

# Missouri Local Government Employees Retirement System

Compiled 49th Annual Actuarial Valuation  
as of February 28, 2017



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## Report of Compiled Actuarial Valuations of LAGERS

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September 6, 2017

The Board of Trustees  
Missouri Local Government Employees Retirement System  
Jefferson City, Missouri

**Submitted in this report** are the compiled results of the **49th annual actuarial valuations** for the Missouri Local Government Employees Retirement System, as amended through February 28, 2017. **The date of the valuations** was February 28, 2017.

**Actuarial valuations** of individual participating employers are made for the purposes of (i) revising employer contribution rates and (ii) examining the reserve strength of each separately experience-rated group. These individual valuations are made annually for each employer who was participating as of the valuation date. Such valuations were made for **1,078 groups (681 employers)**. Actuarial valuations are also made of retired life benefits being paid from the Benefit Reserve Fund to determine the financial condition of this pooled Fund.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The signing individuals are independent of the plan sponsor.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as: plan experience differing from that anticipated by the economic and 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 the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

**The valuations were based upon data** furnished by LAGERS staff concerning members, retirees and beneficiaries.

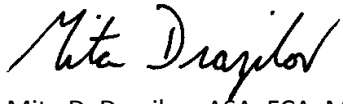
**The financial assumptions** used in making the valuations are shown in the Appendix of this report. Assumptions concerning future experience are needed for computing employer contribution rates. As time passes and actual experience develops, assumed and actual experiences are compared. From time to time one or more of the assumptions about the future are changed by the Board after consulting with the actuary. The assumptions used in performing the 2017 valuations were adopted by the Board in conjunction with a five-year experience investigation for the period ending February 28, 2015.

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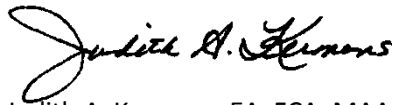
**Your attention is directed particularly** to the Comments on pages 3 through 5, and to the Short Condition Test on page B-6. Based upon the 2017 valuations, it is our opinion that **LAGERS continues to satisfy the actuarial principles of level cost financing**.

Mita D. Drazilov and Judith A. Kermans are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,



Mita D. Drazilov, ASA, FCA, MAAA



Judith A. Kermans, EA, FCA, MAAA

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## Comments on Valuation Results

**Individual Valuations of Participating Employers.** There were 1,078 new employer contribution rates computed as of February 28, 2017. (Sixty-five groups had no active employees and a dollar contribution was calculated for them. These sixty-five groups are excluded from the totals on this page.) Of the 1,078 new rates, 397 were decreases from the previous rates, 576 were increases from the previous rates and 105 were unchanged. Further detail is shown in Section G. A ten-year comparative schedule follows:

Valuation Date	Decreases	Unchanged	Increases	Total
2-29-2008	577	110	233	920
2-28-2009	71	54	820	945
2-28-2010	201	63	707	971
2-28-2011*	230	41	724	995
2-29-2012	507	61	439	1,007
2-28-2013	595	77	359	1,031
2-28-2014	772	52	231	1,055
2-28-2015	738	80	244	1,062
2-29-2016*	255	53	759	1,067
<b>2-28-2017</b>	<b>397</b>	<b>105</b>	<b>576</b>	<b>1,078</b>

\* Revised financial assumptions and/or funding method.

Decreases in employer contribution rates are seldom a problem. Increases can be a problem. As a result of the adoption of the new actuarial assumptions for the February 29, 2016 valuations, the employer contribution rate for many valuation groups was capped due to the 1% increase limitation (e.g., 334 valuation groups had capped employer contribution rates as of February 29, 2016). This is the primary reason that increases in computed employer contribution rates exceeded decreases as of February 28, 2017.

**Experience During Valuation Year.** Investment return was above the assumed rate of return on a funding value of assets basis as of February 28, 2017. The actuarial value of assets exceeds the market value of assets by roughly 1% which puts slight upward pressure on future contribution rates. (Beginning in 2003, the actuarial value of assets is not allowed to deviate from the market value of assets by more than 20%.) In addition, there is still upward pressure on capped employer contribution rates (approximately 232 valuation groups).

## Comments on Valuation Results - Continued

Section D of this report presents a summary of the analysis of the economic and non-economic risk areas. For the year ended February 28, 2017, the System experienced an actuarial gain of approximately \$26 million. This primarily consisted of better than assumed investment return and lower than assumed COLA increases offset by an increase in the Reserve for Future Experience in the Benefit Reserve Fund.

**Retired Life Experience.** The Benefit Reserve Fund (BRF) funded ratio increased from 104.7% to 107.2% as of February 28, 2017, due to a recognized gain on assumed investment return and by lower than expected cost-of-living increases. Please refer to page B-11 for detail.

**Casualty Reserve Fund.** It is our understanding that a \$10 million transfer was made from the Income-Expense Fund (I-EF) to the Casualty Reserve Fund in March 2016. The results as of February 28, 2017 shown on page B-12 reflect this transfer.

**Funded Ratio.** The funded ratio for the System as of the valuation date is 94.8% based on the actuarial value of assets. If the market value of assets were used and the reserve for future experience in the BRF shown on page B-11 were unchanged, the funded ratio would be approximately 94.2%.

## Comments on Reserve Strength of Each Group Being Separately Experience-Rated

"Reserve strength" means the portion of accrued liabilities which are covered by accrued assets. The larger the portion covered, the greater the reserve strength.

At the time a local government joins LAGERS the reserve strength of that new employer is zero because there are no assets, while liabilities (for past service) have been generated.

Contributions to LAGERS are patterned so that reserve strength increases year by year.

However, this underlying pattern is being modified each year as actual financial experiences occur.

Experiences more favorable than assumed cause reserve strength to increase more than planned, while less favorable experiences reduce reserve strength. Like snowflakes, no two groups have identical experiences.

In addition, reserve strength is lowered when a local government adopts a higher benefit formula (larger liabilities for past service are generated).

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The hundreds of separately experience-rated groups within LAGERS have considerable differences in reserve strength. These differences are summarized on page B-8.

Financially, LAGERS consists of a large number of diverse groups, not a large number of clones of a single LAGERS average.



## Summary of Risk Measures

Valuation Date	Funded Ratio	UAAL Amortization Period #	Dollar Standard Deviation of Investment Return / Total Payroll *	UAAL / Total Payroll	Actuarial Value of Assets / Total Payroll	Total AAL / Total Payroll
2-29-2008	97.5%	NA	32.6%	8.3%	323.6%	331.9%
2-28-2009	80.0	NA	21.6	64.6	259.0	323.6
2-28-2010	81.0	97	27.8	63.1	269.8	333.0
2-28-2011	81.6	43	32.7	66.1	292.1	358.2
2-29-2012	83.5	34	34.4	62.2	314.4	376.6
2-28-2013	86.5	26	37.0	52.4	336.3	388.7
2-28-2014	91.7	21	41.1	33.4	370.1	403.4
2-28-2015	94.4	21	43.6	24.0	408.5	432.5
2-29-2016	94.7	24	39.3	23.3	419.2	442.5
2-28-2017	94.8	25	43.2	23.9	434.8	458.7

# Aggregate amortization period for all employers combined.

\* Assumes System goal of a 10% standard deviation. Based upon the market value of assets.

**Funded ratio:** The funded ratio is expected to trend toward 100% based on the current funding policy.

**UAAL Amortization Period:** The aggregate amortization period is for all employers combined. Each employer has specific amortization periods for their respective amortization bases.

**Standard Deviation of Investment Return / Total Payroll:** This measure illustrates the impact of a one standard deviation change in investment return as a percent of payroll. Investment return experience other than expected ultimately affects the employer contribution rates. The higher the ratio of this risk metric, the greater the expected volatility in employer contribution rates. Absent changes in investment policy, this metric is expected to increase as the assets grow to 100% of the AAL.

**UAAL / Total Payroll:** The ratio of the unfunded actuarial accrued liability to payroll is expected to trend towards 0%.

**Funding Value of Assets / Total Payroll:** As the funded ratio increases, this ratio is expected to converge to the ratio of Total AAL / Payroll.

**Total AAL / Total Payroll:** Total AAL / Total Payroll is expected to grow as the system matures and in general remain constant thereafter.

## Other Observations

### General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.25% on the actuarial value of assets), it is expected that:

- (1) Each employer's normal cost as a percentage of pay is expected to remain level in the absence of significant changes due to hiring patterns of each employer. However, given the small number of active members in many of the participating valuation groups, the employer normal cost may change significantly from one valuation to the next.
- (2) The unfunded actuarial accrued liabilities for each employer is expected to be fully amortized after completion of their respective amortization periods.
- (3) In general, the funded status for each employer is expected to trend gradually towards a 100% funded ratio.

When selecting a contribution allocation procedure, the following three items should be considered, including the balance amongst the three items:

- (1) Benefit security,
- (2) Intergenerational equity, and
- (3) Contribution stability and predictability.

Generally, given the nature of public employee retirement systems (e.g., level contribution financing objective and perceived ongoing nature of the plan or plan sponsor), intergenerational equity and contribution stability and predictability have received more consideration than benefit security when contribution allocation procedures are selected. However, given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in the annual valuation reports be considered.

### Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

- (1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.
- (2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- (3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

## **SECTION A**

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### **FINANCIAL PRINCIPLES**

# Financial Principles and Operational Techniques of LAGERS

**Promises Made, and To Be Paid For.** As each year is completed, the System in effect hands an "IOU" to each member then acquiring a year of service credit -- the "IOU" says: "The Missouri Local Government Employees Retirement System owes you one year's worth of retirement benefits, payments in cash commencing when you qualify for retirement."

The related **key financial questions** are:

**Which generation of taxpayers contributes the money to cover the IOU?**

The present taxpayers, who receive the benefit of the member's present year of service?

**Or the future taxpayers**, who happen to be in Missouri at the time the IOU becomes a cash demand?

**LAGERS intends that this year's taxpayers contribute the money to cover the IOUs being handed out this year.** By following this principle, **the employer contribution rate will remain approximately level from generation to generation** -- our children and our grandchildren will contribute the same percents of pay we contribute now.

(There are Systems which have a design for deferring contributions to future taxpayers lured by a lower contribution rate now and putting aside the fact that the contribution rate must relentlessly grow much greater over decades of time -- consume now, and let your children face your **financial pollution** after you have retired.)

An inevitable by-product of the level-cost design is the accumulation of reserve assets, for decades, and the income produced when the assets are invested. **Invested assets are a by-product and not the objective.** **Investment income** becomes in effect **the third contributor** for benefits to employees and is interlocked with the contribution amounts required from employees and employers.

Translated to actuarial terminology, this level-cost objective means that the contribution rates must total at least the following:

Normal Cost (the cost of members' service being rendered this year)

... plus ...

Interest on Unfunded Actuarial Accrued Liabilities (unfunded actuarial accrued liabilities are the difference between: liabilities for members' service already rendered and the accrued assets of the governmental unit in the plan).

**Computing Contributions to Support System Benefits.** From a given schedule of benefits and from the employee data and asset data furnished, the actuary determines the contribution rates to support the benefits by means of ***an actuarial valuation and a funding method.***

An actuarial valuation has a number of ingredients such as: the rate of investment return which plan assets will earn; the rates of withdrawal of active members who leave covered employment before qualifying for any monthly benefit; the rates of mortality; the rates of disability; the rates of pay increases; and the assumed age or ages at actual retirement.

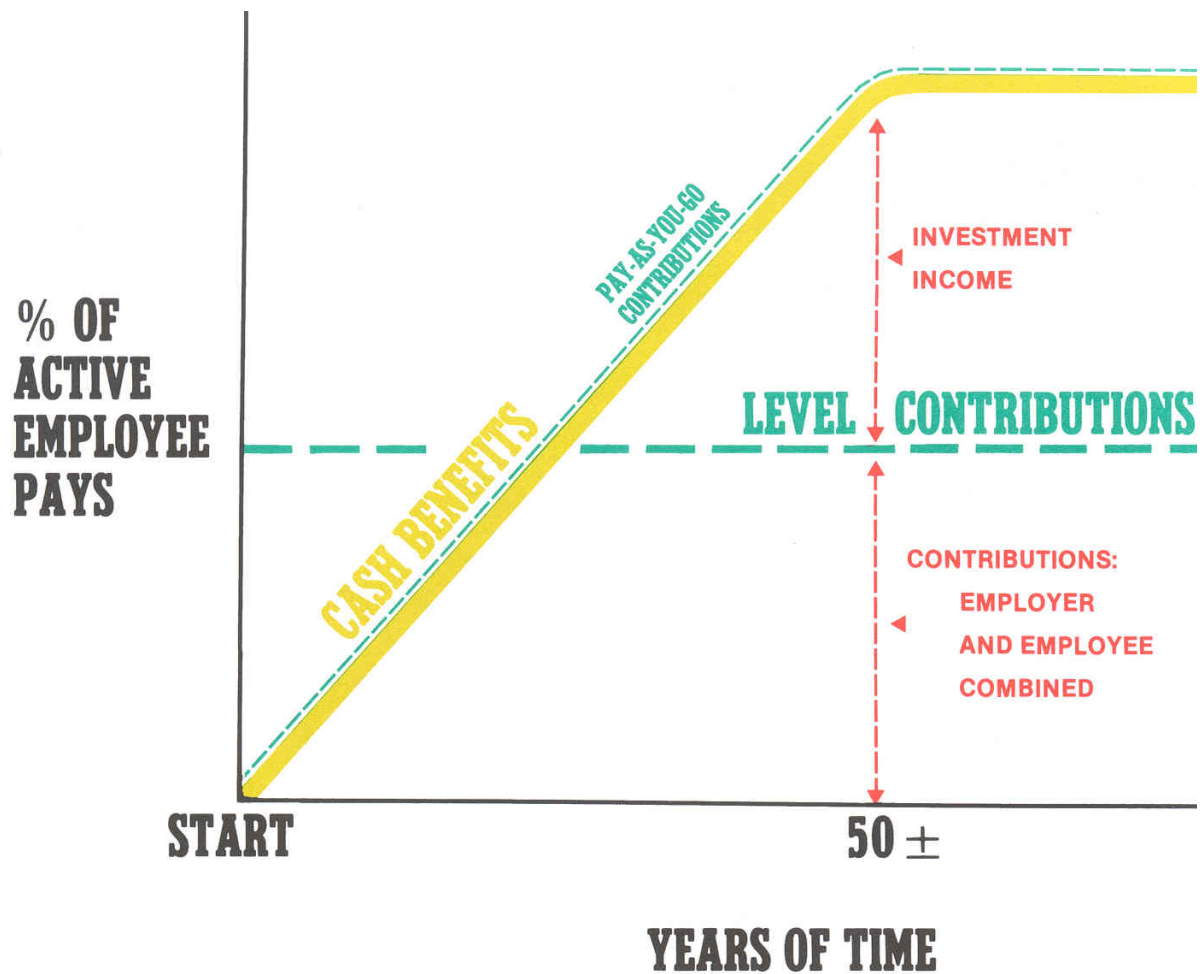
In making an actuarial valuation, the System must assume what the above experience will be for the next year and for decades in the future. Only the subsequent actual experience of the System can indicate the degree of accuracy of the assumptions.

**Reconciling Differences Between Assumed Experience and Actual Experience.** Once actual experience has occurred and been observed, it will not coincide exactly with assumed experience, regardless of the wisdom of the assumptions and regardless of the skill of the actuary and the calculations made. The future can be predicted with considerable but not complete precision, except that inflation seems to defy reliable prediction.

LAGERS copes with these continually changing differences by having ***annual actuarial valuations***, separately for each participating employer group. Each annual actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is continually changing employer contribution rates.

**Generally, the size of an annual change in an employer rate is less than one percent of payroll (up or down)**, particularly for the larger groups, where activities of one or two employees have little effect on the group's status. In periods of volatile investment markets, groups with large Employer Accumulation Fund (EAF) balances may experience larger changes in computed rates.

To avoid causing employer budget problems, LAGERS provides a maximum annual increase of one percent of payroll for any one participating employer. Beginning with the February 28, 1999 valuations, the maximum allowed annual decrease in an employer contribution rate is also one percent of payroll, unless it is clear that a larger decrease will likely be long term in nature. (For example, if a change in active group size appears to not be temporary.)



**CASH BENEFITS LINE.** This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

**LEVEL CONTRIBUTION LINE.** Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

**Economic Risk Areas**

- Rates of investment return
- Rates of pay increase
- Changes in active member group size

**Non-Economic Risk Areas**

- Ages at actual retirement
- Rates of mortality
- Rates of withdrawal of active members (turnover)
- Rates of disability

# The Actuarial Valuation Process

The **actuarial valuation** is the mathematical process by which the contribution rate is determined, and the flow of activity constituting the valuation may be summarized as follows:

- A. **Covered people data**, furnished by plan administrator, including:
  - Retired lives now receiving benefits
  - Former employees with vested benefits not yet payable
  - Active employees
  
- B. + **Asset data** (cash & investments), furnished by plan administrator
  
- C. + **Assumptions concerning future financial experiences in various risk areas**, which assumptions are established by the Board of Trustees after consulting with the actuary
  
- D. + **The funding method** for determining employer contributions (the long-term, planned pattern for employer contributions)
  
- E. + **Mathematically combining the assumptions, the funding method, and the data**
  
- F. = Determination of:
  - Plan financial position**
  - and/or **New Employer Contribution Rate.**

## **SECTION B**

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### **VALUATION RESULTS**



## Change in Employer Contributions\* By Valuation Groups February 28, 2017

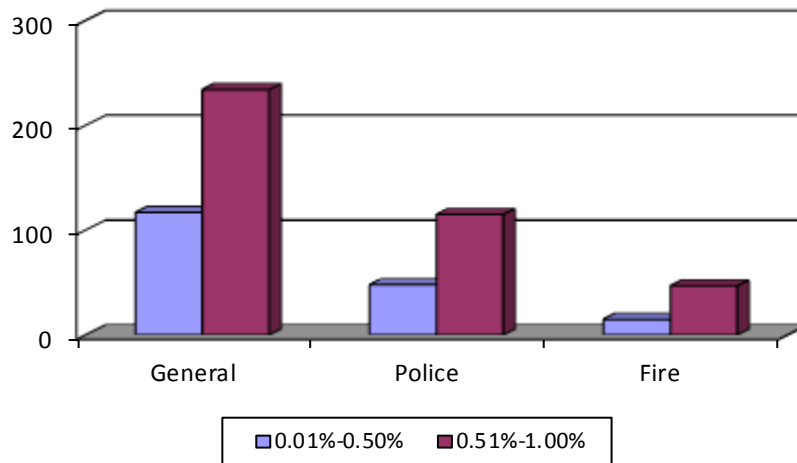
Group	Number of Active Members	Number of Valuation Groups with Indicated Change in Employer Contribution Rate						Totals
		Decreases			Unchanged 0.00%	Increases		
		Over 1.00%	0.51% to 1.00%	0.01% to 0.50%		0.01% to 0.50%	0.51% to 1.00%	
General:	1 - 9	29	19	45	42	37	114	286
	10 - 49	25	37	49	15	47	91	264
	50 & up	<u>3</u>	<u>15</u>	<u>29</u>	<u>10</u>	<u>33</u>	<u>29</u>	<u>119</u>
	Totals	57	71	123	67	117	234	669
Police:	1 - 9	22	13	18	21	12	54	140
	10 - 49	12	11	23	7	28	54	135
	50 & up	<u>1</u>	<u>1</u>	<u>7</u>	—	<u>8</u>	<u>7</u>	<u>24</u>
	Totals	35	25	48	28	48	115	299
Fire:	1 - 9	3	6	6	5	7	13	40
	10 - 49	7	3	11	5	7	29	62
	50 & up	—	—	<u>2</u>	—	<u>1</u>	<u>5</u>	<u>8</u>
	Totals	10	9	19	10	15	47	110
<b>Totals</b>		<b>102</b>	<b>105</b>	<b>190</b>	<b>105</b>	<b>180</b>	<b>396</b>	<b>1,078</b>

\* Includes changes in employer contribution rates due to actual experience, changes in actuarial assumptions and changes in actuarial methods. It does not include changes in employer contribution rates due to benefit program changes.

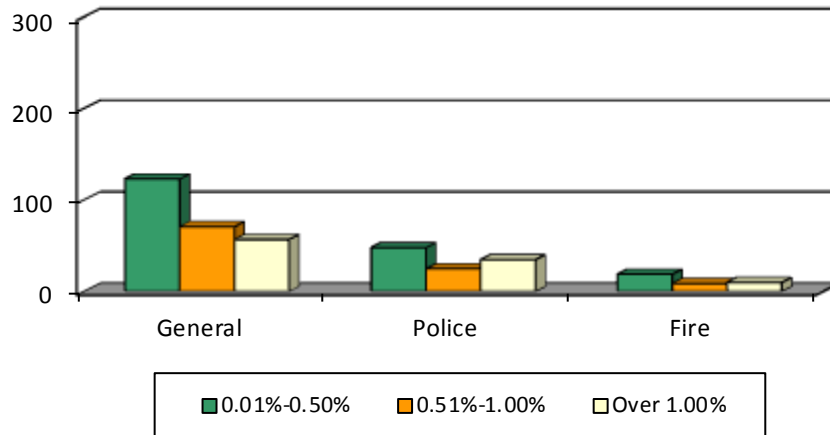
In broad terms, the smaller the group, the greater the chance of a relatively large change in employer rate from one year to the next.

## Change in Employer Contribution Rate\* By Valuation Group

### Increases



### Decreases



\* Includes changes in employer contribution rates due to actual experience, changes in actuarial assumptions and changes in actuarial methods. It does not include changes in employer contribution rates due to benefit program changes. (LAGERS provides a maximum annual increase of one percent of payroll in the absence of benefit changes for any one participating employer.)

## Schedule of Funding Progress

Each time a new employer joins the System, or an employer adopts a higher level of benefits, unfunded actuarial accrued liabilities are created. The law governing the System requires that these additional obligations be financed systematically over a period of future years.

In an inflationary economy the value of dollars is decreasing. This environment results in employee pays increasing in dollar amounts, retirement benefits increasing in dollar amounts, and then, unfunded actuarial accrued liabilities, all at a time when the actual substance of these items may be decreasing. Looking at just the dollar amounts of unfunded actuarial accrued liabilities can be misleading. Unfunded actuarial accrued liability dollars divided by active employee payroll provides an index which helps understanding. The smaller the ratio of unfunded liabilities to active member payroll, the stronger the System.

Valuation Date	(a) Actuarial Value of Assets	(b) Entry Age Actuarial Accrued Liability	(b-a) Unfunded Accrued Liability (UAL)	(a/b) Funded Ratio	(c) Annual Payroll	[(b-a)/c] UAL as a % of Payroll
2-29-2008	\$ 3,957,068,611	\$ 4,058,828,886	\$ 101,760,275	97.5%	\$ 1,222,745,363	8.3%
2-28-2009	3,330,662,923	4,161,775,258	831,112,335	80.0	1,285,952,041	64.6
2-28-2010	3,592,225,739	4,432,331,886	840,106,147	81.0	1,331,226,335	63.1
2-28-2011 #	3,945,085,880	4,837,423,311	892,337,431	81.6	1,350,646,560	66.1
2-29-2012	4,274,440,345	5,120,274,198	845,833,853	83.5	1,359,655,784	62.2
2-28-2013	4,692,218,862	5,423,684,243	731,465,381	86.5	1,395,261,077	52.4
2-28-2014	5,388,198,677	5,873,910,959	485,712,282	91.7	1,456,008,487	33.4
2-28-2015	5,972,471,342	6,324,109,191	351,637,849	94.4	1,462,218,216	24.0
2-29-2016 #	6,320,171,438	6,671,352,337	351,180,899	94.7	1,507,588,470	23.3
2-28-2017	6,764,626,389	7,135,950,253	371,323,864	94.8	1,555,729,666	23.9

# Revised actuarial assumptions.

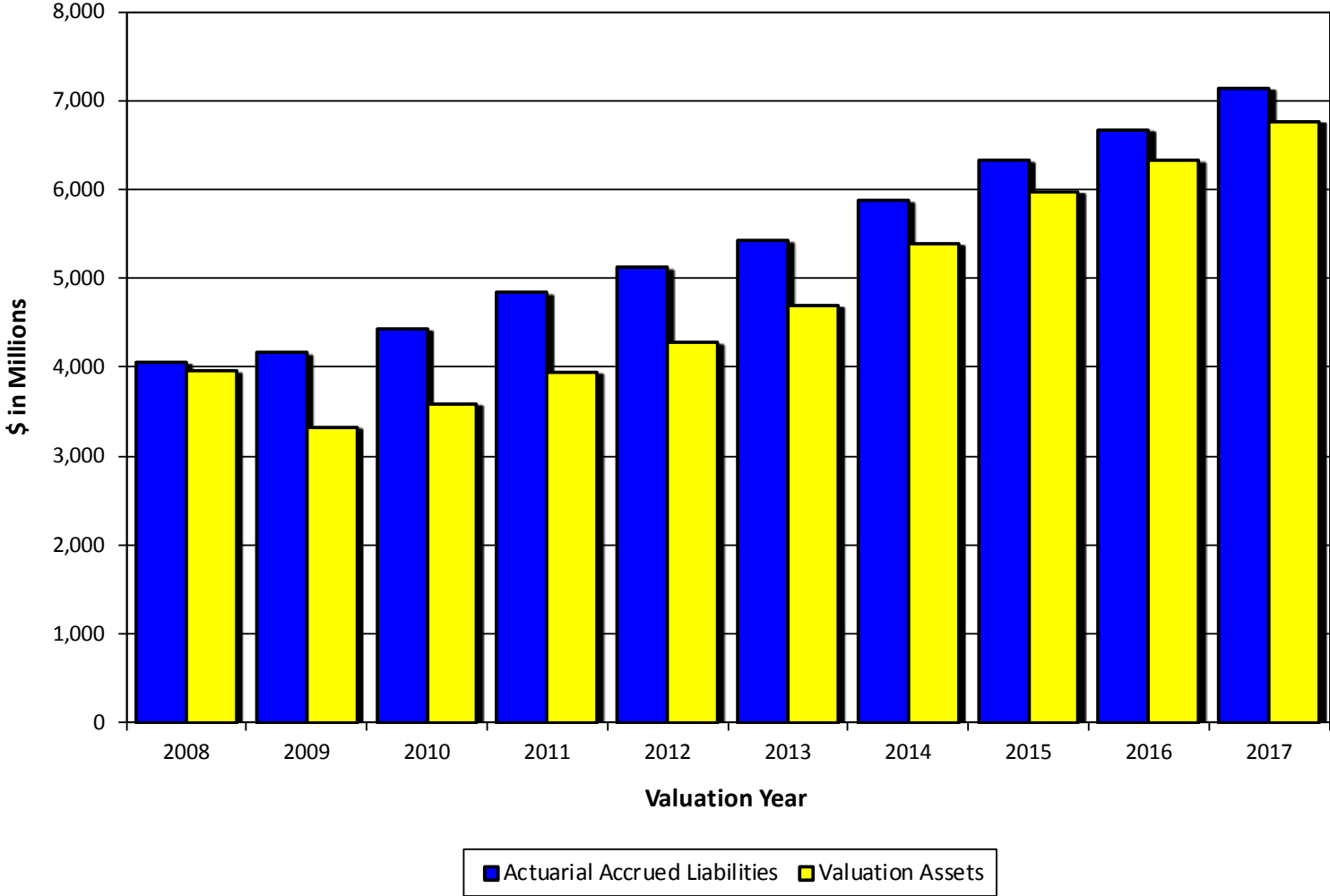
Each employer participating in the System is financially responsible for its own obligation. Accordingly, the aggregate numbers presented on this and the following pages are indicative only of the overall condition of the System and are not indicative of any one employer.

Factors that generally have a downward effect on the funded ratio include:

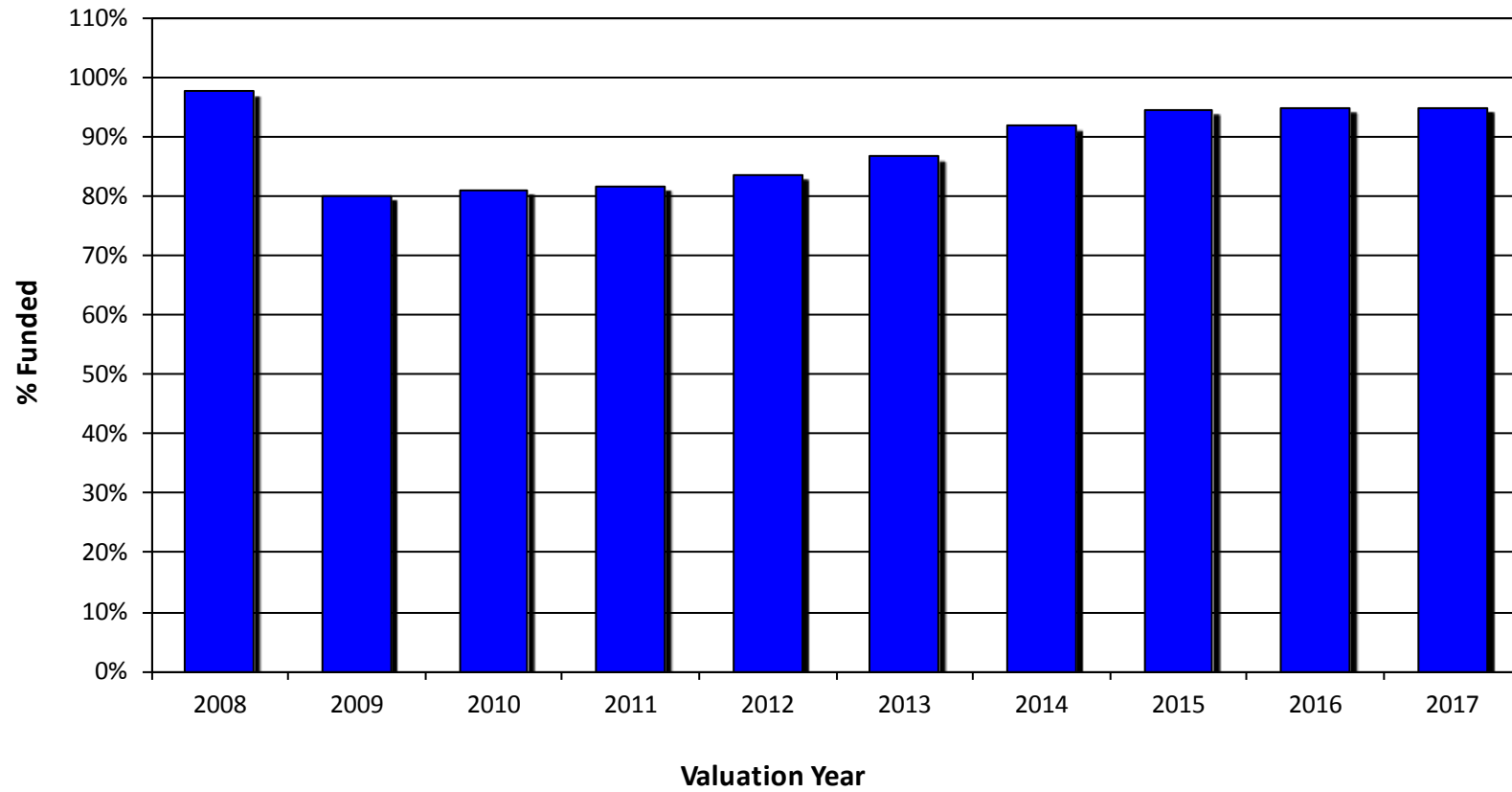
- Employers adopting new benefit programs. For example, before reflecting the benefit changes adopted by political subdivisions during the year, the 2-29-2016 and 2-28-2017 Funded Ratios would have been 95.0% (instead of 94.7%) and 95.4% (instead of 94.8%), respectively.
- New employers joining LAGERS (who at time of joining do not have assets on hand to cover actuarial accrued liabilities associated with past service). For example, before including new political subdivisions joining LAGERS during the year, the 2-28-2017 Funded Ratio would have been 94.9% (instead of 94.8%).
- The planned reduction in funding levels (through reduced employer contributions) for employers that are over 100% funded.

Factors that generally have an upward effect on the funded ratio include scheduled employer contributions and favorable investment experience.

# Portion of Actuarial Accrued Liabilities Covered by Valuation Assets



## Valuation Assets as a Percent of Actuarial Accrued Liabilities



## Short Condition Test

The LAGERS funding objective is to meet long-term benefit promises through contributions that remain approximately level from year to year as a percent of member payroll. If the contributions to the System are level in concept and soundly executed, the System will **pay all promised benefits when due -- the ultimate test of financial soundness**. Testing for level contribution rates is the long-term test.

A short condition test is one means of checking a System's progress under its funding program. In a short condition test, the plan's present assets (cash and investments) are compared with the actuarial accrued liabilities for: (1) active member contributions on deposit; (2) future benefits to present retired lives; and (3) service already rendered by active members. In a System that has been following the discipline of level percent of payroll financing, the liabilities for active member contributions on deposit and for future benefits to present retired lives will be fully covered by present assets (except in rare circumstances). In addition, the liabilities for service already rendered by active members will be partially covered by the remainder of present assets. The larger the funded portion of liability 3, the stronger the condition of the System.

The schedule below illustrates the most recent 10-year history of the System's actuarial accrued liabilities and is indicative of the LAGERS policy of following the discipline of level percent-of-payroll financing.

### Comparative Schedule

Valuation Date	Entry Age Accrued Liability For			Actuarial Value of Assets	Portion of Accrued Liability Covered by Assets		
	(1) Active Member Contributions	(2) Retirants and Beneficiaries*	(3) Active Members (Employer Financed Portion)		(1)	(2)	(3)
	2-29-2008	\$ 83,469,819	\$ 1,508,613,771		\$ 2,466,745,296	\$ 3,957,068,611	100%
2-28-2009	86,881,969	1,473,463,652	2,601,429,637	3,330,662,923	100	100	68
2-28-2010	92,054,693	1,562,886,567	2,777,390,626	3,592,225,739	100	100	70
2-28-2011 #	98,127,911	1,737,107,211	3,002,188,189	3,945,085,880	100	100	70
2-29-2012	102,637,353	1,954,579,782	3,063,057,063	4,274,440,345	100	100	72
2-28-2013	107,120,593	2,132,575,405	3,183,988,245	4,692,218,862	100	100	77
2-28-2014	129,399,490	2,401,194,322	3,343,317,147	5,388,198,677	100	100	85
2-28-2015	133,985,740	2,797,401,342	3,392,722,109	5,972,471,342	100	100	90
2-29-2016 #	137,652,896	2,896,669,106	3,637,030,335	6,320,171,438	100	100	90
2-28-2017	144,754,979	3,195,680,396	3,795,514,878	6,764,626,389	100	100	90

# Revised actuarial assumptions.

\* Includes reserve for future experience.

## Employers Accumulation Fund

**The Employers Accumulation Fund** assets totaled \$3,408,020,661 as of February 28, 2017 based on the actuarial value of assets. The individual participating Employers Accumulation Fund accrued liabilities (entry age normal cost method) were computed to be \$3,779,344,525 as of that date.

Each time a new employer joins the System, or an employer adopts a higher level of benefit, unfunded accrued liabilities are created. The law governing the System requires that these additional EAF liabilities be financed systematically over a period of future years.

**Each employer is financially responsible for its own EAF liabilities.** Accordingly, the aggregate numbers presented for the Employers Accumulation Fund are indicative only of overall condition and not indicative of the status of any individual employer.

### Aggregate Accrued Liabilities and Actuarial Value of Assets Comparative Statement

Valuation Date	Actuarial Value of Assets	Aggregate Accrued Liabilities	Ratio of Assets to Liabilities*
2-29-2008	\$2,347,624,427	\$2,449,384,702	95.8%
2-28-2009	1,941,813,012	2,583,636,842	75.2
2-28-2010	2,082,626,984	2,751,711,380	75.7
2-28-2011#	2,225,518,352	2,970,498,686	74.9
2-29-2012	2,373,234,521	3,040,800,711	78.0
2-28-2013	2,539,356,780	3,163,926,221	80.3
2-28-2014	2,841,763,098	3,327,475,380	85.4
2-28-2015	3,027,965,806	3,379,603,655	89.6
2-29-2016#	3,278,700,980	3,629,881,879	90.3
2-28-2017	3,408,020,661	3,779,344,525	90.2

# Revised actuarial assumptions.

\* The larger the ratio of assets to liabilities, the greater the reserve strength of the Employers Accumulation Fund.

## Employers Accumulation Fund Portion of Liabilities Covered by Assets By Valuation Groups February 28, 2017

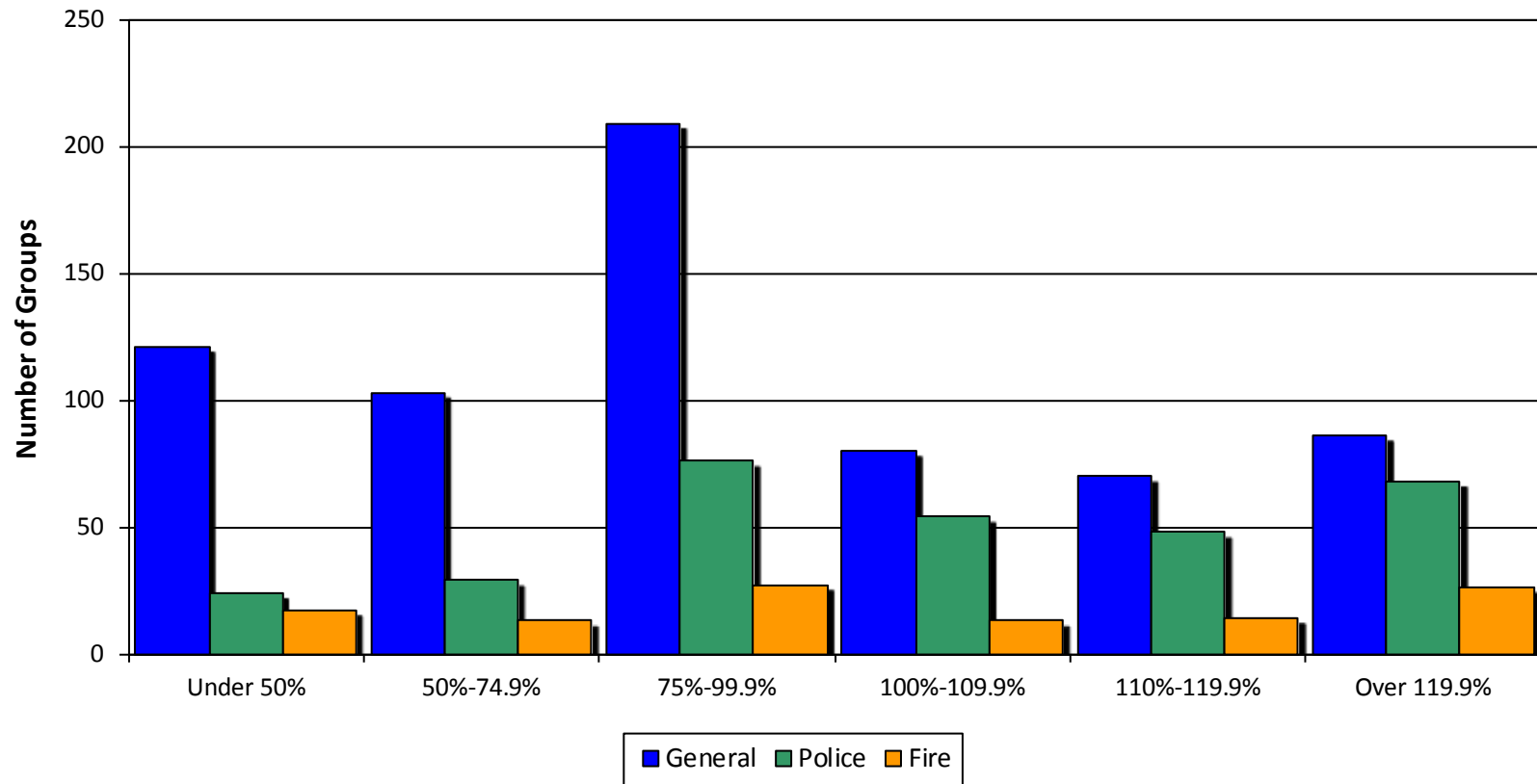
Group	Number of Active Members	Number of Valuation Groups with Assets as a Percent of Actuarial Accrued Liabilities						
		Under 50.0% #	50.0% - 74.9%	75.0% - 99.9%	100.0% - 109.9%	110.0% - 119.9%	Over 119.9%	Totals*
General:	1 - 9	79	66	59	14	23	45	286
	10 - 49	40	27	98	43	27	29	264
	50 & up	<u>2</u>	<u>10</u>	<u>52</u>	<u>23</u>	<u>20</u>	<u>12</u>	<u>119</u>
	Totals	121	103	209	80	70	86	669
Police:	1 - 9	13	11	36	19	17	44	140
	10 - 49	10	18	27	28	29	23	135
	50 & up	<u>1</u>	—	<u>13</u>	<u>7</u>	<u>2</u>	<u>1</u>	<u>24</u>
	Totals	24	29	76	54	48	68	299
Fire:	1 - 9	8	3	9	4	4	12	40
	10 - 49	7	9	16	7	9	14	62
	50 & up	<u>2</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>1</u>	—	<u>8</u>
	Totals	17	13	27	13	14	26	110
<b>Totals*</b>		<b>162</b>	<b>145</b>	<b>312</b>	<b>147</b>	<b>132</b>	<b>180</b>	<b>1,078</b>

\* Not included in this tabulation are 65 groups which presently have no active members.

# Valuation groups included in these totals are generally from employers recently joining the System.



## Employers Accumulation Fund Portion of Liabilities Covered by Assets



## Members Deposit Fund

*The Members Deposit Fund* assets for active members totaled \$144,754,979 as of February 28, 2017. The Members Deposit Fund actuarial accrued liabilities are set equal to assets.

### Aggregate Actuarial Accrued Liabilities and Actuarial Value of Assets Comparative Statement

Valuation Date	Actuarial Value of Assets	Aggregate Accrued Liabilities	Ratio of Assets to Liabilities
2-29-2008	\$ 83,469,819	\$ 83,469,819	100.0%
2-28-2009	86,881,969	86,881,969	100.0
2-28-2010	92,054,693	92,054,693	100.0
2-28-2011	98,127,911	98,127,911	100.0
2-29-2012	102,637,353	102,637,353	100.0
2-28-2013	107,120,593	107,120,593	100.0
2-28-2014	129,399,490	129,399,490	100.0
2-28-2015	133,985,740	133,985,740	100.0
2-29-2016	137,652,896	137,652,896	100.0
2-28-2017	144,754,979	144,754,979	100.0

## Benefit Reserve Fund

*The Benefit Reserve Fund* assets as of February 28, 2017 totaled \$3,195,680,396 based on the actuarial value of assets. The present value of future benefits was computed to be \$2,981,680,216 as of that date.

When a member retires, there is transferred to the Benefit Reserve Fund a single sum reserve which is expected to cover all future pension benefits; this reserve is calculated based on assumptions about mortality and assumed annual investment return.

*Beginning in 1986*, each year LAGERS actual investment return rate is credited to the Benefit Reserve Fund. Investment return over the assumed rate provides the money from which the Board can grant benefit increases after retirement. Beginning in 1999, the investment return credit is limited if the funded ratio exceeds 140%. Beginning in 2002, the threshold was changed to 125%. Beginning in 2014, the investment return credit to the Employers Accumulation Fund is limited if the funded ratio of the benefit reserve fund is below 75%.

The most recent such benefit increase occurred October 1, 2016 and consisted of an overall increase of 4% or less.

### Actuarial Accrued Liabilities and Accrued Assets Comparative Statement

Annual Valuation Date	Pensions Being Paid	Benefit Increase % Last Oct. 1	Investment Return % Last June 30	Present Value of Future Benefits	Reserve for Future Experience	Accrued Liabilities	Actuarial Value of Assets	Ratio of Actuarial Value of Assets to PVFB
2-29-2008	\$118,839,948	4.0%	9.4%	\$1,335,544,346	\$173,069,425	\$1,508,613,771	\$1,508,613,771	113.0%
2-28-2009	131,340,234	4.0	7.5	1,473,463,652	0	1,473,463,652	1,284,175,147	87.2
2-28-2010	139,391,994	4.0	(9.1)	1,562,886,567	0	1,562,886,567	1,391,864,816	89.1
2-28-2011 #	150,824,098	4.0	5.4	1,737,107,211	0	1,737,107,211	1,589,750,114	91.5
2-29-2012	169,170,529	4.0	9.8	1,954,579,782	0	1,954,579,782	1,776,312,119	90.9
2-28-2013	184,411,123	4.0	8.7	2,132,575,405	0	2,132,575,405	2,025,679,465	95.0
2-28-2014	199,601,520	4.0	10.1	2,304,570,607	96,623,715	2,401,194,322	2,401,194,322	104.2
2-28-2015	218,892,566	4.0	14.1	2,523,309,015	274,092,327	2,797,401,342	2,797,401,342	110.9
2-29-2016 #	233,448,283	4.0	21.4	2,767,773,907	128,895,199	2,896,669,106	2,896,669,106	104.7
2-28-2017	251,511,120	4.0	(0.4)	2,981,680,216	214,000,180	3,195,680,396	3,195,680,396	107.2

# Revised actuarial assumptions.

## Casualty Reserve Fund

Beginning with the 1989 valuation, at the time a disability benefit becomes payable there is transferred from the Casualty Reserve Fund to the Benefit Reserve Fund the difference between (i) the full employer reserve covering the disability benefit and (ii) the accrued service liability of the Employer Accumulation Fund for the member who became disabled. Beginning September 2011, this procedure also occurs for duty related death-in-service cases.

Employer contributions to cover the transfers described above are determined on a pooled-group basis (not separately for each financing group). The contribution rates, varying by size of benefit formula, were last changed in 2016.

Benefit Formula	Employer Contribution Rate to the CRF		
	General	Police	Fire
L-1, LT-4	0.2%	0.4%	0.6%
L-3, LT-5	0.3%	0.5%	0.7%
L-7, LT-8	0.3%	0.6%	0.8%
L-9, LT-10, L-12, LT-14	0.4%	0.7%	0.9%
L-6	0.5%	0.8%	1.0%
L-11	0.6%	1.0%	1.2%

If there is a positive balance in the Casualty Reserve Fund at any time, it indicates that cumulative past contributions have fully funded the cumulative past obligations --- similarly, a negative balance would indicate that cumulative past contributions have fallen short of the target. For actuarial valuation purposes, actuarial accrued liabilities equal the actuarial value of assets.

### Actuarial Value of Assets at Valuation Dates Comparative Statement

Valuation Date	Employer L-1 Contributions*: Year Ended	Actuarial Value of Assets	Accrued Liabilities	Assets Expressed as Percents of Member Payroll	
				Total	Change
2-29-2008	0.3%	\$ 17,360,594	\$ 17,360,594	1.4%	0.0%
2-28-2009	0.3	17,792,795	17,792,795	1.4	0.0
2-28-2010	0.3	25,679,246	25,679,246	1.9	0.5
2-28-2011	0.2	31,689,503	31,689,503	2.3	0.4
2-29-2012 @	0.2	22,256,352	22,256,352	1.6	-0.7
2-28-2013	0.2	20,062,024	20,062,024	1.4	-0.2
2-28-2014	0.2	15,841,767	15,841,767	1.1	-0.3
2-28-2015	0.2	13,118,454	13,118,454	0.9	-0.2
2-29-2016	0.2	7,148,456	7,148,456	0.5	-0.4
2-28-2017 #	0.2	16,170,353	16,170,353	1.0	0.5

@ Reflects a special \$12 million transfer from the Casualty Reserve Fund to the Income-Expense Fund.

# Reflects a special \$10 million transfer from the Income-Expense Fund to the Casualty Reserve Fund.

\* General group.

## **SECTION C**

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### **ASSET DATA USED IN THE VALUATION**

## Reported Accrued Assets Available for Benefits February 28, 2017

Statutory Funds	Reported Assets	Actuarial Value of Assets
Employers Accumulation Fund	\$3,138,468,045	\$3,408,020,661
Members Deposit Fund	144,754,979	144,754,979
Benefit Reserve Fund	2,953,220,956	3,195,680,396
Casualty Reserve Fund	14,943,492	16,170,353
<b>Total</b>	<b>\$6,251,387,472</b>	<b>\$6,764,626,389</b>

**The Actuarial Value of Assets** is based on market value, but with a 5-year smoothing of the difference between projected investment return, based on the actuarial assumption, and actual market to market returns. The actuarial value of assets is not permitted to deviate from market value by more than 20%. The derivation of the actuarial value of assets (also called the funding value of assets) is shown on pages C-3 and C-4. The funding value adjustment factor is applied to the reported value of assets of each employer (cost value for valuation years 2015 and prior; market value thereafter). The funding value adjustment factor serves two purposes:

- it incorporates the balance in the Income-Expense Fund for actuarial valuation purposes, since it is not allocated until June 30, and
- it converts the reported value of assets to the actuarial value of assets.

**The Employers Accumulation Fund** represents employer contributions accumulated for benefits to or on behalf of present active and deferred members.

**The Members Deposit Fund** represents employee contributions accumulated for (1) monthly benefits upon future retirements and (2) refunds upon termination if monthly benefits are not payable.

**The Benefit Reserve Fund** represents employer and employee reserves held for the monthly benefits being paid to present retired lives.

**The Casualty Reserve Fund** represents employer contributions accumulated for the added liability incurred when a member becomes a disability retirement.

**The Income-Expense Fund** represents investment income received less administrative expenses paid. At the end of the System's fiscal year, interest is paid to the other four Funds from this Fund. The February 28, 2017 balance in the Income-Expense Fund was used for valuation purposes.

## Investment Activities

A retirement system acquires and invests assets as the result of following the financial objective of level contribution rates. The Board of Trustees of LAGERS has the responsibility for seeing that the assets are invested effectively and within the limits imposed by law. The Board retains professional money managers to assist in the investment process, and reviews their activities throughout each year.

Presented below is a table showing investment credits to the various Funds of the System for the last 5 years.

### Rates of Investment Return Allocated to LAGERS Fund Accounts

Year Ended June 30	Investment Credits as % of Fund Balance				Inflation Loss % (CPI)
	Casualty Reserve Fund A	Members Deposit Fund B	Benefit Reserve Fund C	Employer Accumulation Fund D	
2013	7.25 %	0.5 %	10.1 %	10.5 %	1.8 %
2014	7.25	0.5	14.1	14.8	2.1
2015	7.25	0.5	21.4	35.0	0.1
2016	7.25	0.5	(0.4)	(0.4)	1.0
2017	7.25	0.5	12.0	12.5	1.6
<b>5-Year Compound Average</b>			<b>11.2 %</b>	<b>13.9 %</b>	<b>1.3 %</b>

- A. Casualty Reserve assets are for the non-accrued service portion of disability benefits to future disabled lives. The investment percent is the rate set for actuarial purposes.
- B. Member Deposit assets are the contributions of present members. The investment percent, set by the Board, affects amounts payable to members who request a refund. The percent does not affect the monthly benefit of a retiring member.
- C. Benefit Reserve assets are for benefits to present retired lives. The investment credit comes from the remainder of net investment return after crediting the Casualty Reserve assets. This revised allocation of investment credits is intended to provide the resources for additional benefit increases after retirement, and is based upon a 1986 change in the LAGERS law. Beginning in 1999, the investment credit to the Benefit Reserve Fund (BRF) is limited, if the funded ratio of the BRF exceeds 140%. Beginning in 2002, the threshold was changed to 125%. In addition, for the 2002 interest credits the BRF interest credit was further reduced to permit a 0.0% interest credit to the EAF. Beginning in 2014, the investment credit to the Employer Accumulation Fund is limited if the funded ratio of the BRF is below 75%.
- D. Employer Accumulation assets are for benefits to future retired lives including the accrued service portion of disability benefits. The investment credit is derived from the remainder of net investment return after crediting the Casualty Reserve assets, followed by a further adjustment for the investment credit to the Member Deposit assets (and beginning in 1999 for any reallocation of investment credits from the Benefit Reserve Fund). The Employer Accumulation Fund is responsible for covering liability increases resulting from inflation losses. For years 2014 and before, the percentages shown include net realized capital gains on sale of investments (cost value). For 2015, the percentages include a recognition of converting fund balance accounting from cost value to market value.

## Development of Funding Value of Retirement System Assets

Year Ending February 28:	2013	2014	2015	2016
A. Actuarial Value Beginning of Year	\$4,274,323,523	\$4,692,364,566	\$5,387,990,131	\$5,972,290,794
B. Market Value End of Year	5,156,055,295	5,984,665,251	6,373,132,885	5,927,009,651
C. Market Value Beginning of Year	4,671,976,739	5,156,055,295	5,984,665,251	6,373,132,885
D. Non-Investment/Administrative Net Cash Flow	(17,911,887)	(8,065,305)	(37,941,951)	(60,777,985)
E. Investment Income				
E1. Market Total: B-C-D	501,990,443	836,675,261	426,409,585	(385,345,249)
E2. Assumed Rate of Return	7.25%	7.25%	7.25%	7.25%
E3. Amount for Immediate Recognition	309,239,150	339,904,064	389,253,889	430,787,881
E4. Amount for Phased-In Recognition: E1-E3	192,751,293	496,771,197	37,155,696	(816,133,130)
F. Phased-In Recognition of Investment Income				
F1. Current Year: 0.20 x E4	38,550,259	99,354,239	7,431,139	(163,226,626)
F2. First Prior Year	(4,045,703)	38,550,259	99,354,239	7,431,139
F3. Second Prior Year	91,698,790	(4,045,703)	38,550,259	99,354,239
F4. Third Prior Year	138,229,222	91,698,790	(4,045,703)	38,550,259
F5. Fourth Prior Year	(137,718,788)	138,229,221	91,698,791	(4,045,701)
F6. Total Recognized Phase-Ins	126,713,780	363,786,806	232,988,725	(21,936,690)
G. <b>Actuarial Value End of Year</b>				
G1. Preliminary Actuarial Value End of Year: A+D+E3+F6	\$4,692,364,566	\$5,387,990,131	\$5,972,290,794	\$6,320,364,000
G2. Upper Corridor Limit: 120% x B	6,187,266,354	7,181,598,301	7,647,759,462	7,112,411,581
G3. Lower Corridor Limit: 80% x B	4,124,844,236	4,787,732,201	5,098,506,308	4,741,607,721
G4. Actuarial Value End of Year	\$4,692,364,566	\$5,387,990,131	\$5,972,290,794	\$6,320,364,000
H. Difference Between Market & Actuarial Value	463,690,729	596,675,120	400,842,091	(393,354,349)
I. Ratio of Actuarial Value to Market Value	91.0%	90.0%	93.7%	106.6%
J. Actuarial Value Adjustment Factor (ratio of actuarial value to EAF+MDF+CRF+BRF cost value)	1.1656	1.2169	1.1914	0.9967
K. Recognized Rate of Return	10.22%	15.01%	11.59%	6.88%
L. Market Rate of Return	10.77%	16.24%	7.15%	(6.08)%

The asset valuation method recognizes assumed investment income (line E3) fully each year. Differences between actual and expected investment income (line E4) are phased-in over a closed 5-year period. If in the future, total investment income (line E1) were always equal to assumed investment income (line E3), Funding Value and Market Value would be identical 4 years after the valuation date (line H).

Note: Asset values on this page differ slightly from asset values reported elsewhere in this report, due to a number of miscellaneous closing entries that are not included in the above amounts and rounding.



## Development of Funding Value of Retirement System Assets

Year Ending February 28:	2017	2018	2019	2020	2021
A. Actuarial Value Beginning of Year	\$6,320,364,000				
B. Market Value End of Year	6,724,171,234				
C. Market Value Beginning of Year	5,927,009,651				
D. Non-Investment/Administrative Net Cash Flow	(76,813,805)				
E. Investment Income					
E1. Market Total: B-C-D	873,975,388				
E2. Assumed Rate of Return	7.25%				
E3. Amount for Immediate Recognition	455,441,890				
E4. Amount for Phased-In Recognition: E1-E3	418,533,498				
F. Phased-In Recognition of Investment Income					
F1. Current Year: 0.20 x E4	83,706,700				
F2. First Prior Year	(163,226,626)	\$ 83,706,700			
F3. Second Prior Year	7,431,139	(163,226,626)	\$ 83,706,700		
F4. Third Prior Year	99,354,239	7,431,139	(163,226,626)	\$ 83,706,700	
F5. Fourth Prior Year	38,550,257	99,354,241	7,431,140	(163,226,626)	\$ 83,706,698
F6. Total Recognized Phase-Ins	65,815,709	27,265,454	(72,088,786)	(79,519,926)	83,706,698
<b>G. Actuarial Value End of Year</b>					
G1. Preliminary Actuarial Value End of Year: A+D+E3+F6	\$6,764,807,794				
G2. Upper Corridor Limit: 120% x B	8,069,005,481				
G3. Lower Corridor Limit: 80% x B	5,379,336,987				
G4. Actuarial Value End of Year	\$6,764,807,794				
H. Difference Between Market & Actuarial Value	(40,636,560)	(67,902,014)	4,186,772	83,706,698	
I. Ratio of Actuarial Value to Market Value	100.6%				
J. Actuarial Value Adjustment Factor (ratio of actuarial value to EAF+MDF+CRF+BRF cost value)	1.0821				
K. Recognized Rate of Return	8.30%				
L. Market Rate of Return	14.84%				

The asset valuation method recognizes assumed investment income (line E3) fully each year. Differences between actual and expected investment income (line E4) are phased-in over a closed 5-year period. If in the future, total investment income (line E1) were always equal to assumed investment income (line E3), Funding Value and Market Value would be identical 4 years after the valuation date (line H).

Note: Asset values on this page differ slightly from asset values reported elsewhere in this report, due to a number of miscellaneous closing entries that are not included in the above amounts and rounding.

## Summary of Current Asset Information Reported for Valuation

### Reported Assets (Including Income/Expense Fund)

<b>Market Value - February 28, 2017</b>	
Cash & equivalents	\$ 12,523,207
Receivables & accruals	(2,760,920)
Stocks	3,242,130,837
Bonds & government securities	1,551,167,304
Real assets/alpha	1,421,287,581
Strategic assets	499,823,225
<b>Total Current Assets</b>	<b>\$ 6,724,171,234</b>

### Revenues and Expenses

Market Value	Year Ended February 29, 2016	Year Ended February 28, 2017
Balance - Beginning of year	\$ 6,373,132,885	\$ 5,927,009,651
Revenues:		
Employees' contributions	15,855,748	22,093,418
Employer contributions	187,279,073	181,538,225
Investment income	<u>(310,607,783)</u>	<u>943,391,598</u>
Total	(107,472,962)	1,147,023,241
Expenditures:		
Benefit payments	261,989,530	273,120,147
Refund of member contributions	1,923,276	2,117,569
Investment expenses	69,863,546	69,416,210
Administrative expenses	<u>4,873,920</u>	<u>5,207,732</u>
Total	338,650,272	349,861,658
Balance - End of Year	<u>\$ 5,927,009,651</u>	<u>\$ 6,724,171,234</u>

## SECTION D

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### GAIN/LOSS ANALYSIS

# Gain/(Loss) Analysis

**Purpose of Gain/Loss Analysis.** Regular actuarial valuations provide information about the composite change in unfunded actuarial accrued liabilities -- whether or not the liabilities are increasing or decreasing, and by how much.

However, valuations do not show the portion of the change attributable to each risk area within the Retirement System: the rate of investment income on plan assets; the rates of withdrawal of active members who leave covered employment; the rates of mortality; the rates of disability; the rates of salary increases; the assumed ages at actual retirement. In an actuarial valuation, assumptions are made as to what these rates will be for the next year and for decades in the future.

***The objective of a gain and loss analysis is to determine the portion of the change in unfunded actuarial accrued liabilities attributable to each risk area.***

The fact that actual experience differs from assumed experience is to be expected. The future cannot be predicted with precision. Changes in the valuation assumption for a risk area should be made when the differences between assumed and actual experience have been observed to be sizable and persistent. One year's gain and loss analysis may or may not be indicative of ***long-term trends, which are the basis of financial assumptions.***

## Development of Total Gain/(Loss) March 1, 2016 to February 28, 2017

Unfunded Accrued Liabilities (UAL), March 1	\$ 351,180,899
Employer Normal Cost	154,291,476
Employer Contributions	181,538,225
Interest	24,472,921
Expected UAL Before Any Changes	348,407,071
Change from Benefit Changes Plus New Employers	49,012,031
Change from Revised Actuarial Assumptions	0
Expected UAL After All Changes	397,419,102
Actual UAL, February 29	371,323,864
<b>Gain/(Loss) for Year from Experience</b>	<b>\$ 26,095,238</b>

This page measures the actual gain or loss for the year after adjusting for the effect of benefit and assumption changes plus any new employers joining LAGERS during the year.

## Analysis of Financial Experience for the Year Ended February 28, 2017

### *Gains and Losses in Pension Accrued Liabilities Resulting from Differences Between Assumed Experience and Actual Experience*

Type of Activity	Gain or (Loss) For Year Ended 2/28/2017
<b>Age &amp; Service Retirements.</b> If members retire at older ages or with lower final average pay than assumed, there is a gain. If younger ages or higher average pays, a loss.	\$ (5,209,398)
<b>Death-in-Service Benefits.</b> If more liabilities are released by deaths-in-service than assumed, there is a gain. If smaller releases, a loss.	(194,962)
<b>Withdrawal From Employment.</b> If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	17,957,347
<b>Disability Benefits.</b> If more liabilities are released by disabilities than assumed, there is a gain. If smaller releases, a loss.	237,826
<b>Pay Increases.</b> If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	(5,912,846)
<b>Investment Income.</b> If there is greater investment return on assets than assumed, there is a gain. If less return, a loss.	65,815,709
<b>Retiree, Beneficiary and Deferred Activity.</b> Includes members living longer than expected, COLA increases different than expected, etc.	41,347,158
<b>Benefit Reserve Fund.</b> Change in reserve for future experience.	(85,104,981)
<b>Other.</b> Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, valuation methods, etc.	(2,840,615)
<b>Gain (or Loss) During Year From Experience</b>	<b>\$ 26,095,238</b>

## Investment Gain (Loss) for the Year Ended February 28, 2017

Assets, Beginning of Year	\$6,320,364,000
Net Cash Flow	(76,813,805)
Assumed Investment Return	455,441,890
Expected Assets End of Year	6,698,992,085
Actual Assets End of Year	6,764,807,794
<b>Gain/(Loss) for Year</b>	<b>\$ 65,815,709</b>

## Active Member Population Reconciliation March 1, 2016 to February 28, 2017

	<b>Actual</b>	<b>Expected</b>
Active Members Beginning of Year	33,335	
Plus New Hires	4,554	
Minus Retirements*	1,004	1,285.0
Minus Deaths	23	43.8
Minus Disabilities	49	62.6
Minus Other Terminations	3,180	2,030.4
<b>Active Members End of Year</b>	<b>33,633</b>	

\* Actual retirements include 114 retirees at or above the age where retirements are assumed to occur 100% of the time. Expected retirements include 424 retirees at or above the age where retirements are assumed to occur 100% of the time.



## **SECTION E**

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### **BENEFIT PROVISIONS CONSIDERED IN THE VALUATION**

# Missouri Local Government Employees Retirement System

## Brief Summary of LAGERS

### Benefits and Conditions Evaluated and/or Considered Through February 28, 2017 (Section References are to RSMo)

**Voluntary Retirement.** Sections 70.645 & 70.600. A member may retire with an age & service allowance after both (i) completing 5 years of credited service, and (ii) attaining the minimum service retirement age.

The minimum service retirement age is age 60 for a general employee and age 55 for a police or fire employee. Optionally, employers may also elect to provide for unreduced benefits for employees whose combination of years of age and years of service equals 80 or more.

**Final Average Salary.** Section 70.600. The average of a member's monthly compensation during the period of 60 consecutive months (or optionally, 36 consecutive months) of credited service producing the highest monthly average, which period is contained within the 120 consecutive months of credited service immediately preceding retirement.

**Age & Service Allowance.** Section 70.655. The allowance, payable monthly for life, equals a specified percent of a member's final average salary multiplied by the number of years of credited service. Each employer elects the percent applicable to its members, from the following programs:

L-1 Benefit Program:	1.00% for life
L-3 Benefit Program:	1.25% for life
L-7 Benefit Program:	1.50% for life
LT-4 Benefit Program:	1.00% for life, plus 1.00% to age 62
LT-5 Benefit Program:	1.25% for life, plus 0.75% to age 62
LT-8 Benefit Program:	1.50% for life, plus 0.50% to age 62
LT-4(65) Benefit Program:	1.00% for life, plus 1.00% to age 65
LT-5(65) Benefit Program:	1.25% for life, plus 0.75% to age 65
LT-8(65) Benefit Program:	1.50% for life, plus 0.50% to age 65
L-9 Benefit Program:	1.60% for life
LT-10(65) Benefit Program:	1.60% for life, 0.40% to age 65
L-12 Benefit Program:	1.75% for life
LT-14(65) Benefit Program:	1.75% for life, 0.25% to age 65
L-6 Benefit Program:	2.00% for life
L-11 Benefit Program:	2.50% for life

The only LT benefit programs available for adoption after August 1, 1994 are the LT(65) programs.

Benefit programs L-9 and LT-10(65) are unavailable for adoption after August 1, 2005.

Benefit program L-11 is only available to groups not covered by Social Security.

Subsequent to joining the System the governing body can elect to change benefit programs for the employees, but not more often than once every 2 years.

**Missouri Local Government Employees Retirement System**  
**Brief Summary of LAGERS**  
**Benefits and Conditions Evaluated and/or Considered**  
**Through February 28, 2017**  
**(Section References are to RSMo)**  
**(Continued)**

**Early Allowance.** Section 70.670. A member may retire with an early allowance after both (i) completing 5 years of credited service, and (ii) attaining age 55 if a general employee or age 50 if a police or fire employee.

The early allowance amount, payable monthly for life, is computed in the same manner as an age & service allowance, based upon the service and earnings record to time of early retirement, but reduced to reflect the fact that the age when payments begin is younger than the minimum service retirement age. The amount of the reduction is 1/2% of 1% (.005) for each month the age at retirement is younger than the minimum service retirement age.

**Deferred Allowance.** Section 70.675. If a member leaves LAGERS-covered employment (i) before attaining the early retirement age, and (ii) after completing 5 years of credited service, the member becomes eligible for a deferred allowance; provided the former member lives to the minimum service retirement age and does not withdraw the accumulated contributions.

The deferred allowance amount, payable monthly for life from the minimum service retirement age, is computed in the same manner as an age & service allowance, based upon the service and earnings record to time of leaving LAGERS coverage.

Deferred allowances are also payable any time after reaching the early retirement age, with the reduction for early retirement noted above.

**Non-Duty Disability Allowance.** Section 70.680. A member with 5 or more years of credited service who becomes totally and permanently disabled from other than duty-connected causes becomes eligible to receive a non-duty disability allowance computed in the same manner as an age & service allowance, based upon the service & earnings record to time of disability.

**Duty Disability Allowance.** Section 70.680. A member regardless of credited service who becomes totally and permanently disabled from duty-connected causes becomes eligible to receive a duty disability allowance computed in the same manner as an age & service allowance, based upon the earnings record to time of disability but based upon the years of credited service the member would have completed had the member continued in LAGERS-covered employment to age 60.

**Death-in-Service.** Section 70.661. Upon the death of a member who had completed 5 years of credited service, the eligible surviving dependents receive the following benefits:

- (a) The surviving spouse receives an allowance equal to the Option A allowance (joint and 75% survivor benefit) computed based upon the deceased members' service & earnings record to time of death.
- (b) When no spouse benefit is payable, the dependent children under age 18 (age 23 if they are full-time students) each receive an equal share of 60% of an age & service allowance computed based upon the deceased member's service & earnings record to time of death.

**Missouri Local Government Employees Retirement System**  
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**(Section references are to RSMo)**  
**(Concluded)**

(c) If the death is determined to be duty related, the 5-year service requirement is waived and the benefit is based on years of credited service the member would have completed had the member continued in LAGERS-covered employment to age 60.

**Benefit Changes After Retirement.** Section 70.655. For retirements effective after September 28, 1975, there is an annual redetermination of monthly benefit amount, beginning the October first following 12 months of retirement. As of each October first, the amount of each eligible benefit is redetermined as follows:

- (a) Subject to the maximum in (b), the redetermined amount is the amount otherwise payable multiplied by: 100% plus up to 4%, as determined by the LAGERS Board of Trustees, for each full year of retirement.
- (b) The redetermined amount may not exceed the amount otherwise payable multiplied by the ratio of the Consumer Price Index for the immediately preceding month of June to the Consumer Price Index for the month of June immediately preceding retirement.

**Member Contributions.** Sections 70.690 & 70.700. Each member contributes 4% of compensation beginning after completion of sufficient employment of 6 months of credited service.

If a member leaves LAGERS-covered employment before an allowance is payable, the accumulated contributions are refunded to the member. If the member dies, his accumulated contributions are refunded to a designated beneficiary.

The law governing LAGERS also has a provision for the adoption of a non-contributory plan in which the full cost of LAGERS participation is paid by the employer. Adoption of the non-contributory provisions may be done at the time of membership or a later date; however, a change from contributory to non-contributory or vice-versa may not be made more frequently than every 2 years. Under the non-contributory provisions there is no individual account maintained for each employee and no refund of contributions if an employee terminates before being eligible for a benefit.

**Employer Contributions.** Section 70.730. Each employer contributes the remainder amounts necessary to finance the employees' participation in LAGERS. Contributions to LAGERS are determined based upon level percent-of-payroll principles, so that contribution rates do not have to increase over decades of time.

## Benefit Programs in Effect as of February 28, 2017

**Benefit programs now available** to each employer are:

L-1, since 1967	LT-8(65), since 1994
L-3, since 1975	L-9, since 1995
LT-4, since 1977	LT-10(65) since 1995
LT-4(65), since 1994	L-11, since 2000
LT-5, since 1977	L-12, since 2005
LT-5(65), since 1994	LT-14(65), since 2005
L-6, since 1987	Non-Contributory, since 1983
L-7, since 1988	3-Year Final Average Salary (FAS), since 1984
LT-8, since 1988	Rule of 80, since 1988

The only LT benefit programs that can be adopted after August 1, 1994 are the LT(65) programs. Benefit programs L-9 and LT-10(65) are unavailable for adoption after August 1, 2005. Please see pages E-1 through E-3 for a summary of LAGERS provisions.

When the 2017 actuarial valuations were made, the Benefit Programs evaluated were as follows:

FAS	Groups	Benefit Programs																								Totals
		Non-Contributory												Contributory												
		L-1	L-3	LT-4	LT-5	L-6	L-7	LT-8	L-9	LT-10	L-11	L-12	LT-14	L-1	L-3	LT-4	LT-5	L-6	L-7	LT-8	L-9	LT-10	L-11	L-12	LT-14	
5 yr.	General	40	36	2	3	29	50	10	3	2		4	3	67	30	2		19	31	4	2					345
	Police	17	16	1	1	16	34	4	2			2		27	13			13	15	1			1	1		164
	Fire	<u>2</u>	<u>5</u>	<u>1</u>	-	<u>8</u>	<u>9</u>	<u>3</u>	-	-		<u>2</u>	<u>1</u>	<u>7</u>	<u>5</u>	-		<u>8</u>	<u>6</u>	-	-		<u>1</u>	<u>1</u>	-	<u>59</u>
	Totals	59	57	4	4	53	93	17	5	2		8	4	101	48	2		40	52	5	2		2	9	1	568
3 yr.	General	11	20		4	61	58	18	7	7	3	30	6	22	23	1		31	33	2	4	2		4	1	348
	Police	3	12		4	28	23	13	5	3	1	18	4	8	5	1		16	14	2	2		1	1	1	165
	Fire	<u>2</u>	<u>3</u>		<u>3</u>	<u>10</u>	<u>6</u>	<u>9</u>	-	<u>1</u>	<u>4</u>	<u>8</u>	<u>2</u>	<u>1</u>	<u>2</u>	-	<u>1</u>	<u>4</u>	<u>3</u>	-	-	-	<u>2</u>	<u>1</u>	-	<u>62</u>
	Totals	16	35		11	99	87	40	12	11	8	56	12	31	30	2	1	51	50	4	6	2	3	6	2	575

The above LT columns include both the LT(62) and LT(65) benefit programs. The table includes 65 groups with no active members.

## **SECTION F**

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### **PARTICIPANT DATA**

## Participating Employers Evaluated February 28, 2017

Type of Group	Number of Participating Employers
General Only	337
Police Only	0
Fire Only	19
General and Police	234
General and Fire	26
General and Police and Fire	65
<b>Total</b>	<b>681</b>

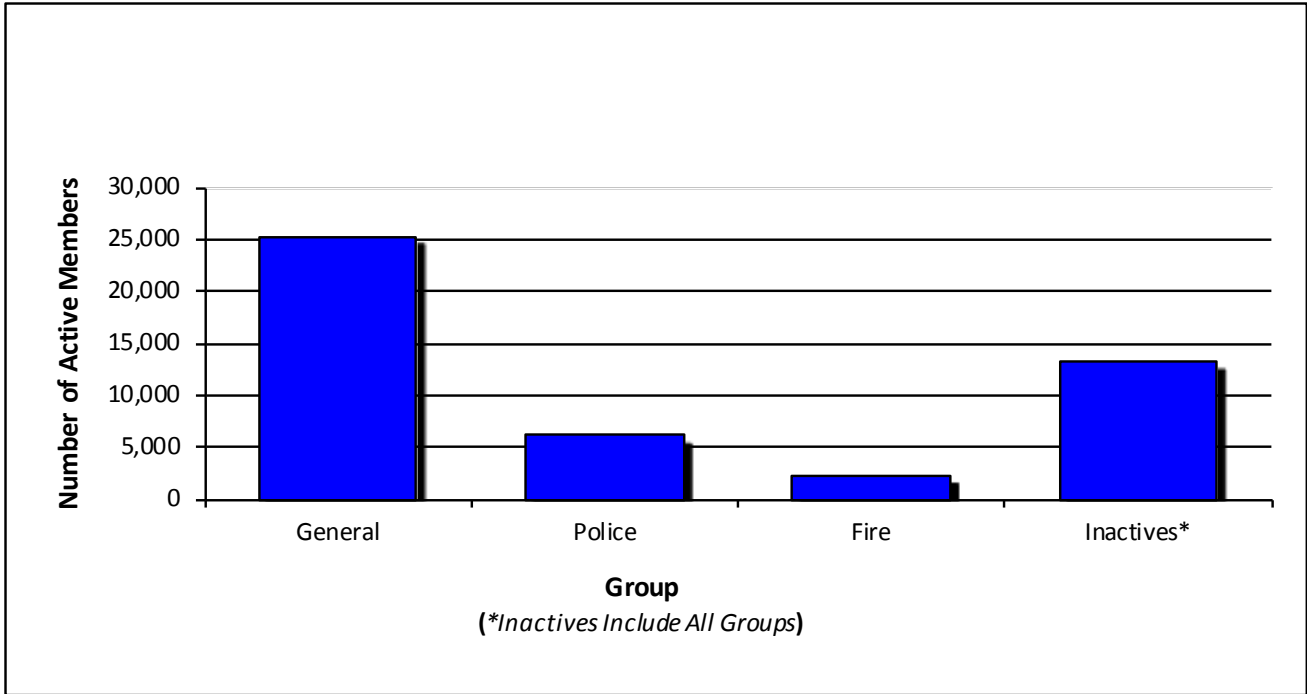
## Active and Inactive Members in Valuations February 28, 2017

Classification	Number of		Annual Payroll
	Members	Valuation Groups*	
Active Members			
General	25,219	669	\$1,121,269,870
Police	6,101	299	303,615,534
Fire	<u>2,313</u>	<u>110</u>	<u>130,844,262</u>
Total Actives	33,633	1,078	\$1,555,729,666
Inactive Members #	<u>13,218</u>		
Total Members	46,851		

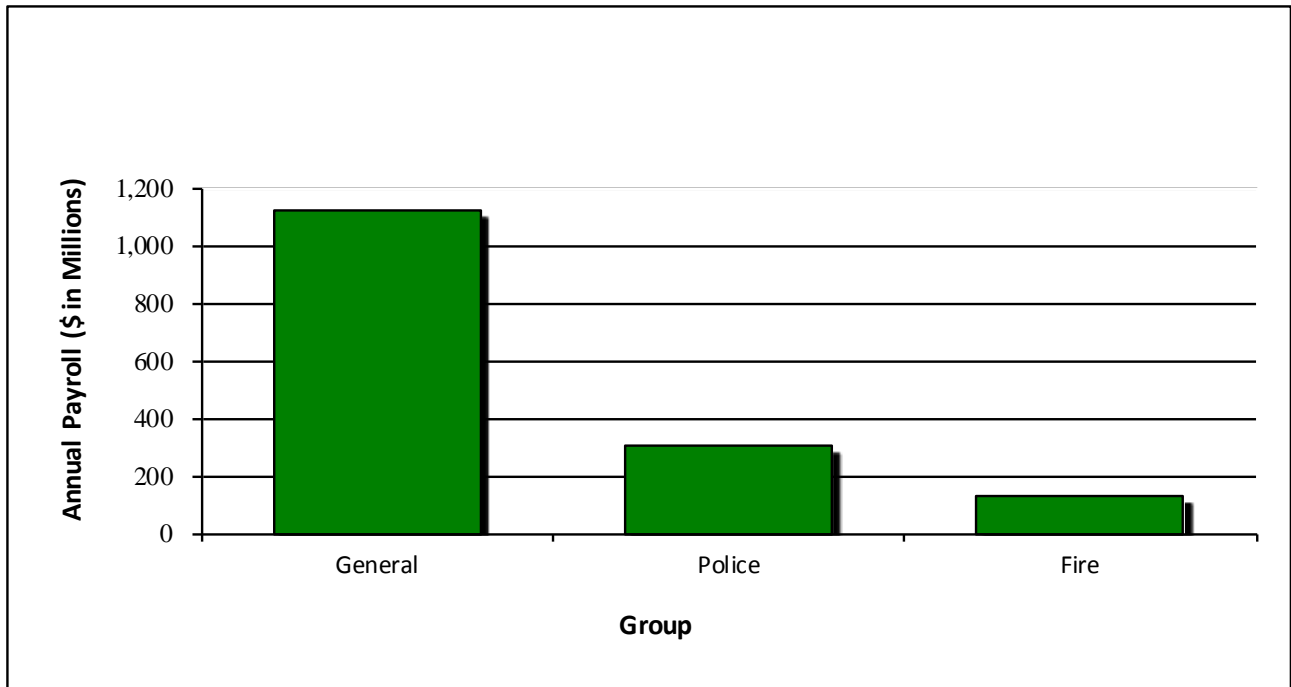
\* Each Police group and each Fire group is evaluated separately. Each General group is evaluated separately, but also may be broken into sub-groups for separate financial experience if the employer desires separate employer rates for internal accounting purposes.

# Inactive members are individuals who terminated employment after 5 or more years of LAGERS service, with rights to a deferred benefit commencing at age 60 (age 55 for police and fire members). In addition, members who terminated with one employer and have worked or are now working for another LAGERS-covered employer are included in this number count ("linked members"). There are 9,039 linked records included in the above total.

## Active Members by Group

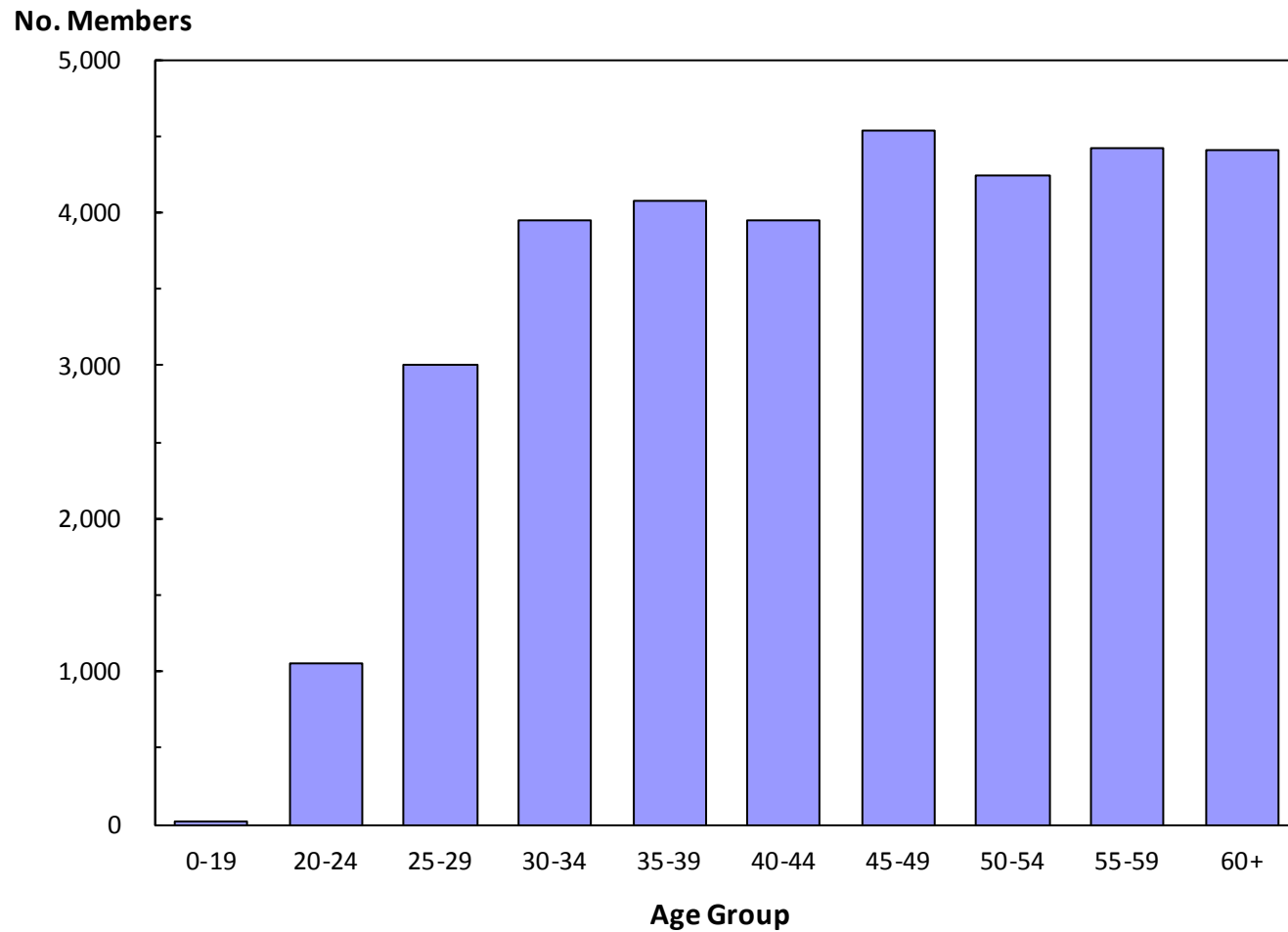


## Annual Payroll by Group

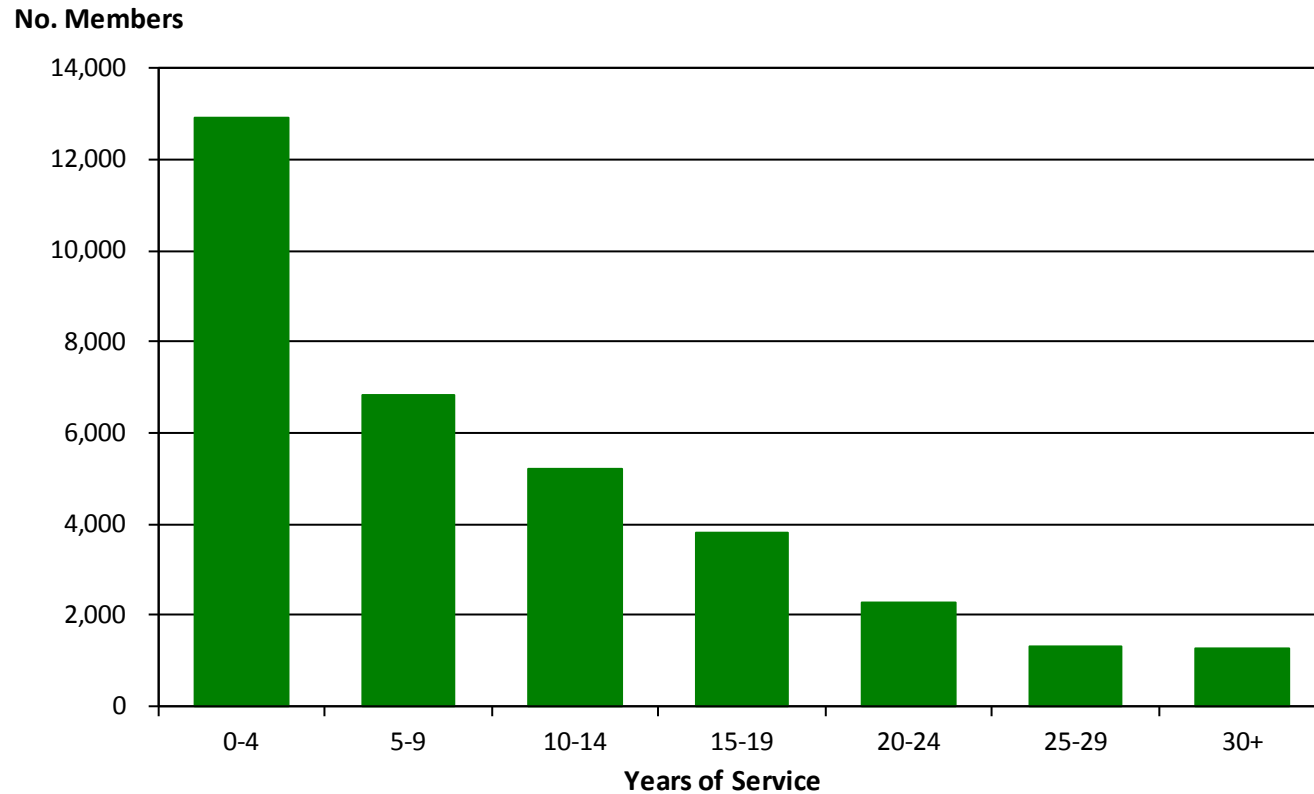




# Distribution of Active Members By Age February 28, 2017



# Distribution of Active Members By Service February 28, 2017



**General Members - Men**  
**Active as of February 28, 2017**  
**By Attained Age and Years of Service**

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20	10							10	\$ 244,413
20-24	471	6						477	14,162,223
25-29	844	165	4					1,013	36,561,421
30-34	778	413	184	8				1,383	58,615,753
35-39	623	408	339	153	4			1,527	71,196,073
40-44	545	310	339	248	97	2		1,541	77,297,960
45-49	489	348	312	304	235	71	2	1,761	92,615,715
50-54	454	335	331	303	208	207	89	1,927	102,616,850
55-59	427	336	350	309	242	184	283	2,131	109,530,933
60	76	63	63	64	19	24	68	377	18,784,364
61	68	49	50	53	35	27	48	330	16,429,821
62	54	58	50	38	27	17	51	295	15,336,512
63	44	51	45	32	25	21	41	259	13,234,382
64	42	40	32	27	21	8	28	198	10,286,620
65	42	37	26	29	12	12	27	185	9,071,664
66	23	30	18	15	6	3	12	107	5,448,459
67	14	17	18	11	6	6	17	89	5,150,114
68	15	20	12	8	8	2	7	72	3,694,230
69	8	13	12	12	3	1	6	55	3,027,813
70 & Over	38	35	40	26	14	3	13	169	6,862,782
<b>Totals</b>	<b>5,065</b>	<b>2,734</b>	<b>2,225</b>	<b>1,640</b>	<b>962</b>	<b>588</b>	<b>692</b>	<b>13,906</b>	<b>\$670,168,102</b>

While not used in the financial computations, the following *group averages* are computed and shown because of their general interest.

Age: 46.4 years  
Service: 10.8 years  
Annual Pay: \$48,193

**General Members - Women**  
**Active as of February 28, 2017**  
**By Attained Age and Years of Service**

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20	7							7	\$ 139,434
20-24	264	0						264	7,423,135
25-29	788	77	1					866	28,660,897
30-34	662	325	89	3				1,079	39,502,946
35-39	569	338	235	68	1			1,211	48,590,820
40-44	511	293	192	153	42	1		1,192	49,101,835
45-49	480	332	245	248	138	40	1	1,484	62,857,569
50-54	424	289	282	227	158	114	47	1,541	64,404,122
55-59	443	328	316	283	207	103	128	1,808	76,304,203
60	81	58	54	67	34	18	28	340	13,499,637
61	57	59	64	68	47	24	28	347	14,924,741
62	55	47	42	29	23	16	21	233	9,470,412
63	41	27	37	27	30	21	18	201	7,997,911
64	27	33	46	28	20	14	20	188	7,653,747
65	16	24	29	26	16	6	9	126	4,940,411
66	19	33	23	17	9	12	6	119	4,909,837
67	9	14	21	9	3	4	8	68	2,503,754
68	11	14	7	13	9	5	3	62	2,230,851
69	5	6	10	7	2	2	3	35	1,222,744
70 & Over	26	22	28	24	18	9	15	142	4,762,762
<b>Totals</b>	<b>4,495</b>	<b>2,319</b>	<b>1,721</b>	<b>1,297</b>	<b>757</b>	<b>389</b>	<b>335</b>	<b>11,313</b>	<b>\$451,101,768</b>

While not used in the financial computations, the following **group averages** are computed and shown because of their general interest.

Age: 46.9 years  
Service: 9.8 years  
Annual Pay: \$39,875

**Police Members**  
**Active as of February 28, 2017**  
**By Attained Age and Years of Service**

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20	1							1	\$ 22,874
20-24	216	0						216	7,719,792
25-29	788	89	0					877	34,987,794
30-34	626	369	77	0				1,072	47,536,141
35-39	347	307	254	55	0			963	46,369,543
40-44	219	173	202	231	36	0		861	44,973,098
45-49	185	141	169	197	191	29	0	912	51,702,897
50-54	71	85	84	75	87	114	21	537	31,428,019
55-59	70	41	46	35	42	50	63	347	20,525,020
60	8	7	8	5	5	6	16	55	3,259,371
61	7	8	9	7	9	7	15	62	3,807,980
62	8	6	9	5	2	4	10	44	2,376,002
63	5	7	4	1	7	3	12	39	2,207,561
64	9	5	7	2	3	5	3	34	2,095,563
65	3	3	3	6	0	1	5	21	1,356,460
66	2	2	1	2	1	2	5	15	830,505
67	0	2	0	1	2	0	1	6	366,399
68	2	2	1	1	1	1	1	9	504,928
69	1	1	2	1	0	0	1	6	361,602
70 & Over	3	3	5	5	2	4	2	24	1,183,985
<b>Totals</b>	<b>2,571</b>	<b>1,251</b>	<b>881</b>	<b>629</b>	<b>388</b>	<b>226</b>	<b>155</b>	<b>6,101</b>	<b>\$303,615,534</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 40.2 years  
Service: 9.3 years  
Annual Pay: \$49,765

**Fire Members**  
**Active as of February 28, 2017**  
**By Attained Age and Years of Service**

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
20-24	92	1						93	\$ 3,384,565
25-29	213	34	1					248	10,493,000
30-34	199	164	50	0				413	20,243,337
35-39	117	143	89	22	0			371	19,963,105
40-44	57	101	104	69	21	0		352	21,060,768
45-49	52	34	94	95	76	21	0	372	23,957,483
50-54	21	17	33	35	54	59	17	236	16,015,085
55-59	14	21	12	14	15	20	43	139	9,554,157
60	2	1	5	1	2	2	10	23	1,457,809
61	3	1	1	2	1	5	7	20	1,417,622
62	1	0	0	1	3	3	6	14	1,055,029
63	0	1	0	0	1	0	5	7	659,029
64	1	1	1	1	0	0	8	12	956,939
65	0	1	2	0	1	1	0	5	185,695
66	0	0	0	0	0	0	2	2	84,930
67	0	1	0	0	0	0	2	3	185,558
68	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0
70 & Over	1	0	0	0	0	0	2	3	170,151
<b>Totals</b>	<b>773</b>	<b>521</b>	<b>392</b>	<b>240</b>	<b>174</b>	<b>111</b>	<b>102</b>	<b>2,313</b>	<b>\$130,844,262</b>

While not used in the financial computations, the following *group averages* are computed and shown because of their general interest.

Age: 40.6 years  
Service: 10.8 years  
Annual Pay: \$56,569

## Participating Employers and Members in Valuations 10-Year Comparative Statement

Valuation Date	Number of		Active Members				Inflation Increase % (C.P.I.)
	Participating Employers	Valuation Groups	Number	Annual Payroll	Average Pay	% Increase	
2-29-2008	563	920	31,187	\$1,222,745,363	\$39,207	4.4%	4.0%
2-28-2009	578	945	32,291	1,285,952,041	39,824	1.6	0.2
2-28-2010	597	971	32,975	1,331,226,335	40,371	1.4	2.1
2-28-2011	608	995	32,851	1,350,646,560	41,114	1.8	2.1
2-29-2012	618	1,007	32,690	1,359,655,784	41,592	1.2	2.9
2-28-2013	640	1,031	32,840	1,395,261,077	42,487	2.2	2.0
2-28-2014	654	1,055	33,205	1,456,008,487	43,849	3.2	1.1
2-28-2015	663	1,062	33,104	1,462,218,216	44,170	0.7	0.0
2-29-2016	667	1,067	33,335	1,507,588,470	45,225	2.4	1.0
2-28-2017	681	1,078	33,633	1,555,729,666	46,256	2.3	2.7
<b>10-Year Compound Average</b>						<b>1.7%</b>	<b>1.4%</b>

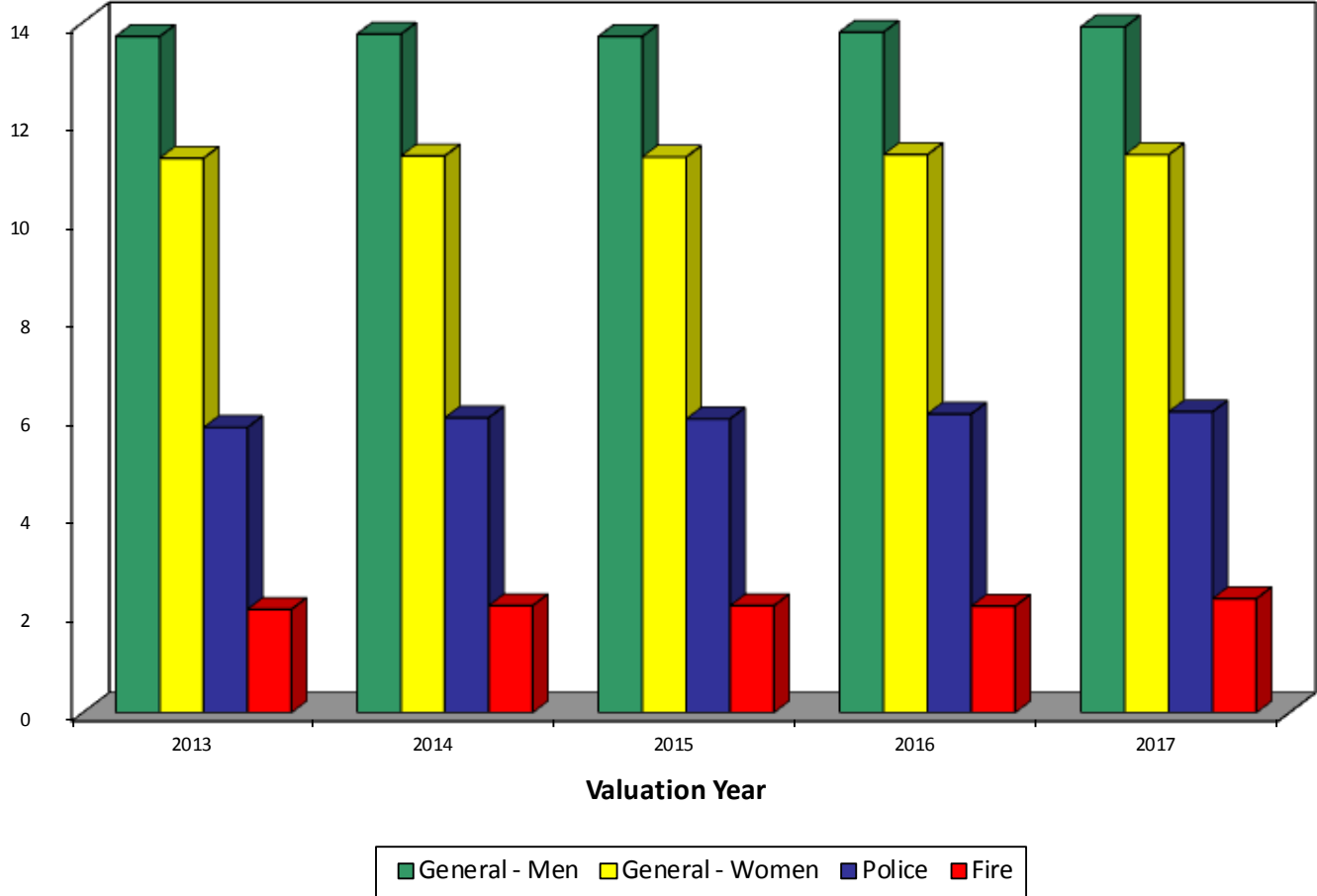
## Active Members in Valuations - Group Averages (Averages Not Used in Valuations; Computed and Shown Because of General Information Value)

Group	Valuation at 2-28	No. of Members	----- Group Averages ----- (In Years)		Annual Payroll		Inflation Increase % (C.P.I.)
			Age	Service	Average	Change	
General - Men	2008	13,360	45.5	10.4	41,277	+3.9	+4.0
	2009	13,665	45.6	10.4	42,076	+1.9	+0.2
	2010	13,989	45.8	10.5	42,393	+0.8	+2.1
	2011	13,798	46.1	10.9	43,271	+2.1	+2.1
	2012	13,695	46.2	11.0	43,553	+0.7	+2.9
	2013	13,714	46.4	11.0	44,541	+2.3	+2.0
	2014	13,761	46.5	11.0	46,048	+3.4	+1.1
	2015	13,712	46.4	11.0	46,269	+0.5	+0.0
	2016	13,800	46.5	11.0	47,395	+2.4	+1.0
	2017	13,906	46.4	10.8	48,193	+1.7	+2.7
General - Women	2008	10,952	45.8	9.0	33,254	+4.6	+4.0
	2009	11,435	45.9	9.0	33,871	+1.9	+0.2
	2010	11,574	46.2	9.3	34,536	+2.0	+2.1
	2011	11,296	46.6	9.6	35,041	+1.5	+2.1
	2012	11,224	46.8	9.8	35,603	+1.6	+2.9
	2013	11,245	47.0	9.9	36,411	+2.3	+2.0
	2014	11,291	47.1	9.9	37,442	+2.8	+1.1
	2015	11,268	47.0	9.9	37,821	+1.0	+0.0
	2016	11,316	46.9	9.9	38,819	+2.6	+1.0
	2017	11,313	46.9	9.8	39,875	+2.7	+2.7
Police	2008	5,243	39.7	9.0	42,973	+5.4	+4.0
	2009	5,427	39.8	9.0	43,584	+1.4	+0.2
	2010	5,566	40.0	9.2	44,256	+1.5	+2.1
	2011	5,753	40.2	9.3	44,448	+0.4	+2.1
	2012	5,740	40.4	9.5	45,043	+1.3	+2.9
	2013	5,784	40.4	9.5	45,885	+1.9	+2.0
	2014	5,982	40.4	9.3	47,279	+3.0	+1.1
	2015	5,956	40.4	9.4	47,742	+1.0	+0.0
	2016	6,057	40.3	9.4	48,600	+1.8	+1.0
	2017	6,101	40.2	9.3	49,765	+2.4	+2.7
Fire	2008	1,632	40.7	11.8	50,106	+5.1	+4.0
	2009	1,764	40.2	11.2	49,397	-1.4	+0.2
	2010	1,846	40.3	11.1	49,914	+1.0	+2.1
	2011	2,004	40.3	11.1	50,932	+2.0	+2.1
	2012	2,031	40.4	11.1	51,721	+1.5	+2.9
	2013	2,097	40.5	11.2	52,259	+1.0	+2.0
	2014	2,171	40.8	11.2	53,782	+2.9	+1.1
	2015	2,168	40.7	11.2	54,088	+0.6	+0.0
	2016	2,162	40.8	11.2	55,456	+2.5	+1.0
	2017	2,313	40.6	10.8	56,569	+2.0	+2.7



# Active Members by Group 2013-2017

Members (Thousands)



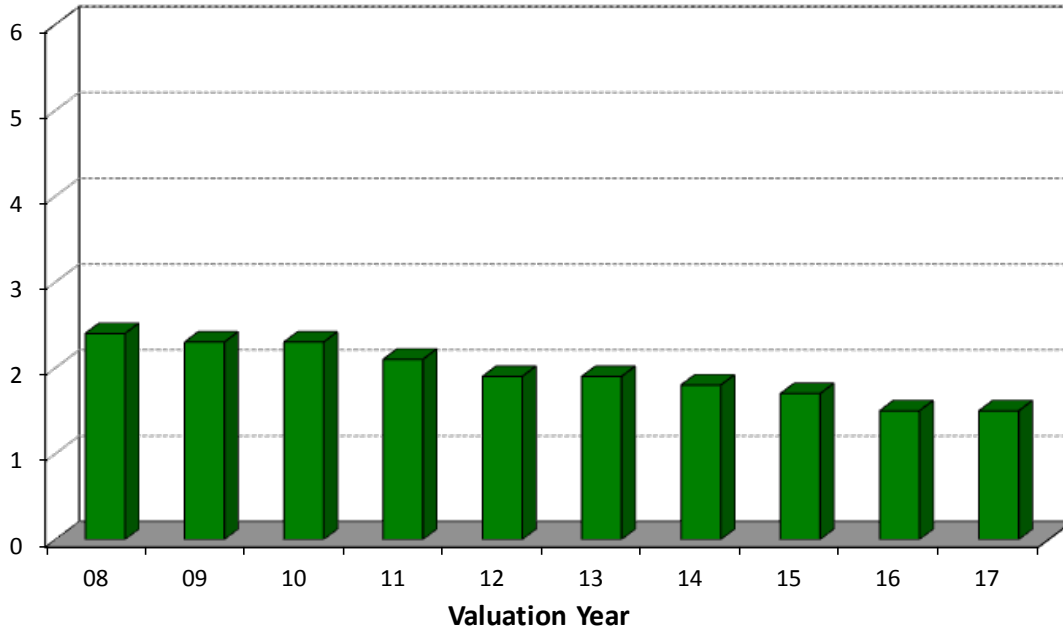
## Retirants and Beneficiaries Added to and Removed from Rolls 10-Year Comparative Statement

Year Ended	Added to Rolls		Removed from Rolls		Rolls End of Year		% Incr. in Annual Allowances	Average Annual Allowances	Retired Lives in Relation to Active Members	
	No.	Annual Allowances*	No.	Annual Allowances	No.	Annual Allowances			Active Members Per Benefit Recipient	Allowances as Percents of Active Payroll
2-29-2008	1,259	\$15,530,468	496	\$ 3,952,480	13,169	\$118,839,948	10.8%	\$ 9,024	2.4	9.7%
2-28-2009	1,227	16,525,323	490	4,025,037	13,906	131,340,234	10.5	9,445	2.3	10.2
2-28-2010	1,197	12,647,092	481	4,595,332	14,622	139,391,994	6.1	9,533	2.3	10.5
2-28-2011	1,399	16,372,009	529	4,939,905	15,492	150,824,098	8.2	9,736	2.1	11.2
2-29-2012	1,519	22,768,228	528	4,421,797	16,483	169,170,529	12.2	10,263	2.0	12.4
2-28-2013	1,524	20,204,275	504	4,963,681	17,503	184,411,123	9.0	10,536	1.9	13.2
2-28-2014	1,586	20,455,414	587	5,265,017	18,502	199,601,520	8.2	10,788	1.8	13.7
2-28-2015	1,698	25,056,006	632	5,764,961	19,568	218,892,566	9.7	11,186	1.7	15.0
2-29-2016	1,715	21,160,239	634	6,604,522	20,649	233,448,283	6.6	11,306	1.6	15.5
2-28-2017	1,817	24,889,736	686	6,826,899	21,780	251,511,120	7.7	11,548	1.5	16.2

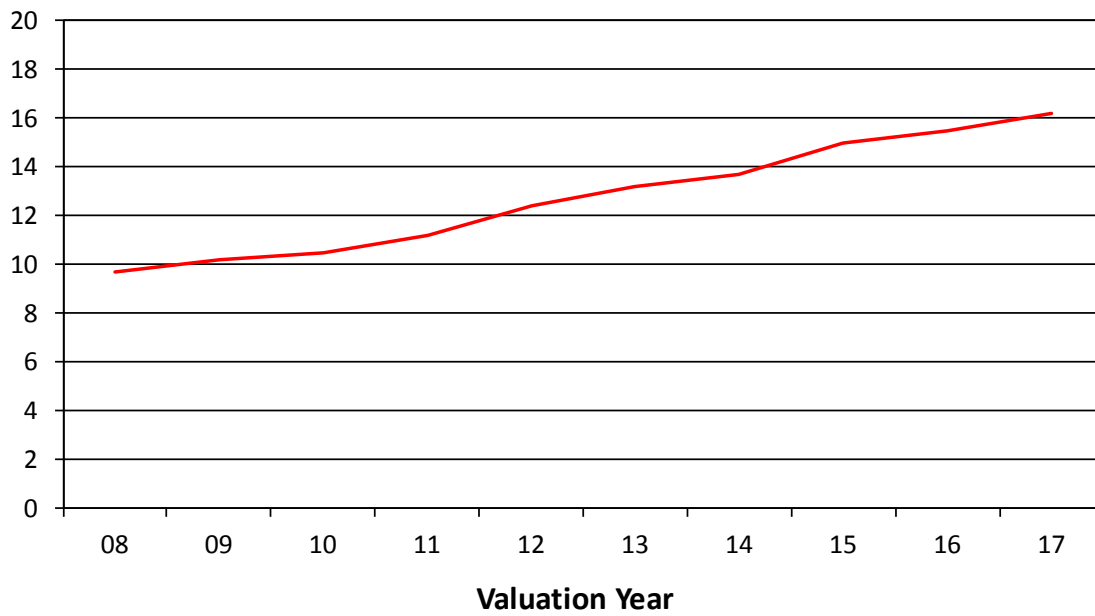
\* Includes post-retirement adjustments.

# Retirants and Beneficiaries Comparative Data

## Active Members Per Benefit Recipient



## Allowances as % of Active Pay



## Retirants and Beneficiaries on Rolls February 28, 2017 By Disbursing Fund and Type of Benefit Being Paid

Type of Benefit	Number	Annual Allowances
Service Early & Deferred		
Life Option	9,588	\$ 109,426,550
Option A	3,671	46,934,939
Option B	2,501	41,469,466
Option C	2,202	19,319,454
Beneficiary Receiving	<u>1,426</u>	<u>10,035,429</u>
Totals	19,388	227,185,838
Duty Disability		
Life Option	372	6,640,241
Option A	131	2,053,047
Option B	80	1,390,177
Option C	<u>57</u>	<u>785,114</u>
Totals	640	10,868,579
Non-Duty Disability		
Life Option	369	3,334,848
Option A	167	1,663,559
Option B	84	1,047,648
Option C	<u>92</u>	<u>724,880</u>
Totals	712	6,770,935
Beneficiary Receiving	<u>242</u>	<u>1,705,928</u>
Total Disability	1,594	19,345,442
Death-In-Service		
Spouse Receiving	728	4,820,397
Children Receiving	<u>70</u>	<u>159,443</u>
Totals	798	4,979,840
<b>Totals</b>	<b>21,780</b>	<b>\$251,511,120</b>

## **SECTION G**

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### **COMPUTED EMPLOYER CONTRIBUTIONS: SUMMARY OF COMPUTED INDIVIDUAL RATES**

## Computed Employer Contributions: Non-Contributory Plans By Valuation Groups as of February 28, 2017

Group	Number of Valuation Groups				Totals
	Under 2.00%	2.00- 4.99%	5.00- 7.99%	Over 8.00%	
<b>Benefit Program L-1</b>					
General	10	8	15	13	46
Police	2	5	8	0	15
Fire	<u>0</u>	<u>0</u>	<u>2</u>	<u>1</u>	<u>3</u>
Total	12	13	25	14	64
<b>Benefit Program L-3</b>					
General	8	12	15	20	55
Police	6	3	10	7	26
Fire	<u>1</u>	<u>0</u>	<u>2</u>	<u>4</u>	<u>7</u>
Total	15	15	27	31	88
<b>Benefit Program LT-4(62)</b>					
General	0	0	0	0	0
Police	0	0	0	0	0
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	0	0	0	0
<b>Benefit Program LT-4(65)</b>					
General	0	0	1	1	2
Police	0	0	1	0	1
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
Total	0	0	2	2	4
<b>Benefit Program LT-5(62)</b>					
General	2	1	0	0	3
Police	1	0	1	0	2
Fire	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	4	1	1	0	6
<b>Benefit Program LT-5(65)</b>					
General	0	1	1	2	4
Police	0	0	1	2	3
Fire	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>2</u>
Total	1	2	2	4	9
<b>Benefit Program L-6</b>					
General	2	2	2	84	90
Police	1	2	5	36	44
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>15</u>	<u>15</u>
Total	3	4	7	135	149
<b>Benefit Program L-7</b>					
General	7	17	27	53	104
Police	10	11	16	17	54
Fire	<u>1</u>	<u>3</u>	<u>3</u>	<u>7</u>	<u>14</u>
Total	18	31	46	77	172

## Computed Employer Contributions: Non-Contributory Plans By Valuation Groups as of February 28, 2017 (Continued)

Group	Number of Valuation Groups				Totals
	Under 2.00%	2.00- 4.99%	5.00- 7.99%	Over 8.00%	
<b>Benefit Program LT-8(62)</b>					
General	0	2	1	0	3
Police	0	0	1	0	1
Fire	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>2</u>
Total	0	3	2	1	6
<b>Benefit Program LT-8(65)</b>					
General	2	4	11	7	24
Police	1	2	4	8	15
Fire	<u>2</u>	<u>1</u>	<u>0</u>	<u>7</u>	<u>10</u>
Total	5	7	15	22	49
<b>Benefit Program L-9</b>					
General	1	2	3	4	10
Police	1	1	2	2	6
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	2	3	5	6	16
<b>Benefit Program LT-10(65)</b>					
General	1	1	1	6	9
Police	1	0	1	1	3
Fire	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	3	1	2	7	13
<b>Benefit Program L-11</b>					
General	0	0	0	2	2
Police	0	0	0	1	1
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>4</u>	<u>4</u>
Total	0	0	0	7	7
<b>Benefit Program L-12</b>					
General	1	2	10	21	34
Police	2	1	9	6	18
Fire	<u>4</u>	<u>1</u>	<u>1</u>	<u>3</u>	<u>9</u>
Total	7	4	20	30	61
<b>Benefit Program LT-14(65)</b>					
General	0	1	2	6	9
Police	1	0	1	2	4
Fire	<u>0</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>
Total	1	1	4	10	16
<b>Totals*</b>	<b>71</b>	<b>85</b>	<b>158</b>	<b>346</b>	<b>660</b>

\* There are thirty-three Non-Contributory groups presently without active members. They are not included in the totals.

## Computed Employer Contributions: Contributory Plans By Valuation Groups as of February 28, 2017

Group	Number of Valuation Groups				Totals
	Under 2.00%	2.00- 4.99%	5.00- 7.99%	Over 8.00%	
<b>Benefit Program L-1</b>					
General	12	23	26	23	84
Police	6	14	6	3	29
Fire	<u>0</u>	<u>3</u>	<u>3</u>	<u>2</u>	<u>8</u>
Total	18	40	35	28	121
<b>Benefit Program L-3</b>					
General	12	7	15	18	52
Police	3	6	1	3	13
Fire	<u>1</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>7</u>
Total	16	14	18	24	72
<b>Benefit Program LT-4(62)</b>					
General	0	0	0	0	0
Police	0	0	0	0	0
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	0	0	0	0
<b>Benefit Program LT-4(65)</b>					
General	0	0	1	1	2
Police	0	0	0	0	0
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	0	1	1	2
<b>Benefit Program LT-5(62)</b>					
General	0	0	0	0	0
Police	0	0	0	0	0
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	0	0	0	0
<b>Benefit Program LT-5(65)</b>					
General	0	0	0	0	0
Police	0	0	0	0	0
Fire	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>
Total	0	0	1	0	1
<b>Benefit Program L-6</b>					
General	0	1	5	41	47
Police	4	3	3	18	28
Fire	<u>1</u>	<u>1</u>	<u>0</u>	<u>8</u>	<u>10</u>
Total	5	5	8	67	85
<b>Benefit Program L-7</b>					
General	5	9	19	29	62
Police	5	10	5	8	28
Fire	<u>1</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>7</u>
Total	11	19	24	43	97



## Computed Employer Contributions: Contributory Plans By Valuation Groups as of February 28, 2017 (Concluded)

Group	Number of Valuation Groups				Totals
	Under 2.00%	2.00- 4.99%	5.00- 7.99%	Over 8.00%	
<b>Benefit Program LT-8(62)</b>					
General	0	1	0	0	1
Police	0	0	0	0	0
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	1	0	0	1
<b>Benefit Program LT-8(65)</b>					
General	1	0	0	4	5
Police	1	1	0	0	2
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	2	1	0	4	7
<b>Benefit Program L-9</b>					
General	1	2	0	3	6
Police	1	0	0	0	1
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	2	2	0	3	7
<b>Benefit Program LT-10(65)</b>					
General	0	0	0	2	2
Police	0	0	0	0	0
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	0	0	2	2
<b>Benefit Program L-11</b>					
General	0	0	0	0	0
Police	0	0	0	2	2
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>3</u>	<u>3</u>
Total	0	0	0	5	5
<b>Benefit Program L-12</b>					
General	1	1	3	6	11
Police	0	0	1	1	2
Fire	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>2</u>
Total	1	1	5	8	15
<b>Benefit Program LT-14(65)</b>					
General	0	0	0	2	2
Police	0	0	0	1	1
Fire	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	0	0	3	3
<b>Totals*</b>	<b>55</b>	<b>83</b>	<b>92</b>	<b>188</b>	<b>418</b>

\* There are thirty-two contributory groups presently without active members. They are not included in the totals.

**SECTION H**

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**APPENDIX**

# Summary Of Assumptions Used For LAGERS Actuarial Valuations Assumptions Adopted By LAGERS Board After Consulting With Actuary

**The actuarial assumptions used** in making the valuations are shown in this Appendix of the report. In accordance with Section 70.605, subsection 14 of the Revised Statutes of Missouri, the Board adopts the actuarial assumptions after receiving the advice of its actuary. The assumptions used in performing the valuations were adopted by the Board in conjunction with a five year investigation for the period ending February 28, 2015. A report of this investigation was issued March 18, 2016. The actuarial assumptions represent estimates of future experience.

## ECONOMIC ASSUMPTIONS -----

**The investment return rate** used in making the valuations was 7.25% per year, compounded annually (net after administrative expenses). The real rate of return is the portion of total investment return which is more than the wage inflation rate. Considering wage inflation recognition of 3.25%, the 7.25% investment return rate translates to an assumed real rate of return of 4.00%. No specific price inflation assumption is required to perform the valuations. However, a price inflation assumption of 2.50% would be consistent with the other economic assumptions. Adopted 2016.

**Pay increase assumptions** for individual active members are shown for sample ages on pages H-4 and H-5. Part of the assumption for each age is for merit and/or seniority increase, and the other 3.25% recognizes wage inflation. Adopted 2016.

**The active member payroll** is assumed to increase 3.25% annually, which is the portion of the individual pay increase assumptions attributable to wage inflation. Adopted 2016.

**Post-retirement increases** are assumed to be 2.50%, compounded annually.

**The number of active members** per employer is assumed to continue at the present number. Adopted 1967.

## NON-ECONOMIC ASSUMPTIONS -----

The **healthy retiree mortality tables**, for post-retirement mortality, used in evaluating allowances to be paid were the RP-2014 Healthy Annuitant mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The **disabled retiree mortality tables**, for post-retirement mortality, used in evaluating allowances to be paid were the RP-2014 disabled mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The **pre-retirement mortality tables** used were the RP-2014 employees mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. It was assumed that 50% of pre-retirement deaths would be duty related. For both the post-retirement and pre-retirement tables, the base year for males was then established to be 2017. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to the above described tables. Related values are shown on page H-3. Adopted 2016.

**The probabilities of age and service retirement** are shown on page H-3. Adopted 2016.

**The probabilities of withdrawal from service and death-in-service** are shown for sample ages on pages H-4 and H-5. It is assumed that all contributory members terminating before age 40 or with less than 10 years of service, and a percentage (General: 30%, Police-Fire: 20%) of contributory members terminating after age 40 with 10 or more years of service, withdraw their contributions and forfeit any vested employer-financed benefit. Adopted 2016.

**An individual entry age normal cost method of valuation** was used in determining age & service allowance normal costs and the allocation of actuarial present values between service rendered before and after the valuation date. The entry age normal cost method has the following characteristics:

- (i) the annual normal costs for each individual active member, payable from the member's actual date of employment to the member's projected date of retirement are sufficient to accumulate the actuarial present value of the member's benefit at the time of retirement; and
- (ii) each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Unfunded accrued liabilities are amortized by level (principal & interest) percent-of-payroll contributions. Actuarial gains or losses for each employer resulting from experience prior to February 28, 2014 are amortized over various closed periods ranging from 15 to 30 years. Actuarial gains or losses for each employer resulting from experience on or after February 28, 2014 are amortized over closed 15-year periods. Benefit changes adopted by employers are amortized over a closed 20-year period. Adoption of the Non-Contributory Refund provision is amortized over a closed 15-year period. Initial unfunded accrued liabilities for new employers joining LAGERS are amortized over closed 30-year periods. Adopted 2014.

**Contribution rates for disability retirement** are determined using a modified terminal funding method. Contribution rates are periodically adjusted based on the trend of the balance of the Casualty Reserve Fund (CRF). The funding objective is to have assets in the CRF sufficient to cover the portion of the present value of future benefits for future disability retired lives not covered by past normal cost contributions for the disabled member. Adopted 1967.

**Future service credit** is always assumed to accrue at the rate of 1 year of credit every 12 calendar months. Lower service accrual rates (service breaks or less-than-full-time employment) or higher service accrual rates (addition of military credit or reinstatement of prior service) are reflected as they are reported. Any lower or higher accrual rates may result in small financial gains or losses when reported. Adopted 1967.

**The form of benefit payment** assumed in the valuation is the Life Option. However, for members with accumulated member contributions, the residual refund available upon an early death after retirement is approximated by assuming pension payments are made for at least 3 years. Adopted 1967.

**Employer contribution dollars** were assumed to be **paid in equal installments** throughout the employer fiscal year. Adopted 1967.

**The Funding Value of Assets** recognizes assumed investment return fully each year. Differences between actual and assumed investment return are phased-in over a closed 5-year period. The funding value of assets is not permitted to deviate from the market value of assets by more than 20%. Adopted 1995 and 2003, respectively.

**The data about persons now covered and about present assets** were furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the Actuary.

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The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA).

## Future Life Expectancy (RP-2014 Healthy Annuitant Mortality Table with Base Year of 2017 for Males and 2006 for Females)

Sample Ages	Future Life Expectancy (Years)*	
	Men	Women
50	33.36	37.72
55	28.66	32.78
60	24.09	27.98
65	19.74	23.35
70	15.71	18.95
75	12.06	14.87
80	8.90	11.22

\* Applicable to calendar year 2017. Values for future years are determined by the above rates and the MP-2015 scale.

## Percent of Eligible Active Members Retiring within the Next Year

Ages	Without Rule of 80 Eligibility				With Rule of 80 Eligibility			
	General*		Police*	Fire*	General		Police	Fire
	Men	Women			Men	Women		
50			2.5%	2.5%	15.0%	15.0%	25.0%	25.0%
51			2.5	2.5	15.0	15.0	25.0	20.0
52			2.5	2.5	15.0	15.0	15.0	20.0
53			2.5	2.5	15.0	15.0	15.0	20.0
54			2.5	2.5	15.0	15.0	15.0	20.0
55	3.0%	3.0%	10.0	13.0	15.0	15.0	15.0	20.0
56	3.0	3.0	10.0	13.0	15.0	15.0	15.0	20.0
57	3.0	3.0	10.0	13.0	15.0	15.0	15.0	25.0
58	3.0	3.0	10.0	13.0	15.0	15.0	15.0	25.0
59	3.0	3.0	10.0	13.0	15.0	15.0	15.0	25.0
60	10.0	10.0	10.0	15.0	15.0	15.0	15.0	35.0
61	10.0	10.0	10.0	15.0	15.0	15.0	25.0	35.0
62	25.0	15.0	25.0	20.0	30.0	15.0	30.0	45.0
63	20.0	15.0	20.0	20.0	30.0	15.0	30.0	45.0
64	20.0	15.0	20.0	20.0	30.0	20.0	30.0	45.0
65	25.0	25.0	100.0	100.0	30.0	25.0	100.0	100.0
66	25.0	25.0			30.0	25.0		
67	20.0	25.0			30.0	25.0		
68	20.0	25.0			30.0	25.0		
69	20.0	20.0			30.0	25.0		
70	100.0	100.0			100.0	100.0		

\* First 5 years of retirement pattern only apply to early retirement. Early retirement rates are also applicable if Rule of 80 is adopted.

## General - Men

### Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating within the Next Year			Pay Increase Assumptions for an Individual Employee		
		Death*	Disability	Other	Merit & Seniority	Base (Economy)	Increase Next Year
ALL	0			19.00%			
	1			17.00			
	2			15.00			
	3			13.00			
	4			11.00			
25	5 & Over	0.05%	0.09%	7.30	3.30%	3.25%	6.55%
30		0.05	0.12	6.50	2.50	3.25	5.75
35		0.06	0.15	5.00	2.00	3.25	5.25
40		0.08	0.21	3.70	1.50	3.25	4.75
45		0.12	0.30	3.00	1.00	3.25	4.25
50		0.20	0.44	2.40	0.60	3.25	3.85
55		0.30	0.68	1.80	0.40	3.25	3.65
60		0.50	1.02	1.00	0.30	3.25	3.55
65		0.95		0.00	0.00	3.25	3.25

\* Applicable to calendar year 2017. Rates in future years are determined by the above rates and the MP-2015 scale.

## General - Women

### Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating within the Next Year			Pay Increase Assumptions for an Individual Employee		
		Death*	Disability	Other	Merit & Seniority	Base (Economy)	Increase Next Year
ALL	0			22.00%			
	1			20.00			
	2			17.00			
	3			14.00			
	4			13.00			
25	5 & Over	0.01%	0.02%	10.80	3.30%	3.25%	6.55%
30		0.02	0.03	8.90	2.50	3.25	5.75
35		0.03	0.06	7.40	2.00	3.25	5.25
40		0.04	0.10	5.70	1.50	3.25	4.75
45		0.06	0.16	4.20	1.00	3.25	4.25
50		0.10	0.24	3.30	0.60	3.25	3.85
55		0.17	0.34	2.50	0.40	3.25	3.65
60		0.25	0.48	1.20	0.30	3.25	3.55
65		0.36		0.00	0.00	3.25	3.25

\* Applicable to calendar year 2017. Rates in future years are determined by the above rates and the MP-2015 scale.

The pay increase assumptions are age based only, and not service based.

## Police Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating within the Next Year			Pay Increase Assumptions for an Individual Employee		
		Death*	Disability	Other	Merit & Seniority	Base (Economy)	Increase Next Year
ALL	0			18.00%			
	1			17.00			
	2			16.00			
	3			13.00			
	4			12.00			
25	5 & Over	0.05%	0.10%	9.80	3.30%	3.25%	6.55%
30		0.05	0.11	7.80	2.50	3.25	5.75
35		0.06	0.16	6.10	2.00	3.25	5.25
40		0.08	0.22	4.40	1.50	3.25	4.75
45		0.12	0.34	3.20	1.00	3.25	4.25
50		0.20	0.53	1.80	0.60	3.25	3.85
55		0.30	0.88	1.00	0.40	3.25	3.65

\* Applicable to calendar year 2017. Rates in future years are determined by the above rates and the MP-2015 scale.

## Fire Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating within the Next Year			Pay Increase Assumptions for an Individual Employee		
		Death*	Disability	Other	Merit & Seniority	Base (Economy)	Increase Next Year
ALL	0			10.00%			
	1			8.00			
	2			7.00			
	3			6.00			
	4			6.00			
25	5 & Over	0.05%	0.06%	5.00	3.90%	3.25%	7.15%
30		0.05	0.10	4.00	2.80	3.25	6.05
35		0.06	0.23	2.80	1.90	3.25	5.15
40		0.08	0.35	2.20	1.20	3.25	4.45
45		0.12	0.56	1.80	0.90	3.25	4.15
50		0.20	0.85	1.00	0.60	3.25	3.85
55		0.30	1.31	0.50	0.40	3.25	3.65

\* Applicable to calendar year 2017. Rates in future years are determined by the above rates and the MP-2015 scale.

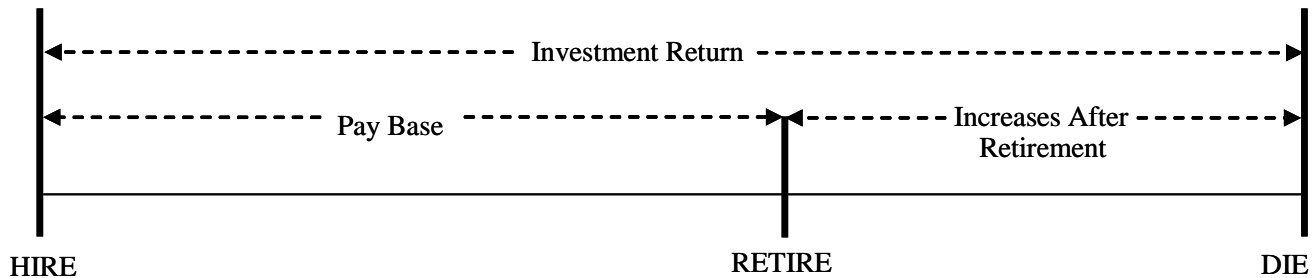
The pay increase assumptions are age based only, and not service based.

## Miscellaneous and Technical Assumptions

<b>Expenses</b>	Assumed investment return is net of investment expenses. Assumed administrative expenses are added to the Normal Cost and were 0.4% of payroll in the February 28, 2017 valuation.
<b>Marriage Assumption</b>	90% of male and 90% of female participants are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses for active member valuation purposes.
<b>Pay Increase Timing</b>	Beginning of year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
<b>Decrement Timing</b>	Decrements of all types are assumed to occur mid-year.
<b>Eligibility Testing</b>	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
<b>Benefit Service</b>	Exact fractional service on the decrement date is used to determine the amount of benefit payable.
<b>Decrement Relativity</b>	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
<b>Incidence of Contributions</b>	Contributions are assumed to be received continuously throughout the employer's applicable fiscal year based upon the computed percent of payroll shown in each employer's individual report, and the actual payroll payable at the time contributions are made.
<b>Decrement Operation</b>	The mortality and disability decrements do not operate during the first 5 years of service. The withdrawal decrement does not operate during retirement eligibility. The disability decrement does not operate during normal retirement eligibility.
<b>Deferred Members' Retirement Age</b>	It was assumed that deferred members would retire at the later of age 60 (55 for police or fire) or their attained age.
<b>Post-Retirement Increases</b>	Assumed to be 2.50%, compounded annually.



# Relationship of Economic Assumptions in Computing Contributions to a Retirement System



## Investment Return

An increase in this assumption reduces computed contributions. The assumption operates over all parts of an employee's lifetime.

## Pay Base

An increase in this assumption increases computed contributions. However, a 1% increase in this assumption, coupled with a 1% increase in Investment Return reduces computed contributions. This is because the Pay Base assumption operates only over an employee's working lifetime, while the Investment Return assumption operates over the employee's entire lifetime.

## Increases After Retirement

An increase in this element increases computed contributions.

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If Investment Return, Pay Base, and Increases After Retirement are each increased by equal amounts, computed contributions remain the same (except in plans using Final Average Pay as a factor in computing benefits; the multi-year average used for Final Average Pay causes computed contributions to decrease slightly).

If Investment Return and Pay Base are increased by equal amounts, with no change in Increases After Retirement, computed contributions decrease – sometimes significantly. The decreases represent the projected devaluation of an employee's benefits following retirement.

# Investment Return and Inflation: Past and Future

## Inflation Distortions

Inflation's impact on investment return is not uniform from year to year. A common expectation for real investment return (which is the portion of total return remaining after price inflation) is in the area of 3% to 5% annually.

## Historical Economic Data

Over the last 30 years, real return on average has exceeded the 3% to 5% range. However, for parts of this period, real return was actually negative. It is difficult to maintain a long-term portfolio allocation during periods of negative real return.

### Annual Investment Return % (including Income) expressed as Real Return (Remainder after Price Inflation)

No. Years Ended December	Inflation (CPI)	Cash Equiv. (T-Bills)	Bonds (Long Term)		Stocks (S & P 500)	Real Return for Sample Fund		
			US Treasury	Corporate (Sol. Bro.)		A	B	C
1/2012	1.7	(1.6)	1.6	8.8	14.1	7.2	8.9	10.4
1/2013	1.5	(1.5)	(12.7)	(8.5)	30.4	2.7	10.8	17.1
1/2014	0.8	(0.8)	22.9	16.4	12.8	15.6	14.2	13.0
1/2015	0.7	(0.2)	(2.0)	(5.5)	0.7	(2.0)	(1.2)	(0.6)
1/2016	2.1	(1.0)	(0.9)	8.7	9.9	5.2	6.4	7.5
5/1985	4.8	5.2	11.5	12.3	9.4	10.7	10.2	9.8
5/1990	4.1	2.6	6.4	6.1	8.6	6.7	7.2	7.6
5/1995	2.8	1.5	10.0	9.1	13.4	10.0	10.8	11.3
5/2000	2.5	2.6	4.9	3.2	15.4	7.7	10.0	11.7
5/2005	2.5	(0.4)	5.1	6.6	(2.0)	3.4	2.0	0.7
5/2010	2.2	0.0	3.3	3.6	0.1	3.1	2.6	2.0
5/2015	1.5	(1.4)	5.9	4.7	10.9	6.8	7.9	8.6
5/2016	1.4	(0.9)	1.1	3.5	13.3	5.6	7.7	9.4
<b>30/2016</b>	<b>2.6</b>	<b>0.7</b>	<b>5.3</b>	<b>5.4</b>	<b>7.6</b>	<b>6.0</b>	<b>6.5</b>	<b>6.8</b>

#### Sample Funds (only three of many reasonable samples)

	A	B	C
Cash Equiv.: T-Bills	10 %	10 %	10 %
Bonds: US Treasury	30	20	10
Bonds: Corporate	30	20	15
Stock	30	50	65

For many pension plans, benefit increases after retirement have fallen short of keeping up with inflation. The retired life group has been affected more than the active life group. The investment return that would be necessary for the indexing of benefits with inflation after retirement probably cannot be realized during periods of high inflation.

## Forward-Looking Economic Data

The assumed rate of price inflation should not give undue weight to recent experience. Some historical economic data may not be appropriate for use in developing assumptions for future periods due to changes in the underlying economic environment. Professional forecasters, economists, and investors are reliable sources to guide in the selection and evaluation of expected future price inflation rates.

## Investment Return and Inflation: Past and Future - Concluded

The Survey of Professional Forecasters, maintained by the Federal Reserve Bank of Philadelphia, is the longest running quarterly survey of macroeconomic forecasts in the U.S. Over 50 forecasters from industry, government, banking, and academics are included in this Survey. With respect to price inflation, their median projections are published quarterly for the annual-average Headline CPI over the next 10 years. Headline CPI is the total CPI, as opposed to Core CPI, which excludes food and energy prices. The following table presents the Survey's quarterly projections through the third quarter of 2017.

### Quarterly Median Projections of the 10-Year Annual-Average Headline CPI-U Inflation (Philadelphia Federal Reserve)

2014-4	2015-1	2015-2	2015-3	2015-4	2016-1	2016-2	2016-3	2016-4	2017-1	2017-2	2017-3
2.20%	2.10%	2.14%	2.15%	2.15%	2.12%	2.20%	2.15%	2.22%	2.30%	2.30%	2.35%

Source: Federal Reserve Bank of Philadelphia – Survey of Professional Forecasters Quarterly (Inflation.xlsx)

The Congressional Budget Office (CBO) regularly publishes its Budget and Economic Outlook. This report includes a forecast of annual CPI-U (All Urban Consumers). The following table presents the CBO's forecast for calendar years 2017 – 2027, as published in its report dated January, 2017.

### Consumer Price Index Forecast (CBO)

2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Compound Average
2.30%	2.30%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%	2.38%

Source: Congressional Budget Office – The Budget and Economic Outlook: 2017 – 2027, Table 2-1 (p. 40)

The Trustees of the Social Security system prepare and publish an annual report. Social Security's economists develop a forecast of future CPI-W (for Urban Wage Earners and Clerical Workers). The following table presents their forecasts in the 2016 annual report.

### Social Security Trustees' Ultimate CPI-W Assumption for 2019 and later

Low-cost	3.20%
Intermediate	2.60%
High-cost	2.00%

Source: 2016 Social Security Trustees' Report (p. 9)

Another source of information about future price inflation is the market for U.S. Treasury bonds. Comparing spreads between nominal and inflation-indexed treasury securities (TIPS) provides an estimate of the bond market's expectation of inflation over the next decade or more. However, this analysis ignores the inflation risk premium that buyers of U.S. Treasury bonds often demand, and it ignores the differences in liquidity between U.S. Treasury bonds and TIPS.

### Treasury Constant Maturities (2016 Annual Yields)

Term	Nominal	Inflation-Indexed	Implied Inflation
10-year	1.84%	0.27%	1.57%
20-year	2.22%	0.65%	1.57%
30-year	2.59%	0.86%	1.73%

Source: Board of Governors of the Federal Reserve System, Selected Interest Rates (Daily) – H.15

## LAGERS Retainer Actuarial Fees 10-Year Comparative Statement

Valuation Date As of	Number of Valuation Groups	Annual Actuarial Fees (nearest \$1)	Consumer Price Index (1967 is 100)	Average Fee per Group	
				Unadjusted Dollars	1967* Dollars
2-29-2008	920	\$210,579	634.139	\$229	\$36
2-28-2009	945	219,088	635.637	232	36
2-28-2010	971	248,740	649.259	256	39
2-28-2011	995	262,962	662.943	264	40
2-29-2012	1,007	274,957	681.977	273	40
2-28-2013	1,031	289,900	695.467	281	40
2-28-2014	1,055	297,900	703.300	282	40
2-28-2015	1,062	296,000	703.122	279	40
2-29-2016	1,067	305,000	710.278	286	40
2-28-2017	1,078	314,000	729.727	291	40

\* A goal for LAGERS during the initial design activity in 1966 and 1967 was that the actuarial retainer fee be approximately \$100 annually per valuation group - - - an amount substantially less than the amount the municipality would pay if it arranged independently for an actuarial valuation of comparable quality.

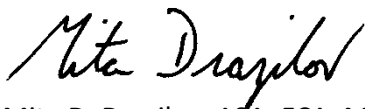
September 6, 2017

Mr. Robert Wilson  
Executive Secretary  
Missouri Local Government  
Employees Retirement System  
701 West Main Street  
Jefferson City, Missouri 65101

Dear Bob:

Please find enclosed 15 copies of the ***Compiled Report of the February 28, 2017 annual actuarial valuations*** for the participating employers of the Missouri Local Government Employees Retirement System.

Sincerely,



Mita D. Drazilov, ASA, FCA, MAAA

MDD/JAK:bd  
Enclosure

cc: Ms. Ashley Ackfeld, (Williams-Keepers, LLC)