

ANNUAL REPORT

2022

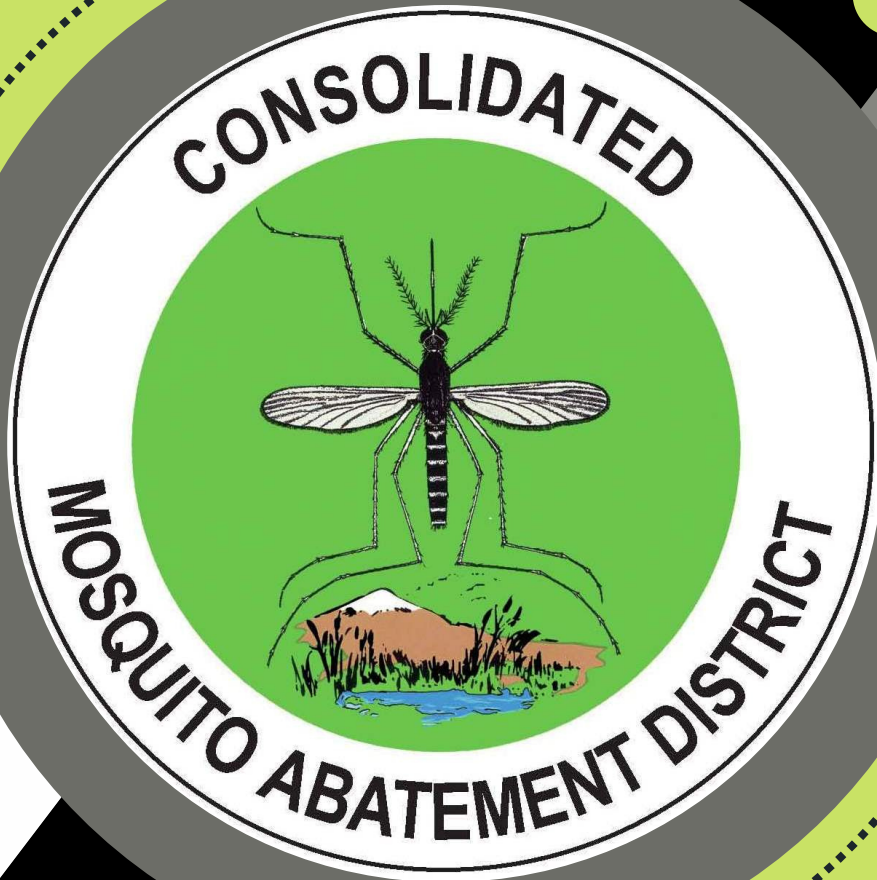
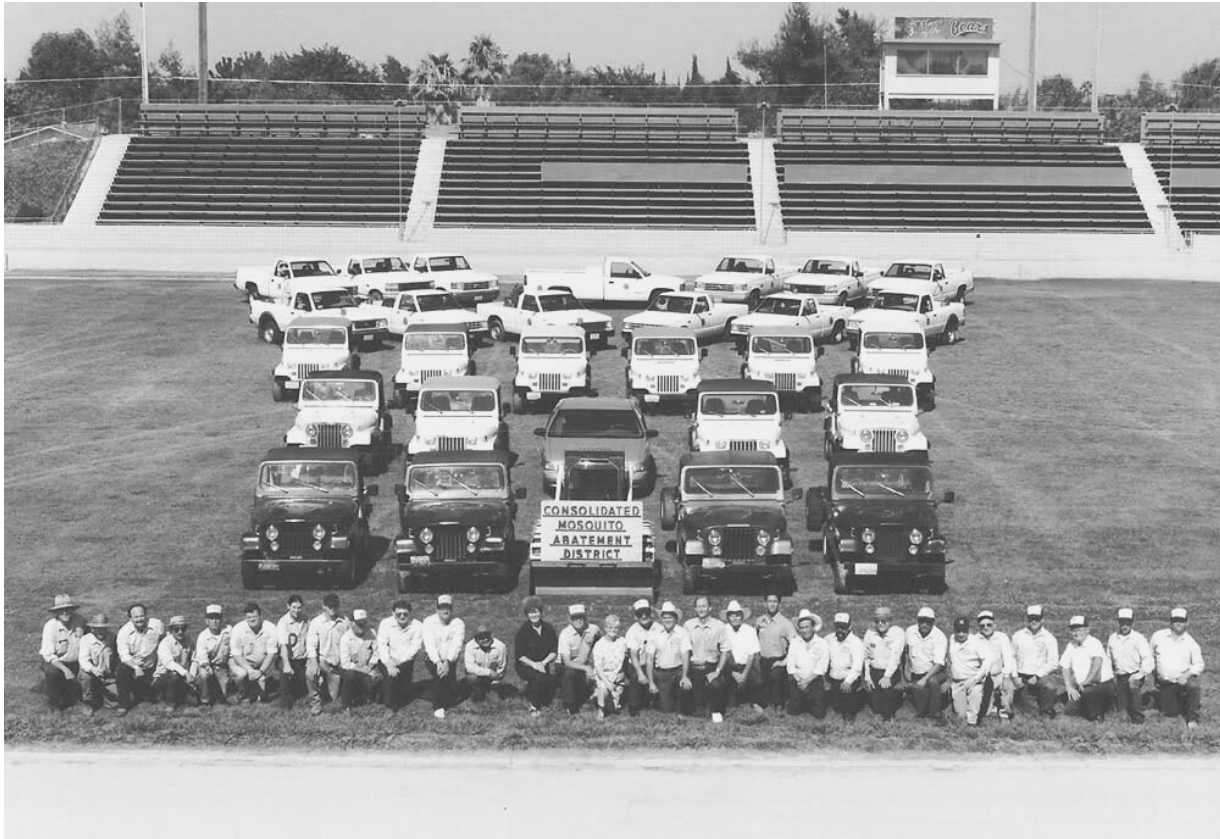




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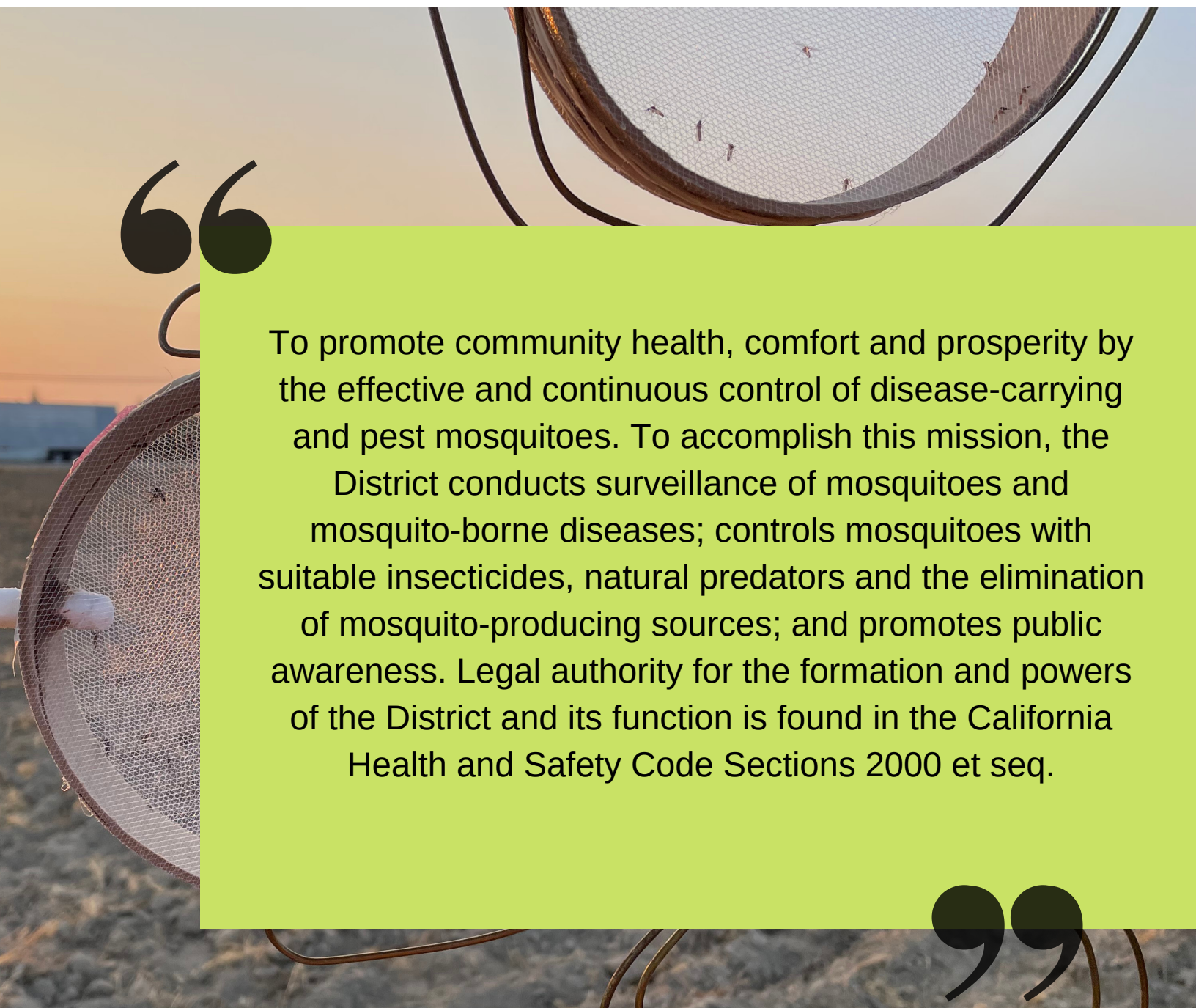


Consolidated Mosquito Abatement District Staff 1996.

DISTRICT HISTORY

The year 2022 marked the 76th year of service for the Consolidated Mosquito Abatement District. The District was organized on June 11, 1946, by the action of the Fresno County Board of Supervisors after petitions from residents and chambers of commerce in the cities of Fowler, Kingsburg, Sanger, and Selma. The District was formed to relieve the nuisance of biting mosquitoes and protect the public from the threat of mosquito-borne diseases, such as encephalitis and malaria. After its formation, the District encompassed about 242 square miles. Within three years, and following additional petitions, the District was expanded through annexations to include the cities of Clovis, Orange Cove, Parlier, Reedley, and adjacent areas; the communities of Caruthers, Del Rey, Friant, Laton, Riverdale, and surrounding areas; and approximately eighteen square miles in Kings County. Currently, the District covers about 1,058 square miles, including part of the City of Fresno.

OUR MISSION



“ To promote community health, comfort and prosperity by the effective and continuous control of disease-carrying and pest mosquitoes. To accomplish this mission, the District conducts surveillance of mosquitoes and mosquito-borne diseases; controls mosquitoes with suitable insecticides, natural predators and the elimination of mosquito-producing sources; and promotes public awareness. Legal authority for the formation and powers of the District and its function is found in the California Health and Safety Code Sections 2000 et seq. ”

DISTRICT ORGANIZATION

BOARD OF TRUSTEES



Pictured from left to right Leonard Hammer, City of Fowler; Mary Anne Hill, Fresno County (Vice President/Secretary); Tokuo Fukuda, City of Kingsburg; Jennifer Willems, City of Clovis; Charles Lockhart, City of Orange Cove; Karen Steinhauer, City of Sanger; and Bruce Taylor, Fresno County (President).
Not pictured: Joe Reyna, City of Parlier; Pete Esraelian, City of Selma; Abe Isaak, City of Reedley; and Peggy Brisendine, City of Fresno.

The District is governed by a Board of Trustees. The Board is composed of eleven members, a trustee appointed from each of the nine incorporated cities and two trustees appointed by the Fresno County Board of Supervisors from the District at large. Trustees are appointed to serve terms of two or four years and serve without compensation, except for an allowance in lieu of travel expenses to attend monthly Board meetings. The primary functions of the Board are to establish District policy and to provide direction for the fiscal administration of the District. The Board meets regularly on the third Monday of each month at 1:00 pm at the District office in Parlier. In 2022 we saw the return of in-person attendance at board meetings while continuing to allow for remote attendance by trustees as permitted under AB361.

Trustee President Bruce Taylor (right) acknowledging retiring District Manager Steve Mulligan (left) for his 32 years of service to the District.



Trustee Fukuda in the field to observe a UAS application.



DISTRICT ORGANIZATION

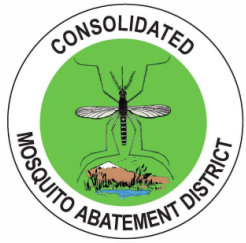
MEET OUR TEAM



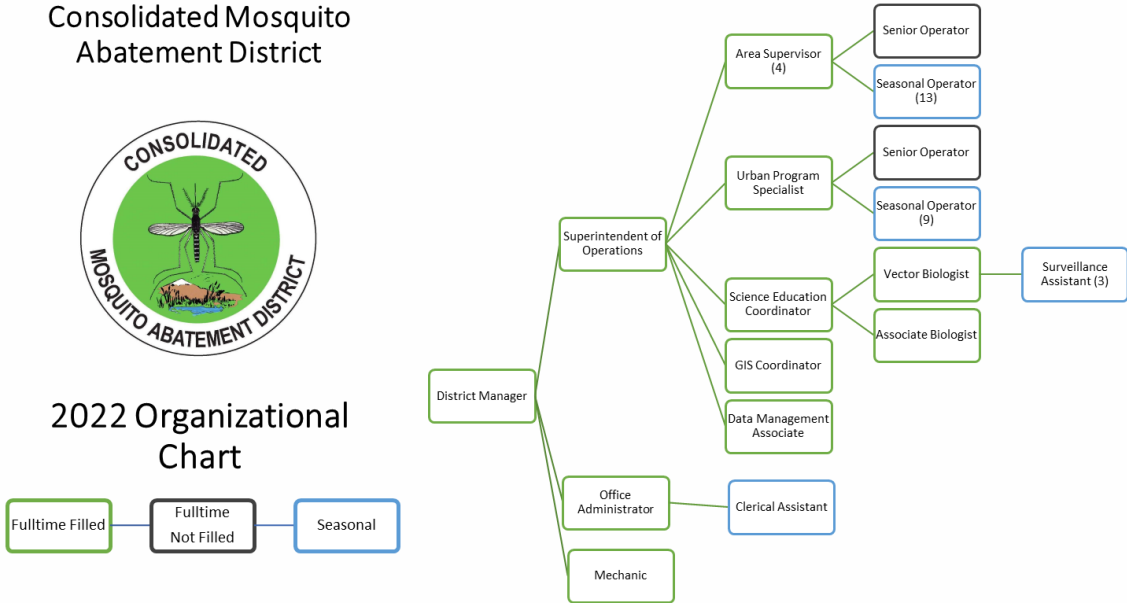
Pictured from left to right Jodi Holeman, Jose Moreno, Amy Garcia, Chris Monis, Katherine Ramirez, Conner Schaak, Devon Cornel, Derek Hill, Katherine Brisco, Karan Cox, Gha Vang, Jovana Benavides, B.Deegan, and Steve Mulligan.

Regular full-time staff employed by the District during 2022 consisted of fourteen employees, including a District Manager, Superintendent of Operations, Science Education Coordinator, Office Administrator, Data Management Associate, GIS Coordinator, Vector Biologist, Associate Biologist, Mechanic, Urban Programs Specialist, and four Area Supervisors (organizational chart below). The District welcomed Katherine Brisco as an Area Supervisor to the team in 2022. Twelve regular staff are certified in mosquito control by the California Department of Public Health (CDPH), and seven also have certification in vertebrate and invertebrate vector control. Certified employees are required to attend State of California-approved education programs each year to maintain their professional competence.

Consolidated Mosquito Abatement District



2022 Organizational Chart



DISTRICT ORGANIZATION

MEET OUR TEAM

Twenty-five seasonal employees were also hired during the 2022 field season. Six have limited certification in mosquito control by CDPH. The field season typically runs from March through October. The District relies on seasonal staff to drive our field operations. Under the direction of supervisors, seasonal employees do a myriad of tasks to support control and surveillance programs. They are often the first face or voices that our residents come into contact with. In 2022, 73% of our seasonal staff were returning seasonals and had worked one or more seasons prior.



Clerical
Annie Munoz



Surveillance
Clarita Ramblas, Melissa Thies, & Bai Thao.



Reedley Crew
Cha Her, Roger Vang, Jacob Uribe, Ronnie Blunt.



Urban Crew
David Rodriguez, Ronnie Blunt, Marty Martinez, Tracy Autrey, Heidi Hubbard, Eric Ferguson, William Monge.



Westside Crew
Tuacheng Vang, Lewis Nunes, Ricky Quiroz.



Sanger Crew
Don McNeil, Cheng Vang, Justin Lor.



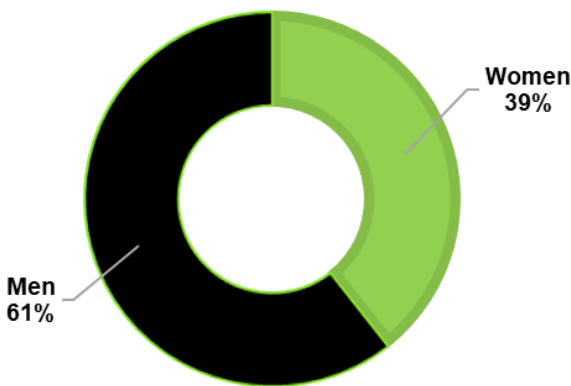
Clovis Crew
Scotty Dunn, Jesse Hernandez, Robert Martinez.

STAFF DEMOGRAPHICS

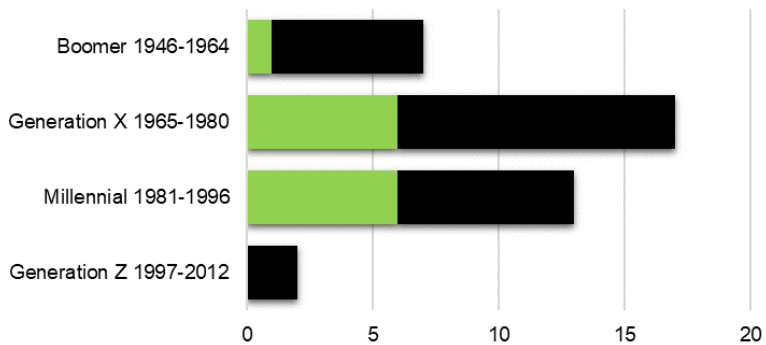
The District strives to recruit and retain the most qualified employees. District employees are our most valuable resource and we are dedicated to supporting a diverse, inclusive, and supportive work environment in the District.

GENDER

% of employees (all staff)

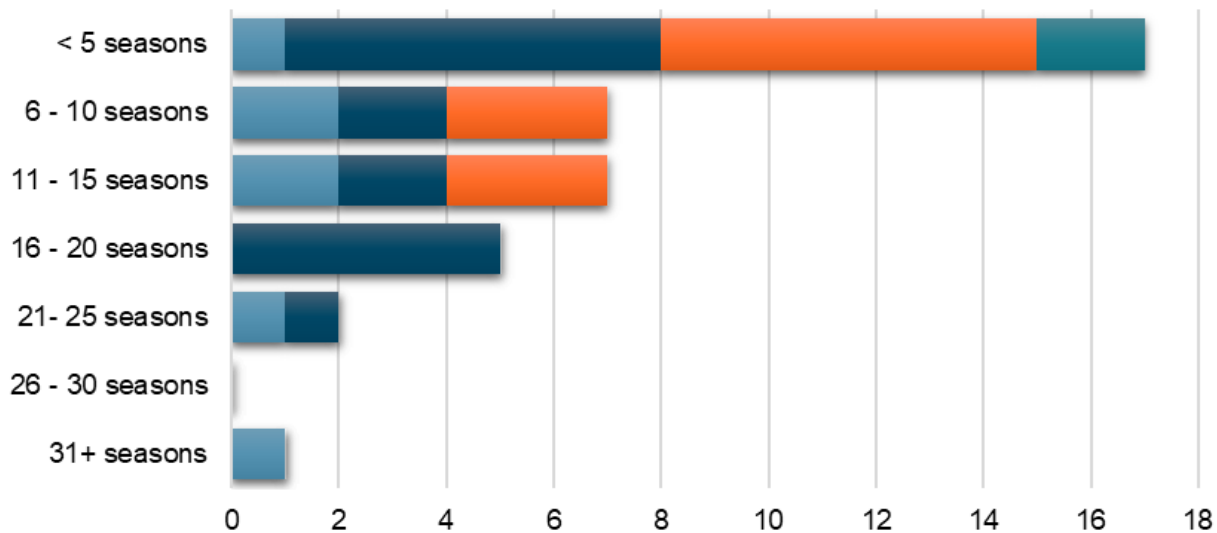


Staff by Generation



	Generation Z 1997-2012	Millennial 1981- 1996	Generation X 1965-1980	Boomer 1946- 1964
Women	0	6	6	1
Men	2	7	11	6

Years Worked per Generation



	31+ seasons	26 - 30 seasons	21 - 25 seasons	16 - 20 seasons	11 - 15 seasons	6 - 10 seasons	< 5 seasons
Boomer 1946-1964	1		1		2	2	1
Generation X 1965-1980			1	5	2	2	7
Millennial 1981-1996					3	3	7
Generation Z 1997-2012							2

ABOUT THE DISTRICT



Main office in Parlier.

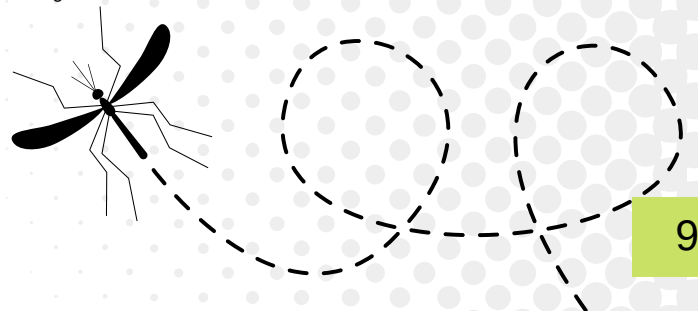
Facilities: In January 2015, a parcel of land (8.6 acres) was purchased in the Parlier Industrial Park, which is a central location within the District's service area. Construction began in June 2017 and was completed in 2018. Staff relocated to the new facility in April 2018. Although the Parlier office is the main office, the District continues to utilize one satellite office in Clovis.

Fleet: The District has a large fleet of vehicles that includes forty-three trucks, six Jeeps, three sport utility vehicles, eighteen all-terrain vehicles, two Bobcats, five amphibious vehicles, one forklift, one mist sprayer, two boats, and various other handheld spray equipment used by staff in service calls and applying treatments throughout the District. A full-time mechanic is on staff to maintain the fleet of vehicles and equipment throughout the year.

Service Area: The District covers 1,058 square miles and provides area-wide mosquito control services to over half a million (ESRI Living Atlas) residents in Fresno and Kings counties.



Certified ATV Safety Instructor and Area Supervisor, Chris Monis conducting a safety training class.





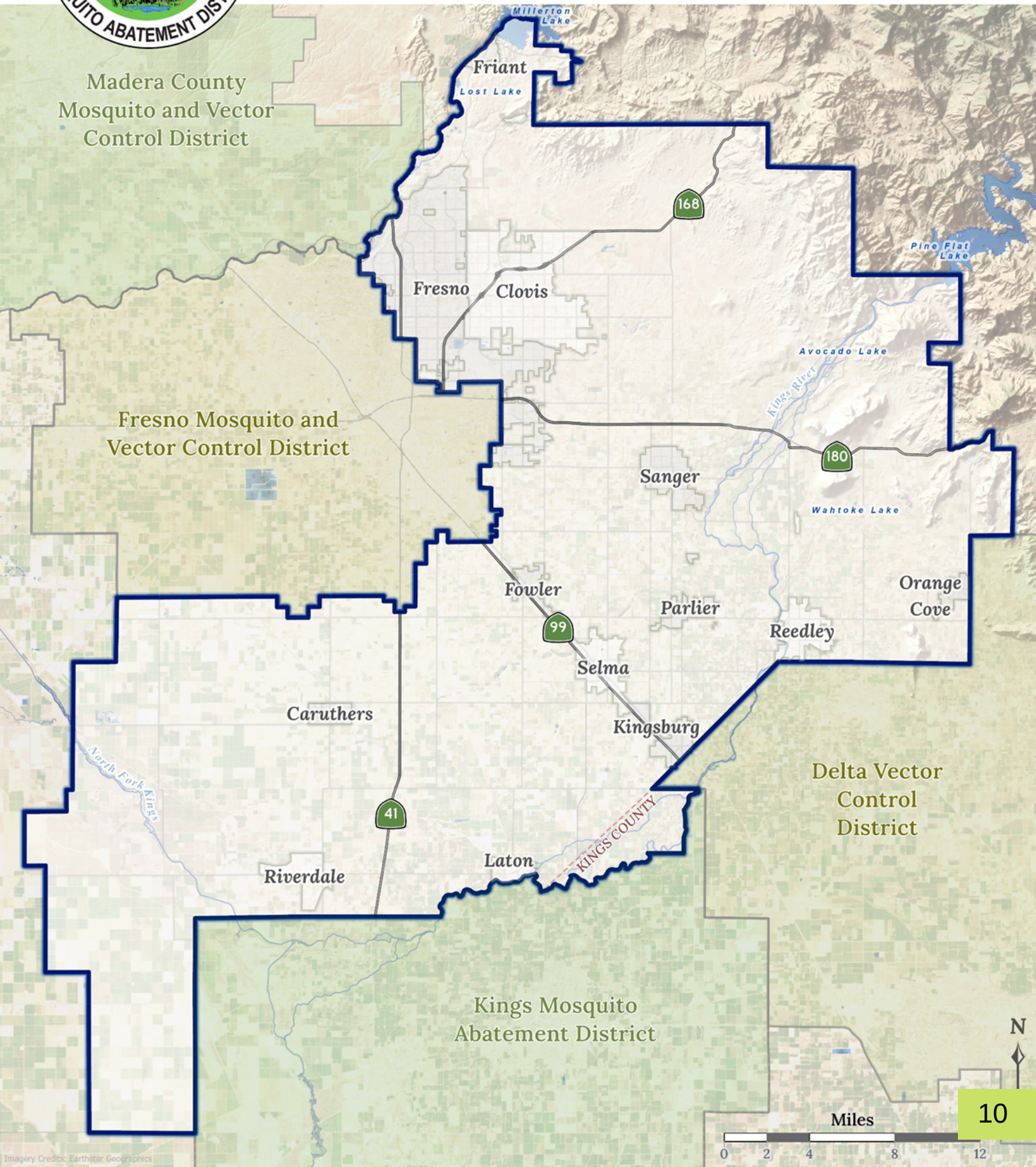
District Boundaries

Madera County
Mosquito and Vector
Control District

Fresno Mosquito and
Vector Control District

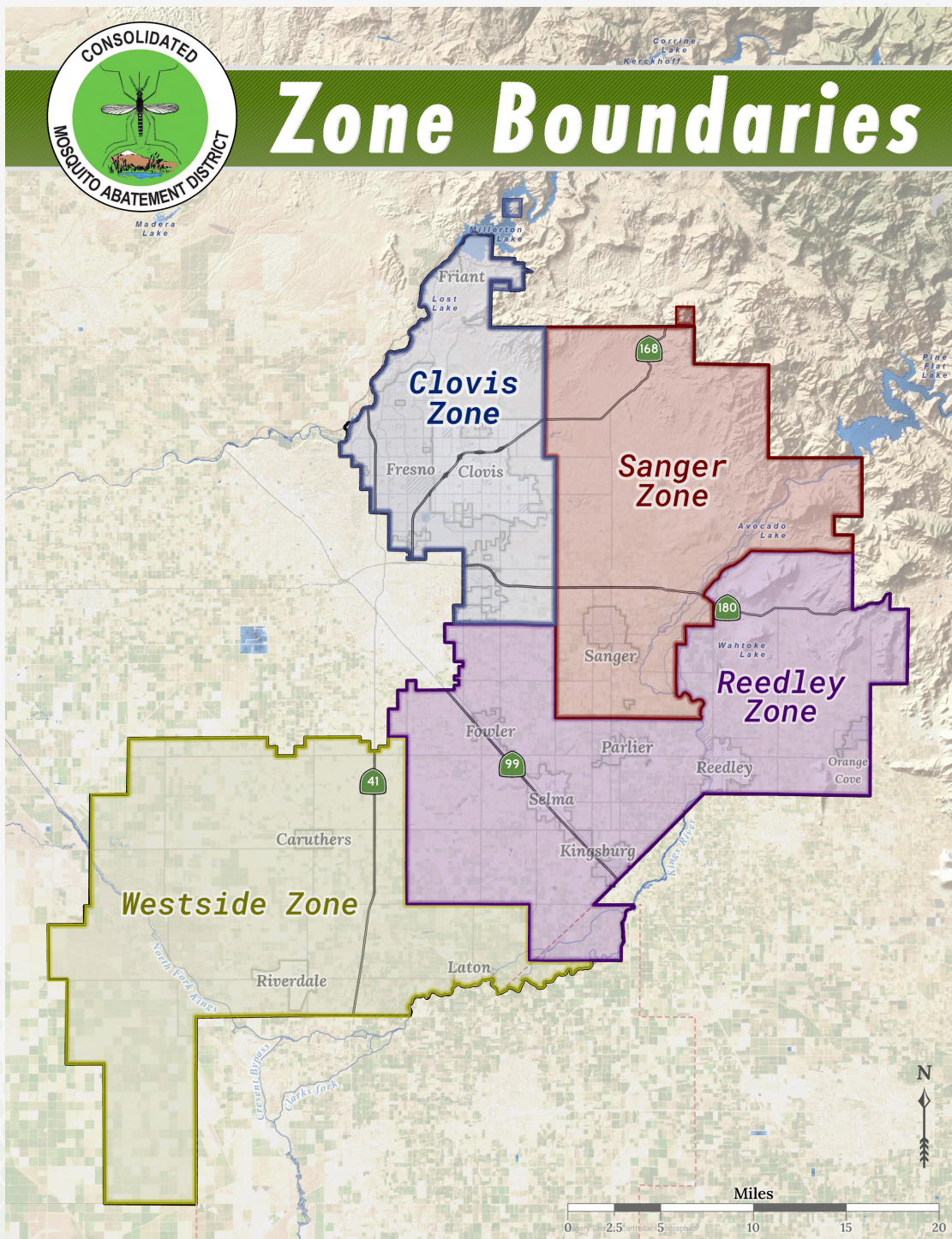
Delta Vector
Control
District

Kings Mosquito
Abatement District



DISTRICT ZONES

The District is divided into four primary work zones. Each zone is supervised by an Area Supervisor that oversees the technicians working in distinct sub-areas within each zone. These sub-areas are referred to as a "priority." Each technician is responsible for certain source types within their priority. This type of source distribution ensures technicians have the proper equipment, product, and support to consistently meet the demands of their area. The District has 31 distinct priorities to organize source types that need to be addressed throughout the District.



MOSQUITO CONTROL

An integrated mosquito management (IMM) approach is emphasized in the District's mosquito control program to ensure that the most appropriate and environmentally sound methods are utilized. This includes incorporating source reduction principles with biological and chemical control methods in the evaluation and treatment of mosquito sources.

The District uses a variety of registered insecticides to control both immature and adult mosquitoes. Pyrethrins, various pyrethroid compounds, and malathion are used as adulticides. Larvicides included the insect developmental inhibitor (IDI), methoprene, and pyriproxyfen; bacterial insecticides, *Bacillus thuringiensis israelensis* (BTI), *B. sphaericus* (BS), and spinosad; and mosquito larvicidal oils, BVA-2 and CocoBear. Methoprene and pyriproxyfen interfere with the development of mosquitoes and normal metamorphosis, and BTI and BS are stomach toxins that specifically target mosquitoes. When used at recommended application rates, these three biorational insecticides can be used in environmentally sensitive habitats. The active ingredients of spinosad, produced by the bacterium *Saccharopolyspora spinosa*, interfere with immature mosquito development by disrupting the nervous system.



Area Supervisor Devon Cornel and Azelis representative Dennis Candito calibrating a ULV fogger.

MOSQUITO CONTROL

TRAINING

“The District is committed to preparing staff for success in the field.”

Training Topics

Policies

Work Day Basics

Field Safety

Resident Communication

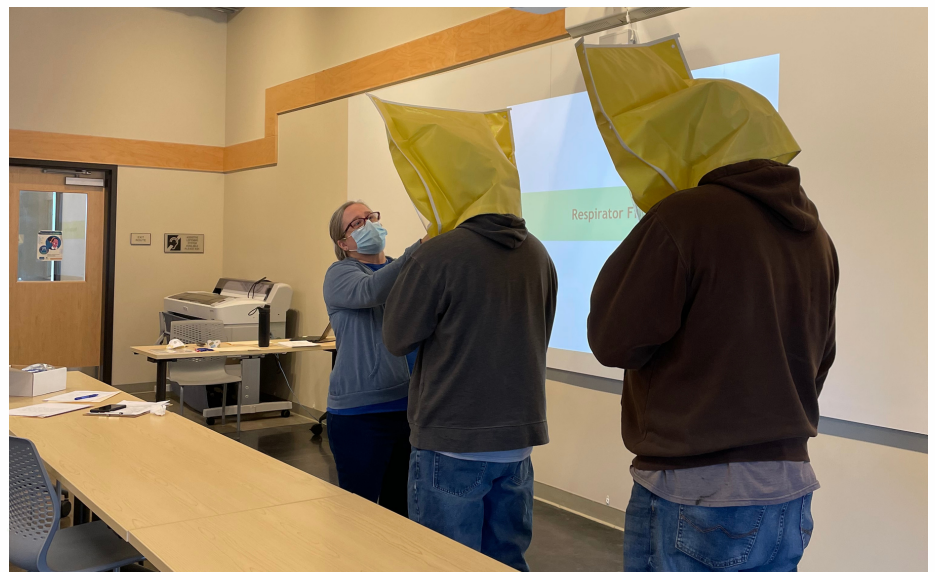
FieldSeeker Use

Mosquito Biology & Control

Pesticide Safety Handling

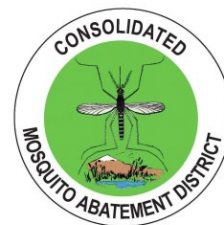
Illness & Injury Prevention

New and returning seasonals attend a two to three-day training workshop to cover a variety of topics that are critical to success in the field. Training was conducted by the Superintendent of Operations, Science Education Coordinator, Vector Biologist, and GIS Coordinator. Training is mandatory for all staff.

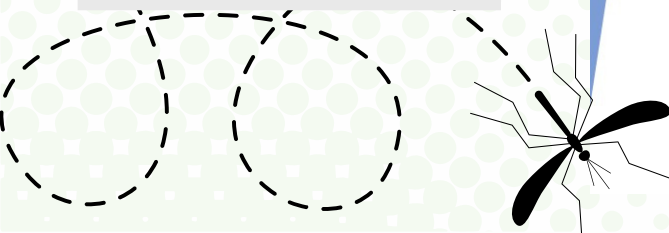


Science Education Coordinator, Katherine Ramirez administering a respiratory fit test to staff.

Welcome!



Consolidated Mosquito Abatement District Training
2022



MOSQUITO CONTROL

OPERATIONS

Activity	Count
First Notice	870
Adulticide Treatment	213
Advisory Notice	8
Assisted	329
Barrier Treatment	70
Final Notice	307
Fish Plant	354
Inspection	26,748
Larvicide Treatment	10,955
No Contact	73
Physical Control	188
Pre-treatment	1,265
Second Notice	751
Seining/Transport	17
Source Removed	6
Spoke to Resident	333
Treat/Fish	118
Verification Complete	319
Voicemail	422
Warrant Assist	154
Warrant Fish Plant	2
Warrant Inspection	109
Warrant Larvicide	139
Warrant Physical Control	1
Warrant Larvicide and Fish	10

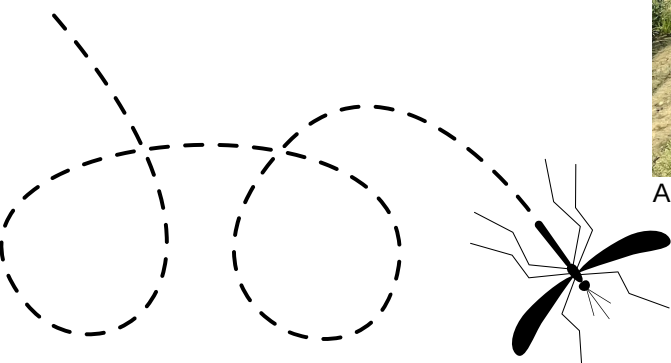
In 2022, 67,268 mosquito control applications were made to mosquito development sites including 7,184 acres of immature and 11,933 acres of adult mosquito treatments. There were also 22 acres stocked with mosquitofish.

The District has 102 miles of gutters mapped throughout the District that hold water for more than 7 days requiring treatment every 14 days.

At the end of 2022, the District had 7,978 active sources (excluding storm drains and utility enclosures) spread across the District requiring ongoing monitoring and/or treatment for mosquito development. The District monitors a variety of source types including but not limited to flood controls, ponds, pastures, canals, orchards, crops, and wastewater ponds.

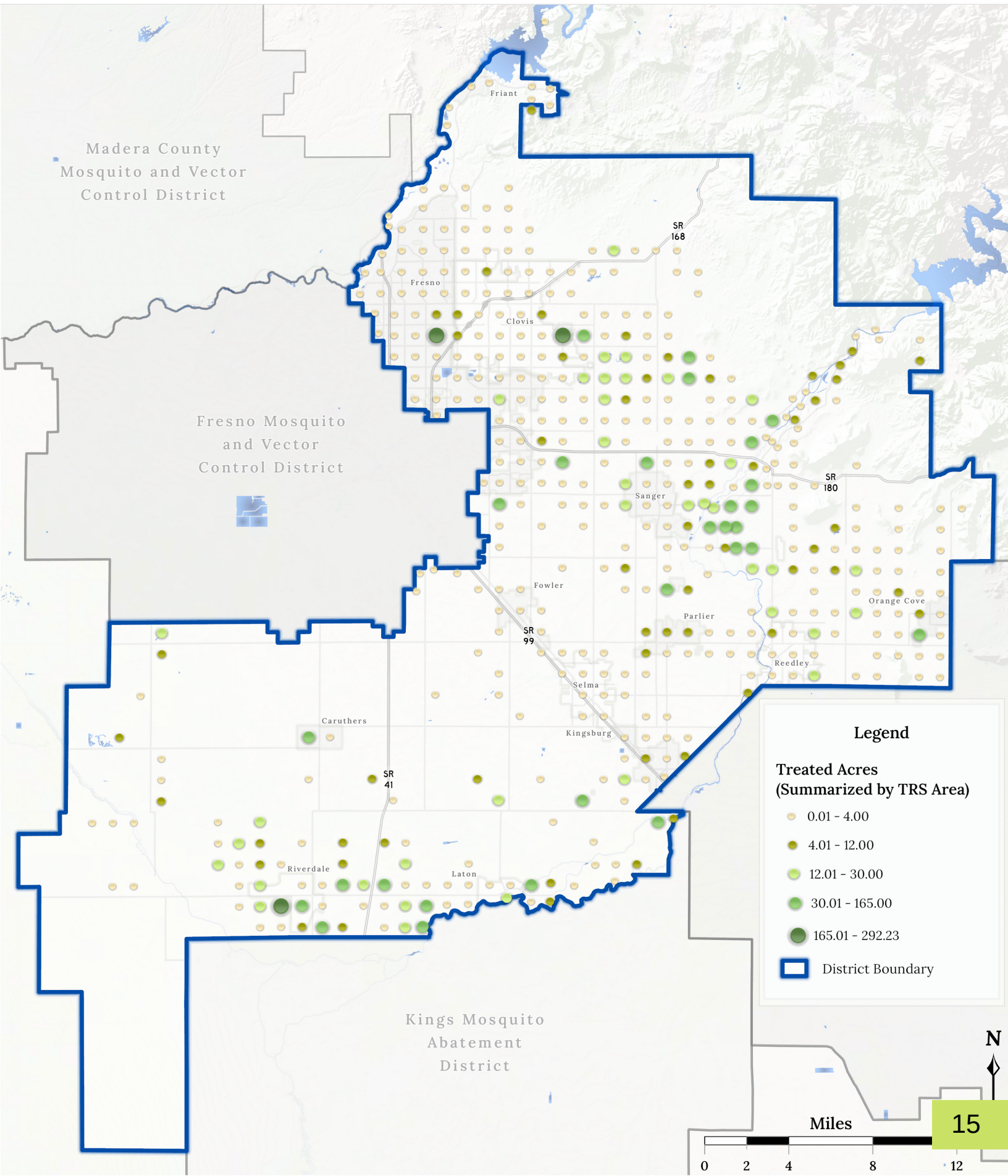


Area Supervisors, Katherine Brisco and Chris Monis inspecting a field.



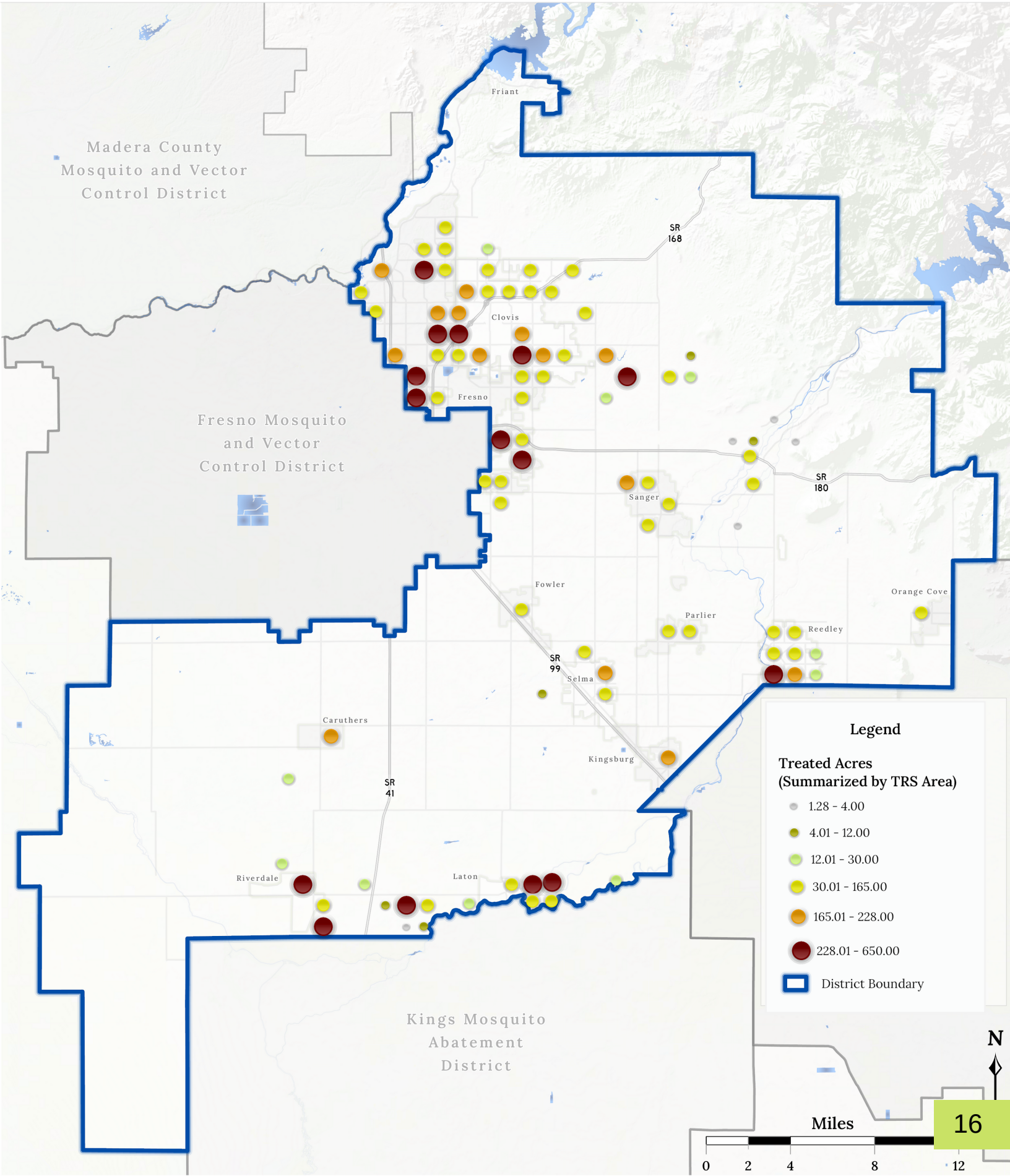
Larvicide Applications

- 2 0 2 2 -



Adult Mosquito Applications

- 2 0 2 2 -



MOSQUITO CONTROL

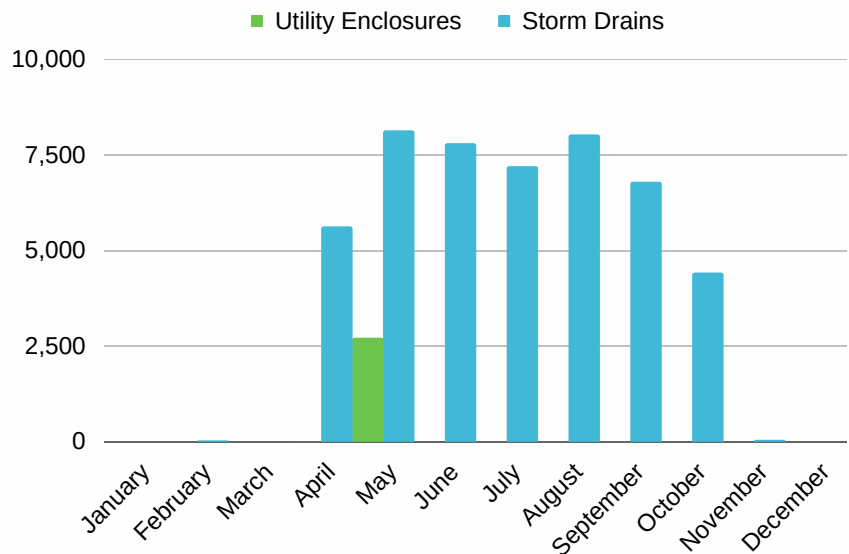
UNDERGROUND

Underground Program

The District routinely treats over 12,000 underground structures/enclosures that hold water and can produce mosquitoes. While the majority of underground sources are located within dense urban areas, these sources can be found throughout the District and include storm drains and utility enclosures. In 2022, the District made 50,653 treatments to storm drains and utility enclosures to prevent mosquito emergence.

Utility Enclosure Program: Underground utility enclosures can be a significant source of mosquito production in residential neighborhoods for both *Culex* species and the invasive *Aedes aegypti*. In 2022, the District collaborated with Pacific Gas and Electric Company (PG&E) to revise and update its treatment program. District staff accompanied by a PG&E technician worked together to access and treat over 2,700 underground utility enclosures within the District's jurisdiction. The District only treats enclosures that hold water in spring or summer months.

2022 Underground treatments by Month



Underground Utility Enclosures

Underground utility enclosures like the one pictured below can fill with rain and sprinkler water providing an ideal habitat for mosquitoes.



Underground utility enclosures filled with water and breeding mosquitoes.

Storm Drains

Storm drains that do not drain properly or become clogged with debris will quickly become a mosquito breeding source.



Storm drain at Woodward Park in Fresno.

MOSQUITO CONTROL

YEARLY COMPARISON

Larvicides	2017	2018	2019	2020	2021	5 YR AVG	2022
IDI Liquid (gals)	4.72	6.71	7.27	0.42	0.00	3.82	0.00
IDI Dry (lbs)	1,664.56	2,220.76	3,465.53	3,177.59	1,806.18	2,466.92	1,933.59
Bacterial Liquid (gals)	724.43	773.50	946.21	220.54	194.45	571.82	242.47
Bacterial Dry (lbs)	19,325.17	13,052.37	17,442.7	14,221.08	13,065.52	15,421.37	12,168.08
Oil (gals)	3,331.53	4,282	5,875.74	3,629.24	2,967.45	4017.29	4,973.27
Adulticide (gal)	2017	2018	2019	2020	2021	5YR AVG	2022
	75.70	77.48	178.36	125.61	32.54	97.94	88.94
Acres Treated	2017	2018	2019	2020	2021	5YR AVG	2022
Adulticide	9,877.23	9,771.89	30,155.25	22,266.04	6,450.99	15,704.28	11,933.56
Larvicide	6982.61	9065.04	10,899.28	4866.57	3608.98	7084.49	4874.05
Fish	59.11	36.94	128	57.46	23.25	60.95	22.77

MOSQUITO CONTROL SWIMMING POOL PROGRAM

In 2022, the District identified 1,321 individual properties with unmaintained swimming pools or spas. Unmaintained swimming pools have been a major habitat for mosquito production in urban and suburban areas since 2008 following the severe downturn in the housing market. Many homes were foreclosed and abandoned or not maintained, with many having swimming pools. Backyard sources are not easy to identify and can be difficult to treat. Mosquitoes that develop in such habitats, specifically *Culex quinquefasciatus* and *Cx. tarsalis* are principal carriers (vectors) of West Nile virus (WN). To help with issues of access, the District has obtained and utilized an area-wide inspection and abatement warrant issued by the Superior Court of Fresno County that allows District personnel to enter private properties to inspect and treat suspected unmaintained swimming pools, water features, and other backyard mosquito sources when owners do not respond to District requests for entry notices. District staff were required to use the inspection warrant at ninety-four properties, or 7% of the total properties requiring a backyard inspection, many of which were vacant properties.

The District has a comprehensive program to address unmaintained swimming pools and gain access for inspection and treatment. Multiple opportunities are provided to residents to work with the District to resolve the concerns around their swimming pool, including in-person inspections or photo verification of a clean, maintained pool.

Due to the difficult nature of identifying unmaintained swimming pools, the District has contracted for aerial photographic surveillance over its cities and larger communities during the summer to identify and locate suspect green pools. The 2022 flyover identified 703 new potential properties with unmaintained swimming pools or spas that were either unknown or previously identified as clean or dry in our system.



Consolidated Mosquito Abatement District
13151 E. Industrial Drive
Parlier, CA 93648

Date/Time: _____ Technician: _____
ID Number: _____ Action Required Within: **5 days**

We are trying to reach you in order to confirm the condition of your swimming pool or other source (see below). We need to verify that mosquitoes are not developing on your property.

- Swimming pool/Spa Miscellaneous Containers
 Fish Pond/Fountain Other: _____

FOR CLEAN OR DRY SWIMMING POOLS AND SPAS ONLY:
Swimming pools are some of the most common breeding sites for mosquitoes in suburban neighborhoods. The District needs to confirm that the condition of your pool will not allow mosquitoes to grow.

Choose one of three ways to confirm:

1. Text us a photo: (559) 217-7901
2. Email us a photo: swimmingpool@mosquitobuzz.net
3. Schedule an inspection: Call (559) 896-1085. A Mosquito Control Technician can come out to the property for a visual confirmation.

Take a photo of your swimming pool with this notice in the foreground. See example on the right.



This notice MUST be in the SAME photo as the pool.

DO NOT WAIT: If repairs are needed to comply, call the District immediately to confirm receipt of this notice and provide an estimated time for completion.

See below for a description of acceptable conditions.

Clean and Functional



A **Clean and Functional** pool has a working pump and filtration system, and a regular chemical treatment schedule. Water must be clear, with little to no algae or debris.
A clean and functional pool is the **BEST** way to stay mosquito-free.

Empty and Dry*



An **Empty and Dry** pool is completely empty and free of debris. Mosquitoes will continue to lay eggs and grow throughout our mild winters so the pool will need to be emptied between rains. Standing water should not be left for more than four days. Empty pools need regular maintenance to stay mosquito-free and will require multiple inspections throughout the year.

Mosquito Fish



Mosquito Fish offer year round mosquito control in non-functional pools.
The District will provide mosquito fish and delivery free of charge. Not all pools are eligible.

Visit www.mosquitobuzz.net for a full description of our program

*Swimming pools without water are prone to costly structural damage. The District in no way recommends that anyone empty their pool and encourages residents to research the negative impact of removing the water before doing so.

Swimming pool first notice.

1,848 Notices left at properties for a swimming pool or spa inspection.

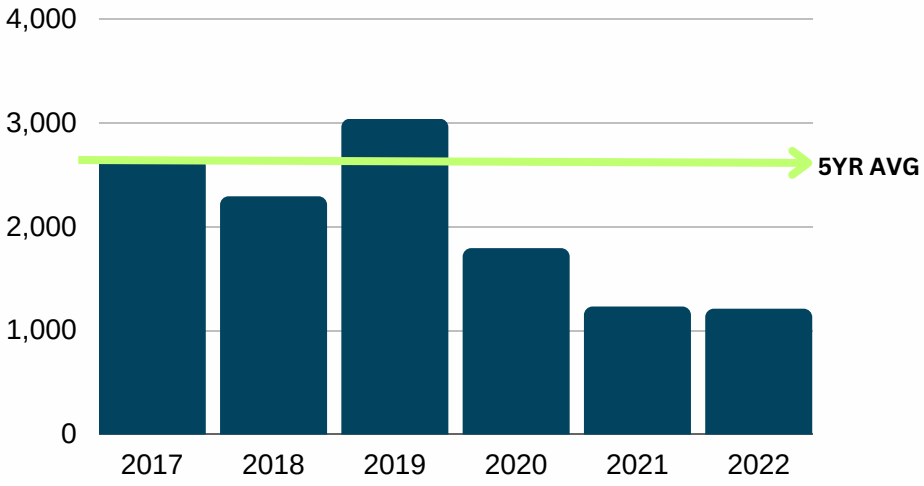


319 texts and/or emails sent in to verify the condition of a swimming pool or spa

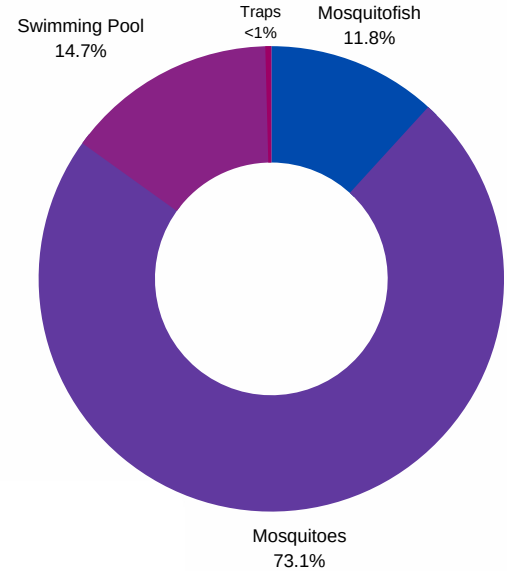
REQUESTS FOR SERVICE

District clerical staff responded to 1,206 telephone and website requests for service from the public. Residents, businesses, property managers, and schools routinely call in to request service. The District strives for a 48hr response time to site visits or follow-up calls to schedule a site visit. Requests are tracked and recorded throughout the year and grouped into four broad categories; swimming pool, mosquitofish, mosquito, and traps. Service requests have trended down over the past three years. The vast majority of service requests the District receives are reports of high numbers of biting mosquitoes.

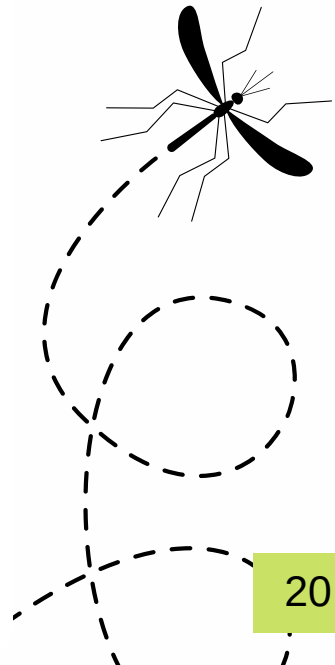
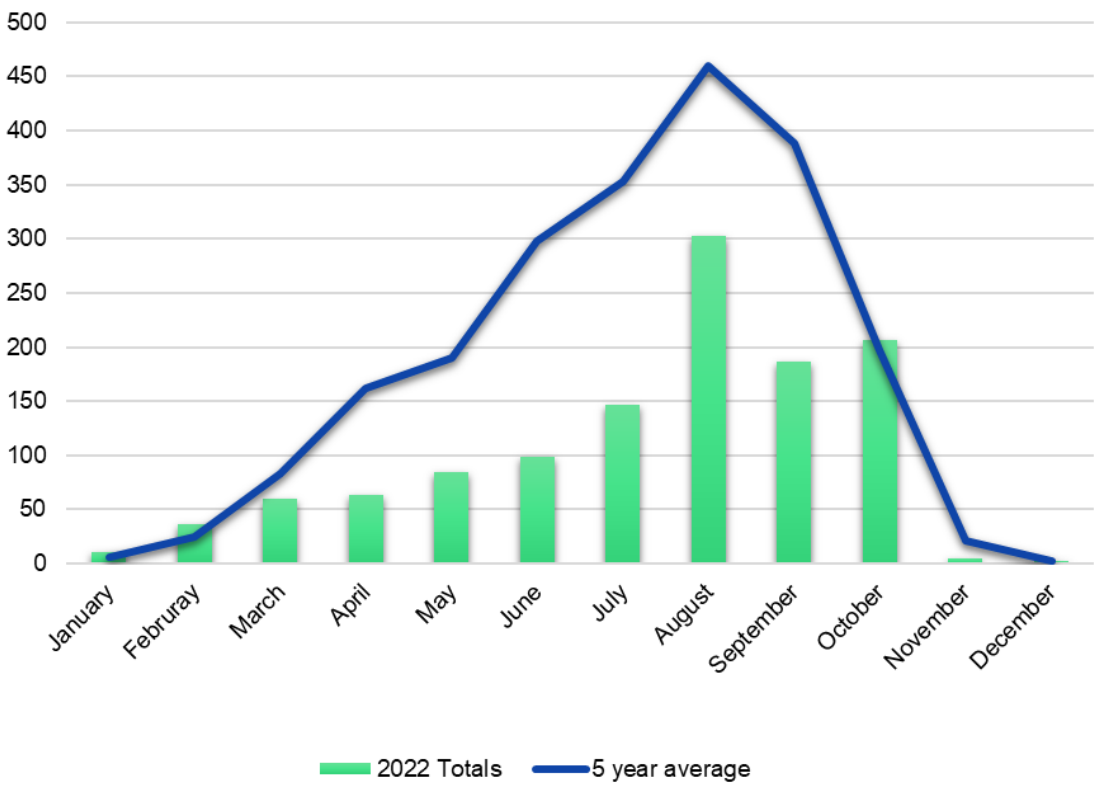
Service Requests 2017-2022 with 5YR AVG



2022 Service Request Type

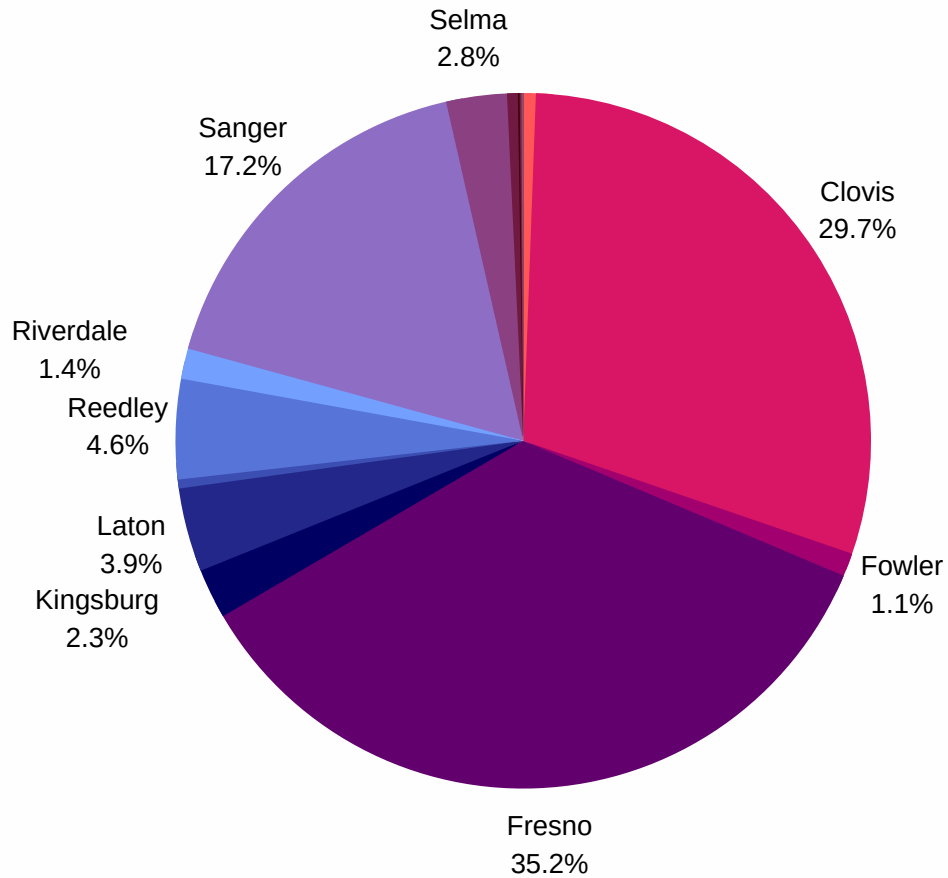


2022 Service Requests per Month



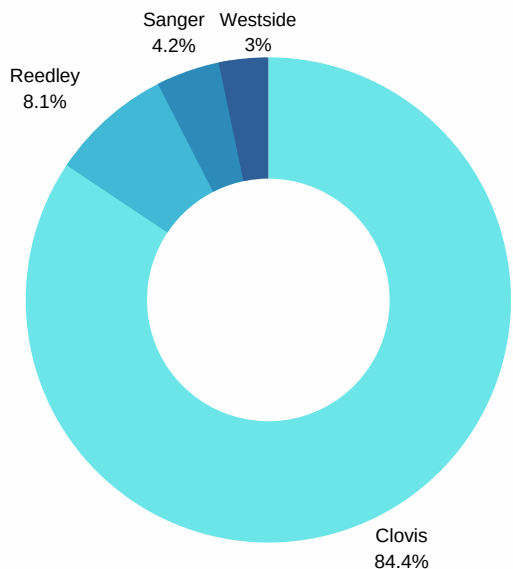
REQUESTS FOR SERVICE

The majority of requests for service (64%) come from the cities of Fresno and Clovis, our most populated urban residential cities.

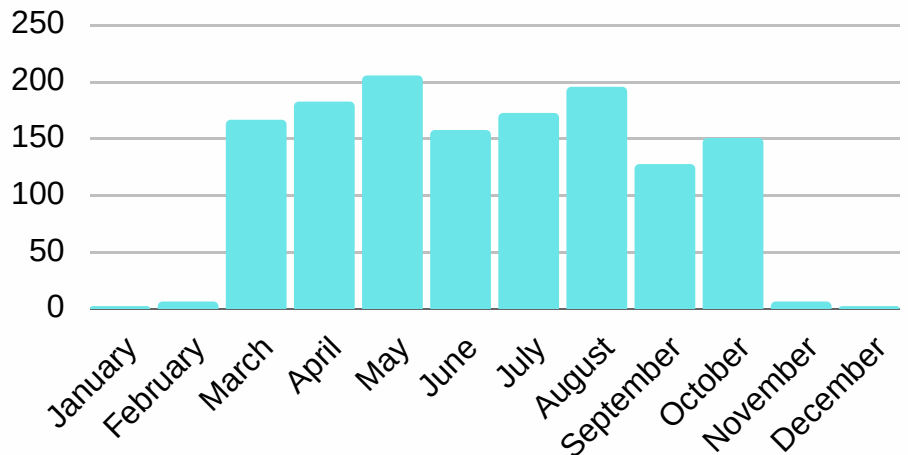


Service requests can be accommodated by the scheduling of an appointment for a specific date and time to conduct an inspection. The majority of appointments are scheduled in urban residential areas; however, some residents give anytime-access to inspect their property and do not require an appointment.

2022 Appointments by Zone



2022 Inspection Appointments Scheduled



SURVEILLANCE

ADULT MOSQUITOES

The District has an active adult mosquito surveillance program investigating mosquito populations. Surveillance traps are used to monitor mosquitoes in areas with suspected virus transmission, as requested by staff, and from fixed and random site trapping.

The surveillance traps used throughout the District in 2022 were the encephalitis virus surveillance (EVS) trap, the gravid (GRVD) trap, and the BG-Sentinel (BGS) trap. These traps target adult female mosquitoes at different stages. The EVS and BGS traps collect host-seeking female mosquitoes, while the GRVD trap collects older females, which have been blood-fed and are ready to lay eggs.



Biogents Sentinel (BGS)

Biogents sentinel traps are designed to attract and collect host-seeking and gravid adult female mosquitoes.



Encephalitis Virus Surveillance (EVS)

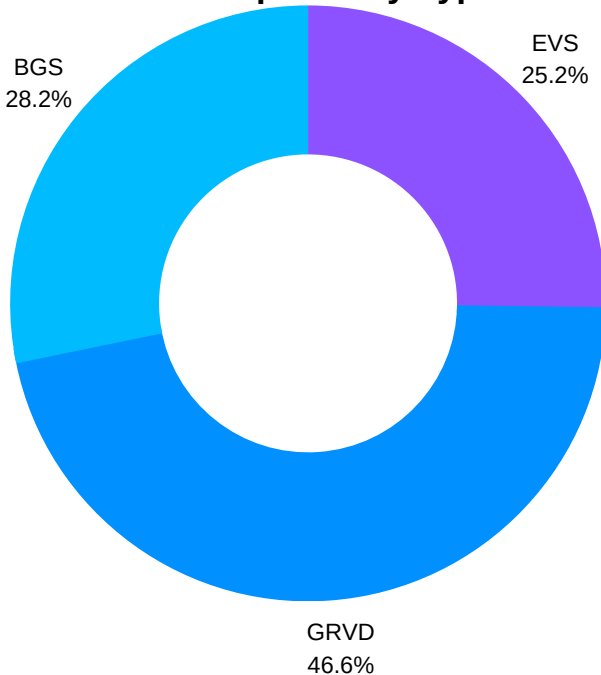
EVS traps are designed to attract and collect host-seeking female mosquitoes.



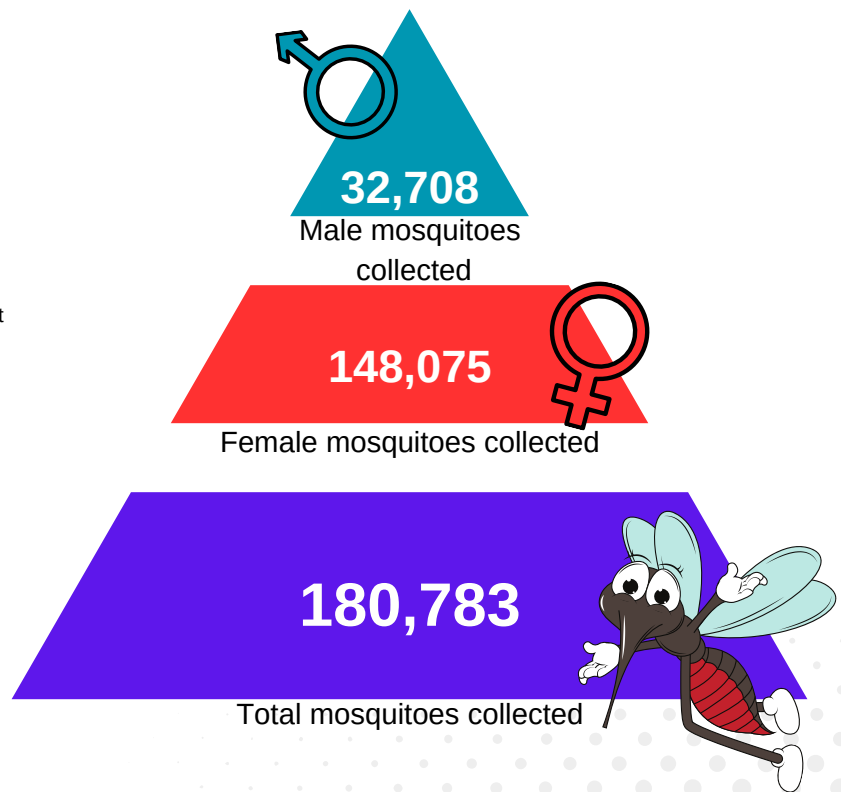
Gravid (GRVD)

Gravid traps are designed to attract and collect gravid adult female mosquitoes.

2022 Traps set by Type



2022 Mosquitoes Collected

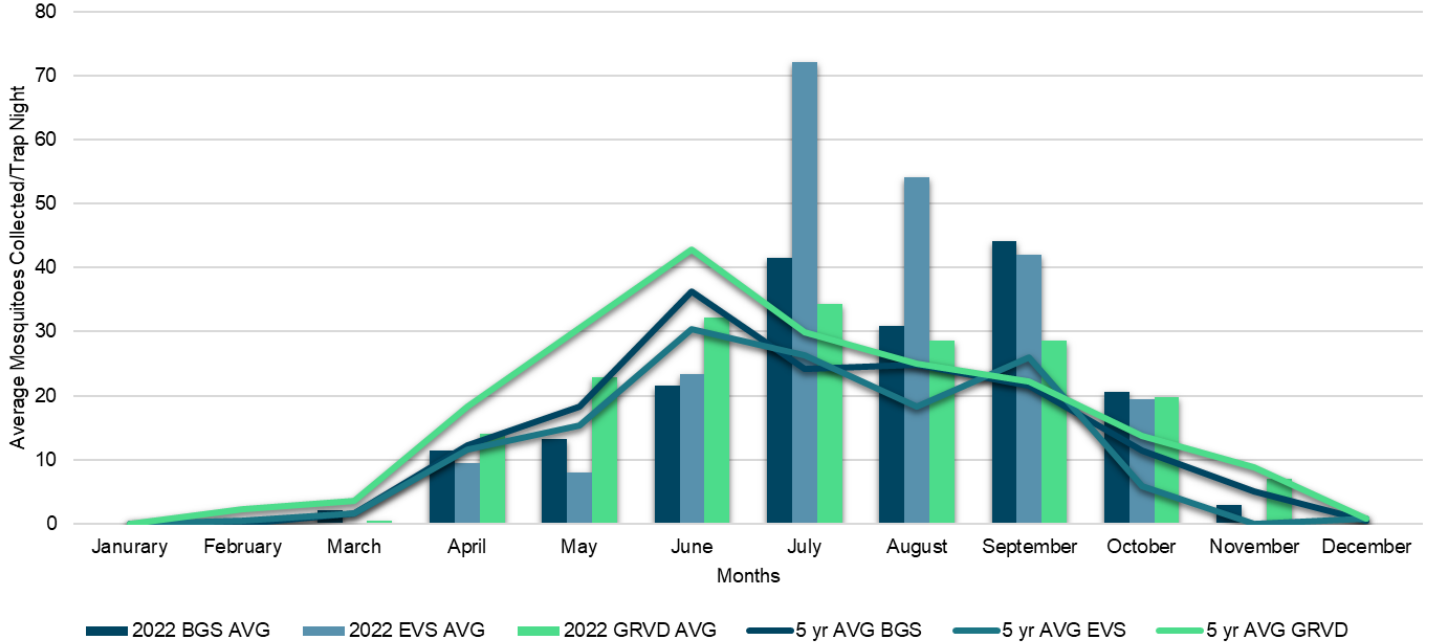


Surveillance Assistant, Bai Thao bringing traps in from the field.

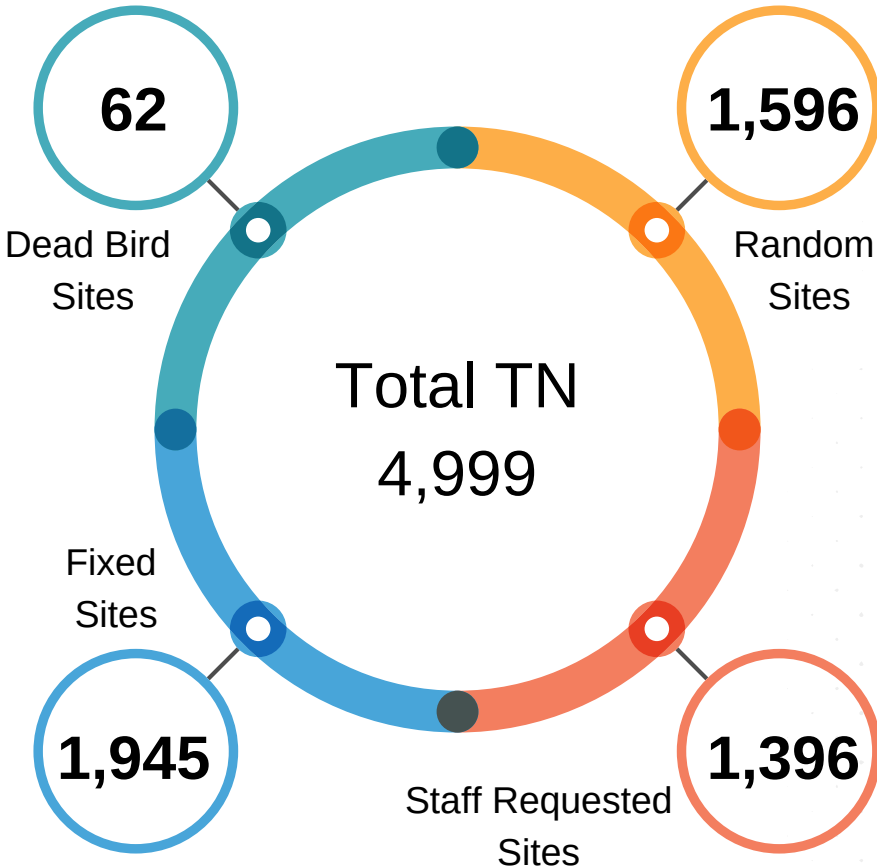
SURVEILLANCE

ADULT MOSQUITOES

2022 Adult Mosquito Collections by Trap Type



2022 Trap Nights (TN) by Site Type

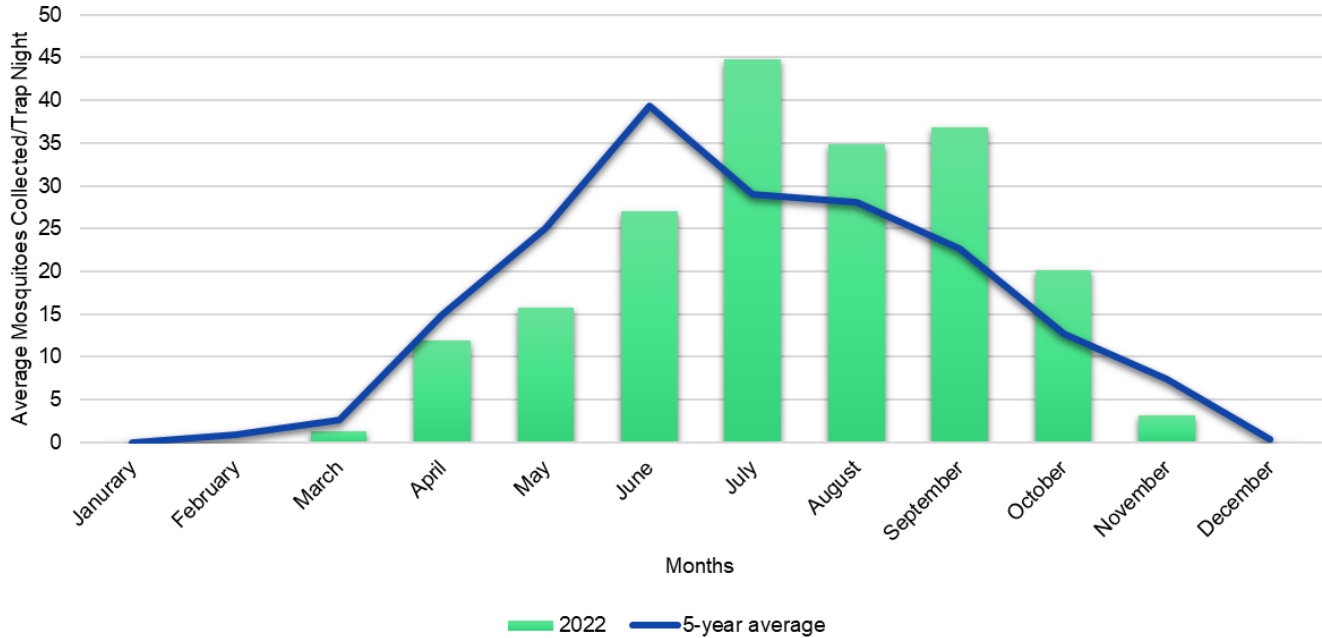


Associate Biologist, Jovana Benavides identifying mosquitoes in the laboratory.

SURVEILLANCE

ADULT MOSQUITOES

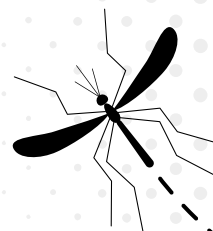
2022 Adult Mosquito Collections by Month



Species	Males Collected	Females Collected
<i>Culex quinquefasciatus</i>	17,212	97,798
<i>Culex tarsalis</i>	2,185	23,713
<i>Aedes aegypti</i>	10,360	14,604
<i>Culex stigmatosoma</i>	2,859	9,995
<i>Aedes vexans</i>	4	509
<i>Aedes nigromaculis</i>	2	466
<i>Anopheles freeborni</i>	69	437
<i>Culex erythrothorax</i>	1	117
<i>Culiseta particeps</i>	4	112
<i>Aedes melanimon</i>	0	98
<i>Culiseta inornata</i>	7	82
<i>Anopheles franciscanus</i>	2	36
<i>Culiseta incidens</i>	0	30
<i>Culex restuans</i>	1	29
<i>Culex thriambus</i>	0	18
<i>Aedes washinoi</i>	0	16
<i>Aedes sierrensis</i>	1	7
<i>Anopheles punctipennis</i>	1	7

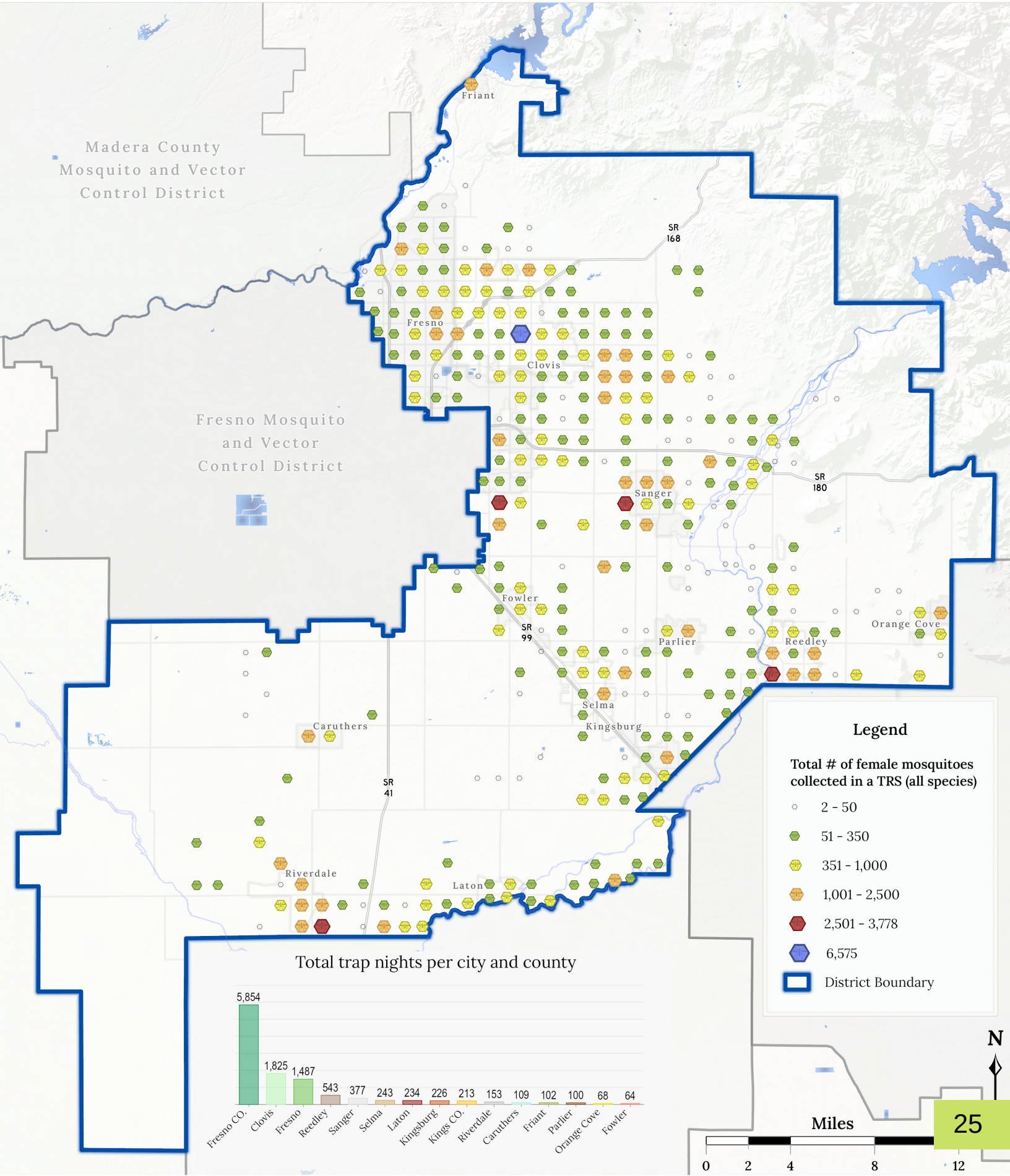


Mosquitoes collected in 2022, minus mosquitoes sent in for disease testing.



Mosquito Abundance Distribution

- 2 0 2 2 -

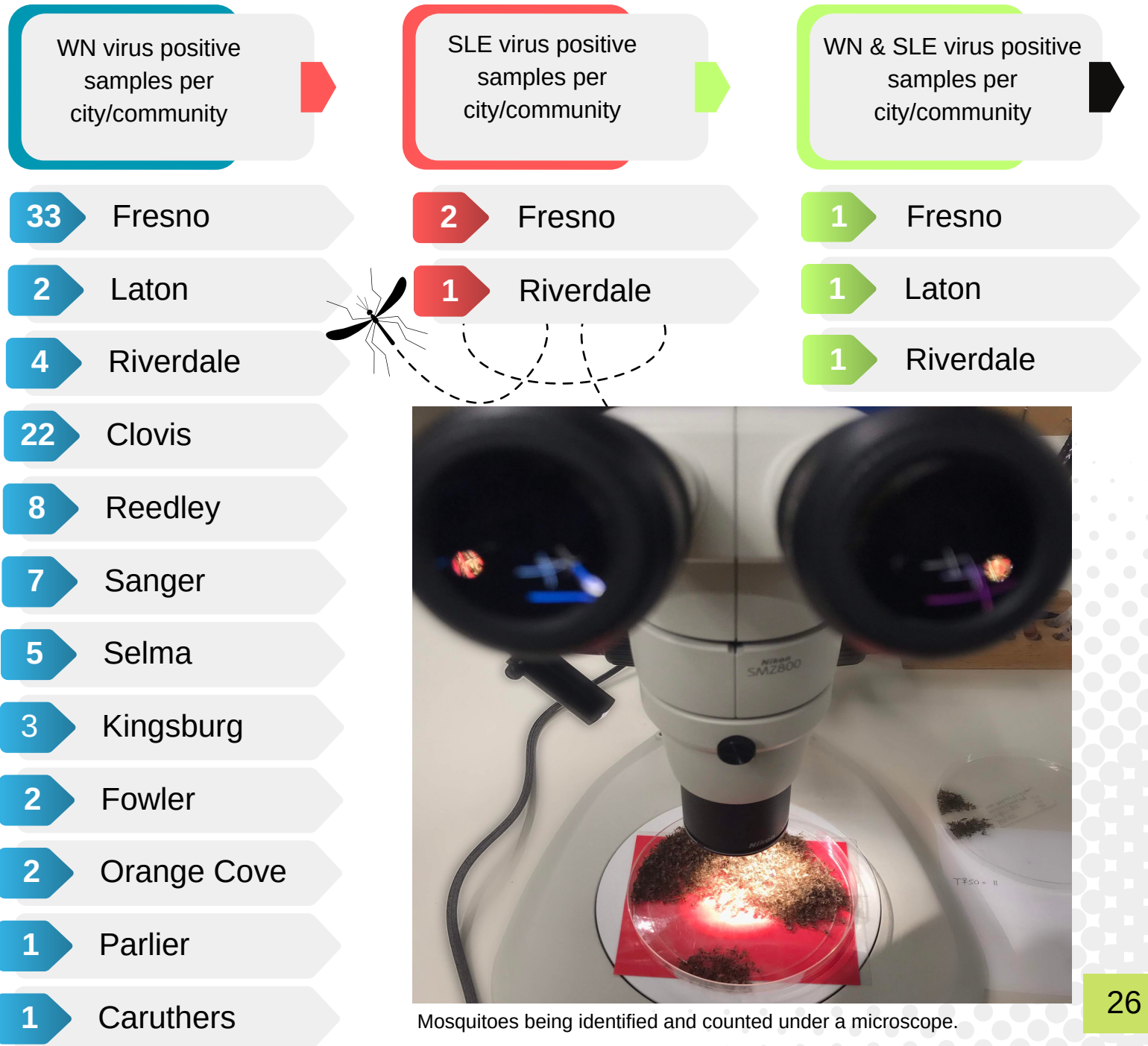


SURVEILLANCE

ARBOVIRUS ACTIVITY

The District participates in a statewide system to monitor for the presence of West Nile virus (WN) and other mosquito-borne viruses, such as St. Louis encephalitis (SLE), and Western equine encephalitis (WEE). This statewide system monitors mosquito-borne viruses in populations of humans, birds, chickens, horses, and mosquitoes. The District focuses on monitoring the mosquito population by submitting samples* of adult female mosquitoes to the Davis Arbovirus Research and Training (DART) laboratory at the University of California, Davis. Submitted samples are tested for the presence of these viruses. A total of 396 (4,280 female) mosquito samples were submitted for testing.

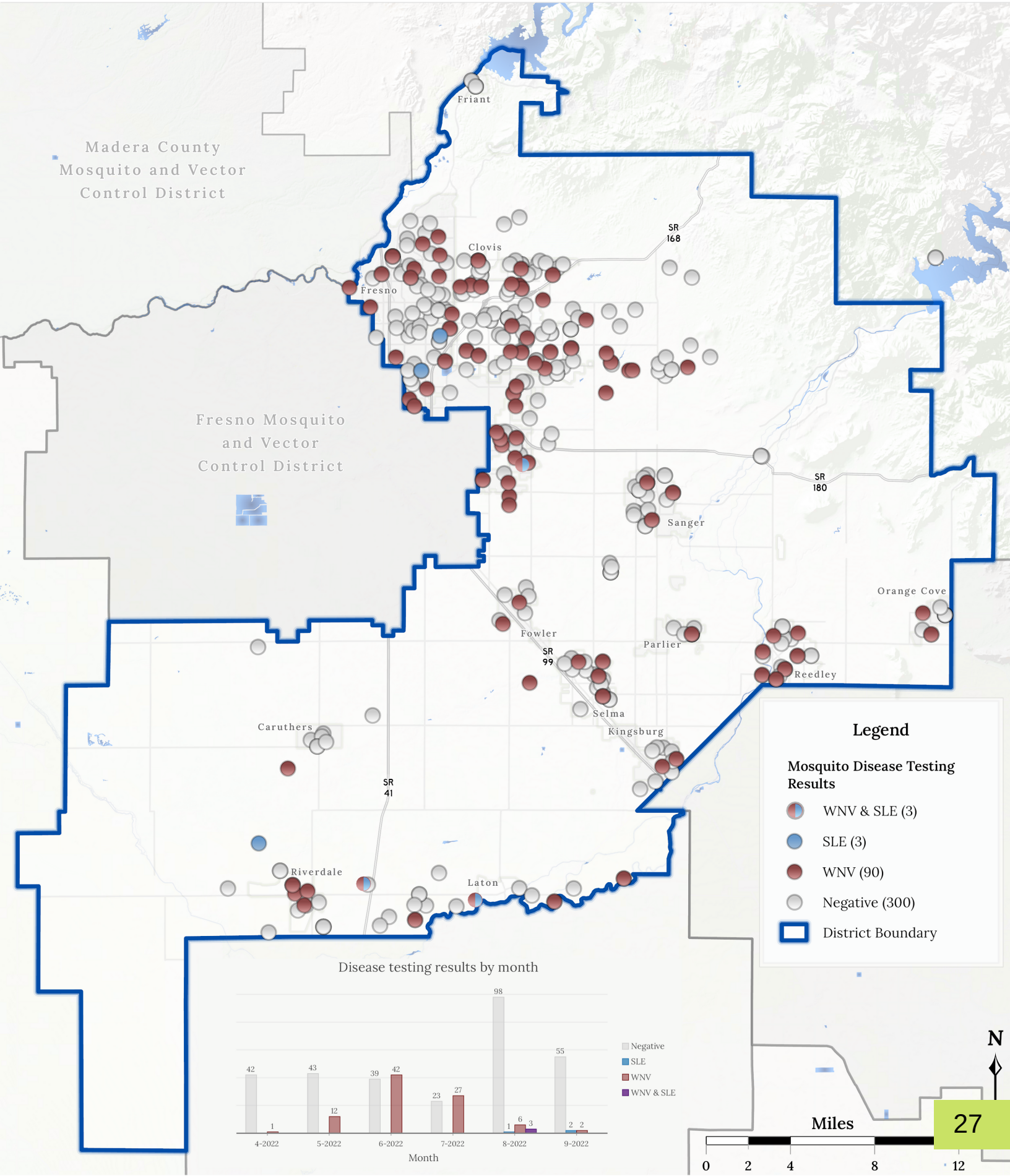
*A sample is 12-50 female mosquitoes of the same species collected from a single trap type in a single night submitted.



Mosquitoes being identified and counted under a microscope.

Mosquito Disease Testing

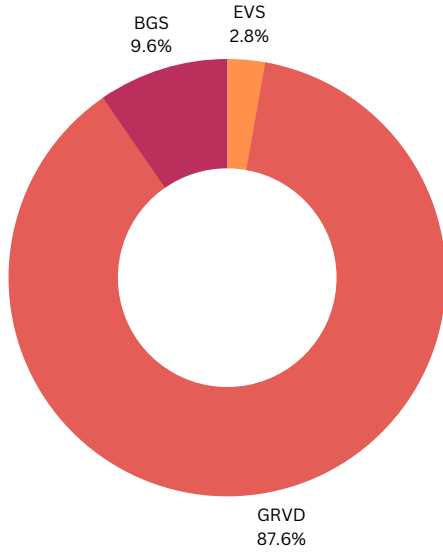
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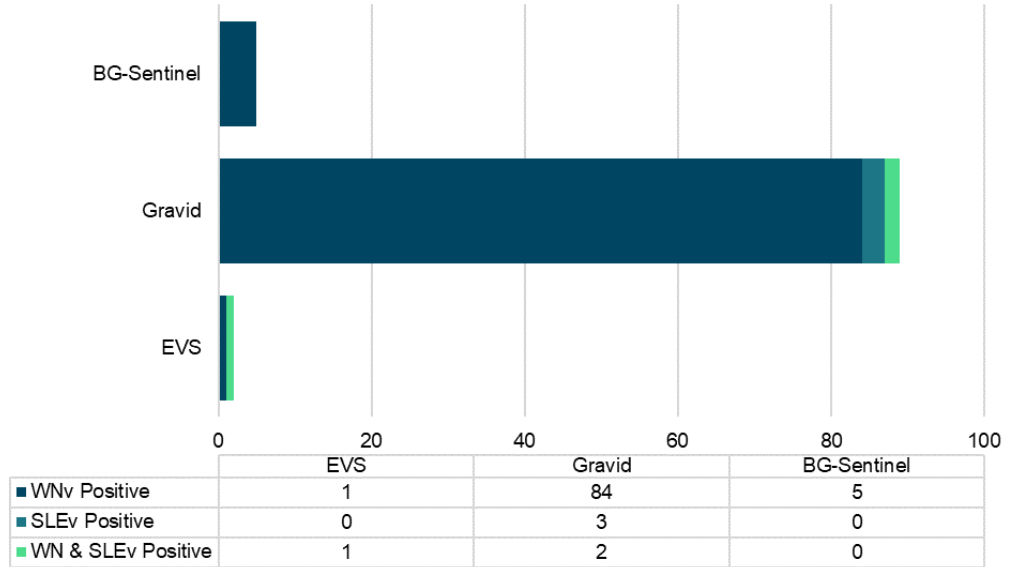
SURVEILLANCE

ARBOVIRUS ACTIVITY

2022 Samples Submitted by Trap Type



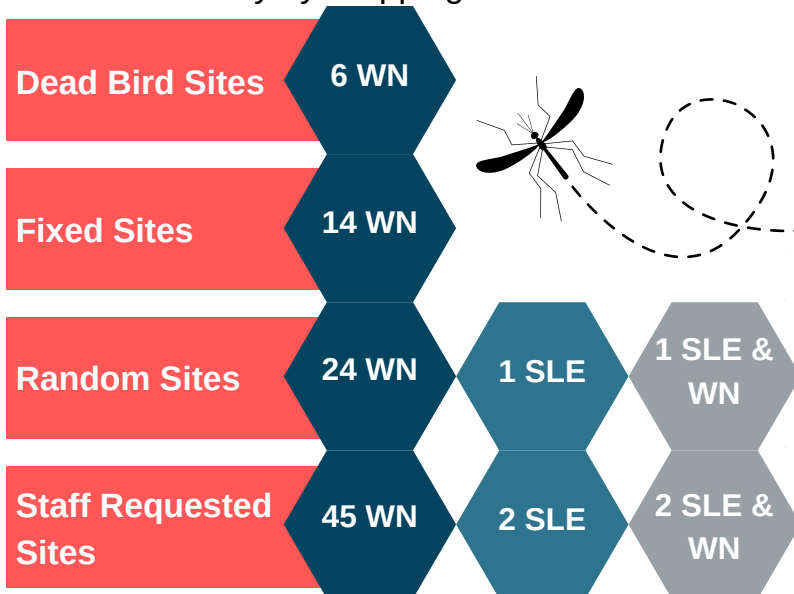
Arbovirus Positive Samples by Trap Type



Arbovirus Activity in the District, county, and state.

	District	County	State
Human (Fatalities)	3 (1) WN	31 (3) WN 1 SLE	170 (12) WN 11 SLE
Birds	N/A	2 WN	186 WN
Mosquitoes	93 WN 6 SLE	296 WN 14 SLE	3,165 WN 153 SLE
Sentinel Chickens	N/A	N/A	145 WN
Horses	0	0	16 WN

Arbovirus Activity by Trapping Sites



Culiseta mosquito taking a blood meal.

OUTREACH & EDUCATION

PUBLIC AWARENESS

The District has an active in-person and virtual public information program that informs residents about mosquito development prevention and mosquito bite protection. Information is provided to the community at local health fairs, festivals, parades, and small group in-person and virtual presentations. Organizations, schools and businesses can request a presentation or staff to attend educational events.

District staff participated in eleven in-person outreach events throughout the community and six small group education presentations; three in-person and three virtual.



Science Education Coordinator, Katherine Ramirez educating residents at the National Night Out in Sanger.



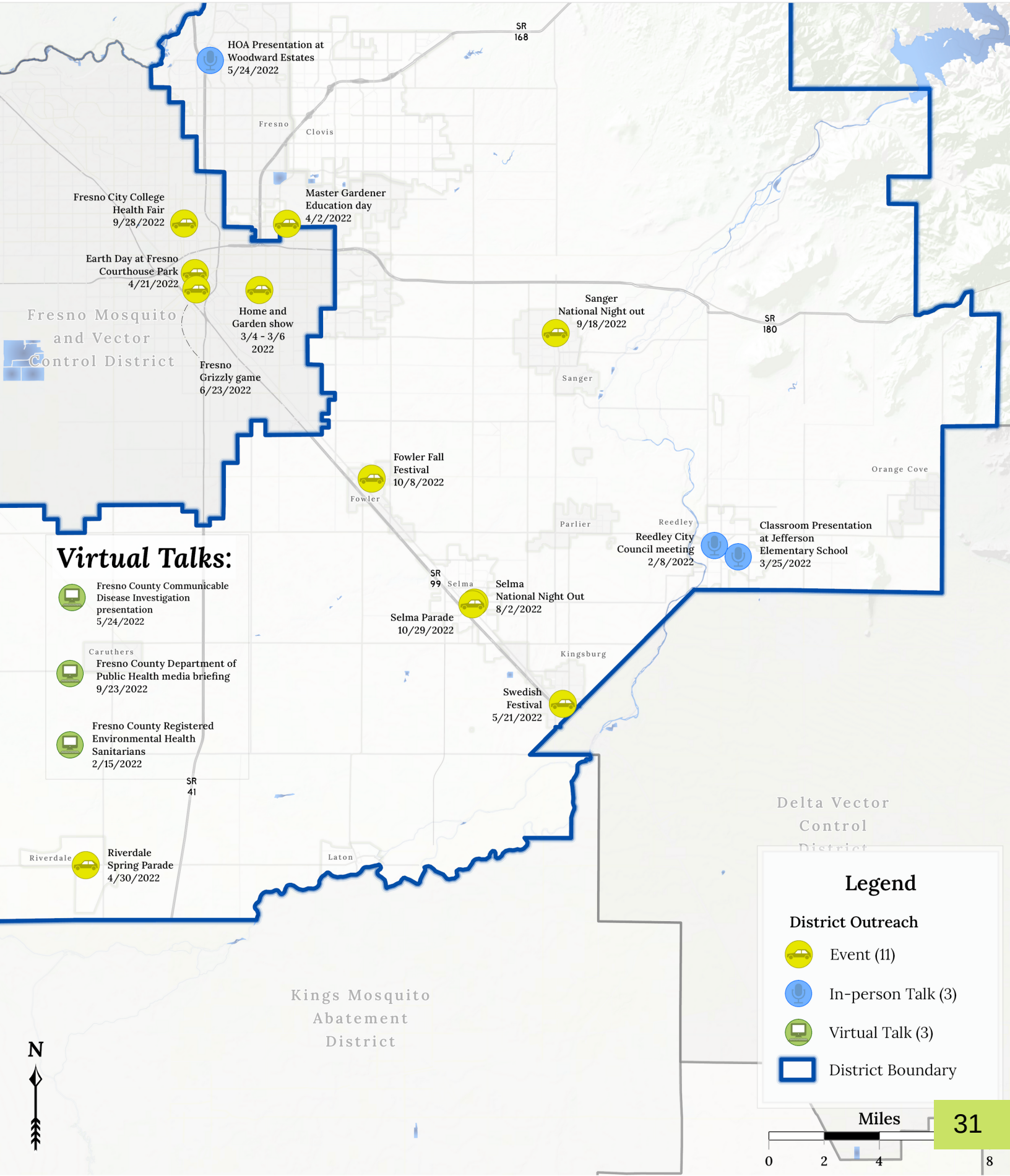
Area Supervisor, Devon Cornel working the Home and Garden Show.



Area Supervisor, Chris Monis working the Fowler parade.

Outreach Events & Presentations

- 2 0 2 2 -



HOA Presentation at Woodward Estates
5/24/2022

Fresno Clovis

Fresno City College Health Fair
9/28/2022

Master Gardener Education day
4/2/2022

Earth Day at Fresno Courthouse Park
4/21/2022

Home and Garden show
3/4 - 3/6 2022

Fresno Grizzly game
6/23/2022

Fresno Mosquito and Vector Control District

Sanger National Night out
9/18/2022

Fowler Fall Festival
10/8/2022

Reedley City Council meeting
2/8/2022

Classroom Presentation at Jefferson Elementary School
3/25/2022

Virtual Talks:

-  Fresno County Communicable Disease Investigation presentation
5/24/2022
-  Caruthers Fresno County Department of Public Health media briefing
9/23/2022
-  Fresno County Registered Environmental Health Sanitarians
2/15/2022

Selma Parade
10/29/2022

Selma National Night Out
8/2/2022





Swedish Festival
5/21/2022

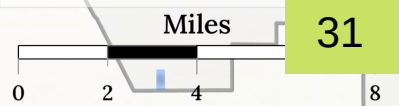
Riverdale Spring Parade
4/30/2022

Kings Mosquito Abatement District

Delta Vector Control District

Legend

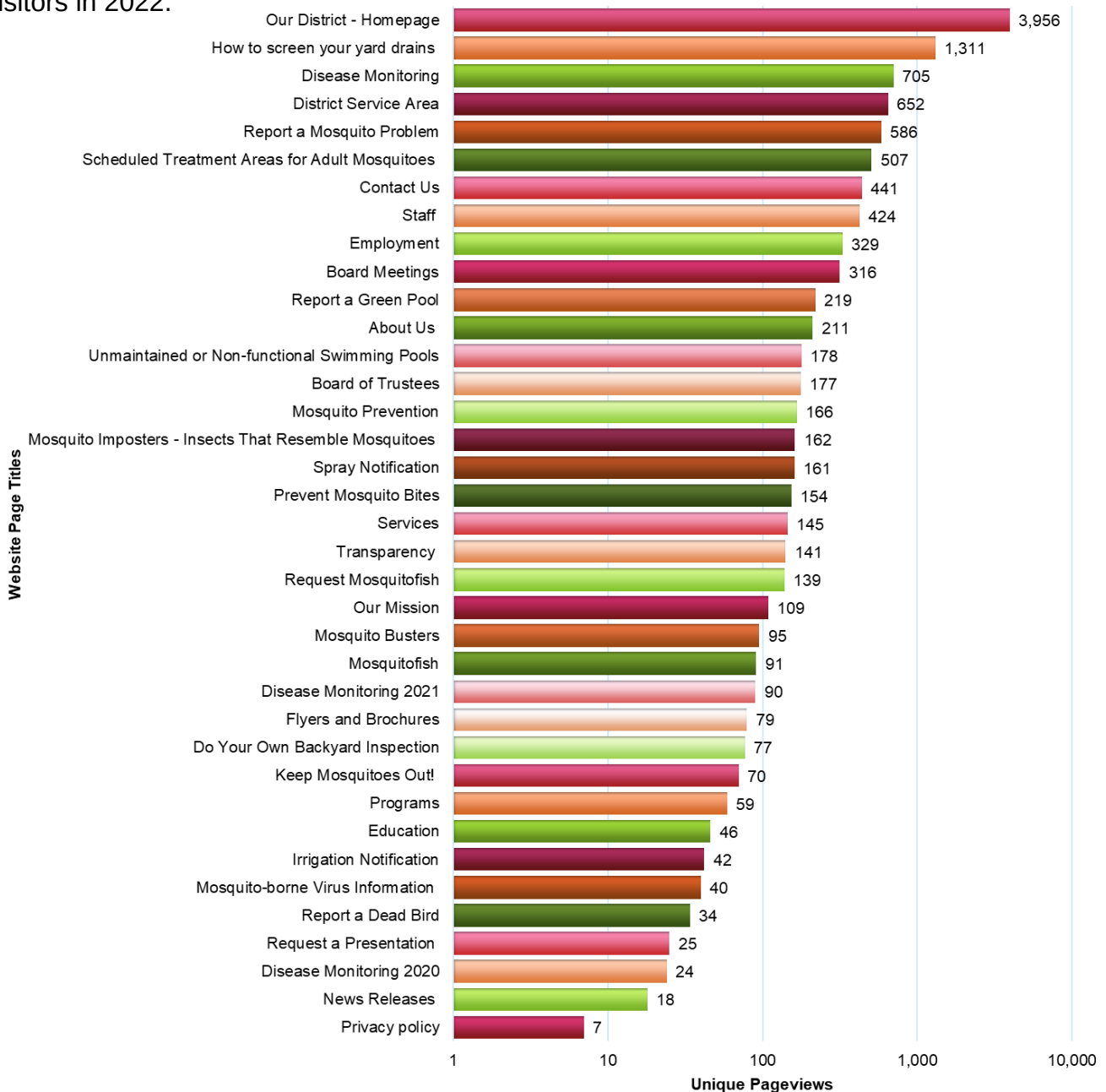
- District Outreach**
-  Event (11)
-  In-person Talk (3)
-  Virtual Talk (3)
-  District Boundary



OUTREACH & EDUCATION

WEBSITE

The District's website, www.mosquitobuzz.net, has served to make the District more accessible and broaden our outreach and education to residents for over a decade. It provides the public with access to information on board meeting schedules, agendas, scheduled treatment areas for adult mosquitoes, source reduction, WN and SLE virus activity in the District, and educational tools, such as the Mosquito Busters interactive learning tool. Overall usage of the website was steady, with 7,105 visitors in 2022.



A unique pageview is a session during which a specified page is viewed at least once. Using this metric allows District staff to get an idea of what is most interesting to website users and allow staff to improve the website users' experience. There were 11,986 total unique pageviews in 2022.

OUTREACH & EDUCATION

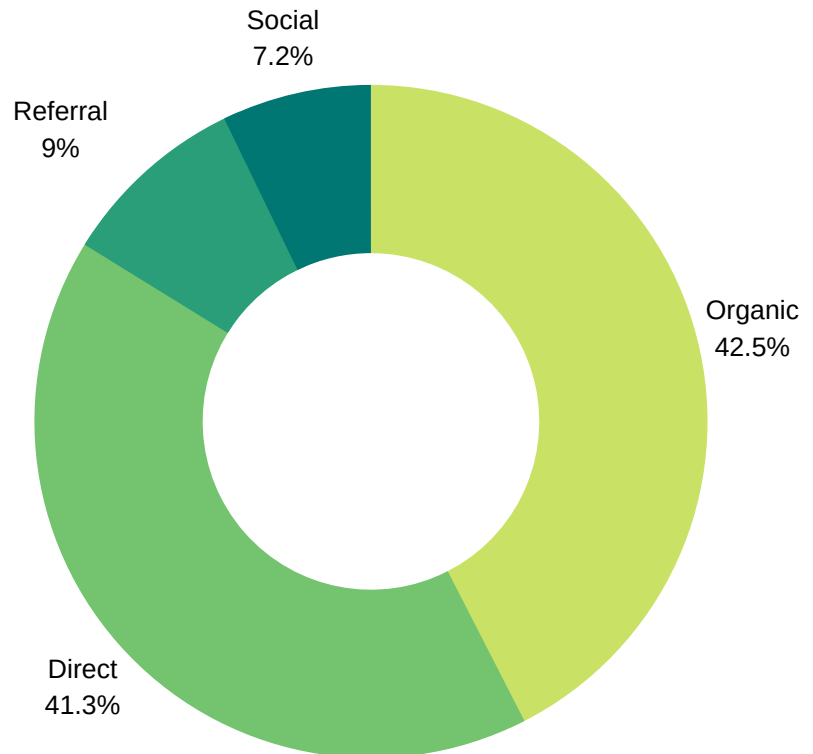
WEBSITE

User acquisition is the act of gaining website users. Users can visit the website in several ways, such as by clicking a link on a social media post or using a search engine. This metric allows District staff to see which channel most users are coming from and could increase users when targeting that channel. The channels used in this metric are; organic search, visitors who come to the website through a search engine; direct, visitors who come to the website without a traceable referral source such as typing the URL into an address bar or using a bookmark on the browser; referral, visitors who come to the website from other websites that link directly to our site; and social, visitors who come to the website from a social platform. In 2022, 6,265 users came to our website from one of these four channels.



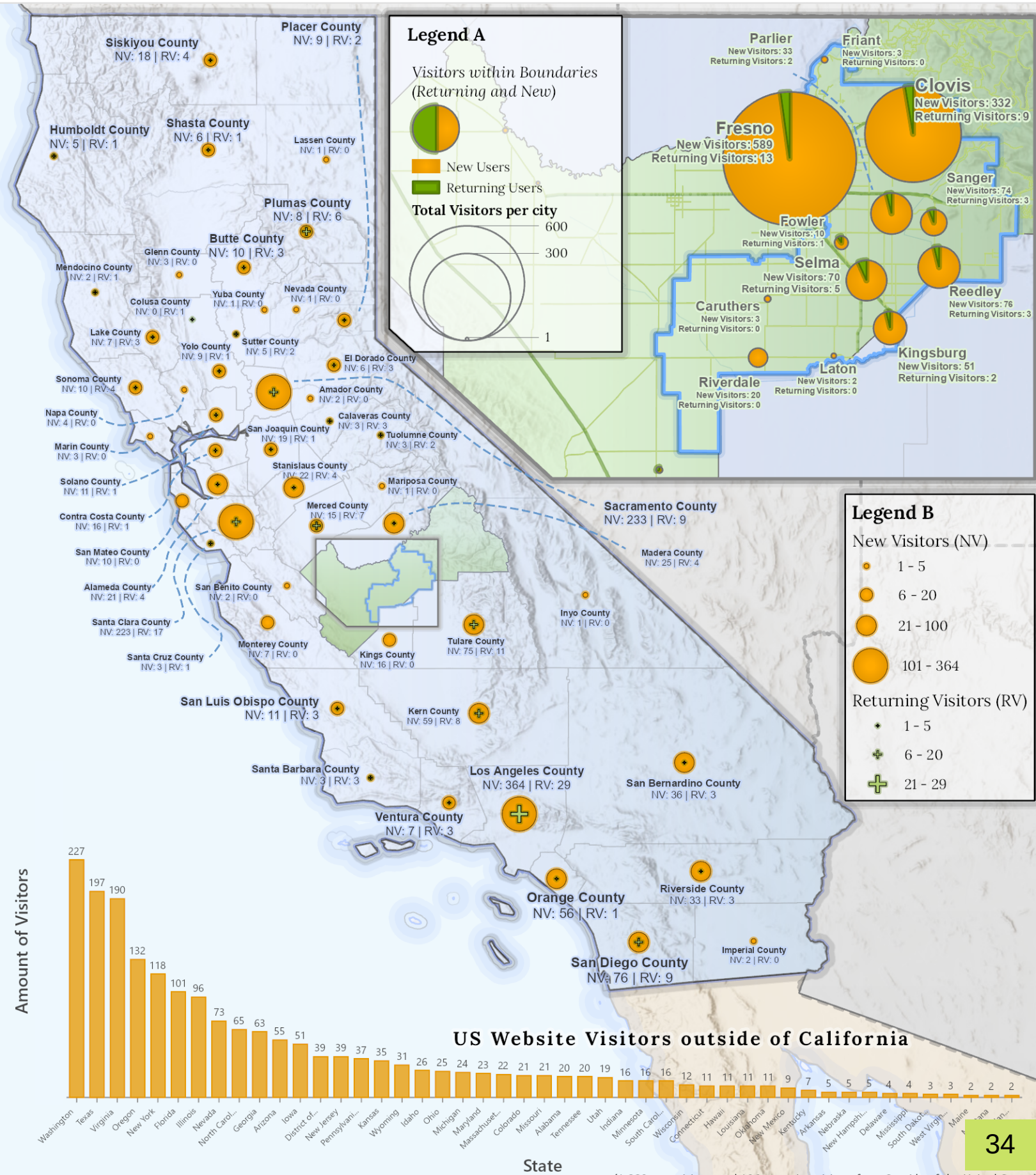
District website homepage.

User Acquisition



Website Visits for All Pages

- 2 0 2 2 -



(1,338 new visitors and 186 returning visitors from Outside of the United States)

OUTREACH & EDUCATION





SOCIAL MEDIA

The District posts regularly on Facebook, Instagram, Twitter, and Nextdoor. Posting on social media platforms has served to educate the community for several years, and posting regularly is an essential aspect of the Districts' outreach strategy. In 2022, the District posted 848 times across all platforms. The District has noted an increase in direct subscribers by 125 on all platforms combined*.

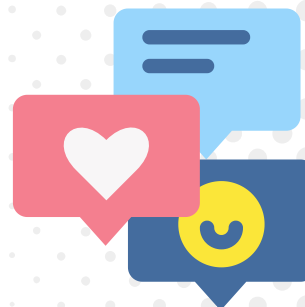
Platform	Number of subscribers (change from 2021)	Number of posts
Facebook	434 (↑21)	257
Twitter	344 (↑79)	238
Nextdoor	124,281 (↑11,168)	103
Instagram	185 (↑25)	250

*Nextdoor users are not direct subscribers. They are not subscribing specifically to CMAD content but are new users to the platform.



	Platform	Engagement Rate
	Facebook	7.7%
	Instagram	9.2%
	Twitter	4.8%
	Nextdoor	0.4%

The engagement rate is a metric that will track how actively involved the audience is with social media content. Engagement is seen when people interact with the platform through likes, comments, sharing, or retweeting.



OUTREACH & EDUCATION

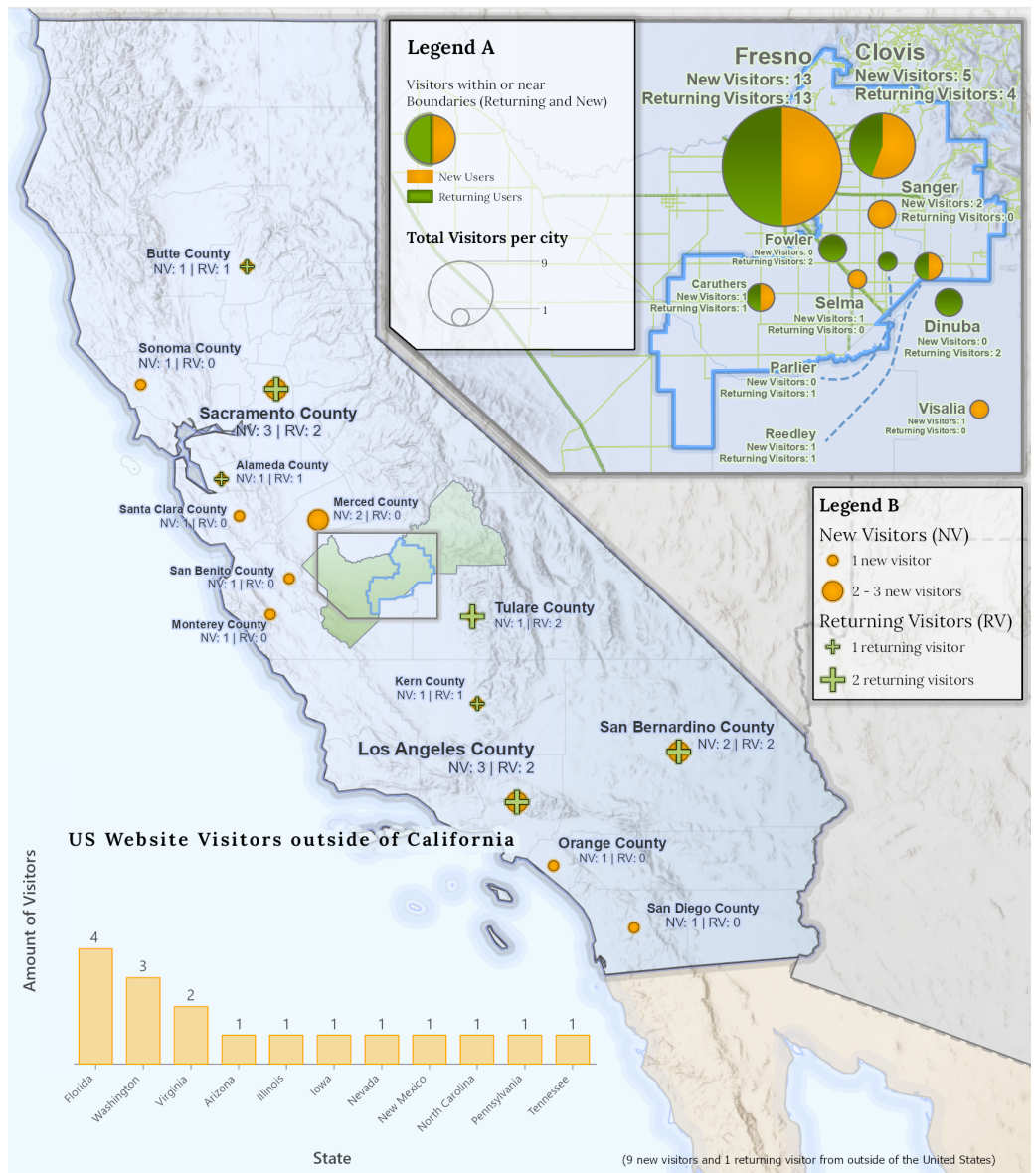
MOSQUITO BUSTERS

An interactive web-based learning tool, "Mosquito Busters," was developed in 2020 by Science Education Coordinator, Katherine Ramirez and Vector Biologist, B. Deegan. All graphics for the learning tool were designed in-house by B. Deegan. The learning tool has been active on the District website since its development. The learning tool underwent improvements in 2021, including new graphics and adding a home button to all pages. In 2022, the District added a free Mosquito Buster's tool kit for participants that complete the learning tool. A total of 26 tool kits were sent to children aged 5-10 years. The learning tool was promoted through social media and during outreach events. The Mosquito Busters webpage* received 95 unique page views.



Website Visits for the Mosquito Buster page

- 2 0 2 2 -



*We cannot guarantee those who visit the Mosquito Busters webpage also visited the Mosquito Busters learning tool.

OUTREACH & EDUCATION

COMMUNITY AWARENESS

In 2022, the District issued multiple public service announcements (PSA) when mosquito-borne viruses were detected. This information was shared by news outlets, cities, and the local community agencies and groups. The District also teamed up with the Fresno County Department of Public Health (FCDPH), Fresno Mosquito and Vector Control District, and Fresno Westside Mosquito Abatement District on August 25th and September 1st to issue joint news releases regarding the confirmation of a human WN and SLE virus-positive cases, respectively.



Date	Publication	Article Title
July 26th	The Fresno Bee	<u>More mosquitoes found carrying virus in Clovis and Reedley.</u>
July 27th	Mid Valley Times	<u>West Nile virus found in mosquitoes in Sanger and Reedley.</u>
August 1st	The Sentinel	<u>West Nile virus found in mosquitoes collected in Valley.</u>
August 8th	Stewawel News (Online Only)	<i>Multiple</i>
August 25th	The Fresno Bee	<u>Nine Fresno County residents test positive for West Nile virus. How to protect yourself</u>
August 26th	The Business Journal	<u>Fresno County Reaches Nine Reported West Nile Cases</u>



<https://abc30.com/west-nile-virus-fresno-county-cases/1>

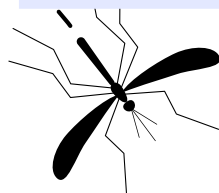
Partner Awareness

City of Sanger's Monthly Newsletter in August.

City of Fowler's Website Homepage.

City of Kingsburg's Weekly Newsletter – August 11th, September 16th, & 22nd.

Fresno County Health Department Facebook Page August 26th & 29th, September 1st.

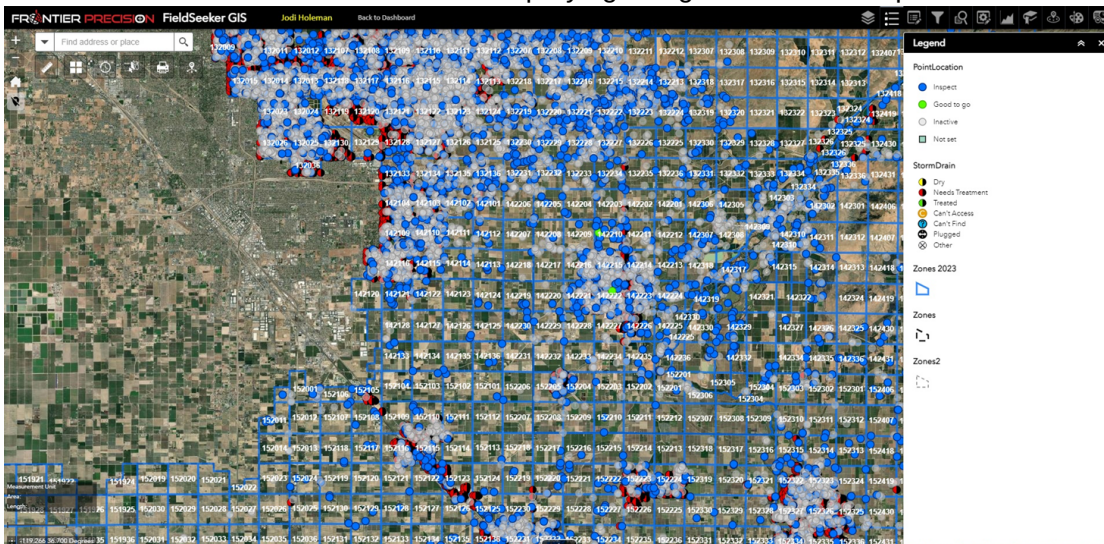


INFORMATION TECHNOLOGY/GIS

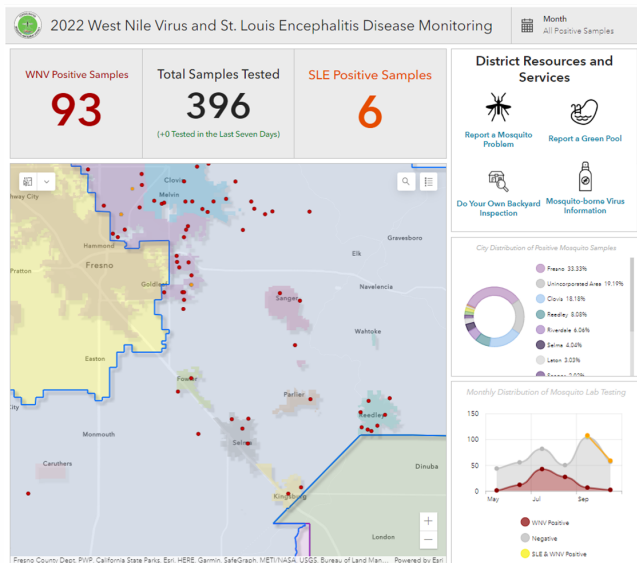
The District has a geographic information system (GIS) to manage field records and enable staff to monitor all operational activities to determine effectiveness and efficiency. The system is fully integrated so that all records can be cross-referenced, minimizing the need for unnecessary inspections and/or treatments. It incorporates using a Microsoft Access® database, FieldSeeker®, and ESRI™ GIS software. In 2022, NearMap was added as an additional imagery set that provides current and historical high-resolution imagery of large portions of the District.

This system enabled the District to effectively manage the 29,132 actively monitored potential mosquito breeding sources and the 111,263 records associated with monitoring those sites in 2022. These records include 43,995 inspection and 67,268 treatment records. In addition to managing known mosquito breeding sources, the District's data management system has been designed to capture service requests made by telephone and through the website, as well as telephone callbacks from notices to schedule appointments for an inspection.

The District leverages GIS and online mapping to provide residents with information on where mosquitoes are testing positive for disease and where the District is spraying at night for adult mosquito control.

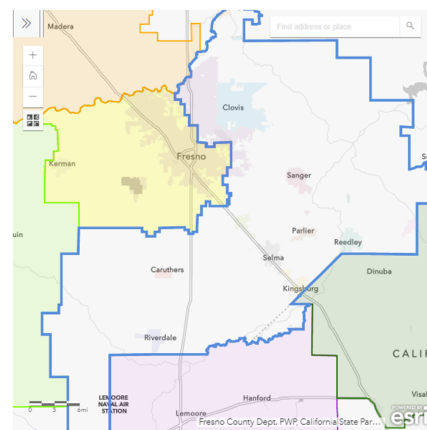


FieldSeeker operational map interface.



Scheduled treatments for adult mosquitoes:

- There are currently no areas scheduled for treatment.



For more information about truck-mounted ULV spraying:
 © CDC-Truck-Spraying-English.pdf
 © CDC-Truck-Spraying-Spanish.pdf

Webmaps created by GIS Coordinator, Conner Schaak showing disease activity and spray missions in the District.

PARTNERSHIPS & COLLABORATION

The District participates as an active member of the Central Valley Emerging Issues in Public Health Consortium, which meets regularly to stay current with public health issues, including WN, and works closely with the Fresno County Department of Public Health and other Fresno County mosquito abatement and vector control districts. The District utilizes the Davis Arbovirus Research and Training (DART) laboratory for mosquito sample testing and works closely with the California Department of Public Health in data exchange.



Dr. Anthony Cornel (UC Davis) setting cages for field ULV trials.

The District is a sustaining member of the American Mosquito Control Association (AMCA), the premier national and international association for mosquito control. The District is also a corporate member of the Mosquito and Vector Control Association of California (MVCAC) and a sustaining member of the Society for Vector Ecology (SOVE). These associations offer invaluable education, training, and advocacy opportunities. The District Manager, Steve Mulligan, was the President for each of the associations; AMCA (2014), MVCAC (2001), and SOVE (2022).

The District continues to have an ongoing interest in and recognition of the benefits of being actively involved in scientific research and developing novel and innovative strategies, techniques, and tools for the surveillance and control of mosquitoes. To keep further abreast of current scientific methods, the District will continue its collaboration with universities and other institutional researchers through in-kind support with staff time, data exchange, and the funding of research projects. Such research has included insecticide efficacy evaluations, insecticide resistance monitoring, and management, investigations of new mosquito surveillance and control methodologies (such as the ADAM and Debug Fresno programs), and mosquito population genetics studies.



FINANCIALS

FISCAL YEAR 2021/2022

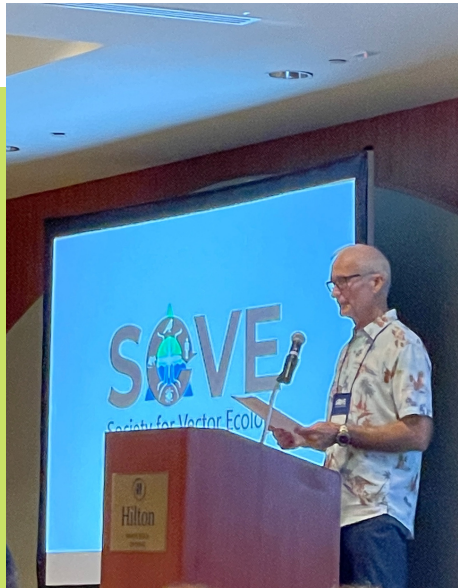
CONSOLIDATED MOSQUITO ABATEMENT DISTRICT
SCHEDULE OF REVENUES, EXPENDITURES, AND CHANGE
IN FUND BALANCE – BUDGET AND ACTUAL
FOR THE YEAR ENDED JUNE 30, 2022

	Budgeted Amounts		Actual	Variance
	Original	Final		Final Budget- Positive (Negative)
REVENUES				
Property taxes	\$3,795,447	\$3,795,447	\$4,218,096	\$ 422,649
Intergovernmental	91,412	91,412	185,271	93,859
Charges for services	10,000	10,000	9,963	(37)
Use of money and property	25,000	25,000	(237,123)	(262,123)
Insurance recoveries and adjustments			46,578	46,578
Other			11,304	11,304
Total Revenues	<u>3,921,859</u>	<u>3,921,859</u>	<u>4,234,089</u>	<u>312,230</u>
EXPENDITURES				
Current:				
Salaries and wages	1,765,000	1,765,000	1,546,628	218,372
Employee benefits	597,000	597,000	445,321	151,679
Supplies and maintenance	484,000	484,000	336,147	147,853
Motor vehicles	207,000	207,000	144,445	62,555
Insurance	163,000	163,000	152,568	10,432
Surveillance and research	50,000	50,000	29,060	20,940
GIS & GPS	60,000	60,000	48,744	11,256
County service charge		51,000	60,739	(9,739)
Utilities	58,000	58,000	45,651	12,349
Communications	44,000	55,000	44,854	10,146
Rent	2,000	2,000		2,000
Travel and subsistence	56,000	56,000	36,023	19,977
Dues and subscriptions	28,000	28,000	21,391	6,609
Office supplies	33,000	33,000	16,690	16,310
Uniforms	30,000	30,000	21,183	8,817
Legal and accounting	28,000	28,000	18,301	9,699
Education and publicity	30,000	30,000	13,213	16,787
Capital outlay	395,000	420,000	5,106	414,894
Debt service:				
Loan and lease purchase payments	290,000	290,000	287,591	2,409
Total Expenditures	<u>4,320,000</u>	<u>4,407,000</u>	<u>3,273,655</u>	<u>1,133,345</u>
Excess of revenues over expenditures	(398,141)	(485,141)	960,434	1,445,575
OTHER FINANCING SOURCES				
Sale of capital assets			246,303	246,303
Insurance proceeds			35,641	35,641
Total Other Financing Sources			<u>281,944</u>	<u>281,944</u>
Net change in fund balance	(398,141)	(485,141)	1,242,378	1,727,519
Fund Balance, Beginning of Year	<u>7,002,215</u>	<u>7,002,215</u>	<u>7,002,215</u>	
Fund Balance, End of Year	<u>\$6,604,074</u>	<u>\$6,517,074</u>	<u>\$8,244,593</u>	<u>\$1,727,519</u>

Message from the Manager

Serving public health is what we have done for the past seventy-six years by following our mission of promoting community health, comfort and prosperity by the effective and continuous control of disease-carrying and pest mosquitoes. But our efforts go beyond simply the control of mosquitoes within our community, for we recognize that mosquitoes and mosquito-borne diseases are dynamic and mobile by nature and not restricted by political boundaries. This has been impressed upon us with the advent of West Nile virus to California in 2003 and the invasion of *Aedes aegypti* mosquitoes in Fresno County in 2013. These events will not be unique, for there are other disease-transmitting mosquito species and new and emerging diseases awaiting an opportunity to invade. Global warming and habitat degradation, coupled with increased travel and transport of goods will continue to provide that opportunity. We realize that we must become and remain vigilant, informed, and ready to respond, and our District is focused on doing so.

Vigilance in the arena of public health requires that we are watchful of threats not just within, but outside our communities and that we are aware of what happens on a global level and the potential for impact locally. We do this through our associations and collaborations with vector biologists and public health professionals both nationally and internationally. Our staff has fostered such close relationships through active participation in professional organizations, such as the Mosquito and Vector Control Association of California (MVCAC), the American Mosquito Control Association (AMCA), and the Society for Vector Ecology (SOVE).



Steve Mulligan delivering the Presidents address at the 2022 International SOVE Congress.

We become informed by attending meetings of these organizations, and by participating in forums, workshops, and committees, and by presenting scientific papers. We encourage our staff to stay abreast with current research and technology. Not only must we stay informed on public health issues, but we recognize we must enhance our ability to effectively educate and inform our residents. Participation in these associations, the MVCAC, AMCA, and SOVE, is crucial in keeping our staff informed and ready to respond to public health issues.

Readiness to respond to public health challenges requires we take steps to ensure that we evaluate and utilize the most effective tools for surveillance and control of mosquitoes and mosquito-borne diseases. Our District has been a leader through our collaborations with university researchers and commercial entities in the evaluation of innovative mosquito control technologies.

With the close of 2022, the completion of another successful year is highlighted by the accomplishments of our employees. The District is fortunate to have a hard-working staff who understand the importance of public health and who are dedicated to our mission and to serving our residents.

It is also now time for me to say adieu, with 2022 being my final year, as I retire after serving 32 years as District Manager. It has been a rewarding experience for me, at times exciting, at times challenging. My position has given me many opportunities to meet and become friends with amazing, dedicated people involved in vector research and public health and to become active in our professional associations, MVCAC, AMCA, and SOVE, and has allowed me to have served as President of each.

I leave with the satisfaction that our residents will continue to receive the best of public health service from our District's dedicated staff. My position will be most ably filled with the hire of Ms. Jodi Holeman as the new District Manager. She brings a wealth of knowledge as well as 20 years of experience with the District. I retire knowing that the District will be in very capable hands.

To the public health,

A handwritten signature in black ink that reads 'Steve Mulligan'.

Steve Mulligan
District Manager 1991-2022



District Headquarters

**13151 E. INDUSTRIAL DRIVE,
PARLIER, CA 93648
559-896-1085
WWW.MOSQUITOBUZZ.NET**

Substations

**CARUTHERS
16800 S MARKS AVENUE
CARUTHERS, CA 93609**

**CLOVIS
3555 LIND AVENUE
CLOVIS, CA 93612**

**SANGER
1717 ACADEMY AVENUE
SANGER, CA 93957**

**SELMA
2425 FLORAL AVENUE
SELMA, CA 93662**

