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Sheriffs' Retirement System of the State of Montana

MPERA
MONTANA PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION

Actuarial Valuation
As of June 30, 2021

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Cavanaugh Macdonald
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The experience and dedication you deserve

September 30, 2021

Public Employees' Retirement Board
100 North Park, Suite 200
Helena, MT 59620-0139

Members of the Board:

In this report are submitted the results of the annual valuation of the assets and liabilities of the Sheriffs' Retirement System of Montana of the State of Montana (SRS), prepared as of June 30, 2021.

The purpose of this report is to provide a summary of the funded status of the System as of June 30, 2021. While not verifying the data at source, the actuary performed tests for consistency and reasonability. The valuation indicates that the statutory contribution rate is sufficient to amortize the unfunded accrued liability within 18 years. The asset values used to determine unfunded liabilities are not market values but less volatile market related values. A smoothing technique is applied to market values to determine the market related values. The unfunded liability amounts using the market value of assets would be different. The interest rate used for determining liabilities is based on the expected return on assets. Therefore, liability amounts in the report cannot be used to assess a settlement of the obligation.

The promised benefits of the System are included in the actuarially calculated contribution rates, which are developed using the Entry Age Normal Cost Method. Four-year market related value of assets is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded accrued liability that is being amortized by regular annual contributions as a level percentage of payroll, on the assumption that payroll will increase by 3.50% annually. The assumptions recommended by the actuary and adopted by the Board are, in the aggregate, reasonably related to the experience under the Fund and to reasonable expectations of anticipated experience under the Fund.

In order to prepare the results in this report we have utilized appropriate actuarial models that were developed for this purpose. These models use assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.

We note that as we are preparing this report, the world is in the midst of a pandemic. We have considered available information, but do not believe that there is yet sufficient data to warrant the modification of any of our assumptions. We will continue to monitor the situation and advise the Board in the future of any adjustments that we believe would be appropriate.

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This is to certify that Todd Green, President, and Beverly Bailey, Senior Actuary, for Cavanaugh Macdonald Consulting are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. This also certifies that the undersigned have experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

Future actuarial results may differ significantly from the current results 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 (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

The Table of Contents, which immediately follows, outlines the material contained in the report.

Respectfully submitted,

Todd B. Green, ASA, EA, FCA, MAAA
President

Beverly V. Bailey, ASA, EA, FCA, MAAA
Senior Actuary

TBG:bvb

Sheriffs' Retirement System
State of Montana

Table of Contents

Section I: Summary of Results

For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below:

VALUATION DATE	June 30, 2021	June 30, 2020
Active Members	1,495	1,502
Retirees and Beneficiaries	775	735
Disabled Members*	30	28
Terminated Vested Members	178	146
Terminated Non-Vested Members	805	696
Total**	3,283	3,107
Annual Covered Payroll of Active Members	$ 90,869,369	$ 84,942,848
Average Salaries from Covered Payroll	$ 60,782	$ 56,553
Annual Allowances for Retired Members and Beneficiaries	$ 23,844,439	$ 21,999,012
Assets		
Actuarial value	$ 438,035,779	$ 400,719,971
Market value	484,711,071	384,294,754
Actuarial Accrued Liability (AAL)	$ 525,238,823	$ 493,241,768
Unfunded Actuarial Accrued Liability (UAAL)	$ 87,203,044	$ 92,521,797
Funded Ratio	83.40%	81.24%
Market Value Rate of Return	27.82%	2.71%
Annual Cost		
Statutory Funding Rate	23.610%	23.610%
Total Normal Rate	15.590%	15.770%
Employee Contribution Rate	10.495%	10.495%
Employer Normal Rate	5.095%	5.275%
Employer Contribution Rate		
Normal Rate	5.095%	5.275%
Administrative Expense Load	0.170%	0.170%
UAAL Rate	7.850%	7.670%
Total Rate	13.115%	13.115%
Amortization Period	18 Years	21 Years
Employer Contribution Rate Necessary to Amortize UAAL over 30 Years		
Normal Rate	5.095%	5.275%
Administrative Expense Load	0.170%	0.170%
UAAL Rate (30-Year Rate)	5.599%	6.200%
Total Rate	10.864%	11.645%
Shortfall/(Surplus)	(2.251)%	(1.470)%

* Based on PERB categorization for the annual report. For actuarial purposes, 49 members in 2020 and 50 members in 2021 were valued as disabled members with offsetting reductions to the number of retired members.

** A reconciliation between participant counts used for the annual report and counts for the valuation appears at the beginning of Appendix D.

As a result of this actuarial valuation of the benefits in effect under the Sheriffs' Retirement System as of June 30, 2021, the statutory employer contributions are sufficient to amortize the Unfunded Actuarial Accrued Liability (UAAL) of the Retirement System within 18 years. The Funded Ratio is 83.40% on an actuarial value of assets basis.

Calculations based on the Market Value of Assets

MCA 19-2-407 requires this report to show how market performance is affecting the actuarial funding of the Retirement System. The June 30, 2021 market value of assets is $46,675,292 greater than the actuarial value of assets. This is due to the smoothing of investment gains and losses over a four-year period. If the market value of assets was used, the amortization period would be 7 years, and the Funded Ratio would be 92.28%.

Additional Details

MCA 19-7 sets the employer contribution at 13.115% of salary and the employee contribution at 10.495% for actives.

The actuarial costs are calculated using the entry age actuarial cost method. This is the method used by most public plans. It is designed to provide a stable contribution rate as a percent of member pay. This actuarial valuation measures the adequacy of the contribution rates set in Montana State Law.

Investment Experience

The market assets earned 27.82% net of investment and operating expenses. As a result of prior year's unrecognized losses, the actuarial assets earned 10.81%, which is 3.16% greater the expected return of 7.65%. The return on the actuarial assets differs from the return on market assets because the actuarial value of assets spreads gains and losses over four years. The chart below shows the annual returns for the past ten years.

Year	Market Return	Actuarial Return	Assumed Investment Return	Market Return over Assumption	Actuarial Return over Assumption
7/1/2011 to 6/30/2012	2.32%	3.82%	7.75%	(5.43)%	(3.93)%
7/1/2012 to 6/30/2013	12.88	11.57	7.75	5.13	3.82
7/1/2013 to 6/30/2014	17.08	12.96	7.75	9.33	5.21
7/1/2014 to 6/30/2015	4.60	9.60	7.75	(3.15)	1.85
7/1/2015 to 6/30/2016	2.06	8.66	7.75	(5.69)	0.91
7/1/2016 to 6/30/2017	11.95	8.23	7.75	4.20	0.48
7/1/2017 to 6/30/2018	8.83	6.92	7.65	1.18	(0.73)
7/1/2018 to 6/30/2019	5.70	7.24	7.65	(1.95)	(0.41)
7/1/2019 to 6/30/2020	2.71	7.04	7.65	(4.94)	(0.61)
7/1/2020 to 6/30/2021	27.82	10.81	7.65	20.17	3.16

Asset gains or losses result when the return on the actuarial value of assets differs from the assumed actuarial investment return.

Amortization of the UAAL

The June 30, 2020 actuarial valuation calculated a 21-year amortization period for the UAAL. The resulting amortization period at June 30, 2021 is 18 years.

Funding and Benefits Policy

The Montana Public Employees' Retirement Board has adopted a Funding and Benefits Policy to provide general guidelines to help ensure decisions are made based on sound, consistent, and thoroughly examined criteria. The Funding and Benefits Policy includes guidance on the following topics:

1) Funding Requirement
   a) The Funding and Benefits Policy states:
      1. The Entry Age Normal Cost Method shall be applied to the projected benefits in determining the Normal Cost and Actuarial Accrued Liability.
      2. Asset smoothing can be used in the valuation process to spread the recognition of investment gains and losses over a four-year period.
      3. The unfunded actuarial accrued liability should be amortized over a reasonable period of time and should not exceed 30 years on a rolling basis. Generally, the funding period should be constant or decreasing.
   b) Analysis: The liabilities of the System are determined using the Entry Age Normal Cost Method and are compared to the actuarial value of assets, which are developed using assets smoothing that recognizes gains and losses over a four-year period. The contributions provided for in statute are sufficient to fully amortize the unfunded actuarial accrued liability within 30 years.
2) Funding Objectives
   a) The Funding and Benefits Policy states: "The primary objectives are to: 1) ensure that the systems are financially sound and pay all benefits promised using assets accumulated from required employer and member contributions and investment income; and 2) achieve a well-funded status with a range of safety to absorb market volatility without creating a UAAL."
   b) Analysis: The contributions provided for in the statute are sufficient to fully amortize the unfunded actuarial accrued liability within 30 years. The employer and employee contributions provided for in statute to amortize the unfunded actuarial accrued liability within a 18-year period. This ensures the System is financially sound and will be able to pay all promised benefit and achieve a well-funded status with a range of safety to absorb market volatility without creating a UAAL.
3) Benefit Enhancements
   a) The Funding and Benefits Policy states: "Proposals must provide funding from sources sufficient to cover future costs. Unfunded liabilities created by the proposal must be amortized over a period of time appropriate to the retirement system, but not more than 30 years."
   b) Analysis: Without the supplemental funding, a benefit enhancement would increase the amortization period of the unfunded actuarial accrued liability and further delay the goal of achieving a well-funded status with a range of safety to absorb market volatility without creating a UAAL.

Sensitivity to Future Experience

The valuation results are projections based on the actuarial assumptions. Actual experience will differ from these assumptions, either increasing or decreasing the ultimate cost. The following illustrations provide simple analyses on how the costs are sensitive to changes in the assumed rate of return.

Investment Return – The investment return generally has the largest impact on the funding of the System.

Impact of Assuming 1.00% Higher Investment Return			
	Funded Ratio	Amortization Period	Actuarially Determined Employer Contribution* (Millions $)
Current Assumption 7.65%	83.40%	18 Years	$ 11.8$
Higher Assumption 8.65%	94.03%	4 Years	4.7$
Increase / (Decrease)	10.63%	(14) Years	$ (7.1)
Impact of Assuming 0.50% Higher Investment Return			
	Funded Ratio	Amortization Period	Actuarially Determined Employer Contribution* (Millions $)
Current Assumption 7.65%	83.40%	18 Years	$ 11.8$
Higher Assumption 8.15%	88.65%	9 Years	8.0$
Increase / (Decrease)	5.25%	(9) Years	$ (3.8)
Impact of Assuming 0.50% Lower Investment Return			
	Funded Ratio	Amortization Period	Actuarially Determined Employer Contribution* (Millions $)
Current Assumption 7.65%	83.40%	18 Years	$ 11.8$
Lower Assumption 7.15%	78.28%	43 Years	15.5$
Increase / (Decrease)	(5.12)%	25 Years	$ 3.7
Impact of Assuming 1.00% Lower Investment Return			
	Funded Ratio	Amortization Period	Actuarially Determined Employer Contribution* (Millions $)
Current Assumption 7.65%	83.40%	18 Years	$ 11.8$
Lower Assumption 6.65%	73.29%	Does not amortize	19.6$
Increase / (Decrease)	(10.11)%	N/A	$ 7.8

* Amounts reflect estimated increase/(decrease) in FY2021 employer contributions in order to maintain the 18 year amortization period.

The future funding status of the System will be determined by the System's experience. The System's actual asset returns and retirement rates, as well as member longevity, salary increases, withdrawal rates, disability rates and future legislation will all impact the funding status of the System. The entry age normal cost method and four year smoothing of asset gains and losses will help to provide a more orderly funding of the System's liabilities, but will not change the actual experience. The amortization period of the UAAL is not likely to decrease by the expected 1.0 year with each passing actuarial valuation. Instead, the amortization period is expected to decrease more or less than 1.0 years each year, reflecting gains and losses due to experience different than the actuarial assumptions.

Assumption Changes

There have been no assumption changes since the previous valuation.

Benefit Changes

There have been no benefit changes since the previous valuation.

Contribution Changes

There have been no contribution changes since the previous valuation.

Method Changes

There have been no method changes since the previous valuation.

Impact of Changes

The following table summarizes how experience has changed the UAAL since the June 30, 2020 Actuarial Valuation. Further detail can be found in Table 10 and Table 11.

Changes in the Unfunded Actuarial Accrued Liability (UAAL)

June 30, 2020 Valuation UAAL	$92,521,797
Normal Cost (Including Expenses)	13,327,015
Contributions	(21,581,395)
Interest	7,271,946
Expected June 30, 2021 UAAL	$91,539,363
Experience (Gain) / Loss on Actuarial Liabilities	$8,232,854
Experience (Gain) / Loss on Actuarial Assets	(12,569,173)
Assumption & Method Changes	0
Plan Changes	0
Total (Gain) / Loss	$(4,336,319)
June 30, 2021 Valuation UAAL	$87,203,044

Summary

* The System's actuarial value investment return of 10.81% for the year ended June 30, 2021 is 3.16% greater than the expected return of 7.65%. This represents an asset gain of $12,569,173 due to investment return greater than anticipated. As of June 30, 2021, the market value of assets was $484,711,071. As of June 30, 2021, the actuarial value of assets was $438,035,779. The June 30, 2021 market value of assets will be recognized in future actuarial valuations unless it is offset by returns less than the 7.65% assumption.

* As of June 30, 2021, the amortization period of the UAAL is 18 years. The ultimate goal of the Board's Funding and Benefits Policy is to increase the funded status to a level such that the amortization period is below 30 years. The System is currently being funded within the parameters defined by the Board.

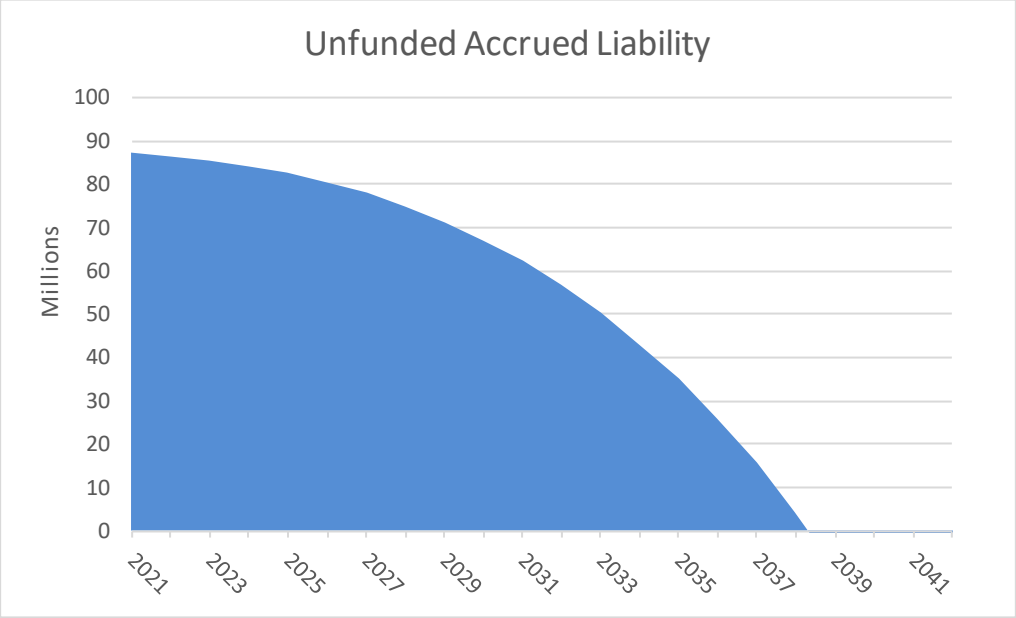
* The funding of the retirement system will be impacted by future experience which will sometimes be more favorable than the actuarial assumptions and sometimes less favorable. In particular, investment returns larger and smaller than the 7.65% assumption are expected to have significant impacts on the System's funding progress. In the long term, the favorable experience is needed to offset the less favorable experience. This is the reason for using an actuarial value of assets that allows gains and losses to be smoothed over four years.

* The unfunded actuarial accrued liability is amortized using a level percentage of payroll method over the amortization period. Under the level percentage of payroll method, amortization payments will not be large enough to cover interest on the UAAL in the beginning of the amortization schedule, which means that as a dollar amount the UAAL is expected to grow. After a period of time, amortization payments will be large enough that the amortization payments will cover both interest and principal, and the UAAL as a dollar amount will be projected to decrease in each subsequent year. The payroll growth assumption is used to determine the percentage of payroll required over the remaining amortization period to fully amortize the unfunded liability. The payroll growth assumption is 3.50%.

* The Board-adopted rate of return assumption of 7.65% does not, in our professional judgment, conflict with what would constitute a reasonable assumption for the purpose of the measurement Actuarial Standard of Practice No. 27 (ASOP 27). The basis for this opinion is the average long-term capital market assumptions published in the Survey of Capital Market Assumptions 2021 Edition by Horizon Actuarial Service, LLC, which yield a median real return of 4.66% and assumed inflation based on the intermediate inflation assumption of 2.4% in the 2021 OASDI Trustees Report used by the Chief Actuary for Social Security to produce 75 year cost projections. Combining these two results yields a nominal return of 7.06%. The Board's adopted assumption of 7.65% is sufficiently close to our calculated reasonable assumption of 7.06%. Note our report discloses the Systems Funded Ratio and Amortization Period based on an assumed rate of return of 7.65%. In the *Sensitivity to Future Experience* section, results are also presented based on an assumed rate of return of 7.15% and 6.65%. The results of the valuation using an assumed rate of return of 7.06% would include a funded ratio and amortization period between the results shown at 7.15% and 6.65%.

Projected Progress toward 100% Funding

The table below shows the projected progress toward reaching 100%. When the System is 100% funded, the Unfunded Actuarial Accrued Liability will be fully amortized. This is scheduled to occur within 18 years. The ultimate goal of the SRS System is to become at least 100% funded and to establish a reserve.



Assets

In many respects, an actuarial valuation can be regarded as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is June 30, 2021. On that date, the assets available for the payment of benefits are appraised. These assets are compared with the actuarial liabilities. The actuarial process thus leads to a method of determining what contributions by members and their employers are needed to strike a balance.

The asset valuation method being used is a four-year smoothing method. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of four years.

Table 1 lists the assets held and their market value for the past two years. Table 2 summarizes the fund's activity during the past two years. Table 3 summarizes the determination of the actuarial value of assets. Table 4 summarizes historical asset returns for the last 10 years including the amount recognized by the actuarial asset valuation method which was greater or less than the actuarial investment return assumption. Table 5 summarizes the historical asset values on a market value and actuarial value basis, to the extent it was available. Additional data can be included in this table for future reports, if provided by the System.

Table 1:
Statement of Fiduciary Net Position
Fiscal Year Ended June 30,

	2021	2020
ASSETS		
Cash and Short Term Investments	$ 5,498,380	$ 4,478,166
Securities Lending Collateral	$ 2,777,481	$ 2,023,785
Receivables:		
Interest Receivable	$ 460	$ 2,001
Accounts Receivable	291,382	387,914
Due from Other Funds	-	-
Due from Primary Government	-	-
Notes Receivable	-	-
Total Receivables	$ 291,842	$ 389,915
Investments, at fair value:		
Investment Pools	479,632,037	379,309,902
Other Investments	-	-
Total Investments	$ 479,632,037	$ 379,309,902
Capital Assets		
Property and Equipment, at cost, net of Accumulated Depreciation	$ 366	$ 366
Intangible Assets, at cost, net of Amortization Expense	248,436	302,439
Total Capital Assets	$ 248,802	$ 302,805
TOTAL ASSETS	$ 488,448,542	$ 386,504,573
LIABILITIES		
Securities Lending Liability	$ 2,777,481	$ 2,023,785
Accounts Payable	20,007	37,302
Unearned Revenue	9,354	1,964
Due to Other Funds	930,629	146,768
Compensated Absences	-	-
OPEB Implicit Rate Subsidy LT	-	-
TOTAL LIABILITIES	$ 3,737,471	$ 2,209,819
NET POSITION - RESTRICTED FOR PENSION BENEFITS	$ 484,711,071	$ 384,294,754

Table 2:
Statement of Changes in Fiduciary Net Position
Fiscal Year Ended June 30,

	2021	2020
ADDITIONS		
Contributions:		
Employer	$ 11,896,985	$ 11,175,181
Plan Member	9,684,410	9,114,615
Other	-	-
Total Contributions	$ 21,581,395	$ 20,289,796
Misc. Income	$ -	$ -
Investment Income:		
Net Appreciation/(Depreciation)		
in Fair Value of Investments	$ 108,661,211	$ 12,064,624
Investment Earnings	12,396	127,337
Security Lending Income	33,282	43,385
Investment Income/(Loss)	$ 108,706,889	$ 12,235,346
Investment Expense	(2,720,045)	(2,030,317)
Security Lending Expense	(6,533)	(23,123)
Net Investment Income/(Loss)	$ 105,980,311	$ 10,181,906
Total Additions	$ 127,561,706	$ 30,471,702
DEDUCTIONS		
Benefit Payments	$ 24,708,608	$ 21,481,264
Refunds/Distributions	1,505,592	1,565,536
Refunds to Other Plans	9,281	65,353
Transfers to DCRP	-	-
Transfers to MUS-RP	-	-
OPEB Expense	-	-
Administrative Expense	1,048,685	294,988
Total Deductions	$ 27,272,166	$ 23,407,141
NET INCREASE (DECREASE) IN PLAN NET ASSETS	$ 100,289,540	$ 7,064,561
NET POSITION - RESTRICTED FOR PENSION BENEFITS BEGINNING OF YEAR	$ 384,294,754	$ 377,222,848
ADJUSTMENT	126,777	7,345
END OF YEAR	$ 484,711,071	$ 384,294,754

Table 3:
Determination of Actuarial Value of Assets

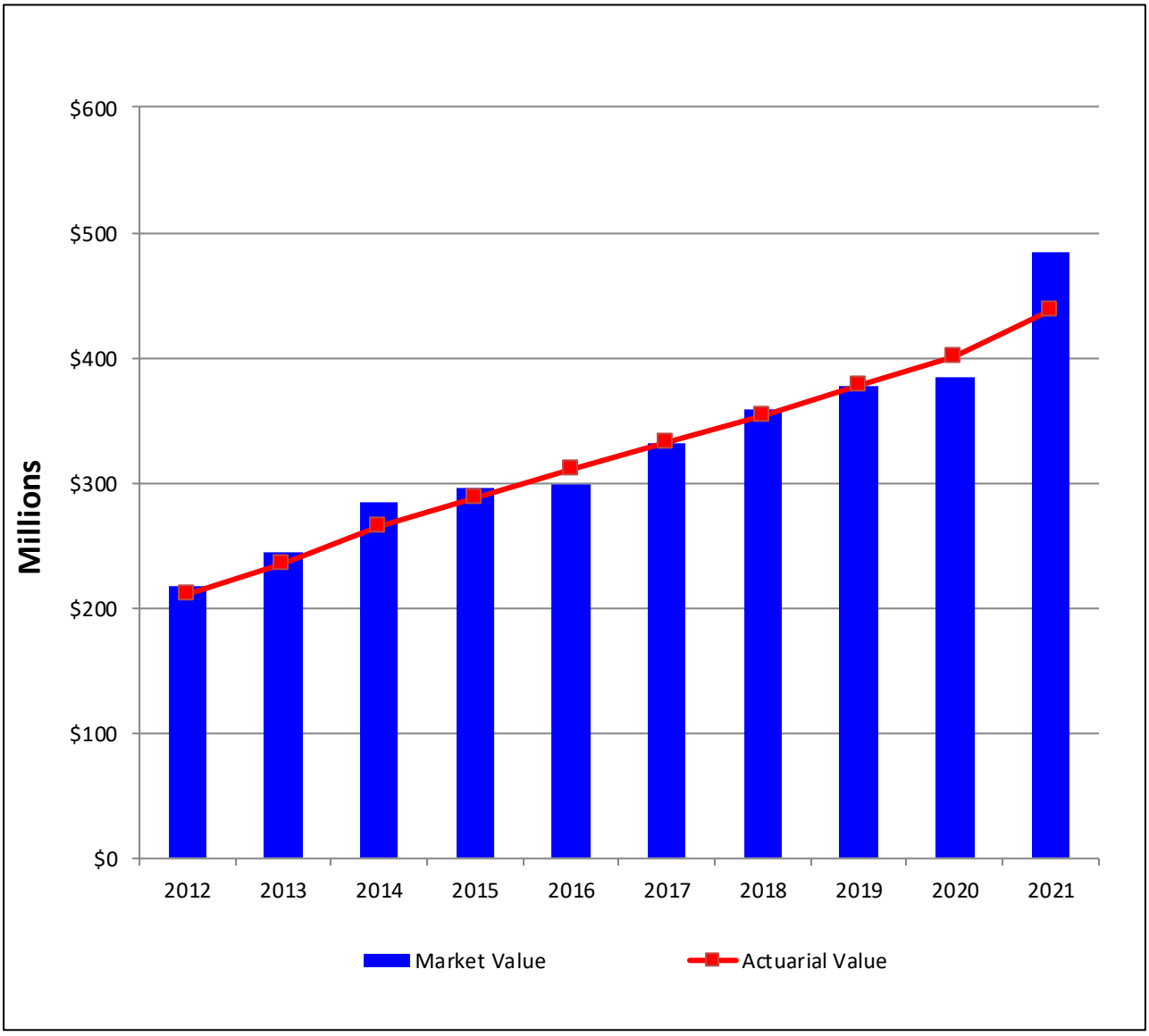
Valuation Date June 30:	2020	2021	2022	2023	2024
A. Actuarial Value Beginning of Year	$ 377,386,901	$ 400,719,971			
B. Market Value End of Year	384,294,754	484,711,071			
C. Market Value of Beginning of Year	377,222,848	384,294,754			
D. Cash Flow					
D1. Contributions	20,289,796	21,581,395			
D2. Benefit Payments	(23,112,153)	(26,223,481)			
D3. Administrative Expenses	(294,988)	(1,048,685)			
D4. Investment Expenses	(2,053,440)	(2,726,578)			
D5. Net	$ (5,170,785)	$ (8,417,349)			
E. Investment Income					
E1. Market Total: B. - C. - D5.	$ 12,242,691	$ 108,833,666			
E2. Assumed Rate	7.65%	7.65%			
E3. Amount for Immediate Recognition C.*E2. + ((D1.+D2.+D3.)*E2.*0.5) - D4.	30,791,749	31,907,455			
E4. Amount for Phased-in Recognition E1. - E3.	(18,549,058)	76,926,211			
F. Phased-In Recognition of Investment Income					
F1. Current Year: 0.25 * E4.	$ (4,637,265)	$ 19,231,553	$ -	$ -	$ -
F2. First Prior Year	(1,744,837)	(4,637,265)	19,231,553	-	-
F3. Second Prior Year	976,251	(1,744,837)	(4,637,265)	19,231,553	-
F4. Third Prior Year	3,117,957	976,251	(1,744,837)	(4,637,265)	19,231,552
F5. Total Recognized Investment Gain	$ (2,287,894)	$ 13,825,702	$ 12,849,451	$ 14,594,288	$ 19,231,552
G. Actuarial Value End of Year A. + D5. + E3. + F5.	$ 400,719,971	$ 438,035,779			

Table 4:
Historical Investment Returns*

Fiscal Year Ending	Market Returns	Actuarial Returns	Assumed Return	Actuarial Return Over Assumption
June 30, 2012	2.32%	3.82%	7.75%	(3.93)%
June 30, 2013	12.88%	11.57%	7.75%	3.82%
June 30, 2014	17.08%	12.96%	7.75%	5.21%
June 30, 2015	4.60%	9.60%	7.75%	1.85%
June 30, 2016	2.06%	8.66%	7.75%	0.91%
June 30, 2017	11.95%	8.23%	7.75%	0.48%
June 30, 2018	8.83%	6.92%	7.65%	(0.73)%
June 30, 2019	5.70%	7.24%	7.65%	(0.41)%
June 30, 2020	2.71%	7.04%	7.65%	(0.61)%
June 30, 2021	27.82%	10.81%	7.65%	3.16%
10 Year Average	9.33%	8.66%		0.94%

* Returns reflect all investment returns, including investment income and realized and unrealized investment gains and losses, and are net of investment expenses and administrative expenses paid by the System.

Table 5:
Market Value of Assets vs. Actuarial Value of Assets



Actuarial Present Value of Future Benefits

In the previous section, an actuarial valuation was related to an inventory process, and an analysis was given of the inventory of assets of the System as of the valuation date. In this section, the discussion will focus on the commitments of the System, which will be referred to as its actuarial liabilities.

Table 6 contains an analysis of the actuarial present value of all future benefits for active members, for retirees, and for beneficiaries. The analysis is given by type of benefit.

The actuarial liabilities summarized in Table 6 include the actuarial present value of all future benefits expected to be paid with respect to each member covered as of the valuation date. For an active member, this value includes a measure of both benefits already earned and future benefits to be earned. Thus, for all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and, if an optional benefit is chosen, for the lives of their surviving beneficiaries.

The actuarial valuation does not recognize liabilities for employees who become members and participate in the System after the valuation date.

Table 6:
Actuarial Present Value of Future Benefits for Actives, Retirees, and Beneficiaries

	June 30, 2021 Total	June 30, 2020 Total
A. Active Members Liability Due to Probability of		
Retirement	$ 236,910,179	$ 228,793,091
Disability	11,952,316	11,665,097
In-Service Death	7,374,245	7,270,764
Termination	29,426,994	29,105,809
Total	$ 285,663,734	$ 276,834,761
B. Inactive Members and Annuitants		
Service Retirement	$ 273,157,268	$ 255,682,433
Disability Retirement	29,983,432	27,897,293
Beneficiaries*	19,384,558	17,097,384
Vested Terminated Members	10,710,582	7,678,991
Refund of Member Contributions	5,065,769	4,557,141
Total	$ 338,301,609	$ 312,913,242
C. Grand Total	$ 623,965,343	$ 589,748,003

* Includes survivors of active and retired members

Employer Contributions

In the previous two sections, attention has been focused on the assets and the present value of all future benefits of the System. A comparison of Tables 3 and 6 indicates that there is a shortfall in current actuarial assets to meet the present value of all future benefits for current members and beneficiaries.

In an active system, there will always be a difference between the assets and the present value of all future benefits. An actuarial valuation sets a schedule of future contributions that will deal with this funding in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. For this valuation, the entry age actuarial cost method has been used. A description of the entry age actuarial cost method is provided in Appendix A. Under this method, or essentially any actuarial cost method, the contributions required to meet the difference between current assets and the present value of all future benefits are allocated each year between three elements:

- A normal cost amount, which ideally is relatively stable as a percentage of salary over the years;
- A load for administrative expenses; and
- An amount which is used to amortize the UAAL.

The two items described above, normal cost and UAAL, are the keys to understanding the actuarial cost method. Let us first discuss the normal cost.

The normal cost is the theoretical contribution rate, which will meet the ongoing costs of a group of average new employees. Suppose that a group of new employees were covered under a separate fund from which all benefits and to which all contributions and associated investment return were to be paid. Under the entry age actuarial cost method, the normal cost contribution rate is that level percentage of pay which would be exactly right to maintain this fund on a stable basis. If experience were to follow the actuarial assumptions exactly, the fund would be completely liquidated with the last payment to the last survivor of the group.

The assumed investment rate of return is 7.65%, net of investment expenses only. As a result, the actuarially determined contribution must include an amount for administrative expenses expected to occur during the year.

We have determined the normal cost rates separately by type of benefit under the System. These are summarized in Table 7. In Table 7 we also provide a summary of the member and employer statutory contributions.

The term "fully funded" is often applied to a system where contributions for everyone at the normal cost rate will fully pay for the benefits of existing as well as new employees. Often, systems are not fully funded, either because of benefit improvements in the past that have not been completely paid for or actuarial deficiencies that have occurred because experience has not been as anticipated. Under these circumstances, a UAAL exists.

Table 8 shows how the UAAL was derived for the System. Lines A and B show, respectively, the total present value of future benefits and the portion of the future liability that is expected to be paid from future normal cost contributions, both employer and employee. The future normal cost contributions are the portion of the present value of future benefits that are attributed to future years of service that have not been earned yet by the active membership. Line C shows the actuarial accrued liability. Line D shows the amount of assets available for benefits. Line E shows the UAAL.

The UAAL at any date after establishment of a system is affected by any actuarial gains or losses arising when the actual experience of the system varies from the experience anticipated by the actuarial assumptions used in the valuations. To the extent actual experience as it develops differs from the assumptions used, so also will the actual emerging costs differ from the estimated costs. The impact of these differences in actual experience from the assumptions is included in Section 1, the Summary of Results.

Table 7:
Normal Cost Contribution Rates
As Percentages of Salary

	June 30, 2021 Total	June 30, 2020 Total
Service retirement	9.610%	9.600%
Disability retirement	1.310%	1.310%
In Service Death	0.440%	0.440%
Termination	4.230%	4.420%
Total Normal Rate	15.590%	15.770%
Employee Normal Rate	10.495%	10.495%
Employer Normal Rate	5.095%	5.275%
Administrative Expense Load	0.170%	0.170%
Rate Available to Amortize Unfunded Actuarial Accrued Liability	7.850%	7.670%
Statutory Funding Rate	23.610%	23.610%

Note: The normal cost rate for members hired on or after July 1, 2011 is 15.00%.

Table 8:
Unfunded Actuarial Accrued Liability

	June 30, 2021	June 30, 2020
A. Actuarial present value of all future benefits for active members, retirees and beneficiaries (Table 6)	$ 623,965,343	$ 589,748,003
B. Less actuarial present value of total future normal costs for present members	$ 98,726,520	$ 96,506,235
C. Actuarial accrued liability	$ 525,238,823	$ 493,241,768
D. Less assets available for benefits	$ 438,035,779	$ 400,719,971
E. Unfunded actuarial accrued liability	$ 87,203,044	$ 92,521,797

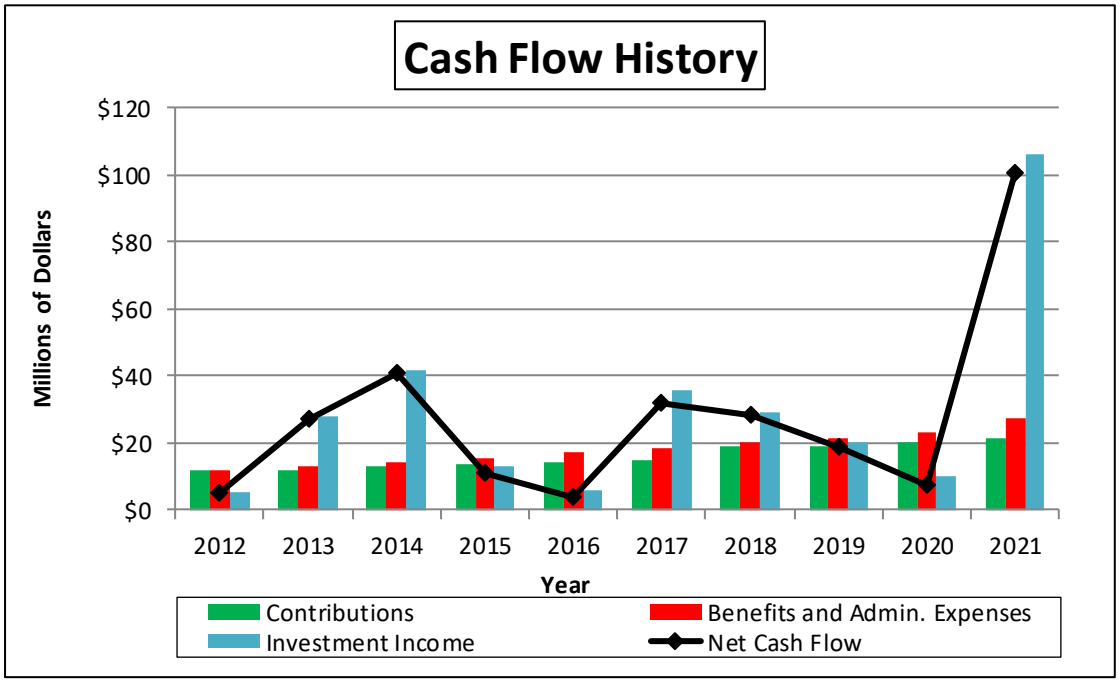
Cash Flows

The fundamental equation for funding a retirement system is that benefits and administrative expenses must be provided for by contributions (past and future) and investment income. When a retirement system matures, benefits and administrative expenses often exceed contributions. In this case we say the system has a "negative cash flow." Mature systems are characterized by negative cash flows and large pools of assets. This is natural. Actuarial funding is designed to accumulate large pools of assets which will in turn provide investment income and finance negative cash flows when systems mature. If the fund is looked at as a whole, investment income is usually larger than the difference between contributions and benefit payments. The retirement system's investment strategy should maximize potential returns at a prudent level of risk while providing for needed cash flows.

Table 9 shows the System had a positive cash flow for the year ended June 30, 2021. The System's total cash flow including benefit payments, administrative expenses and investment earnings was $100.3 million. Of the $100.3 million, $106.0 million was due to investment returns.

As long as the System had a positive cash flow, there was no need to plan where the funds would come from to pay benefits since benefits could be paid by incoming contributions. A negative cash flow, as defined above, requires planning what funds will be used to pay the difference between benefits and contributions.

Table 9:
Cash Flow History
(Dollar amounts in millions)



	Historical Cash Flows			
Year Ended June 30	Contributions	Benefits & Administrative Expenses	Investment Income	Net Cash Flow
2012	$ 11.7	$ 11.9	$ 5.1	$ 5.0
2013	12.1	13.1	28.2	27.2
2014	13.1	14.1	41.8	40.8
2015	13.5	15.5	13.0	11.0
2016	14.3	16.9	6.1	3.5
2017	14.8	18.5	35.5	31.8
2018	18.8	20.0	29.2	28.0
2019	19.2	21.2	20.4	18.4
2020	20.3	23.4	10.2	7.1
2021	21.6	27.3	106.0	100.3

Actuarial Gains or Losses

An analysis of actuarial gains or losses is performed in conjunction with all regularly scheduled valuations.

The developments of the gains or losses related to the actuarial liability and the assets are shown in Table 10. The results of our analysis of the financial experience of the System in the three most recent regular actuarial valuations are presented in Table 11. Each gain or loss shown represents our estimate of how much the given type of experience caused the Unfunded Actuarial Accrued Liability or Funding Reserve to change in the period since the previous actuarial valuation.

Gains and losses shown due to demographic sources are approximate. Demographic experience is analyzed in greater detail in our periodic experience studies.

Non-recurring gains and losses result from changes in the actuarial assumptions and benefit improvements.

Table 10:
Analysis of Actuarial (Gains) or Losses*

A. ACTUARIAL ACCRUED ACTUARIAL LIABILITY (GAIN) / LOSS ANALYSIS	
1. Actual Actuarial Actuarial Liability as of June 30, 2020:	$ 493,241,768
2. Normal Cost for this Plan Year (Including Expenses):	13,327,015
3. Interest on items 1 and 2 [(1+2) x 7.65%]:	38,752,512
4. Benefit Payments for this Plan Year (Including Expenses):	(27,272,166)
5. Interest on item [4 x 7.65% x .5]:	(1,043,160)
6. Expected Actuarial Accrued Liability as of June 30, 2021:	$ 517,005,969
7 Changes due to:	
a. Assumption Changes:	-
b. Plan Amendments:	-
c. Funding Method:	-
d. Actuarial (Gain) / Loss:	$ 8,232,854
8. Actual Actuarial Accrued Liability as of June 30, 2021:	$ 525,238,823
9. Items Affecting Calculation of Unfunded Accrued Actuarial Liability:	
a. Benefit provisions reflected in the unfunded accrued liability (see Appendix C)	
b. Actuarial assumptions and methods used to determine actuarial accrued liability (see Appendix B)	
B. ASSET (GAIN) / LOSS ANALYSIS	
1. Actuarial Value of Assets as of June 30, 2020:	$ 400,719,971
2. Interest on item [1 x 7.65%]:	30,655,078
3. Contributions for this Plan Year:	21,581,395
4. Interest on item [3. x 7.65% x .5]:	825,488
5. Benefit Payments for this Plan Year (Including Expenses):	(27,272,166)
6. Interest on item [5. x 7.65% x .5]:	(1,043,160)
7. Expected Actuarial Value of Assets as of June 30, 2021:	$ 425,466,606
8. Actuarial Value of Assets as of June 30, 2021:	438,035,779
9. (Gain) / Loss	$ (12,569,173)
C. UNFUNDED ACCRUED LIABILITY (GAIN) / LOSS ANALYSIS	
1. Actual Unfunded Actuarial Accrued Liability as of June 30, 2020:	$ 92,521,797
2. Normal Cost for this Plan Year (Including Expenses):	13,327,015
3. Contributions for this Plan Year:	(21,581,395)
4. Interest	7,271,946
5. Expected Unfunded Actuarial Accrued Liability as of June 30, 2021:	$ 91,539,363
6. Changes due to:	
a. Assumption Changes:	-
b. Plan Amendments:	-
c. Funding Method:	-
d. Actuarial (Gain) / Loss:	$ (4,336,319)
7. Actual Actuarial Accrued Liability as of June 30, 2021:	$ 87,203,044

* Effects related to gains are shown in parentheses. Numerical results are expressed as a (decrease) increase in the Actuarial Accrued Liability (AAL). Gains decrease the AAL and losses increase the AAL.

Table 11:
Historical Actuarial (Gains) or Losses*
(Dollar amounts in thousands)

	UAAL (Gain)/Loss		
	June 30, 2021	June 30, 2020	June 30, 2019
Investment Income Investment income was (greater) less than expected based on actuarial value of assets.	$ (12,569.2)	$ 2,300.4	$ 1,458.6
Pay Increases Pay increases were (less) greater than expected.	$ 2,777.9	$ 2,415.2	$ 139.8
Age & Service Retirements Members retired at (older) younger ages or with (less) greater final average pay than expected	$ 2,308.4	$ 2,298.2	$ 4,117.7
Disability Retirements Disability claims were (less) greater than expected	$ 663.6	$ 397.6	$ 319.0
Death-in-Service Benefits Survivor claims were (less) greater than expected	$ 43.5	$ 498.5	$ (91.1)
Withdrawal From Employment (More) less reserves were released by withdrawals than expected	$ (726.7)	$ 1,140.2	$ (354.9)
Death After Retirement Retirees (died younger) lived longer than expected	$ 1,681.3	$ 289.9	$ (2,442.0)
Data Adjustments and Benefit Payment Timing Service purchases, data corrections, etc.	$ 1,525.0	$ (403.6)	$ 408.6
Other Miscellaneous (gains) and losses	$ (40.1)	$ (11.2)	$ 17.1
Total (Gain) or Loss During Period From Financial Experience	$ (4,336.3)	$ 8,925.2	$ 3,572.8
Non-Recurring Items.			
Changes in actuarial assumptions and methods	$ -	$ -	$ -
Changes in benefits caused a (gain) loss	$ -	$ -	$ -
Composite (Gain) Loss During Period	$ (4,336.3)	$ 8,925.2	$ 3,572.8

A typical retirement plan faces many different risks, but the greatest risk is the inability to make benefit payments when due. If plan assets are depleted, benefits may not be paid which could create legal and litigation risk or the plan could become "pay as you go". The term "risk" is most commonly associated with an outcome with undesirable results. However, in the actuarial world, risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions and that uncertainty, whether favorable or unfavorable, creates risk. ASOP 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different than the actuarial assumptions.

The various risk factors for a given plan can have a significant impact – positive or negative – on the actuarial projection of liability and contribution rates.

There are a number of risks inherent in the funding of a defined benefit plan. These include:

- economic risks, such as investment return and price inflation;
- demographic risks such as mortality, payroll growth, aging population including impact of baby boomers, and retirement ages;
- contribution risk, i.e., the potential for contribution rates to be too high for the plan sponsor/employer to pay and
- external risks such as the regulatory and political environment.

There is a direct correlation between healthy, well-funded retirement plans and contributions sufficient to provide promised benefits. The System is primarily funded by member and employer contributions to the trust fund, together with the earnings on these accumulated contributions. These contributions fund benefit accruals for current active members and administrative expenses. The remainder of the contributions amortizes the unfunded actuarial accrued liability. The contribution rates are set by statute and intended to provide the needed amounts to fund the system over time. The purpose of the valuation is to determine if the fixed contributions are sufficient to fund the Plan. Due to the fixed nature of the contributions actuarial gains and losses are reflected in the amortization period. Generally, the largest source of actuarial gains and losses are caused by investment volatility. In addition, the unfunded liability is amortized as a level percentage of pay assuming payroll will grow by 3.50% per year. A key risk factor to the System's funding is that over time, the Statutory Contribution Rates will be insufficient to accumulate enough funds, with investment income, to fund the promised benefits. The funding insufficiency can be caused by amortization periods that are too long or by payroll not growing at the assumed rate.

The other significant risk factor for the System is investment return because of the volatility of returns and the size of plan assets compared to payroll. This is to be expected, given the underlying capital market assumptions and the System's asset allocation. To the extent market rates of interest affect the expected return on assets, there is a risk of change to the discount rate which determines the present value of liabilities and actuarial valuation results. Please see the summary of results of this report which demonstrates the sensitivity of valuation results to differing discount rates.

A key demographic risk for the Retirement System is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions reflect a margin for improvement in mortality experience these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities. Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, which would also be significant, although more easily absorbed. While either of these events could happen, it represents a small probability and thus represents much less risk than the volatility associated with investment returns.

The exhibits on the following pages summarize some historical information that helps indicate how certain key risk metrics have changed over time. Many are due to the maturing of the retirement system.

Historical Asset Volatility Ratios
(in 1,000's)

As a retirement system matures, the size of the market value of assets increases relative to the covered payroll of active members, on which the System is funded. The size of the plan assets relative to covered payroll, sometimes referred to as the asset volatility ratio, is an important indicator of the contribution risk for the System. The higher this ratio, the more sensitive a plan's contribution rate is to investment return volatility. In other words, it will be harder to recover from investment losses with increased contributions.

Actuarial Valuation Date	Market Value of Assets	Estimated Plan Year Payroll	Asset Volatility Ratio
6/30/2015	295,695	67,881	4.36
6/30/2016	299,152	70,593	4.24
6/30/2017	330,910	74,581	4.44
6/30/2018	358,880	77,587	4.63
6/30/2019	377,223	80,461	4.69
6/30/2020	384,295	84,943	4.52
6/30/2021	484,711	90,869	5.33

The assets at June 30, 2021 are 533% of payroll, so underperforming the investment return assumption by 1.00% (i.e., earn 6.65% for one year) is equivalent to 5.33% of payroll. While the actual impact in the first year is mitigated by the asset smoothing method and amortization of the UAAL, this illustrates the risk associated with volatile investment returns.

Historical Cash Flows
(in 1,000's)

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments and administrative expenses. If the System has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of MVA that may cause significant concerns. The System has negative cash flows which ranged from 0.34% to 1.17% for the prior seven years, so it should be closely monitored.

Year End	Market Value of Assets (MVA)	Contributions	Benefit Payments	Net Cash Flow	Net Cash Flow as a Percent of MVA
6/30/2015	295,695	13,526	15,528	(2,003)	(0.68%)
6/30/2016	299,152	14,299	16,903	(2,604)	(0.87%)
6/30/2017	330,910	14,751	18,503	(3,753)	(1.13%)
6/30/2018	358,880	18,835	20,039	(1,204)	(0.34%)
6/30/2019	377,223	19,188	21,242	(2,054)	(0.54%)
6/30/2020	384,295	20,290	23,407	(3,117)	(0.81%)
6/30/2021	484,711	21,581	27,272	(5,691)	(1.17%)

Liability Maturity Measurement

Most public sector retirement systems have been in operation for many years. As a result, they have aging plan populations, and in some cases declining active populations, resulting in an increasing ratio of retirees to active members and a growing percentage of retiree liability. The retirement of the remaining baby boomers over the next decade is expected to further exacerbate the aging of the retirement system population. Retiree liability as a percentage of the total actuarial accrued liability has been growing over the last seven years. As more of the total liability begins to reside with retirees, investment volatility has a greater impact on the funding of the system since it is more difficult to restore the system financially after losses occur when there is comparatively less payroll over which to spread costs. Below are two tables which demonstrate the ratio of the System's retiree liability compared to the total accrued liability and the ratio of the number of retirees and beneficiaries to the number of active members.

Year End	Retiree Liability (a)	Total Actuarial Accrued Liability (b)	Retiree Percentage (a) / (b)
6/30/2015	200,213,973	348,912,406	57.4%
6/30/2016	220,932,031	373,146,158	59.2%
6/30/2017	248,802,189	411,386,604	60.5%
6/30/2018	266,307,582	436,715,156	61.0%
6/30/2019	290,686,246	462,697,753	62.8%
6/30/2020	312,913,242	493,241,768	63.4%
6/30/2021	338,301,609	525,238,823	64.4%

Historical Member Statistics

Valuation Date June 30,	Number of Active	Number of Retired	Active/ Retired
2015	1,336	577	2.32
2016	1,364	620	2.20
2017	1,415	648	2.18
2018	1,429	681	2.10
2019	1,454	726	2.00
2020	1,502	763	1.97
2021	1,495	805	1.86

The assumptions and methods utilized in the valuation were developed in the six-year experience study for the period ending June 30, 2016.

Tables B-1 through B-7 give rates of decrement for service retirement, disablement, mortality, and other terminations of employment.

Actuarial Cost Method

The actuarial valuation was prepared using the entry age actuarial cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit. The portion of this actuarial present value allocated to a valuation year is called the normal cost. The normal cost was first calculated for each individual member. The normal cost rate is defined to equal the total of the individual normal costs, divided by the total pay rate.

The portion of this actuarial present value not provided for at a valuation date by the sum of (a) the actuarial value of the assets and (b) the actuarial present value of future normal costs is called the UAAL. The UAAL is amortized as a level percentage of the projected salaries of present and future members of the System.

Records and Data

The data used in the valuation consist of financial information; records of age, sex, service, salary, contribution rates, and account balances of contributing members; and records of age, sex, and amount of benefit for retired members and beneficiaries. All of the data was supplied by the System and has been accepted for valuation purposes without audit.

Replacement of Terminated Members

The ages at entry and distribution by sex of future members are assumed to average the same as those of the present members they replace. If the number of active members should increase, it is further assumed that the average entry age of the larger group will be the same, from an actuarial standpoint, as that of the present group. Under these assumptions, the normal cost rates for active members will not vary with the termination of present members.

Administrative and Investment Expenses

The investment expenses of the System are assumed to be funded by investment earnings in excess of 7.65% per year.

Administrative expenses are assumed to equal 0.17% of payroll.

Valuation of Assets

The actuarial asset valuation method spreads asset gains and losses over four years. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of four years.

Investment Earnings

The annual rate of investment earnings of the assets of the System is assumed to be 7.65% per year net of investment expenses, compounded annually.

Interest on Member Contributions

Interest on member contributions is assumed to accrue at a rate of 2.75% per annum, compounded annually.

Future Salaries

The rates of annual salary increase assumed for the purpose of the valuation are illustrated in Table B-2. In addition to increases in salary due to merit and longevity, this scale includes an assumed 3.50% annual rate of increase in the general wage level of the membership.

Service Retirement

Table B-3 shows the annual assumed rates of retirement for actives members meeting the service retirement eligibilities.

Disablement

The rates of disablement used in this valuation are illustrated in Table B-4.

Mortality

The mortality rates used in this valuation are illustrated in Table B-5. A written description of each table used is included in Table B-1.

Other Terminations of Employment

The rates of assumed future withdrawal from active service for reasons other than death, disability or retirement are shown for representative ages in Table B-6.

Benefits for Terminating Members

Members terminating with less than five years of service are assumed to request an immediate withdrawal of their contributions with interest. Table B-7 shows the assumed probability of retaining membership in the System among members terminating with five or more years of service.

We estimated the present value of future benefits for terminated vested members based on the greater of the present value of their deferred benefit at age 60 or their available contribution account.

Probability of Marriage & Dependent Children

If death occurs in active status, all members are assumed to have an eligible surviving spouse with no dependent children. Female spouses are assumed to be three years younger than males.

Records with no Birth Date

New records with no birth date are assumed to be 37 years old. Records that are not new and have no birth date used the same birth date as the prior year's valuation.

Active Records with a Salary Less than $1,000

These members are included in the active headcounts, however the pay of these members is not included in the Valuation Projected Salaries summarized in Appendix D. The liability for these members is their accumulated member contributions payable on the valuation date.

Table B-1

Summary of Valuation Assumptions

I.	Economic assumptions	
	A. General wage increases	3.50%
	B. Investment return	7.65%
	C. Price inflation assumption	2.75%
	D. Growth in membership	0.00%
	E. Interest on member accounts	2.75%
	F. Administrative Expenses as a percentage of payroll	0.17%
II.	Demographic assumptions	
	A. Individual salary increase due to promotion and longevity	Table B-2
	B. Retirement	Table B-3
	C. Disablement	Table B-4
	D. Mortality among contributing members, service retired members, and beneficiaries. The tables include margins for mortality improvement which is expected to occur in the future. For Males and Females: RP 2000 Combined Employee and Annuitant Mortality Table projected to 2020 using Scale BB, set back one year for males.	Table B-5
	E. Mortality among disabled members For Males and Females: RP 2000 Combined Mortality Table.	Table B-5
	F. Other terminations of employment	Table B-6
	G. Probability of retaining membership in the System upon vested termination	Table B-7

Table B-2

Future Salaries

Years of Service	(a) Individual Merit & Longevity	(b) General Wage Increase	(1+(a))*(1+(b)) Total Salary Increase
1	6.30%	3.50%	10.02%
2	4.70	3.50	8.36
3	3.50	3.50	7.12
4	2.70	3.50	6.29
5	2.00	3.50	5.57
6	1.40	3.50	4.95
7	0.90	3.50	4.43
8	0.50	3.50	4.02
9	0.20	3.50	3.71
10 & Up	0.00	3.50	3.50

Table B-3

Retirement
Annual Rates

Age	20 or More Years of Service
Less than 50	10.0%
50	10.0%
51	10.0
52	10.0
53	10.0
54	10.0
55	15.0
56	15.0
57	15.0
58	15.0
59	15.0
60	20.0
61	20.0
62	20.0
63	20.0
64	20.0
65 & Over	100.0

Vested terminations are assumed to retire at their earliest unreduced eligibility.

Table B-4

Disablement
Annual Rates

Age	All Members
22	.00%
27	.10
32	.10
37	.10
42	.40
47	.40
52	.40
57	.40
62	.00

75% of disabilities are assumed to be duty-related. All disabilities are assumed to be permanent and without recovery.

Table B-5

Mortality
Annual Rates

	Contributing Members, Service Retired Members and Beneficiaries		Disabled Members	
Age	Men	Women	Men	Women
25	0.0354%	0.0195%	0.0376%	0.0207%
30	0.0388	0.0249	0.0444	0.0264
35	0.0661	0.0447	0.0773	0.0475
40	0.0961	0.0665	0.1079	0.0706
45	0.1316	0.1058	0.1508	0.1124
50	0.1879	0.1578	0.2138	0.1676
55	0.3010	0.2458	0.3624	0.2717
60	0.5271	0.4135	0.6747	0.5055
65	0.9041	0.7624	1.2737	0.9706
70	1.4636	1.3151	2.2206	1.6742
75	2.5057	2.2077	3.7834	2.8106
80	4.2816	3.6037	6.4368	4.5879
85	7.3750	6.0833	11.0757	7.7446
90	13.0721	10.5549	18.3408	13.1682
95	21.7835	17.2452	26.7491	19.4509

10% of all member deaths are assumed to be duty-related.

Table B-6

Other Terminations of Employment
Among Members Not Eligible to Retire
Annual Rates

Years of Service	All Members
0	25.0%
1	17.0
2	15.0
3	13.0
4	11.0
5	9.0
6	9.0
7	9.0
8	5.0
9	5.0
10	5.0
11	4.0
12	4.0
13	4.0
14	4.0
15 & Over	3.0

Table B-7

Probability of Retaining Membership in the System Upon Vested Termination

Age	Probability of Retaining Membership
Under 35	30%
35	40
36	40
37	40
38	40
39	40
40	50
41	50
42	50
43	50
44	50
45	60
46	60
47	60
48	60
49	60
50 & Over	100

Family Composition
Female spouses are assumed to be three years younger than males. 100% of non-retired employees are assumed married for both male and female employees. Actual marital characteristics are used for pensioners.

Vested Benefits for Termination Members
Vested benefits for members who terminated during years ending June 30, 2009 and later were estimated based upon compensation and service information in the census data. For members who terminated prior to June 30, 2008, vested benefits valued were the same as had been calculated by the prior actuary for the June 30, 2008 actuarial valuation.

Service credit	• Service credit is used to determine the amount of a member's retirement benefit. • One month of service credit is earned for each month where the member is paid for 160 hours. This includes certain transferred and purchased service.
Membership service	• Membership service is used to determine eligibility for vesting, retirement or other benefits. • One month of membership service is earned for any month member contributions are made, regardless of the number of hours worked. • Eligible members in all systems may purchase service that counts toward membership service. • Additionally, eligible active and inactive Sheriffs' Retirement System (SRS) members may purchase 1 for 5 (additional) service that will count as membership service.
Contributions	• Member contributions are made through an "employer pick-up" arrangement which results in deferral of taxes on the contributions.
Compensation	• Compensation generally means all remuneration paid, excluding certain allowances, benefits, and lump sum payments. Compensation is specifically defined in law and differs amongst the systems. • Bonuses paid **on or after** July 1, 2013 to any member will not be treated as compensation for retirement purposes. No member or employer contributions will be paid on bonuses.
Withdrawal of employee contributions	• A member is eligible for a withdrawal of their contributions when they terminate service and are either not eligible for or have not taken a retirement benefit. • The member receives the accumulated member contributions, which consists of member contributions and regular interest. • Upon receipt of a refund of accumulated contributions a member's vested right to a monthly benefit is forfeited.
Member contributions interest credited (regular interest)	• Interest is credited to member accounts at the rates determined by the Board. • The current interest rate credited to member accounts is 0.55%.

Working Retiree Limitations

Applies to retirement system members who return **on or after** July 1, 2017 to covered employment in the system from which they retired. These limits already applied to SRS members before July 1, 2017.

- Members who return for **less than 480 hours** in a **calendar** year:
  - may not become an active member in the system; and
  - are subject to a $1 reduction in their retirement benefit for each $3 earned in excess of $5,000 in the calendar year.
- Members who return for **480 or more hours** in a **calendar** year;
  - must become an active member of the system;
  - will stop receiving a retirement benefit from the system; **and**
  - will be eligible for a second retirement benefit if they earn 5 or more years of service credit through their second employment.
- Employee, employer and state contributions apply as follows:
  - Employer contributions and state contributions (if any) must be paid on all working retirees;
  - Employee contributions must be paid on working retirees who return to covered employment for 480 or more hours in a calendar year.

NOTE: PERS has its own limits.

Second Retirement Benefit

Applies to retirement system members who return on or after July 1, 2017 to active service covered by the system from which they retired.

- If the member works more than 480 hours in a calendar year and accumulates less than 5 years of service credit before terminating again, the member:
  - is not awarded service credit for the period of reemployment;
  - is refunded the accumulated contributions associated with the period of reemployment;
  - starting the first month following termination of service, receives the same retirement benefit previously paid to the member; and
  - does not accrue post-retirement benefit adjustments during the term of reemployment but receives a GABA in January immediately following second retirement.

Second Retirement Benefit (continued)

- If the member works more than 480 hours in a calendar year and accumulates at least 5 years of service credit before terminating again, the member:
  - is awarded service credit for the period of reemployment;
  - starting the first month following termination of service, receives:
    * the same retirement benefit previously paid to the member; **and**
    * a second retirement benefit for the period of reemployment calculated based on the laws in effect as of the member's rehire date; **and**
  - does not accrue post-retirement benefit adjustments during the term of reemployment but receives a GABA:
    * on the initial retirement benefit in January immediately following second retirement; **and**
    * on the second retirement benefit starting in January after receiving that benefit for at least 12 months.
- A member who returns to covered service is **not** eligible for a disability benefit.

Refunds

- Terminating members eligible to retire may, in lieu of receiving a monthly retirement benefit, refund their accumulated contributions in a lump sum.
- Terminating members with accumulated contributions between $200 and $1,000 who wish to rollover their refund must do so within 90 days of termination of service.
- Trusts, estates, and charitable organizations listed as beneficiaries are entitled to receive only a lump sum payment.

Lump-sum payouts

- Effective July 1, 2017, lump sum payouts in all systems are limited to the member's accumulated contributions rather than the present value of the member's benefit.

Type of plan

- Multiple-employer cost sharing

Membership eligibility

- Sheriffs
- Investigators (effective July 1, 1993)
- Detention officers (effective July 1, 2005)

Member contributions

- 10.495% of member's compensation (effective July 1, 2017)

Employer contributions	• 13.115% of each member's compensation (effective July 1, 2017) • Rate increased 0.29% from 9.535% to 9.825% on July 1, 2007, then to 10.115% on July 1, 2009, and then to present rate 13.115% on July 1, 2017. • SRS employee contributions will return to 9.245% and SRS employer contributions will return to 9.535% when reducing the employee contribution and terminating the additional employer contributions will not cause the amortization period to exceed 25 years. • Beginning July 1, 2013, employers of retirees who return to work in a position working less than 480 hours contribute 10.115% of the working retiree's compensation.
Compensation period used in benefit calculation	• HAC = Highest Average Compensation • Hired **prior to** July 1, 2011: HAC is average of the highest 36 consecutive months (or shorter period of total service) of compensation paid to member. • Hired **on or after** July 1, 2011: HAC is average of the highest 60 consecutive months (or shorter period of total service) of compensation paid to member. • Hired **on or after** July 1, 2013: 110% annual cap on compensation considered as part of a member's HAC.
Service retirement eligibility and benefit formula	• 20 years of membership service • 2.5% of HAC x years of service credit
Early retirement eligibility and benefit	• Age 50 with 5 years of membership service • Normal retirement benefit calculated using HAC and service credit at early retirement, and reduced to the actuarial equivalent commencing at the earliest of age 60 or the attainment of 20 years of service credit.
Disability retirement eligibility and benefit formula	**Non-duty-related** disability**:** • Active or inactive vested member • 5 years membership service • The actuarial equivalent of the accrued normal retirement benefit available at time of disability. **Duty-related** disability: • Vested or non-vested active member • Any membership service • **Less than 20 years** of membership service: 50% of HAC, or • **20 years or more** of membership service: 2.5% of HAC x years of service credit

Survivor's eligibility and benefit formula

Duty-related death:

- Vested or non-vested active member
- Lump-sum payment of the member's accumulated contributions; **or**
- A monthly survivor benefit to the designated beneficiary **equal to the greater of**:
  - 50% of HAC; **or**
  - 2.5% of HAC for each year of service credit if over 20 years.

Non-duty-related death:

- Active or Inactive member
- Lump-sum payment of the member's accumulated contributions; **or**
- A monthly survivor benefit equal to 2.5% of HAC for each year of service credit actuarially reduced from age 60 **or** from the date when 20 years of membership service would have been completed, whichever provides the greater benefit.

- A beneficiary may elect to receive the present value of the benefit as a single lump sum.
- For retired members without a contingent annuitant, a payment will be made to the designated beneficiary equal to the accumulated contributions reduced by any retirement benefits already paid.

Vesting eligibility and benefit

- 5 years of membership service
- Accrued normal retirement benefit, payable when eligible for retirement.
- In lieu of a pension, a member may receive a refund of accumulated contributions.
- Upon receipt of a refund of accumulated contributions, a member's vested right to a monthly benefit is forfeited.

Retirement benefits - Form of payment

Option 1, the normal form of payment is a single life annuity with a refund of any remaining accumulated contributions (account balance) to a designated beneficiary.

Optional Benefits:

- Option 2, a life annuity and joint 100% survivor benefit,
- Option 3, a life annuity and joint 50% survivor benefit, and
- Option 4, a life annuity with a period certain.

If a retiring member selects Option 2 or 3 and the contingent annuitant predeceases or is divorced from the member, the retiree may, with 18 months of the death or divorce, choose to revert to the higher Option 1 benefit available at retirement or the retiree may select a different contingent annuitant and/or a different option.

Post retirement benefit increases	For retired members who have been retired at least 12 months, a Guaranteed Annual Benefit Adjustment (GABA) will be made each year equal to: • 3% for members hired **before** July 1, 2007, and • 1.5% for members hired **on or after** July 1, 2007
Changes since last valuation	• None

Valuation Data

This chart is presented for informational purposes only. The counts shown in the valuation line were used for preparation of the liabilities disclosed within this report. The counts disclosed for the Annual Financial Report and the Summary of Results (page 1) match the ACFR at the request of the Board. The differences between counts, if any, have no material effect upon the liability calculation.

	Active	Disabled	Retirees and Beneficiaries	Terminated Vested Members	Terminated Non-Vested Members	Total
Participant Counts Used for Valuation	1,495	80	725	176	804	3,280
Disabled Members having attained normal retirement age		(50)	50			
Beneficiaries of Disabled Members						
Beneficiaries with less than one year of certain payments remaining						
Other Adjustments				2	1	3
Participant Counts shown in the Annual Financial Report	1,495	30	775	178	805	3,283

Valuation Data

This valuation is based upon the membership of the System as of June 30, 2021. Membership data was supplied by the System and has been accepted for valuation purposes without audit. However, tests were performed to ensure that the data is sufficiently accurate for valuation purposes.

The salaries used in the tables and charts which follow are different than the salaries used for the Board Summary on page 1. The valuation projected salaries to be paid for the following fiscal year, whereas the Board Summary, salaries are applicable in the year ending on the valuation date.

Active Members	Number	Valuation Projected Salaries
Full-Time Members	1,368	$ 87,622,934
Part-Time Members	127	$ 2,332,800
Total Active Members	1,495	$ 89,955,734

Table D-1 contains summaries of the data for contributing members. For full-time members, values shown in the tables are the numbers of members and their total and average annual salaries. For part-time members, only the numbers of members are shown.

Table D-2 presents distributions of the following:

- Members receiving service retirement benefits.
- Members receiving disability retirement benefits.
- Survivors of deceased retired members receiving benefits.
- Survivors of deceased active members.
- Terminated vested members.

Table D-3 is a reconciliation of membership data from June 30, 2020 to June 30, 2021.

The following is a summary of retired members and beneficiaries currently receiving benefits. The chart reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 47 for an explanation of the number of annuitants used for valuation purposes.

Type of Annuitant	Number	Annual Benefits	Average Annual Benefits
Service Retirement	654	$ 20,068,391	$ 30,686
Survivors of Deceased Retired Members	48	996,001	20,750
Survivors of Deceased Active Members	23	623,928	27,127
Total Retirees and Beneficiaries	725	$ 21,688,320	$ 29,915
Disability Retirement	80	2,156,119	26,951
Total Annuitants	805	$ 23,844,439	$ 29,620

Terminated Members with Contributions Not Withdrawn	Number
Vested Terminated Members	176
Non-Vested Terminated Members	804
Total Terminated Members	980

Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2021

Number of Employees

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	51	35	28	10	2								126
25 to 29	29	47	47	52	40								215
30 to 34	18	30	22	47	72	19							208
35 to 39	20	20	14	31	55	44	14						198
40 to 44	12	11	19	15	37	48	40	8					190
45 to 49	9	12	4	11	19	25	41	11	4				136
50 to 54	5	7	6	12	31	20	33	15	3	2			134
55 to 59	2	3	6	7	20	16	20	9	5	2	1		91
60 to 64		2	1	2	13	9	15	5	1	2	1		51
65 to 69			2		4	3	4	1	2				16
70 and up							1	1			1		3
Totals	146	167	149	187	293	184	168	50	15	6	3	-	1,368

Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2021

Annual Salaries in Thousands

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	2,352	1,676	1,505	541	109								6,183
25 to 29	1,426	2,489	2,635	3,175	2,480								12,206
30 to 34	908	1,661	1,197	2,873	4,879	1,279							12,797
35 to 39	1,020	1,131	762	1,917	3,937	3,235	1,143						13,144
40 to 44	604	584	1,103	1,026	2,556	3,365	3,171	687					13,095
45 to 49	517	669	243	671	1,187	1,785	3,248	1,001	369				9,691
50 to 54	284	416	323	647	2,130	1,375	2,603	1,377	260	203			9,618
55 to 59	120	144	336	339	1,238	1,133	1,404	630	506	168	81		6,098
60 to 64		132	58	110	793	591	1,017	378	69	187	63		3,398
65 to 69			126		311	209	260	65	138				1,108
70 and up							63	63			159		285
Totals	7,230	8,902	8,287	11,299	19,621	12,972	12,909	4,200	1,342	558	303	-	87,623

Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2021

Average Annual Salary

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	46,111	47,880	53,734	54,130	54,739								49,070
25 to 29	49,185	52,957	56,063	61,061	62,003								56,770
30 to 34	50,428	55,360	54,402	61,133	67,767	67,333							61,525
35 to 39	50,981	56,568	54,397	61,844	71,586	73,523	81,609						66,386
40 to 44	50,308	53,099	58,045	68,390	69,072	70,098	79,275	85,916					68,922
45 to 49	57,468	55,728	60,852	60,973	62,476	71,400	79,230	90,983	92,357				71,256
50 to 54	56,716	59,424	53,834	53,938	68,720	68,760	78,867	91,774	86,775	101,363			71,773
55 to 59	59,903	48,161	55,948	48,369	61,885	70,795	70,208	70,007	101,141	84,019	81,016		67,011
60 to 64		65,909	58,157	54,789	61,013	65,633	67,831	75,533	68,567	93,727	63,466		66,628
65 to 69			63,001		77,663	69,787	64,923	64,994	68,863				69,277
70 and up							63,314	62,636			158,997		94,983
Totals	49,518	53,306	55,618	60,422	66,964	70,500	76,840	84,002	89,450	93,036	101,160		64,052

Table D-1:
Active Members Distribution of
Part-Time Employees
as of June 30, 2021

Number of Employees

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	16	3	3	1									23
25 to 29	16	1	1	3	1								22
30 to 34	16	1		4	2								23
35 to 39	12		2	1	4	1							20
40 to 44	7												7
45 to 49	4	2				3							9
50 to 54	7			2	1	1		1					12
55 to 59	1	1	1	2	1								6
60 to 64			1	1	2								4
65 to 69					1								1
70 and up													
Totals	79	8	8	14	12	5	-	1					127

Table D-2:
Distribution of Inactive Lives

The charts reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 47 for an explanation of the number of annuitants used for valuation purposes.

Members Receiving Service Retirement Benefits as of June 30, 2021

Age	Number of Persons	Annual Benefits	Average Annual Benefits
<50	34	$ 1,228,779	$ 36,141
50 to 54	63	1,782,059	28,287
55 to 59	79	2,304,330	29,169
60 to 64	127	3,808,270	29,986
65 to 69	147	4,581,709	31,168
70 to 74	122	3,956,992	32,434
75 to 79	49	1,451,412	29,621
80 to 84	28	867,343	30,977
85 to 89	4	71,267	17,817
90 and up	1	16,230	16,230
Totals	654	$ 20,068,391	$ 30,686

Members Receiving Disability Retirement Benefits as of June 30, 2021

Age	Number of Persons	Annual Benefits	Average Annual Benefits
<50	13	$ 416,156	$ 32,012
50 to 54	10	278,523	27,852
55 to 59	13	371,914	28,609
60 to 64	11	291,180	26,471
65 to 69	16	426,446	26,653
70 to 74	11	267,131	24,285
75 to 79	4	65,883	16,471
80 to 84	1	17,912	17,912
85 to 89	1	20,974	20,974
90 and up	-	-	-
Totals	80	$ 2,156,119	$ 26,951

Table D-2:
Distribution of Inactive Lives

The charts reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 47 for an explanation of the number of annuitants used for valuation purposes.

Survivors of Deceased Retired Members as of June 30, 2021

Age	Number of Persons	Annual Benefits	Average Annual Benefits
<50	2	$ 25,233	$ 12,617
50 to 54	1	6,602	6,602
55 to 59	2	55,692	27,846
60 to 64	3	102,169	34,056
65 to 69	8	218,620	27,328
70 to 74	10	230,490	23,049
75 to 79	5	74,199	14,840
80 to 84	10	146,875	14,688
85 to 89	2	63,618	31,809
90 and up	5	72,503	14,501
Totals	48	$ 996,001	$ 20,750

Survivors of Deceased Active Members as of June 30, 2021

Age	Number of Persons	Annual Benefits	Average Annual Benefits
<50	8	$ 157,293	$ 19,662
50 to 54	4	112,630	28,158
55 to 59	2	102,650	51,325
60 to 64	1	21,773	21,773
65 to 69	2	93,645	46,823
70 to 74	3	83,853	27,951
75 to 79	1	26,212	26,212
80 to 84	-	-	-
85 to 89	1	17,147	17,147
90 and up	1	8,725	8,725
Totals	23	$ 623,928	$ 27,127

Table D-2:
Distribution of Inactive Lives

The chart reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 47 for an explanation of the number of annuitants used for valuation purposes.

Terminated Vested Members as of June 30, 2021
Number of Persons

Age	Number
<25	
25 to 29	6
30 to 34	18
35 to 39	44
40 to 44	29
45 to 49	37
50 to 54	22
55 to 59	14
60 to 64	4
65 to 69	2
70 and above	
Total	176

Table D-3:
Data Reconciliation

The following table shows a reconciliation of the participants used in the previous valuation to this valuation. This chart reflects the counts used for valuation purposes as a result of data processing.

	Active Contributing Members	Terminated Vested Members	Service Retired Members	Disabled Members	Survivors and Beneficiaries
June 30, 2020 Valuation	1,502	145	622	77	64
Refunds and Non-Vested Terminations	(171)	(7)			(3)
Vested Terminations	(45)	45			
Service Retirements	(36)	(5)	41		
Disability Retirements	(3)			3	
Deaths	(1)		(9)		
New Entrants	230				10
Rehires	19	(2)			
Other					
June 30, 2021 Valuation	1,495	176	654	80	71

Comparative Schedules

This section contains tables that summarize the experience of the System shown in present and past valuation reports.

Table E-1 shows a summary of the active members covered as of the various valuation dates.

Table E-2 shows a summary of the retired and inactive members as of the various valuation dates.

Table E-3 summarizes the contribution rates determined by each annual actuarial valuation.

Table E-1:
Active Membership Data

Valuation Date June 30,	Actives	Annual Salaries in Thousands	Average Annual Salary	Average Age	Average Years of Service	Average Hire Age
2021	1,495	90,869	60,782	39.3	7.2	32.2
2020	1,502	84,943	56,553	39.4	7.2	32.3
2019	1,454	80,461	55,338	39.6	7.2	32.4
2018	1,429	77,587	54,295	39.8	7.4	32.4
2017	1,415	74,581	52,708	40.0	7.2	33.8
2016	1,364	70,593	51,755	40.1	7.2	32.9
2015	1,336	67,881	50,809	40.3	7.2	33.1
2014	1,307	64,424	49,291			
2013	1,276	60,948	47,765			
2012	1,241	58,281	46,963			

Table E-2:
Members in Receipt of Annuities and Inactive Membership Data

		All Annuitants					Terminated Members	
Valuation Date June 30,	Number	Annual Benefits in Thousands	Average Annual Benefit	Average Current Age	Average Age at Retirement	Average Service at Retirement	Number Vested Terminated	Number Non-Vested Terminated
2021	805	23,844	29,620	64.5	53.8	19.1	178	805
2020	763	21,999	28,832	64.8	53.8	19.2	146	696
2019	726	20,332	28,006	64.9	53.9	19.3	135	633
2018	681	18,521	27,196	64.9	53.0	18.3	129	539
2017	648	17,153	26,471	64.4	52.8	18.5	108	465
2016	620	16,021	25,840	64.9	54.5	18.3	95	394
2015	577	14,432	25,012	64.2	52.6	18.3	81	342
2014	533	13,044	24,473				73	288
2013	503	12,013	23,883				67	235
2012	469	10,850	23,134				60	212

Table E-3:
Contribution Rates

Valuation Date June 30,	Contribution Rates			Normal Cost Rate*	UAAL Rate**
	Employee	Employer	Total		
2021	10.495 %	13.115 %	23.61 %	15.76 %	7.85 %
2020	10.495	13.115	23.61	15.94	7.67
2019	10.495	13.115	23.61	15.96	7.65
2018	10.495	13.115	23.61	16.17	7.44
2017	9.245	13.115	23.61	16.49	7.12
2016	9.245	10.115	19.36	18.08	1.28
2015	9.245	10.115	19.36	18.22	1.14
2014	9.245	10.115	19.36	18.46	0.90
2013	9.245	10.115	19.36	18.52	0.84
2012	9.245	10.115	19.36	18.73	0.63

* Includes administrative expenses starting with the 2014 Valuation Date
** The UAAL rate is the amount available to amortize the UAAL. It is equal to the total contribution rate, minus the normal cost rate.

The information presented in the required supplementary schedules was determined as part of the actuarial valuation as of June 30, 2021. Additional information as of the latest actuarial valuation follows.

Valuation date	June 30, 2021
Actuarial cost method	Entry Age Normal
Amortization method	Open
Remaining amortization period	18 Years
Asset valuation method	Four-year smoothed market
Actuarial assumptions:	
Investment rate of return*	7.65%
General wage growth*	3.50%
Merit salary increases	0.0% - 6.3%
*Includes inflation	2.75%

Gain and Loss in Accrued Liability During Years Ended June 30 Resulting from Differences Between Assumed Experience and Actual Experience						
	Gain or (Loss) for Year Ending June 30, (expressed in thousands)					
Type of Activity	2016	2017	2018	2019	2020	2021
Investment Income on Actuarial Value of Assets	$ 2,603	$ 1,492	$ (2,426)	$ (1,459)	$ (2,300)	$ 12,569
Combined Liability Experience	(1,892)	(2,488)	(2,713)	(2,114)	(6,625)	(8,233)
(Loss)/Gain During Year from Financial Experience	$ 712	$ (996)	$ (5,140)	$ (3,573)	$ (8,925)	$ 4,336
Non-Recurring Items	0	(12,973)	0	0	0	0
Composite Gain or (Loss) During Year	$ 712	$ (13,969)	$ (5,140)	$ (3,573)	$ (8,925)	$ 4,336

Schedule of Funding Progress (expressed in thousands)						
Valuation Date June 30,	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Funded Ratio	Unfunded AAL (UAAL)	Covered Payroll	UAAL as a Percentage of Covered Payroll
2021	$ 438,036	$ 525,239	83%	$ 87,203	$ 90,869	96%
2020	400,720	493,242	81%	92,522	84,943	109%
2019	377,387	462,698	82%	85,311	80,461	106%
2018	353,904	436,715	81%	82,811	77,587	107%
2017	332,169	411,387	81%	79,217	74,581	106%
2016	310,510	373,146	83%	62,636	70,593	89%

Solvency Test Aggregate Accrued Liabilities for (expressed in thousands)							
Valuation Date June 30,	Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member Employer Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Accrued Liability Covered by Reported Assets (1)	(2)	(3)
2021	$ 64,537	$ 322,525	$ 138,177	$ 438,036	100%	100%	37%
2020	62,479	300,677	130,086	400,720	100%	100%	29%
2019	57,884	279,198	125,616	377,387	100%	100%	32%
2018	55,236	254,965	126,515	353,904	100%	100%	35%
2017	51,998	239,648	119,741	332,169	100%	100%	34%
2016	47,826	213,000	112,321	310,510	100%	100%	44%

The following definitions are largely excerpts from a list adopted in 1981 by the major actuarial organizations in the United States. In some cases the definitions have been modified for specific applicability to the Sheriffs' Retirement System. Defined terms are capitalized throughout this Appendix.

Accrued Benefit

The amount of an individual's benefit (whether or not vested) as of a specific date, determined in accordance with the terms of a pension plan and based on compensation and service to that date.

Actuarial Accrued Liability

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of pension plan benefits and expenses which is not provided for by future Normal Costs.

Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement, and retirement; changes in compensation, rates of investment earnings, and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; and other relevant items.

Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.

Actuarial Gains and Losses

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, as determined in accordance with a particular Actuarial Cost Method.

Actuarial Present Value

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.

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 pension plan.

Actuarial Value of Assets

The value of cash, investments and other property belonging to a pension plan, as used by the actuary for the purpose of an Actuarial Valuation.

Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

Amortization Payment

That portion of the pension plan contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Entry Age Actuarial Cost Method

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability.

Market Value of Assets

The fair value of cash, investments and other property belonging to a pension plan that could be acquired by exchanging them on the open market.

Normal Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.

Projected Benefits

Those pension plan benefit amounts which are 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 and past and anticipated future compensation and service credits.

Unaccrued Benefit

The excess of an individual's Projected Benefits over the Accrued Benefits as of a specified date.

Unfunded Actuarial Accrued Liability

The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.