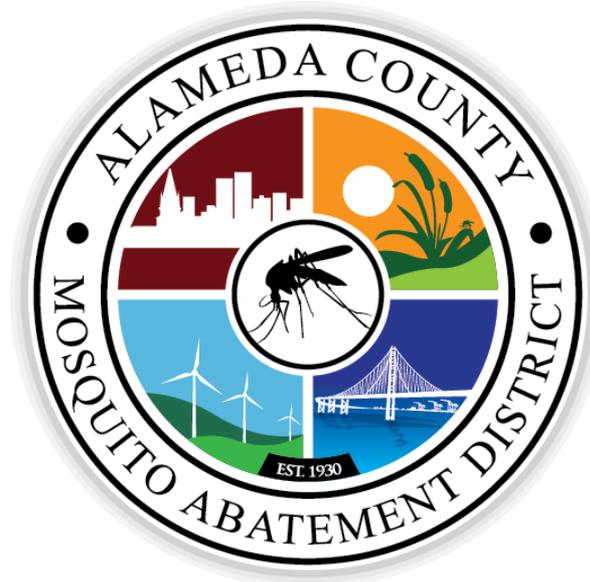


Modern Mosquito Control Challenges and Opportunities

An Independent Special District
Protecting Public Health since 1930



City of San Leandro: 1/7/19



Hello San Leandro.

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



Our Board of Trustees

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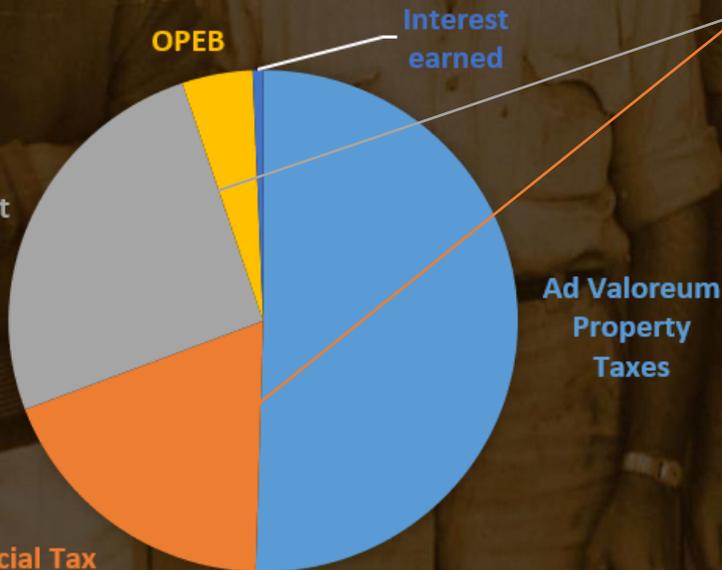
Subru Bhat, City of Union City

County-at-Large, vacant



Fixed Charges and/or Special Assessments

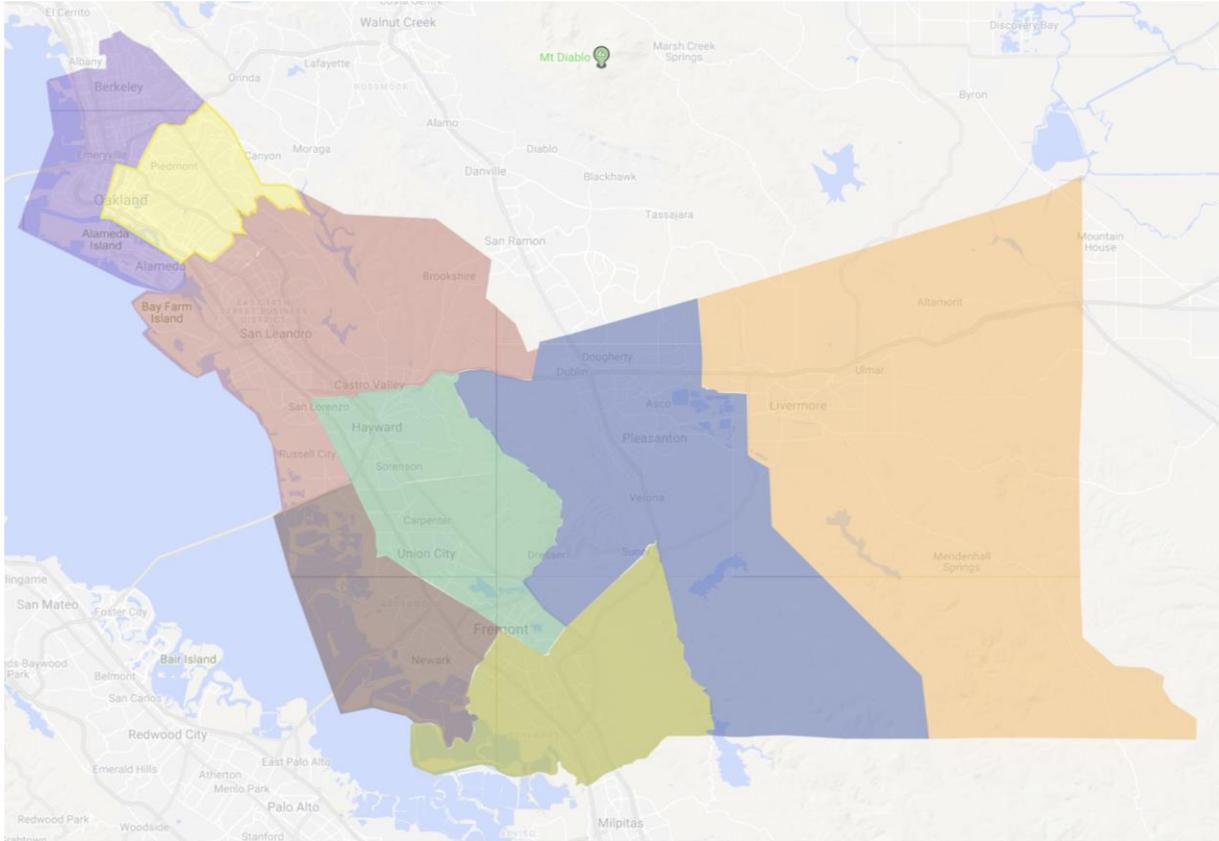
Description	Phone	Amount
CITY SEWER SERVICE	800-676-7516	313.80
MOSQUITO ABATEMENT	800-273-5167	1.74
CSA PARAMEDIC	800-441-8280	32.86
CSA VECTOR CONTROL	800-273-5167	5.92
HEALTHCARE DIST	800-273-5167	298.00
CSA LEAD ABATEMENT	510-567-8280	10.00
* SCHOOL MEASURE B1	844-332-0549	683.20
PERALTA CCD MEAS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

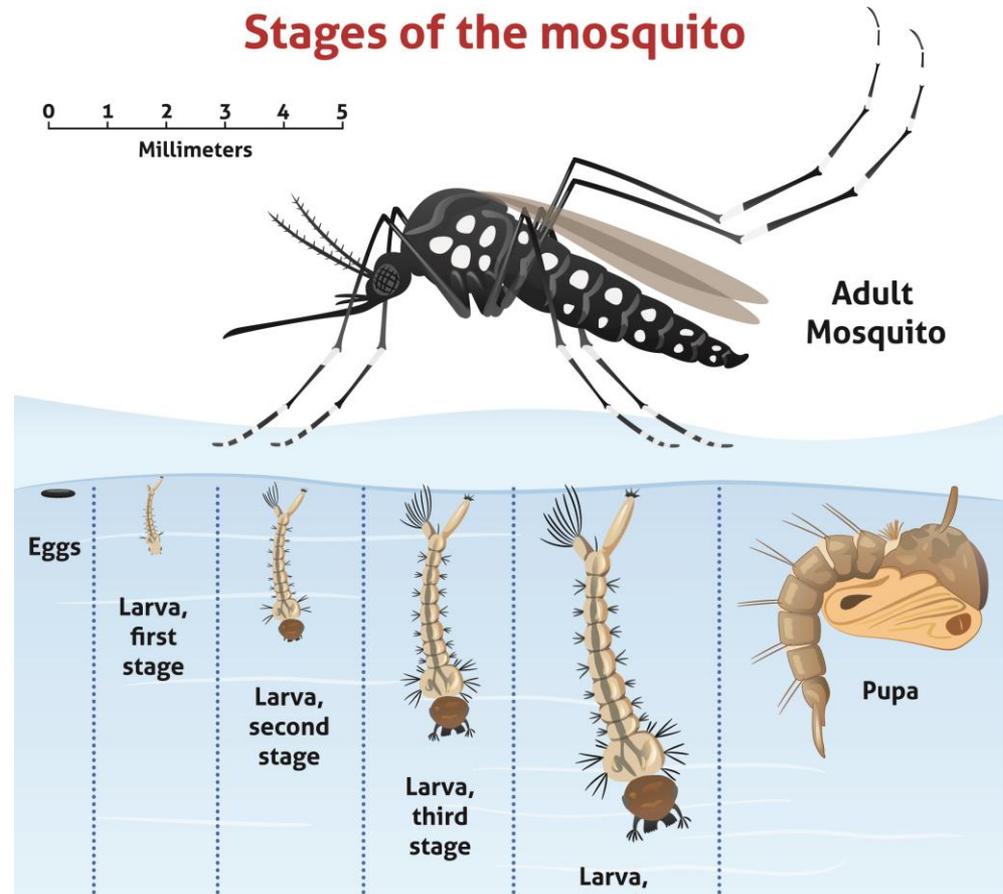
Administrative

5 FT Staff
1 Seasonal Staff



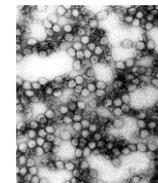
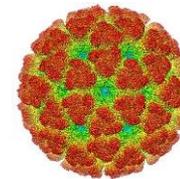
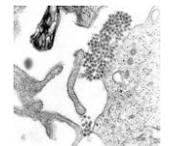
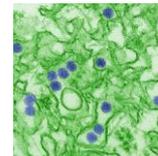
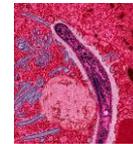
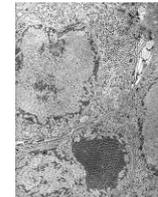
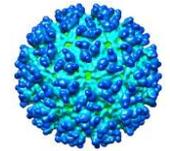
Aquatic Lifecycle

- 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

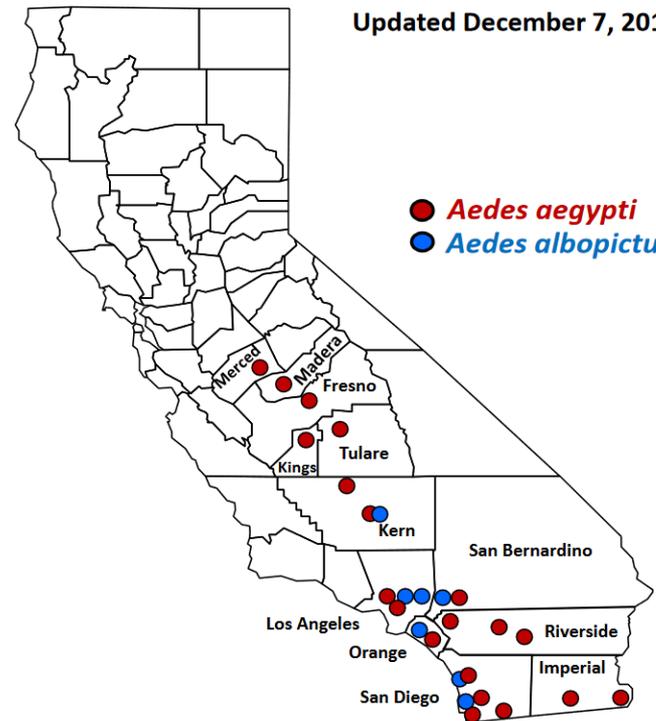
lyre-shaped pattern on thorax

Aedes albopictus

bright lateral line on thorax

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

Updated December 7, 2018



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

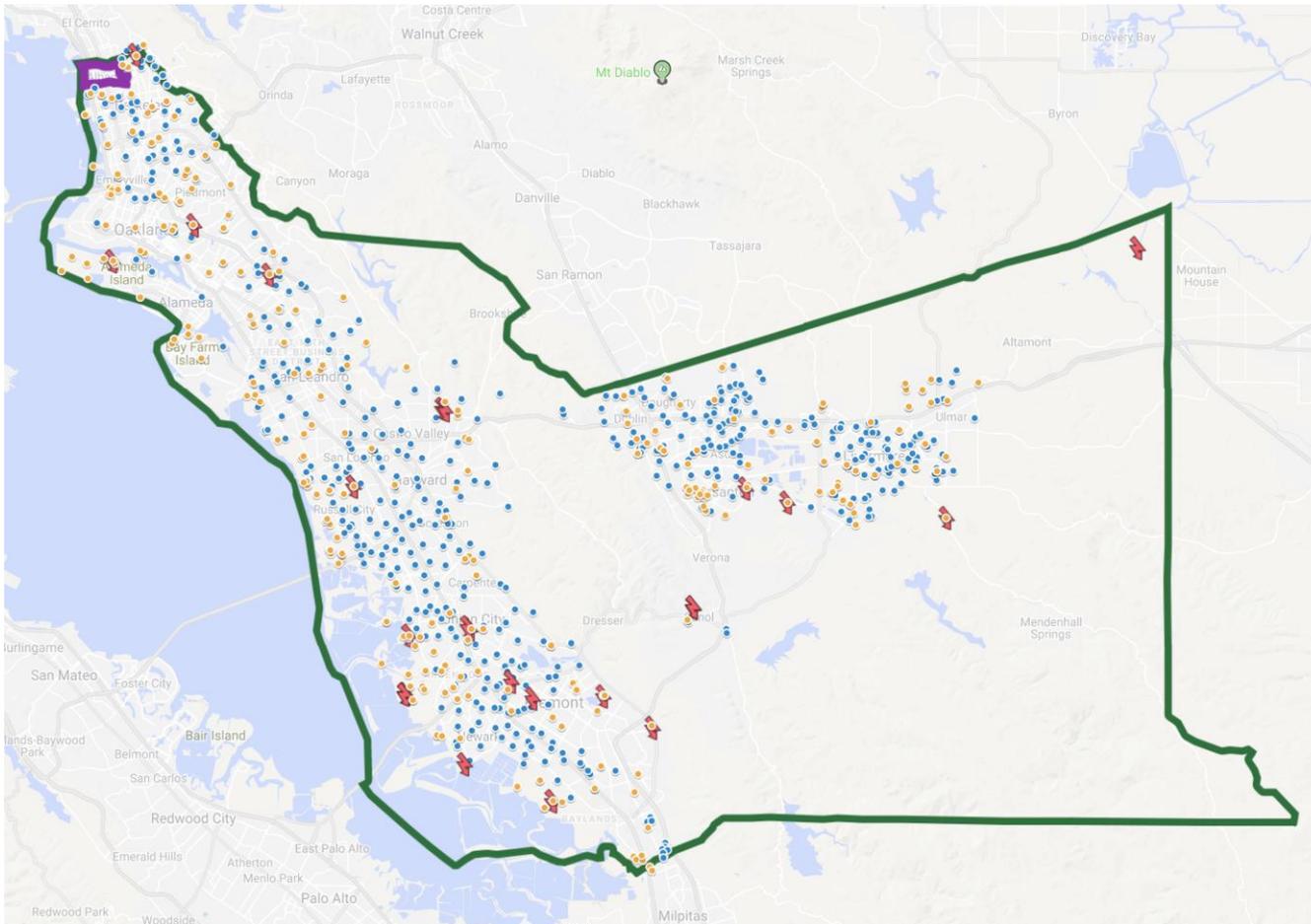
See pages 2 and 3 for *Aedes*
detections by city or census-
designated place in each
county.



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

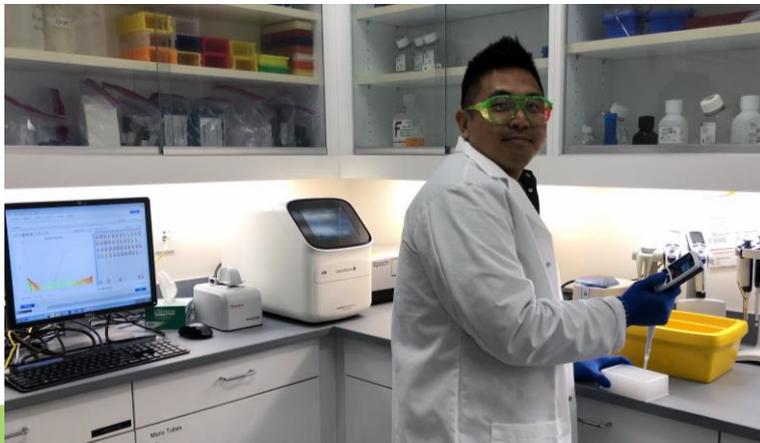


Testing for disease and insecticide resistance

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



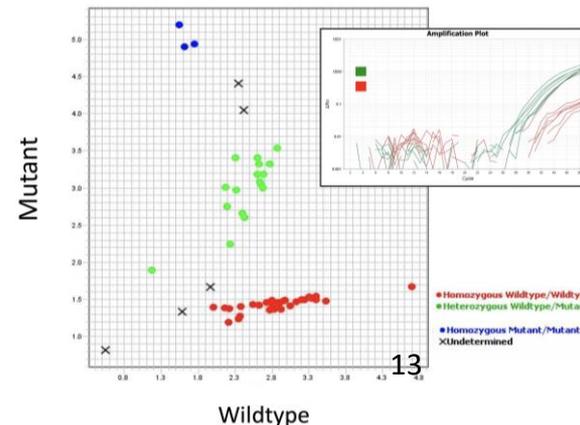
virus test results in 3 hours



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

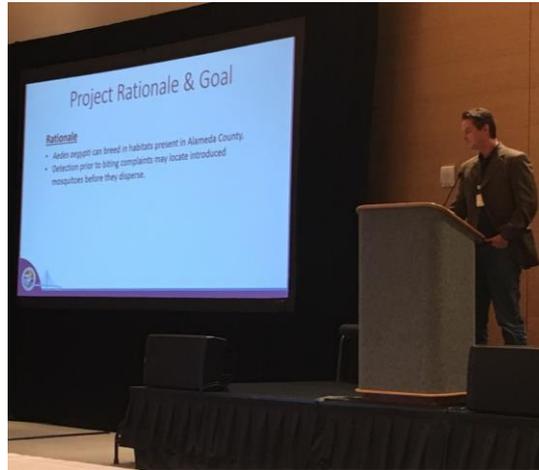


Channels for community outreach

Legislative



Interagency



Public



@AlamedaMosquito



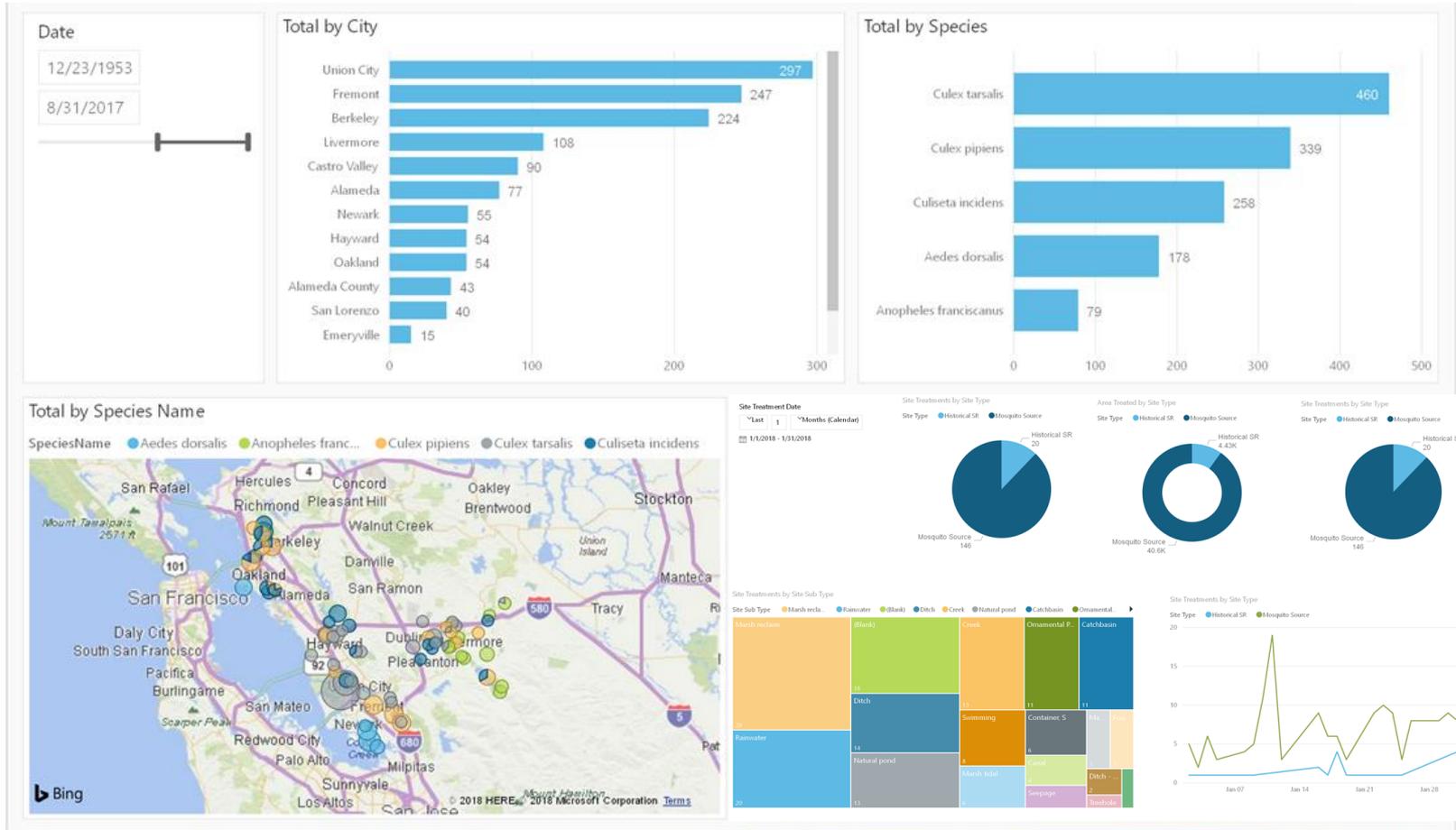
@AlamedaMosquito



AlamedaMosquito



Quality Control & Automation



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 San Leandro



- Heron Bay marsh
- Wastewater Treatment Center
- Golf Courses:
 - Tony Lema
 - Marina
 - Monarch Bay
- Unmaintained swimming pools, catch basins, flood control channels





Thank you-

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

