# 2024-2025 KERN COUNTY GRAND JURY

# DELANO MOSQUITO ABATEMENT DISTRICT

**Release Date**
**May 15, 2025**

# DELANO MOSQUITO ABATEMENT DISTRICT

## Zika, the Mosquito Monster

**SUMMARY:**

It was a dark evening, and the moon had yet to appear over the horizon. The wind was still, and it was the time-of-day mosquitos came out to wreak havoc on backyard parties and on anyone foolish enough to wear shorts and not use an insect repellant. The Mosquito Technician from Delano Mosquito Abatement District worked his way through the target area with a backpack fogger that was designed for smaller areas. (If this had been a large area, the vehicle-based fogger may have been used.)

In California, throughout history, mosquitoes have been an annoyance and spread disease. Before California was settled, seasonally flooded wetlands produced hordes of mosquitoes, compelling Indigenous people to move or abandon coastal and lowland areas during fishing and crop growing peak seasons. Since the early 1900s, California mosquito abatement agencies have been on the front lines of protecting public health and promoting the prevention of mosquito-transmitted disease outbreaks. Although, mosquitos and the diseases they transmit have been known and studied since the 1900's, two relatively new mosquitos have appeared that potentially spread Zika, a particularly nasty virus for pregnant women and fetuses.

Since its charter in 1944, the Delano Mosquito Abatement District has continued to protect the health and quality of life for the people in its service area, by suppressing disease carrying mosquitoes through surveillance, source reduction, public education and pest control measures.

## PURPOSE OF INQUIRY:

California Penal Code §933.5 authorizes the Grand Jury to inquiry/investigate and report on the operations and management of all special districts within Kern County. The 2024-2025 Kern County Grand Jury (Grand Jury) investigated the Delano Mosquito Abatement District (DMAD) for its financial solvency, administrative operations, seasonal mosquito surveillance, detection of mosquito borne diseases, the safe and effective application of pesticides to limit or irradicate mosquito infestations and enhance public safety.

## METHODOLOGY:

The Grand Jury conducted interviews with the District's management, supervisory, scientific and administrative support staff. The Grand Jury also reviewed the most recent DMAD investigative report and responses from the 2012-2013 Grand Jury. The Grand Jury analyzed financial statements and other documents available from the DMAD's office and website, reviewed DMAD Board Meeting minutes and annual report, and toured its office complex, laboratory, equipment and chemical storage units. Additionally, the Grand Jury observed DMAD's mosquito fishpond farming operations.

## DISCUSSION OF FACTS:

The Delano Mosquito Abatement District is an independent special district formed in 1944 pursuant to California Health and Safety Code §2000, to control mosquitoes and provide protections from mosquito-borne illnesses. It has a five-member board jointly appointed by the citizens of North Kern and Southern Tulare County. The Board consists of two members appointed by the Kern County Board of Supervisors, one Member appointed by the Tulare County Board of Supervisors, one Member appointed by the McFarland City Council, and one Member appointed by the Delano City Council.

The DMAD Mission Statement is as follows: "The Delano Mosquito Abatement District mission is to safely and reliably provide surveillance, source reduction, public education, and control measures that seek to mitigate and eliminate the mosquito's life and the diseases vectored [transmitted] by mosquitoes, thus improving the quality of life of its residents".

Facts include the following:

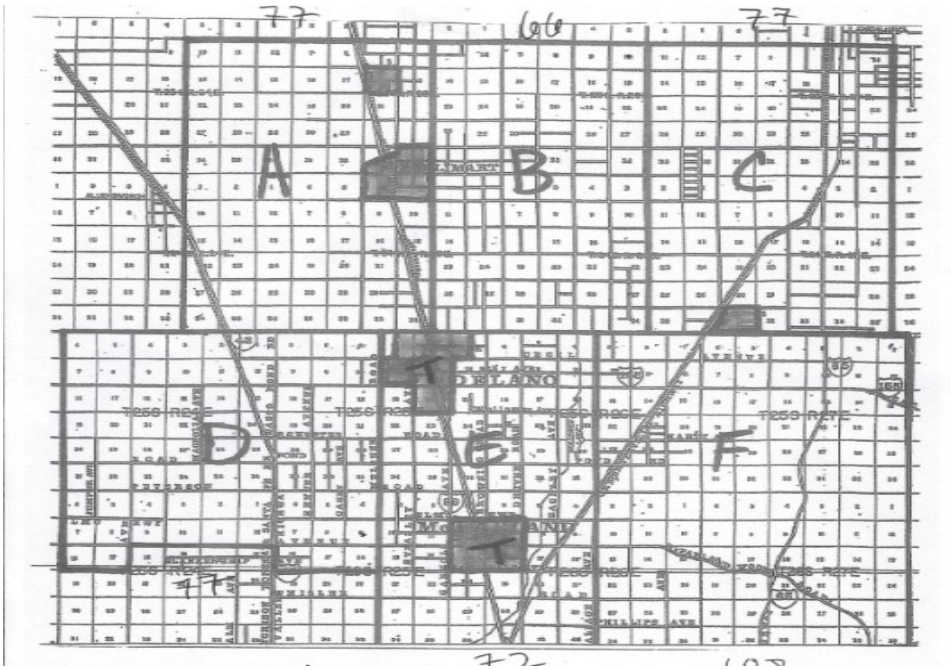
A. The District currently provides mosquito protection to populations within a 477 square mile area of Northern Kern County and Southern Tulare County which includes the cities of Delano, McFarland, Famoso, Pixley, Ducor, Earlimart, Richgrove and Teviston.

B. The majority of the District is agricultural farmland with approximately 20 square miles of residential locations (Delano, McFarland, etc.). The District is divided into six district zones or grids and one citizen zone. Each technician is assigned a zone and is responsible for covering 14–20 square miles per day.

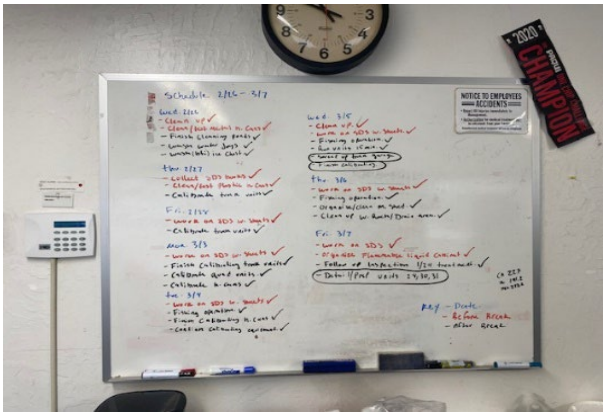
C. The peak mosquito infestation season is from March through September.

D. The District has seven year-round full-time management, supervisory, office management and field technicians. An additional ten field technicians are added during the peak season. All field staff are licensed technicians certified by the California Department of Public Health.

E. Technicians using pesticides that are registered with the Environmental Protection Agency, inspect known and suspected mosquito breeding sources and provide treatment as needed. A technician may also be assigned customer call-in requests for a mosquito inspection and possible treatment.




Deland Mosquito Abatement District Grid
Image provided on DMAD website




The Posted Weekly Work Schedule
Photo by Grand Jury

F. DMAD, in conjunction with the Kern County and Tulare County Public Health Departments, coordinate efforts to report emerging mosquito borne diseases, and release public service advisory notices to mitigate exposure.

G. During the peak mosquito season, DMAD meets with Kern and Tulare County Environmental Health Departments. In addition, statistical reports are sent to Kern and Tulare County and the California Departments of Public Health if evidence of mosquitos carrying West Nile Virus, Western Equine Encephalitis, or St. Louis Encephalitis viruses are detected.

H. This past decade, two new mosquitoes have been identified in California. The Asian Tiger Mosquitos (ankle-biters) and the Aedes Aegypti Mosquitos (Yellow Fever Mosquitos). Both are capable of passing on Yellow Fever, West Nile Virus, as well as Zika, Dengue, and Chikungunya. There have been no reported incidences of Yellow Fever infections in the DMAD area of coverage.

I. Additionally, these two mosquitos are potentially game-changers in that typically the public is warned to limit outdoor activities, wear full-body clothing, and apply repellants when mosquitoes are most active (dawn to dusk). However, these two menacing parasites are small, attack the ankles of unsuspecting victims with bites that can penetrate lightweight clothing, and are active most of the day.

J. DMAD's only income is from tax assessments as outlined in its charter documents. In 2023, as reported to the California State Controller's Office, DMAD had an income of $1.34 million, with $837,137 (62%) paid in wages, and health benefits. Strict cost accounting is critical to the operation of DMAD.

Chemical Storage Building
Photo by Grand Jury

Chemical and Supply Storage Area
Photo by Grand Jury

K. DMAD uses a combination of chemical, biological and physical methods to control mosquito populations.

- Chemical
  - The District conducts chemical control using pesticides registered with the Environmental Protection Agency and kept in a controlled and locked environment
  - Larvicides – are used to treat or modify existing breeding habitats to prevent reproduction
  - Adulticides – spraying to kill adult mosquitos
- Biological
  - Mosquito Fish (Gambusia Affinis) are used to control mosquito infestations during the larva to adult stages
  - Mosquito Fish are kept in a 600-gallon holding tank that is equipped with a circulation pump
- Physical
  - Eliminating breeding sites by cleaning up and draining areas that could be used for breeding
  - Traps

L. DMAD uses three different types of traps to accurately gauge the variety of mosquitoes and type of mosquito control needed. These traps are set out one day and collected the next.

- BG-Sentinel:
  - Used in urban areas to detect host-seeking mosquitoes
  - Help monitor native Culex mosquitoes which transmit West Nile and Encephalitis viruses. Also used to detect invasive species such as Aedes Aegypti
- Gravid:
  - Used also in urban settings to capture pregnant mosquitoes that have already taken a blood meal
  - Used to test these females for arboviruses (Yellow Fever, Zika)

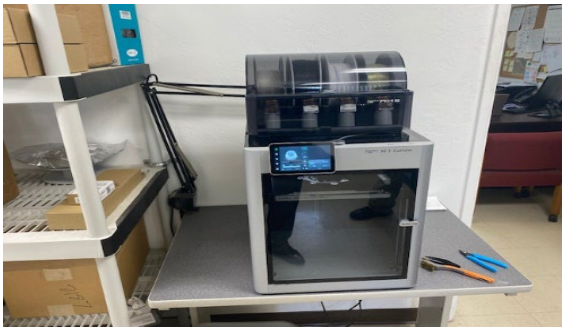
- C02-baited traps:
  - Placed in rural areas such as orchards, retention ponds, and basins
  - Provides data on mosquito abundance and helps detect potential virus activities

M. DMAD uses WALS (Wide Area Larvicide Spraying), a naturally occurring bacterium to kill mosquito larvae in water sources. After the initial application, there will be follow-up surveillance to determine if further treatment is needed such as a utility spray truck and/or backpack sprayers

Utility Spray Truck
Photo by Grand Jury

Backpack Foggers
Photo by Grand Jury

N. DMAD has a 3-dimensional printer. This computer assisted printer is a cost-effective way to create replacement parts for equipment such as mosquito traps.



A 3-D Printer
Photo by Grand Jury

The Lab for Testing
Photo by Grand Jury

O. DMAD annually contracts for two aerial surveillance flyovers usually in April and September to search for homes in the District with neglected green pools. Green pools are a huge source for mosquito breeding.

Empty Pool with Standing Water
Image by Grand Jury

P. The office and grounds of the DMAD were clean, neat and well maintained. Outside perimeter cameras record 24 hours per day.

Q. Board Meetings are held on the third Thursday of the month at 11:00 a. m. Agendas are posted timely on the website and an outdoor bulletin board.

- Minutes are posted on the website after approval
- DMAD adheres to the Brown Act
- Biannual training is provided in adherence with AB1234 Ethics Training
- Major purchases receive Board approval prior to purchase
- Monthly purchases are approved via the consent agenda
- The Policy and Procedures Manual (last updated March 2021) is available upon request

R. Audit Reports are completed timely with no discrepancies

S. Bank accounts and credit card statements are reconciled on a timely basis.

## FINDINGS:

The Grand Jury finds:

F1. Asian Tiger and Yellow Fever Mosquitos are known transmitters of Zika. Zika is particularly dangerous to pregnant women and their fetuses. According to the Kern County Environmental Health Services, no known Yellow Fever cases have been identified in Kern County to date. Because of these potentially game-changing disease-carrying mosquitoes, the community would be better served if DMAD increases its focus on tracking, updating and educating the public.

F2. Pesticides and other chemicals are stored in a temperature controlled "toolshed" which is kept locked and only accessible to authorized personnel. However, the Grand Jury observed that the building is too small, and buckets were observed outside. An RFP (Request For Proposal) is currently posted on the DMAD website soliciting bids to build a larger more secure facility. This new building would meet DMAD's current and future needs.

F3. Technicians use Mosquito Fish traps to harvest wild Mosquito fish which are kept in the 600-gallon holding tank. The main tank can hold up to 1,000 Mosquito Fish and is restocked as needed from ten ponds across the district. There are three ponds, the main pond is for holding fish. The second aids in recirculation and the third houses a circulating pump which also provides filtration.

Fish Farm Tanks
Photos by Grand Jury

F4. The facility has no backup power; in the event of an outage, the Mosquito Fish, security cameras, and refrigeration would be in jeopardy.

F5. The computer assisted 3D printer is used for making parts for traps, dippers and other specialty devices. Increased use of this technology should help to reduce the District's operating costs.

F6. The District currently contracts for aerial surveillance of neighborhoods for green pools and potential breeding hotspots. The addition of drones would allow for more frequent aerial surveillance and should reduce the cost of contracting airplane or helicopter coverage.

F7. Purchases are approved, by consent agenda, at the Board Meetings following the purchase. Purchase orders and receipts were provided. This ensures transparency and fiscal accountability.

F8. The DMAD meets quarterly with the Kern County Public Health Department (KCPHD) and its counterparts from adjacent mosquito abatement districts. Although DMAD has established cooperative lines of communication, there is always a need to improve the dissemination of crucial information and trends to combat the spread of mosquito borne illnesses.

## COMMENTS:

The Grand Jury extends its appreciation to the DMAD's administrative, supervisory and field staff who graciously provided information and insight into the District's efforts to keep the public safe from the threat of mosquito borne diseases. The staff are also motivated and receptive to innovative methods of detecting and eradicating mosquitoes. Additionally, DMAD's Board of Directors was interested in providing the staff with the resources and directions to accomplish the extremely important mission to identify emerging threats and treat mosquito infestation in the communities it serves.

## RECOMMENDATIONS:

The Grand Jury recommends:

R1. DMAD research installing a battery or generator to provide electricity at the facility and provide back-up power for security cameras and fishpond circulating pumps. This should be done by August 31, 2025. (Finding #4)

R2. DMAD work with a Grant Writer and/or the Board of Supervisors to acquire drones for green-pool surveillance. This should be completed by August 31, 2025. (Finding #6)

R3. Because of the dangers involved with the Zika virus, DMAD should improve, expand, and maintain media relationships, signs on vehicles and employ billboards to ensure public awareness during mosquito season and promote efforts to minimize outbreaks of mosquito borne illnesses. This should be completed by August 31, 2025. (Finding #1)

R4. DMAD should expedite the construction of a building to store chemicals to ensure the maintenance of proper temperature control and chemical security. This should be completed by March 31, 2026. (Finding #2)

R5. DMAD should work with the Kern County Public Health Department to establish protocols, within the Health Insurance Portability and Accountability Act (HIPAA) restrictions, for ensuring the expeditious sharing of non-patient specific information that is

critical to the detection and to prevent the spread of emerging mosquito borne illnesses. This should be initiated by July 31, 2025. (Finding #8)

**RESPONSE DEADLINE:**

- **REQUIRED WITHIN 90 DAYS FROM:**

  Delano Mosquito Abatement District

  - Findings #1 through #8
  - Recommendations # 1 through #5

  Kern County Board of Supervisors

  - Recommendation #2

**RESPONSES ARE REQUIRED PURSUANT TO PENAL CODE §§933(c) AND 933.05:**

- **PRESIDING JUDGE**
  **SUPERIOR COURT OF CALIFORNIA**
  **COUNTY OF KERN**
  **1415 TRUXTUN AVENUE, SUITE 212**
  **BAKERSFIELD, CA 93301**

- **FOREPERSON**
  **KERN COUNTY GRAND JURY**
  **1415 TRUXTUN AVENUE, SUITE 600**
  **BAKERSFIELD, CA 93301**

Reports issued by the Grand Jury do not identify individuals interviewed. Cal. Penal Code §929 requires that reports of the Grand Jury not contain the name of any person or facts leading to the identity of any person who provides information to the Grand Jury.