for identification of viruses from human, equine, bird, or arthropod vectors
   - Maintain an interactive website (https://ca.vectorsurv.org/) for dissemination of mosquito-borne virus information and data
   - Maintain inventory of antigens and antisera to detect exotic viruses
   - Provide confirmation of tests done by local or state agencies

5. **California Department of Food and Agriculture**
   - Notify veterinarians and veterinary diagnostic laboratories about WEEV and WNV testing facilities available at California Animal Health and Food Safety Laboratory
   - Provide outreach to general public and livestock and poultry producers on the monitoring and reporting of equine and ratite encephalitides
   - Facilitate equine sample submission from the field
   - Conduct investigations of confirmed WNV and WEEV equine cases and notify CDPH of positive equines.

6. **Local Health Departments and Public Health Laboratories**
   - Test human specimens for arboviruses
   - Refer human specimens to CDPH for further testing
   - Notify local medical community, including hospitals and laboratories, if evidence of viral activity present
   - Participate in emergency response
   - Conduct epidemiological investigations of cases of human disease
   - Report human arbovirus cases to CDPH
   - Conduct public outreach and education

7. **California Emergency Management Agency**
   - Coordinate the local, regional, or statewide emergency response under epidemic conditions in conjunction with CDPH via the Standardized Emergency Management System (SEMS)
   - Serve as liaison with the Federal Emergency Management Agency (FEMA) in the event that a federal disaster has been declared

8. **State Water Resources Control Board**
   - Review NPDES permit applications and respond in a timely manner
   - Review vector control pesticides registered by Department of Pesticide Regulation for inclusion on the Vector Control NPDES permit

9. **Centers for Disease Control and Prevention**
    - Provide consultation to state and local agencies in California if epidemic conditions exist
    - Provide national surveillance data to state health departments
    - Provide diagnostic consultation

B. Equipment

Monitoring of emergency levels of larvicide and adulticide control products will be done on a monthly basis and displayed in the monthly district inventory program located on the district Operations Application program. If larvicide or adulticide levels fall below or are in danger of falling below the emergency treatment level capability, steps will be taken to replenish inventory levels to meet the emergency requirements.

APPLICATION EQUIPMENT

Equipment	*Number in use*
1. Hand Cans (1 gal)	63
2. Maruyama Backpack Sprayers (Granular)	42
3. Stihl Backpack Sprayers (Liquid)	15
4. Stihl Granular	5
5. Tomahawk battery pack	1
6. Hand Backpack Sprayers	52
7. Argo – all-terrain vehicle	1
8. Powered Liquid Skid Mounted Sprayer	3
9. ATV - quadbike	3
10. ATV - ranger	4
11. London Fog ULV Model 18-20	2
12. Guardian Model 190ES ULV Sprayer	1
13. Guardian Model 190G4 ULV Sprayer	4
14. Colt Hand Portable Fog Generator	8
15. A1 Super Duty Mister	4
16. Twister (Liquid)	2
17. Birchmeirer 4-Gal Liquid Backpack Sprayer	13

18. SP2 5-Gal Gas-powered Liquid Backpack Sprayer	2
19. Micronair Liquid Barrier Sprayer	1
20. PS 50-Gal Gas-powered liquid sprayer	2
21. 25-Gal Power Sprayer	1
22. Polaris 15-Gal electric pump sprayer	1
23. Herd Spreader for Ranger	2
24. MultiQuip Water Trailer	1

Aerial applicators available for contact

Salton Sea Air Service, Inc.
101-111 Desert Air Drive
North Shore, CA 92254

Clarke Environmental Mosquito Management, Inc.
110 East Irving Park Road, 4th Floor
Roselle, IL 60172-9963
Telephone: (800) 323-5727

OceanAir Helicopters
16603 Vesper Road
Valley Center, CA 92082

Vector Disease Control International (VDCI)
1320 Brookwood Drive, Suite H
Little Rock, AR 72202
Telephone: (800) 413-4445

C. Control Products

LARVAL CONTROL

Products – The District will maintain an emergency level of larval control product inventory to control mosquito breeding at the following listed levels for 14 consecutive days. This level would be sufficient for District personnel to evaluate the scope and magnitude of the emergency, formulate a specific response plan, and procure additional control products if needed.

The following products are stored at the District and emergency response amounts will be available in combination to treat the listed acreage during the specified season. A combination of products within the same classification can fulfill the emergency requirements. The Maximum Product Required listed in the table is the amount required to fulfill the required treatment capability, provided that no other product within that category is available. The combined acreage capability for each classification of product is displayed in the monthly inventory spreadsheet located at our in-house Ops Application under Pesticide Inventory.

LARVAL CONTROL PRODUCT INVENTORY EMERGENCY RESERVE

Product	Classification	Treatment Rate	Maximum Product Required	Required Treatment Capability and Seasonal Availability
PUPACIDES				
CocoBear Mosquito Larvicide	Pupacide (liquid)	3 gal./acre	240 gals.	40 acres for 14 days – year-round Retreat after 7 days 80 acres treated
INSECT GROWTH REGULATORS - methoprene				
MetaLarv S-PT	IGR (granule)	10 lbs./acre	2500 lbs. – April-Oct. 1500 lbs. – Nov.-March	250 acres April through October; 150 acres November through March. Altosid Liquid – re-treat after 7 days 500 acres April – October treated. 200 acres November – March treated. MetaLarv S-PT – re-treat after 42 days 250 acres April – October treated 150 acres November – March treated
Altosid Liquid	IGR (liquid)	4 oz./acre	15.6 gal. – April-Oct. 9.4 gal. – Nov.-March	

BACTERIAL PRODUCTS – Bti, *Lysinibacillus sphaericus*				
Aquabac 200G	Biological (granule)	10 lbs./acre	5000 lbs. – April - October	250 acres for 14 days – April through October Retreat after 7 days 500 acres treated
VectoBac 12AS	Biological (liquid)	16 oz./acre	62.5 gals. – April - October	
VectoBac G	Biological (granule)	10 lbs./acre	5000 lbs. – April - October	
VectoBac GS	Biological (granule)	10 lbs./acre	5000 lbs. – April - October	
VectoBac WDG	Biological (granule)	7 oz./acre	219 lbs. – April - October	
VectoMax FG	Biological (granule)	10 lbs./acre	5000 lbs. – April - October	
SPINOSAD PRODUCTS				
Censor	Spinosad (granule)	9 lbs./acre	3000 lbs. April-Oct. 1200 lbs. Nov.-March	250 acres for 14 days – April through October. 100 acres for 14 days – November through March. Censor, Natular SC, and Natular G - Retreat after 7 days. 500 acres April – October treated. 200 acres November – March treated. Natular G30 – Retreat after 30 days. 250 acres April – October treated. 100 acres November – March treated.
Natular G	Spinosad (granule)	9 lbs./acre	1500 lbs. April-Oct. 600 lbs. Nov.-March	
Natular SC	Spinosad (liquid)	6.4 oz./acre	25 gals. April-Oct. 10 gals. Nov.-March	
Natular G30	Spinosad (granule)	10 lbs./acre	2500 lbs. April-Oct. 1000 lbs. Nov.-March	

ADULT CONTROL

Products – District emergency adult mosquito control product inventory for rural areas of the Coachella Valley is estimated to be 250 acres (35,000 linear feet), for 10 days of ground treatment, plus 640 acres for 10 days for aerial ULV treatments. Urban control is estimated to be 250 acres, (35,000 linear feet), for 10 days ground ULV. In addition, barrier treatment products capable of treating 4 acres, (29,000 linear feet by 6 foot), will also be available for emergency response. This level would be sufficient for district personnel to evaluate the scope and magnitude of the emergency, formulate a specific response plan, and procure additional control products if needed. A combination of products within the same classification can fulfill the emergency requirements. The Maximum Product Required listed in the table is the amount required to fulfill the required treatment capability, provided that no other product within that category is available.

District personnel may substitute products based on product availability, mosquito population resistance studies, and environmental impacts.

ADULT CONTROL PRODUCT INVENTORY EMERGENCY RESERVE

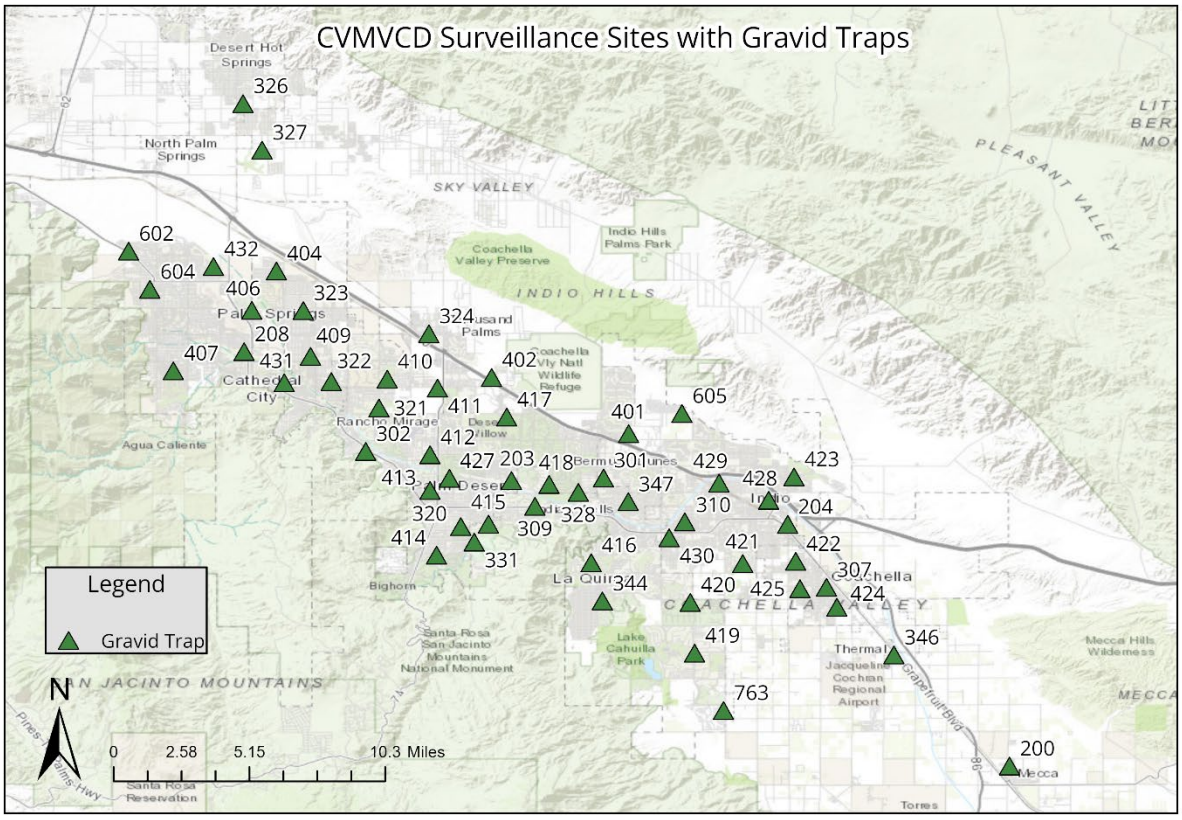
Adulticide Product	Classification	Treatment Rate	Maximum Product Required	Treatment Capability
Aqua-Reslin	Adulticide	0.536oz. Aqua-Reslin/ Acre	37.2 gals.	6400 acres – rural fogging 2500 acres – urban fogging
Duet	Adulticide	1.28 oz. Duet/Acre	89 gals.	
EverGreen 5-25	Adulticide	0.876 oz. EverGreen 5-25/Acre	60.9 gals.	
Fyfanon ULV	Adulticide	0.75 oz Fyfanon/Acre	52.14 gals.	
DeltaGard	Adulticide	1.007 oz. DeltaGard/Acre	19.6 gals.	2500 acres – urban fogging (no rural)
Aqua-Reslin	Barrier Spray	7.7 fl. oz./Acre barrier treatment	0.25 gals.	4 acres Barrier treatments
Demand CS	Barrier Spray	21.78 fl. oz./ Acre barrier treatment	0.68 gals	
Demon Max	Barrier Spray	43.56 fl. oz./ Acre barrier treatment	1.36 gals	
Mavrik Perimeter	Barrier Spray	21.78 fl. oz./ Acre barrier treatment	0.68 gals	

EMERGENCY CONTROL PRODUCT MONITORING

Monitoring of emergency levels of larvicide and adulticide control products will be done monthly and displayed in the monthly district inventory sheets located our in-house Ops Application under Pesticide Inventory. If larvicide or adulticide levels fall below or are in danger of falling below the emergency treatment level capability, steps will be taken to replenish inventory levels to meet the emergency requirements.

IX. APPENDICES

Appendix A.1 – Map of Surveillance Locations with Gravid Traps in the Coachella Valley

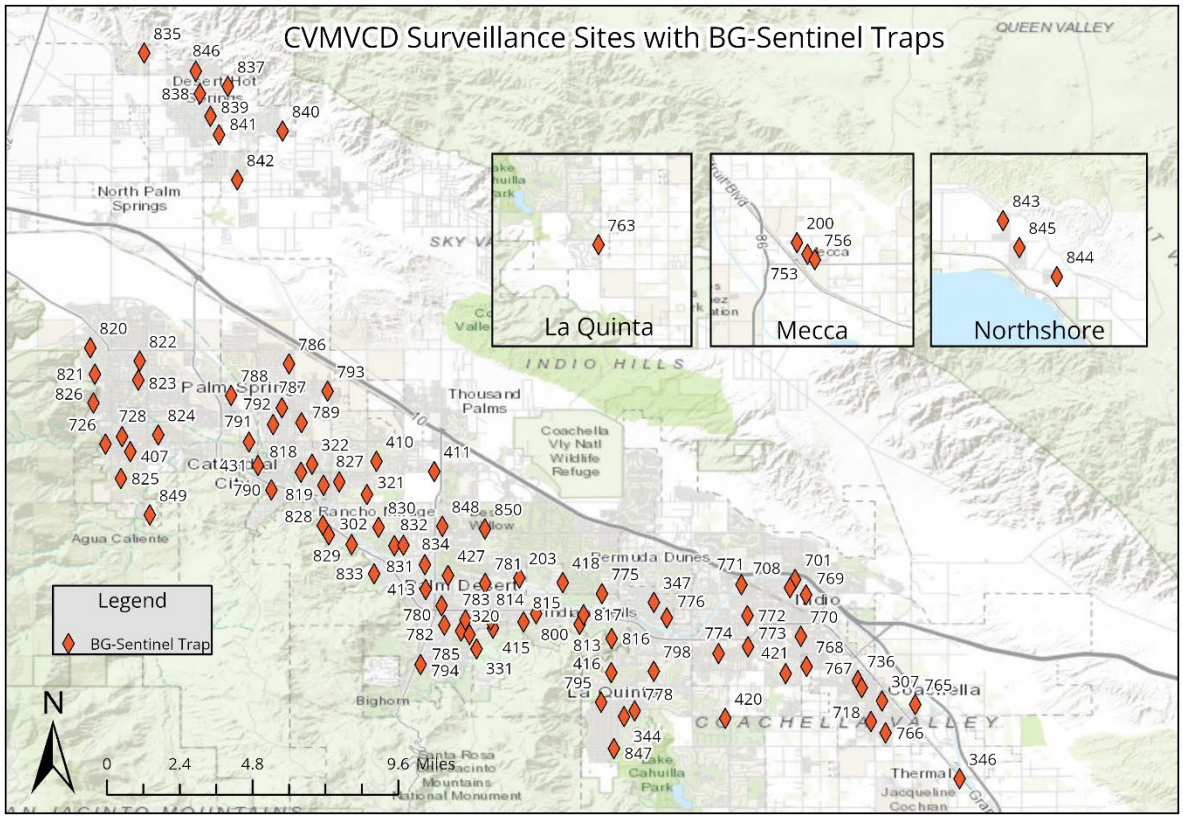


Appendix A.2 – List of Sites with Gravid Trap Locations in the Coachella Valley

No.	Site ID	City	Location Description
1	200	Mecca	Avenue 64 and Lincoln St
2	203	Palm Desert	Cook St and Sheryl Ave
3	204	Indio	Van Buren St and Enterprise Way
4	208	Palm Springs	Mesquite Ave and S Gene Autry Trl
5	301	Bermuda Dunes	Avenue 42 and Washington St
6	302	Rancho Mirage	Hwy 111 and Thunderbird Rd
7	307	Coachella	6th St and Palm Ave
8	309	Indian Wells	Hwy 111 and El Dorado Dr
9	310	New Indio	Avenue 46 and Madison St
10	320	Palm Desert	Portola Ave and Grapevine St
11	321	Rancho Mirage	Frank Sinatra Dr and Thompson Rd
12	322	Cathedral City	Gerald Ford Dr and Plumley Rd
13	323	Cathedral City	Avenue 30 and Avenida Ximino
14	324	Thousand Palms	Ramon Rd and Robert Rd
15	326	Desert Hot Springs	Palm Dr and Park Ln
16	327	Desert Hot Springs	Avenue 18 and Bubbling Wells Rd
17	328	Palm Desert	Fred Waring Dr and Warner Trail
18	331	Palm Desert	Portola Ave and Haystack Rd
19	344	La Quinta	Avenue 52 and Avenida Bermudas
20	346	Thermal	Airport Blvd and Grapefruit Blvd
21	347	La Quinta	Miles Ave and Adams St
22	401	Palm Desert	Avenue 40 and Adams St
23	402	Thousand Palms	Varner Rd and Jack Ivey Dr
24	404	Cathedral City	Landau Blvd and Ontina Rd
25	406	Palm Springs	Gene Autry Trail and Clubhouse View Dr
26	407	Palm Springs	S Camino Real and E La Verne Way
27	409	Cathedral City	Date Palm Dr and Ortega Rd
28	410	Rancho Mirage	Gerald Ford Dr and Inverness Dr
29	411	Rancho Mirage	Gerald Ford Dr and Monterey Ave
30	412	Rancho Mirage	Monterey Ave and Verbenia Rd
31	413	Palm Desert	Monterey Ave and Parkview Dr
32	414	Palm Desert	Mesa View Dr and Alamo Dr
33	415	Indian Wells	Vintage Dr and Fairway Dr
34	416	La Quinta	Eisenhower Dr and Coachella Dr
35	417	Palm Desert	Frank Sinatra Dr and Cook St
36	418	Indian Wells	Fred Waring Dr and Via Toscana
37	419	La Quinta	Airport Blvd and Madison St
38	420	La Quinta	Avenue 52 and Madison St
39	421	Indio	Avenue 50 and Jackson St

40	**422**	Coachella	Avenue 49 and Van Buren St
41	**423**	Indio	Avenue 43 and Golf Center Pkwy
42	**424**	Coachella	Avenue 53 and Genoa St
43	**425**	Coachella	Avenue 51 and Frederick St
44	**427**	Palm Desert	Monterey Ave and Magnesia Falls Dr
45	**428**	Indio	Dillon Ave and Palo Verde St
46	**429**	Indio	Monroe St and Oleander Ave
47	**430**	Indio	Hwy 111 and Jefferson St
48	**431**	Palm Springs	Cathedral Canyon Dr and E Palm Canyon Dr
49	**432**	Palm Springs	N Whitewater Club Dr and N Farrell Dr
50	**602**	Palm Springs	N Palm Canyon Dr and W Gateway Dr
51	**604**	Palm Springs	N Palm Canyon Dr and W Vista Chino
52	**605**	Indio	Avenue 38 and Madison St
53	**763**	La Quinta	Avenue 60 and Monroe St

Appendix B.1 – Map of Surveillance Locations with BG-Sentinel Traps in the Coachella Valley



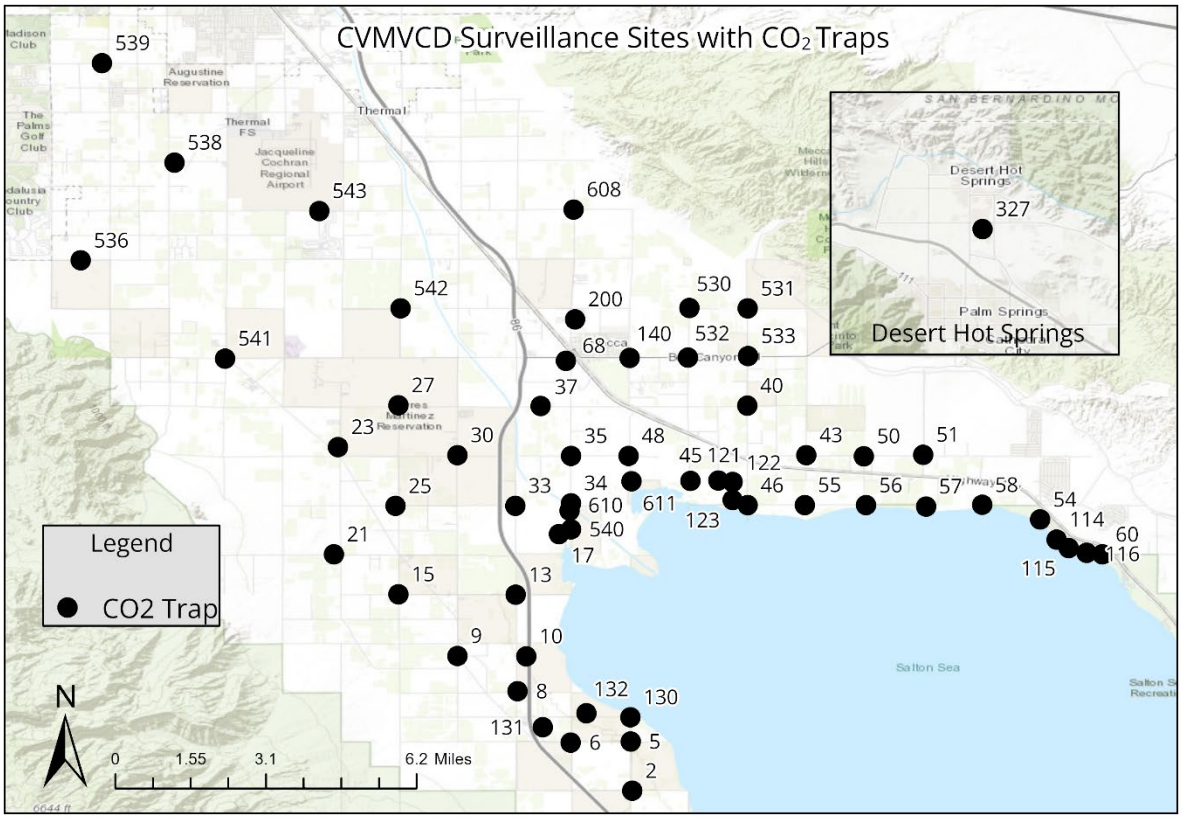
Appendix B.2 – List of Sites with BG-Sentinel Trap Locations in the Coachella Valley

No.	Site ID	City	Location Description
1	200	Mecca	Avenue 64 and Lincoln St
2	203	Palm Desert	Cook St and Sheryl Ave
3	302	Rancho Mirage	Hwy 111 and Thunderbird Rd
4	307	Coachella	6th St and Palm Ave
5	320	Palm Desert	Portola Ave and Grapevine St
6	321	Rancho Mirage	Frank Sinatra Dr and Thompson Rd
7	322	Cathedral City	Gerald Ford Dr and Plumley Rd
8	331	Palm Desert	Portola Ave and Haystack Rd
9	344	La Quinta	Avenue 52 and Avenida Bermudas
10	346	Thermal	Airport Blvd and Grapefruit Blvd
11	347	La Quinta	Miles Ave and Adams St
12	407	Palm Springs	S Camino Real and E La Verne Way
13	410	Rancho Mirage	Gerald Ford Dr and Inverness Dr
14	411	Rancho Mirage	Gerald Ford Dr and Monterey Ave
15	413	Palm Desert	Monterey Ave and Parkview Dr
16	415	Indian Wells	Vintage Dr and Fairway Dr
17	416	La Quinta	Eisenhower Dr and Coachella Dr
18	418	Indian Wells	Fred Waring Dr and Eldorado Dr
19	420	La Quinta	Avenue 52 and Madison St
20	421	Indio	Avenue 50 and Jackson St
21	427	Palm Desert	Monterey Ave and Magnesia Falls Dr
22	431	Palm Springs	Cathedral Canyon Dr and E Palm Canyon Dr
23	701	Indio	Jackson St and Kenner Ave
24	708	Indio	Avenue 44 and Jackson St
25	718	Coachella	Avenue 52 and Harrison St
26	726	Palm Springs	S Palm Canyon Dr and W El Camino Way
27	728	Palm Springs	E Palm Canyon Dr and S Camino Real
28	736	Coachella	Avenue 50 and Frederick St
29	753	Mecca	7th St and Date Palm Ave
30	756	Mecca	4th St and Dale Kiler Rd
31	763	La Quinta	Avenue 60 and Monroe St
32	765	Coachella	Tyler St and Calle Bouganvilia
33	766	Coachella	Avenue 53 and Shady Lane
34	767	Coachella	Avenue 50 and Frederick St
35	768	Coachella	Avenue 49 and Jackson St
36	769	Indio	Avenue 44 and Jackson St

37	**770**	Indio	Jackson St and Dr. Carreon Blvd
38	**771**	Indio	Indio Blvd and Clinton St
39	**772**	Indio	Clinton St and Miles Ave
40	**773**	Indio	Avenue 48 and Monroe St
41	**774**	Indio	Avenue 48 and Shields Rd
42	**775**	Palm Desert	Fred Waring Dr and Warner Trail
43	**776**	La Quinta	Dune Palms Rd and Blackhawk Way
44	**778**	La Quinta	Avenue 52 and Washington St
45	**780**	Palm Desert	Highway 111 and Monterey Ave
46	**781**	Palm Desert	Magnesia Falls Dr and Deep Canyon Rd
47	**782**	Palm Desert	San Luis Rey Ave and Ironwood St
48	**783**	Palm Desert	Portola Ave and Shadow Mountain Dr
49	**785**	Palm Desert	Portola Ave and Grapevine St
50	**786**	Cathedral City	Date Palm Dr and Tachevah Dr
51	**787**	Cathedral City	Ramon Rd and Date Palm Dr
52	**788**	Cathedral City	San Luis Rey Dr and Mission Dr
53	**789**	Cathedral City	Date Palm Dr and Ramon Rd
54	**790**	Cathedral City	E Palm Canyon and Cathedral Canyon Dr
55	**791**	Palm Springs	Avenue 34 and Lawrence Crossley Rd
56	**792**	Cathedral City	Avenue 33 and Cathedral Canyon Dr
57	**793**	Cathedral City	Da Vall Dr and Mccallum Way
58	**794**	Palm Desert	Highway 74 and Mesa View Dr
59	**795**	La Quinta	Eisenhower Dr and Avenida Montezuma
60	**798**	La Quinta	Avenue 50 and Washington St
61	**800**	Indian Wells	Highway 111 and El Dorado Dr
62	**813**	Indian Wells	Iroquois Dr and Club Dr
63	**814**	Palm Desert	Deep Canyon Rd and Candlewood St
64	**815**	Indian Wells	Fairway Dr and Rancho Palmeras Dr
65	**816**	Indian Wells	Quail Run Dr and Seminole Rd
66	**817**	Indian Wells	Highway 111 and Manitou Dr
67	**818**	Cathedral City	Gerald Ford Dr and Plumley Rd
68	**819**	Cathedral City	Da Vall Dr and Sunny Lane
69	**820**	Palm Springs	W Chino Canyon Rd and N Via Norte
70	**821**	Palm Springs	W Alejo Rd and N Via Monte Vista
71	**822**	Palm Springs	N Sunrise Way and E Paseo El Mirador
72	**823**	Palm Springs	E Alejo Rd and N Hermosa Dr
73	**824**	Palm Springs	E Sonora Rd and S Cerritos Dr
74	**825**	Palm Springs	S Calle Palo Fierro and E Avenida Granada

75	**826**	Palm Springs	S Tahquitz Dr and W Baristo Rd
76	**827**	Rancho Mirage	Sunny Lane and Da Vall Dr
77	**828**	Rancho Mirage	Highway 111 and Mirage Cove Dr
78	**829**	Rancho Mirage	Highway 111 and Country Club Dr
79	**830**	Rancho Mirage	Morningside Dr and Country Club Dr
80	**831**	Rancho Mirage	Bob Hope Dr and Country Club Dr
81	**832**	Rancho Mirage	Bob Hope Dr and Palm Crest Dr
82	**833**	Rancho Mirage	Highway 111 and Dunes View Rd
83	**834**	Rancho Mirage	Clancy Ln and Monterey Ave
84	**835**	Desert Hot Springs	Augusta Ave and Little Morongo Rd
85	**837**	Desert Hot Springs	San Ardo Rd and Verbena Dr
86	**838**	Desert Hot Springs	6th St and Palm Dr
87	**839**	Desert Hot Springs	Estrella Ave and Mesquite Ave
88	**840**	Desert Hot Springs	Hacienda Ave and Hacienda Heights Dr
89	**841**	Desert Hot Springs	Verbena Dr and Two Bunch Palms Trail
90	**842**	Desert Hot Springs	Dillon Rd and Bubbling Wells Rd
91	**843**	Northshore	Admiralty Way and Costa Mesa Dr
92	**844**	Northshore	Avenue 72 and Beacon St
93	**845**	Northshore	Avenue 70 and Miramar Dr
94	**846**	Desert Hot Springs	Mission Lakes Blvd and Santa Cruz Rd
95	**847**	La Quinta	Avenida Bermudas and Calle Chillon
96	**848**	Palm Desert	Monterey Ave and Country Club Dr
97	**849**	Palm Springs	Andreas Hills Dr and Hillview Cove
98	**850**	Palm Desert	Portola Ave and Country Club Dr

Appendix C.1 – Map of Surveillance Locations with only CO_2 Traps in the Coachella Valley



Appendix C.2 – List of Surveillance Locations with only CO_2 Traps in the Coachella Valley

No.	Site ID	City	Site Description
1	**2**	Oasis	Avenue 84 and Johnson
2	**5**	Oasis	Avenue 82 and Johnson
3	**6**	Oasis	Avenue 82 and Lincoln
4	**8**	Oasis	Avenue 80 and Buchanan
5	**9**	Thermal	Pierce and King St
6	**10**	Oasis	Avenue 79 and Buchanan
7	**13**	Thermal	Avenue 76 and Buchanan
8	**15**	Thermal	Avenue 76 and Filmore
9	**17**	Thermal	Avenue 73 and Lincoln
10	**21**	Thermal	Avenue 74 and Polk
11	**23**	Thermal	Avenue 70 and Polk
12	**25**	Thermal	Avenue 72 and Filmore
13	**27**	Thermal	Avenue 68 and Filmore
14	**30**	Thermal	Avenue 70 and Pierce
15	**33**	Thermal	Avenue 72 and Buchanan
16	**34**	Mecca	Avenue 72 and Lincoln
17	**35**	Mecca	Avenue 70 and Lincoln
18	**37**	Mecca	Avenue 68 and Buchanan
19	**40**	Mecca	Avenue 68 and Hayes
20	**43**	Mecca	Avenue 70 and Garfield
21	**45**	Mecca	Avenue 71 and Grant
22	**46**	Mecca	Avenue 72 and Hayes
23	**48**	Mecca	Avenue 70 and Johnson
24	**50**	Mecca	Avenue 70 and Arthur
25	**51**	Northshore	Avenue 70 and Cleveland
26	**54**	Northshore	Avenue 73 and Vanderveer
27	**55**	Mecca	Avenue 72 and Garfield
28	**56**	Northshore	Avenue 72 and Arthur
29	**57**	Northshore	Avenue 72 and Cleveland
30	**58**	Northshore	Avenue 72 East of Cleveland
31	**60**	Northshore	Grapefruit Blvd and State Park Rd
32	**68**	Mecca	Avenue 66 and Lincoln
33	**114**	Northshore	Grapefruit Blvd and Desert Beach Dr
34	**115**	Northshore	Mecca Ave and Tripoli Dr
35	**116**	Northshore	Southeast of Tripoli Dr
36	**121**	Mecca	Avenue 71 and Colfax
37	**122**	Mecca	East of Avenue 71 and Colfax
38	**123**	Mecca	Avenue 72 between Hayes and Colfax
39	**130**	Oasis	Avenue 81 and Johnson St

40	**131**	Oasis	Avenue 81 and Buchanan
41	**132**	Oasis	Avenue 81 and Johnson
42	**140**	Mecca	Avenue 66 and Johnson
43	**200**	Mecca	Avenue 64 and Lincoln
44	**327**	Desert Hot Springs	Avenue 18 and Bubbling Wells Rd
45	**530**	Mecca	Avenue 64 and Grant
46	**531**	Mecca	Avenue 64 and Hayes
47	**532**	Mecca	Avenue 66 and Grant
48	**533**	Mecca	Avenue 66 and Hayes
49	**536**	Thermal	Avenue 62 and Monroe St
50	**538**	Thermal	Avenue 58 and Van Buren St
51	**539**	Thermal	Avenue 54 and Jackson St
52	**540**	Mecca	Avenue 73 and Lincoln St
53	**541**	Thermal	Avenue 66 and Harrison St
54	**542**	Thermal	Avenue 64 and Fillmore St
55	**543**	Thermal	Avenue 60 and Laguna Seca Lane
56	**608**	Mecca	Avenue 60 and Lincoln
57	**610**	Mecca	Avenue 72 and Lincoln St (Torres Martinez Wetland)
58	**611**	Mecca	Avenue 70 and End of Johnson

Appendix D – Table 4. Annual and monthly total and average rainfall (in.) for the Coachella Valley

MONTH	2021	2022	2023	2024	2025	5-year Average
JANUARY	0.3	0	0.27	0.87	0.09	0.306
FEBRUARY	0	0.02	0.07	1.33	0.87	0.458
MARCH	0.01	0.01	0.25	0.28	0.21	0.152
APRIL	0	0	0	0	0	0
MAY	0	0	0.14	0	0.02	0.032
JUNE	0	0	0	0	0	0
JULY	0.44	0	0	0	0	0.088
AUGUST	0.17	0	3.23	0	0.19	0.718
SEPTEMBER	0	0.05	0	0.08	0.06	0.038
OCTOBER	0.01	0.01	0	0	0.01	0.006
NOVEMBER	0	0.04	0.15	0	1.51	0.34
DECEMBER	0.13	0.03	0.35	0	0.48	0.198
YEAR TOTAL	**1.06**	**0.16**	**4.46**	**2.56**	**3.44**	**2.336**

*This data used for surveillance factor # 1 in the Mosquito-Borne Virus Risk Assessment Table calculations for WNV, WEEV, and SLEV on pages 10 – 12 of the Coachella Valley Mosquito-Borne Virus Surveillance and Emergency Response Plan. Data is from weather station KTRM in Thermal, CA (KPSP data is used if no information is available from KTRM).

Appendix E – Table 5. Average Minimum and Maximum temperatures (°F) in the Coachella Valley

	2021			2022			2023			2024			2025			5-Year Average		
Month	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min
Jan 1-15	75	55	38	71	52	33	67	54	41	66	55	43	73	51	24	70.40	53.27	35.95
Jan 16-31	69	55	41	74	57	40	67	52	36	72	62	52	69	57	46	70.25	56.59	42.83
Feb 1-14	77	62	46	79	61	42	72	56	39	64	56	48	76	65	54	73.63	59.90	45.74
Feb 15-28	76	58	38	73	57	38	66	53	37	75	65	54	84	71	58	74.83	60.80	45.14
Mar 1-15	75	60	44	76	61	45	72	61	50	73	63	53	71	60	47	73.33	61.15	47.68
Mar 16-31	82	67	50	87	71	54	73	61	45	77	66	53	86	70	48	80.85	66.85	50.18
Apr 1-15	94	79	63	88	73	57	83	68	51	83	70	56	66	47	24	82.88	67.65	49.97
Apr 16-30	90	76	59	91	76	60	95	79	60	92	78	64	80	65	44	89.48	74.78	57.29
May 1-15	97	82	62	94	79	55	88	75	62	93	80	66	92	79	59	93.03	78.79	61.11
May 16-31	95	82	66	97	81	63	96	81	67	96	83	68	98	84	68	96.53	82.23	66.24
Jun 1-15	104	88	70	105	89	70	94	77	55	105	91	75	102	88	66	101.91	86.62	67.27
Jun 16-30	111	95	59	106	92	75	102	88	73	109	96	81	107	91	64	107.05	92.22	70.37
Jul 1-15	109	93	65	108	94	78	110	95	77	113	100	86	109	95	77	109.88	95.41	76.65
Jul 16-31	107	95	82	107	95	83	112	99	85	114	101	87	105	91	59	108.81	96.16	79.00
Aug 1-15	109	96	81	101	89	77	101	87	74	110	99	88	109	94	71	106.01	93.11	77.97
Aug 16-31	106	92	77	106	95	81	102	92	81	108	95	80	105	92	76	105.43	92.94	79.17
Sep 1-15	106	92	75	100	89	79	100	89	78	108	97	84	101	88	74	103.01	90.98	77.92
Sep 16-30	98	83	68	100	87	73	93	80	67	101	87	72	96	83	72	97.51	84.13	70.41
Oct 1-15	89	73	58	96	83	69	97	78	58	106	92	77	90	76	61	95.80	80.15	64.60
Oct 16-31	86	69	52	86	71	56	86	71	57	89	76	65	92	72	55	87.61	71.89	56.85
Nov 1-15	88	69	52	73	59	45	80	65	51	78	66	54	85	74	63	80.83	66.58	52.76
Nov 16-30	81	61	44	74	56	39	72	57	44	75	63	51	73	63	53	74.88	59.94	46.41
Dec 1-15	73	55	40	66	51	35	74	55	39	78	63	51	80	65	50	74.04	57.71	42.73
Dec 16-31	66	53	39	68	51	37	68	55	44	78	64	53	70	60	45	69.95	56.56	43.65

* This data used for surveillance factor # 1 in the Mosquito-Borne Virus Risk Assessment Table calculations for WNV, WEEV, and SLEV on pages 10- 12 of the Coachella Valley Mosquito-Borne Virus Surveillance and Emergency Response Plan. Data is from weather station KTRM in Thermal, CA with KPSP in Palm Springs as a backup.

Appendix F – Risk Assessment Maps

The seasonal transmission risk of the arboviruses WNV, WEEV, and SLEV in the Coachella Valley, among other factors, is related to temperature, rainfall, mosquito infection rates, vector abundance, and population size of vertebrate hosts. Some of these factors are used on a bi-weekly basis to determine the level of risk for WNV, SLEV, and WEEV transmission in various areas or zones of the Valley. Some of the zones used to calculate arbovirus transmission risk are shown in the figures below. For the surveillance zones around the Salton Sea (Figure 3), tables 6, 7, and 8 present the average number of *Cx. tarsalis* and *Cx. quinquefasciatus* female mosquitoes per trap per month.

Figure 1 – Map of the Coachella Valley risk assessment zone.

Figure 2 – Map of urban and agricultural risk assessment zones.

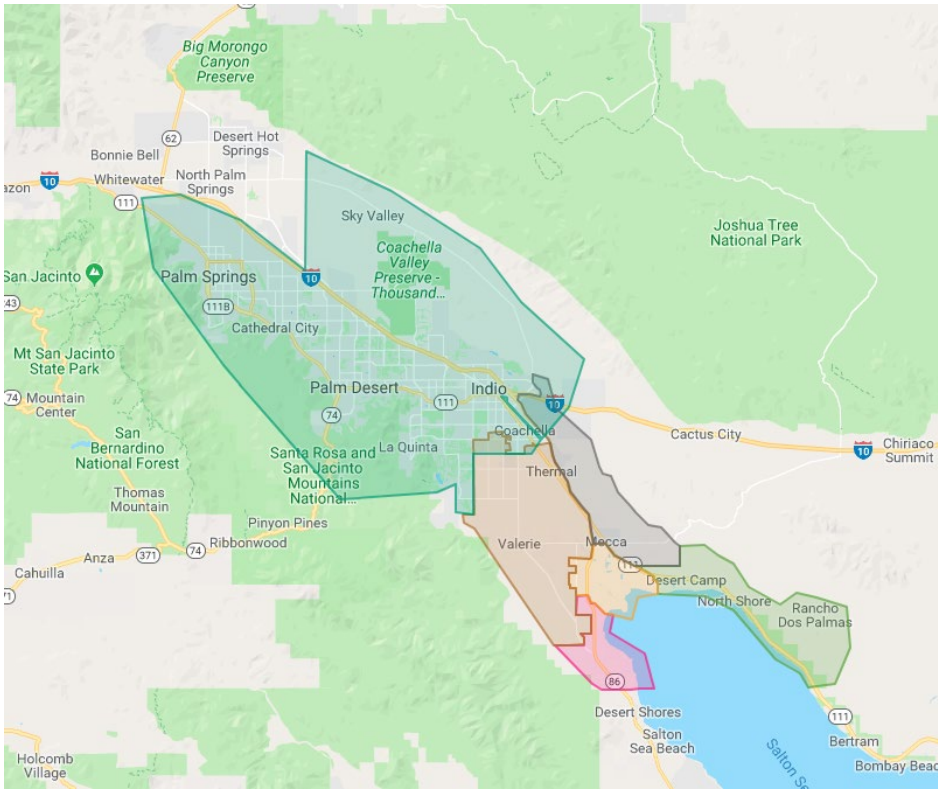


Figure 3 – Map of Salton Sea Shoreline Risk Assessment Zones

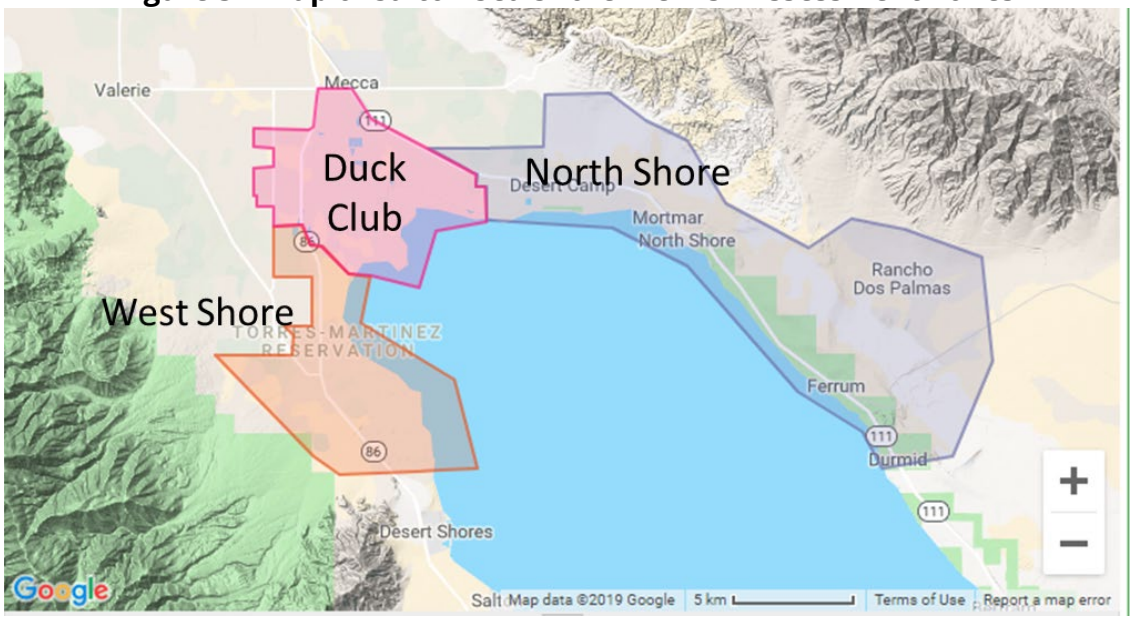


Table 6. North Shore Average Number of *Culex* Mosquitoes

MONTH	2021	2022	2023	2024	2025	*5-year Average*
JAN	207	18.67	122.5	100.88	108.14	***111.44***
FEB	67	214.33	75.13	327.75	282.7	***193.38***
MAR	456.13	269.63	104.83	263.96	404.9	***299.89***
APR	444.04	259.25	203.33	495.38	333.8	***347.16***
MAY	146.83	130.21	211.17	148.79	251.07	***177.61***
JUN	92.36	128.64	77.3	140.71	143.26	***116.45***
JUL	5.42	54.06	56.39	7.17	4.06	***25.42***
AUG	18.04	68.95	15.84	14.42	7.87	***25.02***
SEP	203.42	68..8	338.73	173.88	53.25	***192.32***
OCT	243.15	339.24	539.25	416.75	38.2	***315.32***
NOV	47.48	86.03	39.13	44.38	28.47	***49.10***
DEC		8.75	4.75	156.25	7.8	***44.39***

Table 7. Duck Club Zone Average Number of *Culex* Mosquitoes

MONTH	2021	2022	2023	2024	2025	*5-year Average*
JAN	109.6	113.69	840.55	292.86	252.88	***321.92***
FEB	50.45	288.73	188.25	653.36	230.44	***282.25***
MAR	820.9	1282.3	469.58	411.45	927.5	***782.35***
APR	853.2	813.23	749.57	925.21	470.24	***762.29***
MAY	345.9	342.17	794.86	446.35	678.76	***521.61***
JUN	275.59	178.12	170.9	236.5	355.23	***243.27***
JUL	64.44	40.7	51.81	43.86	20.19	***44.20***
AUG	87.86	131.47	42.2	300.31	45.18	***121.40***
SEP	1229.9	692.56	1602.06	1136.31	266.93	***985.55***
OCT	1045.6	2554.03	3105.08	2295.61	559.91	***1912.05***
NOV	141.76	272.54	149.83	138.7	69.17	***154.40***
DEC		5.8	65.5	700.25	18.29	***197.46***

Table 8. West Shore Average Number of *Culex* Mosquitoes

MONTH	2021	2022	2023	2024	2025	*5-year Average*
JAN	29	6.5	503	152.83	73.5	***152.97***
FEB	80	298	246.5	621	662.25	***381.55***
MAR	200.38	489.64	729.64	441.71	771.25	***526.52***
APR	112.33	343.21	1650.43	335	545.33	***597.26***
MAY	119.14	370.5	733.21	719.64	564.25	***501.35***
JUN	118	222	786.58	448.86	513.44	***417.78***
JUL	16.71	53.89	218.19	20.93	127.5	***87.44***
AUG	18.81	26.38	23.78	9.21	211.64	***57.96***
SEP	90.68	154.79	437.54	119.43	239.96	***208.48***
OCT	36.64	424.36	574	397.62	217.32	***329.99***
NOV	22.69	57.57	34.85	14.79	22.3	***30.44***
DEC		3.5	6	237		***82.17***