

SAN BERNARDINO COUNTY

# MOSQUITO<sub>and</sub> VECTOR CONTROL PROGRAM



Public Health  
Environmental Health Services

ANNUAL  
REPORT  
**2017**



## COUNTYWIDE VISION

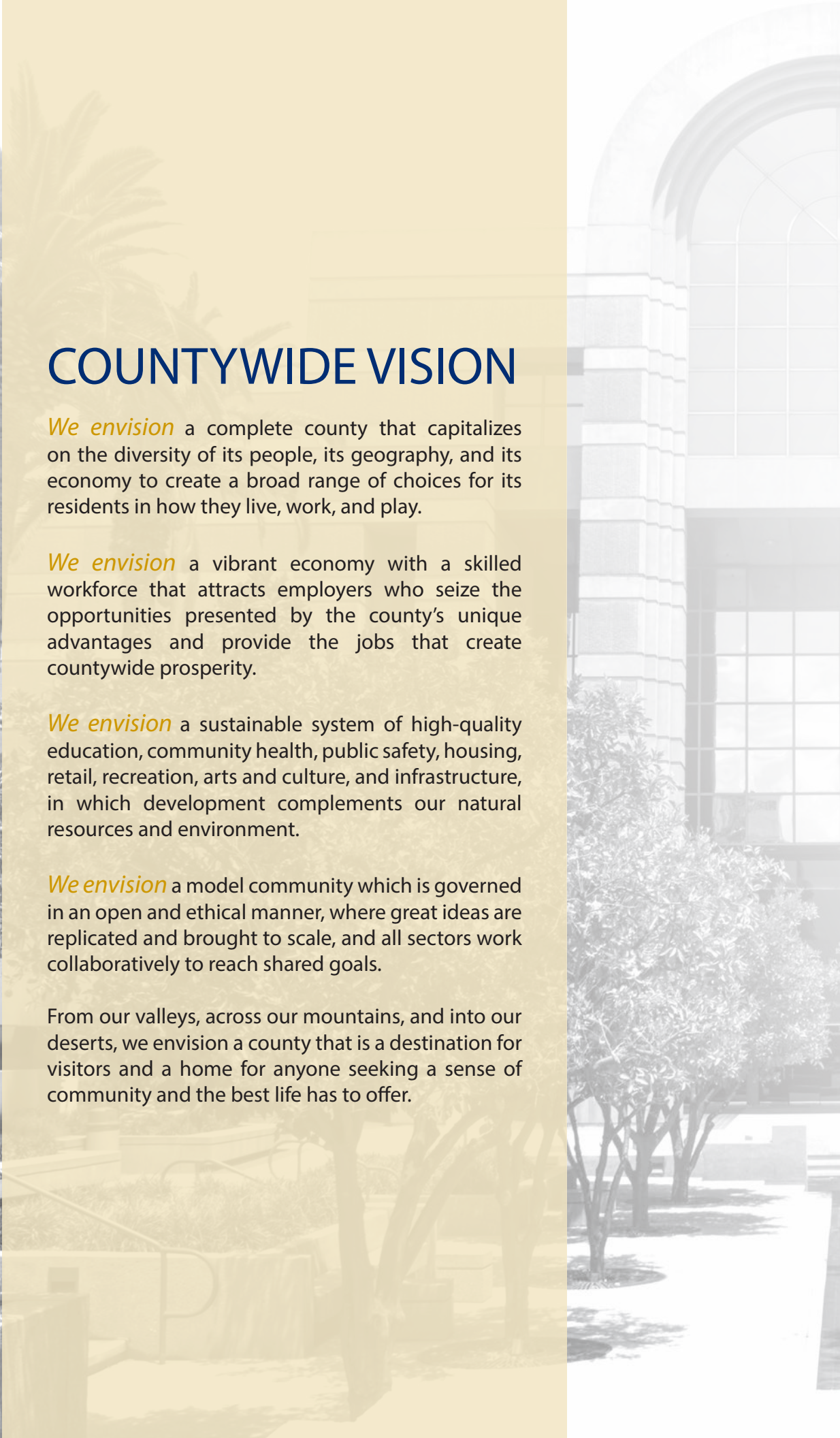
*We envision* a complete county that capitalizes on the diversity of its people, its geography, and its economy to create a broad range of choices for its residents in how they live, work, and play.

*We envision* a vibrant economy with a skilled workforce that attracts employers who seize the opportunities presented by the county's unique advantages and provide the jobs that create countywide prosperity.

*We envision* a sustainable system of high-quality education, community health, public safety, housing, retail, recreation, arts and culture, and infrastructure, in which development complements our natural resources and environment.

*We envision* a model community which is governed in an open and ethical manner, where great ideas are replicated and brought to scale, and all sectors work collaboratively to reach shared goals.

From our valleys, across our mountains, and into our deserts, we envision a county that is a destination for visitors and a home for anyone seeking a sense of community and the best life has to offer.





# SAN BERNARDINO COUNTY BOARD OF SUPERVISORS



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1st District  
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Chief Executive Officer

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DEPARTMENT OF PUBLIC  
HEALTH and DIVISION OF  
ENVIRONMENTAL HEALTH  
SERVICES

## PROTECTING Public Health every day

Our mission is to protect health and enhance the quality of life for all County residents through the suppression of mosquito, rodent, and other vector transmitted diseases, and the reduction of annoyance levels caused by mosquitoes and other pests of public importance.

The information in this report highlights our efforts in 2017 to innovate and improve on surveillance and abatement practices in order to fulfill our mission to the residents of San Bernardino County.

**Trudy Raymundo**

Director, Department of Public Health

**Maxwell Ohikhuare, M.D.**

Health Officer

**Corwin Porter**

Assistant Director, Department of Public Health

**Joshua Dugas**

Chief, Environmental Health Services

**Jason Phillippe**

Program Manager, Environmental Health Services

**Morena Garcia**

Program Coordinator, Environmental Health Services, Mosquito and Vector Control Program





## Joshua Dugas

Division Chief, Environmental Health Services

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The San Bernardino County Mosquito and Vector Control Program (SBCMVCP) operates in the largest county in the contiguous United States with over 19,000 square miles of land area; and the twelfth largest county by population in the United States; with mountains, valleys and expansive desert areas. The SBCMVCP is committed to ensuring public health and safety to County residents and visitors and developing new ways to improve services.

In 2017, the SBCMVCP made strategic improvements to surveillance and abatement through new and innovative practices. New surveillance methods have been implemented through the use of Global Information System (GIS) tracking and “cluster trapping” techniques. Hard work by our highly trained staff and assistance of an engaged public, have helped to make headway combating existing and emerging threats.

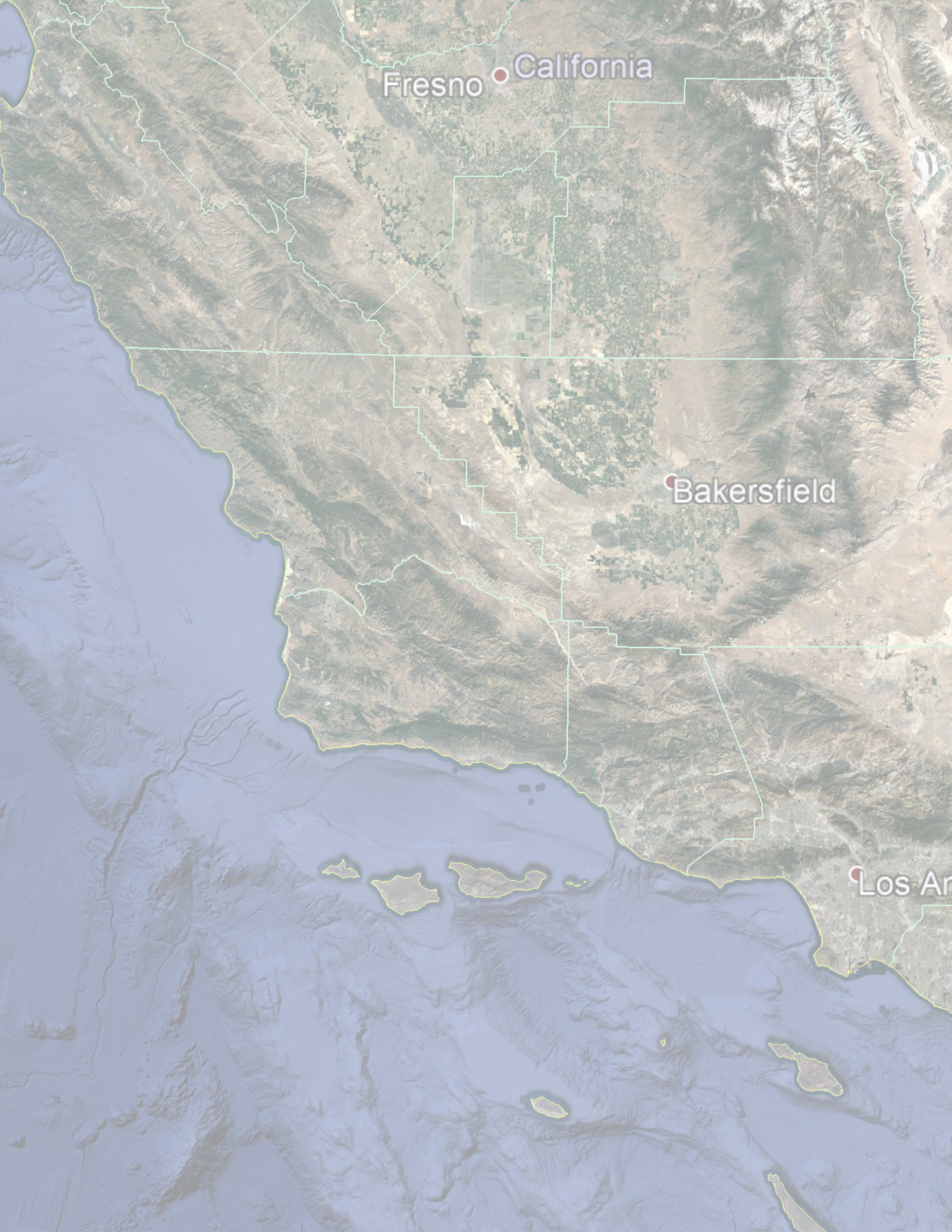
This year we also strengthened our existing partnerships with other agencies in order to better protect public health. We look forward to serving you for another successful—and safe—year ahead!

Respectfully,

A handwritten signature in black ink that reads "Josh Dugas". The signature is fluid and cursive, with a long horizontal line extending from the end.

Joshua Dugas





Fresno • California

Bakersfield

Los Angeles



# SBCMVC P DISTRICT SERVICE AREAS





# AT-A-GLANCE



**7,102** SBCMVCP SERVICE HOURS

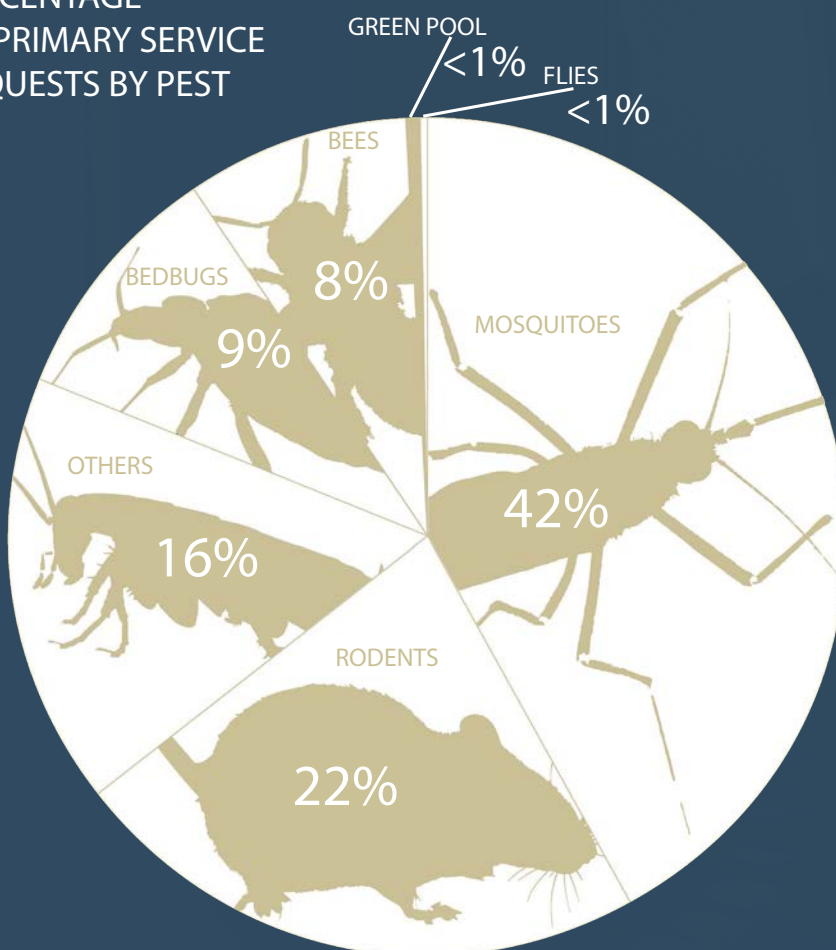
**4,833** SBCMVCP INSPECTION HOURS

**886** INSPECTED WATER SOURCE

## SERVICE REQUESTS PER YEAR/MONTH

	2013	2014	2015	2016	2017
	1,219	1,177	1,269	1,479	1,262

## PERCENTAGE OF PRIMARY SERVICE REQUESTS BY PEST



January **42**

February **52**

March **153**

April **103**

May **105**

June **105**

July **220**

August **108**

September **141**

October **110**

November **71**

December **52**





**19,429**  
MOSQUITOES CAPTURED

**19,429** MOSQUITOES  
SUBMITTED  
FOR TESTING

POSITIVE  
MOSQUITO  
POOLS FOR  
WEST  
NILE  
VIRUS **48**

**ZERO**  
MOSQUITOES TESTED  
**POSITIVE**  
FOR ZIKA VIRUS

**ZERO**  
RODENTS  
TESTED  
POSITIVE FOR  
**PLAGUE** or  
**HANTAVIRUS**

**ZERO**  
TICKS TESTED  
POSITIVE  
FOR **LYME**  
**DISEASE**

**45**  
DEAD BIRDS  
TESTED  
POSITIVE  
FOR **WEST**  
**NILE VIRUS**

**36**  
SENTINEL  
CHICKENS  
TESTED  
POSITIVE FOR  
**WEST NILE**  
**VIRUS**

**2,657**  
RESIDENTIAL  
SURVEY'S  
COMPLETED

**446**  
NOTICE OF  
VIOLATIONS  
ISSUED

**3484**  
**EDUCATIONAL  
PRESENTATIONS  
HEALTH  
FAIRS  
CAREER  
FAIRS**

TOTAL  
NUMBER  
OF PEOPLE  
REACHED AT  
EVENTS:

**7,873**

# ZIKA SHORT-TERM GRANT

In April 2017 the Department of Public Health (DPH) SBCMVC P was awarded \$150,000 from the Public Health Foundation Enterprises (PHFE) for the purpose of surveillance and abatement of the *Aedes* mosquito and educating the public about the threats they pose such as Zika and Dengue fever. The grant term is from April 2017 through July 2018.

With these grant funds, the SBCMVC P was able to hire staff, purchase traps and pesticides, and increase outreach efforts which focus on *Aedes* mosquitoes. New employees conducted surveillance and educated the public about the *Aedes* mosquito through residential surveys and community outreach.

The PHFE grant has made a significant impact in the fight against the *Aedes* mosquito. These funds, along with strategic planning and systematic changes have helped to increase the number of trapping sites from 100 in 2016 to 1200 in 2017. Approximately 1,280 *Aedes* mosquitoes were captured as a result of additional traps and resources provided by the grant. Surveillance efforts led to the *Aedes* mosquito being identified in six new cities within San Bernardino County, including: Bloomington, Grand Terrace, Redlands, Rialto, San Bernardino and Yucaipa. The SBCMVC P was able to reach over 5,000 residences and educate families about the dangers of *Aedes* mosquitoes.

PHFE awarded the SBCMVC P an additional \$40,000 in November of 2017 as a result of successful implementation of the grant and outcomes achieved. In total, the MVC P has received \$190,000 from PHFE for the *Aedes* surveillance program.



Approximately  
**1,100**  
trapping sites were  
added in 2017.



# STRONG PARTNERSHIPS

The SBCMVC is engaged in several formal committees, partnerships and task forces where collaboration leads to innovation and action.

The SBCMVC collaborates with San Bernardino County Department of Public Health's Communicable Disease Section, Preparedness and Response Program (PRP), and the West Valley Mosquito and Vector Control District (WVMVCD) to efficiently and comprehensively address Zika. The task force has developed a Standard Operating Guide which outlines procedures for responding to locally transmitted Zika cases. They have also established a partnership with the Ontario International Airport to display educational material about the dangers of the West Nile Virus and Zika.

The SBCMVC is an active member of the Mosquito and Vector Control Association of California and the American Mosquito Control Association which provides publications, training, develops best practices, and advocates to protect the public from vector-borne disease transmission.

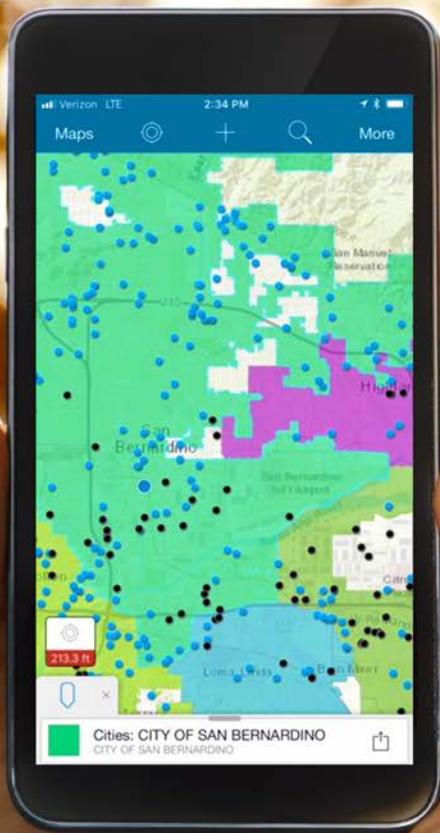
SBCMVC also works with the County Department of Public Works Flood Control District to inspect and treat mosquitoes and other vectors breeding at flood control channels and basins. Both the SBCMVC and Flood Control District work together to identify basins and channels that require debris and vegetation removal to prevent breeding.

In addition to formal partnerships, the SBCMVC has collaborated with local agencies by providing assistance with training and communication. In 2017, the SBCMVC provided mosquito related trainings to city code enforcement and public works departments throughout the county and presentations to the cities of Colton and Fontana regarding the emergence of the *Aedes* mosquito and the threat of Zika in their communities. SBCMVC also conducted vector training for Southern California Edison and CalTrans staff operating within the county .

## 2017 Partnerships

- American Mosquito Control Association
- CalTrans
- County Department of Public Works Flood Control District
- DPH Communicable Diseases Section
- DPH Preparedness and Response Program
- Mosquito and Vector Control Association of California
- Ontario International Airport
- Southern California Edison
- West Valley Mosquito and Vector Control District

AN AVERAGE OF  
**886** WATER  
SOURCES WERE  
**MONITORED** EVERY  
MONTH IN 2017



## IMPROVING DATA COLLECTION

In 2017, SBCMVCPC integrated new technology into its monitoring practice that allows for real time updates of trap and site locations across all of San Bernardino County. In an effort to become more efficient, SBCMVCPC adopted a new software tool developed by Esri. This produced more efficient routing, less time planning and faster response.

Collector by ArcGIS is a Geographic Information System (GIS) mapping tool that allows SBCMVCPC inspectors to digitally locate and track breeding sites for quick navigation. This tool assists SBCMVCPC staff to gauge assets and improve work performance and data retention. Using Collector software has improved efficiency by enabling a small number of SBCMVCPC staff to monitor 886 water sources monthly, establish 1200 trap site locations, and identify 184 water retention basins throughout the County of San Bernardino.

In order to continue to improve efficiency in the future, the SBCMVCPC is looking to utilizing additional technology solutions such as ArcGIS Workforce and Navigator. These improvements would allow real-time coordination and digital tracking between the SBCMVCPC home office and technicians in the field to improve complaint response time and further improve efficiency.



# ADVANCEMENT IN *Aedes* SURVEILLANCE

The *Aedes* mosquito is an invasive day-biting species that can carry dangerous diseases such as Yellow Fever and Zika. This discovery prompted the SBCMVCVP to evaluate new and innovative ways to combat this emerging threat.

With support from the PHFE grant, the SBCMVCVP created a new program in 2017 to monitor *Aedes* mosquito activity in San Bernardino County. The challenge with monitoring and controlling this species is how differently it travels and breeds when compared to mosquito species native to California. To more effectively trap and monitor *Aedes* mosquitoes, the SBCMVCVP developed a new method of trapping not previously used in San Bernardino County's mosquito surveillance program. Carbon dioxide traps were strategically grouped 150 meters apart in a "cluster" that allows for a higher concentration of mosquitoes to be captured. Arc GIS technology was then used to digitally map trap locations deployed across 1200 sites throughout the year. This enabled program resources to be deployed more effectively to high risk areas.

As a result 1280 *Aedes* mosquitoes were captured in six cities in 2017. This increase in surveillance has allowed the SBCMVCVP to more quickly identify concentrated populations of *Aedes* mosquitoes.



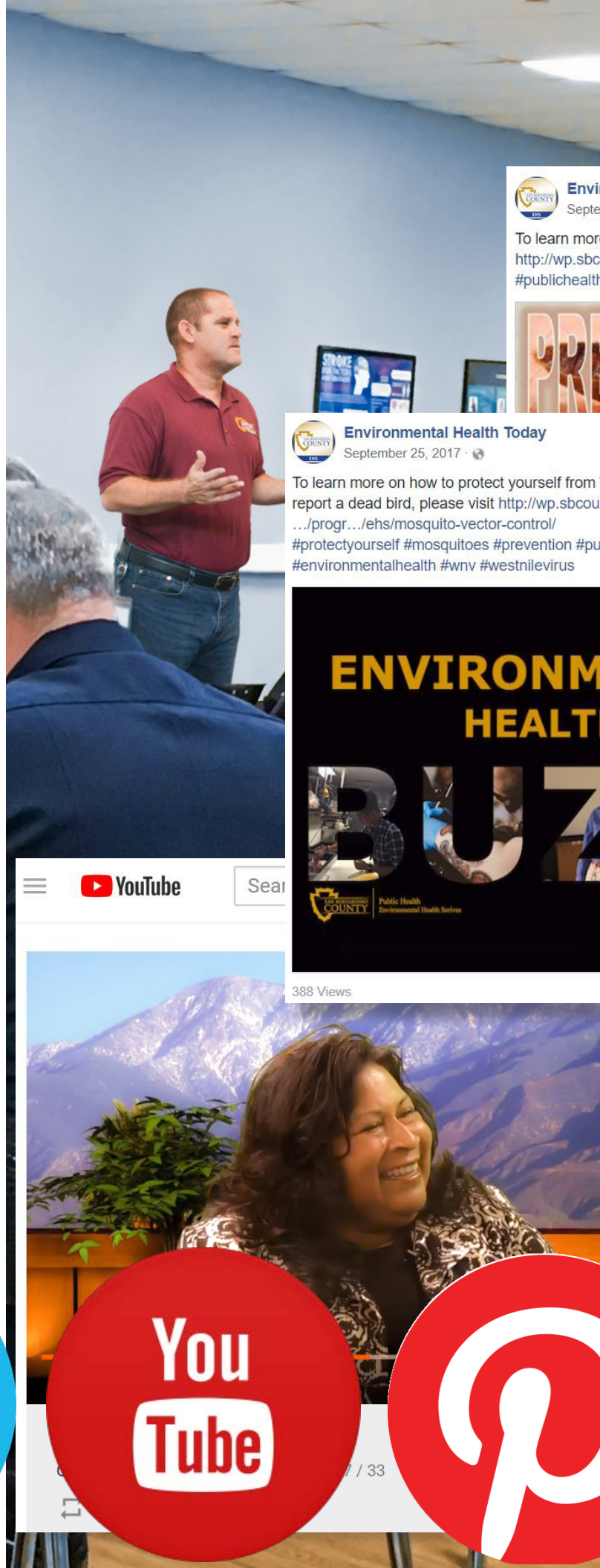
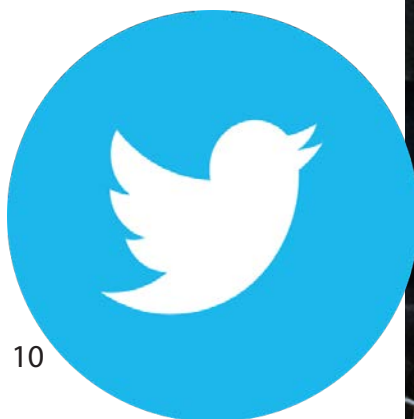
**1,280** *Aedes*  
MOSQUITOES WERE  
CAPTURED IN 2017



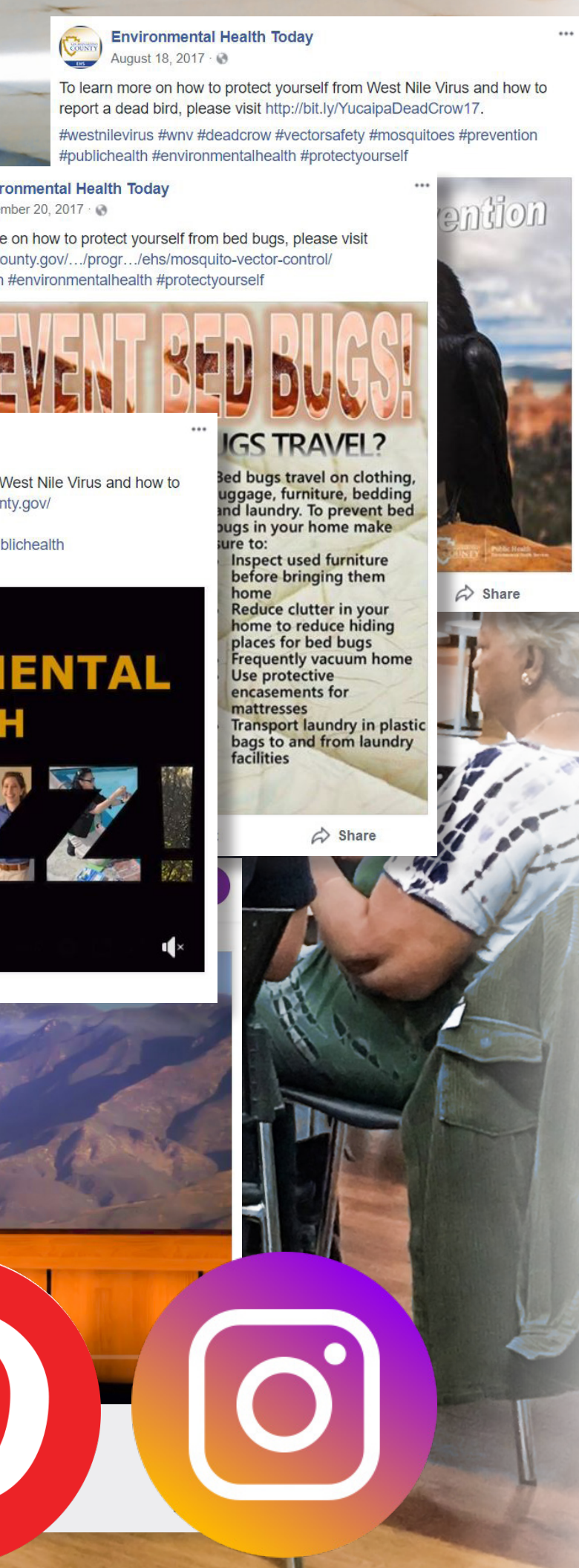
# OUTREACH

SBCMVC P made significant community impacts in 2017 by attending and hosting 46 events throughout San Bernardino County. Health Education Specialists provided oral presentations and educational information to various colleges, schools, fairs, as well as other county departments. This includes: 34 oral presentations, 8 health fairs and 4 career fairs. An estimated 7,873 county residents participated at these events.

The use of social media has greatly increased SBCMVC P's ability to connect with communities. The SBCMVC P webpage has begun creating and hosting educational videos beginning with the topic of West Nile virus. SBCMVC P's Program Coordinator Morena Garcia was also a host on Fontana's YouTube channel Local Matters. SBCMVC P has started utilizing Facebook, Instagram, Pinterest and Twitter to better connect with the community. SBCMVC P will continue to promote the services offered and the educational information available to the community in order to build and increase public awareness.







# EVENT LOCATIONS in 2017

Colton  
Fontana  
Hesperia  
Loma Linda  
Lucern Valley  
Redlands  
Rialto  
Running Springs  
San Bernardino  
Twentynine Palms  
Victorville  
Yucca Valley

## CITIES

California State University San Bernardino  
Loma Linda School of Public Health  
San Bernardino Valley Community College  
Western University Veterinary School

## COLLEGES

Expanding Horizons Charter School  
Paul J Rogers Elementary School  
Pacific High School  
Twentynine Palms High School  
Victor Valley High School

## SCHOOLS



# MONITORING INACCESSIBLE AREAS

The majority of San Bernardino County's 20,105 square miles is rural and inaccessible but still requires mosquito surveillance and in some instances, abatement. SBCMVCP utilizes off road vehicles to identify, inspect, and treat areas that are inaccessible by truck. The Santa Ana River is a key example as it runs through huge population centers under the jurisdiction of the SBCMVCP.

Within the borders of San Bernardino County, the Santa Ana River winds approximately 15 miles from the Seven Oaks Dam in the City of Highland to the City of Grand Terrace. When the river bed is exposed, standing water accumulates and creates an environment for mosquitoes to thrive. To mitigate this issue, SBCMVCP staff have been trained and certified in the safety and operation of ATVs for mosquito surveillance and abatement in these remote locations.

In 2017, a hidden water source measuring approximately one hundred square feet was discovered in the Santa Ana Riverbed between Waterman Avenue and South E Street. The Culex mosquito, known for carrying West Nile Virus, was found breeding at this site. The SBCMVCP staff used ATVs to access the water source to apply a mix of oil and Vectomax granules to kill off any mosquito larvae.





# ENHANCING COMMUNITY HEALTH

SBCMVCPC works to support the county's Vision2bActive campaign by reducing the risk of vector-borne diseases in County parks and trails. San Bernardino County's Vision2BActive campaign is designed to improve wellness throughout the County by encouraging residents to increase their physical activity.

Ticks, rodents, and mosquitoes are hosts to many diseases and may be found in outdoor spaces including public parks, hiking trails and lands across the County. Ticks are known to carry Lyme disease and Relapsing Fever which can be transmitted to humans and cause severe health problems. Rodents can carry diseases such as plague and Hantavirus, leading to severe respiratory problems. Recreational water sources often become breeding sites for mosquitoes. To mitigate these issues, the SBCMVCPC conducts tick, rodent, and mosquito surveillance and abatement in County recreational areas, parks, and hiking trails.

A woman and a man are hiking on a dirt trail. The woman is in the foreground, wearing a blue jacket, dark leggings, and a blue bandana. The man is slightly behind her, wearing a red and grey jacket and plaid shorts. They are both wearing backpacks and sunglasses. The background is a dense forest with green trees.

**PARKS  
AND TRAILS ARE  
REGULARLY MONITORED  
FOR RODENTS, TICKS,  
AND MOSQUITOES**





SBCMVC Staff 2017



# PROTECTING PUBLIC HEALTH EVERY DAY

SBCMVCPC provides services to richly diverse geographic and demographic areas all with unique needs. Threats such as West Nile Virus and Zika continue to evolve and, the SBCMVCPC has found new and innovative ways to address these needs, continue protecting public health and protecting quality of life. The SBCMVCPC team is committed to this continued pursuit for residents and visitors throughout San Bernardino County and look forward to serving you another year.





For information about the San Bernardino County  
Mosquito and Vector Control Program,  
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