

**Vermont State Teachers'
Retirement System
Actuarial Valuation and
Review as of June 30, 2018**

The logo for Segal Consulting is a large, dark blue, stylized shape that resembles a compass needle or a stylized letter 'S'. It is positioned on the right side of the page, pointing towards the top right. The text "Segal Consulting" is written in white, sans-serif font across the upper part of this shape.

 Segal Consulting

This report has been prepared at the request of the Board of Trustees to assist in administering the System. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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October 31, 2018

Board of Trustees
Vermont State Teachers' Retirement System
Montpelier, Vermont 05609

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of June 30, 2018, of the Vermont State Teachers' Retirement System. This report summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirement for the fiscal year ending June 30, 2020.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the Office of the State Treasurer. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Kathleen Riley and Matthew Strom. 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 Board are reasonably related to the experience of and the expectations for the System.

We look forward to reviewing this report and to answering any questions at the next Board meeting.

Sincerely,

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

By: 
Kathleen A. Riley, FSA, MAAA, EA
Senior Vice President and Actuary


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Vice President and Consulting Actuary

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Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting to present a valuation of the Plan as of June 30, 2018, pursuant to section 1942, subsection (n), of Title 16, Chapter 55, Vermont Statutes Annotated, relating to the Vermont State Teachers' Retirement System. 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 Plan assets to cover the estimated cost of settling the Plan's 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.

Certain disclosure information required by GASB Statements No 67 and 68 as of June 30, 2018 for the System is provided in separate reports.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension Plan, as administered by the Board;
- The characteristics of covered active members, inactive members, and retired members and beneficiaries as of June 30, 2018, provided by the Office of the State Treasurer;
- The unaudited assets of the Plan as of June 30, 2018, provided by the Office of the State Treasurer;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.; and
- The funding policy prescribed by State statute.

Valuation Highlights

1. Segal strongly recommends an actuarial funding policy that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance. The funding policy set in the Vermont State Pension Code meets this standard. Section 1944, subsection (c)(4), of Title 16, Chapter 55, Vermont Statutes Annotated calls for annual payments on the unfunded actuarial accrued liability to be made over a closed period ending on June 30, 2038. From July 1, 2009 to June 30, 2019, the amount of each annual payment is calculated assuming that the amortization period would remain closed and that the amortization amount would increase annually at the rate of 5% over the preceding year. Beginning on July 1, 2019 and annually thereafter, the amount of each annual payment is calculated assuming that the amortization period will remain closed and that the amortization amount will increase annually at the rate of 3% over the preceding year.
2. Actual employer contributions made during the fiscal year ending June 30, 2018, were \$114.6 million, or 129.6% of the actuarially determined contribution of \$88.4 million. The \$114.6 million employer contribution amount includes a one-time contribution of \$26.2 million paid after the end of the fiscal year. In the prior fiscal year, actual employer contributions were \$82.9 million, or 100.3% of the prior year's actuarially determined contribution.
3. The actuarially determined contribution for the fiscal year ending June 30, 2019, is \$105.6 million as determined with the June 30, 2017, actuarial valuation.
4. The funded percentage (the ratio of the actuarial value of assets to actuarial accrued liability) is 55.2%, compared to the prior year's funded percentage of 54.2%. This percentage is one measure of funding status and its history is a measure of funding progress. Using the market value of assets, the funded percentage is 54.2%, compared to 53.0% as of the prior valuation date. These measurements are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the System's benefit obligation or the need for or the amount of future contributions.
5. The results of this June 30, 2018, actuarial valuation are used to determine the actuarially determined contribution for the fiscal year ending June 30, 2020, and to estimate the actuarially determined contribution for the fiscal year ending June 30, 2021. The actuarially determined contribution for fiscal 2020 is \$126.2 million, an increase of \$20.6 million from fiscal year 2019. Last year's estimate of the actuarially determined contribution for fiscal 2020 is \$1.6 million more than this year's actual amount. This is due to fewer actives and lower normal cost than expected. The estimated fiscal 2021 actuarially determined contribution is \$129,983,311. The actuarially determined contribution is equal to the Plan's employer normal cost, plus the amount necessary to amortize the unfunded actuarial accrued liability as of June 30, 2018, over a period ending on June 30, 2038, assuming that the amortization period will remain closed and that the amortization amount will increase annually at the rate of 3% over the preceding year.
6. The unfunded actuarial accrued liability is \$1.513 billion, which is an increase of \$11.0 million since the prior valuation.

7. The rate of return on the market value of assets was 7.6% for the July 1, 2017 to June 30, 2018 plan year. The return on the actuarial value of assets was 7.0% for the same period due to the recognition of prior year's investment gains and losses. This resulted in an actuarial loss when measured against the assumed rate of return of 7.5%. We advise the Board to continue to monitor actual and anticipated investment returns relative to the assumed long-term rate of return on investments.
8. The actuarial value of assets is 101.8% of the market value of assets. The investment experience in the past years has only been partially recognized in the actuarial value of assets. As the deferred net loss is recognized in future years, the cost of the Plan is likely to increase unless the net loss is offset by future experience. The recognition of the deferred market losses of \$33.7 million will also have an impact on the future funded percentage. If the net deferred losses were recognized immediately in the actuarial value of assets, the actuarially determined contribution rate would increase from 16.23% to 16.57% of payroll.
9. The actuarial loss from investment experience is \$8.4 million.
10. The net experience loss from sources other than investment experience was approximately \$42.9 million, or 1.3% of the actuarial accrued liability, prior to reflection of an assumption change. Additional detail regarding this loss is shown in *Section 2, Exhibit C*.
11. The following change in actuarial assumptions has been included with this valuation:
 - Valuation liability for inactive members as reported by the System was changed from 332.5% of accumulated contributions to 250% of accumulated contributions.

As a result of this assumption change, the normal cost remained unchanged and the actuarial accrued liability decreased by \$38.6 million, or 1.1%. The total impact was a decrease in the actuarially determined contribution for fiscal 2019 of \$2.5 million, or 0.4% of payroll.

12. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution under the Plan's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, for inclusion in the plan and employer's financial statements as of June 30, 2018, and June 30, 2019, will be provided separately. The actuarially determined contribution in this valuation is expected to be used as the actuarially determined contribution (ADC) for GASB financial reporting.
13. This actuarial report as of June 30, 2018, is based on financial and demographic data as of that date. Changes subsequent to that date are not reflected and will affect future actuarial costs of the Plan.

Summary of Key Valuation Results

		2018	2017
Actuarially determined employer contributions:	• Actuarially determined employer contributions for fiscal 2020 (and 2019)	\$126,197,389	\$105,640,777
	• Estimated actuarially determined contributions for fiscal 2021 (and 2020)	129,983,311	127,827,327
Actuarial accrued liability for plan year beginning July 1:	• Retired members and beneficiaries	\$2,069,795,024	\$1,978,626,262
	• Deferred members as reported by the System	34,587,921	31,641,410
	• Active members	1,158,203,018	1,142,714,193
	• Inactive members as reported by the System	116,967,785	129,063,749
	• Total	3,379,553,748	3,282,045,614
	• Employer normal cost for plan year beginning July 1	6,909,481	7,846,377
Assets for plan year beginning July 1:	• Market value of assets (MVA)	\$1,832,372,553	\$1,738,557,573
	• Actuarial value of assets (AVA)	1,866,120,413	1,779,592,227
	• Actuarial value of assets as a percentage of market value of assets	101.84%	102.36%
Funded status for plan year beginning July 1:	• Unfunded actuarial accrued liability based on MVA	\$1,547,181,195	\$1,543,488,041
	• Funded percentage on MVA basis	54.22%	52.97%
	• Unfunded actuarial accrued liability based on AVA	\$1,513,433,335	\$1,502,453,387
	• Funded percentage on AVA basis	55.22%	54.22%
	• Remaining amortization period	20	21
Key assumptions:	• Interest rate	7.50%	7.50%
	• Inflation rate	2.50%	2.50%
Demographic data for plan year beginning July 1:	• Number of retired members and beneficiaries	9,269	9,021
	• Number of deferred members as reported by the System	787	763
	• Number of inactive members as reported by the System	2,613	2,381
	• Number of active members	9,892	10,028
	• Total payroll	\$612,899,069	\$607,354,756
	• Average payroll	61,959	60,566
	• Total monthly benefits for all retired members and beneficiaries	15,726,785	14,923,544
	• Average monthly benefit for all retired members and beneficiaries	1,697	1,654

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 Consulting (“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.
Membership data	An actuarial valuation for a plan is based on data provided to the actuary by the System. 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 the System. The System uses an “actuarial value of assets” that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan members for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each member 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 salary increases and 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 the System and Board of Trustees. 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.
- Actuarial results in this report are not rounded, but that does not imply precision.
- If the System 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. The System should look to its other advisors for expertise in these areas.

As Segal Consulting 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. Membership Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, inactive members, 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, Exhibits A and B*.

MEMBER POPULATION: 2009 – 2018

As of July 1	Active Members	Deferred Members*	Retired Members and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives
2009	10,799	721	5,910	6,631	0.61
2010	10,509	718	6,146	6,864	0.65
2011	10,123	647	7,005	7,652	0.76
2012	10,262	793	7,376	8,169	0.80
2013	10,101	751	7,743	8,494	0.84
2014	9,952	740	8,086	8,826	0.89
2015	9,585	1,163	8,484	9,647	1.01
2016	9,919	747	8,763	9,510	0.96
2017	10,028	763	9,021	9,784	0.98
2018	9,892	787	9,269	10,056	1.02

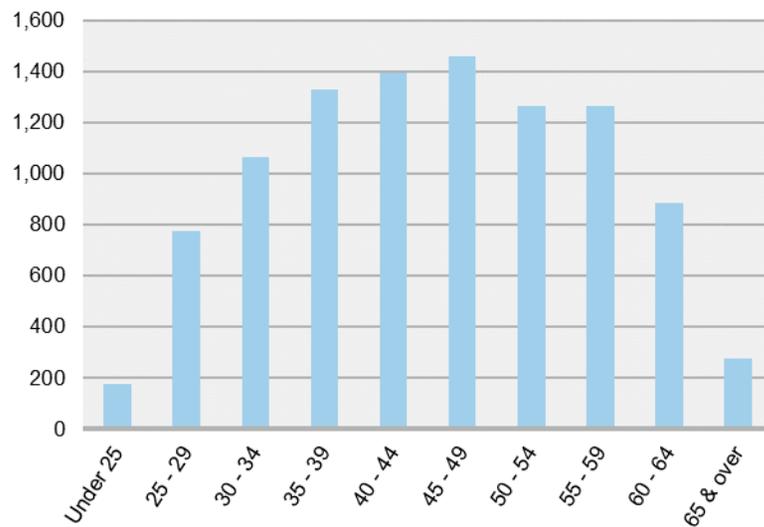
*Excludes inactive members as reported by the System.

Active Members

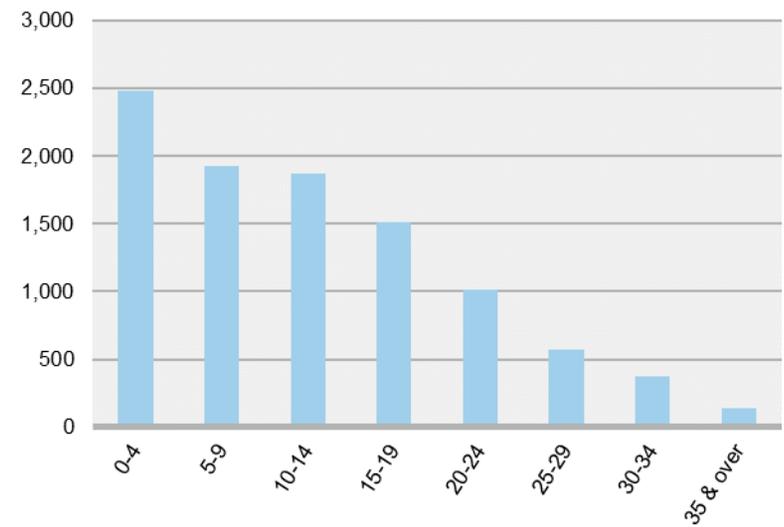
Plan costs are affected by the age, years of creditable service and payroll of active members. In this year's valuation, there were 9,892 active members with an average age of 45.7, average years of creditable service of 12.6 years, and average payroll of \$61,959. The 10,028 active members in the prior valuation had an average age of 45.8, average service of 12.6 years and average payroll of \$60,566.

Distribution of Active Members as of July 1, 2018

BY AGE



BY YEARS OF CREDITABLE SERVICE



Inactive and Deferred Members

In this year's valuation, there were 2,613 inactive members as reported by the System. A member is reported as inactive if they have withdrawn from active employment within the six-year period preceding the valuation date, or if they withdrew prior to the six-year period preceding the valuation date, but do not have a vested right to a deferred or immediate vested benefit and have not taken a refund of their employee contributions.

In addition, there were 787 deferred members as reported by the System. A member is reported as deferred if they have withdrawn from active employment prior to the six-year period preceding the valuation date and have a vested right to a deferred or immediate vested benefit.

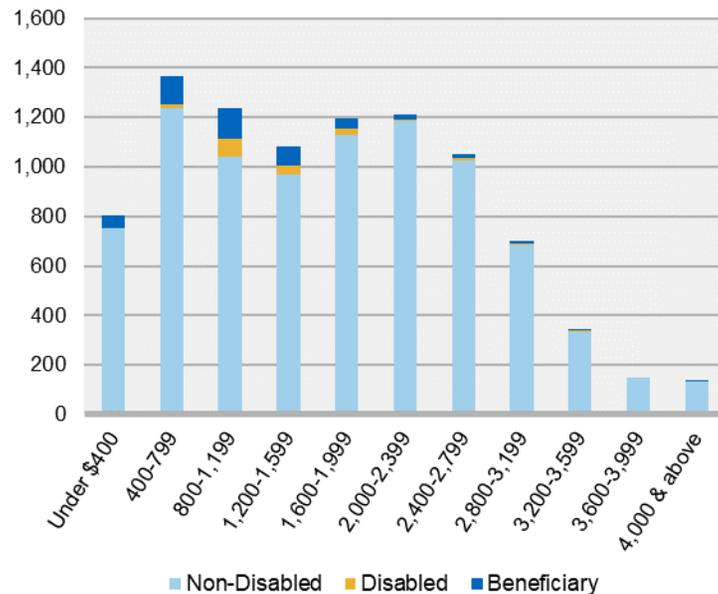
Retired Members and Beneficiaries

As of July 1, 2018, 8,809 retired members (including disability retirees) and 460 beneficiaries were receiving total monthly benefits of \$15,726,785. For comparison, in the previous valuation, there were 8,581 retired members and 440 beneficiaries receiving monthly benefits of \$14,923,544.

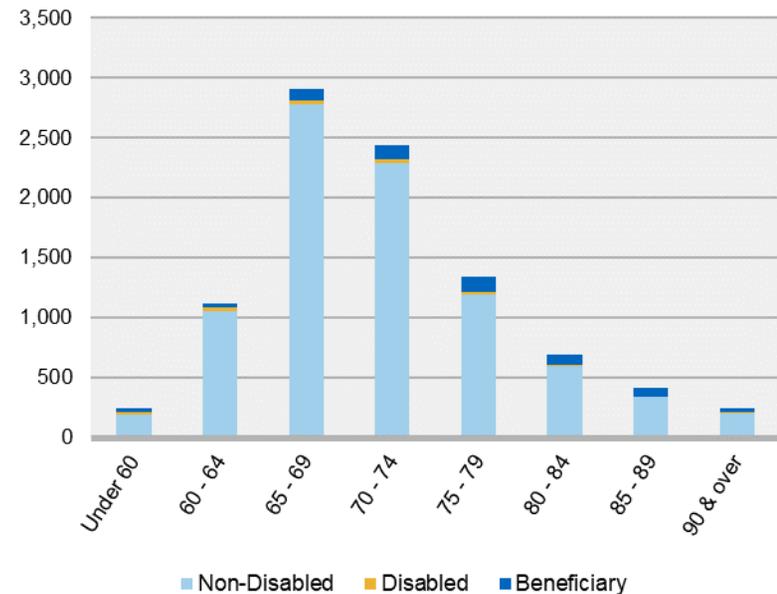
As of July 1, 2018, the average monthly benefit for retired members and beneficiaries is \$1,696, compared to \$1,654 in the previous valuation. The average age for retired members and beneficiaries is 71.8 in the current valuation, compared with 71.3 in the prior valuation.

Distribution of Pensioners as of July 1, 2018

BY TYPE AND MONTHLY AMOUNT



BY TYPE AND BY AGE



Historical Plan Population

The chart below demonstrates the progression of the active population over the last ten years. The chart also shows the growth among the retired population over the same time period.

MEMBERSHIP DATA STATISTICS: 2009 – 2018

As of July 1	Active Members			Retired Members*		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2009	10,799	47.1	13.8	5,586	--	\$1,314
2010	10,509	47.1	13.8	5,831	--	1,319
2011	10,123	46.9	13.8	6,667	--	1,417
2012	10,262	46.9	13.1	7,014	--	1,482
2013	10,101	46.6	13.1	7,356	--	1,514
2014	9,952	46.5	13.2	7,674	69.7	1,547
2015	9,585	46.2	12.9	8,006	70.0	1,614
2016	9,919	45.9	12.7	8,259	70.8	1,641
2017	10,028	45.8	12.6	8,581	71.2	1,683
2018	9,892	45.7	12.6	8,809	71.7	1,726

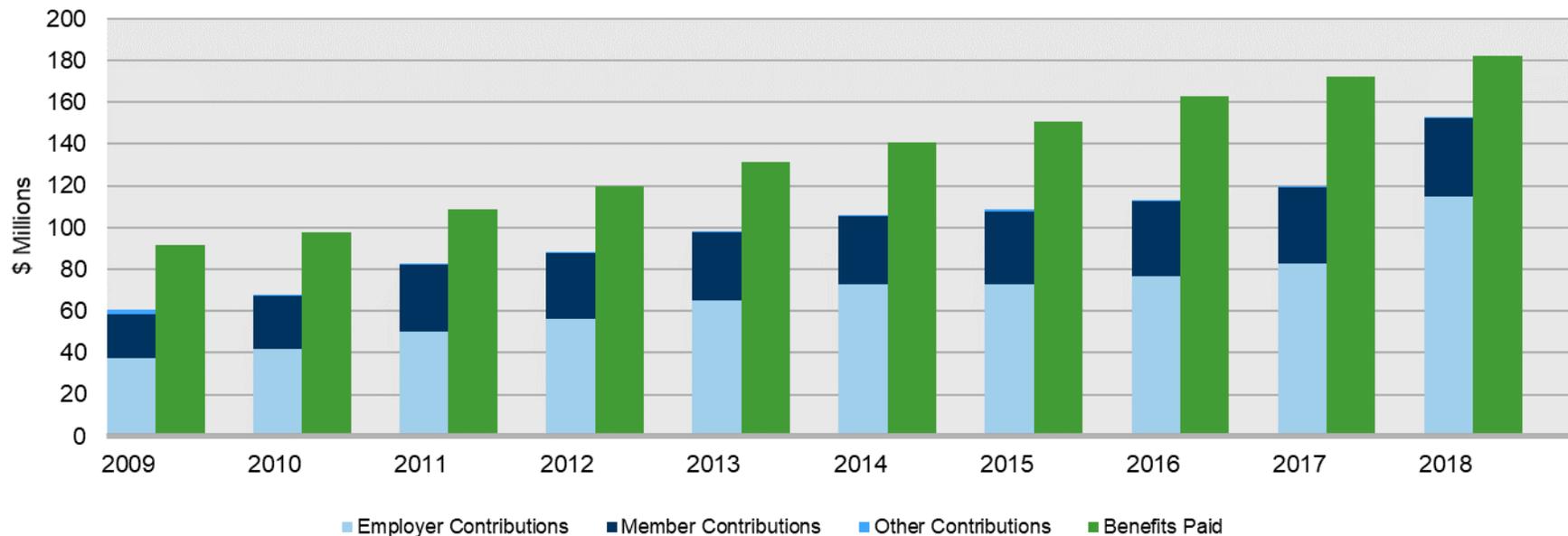
* Not including beneficiaries

B. Financial Information

Retirement plan funding anticipates that, over the long term, both contributions and investment earnings (less investment fees and administrative expenses) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of these transactions for the valuation year, is presented in *Section 3, Exhibits C, D and E*.

COMPARISON OF CONTRIBUTIONS TO BENEFITS PAID FOR YEARS ENDED JUNE 30, 2009 – 2018



It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has adopted an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuation is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

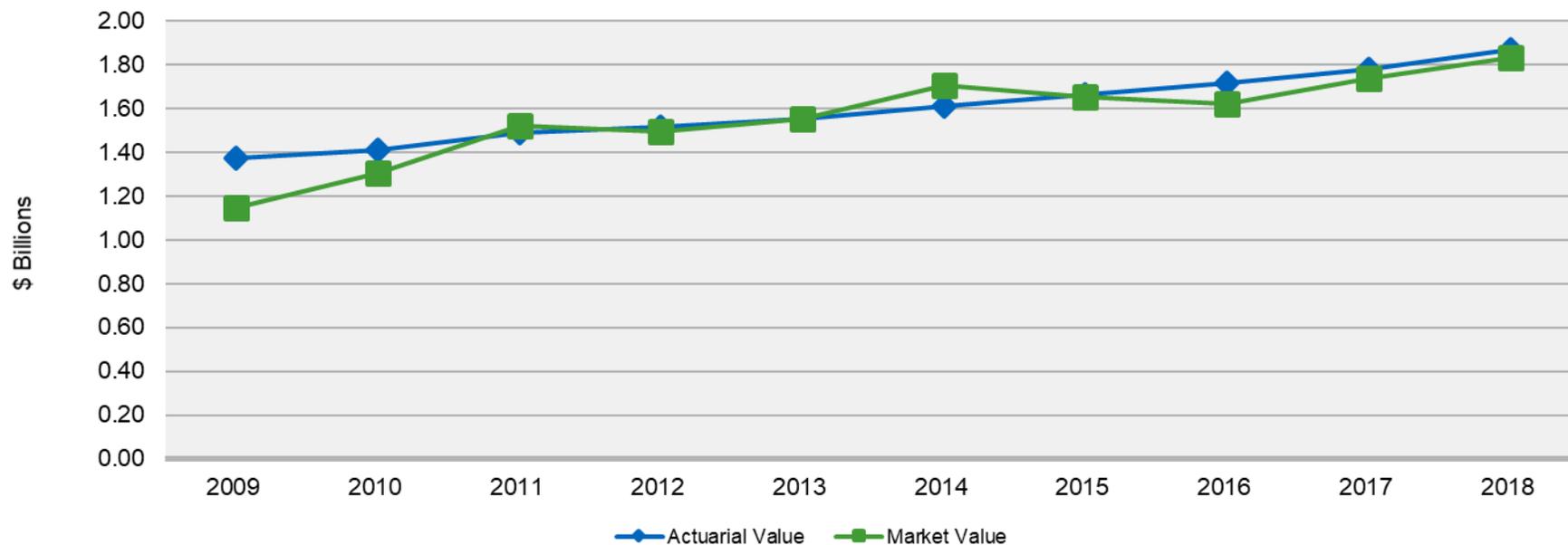
DETERMINATION OF ACTUARIAL VALUE OF ASSETS FOR YEAR ENDED JUNE 30, 2018

1	Actuarial value of assets, June 30, 2017	\$1,779,592,227
2	Net new money, including expected investment income (7.50%)	94,965,151
3	Preliminary asset value: 1 + 2	1,874,557,378
4	Smoothing adjustment	
	(a) Market value, June 30, 2018	\$1,832,372,553
	(b) Preliminary asset value	1,874,557,378
	(c) Unrecognized appreciation	-42,184,825
	(d) Adjustment	x 20% -8,436,965
5	Actuarial value of assets, June 30, 2018: 3 + 4d	\$1,866,120,413

The assets for valuation purposes are 101.84% of market value.

Both the actuarial value and market value of assets are representations of the Plan’s financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Plan’s liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

ACTUARIAL VALUE OF ASSETS VS. MARKET VALUE OF ASSETS AS OF JUNE 30, 2009 – 2018



C. Actuarial Experience

To calculate the actuarially determined contribution, 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), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase 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.

The net experience loss is \$51,348,860, which includes \$8,436,965 from investment losses and \$42,911,895 in losses from all other sources. The net experience variation from individual sources other than investments was 1.3% of the actuarial accrued liability prior to reflection of the assumption change. A discussion of the major components of the actuarial experience is on the following pages.

ACTUARIAL EXPERIENCE FOR YEAR ENDED JUNE 30, 2018

1	Net loss from investments*	-\$8,436,965
2	Net loss from other experience	<u>-42,911,895</u>
3	Net experience gain/(loss): 1 + 2	-\$51,348,860

* Details on next page.

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the System's investment policy. The rate of return on the market value of assets was 7.61% for the year ended June 30, 2018.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.50%. The actual rate of return on an actuarial basis for the 2018 plan year was 7.02%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended June 30, 2018 with regard to its investments.

INVESTMENT EXPERIENCE

	Year Ended June 30, 2018	
	Market Value	Actuarial Value
1 Investment income	\$129,866,264	\$122,579,470
2 Average value of assets	1,705,851,145	1,746,885,799
3 Rate of return: $1 \div 2$	7.61%	7.02%
4 Assumed rate of return	7.50%	7.50%
5 Expected investment income: 2×4	\$127,938,836	\$131,016,435
6 Actuarial gain/(loss): $1 - 5$	<u>\$1,927,428</u>	<u>-\$8,436,965</u>

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The table below shows the rate of return on an actuarial basis compared to the market value investment return for the last 20 years, including averages over select time periods.

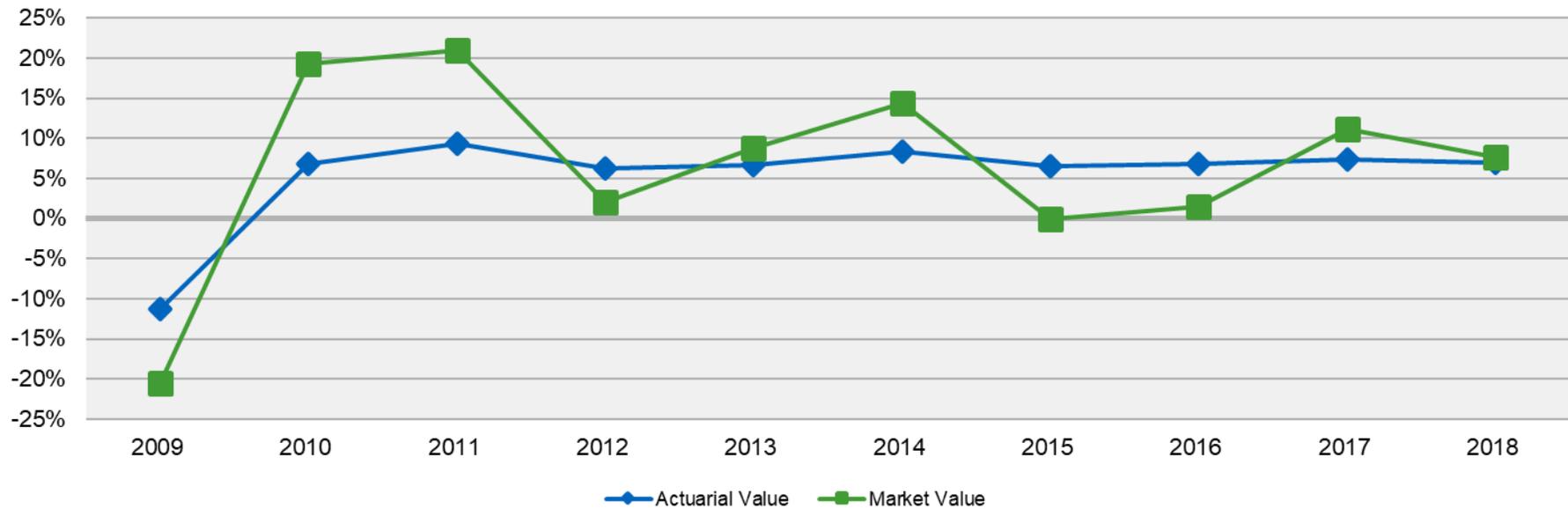
INVESTMENT RETURN – ACTUARIAL VALUE VS. MARKET VALUE: 1999 - 2018

Year Ended June 30	Actuarial Value Investment Return		Market Value Investment Return		Year Ended June 30	Actuarial Value Investment Return		Market Value Investment Return		
	Amount	Percent	Amount	Percent		Amount	Percent	Amount	Percent	
1999	\$119,969,096	14.69%	\$114,611,557	11.45%	2009	-\$177,198,490	-11.23%	-\$302,070,164	-20.49%	
2000	122,585,157	13.28	96,459,461	8.75	2010	90,911,582	6.75	214,806,420	19.22	
2001	105,052,742	10.25	-26,277,091	-2.23	2011	129,010,590	9.32	268,197,459	20.97	
2002	74,521,272	6.71	-50,765,984	-4.50	2012	91,041,364	6.25	31,182,310	2.09	
2003	73,318,724	6.34	57,742,544	5.48	2013	99,823,830	6.72	127,041,593	8.70	
2004	92,527,288	7.68	172,235,639	15.86	2014	125,880,755	8.29	219,532,643	14.44	
2005	102,130,985	8.05	120,839,819	9.83	2015	103,064,276	6.50	-1,244,071	-0.07	
2006	112,662,977	8.44	136,026,631	10.35	2016	110,878,140	6.79	24,710,920	1.52	
2007	148,468,597	10.53	250,776,668	17.74	2017	123,782,547	7.34	178,144,379	11.20	
2008	105,606,299	6.94	-103,733,250	-6.38	2018	122,579,470	7.02	129,866,264	7.61	
							Most recent five-year average return		7.18%	6.70%
							Most recent ten-year average return		5.32%	5.92%
							Most recent 15-year average return		6.23%	6.75%
							Most recent 20-year average return		6.90%	6.10%

Note: Each year's yield is weighted by the average asset value in that year.

Subsection B described the actuarial asset valuation method that gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

MARKET AND ACTUARIAL RATES OF RETURN FOR YEARS ENDED JUNE 30, 2009 - 2018



Administrative Expenses

There is no provision for administrative expenses.

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among members,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected),
- actual COLAs paid (more or less than assumed), and
- salary increases (greater or smaller than projected).

The net loss from this other experience for the year ended June 30, 2018, amounted to \$42,911,895, which is 1.3% of the actuarial accrued liability prior to reflection of the assumption changes.

EXPERIENCE GAIN/(LOSS) DUE TO CHANGES IN DEMOGRAPHICS FOR YEAR ENDED JUNE 30, 2018

Net turnover	-\$29,368,302
Retirement	-15,053,147
Mortality	747,793
Disability retirements	-36,314
Salary increases for continuing actives	10,510,812
COLA experience	-1,386,560
Miscellaneous	<u>-8,326,177</u>
Total	-\$42,911,895

D. Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of June 30, 2018 is \$3,379,553,748, an increase of \$97,508,134, or 3.0%, from the actuarial accrued liability as of the prior valuation date. The change in liability is due to interest, accumulation and payment of benefits, and actuarial experience (as discussed in the previous subsection) and changes in assumptions (described below).

Actuarial Assumptions

The following change in actuarial assumptions has been included with this valuation:

- Valuation liability for inactive members as reported by the System was changed from 332.5% of accumulated contributions to 250.0% of accumulated contributions.

This change decreased the actuarial accrued liability by 1.1% and the normal cost remained unchanged. Details on actuarial assumptions and methods are in Section 4, Exhibit I.

Plan Provisions

There were no changes in plan provisions since the prior valuation. A summary of plan provisions is in Section 4, Exhibit II.

E. Development of Unfunded Actuarial Accrued Liability

DEVELOPMENT OF UNFUNDED ACTUARIAL ACCRUED LIABILITY FOR YEAR ENDED JUNE 30, 2018

1	Unfunded actuarial accrued liability at beginning of year	\$1,502,453,387
2	Normal cost at beginning of year	40,127,656
3	Total contributions	-152,955,987
4	Interest	
	• For whole year on 1 + 2	\$115,693,578
	• For half year on 3*	<u>-4,634,790</u>
	Total interest	<u>111,058,788</u>
5	Expected unfunded actuarial accrued liability	\$1,500,683,844
6	Changes due to:	
	• (Gain)/loss	\$51,348,860
	• Assumptions	-38,599,369
	• Funding method	0
	• Plan provisions	<u>0</u>
	Total changes	<u>12,749,491</u>
7	Unfunded actuarial accrued liability at end of year	<u>\$1,513,433,335</u>

* No interest is included for a one-time \$26.2 million employer contribution that was paid after the end of the fiscal year.

F. Actuarially Determined Contribution

The actuarially determined contribution is equal to the employer normal cost payment and a payment on the unfunded actuarial accrued liability. The statute governing the System specifies the funding policy used to calculate the actuarially determined contribution based on a closed amortization period ending on June 30, 2038. As of July 1, 2018, there are 20 years remaining on this schedule.

The actuarially determined contribution for the fiscal year ending June 30, 2019, is \$105,640,777 as determined with the June 30, 2017, actuarial valuation. The results of this June 30, 2018, actuarial valuation are used to determine the actuarially determined contribution for the fiscal year ending June 30, 2020, and to estimate the actuarially determined contribution for the fiscal year ending June 30, 2021, as shown in *Section H*.

The preliminary contribution requirement as of July 1, 2018, is based on the data previously described, the actuarial assumptions and Plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

PRELIMINARY CONTRIBUTION REQUIREMENT

		Year Beginning July 1			
		2018		2017	
		Amount	% of Payroll	Amount	% of Payroll
1	Total normal cost, adjusted for timing*	\$41,238,252	6.43%	\$41,605,239	6.54%
2	Expected employee contributions	<u>-34,328,771</u>	<u>-5.35%</u>	<u>-33,758,862</u>	<u>-5.31%</u>
3	Employer normal cost: 1 + 2	\$6,909,481	1.08%	\$7,846,377	1.23%
4	Actuarial accrued liability	3,379,553,748		3,282,045,614	
5	Actuarial value of assets	1,866,120,413		1,779,592,227	
6	Unfunded actuarial accrued liability: 4 – 5	1,513,433,335		1,502,453,387	
7	Payment on unfunded actuarial accrued liability, adjusted for timing*	97,214,107	15.15%	92,913,342	14.62%
8	Preliminary contribution requirement: 3 + 7	<u>\$104,123,588</u>	<u>16.23%</u>	<u>\$100,759,719</u>	<u>15.85%</u>
9	Projected payroll	\$641,547,696		\$635,759,343	

*Contributions are assumed to be paid at the middle of the year.

**See page 28 for details

Reconciliation of Preliminary Contribution Requirement

The chart below details the changes in the preliminary contribution requirement from the prior valuation to the current year's valuation.

RECONCILIATION OF PRELIMINARY CONTRIBUTION REQUIREMENT FROM JULY 1, 2017 TO JULY 1, 2018

	Amount	% of Payroll
Preliminary contribution requirement as of July 1, 2017	\$100,759,719	15.85%
Effect of:		
• Plan amendment(s)	0	0.00%
• Change in asset method	0	0.00%
• Expected change in amortization payment due to payroll growth	4,645,667	0.73%
• Change in amortization period	0	0.00%
• Change in actuarial assumptions	-2,479,398	-0.38%
• Total contributions (more)/less than actuarially determined contribution	-1,157,997	-0.18%
• Investment (gain)/loss	541,941	0.08%
• Other gains and losses on accrued liability	2,073,935	0.32%
• Net effect of other changes, including composition and number of members, payroll	<u>-260,279</u>	-0.19%
Total change	3,363,869	0.38%
Preliminary contribution requirement as of July 1, 2018	\$104,123,588	16.23%

G. Amortization Schedule for Unfunded Actuarial Accrued Liability

A schedule of projected future unfunded actuarial accrued liability payments is shown below.

UNFUNDED LIABILITY AMORTIZATION SCHEDULE

As of June 30	Balance	Amortization Payment (Year Following)
2018	\$1,513,433,335	\$97,214,107
2019	1,526,147,104	119,080,624*
2020	1,517,142,718	122,653,043
2021	1,503,759,040	126,332,634
2022	1,485,556,505	130,122,613
2023	1,462,059,246	134,026,292
2024	1,432,752,272	138,047,080
2025	1,397,078,433	142,188,493
2026	1,354,435,149	146,454,148
2027	1,304,170,893	150,847,772
2028	1,245,581,411	155,373,205
2029	1,177,905,649	160,034,401
2030	1,100,321,374	164,835,433
2031	1,011,940,462	169,780,496
2032	911,803,831	174,873,911
2033	798,875,988	180,120,129
2034	672,039,163	185,523,732
2035	530,087,001	191,089,444
2036	371,717,773	196,822,128
2037	195,527,080	202,726,792
2038	0	0

* Beginning July 1, 2019 and each year thereafter, the annual payment to amortize the unfunded actuarial liability will be calculated based upon installments increasing at a rate of 3% per year instead of 5%.

H. Projection of Actuarially Determined Contribution for Following Two Fiscal Years

On the basis of the June 30, 2018, actuarial valuation, the employer normal cost rate is 1.08%. This rate is applied to the projected payrolls for fiscal 2020 and fiscal 2021 to determine the employer normal cost for each year. The payment on the unfunded liability is added to the employer normal cost to determine the actuarially determined contribution for the fiscal year ending June 30, 2020, and to estimate the actuarially determined contribution for the fiscal year ending June 30, 2021, as shown below. The final actuarially determined contribution for fiscal 2021 will be determined with the next valuation.

ACTUARIALLY DETERMINED CONTRIBUTION: 2020 – 2021

Fiscal Year Ended June 30	Projected Payroll*	Employer Normal Cost Rate	Projected Contributions		
			Employer Normal Cost	Unfunded Liability	Total
2020	\$660,794,127	1.08%	\$7,116,765	\$119,080,624	\$126,197,389
2021	680,617,951	1.08%	7,330,268	122,653,043	129,983,311

* In these projections, total payroll is assumed to increase by 3% each year.

Pursuant to Section 1944, subsection (b)(2), of Title 16, Chapter 55, Vermont Statutes Annotated, if expected employee contributions were 5.00% for all Group C active members, the employer normal cost rate would be 1.43%, which would result in an employer normal cost for fiscal 2020 of \$9,429,545 and a total employer contribution requirement of \$128,510,169. For fiscal 2021, the total employer contribution requirement would be \$132,365,474.

I. History of Employer Contributions

A history of the most recent years of employer contributions is shown below.

HISTORY OF EMPLOYER CONTRIBUTIONS: 2010 – 2019

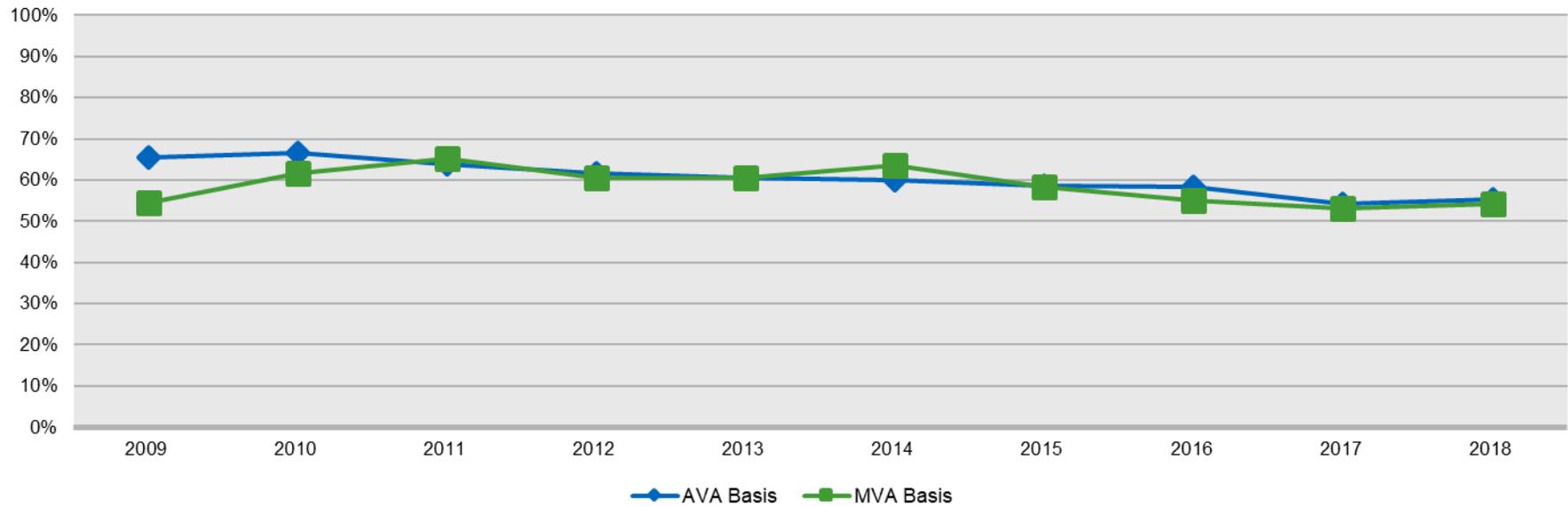
Fiscal Year Ended June 30	Actuarially Determined Employer Contribution		Actual Employer Contribution		Percent Contributed
	Amount*	Percentage of Payroll**	Amount	Percentage of Payroll**	
2010	\$41,503,002	7.41%	\$41,920,603	7.49%	101.01%
2011	48,233,006	8.22%	50,268,131	8.57%	104.22%
2012	51,241,932	8.72%	56,152,011	9.56%	109.58%
2013	60,182,755	10.51%	65,086,320	11.37%	108.15%
2014	68,352,825	11.66%	72,668,413	12.39%	106.31%
2015	72,857,863	14.90%	72,908,805	14.91%	100.07%
2016	76,102,909	12.84%	76,947,869	12.98%	101.11%
2017	82,659,576	14.39%	82,887,174	14.43%	100.28%
2018	88,409,437	14.64%	114,598,921	18.97%	129.62%
2019	105,640,777	16.13%	--	--	--

* Budgeted contribution amount from prior valuation report

**Based on expected payroll

J. History of Funded Percentage

A history of the most recent years of funded percentage as of July 1st is shown below.



K. Actuarial Balance Sheet

An overview of the Plan’s funding is provided by an Actuarial Balance Sheet, which compares the total liabilities (current and future) to the total assets (current and future). The liabilities are calculated by determining the amount and timing of all future payments that will be made by the Plan for current members. These payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value of all benefits, referred to as the “liability” of the Plan.

Second, this liability is compared to the assets. The “assets” for this purpose include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer normal cost contributions, and the present value of future employer amortization payments for the unfunded actuarial accrued liability.

ACTUARIAL BALANCE SHEET

	Year Ended	
	June 30, 2018	June 30, 2017
Liabilities		
• Present value of benefits for retired members and beneficiaries	\$2,069,795,024	\$1,978,626,262
• Present value of benefits for inactive former members	151,555,706	160,705,159
• Present value of benefits for active members	<u>1,441,998,453</u>	<u>1,426,387,303</u>
Total liabilities	\$3,663,349,183	\$3,565,718,724
Assets		
• Total valuation value of assets	\$1,866,120,413	\$1,779,592,227
• Present value of future contributions by members	255,569,223	250,319,947
• Present value of future employer contributions for:		
» Entry age cost	28,226,212	33,353,163
» Unfunded actuarial accrued liability	<u>1,513,433,335</u>	<u>1,502,453,387</u>
Total of current and future assets	<u>\$3,663,349,183</u>	<u>\$3,565,718,724</u>

L. Risk

The actuarial valuation results depend on a single set of assumptions; however, there is a risk that emerging results may differ significantly as actual experience proves to be different than projected from the current assumptions.

We have not been engaged to perform a detailed analysis of the potential range of the impact of risks relative to the Plan's future financial condition, but have included a brief discussion of some of the risks that may affect the Plan. This discussion is focused on funding-related risks, but similar concerns may apply to risks regarding the level of expense and liabilities reported for Plan accounting purposes as well.

A more detailed assessment of the risks could provide a better understanding of the risks inherent in the Plan. This assessment may include scenario testing, sensitivity testing, stress testing, and stochastic modeling.

A detailed risk assessment could be important for VSTRS because:

- The negative cash flow position of the Plan could be exacerbated by relatively small deviations from assumed future experience.
- Retired and inactive members account for more than half of the Plan's liabilities limiting options for reducing plan liabilities in the event of adverse experience.
- The risks identified below show significant potential for variability.

The following risks could significantly affect the Plan's future condition:

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

If the prior year's investment performance resulted in a market value of assets that is 10% different than the current value, it would result in a change of \$183.2 million in the asset value. A 10% increase in assets would cause the unfunded liability (market value basis) to decrease from \$1.547 billion to \$1.364 billion. Likewise, a 10% decrease in the asset value, would cause the unfunded liability to increase from \$1.547 billion to \$1.730 billion.

Since the Plan's assets are much larger than contributions, investment performance may create volatility in the actuarially determined contribution requirements. For example, for each 1% difference in actual return, the actuarially determined contribution would increase or decrease by 0.17%, disregarding the effects of the five-year phase-in of investment gains and losses.

To illustrate the potential for future investment volatility, the market value rate of return over the last ten years has ranged from a low of -20.49% to a high of 20.97%.

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

The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the actuarially determined contribution.

The current mortality assumptions represent our best estimate of the mortality rates for this plan; however, a 10% reduction in the assumed mortality rates results in an increase in the liabilities of roughly 3% for most plans. For VSTRS, a 3% liability increase would result in an increase in the unfunded accrued liability of \$101.4 million. The unfunded accrued liability (market value of assets basis) would increase from \$1.547 billion to \$1.648 billion.

➤ **Demographic Risk** (the risk that member experience will be different than assumed)

Examples of this risk include:

- Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.
- More or less active member turnover than assumed.
- Salary increases more or less than assumed.

➤ **Actual Experience**

- Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past ten years:
 - » The investment gain(loss) for a year (actuarial basis) has ranged from a loss of \$312.7 million to a gain of \$23.7 million.
 - » The non-investment gain(loss) for a year has ranged from a loss of \$86.0 million to a gain of \$30.2 million.
- The funded percentage on the actuarial value of assets has ranged from a low of 54.22% to a high of 66.46% over the past ten years.

➤ **Maturity Measures**

The risk associated with a pension plan increases as it becomes more mature, meaning that the actives represent a smaller portion of the liabilities of the plan. When this happens, there is a greater risk that fluctuations in the experience of the non-active members or of the assets of the plan can result in large swings in the contribution requirements.

- Over the past ten years, the ratio of non-active members to active members has increased from a low of 0.61 to a high of 1.02. Currently the Plan has a non-active to active member ratio of 1.02.

- As of July 1, 2018, the retired life actuarial accrued liability represents 61% of the total actuarial accrued liability. In addition, the actuarial accrued liability for inactive members represents 4% of the total. The higher the non-active actuarial accrued liability is as a percent of the total liability, the greater the danger of volatility in results.
- For the prior year, benefits paid were \$29.3 million more than contributions received, or 1.6% of the market value of assets. In the absence of the additional \$26.2 million employer contribution made after the end of the fiscal year, negative cash flow would have equaled 3.0% of market value of assets. As the Plan matures, more cash will be needed from the investment portfolio to meet benefit payments.

Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE

Category	As of July 1		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	9,892	10,028	-1.4%
• Average age	45.7	45.8	-0.1
• Average years of creditable service	12.6	12.6	0.0
• Total payroll	\$612,848,185	\$607,354,756	0.9%
• Average payroll	61,954	60,566	2.3%
• Total active vested members	7,413	7,508	-1.3%
Inactive members:			
• Number of deferreds as reported by the System	787	763	3.1%
• Number of inactives as reported by the System	2,613	2,381	9.7%
Retired members:			
• Number in pay status	8,646	8,422	2.7%
• Average age	71.8	71.3	0.5
• Average monthly benefit	\$1,733	\$1,690	2.5%
Disability retirees:			
• Number in pay status	163	159	2.5%
• Average age	68.3	68.0	0.3
• Average monthly benefit	\$1,338	\$1,323	1.1%
Beneficiaries:			
• Number in pay status	460	440	4.5%
• Average age	73.3	72.8	0.5
• Average monthly benefit	\$1,127	\$1,094	3.0%

EXHIBIT B – RECONCILIATION OF MEMBERSHIP DATA

	Active Members	Deferreds	Inactives	Disability Retirees	Retired Members	Beneficiaries	Total
Number as of July 1, 2017	10,028	763	2,381	159	8,422	440	22,193
• New members	659	N/A	140	0	6	3	807
• Inactives as reported by the System	-695	-5	700	N/A	N/A	N/A	0
• Deferreds as reported by the System	0	75	-75	N/A	N/A	N/A	0
• Retirements	-322	-22	-22	N/A	366	N/A	0
• New disabilities	-4	0	-2	8	-2	N/A	0
• Return to work from disability	0	N/A	N/A	0	N/A	N/A	0
• Died with beneficiary	-1	0	0	0	-42	43	0
• Died without beneficiary	-5	-2	-1	-4	-106	-23	-141
• Lump sum cash-outs	-39	-13	-248	0	0	0	-300
• Rehire	269	-10	-259	N/A	N/A	N/A	0
• Certain period expired	N/A	N/A	0	0	0	-3	-3
• Data adjustments	2	1	-1	0	2	0	5
Number as of July 1, 2018	9,892	787	2,613	163	8,646	460	22,561

EXHIBIT C – SUMMARY STATEMENT OF INCOME AND EXPENSES ON A MARKET VALUE BASIS

	Year Ended June 30, 2018	Year Ended June 30, 2017
Net assets at market value at the beginning of the year	\$1,738,557,573	\$1,620,899,749
Contribution income:		
• Employer contributions	\$114,598,921	\$82,887,174
• Member contributions	37,888,566	36,142,411
• Less administrative expenses	<u>-2,448,365</u>	<u>-2,623,838</u>
<i>Net contribution income</i>	\$150,039,122	\$116,405,747
Net other income	\$468,500	\$241,526
Investment income:		
• Interest, dividends and other income	\$23,160,822	\$27,040,768
• Asset appreciation	106,705,442	151,103,611
• Less investment fees	<u>-4,299,983</u>	<u>-4,977,765</u>
<i>Net investment income</i>	<u>\$125,566,281</u>	<u>\$173,166,614</u>
Total income available for benefits	\$276,073,903	\$289,813,887
Less benefit payments:		
• Benefits	-\$179,504,941	-\$169,369,143
• Refunds of contributions	-2,149,962	-2,067,038
• Death claims	-334,966	-465,981
• Transfers to other pension trust funds	<u>-269,054</u>	<u>-253,901</u>
<i>Net benefit payments</i>	-\$182,258,923	-\$172,156,063
Change in reserve for future benefits	\$93,814,980	\$117,657,824
Net assets at market value at the end of the year	\$1,832,372,553	\$1,738,557,573

EXHIBIT D – SUMMARY STATEMENT OF PLAN ASSETS

	June 30, 2018	June 30, 2017
Cash equivalents	\$14,709,699	\$63,122,592
Total accounts receivable	92,016,116	97,373,271
Prepaid expenses	85,472	45,857
Capital assets, net of depreciation	1,827,930	2,185,051
Investments:		
• Fixed Income	\$220,506,378	\$249,017,954
• Equities	267,620,098	295,879,610
• Private partnerships	0	175,531,896
• Mutual and commingled funds	1,117,905,351	919,995,492
• Real estate and venture capital	<u>196,393,546</u>	<u>50,451,173</u>
Total investments at market value	\$1,802,425,373	\$1,690,876,125
Total assets	\$1,911,064,590	\$1,853,602,896
Total liabilities	-\$78,692,037	-\$115,045,323
Net assets at market value	\$1,832,372,553	\$1,738,557,573
Net assets at actuarial value	\$1,866,120,413	\$1,779,592,227

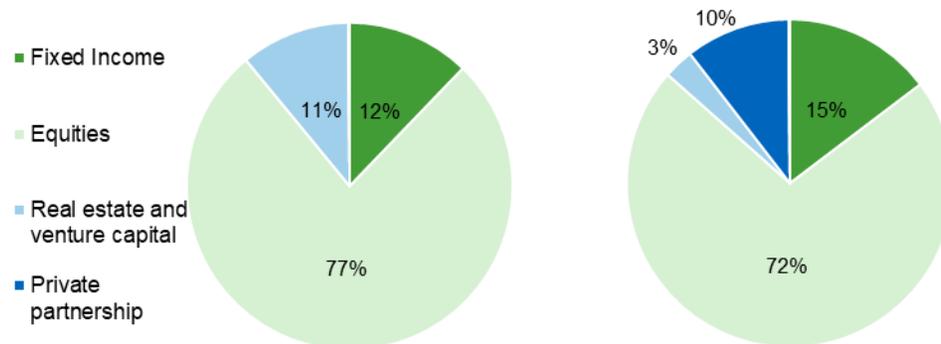


EXHIBIT E – DEVELOPMENT OF THE FUND THROUGH JUNE 30, 2018

Year Ended June 30	Employer Contributions	Member Contributions	Net Other Income	Net Investment Return*	Admin. Expenses**	Benefit Payments***	Market Value of Assets at Year-End	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2008							\$1,501,320,179	\$1,605,461,728	106.94%
2009	\$37,349,818	\$20,937,686	\$2,365,136	-\$307,382,559	-\$17,670,950	-\$91,853,196	1,145,066,114	1,374,079,337	120.00%
2010	41,920,603	25,315,397	442,258	208,723,610	-18,282,431	-97,935,502	1,305,250,049	1,410,368,434	108.05%
2011	50,268,131	32,062,253	208,107	261,886,312	-20,149,407	-108,758,513	1,520,766,932	1,486,698,448	97.76%
2012	56,152,011	31,827,995	85,110	24,726,665	-22,224,879	-119,713,933	1,491,619,901	1,517,410,471	101.73%
2013	65,086,320	32,343,368	292,953	120,403,032	-24,139,941	-131,254,070	1,554,351,563	1,552,924,370	99.91%
2014	72,668,413	32,558,584	410,500	212,338,194	-26,115,813	-140,846,837	1,705,364,604	1,610,285,523	94.42%
2015	72,908,805	34,863,531	830,887	-7,566,696	-2,551,845	-150,732,845	1,653,116,441	1,662,345,707	100.56%
2016	76,947,869	35,408,763	464,668	19,877,270	-2,163,853	-162,751,409	1,620,899,749	1,716,296,235	105.89%
2017	82,887,174	36,142,411	241,526	173,166,614	-2,623,838	-172,156,063	1,738,557,573	1,779,592,227	102.36%
2018	114,598,921	37,888,566	468,500	125,566,281	-2,448,365	-182,258,923	1,832,372,553	1,866,120,413	101.84%

* On a market basis, net of investment fees

** Includes depreciation and health/life insurance expenses (2014 and prior)

*** Includes "other expenses"

EXHIBIT F – 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:	The single-sum value of lifetime benefits to existing pensioners. This sum takes into account life expectancies appropriate to the ages of the pensioners 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 actuarially determined contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge that 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. Actuarial gains will shorten the time required for funding the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
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):	<p>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:</p> <p>Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)</p> <p>Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and</p> <p>Discounted according to an assumed rate (or rates) of return to reflect the time value of money.</p>

Actuarial Present Value of Future Plan 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 Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund 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. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).
Actuarial Value of Assets (AVA):	The value of the Fund'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 percentage and the ADC.
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 law.
Actuarially Determined Contribution (ADC):	The employer's periodic required 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 UAAL. 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 UAAL. 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 designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Fund is calculated, including: <u>Investment return</u> - the rate of investment yield that the Fund will earn over the long-term future;

	<p><u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;</p> <p><u>Retirement rates</u> - the rate or probability of retirement at a given age;</p> <p><u>Withdrawal rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;</p> <p><u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.</p>
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 30 years, it is 29 years at the end of one year, 28 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 withdrawal.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula applied to the member's compensation 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.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Fund 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 as deemed appropriate by the Actuary.
Funded Ratio:	The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes calculate a market funded percentage, using the market value of assets (MVA), rather than the AVA.
GASB 67 and GASB 68:	Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.
Investment Return:	The rate of earnings of the Fund 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.
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one that 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 determining the Amortization Period each year. In theory, if an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the Actuarial Assumptions are realized.
Plan Fiduciary Net Position:	Market value of assets.
Total Pension Liability (TPL):	The actuarial accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
Unfunded Actuarial Accrued Liability (UAAL):	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.
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 Plan 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 ACTUARIAL COST METHOD

Rationale for Assumptions:	<p>The information and analysis used in selecting each assumption (except for economic assumptions and mortality tables) that has a significant effect on this actuarial valuation is shown in the Actuarial Experience Study dated March 2, 2016 (as prepared by Buck Consultants). Economic assumptions, including inflation, investment return, and assumed cost-of-living adjustment increases were studied and adopted by the Board on July 13, 2017. Mortality table assumptions were studied and adopted by the Board on September 25, 2017. Rates of annual increase in salary were modified and adopted by the Board on September 25, 2017. The next Actuarial Experience study will be performed in 2020 for the July 1, 2021 valuation.</p>																			
Inflation:	2.50%.																			
Investment Return:	<p>7.50%.</p> <p>The investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the Plan's target asset allocation.</p>																			
Salary Increases:	<table border="1"> <thead> <tr> <th data-bbox="632 937 877 1018">Age</th> <th data-bbox="877 937 1192 1018">Annual Rate of Salary Increase (%)</th> </tr> </thead> <tbody> <tr> <td data-bbox="632 1018 877 1058">25</td> <td data-bbox="877 1018 1192 1058">7.78%</td> </tr> <tr> <td data-bbox="632 1058 877 1099">30</td> <td data-bbox="877 1058 1192 1099">6.47%</td> </tr> <tr> <td data-bbox="632 1099 877 1140">35</td> <td data-bbox="877 1099 1192 1140">5.60%</td> </tr> <tr> <td data-bbox="632 1140 877 1180">40</td> <td data-bbox="877 1140 1192 1180">4.92%</td> </tr> <tr> <td data-bbox="632 1180 877 1221">45</td> <td data-bbox="877 1180 1192 1221">4.43%</td> </tr> <tr> <td data-bbox="632 1221 877 1261">50</td> <td data-bbox="877 1221 1192 1261">4.09%</td> </tr> <tr> <td data-bbox="632 1261 877 1302">55</td> <td data-bbox="877 1261 1192 1302">3.85%</td> </tr> <tr> <td data-bbox="632 1302 877 1388">60</td> <td data-bbox="877 1302 1192 1388">3.75%</td> </tr> </tbody> </table>		Age	Annual Rate of Salary Increase (%)	25	7.78%	30	6.47%	35	5.60%	40	4.92%	45	4.43%	50	4.09%	55	3.85%	60	3.75%
Age	Annual Rate of Salary Increase (%)																			
25	7.78%																			
30	6.47%																			
35	5.60%																			
40	4.92%																			
45	4.43%																			
50	4.09%																			
55	3.85%																			
60	3.75%																			

Cost-of-Living Adjustments: Assumed to occur on January 1 following one year of retirement at the rate of 2.55% per annum for Group A members and 1.40% per annum for Group C members (beginning at age 62 for Group C members who elect reduced early retirement). The January 1, 2019 COLA is assumed to be 2.60% for group A and 1.30% for groups B and C.

Mortality Rates:

Death in Active Service:

- All Groups 98% of RP-2006 White Collar Employee with generational projection using Scale SSA-2017.

Healthy Post-retirement:

- All Groups 98% of RP-2006 White Collar Annuitant with generational projection using Scale SSA-2017.

Disabled Post-retirement:

- All Groups RP-2006 Disabled Mortality Table with generational projection using Scale SSA-2017.

The tables with the generational projection to the ages of members as of the measurement date reasonably reflect the mortality experience of the Plan as of the measurement date.

The mortality rates were based on historical and current demographic data, adjusted to reflect health characteristics of the various industries and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual amount of deaths by benefit amount and the projected amount based on the prior assumption over the five-year period ending June 30, 2016. The mortality tables were then adjusted to future years using a generational projection with Scale SSA-2017 to reflect future mortality improvement.

Please note, the description of the mortality table has been changed to be consistent with revised nomenclature related to unprojected rates of mortality used in the RP-2014 series of mortality tables.

Separation from Service before Retirement (Due to Withdrawal and Disability):

Representative values of the assumed annual rates of withdrawal and disability are as follows:

Age	Rate (%)			
	Withdrawal		Disability	
	Male	Female	Male	Female
25	21.00%	20.00%	0.005%	0.008%
30	12.60	14.00	0.008	0.008
35	8.40	11.30	0.010	0.008
40	6.50	9.03	0.015	0.010
45	5.80	6.30	0.026	0.023
50	5.40	5.25	0.067	0.070
55	5.40	5.04	0.044	0.048
60	5.40	5.04	0.147	0.084

Retirement Rates:

Age	Reduced Early Retirement		Full Early Retirement
	Group A	Group C	Grandfathered (Group C)
55	6.13%	6.13%	6.13%
56	6.25	6.25	6.25
57	6.25	6.25	6.25
58	6.25	6.25	6.25
59	9.38	9.38	9.38
60	12.50	18.75	18.75
61	18.75	18.75	18.75

Age	Service Retirement		
	Group A	Group C	
		Non-grandfathered	Grandfathered
60	12.50%	17.00%	N/A
61	18.80	17.00	N/A
62	25.00	20.00	20.00%
63	22.00	22.00	22.00
64	22.00	22.00	22.00
65	33.00	33.00	33.00
66	33.00	33.00	33.00
67	33.00	33.00	33.00
68	22.00	22.00	22.00
69	33.00	33.00	33.00
70	100.00	100.00	100.00

Non-grandfathered members are assumed to retire with 25% probability if they are first eligible for service retirement on or before age 62 and 27.5% probability if they are first eligible for service retirement between age 62 and age 65.

Group A and Grandfathered Group C members are assumed to retire at the following rates upon completion of 30 years of creditable service:

Age	Retirement After 30 Years of Service	
	Group A	Grandfathered (Group C)
49	0.00%	0.00%
50	40.00	40.00
51	20.00	20.00
52	20.00	20.00
53	20.00	20.00
54	20.00	20.00
55	20.00	8.75
56	10.00	6.25
57	10.00	6.25
58	10.00	10.00
59	10.00	10.00
60	30.00	25.00
61	25.50	17.00

The retirement rates were based on historical and current demographic data, adjusted to reflect conditions of the various industries, and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of retirements by age and the projected number based on the prior assumption over the four-year period ending June 30, 2014.

Inactive Members as Reported by the System:

Valuation liability equals 250% of accumulated contributions.

Deferred Members as Reported by the System:

Assumed to retire at their Normal Retirement Age with a deferred vested benefit.

Future Administrative Expenses:

No provisions made.

Unknown Data for Members:

Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.

Percent Married:	85% of male members and 35% of female members are assumed to be married.
Age of Spouse:	Females three years younger than males.
Benefit Elections:	All members are assumed to elect the single life annuity option.
Actuarial Value of Assets:	The amount of the assets for valuation purposes equals the preliminary asset value plus 20% of the difference between market and preliminary asset values. The preliminary asset value is equal to the previous year's asset value (for valuation purposes) adjusted for contributions less benefit payments and expenses plus expected investment income. If necessary, a further adjustment is made to ensure that the valuation assets are within 20% of the market value.
Actuarial Cost Method:	Entry Age Actuarial Cost Method. Entry Age is the age at date of employment or, if date is unknown, current age minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary, with Normal Cost determined using the plan of benefits applicable to each member.
Changes in Actuarial Assumptions:	Based on past experience and future expectations of experience, the following actuarial assumption was changed: <ul style="list-style-type: none"> ➤ Valuation liability for inactive members as reported by the System is assumed to equal 250% of accumulated contributions. Previously, this liability was assumed to equal 332.5% of accumulated contributions.

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:	July 1, 1947.	
Creditable Service:	Service as a member plus purchased service.	
Average Final Compensation (AFC):	Average annual compensation during highest 3 consecutive years.	
Grandfathered Status:	Group C members who were within five years of normal retirement eligibility as defined prior to July 1, 2010, are “grandfathered”.	
Normal Retirement – Eligibility:	<ul style="list-style-type: none"> • Group A Age 60 or 30 years of creditable service. • Group C Grandfathered Age 62 or 30 years of creditable service Non-grandfathered Age 65 or age plus creditable service equal to 90. 	
Normal Retirement – Amount:	<ul style="list-style-type: none"> • Group A Member annuity based on accumulated contributions plus a pension, which, with member annuity, equals 1/60th of AFC times creditable service. • Group C Grandfathered Member annuity based on accumulated contributions plus a pension, which, with member annuity, equals 1/80th of AFC times creditable service prior to July 1, 1990, plus 1/60th of AFC times creditable service after July 1, 1990. Non-grandfathered Member annuity based on accumulated contributions plus a pension, which, with member annuity, equals 1/80th of AFC times creditable service prior to July 1, 1990, plus 1/60th of AFC times creditable service after July 1, 1990 up to 20 years of service, plus 1/50th of AFC for years of service after 20. <p style="margin-left: 40px;">If a member already has 20 or more years of service on June 30, 2010, the 1/50th will be applied to all service accrued after July 1, 2010.</p> <p>Minimum benefit applicable to Group A of \$6,600 after 30 years of creditable service (pro-rata for service less than 30 years).</p> <p>Maximum benefit applicable to Group C: Grandfathered maximum benefit is 50% of AFC up to June 30, 2010. May continue to accrue up to 53.34% of AFC with service earned after July 1, 2010. Non-grandfathered maximum benefit is 60% of AFC.</p>	
Early Retirement – Eligibility:	<ul style="list-style-type: none"> • Group A Age 55. • Group C Age 55 with 5 years of creditable service. 	

Early Retirement – Amount:	<ul style="list-style-type: none"> • Group A Actuarial equivalent of normal retirement allowance using AFC and creditable service at early retirement. • Group C Grandfathered Accrued normal benefit reduced 6% for each year prior to age 62. Non-grandfathered Accrued normal benefit reduced by actuarial reduction from normal retirement age.
Vesting:	<ul style="list-style-type: none"> • All groups – 5 years of creditable service. • Allowance beginning at age 60 calculated as a normal retirement allowance based on AFC and creditable service at termination.
Disability Retirement – Eligibility:	<ul style="list-style-type: none"> • All groups – Total and permanent disability after 5 years of creditable service (5 years preceding retirement served in State).
Disability Retirement – Amount:	<ul style="list-style-type: none"> • All groups – Calculated as a service allowance based on AFC and creditable service at disability retirement, subject to a 25% of AFC minimum.
Death Benefit – Eligibility:	<ul style="list-style-type: none"> • Group A Age 60 or 30 years of creditable service; 10 years of creditable service if in service at death. • Group C Age 55 and 5 years of creditable service or 10 years of creditable service.
Death Benefit – Amount:	<ul style="list-style-type: none"> • All groups – Accrued allowance paid under 100% survivorship option. If the eligibility requirements are not met or if beneficiary so elects, the member's accumulated contributions are paid to the beneficiary or estate. Certain children's benefits may also be payable.
Post-Retirement Adjustments:	<ul style="list-style-type: none"> • Group A Allowances in payment for at least one year increased on each January 1 by the percentage increase in Consumer Price Index, but not more than 5%. • Group C Same, but increase is based on half of the Consumer Price Index increase. For members receiving a reduced early retirement allowance, the adjustment will not apply before age 62.
Refund of Contributions:	If no other beneficiary is payable, a terminated member receives his accumulated contributions with interest.
Member Contribution Rates:	<ul style="list-style-type: none"> • Group A 5.5% of earnable compensation. Contributions stop after 25 years of creditable service. • Group C 5% of earnable compensation with at least five years of service as of July 1, 2014. 6% of earnable compensation with less than five years of service as of July 1, 2014.
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.

Section 5: Additional Summary Tables of Member Data

**TABLE 1 – MEMBERS IN ACTIVE SERVICE AS OF JUNE 30, 2018
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE PAYROLL**

All Employee Groups

Age	Years of Creditable Service								
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over
Under 25	178	178	--	--	--	--	--	--	--
	\$38,184	\$38,184	--	--	--	--	--	--	--
25 - 29	774	620	154	--	--	--	--	--	--
	\$44,539	\$ 43,145	\$50,153	--	--	--	--	--	--
30 - 34	1,064	464	489	110	1	--	--	--	--
	\$51,263	\$47,722	\$52,745	\$59,622	\$49,965	--	--	--	--
35 - 39	1,327	370	429	446	82	--	--	--	--
	\$56,712	\$49,079	\$56,051	\$61,818	\$66,837	--	--	--	--
40 - 44	1,394	278	269	402	384	61	--	--	--
	\$62,457	\$48,347	\$58,963	\$66,204	\$69,505	\$73,108	--	--	--
45 - 49	1,460	231	213	306	334	332	44	--	--
	\$66,977	\$51,419	\$59,878	\$66,528	\$72,359	\$75,769	\$78,938	--	--
50 - 54	1,263	153	147	245	239	224	196	59	--
	\$69,169	\$53,804	\$58,645	\$67,349	\$70,575	\$76,001	\$79,373	\$77,270	--
55 - 59	1,268	87	129	202	243	214	194	176	23
	\$69,457	\$50,184	\$60,112	\$66,295	\$68,798	\$74,232	\$76,200	\$75,831	\$79,431
60 - 64	884	68	74	121	174	152	104	101	90
	\$69,863	\$51,216	\$57,386	\$63,709	\$70,842	\$70,972	\$77,740	\$79,231	\$79,103
65 & over	280	20	41	53	35	34	28	20	39
	\$70,483	\$60,205	\$67,246	\$70,227	\$72,203	\$72,729	\$76,929	\$60,205	\$82,120
Total	9,892	2,479	1,924	1,873	1,510	1,018	572	364	152
	\$61,954	\$47,174	\$56,134	\$64,847	\$70,214	\$74,498	\$77,571	\$77,092	\$79,927

TABLE 2 – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY BENEFIT AMOUNT

All Teachers

Allowance Level	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
0 – 500	7	\$870	0	\$0	0	\$0
501 – 1,000	11	8,986	0	0	0	0
1,001 – 1,500	27	34,209	0	0	2	2,574
1,501 – 2,000	44	80,136	0	0	7	12,582
2,001 – 2,500	76	172,174	0	0	9	20,173
2,501 – 3,000	119	329,762	0	0	7	18,659
3,001 – 3,500	112	365,041	0	0	7	22,589
3,501 – 4,000	121	452,038	0	0	9	34,302
4,001 – 4,500	156	662,950	0	0	8	34,217
4,501 – 5,000	132	626,235	0	0	8	37,936
5,001 – 5,500	139	726,579	0	0	9	46,954
5,501 – 6,000	155	887,215	0	0	9	51,943
6,001 – 6,500	126	788,694	0	0	6	37,865
6,501 – 7,000	141	952,402	1	6,893	14	94,438
7,001 – 7,500	126	911,830	1	7,146	12	85,857
7,501 – 8,000	116	899,247	2	15,452	6	46,027
8,001 – 8,500	114	940,904	2	16,242	17	138,939
8,501 – 9,000	102	891,079	2	17,734	12	105,312
9,001 – 9,500	131	1,214,074	5	45,939	21	193,995
9,501 – 10,000	120	1,167,633	6	58,769	15	145,525
10,001 – 10,500	120	1,227,252	10	102,607	10	102,968
10,501 – 11,000	115	1,237,720	7	75,434	20	215,146
11,001 – 11,500	125	1,406,164	11	122,830	14	157,649
11,501 – 12,000	134	1,575,043	11	130,020	13	152,685
12,001 – 12,500	109	1,337,161	3	36,629	15	184,219
12,501 – 13,000	92	1,171,072	4	51,071	18	230,290
13,001 – 13,500	101	1,341,605	6	79,819	10	132,455
13,501 – 14,000	79	1,085,753	11	151,537	7	96,234
14,001 – 14,500	99	1,411,131	4	57,090	8	113,540
14,501 – 15,000	101	1,489,574	4	59,217	4	58,896

TABLE 2 – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY BENEFIT AMOUNT

All Teachers (continued)

Allowance Level	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
15,001 – 15,500	94	\$1,434,975	5	\$76,513	10	\$152,436
15,501 – 16,000	112	1,764,708	5	78,958	12	190,323
16,001 – 16,500	99	1,610,313	4	64,776	3	48,642
16,501 – 17,000	97	1,625,129	5	83,924	12	201,510
17,001 – 17,500	96	1,657,206	2	34,394	6	103,381
17,501 – 18,000	93	1,648,096	3	53,240	6	106,105
18,001 – 18,500	119	2,172,002	3	54,714	9	163,713
18,501 – 19,000	106	1,989,011	3	56,415	9	168,341
19,001 – 19,500	90	1,733,084	2	38,426	6	115,049
19,501 – 20,000	108	2,131,856	3	59,596	5	99,178
20,001 – 20,500	85	1,719,574	6	121,230	5	101,730
20,501 – 21,000	109	2,262,686	1	20,984	7	144,797
21,001 – 21,500	118	2,506,099	1	21,339	6	127,230
21,501 – 22,000	125	2,720,520	2	43,297	5	108,468
22,001 – 22,500	132	2,937,618	5	110,974	6	134,051
22,501 – 23,000	110	2,503,068	4	91,210	4	90,853
23,001 – 23,500	149	3,463,264	1	23,132	1	23,357
23,501 – 24,000	137	3,250,386	2	47,497	1	23,580
24,001 – 24,500	128	3,104,581	0	0	1	24,340
24,501 – 25,000	130	3,218,283	1	24,956	3	74,037
25,001 – 25,500	105	2,649,317	0	0	2	50,320
25,501 – 26,000	122	3,142,840	0	0	1	25,870
26,001 – 26,500	119	3,123,545	0	0	3	78,906
26,501 – 27,000	132	3,530,599	1	26,947	0	0
27,001 – 27,500	122	3,326,013	1	27,360	1	27,238
27,501 – 28,000	112	3,107,713	0	0	6	166,203
28,001 – 28,500	138	3,897,219	0	0	1	28,062
28,501 – 29,000	125	3,593,822	3	86,200	5	143,917
29,001 – 29,500	135	3,949,397	2	58,479	1	29,458
29,501 – 30,000	113	3,361,372	0	0	0	0

TABLE 2 – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY BENEFIT AMOUNT

All Teachers (continued)

Allowance Level	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
30,001 – 30,500	110	\$3,327,121	0	\$0	3	\$90,515
30,501 – 31,000	110	3,379,774	0	0	1	30,734
31,001 – 31,500	94	2,939,018	1	31,476	1	31,365
31,501 – 32,000	112	3,557,784	0	0	2	63,309
32,001 – 32,500	96	3,097,487	1	32,471	1	32,495
32,501 – 33,000	99	3,243,013	0	0	2	65,198
33,001 – 33,500	91	3,022,478	1	33,444	0	0
33,501 – 34,000	90	3,037,259	1	33,599	1	33,780
34,001 – 34,500	88	3,012,764	2	68,369	1	34,266
34,501 – 35,000	92	3,195,781	0	0	1	34,685
35,001 – 35,500	80	2,818,138	0	0	3	105,630
35,501 – 36,000	64	2,286,922	0	0	2	71,861
36,001 – 36,500	58	2,102,751	0	0	1	36,007
36,501 – 37,000	70	2,572,804	1	36,523	2	73,465
37,001 – 37,500	58	2,160,116	0	0	1	37,068
37,501 – 38,000	62	2,339,611	0	0	0	0
38,001 – 38,500	50	1,912,601	0	0	0	0
38,501 – 39,000	50	1,937,020	0	0	0	0
39,001 – 39,500	44	1,726,506	0	0	1	39,292
39,501 – 40,000	41	1,630,061	0	0	0	0
Over 40,000	477	22,021,954	1	43,086	3	148,929
Total	8,646	\$179,849,792	163	\$2,617,959	460	\$6,253,666

**TABLE 3A – INACTIVE MEMBERSHIP AS OF JUNE 30, 2018
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE ANNUAL ALLOWANCE**

Service Pensioners

Age	Years of Creditable Service at Retirement								
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over
Under 60	190	3	3	16	11	14	5	126	12
	\$28,499	\$5,074	\$2,998	\$4,905	\$10,207	\$12,041	\$13,287	\$35,846	\$37,353
60 - 64	1,050	16	35	88	119	90	131	439	132
	\$26,646	\$11,181	\$4,057	\$6,453	\$11,879	\$16,201	\$34,356	\$33,432	\$38,182
65 - 69	2,777	32	203	399	385	378	246	810	324
	\$22,372	\$9,219	\$5,961	\$8,203	\$14,726	\$20,985	\$28,723	\$30,679	\$36,513
70 - 74	2,293	29	151	378	281	336	206	702	210
	\$20,049	\$6,250	\$6,020	\$7,747	\$12,640	\$18,746	\$25,041	\$28,033	\$34,597
75 - 79	1,189	29	46	177	175	195	117	343	107
	\$17,940	\$3,609	\$5,902	\$7,447	\$11,090	\$16,047	\$20,448	\$25,295	\$32,690
80 - 84	601	17	28	101	90	92	74	140	59
	\$16,275	\$2,959	\$5,860	\$7,119	\$11,497	\$13,935	\$18,766	\$24,139	\$29,876
85 - 89	340	10	20	44	49	54	48	72	43
	\$14,458	\$2,681	\$5,014	\$5,885	\$9,820	\$13,964	\$15,660	\$20,572	\$24,685
90 & over	206	10	13	42	38	29	18	40	16
	\$11,320	\$2,691	\$3,355	\$5,747	\$7,943	\$10,848	\$12,570	\$20,354	\$22,699
Total	8,646	146	499	1,245	1,148	1,188	845	2,672	903
	\$20,802	\$6,021	\$5,711	\$7,538	\$12,636	\$17,961	\$25,503	\$29,219	\$34,628

**TABLE 3B – INACTIVE MEMBERSHIP AS OF JUNE 30, 2018
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE ANNUAL ALLOWANCE**

Disability Pensioners

Age	Years of Creditable Service at Retirement								
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over
Under 60	25	--	6	3	4	9	2	1	--
	\$18,225	--	\$12,236	\$13,515	\$16,787	\$20,589	\$30,195	\$28,829	--
60 - 64	39	--	5	12	9	9	4	--	--
	\$17,468	--	\$10,844	\$13,583	\$12,642	\$26,692	\$27,512	--	--
65 - 69	35	--	6	11	11	4	3	--	--
	\$15,331	--	\$12,159	\$12,121	\$16,079	\$22,074	\$21,716	--	--
70 - 74	25	--	3	6	1	9	6	--	--
	\$15,835	--	\$12,020	\$11,545	\$12,022	\$15,575	\$23,057	--	--
75 - 79	23	--	1	7	6	5	4	--	--
	\$14,759	--	\$19,220	\$13,025	\$12,183	\$15,915	\$19,099	--	--
80 - 84	7	--	--	1	2	2	2	--	--
	\$13,417	--	--	\$11,058	\$10,754	\$10,321	\$20,355	--	--
85 - 89	6	--	--	--	2	2	2	--	--
	\$14,020	--	--	--	\$18,036	\$8,322	\$15,701	--	--
90 & over	3	--	--	1	1	--	--	1	--
	\$10,363	--	--	\$10,219	\$8,049	--	--	\$12,820	--
Total	163	--	21	41	36	40	23	2	--
	\$16,061	--	\$12,185	\$12,648	\$14,126	\$19,272	\$22,715	\$20,825	--