AGENDA
1105th MEETING OF THE BOARD OF TRUSTEES
OF THE ALAMEDA COUNTY MOSQUITO ABATEMENT DISTRICT
SEPTEMBER 14TH, 2022

TIME: 5:00 P.M.
PLACE: Hybrid Meeting of the Board of Trustees
Physically held at the Office of the District
23187 Connecticut Street, Hayward, CA 94545 and
Teleconferencing at https://us02web.zoom.us/j/83643352609
see below for additional details.

TRUSTEES: Subru Bhat, President, City of Union City
Victor Aguilar, Vice-President, City of San Leandro
Cathy Roache, Secretary, County-at-Large
Tyler Savage, City of Alameda
Preston Jordan, City of Albany
P. Robert Beatty, City of Berkeley
Shawn Kumagai, City of Dublin
Courtney Welch, City of Emeryville
George Young, City of Fremont
Elisa Márquez, City of Hayward
Steven Cox, City of Livermore
Eric Hentschke, City of Newark
Jan O. Washburn, City of Oakland
Hope Salzer, City of Piedmont
Julie Testa, City of Pleasanton

1. Call to order.

2. Roll call.

3. President Bhat invites any member of the public to speak at this time on any issue relevant to the district (each individual is limited to three minutes).

4. Approval of the minutes of the 1104th Regular Meeting held August 10th, 2022 (**Board action required**).

5. Resolution 1105-1 honoring Vector Biologist, Tom McMahon (**Board action required**)

6. Appointment of an ad-hoc policy review committee to review proposed changes to district policy (**Board Action required**).

7. Review of CalPERS June 30th, 2021, valuation reports (Information only).

    a. Staff report
    b. Actuarial Valuation as of June 30, 2021, for the Miscellaneous Plan of the Alameda County Mosquito Abatement District
    c. Actuarial Valuation as of June 30, 2021, for the PEPRA Miscellaneous Plan of the Alameda County Mosquito Abatement District

8. Financial Reports as of August 31st, 2022: (Information only).

    a. Check Register
    b. Income Statement
    c. Investments, reserves, and cash report
    d. Balance Sheet

9. Presentation of the Monthly Staff Report (Information only).

10. Presentation of the Manager's Report (Information only).
    a. CDPH Weekly Arbovirus report
    b. Pamela Wilde hired as Assistant Mosquito Control Technician
    c. Vector Scientist, Dereje Alemayehu, to present at the Pan African Mosquito Control Association's Annual Conference on September 26th-28th in Kigali, Rwanda.
    d. 2022 CSDA Annual Conference verbal staff report
    e. Training due: AB 1825: Kumagai

11. Board President asks for reports on conferences and seminars attended by Trustees.

12. Board President asks for announcements from members of the Board.

13. Board President asks trustees for items to be added to the agenda for the next Board meeting.

14. Adjournment.

ANYONE ATTENDING THE MEETING MAY SPEAK ON ANY AGENDA ITEM AT THEIR REQUEST.

Please Note: Board Meetings are accessible to people with disabilities and others who need assistance. Individuals who need special assistance or a disability-related modification or accommodation (including auxiliary aids or services) to observe and/or participate in this meeting and access meeting-related materials should contact Ryan Clausnitzer at least 48 hours before the meeting at 510-783-7744 or acmad@mosquitoes.org.

IMPORANT NOTICE REGARDING MEETING PARTICIPATION:

All members of the public seeking to observe and/or to address the local legislative body may participate in the meeting by attending in person at the address listed above, telephonically, or otherwise electronically in the manner described below.

HOW TO OBSERVE THE MEETING:

In Person: Attend in person at the Office of the District located at 23187 Connecticut Street, Hayward, CA 94545.
Telephone: Listen to the meeting live by calling Zoom at **(669) 900-6833** Enter the **Meeting ID#** 836 4335 2609 followed by the pound (#) key.

Computer: Watch the live streaming of the meeting from a computer by navigating to https://us02web.zoom.us/j/83643352609

Mobile: Log in through the Zoom mobile app on a smartphone and enter **Meeting ID#** 836 4335 2609

HOW TO SUBMIT PUBLIC COMMENTS:

Before the Meeting: Please email your comments to acmad@mosquitoes.org, write "Public Comment" in the subject line. In the body of the email, include the agenda item number and title, as well as your comments. If you would like your comment to be read aloud at the meeting (not to exceed three minutes at staff's cadence), prominently write "Read Aloud at Meeting" at the top of the email. All comments received before 12:00 PM the day of the meeting will be included as an agenda supplement on the District's website under the relevant meeting date and provided to the Trustees at the meeting. Comments received after this time will not be read aloud but will be added to the record after the meeting.

During the Meeting: The Board President or designee will announce the opportunity to make public comments. Speakers will be asked to provide their name and city of residence, although providing this is not required for participation. Each speaker will be afforded up to 3 minutes to speak unless another time is specified. Speakers should remain silent and/or will be muted until their opportunity to provide public comment.
In Person: Members of the public may raise their hand and wait to be recognized by the Board President or designee.
Telephone: Press star (*)9, which will alert staff that you have a comment to provide.
Computer or **Mobile**: Use the "raise hand" feature to alert staff that you have a comment to provide.

PUBLIC RECORDS:

Public records that relate to any item on the open session agenda for a meeting are available for public inspection. Those records that are distributed after the agenda posting deadline for the meeting are available for public inspection at the same time they are distributed to all or a majority of the members of the Board. The Board has designated the District's website located at https://www.mosquitoes.org/board-of-trustees-regular-meetings as the place for making those public records available for inspection. The documents may also be obtained by emailing acmad@mosquitoes.org.

MINUTES

1104th MEETING OF THE BOARD OF TRUSTEES OF THE ALAMEDA COUNTY MOSQUITO ABATEMENT DISTRICT

August 10th, 2022

TIME:	5:00 P.M.
PLACE:	Hybrid Meeting of the Board of Trustees Physically held at the Office of the District 23187 Connecticut Street, Hayward, CA 94545 and Teleconferencing at https://us02web.zoom.us/j/82043268457
TRUSTEES:	Subru Bhat, President, City of Union City Victor Aguilar, Vice-President, City of San Leandro Cathy Roache, Secretary, County-at-Large Tyler Savage, City of Alameda Preston Jordan, City of Albany P. Robert Beatty, City of Berkeley Shawn Kumagai, City of Dublin Courtney Welch, City of Emeryville George Young, City of Fremont Elisa Márquez, City of Hayward Steven Cox, City of Livermore Eric Hentschke, City of Newark Jan O. Washburn, City of Oakland Hope Salzer, City of Piedmont Julie Testa, City of Pleasanton

1. Board President Bhat called the regularly scheduled board meeting to order at 5:00 P.M.

2. Board President Bhat along with Trustees Roache and Hentschke were present in-person at the district. Trustees Aguilar, Jordan, Beatty, Young, Cox, Washburn, Salzer, and Testa were present on the Zoom conference. Trustees Savage, Kumagai, Welch, and Márquez were absent.

3. Board President Bhat invited members of the public to speak on any issue relevant to the district. Lab Director Eric Haas-Stapleton was present to speak on behalf of item five. Sky Mihaylo was present to give a presentation titled *Work Effort Distribution Analysis at Alameda County Mosquito Abatement District*. Regulatory & Public Affairs Director Erika Castillo was present to give a presentation titled *ACMAD Regulatory Update*. Information Technology Director Robert Ferdan was present for technical support. Vector Biologist Jeremy Sette was present to record the minutes. No public comments were submitted.

4. Approval of the minutes of the 1103rd meeting held July 13th, 2022.
   Motion: Trustee Hentschke moved to approve the minutes
   Second: Trustee Jordan
   Vote: motion carries: unanimous.

5. Approval of Leica M165C microscope with boom stand to replace Olympus SZ800.
   Discussion:
   Lab Director Eric Haas-Stapleton gave a background of the Leica M165C microscope and its potential benefit to the district and fielded the following discussion. Trustee Hentschke asked what the maintenance schedule is for the microscope (simple in-house maintenance and cleaning). Trustee Beatty commented on the low price. Trustee Cox asked how often these types of microscopes need to be replaced (a ten-year service life according to the capital replacement plan), where in the budget the purchase was coming from (the General Manager answered: from the Repair and Replace reserve fund), and since the price exceeds the amount budgeted, what measures need to be taken (any small overage will be covered by the interest gained in the Reserve and Replace fund). Trustee Jordan asked if all capital expenditures need to be brought to the Board and noted the low price of the microscope (the General Manager answered that per district policy, any purchase above $15K requires Board authorization). Trustee Salzer asked what the plans would be with the Olympus SZ800 (the General Manager answered that if there is no further use for the replacement microscope, it would be sold on an online government auction).
   Motion: Vice-President Aguilar moved to approve the purchase of the Leica M165C microscope with boom stand
   Second: Trustee Washburn
   Vote: motion carries: unanimous.

6. Presentation by Sky Mihaylo, MPP UC Berkeley, Goldman School of Public Policy: *Work Effort Distribution Analysis at Alameda County Mosquito Abatement District*
   Discussion:
   After Sky Mihaylo gave her presentation, she fielded the following questions. Trustee Beatty asked about the “Not Indicated” area of the map (Mihaylo answered that “Not Indicated” was because of a non-defined type of equipment used for operations treatments). The General Manager noted it was likely catch basin treatments. Vector Biologist Jeremy Sette added that the “Not Indicated” may be due to inconsistencies in data entry among staff. Trustee Jordan commented on the high number of service requests from downtown Berkeley and the low number from East Oakland (Mihaylo answered that his observation was consistent with the findings from Emily Estes equity report, and the General Manager agreed with this observation, which staff is addressing). Trustee Washburn asked how square footage treated was correlated to work effort (explained the process of converting acres to square feet for treatments), and asked how the UAS could affect workload effort (this model could be revised to reflect how new technologies change work effort), and asked how things will change when invasive *Aedes* are found in our district (these zones were established to control native mosquitoes; field staff work areas may be revised when invasive mosquitoes arrive to the district). Trustee Beatty commented on the different types of equipment used by operations such as treating tree-holes versus all-terrain vehicle treatments and commented on the challenges associated with interacting with the public (Mihaylo agreed). Trustee Jordan suggested using weighting factors in GIS mapping and asked about the future of the GIS project (the General Manager answered that the project is already in the next phase and gave a background on the rezoning project’s motivation related to improving health equity). Trustees Jordan and Salzer again commented on the low number of insecticide applications in East Oakland (the General Manager agreed and explained their intent to address this gap in service).

7. Presentation by Regulatory & Public Affairs Director, Erika Castillo: *ACMAD Regulatory Update*.
   Discussion:

Erika Castillo gave a presentation titled *ACMAD Regulatory Update* and fielded the following discussion. Trustee Salzer asked what the units were in the SF Estuary Tidal Marsh Restoration Goals slide (acres). President Bhat asked if "pollinators" were strictly bees (bees as well as butterflies and other flying insects). Trustee Jordan asked if the Wetland Regional Monitoring Program was a standalone agency (it is a fairly new organization that relies on grant funding and staffing through the SF Estuary Partnership and the SF Estuary Institute), if they did any fieldwork (not officially, but yes through collaborations), what is the People and Wetlands workgroup focus (expanding that program area to incorporate newly added tribal and community representative perspectives), asked about the purple areas in the map on page four that is not in the legend (will look into). Secretary Roache asked if spartina control in the marsh increased or decreased mosquito habitat (likely decreased). Trustee Cox was pleased with all the district's involvement with other agencies and asked if other regional districts were as involved (the regional districts support the district's efforts but there hasn't been a model developed to dedicate as much staff as ACMAD has). The General Manager commended Castillo and the district's efforts and leadership regionally, state and nationwide. President Bhat thanked Castillo for an excellent presentation. Trustee Salzer thanked Castillo and expressed how she was impressed by Castillo's efforts and leadership.

8. Financial Reports as of July 31st, 2022.
   Discussion:
   The General Manager presented the Financial Reports.

9. Presentation of the Monthly Staff Report.
   Discussion:
   The General Manager, Lab Director, and the Regulatory & Public Affairs Director gave the Monthly Staff Report.

10. Presentation of the Manager's Report.
    Discussion:
    The General Manager presented the Manager's Report and fielded the following discussion. The General Manager asked the Board if they would prefer an OPEB update by PFM in October with June financial numbers or a November report with September numbers (President Bhat suggested November). Next month, an unmaintained swimming pool presentation will likely given by Field Operations Supervisor Joseph Huston with assistance by Information Technology Director Robert Ferdan. Trustee Jordan asked about looking into the possibility of using algorithms for OPEB fund management rather than active management. The General Manager suggested that they speak offline further on the subject before bringing the topic back to the full board.

11. Board President Bhat asked for reports on conferences and seminars attended by Trustees. None.

12. Board President Bhat asked for announcements from the Board. None.

13. Board President Bhat asked trustees for items to be added to the agenda for the next Board meeting. None.

14. The meeting adjourned at 7:03 P.M.

Respectfully submitted,

_____
Cathy Roache, Secretary
BOARD OF TRUSTEES

Approved as written and/or corrected
at the 1105th meeting of the Board of
Trustees held September 14th, 2022

_____
Subru Bhat, President
BOARD OF TRUSTEES

RESOLUTION NO. 1105-1

ALAMEDA COUNTY MOSQUITO
ABATEMENT DISTRICT

COMMENDATION TO: Tom McMahon

WHEREAS: You, Tom McMahon, were hired by the district as an Assistant Technician on March 1st, 1988, until September 1st, 2001, and rehired as a Vector Biologist on April 7th 2014 until now, and

WHEREAS: Prior to your employment, you completed your Bachelor of Science degree in Entomology from San Jose State University in 1981, and

WHEREAS: You co-authored a paper published in 1992 in the Proceedings of the California Mosquito and Vector Control Association Vol:60 159-165; "*Establishing an Artificial Aquatic Weather Station and Its Relation to Alameda County Mosquito Abatement District's Computer Simulation (ECOSIM)*".

WHEREAS: You began your career at ACMAD in the groundbreaking field of predictive modeling (ZING) and completed your career by becoming our first Federal Aviation Administration and California Department of Pesticide Regulation certified unmanned aircraft pilot, and

WHEREAS: You were a hard-working, independent, and extremely reliable employee who some describe as the "best entomologist they know", therefore be it

RESOLVED: We, the Board of Trustees, do hereby extend our sincere appreciation for your dedication of service to this District.

23187 Connecticut Street
Hayward, CA 94545

T: (510) 783-7744
F: (510) 783-3903

acmad@mosquitoes.org

ACMAD Policy Update 2022

Staff is currently reviewing policies to update, focused mostly on updating job titles along with some clean-up language to match policy with practice. After scheduling a meeting with an *ad-hoc board sub-committee*, we hope to have the 1st reading at the October 12th Board meeting.

This is step 2 of the policy revision process **(bolded below):**

1. The General Manager determines which policies may be out of compliance, drafts revisions, and has those revisions reviewed by an HR consultant.
2. **This draft is shared with supervisory staff for comments.**
3. That update is then shared with the ad-hoc board sub-committee on policy for review.
4. Any changes are reviewed by the ACMAD Employee Association.
5. If changes are requested by the employee association, step 3 is repeated. If no changes are suggested, that agreed upon draft is placed in the Board packet for the 1st Board reading.
6. If changes are requested at the Board meeting, steps 3-4 are repeated, if no changes are made, the policies are placed in the following Board packet for a 2nd reading and adoption by the Board of Trustees.
7. The updated policies are then provided to staff and posted to the website.

23187 Connecticut Street
Hayward, CA 94545

T: (510) 783-7744
F: (510) 783-3903

acmad@mosquitoes.org

Staff Report on CalPERS Actuarial Valuation – June 30, 2021

Summary: The 2021 valuation report contains demographic data and financial information through June 30, 2021, to establish the required contributions for employers as well as certain members (e.g., PEPRA employees) for FY 2023-24. The recent announcement of the reported investment loss of -6.1% for FY 2021-22 will ***not*** have an impact on the employer or member contributions for FY 2023-24. This loss will be reflected in the June 30, 2022, valuation report (available August 2023), and will not impact employer contributions until FY 2024-25.

Highlights of 2021 Valuation Results *(report page listed)*:

Classic:

- Page 4: Employer contribution will increase from 11.61% to 13.26%.
- Page 4 – The minimum required employer contribution towards the Unfunded Accrued Liability (UAL) for the 2023-24 FY *decreased* by $12,277.00 from 2022-23 FY's UAL payment.
- Page 6 – Plan's Funded Status as of June 30, 2021 – Increased by 9.8% to 82.6% (this funding status does ***not*** reflect *the district's pension stabilization fund*)
  - This page also lists the projected employer contributions.
- Pages 18-19 provides discount rate sensitivity due to investment return scenarios
- Pages 23 & 24 provides the district's participate data and lists the benefit options

PEPRA:

- Page 4 – Employer contribution increasing from 7.76% to 8.00%.
- Page 4 – Member contribution increasing from 7.25% to 8.25%.
- Page 5 – The minimum required employer contribution towards the UAL for the 2023-24 FY is $0.
- Page 6 – Plan's Funded Status as of June 30, 2021 – Increased by 14.2% to 102.8%.

Attachments:

- Valuation Report – Classic Plan
- Valuation Report – PEPRA Plan

California Public Employees' Retirement System
Actuarial Office
400 Q Street, Sacramento, CA 95811 | Phone: (916) 795-3000 | Fax: (916) 795-2744
888 CalPERS (or **888**-225-7377) | TTY: (877) 249-7442 | **www.calpers.ca.gov**

July 2022

Miscellaneous Plan of the Alameda County Mosquito Abatement District (CalPERS ID: 5854416969)
Annual Valuation Report as of June 30, 2021

Dear Employer,

Attached to this letter, you will find the June 30, 2021 actuarial valuation report for the rate plan noted above. **Provided in this report is the determination of the minimum required employer contributions for fiscal year (FY) 2023-24**. In addition, the report contains important information regarding the current financial status of the plan as well as projections and risk measures to aid in planning for the future.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2021.

Section 2 can be found on the CalPERS website (www.calpers.ca.gov). From the home page, go to *"Forms & Publications"* and select *"View All"*. In the search box, enter *"Risk Pool"* and from the results list download the Miscellaneous Risk Pool Actuarial Valuation Report for June 30, 2021.

Your June 30, 2021 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. The plan actuary whose signature is in the Actuarial Certification is available to discuss.

Actuarial valuations are based on assumptions regarding future plan experience including investment return and payroll growth, eligibility for the types of benefits provided, and longevity among retirees. The CalPERS Board of Administration (board) adopts these assumptions after considering the advice of CalPERS actuarial and investment teams and other professionals. Each actuarial valuation reflects all prior differences between actual and assumed experience and adjusts the contribution requirements as needed. This valuation is based on an investment return assumption of 6.8%, which was adopted by the board in November 2021. Other assumptions used in this report are those recommended in the CalPERS Experience Study and Review of Actuarial Assumptions report from November 2021.

Required Contribution

The table below shows the minimum required employer contributions for FY 2023-24 along with estimates of the required contributions for FY 2024-25. Employee contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The required employer contributions in this report do not reflect any cost sharing arrangement between the agency and the employees.**

Fiscal Year	Employer Normal Cost Rate	Employer Amortization of Unfunded Accrued Liability
2023-24	13.26%	$297,212
Projected Results		
2024-25	*13.3%*	*$292,000*

The actual investment return for FY 2021-22 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 6.8%. ***To the extent the actual investment return for FY 2021-22 differs from 6.8%, the actual contribution requirements for FY 2024-25 will differ from those shown above.*** For additional details regarding the assumptions and methods used for these projections, please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section. This section also contains projected required contributions through FY 2028-29.

Changes from Previous Year's Valuation

On July 12, 2021, CalPERS reported a preliminary 21.3% net return on investments for FY 2020-21. Since the return exceeded the 7.00% discount rate sufficiently, the CalPERS Funding Risk Mitigation policy allows CalPERS to use a portion of the investment gain to offset the cost of reducing the expected volatility of future investment returns. Based on the thresholds specified in the policy, the excess return of 14.3% prescribes a reduction in investment volatility that corresponds to a reduction in the discount rate of 0.20%, from 7.00% to 6.80%.

On November 17, 2021, the board adopted new actuarial assumptions based on the recommendations in the November 2021 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases, and inflation assumption for public agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2023-24. In addition, the board adopted a new strategic asset allocation as part of its Asset Liability Management process. The new asset allocation along with the new capital market assumptions and economic assumptions support a discount rate of 6.80%. This includes a reduction in the price inflation assumption from 2.50% to 2.30%.

Besides the above noted changes, there may also be changes specific to the plan such as contract amendments and funding changes.

Further descriptions of general changes are included in the "Highlights and Executive Summary" section and in Appendix A of the Section 2 report, "Actuarial Methods and Assumptions."

Questions

We understand that you might have questions about these results, and the plan actuary whose signature is on the valuation report is available to discuss. If you have other questions, you may call the Customer Contact Center at (888)-CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO, ASA, EA, MAAA, FCA, CFA
Chief Actuary

Actuarial Valuation
as of June 30, 2021

for the
Miscellaneous Plan
of the
Alameda County Mosquito Abatement District
(CalPERS ID: 5854416969)

Required Contributions
for Fiscal Year
July 1, 2023 - June 30, 2024

Table of Contents

Section 1

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Plan Specific Information for the Miscellaneous Plan of the Alameda County Mosquito Abatement District

(CalPERS ID: 5854416969)
(Rate Plan ID: 111)

Table of Contents

Actuarial Certification

To the best of our knowledge, this report, comprising of Sections 1 and 2, is complete and accurate and contains sufficient information to disclose, fully and fairly, the funded condition of the Miscellaneous Plan of the Alameda County Mosquito Abatement District and satisfies the actuarial valuation requirements of Government Code section 7504. This valuation is based on the member and financial data as of June 30, 2021 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. Section 1 of this report is based on the member and financial data for Alameda County Mosquito Abatement District, while Section 2 is based on the corresponding information for all agencies participating in the Miscellaneous Risk Pool to which the plan belongs.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the Miscellaneous Risk Pool has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the rate plan, it is my opinion as the plan actuary that the Unfunded Accrued Liability amortization bases as of June 30, 2021 and employer contribution as of July 1, 2023 have been properly and accurately determined in accordance with the principles and standards stated above.

The undersigned is an actuary who satisfies the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States with regard to pensions.

EDDIE W. LEE, ASA, EA, FCA, MAAA
Senior Pension Actuary, CalPERS

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Contributions**
- **Additional Discretionary Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Other Pooled Miscellaneous Risk Pool Rate Plans**
- **Cost**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2021 actuarial valuation of the Miscellaneous Plan of the Alameda County Mosquito Abatement District of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for (FY) 2023-24.

Purpose of Section 1

This Section 1 report for the Miscellaneous Plan of the Alameda County Mosquito Abatement District of CalPERS was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2021;
- Determine the minimum required employer contribution for this plan for the FY July 1, 2023 through June 30, 2024; and
- Provide actuarial information as of June 30, 2021 to the CalPERS Board of Administration (board) and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to Governmental Accounting Standards Board (GASB) Statement No. 68 for a Cost Sharing Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available on the CalPERS website (www.calpers.ca.gov).

The measurements shown in this actuarial valuation may not be applicable for other purposes. The agency should contact the plan actuary before disseminating any portion of this report for any reason that is not explicitly described above.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; changes in plan provisions or applicable law; and differences between the required contributions determined by the valuation and the actual contributions made by the agency.

Assessment and Disclosure of Risk

This report includes the following risk disclosures consistent with the recommendations of Actuarial Standards of Practice No. 51 and recommended by the California Actuarial Advisory Panel (CAAP) in the Model Disclosure Elements document:

- A "Scenario Test," projecting future results under different investment income returns.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 5.8% and 7.8%.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10% lower or 10% higher than our current post-retirement mortality assumptions adopted in 2021.
- Plan maturity measures indicating how sensitive a plan may be to the risks noted above.

Required Contributions

Required Employer Contributions	Fiscal Year 2023-24
Employer Normal Cost Rate	**13.26%**
Plus	
Required Payment on Amortization Bases[1]	**$297,212**
Paid either as	
1) Monthly Payment	**$24,767.67**
Or	
2) Annual Prepayment Option*	**$287,595**

The total minimum required employer contribution is the sum of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll and paid as payroll is reported) plus the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly (1) or prepaid annually (2) in dollars).

** Only the UAL portion of the employer contribution can be prepaid **(which must be received in full no later than July 31)**.*

Development of Normal Cost as a Percentage of Payroll	Fiscal Year 2022-23	Fiscal Year 2023-24
Base Total Normal Cost for Formula	17.24%	18.76%
Surcharge for Class 1 Benefits[2]		
a) FAC 1	0.55%	0.63%
b) PRSA	0.74%	0.79%
Phase out of Normal Cost Difference[3]	0.00%	0.00%
Plan's Total Normal Cost	18.53%	20.18%
Formula's Expected Employee Contribution Rate	6.92%	6.92%
Employer Normal Cost Rate	11.61%	13.26%

[1] The required payment on amortization bases does not take into account any additional discretionary payment made after April 29, 2022.

[2] Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

[3] The normal cost change is phased out over a five-year period in accordance with the CalPERS contribution allocation policy.

Additional Discretionary Employer Contributions

The minimum required employer contribution towards the Unfunded Accrued Liability (UAL) for this rate plan for the 2023-24 FY is $297,212. CalPERS allows agencies to make additional discretionary payments (ADPs) at any time and in any amount. These optional payments serve to reduce the UAL and future required contributions and can result in significant long-term savings. Agencies can also use ADPs to stabilize annual contributions as a fixed dollar amount, percent of payroll or percent of revenue.

Provided below are select ADP options for consideration. Making such an ADP during FY 2023-24 does not require an ADP be made in any future year, nor does it change the remaining amortization period of any portion of unfunded liability. For information on permanent changes to amortization periods, see the "Amortization Schedule and Alternatives" section of the report.

Agencies considering making an ADP should contact CalPERS for additional information.

Minimum Required Employer Contribution for Fiscal Year 2023-24

Estimated Normal Cost	Minimum UAL Payment	ADP	Total UAL Contribution	Estimated Total Contribution
$178,934	$297,212	$0	$297,212	$476,146

Alternative Fiscal Year 2023-24 Employer Contributions for Greater UAL Reduction

Funding Target	Estimated Normal Cost	Minimum UAL Payment	ADP[1]	Total UAL Contribution	Estimated Total Contribution
10 years	$178,934	$297,212	$43,249	$340,461	$519,395
5 years	$178,934	$297,212	$288,274	$585,486	$764,420

[1] The ADP amounts are assumed to be made in the middle of the fiscal year. A payment made earlier or later in the fiscal year would have to be less or more than the amount shown to have the same effect on the UAL amortization.

Note that the calculations above are based on the projected Unfunded Accrued Liability as of June 30, 2023 as determined in the June 30, 2021 actuarial valuation. New unfunded liabilities can emerge in future years due to assumption or method changes, changes in plan provisions, and actuarial experience different than assumed. Making an ADP illustrated above for the indicated number of years will not result in a plan that is exactly 100% funded in the indicated number of years. Valuation results will vary from one year to the next and can diverge significantly from projections over a period of several years.

Plan's Funded Status

	June 30, 2020	June 30, 2021
1. Present Value of Projected Benefits (PVB)	$16,220,160	$17,487,363
2. Entry Age Accrued Liability (AL)	14,550,670	15,484,380
3. Plan's Market Value of Assets (MVA)	10,598,648	12,793,951
4. Unfunded Accrued Liability (UAL) [(2) - (3)]	3,952,022	2,690,429
5. Funded Ratio [(3) / (2)]	72.8%	82.6%

The UAL and funded ratio are assessments of the need for future employer contributions based on the actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. The funded ratio, on the other hand, is a relative measure of funded status that allows for comparison between plans of different sizes. For measures of funded status that are appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

Projected Employer Contributions

The table below shows the required and projected employer contributions (before cost sharing) for the next six fiscal years. The projection assumes that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. In particular, the investment return beginning with FY 2021-22 is assumed to be 6.80% per year, net of investment and administrative expenses. Actual contribution rates during this projection period could be significantly higher or lower than the projection shown below. Future contribution requirements may differ significantly from those shown below. The actual long-term cost of the plan will depend on the actual benefits and expenses paid and the actual investment experience of the fund.

	Required Contribution	Projected Future Employer Contributions (Assumes 6.80% Return for Fiscal Year 2021-22 and Beyond)				
Fiscal Year	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**
	Rate Plan 111 Results					
Normal Cost %	13.26%	13.3%	13.3%	13.3%	13.3%	13.3%
UAL Payment	$297,212	$292,000	$277,000	$262,000	$240,000	$250,000

For some sources of UAL, the change in UAL is amortized using a 5-year ramp up. For more information, please see "Amortization of the Unfunded Actuarial Accrued Liability" under "Actuarial Methods" in Appendix A of the Section 2 Report. This method phases in the impact of the change in UAL over a 5-year period in order to reduce employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years when there is a large increase in UAL, the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

For projected contributions under alternate investment return scenarios, please see the "Future Investment Return Scenarios" in the "Risk Analysis" section.

Our online pension plan projection tool, Pension Outlook, is available in the Employers section of the CalPERS website. Pension Outlook can help plan and budget pension costs under various scenarios.

Other Pooled Miscellaneous Risk Pool Rate Plans

All of the results presented in this Section 1 report, except those shown below, correspond to rate plan 111. In many cases, employers have additional rate plans within the same risk pool. For cost analysis and budgeting it is useful to consider contributions for these rate plans as a whole rather than individually. The estimated contribution amounts and rates for all of the employer's rate plans in the Miscellaneous Risk Pool are shown below and assume that the payroll for each rate plan will grow according to the overall payroll growth assumption of 2.80% per year for three years.

	Fiscal Year 2022-23	Fiscal Year 2023-24
Estimated Combined Employer Contributions for all Pooled Miscellaneous Rate Plans		
Projected Payroll for the Contribution Year	$2,048,917	$2,181,248
Estimated Employer Normal Cost	$208,945	$245,480
Required Payment on Amortization Bases	$313,679	$297,212
Estimated Total Employer Contributions	$522,624	$542,692
Estimated Total Employer Contribution Rate (illustrative only)	25.51%	24.88%

Cost

Actuarial Determination of Plan Cost

Contributions to fund the plan are comprised of two components:

- Normal Cost, expressed as a percentage of total active payroll
- Amortization of the Unfunded Accrued Liability (UAL), expressed as a dollar amount

For fiscal years prior to 2016-17, the Amortization of UAL component was expressed as a percentage of total active payroll. Starting with FY 2016-17, the Amortization of UAL component was expressed as a dollar amount and invoiced on a monthly basis. There continues to be an option to prepay this amount during July of each fiscal year.

The Normal Cost component is expressed as a percentage of active payroll with employer and employee contributions payable as part of the regular payroll reporting process.

The determination of both components requires complex actuarial calculations. The calculations are based on a set of actuarial assumptions which can be divided into two categories:

- Demographic assumptions (e.g., mortality rates, retirement rates, employment termination rates, disability rates)
- Economic assumptions (e.g., future investment earnings, inflation, salary growth rates)

These assumptions reflect CalPERS' best estimate of future experience of the plan and are long term in nature. We recognize that all assumptions will not be realized in any given year. For example, the investment earnings at CalPERS have averaged 6.9% over the 20 years ending June 30, 2021, yet individual fiscal year returns have ranged from -23.6% to +21.3%. In addition, CalPERS reviews all actuarial assumptions by conducting in-depth experience studies every four years, with the most recent experience study completed in 2021.

Changes Since the Prior Year's Valuation

Benefits

The standard actuarial practice at CalPERS is to recognize mandated legislative benefit changes in the first annual valuation following the effective date of the legislation. Voluntary benefit changes by plan amendment are generally included in the first valuation that is prepared after the amendment becomes effective, even if the valuation date is prior to the effective date of the amendment.

This valuation generally reflects plan changes by amendments effective before the date of the report. Please refer to the "Plan's Major Benefit Options" and Appendix B of the Section 2 Report for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

On November 17, 2021, the board adopted new actuarial assumptions based on the recommendations in the 2021 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases, and inflation assumption for Public Agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2023-24. In addition, the board adopted a new asset portfolio as part of its Asset Liability Management process. The new asset mix supports a 6.80% discount rate, which reflects a change in the price inflation assumption to 2.30%.

Subsequent Events

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2021. Changes subsequent to that date are not reflected. Investment returns below the assumed rate of return may increase future required contributions while investment returns above the assumed rate of return may decrease future required contributions.

The projected employer contributions on Page 6 are calculated under the assumption that the discount rate remains at 6.8% going forward and that the realized rate of return on assets for FY 2021-22 is 6.8%.

This actuarial valuation report reflects statutory changes, regulatory changes and board actions through January 2022. Any subsequent changes or actions are not reflected.

Assets and Liabilities

- **Breakdown of Entry Age Accrued Liability**
- **Allocation of Plan's Share of Pool's Experience/Assumption Change**
- **Development of Plan's Share of Pool's Market Value of Assets**
- **Schedule of Plan's Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Accrued Liability

Active Members	$5,380,597
Transferred Members	574,154
Terminated Members	335,305
Members and Beneficiaries Receiving Payments	9,194,324
Total	$15,484,380

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1.	Plan's Accrued Liability	$15,484,380
2.	Projected UAL balance at 6/30/2021	3,997,576
3.	Pool's Accrued Liability[1]	20,794,529,023
4.	Sum of Pool's Individual Plan UAL Balances at 6/30/2021[1]	4,597,734,264
5.	Pool's 2020/21 Investment (Gain)/Loss[1]	(2,338,185,055)
6.	Pool's 2020/21 Non-Investment (Gain)/Loss[1]	(84,077,623)
7.	Plan's Share of Pool's Investment (Gain)/Loss: [(1) - (2)] ÷ [(3) - (4)] × (5)	(1,658,246)
8.	Plan's Share of Pool's Non-Investment (Gain)/Loss: (1) ÷ (3) × (6)	(62,607)
9.	Plan's New (Gain)/Loss as of 6/30/2021: (7) + (8)	(1,720,853)
10.	Increase in Pool's Accrued Liability due to Change in Assumptions[1]	60,407,898
11.	Plan's Share of Pool's Change in Assumptions: (1) ÷ (3) × (10)	44,982
12.	Increase in Pool's Accrued Liability due to Funding Risk Mitigation[1]	495,172,731
13.	Plan's Share of Pool's Change due to Funding Risk Mitigation: (1) ÷ (3) × (12)	368,724
14.	Offset due to Funding Risk Mitigation	(386,919)
15.	Plan's Net Investment (Gain): (7) – (14)	(1,271,327)

[1] Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

16.	Plan's UAL: (2) + (9) + (11) + (13)	$2,690,429
17.	Plan's Share of Pool's MVA: (1) - (16)	$12,793,951

Schedule of Plan's Amortization Bases

Note that there is a two-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2021.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: FY 2023-24.

This two-year lag is necessary due to the amount of time needed to extract and test the membership and financial data, and the need to provide public agencies with their required employer contribution well in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward two years from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the expected payment on the UAL for the fiscal year and adjusting for interest. The expected payment for the first fiscal year is determined by the actuarial valuation two years ago and the contribution for the second year is from the actuarial valuation one year ago. Additional discretionary payments are reflected in the Expected Payments column in the fiscal year they were made by the agency.

Reason for Base	Date Est.	Ramp Level 2023-24	Ramp Shape	Escala-tion Rate	Amort. Period	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Expected Payment 2022-23	Balance 6/30/23	Minimum Required Payment 2023-24
Investment (Gain)/Loss	6/30/13	100%	Up/Down	2.80%	22	1,405,905	98,012	1,400,217	100,707	1,391,357	100,988
Non-Investment (Gain)/Loss	6/30/13	100%	Up/Down	2.80%	22	(13,517)	(942)	(13,463)	(968)	(13,378)	(971)
Share of Pre-2013 Pool UAL	6/30/13	No Ramp		2.80%	14	705,256	60,727	690,456	62,397	672,923	62,915
Assumption Change	6/30/14	100%	Up/Down	2.80%	13	625,812	62,929	603,334	64,660	577,538	65,376
Investment (Gain)/Loss	6/30/14	100%	Up/Down	2.80%	23	(1,094,030)	(74,216)	(1,091,726)	(76,257)	(1,087,156)	(76,404)
Non-Investment (Gain)/Loss	6/30/14	100%	Up/Down	2.80%	23	1,177	80	1,174	82	1,169	82
Investment (Gain)/Loss	6/30/15	100%	Up/Down	2.80%	24	682,274	45,117	682,043	46,357	680,515	46,408
Non-Investment (Gain)/Loss	6/30/15	100%	Up/Down	2.80%	24	(54,753)	(3,621)	(54,734)	(3,720)	(54,612)	(3,724)
Assumption Change	6/30/16	100%	Up/Down	2.80%	15	243,149	17,892	241,193	22,979	233,847	23,190
Investment (Gain)/Loss	6/30/16	100%	Up/Down	2.80%	25	828,966	43,358	840,528	55,688	840,134	55,704
Non-Investment (Gain)/Loss	6/30/16	100%	Up/Down	2.80%	25	(101,600)	(5,314)	(103,017)	(6,825)	(102,969)	(6,827)
Assumption Change	6/30/17	100%	Up/Down	2.80%	16	278,816	15,180	282,088	20,797	279,778	26,212
Investment (Gain)/Loss	6/30/17	100%	Up/Down	2.80%	26	(432,186)	(16,984)	(444,023)	(23,269)	(450,169)	(29,071)
Non-Investment (Gain)/Loss	6/30/17	100%	Up/Down	2.80%	26	(21,745)	(855)	(22,340)	(1,171)	(22,649)	(1,463)
Assumption Change	6/30/18	80%	Up/Down	2.80%	17	449,727	16,399	463,361	25,276	468,748	33,942
Investment (Gain)/Loss	6/30/18	80%	Up/Down	2.80%	27	(129,741)	(3,449)	(134,999)	(5,315)	(138,686)	(7,076)
Method Change	6/30/18	80%	Up/Down	2.80%	17	123,946	4,520	127,703	6,966	129,188	9,355
Non-Investment (Gain)/Loss	6/30/18	80%	Up/Down	2.80%	27	63,385	1,685	65,954	2,597	67,755	3,457
Investment (Gain)/Loss	6/30/19	60%	Up Only	0.00%	18	58,356	1,276	61,006	2,552	62,517	3,759
Non-Investment (Gain)/Loss	6/30/19	No Ramp		0.00%	18	61,718	5,632	60,094	5,632	58,360	5,533

Schedule of Plan's Amortization Bases (Continued)

Reason for Base	Date Est.	Ramp Level 2023-24	Ramp Shape	Escala-tion Rate	Amort. Period	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Expected Payment 2022-23	Balance 6/30/23	Minimum Required Payment 2023-24
Investment (Gain)/Loss	6/30/20	40%	Up Only	0.00%	19	267,950	0	286,171	6,269	299,152	12,297
Non-Investment (Gain)/Loss	6/30/20	No Ramp		0.00%	19	48,711	0	52,023	4,756	50,646	4,671
Assumption Change	6/30/21	No Ramp		0.00%	20	44,982	(9,431)	57,787	(9,695)	71,736	6,451
Net Investment (Gain)	6/30/21	20%	Up Only	0.00%	20	(1,271,327)	0	(1,357,777)	0	(1,450,106)	(31,170)
Non-Investment (Gain)/Loss	6/30/21	No Ramp		0.00%	20	(62,607)	0	(66,864)	0	(71,411)	(6,422)
Risk Mitigation	6/30/21	No Ramp		0.00%	1	368,724	(9,581)	403,699	(9,849)	441,329	456,087
Risk Mitigation Offset	6/30/21	No Ramp		0.00%	1	(386,919)	0	(413,229)	0	(441,329)	(456,087)
Total						**2,690,429**	**248,414**	**2,616,659**	**290,646**	**2,494,227**	**297,212**

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed in "Allocation of Plan's Share of Pool's Experience/Assumption Change" earlier in this section. These (gain)/loss bases will be amortized in accordance with the CalPERS amortization policy in effect at the time the base was established.

Amortization Schedule and Alternatives

The amortization schedule on the previous page(s) shows the minimum contributions required according to the CalPERS amortization policy. Many agencies have expressed a desire for a more stable pattern of payments or have indicated interest in paying off the unfunded accrued liabilities more quickly than required. As such, we have provided alternative amortization schedules to help analyze the current amortization schedule and illustrate the potential savings of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternative "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. To initiate a Fresh Start, please contact the plan actuary.

The Current Amortization Schedule typically contains both positive and negative bases. Positive bases result from plan changes, assumption changes, method changes or plan experience that increase unfunded liability. Negative bases result from plan changes, assumption changes, method changes, or plan experience that decrease unfunded liability. The combination of positive and negative bases within an amortization schedule can result in unusual or problematic circumstances in future years, such as:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

In any year when one of the above scenarios occurs, the actuary will consider corrective action such as replacing the existing unfunded liability bases with a single "fresh start" base and amortizing it over an appropriate period.

The Current Amortization Schedule on the following page may appear to show that, based on the current amortization bases, one of the above scenarios will occur at some point in the future. It is impossible to know today whether such a scenario will in fact arise since there will be additional bases added to the amortization schedule in each future year. Should such a scenario arise in any future year, the actuary will take appropriate action based on guidelines in the CalPERS amortization policy.

Amortization Schedule and Alternatives (continued)

	Current Amortization Schedule		Alternate Schedules			
			10 Year Amortization		5 Year Amortization	
Date	**Balance**	**Payment**	**Balance**	**Payment**	**Balance**	**Payment**
6/30/2023	2,494,227	297,212	2,494,227	340,461	2,494,227	585,486
6/30/2024	2,356,682	292,101	2,311,988	340,460	2,058,769	585,485
6/30/2025	2,215,065	277,311	2,117,358	340,461	1,593,701	585,486
6/30/2026	2,079,101	261,526	1,909,492	340,460	1,097,008	585,485
6/30/2027	1,950,209	239,846	1,687,492	340,461	566,540	585,486
6/30/2028	1,834,955	249,602	1,450,395	340,460		
6/30/2029	1,701,784	259,629	1,197,177	340,461		
6/30/2030	1,549,196	269,942	926,739	340,461		
6/30/2031	1,375,572	280,543	637,911	340,460		
6/30/2032	1,179,187	274,670	329,444	340,461		
6/30/2033	975,513	268,171				
6/30/2034	764,712	254,722				
6/30/2035	553,470	232,919				
6/30/2036	350,396	194,111				
6/30/2037	173,620	79,502				
6/30/2038	103,264	53,435				
6/30/2039	55,064	32,981				
6/30/2040	24,724	19,637				
6/30/2041	6,111	6,315				
6/30/2042						
6/30/2043						
6/30/2044						
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
6/30/2049						
6/30/2050						
6/30/2051						
6/30/2052						
Total	**3,844,175**		**3,404,606**		**2,927,428**	
Interest Paid	**1,349,948**		**910,379**		**433,201**	
Estimated Savings			**439,569**		**916,747**	

Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan. The amounts are based on the actuarial valuation from two years prior and does not account for prepayments or benefit changes made during a fiscal year. Additional discretionary payments before July 1, 2019 or after June 30, 2021 are not included.

Fiscal Year	Employer Normal Cost	Unfunded Liability Payment ($)	Additional Discretionary Payments
2016 - 17	9.558%	$101,476	N/A
2017 - 18	9.599%	127,933	N/A
2018 - 19	10.152%	151,625	N/A
2019 - 20	10.868%	192,789	0
2020 - 21	11.746%	223,400	0
2021 - 22	11.60%	267,426	
2022 - 23	11.61%	310,190	
2023 - 24	13.26%	297,212	

Funding History

The table below shows the recent history of the actuarial accrued liability, share of the pool's market value of assets, unfunded accrued liability, funded ratio, and annual covered payroll.

Valuation Date	Accrued Liability (AL)	Share of Pool's Market Value of Assets (MVA)	Unfunded Accrued Liability (UAL)	Funded Ratio	Annual Covered Payroll
06/30/2012	$9,670,474	$6,805,117	$2,865,357	70.4%	$1,377,265
06/30/2013	10,241,401	8,323,145	1,918,256	81.3%	1,249,694
06/30/2014	11,279,511	9,569,301	1,710,210	84.8%	1,363,267
06/30/2015	11,663,490	9,392,360	2,271,130	80.5%	897,921
06/30/2016	12,080,425	9,177,513	2,902,912	76.0%	986,978
06/30/2017	12,861,499	9,978,719	2,882,780	77.6%	955,435
06/30/2018	13,785,793	10,392,461	3,393,332	75.4%	1,100,635
06/30/2019	13,968,713	10,373,669	3,595,044	74.3%	1,139,768
06/30/2020	14,550,670	10,598,648	3,952,022	72.8%	1,195,979
06/30/2021	15,484,380	12,793,951	2,690,429	82.6%	1,242,135

Risk Analysis

- **Future Investment Return Scenarios**
- **Discount Rate Sensitivity**
- **Mortality Rate Sensitivity**
- **Maturity Measures**
- **Maturity Measures History**
- **Hypothetical Termination Liability**

Future Investment Return Scenarios

Analysis using the investment return scenarios from the Asset Liability Management process completed in 2021 was performed to determine the effects of various future investment returns on required employer contributions. The projections below reflect the impact of the CalPERS Funding Risk Mitigation policy. The projections also assume that all other actuarial assumptions will be realized and that no further changes in assumptions, contributions, benefits, or funding will occur.

The first table shows projected contribution requirements if the fund were to earn either 3.0% or 10.8% annually. These alternate investment returns were chosen because 90% of long-term average returns are expected to fall between them over the 20-year period ending June 30, 2041.

Assumed Annual Return FY 2021-22 through 2040-41	Projected Employer Contributions				
	2024-25	2025-26	2026-27	2027-28	2028-29
3.0% (5th percentile)					
Normal Cost Rate	13.3%	13.3%	13.3%	13.3%	13.3%
UAL Contribution	$304,000	$314,000	$335,000	$363,000	$435,000
10.8% (95th percentile)					
Normal Cost Rate	13.5%	13.8%	14.0%	14.3%	14.6%
UAL Contribution	$281,000	$244,000	$194,000	$0	$0

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 3.0% or greater than 10.8% over a 20-year period, the likelihood of a single investment return less than 3.0% or greater than 10.8% in any given year is much greater. The following analysis illustrates the effect of an extreme, single year investment return.

The portfolio has an expected volatility (or standard deviation) of 12.0% per year. Accordingly, in any given year there is a 16% probability that the annual return will be -5.2% or less and a 2.5% probability that the annual return will be -17.2% or less. These returns represent one and two standard deviations below the expected return of 6.8%.

The following table shows the effect of a one or two standard deviation investment loss in FY 2021-22 on the FY 2024-25 contribution requirements. Note that a single-year investment gain or loss decreases or increases the required UAL contribution amount incrementally for each of the next five years, not just one, due to the 5-year ramp in the amortization policy. However, the contribution requirements beyond the first year are also impacted by investment returns beyond the first year. Historically, significant downturns in the market are often followed by higher than average returns. Such investment gains would offset the impact of these single year negative returns in years beyond FY 2024-25.

Assumed Annual Return for Fiscal Year 2021-22	Required Employer Contributions	Projected Employer Contributions
	2023-24	2024-25
(17.2)% (2 standard deviation loss)		
Normal Cost Rate	13.26%	13.3%
UAL Contribution	$297,212	$368,000
(5.2)% (1 standard deviation loss)		
Normal Cost Rate	13.26%	13.3%
UAL Contribution	$297,212	$330,000

- Without investment gains (returns higher than 6.8%) in year FY 2022-23 or later, projected contributions rates would continue to rise over the next four years due to the continued phase-in of the impact of the illustrated investment loss in FY 2021-22.
- The Pension Outlook Tool can be used to model projected contributions for these scenarios beyond FY 2024-25 as well as to model other investment return scenarios.

Discount Rate Sensitivity

The discount rate assumption is calculated as the sum of the assumed real rate of return and the assumed annual price inflation, currently 4.5% and 2.3%, respectively. Changing either the price inflation assumption or the real rate of return assumption will change the discount rate. The sensitivity of the valuation results to the discount rate assumption depends on which component of the discount rate is changed. Shown below are various valuation results as of June 30, 2021 assuming alternate discount rates by changing the two components independently. Results are shown using the current discount rate of 6.8% as well as alternate discount rates of 5.8% and 7.8%. The rates of 5.8% and 7.8% were selected since they illustrate the impact of a 1.0% increase or decrease to the 6.8% assumption.

Sensitivity to the Real Rate of Return Assumption

As of June 30, 2021	1% Lower Real Return Rate	Current Assumptions	1% Higher Real Return Rate
Discount Rate	**5.8%**	**6.8%**	**7.8%**
Inflation	2.3%	2.3%	2.3%
Real Rate of Return	**3.5%**	**4.5%**	**5.5%**
a) Total Normal Cost	25.38%	20.18%	16.22%
b) Accrued Liability	$17,481,560	$15,484,380	$13,823,509
c) Market Value of Assets	$12,793,951	$12,793,951	$12,793,951
d) Unfunded Liability/(Surplus) [(b) - (c)]	$4,687,609	$2,690,429	$1,029,558
e) Funded Ratio	73.2%	82.6%	92.6%

Sensitivity to the Price Inflation Assumption

As of June 30, 2021	1% Lower Inflation Rate	Current Assumptions	1% Higher Inflation Rate
Discount Rate	**5.8%**	**6.8%**	**7.8%**
Inflation	**1.3%**	**2.3%**	**3.3%**
Real Rate of Return	4.5%	4.5%	4.5%
a) Total Normal Cost	21.18%	20.18%	18.41%
b) Accrued Liability	$15,970,638	$15,484,380	$14,281,670
c) Market Value of Assets	$12,793,951	$12,793,951	$12,793,951
d) Unfunded Liability/(Surplus) [(b) - (c)]	$3,176,687	$2,690,429	$1,487,719
e) Funded Ratio	80.1%	82.6%	89.6%

Mortality Rate Sensitivity

The following table looks at the change in the June 30, 2021 plan costs and funded status under two different longevity scenarios, namely assuming post-retirement rates of mortality are 10% lower or 10% higher than our current mortality assumptions adopted in 2021. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.

As of June 30, 2021	10% Lower Mortality Rates	Current Assumptions	10% Higher Mortality Rates
a) Total Normal Cost	20.53%	20.18%	19.86%
b) Accrued Liability	$15,810,995	$15,484,380	$15,184,531
c) Market Value of Assets	$12,793,951	$12,793,951	$12,793,951
d) Unfunded Liability/(Surplus) [(b) - (c)]	$3,017,044	$2,690,429	$2,390,580
e) Funded Ratio	80.9%	82.6%	84.3%

Maturity Measures

As pension plans mature they become more sensitive to risks. Understanding plan maturity and how it affects the ability of a pension plan sponsor to tolerate risk is important in understanding how the pension plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. Since it is the employer that bears the risk, it is appropriate to perform this analysis on a pension plan level considering all rate plans. The following measures are for one rate plan only.

One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio starts increasing. A mature plan will often have a ratio above 60%-65%.

Ratio of Retiree Accrued Liability to Total Accrued Liability	**June 30, 2020**	**June 30, 2021**
1. Retired Accrued Liability	$9,011,729	$9,194,324
2. Total Accrued Liability	14,550,670	15,484,380
3. Ratio of Retiree AL to Total AL [(1) / (2)]	0.62	0.59

Another measure of maturity level of CalPERS and its plans is to look at the ratio of actives to retirees, also called the support ratio. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures and members retire, the ratio declines. A mature plan will often have a ratio near or below one.

To calculate the support ratio for the rate plan, retirees and beneficiaries receiving a continuance are each counted as one, even though they may have only worked a portion of their careers as an active member of this rate plan. For this reason, the support ratio, while intuitive, may be less informative than the ratio of retiree liability to total accrued liability above. For comparison, the support ratio for all CalPERS public agency plans is 0.82 and is calculated consistently with how it is for the individual rate plan. Note that to calculate the support ratio for all public agency plans, a retiree with service from more than one CalPERS agency is counted as a retiree more than once.

Support Ratio	**June 30, 2020**	**June 30, 2021**
1. Number of Actives	10	10
2. Number of Retirees	19	20
3. Support Ratio [(1) / (2)]	0.53	0.50

Maturity Measures (Continued)

The actuarial calculations supplied in this communication are based on various assumptions about long-term demographic and economic behavior. Unless these assumptions (e.g., terminations, deaths, disabilities, retirements, salary growth, investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

Asset Volatility Ratio

Shown in the table below is the asset volatility ratio (AVR), which is the ratio of market value of assets to payroll. Plans that have higher AVR experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 8 may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 4. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as the plan matures.

Liability Volatility Ratio

Also shown in the table below is the liability volatility ratio (LVR), which is the ratio of accrued liability to payroll. Plans that have a higher LVR experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, a plan with LVR ratio of 8 is expected to have twice the contribution volatility of a plan with LVR of 4. It should be noted that this ratio indicates a longer-term potential for contribution volatility, since the AVR, described above, will tend to move closer to the LVR as the funded ratio approaches 100%.

Contribution Volatility	June 30, 2020	June 30, 2021
1. Market Value of Assets	$10,598,648	$12,793,951
2. Payroll	1,195,979	1,242,135
3. Asset Volatility Ratio (AVR) [(1) / (2)]	8.9	10.3
4. Accrued Liability	$14,550,670	$15,484,380
5. Liability Volatility Ratio (LVR) [(4) / (2)]	12.2	12.5

Maturity Measures History

Valuation Date	Ratio of Retiree Accrued Liability to Total Accrued Liability	Support Ratio	Asset Volatility Ratio	Liability Volatility Ratio
06/30/2017	0.70	0.45	10.4	13.5
06/30/2018	0.66	0.50	9.4	12.5
06/30/2019	0.65	0.53	9.1	12.3
06/30/2020	0.62	0.53	8.9	12.2
06/30/2021	0.59	0.50	10.3	12.5

Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2021. The plan liability on a termination basis is calculated differently compared to the plan's ongoing funding liability. For the hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

A more conservative investment policy and asset allocation strategy was adopted by the board for the Terminated Agency Pool. The Terminated Agency Pool has limited funding sources since no future employer contributions will be made. Therefore, expected benefit payments are secured by risk-free assets and benefit security for members is increased while limiting the funding risk. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. The lower discount rate for the Terminated Agency Pool results in higher liabilities for terminated plans.

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable, the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 19-month period from 12 months before the valuation date to seven months after.

Market Value of Assets (MVA)	Hypothetical Termination Liability[1,2] at 1.00%	Funded Ratio	Unfunded Termination Liability at 1.00%	Hypothetical Termination Liability[1,2] at 2.25%	Funded Ratio	Unfunded Termination Liability at 2.25%
$12,793,951	$33,584,055	38.1%	$20,790,104	$27,952,283	45.8%	$15,158,332

[1] The hypothetical liabilities calculated above include a 5% contingency load. The contingency load and other actuarial assumptions can be found in Appendix A.

[2] The discount rate used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 2.00% on June 30, 2021, the valuation date.

In order to terminate the plan, first contact our Pension Contract Services unit to initiate a Resolution of Intent to Terminate. The completed Resolution will allow the plan actuary to provide a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. Before beginning this process, please consult with the plan actuary.

Participant Data

The table below shows a summary of the plan's member data upon which this valuation is based:

	June 30, 2020	June 30, 2021
Active Members		
Counts	10	10
Average Attained Age	49.45	50.45
Average Entry Age to Rate Plan	33.92	33.92
Average Years of Credited Service	14.35	15.35
Average Annual Covered Pay	$119,598	$124,214
Annual Covered Payroll	$1,195,979	$1,242,135
Present Value of Future Payroll	$9,341,366	$10,036,027
Transferred Members	4	3
Separated Members	4	4
Retired Members and Beneficiaries		
Counts*	19	20
Average Annual Benefits*	$38,733	$38,019

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

* Values include community property settlements.

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- One Year Final Compensation (FAC 1)
- Post-Retirement Survivor Allowance (PRSA)

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which the agency has contracted. A description of principal standard and optional plan provisions is in Section 2.

	Benefit Group			
Member Category	Misc	Misc	Misc	
Demographics				
Actives	Yes	No	No	
Transfers/Separated	Yes	No	No	
Receiving	Yes	Yes	Yes	
Benefit Provision				
Benefit Formula	2% @ 55			
Social Security Coverage	No			
Full/Modified	Full			
Employee Contribution Rate	7.00%			
Final Average Compensation Period	One Year			
Sick Leave Credit	Yes			
Non-Industrial Disability	Standard			
Industrial Disability	No			
Pre-Retirement Death Benefits				
Optional Settlement 2	Yes			
1959 Survivor Benefit Level	Level 3			
Special	No			
Alternate (firefighters)	No			
Post-Retirement Death Benefits				
Lump Sum	$500	$500	$500	
Survivor Allowance (PRSA)	Yes	Yes	Yes	
COLA	2%	2%	2%	

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Risk Pool Actuarial Valuation Information

Section 2 may be found on the CalPERS website (www.calpers.ca.gov) in the Forms and Publications section

California Public Employees' Retirement System
Actuarial Office
400 Q Street, Sacramento, CA 95811 | Phone: (916) 795-3000 | Fax: (916) 795-2744
888 CalPERS (or **888**-225-7377) | TTY: (877) 249-7442 | **www.calpers.ca.gov**

July 2022

PEPRA Miscellaneous Plan of the Alameda County Mosquito Abatement District (CalPERS ID: 5854416969)
Annual Valuation Report as of June 30, 2021

Dear Employer,

Attached to this letter, you will find the June 30, 2021 actuarial valuation report for the rate plan noted above. **Provided in this report is the determination of the minimum required employer contributions for fiscal year (FY) 2023-24**. In addition, the report contains important information regarding the current financial status of the plan as well as projections and risk measures to aid in planning for the future.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2021.

Section 2 can be found on the CalPERS website (www.calpers.ca.gov). From the home page, go to "*Forms & Publications*" and select "*View All*". In the search box, enter "*Risk Pool*" and from the results list download the Miscellaneous Risk Pool Actuarial Valuation Report for June 30, 2021.

Your June 30, 2021 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. The plan actuary whose signature is in the Actuarial Certification is available to discuss.

Actuarial valuations are based on assumptions regarding future plan experience including investment return and payroll growth, eligibility for the types of benefits provided, and longevity among retirees. The CalPERS Board of Administration (board) adopts these assumptions after considering the advice of CalPERS actuarial and investment teams and other professionals. Each actuarial valuation reflects all prior differences between actual and assumed experience and adjusts the contribution requirements as needed. This valuation is based on an investment return assumption of 6.8%, which was adopted by the board in November 2021. Other assumptions used in this report are those recommended in the CalPERS Experience Study and Review of Actuarial Assumptions report from November 2021.

Required Contribution

The table below shows the minimum required employer contributions and the Employee PEPRA Rate for FY 2023-24 along with estimates of the required contributions for FY 2024-25. Employee contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The required employer contributions in this report do not reflect any cost sharing arrangement between the agency and the employees.**

Fiscal Year	Employer Normal Cost Rate	Employer Amortization of Unfunded Accrued Liability	PEPRA Member Rate
2023-24	8.00%	$0	8.25%
Projected Results			
2024-25	*8.0%*	*$0*	*TBD*

The actual investment return for FY 2021-22 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 6.8%. ***To the extent the actual investment return for FY 2021-22 differs from 6.8%, the actual contribution requirements for FY 2024-25 will differ from those shown above.*** For additional details regarding the assumptions and methods used for these projections, please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section. This section also contains projected required contributions through FY 2028-29.

Changes from Previous Year's Valuation

On July 12, 2021, CalPERS reported a preliminary 21.3% net return on investments for FY 2020-21. Since the return exceeded the 7.00% discount rate sufficiently, the CalPERS Funding Risk Mitigation policy allows CalPERS to use a portion of the investment gain to offset the cost of reducing the expected volatility of future investment returns. Based on the thresholds specified in the policy, the excess return of 14.3% prescribes a reduction in investment volatility that corresponds to a reduction in the discount rate of 0.20%, from 7.00% to 6.80%.

On November 17, 2021, the board adopted new actuarial assumptions based on the recommendations in the November 2021 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases, and inflation assumption for public agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2023-24. In addition, the board adopted a new strategic asset allocation as part of its Asset Liability Management process. The new asset allocation along with the new capital market assumptions and economic assumptions support a discount rate of 6.80%. This includes a reduction in the price inflation assumption from 2.50% to 2.30%.

Besides the above noted changes, there may also be changes specific to the plan such as contract amendments and funding changes.

Further descriptions of general changes are included in the "Highlights and Executive Summary" section and in Appendix A of the Section 2 report, "Actuarial Methods and Assumptions."

Questions

We understand that you might have questions about these results, and the plan actuary whose signature is on the valuation report is available to discuss. If you have other questions, you may call the Customer Contact Center at (888)-CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO, ASA, EA, MAAA, FCA, CFA
Chief Actuary

Actuarial Valuation
as of June 30, 2021

for the
PEPRA Miscellaneous Plan
of the
Alameda County Mosquito Abatement District
(CalPERS ID: 5854416969)

Required Contributions
for Fiscal Year
July 1, 2023 - June 30, 2024

Table of Contents

Section 1

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Plan Specific Information for the PEPRA Miscellaneous Plan of the Alameda County Mosquito Abatement District

(CalPERS ID: 5854416969)
(Rate Plan ID: 26060)

Table of Contents

Actuarial Certification

To the best of our knowledge, this report, comprising of Sections 1 and 2, is complete and accurate and contains sufficient information to disclose, fully and fairly, the funded condition of the PEPRA Miscellaneous Plan of the Alameda County Mosquito Abatement District and satisfies the actuarial valuation requirements of Government Code section 7504. This valuation is based on the member and financial data as of June 30, 2021 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. Section 1 of this report is based on the member and financial data for Alameda County Mosquito Abatement District, while Section 2 is based on the corresponding information for all agencies participating in the Miscellaneous Risk Pool to which the plan belongs.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the Miscellaneous Risk Pool has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the rate plan, it is my opinion as the plan actuary that the Unfunded Accrued Liability amortization bases as of June 30, 2021 and employer contribution as of July 1, 2023 have been properly and accurately determined in accordance with the principles and standards stated above.

The undersigned is an actuary who satisfies the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States with regard to pensions.

EDDIE W. LEE, ASA, EA, FCA, MAAA
Senior Pension Actuary, CalPERS

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Contributions**
- **Additional Discretionary Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Other Pooled Miscellaneous Risk Pool Rate Plans**
- **Cost**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2021 actuarial valuation of the PEPRA Miscellaneous Plan of the Alameda County Mosquito Abatement District of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for (FY) 2023-24.

Purpose of Section 1

This Section 1 report for the PEPRA Miscellaneous Plan of the Alameda County Mosquito Abatement District of CalPERS was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2021;
- Determine the minimum required employer contribution for this plan for the FY July 1, 2023 through June 30, 2024; and
- Provide actuarial information as of June 30, 2021 to the CalPERS Board of Administration (board) and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to Governmental Accounting Standards Board (GASB) Statement No. 68 for a Cost Sharing Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available on the CalPERS website (www.calpers.ca.gov).

The measurements shown in this actuarial valuation may not be applicable for other purposes. The agency should contact the plan actuary before disseminating any portion of this report for any reason that is not explicitly described above.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; changes in plan provisions or applicable law; and differences between the required contributions determined by the valuation and the actual contributions made by the agency.

Assessment and Disclosure of Risk

This report includes the following risk disclosures consistent with the recommendations of Actuarial Standards of Practice No. 51 and recommended by the California Actuarial Advisory Panel (CAAP) in the Model Disclosure Elements document:

- A "Scenario Test," projecting future results under different investment income returns.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 5.8% and 7.8%.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10% lower or 10% higher than our current post-retirement mortality assumptions adopted in 2021.
- Plan maturity measures indicating how sensitive a plan may be to the risks noted above.

Required Contributions

Required Employer Contributions	Fiscal Year 2023-24
Employer Normal Cost Rate	**8.00%**
Plus	
Required Payment on Amortization Bases[1]	**$0**
Paid either as	
1) Monthly Payment	**$0.00**
Or	
2) Annual Prepayment Option*	**$0**
Required PEPRA Member Contribution Rate	**8.25%**

The total minimum required employer contribution is the sum of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll and paid as payroll is reported) plus the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly (1) or prepaid annually (2) in dollars).

** Only the UAL portion of the employer contribution can be prepaid **(which must be received in full no later than July 31)**.*

For additional detail regarding the determination of the required PEPRA member contribution rate see section on PEPRA Member Contribution Rates.

	Fiscal Year 2022-23	Fiscal Year 2023-24
Development of Normal Cost as a Percentage of Payroll		
Base Total Normal Cost for Formula	14.22%	15.43%
Surcharge for Class 1 Benefits[2]		
a) PRSA	0.79%	0.82%
Phase out of Normal Cost Difference[3]	0.00%	0.00%
Plan's Total Normal Cost	15.01%	16.25%
Plan's Employee Contribution Rate	7.25%	8.25%
Employer Normal Cost Rate	7.76%	8.00%

[1] The required payment on amortization bases does not take into account any additional discretionary payment made after April 29, 2022.

[2] Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

[3] The normal cost change is phased out over a five-year period in accordance with the CalPERS contribution allocation policy.

Additional Discretionary Employer Contributions

The minimum required employer contribution towards the Unfunded Accrued Liability (UAL) for this rate plan for the 2023-24 FY is $0. CalPERS allows agencies to make additional discretionary payments (ADPs) at any time and in any amount. These optional payments serve to reduce the UAL and future required contributions and can result in significant long-term savings. Agencies can also use ADPs to stabilize annual contributions as a fixed dollar amount, percent of payroll or percent of revenue.

Provided below are select ADP options for consideration. Making such an ADP during FY 2023-24 does not require an ADP be made in any future year, nor does it change the remaining amortization period of any portion of unfunded liability. For information on permanent changes to amortization periods, see the "Amortization Schedule and Alternatives" section of the report.

Agencies considering making an ADP should contact CalPERS for additional information.

Minimum Required Employer Contribution for Fiscal Year 2023-24

Estimated Normal Cost	Minimum UAL Payment	ADP	Total UAL Contribution	Estimated Total Contribution
$66,546	$0	$0	$0	$66,546

Alternative Fiscal Year 2023-24 Employer Contributions for Greater UAL Reduction

Funding Target	Estimated Normal Cost	Minimum UAL Payment	ADP[1]	Total UAL Contribution	Estimated Total Contribution
N/A	N/A	N/A	N/A	N/A	N/A

[1] The ADP amounts are assumed to be made in the middle of the fiscal year. A payment made earlier or later in the fiscal year would have to be less or more than the amount shown to have the same effect on the UAL amortization.

Note that the calculations above are based on the projected Unfunded Accrued Liability as of June 30, 2023 as determined in the June 30, 2021 actuarial valuation. New unfunded liabilities can emerge in future years due to assumption or method changes, changes in plan provisions, and actuarial experience different than assumed. Making an ADP illustrated above for the indicated number of years will not result in a plan that is exactly 100% funded in the indicated number of years. Valuation results will vary from one year to the next and can diverge significantly from projections over a period of several years.

Plan's Funded Status

	June 30, 2020	June 30, 2021
1. Present Value of Projected Benefits (PVB)	$1,522,577	$2,038,792
2. Entry Age Accrued Liability (AL)	466,918	671,213
3. Plan's Market Value of Assets (MVA)	413,726	689,712
4. Unfunded Accrued Liability (UAL) [(2) - (3)]	53,192	(18,499)
5. Funded Ratio [(3) / (2)]	88.6%	102.8%

The UAL and funded ratio are assessments of the need for future employer contributions based on the actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. The funded ratio, on the other hand, is a relative measure of funded status that allows for comparison between plans of different sizes. For measures of funded status that are appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

Projected Employer Contributions

The table below shows the required and projected employer contributions (before cost sharing) for the next six fiscal years. The projection assumes that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. In particular, the investment return beginning with FY 2021-22 is assumed to be 6.80% per year, net of investment and administrative expenses. Actual contribution rates during this projection period could be significantly higher or lower than the projection shown below. Future contribution requirements may differ significantly from those shown below. The actual long-term cost of the plan will depend on the actual benefits and expenses paid and the actual investment experience of the fund.

	Required Contribution	Projected Future Employer Contributions (Assumes 6.80% Return for Fiscal Year 2021-22 and Beyond)				
Fiscal Year	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**
	Rate Plan 26060 Results					
Normal Cost %	8.00%	8.0%	8.0%	8.0%	8.0%	8.0%
UAL Payment	$0	$0	$0	$0	$0	$0

For some sources of UAL, the change in UAL is amortized using a 5-year ramp up. For more information, please see "Amortization of the Unfunded Actuarial Accrued Liability" under "Actuarial Methods" in Appendix A of the Section 2 Report. This method phases in the impact of the change in UAL over a 5-year period in order to reduce employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years when there is a large increase in UAL, the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

For projected contributions under alternate investment return scenarios, please see the "Future Investment Return Scenarios" in the "Risk Analysis" section.

Our online pension plan projection tool, Pension Outlook, is available in the Employers section of the CalPERS website. Pension Outlook can help plan and budget pension costs under various scenarios.

Other Pooled Miscellaneous Risk Pool Rate Plans

All of the results presented in this Section 1 report, except those shown below, correspond to rate plan 26060. In many cases, employers have additional rate plans within the same risk pool. For cost analysis and budgeting it is useful to consider contributions for these rate plans as a whole rather than individually. The estimated contribution amounts and rates for all of the employer's rate plans in the Miscellaneous Risk Pool are shown below and assume that the payroll for each rate plan will grow according to the overall payroll growth assumption of 2.80% per year for three years.

	Fiscal Year 2022-23	Fiscal Year 2023-24
Estimated Combined Employer Contributions for all Pooled Miscellaneous Rate Plans		
Projected Payroll for the Contribution Year	$2,048,917	$2,181,248
Estimated Employer Normal Cost	$208,945	$245,480
Required Payment on Amortization Bases	$313,679	$297,212
Estimated Total Employer Contributions	$522,624	$542,692
Estimated Total Employer Contribution Rate (illustrative only)	25.51%	24.88%

Cost

Actuarial Determination of Plan Cost

Contributions to fund the plan are comprised of two components:

- Normal Cost, expressed as a percentage of total active payroll
- Amortization of the Unfunded Accrued Liability (UAL), expressed as a dollar amount

For fiscal years prior to 2016-17, the Amortization of UAL component was expressed as a percentage of total active payroll. Starting with FY 2016-17, the Amortization of UAL component was expressed as a dollar amount and invoiced on a monthly basis. There continues to be an option to prepay this amount during July of each fiscal year.

The Normal Cost component is expressed as a percentage of active payroll with employer and employee contributions payable as part of the regular payroll reporting process.

The determination of both components requires complex actuarial calculations. The calculations are based on a set of actuarial assumptions which can be divided into two categories:

- Demographic assumptions (e.g., mortality rates, retirement rates, employment termination rates, disability rates)
- Economic assumptions (e.g., future investment earnings, inflation, salary growth rates)

These assumptions reflect CalPERS' best estimate of future experience of the plan and are long term in nature. We recognize that all assumptions will not be realized in any given year. For example, the investment earnings at CalPERS have averaged 6.9% over the 20 years ending June 30, 2021, yet individual fiscal year returns have ranged from -23.6% to +21.3%. In addition, CalPERS reviews all actuarial assumptions by conducting in-depth experience studies every four years, with the most recent experience study completed in 2021.

Changes Since the Prior Year's Valuation

Benefits

The standard actuarial practice at CalPERS is to recognize mandated legislative benefit changes in the first annual valuation following the effective date of the legislation. Voluntary benefit changes by plan amendment are generally included in the first valuation that is prepared after the amendment becomes effective, even if the valuation date is prior to the effective date of the amendment.

This valuation generally reflects plan changes by amendments effective before the date of the report. Please refer to the "Plan's Major Benefit Options" and Appendix B of the Section 2 Report for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

On November 17, 2021, the board adopted new actuarial assumptions based on the recommendations in the 2021 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases, and inflation assumption for Public Agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2023-24. In addition, the board adopted a new asset portfolio as part of its Asset Liability Management process. The new asset mix supports a 6.80% discount rate, which reflects a change in the price inflation assumption to 2.30%.

Subsequent Events

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2021. Changes subsequent to that date are not reflected. Investment returns below the assumed rate of return may increase future required contributions while investment returns above the assumed rate of return may decrease future required contributions.

The projected employer contributions on Page 6 are calculated under the assumption that the discount rate remains at 6.8% going forward and that the realized rate of return on assets for FY 2021-22 is 6.8%.

This actuarial valuation report reflects statutory changes, regulatory changes and board actions through January 2022. Any subsequent changes or actions are not reflected.

Assets and Liabilities

- **Breakdown of Entry Age Accrued Liability**
- **Allocation of Plan's Share of Pool's Experience/Assumption Change**
- **Development of Plan's Share of Pool's Market Value of Assets**
- **Schedule of Plan's Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Accrued Liability

Active Members	$665,184
Transferred Members	0
Terminated Members	6,029
Members and Beneficiaries Receiving Payments	0
Total	$671,213

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1.	Plan's Accrued Liability	$671,213
2.	Projected UAL balance at 6/30/2021	55,209
3.	Pool's Accrued Liability[1]	20,794,529,023
4.	Sum of Pool's Individual Plan UAL Balances at 6/30/2021[1]	4,597,734,264
5.	Pool's 2020/21 Investment (Gain)/Loss[1]	(2,338,185,055)
6.	Pool's 2020/21 Non-Investment (Gain)/Loss[1]	(84,077,623)
7.	Plan's Share of Pool's Investment (Gain)/Loss: [(1) - (2)] ÷ [(3) - (4)] × (5)	(88,927)
8.	Plan's Share of Pool's Non-Investment (Gain)/Loss: (1) ÷ (3) × (6)	(2,714)
9.	Plan's New (Gain)/Loss as of 6/30/2021: (7) + (8)	(91,641)
10.	Increase in Pool's Accrued Liability due to Change in Assumptions[1]	60,407,898
11.	Plan's Share of Pool's Change in Assumptions: (1) ÷ (3) × (10)	1,950
12.	Increase in Pool's Accrued Liability due to Funding Risk Mitigation[1]	495,172,731
13.	Plan's Share of Pool's Change due to Funding Risk Mitigation: (1) ÷ (3) × (12)	15,983
14.	Offset due to Funding Risk Mitigation	(27,199)
15.	Plan's Net Investment (Gain): (7) – (14)	(61,728)

[1] Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

16.	Plan's UAL: (2) + (9) + (11) + (13)	($18,499)
17.	Plan's Share of Pool's MVA: (1) - (16)	$689,712

Schedule of Plan's Amortization Bases

Note that there is a two-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2021.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: FY 2023-24.

This two-year lag is necessary due to the amount of time needed to extract and test the membership and financial data, and the need to provide public agencies with their required employer contribution well in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward two years from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the expected payment on the UAL for the fiscal year and adjusting for interest. The expected payment for the first fiscal year is determined by the actuarial valuation two years ago and the contribution for the second year is from the actuarial valuation one year ago. Additional discretionary payments are reflected in the Expected Payments column in the fiscal year they were made by the agency.

Reason for Base	Date Est.	Ramp Level 2023-24	Ramp Shape	Escala-tion Rate	Amort. Period	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Expected Payment 2022-23	Balance 6/30/23	Minimum Required Payment 2023-24
Fresh Start	6/30/21				N/A	(18,499)	(9,082)	(10,371)	(8,558)	(2,232)	0
Total						**(18,499)**	**(9,082)**	**(10,371)**	**(8,558)**	**(2,232)**	**0**

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed in "Allocation of Plan's Share of Pool's Experience/Assumption Change" earlier in this section. These (gain)/loss bases will be amortized in accordance with the CalPERS amortization policy in effect at the time the base was established.

Amortization Schedule and Alternatives

The amortization schedule on the previous page(s) shows the minimum contributions required according to the CalPERS amortization policy. Many agencies have expressed a desire for a more stable pattern of payments or have indicated interest in paying off the unfunded accrued liabilities more quickly than required. As such, we have provided alternative amortization schedules to help analyze the current amortization schedule and illustrate the potential savings of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternative "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. To initiate a Fresh Start, please contact the plan actuary.

The Current Amortization Schedule typically contains both positive and negative bases. Positive bases result from plan changes, assumption changes, method changes or plan experience that increase unfunded liability. Negative bases result from plan changes, assumption changes, method changes, or plan experience that decrease unfunded liability. The combination of positive and negative bases within an amortization schedule can result in unusual or problematic circumstances in future years, such as:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

In any year when one of the above scenarios occurs, the actuary will consider corrective action such as replacing the existing unfunded liability bases with a single "fresh start" base and amortizing it over an appropriate period.

The Current Amortization Schedule on the following page may appear to show that, based on the current amortization bases, one of the above scenarios will occur at some point in the future. It is impossible to know today whether such a scenario will in fact arise since there will be additional bases added to the amortization schedule in each future year. Should such a scenario arise in any future year, the actuary will take appropriate action based on guidelines in the CalPERS amortization policy.

Amortization Schedule and Alternatives (continued)

	Current Amortization Schedule		Alternate Schedules			
			N/A Year Amortization		N/A Year Amortization	
Date	**Balance**	**Payment**	**Balance**	**Payment**	**Balance**	**Payment**
6/30/2023	N/A	N/A	N/A	N/A	N/A	N/A
6/30/2024						
6/30/2025						
6/30/2026						
6/30/2027						
6/30/2028						
6/30/2029						
6/30/2030						
6/30/2031						
6/30/2032						
6/30/2033						
6/30/2034						
6/30/2035						
6/30/2036						
6/30/2037						
6/30/2038						
6/30/2039						
6/30/2040						
6/30/2041						
6/30/2042						
6/30/2043						
6/30/2044						
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
6/30/2049						
6/30/2050						
6/30/2051						
6/30/2052						
Total		**N/A**		**N/A**		**N/A**
Interest Paid		**N/A**		**N/A**		**N/A**
Estimated Savings				**N/A**		**N/A**

Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan. The amounts are based on the actuarial valuation from two years prior and does not account for prepayments or benefit changes made during a fiscal year. Additional discretionary payments before July 1, 2019 or after June 30, 2021 are not included.

Fiscal Year	Employer Normal Cost	Unfunded Liability Payment ($)	Additional Discretionary Payments
2016 - 17	6.930%	$141	N/A
2017 - 18	6.908%	360	N/A
2018 - 19	7.266%	568	N/A
2019 - 20	7.072%	929	0
2020 - 21	7.874%	1,650	0
2021 - 22	7.73%	2,637	
2022 - 23	7.76%	3,489	
2023 - 24	8.00%	0	

Funding History

The table below shows the recent history of the actuarial accrued liability, share of the pool's market value of assets, unfunded accrued liability, funded ratio, and annual covered payroll.

Valuation Date	Accrued Liability (AL)	Share of Pool's Market Value of Assets (MVA)	Unfunded Accrued Liability (UAL)	Funded Ratio	Annual Covered Payroll
06/30/2014	$658	$687	($29)	104.5%	$61,347
06/30/2015	19,399	18,192	1,207	93.8%	212,227
06/30/2016	83,763	76,035	7,728	90.8%	516,269
06/30/2017	185,212	177,972	7,240	96.1%	574,230
06/30/2018	286,462	264,212	22,250	92.2%	577,005
06/30/2019	423,383	387,581	35,802	91.5%	666,618
06/30/2020	466,918	413,726	53,192	88.6%	692,790
06/30/2021	671,213	689,712	(18,499)	102.8%	765,689

Risk Analysis

- **Future Investment Return Scenarios**
- **Discount Rate Sensitivity**
- **Mortality Rate Sensitivity**
- **Maturity Measures**
- **Maturity Measures History**
- **Hypothetical Termination Liability**

Future Investment Return Scenarios

Analysis using the investment return scenarios from the Asset Liability Management process completed in 2021 was performed to determine the effects of various future investment returns on required employer contributions. The projections below reflect the impact of the CalPERS Funding Risk Mitigation policy. The projections also assume that all other actuarial assumptions will be realized and that no further changes in assumptions, contributions, benefits, or funding will occur.

The first table shows projected contribution requirements if the fund were to earn either 3.0% or 10.8% annually. These alternate investment returns were chosen because 90% of long-term average returns are expected to fall between them over the 20-year period ending June 30, 2041.

Assumed Annual Return FY 2021-22 through 2040-41	Projected Employer Contributions				
	2024-25	2025-26	2026-27	2027-28	2028-29
3.0% (5th percentile)					
Normal Cost Rate	8.0%	8.0%	8.0%	8.0%	8.0%
UAL Contribution	$590	$1,800	$3,800	$6,400	$9,800
10.8% (95th percentile)					
Normal Cost Rate	8.2%	8.4%	8.6%	8.8%	8.5%
UAL Contribution	$0	$0	$0	$0	$0

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 3.0% or greater than 10.8% over a 20-year period, the likelihood of a single investment return less than 3.0% or greater than 10.8% in any given year is much greater. The following analysis illustrates the effect of an extreme, single year investment return.

The portfolio has an expected volatility (or standard deviation) of 12.0% per year. Accordingly, in any given year there is a 16% probability that the annual return will be -5.2% or less and a 2.5% probability that the annual return will be -17.2% or less. These returns represent one and two standard deviations below the expected return of 6.8%.

The following table shows the effect of a one or two standard deviation investment loss in FY 2021-22 on the FY 2024-25 contribution requirements. Note that a single-year investment gain or loss decreases or increases the required UAL contribution amount incrementally for each of the next five years, not just one, due to the 5-year ramp in the amortization policy. However, the contribution requirements beyond the first year are also impacted by investment returns beyond the first year. Historically, significant downturns in the market are often followed by higher than average returns. Such investment gains would offset the impact of these single year negative returns in years beyond FY 2024-25.

Assumed Annual Return for Fiscal Year 2021-22	Required Employer Contributions	Projected Employer Contributions
	2023-24	2024-25
(17.2)% (2 standard deviation loss)		
Normal Cost Rate	8.00%	8.0%
UAL Contribution	$0	$4,000
(5.2)% (1 standard deviation loss)		
Normal Cost Rate	8.00%	8.0%
UAL Contribution	$0	$2,000

- Without investment gains (returns higher than 6.8%) in year FY 2022-23 or later, projected contributions rates would continue to rise over the next four years due to the continued phase-in of the impact of the illustrated investment loss in FY 2021-22.
- The Pension Outlook Tool can be used to model projected contributions for these scenarios beyond FY 2024-25 as well as to model other investment return scenarios.

Discount Rate Sensitivity

The discount rate assumption is calculated as the sum of the assumed real rate of return and the assumed annual price inflation, currently 4.5% and 2.3%, respectively. Changing either the price inflation assumption or the real rate of return assumption will change the discount rate. The sensitivity of the valuation results to the discount rate assumption depends on which component of the discount rate is changed. Shown below are various valuation results as of June 30, 2021 assuming alternate discount rates by changing the two components independently. Results are shown using the current discount rate of 6.8% as well as alternate discount rates of 5.8% and 7.8%. The rates of 5.8% and 7.8% were selected since they illustrate the impact of a 1.0% increase or decrease to the 6.8% assumption.

Sensitivity to the Real Rate of Return Assumption

As of June 30, 2021	1% Lower Real Return Rate	Current Assumptions	1% Higher Real Return Rate
Discount Rate	**5.8%**	**6.8%**	**7.8%**
Inflation	2.3%	2.3%	2.3%
Real Rate of Return	**3.5%**	**4.5%**	**5.5%**
a) Total Normal Cost	20.35%	16.25%	13.13%
b) Accrued Liability	$859,312	$671,213	$528,268
c) Market Value of Assets	$689,712	$689,712	$689,712
d) Unfunded Liability/(Surplus) [(b) - (c)]	$169,600	($18,499)	($161,444)
e) Funded Ratio	80.3%	102.8%	130.6%

Sensitivity to the Price Inflation Assumption

As of June 30, 2021	1% Lower Inflation Rate	Current Assumptions	1% Higher Inflation Rate
Discount Rate	**5.8%**	**6.8%**	**7.8%**
Inflation	**1.3%**	**2.3%**	**3.3%**
Real Rate of Return	4.5%	4.5%	4.5%
a) Total Normal Cost	17.13%	16.25%	14.77%
b) Accrued Liability	$708,237	$671,213	$605,035
c) Market Value of Assets	$689,712	$689,712	$689,712
d) Unfunded Liability/(Surplus) [(b) - (c)]	$18,525	($18,499)	($84,677)
e) Funded Ratio	97.4%	102.8%	114.0%

Mortality Rate Sensitivity

The following table looks at the change in the June 30, 2021 plan costs and funded status under two different longevity scenarios, namely assuming post-retirement rates of mortality are 10% lower or 10% higher than our current mortality assumptions adopted in 2021. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.

As of June 30, 2021	10% Lower Mortality Rates	Current Assumptions	10% Higher Mortality Rates
a) Total Normal Cost	16.54%	16.25%	15.98%
b) Accrued Liability	$682,413	$671,213	$660,830
c) Market Value of Assets	$689,712	$689,712	$689,712
d) Unfunded Liability/(Surplus) [(b) - (c)]	($7,299)	($18,499)	($28,882)
e) Funded Ratio	101.1%	102.8%	104.4%

Maturity Measures

As pension plans mature they become more sensitive to risks. Understanding plan maturity and how it affects the ability of a pension plan sponsor to tolerate risk is important in understanding how the pension plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. Since it is the employer that bears the risk, it is appropriate to perform this analysis on a pension plan level considering all rate plans. The following measures are for one rate plan only.

One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio starts increasing. A mature plan will often have a ratio above 60%-65%.

Ratio of Retiree Accrued Liability to Total Accrued Liability	**June 30, 2020**	**June 30, 2021**
1. Retired Accrued Liability	$0	$0
2. Total Accrued Liability	466,918	671,213
3. Ratio of Retiree AL to Total AL [(1) / (2)]	0.00	0.00

Another measure of maturity level of CalPERS and its plans is to look at the ratio of actives to retirees, also called the support ratio. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures and members retire, the ratio declines. A mature plan will often have a ratio near or below one.

To calculate the support ratio for the rate plan, retirees and beneficiaries receiving a continuance are each counted as one, even though they may have only worked a portion of their careers as an active member of this rate plan. For this reason, the support ratio, while intuitive, may be less informative than the ratio of retiree liability to total accrued liability above. For comparison, the support ratio for all CalPERS public agency plans is 0.82 and is calculated consistently with how it is for the individual rate plan. Note that to calculate the support ratio for all public agency plans, a retiree with service from more than one CalPERS agency is counted as a retiree more than once.

Support Ratio	**June 30, 2020**	**June 30, 2021**
1. Number of Actives	8	8
2. Number of Retirees	0	0
3. Support Ratio [(1) / (2)]	N/A	N/A

Maturity Measures (Continued)

The actuarial calculations supplied in this communication are based on various assumptions about long-term demographic and economic behavior. Unless these assumptions (e.g., terminations, deaths, disabilities, retirements, salary growth, investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

Asset Volatility Ratio

Shown in the table below is the asset volatility ratio (AVR), which is the ratio of market value of assets to payroll. Plans that have higher AVR experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 8 may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 4. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as the plan matures.

Liability Volatility Ratio

Also shown in the table below is the liability volatility ratio (LVR), which is the ratio of accrued liability to payroll. Plans that have a higher LVR experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, a plan with LVR ratio of 8 is expected to have twice the contribution volatility of a plan with LVR of 4. It should be noted that this ratio indicates a longer-term potential for contribution volatility, since the AVR, described above, will tend to move closer to the LVR as the funded ratio approaches 100%.

Contribution Volatility	June 30, 2020	June 30, 2021
1. Market Value of Assets	$413,726	$689,712
2. Payroll	692,790	765,689
3. Asset Volatility Ratio (AVR) [(1) / (2)]	0.6	0.9
4. Accrued Liability	$466,918	$671,213
5. Liability Volatility Ratio (LVR) [(4) / (2)]	0.7	0.9

Maturity Measures History

Valuation Date	Ratio of Retiree Accrued Liability to Total Accrued Liability	Support Ratio	Asset Volatility Ratio	Liability Volatility Ratio
06/30/2017	0.00	N/A	0.3	0.3
06/30/2018	0.00	N/A	0.5	0.5
06/30/2019	0.00	N/A	0.6	0.6
06/30/2020	0.00	N/A	0.6	0.7
06/30/2021	0.00	N/A	0.9	0.9

Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2021. The plan liability on a termination basis is calculated differently compared to the plan's ongoing funding liability. For the hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

A more conservative investment policy and asset allocation strategy was adopted by the board for the Terminated Agency Pool. The Terminated Agency Pool has limited funding sources since no future employer contributions will be made. Therefore, expected benefit payments are secured by risk-free assets and benefit security for members is increased while limiting the funding risk. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. The lower discount rate for the Terminated Agency Pool results in higher liabilities for terminated plans.

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable, the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 19-month period from 12 months before the valuation date to seven months after.

Market Value of Assets (MVA)	Hypothetical Termination Liability[1,2] at 1.00%	Funded Ratio	Unfunded Termination Liability at 1.00%	Hypothetical Termination Liability[1,2] at 2.25%	Funded Ratio	Unfunded Termination Liability at 2.25%
$689,712	$1,808,464	38.1%	$1,118,752	$1,200,602	57.4%	$510,890

[1] The hypothetical liabilities calculated above include a 5% contingency load. The contingency load and other actuarial assumptions can be found in Appendix A.

[2] The discount rate used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 2.00% on June 30, 2021, the valuation date.

In order to terminate the plan, first contact our Pension Contract Services unit to initiate a Resolution of Intent to Terminate. The completed Resolution will allow the plan actuary to provide a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. Before beginning this process, please consult with the plan actuary.

Participant Data

The table below shows a summary of the plan's member data upon which this valuation is based:

	June 30, 2020	June 30, 2021
Active Members		
Counts	8	8
Average Attained Age	33.75	35.97
Average Entry Age to Rate Plan	29.85	31.35
Average Years of Credited Service	3.99	4.70
Average Annual Covered Pay	$86,599	$95,711
Annual Covered Payroll	$692,790	$765,689
Present Value of Future Payroll	$8,271,067	$9,521,170
Transferred Members	0	0
Separated Members	0	1
Retired Members and Beneficiaries		
Counts*	0	0
Average Annual Benefits*	$0	$0

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

* Values include community property settlements.

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- Post-Retirement Survivor Allowance (PRSA)

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which the agency has contracted. A description of principal standard and optional plan provisions is in Section 2.

	Benefit Group	
Member Category	Misc	
Demographics		
Actives	Yes	
Transfers/Separated	Yes	
Receiving	No	
Benefit Provision		
Benefit Formula	2% @ 62	
Social Security Coverage	No	
Full/Modified	Full	
Employee Contribution Rate	7.25%	
Final Average Compensation Period	Three Year	
Sick Leave Credit	Yes	
Non-Industrial Disability	Standard	
Industrial Disability	No	
Pre-Retirement Death Benefits		
Optional Settlement 2	Yes	
1959 Survivor Benefit Level	Level 3	
Special	No	
Alternate (firefighters)	No	
Post-Retirement Death Benefits		
Lump Sum	$500	
Survivor Allowance (PRSA)	Yes	
COLA	2%	

PEPRA Member Contribution Rates

The California Public Employees' Pension Reform Act of 2013 (PEPRA) established new benefit formulas, final compensation period, and contribution requirements for "new" employees (generally those first hired into a CalPERS-covered position on or after January 1, 2013). In accordance with Government Code Section 7522.30(b), "new members … shall have an initial contribution rate of at least 50% of the normal cost rate." The normal cost rate is dependent on the plan of retirement benefits, actuarial assumptions, and demographics of the risk pool, particularly members' entry age. Should the total normal cost rate change by more than 1% from the base total normal cost rate, the new member rate shall be 50% of the new normal cost rate rounded to the nearest quarter percent.

The table below shows the determination of the PEPRA member contribution rates effective July 1, 2023, based on 50% of the total normal cost rate as of the June 30, 2021 valuation.

		Basis for Current Rate		Rates Effective July 1, 2023			
Rate Plan Identifier	**Benefit Group Name**	**Total Normal Cost**	**Member Rate**	**Total Normal Cost**	**Change**	**Change Needed**	**Member Rate**
26060	Miscellaneous PEPRA Level	14.322%	7.25%	16.25%	1.928%	Yes	8.25%

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Risk Pool Actuarial Valuation Information

Section 2 may be found on the CalPERS website (www.calpers.ca.gov) in the Forms and Publications section

Alameda County Mosquito Abatement Dist.

Check Register

For the Period From Aug 1, 2022 to Aug 15, 2022

Filter Criteria includes: Report order is by Date.

Check #	Date	Payee	Amount
3262	8/12/22	Adapco	4,873.00
3263	8/12/22	Airgas	1,010.29
3264	8/12/22	Argo Adventure	3,448.80
3265	8/12/22	AT&T	84.65
3266	8/12/22	Beck's Shoes	190.00
3267	8/12/22	CarQuest	158.45
3268	8/12/22	Cintas	691.55
3269	8/12/22	City of Hayward	1,361.86
3270	8/12/22	Coverall North America, Inc.	495.00
3271	8/12/22	Grainger	452.21
3272	8/12/22	Hentschke, Eric Armin	100.00
3273	8/12/22	Industrial Park Landscape Maintenance	243.00
3274	8/12/22	MVCAC	11,000.00
3275	8/12/22	NBC Supply Corp	661.84
3276	8/12/22	Namakan West Fisheries	750.00
3277	8/12/22	PC Professional	3,563.00
3278	8/12/22	PG&E	86.12
3279	8/12/22	Testa, Julie	100.00
3280	8/12/22	Treds	861.50
3281	8/12/22	U.S Bank Corporate Payment System	20,471.04
3282	8/12/22	Voya Institutional Trust Company	181.91
3283	8/12/22	Waste Management of Alameda County	297.04
3284	8/12/22	Young, George	100.00
ACH	8/12/22	Alameda County Mosquito Abatement Dist (Payroll)	93,430.60
ACH	8/12/22	Aguilar, Victor	100.00
ACH	8/12/22	Beatty, Robert .P	100.00
ACH	8/12/22	Bhat, Subrahmanya Y	100.00
ACH	8/12/22	CalPERS	700.00
ACH	8/12/22	CalPERS Retirement	16,259.74
ACH	8/12/22	CalPERS 457	3,001.47
ACH	8/12/22	Cox, Steven	100.00
ACH	8/12/22	Jordan, Preston	100.00
ACH	8/12/22	Roache, Cathy J Pinkerton.	100.00
ACH	8/12/22	Salzer, Hope	100.00
ACH	8/12/22	Washburn, Jan	100.00
		Total Expenditures - August 15, 2022	**165,373.07**

Alameda County Mosquito Abatement Dist.

Check Register

For the Period From Aug 16, 2022 to Aug 31, 2022

Filter Criteria includes: Report order is by Date.

Check #	Date	Payee	Amount
3285	8/30/22	Airgas	1,405.64
3286	8/30/22	Bhat, Subrahmanya Y	1,117.02
3287	8/30/22	California Department of Public Health	272.00
3288	8/30/22	Cintas	626.82
3289	8/30/22	Clarke	44.08
3290	8/30/22	Delta Dental	4,679.81
3291	8/30/22	Grainger	572.53
3292	8/30/22	Guaranteed Auto Service	3,048.61
3293	8/30/22	JH Technologies, Inc	23,406.69
3294	8/30/22	Life Technologies Corporation	5,740.84
3295	8/30/22	Visalia Times Delta	2,499.99
3296	8/30/22	PG&E	101.11
3297	8/30/22	The Hartford	107.19
3298	8/30/22	Treds	159.00
3299	8/30/22	Verizon	499.35
3300	8/30/22	Voya Institutional Trust Company	181.43
3301	8/30/22	VSP	693.24
3302	8/30/22	Waste Management of Alameda County	297.04
3303	8/30/22	WEX Bank	6,675.84
ACH	8/30/22	Alameda County Mosquito Abatement Dist (Payroll)	93,308.77
ACH	8/30/22	CalPERS Health	38,775.33
ACH	8/30/22	CalPERS Retirement	16,173.79
ACH	8/30/22	CalPERS 457	2,699.42
		Total Expenditures - August 31, 2022	**203,085.54**

Alameda County Mosquito Abatement District
Income Statement
August 31, 2022. (2 of 12 mth, 17%)

REVENUES	Actual 2020/21	Actual 2021/22	Current Month	Year to Date 2022/23	Budget 2022/23	Actual vs Budget
Total Revenue	**$ 5,150,753.15**	**$ 5,386,808.18**	**$ 258,021.39**	**$ 262,262.75**	**$ 4,900,658.00**	5%

EXPENDITURES	Actual 2020/21	Actual 2021/22 [1]	Current Month [2]	Year to Date 2022/23	Budget 2022/23	Actual vs Budget
Salaries	**$ 2,029,103.97**	**$ 2,129,077.24**	**$ 202,821.46**	**$ 404,415.36**	$2,371,703	17%
CalPERS Retirement	**$ 423,110.21**	**$ 471,085.19**	**$ 19,002.53**	**$ 341,127.73**	$534,559	64%
Medicare & Social Security	**$ 27,866.82**	**$ 30,025.60**	**$ 3,413.14**	**$ 6,836.68**	$38,763	18%
Fringe Benefits	**$ 502,898.39**	**$ 484,487.10**	**$ 44,255.57**	**$ 132,042.55**	$564,969	23%
Total Salaries, Retirement, & Benefits	**$ 2,982,979.39**	**$ 3,114,675.13**	**$269,493**	**$884,422**	**$3,509,994**	**25%**
Clothing and personal supplies (purchased)	**$ 4,859.20**	**$ 7,881.80**	**$ 770.15**	**$ 1,001.04**	$9,000	11%
Laundry service and supplies (rented)	**$ 9,124.98**	**$ 10,417.41**	**$ 991.93**	**$ 1,455.46**	$13,000	11%
Utilities	**$ 15,421.56**	**$ 18,134.35**	**$ 781.31**	**$ 1,380.30**	$21,700	6%
Communications-IT	**$ 71,771.02**	**$ 74,950.03**	**$ 7,071.33**	**$ 9,337.96**	$107,400	9%
Maintenance: structures & improvements	**$ 20,261.51**	**$ 26,671.36**	**$ 351.46**	**$ 351.46**	$30,000	1%
Maintenance of equipment	**$ 22,290.34**	**$ 25,354.56**	**$ 8,068.70**	**$ 9,570.03**	$30,000	32%
Transportation, travel, training, & board	**$ 74,653.03**	**$ 120,418.29**	**$ 11,476.40**	**$ 20,417.67**	$119,840	17%
Professional services	**$ 91,622.03**	**$ 97,726.00**	**$ 700.00**	**$ 1,416.50**	$152,200	1%
Memberships, dues, & subscriptions	**$ 22,906.45**	**$ 25,103.23**	**$ 11,000.00**	**$ 11,000.00**	$37,000	30%
Insurance - (VCJPA, UAS)	**$ 141,650.37**	**$ 160,932.64**	**$ -**	**$ 176,982.00**	$179,436	99%
Community education	**$ 26,317.23**	**$ 26,225.45**	**$ 2,713.90**	**$ 2,713.90**	$55,000	5%
Operations	**$ 223,362.22**	**$ 182,575.57**	**$ 8,440.09**	**$ 8,441.09**	$227,500	4%
Household expenses	**$ 15,882.05**	**$ 25,388.02**	**$ 536.93**	**$ 1,849.64**	$19,950	9%
Office expenses	**$ 9,747.67**	**$ 7,002.84**	**$ 208.70**	**$ 899.95**	$12,000	7%
Laboratory supplies	**$ 64,135.55**	**$ 82,354.03**	**$ 22,342.79**	**$ 24,001.09**	$132,500	18%
Small tools and instruments	**$ 2,189.34**	**$ 1,963.31**	**$ 40.56**	**$ 40.56**	$3,000	1%
Total Staff Budget	**$ 816,194.55**	**$ 893,098.89**	**$ 75,494.25**	**$ 270,858.65**	**$1,149,526**	**24%**
Total Operating Expenditures	**$ 3,799,173.94**	**$ 4,007,774.02**	**$ 344,986.95**	**$ 1,155,280.97**	**$4,659,520**	**25%**

1 - As of June 30, 2021. Unaudited.
2 - Total Operating Expenditures in current month may not match the check register due to accounts receivable and petty cash transactions.

Alameda County Mosquito Abatement District
Investment, Reserves, and Cash Balance Report
August 31, 2022. (2 of 12 mth, 17%)

Account #	Investment Accounts	Beginning Balance	Deposits	Withdrawls	Earnings [1]	Ending Balance
1004	LAIF	$ 2,074,406.42	$ -	$ (344,000.00)	$ -	$ 1,730,406.42
1005	OPEB Fund	$ 4,692,829.73	$ -	$ -	$ (153,230.85)	$ 4,539,598.88
1006	VCJPA Member Contingency	$ 356,439.00	$ -	$ -	$ -	$ 356,439.00
1008	CAMP: Repair and Replace	$ 2,641,853.76	$ -	$ -	$ 5,154.44	$ 2,647,008.20
1009	CAMP: Public Health Emergency Fund	$ 424.69	$ -	$ -	$ 0.83	$ 425.52
1010	CAMP: Operating Reserve	$ 1,952,115.00	$ -	$ -	$ 3,808.71	$ 1,955,923.71
1011	CAMP: Capital Reserve Fund	$ 370,213.94	$ -	$ -	$ 722.31	$ 370,936.25
1012	PARS: Pension Stabilization [2]	$ 1,628,403.30	$ 434,676.00	$ -	$ 60,151.24	$ 2,123,230.54
1013	California CLASS: Public Health Emergency Fund	$ 527,778.03	$ -	$ -	$ 1,052.63	$ 528,830.66
	Total	**$ 14,244,463.87**	**$ 434,676.00**	**$ (344,000.00)**	**$ (82,340.69)**	**$ 13,723,968.52**

	Cash Accounts	Beginning Balance	Withdrawls	Activity	Ending Balance
1001	Bank of America (Payroll Account) *	$ 64,904.33	-	-	$ 65,061.74
1002	Bank of The West (Transfer Account) *	$ 522,641.80	-	-	$ 523,403.52
1003	County Account	$ 397,580.31	$ -	$ 258,021.39	$ 655,601.70
1013	Petty Cash	$ 387.16	$ -	$ (23.05)	$ 364.11
	Total	**$ 985,513.60**	**$ -**	**$ 257,998.34**	**$ 1,244,431.07**

1 - Earnings are booked as unrealized gains/losses. These earnings would not be recognized as "realized" gains/losses until the accounts are liquidated.
2 - PARS - Pension Stabilization balance is as of July 31, 2022.

Alameda County Mosquito Abatement
Balance Sheet Comparison
August

	8/31/2022	8/31/2021	8/31/2020
ASSETS			
Current Assets			
Bank of America payroll	$ 156,552.15	$ 98,613.85	$ 108,357.86
Bank of the West	418,903.88	182,622.49	299,978.95
County	655,601.70	617,995.27	588,534.12
Cash with LAIF	1,730,406.42	3,193,540.40	1,837,170.85
VCJPA- Member Contingency	356,439.00	373,610.00	374,772.00
CAMP - Repair and Replace	2,647,008.20	1,041,075.78	1,046,492.14
CAMP - Public Health Emergency	425.52	526,266.48	525,706.84
CAMP - Operating Reserve	1,955,923.71	1,944,499.41	1,942,431.62
CAMP - Capital Reserve Fund	370,936.25	19,994.27	59,049.50
PARS	2,123,230.54	1,872,269.25	1,701,948.11
California CLASS: Public Health Emergency Fund	528,830.66	-	-
Accounts Receivable	-	22,459.56	-
Petty cash	364.11	321.04	460.87
Total Current Assets	**10,944,622.14**	**9,893,267.80**	**8,484,902.86**
Property and Equipment			
Acc Dep - equipment	(1,594,225.00)	(1,594,225.00)	(1,479,068.00)
Acc Dep - stru & improv	(2,604,632.00)	(2,604,632.00)	(2,485,267.00)
Equipment	1,824,515.66	1,769,859.00	1,751,859.00
Structure/improvement	4,799,729.70	4,799,729.70	4,760,618.00
Land	61,406.00	61,406.00	61,406.00
Total Property and Equipment	2,486,794.36	2,432,137.70	2,609,548.00
Other Assets			
Net OPEB Asset	2,561,824.00	2,522,763.00	1,823,556.00
Total Other Assets	2,561,824.00	2,522,763.00	1,823,556.00
Total Assets	**$ 15,993,240.50**	**$ 14,848,168.50**	**$ 12,918,006.86**
LIABILITIES AND CAPITAL			
Current Liabilities			
Accounts payable	$ 99,442.04	$ 145,157.29	$ 139,914.23
Acc payroll/vacation	201,023.94	208,228.89	200,290.26
Def inflow - 75	1,254,695.00	1,254,695.00	931,786.00
Def inflow pen defer GASB 68	208,602.00	208,602.00	289,664.00
Defer outflow pen cont GASB 68	(936,411.00)	(936,411.00)	(1,056,534.00)
Net pension liability GASB 68	3,603,091.00	3,603,091.00	3,277,554.00
Total Current Liabilities	$ 4,430,442.98	$ 4,483,363.18	$ 3,782,674.49
Total Liabilities	**4,430,442.98**	**4,483,363.18**	**3,782,674.49**
Capital			
Designated fund balances	4,490,818.25	4,451,757.25	4,440,610.19
Investment in general fixed as	7,856,845.74	6,677,881.96	5,296,151.61
Net Income	(805,025.88)	(764,833.89)	(601,429.43)
Total Capital	11,562,797.52	10,364,805.32	9,135,332.37
Total Liabilities & Capital	**$ 15,993,240.50**	**$ 14,848,168.50**	**$ 12,918,006.86**

23187 Connecticut Street
Hayward, CA 94545

T: (510) 783-7744
F: (510) 783-3903

acmad@mosquitoes.org

MONTHLY STAFF REPORT –1105

A. OPERATIONS REPORT

In August, ACMAD operations staff continued efforts on our main summer priority mosquitoes: Culex *spp.* and *Aedes dorsalis.* This control effort required inspections and treatments of numerous sources using different methods to control larva before they mature to adults.

The three *Culex spp.* receiving attention were *Culex tarsalis, Culex pipiens* and *Culex erythrothorax.* All three species are competent vectors of West Nile virus. Though no WNV positive mosquitoes or birds have been detected in our county this year, it is common for the virus to turn up late in the season. This, coupled with positive detections in neighboring counties, drives control effort of these species before they emerge as adults. There are a wide range of habitats suitable for these mosquitoes throughout our county including freshwater marshes, creeks, canals, catch basins, storm drains, unmaintained swimming pools, back yard sources, cemetery vases, and sanitation treatment facilities. A number of these source types require weekly monitoring and are treated by hand while others, due to size and/or accessibility issues, require the use of specialized equipment. In August, numerous treatments were conducted by ACMAD Argos and right-hand Jeeps and two treatments were conducted with our UAS (drone). A UAS allows treatment of sources that would otherwise require a helicopter. Continued use of the UAS has also made the process more streamlined and efficient. As more operations staff become FAA and DPR certified UAS pilots, the use of this tool will expand in appropriate sources.

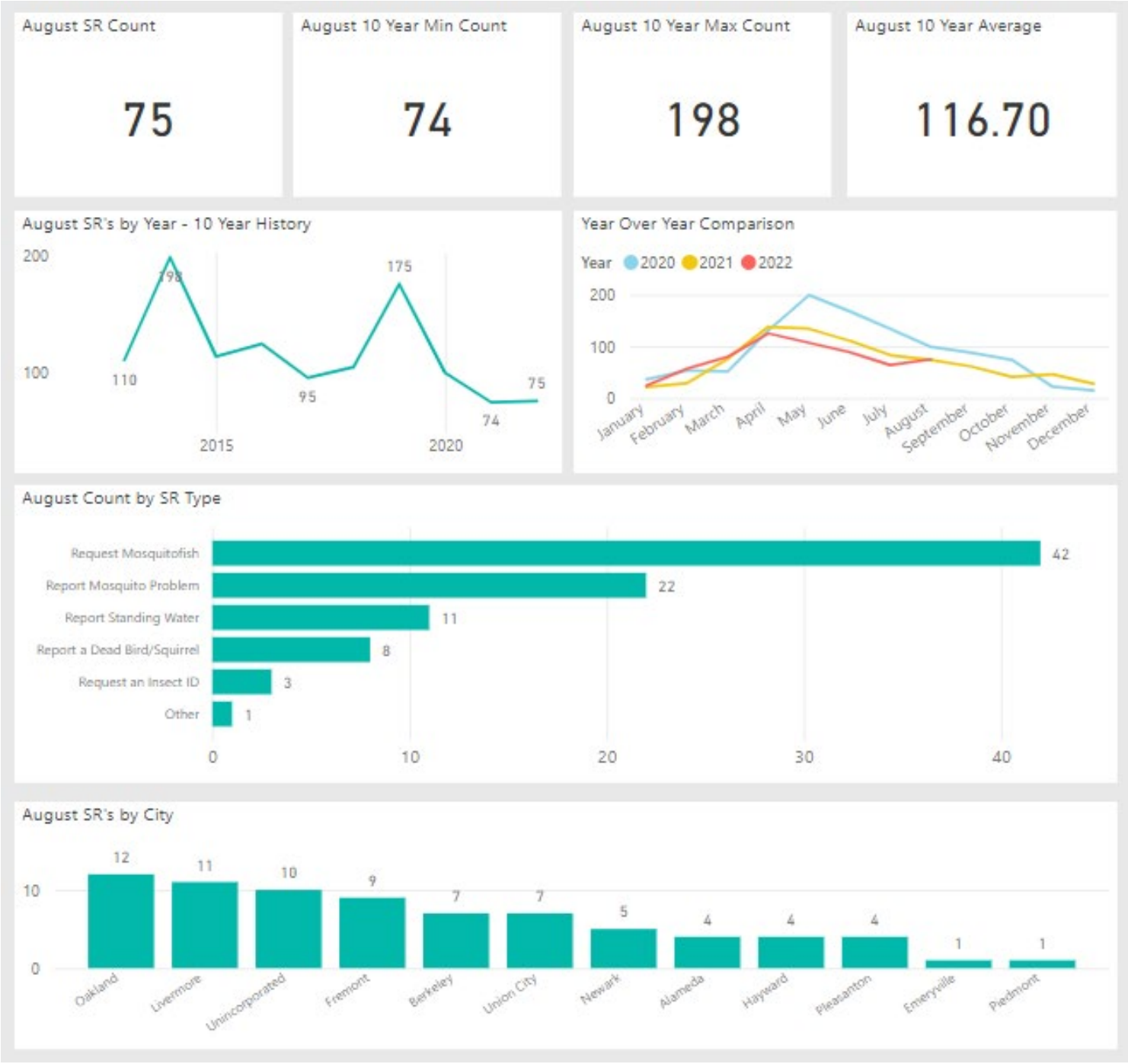
Another high tide event induced eggs of *Aedes dorsalis* to hatch in tidal marsh areas. Operations staff treated larvae in teams, by Argo, and with the ACMAD A-1 Super Duty mist blower. Tide levels, water chemistry, and ambient temperatures all play a role in how rapidly this species moves from egg to adult. Timing has been a crucial factor in control of this species all season. To date, operations staff have managed this species well with few adults detected in traps and only one service request this season attributable to this aggressive day-biting mosquito. Inspections and treatments will continue for all summer mosquito species until the rain arrives and the photoperiod shifts for the fall/winter species to arrive.

Requests for service received by the district in August were close to the lowest in a ten-year period for the month. More than half of the seventy-five requests received were requests for mosquito fish for ornamental ponds, unmaintained swimming pools, and livestock watering troughs. There was an uptick of requests to collect a dead bird, likely driven by WNV in the news. These requests are important to our WNV control program as the ACMAD lab tests them on site and any time a positive is detected, operations can respond to the location rapidly to focus on potential sources for *Culex spp.* mosquitoes.

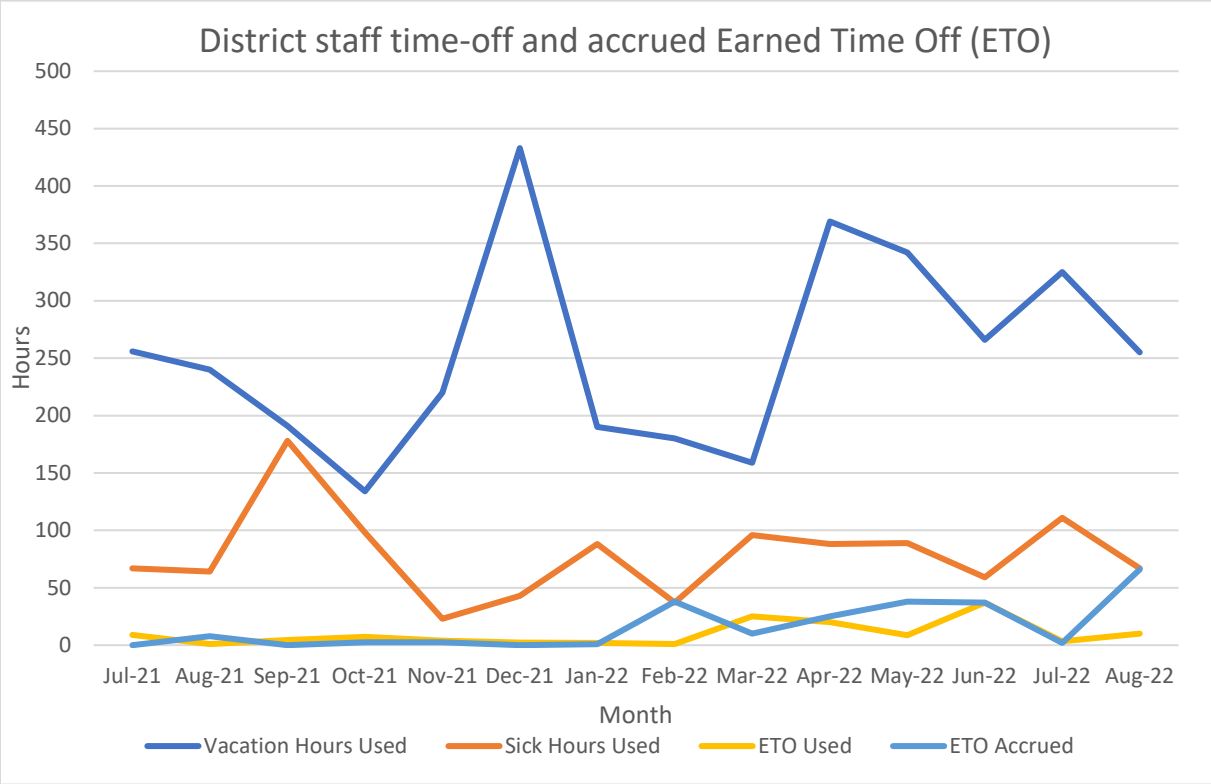
Final notices not responded to by owners of unmaintained swimming pools were turned over to operations staff to address toward the end of the month. These pools are the last for the season and details of this year's program will be presented to the board at a subsequent meeting.

Field Operations Supervisor
Joseph Huston

Service Requests August 2022

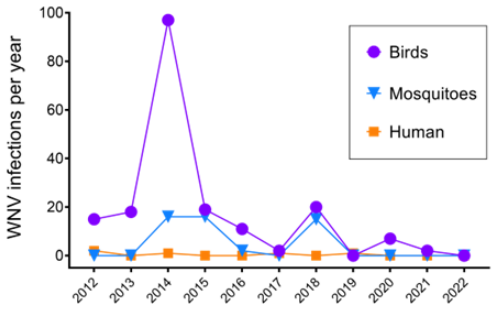


Activity Report

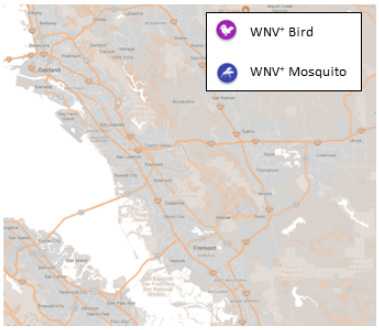


WNV Activity

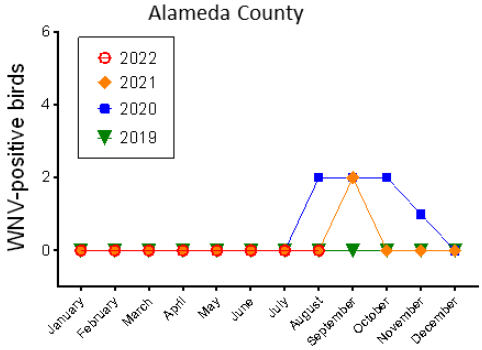
WNV infections detected in Alameda County 2012 – 2022



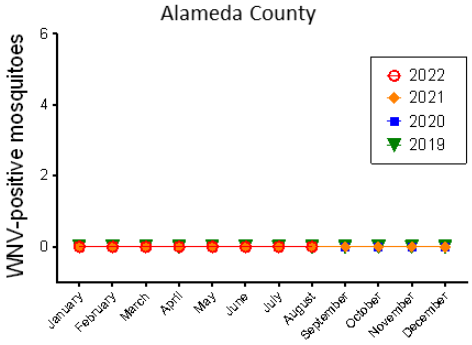
Locations of WNV-infected mosquitoes and birds in Alameda County during 2022



WNV-infected birds collected in Alameda County



WNV-infected mosquitoes collected in Alameda County



B. LAB

Summary

- *Arboviruses.* 176 collections of mosquitoes were tested for the presence of West Nile virus (WNV), Saint Louis encephalitis virus (SLEV) and Western equine encephalitis virus (WEEV) during August and none were found to be infected with those viruses. WNV was not detected in birds during August 2022. Saint Louis encephalitis virus (SLEV) and Western equine encephalitis virus (WEEV) were not detected in Alameda County during the prior 5 years.
- *Native mosquitoes.* A total of 540 CO_2-baited encephalitis virus survey (EVS) traps were placed during August, catching 17,391 adult female mosquitoes (32.2 mosquitos per trap night). Three New Jersey Light Traps (NJ Light Traps) captured 43 adult mosquitoes during the same period.
- Sentinel chicken flocks are in Livermore and Newark. None of the chickens show signs of WNV, SLEV, or WEEV infection.
- Invasive *Aedes* mosquitoes were not detected in Alameda County during 2022.

Arbovirus Monitoring

- WNV was not detected in birds or mosquitoes during August. WNV was last detected in birds collected in Alameda County during September 2021 (WNV Activity figure, above).
- This month, 176 collections of mosquitoes (*i.e.,* pools) were tested for the presence of WNV, SELV and WEEV using quantitative RT-PCR in the ACMAD lab. WNV was last detected in mosquitoes during 2018 (WNV Activity figure, above). SLEV and WEEV have not been detected in the County for over a decade.
- Sentinel chicken flocks in Livermore and Newark have not shown signs of infection with WNV, SLEV or WEEV (i.e., they had not seroconverted).

Native Mosquito Abundance

- The following three species are the principal transmitters of WNV, SLEV and WEEV in California: *Culex pipiens* (occurs predominantly in urban settings), *Culex tarsalis* (associated with marsh and peri-urban areas), and *Culex erythrothorax* (occurs exclusively in marsh but adults can disperse into nearby communities).
- 540 CO_2-baited EVS traps were placed during June. A total of 17,391 adult female mosquitoes were collected, which was 1.4-fold more than the prior month (Figure 1). Adult mosquito abundance during 2022 was higher than prior years (Figure 1), predominantly due higher quantities *Cx. tarsalis* and *Cx. erythrothorax* (Figure 2 and Figure 3).
- Two WNV vector species (*Cx. tarsalis* and *Cx. erythrothorax*) were more abundant in the south western bayside region of the county (Figure 4A). Mosquito abundance in the northern part of the county (Figure 4B) was low and comprised predominantly of *Culiseta spp*., as is typical for the region. Higher abundance of *Cx. erythrothorax* was observed in the midwestern region of the county where there is extensive marsh habitat that support the growth of that species (Figure 4C). Low mosquito abundance was observed in the eastern region of the county, with the exception of the area around Del Valle Regional Park where moderately high abundance of *Aedes vexans* was observed (Figure 4D). Only one of the EVS traps did not collect any mosquitoes (Figure 4A, upper right insert). The three NJ Light Trap sites captured a total of 43 adult female mosquitoes during the month (Figured 5).

Assessing insecticide resistance

- Resistance to the larvicide methoprene was assessed using a benchtop cup bioassay using *Aedes dorsalis* larvae that were collected by Sarah Lawton from the eastern-most region of Pintal Marsh (Fremont, CA). Briefly, multiple concentrations of methoprene were placed into styrofoam cups along with 10 third instar *Ae. dorsalis* larvae. Controls cups did not contain methoprene (all treatments were assessed in duplicate (*i.e.,* two cups per methoprene concentration or control)). The bioassay cups were monitored for 10 days and the proportion of adult mosquitoes that emerged from each cup was monitored. Erick Gaona assisted with scoring the cup bioassays. Since methoprene is an insect growth regulator, larvae that are susceptible to this larvicide remain in the immature stage (larva or pupa) and do not emerge as adults. None of the larvae that were exposed to 5 or 1.0 parts per billion (ppb) of methoprene emerged to form adult mosquitoes (Figure 6). Some larvae that were exposed to

lower concentrations of methoprene emerged (0.25 and 0.05 ppb), but methoprene is applied in the field at 4 – 5 ppb. Therefore, the results of this study suggest that the *Ae. dorsalis* that have colonized Pintail Marsh are susceptible to methoprene at the concentrations that are used in the field. These results are similar to the outcome of the methoprene resistance study that was reported in the July Lab Report to the Board of Trustees, suggesting that *Ae. dorsalis* in Alameda County may be broadly susceptible to methoprene.

LAB FIGURES

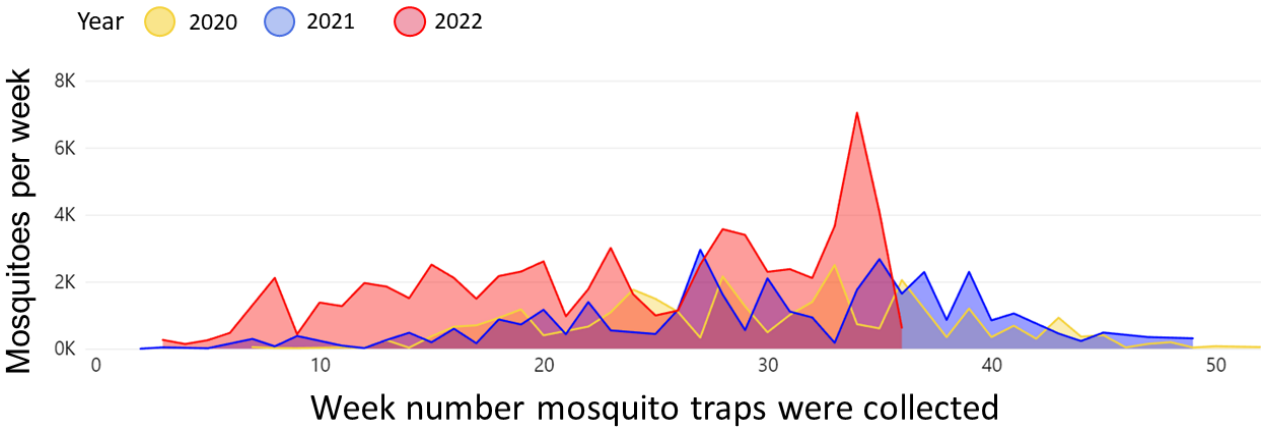


Figure 1. Mosquitoes captured in EVS CO_2 traps from 2020 – 2022. A total of 12,218 adult female mosquitoes were captured in EVS CO_2 traps during August of 2022 and identified to species. Week 24 was excluded from the graph because the high anomalous abundance during 2021 skewed the y-axis.

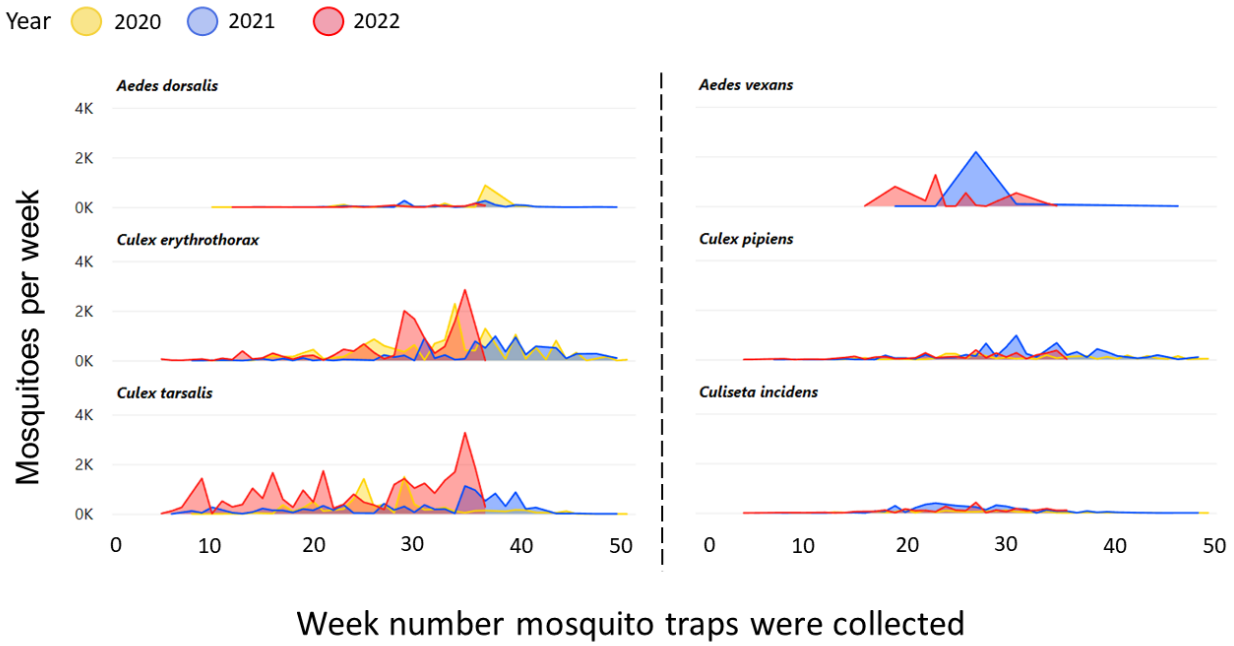


Figure 2. Weekly abundance of important mosquito species during 2020, 2021 and 2022.

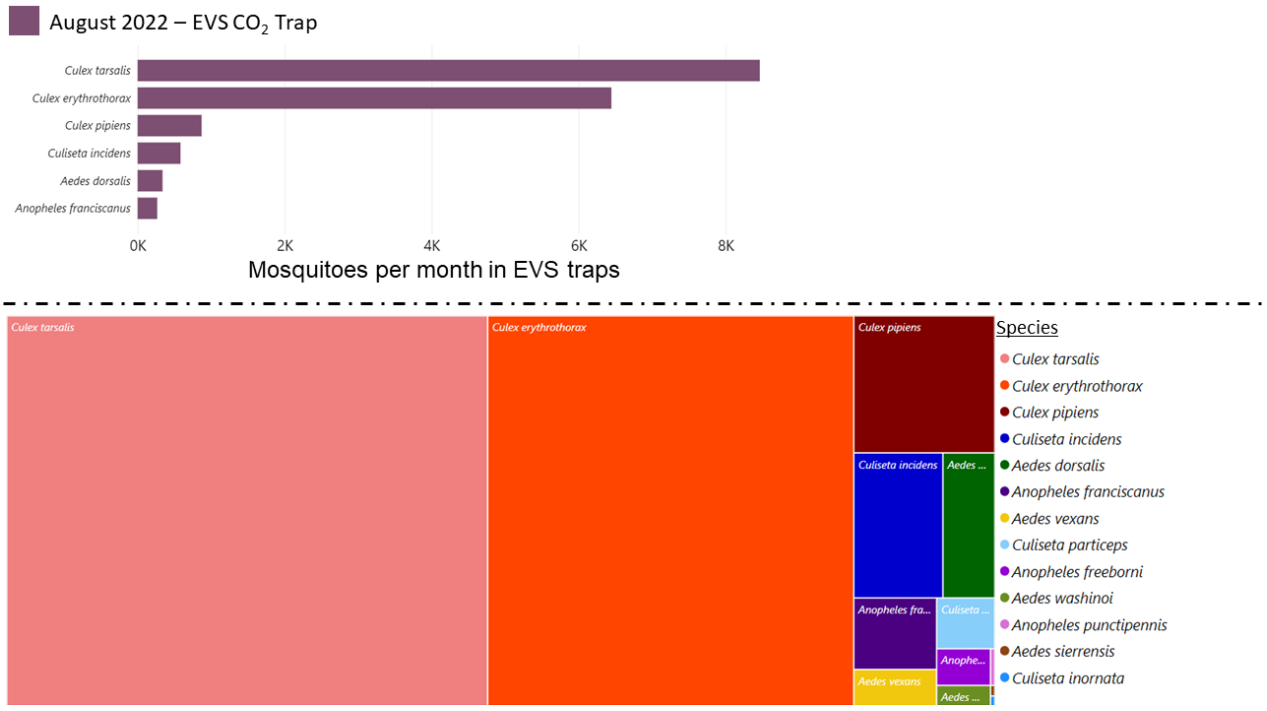
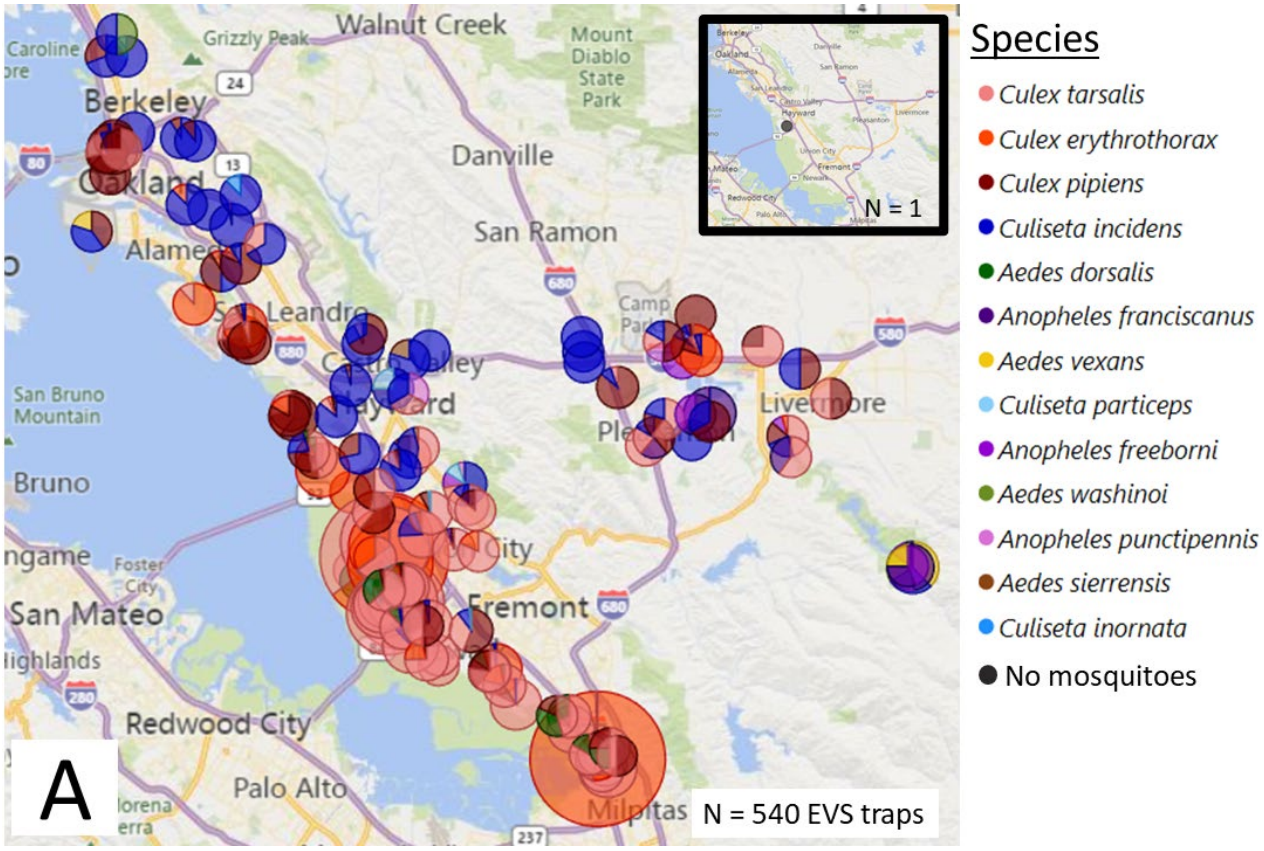


Figure 3. The most abundant species of mosquito captured using EVS CO_2 traps. Larger squares and rectangles indicate higher abundance of that species.


Walnut Creek
Grizzly Peak
Mount Diablo State Park
Berkeley
Danville
Oakland
San Ramon
Alameda
San Leandro
San Bruno Mountain
Bruno
Foster City
San Mateo
Fremont
Redwood City
Palo Alto
Livermore
N = 1
A
N = 540 EVS traps
Species
Culex tarsalis
Culex erythrothorax
Culex pipiens
Culiseta incidens
Aedes dorsalis
Anopheles franciscanus
Aedes vexans
Culiseta particeps
Anopheles freeborni
Aedes washinoi
Anopheles punctipennis
Aedes sierrensis
Culiseta inornata
No mosquitoes

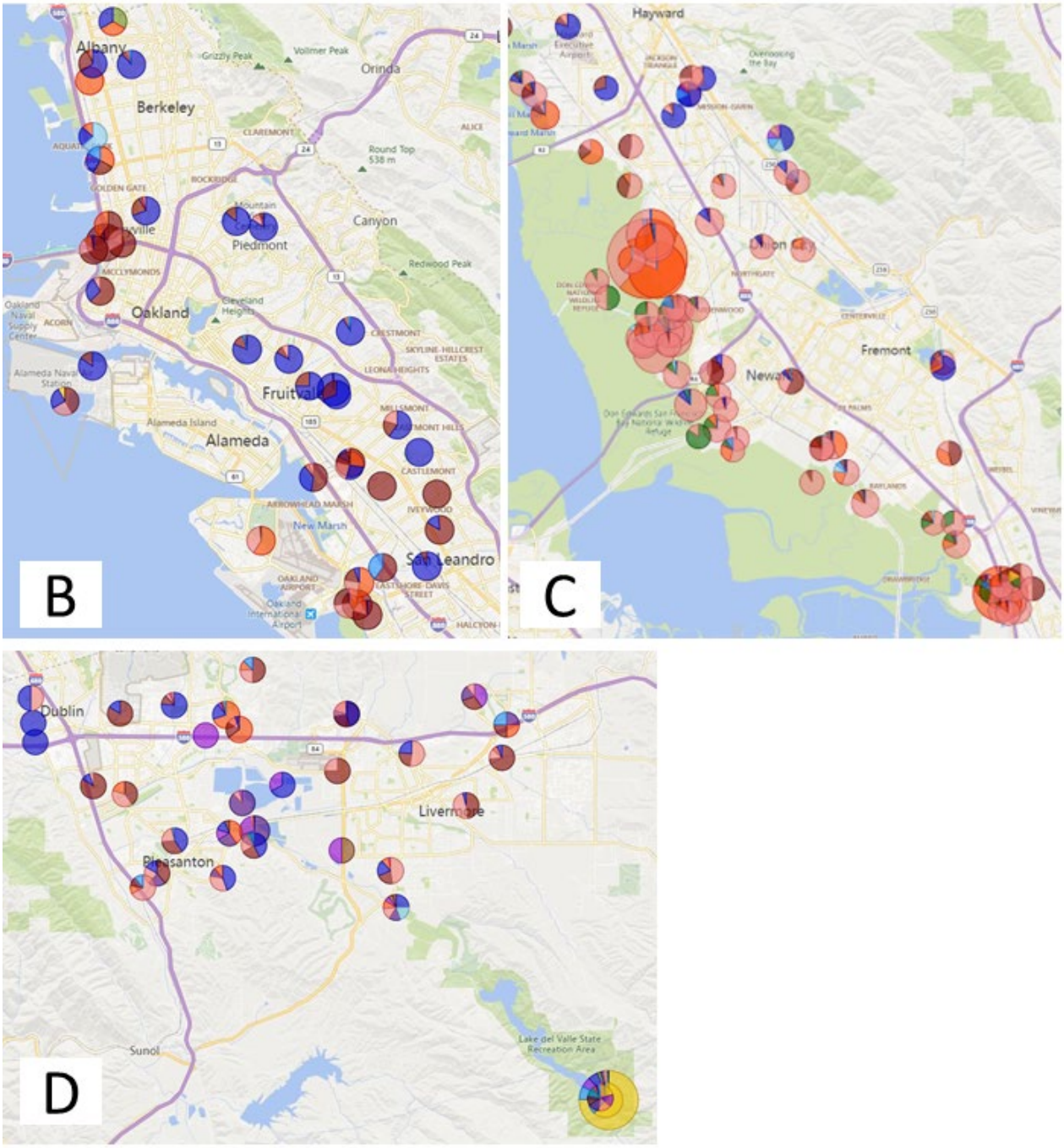


Figure 4. Mosquito abundance by trap site evaluated using EVS CO_2 traps. Pie charts over trap sites indicate the distribution of mosquito species collected at the trap site. The size of each pie chart indicates the relative number of mosquitoes at each site during August of 2022. (A) Alameda County (the insert shows traps that were placed but did not collect mosquitoes), (B) the northern region of the county, (C) the southern region, and (D) the eastern region.

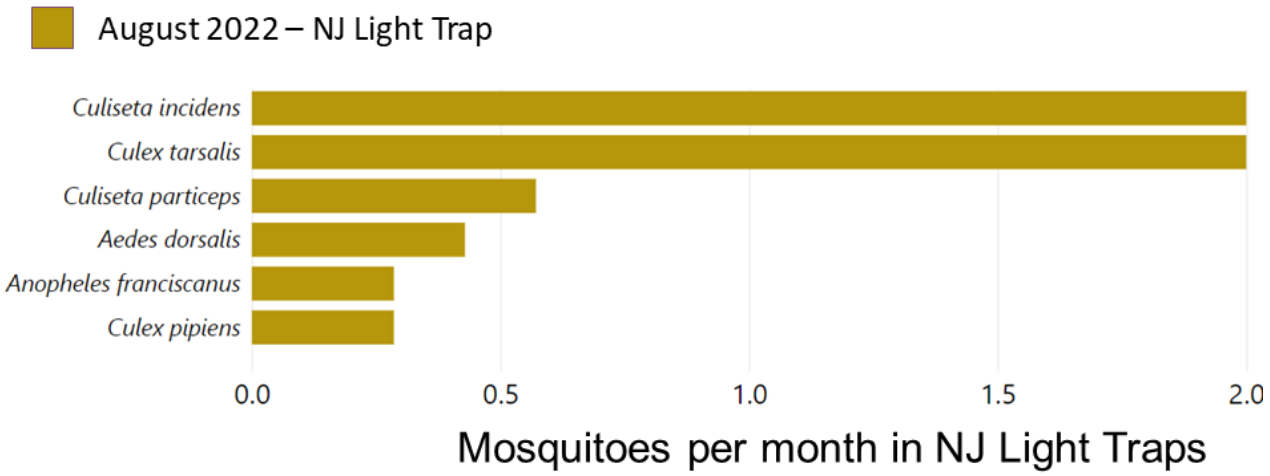


Figure 5. The most abundant species of mosquito captured in NJLT. A total of 43 mosquitoes were captured in NJ Light Traps.

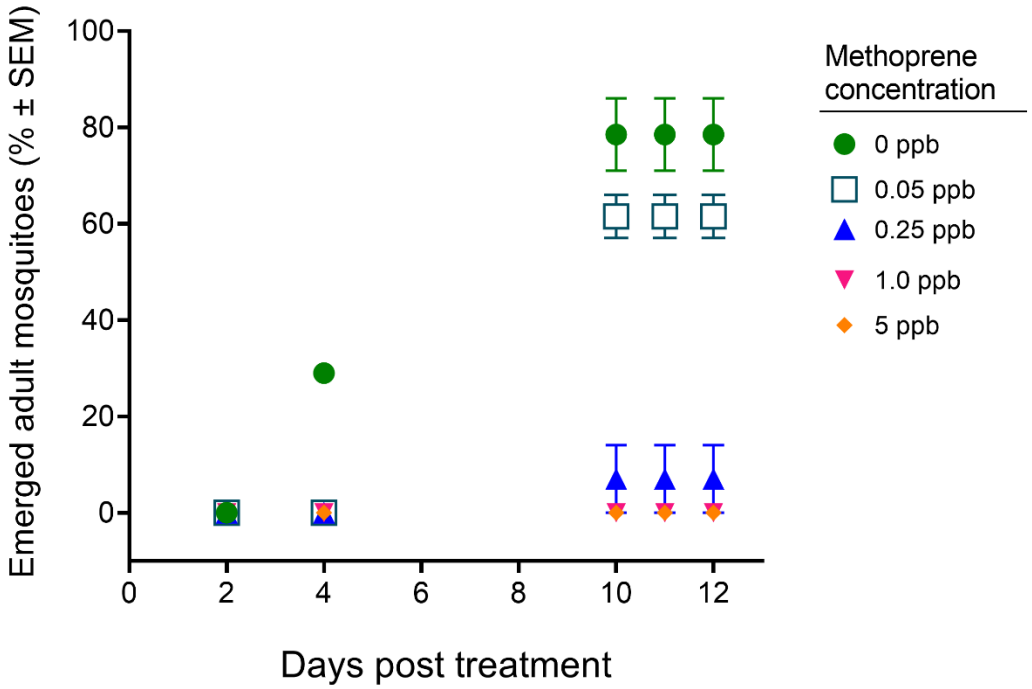


Figure 6. Assessing resistance to methoprene larvicide in *Ae. dorsalis* larvae that were collected from Pintail Marsh (Fremont, CA). None of the larvae that were exposed to methoprene concentrations that are near to what is applied in the field successfully emerged (1 and 5 ppb methoprene). Adults emerged when larvae were exposed to lower concentrations or no methoprene (0.05 and 0.25 ppb), demonstrating that they had the potential to emerge had not the higher methoprene concentrations interrupted their development.

Analysis and report by Eric Haas-Stapleton, PhD, Laboratory Director

C. PUBLIC EDUCATION

Upcoming Events and Presentations

- Solano Stroll in Albany
- San Leandro Unified School District classroom presentations
- Science of Halloween with Quest Science Center in Livermore

School Program

- Survey feedback from teachers is complete.
- Revised parts of the curriculum according to teacher needs. Major changes include easier set up of the mosquito containers, added a Final Results page to the lessons, added more information about mosquito borne diseases into the slide deck, and enhanced the teacher's guide to make the sequence of lessons clearer for teachers.

East Oakland Targeted Outreach

- East Oakland Specific NextDoor post, additional Facebook ads in East Oakland zip codes.
- Emailed East Oakland agencies and non-profits about ACMAD services along with an invitation for free presentations (Oakland Parks and Rec, East Oakland Boxing Association, Oakland Community Gardens, Street Level Health Project),
- Distributed brochures at Eastmont Center and East Oakland libraries.
- Will follow-up with food pantries, East Oakland schools and additional agencies in mid- September.

Google Analytics

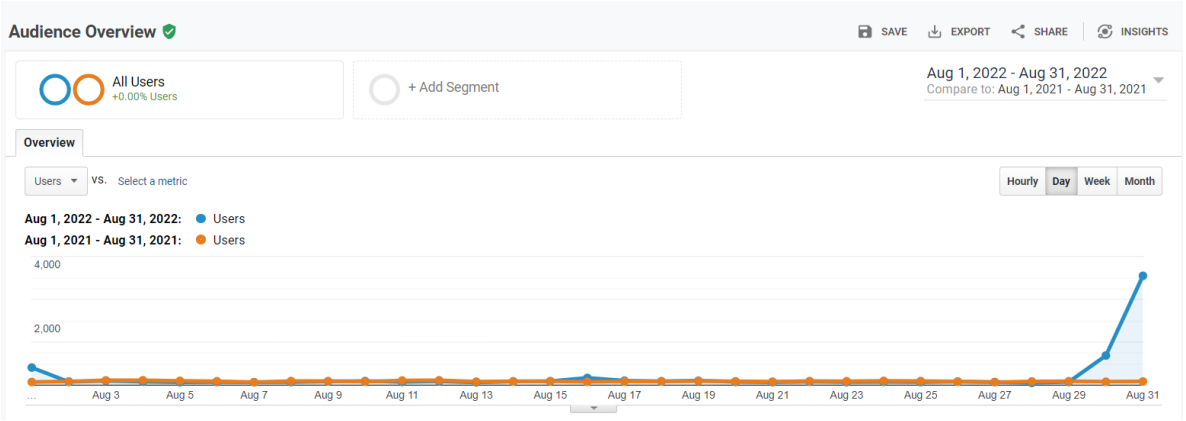


Figure 1: August website users 2022

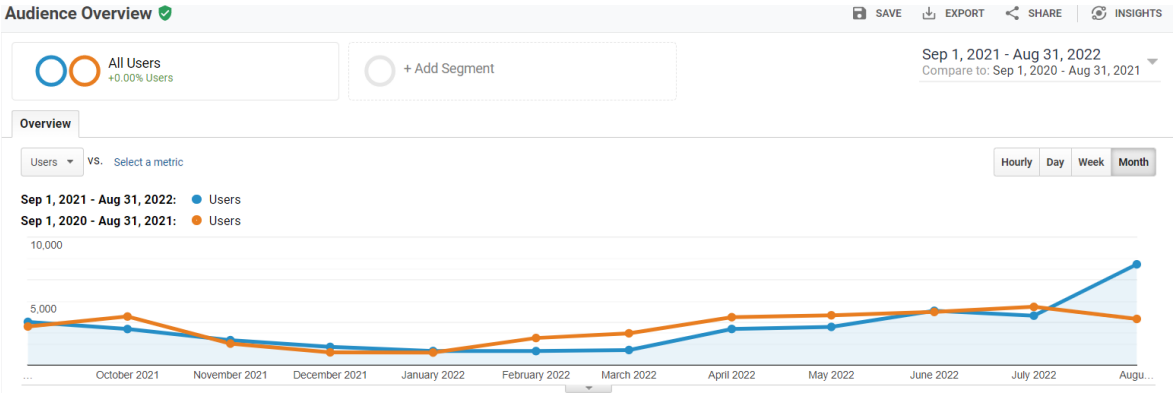
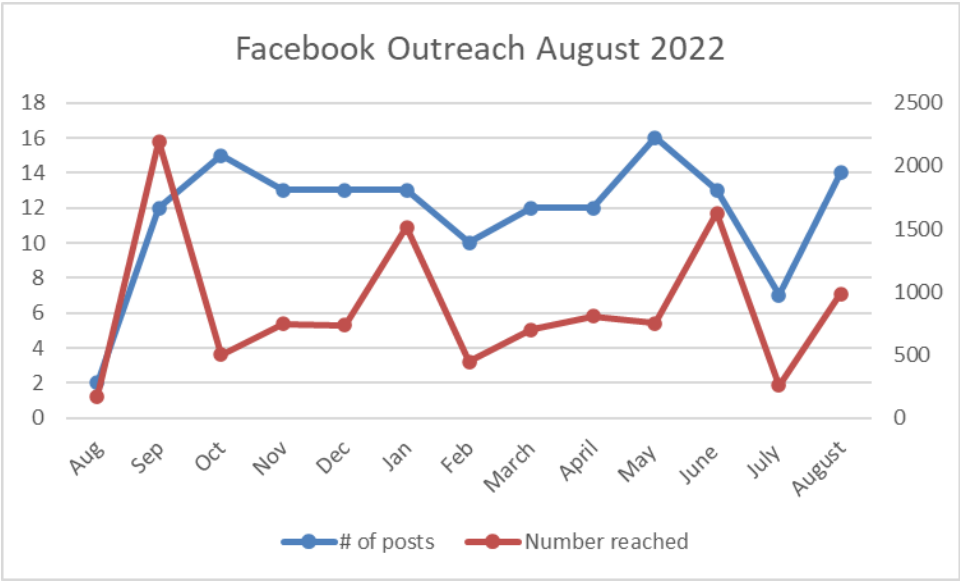


Figure 2: August 2-year website comparison

Facebook



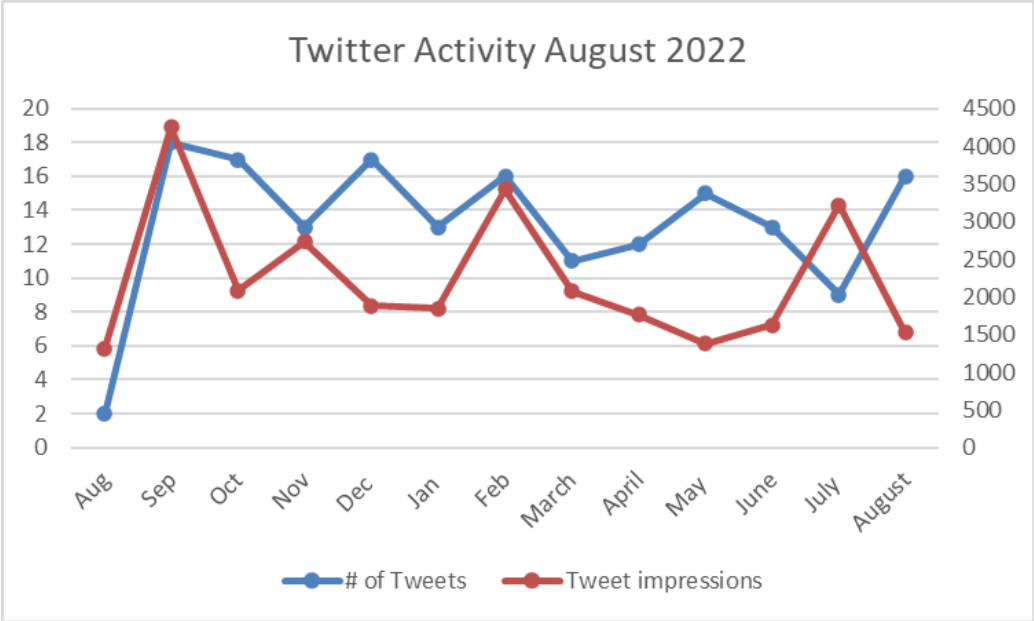
August Data: Posts 14 Reach – 983 Followers – 364 (9 added)

Top August Facebook Post: We had a great time at the Downtown Hayward Street Party this past Thursday. Street parties are a great opportunity to meet face to face with residents and answer all sorts of mosquito questions.

Facebook Ad: In June we started a Facebook ad campaign through LocalIQ. To date the ad above has received 419,598 impressions.

Video Ad In August we launched a video ad on Facebook. Above is a screenshot from the video. It was seen by over 2,500 people, with 707 individuals who chose to watch at least 3 seconds of the video.

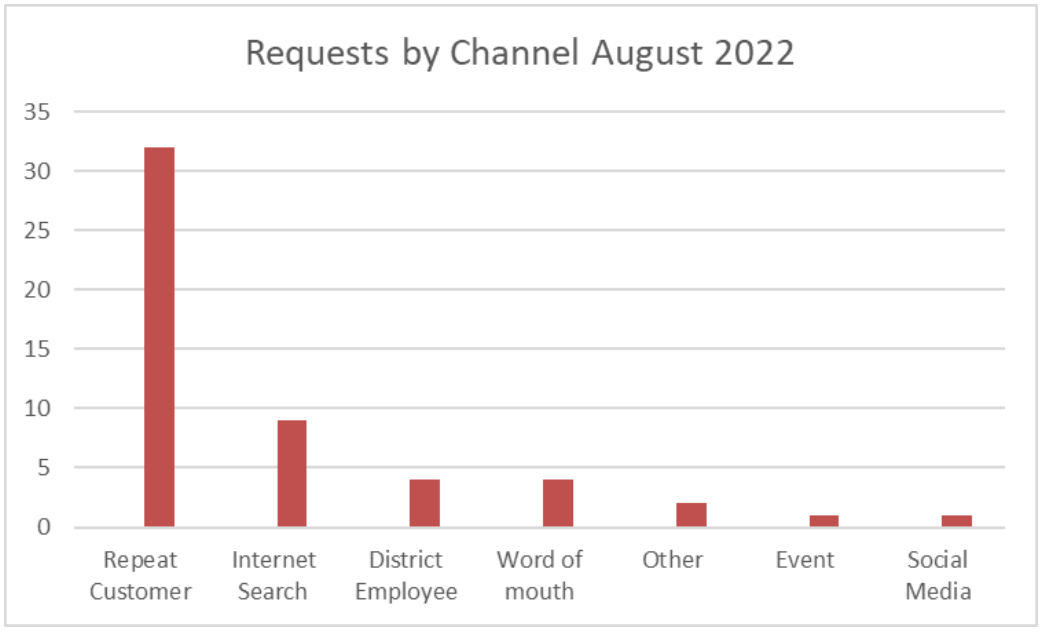
Twitter



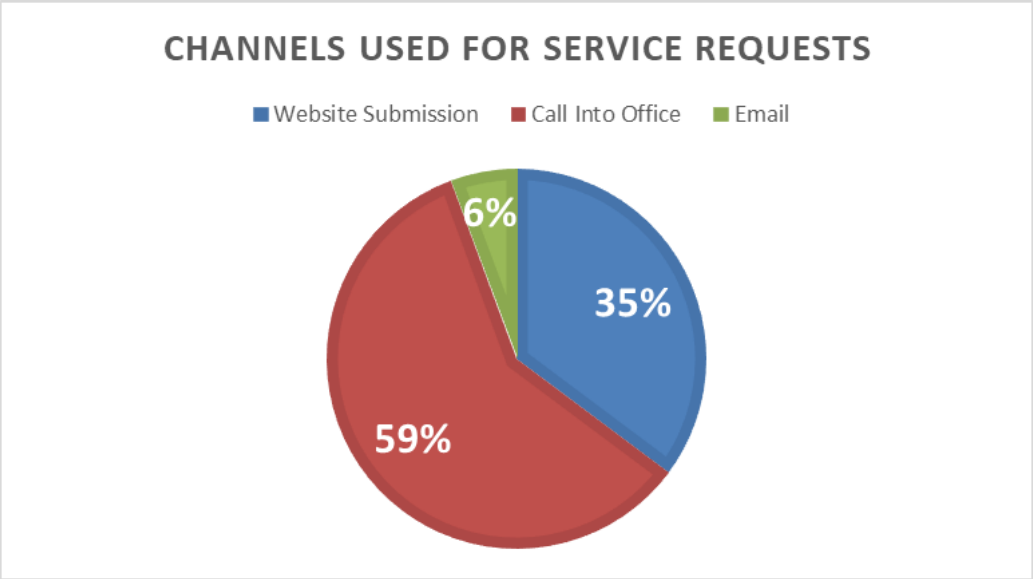
August Data: Posts – 16 Impressions – 1,522 Followers – 786 (5 added)

Top August Twitter Post: Rain? In California during August? It surprised us too. While we appreciate any rain we can get, mosquitoes are also thrilled. Light rain and warm days are a perfect recipe for mosquitoes- so check your pots, any outdoor containers and tarps for standing water.

Service Request Referral Summary for August



Channels Used by Residents to Request Service



71 requests in total: 42 calls, 25 website requests, 4 emails

California Arbovirus Surveillance Bulletin #22
Week 35 Friday, September 2, 2022

WEEKLY UPDATE

Humans

West Nile virus

A total of 11 cases of West Nile virus (WNV) illness were reported this week from 4 counties: Fresno (2), Los Angeles (7), Merced (1), and Yolo (1). **This is the first WNV case reported from Merced County this year.** In 2022, a total of 35 cases have been reported from 12 counties. Of the 35 cases, 23 (66%) had neuroinvasive illness and 3 (8%) were fatal. The median age of the cases was 59 years and 24 (69%) were male. The dates of symptom onset ranged from April 11 to August 19. In addition to the 35 WNV cases, 5 asymptomatic WNV-positive blood donors have been reported from 3 counties: Fresno (3), Kern (1), and Los Angeles (1). At this time last year, 32 WNV cases had been reported from 12 counties.

St. Louis encephalitis virus

A single (1) human case of St. Louis encephalitis virus (SLEV) was reported this week from Kern County; **this is the first SLEV case reported from Kern County this year**. In 2022, 4 SLEV human cases have been reported from 3 counties: Kern (1), Stanislaus (1), and Tulare (2). At this time last year, 0 SLEV cases had been reported.

Dead Birds

A total of 21 WNV positive dead birds were reported this week from 9 counties: Los Angeles (2), Placer (1), Sacramento (2), San Bernardino (1), Santa Clara (5), Shasta (1), Solano (4), Yolo (4), and Yuba (1). **These are the first WNV positive dead birds from Shasta and Yuba counties this year.** In 2022, 113 WNV positive dead birds have been reported from 19 counties. At this time last year, 160 WNV positive dead birds had been reported from 16 counties.

Mosquito Pools

West Nile virus

A total of 302 WNV positive mosquito pools were reported this week from 18 counties: Butte (5), Fresno (24), Kings (31), Lake (1), Los Angeles (63), Madera (26), Merced (2), Orange (2), Placer (3), Riverside (14), Sacramento (2), San Bernardino (11), San Joaquin (20), Santa Clara (2), Shasta (6), Stanislaus (12), Tulare (69), and Yolo (9). In 2022, 2,136 WNV positive mosquito pools have been reported from 24 counties. At this time last year, 1,646 WNV positive pools had been reported from 24 counties.

St. Louis encephalitis virus

A total of 23 SLEV positive mosquito pools were reported this week from 5 counties: Imperial (2), Kings (13), Los Angeles (1), Madera (1), and Riverside (6). **This is the first report of SLEV activity in Los Angeles and Madera counties this year**. In 2022, 69 SLEV positive mosquito pools from 6 counties have been reported: Imperial (5), Kings (18), Los Angeles (1), Madera (1), Riverside (41), and Tulare (3). At this time last year, 19 SLEV positive pools had been reported from 3 counties.

Sentinel Chickens

A total of 26 WNV positive chickens were reported this week from 6 counties: Butte (5), Contra Costa (1), Merced (10), Sutter (5), Tehama (1), and Yuba (4). **This is the first WNV positive chicken reported from Contra Costa County this year.** In 2022, 78 WNV positive chickens have been reported from 11 counties. At this time last year, 45 WNV positive chickens had been reported from 9 counties.

California Arbovirus Surveillance Bulletin #22

Week 35 Friday, September 2, 2022

2021 & 2022 YTD West Nile Virus Comparisons		
	2021	**2022**
Total No. Dead Bird Reports	4,041	3,644
No. Positive Counties	29	27
No. Human Cases	32	35
No. Positive Dead Birds / No. Tested	160 / 1,270	113 / 984
No. Positive Mosquito Pools / No. Tested	1,646 / 25,963	2,136 / 27,682
No. Seroconversions / No. Tested	45 / 4,104	78 / 3,691

YTD WNV Activity by Element and County, 2022					
County	**Humans**	**Horses**	**Dead Birds**	**Mosquito Pools**	**Sentinel Chickens**
Butte	2		2	32	22
Colusa					1
Contra Costa			1	2	1
Fresno	7		2	250	
Imperial				1	
Kern	4	2		69	
Kings	3			94	
Lake			1	7	
Los Angeles	8		24	299	4
Madera				95	
Merced	1		1	12	16
Nevada			1		
Orange	1		1	30	
Placer			3	69	
Riverside			1	95	
Sacramento		1	27	21	1
San Bernardino			6	65	
San Joaquin				157	
Santa Clara			15	16	
Shasta			1	36	
Solano	1		8	11	
Stanislaus	3			34	
Sutter			4	30	9
Tehama	1	1			2
Tulare	1	1	2	648	10
Yolo	3		12	51	3
Yuba			1	12	9
Totals	**35**	**5**	**113**	**2,136**	**78**

California Arbovirus Surveillance Bulletin #22

Week 35 Friday, September 2, 2022

TESTING SUMMARIES

		WNV	SLEV	WEEV
Human Cases	Week	11	1	0
	YTD	35	4	0

		Positive / Total Tested					
		WNV	SLEV	WEEV	CHIK	DENV	ZIKA
Dead Birds	Week	21 / 56					
	YTD	113 / 984					
Chicken Sera	Week	26 / 215	0 / 215	0 / 215			
	YTD	78 / 3,691	0 / 3,691	0 / 3,691			
Mosquito Pools	Week	302 / 1,326	23 / 1,291	0 / 1,277	0 / 88	0 / 88	0 / 88
	YTD	2,136 / 27,682	69 / 24,468	0 / 24,410	0 / 323	0 / 323	0 / 323

POSITIVES

Dead Birds

County	Agency	City	Zip Code	Species	Date Reported	Virus
Los Angeles	Greater Los Angeles Co VCD - Sylmar	Los Angeles	91401	American Crow	8/23/2022	WNV
Los Angeles	Los Angeles Co West VCD	Los Angeles	90036	American Crow	8/24/2022	WNV
Placer	Placer MVCD	Meadow Vista	95722	American Crow	8/24/2022	WNV
Sacramento	Sacramento-Yolo MVCD	Antelope	95843	California Scrub-Jay	8/29/2022	WNV
Sacramento	Sacramento-Yolo MVCD	Carmichael	95608	California Scrub-Jay	8/24/2022	WNV
San Bernardino	West Valley MVCD	Chino	91710	American Crow	9/2/2022	WNV
Santa Clara	Santa Clara Co VCD	Palo Alto	94301	American Crow	8/27/2022	WNV
Santa Clara	Santa Clara Co VCD	Palo Alto	94301	American Crow	8/27/2022	WNV
Santa Clara	Santa Clara Co VCD	San Jose	95123	House Sparrow	8/28/2022	WNV
Santa Clara	Santa Clara Co VCD	San Jose	95129	Song Sparrow	8/25/2022	WNV
Santa Clara	Santa Clara Co VCD	Sunnyvale	94087	House Finch	8/25/2022	WNV
Shasta	Shasta MVCD	Redding	96003	California Scrub-Jay	8/26/2022	WNV
Solano	Sacramento-Yolo MVCD	Dixon	95618	American Crow	8/26/2022	WNV
Solano	Solano Co MAD	Dixon	95620	American Crow	8/29/2022	WNV
Solano	Solano Co MAD	Dixon	95620	American Crow	8/29/2022	WNV
Solano	Solano Co MAD	Dixon	95620	American Crow	8/29/2022	WNV
Yolo	Sacramento-Yolo MVCD	Davis	95616	American Crow	8/27/2022	WNV
Yolo	Sacramento-Yolo MVCD	Davis	95616	American Crow	8/28/2022	WNV
Yolo	Sacramento-Yolo MVCD	Davis	95616	Black Phoebe	8/26/2022	WNV
Yolo	Sacramento-Yolo MVCD	Davis	95618	California Scrub-Jay	8/25/2022	WNV
Yuba	Sutter-Yuba MVCD	Marysville	95901	California Scrub-Jay	8/25/2022	WNV

Mosquito Pools

County	Site code	Pool #	Species	City	# in Pool	Trap type	Collected	Virus
Butte	BUCO 113	356	Cx. tarsalis	Gridley	50	CO2	8/22/2022	WNV
Butte	BUCO 115	365	Cx. tarsalis	Nelson	30	CO2	8/24/2022	WNV
Butte	BUCO 123	357	Cx. tarsalis	Oroville	50	CO2	8/22/2022	WNV

California Arbovirus Surveillance Bulletin #22

Week 35 Friday, September 2, 2022

Butte	BUCO 123	358	Cx. tarsalis	Oroville	50	CO2	8/22/2022	WNV
Butte	BUCO 36	361	Cx. tarsalis	Gridley	50	CO2	8/23/2022	WNV
Fresno	CNSL 6355	611	Cx. quinquefasciatus	Caruthers	50	GRVD	8/26/2022	WNV
Fresno	CNSL 8163	115	Cx. quinquefasciatus	Fresno	50	GRVD	8/23/2022	WNV
Fresno	CNSL 9213	606	Cx. quinquefasciatus	Clovis	14	BGSENT	8/24/2022	WNV
Fresno	FRNO 112	795	Cx. quinquefasciatus	Fresno	50	GRVD	8/30/2022	WNV
Fresno	FRNO 112	796	Cx. quinquefasciatus	Fresno	50	GRVD	8/30/2022	WNV
Fresno	FRNO 112	797	Cx. quinquefasciatus	Fresno	50	GRVD	8/30/2022	WNV
Fresno	FRNO 112	798	Cx. quinquefasciatus	Fresno	50	GRVD	8/30/2022	WNV
Fresno	FRNO 112	799	Cx. quinquefasciatus	Fresno	50	GRVD	8/30/2022	WNV
Fresno	FRNO 162	802	Cx. quinquefasciatus	Fresno	50	GRVD	8/30/2022	WNV
Fresno	FRNO 187	794	Cx. quinquefasciatus	Biola	11	GRVD	8/30/2022	WNV
Fresno	FRNO 214	801	Cx. quinquefasciatus	Kerman	39	GRVD	8/30/2022	WNV
Fresno	FRNO 215	805	Cx. quinquefasciatus	Kerman	14	GRVD	8/30/2022	WNV
Fresno	FRNO 271	788	Cx. quinquefasciatus	Fresno	50	GRVD	8/30/2022	WNV
Fresno	FRNO 8	807	Cx. quinquefasciatus	Fresno	28	GRVD	8/30/2022	WNV
Fresno	FRNO 8005	773	Cx. quinquefasciatus	Fresno	25	GRVD	8/25/2022	WNV
Fresno	FRNO 8007	772	Cx. quinquefasciatus	Fresno	46	GRVD	8/25/2022	WNV
Fresno	FRNO 8008	791	Cx. quinquefasciatus	Biola	39	GRVD	8/30/2022	WNV
Fresno	FRNO 88	820	Cx. quinquefasciatus	Fresno	39	GRVD	8/31/2022	WNV
Fresno	FRWS 1101	293	Cx. tarsalis	Dos Palos	50	CO2	8/30/2022	WNV
Fresno	FRWS 3104	300	Cx. tarsalis	Firebaugh	34	CO2	8/30/2022	WNV
Fresno	FRWS 4301	286	Cx. quinquefasciatus	Cantua Creek	50	BGSENT	8/25/2022	WNV
Fresno	FRWS 5101	303	Cx. tarsalis	Mendota	50	CO2	8/30/2022	WNV
Fresno	FRWS 5110	301	Cx. tarsalis	Tranquillity	50	CO2	8/30/2022	WNV
Fresno	FRWS 5110	302	Cx. tarsalis	Tranquillity	47	CO2	8/30/2022	WNV
Imperial	IMPR 139	138	Cx. quinquefasciatus	El Centro	8	BGSENT	8/30/2022	SLEV
Imperial	IMPR 40	133	Cx. tarsalis	Imperial	15	BGSENT	8/30/2022	SLEV
Kings	CNSL 6356	612	Cx. quinquefasciatus	Laton	50	GRVD	8/26/2022	WNV
Kings	KNGS 3062	215	Cx. tarsalis	Lemoore	50	CO2	8/25/2022	WNV
Kings	KNGS 3062	215	Cx. tarsalis	Lemoore	50	CO2	8/25/2022	SLEV
Kings	KNGS 3062	217	Cx. tarsalis	Lemoore	50	CO2	8/25/2022	WNV
Kings	KNGS 3062	217	Cx. tarsalis	Lemoore	50	CO2	8/25/2022	SLEV
Kings	KNGS 3062	218	Cx. tarsalis	Lemoore	50	CO2	8/25/2022	WNV
Kings	KNGS 3062	218	Cx. tarsalis	Lemoore	50	CO2	8/25/2022	SLEV
Kings	KNGS 3078	187	Cx. tarsalis	Lemoore	50	CO2	8/23/2022	WNV
Kings	KNGS 3078	188	Cx. tarsalis	Lemoore	50	CO2	8/23/2022	WNV
Kings	KNGS 3078	188	Cx. tarsalis	Lemoore	50	CO2	8/23/2022	SLEV
Kings	KNGS 3078	189	Cx. tarsalis	Lemoore	50	CO2	8/23/2022	SLEV
Kings	KNGS 3100	214	Cx. tarsalis	Hanford	16	CO2	8/25/2022	WNV
Kings	KNGS 3108	197	Cx. tarsalis	Island	50	CO2	8/23/2022	WNV
Kings	KNGS 3108	197	Cx. tarsalis	Island	50	CO2	8/23/2022	SLEV
Kings	KNGS 3108	198	Cx. tarsalis	Island	50	CO2	8/23/2022	WNV
Kings	KNGS 3108	198	Cx. tarsalis	Island	50	CO2	8/23/2022	SLEV
Kings	KNGS 3108	199	Cx. tarsalis	Island	50	CO2	8/23/2022	WNV
Kings	KNGS 3108	200	Cx. tarsalis	Island	50	CO2	8/23/2022	WNV
Kings	KNGS 3122	209	Cx. tarsalis	Hanford	50	CO2	8/24/2022	WNV
Kings	KNGS 3122	209	Cx. tarsalis	Hanford	50	CO2	8/24/2022	SLEV
Kings	KNGS 3122	210	Cx. tarsalis	Hanford	26	CO2	8/24/2022	WNV
Kings	KNGS 3126	219	Cx. tarsalis	Corcoran	50	CO2	8/26/2022	WNV
Kings	KNGS 3126	221	Cx. tarsalis	Corcoran	50	CO2	8/26/2022	WNV
Kings	KNGS 3126	222	Cx. tarsalis	Corcoran	50	CO2	8/26/2022	WNV
Kings	KNGS 3127	223	Cx. tarsalis	Corcoran	50	CO2	8/26/2022	WNV
Kings	KNGS 3127	223	Cx. tarsalis	Corcoran	50	CO2	8/26/2022	SLEV
Kings	KNGS 3127	224	Cx. tarsalis	Corcoran	50	CO2	8/26/2022	WNV
Kings	KNGS 3127	225	Cx. tarsalis	Corcoran	50	CO2	8/26/2022	WNV
Kings	KNGS 3127	226	Cx. tarsalis	Corcoran	50	CO2	8/26/2022	WNV
Kings	KNGS 3127	227	Cx. pipiens	Corcoran	50	CO2	8/26/2022	WNV
Kings	KNGS 3127	227	Cx. pipiens	Corcoran	50	CO2	8/26/2022	SLEV
Kings	KNGS 3135	212	Cx. tarsalis	Hanford	19	CO2	8/25/2022	WNV
Kings	KNGS 3136	228	Cx. tarsalis	Hanford	50	CO2	8/26/2022	WNV
Kings	KNGS 3136	229	Cx. tarsalis	Hanford	50	CO2	8/26/2022	WNV
Kings	KNGS 3136	232	Cx. pipiens	Hanford	34	CO2	8/26/2022	WNV
Kings	KNGS 4009	211	Cx. tarsalis	Armona	50	CO2	8/24/2022	WNV
Kings	KNGS 4009	211	Cx. tarsalis	Armona	50	CO2	8/24/2022	SLEV
Kings	KNGS 8014	196	Cx. tarsalis	Laton	25	CO2	8/23/2022	WNV
Kings	KNGS 8022	191	Cx. tarsalis	Lemoore	50	CO2	8/23/2022	WNV
Kings	KNGS 8022	192	Cx. tarsalis	Lemoore	50	CO2	8/23/2022	WNV
Kings	KNGS 8022	193	Cx. tarsalis	Lemoore	50	CO2	8/23/2022	SLEV

California Arbovirus Surveillance Bulletin #22

Week 35 Friday, September 2, 2022

Kings	KNGS 8022	194	Cx. tarsalis	Lemoore	50	CO2	8/23/2022	WNV
Kings	KNGS 8022	195	Cx. pipiens	Lemoore	18	CO2	8/23/2022	WNV
Kings	KNGS 8022	195	Cx. pipiens	Lemoore	18	CO2	8/23/2022	SLEV
Lake	LAKE 131	360	Cx. tarsalis	Lower Lake	10	CO2	8/30/2022	WNV
Los Angeles	GRLA 2017	5788	Cx. quinquefasciatus	Studio City	50	GRVD	8/25/2022	WNV
Los Angeles	GRLA 2029	5779	Cx. quinquefasciatus	Canoga Park	22	GRVD	8/24/2022	WNV
Los Angeles	GRLA 2030	5780	Cx. quinquefasciatus	West Hills	30	GRVD	8/24/2022	WNV
Los Angeles	GRLA 2097	713	Cx. quinquefasciatus	La Mirada	21	BGSENT	8/23/2022	WNV
Los Angeles	GRLA 2101	710	Cx. quinquefasciatus	Santa Fe Springs	20	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2166	707	Cx. quinquefasciatus	Montebello	50	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2194	715	Cx. quinquefasciatus	South El Monte	50	GRVD	8/24/2022	WNV
Los Angeles	GRLA 2247	709	Cx. quinquefasciatus	Pico Rivera	50	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2321	737	Cx. quinquefasciatus	Carson	50	GRVD	8/26/2022	WNV
Los Angeles	GRLA 2383	726	Cx. quinquefasciatus	Whittier	50	GRVD	8/24/2022	WNV
Los Angeles	GRLA 2414	5774	Cx. quinquefasciatus	Granada Hills	50	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2419	5771	Cx. quinquefasciatus	Panorama City	50	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2421	5772	Cx. quinquefasciatus	Panorama City	50	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2478	5803	Cx. quinquefasciatus	Sunland	50	GRVD	8/26/2022	WNV
Los Angeles	GRLA 2550	5806	Cx. quinquefasciatus	Mission Hills	50	GRVD	8/26/2022	WNV
Los Angeles	GRLA 2554	5777	Cx. quinquefasciatus	Winnetka	50	GRVD	8/24/2022	WNV
Los Angeles	GRLA 2580	5765	Cx. quinquefasciatus	Sherman Oaks	50	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2650	5769	Cx. quinquefasciatus	Van Nuys	50	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2651	5767	Cx. quinquefasciatus	Encino	50	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2655	5768	Cx. quinquefasciatus	Encino	50	BGSENT	8/23/2022	WNV
Los Angeles	GRLA 2724	5778	Cx. quinquefasciatus	Winnetka	50	BGSENT	8/24/2022	WNV
Los Angeles	GRLA 2890	731	Cx. quinquefasciatus	Lakewood	50	GRVD	8/25/2022	WNV
Los Angeles	GRLA 2952	712	Cx. quinquefasciatus	South Whittier	19	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2953	705	Cx. quinquefasciatus	Santa Fe Springs	50	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2955	711	Cx. quinquefasciatus	Cerritos	33	GRVD	8/23/2022	WNV
Los Angeles	GRLA 2957	727	Cx. quinquefasciatus	Hawaiian Gardens	50	GRVD	8/25/2022	WNV
Los Angeles	GRLA 2995	5776	Cx. quinquefasciatus	Woodland Hills	42	BGSENT	8/24/2022	WNV
Los Angeles	GRLA 3027	5785	Cx. quinquefasciatus	Studio City	25	GRVD	8/25/2022	WNV
Los Angeles	GRLA 3036	5781	Cx. quinquefasciatus	Canoga Park	50	GRVD	8/24/2022	WNV
Los Angeles	GRLA 3038	5790	Cx. quinquefasciatus	Valley Village	50	GRVD	8/25/2022	WNV
Los Angeles	GRLA 3041	703	Cx. quinquefasciatus	Artesia	50	GRVD	8/23/2022	WNV
Los Angeles	GRLA 3042	719	Cx. quinquefasciatus	Hacienda Heights	32	GRVD	8/24/2022	WNV
Los Angeles	GRLA 3044	716	Cx. quinquefasciatus	South El Monte	30	GRVD	8/24/2022	WNV
Los Angeles	GRLA 3045	725	Cx. quinquefasciatus	Whittier	29	GRVD	8/24/2022	WNV
Los Angeles	GRLA 3048	704	Cx. quinquefasciatus	Pico Rivera	29	GRVD	8/23/2022	WNV
Los Angeles	GRLA 3052	724	Cx. quinquefasciatus	La Habra Heights	50	GRVD	8/24/2022	WNV
Los Angeles	GRLA 3053	723	Cx. quinquefasciatus	Hacienda Heights	50	GRVD	8/24/2022	WNV
Los Angeles	GRLA 3060	708	Cx. quinquefasciatus	Norwalk	24	GRVD	8/23/2022	WNV
Los Angeles	GRLA 3066	5793	Cx. quinquefasciatus	Valley Glen	50	GRVD	8/25/2022	WNV
Los Angeles	GRLA 3069	5791	Cx. quinquefasciatus	Valley Village	37	GRVD	8/25/2022	WNV
Los Angeles	GRLA 3076	5794	Cx. quinquefasciatus	Valley Glen	50	GRVD	8/25/2022	WNV
Los Angeles	GRLA 3097	5805	Cx. quinquefasciatus	Arleta	31	GRVD	8/26/2022	WNV
Los Angeles	GRLA 3133	5796	Cx. quinquefasciatus	San Fernando	50	GRVD	8/26/2022	WNV
Los Angeles	GRLA 3133	5796	Cx. quinquefasciatus	San Fernando	50	GRVD	8/26/2022	SLEV
Los Angeles	SGVA 1010	894	Cx. quinquefasciatus	Monrovia	38	GRVD	8/30/2022	WNV
Los Angeles	SGVA 1032	918	Cx. quinquefasciatus	Pasadena	35	GRVD	8/30/2022	WNV
Los Angeles	SGVA 1074	916	Cx. quinquefasciatus	Temple City	21	GRVD	8/30/2022	WNV
Los Angeles	SGVA 1077	901	Cx. quinquefasciatus	La Puente	16	GRVD	8/30/2022	WNV
Los Angeles	SGVA 294	908	Cx. quinquefasciatus	City of Industry	16	GRVD	8/30/2022	WNV
Los Angeles	SGVA 313	921	Cx. quinquefasciatus	Pasadena	37	GRVD	8/30/2022	WNV
Los Angeles	SGVA 385	897	Cx. quinquefasciatus	Arcadia	50	GRVD	8/30/2022	WNV
Los Angeles	SGVA 395	927	Cx. quinquefasciatus	Pasadena	20	GRVD	8/30/2022	WNV
Los Angeles	SGVA 4	898	Cx. quinquefasciatus	Arcadia	29	GRVD	8/30/2022	WNV
Los Angeles	SGVA 466	925	Cx. quinquefasciatus	Pasadena	27	GRVD	8/30/2022	WNV
Los Angeles	SGVA 473	914	Cx. quinquefasciatus	San Gabriel	40	GRVD	8/30/2022	WNV
Los Angeles	SGVA 482	891	Cx. quinquefasciatus	Duarte	50	GRVD	8/30/2022	WNV
Los Angeles	SGVA 491	896	Cx. quinquefasciatus	El Monte	42	GRVD	8/30/2022	WNV
Los Angeles	SGVA 505	917	Cx. quinquefasciatus	Monterey Park	19	GRVD	8/30/2022	WNV
Los Angeles	SGVA 64	907	Cx. quinquefasciatus	West Covina	50	GRVD	8/30/2022	WNV
Los Angeles	SGVA 650	910	Cx. quinquefasciatus	Pomona	18	GRVD	8/30/2022	WNV
Los Angeles	SGVA 695	919	Cx. quinquefasciatus	Rosemead	50	GRVD	8/30/2022	WNV
Los Angeles	SGVA 898	913	Cx. quinquefasciatus	San Gabriel	37	GRVD	8/30/2022	WNV
Los Angeles	SGVA 953	906	Cx. quinquefasciatus	Covina	50	GRVD	8/30/2022	WNV
Los Angeles	SGVA 996	920	Cx. quinquefasciatus	South Pasadena	50	GRVD	8/30/2022	WNV
Madera	MADR 12	571	Cx. tarsalis	Madera	50	CO2	8/25/2022	WNV

California Arbovirus Surveillance Bulletin #22

Week 35 Friday, September 2, 2022

Madera	MADR 195	591	Cx. tarsalis	Madera	50	CO2	8/25/2022	WNV
Madera	MADR 195	592	Cx. tarsalis	Madera	50	CO2	8/25/2022	WNV
Madera	MADR 198	572	Cx. quinquefasciatus	Madera	15	CO2	8/25/2022	WNV
Madera	MADR 198	573	Cx. tarsalis	Madera	50	CO2	8/25/2022	WNV
Madera	MADR 208	581	Cx. quinquefasciatus	Madera	50	CO2	8/26/2022	WNV
Madera	MADR 208	582	Cx. tarsalis	Madera	50	CO2	8/26/2022	WNV
Madera	MADR 259	583	Cx. tarsalis	Madera	50	CO2	8/26/2022	WNV
Madera	MADR 259	584	Cx. tarsalis	Madera	50	CO2	8/26/2022	WNV
Madera	MADR 259	584	Cx. tarsalis	Madera	50	CO2	8/26/2022	SLEV
Madera	MADR 298	548	Cx. quinquefasciatus	Chowchilla	50	CO2	8/23/2022	WNV
Madera	MADR 299	553	Cx. quinquefasciatus	Chowchilla	50	CO2	8/23/2022	WNV
Madera	MADR 299	554	Cx. tarsalis	Chowchilla	50	CO2	8/23/2022	WNV
Madera	MADR 300	551	Cx. tarsalis	Chowchilla	36	CO2	8/23/2022	WNV
Madera	MADR 3334	587	Cx. quinquefasciatus	Madera	50	CO2	8/26/2022	WNV
Madera	MADR 3334	588	Cx. tarsalis	Madera	50	CO2	8/26/2022	WNV
Madera	MADR 3334	589	Aedes aegypti	Madera	26	CO2	8/26/2022	WNV
Madera	MADR 3334	590	Cx. tarsalis	Madera	50	CO2	8/26/2022	WNV
Madera	MADR 581	563	Cx. tarsalis	Madera	13	CO2	8/24/2022	WNV
Madera	MADR 704	576	Cx. tarsalis	Madera	50	CO2	8/25/2022	WNV
Madera	MADR 704	577	Cx. quinquefasciatus	Madera	50	CO2	8/25/2022	WNV
Madera	MADR 704	578	Cx. tarsalis	Madera	50	CO2	8/25/2022	WNV
Madera	MADR 706	574	Cx. tarsalis	Madera	50	CO2	8/25/2022	WNV
Madera	MADR 706	575	Cx. tarsalis	Madera	50	CO2	8/25/2022	WNV
Madera	MADR 85	566	Cx. quinquefasciatus	Madera	40	CO2	8/24/2022	WNV
Madera	MADR 896	555	Cx. tarsalis	Mendota	50	CO2	8/23/2022	WNV
Madera	MADR 896	557	Cx. tarsalis	Mendota	50	CO2	8/23/2022	WNV
Merced	MERC 1005	253	Cx. tarsalis	Atwater	29	CO2	8/25/2022	WNV
Merced	MERC 787357	268	Cx. pipiens	Livingston	8	BGSENT	8/25/2022	WNV
Orange	ORCO 1011	3186	Cx. quinquefasciatus	La Habra	38	GRVD	8/30/2022	WNV
Orange	ORCO 215	3154	Cx. quinquefasciatus	La Habra	8	CO2	8/25/2022	WNV
Placer	PLCR 139	1439	Cx. tarsalis	Roseville	50	CO2	8/30/2022	WNV
Placer	PLCR 197802	1432	Cx. tarsalis	Elverta	23	CO2	8/30/2022	WNV
Placer	PLCR 25	1485	Cx. tarsalis	Lincoln	50	CO2	8/30/2022	WNV
Riverside	COAV 10	4773	Cx. tarsalis	Oasis	18	CO2	8/30/2022	WNV
Riverside	COAV 13	4770	Cx. tarsalis	Thermal	50	CO2	8/30/2022	WNV
Riverside	COAV 131	4696	Cx. tarsalis	Oasis	37	CO2	8/30/2022	WNV
Riverside	COAV 131	4696	Cx. tarsalis	Oasis	37	CO2	8/30/2022	SLEV
Riverside	COAV 17	4694	Cx. tarsalis	Mecca	50	CO2	8/30/2022	WNV
Riverside	COAV 17	4694	Cx. tarsalis	Mecca	50	CO2	8/30/2022	SLEV
Riverside	COAV 30	4713	Cx. quinquefasciatus	Thermal	50	CO2	8/30/2022	WNV
Riverside	COAV 30	4714	Cx. quinquefasciatus	Thermal	50	CO2	8/30/2022	WNV
Riverside	COAV 30	4867	Cx. quinquefasciatus	Thermal	50	CO2	9/1/2022	WNV
Riverside	COAV 30	4870	Cx. quinquefasciatus	Thermal	50	CO2	9/1/2022	WNV
Riverside	COAV 33	4704	Cx. tarsalis	Thermal	50	CO2	8/30/2022	WNV
Riverside	COAV 33	4704	Cx. tarsalis	Thermal	50	CO2	8/30/2022	SLEV
Riverside	COAV 35	4690	Cx. tarsalis	Mecca	50	CO2	8/30/2022	SLEV
Riverside	COAV 37	4697	Cx. tarsalis	Mecca	50	CO2	8/30/2022	WNV
Riverside	COAV 37	4697	Cx. tarsalis	Mecca	50	CO2	8/30/2022	SLEV
Riverside	COAV 37	4698	Cx. tarsalis	Mecca	50	CO2	8/30/2022	WNV
Riverside	COAV 37	4698	Cx. tarsalis	Mecca	50	CO2	8/30/2022	SLEV
Riverside	COAV 6	4774	Cx. tarsalis	Oasis	7	CO2	8/30/2022	WNV
Riverside	COAV 610	4707	Cx. tarsalis	Oasis	18	CO2	8/30/2022	WNV
Riverside	COAV 799	4792	Cx. quinquefasciatus	La Quinta	6	BGSENT	8/30/2022	WNV
Sacramento	SAYO 204011	4043	Cx. pipiens	Citrus Heights	50	GRVD	8/26/2022	WNV
Sacramento	SAYO 271007	3973	Cx. pipiens	Isleton	1	GRVD	8/26/2022	WNV
San Bernardino	WVAL 2008	1331	Cx. quinquefasciatus	Chino	30	CO2	8/31/2022	WNV
San Bernardino	WVAL 2018	1337	Cx. quinquefasciatus	Chino	15	GRVD	8/31/2022	WNV
San Bernardino	WVAL 3970	1304	Cx. quinquefasciatus	Chino	5	BGSENT	8/30/2022	WNV
San Bernardino	WVAL 4568	1336	Cx. quinquefasciatus	Upland	6	GRVD	8/31/2022	WNV
San Bernardino	WVAL 4721	1341	Cx. quinquefasciatus	Chino	39	BGSENT	8/31/2022	WNV
San Bernardino	WVAL 5005	1358	Cx. quinquefasciatus	Rancho Cucamonga	19	GRVD	9/1/2022	WNV
San Bernardino	WVAL 5009	1349	Cx. quinquefasciatus	Rancho Cucamonga	7	GRVD	8/31/2022	WNV
San Bernardino	WVAL 5456	1355	Cx. quinquefasciatus	Chino	50	BGSENT	8/31/2022	WNV
San Bernardino	WVAL 70	1338	Cx. quinquefasciatus	Ontario	50	GRVD	8/31/2022	WNV
San Bernardino	WVAL 9005	1297	Cx. quinquefasciatus	Upland	21	GRVD	8/30/2022	WNV
San Bernardino	WVAL 9007	1302	Cx. quinquefasciatus	Upland	8	GRVD	8/30/2022	WNV
San Joaquin	SJCM 8008	1747	Cx. tarsalis	Manteca	50	CO2	8/30/2022	WNV
San Joaquin	SJCM 8011	1755	Cx. tarsalis	Ripon	8	CO2	8/30/2022	WNV
San Joaquin	SJCM 8011	1756	Cx. pipiens	Ripon	30	CO2	8/30/2022	WNV

California Arbovirus Surveillance Bulletin #22

Week 35 Friday, September 2, 2022

San Joaquin	SJCM 8018	1714	Cx. tarsalis	Stockton	50	CO2	8/30/2022	WNV
San Joaquin	SJCM 8018	1715	Cx. tarsalis	Stockton	50	CO2	8/30/2022	WNV
San Joaquin	SJCM 8018	1716	Cx. tarsalis	Stockton	50	CO2	8/30/2022	WNV
San Joaquin	SJCM 8018	1717	Cx. tarsalis	Stockton	50	CO2	8/30/2022	WNV
San Joaquin	SJCM 8018	1718	Cx. tarsalis	Stockton	10	CO2	8/30/2022	WNV
San Joaquin	SJCM 8018	1719	Cx. pipiens	Stockton	5	CO2	8/30/2022	WNV
San Joaquin	SJCM 8056	1744	Cx. tarsalis	Manteca	50	CO2	8/30/2022	WNV
San Joaquin	SJCM 8056	1745	Cx. tarsalis	Manteca	24	CO2	8/30/2022	WNV
San Joaquin	SJCM 8097	1729	Cx. tarsalis	Banta	11	CO2	8/30/2022	WNV
San Joaquin	SJCM 8106	1753	Cx. pipiens	Escalon	21	CO2	8/30/2022	WNV
San Joaquin	SJCM 8143	1713	Cx. pipiens	Stockton	16	CO2	8/30/2022	WNV
San Joaquin	SJCM 8161	1741	Cx. pipiens	Ripon	34	CO2	8/30/2022	WNV
San Joaquin	SJCM 8199	1742	Cx. tarsalis	Manteca	34	CO2	8/30/2022	WNV
San Joaquin	SJCM 8209	1778	Cx. pipiens	Lodi	41	CO2	9/1/2022	WNV
San Joaquin	SJCM 8219	1730	Cx. tarsalis	Stockton	28	CO2	8/30/2022	WNV
San Joaquin	SJCM 8227	1760	Cx. pipiens	Ripon	17	CO2	8/30/2022	WNV
San Joaquin	SJCM 8233	1727	Cx. pipiens	stockton	10	CO2	8/30/2022	WNV
Santa Clara	STCL 31725	3008	Cx. pipiens	Sunnyvale	27	GRVD	8/27/2022	WNV
Santa Clara	STCL 31765	3085	Cx. pipiens	Sunnyvale	7	GRVD	8/30/2022	WNV
Shasta	SHAS 110	487	Cx. pipiens	Redding	15	CO2	8/31/2022	WNV
Shasta	SHAS 130	458	Cx. pipiens	Redding	24	GRVD	8/29/2022	WNV
Shasta	SHAS 177	473	Cx. pipiens	Redding	17	CO2	8/31/2022	WNV
Shasta	SHAS 20040	467	Cx. tarsalis	Redding	37	CO2	8/30/2022	WNV
Shasta	SHAS 26	475	Cx. pipiens	Anderson	47	CO2	8/31/2022	WNV
Shasta	SHAS 707	471	Cx. tarsalis	Shasta Lake	36	CO2	8/30/2022	WNV
Stanislaus	TRLK 1615	610	Cx. tarsalis	Modesto	50	CO2	8/30/2022	WNV
Stanislaus	TRLK 1615	614	Cx. tarsalis	Modesto	50	CO2	8/30/2022	WNV
Stanislaus	TRLK 1615	615	Cx. tarsalis	Modesto	50	CO2	8/30/2022	WNV
Stanislaus	TRLK 1673	631	Cx. tarsalis	Patterson	50	CO2	8/30/2022	WNV
Stanislaus	TRLK 1673	639	Cx. tarsalis	Patterson	50	CO2	8/30/2022	WNV
Stanislaus	TRLK 424	621	Cx. tarsalis	Patterson	50	CO2	8/30/2022	WNV
Stanislaus	TRLK 437	672	Cx. pipiens	Patterson	50	CO2	8/30/2022	WNV
Stanislaus	TRLK 437	677	Cx. tarsalis	Patterson	50	CO2	8/30/2022	WNV
Stanislaus	TRLK 437	683	Cx. tarsalis	Patterson	50	CO2	8/30/2022	WNV
Stanislaus	TRLK 437	685	Cx. tarsalis	Patterson	47	CO2	8/30/2022	WNV
Stanislaus	TRLK 806	576	Cx. tarsalis	Grayson	42	CO2	8/30/2022	WNV
Stanislaus	TRLK 9768	659	Cx. tarsalis	Modesto	50	CO2	8/30/2022	WNV
Tulare	DLTA 63173	2705	Cx. quinquefasciatus	Kingsburg	14	CO2	8/23/2022	WNV
Tulare	DLTA 64163	2858	Cx. quinquefasciatus	Dinuba	11	BGSENT	8/25/2022	WNV
Tulare	DLTA 740744	2749	Cx. quinquefasciatus	London	34	CO2	8/24/2022	WNV
Tulare	DLTA 740813	2769	Cx. quinquefasciatus	London	43	CO2	8/24/2022	WNV
Tulare	DLTA 740813	2770	Cx. quinquefasciatus	London	10	CO2	8/24/2022	WNV
Tulare	DLTA 741334	2786	Cx. quinquefasciatus	Monson	50	CO2	8/24/2022	WNV
Tulare	DLTA 741541	2762	Cx. quinquefasciatus	Monson	50	CO2	8/24/2022	WNV
Tulare	DLTA 741541	2764	Cx. quinquefasciatus	Monson	50	CO2	8/24/2022	WNV
Tulare	DLTA 741541	2768	Cx. tarsalis	Monson	35	CO2	8/24/2022	WNV
Tulare	DLTA 8324	2690	Cx. quinquefasciatus	Goshen	47	BGSENT	8/19/2022	WNV
Tulare	DLTA 8413	2733	Cx. quinquefasciatus	Visalia	50	BGSENT	8/23/2022	WNV
Tulare	DLTA 8413	2851	Cx. quinquefasciatus	Visalia	15	BGSENT	8/25/2022	WNV
Tulare	DLTA 8414	2718	Cx. quinquefasciatus	Visalia	50	BGSENT	8/23/2022	WNV
Tulare	DLTA 8414	2719	Cx. quinquefasciatus	Visalia	50	BGSENT	8/23/2022	WNV
Tulare	DLTA 841543	2836	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841543	2840	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841543	2841	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841543	2842	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841543	2843	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841543	2844	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841543	2845	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841543	2847	Cx. tarsalis	Visalia	15	CO2	8/25/2022	WNV
Tulare	DLTA 841611	2796	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841611	2797	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841611	2798	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841611	2799	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841611	2800	Cx. quinquefasciatus	Visalia	30	CO2	8/25/2022	WNV
Tulare	DLTA 841631	2809	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841631	2810	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841631	2812	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841631	2813	Cx. quinquefasciatus	Visalia	33	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2817	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV

Tulare	DLTA 841632	2819	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2821	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2822	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2823	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2824	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2825	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2826	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2830	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2831	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2832	Cx. quinquefasciatus	Visalia	49	CO2	8/25/2022	WNV
Tulare	DLTA 841632	2833	Cx. tarsalis	Visalia	15	CO2	8/25/2022	WNV
Tulare	DLTA 841634	2848	Cx. quinquefasciatus	Visalia	20	CO2	8/25/2022	WNV
Tulare	DLTA 841642	2802	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 841642	2803	Cx. quinquefasciatus	Visalia	50	CO2	8/25/2022	WNV
Tulare	DLTA 8419	2784	Cx. quinquefasciatus	Goshen	50	BGSENT	8/24/2022	WNV
Tulare	DLTA 84193	2855	Cx. quinquefasciatus	Visalia	19	BGSENT	8/25/2022	WNV
Tulare	DLTA 8422	2753	Cx. quinquefasciatus	Goshen	50	BGSENT	8/24/2022	WNV
Tulare	DLTA 8422	2755	Cx. quinquefasciatus	Goshen	50	BGSENT	8/24/2022	WNV
Tulare	DLTA 8422	2757	Cx. quinquefasciatus	Goshen	50	BGSENT	8/24/2022	WNV
Tulare	DLTA 8422	2878	Cx. quinquefasciatus	Goshen	50	BGSENT	8/26/2022	WNV
Tulare	DLTA 8422	2880	Cx. quinquefasciatus	Goshen	50	BGSENT	8/26/2022	WNV
Tulare	DLTA 8422	2881	Cx. quinquefasciatus	Goshen	11	BGSENT	8/26/2022	WNV
Tulare	DLTA 84221	2729	Cx. quinquefasciatus	Visalia	10	BGSENT	8/23/2022	WNV
Tulare	DLTA 8423	2857	Cx. quinquefasciatus	Visalia	50	BGSENT	8/25/2022	WNV
Tulare	DLTA 8423	2877	Cx. quinquefasciatus	Visalia	47	BGSENT	8/26/2022	WNV
Tulare	DLTA 84231	2711	Cx. quinquefasciatus	Visalia	50	BGSENT	8/23/2022	WNV
Tulare	DLTA 84231	2712	Cx. quinquefasciatus	Visalia	50	BGSENT	8/23/2022	WNV
Tulare	DLTA 84231	2713	Cx. quinquefasciatus	Visalia	50	BGSENT	8/23/2022	WNV
Tulare	DLTA 84231	2714	Cx. quinquefasciatus	Visalia	50	BGSENT	8/23/2022	WNV
Tulare	DLTA 84231	2715	Cx. quinquefasciatus	Visalia	50	BGSENT	8/23/2022	WNV
Tulare	DLTA 84231	2716	Cx. quinquefasciatus	Visalia	48	BGSENT	8/23/2022	WNV
Tulare	DLTA 8425	2695	Cx. quinquefasciatus	Visalia	29	GRVD	8/23/2022	WNV
Tulare	DLTA 8527	2737	Cx. quinquefasciatus	Visalia	34	BGSENT	8/23/2022	WNV
Tulare	DLTA 85293	2853	Cx. quinquefasciatus	Visalia	13	BGSENT	8/25/2022	WNV
Tulare	DLTA 9403	2696	Cx. quinquefasciatus	Visalia	34	GRVD	8/23/2022	WNV
Tulare	DLTA 94032	2760	Cx. quinquefasciatus	Visalia	16	BGSENT	8/24/2022	WNV
Tulare	DLTA 94033	2864	Cx. quinquefasciatus	Visalia	37	CO2	8/26/2022	WNV
Yolo	SAYO 115008	4137	Cx. tarsalis	Woodland	50	CO2	8/30/2022	WNV
Yolo	SAYO 115008	4138	Cx. tarsalis	Woodland	50	CO2	8/30/2022	WNV
Yolo	SAYO 115008	4140	Cx. tarsalis	Woodland	50	CO2	8/30/2022	WNV
Yolo	SAYO 124007	4037	Cx. tarsalis	Woodland	16	CO2	8/26/2022	WNV
Yolo	SAYO 136010	3886	Cx. tarsalis	Woodland	50	CO2	8/23/2022	WNV
Yolo	SAYO 136010	3887	Cx. tarsalis	Woodland	50	CO2	8/23/2022	WNV
Yolo	SAYO 136010	3889	Cx. tarsalis	Woodland	50	CO2	8/23/2022	WNV
Yolo	SAYO 136010	4155	Cx. tarsalis	Woodland	50	CO2	8/30/2022	WNV
Yolo	SAYO 145008	3908	Cx. tarsalis	Davis	22	CO2	8/23/2022	WNV

Sentinel Chickens

County	Site Code	Nearest City	Date Bled	Virus	Band 01	Band 02	Band 03
Butte	BUCO 000001	Chico	8/23/2022	WNV	1604	1605	
Butte	BUCO 000004	Gridley	8/23/2022	WNV	1624		
Butte	BUCO 000007	Chico	8/23/2022	WNV	1642	1643	
Contra Costa	CNTR 8152	Knightsen	8/22/2022	WNV	1059		
Merced	MERC 000001	Merced	8/26/2022	WNV	1149	1151	
Merced	MERC 000006	Merced	8/26/2022	WNV	1163	1164	
Merced	MERC 000501	Merced	8/26/2022	WNV	1167	1169	1170
Merced	MERC 000502	Hilmar	8/26/2022	WNV	1173	1175	1176
Sutter	SUYA 000015	Robbins	8/25/2022	WNV	1443		
Sutter	SUYA 000030	Live Oak	8/25/2022	WNV	1426	1428	
Sutter	SUYA 000084	Yuba City	8/25/2022	WNV	1403	1406	
Tehama	TEHA 000100	Corning	8/24/2022	WNV	1496		
Yuba	SUYA 000007	Marysville	8/25/2022	WNV	1416	1419	1420
Yuba	SUYA 000010	Olivehurst	8/25/2022	WNV	1411		

California Arbovirus Surveillance Bulletin #22

Week 35 Friday, September 2, 2022

TEST PROTOCOLS

Humans:
Specimens are tested by local laboratories with an IgM or IgG immunofluorescent assay (IFA) and/or an IgM enzyme immunoassay (EIA). Specimens with inconclusive results are forwarded to the California Department of Public Health Viral and Rickettsial Disease Laboratory (VRDL) for further testing with a plaque reduction neutralization test (PRNT).

Dead Birds
Oral swab samples collected from bird carcasses are tested at the UC Davis Arbovirus Research and Training laboratory (DART) or at a local agency for West Nile virus by RT-qPCR.

Sentinel Chickens:
Dried blood spot samples from sentinel chickens are tested at the California Department of Public Health Vector-Borne Disease Laboratory for IgG antibodies to West Nile, St. Louis encephalitis, and western equine encephalomyelitis viruses by an EIA. Positive samples are confirmed by IFA, western-blot, or PRNT.

Mosquito Pools:
Mosquito pools are tested at DART or at a local agency for West Nile, western equine encephalomyelitis, and St. Louis encephalitis viral RNA using a multiplex RT-qPCR. Invasive *Aedes* mosquitoes (*Ae. aegypti* and *Ae. albopictus*) are also tested at DART for chikungunya, dengue, and Zika viral RNA by a separate RT-qPCR.

Website Information: For updated information on WNV in California, please visit the California WNV website, https://westnile.ca.gov*, or the California Vector-Borne Disease Surveillance System website,* https://maps.vectorsurv.org.

Prepared by the Vector-Borne Disease Section (Infectious Diseases Branch), California Department of Public Health, 850 Marina Bay Parkway, Richmond, CA 94804. Questions concerning this bulletin should be addressed to Hannah Romo: Hannah.romo@cdph.ca.gov