COUNTY OF SAN DIEGO

WEST NILE VIRUS
STRATEGIC RESPONSE PLAN

Department of Environmental Health
Vector Control Program

2018

Contents

Purpose

The West Nile Virus Strategic Response Plan (WNV-SRP) provides the basis for implementing an integrated, risk-based response to limit the risk of disease from West Nile virus. The Plan describes the County of San Diego, Department of Environmental Health – Vector Control Program's strategy to protect residents from West Nile virus.

Introduction

The Vector Control Program (VCP) is responsible for mosquito- and vector-borne disease surveillance and control services in all 18 incorporated cities and the unincorporated areas of San Diego County. For over 40 years the VCP has been reducing and controlling mosquitoes and other vectors, protecting the County against vector-borne diseases. A service charge and benefit assessment are used to fund the program. Annually, the benefit assessment is evaluated and set by the County Board of Supervisors.

West Nile virus (WNV) was first detected in the United States in 1999 in New York when it caused an outbreak of encephalitis in people and killed hundreds of birds. Transmitted by mosquitoes, it rapidly spread westward until it reached San Diego County in 2003 (Reisen *et al.*, 2004). Although 80% of people infected with WNV do not get ill, 20% of infections result in fever, headache, joint pains, vomiting, diarrhea, or rash. Less than 1% of infected people develop a severe illness that affects the brain and causes long-term damage or death. There is no vaccine or specific treatment for people infected with WNV.

WNV circulates in wild bird populations, especially passerine birds such as sparrows and finches, because the primary mosquitoes that transmit WNV (e.g., *Culex tarsalis* and *Culex quinquefasciatus*) prefer to feed on birds. It has been found in more than 110 bird species, with corvids (e.g., crows and jays) and raptors, being highly susceptible and frequently dying from infection. Monitoring dead corvids and raptors for WNV is a sensitive indicator of WNV activity and often precedes detection of WNV in mosquitoes and people. Infection can spill over into other species, such as people and horses, when infected *Culex* mosquitoes feed on them (*Figure 1*). Although very effective horse vaccines have reduced the incidence of WNV-induced disease in horse populations, no human vaccine exists. Therefore, a plan to mitigate WNV effects on people must be employed to protect public health. This WNV Strategic Response Plan is based on published research, current state and federal guidelines, and VCP experience; it is updated as new information becomes available.

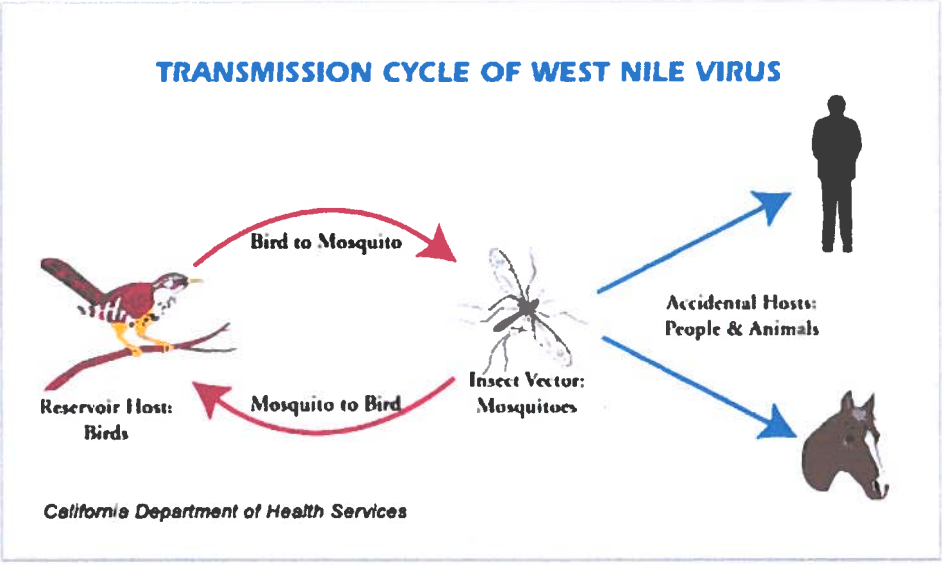

Figure 1. WNV transmission cycle. Credit: The Centers for Disease Control and Prevention.

Response

Response to WNV is based on a phased, risk-based continuum (*Table 1*). The continuum consists of three graduated levels in response to increasing risks of WNV. The response levels are:

1. Level 1: Endemic conditions with low risk to human health;
2. Level 2: Conditions conducive to above average circulation of WNV with medium risk to human health; and
3. Level 3: Conditions highly conducive to the spread of WNV with high risk to human health.

Table 1. Response classification to WNV based on three-level risk-based continuum.

Level	Conditions	Response
1	• Average daily temperature below rapid mosquito breeding threshold • Mosquito abundance at low levels • Low minimum infection rate* (MIR) • Low number of infected birds • No human cases	• Conduct routine public education, mosquito and virus surveillance, mosquito larvae control. • Evaluate insecticide resistance. • Release routine press notices. • Monitor for neglected pools. • Post WNV test results on www.sdfightthebite.com.
2	• Average daily temperature above rapid mosquito breeding threshold • Mosquito abundance at	Continue with Level 1 response activities plus: • Increase surveillance, testing and control of mosquitoes (increase aerial green pool

	moderate levels • Medium MIR • Moderate numbers of infected mosquitoes, birds, horses, and people	surveillance, mosquito traps, aerial and ground larvicide applications, and source reduction). • Notify Public Health Service (PHS) of WNV risk level. • Enhance outreach to communities. • Conduct site investigations for all locally acquired human cases and positive mosquito pools to find mosquito breeding sources. • Alert neighborhoods where WNV-positive mosquito pools, horses, or people are detected. • Apply adulticides in localized areas, if warranted, to prevent or control an elevated risk to public health. • Conduct focused outreach to communities in which adulticides are used.
3	• Average daily temperature well above rapid mosquito breeding threshold • Mosquito abundance at high levels • High MIR • High numbers of infected mosquitoes, birds, horses, and people	Increase Level 2 response activities as appropriate plus: • Consider wider use of adulticides including truck and/or aerial delivery methods to reduce public health risk.

*Minimum infection rate (MIR) = Number of mosquito pools positive for WNV/total number of mosquito pools tested multiplied by 1000.

Goals

The VCP's goals are to mitigate the impacts of WNV to the health, well-being, and economy of the County by: 1) limiting mosquito numbers in critical areas, 2) educating residents how to prevent mosquitoes from breeding in their homes and protect themselves from getting bitten, and 3) mobilizing residents to report mosquito breeding sites and sentinel dead bird species to the VCP. These goals are met using an integrated pest management approach that encompasses:

1. **Surveillance** of mosquitoes, dead birds, horses and humans for WNV;
2. **Testing** of appropriate mosquitoes, birds, horses and humans for WNV;
3. **Control** of mosquito populations; and
4. **Outreach** to the public on how to prevent WNV infection, prevent mosquito breeding, and report mosquito breeding and dead birds.

1. Surveillance

Goal: *To monitor the levels of vector mosquito populations and virus activity in San Diego County in order to mitigate the spread of WNV.*

Birds
Surveillance of dead corvid and raptor birds for WNV has proven to be the earliest indicator of WNV activity and precedes human WNV cases throughout the state. Consequently, the VCP operates a year-round program for collecting and testing dead raptors and corvids for WNV. The public is encouraged to report these species of dead birds to the VCP. Birds meeting appropriate testing criteria are collected from throughout the County 7 days a week and tested at the Vector Disease and Diagnostic Laboratory (VDDL) for the presence of WNV. The results are used by the VCP to help direct surveillance, control, and outreach efforts.

Mosquitoes
The VCP monitors over 1,375 known mosquito-breeding locations throughout the County. Monitoring involves visual observation, trapping adult mosquitoes, and/or larval collection from water sources. In addition, the VCP investigates reports and complaints of mosquito activity from the public. An increase in mosquito abundance and the presence of specific species that can transmit WNV help direct appropriate control measures and outreach efforts. In addition, mosquitoes are tested by the VCP Vector Disease and Diagnostic Laboratory (VDDL) for WNV as well as other viruses harmful to people, such as Saint Louis encephalitis virus (SLEV) and Western equine encephalitis virus (WEEV).

Mosquito populations are periodically monitored for susceptibility to pesticides that kill larvae (larvicides) and adults (adulticides) through a cooperative agreement with the West Valley Mosquito and Vector Control District (WVMVCD) http://www.wvmvcd.org/. The WVMVCD is a recognized leader in testing mosquitoes for resistance to pesticides.

Horses
Local equine WNV cases are reported to the VCP or to the California Department of Food and Agriculture, which, in turn, reports the cases to the VCP. Since horses are stabled and their travel history can be determined, the location of their exposure to mosquitoes can be pinpointed. The VCP uses this information to find additional sources of mosquitoes that can transmit WNV and direct control efforts to reduce these risks.

Humans
In accordance with Title 17 of the California Code of Regulations (Section 2500 and 2505), physicians, diagnostic laboratories, and blood and tissue banks are required to report suspected or confirmed cases of human WNV infection (i.e., any positive laboratory finding of WNV) within one (1) working day of identification to County of San Diego Health and Human Services Agency – Public Health Services. Suspected human WNV cases (i.e., presumptive WNV IgM antibody positive, nucleic acid-amplification test (NAAT) reactive, or physician-diagnosed) are interviewed by Public Health Services using a standardized risk history questionnaire. The questionnaire documents illness onset, signs and symptoms, travel

history, mosquito exposure, and whether the infection was acquired locally, imported from a region outside the patient's residence, or acquired by a non-mosquito route of transmission such as blood transfusion or organ transplantation. Symptomatic cases that meet the national surveillance case definition for acute WNV infection as well as asymptomatic WNV-positive blood donors are reported to California Department of Public Health (CDPH), the Centers for Disease Control and Prevention (CDC), and to the VCP. The VCP investigates the property and neighborhood of the WNV-positive cases to identify and eliminate or treat mosquito breeding sites. Health alert notices are sent to residents located in at-risk areas to inform/alert them to take action to prevent mosquitoes from breeding on their properties and to protect themselves from mosquito bites.

2. Testing

Goal: *To rapidly detect WNV in surveillance specimens and to confirm human cases.*

Mosquitoes and Birds

The VDDL tests field-caught mosquitoes and dead birds for WNV and other zoonotic mosquito-borne viruses like Saint Louis encephalitis and Western equine encephalitis viruses. It uses highly sensitive and accurate advanced molecular tests, such as real-time reverse transcriptase – polymerase chain reaction (RT-PCR) and genetic sequencing to detect these viruses. Timely test results enable VCP surveillance, control, and outreach groups to rapidly respond and reduce the spread of WNV. Additionally, WNV mutations and new emerging diseases are analyzed by the VDDL to better prepare and protect the public.

Humans

Identification of WNV cases in people is important to assess the burden of human illness and to target mosquito control and public education activities to reduce exposure risk. During the WNV season, testing is recommended for individuals with aseptic meningitis, encephalitis, acute flaccid paralysis, atypical Guillain-Barré syndrome, transverse myelitis, and febrile illness lasting more than 7 days.

Residual serum and cerebral spinal fluid specimens (if available) from suspect WNV cases are requested from non-public health diagnostic laboratories for submittal through the San Diego County Public Health Laboratory (SDCPHL) or directly to the California Department of Public Health Viral and Rickettsial Disease Laboratory (CDPH VRDL) for confirmatory testing.

WNV testing capacities available through CDPH VRDL include the following:

- IgM and IgG enzyme immunoassay (EIA) testing;
- IgM and IgG immunofluorescent assay (IFA) testing;
- Plaque Reduction Neutralization Test (PRNT), which is a virus-specific neutralizing antibody test for distinguishing between arthropod flaviviruses; and
- Reverse Transcriptase – Polymerase Chain Reaction (RT-PCR).

3. Control

Goal: *To decrease the risk of WNV transmission by reducing mosquito populations.*

The VCP uses integrated pest management (IPM) practices to limit mosquito numbers and protect public health and the environment from WNV. This approach reduces the amount of insecticides required. IPM practices include reducing and eliminating mosquito breeding sources, biological and chemical larval control, and chemical control of adult mosquitoes. Specific actions include:

- Removing standing water from residential properties and enhancing water flow in catchments basins (physical);
- Finding backyard mosquito breeding sources, such as unmaintained swimming pools, ponds, and fountains and using mosquitofish to consume larvae (biological);
- Applying special bacteria or mosquito growth regulators (biological or chemical) to kill mosquito larvae;
- Applying insecticides that kill adult mosquitoes only when an elevated risk to public health exists that cannot be mitigated by other means; and
- Ordering abatement of mosquito breeding sources.

4. Outreach

Goal: *To educate the public how to prevent mosquito breeding, to prevent mosquito bites and to report mosquito breeding sites to the VCP.*

The VCP Outreach Group educates County residents how to protect themselves from mosquito bites, prevent mosquito breeding, and report dead birds and locations of breeding mosquitoes. Outreach staff members give presentations and attend events to educate the public about WNV and mosquitoes. The website www.SDFightTheBite.com is kept current with the latest County WNV information. A 24-hour phone line with recorded information about WNV is also accessible at (858) 694-2888. In addition, educational brochures are created and distributed, and public service information campaigns are created that utilize TV, radio, outdoor displays, and mobile device and internet distribution media. Notification letters are sent to residents within 1/4-mile radius of where WNV-positive mosquitoes or infections are detected. Outreach also works with city and County storm water management programs to protect rain barrels from breeding mosquitoes. Groups such as realtors and apartment associations are educated about backyard sources of mosquito breeding (unmaintained pools, overwatered plants/saucers) and how to prevent mosquito breeding.

Communication

Communication and transparency of operations are of paramount importance to prevent the spread of WNV. The County employs a wide spectrum of media to inform the public about the risk of WNV and its control operations. In the event of WNV detections that necessitate aerosol larvicide or aerosol adulticide treatments, the County will communicate information using the following methods:

- Press releases on the County News Center: http://www.countynewscenter.com/.
- Situation updates and information on the VCP website www.sdfightthebite.com:
    - Aerial maps and descriptions of areas that will be treated, and
    - Insecticide information-Safety Data Sheets, Frequently Asked Questions (FAQs), and product labels.
- Staffed phone line to answer questions at (858) 694-2888.

Additional communication measures and notifications that may also be utilized include:

- Informational door hangers on all residences that will be treated approximately 48 hours prior to treatment.
- Informational sandwich boards listing date and time range of treatment at street intersections in neighborhoods where ultra-low volume sprays (ULV) treatment will occur at least 48 hours prior to treatment.
- Door hangers placed after treatment on all premises that were treated to indicate that treatment occurred and with what material(s).
- Communications with other governmental and non-governmental agencies where operations to control WNV will occur (e.g., city governments, United States Postal Service, schools, daycare centers, care facilities). The VCP will work with these entities as well as homeowners to resolve potential problems or concerns.

Conclusion

The VCP strives to safeguard the public's health from WNV as well as to minimize harmful effects to the environment by using an integrated pest management, step-wise, risk-driven approach to controlling the spread of WNV. Public communication, education, and transparency of operations are cornerstones of its strategy to protect against WNV. As new information develops, this WNV Strategic Response Plan will be updated to reflect new technologies and best practices. The latest information on WNV and VCP operations can be found at www.SDFightTheBite.com.

Authorization

This West Nile Virus Strategic Response Plan was developed in concurrence with Public Health Services and approved by the Director of Environmental Health and the Public Health Officer. The plan will be updated as new information becomes available and will be reauthorized biennially unless otherwise necessary.

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Director, Department of Environmental Health

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Public Health Officer, Public Health Services

Signed original on file at the Vector Control Program.

Attachment A Mosquito Control

Larvae

Eliminating mosquito larvae reduces the number of biting adult females capable of transmitting disease, causing discomfort, and ultimately producing another generation of mosquitoes. Larval mosquito control has three key components: 1) breeding source reduction /environmental management, 2) biological control, and 3) larvicides.

1. Breeding source reduction/environmental management involves eliminating stagnant water in and around homes, storm drains, flood control channels, and underground utility vaults so that mosquitoes cannot breed. Breeding sources are anything that can collect ½ inch or more of standing water including common household items like pots, saucers, vases, pet bowls, unused tires, tire swings, buckets, rain barrels, wheelbarrows, bird baths, non-circulating fountains, toys, garbage cans, hollow uncapped fence posts, landscape drains, clogged rain gutters, and many others. Dumping out, tipping over, covering, screening and/or cleaning up these water collection sources weekly are effective and inexpensive ways to prevent mosquitoes from breeding in them. Environmental management includes steps to prevent water accumulation such as proper storm water management and controlling irrigation to avoid overwatering of the landscape, and vegetation management to reduce emergent vegetation that provides food and refuge for mosquito larvae.

2. Biological control entails the use of natural predators, parasites, or pathogens to reduce immature mosquito numbers. Mosquito fish, *Gambusia affinis*, is the most widely used biological control agent in California. This fish can be placed in standing water sources that cannot be drained, such as fountains, ponds, and unused pools. The County provides this fish free of charge to the public to prevent mosquito breeding on their property.

3. Larvicides are products that selectively kill mosquito larvae but are nontoxic to other insects, fish, mammals, birds, people, or the environment (Attachment C, *Table 1*). They are applied to water where mosquito larvae are found. The Vector Control Program (VCP) only uses Environmental Protection Agency (EPA)-registered larvicides. There are several larvicides that are highly specific and thus have minimal impact on non-target organisms. These include microbial control agents, such as *Bacillus thuringiensis israelensis* (Bti) and *Lysinibacillus (Bacillus) sphaericus* (Bs), as well as natural insecticides known as spinosad made up of spinosyn A and D compounds that are derived from a microbial fermentation process. Other larvicides include insect growth regulators and surface films. Insect growth regulators, such as methoprene and pyriproxyfen, prevent immature mosquitoes from developing into adults and are sometimes used in shallow, standing water sources (shallow ponds, areas subject to periodic flooding). Surface films prevent larvae and pupae from breathing at the surface of the water. They are very effective but may suffocate other surface breathing aquatic insects; therefore, they are used judiciously and only with small pockets of calm water. Because larvicides prevent mosquito larvae from becoming adult mosquitoes, their effects are most noticeable one to several weeks after they are applied. During the mosquito-breeding season, larvicide is applied by helicopter to mosquito-breeding sites that are inaccessible by other means throughout San Diego

County. These applications are performed using a helicopter service with a granular spreading applicator. Treatments are conducted approximately every three weeks from April through October. Application equipment is calibrated to assure the delivery of the correct amount of larvicides consistent with label amounts. Aerial application locations and application dates can be found at www.SDFightTheBite.com.

Adults

When adult mosquito populations must be rapidly suppressed in order to reduce a condition that may cause an elevated risk to human health, insecticides that kill adult mosquitoes may be used. Insecticides that kill adult mosquitoes are called "adulticides" and, by nature, are less specific than larvicide products; therefore, whenever possible, they are applied in a manner (via time and space) to maximize the impact on mosquitoes and minimize the effect on other insects. They are applied as regular or ultralow volume sprays (ULV) that are delivered via ground-based spray equipment (hand-held, backpack, or truck-mounted spray equipment) or by aircraft. The ULV sprays create microscopic aerosolized droplets that kill mosquitoes that fly into them. Other adulticide sprays are applied directly to breeding sites or resting sites to create a barrier so that when mosquitoes land on these areas, they come into contact with the adulticide and are killed. Adulticide products include pyrethrins, which are derived from the chrysanthemum flower; pyrethroids, which are synthetic versions of pyrethrins; organophosphates; as well as other products (Attachment C, *Table 1*). Additional chemicals that act as synergists with the pyrethrins and permethrins may also be used which have the effect of *lowering* the amount of insecticide needed while *increasing* efficacy of the treatment. The VCP contracts with a certified pesticide applicator to provide aerial applications of mosquito adulticides for mosquito control if needed. A link to Frequently Asked Questions (FAQs) regarding adulticides can be found at www.SDFightTheBite.com.

All insecticide applications are performed in accordance with EPA-label instructions in conformance with all environmental and pesticide use laws and regulations and may be monitored by the Department of Agriculture, Weights and Measures - Pesticide Regulation Program.

Risk Analysis and Response

The Vector Control Program evaluates the overall countywide West Nile virus (WNV) risk level to public health by using the CalSurv risk assessment program operated by the UC Davis Arbovirus Research and Teaching laboratory (DART) (https://gateway.calsurv.org/) and uses it to guide responses. This risk assessment incorporates data from temperature, mosquito abundance, minimum infection rate, and dead bird infection to assign a risk and response level from 1 to 3. According to the risk analysis, responses levels and conditions are:

- **Response Level 1**: Endemic conditions with low risk to human health;
- **Response Level 2**: Conditions conducive to above average circulation of WNV with medium risk to human health; and
- **Response Level 3:** Conditions highly conducive to spread of WNV with high potential risk to human health.

Table 1. Three level response plan for WNV based on risk assessment and conditions.

Level	Conditions	Response
1	• Average daily temperature below rapid mosquito breeding threshold (<65 °F) • Mosquito abundance at low levels equal to or below five year average • No virus detected in mosquitoes • No recently infected WNV-positive dead birds • No human cases	• Conduct routine public education. • Conduct routine mosquito and virus surveillance activities. • Conduct routine mosquito larvae control. • Evaluate pesticide resistance in mosquitoes. • Release routine press notices. • Monitor for neglected pools. • Post WNV test results on www.sdfightthebite.com.
2	• Average daily temperature above average (66-79 °F) • Mosquito abundance greater than 5 year average (150% to 300% above normal) • One or more virus infections detected in *Culex* mosquitoes (Minimum infection rate of mosquitoes (MIR) <5 per 1,000 tested) • One to five recently infected WNV-positive dead birds in specific region • One human case in broad or specific region	Continue with Level 1 response activities plus: • Increase surveillance, testing, and control of mosquito larvae; continue aerial green pool surveillance; and increase mosquito traps, aerial and ground larvicide applications, and source reduction. • Notify Public Health Service (PHS) of WNV risk level. • Enhance educational outreach to communities. • Alert physicians (via PHS) • Conduct site investigations of all locally acquired human cases and WNV-pos mosquito pools to find mosquito breeding sources. • Alert neighborhoods where WNV-pos mosquito pools, horses, or humans are detected. • Alert Board of Supervisors of WNV activity and VCP activities via the Vector Communique email update. • Apply adulticides in localized areas to prevent or control an elevated risk to public health if necessary (see adulticide use below). • Conduct focused outreach to communities in which adulticide activities occur.

3	• Average daily temperature above 79 °F • Mosquito abundance at high levels, >300% above normal • Minimum infection rate in multiple pools of *Cx. tarsalis* or *Cx. quinquefasciatus* mosquitoes >5 • More than five recently infected WNV-positive dead birds and multiple reports of dead birds in a specific region • More than one human case in a specific region	Increase Level 2 response activities as appropriate plus: • Consider wider use of adulticides including truck and/or aerial delivery methods to reduce public health risk (see adulticide use below). • Determine if additional resources needed and/or emergency proclamation is required.

Adulticide Use

The VCP evaluates whether adulticide use is required in a particular area whenever a mosquito pool tests positive for WNV or vector mosquito abundance is elevated significantly above normal levels (response levels 2 and 3). The determination for using ULV adulticides involves calculating WNV infection rates in mosquitoes, assessing the number of mosquitoes present, analyzing trends in infection rates and mosquito numbers, and evaluating weather conditions. An elevated risk or imminent threat to public health may exist when criteria 1-4 (listed below) are above threshold levels. If an elevated health risk is determined to be present, the feasibility of ULV insecticide application will be evaluated (weather dependent).

Table 2. Four risk criteria for ULV pesticide use based on threshold levels.

Criteria	Description	Comment
1. WNV infection prevalence in mosquitoes	Minimum infection rate (MIR) or Maximum Likelihood Estimate (MLE) ≥3 for two successive trapping events, 1 week apart in the same at-risk area*. These limits are set in concordance with recommendations from Centers for Disease Control and Prevention (CDC) and California Department of Public Health (CDPH).	a. MIR = number of infected pools/total mosquitoes X 1000; (50 female mosquitoes/pool) b. MLE is more accurate at high infection prevalence and takes into account variably sized mosquito pools. The Excel plugin to calculate MLE can be found at: http://www.cdc.gov/westnile/resourcepages/mosqsurvsoft.html

2. High numbers of vector mosquitoes detected**	Average number of mosquitoes per trap-night with 2 trapping events, 1 week apart exceeds: • *Cx. tarsalis* >50 • *Cx. quinquefasciatus* >20	NOTE: Alternatively, if trap data (counts and species) are available for a given location and month over a 5-year period, and current trap data exceeds the average by 300%, then this may be used instead of absolute trap count data.
3. WNV positive mosquitoes and elevated mosquito counts remain elevated	WNV positive mosquitoes and mosquito numbers remain or increase above levels in criteria 1 and 2 for two trapping events, 1 week apart	Additional traps may be set to determine the boundaries of the area at risk.
4. Weather conditions are forecast to be conducive to high mosquito breeding during the week following WNV detection	Average daily temperature forecast >79 °F for 1 week following the initial positive mosquito pool detection, winds <10 mph, no rain.	Local temperature may be analyzed using local weather station data (such as at http://www.wunderground.com/us/ca/san-diego) or via a portable weather monitor.

*at-risk area defined by geography, population, mosquito species, microclimate.
**if abnormally high numbers of mosquitoes are detected early in the year (Jan-May), then adulticides may be employed in the absence of WNV-detection to reduce mosquito numbers so that critical masses of mosquitoes are not reached during peak mosquito season (July-Oct). In addition, non-ULV adulticides, such as a residual sprays, may be used on surfaces to create a barrier for mosquitoes and help contain their spread.

Attachment B Legal Authority for Mosquito Control

The legal authority for the Vector Control Program within the Community Health Division of the Department of Environmental Health is derived from statutes and regulations in the California Government Code, California Health and Safety Code, California Civil Code, California Penal Code, San Diego County Code of Regulatory County Ordinances, and the California Environmental Quality Act (CEQA).

California Government Code
http://www.leginfo.ca.gov/cgi-bin/calawquery?codesection=gov
Title 3, Division 2 – Officers, Part 2, Board of Supervisors; and
Chapter 8 Health and Safety, Article 3 Miscellaneous

California Health and Safety Code
http://www.leginfo.ca.gov/cgi-bin/calawquery?codesection=hsc
Division 3 – Pest Abatement, Chapter 2, Section 1800;
Division 3 – Pest Abatement, Chapter 5 Mosquito Abatement Districts, Article 1 General Provisions, Section 2200;
Division 3 Pest Abatement, Chapter 5 Mosquito Abatement District, Article 4 District Powers; and
Division 13 Housing, Part 1.5 Section 17920.3 Substandard Building Conditions

California Civil Code
http://www.leginfo.ca.gov/cgi-bin/displaycode?section=civ&group=03001-04000&file=3479-3486.5
Sections 3479 and 3480

California Penal Code
http://www.leginfo.ca.gov/cgi-bin/displaycode?section=pen&group=00001-01000&file=369a-402c
Sections 372 and 373 (a)

San Diego County Code of Regulatory County Ordinances
http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=amlegal:sandiegoco_ca_mc
Title 6 Health and Sanitation Division 4 Disease Control, Chapter 1 General Provisions Nuisances, Sections 64.101-64.106; and
Division 4 Disease Control, Chapter 2 Mosquitoes and Flies Sections 64.201 *et seq*. Division 4 Disease Control, Chapter 3 Sections 64.301*et seq.*

Municipal Codes for all 18 incorporated cities within San Diego County (e.g., City of San Diego Municipal Code)

California Environmental Quality Act (CEQA)
http://www.calrecycle.ca.gov/SWFacilities/Permitting/ceqa/Overview/Purpose.htm

Public Resources Code sections 21000-21004;
California State CEQA Guidelines, California Administrative Code (Guidelines), sections 15002, 15086, and 15087

The main objective of CEQA is to ensure that decision-makers and the public are aware of any significant environmental effects of proposed activities and to require agencies to avoid or reduce the environmental effects by implementing feasible alternatives or mitigation measures. Other objectives of CEQA focus on public disclosure regarding the reasons for agency approval of projects with significant environmental effects, interagency coordination in the review of projects, and enhancement of public participation in the planning process.

The legal authority of a vector control district such as routine surveillance, control, and access issues do not require obtaining a permit from regulatory agencies (e.g., California Department of Fish and Wildlife). Permits may be required if major access or environmental modification issues, such as drainage channel alterations, arise.

Under the requirements of the State Porter-Cologne Act and the Federal Clean Water Act, the State Water Resources Control Board (SWRCB) is delegated authority for protection of surface and groundwater. The Vector Control Program is subject to: State Water Quality Order No. 2016-0039-DWQ, General Permit No. 990004 and Statewide National Pollutant Discharge Elimination System (NPDES) Permit for Biological and Residual Pesticide Discharges to Waters of the United States from Vector Control Applications.

County of San Diego Vector Control Program enrollee number is 937AP00009.

Statutory Exemptions

Actions in response to an imminent threat to public health, as determined by the County Health Officer (delegated to the Director of Environmental Health), are exempt from CEQA and other regulatory permits under the Public Resources Code 21080(b)(4). Vector control programs that have entered into a cooperative agreement with California Department of Public Health (CDPH) (as San Diego County has) and that meet certain requirements are also exempt from certain pesticide-related requirements when applying approved pesticides for vector control purposes. Exemptions include employee certification requirements (but substitute training is required) and certain notification and permitting requirements (however, this plan retains equivalent notification protocols). For more information refer to/see Education Code § 17613; Food and Agriculture Code § 11408(e); Health and Safety Code § 25174.7(a)(3) and Title 3; and California Code of Regulations, sections 6400(c)(2) and 6400(e), 6620, 6651, and 6760.

Attachment C Larvicide and Adulticide Products Used by the VCP

Table 1. Products used for larval and adult mosquito control.

Type	Product Name	Use/ Action
Larvicide	*Bacillus thuringiensis israelensis* Trade names: Vectobac®, Teknar®	Use: Approved for most permanent and temporary bodies of water. Limitations: Only works on actively feeding stages. Does not persist well in the water column.
Larvicide	Spinosad (spinosyn A and D compounds derived from a fermentation process by certain microbes) Trade name: Natular®	Use: Approved for most water bodies. Good penetration into vegetated areas. Works predominantly on feeding stages (may also have limited contact activity).
Larvicide	*Bacillus sphaericus* Trade name: Vectolex®	Use: Approved for most permanent and temporary bodies of water. Limitations: Only works on actively feeding stages. Does not work well on all species. May persist and have residual activity in some sites.
Larvicide	*Bacillus sphaericus* and *Bacillus thuringiensis israelensis* combined. Trade name: Vectomax®	Use: Approved for most permanent and temporary bodies of water. Only works on actively feeding stages. May persist and have residual activity in some sites.
Larvicide	Methoprene Trade names: Metalarv S-PT, Altosid®	Use: Approved for most permanent and temporary bodies of water. Limitations: Works best on older instars. Some populations of mosquitoes may show some resistance.
Larvicide	Larvicide oils Trade names: Golden Bear Oil (GB-1111), BVA Chrysalin	Use: Ditches, dairy lagoons, floodwater. Effective against all immature stages, including pupae. Limitations: Consult California Department of Fish and Wildlife for local restrictions.
Larvicide	Monomolecular Films Trade name: Agnique® MMF	Use: Most standing water including certain crops. Limitations: Does not work well in areas with unidirectional winds in excess of 10 mph.
Adulticide	Pesticides containing natural pyrethrin Trade names: Pyrenone®, Pyrocide®	Use: Wetlands, floodwater, residential areas, some crops. Limitations: Do not apply to drinking water, milking areas; may be toxic to bees, fish, and some wildlife. Some formulations with synergists have greater limitations.
Adulticide	Pyrethroids - synthetic pyrethrin products containing resmethrin or permethrin Trade name: Scourge®	Use: All non-crop areas including wetlands and floodwater. Limitations: May be toxic to bees, fish, and some wildlife; avoid treating food crops, drinking water or milk production.

Attachment D Glossary

BOS	Board of Supervisors
Bs	*Bacillus sphaericus*
Bti	*Bacillus thuringiensis israelensis*
CCR	California Code of Regulations
CDC	Centers for Disease Control and Prevention
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CHD	Community Health Division
CMR	Confidential Morbidity Report
COC	County Operations Center
DART	UC Davis Arbovirus Research and Training laboratory
DEH	Department of Environmental Health
EIA	Enzyme-linked immunoassay
EPA	Environmental Protection Agency
HHSA	Health and Human Services Agency
IFA	Indirect fluorescent antibody
IPM	Integrated Pest Management
MIR	Minimum infection rate
MLE	Maximum likelihood estimate
NPDES	National Pollutant Discharge Elimination System
PHL	Public Health Laboratory
PHO	Public Health Officer
PHS	Public Health Services
PPE	Personal Protective Equipment
PRNT	Plaque reduction neutralization test
RT-PCR	Reverse transcription polymerase chain reaction
SDCCAO	San Diego County Code of Administrative Ordinances
SDCPHL	San Diego County Public Health Laboratory
SWRCB	State Water Resources Control Board
ULV	Ultralow volume insecticide spray or mist
VCP	Vector Control Program
VDDL	Vector Disease and Diagnostic Laboratory
VHRP	Vector Habitat Remediation Program
VRDL	Viral and Rickettsial Disease Laboratory
WNCH	West Nile Case History
WNV	West Nile virus
WNV SRP	West Nile Virus Strategic Response Plan
WVMVCD	West Valley Mosquito and Vector Control District

Attachment E References

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Attachment F Revision History

Date	Author	Revision Summary