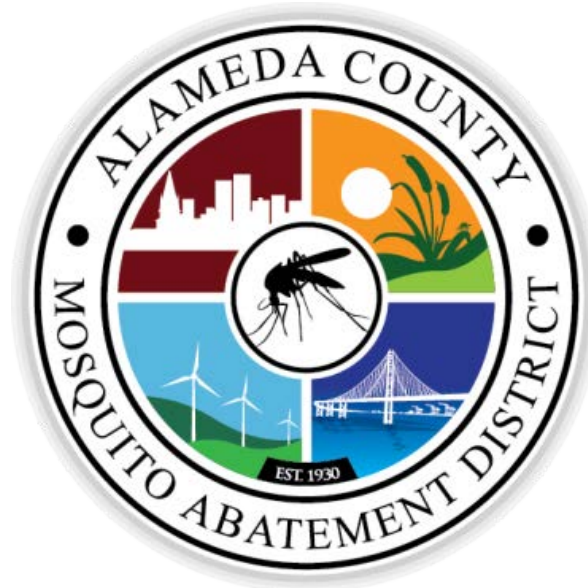


Modern Mosquito Control Challenges and Opportunities

An Independent Special District
Protecting Public Health since 1930



City of Berkeley: 4/23/19



Hello Berkeley.

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



Our Board of Trustees

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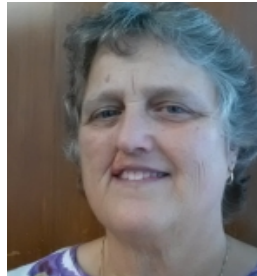
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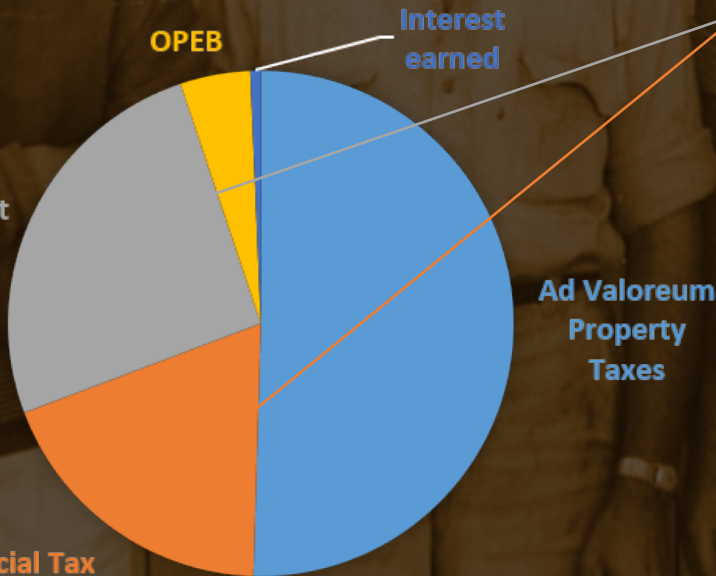
Victor Aguilar, City of San Leandro

Subru Bhat, City of Union City



Page 4 of 29
Fixed Charges and/or Special Assessments

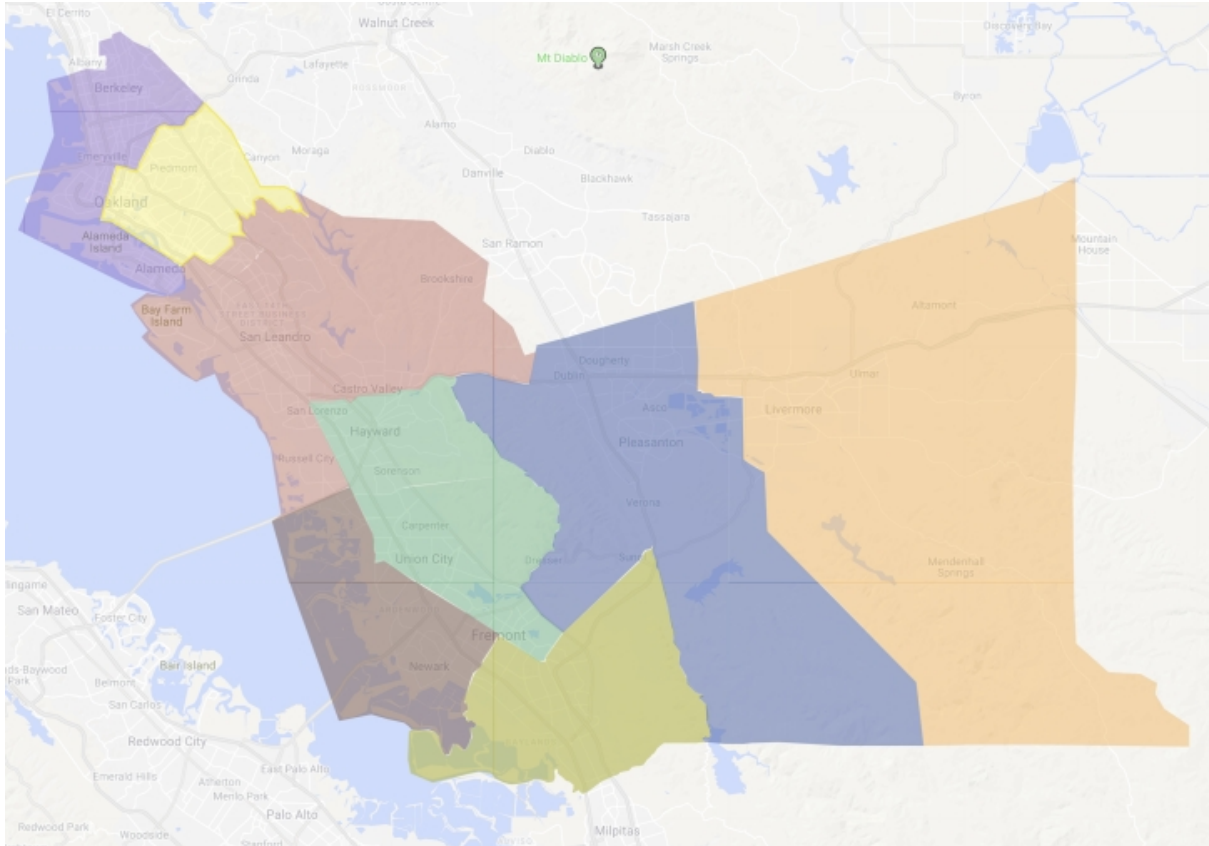
Description	Phone	Amount
CITY SEWER SERVICE	800-676-7516	313.80
MOSQUITO ABATEMENT	800-273-5167	1.74
CSA PARAMEDIC	800-441-8280	32.86
CSA VECTOR CONTROL	800-273-5167	5.92
HEALTHCARE DIST	800-273-5167	298.00
CSA LEAD ABATEMENT	510-567-8280	10.00
* SCHOOL MEASURE B1	844-332-0549	683.20
PERALTA CCD MEAS 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

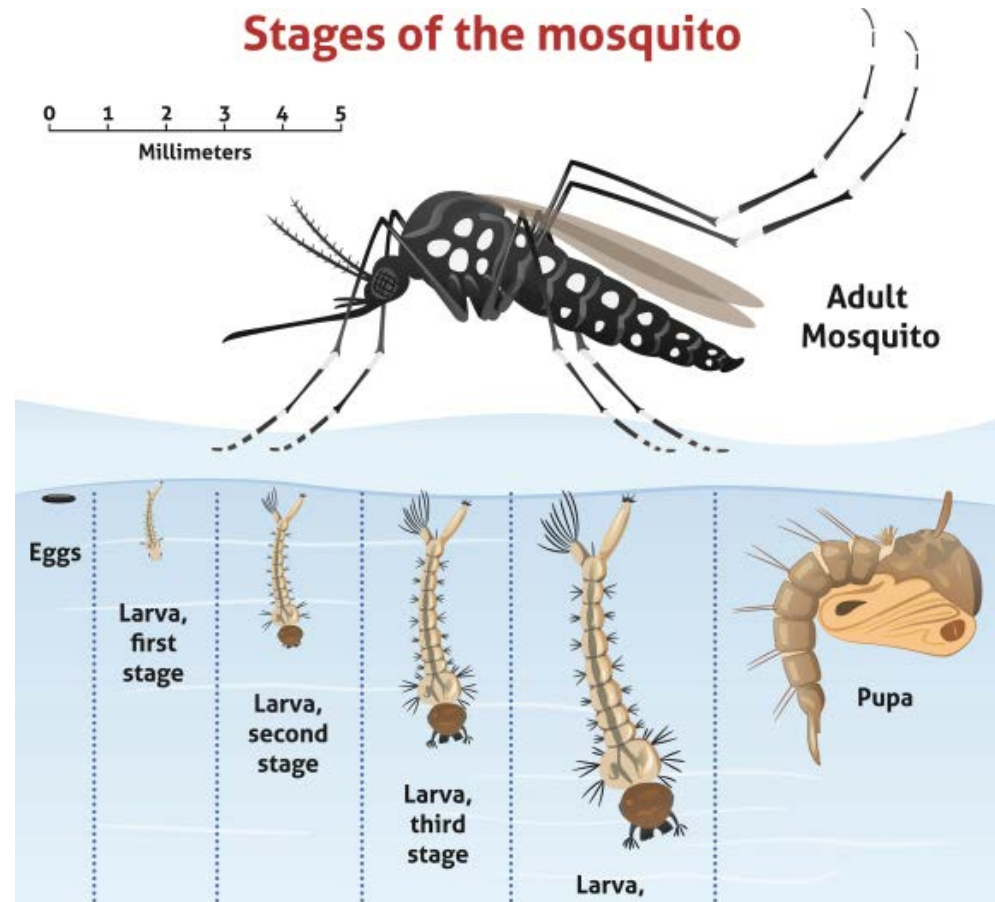
Administrative

5 FT Staff
1 Seasonal Staff



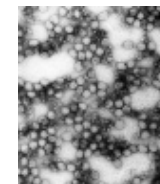
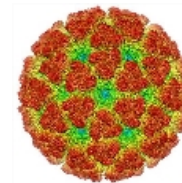
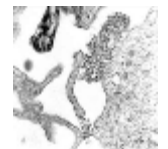
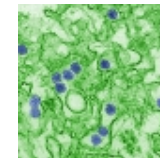
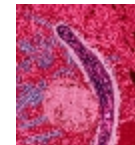
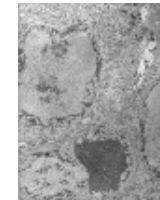
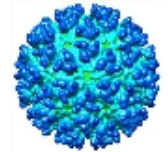
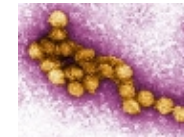
Aquatic Lifecycle

- 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

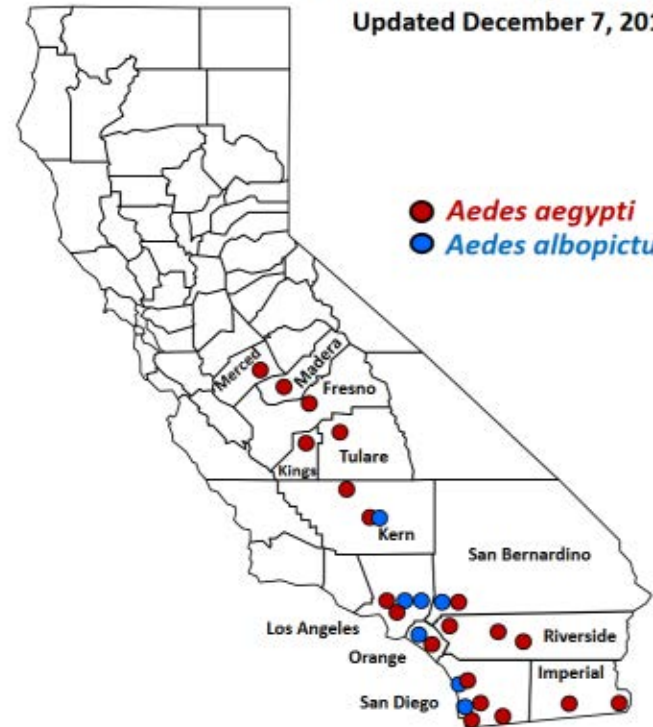
lyre-shaped pattern on thorax

Aedes albopictus

bright lateral line on thorax

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

Updated December 7, 2018



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

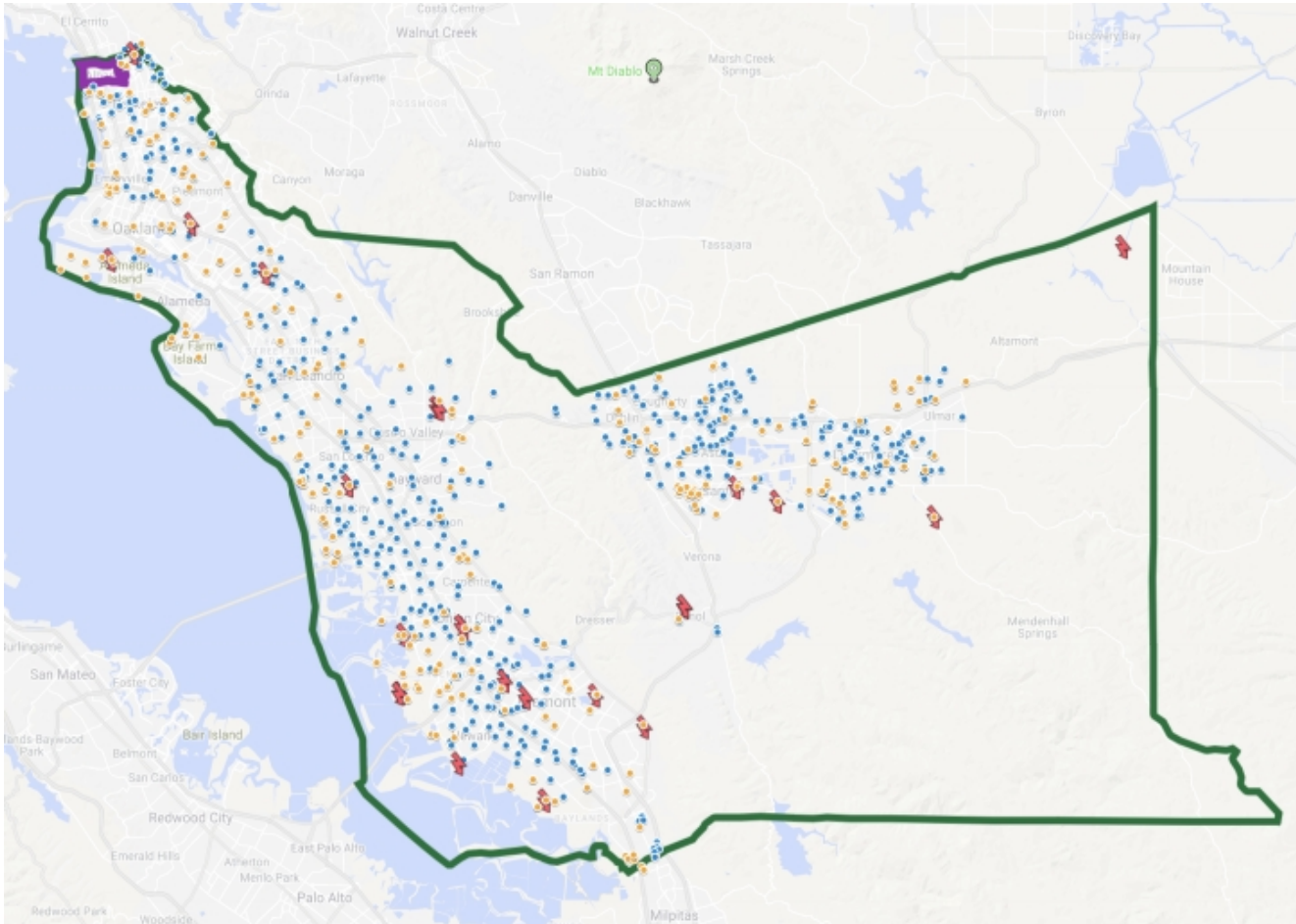
See pages 2 and 3 for *Aedes*
detections by city or census-
designated place in each
county.



Controlling Mosquitoes



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



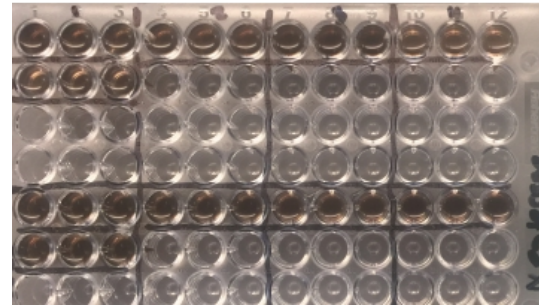
Testing for disease and insecticide resistance

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

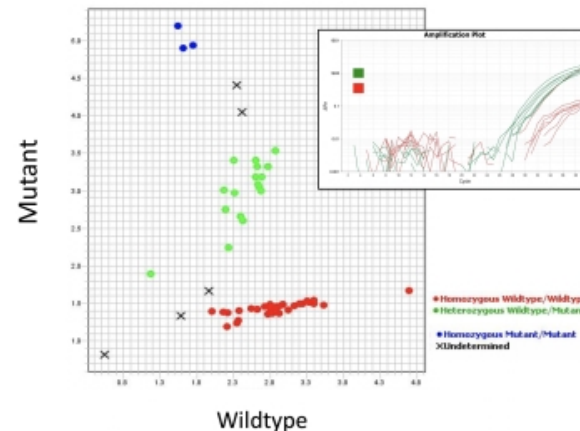
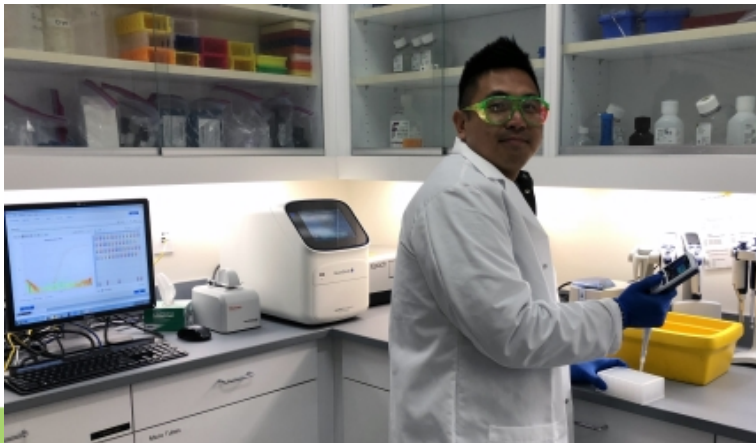


sensitivity to insecticides

virus test results in 3 hours



insecticide detoxification



genetic resistance

Controlling mosquitoes in storm drain systems



Controlling mosquitoes in marshes



Controlling mosquitoes with fish



Controlling mosquitoes through source reduction

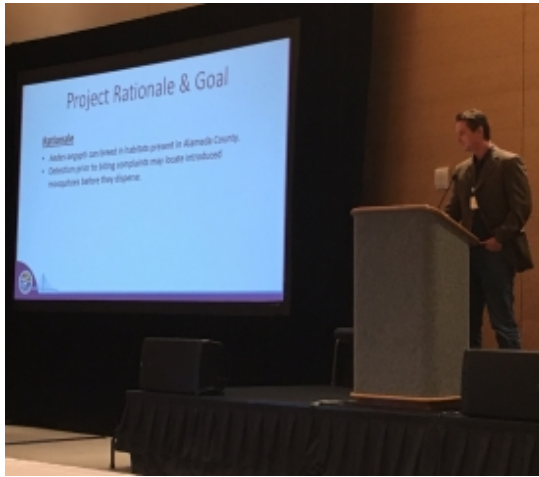


Channels for community outreach

Legislative



Interagency



Public



@AlamedaMosquito



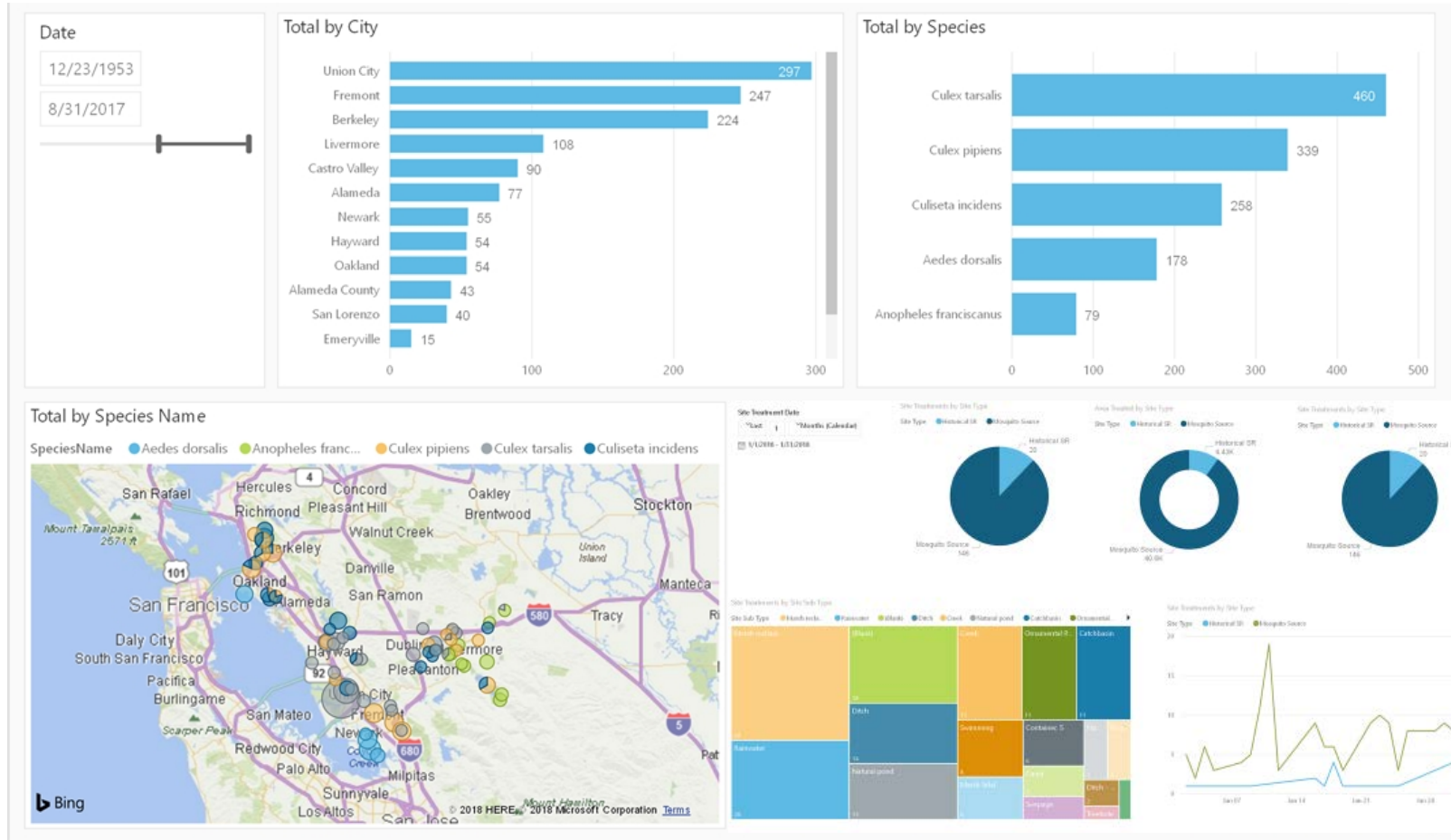
@AlamedaMosquito

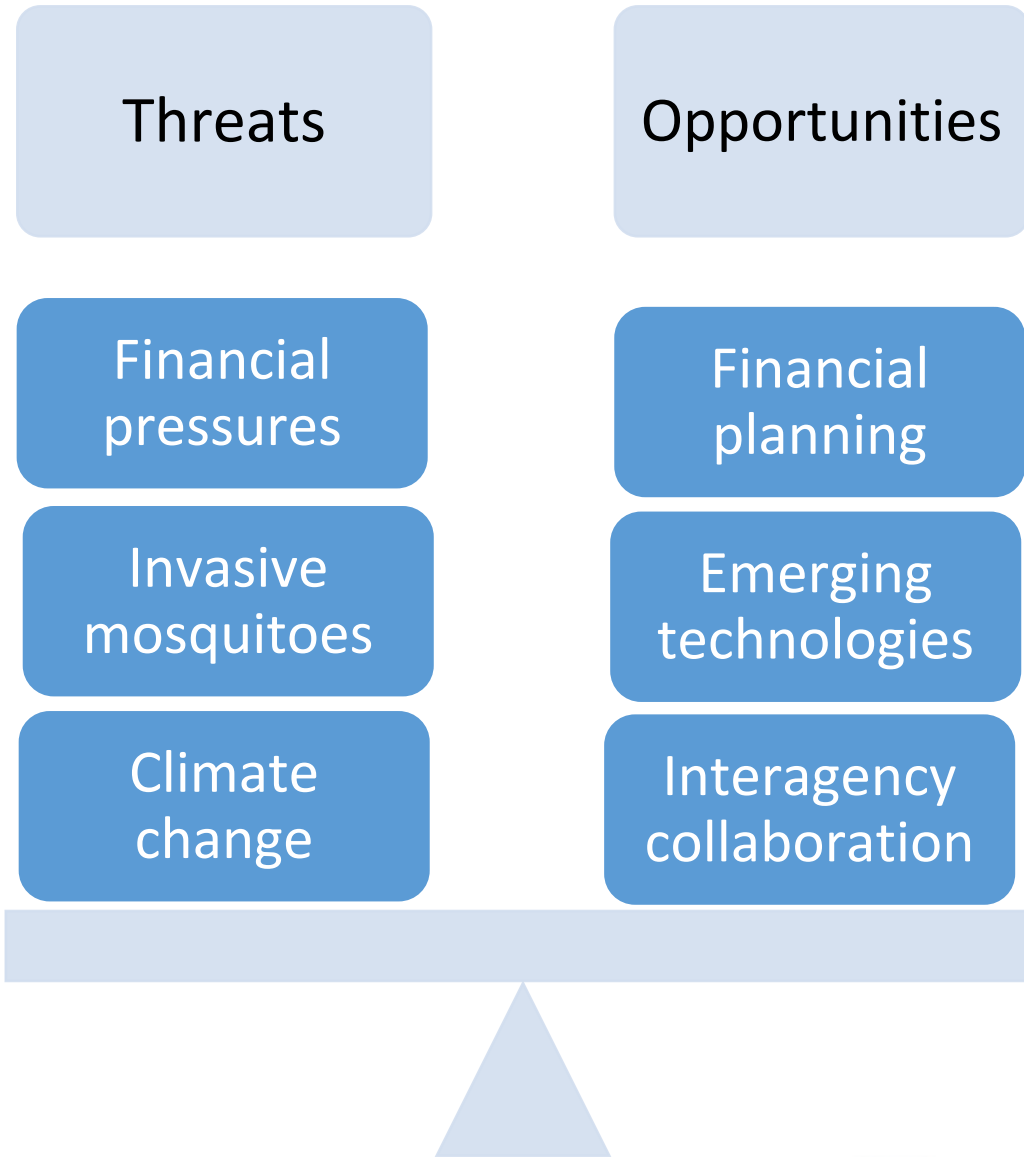


AlamedaMosquito



Quality Control & Automation





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



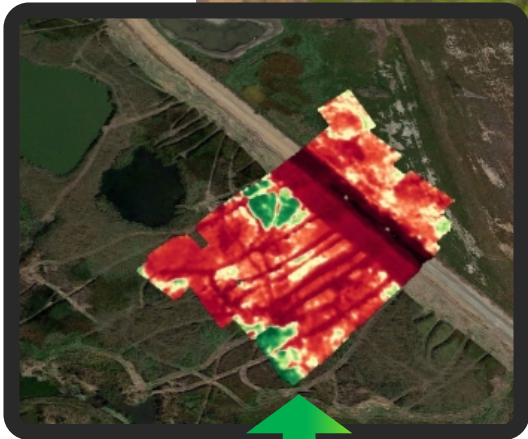
California Department of
Fish and Wildlife



**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



Mosquito Sources in the City of Berkeley



- Unmaintained swimming pools, catch basins, street gutters, creeks: Codornices & at Rose Garden
- McLaughlin East shore State Park
- Flooded basements
- Fish ponds-
mosquitofish requests
- Treeholes in Botanical Garden & John Hinkel Park
- UC Berkeley





- **Ryan Clausnitzer, MPA**
- **General Manager**
- 23187 Connecticut Street
- Hayward, CA 94545
- www.mosquitoes.org
- ryan@mosquitoes.org
- 510-925-1756

Thank you-

