Segal Consulting

University of California
PERS Plus 5 Plan

Actuarial Valuation and Review as of July 1, 2019

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October 21, 2019

Ms. Cheryl Lloyd
Acting Vice President, Human Resources
University of California
1111 Franklin Street, 10th Floor
Oakland, California 94607

Dear Acting Vice President Lloyd:

We are pleased to submit this Actuarial Valuation and Review as of July 1, 2019 for the University of California PERS Plus 5 Plan ("Plan"). It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal year 2019-2020 and determines the funded ratio for purposes of the July 1, 2020 annual COLA.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the University of California to assist in administering the Plan. The census information and financial information on which our calculations were based was prepared by the UC HR Staff. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of John Monroe, ASA, MAAA, and Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Regents are reasonably related to the experience of and the expectations for the Plan.

We look forward to reviewing this report at the November 2019 Regents meeting.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By:

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Senior Vice President and Actuary

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Vice President and Actuary

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University of California PERS Plus 5 Plan Actuarial Valuation and Review as of July 1, 2019

Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting ("Segal") to present a valuation of the University of California PERS Plus 5 Plan – University of California Voluntary Early Retirement Incentive Program ("the Plan" or "PERS Plus 5 Plan") as of July 1, 2019 for eligible employees with PERS membership related to employment at the University. The UC PERS Plus 5 Plan, established in 1991, is a frozen plan covering a closed group of members, all of whom are in retirement status. Since no additional benefits will accrue for these members in the future, the Plan has no Normal Cost. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of current Plan assets to cover the estimated cost of settling the Plan's accrued benefit obligations.

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; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Plan, as administered by the UC HR Staff;
- The characteristics of retired members and beneficiaries as of July 1, 2019, provided by the UC HR Staff;
- The assets of the Plan as of June 30, 2019, provided by the UC Staff;
- Economic assumptions regarding investment earnings; and
- Other actuarial assumptions regarding death and administrative expenses, etc.

In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to evaluate the Plan's liabilities and future contribution requirements. Our calculations are based upon member data and financial information provided to us by the UC HR Staff. This information has not been audited by us, but it has been reviewed and found to be consistent, both internally and with prior year's information.

Significant Issues

Assets and Funded Ratios

1. The Plan's funded ratio for valuation purposes (i.e., assets divided by Actuarial Accrued Liability (AAL); herein referred to as the "funded ratio") has been determined as of the current valuation date and includes all future assumed 2% annual cost-of-living adjustments (COLAs) in the calculation of the AAL. For purposes of granting an annual COLA as of July 1, 2020, an additional funded ratio has been developed that does not include any future annual COLAs in the calculation of the AAL. This additional funded ratio is herein referred to as the "funded ratio for COLA purposes."

Ref: Pgs. 14, 15

2. The Plan's funded ratio increased from 221.5% as of July 1, 2018 to 243.5% as of July 1, 2019. This increase in funded ratio is mainly a result of the decrease in the AAL due to the continued decline in the number of members receiving benefits. *Section 2, Subsection D* shows a graphical representation of the Plan's funded ratio over the past ten years. Similar information in numerical format can also be found in *Section 2, Subsection D.*

3. The actuarial valuation report as of July 1, 2019 is based on financial information as of that date. Changes in the value of assets subsequent to that date, to the extent that they exist, are not reflected. Declines in asset values will decrease the Plan's funded ratios, while increases will increase the Plan's funded ratios.

COLA Test For 2020

Ref: Pg. 7

4. The Plan's funded ratio for COLA purposes as of July 1, 2019 is 266.6%. Since this ratio is greater than 100%, it is our understanding that a July 1, 2020 COLA can be granted in a percentage equal to that determined under the University of California Retirement Plan (UCRP) formula for UCRP annuitants whose retirement income commenced July 2, 1991 through and including July 1, 1992.

Demographic Experience

Ref: Pg. 18

5. The Plan has 450 retired members and beneficiaries currently receiving benefits, a decrease of 42 from 2018. Total annual benefits in pay status are $4.2 million.

Results of Experience Study

6. Based on the same actuarial assumptions used to perform last year's valuation, the Plan's surplus of assets over the AAL would have been $38.9 million as of July 1, 2019, and the funded ratio would have increased from 221.5% as of July 1, 2018 to 250.4% as of July 1, 2019. However, the post-retirement mortality assumption, the net investment return assumption, and the inflation assumption were changed in this valuation as a result of the UCRP Actuarial Experience Study from July 1, 2014 through June 30, 2018. These assumption changes decreased the Plan's surplus by approximately $0.7 million and reduced the funded ratio by about 7%. The net effect of all experience during 2018/2019, including from the change in the actuarial assumptions, was an increase in the Plan's surplus by approximately $2.4 million and an increase in the funded ratio by 22%.

Future Expectations

7. Plan assets exceed liabilities by $38.2 million. Since the Plan covers only retired members and beneficiaries, the Plan's current assets along with future assumed investment returns are expected to be sufficient to fund all expected future Plan benefit payments based on current Plan provisions (including all future assumed 2% annual COLAs that have been reflected in this valuation as noted earlier). Therefore, no future contributions are expected to be necessary. Based on projections under the current actuarial assumptions, it is estimated that the Plan will be paying benefits through 2082.

Actuarial Standard of Practice No. 51 (ASOP 51)

Ref: Pg. 16

8. The Actuarial Standards Board approved a new Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment. ASOP 51 will be effective with the PERS Plus 5 Plan's July 1, 2019 actuarial valuation. ASOP 51 requires actuaries to identify risks that "may reasonably be anticipated to significantly affect the plan's future financial condition". Investment risk, asset/liability mismatch risk, interest rate risk, longevity and other demographic risks and contribution risk are also cited as examples in ASOP 51. The standard does not require the actuary to evaluate the likelihood of contributing entities to make contributions when due, nor does it require the actuary to assess the likelihood or consequences of future changes in applicable law.

   The actuary's initial assessment can be strictly a qualitative discussion about potential adverse experience and the possible effect on future results, but it may also include quantitative numerical demonstrations where informative.

   Since the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the plan. We have not performed a detailed analysis of the potential range of the impact of risk relative to the future financial condition of this plan, but have included a brief discussion of key risks that may affect the Plan in *Section 2, Subsection D*.

Summary of Key Valuation Results

		July 1, 2019	July 1, 2018
Actuarial Accrued Liability as of July 1:	• Retired members and beneficiaries	$26,603,031	$29,460,992
	• Total Actuarial Accrued Liability (AAL)[1][2]	26,603,031	29,460,992
	• Normal Cost for plan year beginning July 1	0	0
Assets as of July 1:	• Market Value of Assets (MVA)	$64,778,034	$65,250,647
	• Actuarial Value of Assets (AVA)[3]	64,778,034	65,250,647
	• Actuarial Value of Assets as a percentage of Market Value of Assets	100.00%	100.00%
Funded status as of July 1:	• Overfunded Actuarial Accrued Liability	$(38,175,003)	$(35,789,655)
	• Funded ratio (AVA / AAL)	243.50%	221.48%
Funded status for COLA Purposes:	• Actuarial Accrued Liability for COLA purposes (AAL COLA)[2][4]	$24,302,194	$26,873,051
	• Funded ratio (AVA / AAL COLA)	266.55%	242.81%
Key assumptions:	• Net investment return	6.75%	7.25%
	• Price inflation	2.50%	3.00%
Demographic data as of July 1:	**Retired Members and Beneficiaries:**		
	• Number of members:		
	– Service retired	313	349
	– Beneficiaries	137	143
	– Total	450	492
	• Average age	86.9	86.1
	• Average monthly benefit	$773	$763

(1) Reflects all future assumed 2% annual COLAs.
(2) Includes present value of administrative expenses equal to one percent of AAL.
(3) For this Plan, the Actuarial Value of Assets is equal to the Market Value of Assets.
(4) Excludes all future assumed 2% annual COLAs.

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by the University of California (UC). Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the Market Value of Assets as of the valuation date, as provided by UC.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan's assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of UC. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan. Future contribution requirements may differ from those determined in the valuation because of:
  - Differences between actual experience and anticipated experience;
  - Changes in actuarial assumptions or methods;
  - Changes in plan provisions; and
  - Differences between the contribution rates determined by the valuation and those adopted by the Regents.
- If UC is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. UC should look to their other advisors for expertise in these areas.

As Segal has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

Section 2: Actuarial Valuation Results

A. Member Data

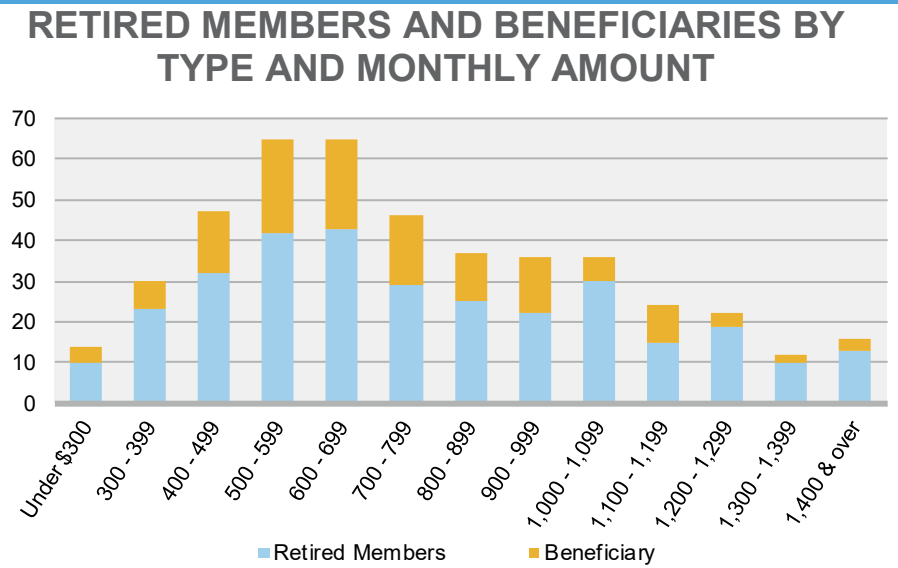
The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including retired members and beneficiaries. This section presents a summary of significant statistical data on these member groups. More detailed information for this valuation year and the preceding valuation can be found in *Section 3, Exhibit A*.

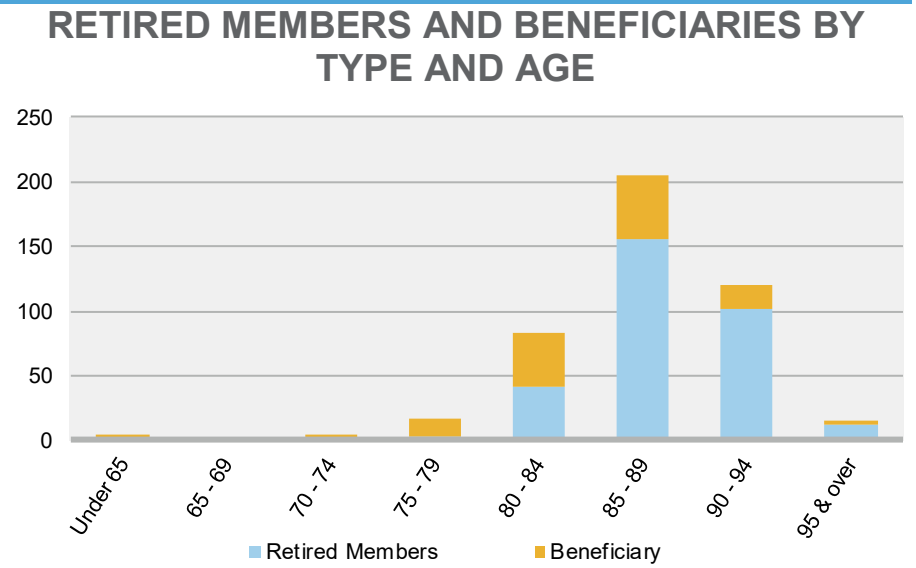
Retired Members and Beneficiaries

As of July 1, 2019, 313 retired members and 137 beneficiaries were receiving total monthly benefits of $348,005. For comparison, in the previous valuation, there were 349 retired members and 143 beneficiaries receiving monthly benefits of $375,239.

As of July 1, 2019, the average monthly benefit for retired members and beneficiaries is $773, compared to $763 in the previous valuation. The average age for retired members and beneficiaries is 86.9 in the current valuation, compared with 86.1 in the prior valuation.

Distribution of Retired Members and Beneficiaries as of July 1, 2019





B. Financial Information

Retirement plan assets change as a result of the net impact of income and expense components, such as net investment earnings (less investment fees), administration expenses and benefit payments.

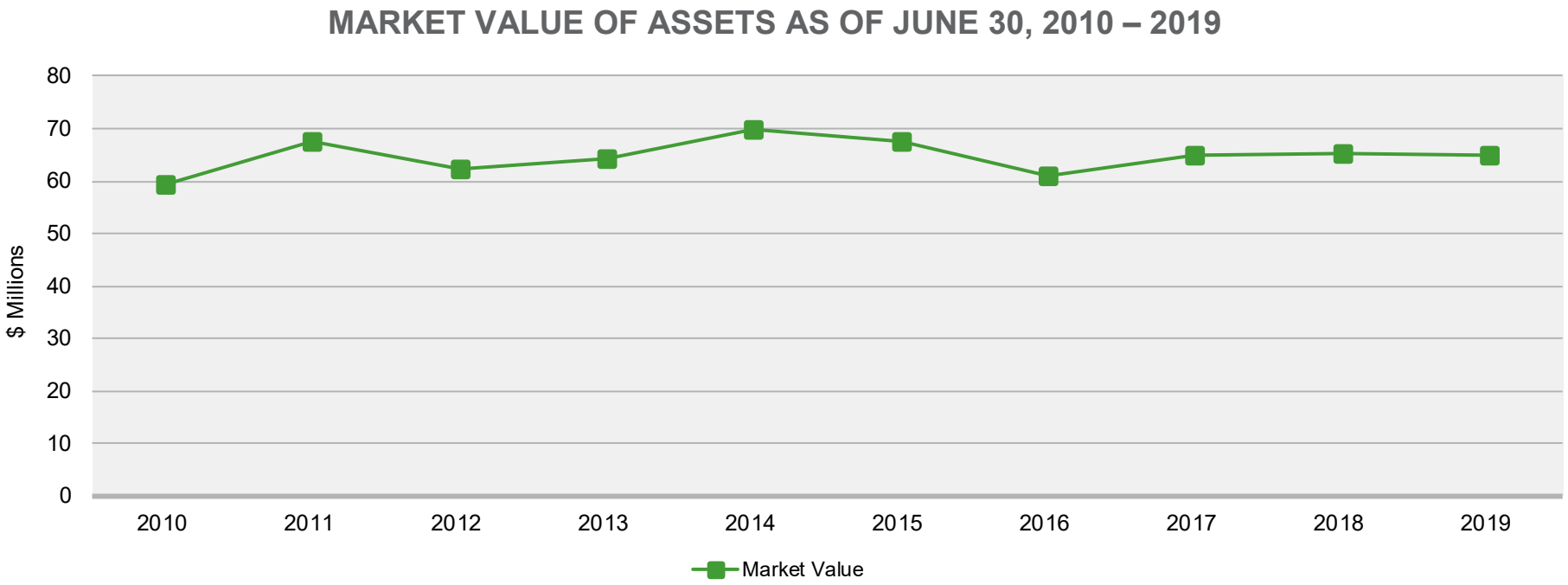
The chart below shows the net assets and changes to those asset values for the past two years.

The Regents have approved an asset valuation method that uses the Market Value of Assets as the Actuarial Value of Assets. The entire market value investment return is treated as income, which may be positive or negative.

	June 30, 2019	June 30, 2018
Total investments	$65,724,834	$66,291,023
Receivables[1]	930,897	87,339
Payables for securities purchased and other	(1,877,697)	(1,127,715)
Net assets	**$64,778,034**	**$65,250,647**
Change in Asset Values:		
Value as of the beginning of the year	$65,250,647	$64,980,452
University contributions	0	0
Administration expenses	(4,710)	(5,080)
Benefit payments	(4,213,126)	(4,609,623)
Net investment return	3,745,223	4,884,898
Value as of the end of the year	**$64,778,034**	**$65,250,647**

[1] Represents securities traded and allotted to UC PERS Plus 5 Plan as of valuation date, not tied to contributions.

The Market Value of Assets is a representation of the Plan's financial status. The Market Value of Assets is significant because the Plan's liabilities are compared to these assets to determine what portion, if any, remains unfunded.



C. Actuarial Experience

To calculate the surplus of assets over liabilities 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 measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), then the surplus of assets over liabilities will increase from the previous year. On the other hand, the surplus of assets over liabilities will decrease if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years. However, note that no future contributions are expected to be necessary for the Plan. This valuation reflects changes in actuarial assumptions adopted by the Regents.

The total gain is $0.53 million, which includes $0.83 million from investment losses and $1.36 million in gains from all other sources. The net experience variation from individual sources other than investments was 5.3% of the Actuarial Accrued Liability.

ACTUARIAL EXPERIENCE FOR YEAR ENDED JUNE 30, 2019

1	Net loss from investments	$832,552
2	Net gain from other experience[1]	(1,358,791)
3	Net experience gain[1] 1 + 2	$(526,239)

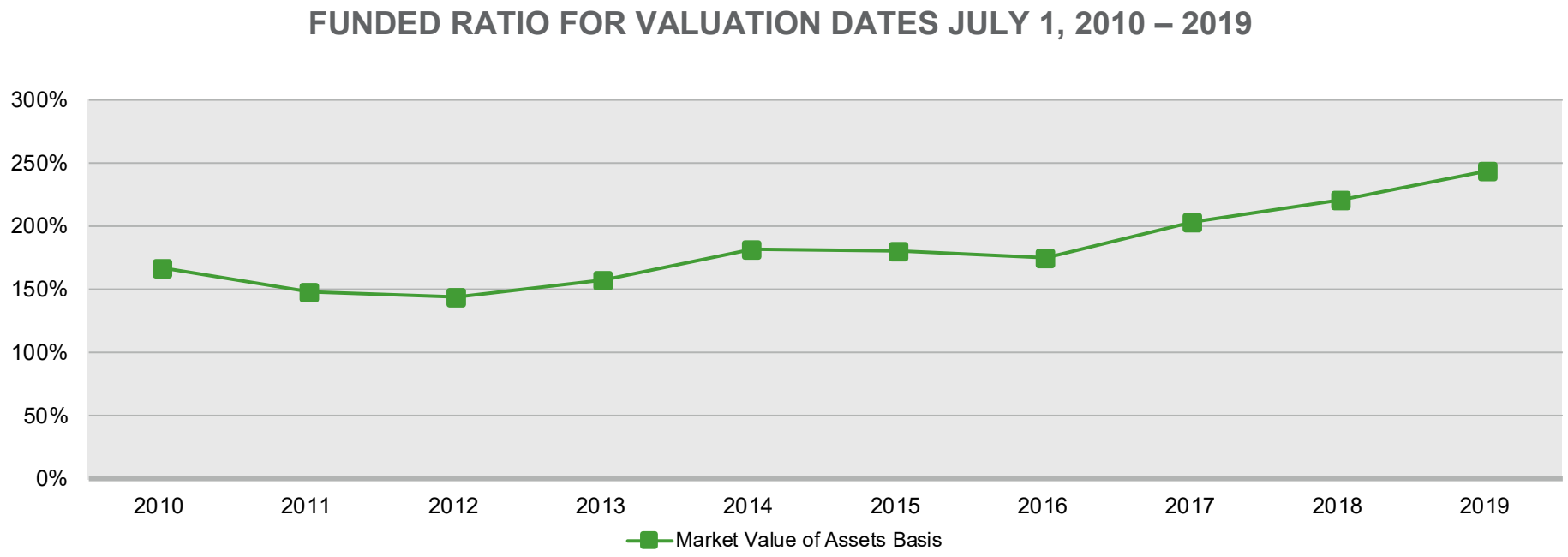
[1] Excludes impact of changes in actuarial assumptions equal to a loss of $735,641.

D. Funded Status

A commonly reported piece of information regarding the Plan's financial status is the funded ratio. This ratio compares the Market Value of Assets to the Actuarial Accrued Liability of the Plan. High ratios indicate a well-funded plan with assets sufficient to cover the Plan's Actuarial Accrued Liability. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other changes.

The chart below depicts a history of the funded ratio for the Plan.

The funded status measure shown in this valuation is appropriate for assessing the need for or amount of future contributions. However, they are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations.



SCHEDULE OF FUNDING PROGRESS FOR VALUATION DATES JULY 1, 2010 – 2019

Actuarial Valuation Date as of July 1,	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL)[1] (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (%) (a) / (b)
2010	$59,423,908	$35,513,957	$(23,909,951)	167.33%
2011	67,528,568	45,716,252	(21,812,316)	147.71
2012	62,242,788	43,334,209	(18,908,579)	143.63
2013	64,102,549	40,672,101	(23,430,448)	157.61
2014	69,962,230	38,601,892	(31,360,338)	181.24
2015	67,424,239	37,411,714	(30,012,525)	180.22
2016	61,056,375	34,818,010	(26,238,365)	175.36
2017	64,980,452	31,997,188	(32,983,264)	203.08
2018	65,250,647	29,460,992	(35,789,655)	221.48
2019	64,778,034	26,603,031	(38,175,003)	243.50

[1] Includes present value of administrative expenses equal to one percent of Actuarial Accrued Liability. Starting in 2011, reflects all future assumed 2% annual COLAs.

E. Risk Assessment

Since the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the plan.

This section does not contain a detailed analysis of the potential range of future measurements, but does provide descriptions and basic assessments of the primary risks that are likely to affect the Plan's future financial condition, as well as a discussion of historical trends and maturity measures.

Risk Assessments

- Asset/Liability Mismatch Risk (the potential that future plan experience does not affect asset and liability values in the same way, causing them to diverge)

  The most significant asset/liability mismatch risk to the Plan is investment risk, as discussed below. In fact, investment risk has the potential to impact asset/liability mismatch in two ways. The first mismatch is evident in annual valuations: when asset values deviate from assumptions, they are typically independent from liability changes. The second mismatch can be caused when systemic asset deviations from assumptions may signal the need for an assumption change, which causes liability values and contribution rates to move in the opposite direction from any changes in the expected experience of asset growth rates.

  Asset/liability mismatch can also be caused by demographic assumption risk such as longevity, which affects liabilities but have no impact on asset levels. This risk is also discussed below.

- Investment Risk (the risk that investment returns will be different than expected)

  The investment return assumption is a long-term, static assumption for valuation purposes even though in reality market experience can be quite volatile in any given year. That volatility can cause significant changes in the financial health of the system, affecting the funded status. The inherent year-to-year volatility in investment experience can have a sizable impact since this Plan uses the market value of assets when determining funded status.

  The single period market value rate of return over the last 10 years has ranged from a low of about -2% to a high of about 23%.

- Longevity Risk (the risk that mortality experience will be different than expected)

  The actuarial valuation includes current life expectancy assumptions and an expectation of future improvement in life expectancy, which are significant assumptions given the relatively long duration of liabilities for pension plans. Emerging plan experience that does not match these expectations will result in increases or decreases in the actuarially determined contribution over time. This risk

can be reduced by using tables appropriate for the Plan (public experience tables) that are weighted by benefit levels, and by using generational mortality projections.

Evaluation of Historical Trends

Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past ten years:

- The funded percentage on the Actuarial Value of Assets basis has increased from 167.3% to 243.5%. This is primarily due to due to the continued decline in the number of members receiving benefits and interest earned on the surplus of assets over liabilities. For a more detailed history see *Section 2, Subsection D, Funded Status* starting on page 14.

Maturity Measures

This Plan only covers retired members and beneficiaries and is very mature. The Plan has negative cash flows as the Plan is paying benefit payments, but no contributions are being made. For the prior year benefits paid were about $4.2 million. Plans with high levels of negative cash flows have a need for a larger allocation to income generating assets, which can create a drag on investment return. However, for this Plan the annual benefit payments are about 6.5% of total Plan assets, which is a relatively small percentage.

Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE

Category	As of July 1		Change From Prior Year
	2019	2018	
Retired members:			
• Number in pay status	313	349	-10.3%
• Average age	88.2	87.3	0.9
• Total monthly benefit	$247,427	$270,884	-8.7%
• Average monthly benefit	$791	$776	1.9%
Beneficiaries:			
• Number in pay status	137	143	-4.2%
• Average age	83.9	83.1	0.8
• Total monthly benefit	$100,578	$104,355	-3.6%
• Average monthly benefit	$734	$730	0.6%
Total members:			
• Number in pay status	450	492	-8.5%
• Average age	86.9	86.1	0.8
• Total monthly benefit	$348,005	$375,239	-7.3%
• Average monthly benefit	$773	$763	1.3%

EXHIBIT B – ACTUARIAL LIABILITIES

	July 1, 2019	July 1, 2018
Plan assets		
• Market Value of Assets	$64,778,034	$65,250,647
• Present value of future contributions	0	0
Total Plan assets	**$64,778,034**	**$65,250,647**
Actuarial Accrued Liability[1]		
• Retired members	$17,934,039	$20,472,402
• Beneficiaries	8,405,596	8,696,897
• Present value of future expenses	263,396	291,693
Total Actuarial Accrued Liability	**$26,603,031**	**$29,460,992**
Funded ratio	**243.50%**	**221.48%**
Excess of assets over liabilities	**$38,175,003**	**$35,789,655**
Actuarial Accrued Liability for COLA purposes[2]		
• Retired members	$16,475,289	$18,742,410
• Beneficiaries	7,586,288	7,864,570
• Present value of future expenses	240,617	266,071
Total Actuarial Accrued Liability for COLA purposes	**$24,302,194**	**$26,873,051**
Funded ratio for COLA purposes	**266.55%**	**242.81%**

Note: Results may be slightly off due to rounding.

(1) Reflects all future assumed 2% annual COLAs.

(2) Excludes all future assumed 2% annual COLAs.

EXHIBIT C – DEFINITION OF PENSION TERMS

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated Normal Costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners and Beneficiaries:	Actuarial Present Value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the recommended contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield actuarial liabilities that are larger than projected.
Actuarially Equivalent:	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is: Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) Multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund of member contributions or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan, as well as Actuarially Determined Contributions.
Actuarial Value of Assets (AVA):	The value of the Plan's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the Actuarially Determined Contribution.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the Plan.
Actuarially Determined Contribution (ADC):	The contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is intended to pay off the Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Plan is calculated, including: Investment return - the rate of investment yield that the Plan will earn over the long-term future; Mortality rates - the rate or probability of death at a given age for employees and pensioners; Retirement rates - the rate or probability of retirement at a given age or service; Disability rates – the rate or probability of disability retirement at a given age; Termination rates - the rate or probability at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement; Salary increase rates - the rates of salary increase due to inflation, real wage growth and merit and promotion increases.
Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 20 years, it is 19 years at the end of one year, 18 years at the end of two years, etc. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula based on the member's compensation, age and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Experience Study:	A periodic review and analysis of the actual experience of the Plan that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified based on recommendations from the Actuary.
Funded Ratio:	The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes also calculate a market funded ratio, using the Market Value of Assets (MVA), rather than the AVA.
Investment Return:	The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Normal Cost:	The portion of the Actuarial Present Value of Future Benefits allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of the Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of member contributions and employer Normal Cost unless otherwise specifically stated.

Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in each future year in determining the Amortization Period.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus or an Overfunded Actuarial Accrued Liability.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

Section 4: Actuarial Valuation Basis

EXHIBIT I – ACTUARIAL ASSUMPTIONS AND METHODS

Rationale for Assumptions:	The information and analysis used in selecting most of the assumptions that have a significant effect on this actuarial valuation are shown in the UCRP July 1, 2014 through June 30, 2018 Actuarial Experience Study dated July 2, 2019. The Regents of the University of California approved a net investment return assumption and inflation assumption that differ from what was shown in that study. The assumptions adopted by the Regents are generally more conservative than those recommended in that study.
Economic Assumptions	
Net Investment Return:	6.75%; net of investment expenses.
Consumer Price Index:	Increase of 2.50% per year; COLA increases are assumed to be 2.00% per year. For valuation purposes, all future assumed 2.00% annual COLAs have been reflected.
Administrative Expenses:	1.0% load added to the Actuarial Accrued Liability
Demographic Assumptions	
Post-Retirement Mortality Rates:	• **Faculty Members:** Pub-2010 Healthy Teacher Amount-Weighted Above-Median Mortality Table multiplied by 90% for males and 95% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018. • **Staff & Safety Members:** Pub-2010 Healthy Teacher Amount-Weighted Above-Median Mortality Table multiplied by 100% for males and 110% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018. • **Beneficiaries:** Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table multiplied by 100% for males and 90% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018. The Pub-2010 mortality tables and adjustments as shown above reasonably reflect the mortality experience as of the measurement date. These mortality tables were adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years.
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Actuarial Funding Policy	
Actuarial Cost Method:	Unit Credit Actuarial Cost Method

Actuarial Value of Assets:	At Market Value
Changed Actuarial Assumptions	The following assumptions have been changed since the prior valuation as a result of the UCRP July 1, 2014 through June 30, 2018 Actuarial Experience Study:
Net Investment Return:	7.25%; net of investment expenses.
Consumer Price Index:	Increase of 3.00% per year; COLA increases are assumed to be 2.00% per year. For valuation purposes, all future assumed 2.00% annual COLAs have been reflected.
Post-Retirement Mortality Rates:	• **All Members and Beneficiaries:** RP-2014 White Collar Healthy Annuitant Mortality table projected with the two-dimensional MP-2014 projection scale to 2029. Ages are then set forward one year for males and females.

EXHIBIT II – SUMMARY OF PLAN PROVISIONS

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Effective Date:	October 1, 1991. Includes amendments through July 1, 2019.
Plan Year:	July 1 through June 30
Covered Members:	Active employees on October 1, 1991 who were active members of, and who were eligible to retire from the California Public Employee's Retirement System (PERS), whose age plus service equaled 75 or more (80 or more for faculty members), and who elected to retire from the University effective October 1, 1991.
UC PERS Plus 5 Average Pay:	Average monthly full-time-equivalent base compensation rate received during the 36 consecutive month period prior to June 30, 1990, multiplied by 1.07.
Retirement Date:	October 1, 1991.
Service Credit:	Each eligible member was granted five years of Service Credit.
Age Factor:	Percentage of UC PERS Plus 5 Average Pay per year of Service Credit (interpolated for fractional ages).
Benefit Percentage:	Age Factor multiplied by years of Service Credit.
Basic Retirement Income (BRI):	Benefit Percentage multiplied by UC PERS Plus 5 Average Pay.
Transition Assistance:	Single payment on November 1, 1991 equal to three (3) times the June 30, 1990 covered compensation, multiplied by 1.07.

Age	Factor	Age	Factor
50	1.09%	57	1.70%
51	1.16	58	1.80
52	1.22	59	1.90
53	1.30	60	2.00
54	1.38	61	2.13
55	1.50	62	2.27
56	1.60	63 & Over	2.41

Service Retirement:	
Benefit	BRI.
Form of Payment	Single life annuity.
Optional Form of Payment	Full continuance to contingent annuitant.
Post-Retirement Automatic Survivor Benefit:	None.
Cost-of-Living Adjustment:	
Annual	The lesser of: • The same percentage increase for UCRP annuitants whose retirement income commenced July 2, 1991 through and including July 1, 1992, and • The percentage that the Plan's funded ratio for COLA purposes (determined as of the previous July 1) exceeds 100%. The UCRP COLA is 100% of the annual Consumer Price Index (CPI) increase up to 2% per year, plus generally 75% of the annual CPI increase above 4%. The COLA cannot exceed 6% per year.
Ad Hoc	A one-time ad hoc COLA of 25% was provided to all annuitants as of July 1, 2002. A one-time ad hoc COLA of 15.19% was provided to all annuitants as of April 1, 2011.
University of Contributions:	The actuarial cost of the University of California PERS Plus 5 Plan was determined for each University location. Each location could elect to contribute their cost in a lump sum, over two, three or five years. The last contributions were made in 1995.
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.

Note: The summary of major plan provisions is designed to outline principal plan benefits as interpreted for purposes of the actuarial valuation. If the University of California should find the plan summary not in accordance with the actual provisions, the University of California should alert the actuary so they can both be sure the proper provisions are valued.

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