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***NEBRASKA PUBLIC EMPLOYEES
RETIREMENT SYSTEM***

STATE PATROL RETIREMENT SYSTEM

**ACTUARIAL VALUATION REPORT
AS OF JULY 1, 2018**

**Sixty-Third Actuarial Report for
System Plan Year Beginning July 1, 2018
and
State Fiscal Year Ending June 30, 2020**





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November 8, 2018

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, 2018 for purposes of determining the actuarial required contribution rate for the plan year ending June 30, 2019. It is our understanding that any additional required State contributions for this plan year will be made on July 1, 2019 (State fiscal year end 2020). The major findings of the valuation are contained in this report, which reflects the benefit provisions in place on July 1, 2018. There were no changes to the actuarial assumptions and methods or benefit provisions from the prior valuation.

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 them as indicated in Appendix C.

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.



Public Employees Retirement Board
November 8, 2018
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The actuarial computations presented in this report are for purposes of determining the funding amounts for the System as set out 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 will be presented in completely 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.

On the basis of 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".

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

A handwritten signature in blue ink that reads "Brent A. Banister".

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



SECTION 1 – BOARD SUMMARY

This report presents the results of the July 1, 2018 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, 2019 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.
- Compare actual and expected experience under the System during the plan year ended June 30, 2018.
- Analyze and report on trends in System contributions, assets and liabilities over the past several years.

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, 2018 actuarial valuation, an additional State contribution of \$3,983,698 is required for the plan year ending June 30, 2019 (expected to be paid July 1, 2019).**

The actuarial valuation results provide a “snapshot” view of the System’s financial condition on July 1, 2018. The System’s unfunded actuarial accrued liability (UAAL) decreased from \$69.9 million last year to \$62.5 million this year and the funded ratio increased from 85% to 87%. In addition, the actuarial required contribution rate decreased from 47.23% of pay last year to 45.53% of pay in this year’s valuation, a decrease of 1.70%.

The valuation results reflect net favorable experience for the past plan year as demonstrated by an UAAL that was lower than expected. The UAAL on July 1, 2018 is \$62.5 million compared to an expected UAAL of \$69.9 million. The favorable experience was due to the combined impact of an experience gain on both the System liabilities and the actuarial value of assets. The rate of return on the market value of assets for FY 2018 was 8.2%, as reported by the Nebraska Investment Council. However, the asset smoothing method only recognizes 20% of the excess/shortfall between the assumed rate of return and the actual return. The partial recognition of FY 2018 experience, coupled with the scheduled recognition of the deferred experience from the prior four years, resulted in a rate of return on the actuarial (smoothed) value of assets of 8.4%. Because this return is higher than the assumed rate (7.5%), it generated an experience gain of \$3.4 million on the actuarial value of assets. There was also a net experience gain of \$4.0 million on the System’s liabilities, largely as the result of salary increases being lower than expected and more complete beneficiary data.

The 2016 Legislature made changes to the benefit structure for members hired on or after July 1, 2016 (Tier 2) which 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 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 the report. The weighted statutory contribution rate in the current valuation is 16.08%, slightly above the Tier 1 contribution rate of 16.00%. This is due to the fact that there are only 38 members in Tier 2 as of July 1, 2018, which is about 10% of the active membership. While the weighted



SECTION 1 – BOARD SUMMARY

contribution rate will continue to increase gradually, it will be a number of years before Tier 2 has a meaningful impact on the valuation results.

A summary of the key results from the July 1, 2018 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 13.37% of pay, or \$3,983,698, is required. Further detail on the valuation results can be found in the following sections of this Board Summary.

	Valuation Results	
	July 1, 2018	July 1, 2017
Unfunded Actuarial Accrued Liability	\$62,504,026	\$69,916,439
Funded Ratio (Actuarial Assets)	86.98%	84.97%
Normal Cost Rate	30.43%	30.57%
UAAL Amortization Rate	15.10%	16.66%
Total Actuarial Required Contribution	45.53%	47.23%
Weighted Member Contribution Rate	(16.08%)	(16.04%)
Weighted Employer Contribution Rate	(16.08%)	(16.04%)
Additional Required State Contribution Rate	13.37%	15.15%
Additional Required State Contribution	\$3,983,698	\$4,337,435

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, 2017 and July 1, 2018. The components are examined in the following discussion.

MEMBERSHIP

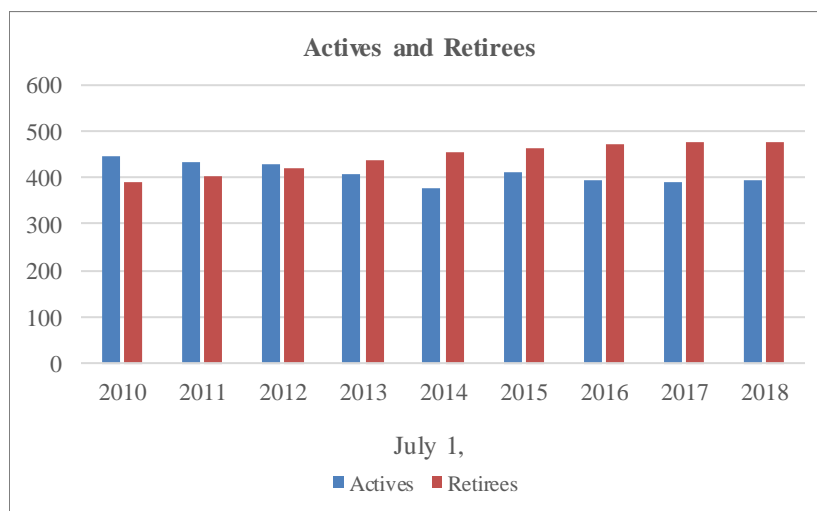
There were 395 active members (excluding DROP members) in the 2018 valuation compared to 391 in the 2017 valuation, a 1.0% increase. When the number of active members increases, it has a positive impact on the System’s funding as the amount of the statutory fixed contributions are higher, reducing the additional contribution needed from the State. In addition, the UAAL contribution rate is favorably impacted by a larger group of active members and the resulting higher payroll. The UAAL is amortized assuming future covered payroll will increase 3.50% per year so payments increase 3.50% each year. If total payroll grows more than 3.50%, the UAAL payment is divided by payroll that is larger than expected, which results in a lower UAAL amortization rate. Conversely, a decrease in active members, or payroll growth less than 3.5% per year, will tend to result in a higher amortization rate.

The graph on the next page compares the number of active and retired members for the past nine valuations. While the number of active members has fluctuated at times over this period, the number of members receiving a benefit has steadily increased and is 478 in this valuation. This is an indication of the maturity of the plan and is not necessarily unexpected. This metric does indicate there may now be a higher risk of contribution rate volatility due to actual experience that varies from that expected.



SECTION 1 – BOARD SUMMARY

The following graph shows the number of active members compared to the number of members receiving a benefit.



ASSETS

As of June 30, 2018, the System had net assets of \$420.7 million, when measured on a market value basis, an increase of \$23.5 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 \$417.6 million, an increase of \$22.4 million from the prior year. The components of change in the asset values are shown in the following table:

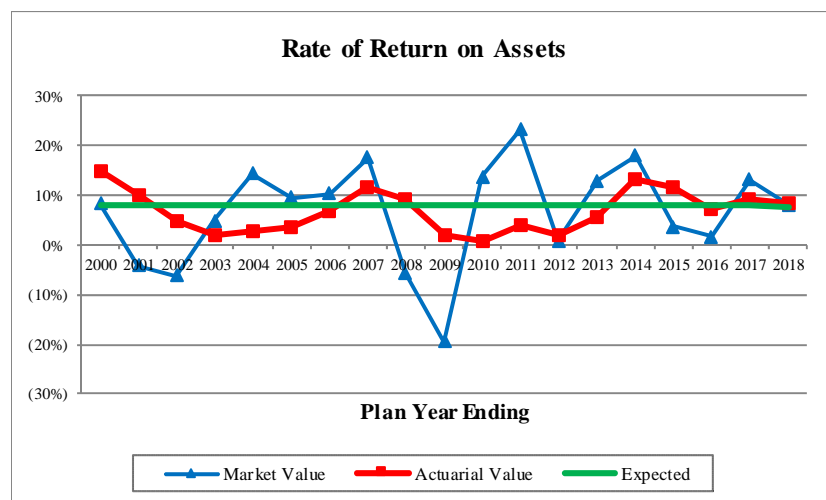
	Market Value (\$M)		Actuarial Value (\$M)	
Net Assets, June 30, 2017	\$	397.1	\$	395.1
- Employer and Member Contributions	+	13.6	+	13.6
- Benefit Payments	-	23.8	-	23.8
- Net Investment Income	+	33.8	+	32.7
Net Assets, June 30, 2018	\$	420.7	\$	417.6
Estimated Rate of Return		8.2%		8.4%

The rate of return on the actuarial value of assets was 8.4%, which was higher than the 7.5% investment return assumption. As a result, there was an experience gain on assets of \$3.4 million. The investment return on the market value of assets for FY 2018 of 8.2% resulted in an increase in the deferred investment experience from a net deferred investment gain of \$2.0 million in last year’s valuation to a net deferred



SECTION 1 – BOARD SUMMARY

investment gain of \$3.1 million in the current valuation. Please see Section 3 of this report for more detailed information on the market and actuarial value of assets.



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. 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 is shown as of July 1, 2018 in the table below:

	Actuarial Value of Assets	Market Value of Assets
Actuarial Accrued Liability	\$480,092,201	\$480,092,201
Value of Assets	<u>417,588,175</u>	<u>420,683,030</u>
Unfunded Actuarial Accrued Liability	\$62,504,026	\$59,409,171
Funded Ratio	86.98%	87.63%

See Section 4 of the report for the detailed development of the unfunded actuarial accrued liability.



SECTION 1 – BOARD SUMMARY

The net change in the UAAL from July 1, 2017 to July 1, 2018 was a decrease of \$7.4 million. The components of this net change are shown in the following table:

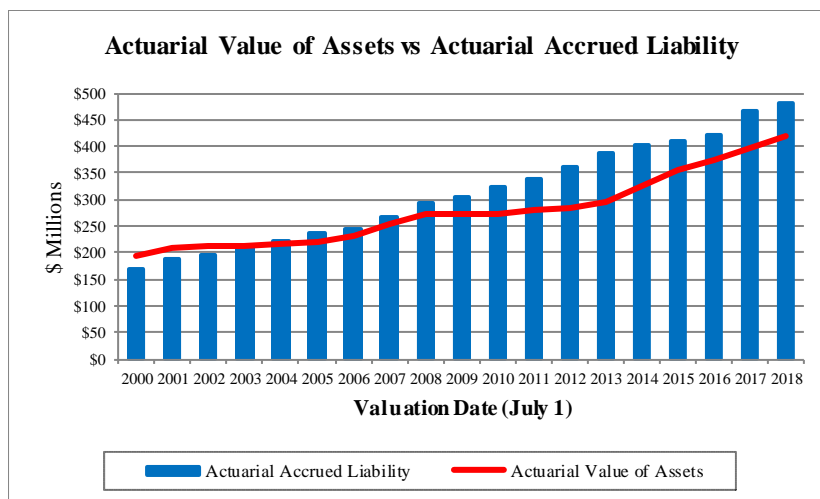
	(\$ Millions)
Unfunded Actuarial Accrued Liability, July 1, 2017	\$69.92
- Expected increase from amortization method	0.30
- Investment experience	(3.37)
- Liability experience	(4.02)
- Other experience	(0.33)
Unfunded Actuarial Accrued Liability, July 1, 2018	\$62.50

As shown above, various components impacted the UAAL. Actuarial gains (losses), which result from actual experience that is more (less) favorable than anticipated based on 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 provision changes. Overall, the System experienced a net actuarial gain of \$7.4 million which may be explained by considering the separate experience of assets and liabilities. As noted earlier, there was an experience gain of \$3.4 million on the actuarial value of assets. Favorable experience on System liabilities resulted in an actuarial gain of \$4.0 million. The liability gain was the net result of various components of actuarial experience, the largest of which were gains from actual salary increases that were lower than expected and more complete beneficiary data. A breakdown of the components of experience gains and losses can be found in Table 8 of this report.

As the following graph of historical actuarial assets and 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 a result, the funded ratio declined over that period. Recently, the System's assets have been growing at a faster rate than the System's liabilities and the funded ratio has been improving. However, changes to actuarial assumptions in the July 1, 2017 valuation significantly increased the System's liabilities and lowered the funded ratio.



SECTION 1 – BOARD SUMMARY



An evaluation of the UAAL on a pure dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both very 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).

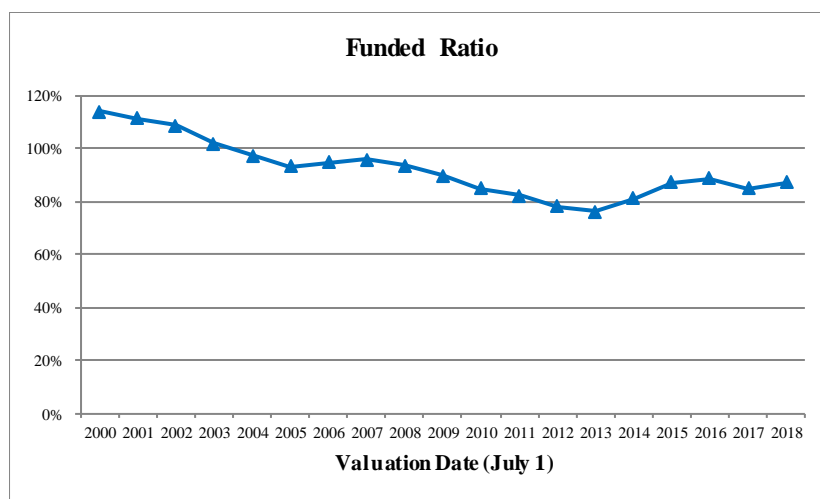
	7/1/2014	7/1/2015	7/1/2016	7/1/2017	7/1/2018
Funded Ratio (AVA/AAL)	81.20%	86.89%	88.69%	84.97%	86.98%
UAAL	\$75.45	\$53.76	\$47.72	\$69.92	\$62.50

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 differ.

The funded ratio over a longer period is shown in the following graph. Given the weighted statutory contribution rate of 32.16% of pay (16.08% by members and 16.08% by the employer) and a normal cost rate of 30.43% of pay, only a small portion of the total contribution is available to fund the UAAL. As a result, additional contributions from the State will be necessary to improve the funded ratio unless actual investment experience in future years is higher than the assumed rate of return.



SECTION 1 – BOARD SUMMARY



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 to make an additional contribution if the regular, payroll-related contributions by employees and employers 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. Based on the results of the July 1, 2018 actuarial valuation, an additional State contribution of 13.37% of pay, or \$3,983,698, is necessary for the plan year ending June 30, 2019.

Under the Entry Age Normal cost method, the actuarial contribution rate consists of two 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 “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 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 of 3.50%. Because the UAAL contribution rate is determined as a level percent of payroll, the dollar amount of the UAAL contribution is scheduled to increase 3.50% each year in the future even if all actuarial assumptions are met. Therefore, if the increase in covered payroll is less than 3.50% per year, the UAAL contribution rate will increase.

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



SECTION 1 – BOARD SUMMARY

Contribution Rates	July 1, 2018	July 1, 2017
1. Normal Cost Rate	30.43%	30.57%
2. UAAL Contribution Rate	15.10%	16.66%
3. Total Actuarial Required Contribution Rate	45.53%	47.23%
4. Weighted Member Contribution Rate	(16.08%)	(16.04%)
5. Weighted Employer Contribution Rate	(16.08%)	(16.04%)
6. Total Statutory Contribution Rate	(32.16%)	(32.08%)
7. Additional Required State Contribution Rate [3 + 6]	13.37%	15.15%
8. Estimated Payroll	\$ 29,795,799	\$ 28,629,936
9. Additional State Required Contribution [7 * 8, but not less than \$0]	\$ 3,983,698	\$ 4,337,435

The actuarial required contribution rate for the plan year ending June 30, 2019 is 45.53%. The weighted contribution rate of 16.08% for the member and employer result in a total payroll-related statutory contribution rate of 32.16% of pay. As a result, there is a contribution shortfall this year of 13.37% of payroll, which is projected to be about \$4.0 million. The actuarial required contribution, determined this year based on the snapshot of the System taken on the valuation date of July 1, 2018, will change each year 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.

A history of actuarial required contribution rates and any resulting additional required State contributions, whether or not actually contributed, is shown in the following table:



SECTION 1 – BOARD SUMMARY

History of Expected State Contributions				
Plan Year	Statutory State Contributions		Additional Appropriations	Total
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
2002/2003		2,413,762	0	2,413,762

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

The actuarial required contribution rate, which for this plan year is determined based on the snapshot of the System taken on the valuation date of July 1, 2018, will change each year as the deferred investment experience is recognized and other experience (both investment and demographic) impacts the System.

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

	<u>7/1/2018</u> <u>Valuation</u>	<u>7/1/2017</u> <u>Valuation</u>	<u>% Change</u>
1. PARTICIPANT DATA			
Number of:			
Active Members			
- Tier 1	357	372	(4.03%)
- Tier 2	38	19	100.00%
- Total	<u>395</u>	<u>391</u>	1.02%
Retired Members and Beneficiaries	431	421	2.38%
DROP Participants	33	42	(21.43%)
Disabled Members	14	15	(6.67%)
Inactive Members	<u>36</u>	<u>32</u>	12.50%
Total Members	909	901	0.89%
Projected Annual Salaries of Active Members	\$ 29,795,799	\$ 28,629,936	4.07%
Annual Retirement Payments for Members in Receipt and DROP Participants	\$ 22,642,266	\$ 22,006,407	2.89%
2. ASSETS AND LIABILITIES			
a. Market Value of Assets	\$ 420,683,030	\$ 397,137,172	5.93%
b. Actuarial Value of Assets	417,588,175	395,149,596	5.68%
c. Total Actuarial Accrued Liability	480,092,201	465,066,035	3.23%
d. Unfunded Actuarial Accrued Liability [c - b]	\$ 62,504,026	\$ 69,916,439	(10.60%)
e. Funded Ratio (Actuarial Value of Assets) [b / c]	86.98%	84.97%	2.37%
f. Funded Ratio (Market Value of Assets) [a / c]	87.63%	85.39%	2.62%
3. EMPLOYER CONTRIBUTION RATES AS A PERCENT OF PAYROLL			
Normal Cost	30.43%	30.57%	(0.46%)
Amortization of Unfunded Actuarial Accrued Liability	<u>15.10%</u>	<u>16.66%</u>	(9.36%)
Actuarial Required Contribution Rate	45.53%	47.23%	(3.60%)
Weighted Member Contribution Rate	(16.08%)	(16.04%)	0.25%
Weighted Employer Contribution Rate	<u>(16.08%)</u>	<u>(16.04%)</u>	0.25%
Additional Required State Contribution Rate	13.37%	15.15%	(11.75%)
Additional Required State Contribution	\$ 3,983,698	\$ 4,337,435	(8.16%)



SECTION 2 – SCOPE OF THE REPORT

This report presents the actuarial valuation of the State Patrol Retirement System as of July 1, 2018. 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 of the System are to be met under the actuarial cost method in use. Section 6 includes some historical funding and other 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, 2018.
- 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, 2018. 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, 2018 and July 1, 2017, in total and by investment category. Table 2 summarizes the change in the market value of assets from July 1, 2017 to July 1, 2018.

Actuarial Value of Assets

Neither the market value of assets, representing a "cash-out" value of System assets, nor the book values of assets, representing the cost of investments, may 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 actual and assumed 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, 2018</u>	<u>June 30, 2017</u>
1. Cash and Equivalents	\$ 191,614	\$ 131,822
2. Investments*	428,634,410	404,578,841
3. Capital Assets	57	80
4. Receivables and Prepaids	41,983,291	31,609,209
5. Accounts Payable	<u>(50,126,342)</u>	<u>(39,182,780)</u>
6. Net Assets Available for Pension Benefits	\$ 420,683,030	\$ 397,137,172

* Includes DROP account balances.



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

	2018	2017
1. Market Value of Assets, Beginning of Year	\$ 397,137,172	\$ 361,155,486
2. Contributions		
(a) Member (includes purchased service)	\$ 4,615,214	\$ 4,500,952
(b) State	4,615,214	4,511,552
(c) State appropriations	4,337,435	2,541,558
(d) Total	\$ 13,567,863	\$ 11,554,062
3. Expenditures		
(a) Benefit payments	\$ 19,807,411	\$ 18,481,633
(b) Refunds	288,116	261,161
(c) DROP Disbursements	3,733,153	5,396,810
(d) Administrative expenses	89,102	141,196
(e) Total	\$ 23,917,782	\$ 24,280,800
4. Investment Return, Net of Investment Expenses		
(a) Investment income	\$ 6,677,908	\$ 5,371,933
(b) Securities lending income	160,575	101,038
(c) Securities lending expense	(110,196)	(45,936)
(d) Net appreciation/(depreciation) in fair value of investments	27,144,306	43,252,832
(e) Other	23,184	28,557
(f) Total investment return	\$ 33,895,777	\$ 48,708,424
5. Market Value of Assets, End of Year [1 + 2(d) - 3(e) + 4(f)]	\$ 420,683,030	\$ 397,137,172
6. Rate of Return, Net of Expenses*	8.2%	13.2%

* As reported by the Nebraska Investment Council



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

	Year End			
	6/30/2015	6/30/2016	6/30/2017	6/30/2018
1. Actuarial Value of Assets, Beginning of Year	\$ 325,966,725	\$ 356,446,470	\$ 374,205,616	\$ 395,149,596
2. Unrecognized Return Beginning of Year	31,350,167	7,476,161	(13,050,130)	1,987,576
3. Contributions During Year				
(a) Member	\$ 4,180,263	\$ 4,365,651	\$ 4,500,952	\$ 4,615,214
(b) State	4,207,087	4,327,670	4,511,552	4,615,214
(c) State appropriations	4,439,339	2,725,738	2,541,558	4,337,435
(d) Total	\$ 12,826,689	\$ 11,419,059	\$ 11,554,062	\$ 13,567,863
4. Benefit Payments	17,235,329	17,752,098	18,481,633	19,807,411
5. Refund of Contributions/DROP disbursements	2,223,211	1,824,278	5,657,971	4,021,269
6. Expected Investment Income on (1), (2), (3), (4) and (5)*	28,389,923	28,858,929	28,479,019	29,481,800
7. Actual Return on Market Value Net of All Expenses	13,237,590	5,390,172	48,567,228	33,806,675
8. Return to be Spread, End of Year	\$ (15,152,333)	\$ (23,468,757)	\$ 20,088,209	\$ 4,324,875

* Based on the investment return assumption applicable at the beginning of the year. The assumption was 8.0% through year end 6/30/2017 and 7.5% thereafter.



**TABLE 3
(continued)**

**STATE PATROL RETIREMENT SYSTEM
AS OF JULY 1, 2018**

9. Return to be Spread

Plan Year <u>Ending</u>	Return to be <u>Spread</u>	Unrecognized <u>Percent</u>	Unrecognized <u>Return</u>
2018	\$4,324,875	80%	\$3,459,900
2017	20,088,209	60%	12,052,925
2016	(23,468,757)	40%	(9,387,503)
2015	(15,152,333)	20%	(3,030,467)
			<hr/> \$3,094,855

10. Total Market Value of Assets as of July 1, 2018 \$420,683,030

11. Total Actuarial Value of Assets as of July 1, 2018 \$417,588,175
[10 - 9]

12. Asset Ratios

(a) Actuarial Value to Market Value [11 / 10]	99.26%
(b) Market Value to Actuarial Value [10 / 11]	100.74%



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, 2018. 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, 2018.

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, 2018

1. Active Employees	
(a) Retirement	\$ 223,368,954
(b) Termination	3,228,961
(c) Disability	7,362,138
(d) Death	1,160,240
(e) Total	\$ <u>235,120,293</u>
2. Inactive Vested Members	6,706,528
3. Inactive Nonvested Members	210,042
4. DROP Account Balances	6,126,048
5. Disabled Members	6,138,891
6. Retirees	271,557,164
7. Beneficiaries	<u>24,174,712</u>
8. Total Present Value of Future Benefits	\$ 550,033,678



TABLE 5
STATE PATROL RETIREMENT SYSTEM
ACTUARIAL ACCRUED LIABILITY
AS OF JULY 1, 2018

1. Present Value of Future Benefits for Active Members	\$	235,120,293
2. Present Value of Future Normal Costs for Active Members		
(a) Retirement	\$	60,739,210
(b) Termination		4,158,807
(c) Disability		4,256,195
(d) Death		787,265
(e) Total	\$	<u>69,941,477</u>
3. Actuarial Accrued Liability for Active Members [1 - 2(e)]	\$	165,178,816
4. Actuarial Accrued Liability for Inactive Members	\$	314,913,385
5. Total Actuarial Accrued Liability [3 + 4]	\$	480,092,201
6. Actuarial Value of Assets	\$	417,588,175
7. Unfunded Actuarial Accrued Liability [5 - 6]	\$	62,504,026



TABLE 6
STATE PATROL RETIREMENT SYSTEM
ACTUARIAL BALANCE SHEET
AS OF JULY 1, 2018

ASSETS

Actuarial Value of Assets	\$	417,588,175
Unfunded Actuarial Accrued Liability		62,504,026
Present Value of Future Normal Costs		<u>69,941,477</u>
Total Assets	\$	550,033,678

LIABILITIES

Present Value of Future Benefits			
Active members			
Retirement	\$	223,368,954	
Termination		3,228,961	
Disability		7,362,138	
Death		<u>1,160,240</u>	
Total			235,120,293
Inactive members			6,916,570
Retirees, disabilities and beneficiaries*			<u>307,996,815</u>
Total	\$		550,033,678

* Includes DROP account balances.



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

Liabilities

1. Actuarial Accrued Liability as of July 1, 2017	\$ 465,066,035
2. Normal Cost for Plan Year Ending June 30, 2018	8,181,278
3. Benefit Payments During Plan Year Ending June 30, 2018	(23,828,680)
4. Interest at 7.50%	<u>34,690,464</u>
5. Expected Actuarial Accrued Liability as of July 1, 2018	\$ 484,109,097
6. Actuarial Accrued Liability as of July 1, 2018	\$ 480,092,201

Assets

7. Actuarial Value of Assets as of July 1, 2017	\$ 395,149,596
8. Contributions During Plan Year Ending June 30, 2018	13,567,863
9. Benefit Payments During Plan Year Ending June 30, 2018	(23,828,680)
10. Interest at 7.50%	<u>29,332,732</u>
11. Expected Actuarial Value of Assets as of July 1, 2018	\$ 414,221,511
12. Actuarial Value of Assets as of July 1, 2018	\$ 417,588,175

Gain / (Loss)

13. Actuarial Gain / (Loss) on Liabilities [5 - 6]	\$ 4,016,896
14. Actuarial Gain / (Loss) on Assets [12 - 11]	3,366,664
15. Total Actuarial Gain / (Loss) for Plan Year Ending June 30, 2018 [13 + 14]	\$ 7,383,560



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

Liability Sources	<u>Gain/(Loss)</u>
Retirement	\$ (136,812)
Termination	1,139,802
Disability	156,891
Mortality	133,339
Salary	1,851,920
New Entrants/Rehires	(318,510)
COLA	(622,309)
Beneficiary Data Adjustments	1,789,404
Miscellaneous	<u>23,171</u>
Total Liability Gain/(Loss)	\$ 4,016,896
Asset Gain/(Loss)	\$ 3,366,664
Net Actuarial Gain/(Loss)	\$ 7,383,560



TABLE 9
STATE PATROL RETIREMENT SYSTEM
PROJECTED BENEFIT PAYMENTS
AS OF JULY 1, 2018

<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>
2019	\$ 705,000	\$ 22,564,000	\$ 23,269,000
2020	2,128,000	22,838,000	24,966,000
2021	3,137,000	23,115,000	26,252,000
2022	4,363,000	23,393,000	27,756,000
2023	5,163,000	23,732,000	28,895,000
2024	6,586,000	24,070,000	30,656,000
2025	8,496,000	24,367,000	32,863,000
2026	10,236,000	24,699,000	34,935,000
2027	11,710,000	24,911,000	36,621,000
2028	14,920,000	25,110,000	40,030,000
2029	16,227,000	25,352,000	41,579,000
2030	17,426,000	25,499,000	42,925,000
2031	18,943,000	25,661,000	44,604,000
2032	19,921,000	25,702,000	45,623,000
2033	21,868,000	25,784,000	47,652,000
2034	23,128,000	25,744,000	48,872,000
2035	24,144,000	25,717,000	49,861,000
2036	25,327,000	25,590,000	50,917,000
2037	26,144,000	25,395,000	51,539,000
2038	27,546,000	25,142,000	52,688,000
2039	28,264,000	24,845,000	53,109,000
2040	29,779,000	24,473,000	54,252,000
2041	32,161,000	24,042,000	56,203,000
2042	34,527,000	23,548,000	58,075,000
2043	36,086,000	22,993,000	59,079,000
2044	37,567,000	22,374,000	59,941,000
2045	38,861,000	21,692,000	60,553,000
2046	40,035,000	20,947,000	60,982,000
2047	40,727,000	20,140,000	60,867,000
2048	41,411,000	19,276,000	60,687,000

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 two elements: (1) the normal cost rate and (2) 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 contribution rate, based on the July 1, 2018 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, 2019. Any additional State contributions are expected to be deposited on July 1, 2019 (State fiscal year end 2020). 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, 2018, is developed. Table 11 develops the actuarial required contribution rate for the System and the amount of the required state contribution.

The actuarial 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

Table with 6 columns: Amortization Bases, Original Amount, July 1, 2018 Remaining Payments, Date of Last Payment, Outstanding Balance as of July 1, 2018, Annual Contribution*. Rows include UAAL Base (2006-2018) and Experience Base (2013-2018), ending with a Total row.

* Contribution amount reflects mid-year timing.

- 1. Total UAAL Amortization Payments \$ 4,498,389
2. Projected Payroll for FY 2019 \$ 29,795,799
3. UAAL Amortization Payment Rate 15.10%

Note: Beginning with the July 1, 2017 valuation, the payments on each UAAL base are determined as a level-percent of payroll using a 3.50% payroll growth assumption.



TABLE 11
STATE PATROL RETIREMENT SYSTEM
ACTUARIAL REQUIRED CONTRIBUTION
FOR PLAN YEAR ENDING JUNE 30, 2019
and
DEVELOPMENT OF ADDITIONAL STATE CONTRIBUTION

1. Normal Cost	
(a) Amount	\$ 8,445,896
(b) Expected pay for current actives	27,753,772
(c) Normal Cost Rate as % of pay	30.43%
2. UAAL Amortization Rate (see Table 10)	15.10%
3. Total Actuarial Required Contribution Rate [1(c) + 2]	45.53%
4. Weighted Statutory Member Contribution Rate	16.08%
5. Weighted Statutory Employer Contribution Rate	16.08%
6. Additional Required State Contribution Rate [3 - 4 - 5, but not less than 0%]	13.37%
7. Projected Payroll for FY 2019	\$ 29,795,799
8. Additional Required State Contribution [6 * 7]	\$ 3,983,698
9. Total State Contributions	
(a) State statutory amount	\$ 4,791,164
(b) Additional State contribution	3,983,698
(c) Total	\$ <u>8,774,862</u>



SECTION 6 – 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 6 – HISTORICAL FUNDING AND OTHER INFORMATION

TABLE 12
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 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, 2018.

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



TABLE 13
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%

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, 2017	391	42	25	7	421	15	901
Changes in status							
a) Retirement	(3)	(13)	0	0	16	0	0
b) DROP	(3)	3	0	0	0	0	0
c) Death	0	0	(1)	0	(20)	(1)	(22)
d) Non-vested terminations	(1)	0	0	1	0	0	0
e) Vested terminations	(5)	0	5	0	0	0	0
f) Contribution refund	(3)	0	(1)	0	0	0	(4)
g) Beneficiaries in receipt	0	0	0	0	15	0	15
h) Disability retirements	0	0	0	0	0	0	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	(15)	(10)	3	1	11	(1)	(11)
New entrants	19	0	0	0	0	0	19
Data Corrections	0	1	0	0	(1)	0	0
Net Change	4	(9)	3	1	10	(1)	8
As of July 1, 2018	395	33	28	8	431	14	909



APPENDIX A – MEMBERSHIP DATA

SUMMARY OF MEMBERSHIP DATA

A. ACTIVE MEMBERS	July 1, 2018	July 1, 2017	% Change
1. Number of Active Members			
(a) Before assumed retirement age	388	380	2.1%
(b) Beyond assumed retirement age	7	11	(36.4%)
(c) Total	<u>395</u>	<u>391</u>	1.0%
2. Annual Reported Salary			
(a) Before assumed retirement age	\$ 27,576,026	\$ 26,219,423	5.2%
(b) Beyond assumed retirement age	644,521	902,415	(28.6%)
(c) Total	<u>\$ 28,220,547</u>	<u>\$ 27,121,838</u>	4.1%
3. Accumulated Contributions	\$ 46,520,462	\$ 43,844,138	6.1%
4. Active Member Averages			
(a) Age	40.8	40.6	0.5%
(b) Service	13.6	13.5	0.7%
(c) Compensation	\$ 71,444	\$ 69,365	3.0%
(d) Accumulated contributions	\$ 117,773	\$ 112,133	5.0%
B. INACTIVE MEMBERS			
1. Number of Inactive Members	36	32	12.5%
2. Accumulated Member Contributions	\$ 3,274,519	\$ 2,521,122	29.9%
3. Inactive Members Averages			
(a) Age (vested members only)	44.7	43.7	2.3%
(b) Accumulated member contributions	\$ 90,959	\$ 78,785	15.5%
C. RETIREES, DISABLEDS, AND BENEFICIARIES			
1. Number of Members			
(a) Retired	339	339	0.0%
(b) Disabled	14	15	(6.7%)
(c) Beneficiaries	92	82	12.2%
(d) DROP	33	42	(21.4%)
(e) Total	<u>478</u>	<u>478</u>	0.0%
2. Annual Benefits			
(a) Retired	\$ 17,671,350	\$ 16,709,472	5.8%
(b) Disabled	489,262	509,602	(4.0%)
(c) Beneficiaries	2,434,084	2,164,764	12.4%
(d) DROP	2,047,570	2,622,569	(21.9%)
(e) Total	<u>\$ 22,642,266</u>	<u>\$ 22,006,407</u>	2.9%
3. Market Value of DROP Account Balances	\$ 6,126,048	\$ 6,919,465	(11.5%)

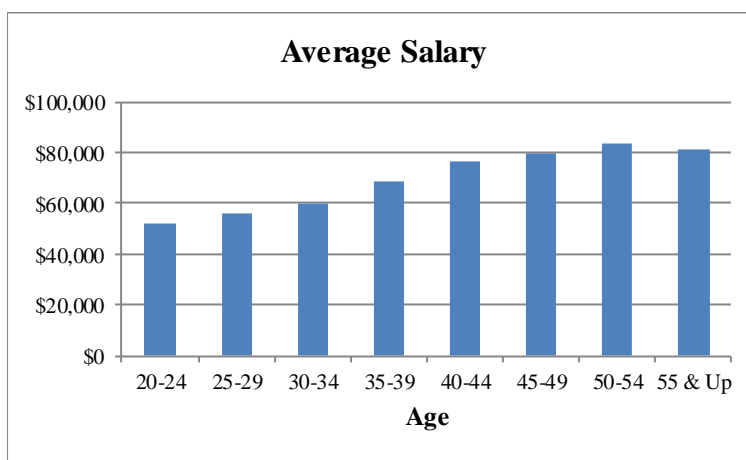
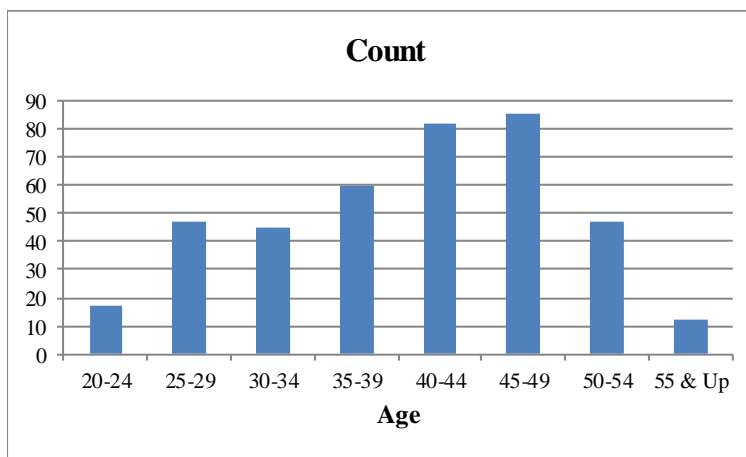


APPENDIX A – MEMBERSHIP DATA

**ACTIVE MEMBERS
AS OF JULY 1, 2018**

Total

Age	Count			Reported FY 2018 Earnings		
	Male	Female	Total	Male	Female	Total
20-24	15	2	17	\$ 806,402	\$ 84,298	\$ 890,700
25-29	40	7	47	2,240,552	399,629	2,640,181
30-34	40	5	45	2,438,809	256,019	2,694,828
35-39	57	3	60	3,932,915	194,455	4,127,370
40-44	77	5	82	5,897,389	347,928	6,245,317
45-49	81	4	85	6,442,011	296,736	6,738,747
50-54	46	1	47	3,839,461	71,494	3,910,955
55 & Up	12	0	12	972,449	0	972,449
Total	368	27	395	\$ 26,569,988	\$ 1,650,559	\$ 28,220,547



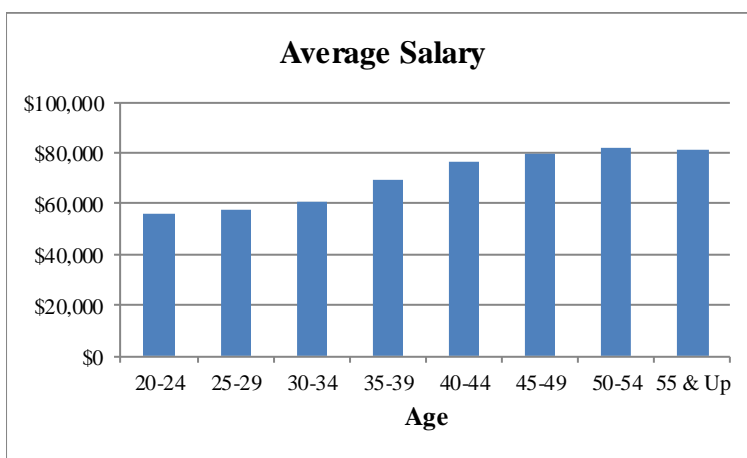
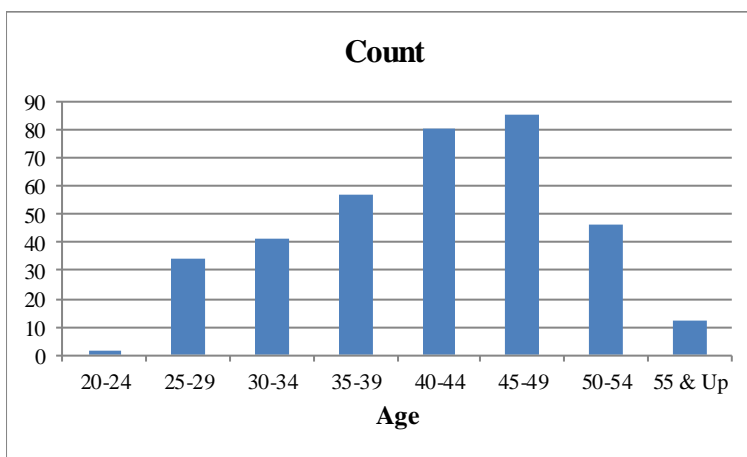


APPENDIX A – MEMBERSHIP DATA

**ACTIVE MEMBERS
AS OF JULY 1, 2018**

Tier 1

Age	Count			Reported FY 2018 Earnings		
	Male	Female	Total	Male	Female	Total
20-24	2	0	2	\$ 112,367	\$ 0	\$ 112,367
25-29	30	4	34	1,712,170	244,356	1,956,526
30-34	36	5	41	2,225,524	256,019	2,481,543
35-39	55	2	57	3,834,127	141,549	3,975,676
40-44	76	4	80	5,838,115	295,844	6,133,959
45-49	81	4	85	6,442,011	296,736	6,738,747
50-54	45	1	46	3,689,465	71,494	3,760,959
55 & Up	12	0	12	972,449	0	972,449
Total	337	20	357	\$ 24,826,228	\$ 1,305,998	\$ 26,132,226



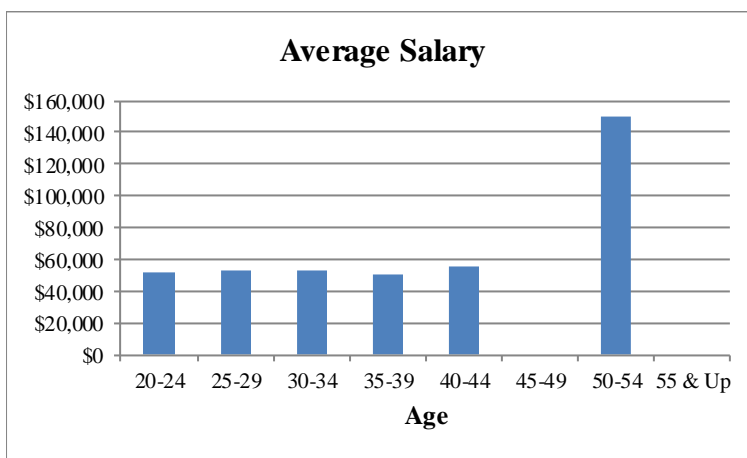
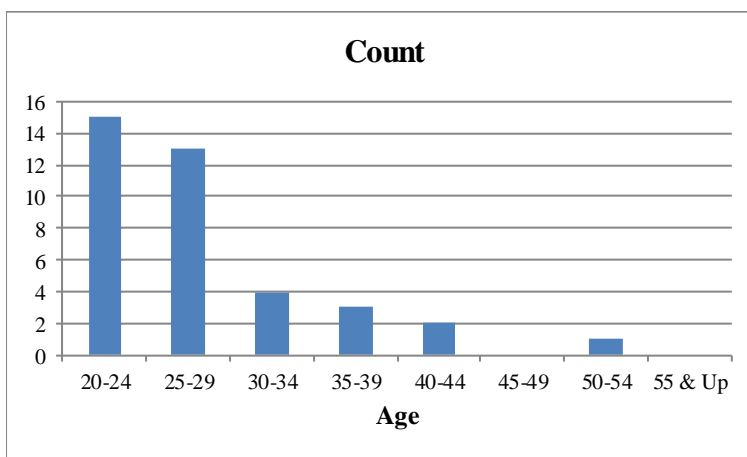


APPENDIX A – MEMBERSHIP DATA

**ACTIVE MEMBERS
AS OF JULY 1, 2018**

Tier 2

<u>Age</u>	<u>Count</u>			<u>Reported FY 2018 Earnings</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
20-24	13	2	15	\$ 694,035	\$ 84,298	\$ 778,333
25-29	10	3	13	528,382	155,273	683,655
30-34	4	0	4	213,285	0	213,285
35-39	2	1	3	98,788	52,906	151,694
40-44	1	1	2	59,274	52,084	111,358
45-49	0	0	0	0	0	0
50-54	1	0	1	149,996	0	149,996
55 & Up	0	0	0	0	0	0
Total	31	7	38	\$ 1,743,760	\$ 344,561	\$ 2,088,321





APPENDIX A – MEMBERSHIP DATA

**AGE AND SERVICE DISTRIBUTION
AS OF JULY 1, 2018**

Age		0-4	5-9	10-14	15-19	20-24	Over 25	Total
20-24	Number	17	0	0	0	0	0	17
	Total Salary	\$ 890,700	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 890,700
	Average Sal.	\$ 52,394	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 52,394
25-29	Number	43	4	0	0	0	0	47
	Total Salary	\$ 2,384,640	\$ 255,541	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,640,181
	Average Sal.	\$ 55,457	\$ 63,885	\$ 0	\$ 0	\$ 0	\$ 0	\$ 56,174
30-34	Number	16	15	14	0	0	0	45
	Total Salary	\$ 866,884	\$ 937,470	\$ 890,474	\$ 0	\$ 0	\$ 0	\$ 2,694,828
	Average Sal.	\$ 54,180	\$ 62,498	\$ 63,605	\$ 0	\$ 0	\$ 0	\$ 59,885
35-39	Number	5	3	39	13	0	0	60
	Total Salary	\$ 269,707	\$ 190,119	\$ 2,699,303	\$ 968,241	\$ 0	\$ 0	\$ 4,127,370
	Average Sal.	\$ 53,941	\$ 63,373	\$ 69,213	\$ 74,480	\$ 0	\$ 0	\$ 68,790
40-44	Number	2	4	7	61	8	0	82
	Total Salary	\$ 111,358	\$ 243,449	\$ 509,716	\$ 4,688,033	\$ 692,761	\$ 0	\$ 6,245,317
	Average Sal.	\$ 55,679	\$ 60,862	\$ 72,817	\$ 76,853	\$ 86,595	\$ 0	\$ 76,162
45-49	Number	0	1	9	30	38	7	85
	Total Salary	\$ 0	\$ 57,253	\$ 593,946	\$ 2,283,413	\$ 3,167,165	\$ 636,970	\$ 6,738,747
	Average Sal.	\$ 0	\$ 57,253	\$ 65,994	\$ 76,114	\$ 83,346	\$ 90,996	\$ 79,279
50-54	Number	2	0	0	21	20	4	47
	Total Salary	\$ 201,624	\$ 0	\$ 0	\$ 1,663,113	\$ 1,654,750	\$ 391,468	\$ 3,910,955
	Average Sal.	\$ 100,812	\$ 0	\$ 0	\$ 79,196	\$ 82,738	\$ 97,867	\$ 83,212
55 & Up	Number	0	0	0	10	2	0	12
	Total Salary	\$ 0	\$ 0	\$ 0	\$ 789,345	\$ 183,104	\$ 0	\$ 972,449
	Average Sal.	\$ 0	\$ 0	\$ 0	\$ 78,935	\$ 91,552	\$ 0	\$ 81,037
Total	Number	85	27	69	135	68	11	395
	Total Salary	\$ 4,724,913	\$ 1,683,832	\$ 4,693,439	\$ 10,392,145	\$ 5,697,780	\$ 1,028,438	\$ 28,220,547
	Average Sal.	\$ 55,587	\$ 62,364	\$ 68,021	\$ 76,979	\$ 83,791	\$ 93,494	\$ 71,444



APPENDIX A – MEMBERSHIP DATA

**MEMBERS PARTICIPATING IN DROP
AS OF JULY 1, 2018**

<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	2	5	187,984	140,303	328,287
52-53	7	0	7	431,866	0	431,866
54-55	11	0	11	680,501	0	680,501
56-57	3	0	3	163,488	0	163,488
58-59	7	0	7	443,428	0	443,428
60 & Up	0	0	0	0	0	0
Total	31	2	33	\$ 1,907,267	\$ 140,303	\$ 2,047,570



APPENDIX A – MEMBERSHIP DATA

**INACTIVE VESTED MEMBERS
AS OF JULY 1, 2018**

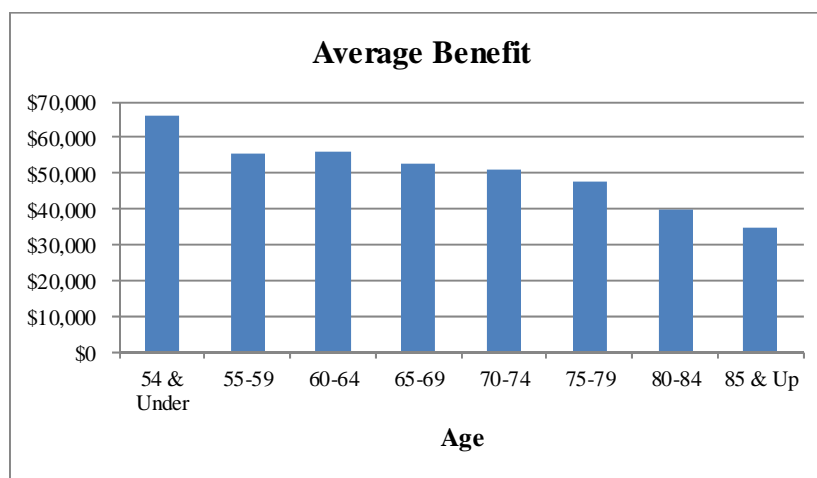
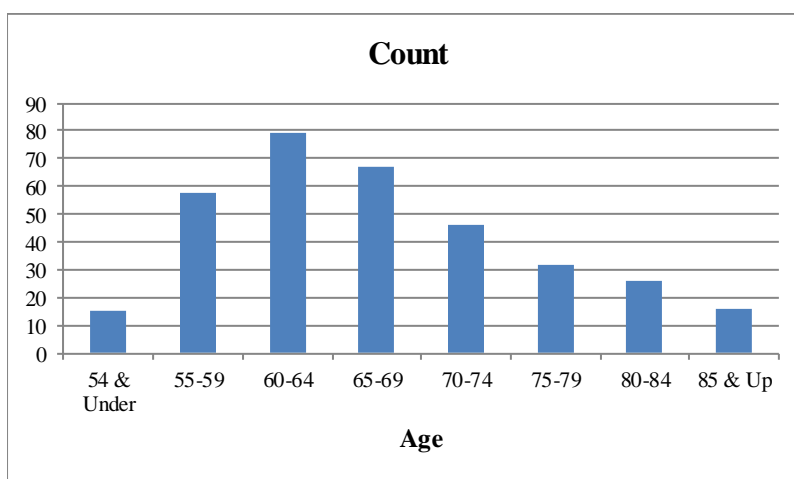
<u>Age</u>	<u>Count</u>			<u>Annual Benefits</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
20-24	0	0	0	\$ 0	\$ 0	\$ 0
25-29	0	0	0	0	0	0
30-34	1	0	1	14,106	0	14,106
35-39	4	0	4	75,662	0	75,662
40-44	9	0	9	226,511	0	226,511
45-49	10	0	10	354,659	0	354,659
50-54	3	0	3	68,869	0	68,869
55 & Up	1	0	1	28,477	0	28,477
Total	28	0	28	\$ 768,284	\$ 0	\$ 768,284



APPENDIX A – MEMBERSHIP DATA

**RETIRED MEMBERS
AS OF JULY 1, 2018**

Age	Count			Annual Benefits		
	Male	Female	Total	Male	Female	Total
54 & Under	14	1	15	\$ 925,823	\$ 62,854	\$ 988,677
55-59	51	7	58	2,804,538	421,154	3,225,692
60-64	74	5	79	4,203,051	229,331	4,432,382
65-69	66	1	67	3,518,451	21,347	3,539,798
70-74	45	1	46	2,294,708	61,687	2,356,395
75-79	32	0	32	1,531,657	0	1,531,657
80-84	26	0	26	1,042,985	0	1,042,985
85 & Up	16	0	16	553,764	0	553,764
Total	324	15	339	\$16,874,977	\$796,373	\$17,671,350

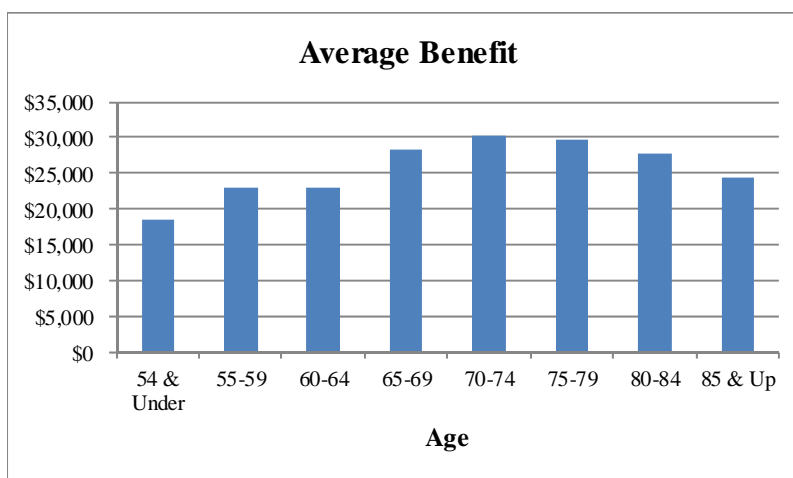
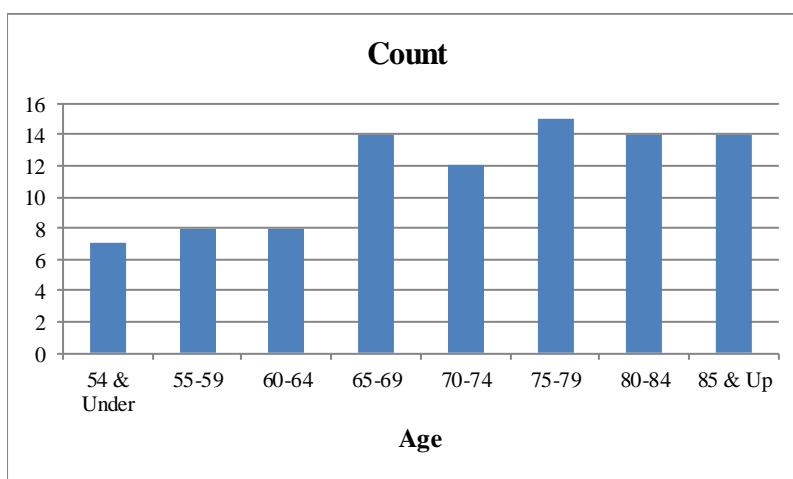




APPENDIX A – MEMBERSHIP DATA

**BENEFICIARIES
AS OF JULY 1, 2018**

Age	Count			Annual Benefits		
	Male	Female	Total	Male	Female	Total
54 & Under	1	6	7	\$ 21,179	\$ 107,844	\$ 129,023
55-59	0	8	8	0	184,961	184,961
60-64	0	8	8	0	185,069	185,069
65-69	0	14	14	0	397,322	397,322
70-74	0	12	12	0	362,029	362,029
75-79	0	15	15	0	446,710	446,710
80-84	1	13	14	31,164	358,119	389,283
85 & Up	0	14	14	0	339,687	339,687
Total	2	90	92	\$ 52,343	\$ 2,381,741	\$ 2,434,084





APPENDIX A – MEMBERSHIP DATA

**DISABLED MEMBERS
AS OF JULY 1, 2018**

Age	Count			Annual Benefits		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
54 & Under	4	1	5	\$ 127,024	\$ 29,570	\$ 156,594
55-59	0	0	0	0	0	0
60-64	1	1	2	39,525	35,955	75,480
65-69	4	0	4	146,076	0	146,076
70-74	2	0	2	78,511	0	78,511
75-79	0	0	0	0	0	0
80-84	0	0	0	0	0	0
85 & Up	1	0	1	32,601	0	32,601
Total	12	2	14	\$ 423,737	\$ 65,525	\$ 489,262



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, 2018

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.



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

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. The initial unfunded actuarial accrued liability established July 1, 2004, is amortized with a level-dollar payment amount over 25 years. At subsequent valuation dates, amortization bases equal to changes in the unfunded actuarial accrued liability are established and amortized with a level-dollar payment over a 25-year period. The unfunded actuarial accrued liability was reinitialized as of July 1, 2006 and amortized over a 30-year period. At subsequent valuation dates, amortization bases equal to changes in the unfunded actuarial accrued liability are established and amortization over a level-dollar payment over a 30-year period. If the unfunded actuarial accrued liability was \$0 or less as of the prior valuation date, all previous amortization bases are considered fully amortized. Effective with the July 1, 2013 valuation, amortization payments were recalculated to amortize the remaining bases as a level-percent of expected payroll.

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.



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.

The passage of legislation in the 2013 session changed the amortization of the unfunded actuarial accrued liability (UAAL) from a level-dollar payment to a level-percent of payroll payment, where the dollar amount of the payment increases with the assumed payroll growth each year in the future. This change lowered the dollar amount of the UAAL payment in the 2013 valuation, but creates a payment schedule where the dollar amount of UAAL contribution increases 3.50% each year in the future. If actual payroll increases at the assumed rate of 3.50%, the UAAL contribution rate will remain level. If payroll increases are less than the 3.50% assumption, the UAAL contribution rate will increase.

Changes in Methods and Procedures Since the Prior Year

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

VALUATION PROCEDURES

Data Procedures

Salaries for first year members are annualized by using the client's Calculated Salary field. For continuing active members, the Accumulated Salary field is used.

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.



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

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.



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

ECONOMIC ASSUMPTIONS

- 1. Investment Return 7.50% per annum, compounded annually, net of expenses.
- 2. Inflation 2.75% per annum, compounded annually.
- 3. Salary Increase Rates vary by service. Sample rates are as follows:

Rates by Service	
Years	Rate*
<1	9.0%
5	6.1
10	5.1
15	5.0
20	5.0
25	5.0
30	3.5

- 4. Payroll Growth 3.50% per annum
- 5. Interest on Employee Contributions 3.00% per annum, compounded annually.
- 6. Increases on Compensation And Benefit Limits 2.75% per annum on the 401(a)(17) compensation limit and the 415 benefit limit

DEMOGRAPHIC ASSUMPTIONS

- 1. Mortality
 - a. Healthy lives - Active members RP-2014 White Collar Table for Employees (100% of male rates for males, 55% of female rates for females), projected generationally with MP-2015.
 - b. Healthy lives – Retired members and beneficiaries RP-2014 White Collar Table for Employees, set back two years, scaled (males: under 80, 1.008; over 80, 1.449; females: under 85, .924; over 85, 1.5855; geometrically blended), projected generationally from 2013 with a SOA projection scale tool using 0.5% ultimate 2035 rate in 2035.
 - c. Disabled lives RP-2014 Disabled Lives Table (static table)



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

d. Healthy mortality rates and life expectancies are shown below at sample ages:

Pre-retirement Mortality		
Mortality Rate		
Sample Age	Males	Females
20	0.03%	0.01%
30	0.03	0.01
40	0.04	0.02
50	0.12	0.05
60	0.33	0.11

Post-retirement Mortality		
Mortality Rate		
Sample Age	Males	Females
50	0.23%	0.17%
60	0.47	0.31
70	1.03	0.82
80	3.65	2.28
90	14.57	12.63

Projection Scale – Post-retirement Mortality						
Sample Age	Scale (2020)		Scale (2030)		Scale (2040)	
	Males	Females	Males	Females	Males	Females
50	0.0252	0.0144	0.0080	0.0052	0.0050	0.0050
60	0.0083	0.0051	0.0066	0.0059	0.0050	0.0050
70	0.0088	0.0121	0.0061	0.0057	0.0050	0.0050
80	0.0114	0.0104	0.0057	0.0058	0.0050	0.0050
90	0.0109	0.0104	0.0057	0.0057	0.0046	0.0046

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

Sample Age	Males	Females
30	0.79%	0.30%
40	1.10	0.55
50	2.04	1.19
60	2.66	1.70
70	4.03	2.82
80	7.66	6.10



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

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	3% 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

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	.08%
30	.10
35	.13
40	.20
45	.31
50	.52
55	.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.



APPENDIX C – SUMMARY OF ACTUARIAL ASSUMPTIONS

2. Marital Status	
a. Percent married	100% married
b. Spouse's age	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	Investment return is assumed to be net of expenses.
5. Cost of living adjustments	2.25% per annum, compounded annually.
6. 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.
7. 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

There have been no changes to the assumptions since the prior year.



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.”