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***NEBRASKA PUBLIC EMPLOYEES
RETIREMENT SYSTEM***

STATE PATROL RETIREMENT SYSTEM

**ACTUARIAL VALUATION REPORT
AS OF JULY 1, 2022**

**Sixty-Seventh Actuarial Report for
System Plan Year Beginning July 1, 2022
and
State Fiscal Year Ending June 30, 2024**





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November 11, 2022

Public Employees Retirement Board
Nebraska Public Employees Retirement System
Post Office Box 94816
Lincoln, NE 68509

Dear Members of the Board:

At your request, we performed an actuarial valuation of the State Patrol Retirement System as of July 1, 2022 for purposes of determining the actuarial required contribution rate for the plan year ending June 30, 2023. It is our understanding that any additional required State contributions for this plan year will be made on July 1, 2023 (State fiscal year end 2024). The major findings of the valuation are contained in this report, which reflects the benefit and funding provisions in place on July 1, 2022. There have been no changes to the actuarial methods or benefit provisions from the prior valuation, but the set of economic assumptions has changed since the last valuation.

At their December 21, 2020 meeting, the Board adopted a plan to phase-in a change in the set of economic assumptions over a four-year period, with the ultimate set of economic assumptions going into effect with the July 1, 2024 valuation. The scheduled economic assumption changes include price inflation, cost-of-living adjustments for Tier 1 members, general wage inflation, covered payroll growth and the investment return assumption. Over the course of this four-year period, two years of which have been completed, the investment return assumption will decrease from 7.50% to 7.00%. The phase-in of the new set of economic assumptions, as well as its impact on the current valuation results, is discussed in further detail in the Executive Summary of this report.

In preparing our report, we relied, without audit, on information (some oral and some in writing) supplied by the System's staff. This information includes, but is not limited to, statutory provisions, member data and financial information. We found this information to be reasonably consistent and comparable with the information received in prior years. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different, and our calculations may need to be revised.

We further certify that all costs, liabilities, rates of interest and other factors for the State Patrol Retirement System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer the best estimate of anticipated experience affecting the System. Nevertheless, the emerging costs will vary from those presented in this report to the extent actual experience differs from that projected by the actuarial assumptions. The Public Employees Retirement Board has the final decision regarding the appropriateness of the assumptions and adopted the set of assumptions indicated in Appendix C.



Public Employees Retirement Board
November 11, 2022
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In order to prepare the results in this report, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results. 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 (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. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements.

Actuarial computations presented in this report are for purposes of determining the funding amounts for the System as specified in the Nebraska state statutes. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes. For example, actuarial computations for purposes of fulfilling financial accounting requirements for the System under Governmental Accounting Standards No. 67 and No. 68 are provided in separate reports.

The consultants who worked on this assignment are pension actuaries. Cavanaugh Macdonald's advice is not intended to be a substitute for qualified legal or accounting counsel.

Based on the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein. We are available to answer any questions on the material contained in the report, or to provide explanations or further details as may be appropriate.

We respectfully submit the following report and look forward to discussing it with you.

Sincerely,

A handwritten signature in blue ink that reads 'Patrice Beckham' in a cursive script.

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink that reads 'Brent A. Banister' in a cursive script.

Brent A. Banister Ph.D., FSA, EA, MAAA, FCA
Chief Actuary



SECTION 1 – BOARD SUMMARY

This report presents the results of the July 1, 2022 actuarial valuation of the State Patrol Retirement System (System). The primary purposes of performing this actuarial valuation are to:

- Determine the level of State contributions for the plan year ending June 30, 2023 which are sufficient to meet the funding policy set out in the Nebraska state statutes.
- Disclose asset and liability measurements as well as the current funded status of the System as of the valuation date.
- Assess and disclose the key risks associated with funding the System.
- Compare actual and expected experience under the System during the plan year ended June 30, 2022.
- Analyze and report on trends in System contributions, assets and liabilities over the past several years.

The actuarial valuation results provide a “snapshot” view of the System’s financial condition on July 1, 2022. As the result of various factors, the System’s unfunded actuarial accrued liability (UAAL) increased from \$51.4 million last year to \$52.9 million this year and the funded ratio held steady at 91%. In addition, the actuarial required contribution rate increased from 43.74% of pay last year to 44.64% of pay in this year’s valuation, an increase of 0.90%.

The Nebraska statutes require the State to make an additional contribution if the regular, payroll-related contributions by members and the State are insufficient to meet the actuarial required contribution for the plan year. **Based on the results of the July 1, 2022 actuarial valuation, an additional State contribution of \$4,092,005 is required for the plan year ending June 30, 2023 (expected to be paid July 1, 2023).** This is an increase from the additional amount in the June 30, 2021 actuarial valuation of \$3,752,980.

Changes to Actuarial Assumptions

At their December 21, 2020 meeting, the Board adopted a plan to phase-in a change in the set of economic assumptions over a four-year period (2021 through 2024 valuation). The scheduled economic assumption changes include price inflation, COLA for Tier 1 members, general wage inflation, covered payroll growth and the investment return assumption. The remaining phase-in of the economic assumptions will be implemented as follows:

	Current (2022 Valuation)	2023 Valuation	2024 Valuation
Price Inflation	2.55%	2.45%	2.35%
Real Return	4.65%	4.65%	4.65%
Investment Return	7.20%	7.10%	7.00%
COLA (Tier 1)	2.10%	2.05%	2.00%
General Wage Inflation	3.05%	2.95%	2.85%
Covered Payroll Growth	3.05%	2.95%	2.85%

The net impact of the scheduled change in the set of economic assumptions in this valuation was an increase of \$3.9 million in the actuarial accrued liability, as well as an increase of 1.13% in the actuarial required contribution rate. The continued phase-in of the economic assumptions is expected to increase the unfunded actuarial accrued liability (UAAL), normal cost rate and actuarial required contribution rate over the next two years, absent the impact of future favorable experience. If the ultimate set of economic assumptions



SECTION 1 – BOARD SUMMARY

was fully recognized in the current valuation, it would increase the UAAL by \$7.5 million, decrease the funded ratio to 90% and increase the actuarial required contribution rate by 2.09%.

Actual Experience Impacting the July 1, 2022 Valuation

The valuation results reflect net favorable experience for the past plan year as demonstrated by an UAAL that was lower than expected. The UAAL as of July 1, 2022 is \$52.9 million compared to an expected UAAL of \$54.4 million. The key factors impacting the 2022 valuation include:

- The rate of return on the market value of assets for the year ending June 30, 2022 was -8.2%, as reported by the Nebraska Investment Council, compared to the assumed return of 7.3% for that year. The asset smoothing method used in the valuation only recognizes 20% of the difference between the dollar amount of the assumed and actual return in the current valuation. The partial recognition of FY 2022 experience, coupled with the scheduled recognition of the deferred investment experience from the prior four years, resulted in a rate of return on the actuarial (smoothed) value of assets of 7.8%. Because this return is higher than the assumed rate of return (7.3% for FY 2022), there was an actuarial experience gain of \$2.5 million on the actuarial value of assets.
- There was a net actuarial experience loss of \$1.1 million on System liabilities as a result of actual cost-of-living increases that were higher than expected (2.5% versus 2.15%) and actual salary increases that were higher than expected based on the actuarial assumptions.
- The 2016 Legislature made changes to the benefit structure for members hired on or after July 1, 2016 (Tier 2). As a result of an increase in the number of active members covered by Tier 2, the normal cost rate decreased by 0.16% and the average employee contribution rate increased by 0.02% (from 16.21% to 16.23%).

The changes to the benefit structure in Tier 2 included final average compensation moving from the average of the three highest 12-month periods to the average of the five highest 12-month periods, the maximum cost-of-living adjustment changing from 2.50% to 1.00%, and the employee and employer contribution rate changing from 16.00% to 17.00%. In addition, Tier 2 members are not eligible to participate in DROP. As a result of the change in the contribution rate for Tier 2 members, statutory contribution rates are expressed as a weighted average of the Tier 1 and Tier 2 contribution rates throughout this report. The weighted statutory employee and employer contribution rate in the current valuation is 16.23%, slightly above the Tier 1 contribution rate of 16.00%. This is because there are only 112 members in Tier 2 as of July 1, 2022, which is about 29% of the active membership. While the weighted contribution rate will continue to increase gradually as more of the active members are in Tier 2, we expect it will be a number of years before Tier 2 has a meaningful impact on the System's liabilities and overall valuation results.

A summary of the key results from the July 1, 2022 actuarial valuation is shown in the following table. As the table indicates, the statutory contribution rates are not sufficient to meet the actuarial required contribution rate and an additional State appropriation of 12.18% of pay, or \$4,092,005, is required. Further detail on the valuation results can be found in the following sections of this Board Summary.



SECTION 1 – BOARD SUMMARY

	Valuation Results	
	July 1, 2022	July 1, 2021
Unfunded Actuarial Accrued Liability	\$52,925,289	\$51,368,046
Funded Ratio (Actuarial Assets)	90.67%	90.50%
Actuarial Required Contribution	44.64%	43.74%
Weighted Member Contribution Rate	(16.23%)	(16.21%)
Weighted Employer Contribution Rate	<u>(16.23%)</u>	<u>(16.21%)</u>
Additional Required State Contribution Rate	12.18%	11.32%
Additional Required State Contribution*	\$4,092,005	\$3,752,980

* Reflects interest to the expected contribution date, which is July 1 of the following year.

EXPERIENCE FOR THE LAST PLAN YEAR

Numerous factors contributed to the change in the System’s assets, liabilities, and actuarial required contribution rate between July 1, 2021 and July 1, 2022. The components of the System’s experience are examined in the following discussion.

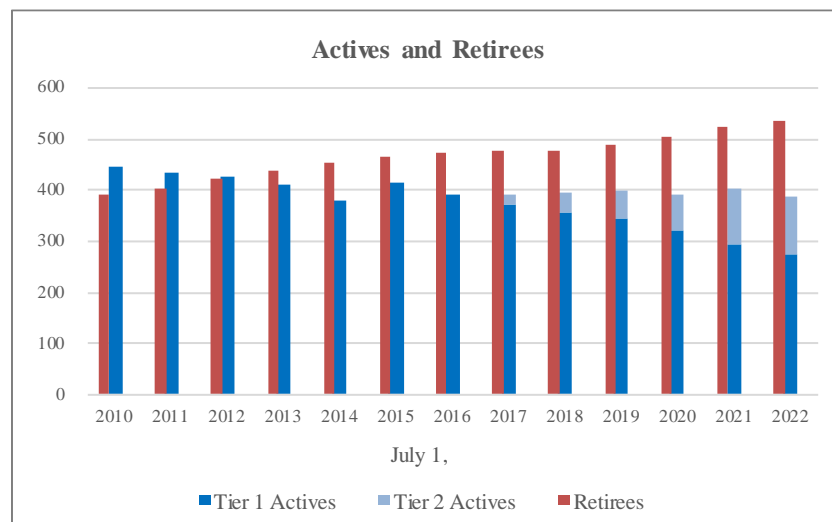
MEMBERSHIP

There were 388 active members (excluding DROP members) in the 2022 valuation compared to 403 in the 2021 valuation, a 3.7% decrease. This decrease of fifteen active members did not have a material impact on the current valuation results. However, the UAAL is amortized assuming future covered payroll will increase with the assumed payroll growth assumption (3.05% for plan year beginning July 1, 2022). If total payroll grows more than 3.05%, the UAAL payment is divided by covered payroll that is larger than expected, which results in a lower UAAL contribution rate. Conversely, a decrease in active members, or payroll growth less than 3.05% per year, results in a higher UAAL contribution rate. The 2022 valuation reflects an increase in covered payroll of only 1.4% compared to the 3.15% assumed increase for plan year ending June 30, 2022, which creates a higher UAAL contribution rate, all other things being equal.

The following graph compares the number of active and members receiving benefits (retirees and beneficiaries) in each valuation since 2010. While the number of active members has fluctuated at times over this period, the number of members receiving a benefit has steadily increased, reaching 537 in this valuation. This is a standard indicator of the maturity of the system and is not necessarily unexpected or problematic. However, this metric does indicate the likelihood of a higher degree of contribution rate volatility when actual experience varies from that expected by the assumptions.



SECTION 1 – BOARD SUMMARY



ASSETS

As of June 30, 2022, the System had net assets of \$494.6 million, when measured on a market value basis, a decrease of \$57.5 million from the prior year.

The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the actuarial required contribution rate. An asset valuation method, which smoothes the effect of market fluctuations, is applied to determine the value of assets used in the valuation. The resulting amount is called the actuarial value of assets. In this year’s valuation, the actuarial value of assets is \$514.6 million, an increase of \$25.3 million from the prior year. The components of change in the asset values are shown in the following table.

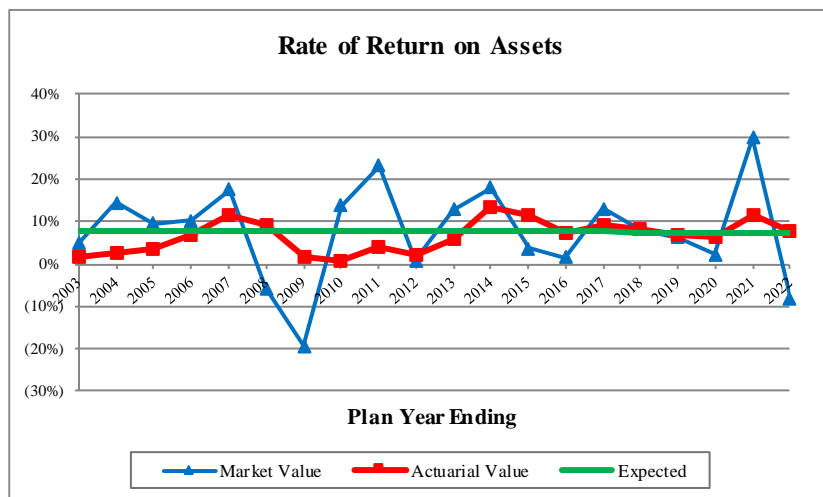
	Market Value (\$M)		Actuarial Value (\$M)	
Net Assets, June 30, 2021	\$	552.1	\$	489.2
- Employer and Member Contributions	+	14.0	+	14.0
- Benefit Payments and Admin Expenses	-	26.3	-	26.3
- Net Investment Income	+	(45.2)	+	37.7
Net Assets, June 30, 2022	\$	494.6	\$	514.6
Estimated Rate of Return*		-8.2%		7.8%

* Rate of return on the market value of assets was provided by the Nebraska Investment Council.

The rate of return on the market value of assets was -8.2%, as reported by the Nebraska Investment Council. However, the return on the actuarial value of assets was 7.8%, which was higher than the 7.3% investment return assumption. As a result, there was an actuarial experience gain on assets of \$2.5 million. As a result of the combined impact of the unfavorable investment experience for FY 2022 and the scheduled recognition of deferred investment gains and losses, the net deferred investment gain of \$62.9 million in last year’s valuation is now a net deferred investment loss of \$19.9 million in the current valuation. Please see Section 3 of this report for more detailed information on the market and actuarial value of assets.



SECTION 1 – BOARD SUMMARY



The rate of return of the actuarial value of assets has been less volatile than the market value return, illustrating the benefit of using an asset smoothing method.

LIABILITIES

The actuarial accrued liability is that portion of the present value of future benefits that will not be paid by future normal costs, i.e. the portion allocated to past years of service. The difference between this liability and the actuarial value of assets as of the valuation date is called the unfunded actuarial accrued liability (UAAL). The dollar amount of unfunded actuarial accrued liability is reduced if the contributions to the System exceed the normal cost for the year plus interest on the prior year’s UAAL.

The unfunded actuarial accrued liability as of July 1, 2022, using both the actuarial and market value of assets, is shown in the following table.

	Actuarial Value of Assets	Market Value of Assets
Actuarial Accrued Liability	\$567,483,653	\$567,483,653
Value of Assets	<u>514,558,364</u>	<u>494,616,603</u>
Unfunded Actuarial Accrued Liability	\$52,925,289	\$72,867,050
Funded Ratio	90.67%	87.16%

Absent investment returns greater than expected (7.2%, 7.1% and 7.0% for plan years beginning July 1, 2022 through 2024), the deferred investment experience will be recognized over the next four years and negatively impact the plan’s funded status. There will also be downward pressure on the funded ratio as a result of the phase-in of the set of economic assumptions discussed earlier. See Section 4 of the report for the detailed development of the unfunded actuarial accrued liability.

The components of the net increase of \$1.6 million in the UAAL from July 1, 2021 to July 1, 2022 are shown in the following table:

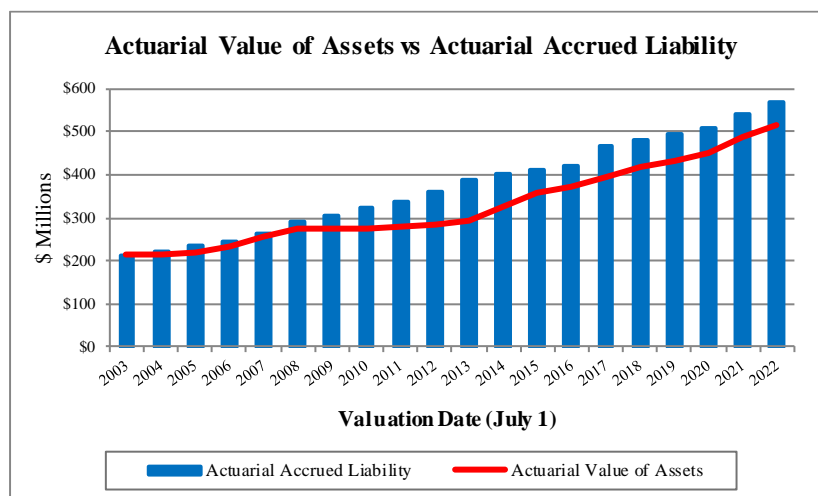


SECTION 1 – BOARD SUMMARY

	(\$ Millions)
Unfunded Actuarial Accrued Liability, July 1, 2021	\$51.37
- Expected change from amortization method	(0.77)
- Investment experience	(2.48)
- Liability experience	1.06
- Assumption changes	3.85
- Other experience	(0.10)
Unfunded Actuarial Accrued Liability, July 1, 2022	\$52.93

As shown above, various factors impacted the amount of the UAAL in the current valuation. Actuarial experience gains (losses), which result from actual experience that is more (less) favorable than anticipated by the actuarial assumptions, are reflected in the UAAL and are measured as the difference between the expected UAAL and the actual UAAL, taking into account any changes due to actuarial assumptions and methods or benefit provisions. Overall, the System experienced a net actuarial experience gain of \$1.4 million which may be explained by considering the separate experience of assets and liabilities. As noted earlier, there was an actuarial experience gain of \$2.5 million on the actuarial value of assets. Unfavorable experience on System liabilities resulted in a net liability experience loss of \$1.1 million, largely due to a cost-of-living increase that was higher than the assumed increase (2.50% versus 2.15%) and salary increases that were higher than expected based on the actuarial assumptions. A breakdown of actuarial experience gains and losses by amount can be found in Table 8 of this report.

As the following graph of historical actuarial assets and actuarial accrued liabilities shows, the System’s liabilities grew at a faster pace than the System’s assets for the five-year period beginning after the FY 2009 market downturn as that experience was reflected in the smoothing method. As a result, the funded ratio declined over that period. Since 2013, the System’s funded ratio has generally been improving. However, changes to the actuarial assumptions in the July 1, 2017 valuation, including lowering the assumed rate of return from 8.0% to 7.5%, increased the System’s liabilities and lowered the funded ratio. The 2022 funded ratio remained steady as increasing liabilities due to assumption changes were offset by deferred investment gains.





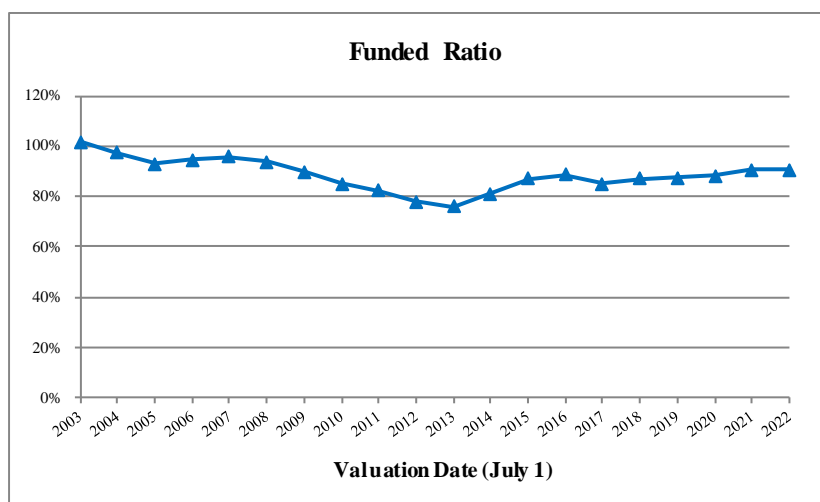
SECTION 1 – BOARD SUMMARY

An evaluation of the UAAL purely on a dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both large numbers) is reflected. Another way to evaluate the UAAL and the progress made in its funding is to track the funded ratio, the ratio of the actuarial value of assets to the actuarial accrued liability. The funded status information, which is based on the actuarial value of assets, is shown below (in millions).

	7/1/2018	7/1/2019	7/1/2020	7/1/2021	7/1/2022
Funded Ratio (AVA/AAL)	86.98%	87.34%	88.13%	90.50%	90.67%
UAAL	\$62.50	\$62.86	\$60.61	\$51.37	\$52.93

Note that the funded ratio does not indicate whether or not the System assets are sufficient to settle benefits earned to date. The funded ratio, by itself, also may not be indicative of future funding requirements. In addition, if the funded ratios were shown using the market value of assets, the results would be different.

The funded ratio over a longer period is shown in the following graph. Given the weighted statutory contribution rate of 32.46% of pay (16.23% by members and 16.23% by the employer) and a normal cost rate of 30.05% of pay, only a small portion of the total fixed contribution rate is available to fund the UAAL. As a result, additional contributions from the State will be necessary to improve the funded ratio absent actual investment experience in future years that is higher than the assumed rate of return.



ACTUARIAL REQUIRED CONTRIBUTION RATE

The System is funded by statutory contribution rates of 16.00% of pay for Tier 1 members, 17.00% of pay for Tier 2 members, and matching contributions paid by the employer. State statutes require the state of Nebraska to make an additional contribution if the regular, payroll-related contributions by employees and employers are insufficient to meet the actuarial required contribution rate for the plan year. The additional State contribution for each plan year is made on the July 1 following the plan year-end. **Based on the results of the July 1, 2022 actuarial valuation, an additional State contribution of 12.18% of pay, or \$4,092,005, is necessary for the plan year ending June 30, 2023.**



SECTION 1 – BOARD SUMMARY

Under the Entry Age Normal cost method, the actuarial required contribution rate consists of three components:

- A “normal cost” for the portion of projected liabilities allocated by the actuarial cost method to service of members during the year following the valuation date.
- An “administrative expense” load for the expenses expected to be paid from the trust for the year.
- An “unfunded actuarial accrued liability contribution” for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

The UAAL contribution rate is determined by calculating the amortization payments as a level-percent of payroll. This methodology results in dollar amounts of payments that are lower in the initial years of the amortization period but increase each year in the future with the assumed payroll growth assumption (3.05% for plan year beginning July 1, 2022). Because the UAAL contribution rate is determined as a level-percent of payroll, the dollar amount of the UAAL contribution is scheduled to increase each year in the future, even if all actuarial assumptions are met. Therefore, if the actual increase in covered payroll is less than assumed, the UAAL contribution rate will increase. The increase in covered payroll from the prior valuation was 1.4% compared to the 3.15% assumed increase in the July 1, 2021 valuation for plan year ending June 30, 2022, resulting in a higher UAAL contribution rate in this valuation.

See Section 5 of the report for the detailed development of the actuarial required contribution rate and the corresponding dollar amount, which are summarized in the following table.

Contribution Rates	July 1, 2022	July 1, 2021
1. Normal Cost Rate	30.05%	29.85%
2. Administrative Expenses	0.26%	0.26%
3. UAAL Contribution Rate	14.33%	13.63%
4. Total Actuarial Required Contribution Rate	44.64%	43.74%
5. Weighted Member Contribution Rate	(16.23%)	(16.21%)
6. Weighted Employer Contribution Rate	(16.23%)	(16.21%)
7. Total Statutory Contribution Rate	(32.46%)	(32.42%)
8. Additional Required State Contribution Rate [4 + 7]	12.18%	11.32%
9. Estimated Payroll	\$ 32,448,265	\$ 32,005,893
10. Additional State Required Contribution* [8 * 9 with interest, but not less than \$0]	\$ 4,092,005	\$ 3,752,980

* Reflects interest to the expected payment date, which is July 1 of the following year.



SECTION 1 – BOARD SUMMARY

The actuarial required contribution rate for the plan year ending June 30, 2023 is 44.64%. The weighted contribution rate of 16.23% for the member and employer results in a total payroll-related statutory contribution rate of 32.46% of pay. As a result, there is a contribution shortfall this year of 12.18% of payroll, which is projected to be about \$4.1 million.

The actuarial required contribution, based on the snapshot of the System taken on the valuation date of July 1 each year, will change as the deferred investment experience is recognized and other experience (both investment and demographic) impacts the System. Therefore, it is expected to change each year. To the extent the difference between the actual and expected experience is significant, the change in the actuarial required contribution rate is also expected to change significantly. This volatility in the actuarial required contribution rate can result in extreme volatility in the additional State contribution as it is the difference between the actuarial required contribution rate and the statutory contribution rate. Any material change in the actuarial required contribution rate will directly flow through and impact the additional State contribution.

The primary components of the change in the actuarial required contribution rate from the prior valuation are shown in the following table.

Total Actuarial Required Contribution Rate, July 1, 2021	43.74%
- Change in normal cost rate (before assumption changes)	(0.16%)
- Investment experience	(0.49%)
- Liability experience	0.21%
- Actual vs. expected payroll	0.22%
- Assumption changes	1.13%
- Other experience	<u>(0.01%)</u>
Total Actuarial Required Contribution Rate, July 1, 2022	44.64%



SECTION 1 – BOARD SUMMARY

The historical actuarial required contributions and any resulting additional required State contributions as shown in the actuarial valuation report, whether or not actually contributed, are shown below:

History of Expected State Contributions						
Plan Year	Statutory State		Additional			
	Contributions		Appropriations	Total		
2022/2023	\$	5,266,353	\$	4,092,005	\$	9,358,358
2021/2022		5,188,155		3,752,980		8,941,135
2020/2021		5,024,748		4,082,024		9,106,772
2019/2020		4,926,271		4,112,870		9,039,141
2018/2019		4,791,164		3,983,698		8,774,862
2017/2018		4,592,242		4,337,435		8,929,677
2016/2017		4,449,116		2,541,558		6,990,674
2015/2016		4,547,633		2,725,738		7,273,371
2014/2015		4,149,416		3,866,737		8,016,153
2013/2014		4,386,823		4,652,774		9,039,597
2012/2013		5,005,482		4,552,680		9,558,162
2011/2012		5,291,940		2,255,430		7,547,370
2010/2011		4,597,331		2,770,262		7,367,593
2009/2010		4,203,166		1,801,610		6,004,776
2008/2009		4,361,746		812,087		5,173,833
2007/2008		4,225,729		365,020		4,590,749
2006/2007		3,942,430		813,159		4,755,589
2005/2006		3,766,098		1,080,050		4,846,148
2004/2005		3,050,645		948,654		3,999,299
2003/2004		2,745,970		434,202		3,180,172

Note: Information before Plan Year 2013/2014 was produced by prior actuary.

RISK ASSESSMENT AND DISCLOSURE

A typical retirement plan faces many different risks. 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. Actuarial Standard of Practice Number 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. Risk evaluation is an important part of managing a defined benefit plan. Please see Section 6 of this report for an in-depth discussion of the specific risks facing the Nebraska State Patrol Retirement System.

**SECTION 1 – BOARD SUMMARY****SUMMARY OF PRINCIPAL RESULTS**

	<u>7/1/2022</u> <u>Valuation</u>	<u>7/1/2021</u> <u>Valuation</u>	<u>% Change</u>
1. PARTICIPANT DATA			
Number of:			
Active Members			
- Tier 1	276	293	(5.8%)
- Tier 2	112	110	1.8%
- Total	<u>388</u>	<u>403</u>	(3.7%)
Retired Members and Beneficiaries	487	475	2.5%
DROP Participants	35	35	0.0%
Disabled Members	15	15	0.0%
Inactive Members	42	39	7.7%
Total Members	<u>967</u>	<u>967</u>	0.0%
Projected Annual Salaries of Active Members	\$ 32,448,265	\$ 32,005,893	1.4%
Annual Retirement Payments for Members in Receipt and DROP Participants	\$ 27,770,551	\$ 26,441,313	5.0%
2. ASSETS AND LIABILITIES			
a. Market Value of Assets	\$ 494,616,603	\$ 552,081,721	(10.4%)
b. Actuarial Value of Assets	514,558,364	489,208,407	5.2%
c. Total Actuarial Accrued Liability	567,483,653	540,576,453	5.0%
d. Unfunded Actuarial Accrued Liability [c - b]	\$ 52,925,289	\$ 51,368,046	3.0%
e. Funded Ratio (Actuarial Value of Assets) [b / c]	90.67%	90.50%	0.2%
f. Funded Ratio (Market Value of Assets) [a / c]	87.16%	102.13%	(14.7%)
3. EMPLOYER CONTRIBUTION RATES AS A PERCENT OF PAYROLL			
Normal Cost	30.05%	29.85%	0.7%
Administrative Expenses	0.26%	0.26%	0.0%
Amortization of Unfunded Actuarial Accrued Liability	14.33%	13.63%	5.1%
Actuarial Required Contribution Rate	<u>44.64%</u>	<u>43.74%</u>	2.1%
Weighted Member Contribution Rate	(16.23%)	(16.21%)	0.1%
Weighted Employer Contribution Rate	<u>(16.23%)</u>	<u>(16.21%)</u>	0.1%
Additional Required State Contribution Rate	12.18%	11.32%	7.6%
Additional Required State Contribution*	\$ 4,092,005	\$ 3,752,980	9.0%

* Reflects interest to the expected payment date, which is July 1 of the following year.



SECTION 2 – SCOPE OF THE REPORT

This report presents the actuarial valuation of the State Patrol Retirement System as of July 1, 2022. This valuation was prepared at the request of the Public Employees Retirement Board of the Nebraska Public Employees Retirement System.

Please pay particular attention to our actuarial certification letter, where the guidelines employed in the preparation of this report are outlined. We also comment on the sources and reliability of both the data and the actuarial assumptions upon which our findings are based. Those comments are the basis for our certification that this report is complete and accurate to the best of our knowledge and belief.

A summary of the findings which result from this valuation is presented in the previous section. Section 3 describes the assets and investment experience of the System. Sections 4 and 5 describe how the obligations (liabilities) of the System are to be met under the actuarial cost method in use. Section 6 discloses key maturity measurements and discusses the key risks facing the funding of the System. Section 7 includes some historical funding information.

This report includes several appendices:

- Appendix A Schedules of valuation data classified by various categories of members.
- Appendix B A summary of the current benefit structure, as determined by the provisions of governing law on July 1, 2022.
- Appendix C A summary of the actuarial methods and assumptions used to estimate liabilities and determine contribution rates.
- Appendix D A glossary of actuarial terms.



SECTION 3 – ASSETS

In many respects, an actuarial valuation can be thought of as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is July 1, 2022. On that date, the assets available for the payment of benefits are appraised. The assets are compared with the liabilities of the System, which are generally in excess of assets. The actuarial process then leads to a method of determining the contributions needed by members and the employer in the future to balance the System's assets and liabilities.

Market Value of Assets

The current market value represents the "snapshot" or "cash-out" value of System assets as of the valuation date. In addition, the market value of assets provides a basis for measuring investment performance from time to time. Table 1 is a comparison, at market values, of System assets as of July 1, 2022 and July 1, 2021, in total and by investment category. Table 2 summarizes the change in the market value of assets from July 1, 2021 to July 1, 2022.

Actuarial Value of Assets

Due to extreme volatility, the market value of assets, which represents the "cash-out" value of System assets on a single day, may not be the best measure of the System's ongoing ability to meet its obligations. To arrive at a suitable value of assets for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens swings in the market value while still indirectly recognizing market values. Under the asset smoothing methodology, the difference between the dollar amount of the actual and expected investment return on the market value of assets is recognized evenly over a five-year period.

Table 3 shows the development of the actuarial value of assets (AVA) as of the valuation date.



TABLE 1
STATE PATROL RETIREMENT SYSTEM
MARKET VALUE OF ASSETS
by Investment Category

	<u>June 30, 2022</u>	<u>June 30, 2021</u>
1. Cash and Equivalents	\$ 148,050	\$ 189,717
2. Investments*	499,137,340	558,733,162
3. Capital Assets	70	82
4. Receivables and Prepaids	30,815,819	23,500,009
5. Accounts Payable	<u>(35,484,676)</u>	<u>(30,341,249)</u>
6. Net Assets Available for Pension Benefits	\$ 494,616,603	\$ 552,081,721

* Includes DROP account balances.



TABLE 2
STATE PATROL RETIREMENT SYSTEM
CHANGE IN MARKET VALUE OF ASSETS

	2022	2021
1. Market Value of Assets, Beginning of Year	\$ 552,081,721	\$ 435,782,874
2. Contributions		
(a) Member (includes purchased service)	\$ 5,121,375	\$ 5,081,804
(b) State	5,121,375	5,081,804
(c) State appropriations	3,752,980	4,082,024
(d) Total	\$ 13,995,730	\$ 14,245,632
3. Expenditures		
(a) Benefit payments	\$ 24,343,401	\$ 23,050,795
(b) Refunds	438,789	184,266
(c) DROP Disbursements	1,449,330	3,021,481
(d) Administrative expenses	111,359	157,638
(e) Total	\$ 26,342,879	\$ 26,414,180
4. Investment Return, Net of Investment Expenses		
(a) Investment income	\$ 6,989,167	\$ 6,474,899
(b) Securities lending income	79,067	67,765
(c) Securities lending expense	(28,462)	(12,998)
(d) Net appreciation/(depreciation) in fair value of investments	(52,174,802)	121,922,834
(e) Other	17,061	14,895
(f) Net investment return	\$ (45,117,969)	\$ 128,467,395
5. Market Value of Assets, End of Year [1 + 2(d) - 3(e) + 4(f)]	\$ 494,616,603	\$ 552,081,721
6. Rate of Return, Net of Expenses*	(8.2%)	29.9%

*Annual money-weighted rate of return, net of investment expense, as reported by the Nebraska Investment Council



TABLE 3
STATE PATROL RETIREMENT SYSTEM
DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

	Year End			
	6/30/2019	6/30/2020	6/30/2021	6/30/2022
1. Actuarial Value of Assets, Beginning of Year	\$ 417,588,175	\$ 433,655,500	\$ 450,151,647	\$ 489,208,407
2. Unrecognized Return Beginning of Year	3,094,855	2,956,497	(14,368,773)	62,873,314
3. Contributions During Year				
(a) Member	\$ 4,710,105	\$ 4,970,209	\$ 5,081,804	\$ 5,121,375
(b) State	4,710,107	4,970,209	5,081,804	5,121,375
(c) State appropriations	3,983,698	4,112,870	4,082,024	3,752,980
(d) Total	\$ 13,403,910	\$ 14,053,288	\$ 14,245,632	\$ 13,995,730
4. Benefit Payments and Admin Expenses During Year	21,185,702	22,357,949	23,050,795	24,454,760
5. Refund of Contributions/DROP disbursements	3,768,074	2,595,111	3,205,747	1,888,119
6. Assumed Rate of Return	7.50%	7.50%	7.50%	7.30%
7. Expected Investment Income on (1), (2), (3), (4) and (5)	31,203,784	32,422,392	32,173,051	39,804,653
8. Actual Return on Market Value Net of Investment Expenses*	27,478,833	10,070,649	128,309,757	(45,117,969)
9. Return to be Spread, End of Year	\$ (3,724,951)	\$ (22,351,743)	\$ 96,136,706	\$ (84,922,622)

*Prior to 6/30/2022, the return on the market value of assets was net of all expenses.



TABLE 3
(continued)

STATE PATROL RETIREMENT SYSTEM
AS OF JULY 1, 2022

10. Return to be Spread

Plan Year <u>Ending</u>	Return to be <u>Spread</u>	Unrecognized <u>Percent</u>	Unrecognized <u>Return</u>
2022	(\$84,922,622)	80%	(\$67,938,098)
2021	96,136,706	60%	57,682,024
2020	(22,351,743)	40%	(8,940,697)
2019	(3,724,951)	20%	(744,990)
			(\$19,941,761)

11. Total Market Value of Assets as of July 1, 2022 \$494,616,603

12. Total Actuarial Value of Assets as of July 1, 2022 \$514,558,364
[11 - 10]

13. Asset Ratios

(a) Actuarial Value to Market Value [12 / 11]	104.03%
(b) Market Value to Actuarial Value [11 / 12]	96.12%

Plan Year Ended	Gain/(Loss) Deferred to Future Years	<u>Gain/(Loss) to be Recognized in Plan Year Ending</u>			
		2023	2024	2025	2026
6/30/2019	(\$744,990)	(744,990)			
6/30/2020	(8,940,697)	(4,470,349)	(4,470,348)		
6/30/2021	57,682,024	19,227,341	19,227,341	19,227,342	
6/30/2022	(67,938,098)	(16,984,524)	(16,984,524)	(16,984,524)	(16,984,526)
Total	(\$19,941,761)	(\$2,972,522)	(\$2,227,531)	\$2,242,818	(\$16,984,526)



SECTION 4 – SYSTEM LIABILITIES

In the previous section, an actuarial valuation was compared with an inventory process, and an analysis was given of the inventory of assets of the State Patrol Retirement System as of the valuation date, July 1, 2022. In this section, the discussion will focus on the commitments (future benefit payments) of the System, which are referred to as its liabilities.

Table 4 contains an analysis of the actuarial present value of all future benefits (PVFB) for contributing active members, inactive members, retirees and their beneficiaries.

The liabilities summarized in Table 4 include the actuarial present value of all future benefits expected to be paid with respect to each member. For an active member, this value includes the measurement of both benefits already earned and future benefits to be earned. For all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and for the lives of the surviving beneficiaries.

All liabilities reflect the benefit provisions in place as of July 1, 2022.

Actuarial Accrued Liability

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. An actuarial cost method is a mathematical technique that allocates the present value of future benefits into annual costs. In order to do this allocation, it is necessary for the funding method to "breakdown" the present value of future benefits into two components:

- (1) that which is attributable to the past and
- (2) that which is attributable to the future.

Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial accrued liability." The portion allocated to the future is known as the present value of future normal costs, with the specific piece of it allocated to the current year being called the "normal cost." Table 5 contains the calculation of actuarial accrued liability for the System. The Entry Age Normal actuarial cost method is used to develop the actuarial accrued liability.



TABLE 4
STATE PATROL RETIREMENT SYSTEM
PRESENT VALUE OF FUTURE BENEFITS (PVFB)
AS OF JULY 1, 2022

1. Active Employees	
(a) Retirement	\$ 244,949,416
(b) Termination	3,758,071
(c) Disability	8,004,609
(d) Death	1,616,920
(e) Total	\$ <u>258,329,016</u>
2. Inactive Vested Members	7,222,518
3. Inactive Nonvested Members	299,400
4. DROP Account Balances	4,794,979
5. Disabled Members	7,726,655
6. Retirees	329,699,160
7. Beneficiaries	<u>33,043,955</u>
8. Total Present Value of Future Benefits	\$ 641,115,683



TABLE 5
STATE PATROL RETIREMENT SYSTEM
ACTUARIAL ACCRUED LIABILITY
AS OF JULY 1, 2022

1. Present Value of Future Benefits for Active Members	\$	258,329,016
2. Present Value of Future Normal Costs for Active Members		
(a) Retirement	\$	63,304,632
(b) Termination		4,653,796
(c) Disability		4,593,691
(d) Death		1,079,911
(e) Total	\$	73,632,030
3. Actuarial Accrued Liability for Active Members [1 - 2(e)]	\$	184,696,986
4. Actuarial Accrued Liability for Inactive Members	\$	382,786,667
5. Total Actuarial Accrued Liability [3 + 4]	\$	567,483,653
6. Actuarial Value of Assets	\$	514,558,364
7. Unfunded Actuarial Accrued Liability [5 - 6]	\$	52,925,289
8. Funded Ratio [6 / 5]		90.67%



TABLE 6
STATE PATROL RETIREMENT SYSTEM
ACTUARIAL BALANCE SHEET
AS OF JULY 1, 2022

ASSETS

Actuarial Value of Assets	\$	514,558,364
Unfunded Actuarial Accrued Liability		52,925,289
Present Value of Future Normal Costs		<u>73,632,030</u>
Total Assets	\$	641,115,683

LIABILITIES

Present Value of Future Benefits			
Active members			
Retirement	\$	244,949,416	
Termination		3,758,071	
Disability		8,004,609	
Death		<u>1,616,920</u>	
Total			258,329,016
Inactive members			7,521,918
Retirees, disabilities and beneficiaries*			<u>375,264,749</u>
Total	\$		641,115,683

* Includes DROP account balances.



TABLE 7
STATE PATROL RETIREMENT SYSTEM
ACTUARIAL GAIN/(LOSS)

Liabilities

1. Actuarial Accrued Liability as of July 1, 2021	\$ 540,576,453
2. Normal Cost for Plan Year Ending June 30, 2022, Including New Hires	8,975,430
3. Benefit Payments During Plan Year Ending June 30, 2022	(26,231,520)
4. Interest at 7.30%	39,256,354
5. Assumption Changes	<u>3,850,944</u>
6. Expected Actuarial Accrued Liability as of July 1, 2022	\$ 566,427,661
7. Actuarial Accrued Liability as of July 1, 2022	\$ 567,483,653

Assets

8. Actuarial Value of Assets as of July 1, 2021	\$ 489,208,407
9. Contributions During Plan Year Ending June 30, 2022	13,995,730
10. Benefit Payments and Expenses During Plan Year Ending June 30, 2022	(26,342,879)
11. Interest at 7.30%	<u>35,214,901</u>
12. Expected Actuarial Value of Assets as of July 1, 2022	\$ 512,076,159
13. Actuarial Value of Assets as of July 1, 2022	\$ 514,558,364

Gain / (Loss)

14. Actuarial Gain / (Loss) on Liabilities [6 - 7]	\$ (1,055,992)
15. Actuarial Gain / (Loss) on Assets [13 - 12]	2,482,205
16. Total Actuarial Gain / (Loss) for Plan Year Ending June 30, 2022 [14 + 15]	\$ 1,426,213



TABLE 8
STATE PATROL RETIREMENT SYSTEM
GAIN/(LOSS) ANALYSIS BY SOURCE

Liability Sources	<u>Gain/(Loss)</u>
Retirement	\$ (837,000)
Termination	(210,000)
Disability	55,000
Mortality	1,596,000
Salary	(1,198,000)
COLA	(1,206,000)
Miscellaneous	<u>744,000</u>
Total Liability Gain/(Loss)	\$ (1,056,000)
Asset Gain/(Loss)	\$ 2,482,000
Net Actuarial Gain/(Loss)	\$ 1,426,000



TABLE 9
STATE PATROL RETIREMENT SYSTEM
PROJECTED BENEFIT PAYMENTS
AS OF JULY 1, 2022

<u>Plan Year</u> <u>Ending June 30</u>	<u>Current Active</u> <u>Members</u>	<u>Current In-Pay</u> <u>Members</u>	<u>Total</u>
2023	\$ 684,000	\$ 27,641,000	\$ 28,325,000
2024	2,065,000	27,913,000	29,978,000
2025	3,872,000	28,179,000	32,051,000
2026	5,534,000	28,529,000	34,063,000
2027	6,872,000	28,804,000	35,676,000
2028	10,289,000	29,041,000	39,330,000
2029	11,379,000	29,363,000	40,742,000
2030	12,572,000	29,608,000	42,180,000
2031	13,957,000	29,777,000	43,734,000
2032	14,876,000	29,926,000	44,802,000
2033	16,744,000	30,037,000	46,781,000
2034	17,900,000	30,100,000	48,000,000
2035	18,532,000	30,153,000	48,685,000
2036	19,539,000	30,101,000	49,640,000
2037	20,188,000	29,991,000	50,179,000
2038	21,400,000	29,854,000	51,254,000
2039	21,992,000	29,642,000	51,634,000
2040	23,288,000	29,403,000	52,691,000
2041	25,371,000	29,082,000	54,453,000
2042	27,665,000	28,704,000	56,369,000
2043	29,135,000	28,268,000	57,403,000
2044	30,960,000	27,773,000	58,733,000
2045	32,915,000	27,219,000	60,134,000
2046	35,407,000	26,606,000	62,013,000
2047	36,756,000	25,933,000	62,689,000
2048	37,888,000	25,203,000	63,091,000
2049	39,644,000	24,416,000	64,060,000
2050	40,602,000	23,576,000	64,178,000
2051	41,561,000	22,684,000	64,245,000
2052	42,096,000	21,746,000	63,842,000

Note: Cash flows are the expected future non-discounted payments to current members. These numbers exclude refund payouts to any current nonvested inactive members and assume future retirees elect the normal form of payment.



SECTION 5 – EMPLOYER CONTRIBUTIONS

The previous two sections were devoted to a discussion of the assets and liabilities of the System. A comparison of Tables 3 and 4 indicates that current assets fall short of meeting the present value of future benefits (total liability). This is expected in all but a completely closed fund, where no further contributions are anticipated. In an active system, there will almost always be a difference between the actuarial value of assets and total liabilities. This deficiency has to be made up by future contributions and investment returns. An actuarial valuation sets out a schedule of future contributions that will deal with this deficiency in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. Under an actuarial cost method, the contributions required to meet the difference between current assets and current liabilities are allocated each year between three elements: (1) the normal cost rate, (2) administrative expenses and (3) the unfunded actuarial accrued liability contribution rate.

The term "fully funded" is often applied to a system in which contributions at the normal cost rate are sufficient to pay for the benefits of existing employees as well as for those of new employees. More often than not, systems are not fully funded, either because of past benefit improvements that have not been completely funded or because of actuarial deficiencies that have occurred because experience has not been as favorable as anticipated by the actuarial assumptions. Under these circumstances, an unfunded actuarial accrued liability (UAAL) exists. Likewise, when the actuarial value of assets is greater than the actuarial accrued liability, a surplus exists.

Description of Contribution Rate Components

The Entry Age Normal (EAN) actuarial cost method is used for the valuation. Under that method, the normal cost for each year from entry age to assumed exit age is a constant percentage of the member's year by year projected compensation. The portion of the present value of future benefits not provided by the present value of future normal costs is the actuarial accrued liability. The unfunded actuarial accrued liability/(surplus) represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains and losses.

In general, contributions are computed in accordance with a level-percent of payroll funding objective. The actuarial required contribution rate, based on the July 1, 2022 actuarial valuation, will be used to determine the actuarial required employer contribution rate to the State Patrol Retirement System for the plan year ending June 30, 2023. Any additional State contributions are expected to be deposited on July 1, 2023 (State fiscal year end 2024). In this context, the term "contribution rate" means the percentage, which is applied to a particular active member payroll to determine the actual employer contribution amount (i.e., in dollars) for the group.

Contribution Rate Summary

In Table 10 the amortization payment related to the unfunded actuarial accrued liability, as of July 1, 2022, is developed. Table 11 develops the actuarial required contribution rate for the System and the amount of the required state contribution.

The actuarial required contribution rates shown in this report are based on the actuarial assumptions and cost methods described in Appendix C.



SECTION 5 – EMPLOYER CONTRIBUTIONS

TABLE 10
STATE PATROL RETIREMENT SYSTEM
AMORTIZATION SCHEDULE FOR THE
UNFUNDED ACTUARIAL ACCRUED LIABILITY

Amortization Bases	Original Amount	July 1, 2022 Remaining Payments	Date of Last Payment	Outstanding Balance as of July 1, 2022	Annual Contribution*
2006 UAAL Base	\$ 13,632,330	14	7/1/2036	\$ 12,313,334	\$ 1,162,285
2007 UAAL Base	(2,328,213)	15	7/1/2037	(2,189,797)	(196,398)
2008 UAAL Base	7,528,427	16	7/1/2038	7,343,611	628,520
2009 UAAL Base	12,752,991	17	7/1/2039	12,856,509	1,054,029
2010 UAAL Base	17,735,331	18	7/1/2040	18,421,689	1,451,540
2011 UAAL Base	12,260,750	19	7/1/2041	13,086,398	993,980
2012 UAAL Base	19,767,597	20	7/1/2042	21,629,143	1,587,831
2013 Experience Base	13,785,867	21	7/1/2043	15,430,721	1,097,466
2014 Experience Base	(18,572,226)	22	7/1/2044	(20,600,654)	(1,422,517)
2015 Experience Base	(22,807,048)	23	7/1/2045	(25,020,887)	(1,680,716)
2016 Experience Base	(6,583,578)	24	7/1/2046	(7,130,830)	(466,783)
2017 Assumption Change Base	27,947,994	25	7/1/2047	29,837,893	1,906,454
2017 Experience Base	(6,040,886)	25	7/1/2047	(6,449,383)	(412,075)
2018 Experience Base	(7,711,191)	26	7/1/2048	(8,141,431)	(508,492)
2019 Experience Base	335,966	27	7/1/2049	350,302	21,416
2020 Experience Base	(2,126,062)	28	7/1/2050	(2,186,480)	(131,009)
2021 Assumption Change Base	6,936,227	24	7/1/2046	6,983,457	457,136
2021 Experience Base	(15,827,503)	24	7/1/2046	(15,935,275)	(1,043,120)
2022 Assumption Change Base	3,850,944	25	7/1/2047	3,850,944	246,051
2022 Experience Base	(1,523,975)	25	7/1/2047	(1,523,975)	(97,372)
Total				\$ 52,925,289	\$ 4,648,226

* Contribution amount reflects mid-year timing.

- 1. Total UAAL Amortization Payments \$ 4,648,226
- 2. Projected Payroll for FY 2023 \$ 32,448,265
- 3. UAAL Amortization Payment Rate 14.33%

Note: Payments on each UAAL base are determined as a level-percent of payroll using a 3.05% payroll growth assumption.



TABLE 11

STATE PATROL RETIREMENT SYSTEM

ACTUARIAL REQUIRED CONTRIBUTION
FOR PLAN YEAR ENDING JUNE 30, 2023
and
DEVELOPMENT OF ADDITIONAL STATE CONTRIBUTION

1. Normal Cost Rate	30.05%
2. Administrative Expenses	0.26%
3. UAAL Amortization Rate (see Table 10)	14.33%
4. Total Actuarial Required Contribution Rate [1 + 2 + 3]	44.64%
5. Weighted Statutory Member Contribution Rate*	16.23%
6. Weighted Statutory Employer Contribution Rate*	16.23%
7. Additional Required State Contribution Rate [4 - 5 - 6, but not less than 0%]	12.18%
8. Projected Payroll for FY 2023	\$ 32,448,265
9. Additional Required State Contribution as of July 1, 2023 [7 * 8 * 1.072 ^{1/2}]	\$ 4,092,005
10. Total State Contributions	
(a) State statutory amount	\$ 5,266,353
(b) Additional State contribution as of July 1, 2023	<u>4,092,005</u>
(c) Total	\$ 9,358,358

*The statutory contribution rate is expressed as the weighted average of the Tier 1 and Tier 2 contribution rates, 16.00% and 17.00%, respectively.



SECTION 6 – RISK CONSIDERATIONS

Actuarial Standards of Practice are issued by the Actuarial Standards Board and are binding on credentialed actuaries practicing in the United States. These standards generally identify what the actuary should consider, document and disclose when performing an actuarial assignment. In September 2017, Actuarial Standard of Practice Number 51, *Assessment and Disclosure of Risk in Measuring Pension Obligations*, (ASOP 51) was issued as final with application to measurement dates on or after November 1, 2018. This ASOP, which applies to funding valuations, actuarial projections, and actuarial cost studies of proposed plan changes, was first applicable for the July 1, 2019 actuarial valuation for the Nebraska State Patrol Retirement System (System).

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.

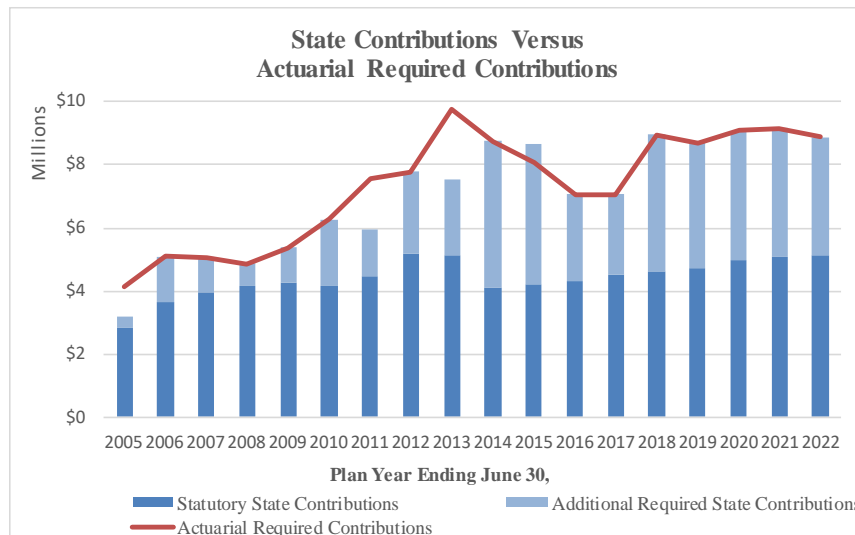
Although the external risks do exist, ASOP 51 does not require the actuary to opine on those risks, so no discussion is included here.

Actual vs Actuarial Contributions

The System is funded by statutory contribution rates of 16.00% of pay for Tier 1 members and 17.00% of pay for Tier 2 members, and matching contributions paid by the employer. State statutes require the State to make an additional contribution if the regular, payroll-related contributions by employees and the employer are insufficient to meet the actuarial required contribution amount for the plan year. The additional State contribution for each plan year is made on the July 1 following the plan year-end. There is a direct correlation between healthy, well-funded retirement systems and consistent contributions equal to the full actuarial required contribution rate each year. As the following graph shows, the State has met the full actuarial required contribution requirement in 15 of the last 18 years.



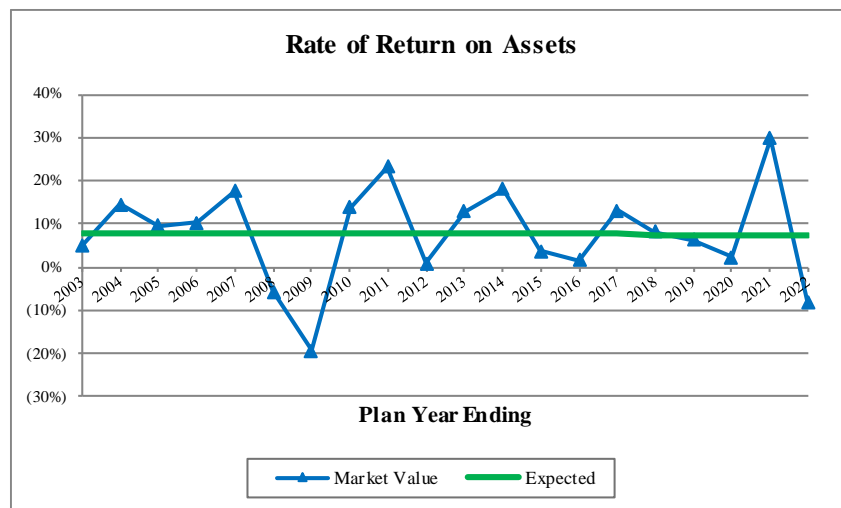
SECTION 6 – RISK CONSIDERATIONS



One of the positive factors regarding the funding of the State Patrol Retirement System is the State’s commitment to make contributions that are at least equal to the full actuarial required contribution. As a result, the funded ratio for the System has historically been strong.

Investment Return Risk

The most significant risk factor for most public retirement systems, including the Nebraska State Patrol Retirement System, is investment return because of the volatility of returns and the size of plan assets compared to payroll (see Table 12). A perusal of historical returns over 10-20 years reveals that the actual return each year is rarely close to the assumed return.



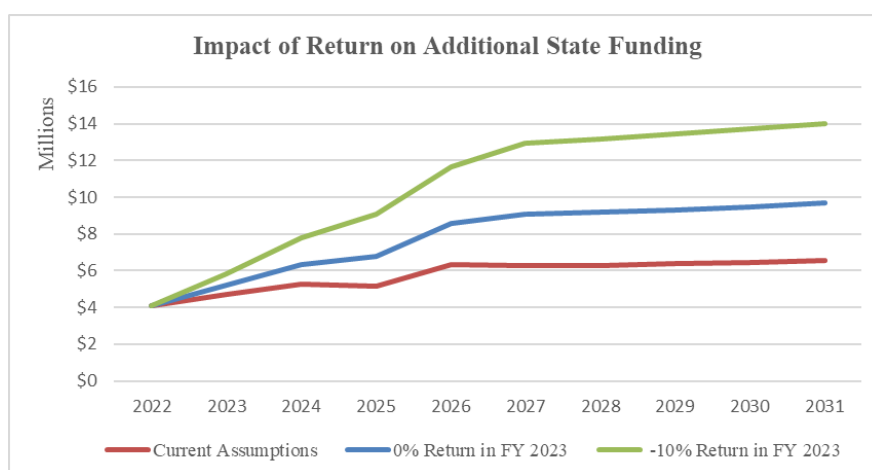
This is not unexpected, given the underlying capital market assumptions and the System’s asset allocation, but it creates significant contribution risk. As Table 12 illustrates, a return that varies from the 7.20% assumption by 10.0% (-2.80% or 17.20%) equates to 152% of payroll. Even with amortizing the actuarial experience loss over 25 years, the impact on the actuarial required contribution rate is dramatic (9.74% once the experience is fully recognized).



SECTION 6 – RISK CONSIDERATIONS

Contribution Risks

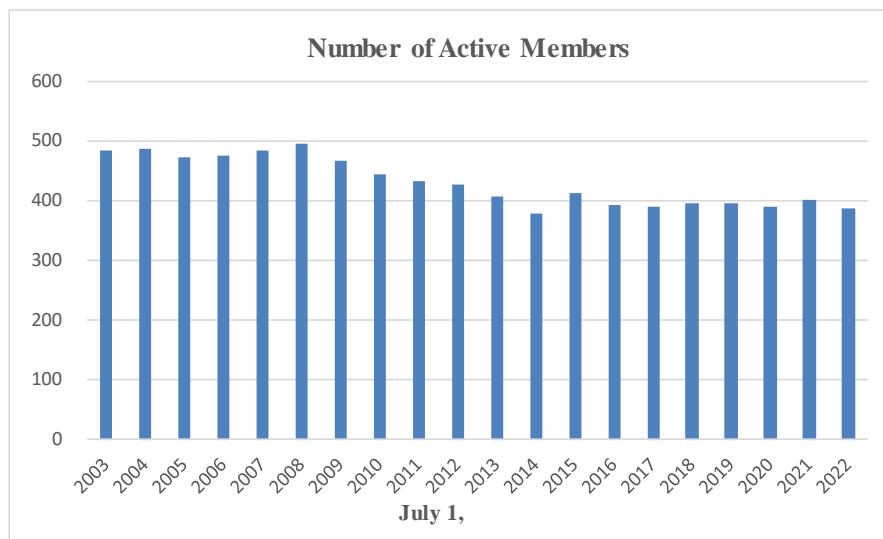
The actuarial required contribution, determined this year, based on the snapshot of the System taken on the valuation date of July 1, will change each year as the deferred investment experience is recognized and other experience (both investment and demographic) impacts the System. Therefore, the actuarial required contribution rate is expected to change each year. To the extent the difference between the actual and expected experience is significant, the change in the actuarial required contribution rate is also expected to change significantly. This volatility in the actuarial required contribution rate results in potentially extreme volatility in the additional State contribution (see graph below) due to the fact it is the difference between the actuarial required contribution rate and the statutory contribution rates. Any material difference in the actuarial required contribution rate will impact the additional State contribution.



Finally, the unfunded actuarial accrued liability is amortized as a level percentage of payroll, so the UAAL payment schedule reflects an increasing dollar amount of payments over time in anticipation of increasing payroll. However, payroll generally does not grow as expected if the number of active members is not stable or increasing. When payroll does not grow as expected, the UAAL contribution rate will be higher than expected even if the dollar amount of the payment is the same as scheduled. The following graph shows the number of active members in the last twenty valuations:



SECTION 6 – RISK CONSIDERATIONS



While the valuation process captures differences between actual and expected number of active members (and payroll) each year and adjusts the actuarial required contribution rate, a decline in the active member count will create pressure on the contribution rate and push more of the funding of the UAAL to the additional State contribution.

Demographic Risks

A key demographic risk for all retirement systems, including the Nebraska State Patrol Retirement System, is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions reflect small, continuous improvements in mortality experience over time and these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps due to 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, as experienced with the COVID-19 pandemic. This type of event is also 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 following exhibits 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.



TABLE 12

STATE PATROL RETIREMENT SYSTEM
HISTORICAL ASSET VOLATILITY RATIOS

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	Covered Payroll	Asset Volatility Ratio	Increase in ACR with a Return 10% Lower than Assumed*
July 1, 2003	\$183,989,762	\$21,929,399	8.39	5.36%
July 1, 2004	206,369,362	22,640,907	9.11	5.82%
July 1, 2005	221,307,954	22,882,413	9.67	6.18%
July 1, 2006	241,017,483	24,057,960	10.02	6.40%
July 1, 2007	279,618,100	26,072,859	10.72	6.85%
July 1, 2008	259,479,803	26,979,643	9.62	6.15%
July 1, 2009	205,033,476	25,922,439	7.91	5.05%
July 1, 2010	229,574,640	26,765,816	8.58	5.48%
July 1, 2011	278,146,750	26,195,473	10.62	6.79%
July 1, 2012	278,311,367	25,794,219	10.79	6.89%
July 1, 2013	309,589,784	27,417,644	11.29	7.21%
July 1, 2014	357,316,892	25,933,848	13.78	8.80%
July 1, 2015	363,922,631	28,422,706	12.80	8.18%
July 1, 2016	361,155,486	27,806,977	12.99	8.30%
July 1, 2017	397,137,172	28,629,936	13.87	8.86%
July 1, 2018	420,683,030	29,795,799	14.12	9.02%
July 1, 2019	436,611,997	30,578,962	14.28	9.12%
July 1, 2020	435,782,874	31,112,989	14.01	8.95%
July 1, 2021	552,081,721	32,005,893	17.25	11.02%
July 1, 2022	494,616,603	32,448,265	15.24	9.74%

Note: Years prior to July 1, 2013 were provided by the prior actuary.

*The impact of asset smoothing is not reflected in the impact on the Actuarial Contribution Rate (ACR). Current year assumptions are used for all years shown.

The assets at July 1, 2022 are 15 times payroll, so underperforming the investment return assumption by 10.00% (i.e., earn -2.80% for one year) creates an actuarial loss of about \$49 million, or 152% 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 significant contribution risk associated with volatile investment returns.



TABLE 13
STATE PATROL RETIREMENT SYSTEM

HISTORICAL CASH FLOWS

The net cash flow of a system (contributions minus benefit payments and expenses), as a percentage of the beginning of year asset value, indicates the sensitivity of the system to short-term investment returns. Mature plans can have large amounts of benefit payments compared to contributions, particularly if they are well funded. In fact, this is one reason for prefunding retirement benefits – so a portion of investment return can help to pay plan benefits. When there is negative cash flow, investment losses in the short-term are compounded by the net withdrawal from plan assets leaving a smaller asset base to try to recover from the investment losses. Large negative cash flow can also create liquidity needs for the system.

Year End	Market Value of Assets (MVA)	Contributions	Benefit Payments	Net Cash Flow	Net Cash Flow as a Percent of MVA
6/30/2003	\$183,989,762	\$4,976,790	\$8,727,404	(\$3,750,614)	(2.04%)
6/30/2004	206,369,362	5,479,510	9,155,571	(3,676,061)	(1.78%)
6/30/2005	221,307,954	6,011,266	10,269,807	(4,258,541)	(1.92%)
6/30/2006	241,017,483	8,261,575	11,313,637	(3,052,062)	(1.27%)
6/30/2007	279,618,100	8,535,103	12,180,422	(3,645,319)	(1.30%)
6/30/2008	259,479,803	8,525,981	12,936,189	(4,410,208)	(1.70%)
6/30/2009	205,033,476	9,073,382	13,450,493	(4,377,111)	(2.13%)
6/30/2010	229,574,640	10,403,865	13,756,761	(3,352,896)	(1.46%)
6/30/2011	278,146,750	10,433,680	14,951,984	(4,518,304)	(1.62%)
6/30/2012	278,311,367	12,983,827	15,159,390	(2,175,563)	(0.78%)
6/30/2013	309,589,784	12,622,461	16,928,305	(4,305,844)	(1.39%)
6/30/2014	357,316,892	12,887,225	20,010,413	(7,123,188)	(1.99%)
6/30/2015	363,922,631	12,826,689	19,458,540	(6,631,851)	(1.82%)
6/30/2016	361,155,486	11,419,059	19,576,376	(8,157,317)	(2.26%)
6/30/2017	397,137,172	11,554,062	24,139,604	(12,585,542)	(3.17%)
6/30/2018	420,683,030	13,567,863	23,828,680	(10,260,817)	(2.44%)
6/30/2019	436,611,997	13,403,910	24,953,776	(11,549,866)	(2.65%)
6/30/2020	435,782,874	14,053,288	24,953,060	(10,899,772)	(2.50%)
6/30/2021	552,081,721	14,245,632	26,256,542	(12,010,910)	(2.18%)
6/30/2022	494,616,603	13,995,730	26,231,520	(12,235,790)	(2.47%)

Note: Years prior to 6/30/2013 were provided by the prior actuary.



TABLE 14

STATE PATROL RETIREMENT SYSTEM

LIABILITY MATURITY MEASUREMENTS

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 (see Table 15) and a growing percentage of retiree liability (see table below). With more of the total liability residing with retirees, investment volatility has a greater impact on the funding of the system because it is more difficult to restore the system financially after losses occur when there is comparatively less payroll over which to spread costs.

Actuarial Valuation Date	Retiree Liability (a)	Total Actuarial Liability (b)	Retiree Percentage (a) / (b)
July 1, 2003	\$122,452,596	\$210,930,784	58.1%
July 1, 2004	130,817,914	222,161,512	58.9%
July 1, 2005	137,890,496	236,026,471	58.4%
July 1, 2006	151,774,452	245,373,102	61.9%
July 1, 2007	162,565,102	265,846,597	61.1%
July 1, 2008	171,898,267	291,996,719	58.9%
July 1, 2009	186,078,948	305,291,065	61.0%
July 1, 2010	201,734,175	321,901,446	62.7%
July 1, 2011	210,595,076	339,554,456	62.0%
July 1, 2012	232,413,652	362,298,975	64.1%
July 1, 2013	246,649,393	386,875,100	63.8%
July 1, 2014	263,401,639	401,415,518	65.6%
July 1, 2015	272,309,342	410,210,579	66.4%
July 1, 2016	279,581,643	421,923,380	66.3%
July 1, 2017	303,829,524	465,066,035	65.3%
July 1, 2018	307,996,815	480,092,201	64.2%
July 1, 2019	315,463,480	496,519,265	63.5%
July 1, 2020	327,900,484	510,757,085	64.2%
July 1, 2021	355,959,053	540,576,453	65.8%
July 1, 2022	375,264,749	567,483,653	66.1%

Note: Years prior to July 1, 2013 were provided by the prior actuary.



TABLE 15
STATE PATROL RETIREMENT SYSTEM
HISTORICAL MEMBER STATISTICS

Valuation Date July 1,	Number of Active Members	Number of Retired Members	Active/Retired
2003	486	288	1.69
2004	489	301	1.62
2005	473	316	1.50
2006	477	331	1.44
2007	484	341	1.42
2008	496	352	1.41
2009	468	372	1.26
2010	444	390	1.14
2011	433	402	1.08
2012	427	422	1.01
2013	409	438	0.93
2014	378	453	0.83
2015	413	464	0.89
2016	393	471	0.83
2017	391	478	0.82
2018	395	478	0.83
2019	397	488	0.81
2020	392	503	0.78
2021	403	525	0.77
2022	388	537	0.72

Note: Years prior to July 1, 2013 were provided by the prior actuary.

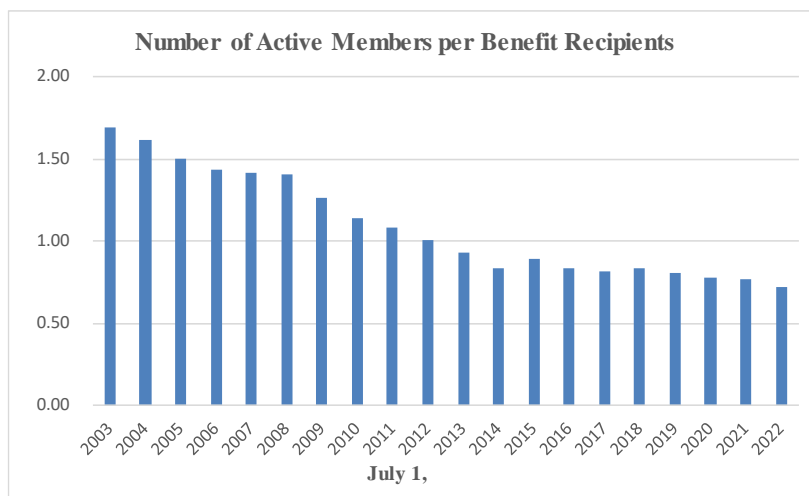




TABLE 16

STATE PATROL RETIREMENT SYSTEM

COMPARISON OF VALUATION RESULTS UNDER ALTERNATE
INVESTMENT RETURN ASSUMPTIONS

(\$ in Thousands)

This exhibit compares the key July 1, 2022 valuation results under five (5) different investment return assumptions to illustrate the impact of different assumptions on the funding of the System. Note that only the investment return assumption is changed, as identified in the heading below. All other assumptions are unchanged for purposes of this analysis.

Investment Return Assumption	6.70%	6.95%	7.20%	7.45%	7.70%
Contributions					
Normal Cost Rate	34.13%	32.01%	30.05%	28.24%	26.57%
Administrative Expenses	0.26%	0.26%	0.26%	0.26%	0.26%
UAAL Amortization Rate	<u>20.82%</u>	<u>17.56%</u>	<u>14.33%</u>	<u>11.10%</u>	<u>7.89%</u>
Total Actuarial Required Contribution	55.21%	49.83%	44.64%	39.60%	34.72%
Weighted Member Contribution Rate	(16.23%)	(16.23%)	(16.23%)	(16.23%)	(16.23%)
Weighted Employer Contribution Rate	<u>(16.23%)</u>	<u>(16.23%)</u>	<u>(16.23%)</u>	<u>(16.23%)</u>	<u>(16.23%)</u>
Additional Required State Contribution Rate	22.75%	17.37%	12.18%	7.14%	2.26%
Additional Required State Contribution	\$7,625	\$5,829	\$4,092	\$2,402	\$761
Actuarial Accrued Liability	\$604,562	\$585,531	\$567,484	\$550,352	\$534,077
Actuarial Value of Assets	<u>514,558</u>	<u>514,558</u>	<u>514,558</u>	<u>514,558</u>	<u>514,558</u>
Unfunded Actuarial Accrued Liability*	\$90,004	\$70,973	\$52,925	\$35,793	\$19,519
Funded Ratio	85.11%	87.88%	90.67%	93.50%	96.35%

Note: All other assumptions are unchanged for purposes of this sensitivity analysis.

*Numbers may not add due to rounding.



SECTION 7 – HISTORICAL FUNDING AND OTHER INFORMATION

This section of the report provides a historical perspective on the System’s funding and contribution practices, along with other information that may be of interest.



SECTION 7 – HISTORICAL FUNDING AND OTHER INFORMATION

TABLE 17
STATE PATROL RETIREMENT SYSTEM
HISTORICAL FUNDING INFORMATION
SCHEDULE OF FUNDING PROGRESS

Table with 7 columns: Actuarial Valuation Date, Actuarial Value of Assets (a), Actuarial Accrued Liability (AAL) (b), Unfunded Actuarial Accrued Liability (UAAL) (b - a), Funded Ratio (a / b), Covered Payroll (c), and UAAL as a % of Covered Payroll [(b - a) / c]. Rows range from June 30, 2003 to June 30, 2022.

Note: Information before 2013 was produced by the prior actuary.



TABLE 18
STATE PATROL RETIREMENT SYSTEM
HISTORICAL FUNDING INFORMATION
SCHEDULE OF CONTRIBUTIONS FROM THE EMPLOYER

Plan Year Ending	Actuarial Required Contributions	Percent Contributed
June 30, 2005	\$ 4,121,155	77%
June 30, 2006	5,081,930	100%
June 30, 2007	5,058,621	100%
June 30, 2008	4,855,700	100%
June 30, 2009	5,384,789	100%
June 30, 2010	6,260,122	100%
June 30, 2011	7,563,126	79%
June 30, 2012	7,774,506	100%
June 30, 2013	9,768,585	77%
June 30, 2014	8,752,627	100%
June 30, 2015	8,073,824	100%
June 30, 2016	7,053,408	100%
June 30, 2017	7,053,110	100%
June 30, 2018	8,952,649	100%
June 30, 2019	8,693,805	100%
June 30, 2020	9,083,079	100%
June 30, 2021	9,163,828	100%
June 30, 2022	8,874,355	100%

Note: Contribution information is consistent with that shown in the GASB 67 report prepared for the System.



APPENDIX A – MEMBERSHIP DATA

MEMBER DATA RECONCILIATION

	Active Members	Members in DROP	Inactive Vested	Inactive Non-vested	Retirees and Beneficiaries	Disabled Members	Total
As of July 1, 2021	403	35	30	9	475	15	967
Changes in status							
a) Retirement	(8)	(6)	(3)	0	17	0	0
b) DROP	(6)	6	0	0	0	0	0
c) Death	(1)	0	(2)	(1)	(17)	(1)	(22)
d) Non-vested terminations	(10)	0	0	10	0	0	0
e) Vested terminations	(1)	0	1	0	0	0	0
f) Contribution refund	(1)	0	(1)	(1)	0	0	(3)
g) Beneficiaries in receipt	0	0	0	0	12	0	12
h) Disability retirements	(1)	0	0	0	0	1	0
i) Return to active service	0	0	0	0	0	0	0
j) Expired benefits	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total changes in status	(28)	0	(5)	8	12	0	(13)
New entrants	13	0	0	0	0	0	13
Data Corrections	0	0	0	0	0	0	0
Net Change	(15)	0	(5)	8	12	0	0
As of July 1, 2022	388	35	25	17	487	15	967



APPENDIX A – MEMBERSHIP DATA

SUMMARY OF MEMBERSHIP DATA

A. ACTIVE MEMBERS	July 1, 2022	July 1, 2021	% Change
1. Number of Active Members			
(a) Before assumed retirement age	388	400	(3.0%)
(b) Beyond assumed retirement age	0	3	(100.0%)
(c) Total	388	403	(3.7%)
2. Annual Reported Salary			
(a) Before assumed retirement age	\$ 30,838,820	\$ 30,086,231	2.5%
(b) Beyond assumed retirement age	0	290,672	(100.0%)
(c) Total	\$ 30,838,820	\$ 30,376,903	1.5%
3. Accumulated Contributions	\$ 50,978,146	\$ 49,296,108	3.4%
4. Active Member Averages			
(a) Age	39.9	39.7	0.5%
(b) Service	13.1	12.7	3.1%
(c) Compensation	\$ 79,481	\$ 75,377	5.4%
(d) Accumulated contributions	\$ 131,387	\$ 122,323	7.4%
B. INACTIVE MEMBERS			
1. Number of Inactive Members			
(a) System nonvested (refund only)	17	9	88.9%
(b) System vested	25	30	(16.7%)
(c) Total	42	39	7.7%
2. Accumulated Member Contributions	\$ 3,404,782	\$ 3,841,250	(11.4%)
3. Inactive Members Averages			
(a) Age (vested members only)	46.6	46.9	(0.6%)
(b) Accumulated member contributions	\$ 81,066	\$ 98,494	(17.7%)
C. RETIREES, DISABLEDS, AND BENEFICIARIES			
1. Number of Members			
(a) Retired	371	364	1.9%
(b) Disabled	15	15	0.0%
(c) Beneficiaries	116	111	4.5%
(d) DROP	35	35	0.0%
(e) Total	537	525	2.3%
2. Annual Benefits			
(a) Retired	\$ 21,324,842	\$ 20,298,619	5.1%
(b) Disabled	577,907	549,252	5.2%
(c) Beneficiaries	3,404,369	3,168,549	7.4%
(d) DROP	2,463,433	2,424,893	1.6%
(e) Total	\$ 27,770,551	\$ 26,441,313	5.0%
3. Market Value of DROP Account Balances	\$ 4,794,979	\$ 4,311,477	11.2%

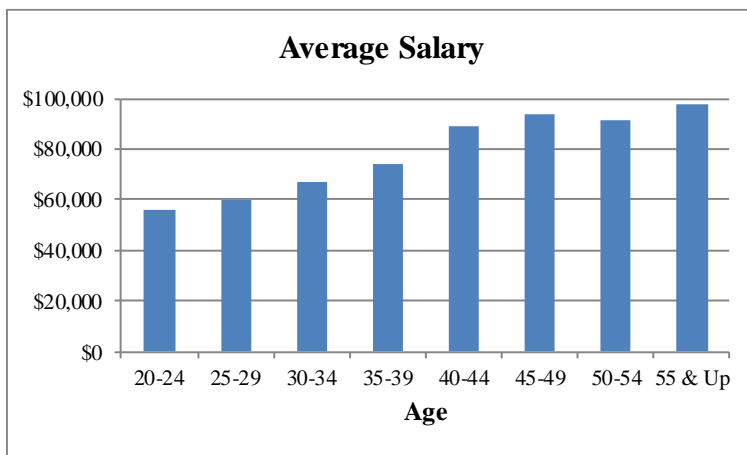
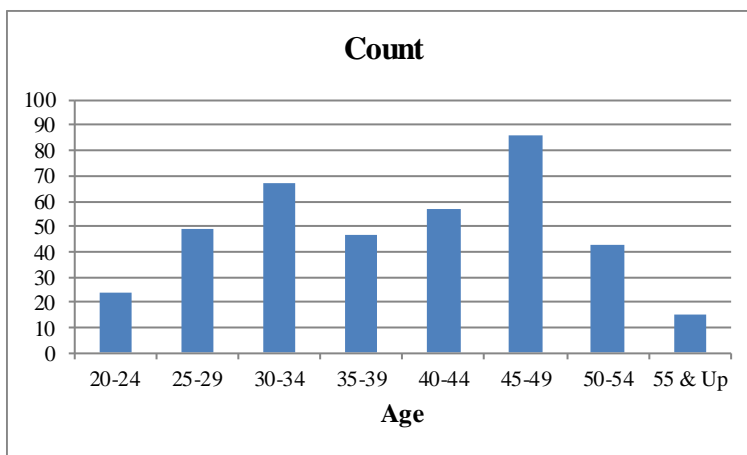


APPENDIX A – MEMBERSHIP DATA

**ACTIVE MEMBERS
AS OF JULY 1, 2022**

Total

Age	Count			Reported FY 2022 Earnings		
	Male	Female	Total	Male	Female	Total
20-24	19	5	24	\$ 1,071,147	\$ 276,012	\$ 1,347,159
25-29	44	5	49	2,678,693	264,807	2,943,500
30-34	61	6	67	4,081,639	407,172	4,488,811
35-39	43	4	47	3,273,207	208,083	3,481,290
40-44	53	4	57	4,760,311	334,095	5,094,406
45-49	82	4	86	7,697,478	375,171	8,072,649
50-54	42	1	43	3,838,591	102,153	3,940,744
55 & Up	15	0	15	1,470,261	0	1,470,261
Total	359	29	388	\$ 28,871,327	\$ 1,967,493	\$ 30,838,820

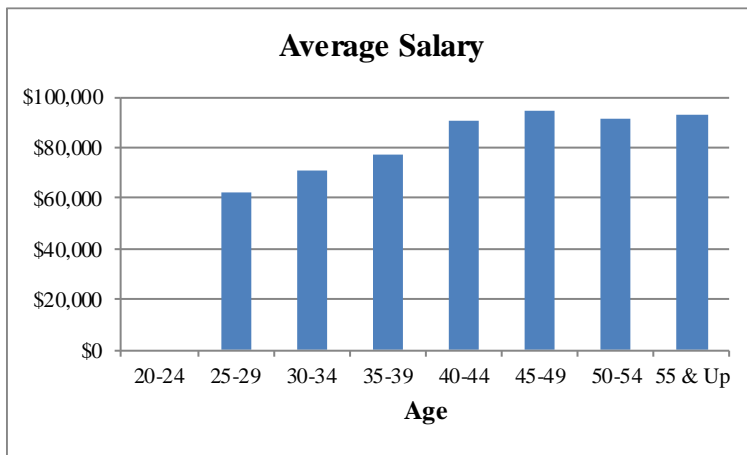
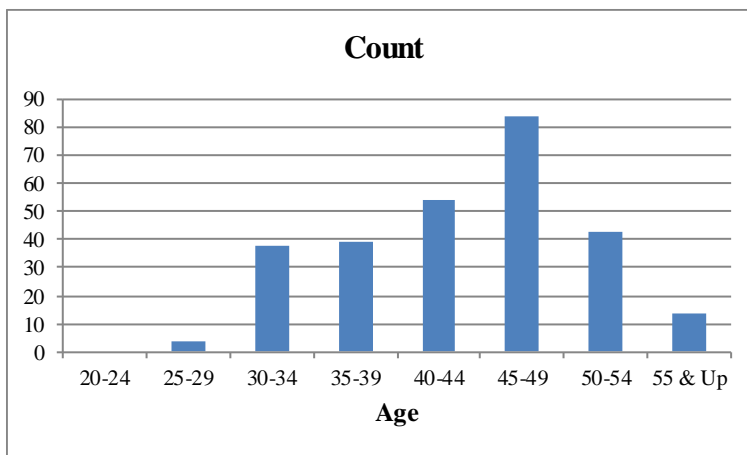




**ACTIVE MEMBERS
AS OF JULY 1, 2022**

Tier 1

Age	Count			Reported FY 2022 Earnings		
	Male	Female	Total	Male	Female	Total
20-24	0	0	0	\$ 0	\$ 0	\$ 0
25-29	4	0	4	248,722	0	248,722
30-34	34	4	38	2,419,650	288,286	2,707,936
35-39	36	3	39	2,854,271	155,417	3,009,688
40-44	51	3	54	4,635,901	268,082	4,903,983
45-49	80	4	84	7,575,828	375,171	7,950,999
50-54	42	1	43	3,838,591	102,153	3,940,744
55 & Up	14	0	14	1,297,265	0	1,297,265
Total	261	15	276	\$ 22,870,228	\$ 1,189,109	\$ 24,059,337



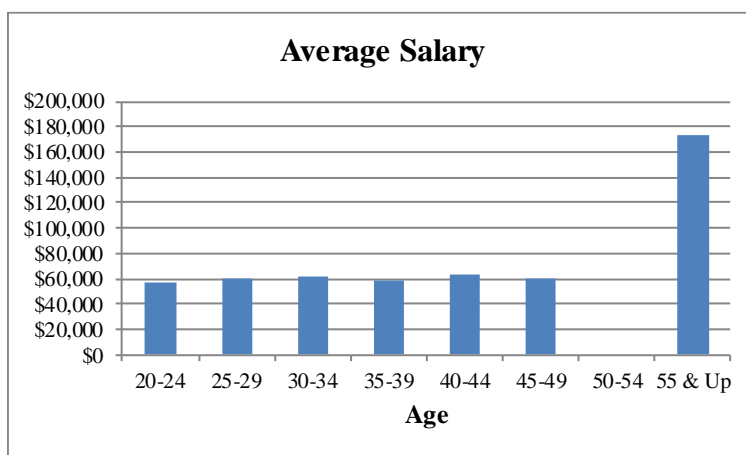
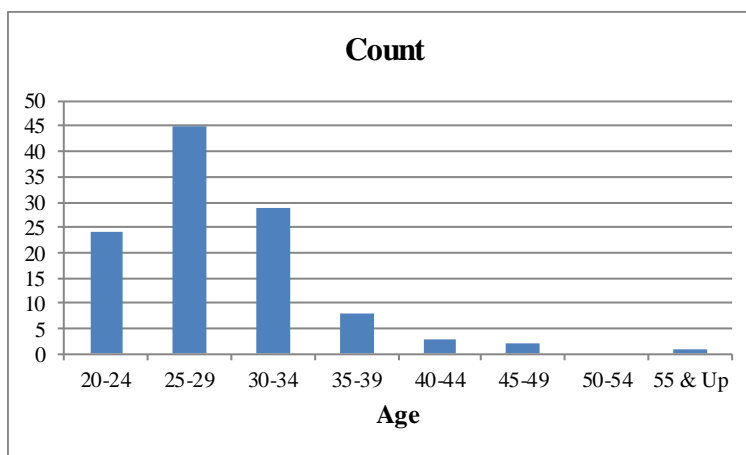


APPENDIX A – MEMBERSHIP DATA

**ACTIVE MEMBERS
AS OF JULY 1, 2022**

Tier 2

<u>Age</u>	<u>Count</u>			<u>Reported FY 2022 Earnings</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
20-24	19	5	24	\$ 1,071,147	\$ 276,012	\$ 1,347,159
25-29	40	5	45	2,429,971	264,807	2,694,778
30-34	27	2	29	1,661,989	118,886	1,780,875
35-39	7	1	8	418,936	52,666	471,602
40-44	2	1	3	124,410	66,013	190,423
45-49	2	0	2	121,650	0	121,650
50-54	0	0	0	0	0	0
55 & Up	1	0	1	172,996	0	172,996
Total	98	14	112	\$ 6,001,099	\$ 778,384	\$ 6,779,483





APPENDIX A – MEMBERSHIP DATA

**AGE AND SERVICE DISTRIBUTION
AS OF JULY 1, 2022**

Age		0-4	5-9	10-14	15-19	20-24	Over 25	Total
20-24	Number	24	0	0	0	0	0	24
	Total Salary	\$ 1,347,159	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,347,159
	Average Sal.	\$ 56,132	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 56,132
25-29	Number	37	12	0	0	0	0	49
	Total Salary	\$ 2,212,852	\$ 730,648	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,943,500
	Average Sal.	\$ 59,807	\$ 60,887	\$ 0	\$ 0	\$ 0	\$ 0	\$ 60,071
30-34	Number	21	41	5	0	0	0	67
	Total Salary	\$ 1,269,490	\$ 2,809,064	\$ 410,257	\$ 0	\$ 0	\$ 0	\$ 4,488,811
	Average Sal.	\$ 60,452	\$ 68,514	\$ 82,051	\$ 0	\$ 0	\$ 0	\$ 66,997
35-39	Number	8	7	20	12	0	0	47
	Total Salary	\$ 471,603	\$ 439,056	\$ 1,541,384	\$ 1,029,247	\$ 0	\$ 0	\$ 3,481,290
	Average Sal.	\$ 58,950	\$ 62,722	\$ 77,069	\$ 85,771	\$ 0	\$ 0	\$ 74,070
40-44	Number	2	3	12	33	7	0	57
	Total Salary	\$ 124,410	\$ 207,675	\$ 1,002,804	\$ 3,074,422	\$ 685,095	\$ 0	\$ 5,094,406
	Average Sal.	\$ 62,205	\$ 69,225	\$ 83,567	\$ 93,164	\$ 97,871	\$ 0	\$ 89,376
45-49	Number	1	1	4	34	42	4	86
	Total Salary	\$ 53,599	\$ 68,049	\$ 338,908	\$ 3,052,768	\$ 4,139,092	\$ 420,233	\$ 8,072,649
	Average Sal.	\$ 53,599	\$ 68,049	\$ 84,727	\$ 89,787	\$ 98,550	\$ 105,058	\$ 93,868
50-54	Number	0	0	3	17	23	0	43
	Total Salary	\$ 0	\$ 0	\$ 232,609	\$ 1,457,623	\$ 2,250,512	\$ 0	\$ 3,940,744
	Average Sal.	\$ 0	\$ 0	\$ 77,536	\$ 85,743	\$ 97,848	\$ 0	\$ 91,645
55 & Up	Number	1	0	0	6	8	0	15
	Total Salary	\$ 172,996	\$ 0	\$ 0	\$ 592,630	\$ 704,635	\$ 0	\$ 1,470,261
	Average Sal.	\$ 172,996	\$ 0	\$ 0	\$ 98,772	\$ 88,079	\$ 0	\$ 98,017
Total	Number	94	64	44	102	80	4	388
	Total Salary	\$ 5,652,109	\$ 4,254,492	\$ 3,525,962	\$ 9,206,690	\$ 7,779,334	\$ 420,233	\$ 30,838,820
	Average Sal.	\$ 60,129	\$ 66,476	\$ 80,136	\$ 90,262	\$ 97,242	\$ 105,058	\$ 79,481



APPENDIX A – MEMBERSHIP DATA

**MEMBERS PARTICIPATING IN DROP
AS OF JULY 1, 2022**

<u>Age</u>	<u>Count</u>			<u>Annual Benefits</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
49 & Under	0	0	0	\$ 0	\$ 0	\$ 0
50-51	3	0	3	224,886	0	224,886
52-53	18	1	19	1,235,142	59,741	1,294,883
54-55	6	2	8	457,623	140,303	597,926
56-57	3	0	3	199,737	0	199,737
58-59	2	0	2	146,001	0	146,001
60 & Up	0	0	0	0	0	0
Total	32	3	35	\$ 2,263,389	\$ 200,044	\$ 2,463,433



APPENDIX A – MEMBERSHIP DATA

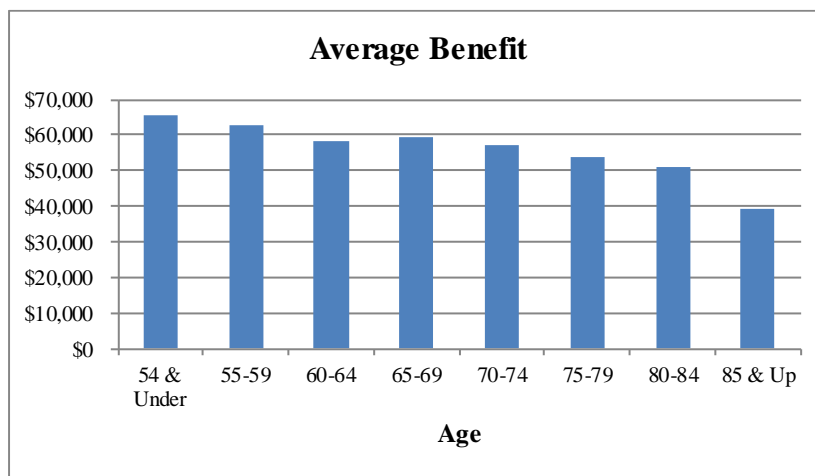
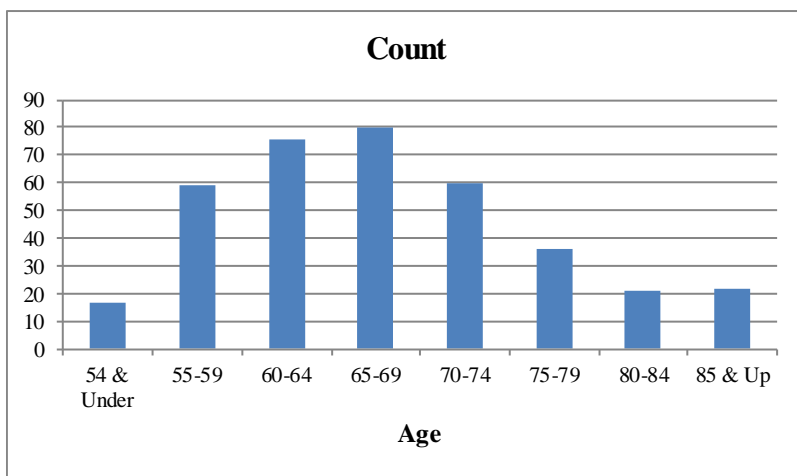
**INACTIVE VESTED MEMBERS
AS OF JULY 1, 2022**

<u>Age</u>	<u>Count</u>			<u>Annual Benefits</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
20-24	0	0	0	\$ 0	\$ 0	\$ 0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	2	0	2	51,307	0	51,307
40-44	6	0	6	141,552	0	141,552
45-49	11	0	11	368,570	0	368,570
50-54	5	1	6	137,527	27,733	165,260
55 & Up	0	0	0	0	0	0
Total	24	1	25	\$ 698,956	\$ 27,733	\$ 726,689



**RETIRED MEMBERS
AS OF JULY 1, 2022**

Age	Count			Annual Benefits		
	Male	Female	Total	Male	Female	Total
54 & Under	17	0	17	\$ 1,117,563	\$ 0	\$ 1,117,563
55-59	55	4	59	3,489,978	229,194	3,719,172
60-64	70	6	76	4,026,416	389,369	4,415,785
65-69	76	4	80	4,567,332	191,916	4,759,248
70-74	59	1	60	3,406,103	22,869	3,428,972
75-79	35	1	36	1,878,219	66,085	1,944,304
80-84	21	0	21	1,070,624	0	1,070,624
85 & Up	22	0	22	869,174	0	869,174
Total	355	16	371	\$ 20,425,409	\$ 899,433	\$ 21,324,842

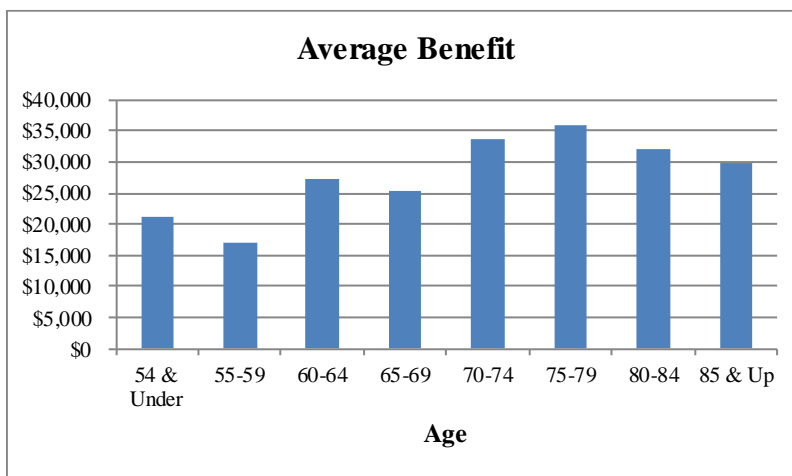
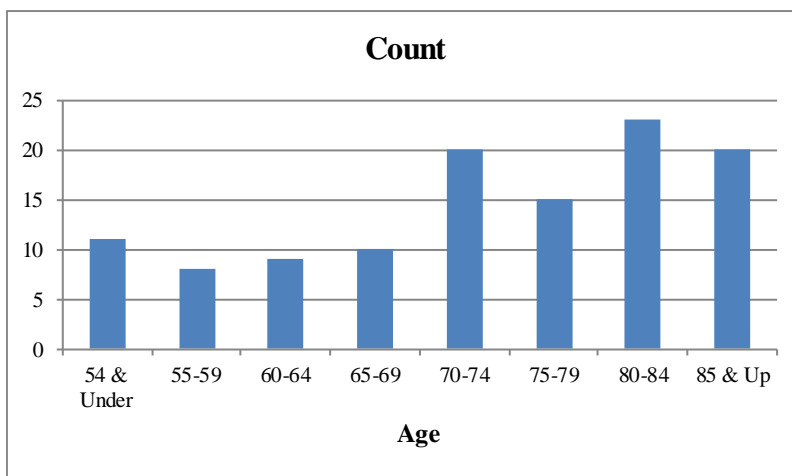




APPENDIX A – MEMBERSHIP DATA

**BENEFICIARIES
AS OF JULY 1, 2022**

Age	Count			Annual Benefits		
	Male	Female	Total	Male	Female	Total
54 & Under	1	10	11	\$ 22,689	\$ 209,824	\$ 232,513
55-59	0	8	8	0	135,055	135,055
60-64	1	8	9	9,776	234,636	244,412
65-69	0	10	10	0	252,273	252,273
70-74	0	20	20	0	670,324	670,324
75-79	0	15	15	0	537,623	537,623
80-84	1	22	23	33,385	701,502	734,887
85 & Up	0	20	20	0	597,282	597,282
Total	3	113	116	\$ 65,850	\$ 3,338,519	\$ 3,404,369





APPENDIX A – MEMBERSHIP DATA

**DISABLED MEMBERS
AS OF JULY 1, 2022**

Age	Count			Annual Benefits		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
54 & Under	7	1	8	\$ 268,894	\$ 31,678	\$ 300,572
55-59	0	0	0	0	0	0
60-64	0	1	1	0	38,519	38,519
65-69	1	0	1	42,343	0	42,343
70-74	3	0	3	112,364	0	112,364
75-79	2	0	2	84,109	0	84,109
80-84	0	0	0	0	0	0
85 & Up	0	0	0	0	0	0
Total	13	2	15	\$ 507,710	\$ 70,197	\$ 577,907



APPENDIX B – SUMMARY OF PLAN PROVISIONS

Member	Any member of the Nebraska State Patrol, permanent force.
Participation Date	Date of becoming a member.
Benefit Tiers	<p>Tier 1 refers to participants who joined the plan prior to July 1, 2016.</p> <p>Tier 2 refers to participants who joined the plan on or after July 1, 2016, as well as Tier 1 participants who took a refund and returned to the plan on or after July 1, 2016.</p>
Definitions	
<i>Covered pay</i>	Gross annual earnings subject to contributions.
<i>Final average compensation</i>	<p>For Tier 1 participants, it is the average of the highest three 12-month periods of covered pay, ending on the earlier of the participant's termination date or retirement date.</p> <p>For Tier 2 participants, it is the average of the highest five 12-month periods of covered pay, ending on the earlier of the participant's termination date or retirement date.</p>
<i>Salary caps</i>	For Tier 2 participants only, increases in compensation during the final five plan years of employment will be capped at 8% per year.
<i>Pension service</i>	Length of service includes all service with the Nebraska State Patrol, permanent force, computed to the nearest one-twelfth year, plus declared emergency service in the armed forces.
<i>Fiscal year</i>	Twelve month period ending June 30.
<i>Member and employer contributions</i>	<p>Tier 1 participants contribute 16.0% of covered pay. Such contributions are credited with interest based on the 1-year treasury yield curve on July 1 of each year, as determined by State Statutes. Employer contributions on Tier 1 Covered Pay are 16.0% of monthly salary. (Prior to July 1, 2013, employee and employer contribution rates for Tier 1 members were 19.0% of pay.).</p> <p>Tier 2 participants contribute 17.0% of covered pay. Such contributions are credited with interest based on the 1-year treasury yield curve on July 1 of each year, as determined by State Statutes. Employer contributions on Tier 2 Covered Pay are 17.0% of monthly salary.</p> <p>The State makes any additional contributions that are actuarially required.</p>



APPENDIX B – SUMMARY OF PLAN PROVISIONS

Pension benefit 3.0% of Final Average Compensation times Pension Service. The benefit is subject to a maximum of 75% of Final Average Compensation. Effective July 1, 2001, an automatic annual cost-of-living adjustment (COLA) equal to the CPI-W index is granted to each participant who has been retired for at least one full fiscal year.

For Tier 1 participants, the COLA is capped at 2.5%, unless the benefit drops below 60% of the purchasing power of the original benefit. For Tier 2 participants, the COLA is capped at 1.0% and there is no purchasing power floor.

Normal Retirement Date (NRD) First of month coinciding with or next following (a) the completion of 25 years of service and attaining age 50, (b) the completion of ten years of service and attaining age 55, or (c) attaining age 60 regardless of service.

Eligibility for Benefits

Deferred vested Termination for reasons other than death, disability, or retirement after completing at least six years of pension service.

Disability retirement Retirement by reason of disability as defined by State Statutes.

Early retirement Retirement before NRD and on or after both attaining age 50 and completing ten years of pension service.

Normal retirement Retire on NRD.

Postponed retirement Retire after NRD.

Post-retirement death benefit Death after retirement with surviving spouse or dependent children under age 19. For non-disability retirement, the surviving spouse must have been married to the member at the date of retirement.

Pre-retirement death benefit Death prior to retirement.

Monthly Benefits Paid Upon the Following Events

Normal retirement Pension benefit determined as of NRD.

Early retirement Pension benefit determined as of early retirement date, reduced by 5/9% for each month that commencement (which must be after age 50 and ten years of service) of payment precedes the earlier of age 55 or completion of 25 years of service. No reduction is made after 25 years of service.

Postponed retirement Monthly pension benefit determined as of actual retirement date.



APPENDIX B – SUMMARY OF PLAN PROVISIONS

Termination with deferred vested benefit

Refund of contributions with regular interest or a percentage of the pension benefit determined as of termination date, reduced by 5/9% for each month that commencement (which must be after age 50 and ten years of service) of payment precedes the earlier of age 55 or completion of 25 years of service. This percentage is based upon completed years of pension service as follows:

<u>Years</u>	<u>Vested Percentage</u>
5 and under	0%
6	20
7	40
8	60
9	80
10 or more	100

Disability retirement

A monthly benefit equal to 50% of current monthly salary at the date of disablement for members with less than 17 years of service.

For members with more than 17 years of service, a monthly benefit equal to the product of 3% of final monthly salary, times total years of service subject to a maximum of 75% of Final Average Compensation.

Pre-retirement death benefits

Surviving spouse or dependent children under age 19:

Benefit is computed as if member retired for disability on the date of death. This benefit is payable to the surviving spouse as long as spouse has dependent children under age 19. If spouse dies or remarries, 75% of this benefit continues to children until the youngest attains age 19. If there are no dependent children under age 19, 75% of this benefit is payable to the surviving spouse until death or remarriage.

No surviving spouse or dependent children under age 19:

A lump sum equal to the member’s contributions plus regular interest.

Post-retirement death benefits

100% of member’s annuity is payable to the surviving spouse provided spouse has dependent children under 19. If there is no surviving spouse or spouse dies or remarries, 75% of member’s annuity continues to children until the youngest attains age 19. If there are no dependent children under age 19, 75% of member’s annuity continues to surviving spouse.

Forms of payment

Normal form is 75% Joint and Survivor benefit. Members may also elect a refund of contributions. If there is no surviving spouse or dependent children under age 19, the member’s accumulated contributions with interest are paid to the beneficiary or estate.



APPENDIX B – SUMMARY OF PLAN PROVISIONS

Deferred Retirement Option Plan (DROP)

A Tier 1 member may elect to participate in the DROP after they attain age 50 with 25 years of service. A member can continue to work while participating in the DROP, but must terminate employment within 5 years of entry into the DROP. The member's retirement benefits would be calculated as of the DROP entry date. The monthly payments that begin at entry into the DROP are accumulated until the member terminates service, at which time the DROP accumulated benefits and investment income can be paid as a lump sum, rollover or annuity. The COLA for retirees would not apply to the member during participation in the DROP and both the member and employer contributions cease upon entry into the DROP.

Tier 2 members cannot participate in DROP.

Benefits Reflected in Valuation

All benefits were valued, including future cost of living increases granted by statute.

Plan Provisions Effective After July 1, 2022

No future changes in plan provisions were recognized in determining the funded status or in determining the actuarial soundness of statutory contribution levels.

Changes in Plan Provisions Since the Prior Year

There have been no changes to plan provisions since the prior year.



A. ACTUARIAL METHODS

- 1. Calculation of Normal Cost and Actuarial Accrued Liability:** The method used to determine the normal cost and actuarial accrued liability was the Entry Age Actuarial Cost Method described below.

Entry Age Actuarial Cost Method

Projected pension and preretirement spouse's death benefits were determined for all active members who had not reached age 60 or 25 years of service. Cost factors designed to produce annual costs as a level percentage of each member's expected compensation in each year from the assumed entry age to the assumed retirement age were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members who had not reached age 60 or 25 years of service and determining an average normal cost rate which is then related to the total payroll of active members who had not reached age 60 or 25 years of service. The actuarial assumptions shown in Appendix C were used in determining the projected benefits and cost factors. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for retired members and their beneficiaries currently receiving benefits, active members who either reached age 60 or 25 years of service, terminated vested members and disabled members not yet receiving benefits was determined as the actuarial present value of the benefits to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date. Under the Entry Age Normal method, experience gains or losses, i.e., decreases or increases in actuarial accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

The unfunded actuarial accrued liability is amortized using the "layered" approach. The unfunded actuarial accrued liability as of July 1, 2006 was the initial or legacy amortization base, amortized over a closed 30-year period. Changes in the unfunded actuarial accrued liability due to assumption changes or actuarial experience gains/losses are amortized over separate 25-year amortization bases, each with their own individual payment schedules, beginning June 30, 2021 and after. If the UAAL is less than or equal to zero, then all prior bases shall be considered fully funded and the UAAL shall be amortized over a 25-year period as of the actuarial valuation date. The UAAL amortization payment schedules are determined using the level percent of payroll methodology, where payments escalate annually with the assumed increase in payroll growth.



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

2. Calculation of the Actuarial Value of Assets: The actuarial value of assets is based on a five-year smoothing method and is determined by spreading the effect of each year's investment return in excess of or below the expected return. The market value of assets as the valuation date is reduced by the sum of the following:

- i. 80% of the return to be spread during the first year preceding the valuation date,
- ii. 60% of the return to be spread during the second year preceding the valuation date,
- iii. 40% of the return to be spread during the third year preceding the valuation date, and
- iv. 20% of the return to be spread during the fourth year preceding the valuation date.

The return to be spread is the difference between (1) the actual investment return on market value of assets and (2) the expected return of actuarial value of assets. Effective July 1, 2000, the expected return on actuarial value of assets includes interest on the previous year's unrecognized return.

B. VALUATION PROCEDURES

Data Procedures

Salaries for first year members are annualized by NPERS and reflected in the Calculated Salary field in the census data. This is used in the valuation process for new members. For continuing active members, the Accumulated Salary field from the data, representing the actual salary earned in the prior fiscal year, is used in the valuation process.

When multiple records are received, the record with the oldest beneficiary date of birth is valued.

Other Valuation Procedures

The compensation amounts used in the projection of benefits and liabilities for active members were prior plan year compensations. Salary increases are assumed to apply to annual amounts.

Projected benefits were limited by the dollar limitation required by the Internal Revenue Code Section 415 as it applies to governmental plans and compensation limited by Section 401(a)(17).

Decrements are assumed to occur mid-year, except that immediate retirement is assumed for those who are at or above the age at which retirement rates are 100%. Standard adjustments are made for multiple decrements.

No actuarial accrued liability is included for participants who terminated without being vested prior to the valuation date, except those who are owed a refund of contributions.

Changes in Methods and Procedures Since the Prior Year

There have been no changes to the methods and procedures since the prior year.



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

ECONOMIC ASSUMPTIONS

1. Investment Return 7.20% per annum, compounded annually, net of expenses.
Note: The assumption will decrease by 0.10% per year until reaching the ultimate rate of 7.00% in the 2024 valuation.

2. Inflation 2.55% per annum, compounded annually.
Note: The assumption will decrease by 0.10% per year until reaching the ultimate rate of 2.35% in the 2024 valuation.

3. Salary Increase Rates vary by service as follows:

Rates by Service				
Years	Inflation	Productivity	Merit	Total
1	2.55%	0.50%	5.50%	8.55%
2	2.55	0.50	4.50	7.55
3	2.55	0.50	3.60	6.65
4	2.55	0.50	3.00	6.05
5	2.55	0.50	2.60	5.65
6	2.55	0.50	2.30	5.35
7	2.55	0.50	2.05	5.10
8	2.55	0.50	1.85	4.90
9	2.55	0.50	1.65	4.70
10	2.55	0.50	1.60	4.65
11	2.55	0.50	1.56	4.61
12	2.55	0.50	1.53	4.58
13-25	2.55	0.50	1.50	4.55
26	2.55	0.50	1.20	4.25
27	2.55	0.50	0.90	3.95
28	2.55	0.50	0.60	3.65
29	2.55	0.50	0.30	3.35
30+	2.55	0.50	0.00	3.05

4. Payroll Growth 3.05% per annum.
Note: The assumption will decrease by 0.10% per year until reaching the ultimate rate of 2.85% in the 2024 valuation.

5. Interest on Employee Contributions 2.50% per annum, compounded annually.

6. Increases on Compensation And Benefit Limits 2.55% per annum on the 401(a)(17) compensation limit and the 415 benefit limit.
Note: The assumption will decrease by 0.10% per year until reaching the ultimate rate of 2.35% in the 2024 valuation.



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

DEMOGRAPHIC ASSUMPTIONS

1. Mortality

- a. Healthy lives - Active members Pub-2010 General Members (Above Median) Employee Mortality Table (100% of male rates, 95% of female rates), both male and female rates set back one year, projected generationally using MP-2019 modified to 75% of the ultimate rates.
- b. Healthy lives – Retired members Pub-2010 General Members (Above Median) Retiree Mortality Table (100% of male rates, 95% of female rates), both male and female rates set back one year, projected generationally using MP-2019 modified to 75% of the ultimate rates.
- c. Healthy lives – Beneficiaries Pub-2010 General Members (Above Median) Contingent Survivor Mortality Table (100% of male rates, 95% of female rates), both male and female rates set back one year, projected generationally using MP-2019 modified to 75% of the ultimate rates.
- d. Disabled lives Pub-2010 Non-Safety Disabled Retiree Mortality Table (static table).
- e. Healthy mortality rates and projection scale are shown below at sample ages:

Pre-retirement Mortality		
Mortality Rate (Base Rates)		
Sample Age	Males	Females
20	0.04%	0.01%
30	0.04	0.01
40	0.07	0.03
50	0.11	0.06
60	0.27	0.16

Post-retirement Mortality		
Mortality Rate (Base Rates)		
Sample Age	Males	Females
50	0.11%	0.06%
60	0.53	0.35
70	1.17	0.80
80	3.60	2.60
90	11.73	9.07



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

Projection Scale – Post-retirement Mortality						
Sample Age	Scale (2020)		Scale (2030)		Scale (2040)	
	Males	Females	Males	Females	Males	Females
50	0.0004	0.0030	0.0026	0.0036	0.0075	0.0075
60	0.0004	-0.0041	0.0063	0.0069	0.0075	0.0075
70	0.0017	0.0052	0.0069	0.0063	0.0075	0.0075
80	0.0067	0.0061	0.0066	0.0070	0.0075	0.0075
90	0.0048	0.0032	0.0067	0.0067	0.0069	0.0069

f. Disabled mortality rates are shown below at sample ages:

Sample Age	Males	Females
30	0.35%	0.26%
40	0.65	0.63
50	1.61	1.48
60	2.50	1.96
70	3.90	2.86
80	7.35	6.01

2. Retirement

Retirement is assumed to occur upon attaining certain age and service requirements. The retirement assumption varies depending on benefit eligibility and age at retirement.

Early/Normal Retirement Eligibility	Age and Service Requirements	Retirement Assumption
Reduced	Age 50 Service: 10 years	1% at each age
Unreduced	Age 55 Service: 10 years	10% at each age
Unreduced (Eligible for DROP)	Age 50 Service: 25 years	100% at each age
Unreduced (Mandatory)	Age 60	100% at each age



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

3. Termination

Rates vary by service. Sample rates are as follows:

Rates by Service	
Years	Rate
<1	4.00%
1	3.75
5	2.75
10	2.00
15	1.25
20+	0.00

4. Disability

Rates vary by age. Sample rates are as follows:

Rates by Age	
Age	Rate
25	0.08%
30	0.10
35	0.13
40	0.20
45	0.31
50	0.52
55	0.91
60	1.36

OTHER ASSUMPTIONS

1. Form of Payment

75% Joint & Survivor Annuity. Deferred vesteds are assumed to take the greater of the present value of an annuity at earliest unreduced eligibility or a refund of contributions.

2. Marital Status

- a. Percent married
- b. Spouse’s age

100% married
Females assumed to be three years younger than males.

3. Children

All members are assumed to have one dependent child at death or retirement. The child is assumed to be 28 years younger than the member and is assumed to always survive until age 19.

4. Administrative Expense

0.26% of payroll

5. Commencement Age for Deferred Vested Benefit

Age 55

6. Cost of Living Adjustments

2.10% per annum, compounded annually for Tier 1 members.
Note: The assumption will decrease by 0.05% per year until reaching the ultimate rate of 2.00% in the 2024 valuation.
1.00% per annum, compounded annually for Tier 2 members.



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

- | | |
|-----------------------|---|
| 7. DROP Participation | All members elect the DROP at the earliest possible date and remain in the DROP for 4 years or to age 60, if earlier. No COLA is received during DROP. |
| 8. State Contribution | Additional State contributions for the current plan year are assumed to be contributed in a lump sum on the July 1 following the plan year end. These amounts from the prior plan year are treated as a contribution receivable on the plan's financial statements. |

Changes in Assumptions since the Prior Year

At their meeting on December 21, 2020, the Public Employees Retirement Board adopted a new set of actuarial assumptions, based on the recommendations in the 2020 experience study. Changes to the set of economic assumptions are phased in over a four-year period, beginning with the July 1, 2021 valuation. Below is a summary of the key assumption changes in this valuation:

- Price inflation assumption was lowered from 2.65% to 2.55%.
- Investment return assumption was lowered from 7.30% to 7.20%.
- COLA assumption for Tier 1 members was lowered from 2.15% to 2.10%.
- General wage inflation assumption was lowered from 3.15% to 3.05%.
- Payroll growth assumption was lowered from 3.15% to 3.05%.



APPENDIX D – GLOSSARY OF TERMS

Actuarial Accrued Liability	The difference between the actuarial present value of system benefits and the actuarial value of future normal costs. Also referred to as “accrued liability” or “actuarial liability”.
Actuarial Assumptions	Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
Actuarial Equivalent	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate assumptions.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of retirement system benefit between future normal cost and actuarial accrued liability. Sometimes referred to as the “actuarial funding method”.
Experience Gain (Loss)	The difference between actual experience and actuarial assumptions anticipated experience during the period between two actuarial valuation dates.
Actuarial Present Value	The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.
Amortization	Paying off an interest-discounted amount with periodic payments of interest and principal, as opposed to paying off with lump sum payment.
Normal Cost	The actuarial present value of retirement system benefits allocated to the current year by the actuarial cost method.
Unfunded Actuarial Accrued Liability	The difference between actuarial accrued liability and the valuation assets. Sometimes referred to as “unfunded actuarial liability” or “unfunded accrued liability.”