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NEBRASKA PUBLIC EMPLOYEES RETIREMENT SYSTEM

STATE PATROL RETIREMENT SYSTEM

ACTUARIAL VALUATION REPORT AS OF JULY 1, 2017

Sixty-Second Actuarial Report for
System Plan Year Beginning July 1, 2017
and
State Fiscal Year Ending June 30, 2019

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November 8, 2017

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, 2017 for purposes of determining the actuarial required contribution rate for the plan year ending June 30, 2018. It is our understanding that any additional required State contributions for this plan year will be made on July 1, 2018 (State fiscal year end 2019). The major findings of the valuation are contained in this report, which reflects the benefit provisions in place on July 1, 2017. The 2017 Legislature passed LB 415, which affects the calculation of actuarial equivalent early retirement factors and optional forms of payment for members of all of the defined benefit plans who are hired on or after July 1, 2017. Since the State Patrol Retirement System does not include either of these provisions, the adopted changes have no impact on the funding of the System. At the Public Employees Retirement Board (PERB) meeting on October 17, 2016, the results of an experience study covering the four-year period ending June 30, 2015 were presented to the PERB. All of the recommended assumptions were adopted and are first used in this valuation. The net impact of the assumption changes was an increase in both the unfunded actuarial accrued liability and the actuarial contribution rate.

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.

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,

Patrice Beckham

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

Brent A. Banister

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

This report presents the results of the July 1, 2017 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, 2018 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 on the valuation date.

- Compare actual and expected experience under the System during the plan year ended June 30, 2017.

- 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, 2017 actuarial valuation, an additional State contribution of $4,337,435 is required for the plan year ending June 30, 2018 (expected to be paid July 1, 2018).**

The 2017 Legislature passed LB 415, which affects the calculation of actuarial equivalent early retirement factors and optional forms of payment for members of all of the defined benefit plans who are hired on or after July 1, 2017. Since the State Patrol Retirement System does not include either of these provisions, the adopted changes have no impact on the funding of the System.

The results of an experience study covering the four-year period ending June 30, 2015 were presented to the PERB on October 17, 2016. All of the recommended assumption changes were adopted and are first reflected in this valuation, including:

- The inflation assumption decreased from 3.25% to 2.75%.
- The investment return assumption declined from 8.00% to 7.50%.
- The cost of living adjustment assumption decreased from 2.50% to 2.25% for members hired before July 1, 2016.
- The covered payroll growth assumption decreased from 4.00% to 3.50%.
- The individual salary increase assumption was lowered by 0.50% in order to remain consistent with the inflation assumption.
- The assumed interest rate credited on employee contributions was lowered from 4.25% to 3.00%.
- The mortality assumption has been changed to the RP-2014 White Collar Mortality Table, with adjustments made to better reflect observed experience. Generational mortality improvements are modeled using a System-specific projection scale.
- Termination rates were adjusted to better reflect observed experience.

As a result of the assumption changes, the actuarial accrued liability (AAL) increased by $27.9 million and the actuarial required contribution rate increased by 7.24% of pay. The changes to the investment return and mortality assumptions had the most significant impact on the valuation results. The impact of these changes on the July 1, 2017 valuation results is summarized in the following table (in millions):

	Old Assumptions	New Assumptions	Difference
Actuarial Accrued Liability (AAL)	$437.1	$465.1	$27.9
Actuarial Value of Assets (AVA)	395.1	395.1	0.0
Unfunded AAL (UAAL)	$ 42.0	$ 69.9	$27.9
Funded Ratio	90.40%	84.97%	(5.43%)
Normal Cost Rate	28.92%	30.57%	1.65%
UAAL Amortization Rate	11.07%	16.66%	5.59%
Actuarial Required Contribution Rate	39.99%	47.23%	7.24%
Additional Required State Contribution	$2.3	$4.3	$2.0

Note: Numbers may not add due to rounding.

The actuarial valuation results provide a "snapshot" view of the System's financial condition on July 1, 2017. The System's unfunded actuarial accrued liability (UAAL) increased from $47.7 million last year to $69.9 million this year and the funded ratio decreased from 89% to 85%. In addition, the actuarial required contribution rate increased from 41.14% of pay last year to 47.23% of pay in this year's valuation, an increase of 6.09%. The primary factor in the changes from the prior valuation to the current valuation was the change in the set of actuarial assumptions adopted by the Board.

The valuation results reflect net favorable experience for the past plan year as demonstrated by an UAAL that was lower than expected, taking into account the impact of the change in assumptions. The UAAL on July 1, 2017 is $69.9 million as compared to an expected UAAL of $75.4 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 2017 was 13.2%, 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. Note that the assumed rate of return for the year ended June 30, 2017 is the investment return assumption from the 2016 valuation (8.0%). The 7.5% assumption applies prospectively from July 1, 2017. The partial recognition of FY 2017 experience, coupled with the scheduled recognition of the deferred experience from recent years, resulted in a rate of return on the actuarial (smoothed) value of assets of 9.1%. This generated a net experience gain of $4.0 million on the actuarial value of assets. There was also a net experience gain of $1.5 million on the System's liabilities, largely as the result of a lower cost of living adjustment (COLA) than expected being granted this year to members currently receiving benefits (1.50% actual versus 2.50% expected).

The 2016 Legislature made changes to the benefit structure for members hired on or after July 1, 2016 (Tier 2) including changing final average compensation from the average of the three highest 12-month periods to the average of the five highest 12-month periods, changing the maximum cost-of-living adjustment from 2.50% to 1.00%, and changing the contribution rate from 16.00% to 17.00%. In addition, Tier 2 members will not be eligible to participate in DROP. As a result of the change to 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 16.04%, very close to the Tier 1 contribution rate of 16.00%. This is due to the

fact that there are only 19 members in Tier 2 as of July 1, 2017, which is about 5% of the active membership. It will be many years before Tier 2 has a meaningful impact on the valuation results.

A summary of the key results from the July 1, 2017 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 15.15% of pay, or $4,337,435, is required. Further detail on the valuation results can be found in the following sections of this Board Summary.

	Valuation Results	
	July 1, 2017	July 1, 2016
Unfunded Actuarial Accrued Liability	$69,916,439	$47,717,764
Funded Ratio (Actuarial Assets)	84.97%	88.69%
Normal Cost Rate	30.57%	28.94%
UAAL Amortization Rate	16.66%	12.20%
Total Actuarial Required Contribution	47.23%	41.14%
Weighted Member Contribution Rate	(16.04%)	(16.00%)
Weighted Employer Contribution Rate	(16.04%)	(16.00%)
Additional Required State Contribution Rate	15.15%	9.14%
Additional Required State Contribution	$4,337,435	$2,541,558

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, 2016 and July 1, 2017. The components are examined in the following discussion.

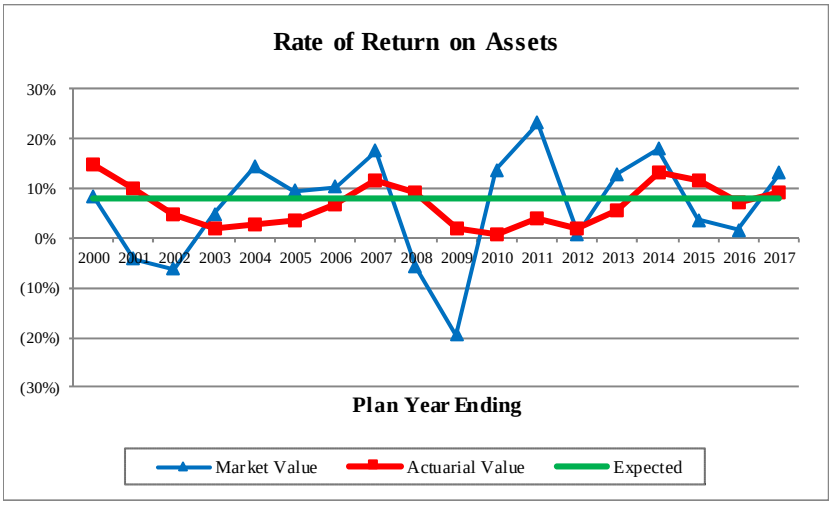
ASSETS

As of June 30, 2017, the System had net assets of $397.1 million, when measured on a market value basis, an increase of $36.0 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 $395.1 million, an increase of $20.9 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, 2016	$ 361.16	$ 374.21
- Employer and Member Contributions	+ 11.55	+ 11.55
- Benefit Payments	- 24.14	- 24.14
- Net Investment Income	+ 48.57	+ 33.53
Net Assets, June 30, 2017	$ 397.14	$ 395.15
Estimated Rate of Return	13.2%	9.1%

The rate of return on the actuarial value of assets was 9.1%, which was higher than the 8.0% investment return assumption applicable for the year ended June 30, 2017 (set in the July 1, 2016 valuation). As a result, there was an experience gain on assets of $4.0 million. The investment return on the market value of assets for FY 2017 of 13.2% resulted in a change in the deferred investment experience from a net deferred investment loss of $13.0 million in last year's valuation to a net deferred investment gain of $2.0 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, 2017 in the table below:

	Actuarial Value of Assets	Market Value of Assets
Actuarial Accrued Liability	$465,066,035	$465,066,035
Value of Assets	395,149,596	397,137,172
Unfunded Actuarial Accrued Liability	$69,916,439	$67,928,863
Funded Ratio	84.97%	85.39%

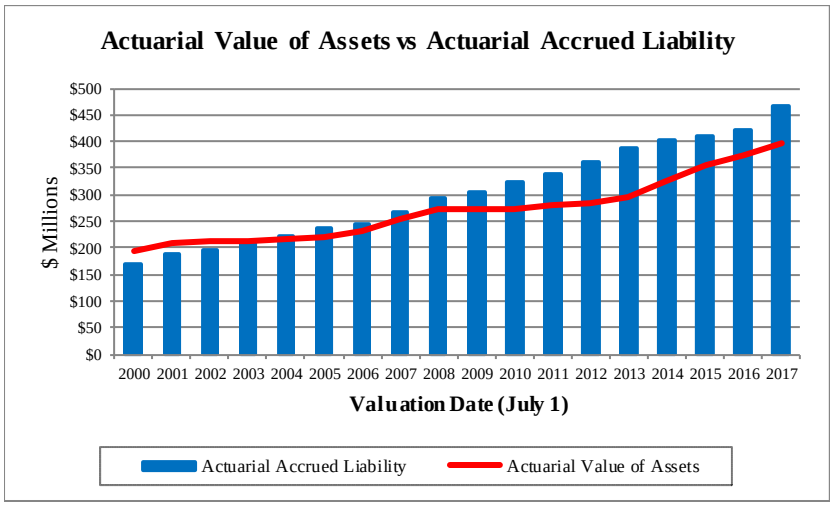
See Section 4 of the report for the detailed development of the unfunded actuarial accrued liability.

The net change in the UAAL from July 1, 2016 to July 1, 2017 was an increase of $22.2 million. As the following table illustrates, the change in assumptions was the main reason for the increase in the UAAL. The components of this net change are shown in the following table:

	($ Millions)
Unfunded Actuarial Accrued Liability, July 1, 2016	$47.72
- Expected increase from amortization method	0.29
- Investment experience	(4.01)
- Liability experience	(1.51)
- Assumption changes	27.95
- Other experience	(0.52)
Unfunded Actuarial Accrued Liability, July 1, 2017	$69.92

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 $5.5 million. The net actuarial gain may be explained by considering the separate experience of assets and liabilities. As noted earlier, there was an experience gain of $4.0 million on the actuarial value of assets. Favorable experience on System liabilities resulted in an actuarial gain of $1.5 million. The liability gain was the net result of various components of actuarial gains and losses, the largest of which was a gain from a smaller COLA than expected being granted to members currently receiving benefits (1.50% actual COLA vs 2.50% expected). The biggest impact on the UAAL was the change in the actuarial assumptions which increased the UAAL by $27.9 million. 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 current valuation significantly increased the System's liabilities and lowered the funded ratio.

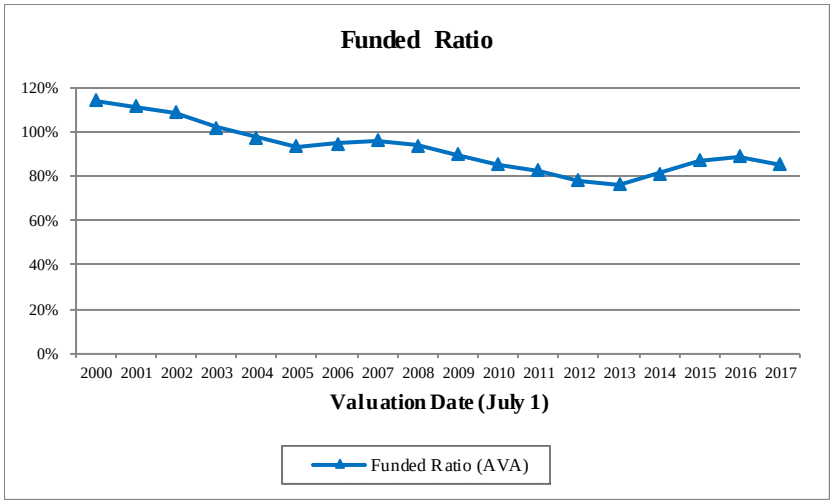


An evaluation of the UAAL on a pure dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both very large numbers) is reflected. Another way to evaluate the UAAL and the progress made in its funding is to track the funded ratio, the ratio 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).

	7/1/2013	7/1/2014	7/1/2015	7/1/2016	7/1/2017
Funded Ratio (AVA/AAL)	76.11%	81.20%	86.89%	88.69%	84.97%
UAAL	$92.41	$75.45	$53.76	$47.72	$69.92

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 32.08% of pay (16.04% by members and 16.04% by the employer) and a normal cost rate of 30.57% 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.



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 contributions for the plan year are made on the July 1 following the plan year end. Based on the results of the July 1, 2017 actuarial valuation, an additional State contribution of 15.15% of pay, or $4,337,435, is necessary for the plan year ending June 30, 2018.

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 percentage 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:

Contribution Rates	July 1, 2017	July 1, 2016
1. Normal Cost Rate	30.57%	28.94%
2. UAAL Contribution Rate	16.66%	12.20%
3. Total Actuarial Required Contribution Rate	47.23%	41.14%
4. Weighted Member Contribution Rate	(16.04%)	(16.00%)
5. Weighted Employer Contribution Rate	(16.04%)	(16.00%)
6. Total Statutory Contribution Rate	(32.08%)	(32.00%)
7. Additional Required State Contribution Rate [3 + 6]	15.15%	9.14%
8. Estimated Payroll	$ 28,629,936	$ 27,806,977
9. Additional State Required Contribution [7 * 8, but not less than $0]	$ 4,337,435	$ 2,541,558

The actuarial required contribution rate for the plan year ending June 30, 2018 is 47.23%. The weighted member contribution rate of 16.04% and the weighted employer contribution rate of 16.04% result in a total statutory contribution rate of 32.08% of pay. As a result, there is a contribution rate shortfall this year of 15.15%, which is projected to be about $4.3 million. The actuarial required contribution, determined this year based on the snapshot of the System taken on the valuation date of July 1, 2017, 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:

History of Expected State Contributions			
Plan Year	Statutory State Contributions	Additional Appropriations	Total
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, 2017, will change each year as the deferred investment experience is recognized and other experience (both investment and demographic) impacts the System.

SUMMARY OF PRINCIPAL RESULTS

	7/1/2017 Valuation	7/1/2016 Valuation	% Change
1. PARTICIPANT DATA			
Number of:			
Active Members			
- Tier 1	372	393	(5.34%)
- Tier 2	19	0	N/A
- Total	391	393	(0.51%)
Retired Members and Beneficiaries	421	404	4.21%
DROP Participants	42	52	(19.23%)
Disabled Members	15	15	0.00%
Inactive Members	32	27	18.52%
Total Members	901	891	1.12%
Projected Annual Salaries of Active Members	$ 28,629,936	$ 27,806,977	2.96%
Annual Retirement Payments for Members in Receipt and DROP Participants	$ 22,006,407	$ 21,157,018	4.01%
2. ASSETS AND LIABILITIES			
a. Market Value of Assets	$ 397,137,172	$ 361,155,486	9.96%
b. Actuarial Value of Assets	395,149,596	374,205,616	5.60%
c. Total Actuarial Accrued Liability	465,066,035	421,923,380	10.23%
d. Unfunded Actuarial Accrued Liability [c - b]	$ 69,916,439	$ 47,717,764	46.52%
e. Funded Ratio (Actuarial Value of Assets) [b / c]	84.97%	88.69%	(4.19%)
f. Funded Ratio (Market Value of Assets) [a / c]	85.39%	85.60%	(0.25%)
3. EMPLOYER CONTRIBUTION RATES AS A PERCENT OF PAYROLL			
Normal Cost	30.57%	28.94%	5.63%
Amortization of Unfunded Actuarial Accrued Liability	16.66%	12.20%	36.56%
Actuarial Required Contribution Rate	47.23%	41.14%	14.80%
Weighted Member Contribution Rate	(16.04%)	(16.00%)	0.25%
Weighted Employer Contribution Rate	(16.04%)	(16.00%)	0.25%
Additional Required State Contribution Rate	15.15%	9.14%	65.75%
Additional Required State Contribution	$ 4,337,435	$ 2,541,558	70.66%

This report presents the actuarial valuation of the State Patrol Retirement System as of July 1, 2017. 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, 2017.
- 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.

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, 2017. 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 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, 2017, and July 1, 2016, in total and by investment category. Table 2 summarizes the change in the market value of assets from July 1, 2016 to July 1, 2017.

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

	June 30, 2017	June 30, 2016
1. Cash and Equivalents	$ 131,822	$ 132,452
2. Investments*	404,578,841	366,996,034
3. Capital Assets	80	38
4. Receivables and Prepaids	31,609,209	23,587,975
5. Accounts Payable	(39,182,780)	(29,561,013)
6. Net Assets Available for Pension Benefits	$ 397,137,172	$ 361,155,486

* Includes DROP account balances.

TABLE 2

STATE PATROL RETIREMENT SYSTEM

CHANGE IN MARKET VALUE OF ASSETS

	2017	2016
1. Market Value of Assets, Beginning of Year	$ 361,155,486	$ 363,922,631
2. Contributions		
(a) Member (includes purchased service)	$ 4,500,952	$ 4,365,651
(b) State	4,511,552	4,327,670
(c) State appropriations	2,541,558	2,725,738
(d) Total	$ 11,554,062	$ 11,419,059
3. Expenditures		
(a) Benefit payments	$ 18,481,633	$ 17,752,098
(b) Refunds	261,161	84,092
(c) DROP Disbursements	5,396,810	1,740,186
(d) Administrative expenses	141,196	128,156
(e) Total	$ 24,280,800	$ 19,704,532
4. Investment Return, Net of Investment Expenses		
(a) Investment income	$ 5,371,933	$ 4,847,590
(b) Securities lending income	101,038	78,977
(c) Securities lending expense	(45,936)	(26,790)
(d) Net appreciation/(depreciation) in fair value of investments	43,252,832	591,773
(e) Other	28,557	26,778
(f) Total investment return	$ 48,708,424	$ 5,518,328
5. Market Value of Assets, End of Year [1 + 2(d) - 3(e) + 4(f)]	$ 397,137,172	$ 361,155,486
6. Rate of Return, Net of Expenses*	13.2%	1.6%

* As reported by the Nebraska Investment Council

TABLE 3

STATE PATROL RETIREMENT SYSTEM

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

	Year End			
	6/30/2014	6/30/2015	6/30/2016	6/30/2017
1. Actuarial Value of Assets, Beginning of Year	$ 294,468,029	$ 325,966,725	$ 356,446,470	$ 374,205,616
2. Unrecognized Return Beginning of Year	15,121,755	31,350,167	7,476,161	(13,050,130)
3. Contributions During Year				
(a) Member	$ 4,134,598	$ 4,180,263	$ 4,365,651	$ 4,500,952
(b) State	4,099,853	4,207,087	4,327,670	4,511,552
(c) State appropriations	4,652,774	4,439,339	2,725,738	2,541,558
(d) Total	$ 12,887,225	$ 12,826,689	$ 11,419,059	$ 11,554,062
4. Benefit Payments	16,194,014	17,235,329	17,752,098	18,481,633
5. Refund of Contributions/DROP disbursements	3,816,399	2,223,211	1,824,278	5,657,971
6. Expected Investment Income on (1), (2), (3), (4) and (5)*	24,554,315	28,389,923	28,858,929	28,479,019
7. Actual Return on Market Value Net of All Expenses	54,850,296	13,237,590	5,390,172	48,567,228
8. Return to be Spread, End of Year [7 - 6]	$ 30,295,981	$ (15,152,333)	$ (23,468,757)	$ 20,088,209

* Based on the investment return assumption applicable at the beginning of the year. The assumption was 8.0% for all years shown.

TABLE 3
(continued)

STATE PATROL RETIREMENT SYSTEM
AS OF JULY 1, 2017

9. Return to be Spread

Plan Year Ending	Return to be Spread	Unrecognized Percent	Unrecognized Return
2017	$20,088,209	80%	$16,070,567
2016	(23,468,757)	60%	(14,081,254)
2015	(15,152,333)	40%	(6,060,933)
2014	30,295,981	20%	6,059,196
			$1,987,576

10. Total Market Value of Assets as of July 1, 2017	$397,137,172
11. Total Actuarial Value of Assets as of July 1, 2017 [10 - 9]	$395,149,596
12. Asset Ratios	
(a) Actuarial Value to Market Value [11 / 10]	99.50%
(b) Market Value to Actuarial Value [10 / 11]	100.50%

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, 2017. 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, 2017.

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, 2017

1. Active Employees		
(a) Retirement	$	213,629,895
(b) Termination		3,208,116
(c) Disability		7,352,066
(d) Death		1,174,727
(e) Total	$	225,364,804
2. Inactive Vested Members		4,633,387
3. Inactive Nonvested Members		182,436
4. DROP Account Balances		6,919,465
5. Disabled Members		6,627,305
6. Retirees		268,696,086
7. Beneficiaries		21,586,668
8. Total Present Value of Future Benefits	$	534,010,151

TABLE 5

STATE PATROL RETIREMENT SYSTEM

ACTUARIAL ACCRUED LIABILITY
AS OF JULY 1, 2017

1. Present Value of Future Benefits for Active Members	$	225,364,804
2. Present Value of Future Normal Costs for Active Members		
(a) Retirement	$	59,810,533
(b) Termination		4,082,174
(c) Disability		4,253,280
(d) Death		798,129
(e) Total	$	68,944,116
3. Actuarial Accrued Liability for Active Members [1 - 2(e)]	$	156,420,688
4. Actuarial Accrued Liability for Inactive Members	$	308,645,347
5. Total Actuarial Accrued Liability [3 + 4]	$	465,066,035
6. Actuarial Value of Assets	$	395,149,596
7. Unfunded Actuarial Accrued Liability [5 - 6]	$	69,916,439

TABLE 6

STATE PATROL RETIREMENT SYSTEM

ACTUARIAL BALANCE SHEET
AS OF JULY 1, 2017

ASSETS

Actuarial Value of Assets		$ 395,149,596
Unfunded Actuarial Accrued Liability		69,916,439
Present Value of Future Normal Costs		68,944,116
Total Assets		$ 534,010,151

LIABILITIES

Present Value of Future Benefits		
Active members		
Retirement	$ 213,629,895	
Termination	3,208,116	
Disability	7,352,066	
Death	1,174,727	
Total		225,364,804
Inactive members		4,815,823
Retirees, disabilities and beneficiaries*		303,829,524
Total		$ 534,010,151

* Includes DROP account balances.

TABLE 7

STATE PATROL RETIREMENT SYSTEM

ACTUARIAL GAIN/(LOSS)

Liabilities		
1. Actuarial Accrued Liability as of July 1, 2016	$	421,923,380
2. Normal Cost for Plan Year Ending June 30, 2017		7,366,409
3. Benefit Payments During Plan Year Ending June 30, 2017		(24,139,604)
4. Interest at 8.0% (assumed rate on July 1, 2016)		33,476,491
5. Assumption changes		27,947,994
6. Expected Actuarial Accrued Liability as of July 1, 2017	$	466,574,670
7. Actuarial Accrued Liability as of July 1, 2017	$	465,066,035
Assets		
8. Actuarial Value of Assets as of July 1, 2016	$	374,205,616
9. Contributions During Plan Year Ending June 30, 2017		11,554,062
10. Benefit Payments During Plan Year Ending June 30, 2017		(24,139,604)
11. Interest at 8.0% (assumed rate on July 1, 2016)		29,523,029
12. Expected Actuarial Value of Assets as of July 1, 2017	$	391,143,103
13. Actuarial Value of Assets as of July 1, 2017	$	395,149,596
Gain / (Loss)		
14. Actuarial Gain / (Loss) on Liabilities [6 - 7]	$	1,508,635
15. Actuarial Gain / (Loss) on Assets [13 - 12]		4,006,493
16. Total Actuarial Gain / (Loss) for Plan Year Ending June 30, 2017 [14 + 15]	$	5,515,128

TABLE 8

STATE PATROL RETIREMENT SYSTEM

GAIN/(LOSS) ANALYSIS BY SOURCE

Liability Sources		Gain/(Loss)
Retirement	$	(689,507)
Termination		556,218
Disability		150,534
Mortality		(55,930)
Salary		(408,879)
New Entrants/Rehires		(314,826)
COLA		2,675,356
Miscellaneous		(404,331)
Total Liability Gain/(Loss)	$	1,508,635
Asset Gain/(Loss)	$	4,006,493
Net Actuarial Gain/(Loss)	$	5,515,128

Note: The expected experience is based on the assumptions used in the July 1, 2016 actuarial valuation. New assumptions apply prospectively from July 1, 2017.

TABLE 9

STATE PATROL RETIREMENT SYSTEM

PROJECTED BENEFIT PAYMENTS
AS OF JULY 1, 2017

Plan Year Ending June 30	Current Active Members	Current In-Pay Members	Total
2018	$ 627,000	$ 21,938,000	$ 22,565,000
2019	1,237,000	22,201,000	23,438,000
2020	2,735,000	22,469,000	25,204,000
2021	3,753,000	22,744,000	26,497,000
2022	4,946,000	23,021,000	27,967,000
2023	5,767,000	23,341,000	29,108,000
2024	7,224,000	23,600,000	30,824,000
2025	9,242,000	23,891,000	33,133,000
2026	11,029,000	24,195,000	35,224,000
2027	12,495,000	24,401,000	36,896,000
2028	15,807,000	24,592,000	40,399,000
2029	17,090,000	24,826,000	41,916,000
2030	18,290,000	24,965,000	43,255,000
2031	19,792,000	25,081,000	44,873,000
2032	20,829,000	25,113,000	45,942,000
2033	22,749,000	25,158,000	47,907,000
2034	24,018,000	25,111,000	49,129,000
2035	25,029,000	25,076,000	50,105,000
2036	26,198,000	24,944,000	51,142,000
2037	27,019,000	24,743,000	51,762,000
2038	28,456,000	24,486,000	52,942,000
2039	29,171,000	24,185,000	53,356,000
2040	30,688,000	23,811,000	54,499,000
2041	33,061,000	23,376,000	56,437,000
2042	35,379,000	22,880,000	58,259,000
2043	36,476,000	22,320,000	58,796,000
2044	37,765,000	21,697,000	59,462,000
2045	38,619,000	21,009,000	59,628,000
2046	39,495,000	20,256,000	59,751,000
2047	40,200,000	19,441,000	59,641,000

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

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, 2017 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, 2018. Any additional State contributions are expected to be deposited on July 1, 2018 (State fiscal year end 2019). 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, 2017, 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.

TABLE 10

STATE PATROL RETIREMENT SYSTEM

AMORTIZATION SCHEDULE FOR THE UNFUNDED ACTUARIAL ACCRUED LIABILITY

Amortization Bases	Original Amount	July 1, 2017 Remaining Payments	Date of Last Payment	Outstanding Balance as of July 1, 2017	Annual Contribution*
2006 UAAL Base	$ 13,632,330	19	7/1/2036	$ 12,959,707	$ 973,716
2007 UAAL Base	(2,328,213)	20	7/1/2037	(2,265,664)	(164,431)
2008 UAAL Base	7,528,427	21	7/1/2038	7,483,766	525,894
2009 UAAL Base	12,752,991	22	7/1/2039	12,926,045	881,389
2010 UAAL Base	17,735,331	23	7/1/2040	18,298,292	1,213,066
2011 UAAL Base	12,260,750	24	7/1/2041	12,857,595	830,189
2012 UAAL Base	19,767,597	25	7/1/2042	21,041,981	1,325,417
2013 Experience Base	13,785,867	26	7/1/2043	14,877,574	915,571
2014 Experience Base	(18,572,226)	27	7/1/2044	(19,700,065)	(1,186,082)
2015 Experience Base	(22,807,048)	28	7/1/2045	(23,748,231)	(1,400,594)
2016 Experience Base	(6,583,578)	29	7/1/2046	(6,721,669)	(388,774)
2017 Assumption Change Base	27,947,994	30	7/1/2047	27,947,994	1,587,002
2017 Experience Base	(6,040,886)	30	7/1/2047	(6,040,886)	(343,026)
Total				**$ 69,916,439**	**$ 4,769,337**

* Contribution amount reflects mid-year timing.

1. Total UAAL Amortization Payments	$ 4,769,337
2. Projected Payroll for FY 2018	$ 28,629,936
3. UAAL Amortization Payment Rate	16.66%

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, 2018 and DEVELOPMENT OF ADDITIONAL STATE CONTRIBUTION

1. Normal Cost		
(a) Amount	$	8,181,278
(b) Expected pay for current actives		26,761,261
(c) Normal Cost Rate as % of pay		30.57%
2. UAAL Amortization Rate (see Table 10)		16.66%
3. Total Actuarial Required Contribution Rate [1(c) + 2]		47.23%
4. Weighted Statutory Member Contribution Rate		16.04%
5. Weighted Statutory Employer Contribution Rate		16.04%
6. Additional Required State Contribution Rate [3 - 4 - 5, but not less than 0%]		15.15%
7. Projected Payroll for FY 2018	$	28,629,936
8. Additional Required State Contribution [6 * 7]	$	4,337,435
9. Total State Contributions		
(a) State statutory amount	$	4,592,242
(b) Additional State contribution		4,337,435
(c) Total	$	8,929,677

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.

TABLE 12

STATE PATROL RETIREMENT SYSTEM

HISTORICAL FUNDING INFORMATION

SCHEDULE OF FUNDING PROGRESS

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)	UAAL as a % of Covered Payroll [(b - a) / c]
June 30, 2003	$214,657,454	$210,930,784	($3,726,670)	101.8%	$21,929,399	(17.0%)
June 30, 2004	216,422,556	222,161,512	5,738,956	97.4%	22,640,907	25.3%
June 30, 2005	219,831,273	236,026,471	16,195,198	93.1%	22,882,413	70.8%
June 30, 2006	231,740,772	245,373,102	13,632,330	94.4%	24,057,960	56.7%
June 30, 2007	254,662,819	265,846,597	11,183,778	95.8%	26,072,859	42.9%
June 30, 2008	273,393,928	291,996,719	18,602,791	93.6%	26,979,643	69.0%
June 30, 2009	274,119,906	305,291,065	31,171,159	89.8%	25,922,439	120.2%
June 30, 2010	273,306,925	321,901,446	48,594,521	84.9%	26,765,816	181.6%
June 30, 2011	279,192,669	339,554,456	60,361,787	82.2%	26,195,473	230.4%
June 30, 2012	282,810,785	362,298,975	79,488,190	78.1%	25,794,219	308.2%
June 30, 2013	294,468,029	386,875,100	92,407,071	76.1%	27,417,644	337.0%
June 30, 2014	325,966,725	401,415,518	75,448,793	81.2%	25,933,848	290.9%
June 30, 2015	356,446,470	410,210,579	53,764,109	86.9%	28,422,706	189.2%
June 30, 2016	374,205,616	421,923,380	47,717,764	88.7%	27,806,977	171.6%
June 30, 2017	395,149,596	465,066,035	69,916,439	85.0%	28,629,936	244.2%

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%

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

MEMBER DATA RECONCILIATION

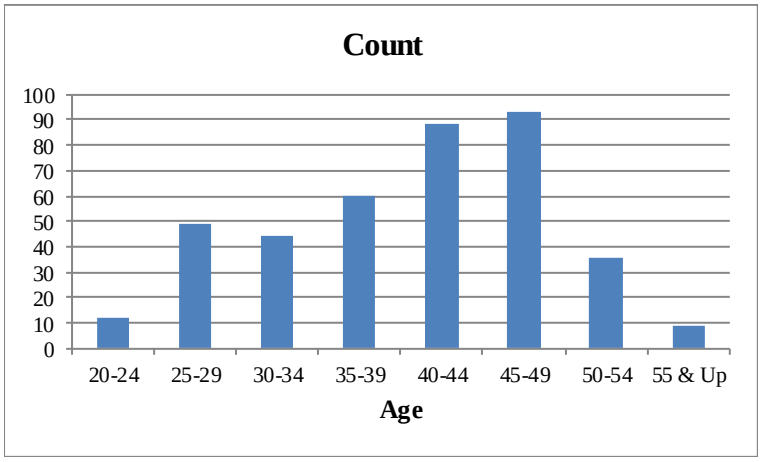
	Active Members	Members in DROP	Inactive Vested	Inactive Non-vested	Retirees and Beneficiaries	Disabled Members	Total
As of July 1, 2016	393	52	20	7	404	15	891
Changes in status							
a) Retirement	(4)	(19)	0	0	23	0	0
b) DROP	(9)	9	0	0	0	0	0
c) Death	0	0	0	0	(13)	0	(13)
d) Non-vested terminations	(1)	0	0	1	0	0	0
e) Vested terminations	(5)	0	5	0	0	0	0
f) Contribution refund	(3)	0	0	(1)	0	0	(4)
g) Beneficiaries in receipt	0	0	0	0	7	0	7
h) Disability retirements	0	0	0	0	0	0	0
i) Return to active service	1	0	0	(1)	0	0	0
j) Expired benefits	0	0	0	0	0	0	0
Total changes in status	(21)	(10)	5	(1)	17	0	(10)
New entrants	19	0	0	1	0	0	20
Net Change	(2)	(10)	5	0	17	0	10
As of July 1, 2017	391	42	25	7	421	15	901

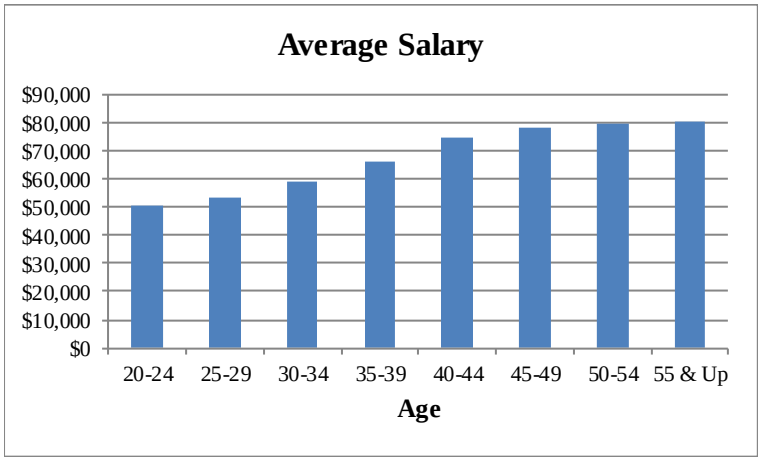
SUMMARY OF MEMBERSHIP DATA

A. ACTIVE MEMBERS	July 1, 2017	July 1, 2016	% Change
1. Number of Active Members			
(a) Before assumed retirement age	380	377	0.8%
(b) Beyond assumed retirement age	11	16	(31.3%)
(c) Total	391	393	(0.5%)
2. Annual Reported Salary			
(a) Before assumed retirement age	$ 26,219,423	$ 25,000,142	4.9%
(b) Beyond assumed retirement age	902,415	1,233,812	(26.9%)
(c) Total	$ 27,121,838	$ 26,233,954	3.4%
3. Accumulated Contributions	$ 43,844,138	$ 42,684,305	2.7%
4. Active Member Averages			
(a) Age	40.6	40.7	(0.2%)
(b) Service	13.5	13.4	0.7%
(c) Compensation	$ 69,365	$ 66,753	3.9%
(d) Accumulated contributions	$ 112,133	$ 108,611	3.2%
B. INACTIVE MEMBERS			
1. Number of Inactive Members	32	27	18.5%
2. Accumulated Member Contributions	$ 2,521,122	$ 1,934,830	30.3%
3. Inactive Members Averages			
(a) Age (vested members only)	43.7	43.5	0.5%
(b) Accumulated member contributions	$ 78,785	$ 71,660	9.9%
C. RETIREES, DISABLEDS, AND BENEFICIARIES			
1. Number of Members			
(a) Retired	339	324	4.6%
(b) Disabled	15	15	0.0%
(c) Beneficiaries	82	80	2.5%
(d) DROP	42	52	(19.2%)
(e) Total	478	471	1.5%
2. Annual Benefits			
(a) Retired	$ 16,709,472	$ 15,446,286	8.2%
(b) Disabled	509,602	502,071	1.5%
(c) Beneficiaries	2,164,764	2,039,223	6.2%
(d) DROP	2,622,569	3,169,438	(17.3%)
(e) Total	$ 22,006,407	$ 21,157,018	4.0%
3. Market Value of DROP Account Balances	$ 6,919,465	$ 8,587,209	(19.4%)

ACTIVE MEMBERS
AS OF JULY 1, 2017

	Count			Reported FY 2017 Earnings		
Age	Male	Female	Total	Male	Female	Total
20-24	9	3	12	$ 454,941	$ 147,909	$ 602,850
25-29	43	6	49	2,280,708	323,392	2,604,100
30-34	40	4	44	2,380,360	209,104	2,589,464
35-39	55	5	60	3,654,322	303,599	3,957,921
40-44	84	4	88	6,285,038	253,856	6,538,894
45-49	88	5	93	6,851,280	404,509	7,255,789
50-54	35	1	36	2,782,034	70,782	2,852,816
55 & Up	9	0	9	720,004	0	720,004
Total	363	28	391	$ 25,408,687	$ 1,713,151	$ 27,121,838





AGE AND SERVICE DISTRIBUTION
AS OF JULY 1, 2017

Age		0-4	5-9	10-14	15-19	20-24	Over 25	Total
20-24	Number	12	0	0	0	0	0	12
	Total Salary	$ 602,850	$ 0	$ 0	$ 0	$ 0	$ 0	$ 602,850
	Average Sal.	$ 50,238	$ 0	$ 0	$ 0	$ 0	$ 0	$ 50,238
25-29	Number	43	6	0	0	0	0	49
	Total Salary	$ 2,259,830	$ 344,270	$ 0	$ 0	$ 0	$ 0	$ 2,604,100
	Average Sal.	$ 52,554	$ 57,378	$ 0	$ 0	$ 0	$ 0	$ 53,145
30-34	Number	7	24	13	0	0	0	44
	Total Salary	$ 367,006	$ 1,392,070	$ 830,388	$ 0	$ 0	$ 0	$ 2,589,464
	Average Sal.	$ 52,429	$ 58,003	$ 63,876	$ 0	$ 0	$ 0	$ 58,851
35-39	Number	5	12	36	7	0	0	60
	Total Salary	$ 255,990	$ 748,614	$ 2,415,122	$ 538,195	$ 0	$ 0	$ 3,957,921
	Average Sal.	$ 51,198	$ 62,385	$ 67,087	$ 76,885	$ 0	$ 0	$ 65,965
40-44	Number	1	4	34	45	4	0	88
	Total Salary	$ 55,397	$ 225,229	$ 2,408,789	$ 3,515,519	$ 333,960	$ 0	$ 6,538,894
	Average Sal.	$ 55,397	$ 56,307	$ 70,847	$ 78,123	$ 83,490	$ 0	$ 74,306
45-49	Number	0	3	18	28	30	14	93
	Total Salary	$ 0	$ 164,020	$ 1,240,411	$ 2,066,400	$ 2,523,080	$ 1,261,878	$ 7,255,789
	Average Sal.	$ 0	$ 54,673	$ 68,912	$ 73,800	$ 84,103	$ 90,134	$ 78,019
50-54	Number	1	0	8	10	14	3	36
	Total Salary	$ 50,244	$ 0	$ 681,837	$ 742,891	$ 1,103,274	$ 274,570	$ 2,852,816
	Average Sal.	$ 50,244	$ 0	$ 85,230	$ 74,289	$ 78,805	$ 91,523	$ 79,245
55 & Up	Number	1	0	4	3	1	0	9
	Total Salary	$ 92,159	$ 0	$ 323,806	$ 216,245	$ 87,794	$ 0	$ 720,004
	Average Sal.	$ 92,159	$ 0	$ 80,952	$ 72,082	$ 87,794	$ 0	$ 80,000
Total	Number	70	49	113	93	49	17	391
	Total Salary	$ 3,683,476	$ 2,874,203	$ 7,900,353	$ 7,079,250	$ 4,048,108	$ 1,536,448	$ 27,121,838
	Average Sal.	$ 52,621	$ 58,657	$ 69,915	$ 76,121	$ 82,614	$ 90,379	$ 69,365

MEMBERS PARTICIPATING IN DROP
AS OF JULY 1, 2017

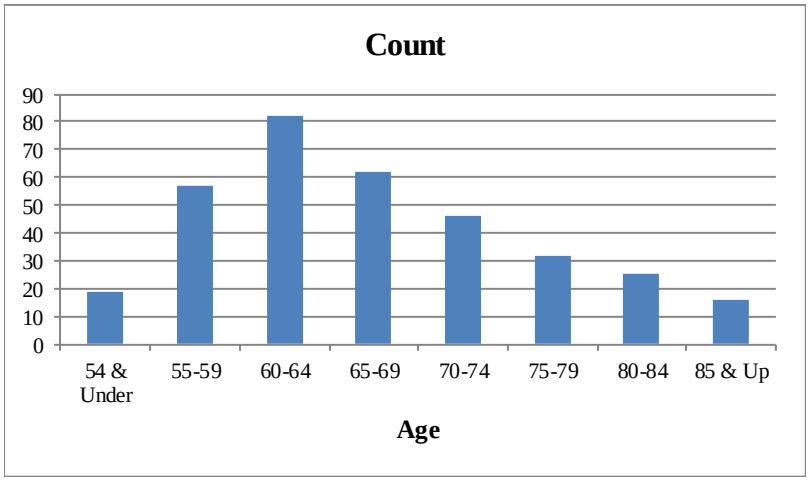
	Count			Annual Benefits		
Age	Male	Female	Total	Male	Female	Total
49 & Under	0	0	0	$ 0	$ 0	$ 0
50-51	7	0	7	440,524	0	440,524
52-53	12	0	12	765,425	0	765,425
54-55	10	0	10	627,826	0	627,826
56-57	8	1	9	495,701	49,797	545,498
58-59	4	0	4	243,296	0	243,296
60 & Up	0	0	0	0	0	0
Total	41	1	42	$ 2,572,772	$ 49,797	$ 2,622,569

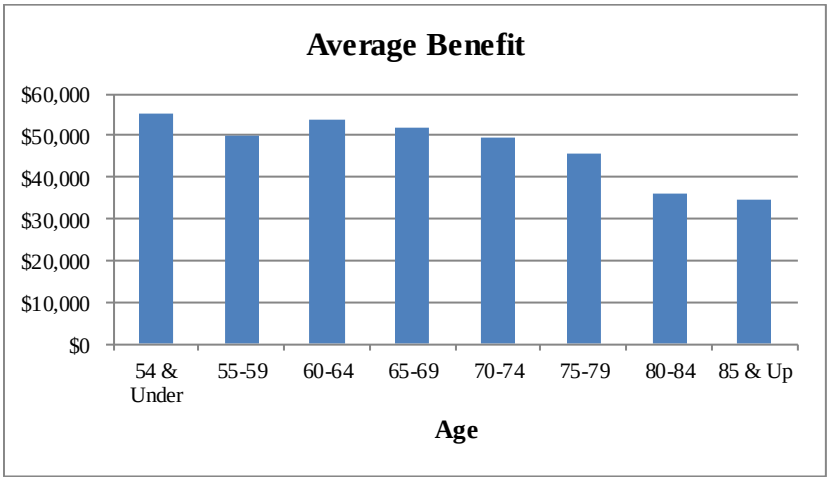
INACTIVE VESTED MEMBERS
AS OF JULY 1, 2017

	Count			Annual Benefits		
Age	Male	Female	Total	Male	Female	Total
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	5	0	5	94,812	0	94,812
40-44	9	0	9	225,851	0	225,851
45-49	7	0	7	178,775	0	178,775
50-54	2	0	2	41,993	0	41,993
55 & Up	1	0	1	28,477	0	28,477
Total	25	0	25	$ 584,014	$ 0	$ 584,014

RETIRED MEMBERS
AS OF JULY 1, 2017

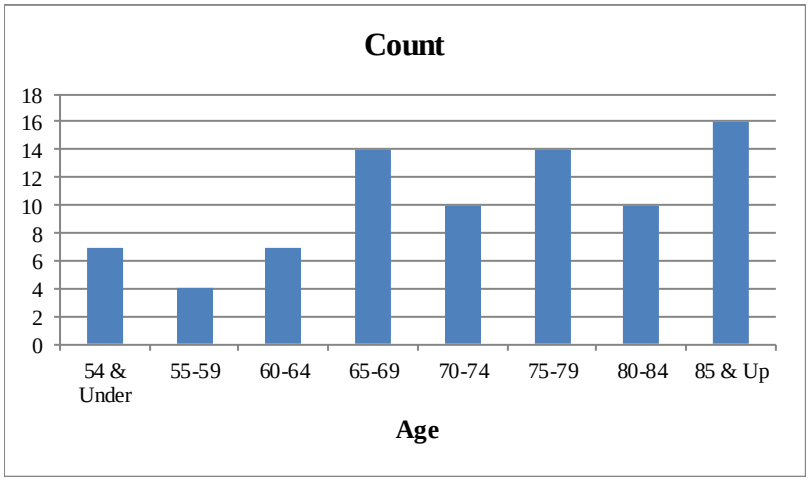
	Count			Annual Benefits		
Age	Male	Female	Total	Male	Female	Total
54 & Under	14	5	19	$ 866,916	$ 181,229	$ 1,048,145
55-59	49	8	57	2,511,335	343,404	2,854,739
60-64	77	5	82	4,231,255	181,411	4,412,666
65-69	61	1	62	3,181,711	20,826	3,202,537
70-74	45	1	46	2,208,794	60,182	2,268,976
75-79	32	0	32	1,465,881	0	1,465,881
80-84	25	0	25	902,813	0	902,813
85 & Up	16	0	16	553,715	0	553,715
Total	319	20	339	$15,922,420	$787,052	$16,709,472

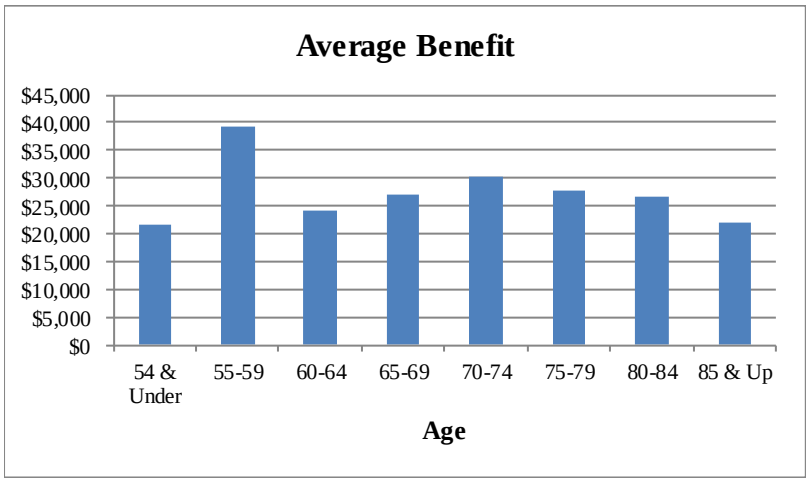




BENEFICIARIES
AS OF JULY 1, 2017

	Count			Annual Benefits		
Age	Male	Female	Total	Male	Female	Total
54 & Under	1	6	7	$ 20,663	$ 132,108	$ 152,771
55-59	0	4	4	0	156,563	156,563
60-64	0	7	7	0	168,818	168,818
65-69	0	14	14	0	376,954	376,954
70-74	0	10	10	0	301,299	301,299
75-79	1	13	14	30,403	357,915	388,318
80-84	0	10	10	0	268,679	268,679
85 & Up	0	16	16	0	351,362	351,362
Total	2	80	82	$ 51,066	$ 2,113,698	$ 2,164,764





DISABLED MEMBERS
AS OF JULY 1, 2017

	Count			Annual Benefits		
Age	Male	Female	Total	Male	Female	Total
54 & Under	4	1	5	$ 123,925	$ 28,849	$ 152,774
55-59	0	1	1	0	35,078	35,078
60-64	1	0	1	38,561	0	38,561
65-69	4	0	4	142,513	0	142,513
70-74	3	0	3	108,870	0	108,870
75-79	0	0	0	0	0	0
80-84	0	0	0	0	0	0
85 & Up	1	0	1	31,806	0	31,806
Total	13	2	15	$ 445,675	$ 63,927	$ 509,602

Member	Any member of the Nebraska State Patrol, permanent force.
Participation Date	Date of becoming a member.
Benefit Tiers	Tier 1 refers to participants who joined the plan prior to July 1, 2016. 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.
Definitions	
Covered pay	Gross annual earnings subject to contributions.
Final average compensation	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. 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.
Salary caps	For Tier 2 participants only, increases in compensation during the final five plan years of employment will be capped at 8% per year.
Pension service	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.
Fiscal year	Twelve month period ending June 30.
Member and employer contributions	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.). 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. The State makes any additional contributions that are actuarially required.

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.

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:

Years	Vested Percentage
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.

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, 2017

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

The 2017 Legislature passed LB 415, which grants the PERB the authority to set the actuarial assumptions used to determine the benefit amounts payable under optional forms of payment for members hired on or after July 1, 2017. Since these changes do not affect any members in the current valuation, the adopted changes have no impact on the valuation results.

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 percentage 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.

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 and (2) the expected return of Actuarial Value. Effective July 1, 2000, the expected return on Actuarial Value includes interest on the previous year's unrecognized return.

   Changes in Methods and Procedures Since the Prior Year

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

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

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)

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					
	Scale (2020)		Scale (2030)		Scale (2040)	
Sample Age	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

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.

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

The results of an experience study covering the four-year period ending June 30, 2015 were presented to the PERB on October 17, 2016. All of the recommended assumption changes were adopted and are first reflected in this valuation, including:

- The inflation assumption decreased from 3.25% to 2.75%.
- The investment return assumption declined from 8.00% to 7.50%.
- The cost of living adjustment assumption decreased from 2.50% to 2.25% for members hired before July 1, 2016.
- The covered payroll growth assumption decreased from 4.00% to 3.50%.
- The individual salary increase assumption was lowered by 0.50% in order to remain consistent with the inflation assumption.
- The assumed interest rate credited on employee contributions was lowered from 4.25% to 3.00%.
- The mortality assumption has been changed to the RP-2014 White Collar Mortality Table, with adjustments made to better reflect observed experience. Generational mortality improvements are modeled using a System-specific projection scale.
- Termination rates were adjusted to better reflect observed experience.

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". Most retirement systems have unfunded actuarial accrued liability. They arise each time new benefits are added and each time an actuarial loss is realized.