

Judges' Retirement System Actuarial Valuation

As of June 30, 2019



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Actuarial Certification



February 2020

To the best of our knowledge, this report is complete and accurate and contains sufficient information to fully and fairly disclose the actuarial funded condition of the Judges' Retirement System. This valuation is based on the member and financial data as of June 30, 2019 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. In our opinion, this valuation has been performed in accordance with generally accepted actuarial principles, in accordance with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for this plan, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

The undersigned are actuaries for CalPERS, who are members of the American Academy of Actuaries and the Society of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

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Highlights and Executive Summary

Introduction

This is the actuarial valuation report as of June 30, 2019 for the Judges' Retirement System. This actuarial valuation is used to recommend the fiscal year 2020-21 employer contributions. The Judges' Retirement System provides retirement and ancillary benefits to judges elected or appointed prior to November 9, 1994. The employer and member contribution rates for the plan are set by State statute and are each equal to 8 percent of payroll. The State currently funds the System using a pay-as-you-go approach since the 8 percent of payroll contributions made by both the State and members are ***not adequate to meet the System's current benefit payouts***.

Purpose of Report

This actuarial valuation of the Judges' Retirement System of the State of California was performed by CalPERS staff actuaries as of June 30, 2019 in order to:

- Set forth the assets, accrued liabilities and funded status of the System as of June 30, 2019;
- Provide expected benefit payouts and funding alternatives;
- Provide actuarial information as of June 30, 2019, to the CalPERS Board of Administration 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. A separate accounting valuation report for such purposes is available from CalPERS. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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, and changes in plan provisions or applicable law.

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 that would be applicable to a pay-as-you-go plan:

- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 2 percent and 3 percent and inflation rates of 1.5 percent and 3.5 percent.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10 percent lower or 10 percent higher than our current mortality assumptions adopted in 2017. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.

Highlights and Executive Summary

Employer Contribution

The State contributes to the plan on a pay-as-you-go basis. In other words, member contributions plus employer contributions are designed to cover only benefit payments and expenses each year, with nothing left over for pre-funding. A pay-as-you-go approach is easy to understand. However, from an accounting viewpoint, pensions in the aggregate are considered a form of deferred wages and should generally be charged over the period of employment. Also, from the member's point of view, it is generally not satisfactory that his/her future benefit payments are dependent upon the continued willingness and ability of the employer to cover the benefit payments each year.

Pay-As-You-Go Employer Contributions

A comparison of the pay-as-you-go costs reduced by expected member contributions for the prior and current valuation is shown below.

	Fiscal Year 2019-20	Fiscal Year 2020-21
Estimated Employer Pay-as-You-Go Cost (PAYG)	\$210,045,751	\$209,344,866

The average expected remaining service for current actives is approximately 3.8 years. Some believe that pensions should be funded over a period similar to the remaining service life. CalPERS recognizes that making contributions equal to the entire Unfunded Actuarial Liability (UAL) within 4 years is not realistic at this time. However, the lack of any accumulation of assets remains a serious concern. Advance funding of the System's benefits enables the pension assets to grow with investment earnings and would reduce future contribution requirements needed on a pay-as-you-go basis. It is recommended that the State consider some form of advanced funding.

Prefunded Employer Contributions

In the following table, we have shown three possible funding amounts, equal to the Normal Cost plus a 15-year, a 10-year and a 5-year level dollar amortization of the UAL, in addition to the PAYG amount. We recommend a 10-year or shorter amortization, since most, if not all, active members would be expected to retire within that time and the duration of benefit payments is 10.8. We have also shown the expected total amount of payments expected to be made over the life of the plan under each scenario. This demonstrates the amount of savings that can be realized when assets are invested.

Prefunded Employer Contributions

	Pay-as-You-Go	Fiscal Year 2020-21		
		Funding, 15-Year Amortization	Funding, 10-Year Amortization	Funding, 5-Year Amortization
Total Normal Cost	N/A	14,850,348	14,850,348	14,850,348
Less Estimated Employee Contributions	N/A	(1,829,987)	(1,829,987)	(1,829,987)
Unfunded Accrued Liability Payment	N/A	252,538,878	353,425,679	658,293,774
Total Annual	\$209,344,866	\$ 265,559,238	\$366,446,040	\$ 671,314,135
Expected Total Payout over the Life of the Plan (Employer and Employee costs including the estimated PAYG costs for fiscal year 2019-20)	\$4,582,602,155	\$4,069,755,776	\$3,815,929,399	\$3,573,141,481

CalPERS is ready to work with the Administration in establishing an acceptable advance-funding basis that satisfies both the recommendation for advanced funding and current fiscal limitations. The funding schedules above are based on a 3 percent discount rate. This 3 percent discount rate used in the valuation represents an expected return on a fixed income portfolio consistent with the capital market assumptions used by CalPERS in its most recent Asset Liability Management review.

Highlights and Executive Summary

Plan's Funded Status

The table below summarizes the funded status of the Judges' Retirement System as of June 30, 2019, and the prior valuation year.

	June 30, 2018	June 30, 2019
1) Present Value of Projected Benefits	\$3,411,517,939	\$3,252,357,421
2) Entry Age Normal Accrued Liability	3,320,530,020	3,173,229,040
3) Market Value of Assets (MVA)	44,491,530	14,080,882
4) Unfunded Accrued Liability [(2) - (3)]	\$3,276,038,490	\$3,159,148,158
5) Funded Ratio [(3) / (2)]	1.3%	0.4%

This measure of funded status is an assessment of the need for future employer contributions. The Unfunded Liability, if positive, 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. This measure of funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligations.

Changes Since the Prior Year's Valuation

Actuarial Methods and Assumptions

The CalPERS Board of Administration adopted a new amortization policy for pre-funded CalPERS plans effective with this actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed as a level dollar amount. In addition, the new policy does not utilize a 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy also does not utilize a 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

A complete description of the actuarial methods and assumptions used in the June 30, 2019 valuation may be found in Appendix A of this report.

Plan Provisions

There were no plan changes since the prior valuation. A description of the principal plan provisions may be found in Appendix B of this report.

Subsequent Events

Plan Data

In the case of Robert M. Mallano, et al. v. John Chiang, Controller of the State of California (SCO), the Judges' Retirement System (JRS), and the Judges' Retirement System II (JRS II), the judge issued a Statement of Decision which orders judicial salary increases to be given to the judges for the FY 2008-09, FY 2009-10, FY 2010-11, FY 2013-14, FY 2014-15 and FY 2015-16 plus 10 percent interest per year for each year that the judicial salaries were not increased. Based on the increased judicial salaries, adjustments to the defined benefit and lump sum payments are currently being calculated and paid. Some of these adjustments have been made and are reflected in this valuation. It is anticipated the remaining adjustments pursuant to this lawsuit will be reflected in the June 30, 2020 valuation.

Assets

7 Reconciliation of the Market Value of Assets

7 Asset Allocation

Assets

Reconciliation of the Market Value of Assets

The following displays the change in the Market Value of Assets from the prior valuation date to June 30, 2019.

Changes	Market Value
Beginning Balance as of June 30, 2018.	\$44,491,530
Prior Period Adjustment	-
Adjusted Beginning Balance as of June 30, 2018.	\$44,491,530
Contributions (Employer plus Employee)	\$6,867,051
Other Income	2,775,553
Transfer from General Fund	191,715,000
Investment Earnings Credit ¹	1,174,157
Less Other Investment Expenses	(8,489)
Contribution Refund	-
Administrative Costs	(10,980,108)
Benefit Payments	(221,953,811)
Ending Balance as of June 30, 2019.	\$ 14,080,882

(1) Net Fund return for the FY 2018-19 is 3.2%

Asset Allocation

Shown below is the Market Value of Assets, by asset type, as of the valuation date.

Investment Type	Value as of June 30, 2019
Cash	\$827
Investments at Market Value	-
Investment in Short Term Domestic Securities	\$18,341,652
Accounts Receivable	-
Member, Agency, State, School and Other	2,115,712
Due from PERF	143,183
Accrued Interest Receivable	151,119
Subtotal of Accounts Receivable	\$2,410,014
Accounts Payable	-
Retirement Benefits in Process of Payment	(120)
Due to General Fund	(19,735)
Due to Other Funds	(202,011)
Other Program Liabilities	(6,449,746)
Subtotal of Accounts Payable	\$(6,671,612)
Fund Balance at Market Value on June 30, 2019.	\$14,080,882

Liabilities and Employer Contributions

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Liabilities and Required Employer Contributions

Comparison of Current and Prior Year Results

Shown below are the comparisons of key valuation results for the current valuation date compared to corresponding values from the prior valuation date.

	June 30, 2018	June 30, 2019
1) Members Included in the Valuation		
a) Active Members	170	146
b) Deferred Vested Terminated Members & QDRO's	4	4
c) Receiving Payments	1,796	1,767
d) Total Members Included in the Valuation	1,970	1,917
2) Payroll		
a) Covered Annual Payroll	\$35,335,347	\$31,511,394
b) Projected Covered Annual Payroll	31,964,016	22,874,843
c) Average Covered Annual Payroll [(2a) / (1a)]	\$207,855	\$215,831
3) Age and Service for Actives		
a) Average Attained Age for Actives	71.3	72.3
b) Average Service for Actives	29.61	30.55
c) Average Future Service for Actives	3.96	3.85
4) Present Value of Benefits at Valuation Date		
a) Active Members	\$456,464,524	\$391,719,045
b) Deferred Vested Terminated Members & QDRO's	6,343,607	9,485,606
c) Receiving Benefits	2,948,709,808	2,851,152,770
d) Total Present Value of Benefits at Valuation Date	\$3,411,517,939	\$3,252,357,421
5) Present Value of Future Normal Costs at Valuation Date		
a) Member Contributions	\$11,221,653	\$9,740,404
b) Employer Normal Costs	79,766,266	69,387,977
6) Unfunded Accrued Actuarial Liability		
a) Accrued Actuarial Liability		
i. Active Members	\$365,476,605	\$312,590,664
ii. Deferred Vested Terminated Members & QDRO's	6,343,607	9,485,606
iii. Receiving Benefits	2,948,709,808	2,851,152,770
iv. Total Accrued Actuarial Liability	\$3,320,530,020	\$3,173,229,040
b) Assets (Market Value)	44,491,530	14,080,882
c) Unfunded Actuarial Liability [(6 a iv) – (6b)]	\$3,276,038,490	\$3,159,148,158
d) Funded Ratio [(6b) / (6 a iv)]	1.3%	0.4%
7) Normal Cost	\$20,736,803	\$14,850,348
8) Employer Contributions		
a) Recommended 10-Year Funding		
i. Normal Cost ¹	21,358,907	14,850,348
ii. Estimated Employee Contributions	2,083,532	1,829,987
iii. Payment on Unfunded Liability	\$395,573,201	\$353,425,679
iv. Total Recommended Employer Contribution [(8 a i) – (8 a ii) + (8 a iii)]	\$414,848,576	\$366,446,040
b) Estimated Pay-as-You-Go Costs (PAYG)		
i. Estimated Benefit Payments	\$212,129,283	\$211,174,853
ii. Estimated Employee Contributions	2,083,532	1,829,987
iii. Estimated Employer Contributions [(10 b i) – (10 b ii)]	\$210,045,751	\$209,344,866

¹In the prior year valuation, the normal cost was rolled forward with interest. Due to a methodology change, this will no longer be the case starting with the June 30, 2019 valuation.

Liabilities and Required Employer Contributions (continued)

(Gain)/Loss Analysis

To calculate the cost requirements of the plan, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year, actual experience is compared to the expected experience based on the actuarial assumptions. This results in actuarial gains or losses, as shown below.

1) Total (Gain)/Loss for the Year	Amount
a)Unfunded Accrued Liability (UAL) as of 6/30/2018	\$3,276,038,490
b)Expected Pay as You Go Excluding Normal Cost	187,408,422
c)Interest through 6/30/19 $[0.03 \times 1a - ((1.03)^{1/2} - 1) \times 1b]$	95,490,801
d)Expected UAL Before All Other Changes $[1a - 1b + 1c]$	\$3,184,120,869
e)Change Due to Revised Actuarial Methods	0
f)Change Due to New Actuarial Assumptions	0
g)Expected UAL After All Changes $[1d + 1e + 1f]$	\$3,184,120,869
h)Actual Unfunded Accrued Liability as of 6/30/2019	3,159,148,158
i) Total (Gain)/Loss for FY 2018-19 [1h - 1g]	(\$24,972,711)
2) Contribution (Gain)/Loss for the Year	Amount
a)Expected Contribution (Employer and Employee)	\$209,652,771
b)Interest on Expected Contributions $[((1.03)^{1/2} - 1) \times 2a]$	3,121,553
c)Actual Contribution	198,582,051
d)Interest on Actual Contributions $[((1.03)^{1/2} - 1) \times 2c]$	2,956,719
e)Contribution (Gain)/Loss $[(2a + 2b) - (2c + 2d)]$	\$11,235,554
3) Asset (Gain)/Loss for the Year	Amount
a)Market Value of Assets as of 6/30/2018	\$44,491,530
b)Contributions Received	198,582,051
c)Benefits, Refunds Paid and Administrative Costs	(232,933,919)
d)Transfers, SCP, and Miscellaneous Adjustments	2,775,553
e)Expected Interest $[0.03 \times 3a + ((1.03)^{1/2} - 1) \times (3b + 3c + 3d)]$	864,601
f)Expected Assets as of 6/30/2019 $[3a + 3b + 3c + 3d + 3e]$	13,779,815
g)Actual Market Value of Assets as of 6/30/2019	14,080,882
h)Asset (Gain)/Loss [3f - 3g]	(\$301,066)
4) Liability (Gain)/Loss for the Year	Amount
a)Total (Gain)/Loss (1i)	(\$24,972,711)
b)Contribution (Gain)/Loss (2e)	11,235,554
c)Asset (Gain)/Loss (3h)	(301,066)
d)Liability (Gain)/Loss $[4a - 4b - 4c]$	(\$35,907,199)

Liabilities and Required Employer Contributions (continued)

Funding History

The Funding History below shows the recent history of the Actuarial Accrued Liability, the Market Value of Assets, Funded Ratio, the Annual Covered Payroll and the Pay-As-You-Go (PAYG) Cost.

Valuation Date	Entry Age Normal Accrued Liability	Market Value of Assets (MVA)	Unfunded Accrued Liability	Funded Ratio (MVA)	Annual Covered Payroll	PAYG Cost
6/30/19	\$3,173,229,040	\$14,080,882	\$3,159,148,158	0.4%	\$31,511,394	\$209,344,866
6/30/18	3,320,530,020	44,491,530	3,276,038,490	1.3%	35,335,347	210,045,751
6/30/17	3,315,731,052	48,274,516	3,267,456,536	1.5%	38,330,347	207,313,847
6/30/16	3,428,743,441	39,793,891	3,388,949,550	1.2%	42,429,926	208,334,913
6/30/15	3,322,609,989	41,177,519	3,281,432,470	1.2%	44,284,467	227,341,695
6/30/14	3,414,779,730	57,198,659	3,357,581,071	1.7%	52,335,325	225,157,030
6/30/13	3,383,309,964	53,819,947	3,329,490,017	1.6%	60,593,543	217,464,586
6/30/12	3,172,276,086	72,693,177	3,099,582,909	2.3%	69,227,033	213,556,754
6/30/11	3,296,537,803	54,383,026	3,242,154,777	1.6%	75,919,674	212,005,561
6/30/10	3,429,380,904	63,828,344	3,365,552,560	1.9%	85,947,377	210,566,972
6/30/09	3,582,992,463	41,390,491	3,541,601,972	1.2%	96,648,907	206,226,920

Projections of Contributions & Payouts

12 10-Year Projection of Contributions and Benefits

12 Projected Benefit Payouts

Projections of Contributions & Payouts (continued)

10-Year Projection of Contributions and Benefits

Shown below is a 10-year projection of expected State and member statutory contributions and expected benefit payouts.

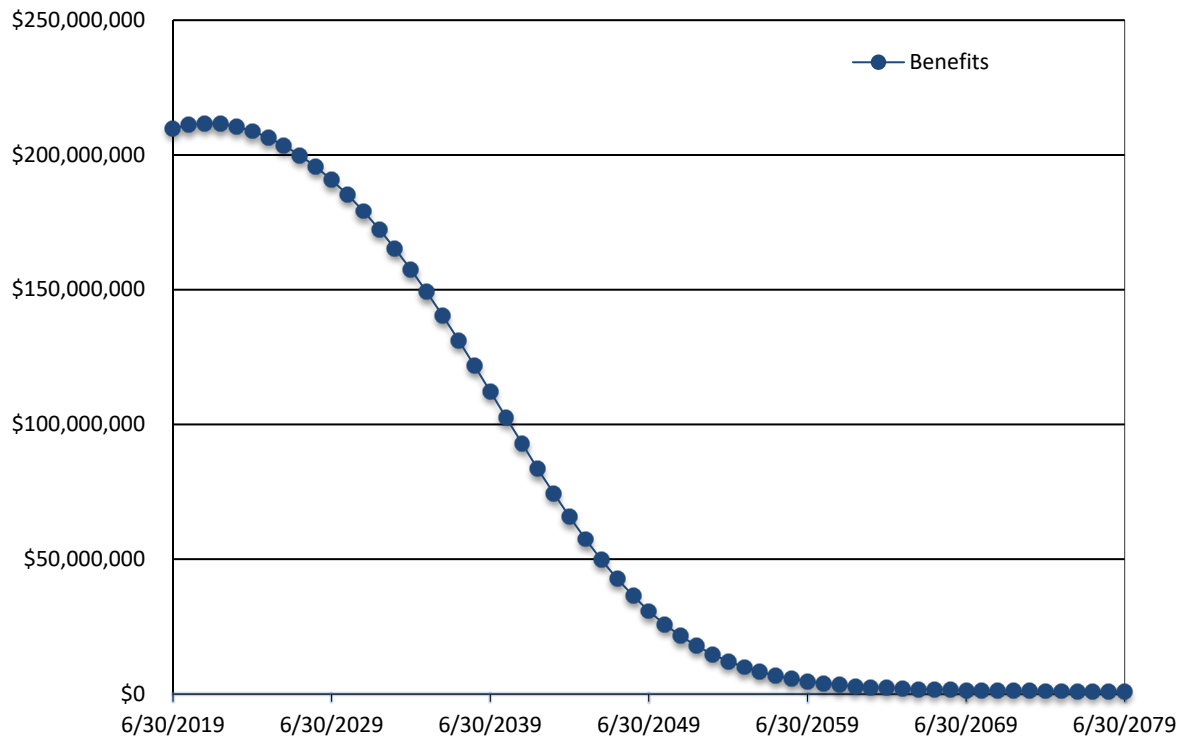
Fiscal Years Beginning July 1	State Statutory Contributions ¹	Member Statutory Contributions ¹	Future Benefits Payouts
2020	\$ 1,829,987	\$ 1,829,987	\$ 211,174,853
2021	1,473,610	1,473,610	211,697,940
2022	1,180,272	1,180,272	211,473,141
2023	937,318	937,318	210,606,812
2024	740,637	740,637	208,864,538
2025	585,503	585,503	206,448,023
2026	458,558	458,558	203,611,538
2027	353,788	353,788	199,933,661
2028	271,243	271,243	195,635,978
2029	206,374	206,374	190,754,803

(1) Statutory State contributions and statutory member contributions both equal eight percent (8%) of pay.

Projected Benefit Payouts

The graph below shows a projection of future annual benefit payouts from the System. Total benefit payments from the System are projected to decline from a peak of \$212 million during Fiscal Year 2021-2022. Total projected benefit payments over the remaining life of the plan are \$4.58 billion.

Projection of Annual Benefit Payouts



Risk Analysis

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Risk Analysis (continued)

Future Investment Return Scenarios

Analysis was not performed to determine the effects of various future investment returns on required employer contributions for this plan because the results of such analysis would not have a material impact on the funding of this plan. This is primarily due to the lack of prefunding, which results in a relatively low level of assets.

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 0.50 percent and 2.50 percent, 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, 2019 assuming alternate discount rates by changing the two components independently. Results are shown using the current discount rate of 3.0 percent as well as alternate discount rates of 2.0 percent and 4.0 percent. The rates of 2.0 percent and 4.0 percent were selected since they illustrate the impact of a 1.0 percent increase or decrease to the 3.0 percent assumption. This type of analysis gives the reader a sense of the long-term risk to the FY 2020-21 employer contribution rates.

Sensitivity to the Real Rate of Return Assumption

As of June 30, 2019	-1% Real Rate of Return ¹	Current Assumptions	+1% Real Rate of Return
Discount Rate	2.0%	3.0%	4.0%
Inflation	2.5%	2.5%	2.5%
Real Rate of Return	-0.5%	0.5%	1.5%
a) Total Normal Cost	83.33%	64.92%	50.84%
b) Accrued Liability	3,510,862,105	3,173,229,040	2,886,142,672
c) Market Value of Assets	14,080,882	14,080,882	14,080,882
d) Unfunded Liability (Surplus) [(b)-(c)]	3,496,781,223	3,159,148,158	2,872,061,790
e) Funded Status	0.40%	0.45%	0.49%

(1) The -1% Inflation Rate results in the table below is a more realistic scenario than this combination of assumptions, which results in a negative real rate of return.

Sensitivity to the Price Inflation Assumption

As of June 30, 2019	-1% Inflation Rate	Current Assumptions	+1% Inflation Rate
Discount Rate	2.0%	3.0%	4.0%
Inflation	1.5%	2.5%	3.5%
Real Rate of Return	0.5%	0.5%	0.5%
a) Total Normal Cost	65.30%	64.92%	64.56%
b) Accrued Liability	\$3,188,495,670	\$3,173,229,040	\$3,158,138,322
c) Market Value of Assets	14,080,882	14,080,882	14,080,882
d) Unfunded Liability (Surplus) [(b)-(c)]	3,174,414,788	3,159,148,158	3,144,057,440
e) Funded Status	0.44%	0.45%	0.45%

Risk Analysis (continued)

Mortality Rate Sensitivity

The following looks at the change in the June 30, 2019 plan costs and funded ratio under two different longevity scenarios, namely assuming rates of mortality are 10 percent lower or 10 percent higher than our current mortality assumptions. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.

As of June 30, 2019	10% Lower Mortality Rates	Current Mortality	10% Higher Mortality Rates
a) Total Normal Cost	67.08%	64.92%	62.98%
b) Accrued Liability	\$3,317,077,346	\$3,173,229,040	\$3,046,270,030
c) Market Value of Assets	14,080,882	14,080,882	14,080,882
d) Unfunded Liability (Surplus) [(b)-(c)]	3,302,996,464	3,159,148,158	3,032,189,148
e) Funded Status	0.43%	0.45%	0.46%

Plan Maturity Measures

As pension plans mature they become much more sensitive to risks than plans that are less mature. Understanding plan maturity and how it affects the ability of a pension plan to tolerate risk is important in understanding how the plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions.

The Judges' Retirement plan closed to new entrants in 1994 and is a mature pension plan. For a plan that is closed to new entrants and does not prefund the pension benefits, plan maturity measures do not yield results that are very meaningful. For example, eventually there will be no payroll associated with this plan, so measuring contribution volatility with relation to payroll does not provide information consistent with plans that are open to new entrants. Additionally, eventually there will be no actives in this plan, so measuring the ratio of actives to retirees or retired to total accrued liability won't provide results that are consistent with plans open to new entrants. For these reasons, plan maturity measures have been omitted from this report.

Appendices

A-1 Appendix A – Statement of Actuarial Methods and Assumptions

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Appendix A – Statement of Actuarial Methods and Assumptions

Actuarial Data

As stated in the Actuarial Certification, the data, which serves as the basis of this valuation, has been obtained from the various CalPERS databases. We have reviewed the valuation data and believe that it is reasonable and appropriate in aggregate.

Actuarial Funding Method

The method used to determine the optional funding schedules is the Entry Age Normal actuarial cost method. Under this funding method, projected benefits are determined for all members and the associated liabilities are spread in a manner that produces level annual cost as a percent of pay in each year from the age of hire (entry age) to the assumed retirement age. The cost allocated to the current fiscal year is called the normal cost.

The actuarial accrued liability for active members is then calculated as the portion of the total cost of the plan allocated to prior years. The actuarial accrued liability for members currently receiving benefits and for members entitled to deferred benefits, is equal to the present value of the benefits expected to be paid. No normal costs are applicable for these participants.

The following table provides a brief history of the actuarial cost method.

Valuation Year June 30	Funding Method
2010 to Current	Entry Age Normal
1998 to 2009	Aggregate

Amortization Period

No formal amortization of the unfunded liability is currently in use, since contributions are being made on a pay-as-you-go basis. However, we have included a recommended contribution using an amortization period of 10 years.

Asset Valuation Method

The value of assets equals the market value of the fund.

Actuarial Assumptions

The actuarial assumptions used in the actuarial valuation are shown below.

The demographic assumptions used in the valuation are not expected to produce significant experience gains or losses for the plan. The actuary has concluded that the continued use of these assumptions is reasonable for valuation purposes. Service retirement, termination and disability retirement assumptions were changed in the June 30, 2016 valuation. Mortality assumptions were changed in the June 30, 2017 valuation. More information on the mortality assumption is available in the mortality assumption section of this appendix.

The assumptions for inflation, individual salary increase and overall payroll growth are based on the 2017 experience study performed by CalPERS staff based on the Public Employees' Retirement Fund (PERF) and adopted by the CalPERS Board of Administration in December 2017. The decision was primarily based on reduced capital market assumptions provided by external investment consultants and CalPERS investment staff in December 2016. The discount rate (investment return assumption) for this valuation is 3.0 percent and is consistent with the expected 10-year return of a fixed income portfolio from the most recently approved Asset Liability Management process.

Appendix A - Statement of Actuarial Methods and Assumptions (continued)

Economic Assumptions

Investment Return: 3.00 percent per annum, compounded annually.

Salary Increases: 2.75 percent per annum, compounded annually.

Inflation: 2.50 percent per annum, compounded annually.

Cost-of-Living Adjustment: Benefits are fully adjusted for increases in wages for the active judges of the same court from which the member retired. Therefore, we assume that benefits will increase by 2.75 percent per annum compounded annually.

Extended Service Incentive Program (ESIP) Interest Crediting Rate: Based on the rate for 30-year U.S. Treasuries, or their equivalent, for the month of June of the valuation year. This rate for June 2019 equals 2.57 percent (a change from 3.05 percent as of June 2018).

Investment Return (Interest)

3.00 percent compounded per year, net of expenses.

The following table provides a brief history of the Investment Return Assumption.

Time Frame	Investment Return Assumption
7/1/2017 - Current	3.00%
7/1/2016 – 6/30/2017	3.25%
7/1/2011 – 6/30/2016	4.25%
7/1/2010 – 6/30/2011	4.50%
7/1/2003 – 6/30/2010	7.00%
7/1/1998 – 6/30/2003	7.50%

Individual Salary Increases

2.75 percent compounded per year.

Inflation

2.50 percent compounded per year. The current inflation assumption is based on the most recent CalPERS Experience Study adopted by the CalPERS Board in December 2017. The following table provides a brief history of the Inflation Return Assumption.

Time Frame	Inflation Assumption
7/1/2017 - Current	2.50%
7/1/2011 - 6/30/2017	2.75%
7/1/2003 - 6/30/2010	3.00%
7/1/1998 – 7/1/2003	3.50%

Appendix A - Statement of Actuarial Methods and Assumptions (continued)

Demographic Assumptions

The following decrements apply to all members.

Probability of Termination and Disability

No pre-retirement termination or disability rates were assumed.

Service Retirement

The table below illustrates the assumptions used in the valuation to determine the probability of a judge retiring out of the system.

Age	Rate
60-68	0.2
69	0.3
70	0.1
71	0.1
72 - 79	0.2
80 - 84	0.3
85 - 89	0.5
> 89	1.0

Mortality: Pre-Retirement and Post-Retirement mortality rates include 15 years of projected on-going mortality improvement using 90 percent of Scale MP 2016 published by the Society of Actuaries. For more details, please refer to the experience study report that can be found on the CalPERS website.

Pre-Retirement Morality

Rates vary by age as shown in the table below. This table only contains a sample of the rates for illustrative purposes.

Attained Age	Male	Female
35	0.00049	0.00027
40	0.00064	0.00037
45	0.00080	0.00054
50	0.00116	0.00079
55	0.00172	0.00120
60	0.00255	0.00166
65	0.00363	0.00233
70	0.00623	0.00388
75	0.01057	0.00623
80	0.01659	0.00939

Appendix A - Statement of Actuarial Methods and Assumptions (continued)

Demographic Assumptions (continued)

Sample rates by age are shown in the table below.

Post-Retirement Mortality

Rates vary by age as shown in the table below. This table only contains a sample of the rates for illustrative purposes.

Attained Age	Standard		Disability	
	Male	Female	Male	Female
35	0.00049	0.00027	0.00049	0.00027
40	0.00064	0.00037	0.00064	0.00037
45	0.00080	0.00054	0.00080	0.00054
50	0.00372	0.00346	0.01183	0.01083
55	0.00437	0.00410	0.01613	0.01178
60	0.00671	0.00476	0.02166	0.01404
65	0.00928	0.00637	0.02733	0.01757
70	0.01339	0.00926	0.03358	0.02183
75	0.02316	0.01635	0.04277	0.02969
80	0.03977	0.03007	0.06272	0.04641
85	0.07122	0.05418	0.09793	0.07847
90	0.13044	0.10089	0.14616	0.13220
95	0.21658	0.17698	0.21658	0.21015
100	0.32222	0.28151	0.32222	0.32226
105	0.46691	0.43491	0.46691	0.43491
110	1.00000	1.00000	1.00000	1.00000

Marital Status

90 percent of non-retired members are assumed to be married.

Age of Spouse

Female spouses are assumed to be four years younger than male spouses. For retired members receiving some form of joint and survivor annuity, the spouse's actual date of birth was used in the valuation if such information was furnished. Otherwise, wives were assumed to be four years younger than their husbands.

Form of Payment

For retired members for whom no optional form of payment was elected, the assumed form of payment was:

1. 50 percent joint and survivor if beneficiary information was provided, or
2. a life annuity if no beneficiary information was provided.

Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 were taken into account in this valuation.

Internal Revenue Code Section 401(a)(17)

The limitations on compensation imposed by Internal Revenue Code Section 401(a) (17) were taken into account in this valuation.

Appendix B – Summary of Principal Plan Provisions

Eligibility of Membership

All Supreme Court, District Court of Appeal, Superior Court, and Municipal Court Judges and Justices were immediately eligible for membership, if elected or appointed before November 9, 1994.

Membership Contributions

8 percent of pay. Withdrawal of contributions results in forfeiture of all other benefits.

Service Retirement

Eligibility

To qualify for a Service Retirement, you must be at least age 60. The table below illustrates the percent of active judicial salary that the unmodified allowance is based upon given age and years of service.

Retirement Age	Minimum Required Years of Service	Percent of Active Judicial Salary
60+	20	75 percent
66	18	65 percent
67	16	65 percent
68	14	65 percent
69	12	65 percent
70+	10	65 percent

* At least 5 years of service must immediately precede retirement.

Benefit

Members retiring after age 60 with at least 20 years of service receive 75 percent of pay of the last judicial office held. With less than 20 years of service, the benefit percentage is 65 percent.

Form of Payment

50 percent of the retirement allowance will automatically be continued to the spouse upon the death of the retiree, without a reduction in the retiree's allowance. For post-January 1, 1980 judges, there is a one-year marriage requirement at benefit commencement. The remaining 50 percent, often referred to as the option portion, is paid to the retiree as an annuity for as long as he or she is alive. The retiree may choose to provide for some, or all, of the option portion to be paid to any designated beneficiary after the retiree's death, paid for by a reduction to the option portion of the allowance.

Termination Benefit

Eligibility

Completion of five years of service.

Benefit

3.75 percent of pay of last judicial office held had he or she remained continuously in service as a judge of a court of record multiplied by years of service to a maximum of 20 years. Benefit percentage is reduced by 0.25 percent for each year of service less than 12 years. Benefit begins at the earliest age that member would have been eligible for service retirement had he remained in service; and, the member is at least age 63, or age 60 with 20 years of service.

Appendix B - Summary of Principal Plan Provisions (continued)

Termination Benefit (continued)

Minimum benefit for pre-January 1, 1974 judges: 5 percent of pay of last judicial office held multiplied by years of service, to a maximum of 8 years. Benefit is payable at age 65.

Form of Payment: 50 percent contingent annuity with spouse as contingent annuitant. Minimum benefit is paid as life annuity only.

Disability Retirement

Eligibility

Four years of service (no service requirement is necessary for a work-related disability), two years of service for pre-January 1, 1989 judges. No service requirement for pre-January 1, 1980 judges.

Benefit

With 20 years of service, 75 percent of pay of last judicial office held, payable immediately. With less than 20 years of service, the benefit is 65 percent of pay.

Pre-Retirement Death Benefits

Spouses Benefit

25 percent of pay of last judicial office held, payable for spouse's lifetime if not eligible for retirement. If a member dies after being eligible to retire, the surviving spouse will receive a monthly allowance equal to 50 percent of the monthly allowance the member would have received, had he/she retired, for life.

Contributory Benefit

After 10 years of service, spouse or minor child receives 1.625 percent of pay of last judicial office held multiplied by years of service, to a maximum of 20 years. Spouse's benefit is payable for life. Child's benefit ceases at age 18, or at age 22 if a full-time student. Requires \$2 monthly contribution.

Benefit with No Spouse or Children

Refund of accumulated member contributions plus one month's pay multiplied by years of service, to a maximum of 6 years.

Post Retirement Adjustments

The retirement allowances of retired judges, beneficiaries and individuals receiving benefits under domestic relation orders will increase proportionately according to increases in judicial salary increases for the judicial office last held by the member.

Appendix B - Summary of Principal Plan Provisions (continued)

Extended Service Incentive Program (ESIP)

Eligibility

An active member shall automatically participate in the program if he/she has 20 or more years of creditable service and has attained the age of 60 or more on or after January 1, 2001.

Vesting

36 months of creditable service after the later of January 1, 2001 or the date the judge first becomes eligible to participate in the program. However, the 36 months of creditable service requirement is waived in the event of the member's death, disability, or because he/she was unsuccessful in his/her efforts to be reelected or retained in office.

Benefit

For the first 60 months of participation in the program, 20 percent of the judge's monthly salaries and 8 percent of the judge's monthly salaries for the 61st to the 120th months of participation plus interest based on market yield on 30-year constant maturity U.S. Treasury Bonds shall be credited to the judge. The benefit shall be paid in the form of a single, lump sum payment.

Appendix C – Participant Data

Summary of Valuation Data

The table below illustrates counts of records processed by this valuation and the previous year valuation.

	June 30, 2018	June 30, 2019
1) Active Members		
a) Counts	170	146
b) Average Attained Age	71.34	72.26
c) Average Entry Age to Rate Plan	41.73	41.70
d) Average Years of Service	29.61	30.55
e) Average Annual Covered Pay	\$207,855	\$215,831
f) Annual Covered Payroll	35,335,347	31,511,394
g) Projected Annual Payroll	31,964,016	28,267,667
h) Present Value of Future Payroll	140,270,672	121,755,060
2) Transferred and Vested Termination Members and QDRO's		
a) Counts	4	4
3) Receiving Payments		
a) Counts	1,796	1,767
b) Average Attained Age	78.38	78.86
c) Average Monthly Benefits	9,397	9,478
4) Active to Retired Ratio [(1a) / (3)]	0.09	0.08

Reconciliation of Participants

The table below provides a reconciliation of the member data over the course of the valuation year.

Reconciliation of Participants for the fiscal year ending June 30, 2019.

	Actives Judges	Vested Terminated Judges	Retired Judges	Beneficiaries	QDRO ¹ Receiving Benefits	QDRO ¹ Not Receiving Benefits	Total Participants
As of June 30, 2018	170	1	1,174	549	73	3	1,970
New Entrants	-	-	-	-	-	-	-
Rehires	-	-	-	-	-	-	-
Disability Retirements	-	-	-	-	-	-	-
Service Retirements	-21	-1	22	-	1	-1	-
Vested Terminations	-2	2	-	-	-	-	-
Termination with Refund	-	-	-	-	-	-	-
Died, With Beneficiaries' Benefit Payable	-	-	-	-	-	-	-
Divorce Settlements	-	-	-	-	-	-	-
Died, without Beneficiary; and Other Terminations	-1	-	-15	-36	-1	-	-53
Beneficiary Deaths	-	-	-30	31	-	-	1
Data Corrections ²	-	-	-	-1	-	-	-1
As of June 30, 2019	146	2	1,151	543	73	2	1,917

(1) Qualified Domestic Relations Order

(2) Data Corrections due to a change in QDRO grouping. Pre-Retirement Community Property Splits will now be valued with the corresponding Retired Judge.

Appendix C - Participant Data (continued)

Distribution of Active Members

The following table displays the number of active members and valuation payroll by age and service used in the June 30, 2019 valuation.

Attained Age	Years of Service at Valuation Date ¹							Total Count of Active Members	Valuation Payroll
	0 - 5	5 - 10	10 - 14	15-20	20-25	25-30	>30		
15 - 19	0	0	0	0	0	0	0	0	0
20 - 24	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-
30 - 34	-	-	-	-	-	-	-	-	-
35 - 39	-	-	-	-	-	-	-	-	-
40 - 44	-	-	-	-	-	-	-	-	-
45 - 49	-	-	-	-	-	-	-	-	-
50 - 54	-	-	-	-	-	-	-	-	-
55 - 59	-	-	-	-	-	2	-	2	414,848
60 - 64	-	-	-	2	1	5	-	8	1,717,476
65 - 69	-	-	-	4	4	22	14	44	9,426,064
70 - 74	-	-	-	2	1	17	31	51	11,043,560
75+	-	-	-	1	1	13	26	41	8,909,439
Total	0	0	0	9	7	59	71	146	\$31,511,387

(1)Years of Service at Valuation Date may include service related to a Qualified Domestic Relations Order.

Distribution of Average Annual Salaries

The following table displays the average annual payroll of active participants by age and service used in the June 30, 2019 valuation.

Attained Age	Years of Service at Valuation Date ¹								Average Valuation Payroll
	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35+	
15 - 19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20 - 24	-	-	-	-	-	-	-	-	0
25 - 29	-	-	-	-	-	-	-	-	0
30 - 34	-	-	-	-	-	-	-	-	0
35 - 39	-	-	-	-	-	-	-	-	0
40 - 44	-	-	-	-	-	-	-	-	0
45 - 49	-	-	-	-	-	-	-	-	0
50 - 54	-	-	-	-	-	-	-	-	0
55 - 59	-	-	-	-	-	207,424	-	-	207,424
60 - 64	-	-	-	207,424	207,424	219,041	-	-	214,684
65 - 69	-	-	-	222,394	207,424	208,785	222,394	-	214,229
70 - 74	-	-	-	207,424	207,424	214,469	218,559	-	216,540
75+	-	-	-	237,365	207,424	209,727	220,700	-	217,303
Average	\$0	\$0	\$0	217,404	207,424	211,453	220,099		\$ 215,831

(1)Years of Service at Valuation Date may include service related to a Qualified Domestic Relations Order.

Appendix C - Participant Data (continued)

Distribution of Terminated Vested Members & QDRO's Not Receiving Benefits

The following table displays the number of terminated vested members and QDRO's not receiving benefits by age and service used in the June 30, 2019 valuation

Attained Age	Years of Service at Valuation Date							Total Count of Terminated Vested and QDRO's Not Receiving Benefits
	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30+	
15 - 19	0	0	0	0	0	0	0	0
20 - 24	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-
30 - 34	-	-	-	-	-	-	-	-
35 - 39	-	-	-	-	-	-	-	-
40 - 44	-	-	-	-	-	-	-	-
45 - 49	-	-	-	-	-	-	-	-
50 - 54	-	-	-	-	-	-	-	-
55 - 59	1	-	-	-	-	-	-	2
60 - 64	-	1	-	-	-	-	-	-
65 - 69	-	-	-	1	-	1	-	2
70 - 74	-	-	-	-	-	-	-	-
75+	-	-	-	-	-	-	-	-
Total	1	1	0	1	0	1	0	4

Distribution of Retired Judges, Beneficiaries & QDRO's Receiving Benefits

The following table displays the distribution of retired judges, beneficiaries & QDRO's receiving benefits by age used in the June 30, 2019 valuation.

Attained Age	Service & Disability Retired Judges	Beneficiaries & QDRO's	Total Count of Participants Receiving Benefits
Under 30	0	0	0
30-34	-	-	-
35-39	-	1	1
40-44	-	0	0
45-49	-	3	3
50-54	-	5	5
55-59	-	3	3
60-64	15	20	35
65-69	128	44	172
70-74	277	79	356
75-79	295	110	405
80-84	231	127	358
85+	205	222	427
Total	1,151	616	1,767

Appendix C - Participant Data (continued)

Distribution Annual Benefits for Retired Judges, Beneficiaries & QDRO's

The following table displays the distribution of annual benefits for retirees, beneficiaries & QDRO's by age used in the June 30, 2019 valuation.

Attained Age	Service & Disability Retired Judges	Beneficiaries & QDRO's	Annual Benefits Paid
Under 30	-	54,688	54,688
30-34	-	-	-
35-39	-	25,928	25,928
40-44	-	-	-
45-49	-	51,856	51,856
50-54	-	181,496	181,496
55-59	-	258,046	258,046
60-64	1,993,988	1,405,776	3,399,764
65-69	17,820,632	2,951,892	20,772,524
70-74	38,700,285	5,443,346	44,143,631
75-79	40,132,197	7,954,634	48,086,831
80-84	31,542,184	9,249,815	40,791,999
85+	28,228,613	14,967,630	43,196,242
Total¹	158,417,899	42,545,107	200,963,006
Average	\$137,635	\$69,067	\$113,731

(1) Total does not include ESIP benefit payments.

Appendix D – Glossary of Actuarial Terms

Accrued Liability: (also called Actuarial Accrued Liability or Entry Age Normal Accrued Liability) The total dollars needed as of the valuation date to fund all benefits earned in the past for *current* members.

Actuarial Assumptions: Assumptions made about certain events that will affect pension costs. Assumptions generally can be broken down into two categories: demographic and economic. Demographic assumptions include such things as mortality, disability and retirement rates. Economic assumptions include discount rate, salary growth and inflation.

Actuarial Methods: Procedures employed by actuaries to achieve certain funding goals of a pension plan. Actuarial methods include funding method, setting the length of time to fund the Accrued Liability and determining the Value of Assets.

Actuarial Valuation: The determination, as of a valuation date of the Normal Cost, Accrued Liability, and related actuarial present values for a pension plan. These valuations are performed annually or when an employer is contemplating a change to their plan provisions.

Amortization Period: The number of years required to pay off an Amortization Base.

Entry Age: The earliest age at which a plan member begins to accrue benefits under a defined benefit pension plan. In most cases, this is the age of the member on their date of hire.

Entry Age Normal Cost Method: An actuarial cost method designed to fund a member's total plan benefit over the course of his or her career. This method is designed to yield a rate expressed as a level percentage of payroll.

(The assumed retirement age less the entry age is the amount of time required to fund a member's total benefit. Generally, the older a member on the date of hire, the greater the entry age normal cost. This is mainly because there is less time to earn investment income to fund the future benefits.)

Funded Status: A measure of how well funded, or how "on track" a plan or risk pool is with respect to assets versus accrued liabilities. A ratio greater than 100 percent means the plan or risk pool has more assets than liabilities and a ratio less than 100 percent means liabilities are greater than assets.

Normal Cost: The annual cost of service accrual for the upcoming fiscal year for active employees. The normal cost should be viewed as the long term contribution rate.

Pension Actuary: A business professional that is authorized by the Society of Actuaries, and the American Academy of Actuaries to perform the calculations necessary to properly fund a pension plan.

Present Value of Benefits (PVB): The total dollars needed as of the valuation date to fund all benefits earned in the past or expected to be earned in the future for current members.

Unfunded Liability (UAL): When a plan or pool's Value of Assets is less than its Accrued Liability, the difference is the plan or pool's Unfunded Liability. If the Unfunded Liability is positive, the plan or pool will have to pay contributions exceeding the Normal Cost.

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