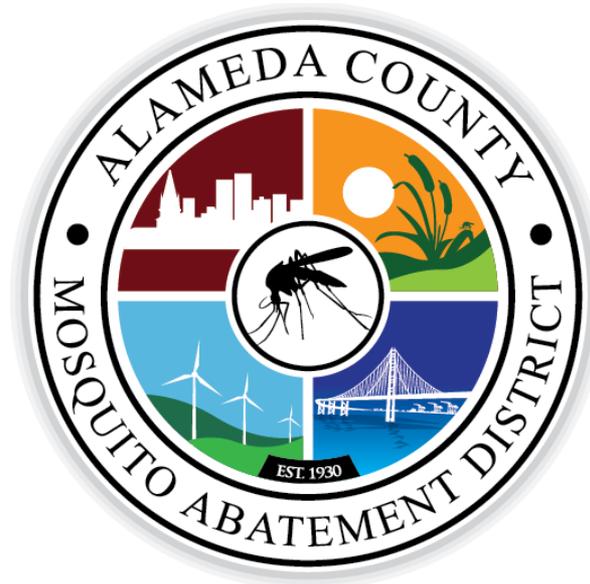


# Modern Mosquito Control Challenges and Opportunities

An Independent Special District  
Protecting Public Health since 1930



City of Oakland: 4/16/19



# Hello Oakland.

- Our District
- Mosquitoes
- Health Threats
- Control
- Innovations
- Partners



# Our Board of Trustees

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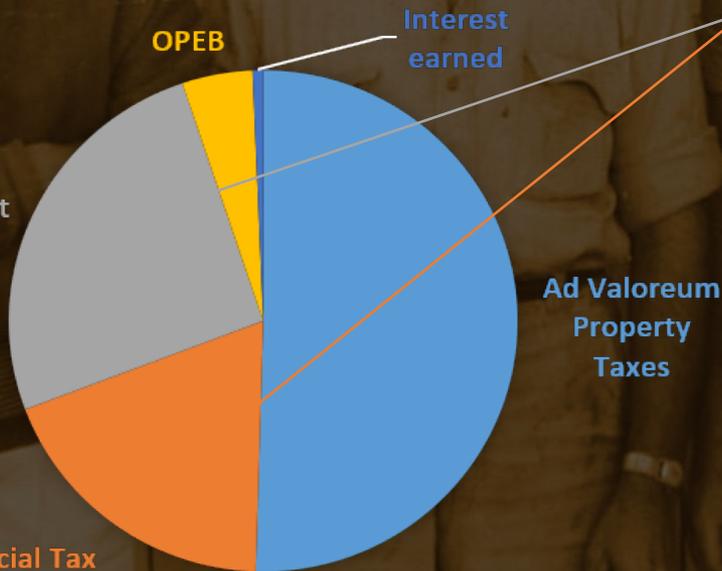
Subru Bhat, City of Union City

County-at-Large, vacant



## Fixed Charges and/or Special Assessments

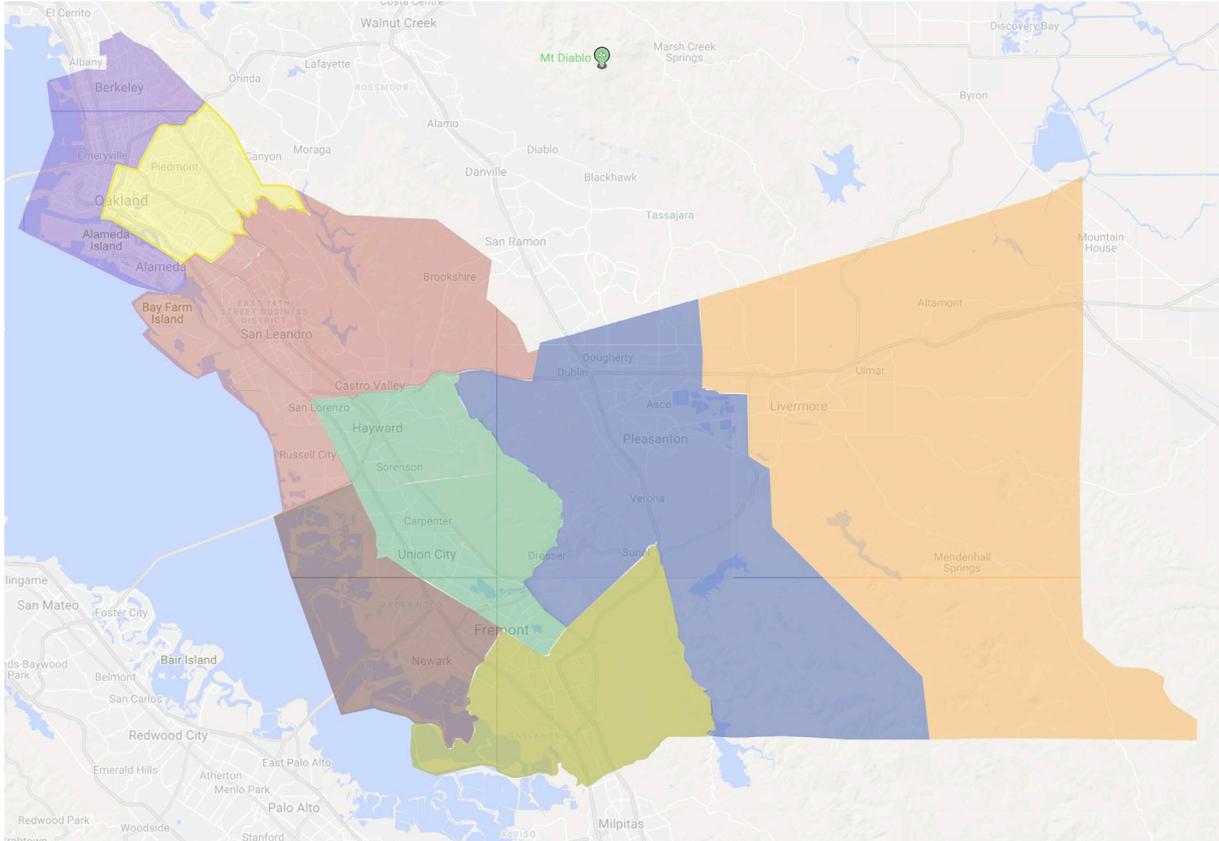
Description	Phone	Amount
CITY SEWER SERVICE	800-676-7516	313.80
MOSQUITO ABATEMENT	800-273-5167	1.74
CSA PARAMEDIC	800-441-8280	32.86
CSA VECTOR CONTROL	800-273-5167	5.92
HEALTHCARE DIST	800-273-5167	298.00
CSA LEAD ABATEMENT	510-567-8280	10.00
* SCHOOL MEASURE B1	844-332-0549	683.20
PERALTA CCD MEAS B	800-792-8021	48.00
SFBRA MEASURE AA	888-508-8157	12.00
HAZ WASTE PROGRAM	800-273-5167	7.40
CSA VECTOR CNTRL B	800-273-5167	4.08
MOSQUITO ASSESS 2	800-273-5167	2.50
AC TRANSIT MEAS VV	800-273-5167	96.00
EBMUD WETWEATHER	866-403-2683	103.74
* EAST BAY TRAIL LLD	888-512-0316	5.44
* EBRP PARK SAFETY/M	888-512-0316	12.00
URBAN RUNOFF	510-670-6615	56.14



(.0009% of property tax assessed value)

# Financials

# Our Staff: *17 FT & 5 Seasonal Staff*



## Mosquito Control

9 FT Staff in 8 Zones  
2 Seasonal Staff

## Monitoring

3 FT Staff  
2 Seasonal Staff

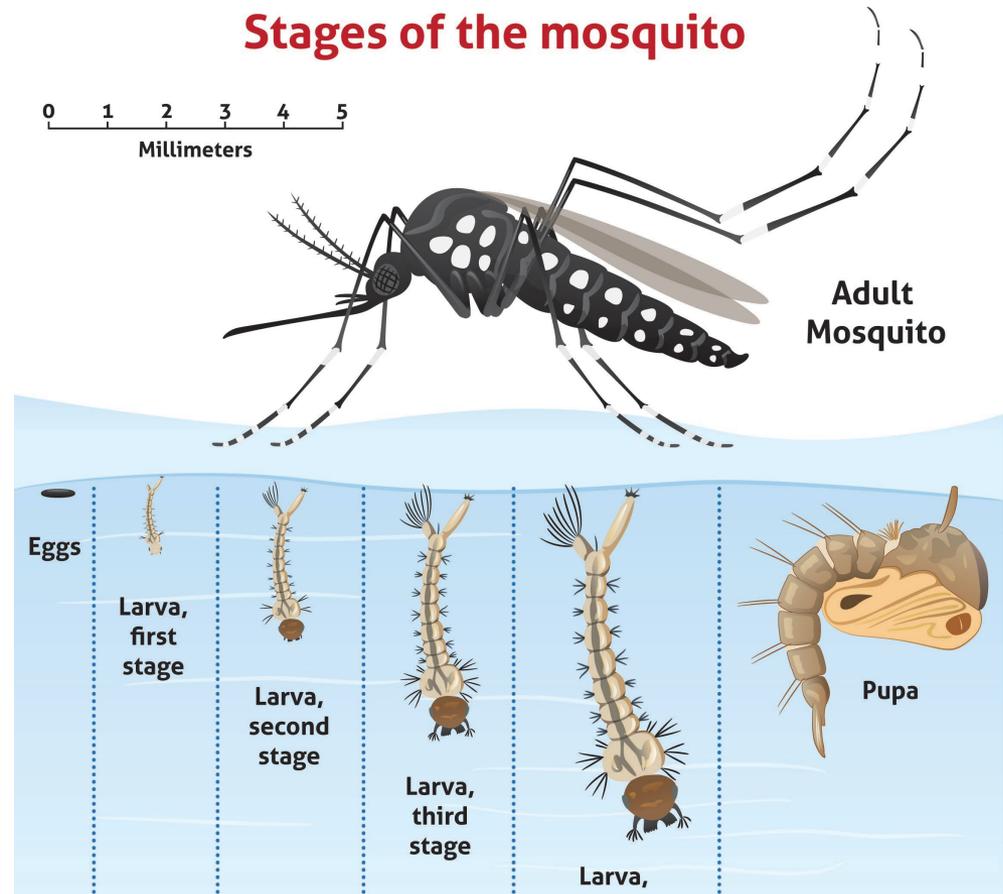
## Administrative

5 FT Staff  
1 Seasonal Staff



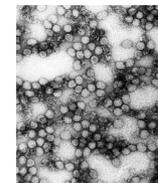
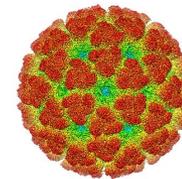
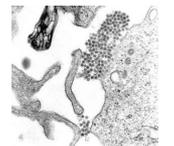
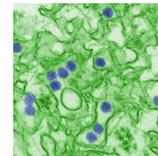
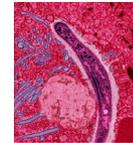
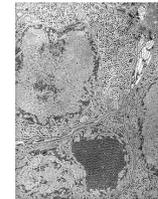
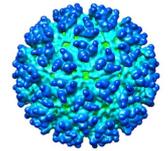
# Aquatic Lifecycle

- Urban mosquitoes spend 1 - 2 weeks as larvae or pupae
- Breathe air at the surface of water



# Mosquito Pathogens

- West Nile virus
- Western equine encephalitis virus
- Saint Louis encephalitis virus
- Dog heartworm
- Malaria
- Zika virus
- Dengue virus
- Chikungunya virus
- Yellow fever virus



# Mosquitoes in Alameda County that transmit West Nile virus



*Culex pipiens*:  
common house mosquito



*Culex tarsalis*:  
western encephalitis mosquito



# Mosquitoes that spread Zika, Dengue, Chikungunya, Yellow Fever viruses



*Aedes aegypti*

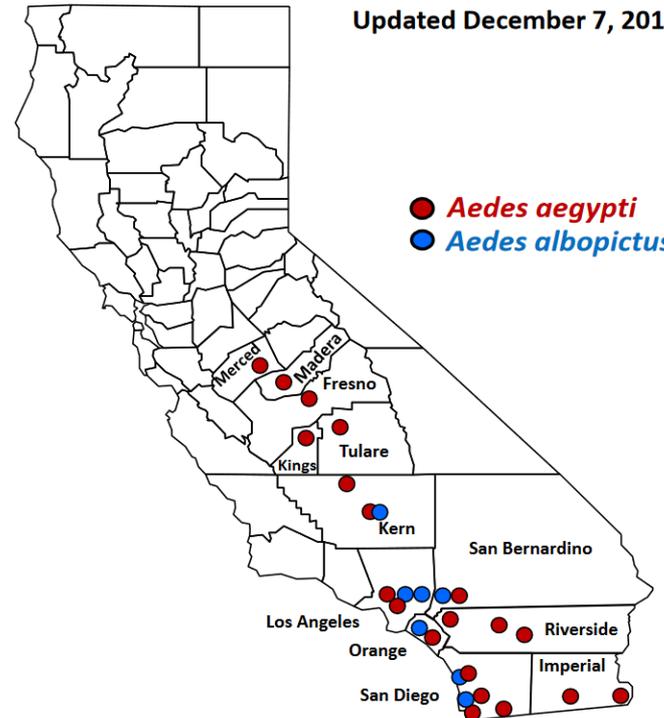
lyre-shaped pattern on thorax

*Aedes albopictus*

bright lateral line on thorax

## *Aedes aegypti* and *Aedes albopictus* Mosquitoes in California Detection Sites by County/City

Updated December 7, 2018



● *Aedes aegypti*  
● *Aedes albopictus*

Counties with  
*Aedes aegypti* only:  
Fresno, Imperial, Kings,  
Madera, Riverside, Merced,  
Tulare

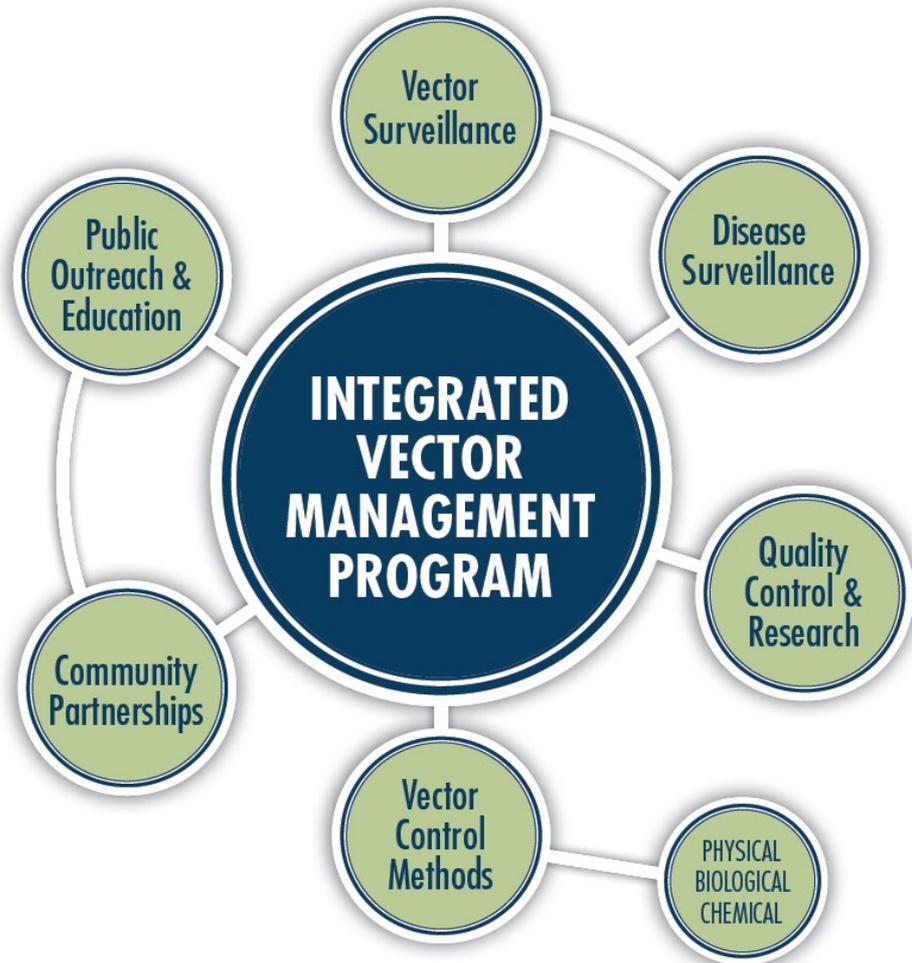
Both *Aedes aegypti* and  
*Aedes albopictus*:  
Kern, Los Angeles, Orange,  
San Bernardino, San Diego

See pages 2 and 3 for *Aedes*  
detections by city or census-  
designated place in each  
county.

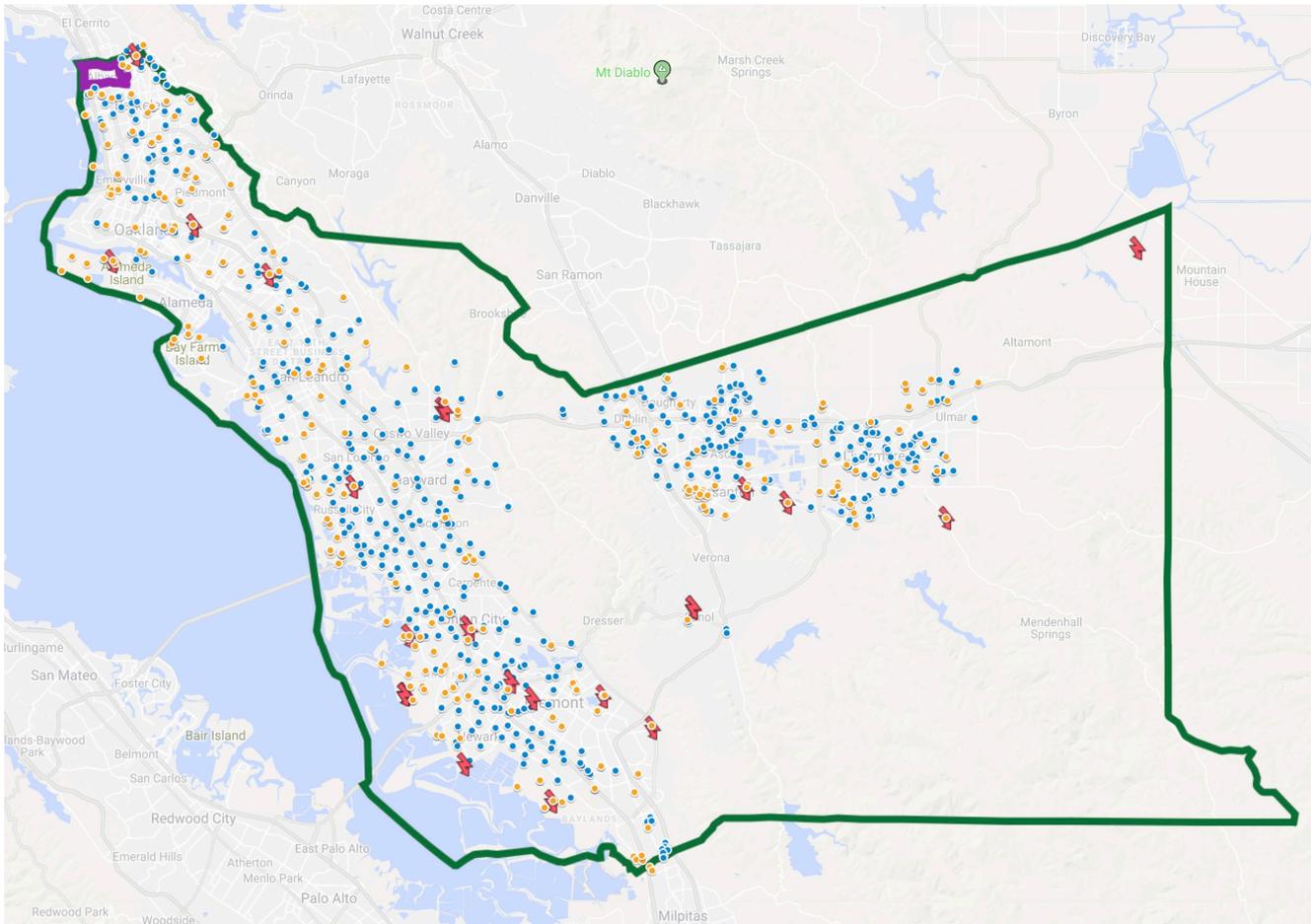


# Controlling Mosquitoes

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# Our Service Area and Monitoring Sites



— County boundary

— Outside of service area

↗ Light traps  
(n = 22)

● Native mosquito traps  
(n = 180)

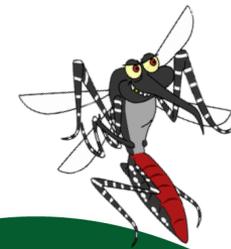
● Invasive *Aedes* traps  
(n = 710)



# Monitoring Approach

## Adult monitoring with traps

### Looking for larvae & eggs

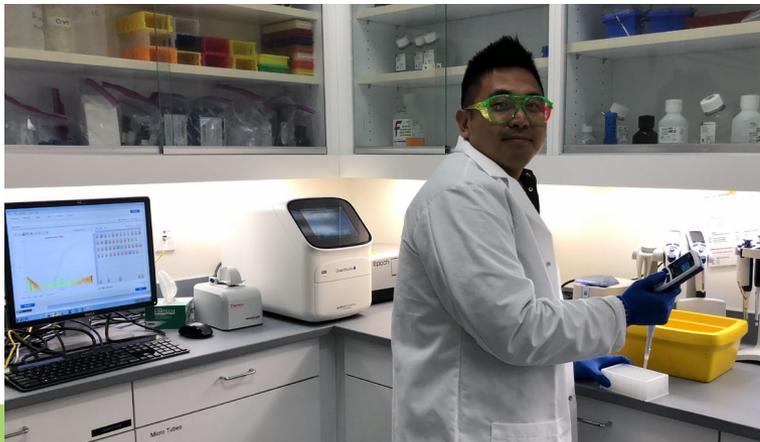


# Testing for disease and insecticide resistance

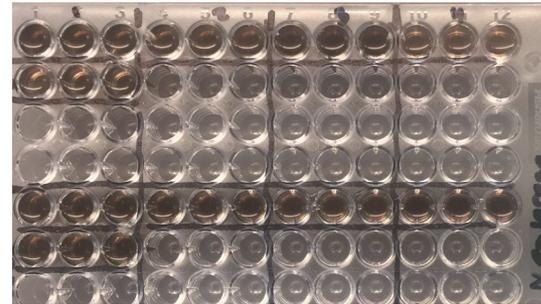
we test more than 90 % of disease-spreading mosquitoes caught in our traps



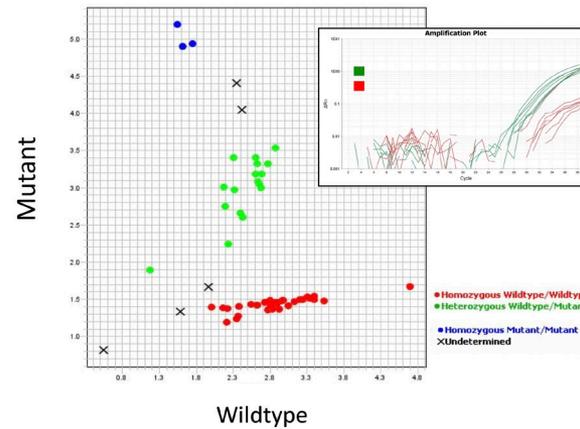
virus test results in 3 hours



sensitivity to insecticides



insecticide detoxification



genetic resistance

# Controlling mosquitoes in storm drain systems



# Controlling mosquitoes in marshes



# Controlling mosquitoes with fish



# Controlling mosquitoes through source reduction



# Channels for community outreach

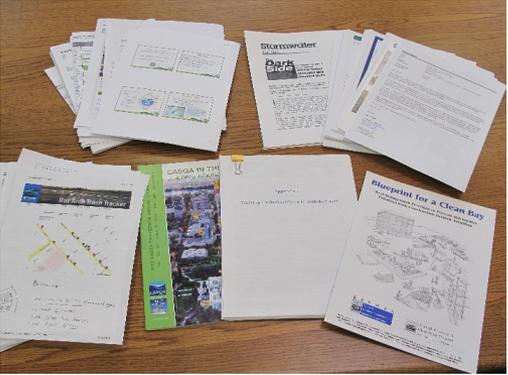
Legislative



Interagency



Public





Threats

Opportunities

Financial pressures

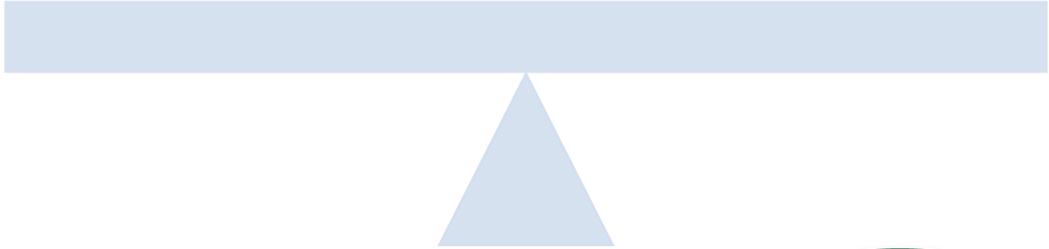
Financial planning

Invasive mosquitoes

Emerging technologies

Climate change

Interagency collaboration



# 1. Financial Planning



\$2.50 benefit  
assessment *can* be  
raised to \$7.00 for  
enhanced services



Pension stabilization-  
115 trust with PARS

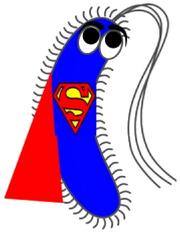


Reserve funds with  
CAMP

## 2. Innovative Control Methods



Irradiate reproductive cells



Wolbachia-infect



Modify genome using Gene Drives  
(CRISPR)



# 3. Interagency collaboration: trash capture devices/ BMPs



California Stormwater  
Quality Association



# 4. Healthy Wetlands



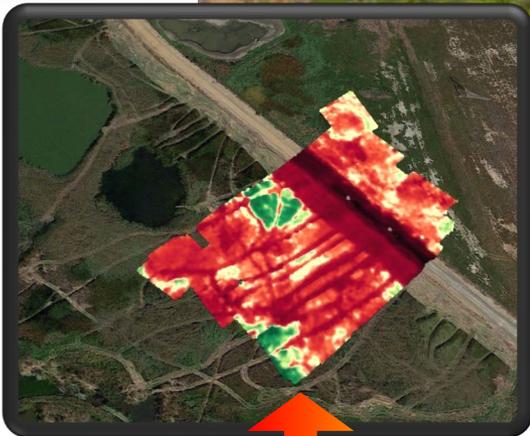
California Department of  
Fish and Wildlife



**South Bay Salt Pond  
Restoration Project**



# 5. Emerging technologies: drone imagery of marshes where mosquitoes can breed



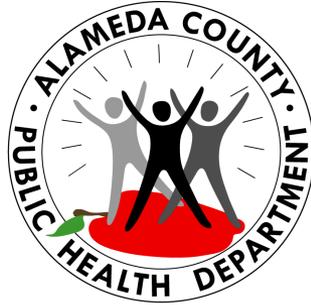
Multispectral camera imagery of landscape



# Partnerships



San Francisco Bay Restoration Authority



**SAN MATEO COUNTY  
MOSQUITO & VECTOR  
CONTROL DISTRICT**  
Protecting public health since 1916



# Mosquito Sources in the City of Oakland



- Airport sources
- Mills College
- Lake Merritt
- Lake Temescal
- Leona Trout Ponds
- Port of Oakland
- Unmaintained swimming pools, catch basins, flood control channels





Thank you-

**Ryan Clausnitzer, MPA**

**General Manager**

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Hayward, CA 94545

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510-925-1756

