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IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Actuarial Valuation Report
as of June 30, 2017

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TABLE OF CONTENTS

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October 25, 2017

Investment Board
Iowa Public Employees' Retirement System
7401 Register Drive
Des Moines, IA 50321

Re: June 30, 2017 Actuarial Valuation Report

Dear Investment Board Members:

At your request, we have performed an actuarial valuation of the Iowa Public Employees' Retirement System (IPERS or System) as of June 30, 2017 to measure the assets and liabilities of the System, determine the funded status, and set the Required Contribution Rate based on the results of the valuation and IPERS' Contribution Rate Funding Policy. While not verifying the data at its source, the actuary performed tests for consistency and reasonableness. The major findings of the valuation are contained in this report which reflects the benefit provisions in place on June 30, 2017. There have been no changes to the benefit provisions or actuarial methods since last year's valuation. However, an experience study of the System's economic assumptions was performed in March 2017. At the recommendation of the actuary, the Investment Board adopted a new set of economic assumptions which includes a reduction in the investment return from 7.5% to 7.0%. The assumption changes, as well as their impact on the current valuation results, are discussed further in the Executive Summary section of the report.

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

All costs, liabilities, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the System. The Investment Board has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix C.

This valuation report is only an estimate of the System's financial condition as of a single date. It can neither predict the System's future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of System benefits, only the timing of System contributions. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable, and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of potential results is not presented herein.

The actuarial computations presented in this report are for purposes of determining the recommended funding amounts for the System and have been made on a basis consistent with our understanding of the System's funding requirements and goals and the plan provisions described in Appendix B of this report. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes. In particular, actuarial computations for purposes of fulfilling financial reporting requirements for the System under Governmental Accounting Standards Board Statement Number 67 will be presented in a separate report.

The consultants who worked on this assignment are pension actuaries with significant public plan experience. In addition, the signing actuaries are independent of the System and the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonable based on the actual experience of the System. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

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

Patrice Beckham

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

Brent A. Banister

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

INTRODUCTION

This report presents the results of the June 30, 2017 actuarial valuation of the Iowa Public Employees' Retirement System (IPERS). The primary purposes of performing the valuation are as follows:

- to determine the Actuarial Contribution Rate (ACR) and the Required Contribution Rate (RCR) for the Regular membership, Sheriffs and Deputies, and the Protection Occupation group (all public safety members other than Sheriffs and Deputies) in accordance with IPERS' Contribution Rate Funding Policy (described in Appendix D),
- to evaluate the funded status of the System and disclose various asset and liability measures as of June 30, 2017,
- to determine the actuarial experience of the System since the last valuation, and
- to analyze and report on trends in System contributions, assets, and liabilities over the past several years.

While there have been no changes to the plan provisions or actuarial methods since last year's valuation, an experience study of the System's economic assumptions was performed in March 2017. As a result, the Investment Board adopted a new set of economic assumptions, based on the recommendations of the System's actuary:

- Price inflation assumption decreased from 3.00% to 2.60%.
- Investment return assumption decreased from 7.50% to 7.00%.
- Wage growth assumption decreased from 4.00% to 3.25%.
- Payroll increase assumption decreased from 4.00% to 3.25%.
- Interest credited on contribution balances decreased from 3.75% to 3.50%.

The price inflation assumption is a component of other economic assumptions such as the wage growth assumption and the investment return assumption. In addition, the change to the wage growth assumption also impacts the individual salary increase assumption used to project future benefit payments. The impact of these changes on the July 1, 2017 valuation results is summarized in the following tables (dollars in millions):

Regular Members	Old Assumptions	New Assumptions	Difference
Actuarial Liability (AL)	$33,829	$35,177	$1,348
Actuarial Value of Assets (AVA)	28,293	28,293	0
Unfunded AL (UAL)	$ 5,536	$ 6,884	$1,348
Funded Ratio	83.6%	80.4%	(3.2%)
Normal Cost Rate	10.18%	10.40%	0.22%
UAL Rate	3.88%	5.33%	1.45%
Actuarial Contribution Rate	14.06%	15.73%	1.67%
Required Contribution Rate	14.88%	15.73%	0.85%

Note: Numbers may not add due to rounding

Sheriffs & Deputies	Old Assumptions	New Assumptions	Difference
Actuarial Liability (AL)	$664.0	$691.2	$27.2
Actuarial Value of Assets (AVA)	642.5	642.5	0.0
Unfunded AL (UAL)	$ 21.5	$ 48.7	$27.2
Funded Ratio	96.8%	93.0%	(3.8%)
Normal Cost Rate	16.44%	16.85%	0.41%
UAL Rate	0.84%	2.67%	1.83%
Actuarial Contribution Rate	17.28%	19.52%	2.24%
Required Contribution Rate	18.26%	19.52%	1.26%

Note: Numbers may not add due to rounding

Protection Occupation	Old Assumptions	New Assumptions	Difference
Actuarial Liability (AL)	$1,515	$1,572	$57
Actuarial Value of Assets (AVA)	1,537	1,537	0
Unfunded AL (UAL)	$ (22)	$ 35	$57
Funded Ratio	101.5%	97.8%	(3.7%)
Normal Cost Rate	15.93%	16.31%	0.38%
UAL Rate	0.00%	0.71%	0.71%
Actuarial Contribution Rate	15.93%	17.02%	1.09%
Required Contribution Rate	16.40%	17.02%	0.62%

Note: Numbers may not add due to rounding

The actuarial valuation results provide a "snapshot" view of the System's financial condition on June 30, 2017. The results reflect net favorable experience for the past plan year as demonstrated by an unfunded actuarial liability (UAL) that was lower than expected. The total UAL on June 30, 2017 for all three membership groups covered by IPERS is $6.968 billion as compared to an expected UAL of $7.037 billion. The favorable experience was the net result of an experience gain of $102 million on the actuarial value of assets and an experience loss of $33 million on System liabilities.

Historically, the contribution rate for Regular members was set by state statute. Effective with the 2011 valuation, IPERS has the authority to set the Required Contribution Rate for the Regular membership group based on the Actuarial Contribution Rate developed in the annual actuarial valuation, subject to a maximum change of 1.00% per year. Based on the current Contribution Rate Funding Policy, which is described in Appendix D, the Required Contribution Rate increased since the prior valuation by 0.85% of pay for Regular members, 0.76% of pay for Sheriffs and Deputies, and 0.62% of pay for Protection Occupation. The Required Contribution Rate is equal to the ACR for all three groups, as shown in the following table.

Contribution Rate for FY 2019	Regular Membership	Sheriffs and Deputies	Protection Occupation
1. Normal Cost Rate	10.40%	16.85%	16.31%
2. Amortization of UAL	5.33%	2.67%	0.71%
3. Actuarial Contribution Rate	15.73%	19.52%	17.02%
4. Required Contribution Rate	15.73%	19.52%	17.02%
5. Shortfall/(Margin) (3) – (4)	0.00%	0.00%	0.00%
6. Employee Contribution Rate	6.29%	9.76%	6.81%
7. Employer Contribution Rate (4) - (6)	9.44%	9.76%	10.21%
8 Unfunded Actuarial Liability ($M)	$6,884	$49	$35
9. Funded Ratio	80.4%	93.0%	97.8%

Further details on the valuation results can be found in the following sections of this Executive Summary.

EXPERIENCE FOR THE PRIOR PLAN YEAR

Numerous factors contributed to the change in the Systems' assets, liabilities and the Actuarial Contribution Rate between the June 30, 2016 and June 30, 2017 valuation. The components are examined in the following discussion.

ASSETS

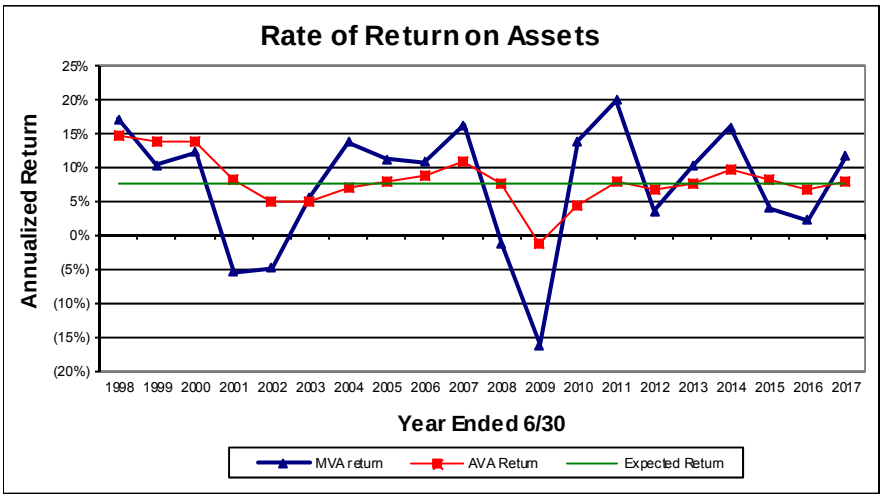
As of June 30, 2017, the System (all membership groups) had total assets of $30.779 billion, when measured on a market value basis. This was an increase of $2.453 billion from the prior year.

The market value of assets is not used directly in the calculation of the unfunded actuarial liability and the Actuarial Contribution Rates. An asset valuation method, which smoothes the effect of market fluctuations, is used to determine the value of assets used in the valuation. This amount, called the "actuarial value of assets", is equal to the expected asset value, based on the actuarial value in the prior year, net cash flows, and the assumed rate of return plus 25% of the difference between the actual market value and the expected asset value. Note that the assumed rate of return was 7.5% for the year ending June 30, 2017, based on the 2016 actuarial valuation. The assumed rate of return of 7.0% applies prospectively from July 1, 2017. After applying the asset valuation method, the resulting value must be no less than 80% of market value and no more than 120% of market value (referred to as a "corridor"). The corridor did not apply this year. The actuarial value of assets as of June 30, 2017 was $30.472 billion, an increase of $1.438 billion from the value in the prior year. The components of the change in the asset values are shown in the following table:

	Market Value ($M)	Actuarial Value ($M)
Net Assets, June 30, 2016	$ **28,326**	$ **29,034**
• Employer and Member Contributions	+ 1,182	+ 1,182
• Benefit Payments and Refunds	- 1,994	- 1,994
• Expected Investment Income, net of expenses (Based on 7.5% assumption)	+ 2,095	+ 2,148
• Actuarial Gain/(Loss) on Investment Return	+ 1,170	+ 102
Net Assets, June 30, 2017 Before FED Transfer	**$ 30,779**	**$ 30,472**
• FED Transfer	+ 0	+ 0
Net Assets, June 30, 2017 After FED Transfer	**$ 30,779**	**$ 30,472**
• Application of Corridor	- 0	- 0
Final Net Assets, June 30, 2017	**$ 30,779**	**$ 30,472**

The time-weighted rate of return on a market value basis, as reported by IPERS, was 11.70%. The dollar-weighted rate of return, net of investment and administrative expenses, measured on the actuarial value of assets was 7.86%. Since this return was above the investment return assumption of 7.50% for FY 2017, this experience resulted in an actuarial gain of $102 million.

Please see Exhibits 2 and 3 in Section II of this report for a summary of the market and actuarial value of assets by group (Regular, Sheriffs and Deputies, and Protection Occupation group) as of June 30, 2017.



Rates of return on the actuarial value of assets are much smoother than market value returns, illustrating the advantage of using an asset smoothing method.

In last year's valuation, there was a deferred (unrecognized) investment loss (actuarial value exceeded market value) of $708 million. Due to the rate of return on the market value of assets for FY 2017, the deferred investment loss from the 2016 valuation has been eliminated and a deferred investment gain (market value exceeds actuarial value) of $307 million now exists. The deferred investment gain will be recognized in the smoothing method in future years, but may be offset by actual investment experience if it is less favorable than assumed.

LIABILITIES

The actuarial liability is that portion of the present value of future benefits that will not be paid by future normal costs. The difference between this liability and the actuarial value of assets at the same date is called the unfunded actuarial liability. The dollar amount of the UAL will be reduced if the contributions to the System exceed the normal cost for the year plus interest on the prior year's UAL, assuming that all actuarial assumptions are met.

The unfunded actuarial liability by group, as of June 30, 2017, is shown in the following table:

($Millions)	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total*
Actuarial Liability	$35,177	$691	$1,572	$37,440
Actuarial Value of Assets	28,293	643	1,537	30,472
Unfunded Actuarial Liability*	$ 6,884	$ 49	$ 35	$ 6,968
Funded Ratio	80.4%	93.0%	97.8%	81.4%

*May not add due to rounding.

See Exhibit 7 in Section III of the report for the detailed development of the unfunded actuarial liability for each group.

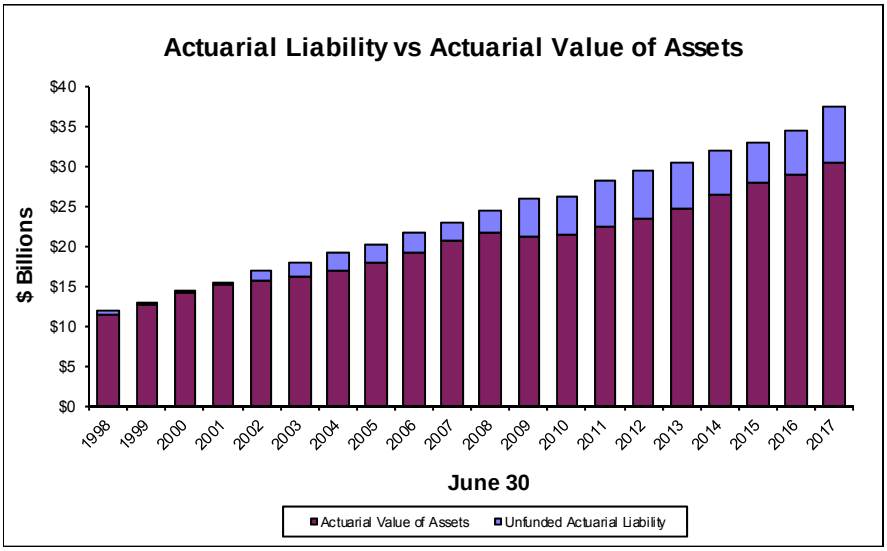
Changes in the UAL occur for various reasons. The net increase in the UAL from June 30, 2016 to June 30, 2017 was $1.382 billion, largely due to the impact of the change in the economic assumptions. The components of the net change in the UAL are shown in the following table (in millions):

Unfunded Actuarial Liability, June 30, 2016 ($M)	$ 5,586
• Expected increase from amortization method	52
• Expected decrease from contributions above actuarial rate	(58)
• Investment experience	(102)
• Liability experience*	33
• Changes in economic assumptions	1,433
• Other	24
Unfunded Actuarial Liability before FED transfer, June 30, 2017	$ 6,968
• FED Transfer for favorable experience	0
Unfunded Actuarial Liability after FED transfer, June 30, 2017	$ 6,968

* Liability experience is 0.09% of the actuarial liability.

As can be observed above, various factors impacted the UAL. Actuarial gains (losses), which result from actual experience that is more (less) favorable than anticipated based on the actuarial assumptions, are reflected in the UAL. They are measured as the difference between the expected unfunded actuarial liability and the actual unfunded actuarial liability, taking into account any changes due to actuarial assumptions and methods or benefit provision changes. Overall, the System experienced a net actuarial gain of $69 million. The total actuarial gain may be explained by considering the separate experience of assets and liabilities. As discussed earlier, there was a $102 million actuarial gain as measured on the actuarial value of assets. There

was a net actuarial loss of $33 million from demographic experience that was less favorable than anticipated by the actuarial assumptions. While there are various components of demographic experience, both gains and losses, the more material impact were gains from salary and retirement experience and losses from mortality and termination of employment experience.

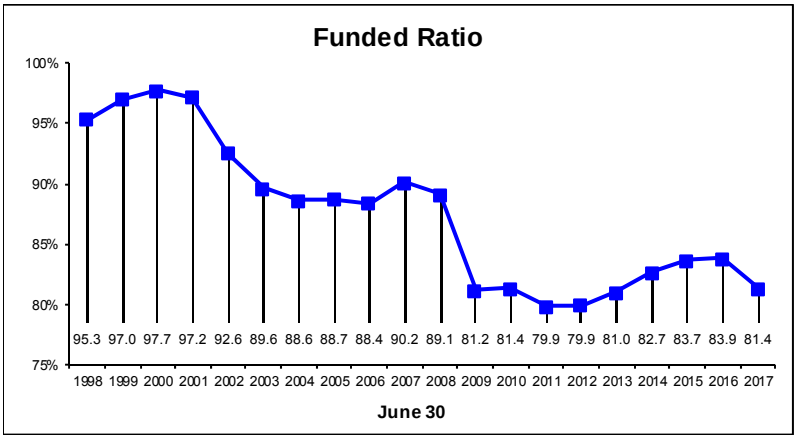


The dollar amount of the UAL has grown over the past two decades due to numerous factors, the most significant of which have been the investment loss of FY 2009, many years of contributions below the Actuarial Contribution Rate, and changes in actuarial assumptions.

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

	6/30/13	6/30/14	6/30/15	6/30/16	6/30/17
Funded Ratio (Actuarial Value)	81.0%	82.7%	83.7%	83.9%	81.4%
Unfunded Actuarial Liability ($M)	$5,787	$5,544	$5,455	$5,586	$6,968

Measures of the funded ratio presented here are not an indication of the System's ability to settle its current obligations, nor, on its own, is it an indication of the need for future funding. In addition, please note that due to the use of an asset smoothing method the funded ratio, based on the market value of assets, may differ from the funded ratio based on the actuarial value of assets.



Negative investment experience in FY 2009 caused a significant drop in the funded ratio, which had been stable at around 90% since 2003. The funded ratio stabilized in FY 2010 due to a strong investment return coupled with benefit reductions and has remained between 80% and 84% in recent years.

CONTRIBUTION RATE

Under the Entry Age Normal cost method, the Actuarial Contribution Rate consists of two components:

- a "normal cost" for the portion of projected liabilities allocated by the actuarial cost method to the service of members during the year following the valuation date, and
- an "unfunded actuarial liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

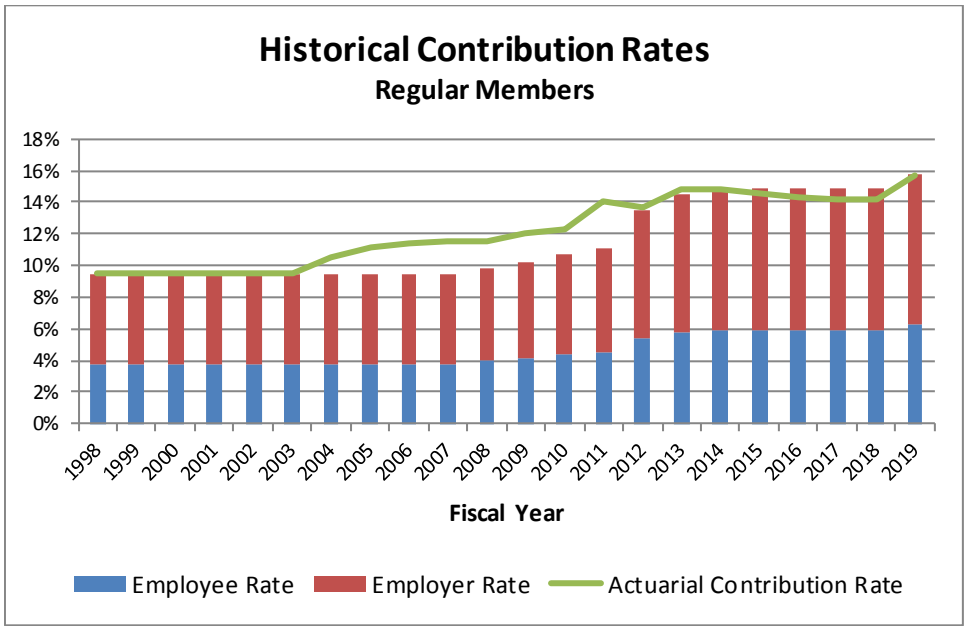
This valuation is used to determine the contribution rates that will be effective July 1, 2018 for the fiscal year ending June 30, 2019. Prior to the 2011 valuation, Regular members contributed according to scheduled rates set in statute. Beginning with the 2011 valuation (which applied to FY 2013), IPERS was given the statutory authority to set the Required Contribution Rate for Regular members, subject to a maximum increase of 1.00% per year. Based on IPERS' Contribution Rate Funding Policy, the Required Contribution Rate for Regular members in this valuation will increase by 0.85% of pay compared to the prior valuation.

The remaining 5% of the active members, the Sheriffs and Deputies group and the Protection Occupation group, have historically contributed at the Actuarial Contribution Rate which was subject to change each year. These groups now contribute based on the same funding policy as is used for the Regular members. Based on the current Contribution Rate Funding Policy, the Required Contribution Rate for the Sheriffs and Deputies group will increase by 0.76% of pay compared to the prior valuation and the Required Contribution Rate for the Protection Occupation group will increase by 0.62% of pay. We would note that, based on the results of this valuation, the Required Contribution Rate is equal to the Actuarial Contribution Rate for all three groups.

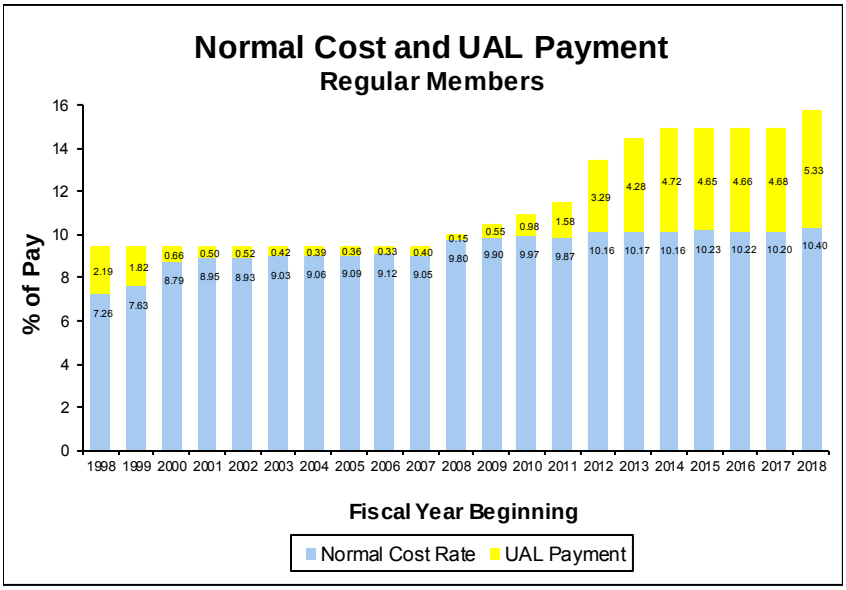
See Exhibit 14 in Section IV for the development of these contribution rates which are summarized in the following table:

Contribution Rate for FY 2019	Regular Membership	Sheriffs & Deputies	Protection Occupation
1. Actuarial Contribution Rate	15.73%	19.52%	17.02%
2. Required Contribution Rate	15.73%	19.52%	17.02%
3. Employee Contribution Rate	6.29%	9.76%	6.81%
4. Employer Contribution Rate (2) – (3)	9.44%	9.76%	10.21%
5. Shortfall/(Margin) (1) – (2)	0.00%	0.00%	0.00%

In 2006 and 2010, legislation was passed that increased the statutory contribution rate for Regular members. Beginning with the 2011 valuation (which applied to FY 2013), the Investment Board was given the authority to set the Required Contribution Rate for Regular members subject to certain statutory limitations. A historical summary of the actual contribution rate and the Actuarial Contribution Rate is shown in the following graph:



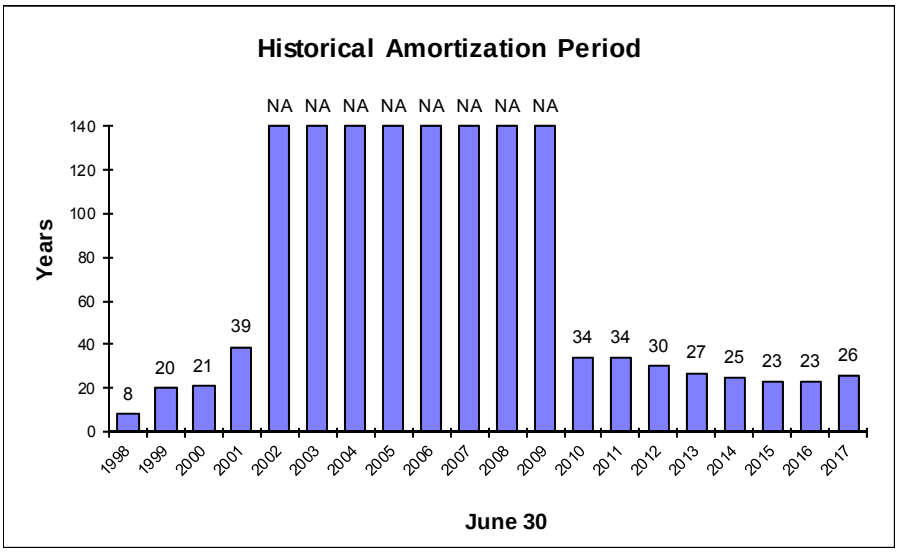
Based on the results of this valuation and the Contribution Rate Funding Policy adopted by the Investment Board, the Required Contribution Rate for the fiscal year ending June 30, 2019 for the Regular members is 15.73%, which is equal to the Actuarial Contribution Rate.



This graph shows the normal cost rate and the contribution rate available to fund the UAL based on the Required Contribution Rate payable in that fiscal year.

For a number of years, only a small portion of the total contribution rate was available to fund the UAL. Recent changes have increased this portion, providing more progress toward eliminating the UAL.

The Actuarial Contribution Rate is determined based on the snapshot of the System taken on the valuation date, June 30, 2017, and applies only for the fiscal year beginning July 1, 2018. The Actuarial Contribution Rate in future years will change each year as the deferred actuarial investment experience is recognized and other experience (both investment and demographic) impacts the System. The Required Contribution Rate will be set in each future year based on the Actuarial Contribution Rate for that year and the Contribution Rate Funding Policy.



Based on the statutory contribution rate, the period to amortize the UAL was infinite in the 2002 to 2009 valuations. Due to the benefit reductions in 2010 and the increase in the contribution rate beginning in FY 2012, more funds are available to finance the UAL and the years to amortize is finite. Future investment experience will have a significant impact on the System's funding and the years to amortize the UAL.

Note: Years to amortize after 2012 assume the current UAL amortization contribution rate remains level in future years. However, the provisions in the Contribution Rate Funding Policy will result in changes in the contribution rates over time. See Exhibits 12 through 14 for the applicable amortization periods established pursuant to the Actuarial Amortization Method.

SUMMARY

While there have been no changes to the plan provisions or actuarial methods since last year's valuation, an experience study of the System's economic assumptions was performed in March 2017. As a result of the actuary's recommendations, the Investment Board adopted several a new set of economic assumptions. These changes include a decrease in the investment return assumption as well as lower projected salary increases, lower assumed increases in future payroll, and a lower interest crediting rate on employee account balances. As a result of the changes to the economic assumptions, the unfunded actuarial liability increased by $1.433 billion and the Required Contribution Rate increased by 0.85% of pay for Regular members, 0.76% for Sheriffs and Deputies and 0.62% for the Protection Occupation group.

The investment return on the market value of assets for FY 2017 was 11.70%, as reported by IPERS. However, due to the application of the asset smoothing method and the deferred investment losses from prior years, the investment return on the actuarial value of assets was 7.86%. This return is still above the assumed investment return for the year ended June 30, 2017 (7.50% used in the June 30, 2016 valuation; 7.0% applies prospectively from July 1, 2017). Therefore, there was an experience gain on the actuarial value of assets. The favorable asset experience was partially offset by unfavorable liability experience. However, the System's combined experience for FY 2017 was a net experience gain of $69 million, resulting in a lower unfunded actuarial liability than was expected.

As mentioned earlier in this section, the System utilizes an asset smoothing method in the valuation process. While this is a common procedure for public retirement systems, it is important to identify the potential impact of the deferred investment experience. The asset smoothing method impacts only the timing of when the actual market experience is recognized in the valuation process. As a result of the return on the market value of assets for FY 2017, there is currently a deferred investment gain of $307 million. The key valuation results, using both actuarial and market value of assets, are shown below:

Actuarial Contribution Rate*	Actuarial Value	Market Value
Regular Members		
Normal Cost	10.40%	10.40%
UAL Contribution	5.33%	5.06%
Total Contribution	15.73%	15.46%
UAL ($M)	$ 6,884	$ 6,602
Funded Ratio	80.4%	81.2%
Sheriffs and Deputies		
Normal Cost	16.85%	16.85%
UAL Contribution	2.67%	2.21%
Total Contribution	19.52%	19.06%
UAL ($M)	$ 49	$ 42
Funded Ratio	93.0%	94.0%
Protection Occupation		
Normal Cost	16.31%	16.31%
UAL Contribution	0.71%	0.36%
Total Contribution	17.02%	16.67%
UAL ($M)	$ 35	$ 18
Funded Ratio	97.8%	98.9%

*Actuarial Contribution Rate is calculated prior to the application of the Contribution Rate Funding Policy which determines the Required Contribution Rate.

Based on the Contribution Rate Funding Policy adopted by the Investment Board, the Required Contribution Rate determined in this year's valuation for Regular members will increase by 0.85% of pay from last year to 15.73% of pay (applicable for the fiscal year ending June 30, 2019). The Required Contribution Rate for the Sheriffs and Deputies group in this valuation increased by 0.76% of pay from last year's rate to 19.52% of pay. The Required Contribution Rate for the Protection Occupation group increased by 0.62% of pay to 17.02% of pay. As a result, the Required Contribution Rate is equal to the Actuarial Contribution Rate for FY 2019 for all three membership groups.

The Actuarial Contribution Rate is determined based on the snapshot of the System taken on the valuation date, June 30, 2017, and applies only for the fiscal year beginning July 1, 2018. The Actuarial Contribution Rate in the future will change each year as the deferred actuarial investment experience is recognized and as other experience (both investment and demographic) impacts the System. While the Required Contribution Rate can vary each year, the annual change to the rate for Regular members is limited by statute to 1.0% and the Contribution Rate Funding Policy also limits how the rate decreases. Therefore, depending on actual experience in future years, the Required Contribution Rate may vary from the Actuarial Contribution Rate.

The long-term financial health of IPERS is heavily dependent on two key items: (1) future investment returns and (2) systematic contributions to the System at the full actuarially determined rate. Given the System's current funded status, the Actuarial Contribution Rate, and the Required Contribution Rate, the System's funded ratio is expected to improve over the long term, assuming all actuarial assumptions are met in the future and contributions are made according to the current Contribution Rate Funding Policy.

We conclude this executive summary by presenting comparative statistics and actuarial information on both the June 30, 2017 and June 30, 2016 valuations. All figures shown include the Regular membership, Sheriffs and Deputies, and the Protection Occupation group.

SUMMARY OF HISTORICAL CHANGE IN IPERS UNFUNDED ACTUARIAL LIABILITY

($Millions)	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13
Unfunded Actuarial Liability (BOY[1])	1,255	1,867	2,176	2,289	2,507	2,266	2,665	4,895	4,931	5,682	5,916
• **Expected Change**											
– **From Amortization Method**	24	36	42	22	49	44	52	95	96	110	115
– **Contributions different than Actuarial Rate**	61	87	103	125	118	127	140	248	218	65	21
• **Investment Experience**	402	75	(89)	(235)	(622)	5	1,903	666	(66)	168	(15)
• **Liability and Other Experience**	125	82	57	242	187	214	135	(185)	(17)	(109)	(250)
• **Benefit Enhancements**	0	29	0	0	0	6	0	(674)	0	0	0
• **Change in Assumptions/Methods**	0	0	0	64	27	3	0	(114)	417	0	0
• **Change in Actuarial Software**	0	0	0	0	0	0	0	0	103	0	0
• **FED Transfer**	0	0	0	0	0	0	0	0	0	0	0
Unfunded Actuarial Liability (EOY[2])	1,867	2,176	2,289	2,507	2,266	2,665	4,895	4,931	5,682	5,916	5,787

1 = Beginning of Year
2 = End of Year

Note: The amounts shown in each year are not additive because they are calculated on each valuation date and, therefore, represent a value at a different point in time.

SUMMARY OF HISTORICAL CHANGE IN IPERS UNFUNDED ACTUARIAL LIABILITY (continued)

($Millions)	FY14	FY15	FY16	FY17
Unfunded Actuarial Liability (BOY[1])	5,787	5,544	5,455	5,586
• **Expected Change** – **From Amortization Method**	99	72	54	52
– **Contributions different than Actuarial Rate**	0	(20)	(38)	(58)
• **Investment Experience**	(527)	(171)	236	(102)
• **Liability and Other Experience**	(29)	30	(121)	57
• **Benefit Enhancements**	0	0	0	0
• **Change in Assumptions/Methods**	215	0	0	1,433
• **Change in Actuarial Software**	0	0	0	0
• **FED Transfer**	(1)	0	0	0
Unfunded Actuarial Liability (EOY[2])	5,544	5,455	5,586	6,968

1 = Beginning of Year
2 = End of Year

Note: The amounts shown in each year are not additive because they are calculated on each valuation date and, therefore, represent a value at a different point in time.

IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM
PRINCIPAL RESULTS

	June 30, 2017	June 30, 2016	% Chg
SYSTEM MEMBERSHIP			
1. Active Membership			
- Number of Members			
(excluding Retired/Reemployed)	169,909	168,372	0.9
- Projected Payroll for Upcoming Fiscal Year	$8,058M	$7,812M	3.1
- Average Salary	$47,425	$46,399	2.2
2. Inactive Membership			
- Number Not in Pay Status	67,955	66,847	1.7
- Number of Retirees/Beneficiaries	117,508	114,240	2.9
- Average Annual Benefit	$16,602	$16,149	2.8
ASSETS AND LIABILITIES			
1. Net Assets (excluding FED reserve)			
- Market Value	$30,779M	$28,326M	8.7
- Actuarial Value	30,472M	29,034M	5.0
2. Projected Liabilities			
- Retired Members	$19,335M	$17,657M	9.5
- Inactive Members	835M	748M	11.6
- Active Members	24,515M	23,192M	5.7
- Total Liability	$44,685M	$41,597M	7.4
3. Actuarial Liability	$37,440M	$34,620M	8.1
4. Unfunded Actuarial Liability	$6,968M	$5,586M	24.7
5. Funded Ratio			
a. Actuarial Value Assets/Actuarial Liability	81.39%	83.86%	(2.9)
b. Market Value Assets/Actuarial Liability	82.21%	81.82%	0.5
SYSTEM CONTRIBUTIONS			
Required Contribution Rate, Regular Members*	15.73%	14.88%	5.7
Employer Contribution Rate	9.44%	8.93%	5.7
Employee Contribution Rate	6.29%	5.95%	5.7
Total Actuarial Contribution Rate	15.73%	14.21%	10.7
Shortfall/(Margin)	0.00%	(0.67%)	(100.0)

Note: Totals may not add due to rounding

M = ($)Millions

* Contribution rates for Sheriffs and Deputies are 9.76% for employers, 9.76% for employees

Contribution rates for Protection Occupation are 10.21% for employers, 6.81% for employees

SECTION II

SYSTEM ASSETS

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In this section, the values assigned to the assets held by the System are presented. These assets are valued on two different bases: the market value and the actuarial value.

Market Value of Net Assets

For certain accounting statement purposes, System assets are valued at current market prices. These values represent the "snapshot" of the fair value of System assets as of the valuation date.

Actuarial Value of Net Assets

The market value of assets may not necessarily be the best measure of the System's ongoing ability to meet its obligations.

To arrive at a suitable value for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens volatility in the market value while still indirectly recognizing market value. The specific technique follows:

Step 1: Determine the expected value of plan assets at the current valuation date using the actuarial assumption for investment return on the prior actuarial value of assets and the actual receipts and disbursements of the fund for the previous 12 months.

Step 2: Subtract the expected value determined in Step 1 from the total market value of the Fund at the current valuation date.

Step 3: Multiply the difference between market and expected values determined in Step 2 by 25%.

Step 4: Add the expected value of Step 1 and the product of Step 3 to determine the actuarial value of assets.

Step 5: Verify the preliminary actuarial value of assets in Step 4 is not more than 120% of the market value of assets, nor less than 80% of the market value. If it is, adjust the actuarial value of assets so it falls within the 80% - 120% corridor.

EXHIBIT 1

ANALYSIS OF NET ASSETS AT MARKET VALUES

($ Millions)

	June 30, 2017		June 30, 2016	
	Amount	% of Total	Amount	% of Total
Cash & Equivalents	$ 1,254	4.1%	$ 160	0.6%
Capital Assets, Receivables and Payables	(1,182)	(3.8)	(1,110)	(3.9)
Domestic Equity	7,068	23.0	6,964	24.6
International Equity	4,635	15.1	4,428	15.6
Fixed Income	10,090	32.7	9,552	33.7
Public Real Assets	2,208	7.2	3,988	14.1
Private Real Assets	1,984	6.4	155	0.6
Private Equity/Debt	3,890	12.6	3,268	11.5
Securities Lending Collateral Pool	832	2.7	921	3.2
TOTAL NET ASSETS	$ 30,779	100.0%	$ 28,326	100.0%
FED Reserve (Before current year transfer)	0		0	
Current Year FED Transfer Payable	0		0	
Net Retirement System Assets	$ 30,779		$ 28,326	

EXHIBIT 2

SUMMARY OF FUND ACTIVITY
(Market Value)

	Regular Membership	Sheriffs & Deputies	Protection Occupation	FED Reserve	Total
NET RETIREMENT SYSTEM ASSETS ON JUNE 30, 2016	$26,341,407,289	$588,117,030	$1,396,909,337	$0	$28,326,433,656
REVENUE					
Employer contributions	659,859,251	10,464,153	34,442,710	0	704,766,114
Member contributions	439,928,972	10,464,153	22,961,807	0	473,354,932
Service purchase	3,919,204	90,115	261,735	0	4,271,054
Investment income	3,111,062,808	70,006,760	166,735,240	0	3,347,804,808
Total Revenue	$4,214,770,235	$91,025,181	$224,401,492	$0	$4,530,196,908
DISBURSEMENTS					
Benefit payments	1,849,131,607	28,982,145	64,989,456	0	1,943,103,208
Member and employer refunds	44,077,167	763,170	5,610,612	0	50,450,949
Administrative expenses	15,261,929	120,171	516,896	0	15,898,996
Investment expenses	63,248,105	1,423,242	3,389,738	0	68,061,085
Total Expenses	$1,971,718,808	$31,288,728	$74,506,702	$0	$2,077,514,238
PRELIMINARY NET ASSETS ON JUNE 30, 2017	$28,584,458,716	$647,853,483	$1,546,804,127	$0	$30,779,116,326
TRANSFERS					
Membership changes	(9,201,109)	1,815,378	7,385,731	0	0
FED Reserve	0	0	0	0	0
ADJUSTED NET ASSETS ON JUNE 30, 2017	$28,575,257,607	$649,668,861	$1,554,189,858	$0	$30,779,116,326

EXHIBIT 3

ACTUARIAL VALUE OF NET ASSETS

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
1. Actuarial Value of Assets as of June 30, 2016	$27,001,194,364	$602,213,442	$1,430,288,781	$29,033,696,587
2. Actual Receipts/Disbursements				
a. Contributions	1,103,707,427	21,018,421	57,666,252	1,182,392,100
b. Benefit Payments and Refunds	1,893,208,774	29,745,315	70,600,068	1,993,554,157
c. Net Change	(789,501,347)	(8,726,894)	(12,933,816)	(811,162,057)
3. Expected Value of Assets as of June 30, 2017 [(1) x 1.075] + [(2c) x $(1.075)^{.5}$]	28,207,711,522	638,331,214	1,524,150,374	30,370,193,110
4. Preliminary Market Value of Assets as of June 30, 2017	28,584,458,716	647,853,483	1,546,804,127	30,779,116,326
5. Difference Between Market and Expected Values (4) - (3)	376,747,194	9,522,269	22,653,753	408,923,216
6. Preliminary Actuarial Value of Assets as of June 30, 2017 (3) + [(5) x 25%]	28,301,898,321	640,711,781	1,529,813,812	30,472,423,914
7. Transfers				
a. Membership changes	(9,109,426)	1,797,289	7,312,137	0
b. FED Reserve	0	0	0	0
8. Initial Actuarial Value of Assets as of June 30, 2017	$28,292,788,895	$642,509,070	$1,537,125,949	$30,472,423,914
9. Determination of Corridor				
a. 80% of Market Value of Assets	22,860,206,086	519,735,089	1,243,351,886	24,623,293,061
b. 120% of Market Value of Assets	34,290,309,128	779,602,633	1,865,027,830	36,934,939,591
10. Final Actuarial Value of Assets as of June 30, 2017 (8), but not less than (9a), nor greater than (9b)	$28,292,788,895	$642,509,070	$1,537,125,949	$30,472,423,914

EXHIBIT 4

HISTORICAL COMPARISON (ACTUARIAL AND MARKET)

Value as of June 30		Actuarial Value of Net Assets (AVA)	Market Value of Net Assets (MVA)	AVA/MVA
1998	*	11,352,674,142	13,463,899,832	84%
1999	*	12,664,031,437	14,814,311,451	85%
2000	*	14,145,141,535	16,473,516,141	86%
2001		15,112,424,729	15,357,519,356	98%
2002		15,613,114,099	14,387,799,637	109%
2003		16,120,476,011	14,915,941,546	108%
2004		16,951,942,539	16,726,227,853	101%
2005		17,951,490,071	18,224,067,613	99%
2006		19,144,036,519	19,847,676,903	96%
2007		20,759,628,415	22,624,387,015	92%
2008		21,857,423,183	21,844,112,206	100%
2009		21,123,979,941	17,603,316,618	120%
2010		21,537,458,560	19,538,971,423	110%
2011		22,575,309,199	22,772,344,651	99%
2012		23,530,094,461	23,024,773,746	102%
2013		24,711,096,187	24,756,663,715	100%
2014		26,460,428,085	28,038,549,893	94%
2015		27,915,379,103	28,429,834,829	98%
2016		29,033,696,587	28,326,433,656	102%
2017		30,472,423,914	30,779,116,326	99%

*Reflects reduction for transfers to the Favorable Experience Dividend Reserve Account.

Values are for all three membership groups, but exclude the Favorable Experience Dividend Reserve Account.

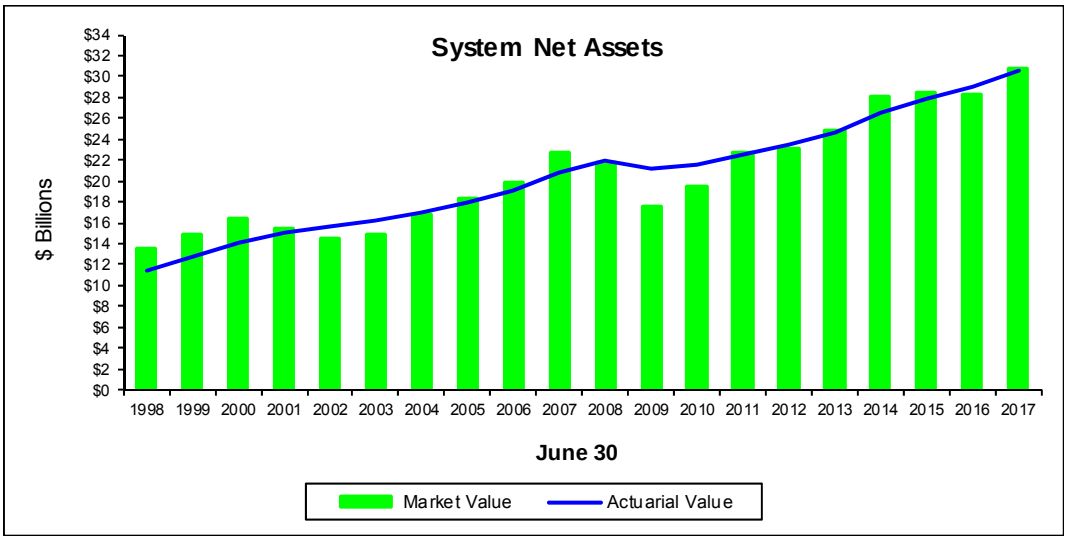

EXHIBIT 5

SUMMARY OF FAVORABLE EXPERIENCE DIVIDEND RESERVE

1. Initial Market Value of FED Reserve as of June 30, 2017	$	0
2. Transfer to Membership Groups		0
3. Final Value of FED Reserve as of June 30, 2017 (1) - (2)	$	0

SECTION III

SYSTEM LIABILITIES

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SECTION III

SYSTEM LIABILITIES

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. There are several methods used to allocate the cost of benefits to members' working lifetimes. These mathematical techniques are called actuarial cost methods.

The method used for this valuation is referred to as the "entry age normal" actuarial cost method. In general, under this method, a contribution that is a level percent of rates of pay is determined for each member, which if paid from date of hire to retirement date, will finance all future benefit payments. The level percent of pay that is developed is called the **"normal cost"**. The sum of the individual normal cost dollar amounts is divided by expected covered payroll of current actives to determine the normal cost rate for the System.

The actuarial liability is that portion of the present value of future benefits (PVFB) that will not be paid by the normal costs in future years. The difference between this liability and the actuarial value of assets as of the same date is referred to as the **unfunded actuarial liability (UAL).** If contributions exceed the normal cost for the year, after allowing for interest on the previous balance of the UAL, this liability will be reduced. Benefit changes, experience gains and losses, and changes in actuarial assumptions or procedures will also have an effect on the total actuarial liability and on the portion of it that is unfunded.

The UAL is projected to the following year to reflect the time lag from the valuation date to the date the contribution rates are effective and is then amortized according to the Actuarial Amortization Method adopted by the Investment Board.

Effective with the June 30, 2008 valuation, a transfer of assets is performed as of June 30th for all employees whose membership group changed since the prior valuation. The purpose behind the transfer is to better match the assets and liabilities for each membership group by having both the assets and liabilities for each member reside in their current membership group. When employees move between membership groups, an asset transfer for valuation purposes is made based on the funded ratio of their former group prior to the transfer. The asset transfer calculation is determined by multiplying the actuarial liability of the employee transferring by the funded ratio of their former group just prior to the transfer. The asset values after the transfers and the liabilities for the employees reside in their current membership group and are used to prepare the final valuation results.

A summary of the number of employees who transferred is shown below:

From	To		
	Regular	Sheriffs and Deputies	Protection Occupation
Regular		14	259
Sheriffs and Deputies	8		15
Protection Occupation	150	47	

The impact on the UAL from the transfer is shown below:

Regular	Sheriffs and Deputies	Protection Occupation
($4,491,779)	$522,445	$2,493,189

EXHIBIT 6

PRESENT VALUE OF FUTURE BENEFITS
as of June 30, 2017

The actuarial present value of future benefits represents the current value of benefits expected to ultimately be earned by the current members of the System as of the valuation date.

Present Value of Future Benefits:	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
Active Members				
Retirement benefits	$20,745,853,908	$457,377,007	$1,120,475,082	$22,323,705,997
Death benefits	219,802,210	5,947,161	25,687,305	251,436,676
Termination benefits	1,143,990,357	42,445,704	173,192,319	1,359,628,380
Disability benefits	507,863,381	14,599,322	57,384,193	579,846,896
Inactive Members				
Vested members	700,126,007	10,042,617	40,613,325	750,781,949
Nonvested members	82,311,806	238,832	1,922,542	84,473,180
Retired Members and Beneficiaries	18,304,044,337	325,186,602	705,541,965	19,334,772,904
Total Present Value of Future Benefits	$41,703,992,006	$855,837,245	$2,124,816,731	$44,684,645,982

EXHIBIT 7

UNFUNDED ACTUARIAL LIABILITY
as of June 30, 2017

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
1. Present Value of Future Benefits	$41,703,992,006	$855,837,245	$2,124,816,731	$44,684,645,982
2. Present Value of Future Normal Costs	6,527,041,429	164,631,493	552,591,031	7,244,263,953
3. Actuarial Liability (1) - (2)	$35,176,950,577	$691,205,752	$1,572,225,700	$37,440,382,029
4. Actuarial Value of Net Assets	28,292,788,895	642,509,070	1,537,125,949	30,472,423,914
5. Unfunded Actuarial Liability (3) - (4)	$6,884,161,682	$48,696,682	$35,099,751	$6,967,958,115
6. Funded Ratio (4) / (3)	80.4%	93.0%	97.8%	81.4%

EXHIBIT 8

CALCULATION OF ACTUARIAL (GAIN)/LOSS AND ANY TRANSFER TO THE FAVORABLE EXPERIENCE DIVIDEND RESERVE
Based on the June 30, 2017 Actuarial Valuation

The Favorable Experience Dividend (FED) reserve account was created by legislation in 1998. The main purpose of the account is to help offset the negative impact of postretirement inflation for members who retired after June 30, 1990. The law provided that a portion of the favorable actuarial experience, if any, in subsequent years would be transferred to the FED reserve. Legislation passed in 2000 capped the FED reserve at ten years of expected payouts at the maximum level. Further legislation in 2006 prohibited further transfers to the FED until the System has no remaining UAL. The System currently has an UAL so no transfer is to be made this year, nor is any future transfer assumed for any actuarial valuation calculations.

1. June 30, 2016 Unfunded Actuarial Liability	$	5,586,052,560
2. Normal Cost for year ending June 30, 2017		764,988,926
3. Employer and Employee Contributions*		1,178,121,046
4. Change due to membership transfers		(1,476,145)
5. Change due to FED transfer		0
6. Change due to assumptions and method revisions		1,432,643,482
7. Expected Unfunded Actuarial Liability as of June 30, 2017 $[(1) + (2)] * 1.075 - (3) * (1.075)^{.5} + (4) + (5) + (6)$		7,037,035,036
8. Actual Unfunded Actuarial Liability as of June 30, 2017		6,967,958,115
9. (Gain)/loss (8) - (7)		(69,076,921)
10. Portion of gain to transfer to FED		N/A
11. Amount of Actuarial Value of Assets to transfer to FED	$	0
12. Market value of FED transfer	$	0

* Does not include service purchases

EXHIBIT 9

ACTUARIAL (GAIN)/LOSS BY GROUP
Based on the June 30, 2017 Actuarial Valuation

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
1. Expected Actuarial Liability				
a. Actuarial Liability at June 30, 2017	$32,577,657,593	$624,791,635	$1,417,299,919	$34,619,749,147
b. Normal Cost for FY 2017	696,446,333	16,742,469	51,800,124	764,988,926
c. Benefit Payments for FY 2017	(1,893,208,774)	(29,745,315)	(70,600,068)	(1,993,554,157)
d. Interest on (a), (b), and (c) at 7.5%	2,425,845,933	47,019,774	107,582,863	2,580,448,570
e. Transfers and Service Purchases	(9,232,235)	2,184,416	9,999,997	2,952,178
f. Change due to assumption changes	1,347,992,919	27,222,003	57,428,560	1,432,643,482
g. Expected Actuarial Liability as of June 30, 2017	$35,145,501,769	$688,214,982	$1,573,511,395	$37,407,228,146
2. Actuarial Liability at June 30, 2017	$35,176,950,577	$691,205,752	$1,572,225,700	$37,440,382,029
3. Actuarial Liability (Gain)/Loss (2) - (1g)	$31,448,808	$2,990,770	($1,285,695)	$33,153,883
4. Expected Actuarial Value of Assets				
a. Actuarial Value of Assets at June 30, 2016	$27,001,194,364	$602,213,442	$1,430,288,781	$29,033,696,587
b. Contributions for FY 2017	1,103,707,427	21,018,421	57,666,252	1,182,392,100
c. Benefit Payments for FY 2017	(1,893,208,774)	(29,745,315)	(70,600,068)	(1,993,554,157)
d. Interest on (a), (b), and (c) at 7.5%	1,996,018,505	44,844,666	106,795,409	2,147,658,580
e. Transfers	(9,109,426)	1,797,289	7,312,137	0
f. Expected Actuarial Value of Assets as of June 30, 2017	$28,198,602,096	$640,128,503	$1,531,462,511	$30,370,193,110
5. Actuarial Value of Assets at June 30, 2017	$28,292,788,895	$642,509,070	$1,537,125,949	$30,472,423,914
6. Actuarial Value of Assets (Gain)/Loss (4f) - (5)	($94,186,799)	($2,380,567)	($5,663,438)	($102,230,804)
7. Net Actuarial (Gain)/Loss (3) + (6)	($62,737,991)	$610,203	($6,949,133)	($69,076,921)

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SECTION IV

SYSTEM CONTRIBUTIONS

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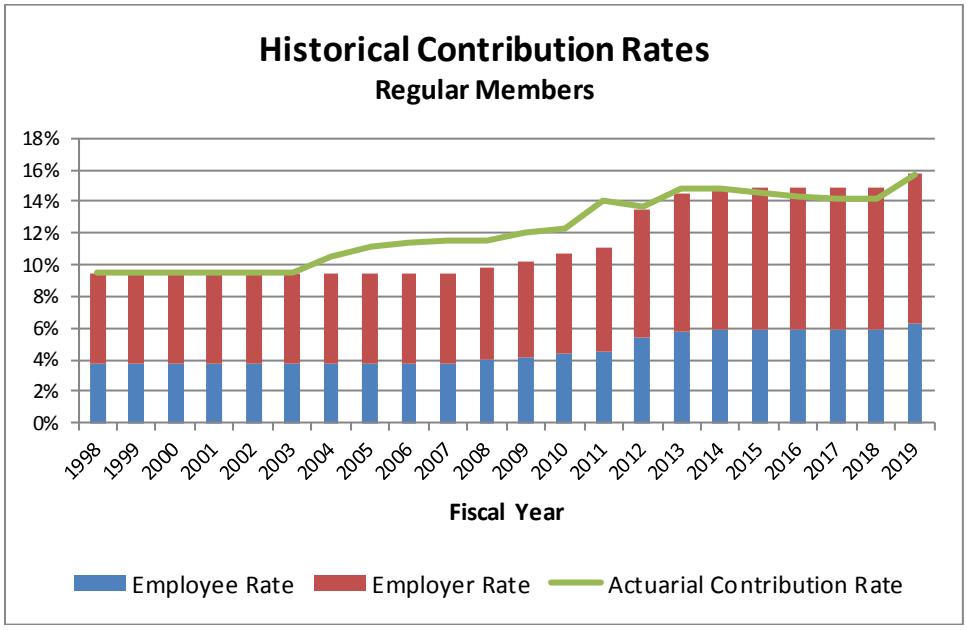
Under the actuarial funding method described in Appendix C, the actuarial contribution rate consists of two elements:

(1) the normal cost rate and
(2) the contribution rate to amortize the unfunded actuarial liability as a level percent of payroll.

The unfunded actuarial liability represents the difference between the portion of the present value of future benefits allocated to service credited prior to the valuation date by the actuarial cost method and the actuarial value of assets as of that date.

In 2006 and 2010, legislation was passed that increased the statutory contribution rate for Regular members. Beginning with the 2011 valuation (applicable for contributions for FY 2013), the Investment Board was given the authority to set the Required Contribution Rate for Regular members subject to certain statutory limitations. A historical summary of the actual contribution rate and the actuarial contribution rate is shown in the graph below:



Effective with the June 30, 2008 valuation, a transfer of assets is performed on June 30th for all split service members (those members with service in more than one membership group) whose membership group changed since the prior valuation. In addition, IPERS also transfers assets for certain split service members who have not changed groups since the last valuation. As a result, all assets and liabilities for each member reside in their current membership group. When members move between membership groups, an asset transfer for valuation purposes is made based on the funded ratio of their former group prior to the transfer. The asset transfer calculation is determined by multiplying the actuarial liability of the members transferring by the funded ratio of their former group just prior to the transfer. The asset values after the transfers and the liabilities for the members reside in their current membership group and are used to prepare the final valuation results.

EXHIBIT 10

ACTUARIAL BALANCE SHEET
as of June 30, 2017

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
ASSETS				
Actuarial value of assets	$28,292,788,895	$642,509,070	$1,537,125,949	$30,472,423,914
Present value of future normal costs	6,527,041,429	164,631,493	552,591,031	7,244,263,953
Present value of future contributions to amortize unfunded actuarial liability	6,884,161,682	48,696,682	35,099,751	6,967,958,115
Total Net Assets	$41,703,992,006	$855,837,245	$2,124,816,731	$44,684,645,982
LIABILITIES				
Present Value of Future Benefits:				
Retired Members and Beneficiaries	$18,304,044,337	$325,186,602	$705,541,965	$19,334,772,904
Active Members	22,617,509,856	520,369,194	1,376,738,899	24,514,617,949
Inactive Members	782,437,813	10,281,449	42,535,867	835,255,129
Total Liabilities	$41,703,992,006	$855,837,245	$2,124,816,731	$44,684,645,982

EXHIBIT 11

PROJECTED UNFUNDED ACTUARIAL LIABILITY ON JUNE 30, 2018

	Regular Membership	Sheriffs & Deputies	Protection Occupation
1. FYE 2018 Required Contribution Rate	14.88%	18.76%	16.40%
2. Normal Cost Rate	10.40%	16.85%	16.31%
3. Contribution Rate Applied to Fund the UAL for FYE 2018 (1) - (2)	4.48%	1.91%	0.09%
4. Unfunded Actuarial Liability/(Surplus) on June 30, 2017	$ 6,884,161,682	$ 48,696,682	$ 35,099,751
5. Expected Payroll for FYE 2018	$ 7,701,616,677	$ 113,895,727	$ 362,081,398
6. Projected UAL on June 30, 2018 [(4) x 1.07] - [(3) x (5) x $1.07^{.5}$]	$ 7,009,148,682	$ 49,855,190	$ 37,219,648

EXHIBIT 12

UAL AMORTIZATION BASES
REGULAR MEMBERS

Amortization Bases	Original Amount	Remaining Payments	Projected July 1, 2018 Balance	Annual Payment*
2014 Initial UAL	$ 5,592,056,086	27	$ 5,903,858,164	$ 346,133,491
2015 Experience	(193,648,198)	18	(194,178,387)	(14,856,048)
2016 Experience	21,763,596	19	21,822,640	1,607,050
2017 Experience	(158,062,524)	20	(158,062,524)	(11,233,898)
2017 Assumption Changes	1,435,708,789	20	1,435,708,789	102,039,403
Total			**$ 7,009,148,682**	**$ 423,689,998**

* Payment amount reflects mid-year timing.

1. Total UAL Amortization Payments	$	423,689,998
2. Projected Payroll for FYE 2018	$	7,701,616,677
3. Projected Payroll for FYE 2019 (2) x 1.0325	$	7,951,919,219
4. UAL Amortization Payment Rate (1) / (3)		5.33%

Note: Based on the Actuarial Amortization Method, adopted by the Investment Board, annual net experience gains/losses are amortized over a new, closed 20-year period.

EXHIBIT 13

UAL AMORTIZATION BASES
SHERIFFS & DEPUTIES

Amortization Bases	Original Amount	Remaining Payments	Projected July 1, 2018 Balance	Annual Payment*
2014 Initial UAL	$ 27,848,921	27	$ 29,401,722	$ 1,723,775
2015 Experience	(6,576,758)	18	(6,594,765)	(504,547)
2016 Experience	(1,325,410)	19	(1,329,006)	(97,870)
2017 Experience	(1,155,794)	20	(1,155,794)	(82,145)
2017 Assumption Changes	29,533,033	20	29,533,033	2,098,986
Total			**$ 49,855,190**	**$ 3,138,199**

* Payment amount reflects mid-year timing.

1. Total UAL Amortization Payments	$	3,138,199
2. Projected Payroll for FYE 2018	$	113,895,727
3. Projected Payroll for FYE 2019 (2) x 1.0325	$	117,597,338
4. UAL Amortization Payment Rate (1) / (3)		2.67%

Note: Based on the Actuarial Amortization Method, adopted by the Investment Board, annual net experience gains/losses are amortized over a new, closed 20-year period.

EXHIBIT 14

UAL AMORTIZATION BASES
PROTECTION OCCUPATION

Amortization Bases	Original Amount	Remaining Payments	Projected July 1, 2018 Balance	Annual Payment*
2017 Initial UAL	$ 37,219,648	20	$ 37,219,648	$ 2,645,293
Total			**$ 37,219,648**	**$ 2,645,293**

* Payment amount reflects mid-year timing.

1. Total UAL Amortization Payments	$	2,645,293
2. Projected Payroll for FYE 2018	$	362,081,398
3. Projected Payroll for FYE 2019 (2) x 1.0325	$	373,849,043
4. UAL Amortization Payment Rate (1) / (3)		0.71%

Note: When going from an asset surplus to a deficit, the projected UAL becomes the initial UAL base and is amortized over a new, closed 20-year period.

EXHIBIT 15

ANALYSIS OF CONTRIBUTION RATE

The actuarial cost method used to determine the required level of annual contributions by the employees and the employers to support the expected benefits is the Entry Age Normal Cost Method. Under this method, the total cost is comprised of the normal cost rate and the unfunded actuarial liability payment. The payment to amortize the unfunded actuarial liability is determined as a level percentage of payroll, based on the Actuarial Amortization Method, adopted by the Investment Board. This method was revised by the Investment Board in September 2013 (see Appendix C). The contribution rate developed in this exhibit is based on the Funding Policy and the June 30, 2017 actuarial valuation and applies to the fiscal year beginning July 1, 2018 and ending June 30, 2019.

	Regular Membership	Sheriffs & Deputies	Protection Occupation
1. Normal Cost Rate	10.40%	16.85%	16.31%
2. UAL Contribution Rate for FY 2019	5.33%	2.67%	0.71%
3. Funded Ratio as of June 30, 2017	80.4%	93.0%	97.8%
Funded Ratio as of June 30, 2016	82.9%	96.4%	100.9%
Funded Ratio as of June 30, 2015	82.7%	96.0%	101.3%
4. UAL Contribution Rate Applicable for FY 2019 (2) if positive or if all years in (3) >=110%	5.33%	2.67%	0.71%
5. Actuarial Contribution Rate for FY 2019 (1) + (4)	15.73%	19.52%	17.02%
6. Required Contribution Rate for FY 2018	14.88%	18.76%	16.40%
7. Required Contribution Rate for FY 2019*	15.73%	19.52%	17.02%
Employer Contribution Rate	9.44%	9.76%	10.21%
Employee Contribution Rate	6.29%	9.76%	6.81%

* The Required Contribution Rate is the Actuarial Contribution Rate, but not more than 1% greater than the prior year's Required Contribution Rate for Regular Members, nor lower than the prior year's Required Contribution Rate unless the difference is at least 0.50% and the funded ratio is at least 95%, in which case the Required Contribution Rate is the prior year's Required Contribution Rate less 0.50% for all groups.

EXHIBIT 16

UNFUNDED ACTUARIAL LIABILITY AMORTIZATION SCHEDULE
REGULAR MEMBERS

This schedule illustrates the funding of the UAL over the remaining amortization period assuming all assumptions are met in the future (no experience gains or losses).

Fiscal Year Ending June 30	Projected Active Member Payroll	Unfunded Actuarial Liability (BOY)	Annual Contributions	
			Dollars	% of Payroll
	----------$ in millions----------			
2018	$7,702	$6,884	$312	4.01 %
2019	7,952	7,009	424	5.33
2020	8,210	7,061	438	5.33
2021	8,477	7,103	452	5.33
2022	8,753	7,133	467	5.33
2023	9,037	7,150	482	5.33
2024	9,331	7,152	497	5.33
2025	9,634	7,138	513	5.33
2026	9,947	7,106	530	5.33
2027	10,271	7,055	547	5.33
2028	10,604	6,983	565	5.33
2029	10,949	6,887	584	5.33
2030	11,305	6,766	603	5.33
2031	11,672	6,616	622	5.33
2032	12,052	6,436	642	5.33
2033	12,443	6,222	663	5.33
2034	12,848	5,971	685	5.33
2035	13,265	5,681	707	5.33
2036	13,696	5,347	730	5.33
2037	14,141	4,966	780	5.52
2038	14,601	4,507	803	5.50
2039	15,076	3,992	656	4.35
2040	15,566	3,593	678	4.35
2041	16,071	3,143	700	4.35
2042	16,594	2,639	723	4.35
2043	17,133	2,076	746	4.35
2044	17,690	1,450	770	4.35
2045	18,265	755	795	4.35
2046	18,858	0	0	0.00

SECTION V

HISTORICAL FUNDING AND OTHER INFORMATION

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

In the past, Governmental Accounting Standards Board (GASB) Statements No. 25, Financial Reporting for Defined Benefit Pension Plans, applied to the preparation of financial reports of pension plans for state and local governments. GASB 67, which is effective for fiscal years ending after June 15, 2014, replaces GASB 25 and represents a significant departure from the requirements of that older statement. GASB 25 was issued as a "funding friendly" statement that required pension plans to report items consistent with the results of the plan's actuarial valuations, as long as those valuations met certain parameters. GASB 67 separates accounting from funding by creating disclosure and reporting requirements that may or may not be consistent with the basis used for funding the System. A separate report that contains all of the information and exhibits of an actuarial nature that are necessary for the System's financial reporting under GASB 67 will be issued.

This section continues to report certain key actuarial metrics related to the historical funding of the System, many of which were formerly disclosed under GASB 25. This data provides a valuable long-term perspective of the System's funding and contribution practices. Additionally, we include some discussion and exhibits regarding the risks faced by the System.

EXHIBIT 17

SUMMARY OF VALUATION MEMBERSHIP

	June 30, 2017	June 30, 2016
Active Employees:		
Vested	98,675	99,694
Not yet vested	71,234	68,678
Total active employees	169,909	168,372
Retirees and beneficiaries currently receiving benefits*	117,508	114,240
Inactive vested members entitled to benefits but not yet receiving them	25,984	26,960
Inactive, nonvested members entitled to a refund of contributions**	41,971	39,887

* Retired/reemployed members are included in retiree counts, but not the active or inactive counts. Counts are 10,787 for 2017 and 10,608 for 2016.

** Includes deceased vested inactive members with employee contributions still held by the System.

EXHIBIT 18

SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date	Net Actuarial Value of Assets (a)	Actuarial Liability (AL) (b)	Unfunded AL (UAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (P/R) (c)	UAL as a Percentage of Covered P/R [(b-a)/c]
6/30/03	$16,120,476,011	$17,987,374,960	1,866,898,949	89.62%	$4,881,100,238	38.25%
6/30/04	16,951,942,539	19,128,410,606	2,176,468,067	88.62%	5,072,027,906	42.91%
6/30/05	17,951,490,071	20,240,098,667	2,288,608,596	88.69%	5,236,860,886	43.70%
6/30/06	19,144,036,519	21,651,122,419	2,507,085,900	88.42%	5,523,863,321	45.39%
6/30/07	20,759,628,415	23,026,113,782	2,266,485,367	90.16%	5,781,706,199	39.20%
6/30/08	21,857,423,183	24,522,216,589	2,664,793,406	89.13%	6,131,445,367	43.46%
6/30/09	21,123,979,941	26,018,593,823	4,894,613,882	81.19%	6,438,643,124	76.02%
6/30/10	21,537,458,560	26,468,419,650	4,930,961,090	81.37%	6,571,182,005	75.04%
6/30/11	22,575,309,199	28,257,080,114	5,681,770,915	79.89%	6,574,872,719	86.42%
6/30/12	23,530,094,461	29,446,197,486	5,916,103,025	79.91%	6,786,158,720	87.18%
6/30/13	24,711,096,187	30,498,342,320	5,787,246,133	81.02%	6,880,131,134	84.12%
6/30/14	26,460,428,085	32,004,456,088	5,544,028,003	82.68%	7,099,277,280	78.09%
6/30/15	27,915,379,103	33,370,318,731	5,454,939,628	83.65%	7,326,348,141	74.46%
6/30/16	29,033,696,587	34,619,749,147	5,586,052,560	83.86%	7,556,515,720	73.92%
6/30/17	30,472,423,914	37,440,382,029	6,967,958,115	81.39%	7,863,160,443	88.62%

EXHIBIT 19

SCHEDULE OF EMPLOYER CONTRIBUTIONS

The Employer Actuarial Contribution Rate (ACR) is determined as a rate of pay as part of the annual valuation. The dollar amounts displayed in this table are based on analysis by IPERS each year to consider the actual contributions received (using the actual contribution rate in effect) and then determining what the ACR amount would have been on the same payroll.

	Actuarial Contribution Rate (ACR)				Percentage of ACR Contributed			
Fiscal Year Ending	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
6/30/03	$270,363,338	$5,670,239	$13,738,478	$289,772,054	99.2%	100.0%	100.0%	99.2%
6/30/04	309,006,609	5,489,797	14,263,836	328,760,242	90.3%	100.0%	100.0%	90.9%
6/30/05	341,552,685	6,236,611	15,391,729	363,181,025	84.7%	100.0%	100.0%	85.6%
6/30/06	364,424,911	6,228,675	16,888,833	387,542,419	82.7%	100.0%	100.0%	83.8%
6/30/07	387,578,925	6,577,652	17,723,013	411,879,590	82.2%	100.0%	100.0%	83.3%
6/30/08	408,882,080	6,301,171	17,644,966	432,828,217	96.4%	100.0%	100.0%	87.2%
6/30/09	441,951,764	6,365,911	24,736,688	473,054,363	86.9%	100.0%	100.0%	87.8%
6/30/10	467,839,274	6,725,778	27,328,184	501,893,236	88.7%	100.0%	100.0%	89.5%
6/30/11	530,692,453	7,994,058	29,711,050	568,397,561	81.1%	100.0%	100.0%	82.3%
6/30/12	528,525,785	8,999,273	30,864,449	568,389,507	98.1%	100.0%	100.0%	98.2%
6/30/13	573,480,969	9,246,766	32,118,873	614,846,608	97.8%	100.0%	100.0%	98.0%
6/30/14	596,983,323	9,583,512	32,434,713	639,001,548	100.0%	100.0%	100.0%	100.0%
6/30/15	602,423,393	9,588,844	32,548,775	644,561,012	102.1%	102.4%	101.7%	101.9%
6/30/16	618,051,508	9,427,481	32,612,466	660,091,455	103.7%	110.4%	102.2%	103.7%
6/30/17	628,387,062	9,507,927	33,623,646	671,518,635	105.0%	110.1%	102.4%	105.0%

EXHIBIT 20

EXPECTED BENEFIT PAYMENTS

The following table shows the expected benefit payments to be made over the next 20 years. These payments include those expected to be made to current retirees and beneficiaries, current active members, and current deferred vested members (included in the active values) if all actuarial assumptions are met in future years. The benefits reflected include expected refunds and death benefits as well as retirement benefit payments.

These payouts do not include any current non-vested inactive members, any future members, or any FED payments.

Fiscal Year End	Actives at 6/30/17	Retirees at 6/30/17	Total
2018	$ 175,241,000	$ 1,944,517,000	$ 2,119,758,000
2019	326,296,000	1,911,173,000	2,237,469,000
2020	475,873,000	1,876,443,000	2,352,316,000
2021	620,224,000	1,839,524,000	2,459,748,000
2022	761,254,000	1,800,983,000	2,562,237,000
2023	900,617,000	1,760,483,000	2,661,100,000
2024	1,037,260,000	1,718,117,000	2,755,377,000
2025	1,174,975,000	1,673,701,000	2,848,676,000
2026	1,312,721,000	1,627,425,000	2,940,146,000
2027	1,450,224,000	1,579,161,000	3,029,385,000
2028	1,587,340,000	1,529,230,000	3,116,570,000
2029	1,724,268,000	1,477,869,000	3,202,137,000
2030	1,860,521,000	1,424,643,000	3,285,164,000
2031	1,996,210,000	1,369,588,000	3,365,798,000
2032	2,131,241,000	1,312,743,000	3,443,984,000
2033	2,268,025,000	1,254,179,000	3,522,204,000
2034	2,404,286,000	1,194,011,000	3,598,297,000
2035	2,538,701,000	1,132,373,000	3,671,074,000
2036	2,669,985,000	1,069,415,000	3,739,400,000
2037	2,802,606,000	1,005,342,000	3,807,948,000

Note: Cash flows are the expected future non-discounted payments to current members. These numbers exclude refund payouts to current non-vested inactives and assume future retirees elect the normal form of annuity payment (Option 2) and future withdrawals elect refunds according to valuation assumptions.

RISK CONSIDERATIONS

While actuarial assumptions allow for a projection of how future contributions and investment returns will meet the cash flow needs for future benefit payments, actual experience will not unfold exactly as anticipated by the assumptions. In this section, we discuss some of the risk factors that can have a significant impact – good or bad – on the actuarial projection of liability and contribution rates.

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

- economic risks, such as investment return and inflation;
- demographic risks such as mortality, payroll growth, aging population including impact of baby boomers, and retirement ages; and
- external risks such as the regulatory and political environment.

The most significant risk factor is investment return because of the volatility of returns and the size of plan assets compared to payroll (see Exhibit 20). A perusal of historical rates over 10-20 years reveals that the actual return each year is rarely close to the average return for the same period. This is an expected result given the underlying capital market assumptions and the asset allocation.

A key demographic risk for all retirement systems, including IPERS, is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions reflect small, continuous improvements in mortality experience and these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities, Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, would also be significant, although more easily absorbed.

Finally, the projections for funding anticipate a stable employment level, i.e., active member count remains the same. A significant change in the employment level of governmental employees, perhaps resulting from a sustained decline in the Iowa population over time, could have an adverse impact on the System's funding status.

As a plan matures and the funded status changes, the risk factors may change. The following three exhibits summarize some historical information that helps indicate how certain key risk metrics have changed over time.

EXHIBIT 21

HISTORICAL LEVERAGE RATIO

As a retirement system matures, the size of the market value of assets increases relative to the covered payroll of active members, on which the System is funded. The size of the plan assets relative to covered payroll, sometimes referred to as a leverage ratio, is an important indicator of the contribution risk for the System. The higher this ratio, the more sensitive a plan's contribution rate is to investment return volatility. In the June 30, 2017 valuation, the asset leverage ratio was 3.91. So, for example, if the actual return on the market value of assets was 10% lower than expected (not unexpected given the 10-11% standard deviation of the IPERS portfolio), it would translate to 39.1% of payroll. If this were to occur, the full impact would not be reflected immediately in the contribution rate. Both the asset smoothing method and the amortization policy of paying off increases in the UAL over 20-years would mitigate the impact in the first year. However, if the entire loss flowed through the smoothing method (no actuarial gains to offset the losses) there would be additional increases in the actuarial contribution rate. The full impact of the 10% lower return would be about 2.75% of payroll. This ratio tends to grow over time as plans mature and also become better funded, so this is an important metric to monitor over time.

Fiscal Year End	Market Value of Assets	Covered Payroll	Leverage Ratio
6/30/07	$22,624,387,015	$5,781,706,199	3.91
6/30/08	21,844,112,206	6,131,445,367	3.56
6/30/09	17,603,316,618	6,438,643,124	2.73
6/30/10	19,538,971,423	6,571,182,005	2.97
6/30/11	22,772,344,651	6,574,872,719	3.46
6/30/12	23,024,773,746	6,786,158,720	3.39
6/30/13	24,756,663,715	6,880,131,134	3.60
6/30/14	28,038,549,893	7,099,277,280	3.95
6/30/15	28,429,834,829	7,326,348,141	3.88
6/30/16	28,326,433,656	7,556,515,720	3.75
6/30/17	30,779,116,326	7,863,160,443	3.91

EXHIBIT 22

HISTORICAL CASH FLOWS

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments and expenses. If the System has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of MVA that causes significant concerns. While this is not a concern for IPERS at this time, it is important to monitor this metric so that any trends can be identified.

Fiscal Year End	Market Value of Assets (MVA)	Contributions	Benefit Payments and Expenses	Net Cash Flow	Net Cash Flow as a Percent of MVA
6/30/07	$22,624,387,015	$574,604,219	$1,066,549,966	($491,945,747)	(2.17%)
6/30/08	21,844,112,206	634,189,547	1,120,978,091	(486,788,544)	(2.23%)
6/30/09	17,603,316,618	695,559,397	1,191,706,184	(496,146,787)	(2.82%)
6/30/10	19,538,971,423	755,210,092	1,283,181,315	(527,971,223)	(2.70%)
6/30/11	22,772,344,651	789,353,899	1,460,600,613	(671,246,714)	(2.95%)
6/30/12	23,024,773,746	942,394,013	1,554,642,740	(612,248,727)	(2.66%)
6/30/13	24,756,663,715	1,019,108,941	1,661,824,635	(642,715,694)	(2.60%)
6/30/14	28,038,549,893	1,082,521,228	1,768,869,433	(686,348,205)	(2.45%)
6/30/15	28,429,834,829	1,115,600,029	1,882,337,766	(766,737,737)	(2.70%)
6/30/16	28,326,433,656	1,176,666,912	1,965,566,274	(788,899,362)	(2.79%)
6/30/17	30,779,116,326	1,182,392,100	2,077,514,238	(895,122,138)	(2.91%)

EXHIBIT 23

LIABILITY MATURITY MEASUREMENTS

Most public sector retirement systems have been in operation for many years. As a result, they have aging plan populations indicated by an increasing ratio of retirees to active members and a growing percentage of retiree liability. The retirement of the baby boomers over the next 10-15 years is expected to further exacerbate the aging of the retirement system population. With more of the total liability residing with retirees, investment volatility has a greater impact on the funding of the system since it is more difficult to restore the system financially after losses occur when there is comparatively less payroll over which to spread costs.

The retirement system is also growing larger with respect to the sponsoring entities, as can be seen by the ratio of actuarial liability to payroll.

Projections provide the most effective way of analyzing the impact of these changes on future funding measures, but studying several key metrics from the valuation can also provide some valuable insight.

Fiscal Year End	Retiree Liability (a)	Total Actuarial Liability (b)	Retiree Percentage (a) / (b)	Covered Payroll (c)	Ratio (b) / (c)
6/30/07	$9,217,242,773	$23,026,113,782	40.0%	$5,781,706,199	3.98
6/30/08	9,922,758,244	24,522,216,589	40.5%	6,131,445,367	4.00
6/30/09	10,623,480,763	26,018,593,823	40.8%	6,438,643,124	4.04
6/30/10	11,769,870,329	26,468,419,650	44.5%	6,571,182,005	4.03
6/30/11	13,252,276,665	28,257,080,114	46.9%	6,574,872,719	4.30
6/30/12	14,151,967,558	29,446,197,486	48.1%	6,786,158,720	4.34
6/30/13	15,000,576,427	30,498,342,320	49.2%	6,880,131,134	4.43
6/30/14	15,974,726,784	32,004,456,088	49.9%	7,099,277,280	4.51
6/30/15	16,843,177,973	33,370,318,731	50.5%	7,326,348,141	4.55
6/30/16	17,657,404,813	34,619,749,147	51.0%	7,556,515,720	4.58
6/30/17	19,334,772,904	37,440,382,029	51.6%	7,863,160,443	4.76

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APPENDIX A

SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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APPENDIX A

SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

TABLE OF CONTENTS

RECONCILIATION OF ACTIVE MEMBERS

Below is a summary of the changes in active members (excluding retired re-employed members) between June 30, 2016 and June 30, 2017.

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
6/30/2016 Starting count	159,782	1,598	6,992	168,372
New actives	16,215	60	625	16,900
Returning actives	2,712	7	94	2,813
Nonvested Terminations	(6,748)	(7)	(199)	(6,954)
Elected Refund	(2,856)	(10)	(175)	(3,041)
Vested Terminations	(2,383)	(15)	(168)	(2,566)
Total Withdrawals	(11,987)	(32)	(542)	(12,561)
Deaths	(176)	(3)	(9)	(188)
Disability Retirements	(82)	(1)	(12)	(95)
AE Benefits	(204)	0	(1)	(205)
Service Retirements	(4,696)	(63)	(196)	(4,955)
Total Retirements	(4,982)	(64)	(209)	(5,255)
Other/transfer	(249)	28	49	(172)
6/30/2017 Ending count	161,315	1,594	7,000	169,909

HISTORICAL SUMMARY OF MEMBERS

The following table displays selected historical data (including Regular, Sheriffs and Deputies, and Protection Occupation groups) as available.

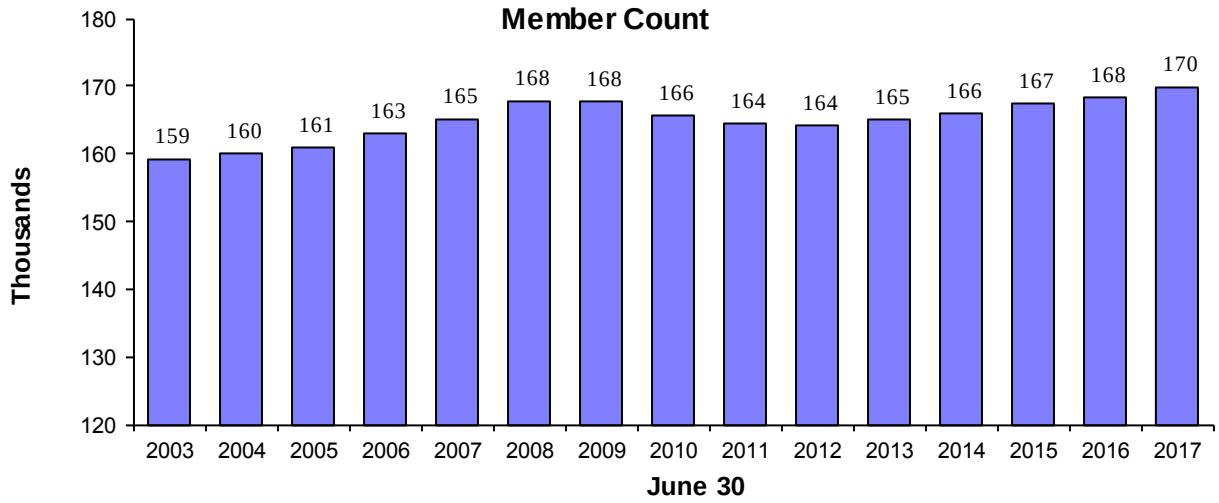
Valuation Date June 30	Total Count	Number	Average					Number			Active/Retired Ratio
			Age	Entry Age	Service	Annual Pay ($)	% Change	Retired Reemployed	Inactive Vested	Retired	
1993	211,862	136,409	43.9			22,604	0.4%			54,212	2.52
1994	216,989	141,423	44.2			22,968	1.6%			54,295	2.60
1995	216,973	144,912	44.1			23,322	1.5%			56,353	2.57
1996	221,891	147,431	44.2			25,218	8.1%			57,914	2.55
1997	224,357	147,736	44.6	33.1	11.5	26,031	3.2%		28,377	59,320	2.49
1998	241,767	148,917	44.7	33.2	11.5	26,767	2.8%		31,202	61,648	2.42
1999	250,168	152,440	44.8	33.4	11.4	27,322	2.1%	4,853	34,332	63,396	2.40
2000	249,970	153,039	44.8	33.2	11.6	29,032	6.3%	5,050	31,219	65,712	2.33
2001	255,963	154,610	45.0	33.5	11.5	30,341	4.5%	4,886	32,650	68,703	2.25
2002	264,974	158,467	45.1	33.8	11.3	32,119	5.9%	5,387	34,792	71,715	2.21
2003	268,813	159,310	45.2	33.8	11.4	31,950	-0.5%	6,126	35,375	74,128	2.15
2004	272,573	160,003	45.4	33.8	11.6	33,082	3.5%	6,438	35,788	76,782	2.08
2005	267,214	160,876	45.6	33.8	11.8	34,066	3.0%	6,592	26,919	79,419	2.03
2006	271,007	163,052	45.7	34.0	11.7	35,475	4.1%	8,044	25,918	82,037	1.99
2007	276,421	165,216	45.7	34.0	11.7	36,615	3.2%	7,848	26,435	84,770	1.95
2008	282,778	167,823	45.7	34.1	11.6	38,515	5.2%	8,523	27,626	87,309	1.92
2009	294,076	167,691	46.0	34.2	11.8	40,326	4.7%	8,427	28,240	89,718	1.87
2010	287,611	165,626	46.0	34.1	11.9	40,635	0.8%	8,347	28,472	93,513	1.77
2011	291,825	164,436	45.8	34.1	11.7	40,782	0.4%	8,321	29,077	98,312	1.67
2012	294,996	164,200	45.8	34.2	11.6	42,223	3.5%	8,265	29,119	101,677	1.61
2013	299,793	165,095	45.7	34.1	11.6	42,404	0.4%	9,925	28,443	104,640	1.58
2014	302,558	165,911	45.7	34.1	11.6	44,225	4.3%	9,931	28,713	107,934	1.54
2015	306,154	167,368	45.6	34.1	11.5	45,247	2.3%	10,295	27,659	111,127	1.51
2016	309,572	168,372	45.5	34.0	11.5	46,399	2.5%	10,608	26,960	114,240	1.47
2017	313,401	169,909	45.4	34.1	11.3	47,425	2.2%	10,787	25,984	117,508	1.45

Note: The Total Count figure represents the number of members valued in this report. The Retired Reemployed figure represents the number of members who have both an in-pay record and a not-in-pay record.

SUMMARY OF ACTIVE MEMBERS

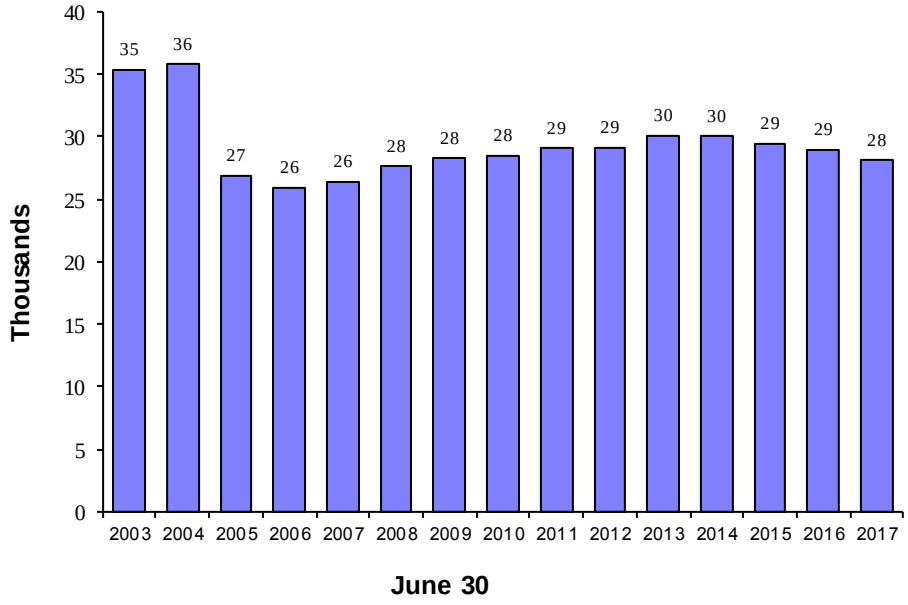
	Regular Membership	Sheriffs & Deputies	Protection Occupations	Total 6/30/2017	Total 6/30/2016	Percent Change
Total Active Members	161,315	1,594	7,000	169,909	168,372	0.9
Projected Covered Payroll* (millions)	$7,587	$112	$359	$8,058	$7,812	3.1
Average Age	45.6	40.9	41.8	45.4	45.5	(0.2)
Average Entry Age	34.3	26.5	30.7	34.1	34.0	0.3
Average Earnings	$47,030	$70,233	$51,337	$47,425	$46,399	2.2
Retired Reemployed	8,396	111	166	8,673	8,627	0.5

*Payroll figures as of June 30 are actual amounts paid during the prior fiscal year, increased by the assumed salary increase factor for the upcoming fiscal year.



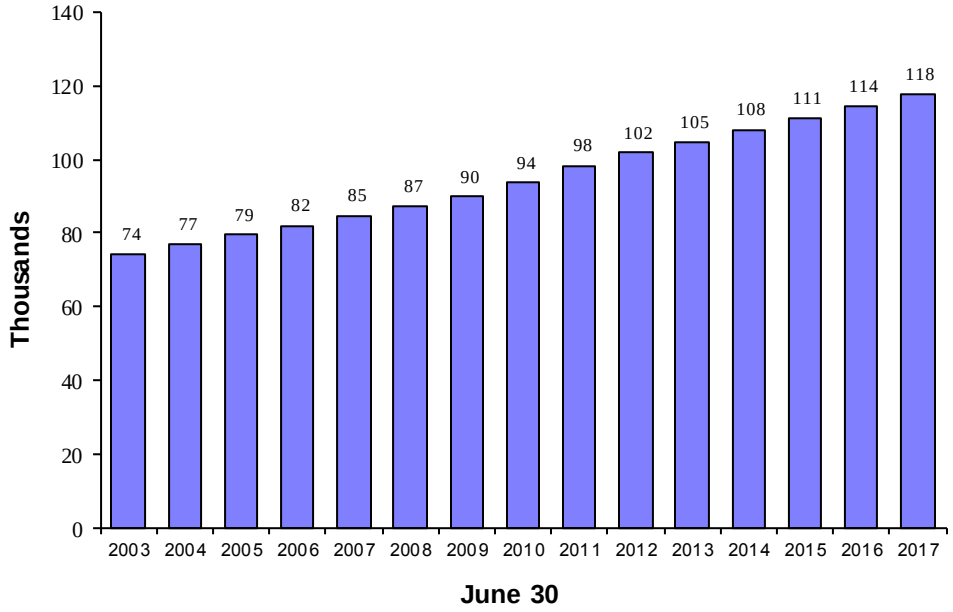
SUMMARY OF INACTIVE VESTED MEMBERS

	Regular Membership	Sheriffs & Deputies	Protection Occupations	Total 6/30/2017	Total 6/30/2016	Percent Change
Inactive Vested	25,002	96	886	25,984	26,960	(3.6%)
Inactive Retired Reemployed	2,052	18	44	2,114	1,981	6.7%
Total Inactive Vested	27,054	114	930	28,098	28,941	(2.9%)



SUMMARY OF RETIRED MEMBERS AND BENEFICIARIES

Regular Membership	Sheriffs & Deputies	Protection Occupations	Total 6/30/2017	Total 6/30/2016	Percent Change
113,830	957	2,721	117,508	114,240	2.9%



AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2017 FOR ACTIVE MEMBERS*

Males and Females - Regular Membership

Years of Service

	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary
Under 25	6,594	18,405	57	27,783	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	6,651	18,485
25-29	11,330	32,774	2,971	42,550	46	36,463	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	14,347	34,810
30-34	7,405	34,761	6,608	48,548	2,191	53,879	35	42,848	0	NA	0	NA	0	NA	0	NA	0	NA	16,239	42,968
35-39	6,721	33,115	4,569	47,957	5,808	58,480	1,697	61,309	12	52,476	0	NA	0	NA	0	NA	0	NA	18,807	47,111
40-44	5,475	30,978	3,858	44,481	3,304	55,771	4,384	65,117	1,128	68,324	12	55,486	0	NA	0	NA	0	NA	18,161	48,934
45-49	4,671	31,262	3,688	41,590	3,394	50,192	3,474	59,739	3,815	69,440	963	70,826	12	58,869	1	76,319	0	NA	20,018	50,514
50-54	3,835	30,380	3,131	38,474	3,314	43,766	3,375	51,130	2,730	61,095	3,039	70,496	1,101	69,417	34	61,893	0	NA	20,559	49,328
55-59	3,982	27,543	2,749	37,587	2,929	42,172	3,613	45,805	3,091	51,859	2,552	61,936	2,546	71,955	1,072	66,171	57	59,773	22,591	47,714
60-64	4,074	20,410	2,435	33,037	1,982	39,820	2,387	44,983	2,240	49,328	1,851	55,413	1,154	64,513	1,054	69,450	529	64,808	17,706	42,070
65-69	3,221	13,499	1,848	21,303	951	30,519	791	40,645	610	45,946	466	50,211	271	59,916	202	65,779	269	73,647	8,629	28,367
70 & over	3,160	15,631	1,597	14,188	797	12,962	278	16,666	79	27,197	39	42,901	19	52,974	9	41,747	25	54,981	6,003	15,591
Totals	60,468	27,957	33,511	40,559	24,716	48,586	20,034	53,947	13,705	59,129	8,922	63,753	5,103	68,983	2,372	67,445	880	66,904	169,711	42,904

*Including retired/reemployed members

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2017 FOR ACTIVE MEMBERS*

Males and Females - Sheriffs and Deputies

Years of Service

	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary
Under 25	50	44,418	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	50	44,418
25-29	127	52,060	63	61,634	2	65,149	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	192	55,338
30-34	69	55,015	118	63,462	71	65,776	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	258	61,840
35-39	18	57,309	49	65,494	126	65,933	49	73,710	1	52,537	0	NA	0	NA	0	NA	0	NA	243	66,719
40-44	11	51,866	26	61,128	42	68,598	127	71,773	37	72,216	1	53,386	0	NA	0	NA	0	NA	244	69,187
45-49	12	53,176	18	64,779	35	66,405	66	70,759	106	74,782	32	73,419	0	NA	0	NA	0	NA	269	70,910
50-54	18	28,330	10	56,561	12	64,543	22	74,501	44	74,272	62	78,640	27	82,639	0	NA	0	NA	195	71,097
55-59	23	20,631	4	31,024	4	65,668	24	71,879	15	68,497	22	76,964	20	76,778	8	102,884	2	103,955	122	64,538
60-64	22	16,417	9	32,038	3	64,018	4	67,956	3	88,057	12	76,117	8	68,967	15	69,314	8	81,647	84	53,995
65-69	10	10,102	12	17,562	4	51,674	0	NA	0	NA	1	98,457	0	NA	0	NA	2	72,448	29	26,270
70 & over	8	11,775	1	18,520	9	14,202	1	21,645	0	NA	0	NA	0	NA	0	NA	0	NA	19	13,799
Totals	368	44,591	310	59,817	308	64,536	293	71,859	206	73,840	130	76,796	55	78,519	23	80,990	12	83,831	1,705	63,499

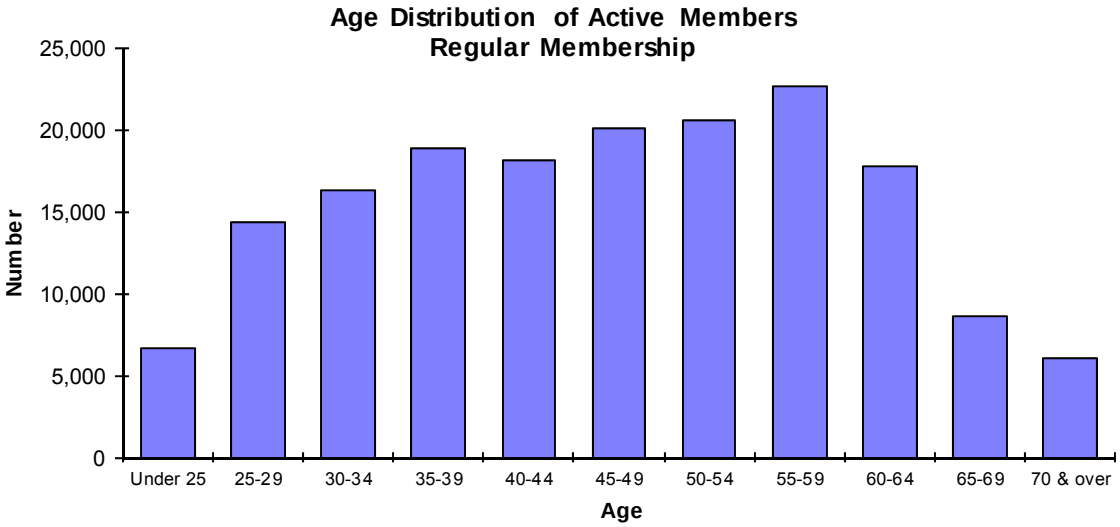
*Including retired/reemployed members

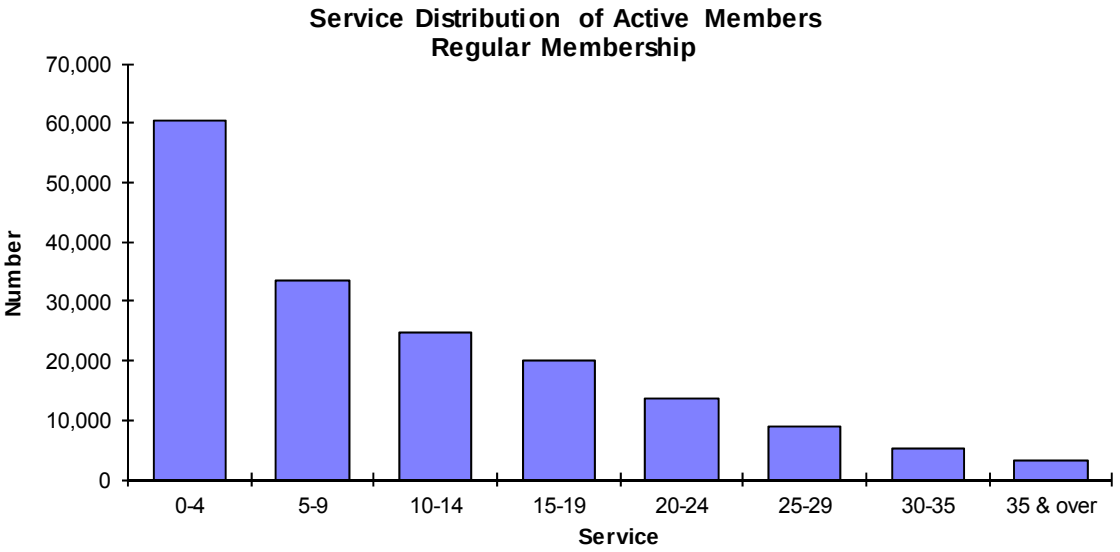
AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2017 FOR ACTIVE MEMBERS*

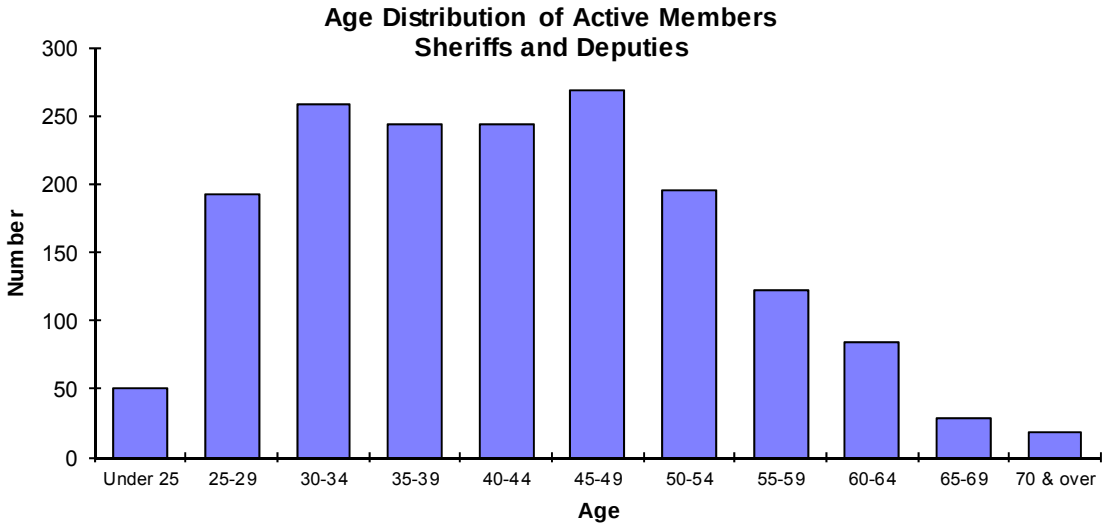
Males and Females - Protection Occupation

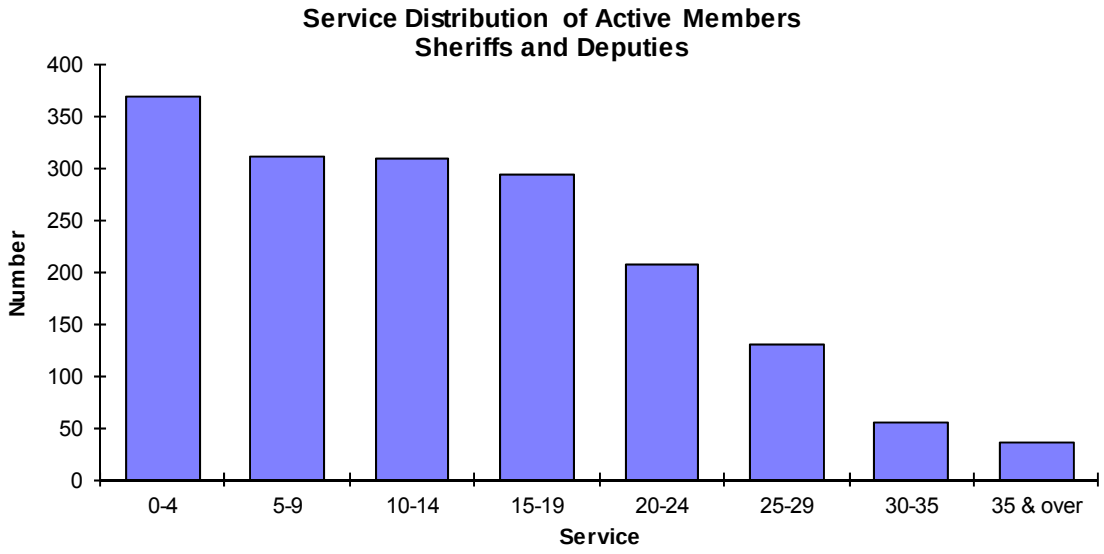
	Years of Service																			
	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary
Under 25	429	26,966	6	31,387	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	435	27,027
25-29	637	36,896	171	46,812	5	40,597	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	813	39,005
30-34	413	36,321	372	51,159	143	55,200	2	76,872	0	NA	0	NA	0	NA	0	NA	0	NA	930	45,247
35-39	259	35,344	251	49,113	313	59,003	117	58,102	6	51,539	0	NA	0	NA	0	NA	0	NA	946	49,743
40-44	182	34,860	186	45,830	190	57,216	245	59,766	82	58,595	1	80,964	0	NA	0	NA	0	NA	886	51,093
45-49	138	33,939	149	45,602	167	52,799	213	58,720	201	64,679	56	65,747	3	57,466	0	NA	0	NA	927	53,568
50-54	108	33,780	116	44,776	147	53,319	169	57,360	143	61,565	151	66,188	55	71,661	1	80,961	0	NA	890	55,275
55-59	95	31,153	78	44,787	107	47,949	141	55,291	100	58,272	70	64,607	88	65,571	39	71,299	0	NA	718	53,315
60-64	73	21,463	54	36,943	79	50,703	72	51,001	55	58,907	37	53,843	23	61,491	24	74,176	6	70,531	423	47,492
65-69	43	12,335	22	24,093	23	40,970	21	51,414	14	60,520	6	39,732	3	70,066	5	66,867	6	73,262	143	36,030
70 & over	28	22,496	19	14,252	4	17,677	1	12,500	3	16,374	0	NA	0	NA	0	NA	0	NA	55	18,782
Totals	2,405	33,093	1,424	46,597	1,178	54,533	981	57,447	604	61,062	321	63,895	172	66,909	69	72,118	12	71,897	7,166	47,625

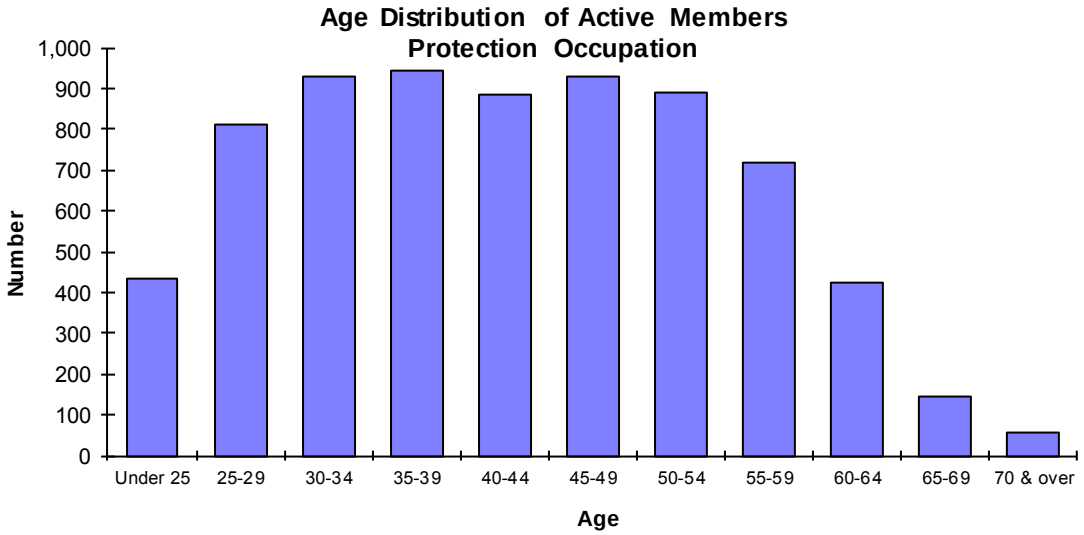
*Including retired/reemployed members

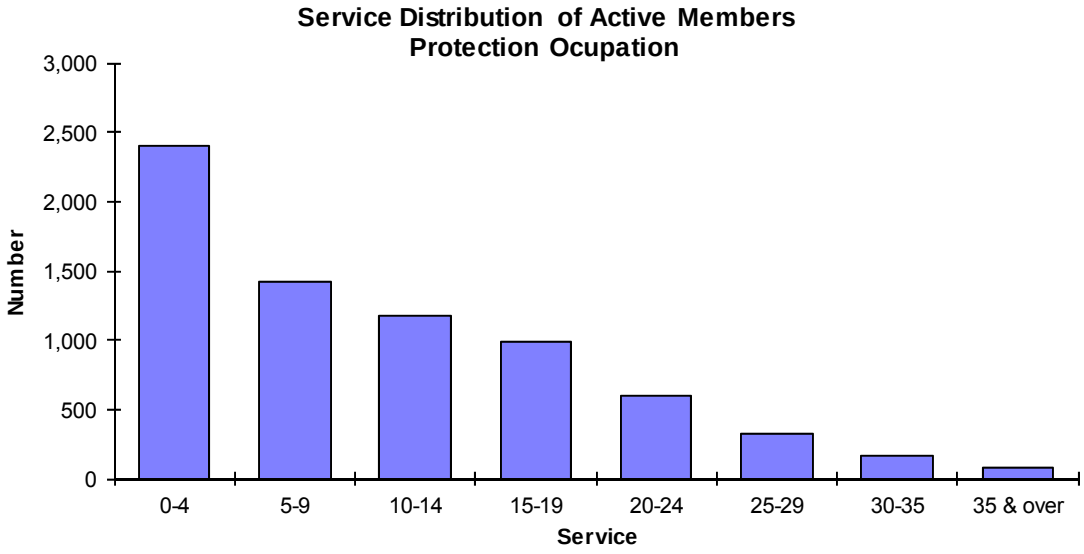

Age Distribution of Active Members
Regular Membership
25,000
20,000
15,000
10,000
5,000
0
Number
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Active Members
Regular Membership
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Number
0-4
5-9
10-14
15-19
20-24
25-29
30-35
35 & over
Service


Age Distribution of Active Members
Sheriffs and Deputies
Number
300
250
200
150
100
50
0
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Active Members
Sheriffs and Deputies
Number
400
350
300
250
200
150
100
50
0
0-4
5-9
10-14
15-19
20-24
25-29
30-35
35 & over
Service


Age Distribution of Active Members
Protection Occupation
Number
1,000
900
800
700
600
500
400
300
200
100
0
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Active Members
Protection Ocupation
Number
3,000
2,500
2,000
1,500
1,000
500
0
0-4
5-9
10-14
15-19
20-24
25-29
30-35
35 & over
Service

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2017 FOR INACTIVE VESTED MEMBERS*

Males and Females - Regular Membership

Years of Service

	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.
Under 25	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA
25-29	21	11,513	90	17,882	2	25,309	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	113	16,830
30-34	228	24,221	769	29,185	62	33,741	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	1,059	28,383
35-39	414	25,503	1,295	32,283	401	40,700	32	41,137	0	NA	0	NA	0	NA	0	NA	0	NA	2,142	32,680
40-44	356	23,851	1,288	29,930	513	39,435	165	45,142	13	46,051	0	NA	0	NA	0	NA	0	NA	2,335	32,256
45-49	416	24,062	1,535	25,992	741	33,168	321	44,478	98	49,395	11	57,355	0	NA	0	NA	0	NA	3,122	30,184
50-54	423	20,862	1,939	23,055	1,033	26,618	466	36,416	211	43,898	83	56,748	16	52,681	3	73,335	0	NA	4,174	27,080
55-59	519	17,295	2,071	20,016	1,109	24,298	550	29,341	231	34,398	92	43,943	22	51,602	1	55,049	0	NA	4,595	23,219
60-64	1,391	13,318	1,747	18,094	860	20,440	400	23,907	150	33,778	41	32,718	4	80,274	6	36,632	2	64,818	4,601	18,334
65-69	2,324	9,421	793	11,247	232	16,372	110	18,044	40	24,787	5	30,430	3	44,059	3	22,954	0	NA	3,510	10,810
70 & over	1,083	6,792	217	6,999	71	6,568	21	6,726	6	18,301	2	28,708	2	23,333	1	2,400	0	NA	1,403	6,913
Totals	7,175	13,993	11,744	23,204	5,024	27,778	2,065	32,851	749	38,472	234	46,730	47	52,725	14	40,436	2	64,818	27,054	23,037

*Including inactive retired/reemployed members

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2017 FOR INACTIVE VESTED MEMBERS*

Males and Females - Sheriffs and Deputies

Years of Service

	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.
Under 25	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA
25-29	0	NA	1	49,406	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	1	49,406
30-34	2	53,096	4	49,556	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	6	50,736
35-39	3	36,471	13	45,157	3	54,123	2	35,537	0	NA	0	NA	0	NA	0	NA	0	NA	21	44,281
40-44	4	42,883	9	44,707	10	42,743	4	56,933	0	NA	0	NA	0	NA	0	NA	0	NA	27	45,521
45-49	0	NA	4	31,497	5	47,940	2	58,539	5	61,420	1	50,216	1	69,423	0	NA	0	NA	18	50,528
50-54	2	25,353	5	42,342	4	46,651	4	52,148	1	59,539	1	69,929	0	NA	0	NA	0	NA	17	46,299
55-59	4	7,409	1	33,250	1	33,572	1	48,134	0	NA	0	NA	0	NA	0	NA	0	NA	7	20,656
60-64	6	12,423	5	33,796	0	NA	2	29,001	0	NA	0	NA	0	NA	0	NA	0	NA	13	23,194
65-69	3	6,324	1	7,095	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	4	6,517
70 & over	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA
Totals	24	23,375	43	41,490	23	45,638	15	48,707	6	61,107	2	60,073	1	69,423	0	NA	0	NA	114	41,066

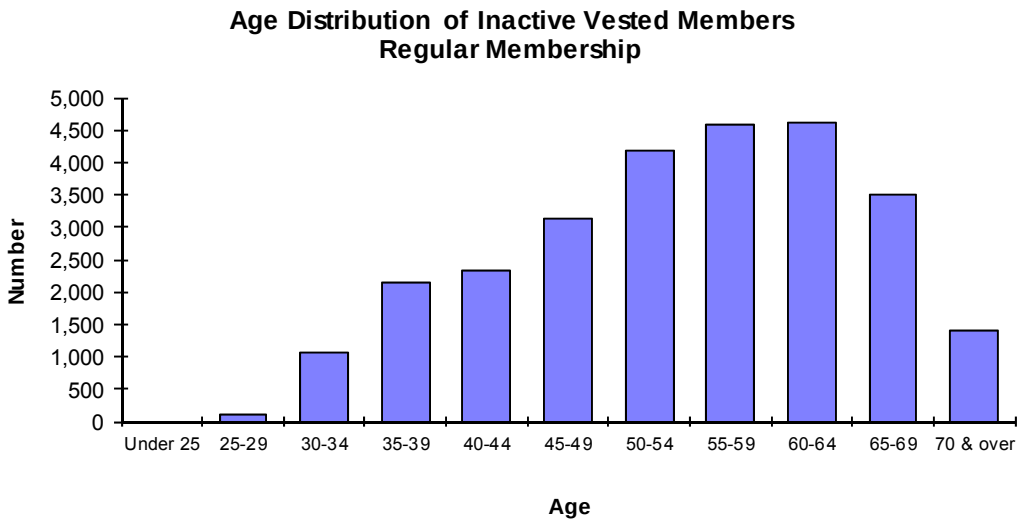
*Including inactive retired/reemployed members

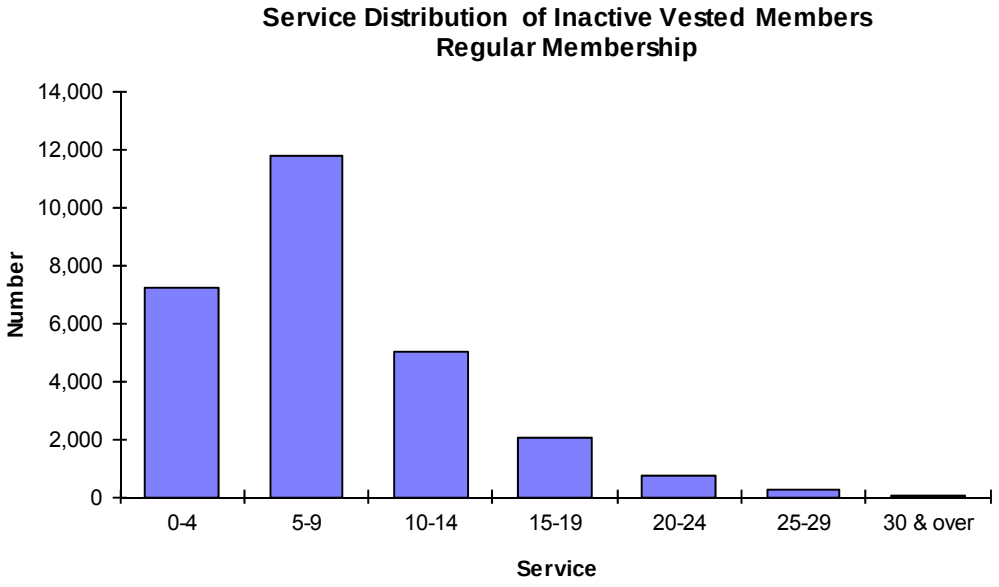
AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2017 FOR INACTIVE VESTED MEMBERS*

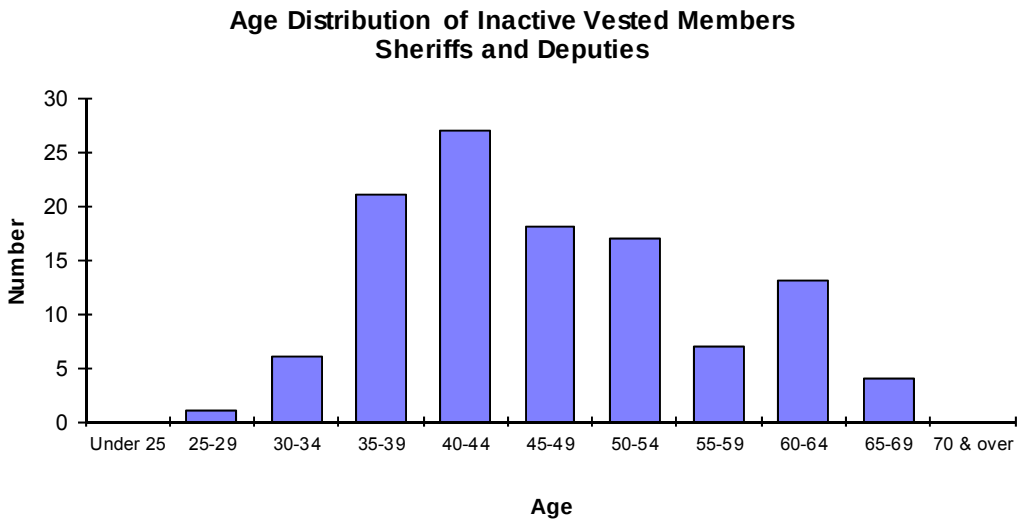
Males and Females - Protection Occupation

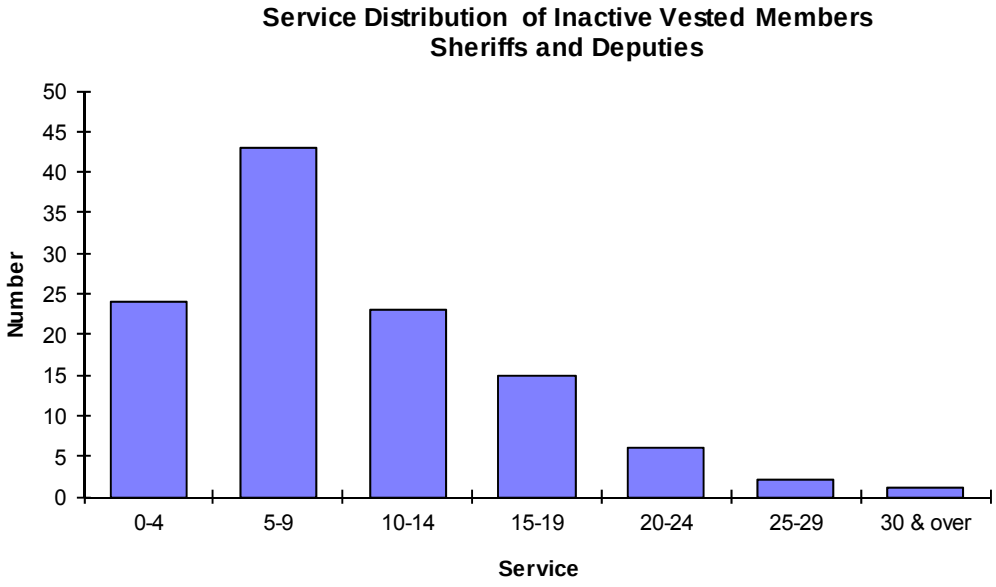
	Years of Service																			
	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.
Under 25	1	6,490	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	1	6,490
25-29	19	24,813	18	26,374	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	37	25,572
30-34	25	24,027	68	28,819	5	12,328	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	98	26,755
35-39	22	20,786	86	24,037	29	34,416	3	20,424	0	NA	0	NA	0	NA	0	NA	0	NA	140	25,599
40-44	12	26,441	61	22,145	31	29,925	15	38,274	2	66,435	0	NA	0	NA	0	NA	0	NA	121	27,296
45-49	10	19,940	68	18,916	41	22,163	13	41,654	12	43,181	3	51,837	0	NA	0	NA	0	NA	147	24,555
50-54	8	15,414	61	20,126	48	27,427	20	30,090	15	48,353	6	42,466	0	NA	0	NA	0	NA	158	26,895
55-59	25	11,705	39	14,614	17	11,885	12	31,019	2	17,633	2	54,721	4	38,468	0	NA	0	NA	101	17,182
60-64	46	8,879	20	11,837	3	1,946	6	15,198	3	12,658	1	824	1	43,608	0	NA	0	NA	80	10,308
65-69	22	9,189	10	3,747	4	17,332	3	3,201	0	NA	0	NA	0	NA	0	NA	0	NA	39	8,168
70 & over	6	12,048	2	20,716	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	8	14,215
Totals	196	16,079	433	21,367	178	25,223	72	31,274	34	42,634	12	43,381	5	39,496	0	NA	0	NA	930	22,917

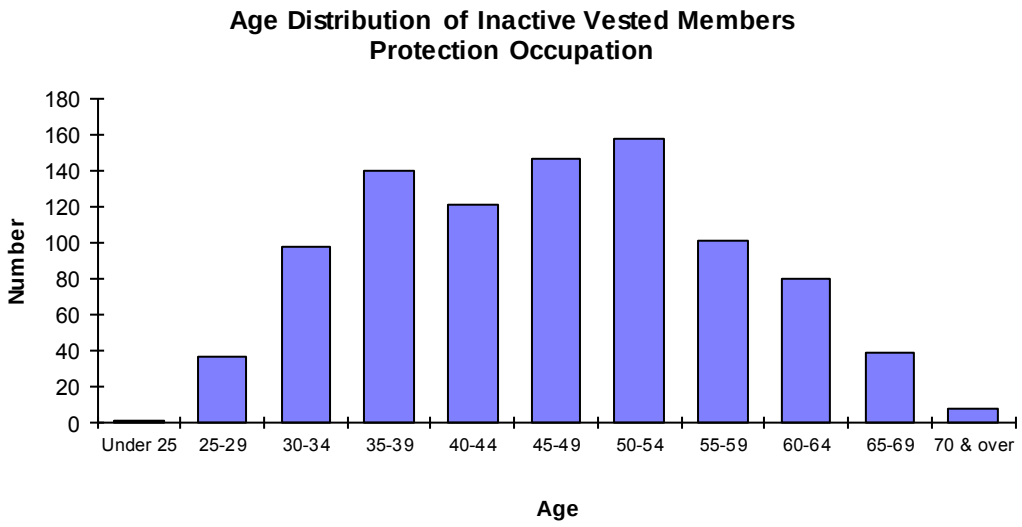
*Including inactive retired/reemployed members

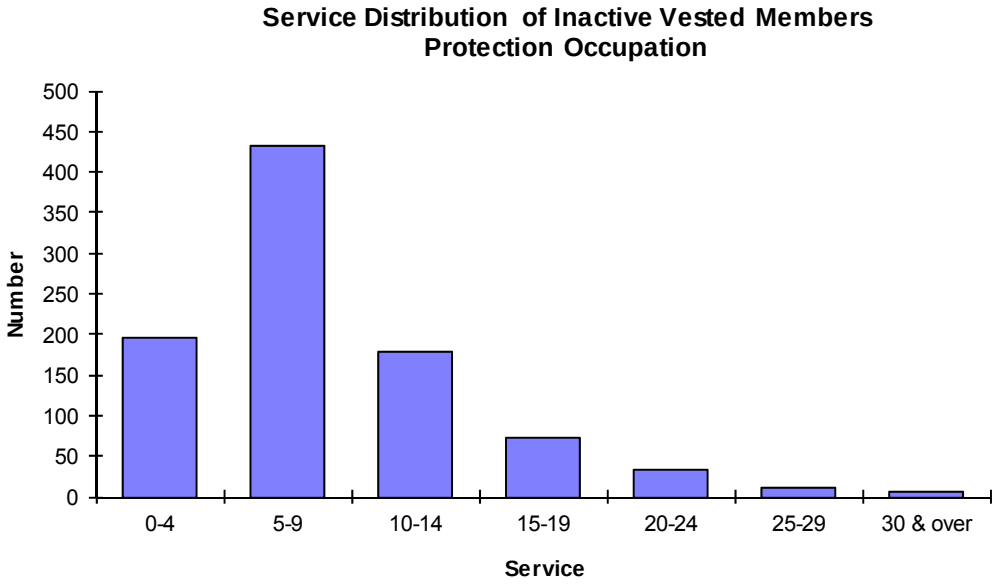

Age Distribution of Inactive Vested Members
Regular Membership
Number
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Inactive Vested Members
Regular Membership
Number
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
0-4
5-9
10-14
15-19
20-24
25-29
30 & over
Service


Age Distribution of Inactive Vested Members
Sheriffs and Deputies
Number
30
25
20
15
10
5
0
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Inactive Vested Members
Sheriffs and Deputies
Number
50
45
40
35
30
25
20
15
10
5
0
0-4
5-9
10-14
15-19
20-24
25-29
30 & over
Service


Age Distribution of Inactive Vested Members
Protection Occupation
Number
180
160
140
120
100
80
60
40
20
0
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Inactive Vested Members
Protection Occupation
Number
500
450
400
350
300
250
200
150
100
50
0
0-4
5-9
10-14
15-19
20-24
25-29
30 & over
Service

ANALYSIS OF RETIREES AND BENEFICIARIES

Males and Females - Regular Membership

	Number of Members and Beneficiaries									Average
Age	Option 1	Option 2	Option 3	Option 4	Contingent Beneficiary	Option 5	Option 6	Period Certain	Total	Annual Benefit
Under 40	4	2	6	0	43	0	7	6	68	$7,816
40 to 44	9	5	4	4	30	2	5	5	64	6,338
45 to 49	24	16	3	8	42	2	14	7	116	7,879
50 to 54	75	45	13	18	95	10	39	2	297	10,749
55 to 59	884	839	301	317	211	338	1,302	14	4,206	21,479
60 to 64	2,850	3,260	1,397	1,004	397	1,157	4,396	23	14,484	22,756
65 to 69	5,461	6,142	3,428	1,950	675	2,172	7,142	33	27,003	20,818
70 to 74	5,246	5,672	3,544	1,836	856	2,163	4,631	24	23,972	16,775
75 to 79	4,331	3,890	2,613	1,932	968	1,847	1,655	19	17,255	13,283
80 to 84	3,591	2,786	1,612	1,938	1,010	1,571	268	4	12,780	10,569
85 to 89	2,416	1,984	893	1,089	836	933	45	2	8,198	7,888
90 to 94	1,204	1,135	429	412	432	418	0	0	4,030	5,875
95 to 99	254	466	119	80	101	178	1	0	1,199	5,134
100 & up	8	93	14	5	9	29	0	0	158	4,291
Counts	26,357	26,335	14,376	10,593	5,705	10,820	19,505	139	113,830	$16,241
% of Total	23.2%	23.1%	12.6%	9.3%	5.0%	9.5%	17.1%	0.1%	100.0%	

ANALYSIS OF RETIREES AND BENEFICIARIES

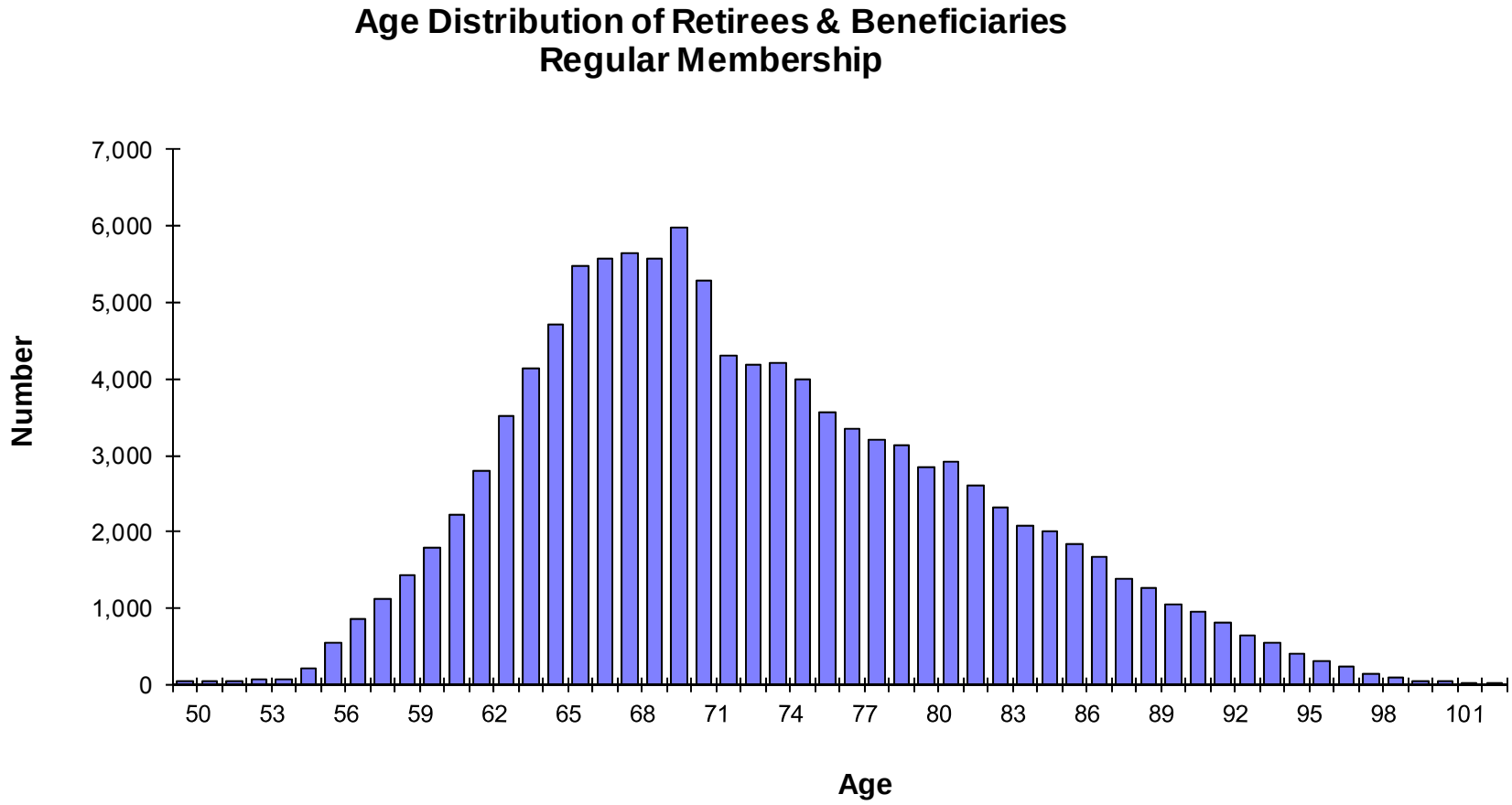
Males and Females - Sheriffs and Deputies

	Number of Members and Beneficiaries									Average
Age	Option 1	Option 2	Option 3	Option 4	Contingent Beneficiary	Option 5	Option 6	Period Certain	Total	Annual Benefit
Under 40	1	0	1	0	1	0	1	0	4	$23,619
40 to 44	0	0	0	0	2	0	1	0	3	16,163
45 to 49	3	0	0	1	1	0	0	0	5	31,599
50 to 54	13	12	2	15	2	4	29	0	77	41,859
55 to 59	24	12	11	28	5	4	50	0	134	39,842
60 to 64	34	29	18	43	14	14	66	0	218	36,861
65 to 69	41	31	11	34	7	10	94	1	229	33,137
70 to 74	31	11	12	24	14	6	38	0	136	25,906
75 to 79	17	8	4	24	11	5	6	0	75	22,290
80 to 84	16	4	3	17	7	3	4	0	54	15,057
85 to 89	1	2	2	4	8	0	0	0	17	11,291
90 to 94	1	1	0	1	2	0	0	0	5	8,006
95 to 99	0	0	0	0	0	0	0	0	0	NA
100 & up	0	0	0	0	0	0	0	0	0	NA
Counts	182	110	64	191	74	46	289	1	957	$32,108
% of Total	19.0%	11.5%	6.7%	20.0%	7.7%	4.8%	30.2%	0.1%	100.0%	

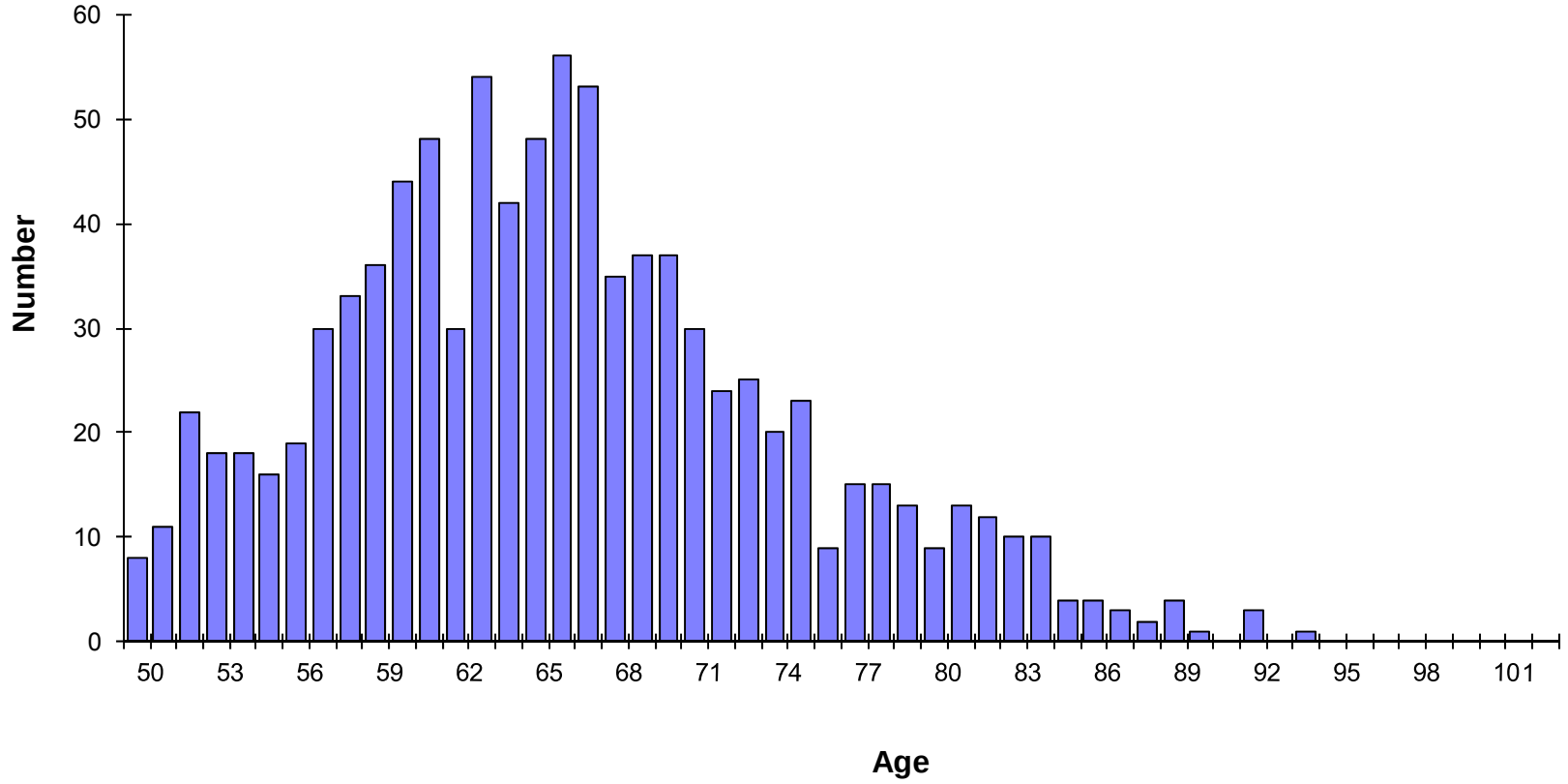
ANALYSIS OF RETIREES AND BENEFICIARIES

Males and Females - Protection Occupation

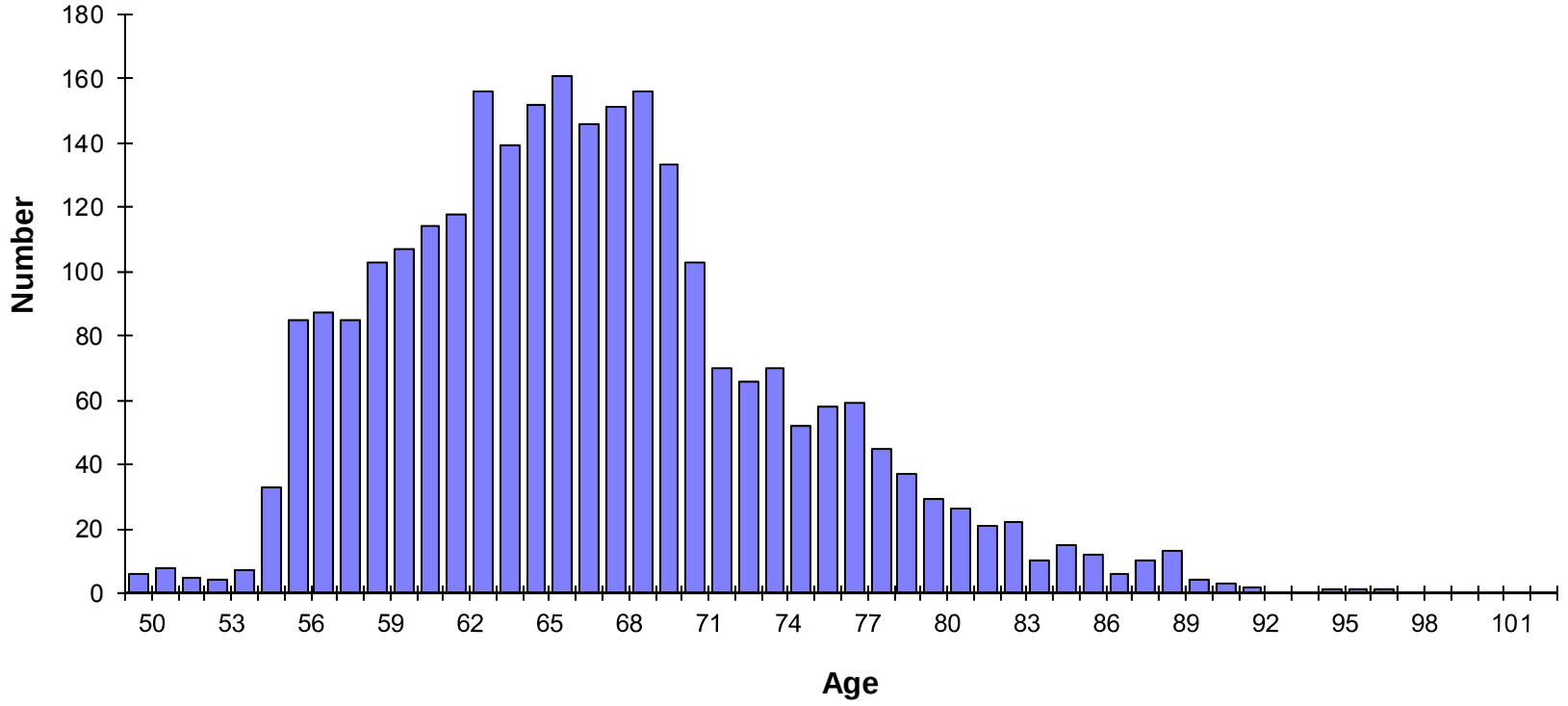
	Number of Members and Beneficiaries									Average
Age	Option 1	Option 2	Option 3	Option 4	Contingent Beneficiary	Option 5	Option 6	Period Certain	Total	Annual Benefit
Under 40	0	1	0	1	3	0	0	0	5	$13,965
40 to 44	1	0	0	1	1	1	2	0	6	30,222
45 to 49	1	0	1	5	4	2	4	1	18	21,970
50 to 54	7	0	7	4	3	3	6	0	30	21,052
55 to 59	57	52	27	87	15	16	137	2	393	31,977
60 to 64	123	89	32	106	29	31	224	0	634	29,749
65 to 69	146	143	69	112	29	27	240	0	766	25,423
70 to 74	95	72	30	65	26	28	126	0	442	20,647
75 to 79	53	40	22	56	28	11	41	0	251	16,211
80 to 84	27	7	3	34	22	10	5	0	108	12,934
85 to 89	15	2	2	20	13	4	0	0	56	10,721
90 to 94	2	1	0	2	3	1	0	0	9	7,715
95 to 99	0	0	0	1	1	1	0	0	3	7,630
100 & up	0	0	0	0	0	0	0	0	0	NA
Counts	527	407	193	494	177	135	785	3	2,721	$24,794
% of Total	19.4%	15.0%	7.1%	18.2%	6.5%	5.0%	28.8%	0.1%	100.0%	


Age Distribution of Retirees & Beneficiaries
Regular Membership
Number
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
50
53
56
59
62
65
68
71
74
77
80
83
86
89
92
95
98
101
Age

Age Distribution of Retirees & Beneficiaries
Sheriffs and Deputies



Age Distribution of Retirees & Beneficiaries
Protection Occupation



SUMMARY OF DATA FILE RECONCILIATION

The following table reconciles the data we received from IPERS to the final membership counts used in the valuation.

Records on the in-pay data file	117,532
Removed those no longer entitled to benefits	(24)
Records used in the valuation	117,508
Records on the not-in-pay data file	248,658
Records removed because the member has received all benefits	(7)
Records used in the valuation*	248,651

* These records are allocated as follows:

Active members	169,909
Retired, reemployed members	8,673
Vested inactive members	28,098
Nonvested inactive members	41,971
Total	248,651

Nonvested inactive members include deceased vested inactive members with employee contributions still held by the System. Records that had no remaining benefit or had passed away prior to the valuation date were removed.

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APPENDIX B

SUMMARY OF PLAN PROVISIONS

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Chapter 97B of the Iowa code sets out the IPERS provisions, which are briefly summarized as follows:

Participation: In general, the System covers people in non-federal public employment within the State of Iowa. Membership is mandatory if a person is in covered employment. Exceptions to this are set out in the law. Notable exceptions are those covered by another public system in Iowa (such as judges, state patrol, and policemen and firemen in cities having civil service), employees of the Regents' institutions, and employees of the community colleges who elect alternative coverage.

Service Credit: A member will receive membership credit for service rendered after July 4, 1953 (special rules apply to service before this date). Service is counted to the complete quarter of a calendar year. A member will not receive credit for more than four quarters of service in a calendar year regardless of the number of employers reporting covered wages for that member. A calendar year is the 12-month period beginning January 1 and ending December 31.

Members may purchase service under specified conditions. To make such a purchase, the member must pay the actuarial cost of such service.

REGULAR MEMBERS:

Average Salary: The average of the member's highest three years of covered wages. Effective July 1, 2012 the average of a member's highest five years of covered wages, but not less than the member's highest three years as of June 30, 2012, if vested at that time.

Age and Service Requirements for Benefits:

Normal Retirement	Earliest of the first day of the month of the member's 65th birthday, age 62 with 20 years of service or Rule of 88 (age plus service equals/exceeds 88), with a minimum of age 55.
Early Retirement	First day of any month starting with the month of the member's 55th birthday but preceding the normal retirement date.
Inactive Vested Benefit	Four years of service (seven years effective July 1, 2012). Prior to July 1, 2005 inactive members could become eligible for a vested benefit merely by reaching age 55.
Pre-retirement Death Benefit	Upon death of a member before benefits have started.
Disability Benefit	Upon meeting requirements to be vested, if the active or inactive member begins receiving federal Social Security disability or Railroad Retirement disability benefits.

Retirement Benefits:

Normal Retirement	An annuity equal to 2% of Average Salary (AS) for each year of service up to 30 years plus 1% of AS for each of the next 5 years of service. Maximum years of service recognized for benefit accrual purposes is 35 with a resulting maximum benefit of 65% of AS.
Early Retirement	An annuity, determined in the same manner as for normal retirement. However, a reduction of 0.25% per month is applied for each month the benefit commences prior to normal retirement age (based on service at early retirement). Effective July 1, 2012, the reduction changed to 0.50% per month and applies to each month that the benefit commences before age 65. Transition rules apply if members have service both before and after July 1, 2012.
Pre-retirement Death Benefits	Beneficiaries of members may receive a lump sum determined by a formula that includes how much the member contributed to IPERS, years of service, highest year's salary, and other factors. Beneficiaries may have the option of receiving a monthly benefit based on the present value of the member's accrued benefit at death.
Disability Benefits	An annuity, payable immediately, equal to the Normal Retirement Benefit without an early retirement adjustment.

Termination Benefits:

Less than four* years of Service (Nonvested)	A refund of all of the member's accumulated contributions.
Four* or more years of Service (Vested)	At the member's election either: (1) a refund of all of the member's accumulated contributions plus a portion (years of service divided by 30) of the employer's contributions with interest, or (2) a deferred benefit determined in the same manner as for normal retirement. Payments can begin at normal or early retirement.

* Effective July 1, 2012 seven years of service for those not vested at that time.

Form of Annuity:	The base form, or normal form, is a life annuity with a guaranteed return of employee contributions (Option 2).

Optional Forms of Payment:	*Option 1:* The member specifies a dollar amount, in $1,000 increments, that the member wishes to have paid to a designated beneficiary following the death of the member. The death benefit will be in the form of a single payment and cannot exceed the amount of a member's own accumulated contributions to IPERS, and it cannot lower the member's benefit as calculated under Option 2 by more than 50%. *Option 3:* After the member's death, all benefits cease. *Option 4:* The member receives a reduced monthly benefit so that a lifetime monthly benefit may be provided after the member's death to the person named by the member as the contingent annuitant. The member specifies what benefit the contingent annuitant will receive after the death of the member. The monthly benefit can be the same as the member's monthly benefit or three-fourths, one-half, or one-fourth of the amount. These choices may be restricted if the contingent annuitant is not the member's spouse and is more than ten years younger than the member. *Option 5:* If the member dies before ten full years (120 months of payments) have ended, the member's beneficiary will receive a monthly benefit for the remainder of the ten years. Members who have attained age 90 as of the first month of entitlement are not allowed to select this option. *Option 6:* The member receives a reduced monthly benefit so that a lifetime monthly benefit may be provided after the member's death to the person named by the member as the contingent annuitant. In addition, the monthly amounts are also reduced to pay for a pop-up feature. The pop-up feature provides that if the contingent annuitant dies before the member, the member's benefit will pop back up to what it would have been under IPERS Option 2, and death benefits may be payable to the member's designated beneficiary if certain conditions are met.
Actuarial Equivalent Lump Sum Payment:	If a vested member is entitled to receive a benefit and it is less than $50 per month under Option 2, the member shall receive a retirement benefit in an actuarial equivalent lump sum payment. The lump sum will include the member's and employer's accumulated contributions.
Post-retirement Benefit Increases:	Annual dividends are paid to those retired prior to July 1, 1990. Effective with the November 2000 dividend payment, the dividend is adjusted by the least of the following percentages: (1) the change in the CPI, (2) percentage certified to by the actuary as affordable by the System, and (3) 3%.

Favorable Experience Dividend (FED):

For members who retired after June 30, 1990, a favorable experience dividend (FED) reserve account has been established under Iowa Code §97B.49F(2). The main purpose of this account is to help offset the negative effects of postretirement inflation. All members and beneficiaries who receive a monthly allowance qualify for favorable experience dividend payments. Each November, IPERS determines if a FED payment should be paid the following January subject to the following conditions:

- The member must be retired one year.
- The FED rate cannot exceed 3%.
- The FED payment will be issued in a lump sum in January.
- The FED payment is not guaranteed.

The formula is as follows:
(December's Monthly benefit) X (12 months) X (Rate) X (Full calendar years retired) = FED

Source of Funds:

Regular Membership:

Contribution Rates

Time Period	Employees**	Employer	Total
Prior to 7/1/07	3.70%	5.75%	9.45%
7/1/07 – 6/30/08	3.90%	6.05%	9.95%
7/1/08 – 6/30/09	4.10%	6.35%	10.45%
7/1/09 – 6/30/10	4.30%	6.65%	10.95%
7/1/10 – 6/30/11	4.50%	6.95%	11.45%
7/1/11 – 6/30/12	5.38%	8.07%	13.45%
7/1/12 and later	Determined by Contribution Rate Funding Policy*		

*Change in contribution rate cannot exceed 1.0% per year.
**Employee rate is 40% of total contribution rate.

SHERIFFS/DEPUTIES AND PROTECTION OCCUPATION:

Average Salary:

The average of the member's highest three years of covered wages

Age and Service Requirements for Benefits:

Normal Retirement

Generally age 55. However, a member of the Sheriffs and Deputy Sheriffs may retire at age 50 with 22 years of service.

Inactive Vested Benefit	Four years of service. Prior to July 1, 2005 inactive members could become eligible for vested benefits merely by reaching age 55.
Pre-retirement Death Benefit	Upon death of a member before benefits have started.
Disability Benefit	Upon meeting requirements to be vested, (i) if the active or inactive member begins receiving federal Social Security or Railroad Retirement disability benefits, or (ii) upon being determined by IPERS to be disabled under the provisions of Iowa Code section 97B.50A. The disability benefits under Iowa Code section 97B.50A must be applied for through IPERS within one (1) year after termination of employment. Benefits under Iowa Code section 97B.50A may be paid for in-service disability or ordinary disability.

Retirement Benefits:

Normal Retirement	60% of average salary after completion of 22 years of service, plus an additional 1.5% of average salary for years of service greater than 22 but not more than 30. Maximum formula is 72% of average salary.
Pre-retirement Death Benefit	Beneficiaries of members may receive a lump sum determined by a formula that includes how much the member contributed to IPERS, years of service, highest year's salary, and other factors. Beneficiaries may have the option of receiving a monthly benefit based on the present value of the member's accrued benefit at death.
Disability Benefits	An annuity, payable immediately, equal to the Normal Retirement Benefit, without an adjustment. The benefit is the greater of the Normal Retirement Benefit and either 50% (for ordinary disability) or 60% (for in-service disability) of Average Salary.

Termination Benefits:

Less than four years of Service (Non-vested)	A refund of all of the member's accumulated contributions.
Four or more years of Service (Vested)	At the member's election either: (1) a refund of all of the member's accumulated contributions plus a portion (years of service divided by 22) of the employer's contributions with interest, or

(2) a deferred benefit determined in the same manner as for normal retirement. Payments begin at normal retirement.

Form of Annuity:

The base form, or normal form, is a life annuity with a guaranteed return of employee contributions (Option 2).

Optional Forms of Payment:

Option 1: The member specifies a dollar amount, in $1,000 increments, that the member wishes to have paid to a designated beneficiary following the death of the member. The death benefit will be in the form of a single payment and cannot exceed the amount of a member's own accumulated contributions to IPERS, and it cannot lower the member's benefit as calculated under Option 2 by more than 50%.

Option 3: After the member's death, all benefits cease.

Option 4: The member receives a reduced monthly benefit so that a lifetime monthly benefit may be provided after the member's death to the person named by the member as the contingent annuitant. The member specifies what benefit the contingent annuitant will receive after the death of the member. The monthly benefit can be the same as the member's monthly benefit or three-fourths, one-half, or one-fourth of the amount. These choices may be restricted if the contingent annuitant is not the member's spouse and is more than ten years younger than the member.

Option 5: If the member dies before ten full years (120 months of payments) have ended, the member's beneficiary will receive a monthly benefit for the remainder of the ten years. Members who have attained age 90 as of the first month of entitlement are not allowed to select this option.

Option 6: The member receives a reduced monthly benefit so that a lifetime monthly benefit may be provided after the member's death to the person named by the member as the contingent annuitant. In addition, the monthly amounts are also reduced to pay for a pop-up feature. The pop-up feature provides that if the contingent annuitant dies before the member, the member's benefit will pop back up to what it would have been under IPERS Option 2, and death benefits may be payable to the member's designated beneficiary if certain conditions are met.

Level Income Payment Option: A Level Income payment alternative is authorized for members of the Sheriffs and Deputies group and the Protection Occupation group. This alternative applies to all IPERS retirement options listed

above except Option 6. The Level Income payment alternative permits a member to receive a relatively level income both before and after age 62 when benefits from IPERS and Social Security are combined. Higher IPERS benefits are paid prior to age 62. When the member reaches age 62, the member's IPERS benefit is permanently reduced. This amount is determined when the member retires and is not recomputed based on the actual Social Security benefit.

Actuarial Equivalent Lump Sum Payment: If a vested member is entitled to receive a benefit and it is less than $50 per month under Option 2, the member shall receive a retirement benefit in an actuarial equivalent lump sum payment. The lump sum will include the member's and employer's accumulated contributions.

Post-retirement Benefit Increases: Annual dividends are paid to those retired prior to July 1, 1990. Effective with the November 2000 dividend payment, the dividend is adjusted by the least of the following percentages: (1) the change in the CPI, (2) percentage certified to by the actuary as affordable by the System, and (3) 3%.

Favorable Experience Dividend (FED): For members who retired after June 30, 1990, a favorable experience dividend (FED) reserve account has been established under Iowa Code §97B.49F(2). The main purpose of this account is to help offset the negative effects of postretirement inflation. All members and beneficiaries who receive a monthly allowance qualify for favorable experience dividend payments. Each November, IPERS determines if a FED payment should be paid the following January subject to the following conditions:

- The member must be retired one year.
- The FED rate cannot exceed 3%.
- The FED payment will be issued in a lump sum in January.
- The FED payment is not guaranteed.

The formula is as follows:
(December's Monthly benefit) x (12 months) x (Rate) x (Full calendar years retired) = FED

Source of Funds:

Sheriffs and Deputies: Determined by Contribution Rate Funding Policy. Employees contribute 50% and employers contribute 50%.

Protection Occupation: Determined by Contribution Rate Funding Policy. Employees contribute 40% and employers contribute 60%.

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APPENDIX C

ACTUARIAL ASSUMPTIONS AND METHODS

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TABLE OF CONTENTS

Sound financing of any retirement system requires that benefits accruing to its members shall be paid for during their active working lifetime so that when a member (or his beneficiary) becomes entitled to a benefit, the monies necessary to provide such benefit shall be on hand. In this way, the cost of benefits for present active members will not become a liability to future members and taxpayers.

The principal purpose of an actuarial valuation is to calculate, on the basis of certain assumptions, the present value of benefits that are payable in the future from the system to present members (and their beneficiaries) and the present value of future contributions to be made by the members and their employers. Having calculated such present values, the level of annual contribution to the system required to fund (or pay for) the benefits, in accordance with the above stated principle of sound financing, may be determined.

VALUATION ASSUMPTIONS

Retirement System contribution requirements and actuarial present values are calculated by applying experience assumptions to the benefit provisions and census (member) information of the Retirement System, using the actuarial cost method.

The principal areas of risk which require experience assumptions about future activities of the Retirement System are:

- long-term rates of investment return to be generated by the assets of the system
- patterns of pay increases to members
- rates of mortality among members, retirants and beneficiaries
- rates of withdrawal of active members
- rates of disability among active members
- the age patterns of actual retirements

In making a valuation, the monetary effect of each assumption is calculated for as long as a present member survives -- a period of time which can be as long as a century.

Actual experience of the Retirement System will not coincide exactly with assumed experience. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experiences. The result is a continual series of adjustments to the computed contribution rate, or alternatively to the amortization period for the unfunded actuarial liability.

From time to time, one or more of the assumptions are modified to reflect experience trends (but not random or temporary year to year fluctuations). A complete review of the actuarial assumptions was completed in 2014, based on experience from 2009-2013. A review of the economic actuarial assumptions was completed in 2017. The Investment Board has adopted and approved the use of the economic assumptions presented in the 2017 Economic Experience Study. The following is a summary of the assumptions and methods used in the valuation:

ECONOMIC ASSUMPTIONS:

Rate of Inflation (effective June 30, 2017)

2.60% per annum

Rate of Crediting Interest on Contribution Balances (effective June 30, 2017)

3.50% per annum, compounded annually

Rate of Investment Return (effective June 30, 2017)

7.00% per annum, compounded annually, net of expenses.

Wage Growth Assumption (effective June 30, 2017)

3.25% per annum based on 2.60% inflation assumption and 0.65% real wage inflation.

Payroll Increase Assumption (effective June 30, 2017)

3.25% per year

Cost of Living Adjustments Assumption (effective June 30, 2017)

2.60% for members who retired before July 1, 1990. No cost-of-living adjustments are assumed to be granted to future retirees

DEMOGRAPHIC ASSUMPTIONS:

Rates of Mortality

To reflect anticipated future mortality improvements, generational mortality is used with projected mortality improvements based on Projection Scale AA.

Pre-Retirement (effective June 30, 2010)

State	
Male	RP-2000 Employee Table, Generational, set back 3 years
Female	RP-2000 Employee Table, Generational, set back 8 years
School	
Male	RP-2000 Employee Table, Generational, set back 3 years
Female	RP-2000 Employee Table, Generational, set back 8 years
Other	
Male	RP-2000 Employee Table, Generational, no set back
Female	RP-2000 Employee Table, Generational, set back 8 years

Sheriffs/Deputies and Protection Occupation	
Male	RP-2000 Employee Table, Generational
Female	RP-2000 Employee Table, Generational

5% of active deaths are assumed to be service related for non-regular members.

Post-Retirement (effective June 30, 2014)

State	RP-2000 Healthy Annuitant Table, Generational
Male	No age adjustment
Female	1 Year set back with 5% increase above age 75
School	RP-2000 Healthy Annuitant Table, Generational
Male	1 Year set back with rates decreased by 5% below age 75
Female	3 Year set back with 10% decrease before age 75 and 10% increase above age 75
Other	RP-2000 Healthy Annuitant Table, Generational
Male	No age adjustment
Female	2 Year set back with 5% increase above age 75
Sheriffs/Deputies and Protection Occupation	RP-2000 Healthy Annuitant Table, Generational
Male	No age adjustment
Female	No age adjustment

Beneficiaries:	Same as members
Disabled Members (all groups):	RP-2000 Disabled Mortality, Generational Set back 1 year for males and set forward 3 years for females

Retirement Rates (effective June 30, 2014)

Upon meeting the requirements for early retirement, the following rates apply to Regular Members:

	Assumed Retirement Rates – Early		
Age	State	School	Other
55	5.0%	8.0%	5.0%
56	5.0%	8.0%	5.0%
57	5.0%	8.0%	5.0%
58	5.0%	8.0%	5.0%
59	5.0%	9.0%	5.0%
60	5.0%	10.0%	5.0%
61	15.0%	15.0%	10.0%
62	15.0%	20.0%	20.0%
63	15.0%	20.0%	20.0%
64	15.0%	20.0%	20.0%

Upon reaching the requirements for normal retirement (unreduced benefits), the following rates apply:

Assumed Retirement Rates – Select Unreduced

Age	State	School	Other
55	20.0%	30.0%	20.0%
56	15.0%	30.0%	20.0%
57	15.0%	30.0%	20.0%
58	15.0%	30.0%	20.0%
59	15.0%	30.0%	20.0%
60	15.0%	30.0%	20.0%
61	20.0%	30.0%	20.0%
62	40.0%	40.0%	40.0%
63	35.0%	30.0%	35.0%
64	30.0%	30.0%	35.0%
65	30.0%	30.0%	30.0%

Assumed Retirement Rates – Ultimate Unreduced

Age	State	School	Other
55	15.0%	23.0%	15.0%
56	15.0%	23.0%	15.0%
57	15.0%	23.0%	15.0%
58	15.0%	23.0%	15.0%
59	15.0%	23.0%	15.0%
60	15.0%	23.0%	15.0%
61	20.0%	30.0%	20.0%
62	40.0%	35.0%	35.0%
63	30.0%	30.0%	25.0%
64	30.0%	30.0%	25.0%
65	30.0%	45.0%	40.0%
66	30.0%	35.0%	30.0%
67	20.0%	25.0%	20.0%
68	20.0%	25.0%	20.0%
69	35.0%	40.0%	40.0%
70	100.0%	100.0%	100.0%

	Assumed Retirement Rates	
Age	Sheriffs and Deputies	Protection Occupation
50	20.0%	
51	20.0%	
52	20.0%	
53	20.0%	
54	20.0%	
55	17.0%	20.0%
56	17.0%	10.0%
57	17.0%	10.0%
58	17.0%	10.0%
59	17.0%	10.0%
60	17.0%	10.0%
61	17.0%	10.0%
62	30.0%	35.0%
63	30.0%	30.0%
64	30.0%	30.0%
65	100.0%	100.0%

Terminated vested members are assumed to retire at age 62 (55 for Sheriffs/Deputies and Protection Occupation groups).

For Regular membership, retired reemployed members are assumed to retire at a rate of 25% per year until age 80 when all are assumed to retire.

All retirees are assumed to elect a modified cash refund annuity (Option 2).

Rates of Disablement (effective June 30, 2010)

	Assumed Rates					
	Males			Females		
Age	State	School	Other	State	School	Other
27	0.020%	0.020%	0.020%	0.020%	0.030%	0.020%
32	0.020%	0.020%	0.020%	0.020%	0.030%	0.020%
37	0.040%	0.040%	0.040%	0.032%	0.040%	0.032%
42	0.065%	0.065%	0.065%	0.051%	0.050%	0.051%
47	0.120%	0.110%	0.140%	0.087%	0.090%	0.087%
52	0.220%	0.160%	0.326%	0.220%	0.165%	0.200%
57	0.320%	0.260%	0.630%	0.390%	0.240%	0.350%
62	0.420%	0.360%	0.900%	0.620%	0.320%	0.500%

Assumed Rates
Sheriffs/Deputies
Protection Occupation

Age	Rate
27	0.150%
32	0.150%
37	0.150%
42	0.180%
47	0.230%
52	0.280%
57	0.380%
62	0.510%

Rates of Termination of Employment (effective June 30, 2010)

Regular Membership

	Male			Female		
Years of Service	State	School	Other	State	School	Other
1	15.4%	15.0%	21.0%	15.4%	15.0%	21.0%
5	5.5%	6.9%	8.4%	5.5%	6.9%	9.2%
10	2.2%	2.9%	4.3%	2.2%	2.9%	5.8%
15	1.7%	1.8%	2.6%	1.7%	1.8%	4.1%
20	1.1%	1.3%	2.4%	1.1%	1.3%	3.2%
25	1.1%	1.2%	2.0%	1.1%	1.2%	2.4%
30	1.1%	1.2%	1.2%	1.1%	1.2%	1.5%

Sheriffs/Deputies and Protection Occupation

Age	Rate of Termination
22	5.8%
27	5.8%
32	3.5%
37	3.0%
42	2.6%
47	2.0%
52	2.0%

Probability of Electing a Deferred Vested Benefit (effective June 30, 2010)

	Regular Membership					
	Male			Female		
Years of Service	State	School	Other	State	School	Other
5	66.0%	76.0%	61.0%	61.0%	80.0%	70.0%
10	73.0%	81.0%	66.0%	66.0%	80.0%	73.0%
15	78.0%	86.0%	71.0%	76.0%	85.0%	80.0%
20	83.0%	91.0%	76.0%	86.0%	90.0%	85.0%
25	88.0%	95.0%	80.0%	96.0%	95.0%	90.0%
30	90.0%	95.0%	80.0%	100.0%	100.0%	90.0%

	Sheriffs/Deputies and Protection Occupation
Years of Service	Rate
5	53%
10	65%
15	85%
20	95%
25	100%
30	100%

Rates of Salary Increase* (effective June 30, 2017)

	Annual Increase			
Years of Service	State	School	Other	Sheriffs/Deputies and Protection Occupation
1	14.25%	16.25%	14.25%	16.25%
5	6.85%	5.75%	5.35%	5.75%
10	5.50%	4.55%	4.55%	4.55%
15	4.45%	3.75%	4.05%	4.05%
20	4.05%	3.40%	3.75%	3.75%
25	3.80%	3.25%	3.65%	3.75%
30	3.55%	3.25%	3.65%	3.25%
35+	3.25%	3.25%	3.25%	3.25%

* Includes 3.25 % wage growth

ACTUARIAL COST METHOD (adopted 1996)

The actuarial cost method is a procedure for allocating the actuarial present value of pension plan benefits and expenses to time periods. The method used for the valuation is known as the entry age normal actuarial cost method. Under this method, a total contribution rate is determined which consists of two parts: (i) the normal cost rate and (ii) the unfunded actuarial liability (UAL) rate. The entry age normal cost method has the following characteristics:

(i) The annual normal costs for each individual active member are sufficient to accumulate the value of the member's pension at time of retirement.

(ii) Each annual normal cost is a constant percentage of the member's year by year projected compensation rates.

The entry age normal actuarial cost method allocates the actuarial present value of each member's projected benefits on a level basis over the member's compensation rates between the entry age of the member and the assumed exit ages.

ACTUARIAL AMORTIZATION METHOD (adopted 2013)

The portion of the actuarial present value of benefits allocated to the valuation year is called the normal cost. The portion of the actuarial present value of benefits not provided for by the actuarial present value of future normal costs is called the actuarial liability. Deducting the actuarial value of assets from the actuarial liability determines the unfunded actuarial liability (UAL). The one-year lag between the valuation date and the date the contribution rate is effective is reflected in calculating the corresponding amortization payment. The UAL is amortized according to the Actuarial Amortization Method adopted by the Investment Board and summarized below:

1. Amortization payments will be calculated as a level percentage of payroll.
2. For the actuarial valuation prepared as of June 30, 2013, the amortization period of the UAL shall be 30-year open for all membership groups.
3. For the actuarial valuation prepared as of June 30, 2014:
   a. The UAL for each membership group shall be amortized over a 30-year closed period.
   b. This will be designated as the initial UAL base for subsequent valuations and it will be amortized over the remaining years of the 30-year closed period set on June 30, 2014.
4. For each valuation subsequent to June 30, 2014, annual net experience gains/losses for each membership group will be amortized over a new, closed 20-year period.
5. Subsequent plan amendments or changes in actuarial assumptions or methods that create a change in the UAL will be amortized over a demographically appropriate period selected by the Investment Board at the time that the change is incurred.
6. The dollar amount of the UAL payment for purposes of computing the UAL component of the actuarial and required contribution rate will be the sum of the amortization payments for each amortization schedule divided by the total projected payroll. Unless the plan has been 110 percent funded for the current and prior two years, a negative amortization payment shall be ignored.

7. If the valuation shows that the group has surplus, the prior amortization bases will be eliminated and one base equal to the amount of surplus shall be established. The amortization period of a surplus shall be a 30-year open period for all groups.

ACTUARIAL VALUE OF ASSETS SMOOTHING METHOD (adopted 2007)

The market value of assets, representing a fair value of System assets, may not necessarily be the best measure of the System's ongoing ability to meet its obligations.

To arrive at a suitable value for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens volatility in the market value while still indirectly recognizing market value. The specific technique follows:

Step 1: Determine the expected value of plan assets at the current valuation date using the actuarial assumption for investment return applied to the prior actuarial value and the actual receipts and disbursements of the fund for the previous 12 months.

Step 2: Subtract the expected value determined in Step 1 from the total market value of the Fund at the current valuation date.

Step 3: Multiply the difference between market and expected values determined in Step 2 by 25%.

Step 4: Add the expected value of Step 1 and the product of Step 3 to determine the actuarial value of assets.

Step 5: Verify the preliminary actuarial value of assets in Step 4 is not more than 120% of the market value of assets nor less than 80% of the market value. If it is, adjust the actuarial value of assets so it falls within the 80% - 120% corridor.

TECHNICAL VALUATION PROCEDURES

Data Procedures

In-pay members:

If a birth date is not available, the member is assumed to be 80. If a retirement date is also not available, the member is assumed to have retired at 65.

If a beneficiary birth date is needed but not supplied, husbands are assumed to be 3 years older than wives.

Not in-pay members:

If a birth date is not available, the member is assumed to be the average age of the members with the same status.

If gender is not provided, regular members are assumed to be female and Sheriffs/Deputies and Protection Occupation members are assumed to be male.

Salaries for first year members are annualized based on the number of quarters with wages.

Membership Transfers

IPERS provides a code in the valuation data to indicate that a member is in a membership group (regular, Sheriffs and Deputies and Protection Occupation) different from that on the prior valuation date. The actuarial liability for these members is calculated under the assumptions and provisions of the prior membership group. A preliminary funded ratio (before asset transfer) is determined for the three membership groups. Assets are then transferred from the prior to the current membership group based on the funded ratio of the prior group times the actuarial liability of the member in the prior group. Then, the members are revalued in the current membership group for purposes of valuation calculations.

Other Valuation Procedures

No actuarial accrued liability in excess of the unclaimed member contribution balance is held for nonvested, inactive members. Inactive vested members who have died are treated in the same manner.

The wages used in the projection of benefits and liabilities are considered earnings for the current year ending June 30, increased by the salary scale.

The calculations for the actuarial contribution rate are determined as of mid-year. This is a reasonable estimate since contributions are made throughout the year.

The projected IRC Section 415 limit for active participants was not valued. The impact was assumed to be *de minimus*.

The compensation limitation under IRC Section 401(a)(17) is considered in this valuation.

No future additions to, or payments from, the Favorable Experience Dividend Reserve Account or the Active Member Supplemental Accounts are reflected in the valuation.

DEFINITION OF TERMS

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

Unfunded Actuarial Liability

The difference between actuarial liability and the actuarial value of assets. Sometimes referred to as "unfunded accrued liability" or "unfunded liability".

Most retirement systems have unfunded actuarial liability. They arise anytime new benefits are added and anytime an actuarial loss is realized.

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APPENDIX D

CONTRIBUTION RATE FUNDING POLICY

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Background:
IPERS is charged with setting a "Required Contribution Rate" for each membership category within IPERS that will discharge its liabilities. Iowa Code §97B.11(3)(d) provides the basic framework for implementing this charge by stating:

> The Required Contribution Rate that is set by the system for a membership category shall be the contribution rate the system actuarially determines, based upon the most recent actuarial valuation of the system and using the actuarial methods, assumptions, and funding policy approved by the Investment Board, is the rate required by the system to discharge its liabilities as a percentage of the covered wages of members in that membership category. However, the Required Contribution Rate set by the system for members in regular service for a fiscal year shall not vary by more than one percentage point from the Required Contribution Rate for the prior fiscal year.

Goal:
To establish policy and procedures in setting contribution rates that combined with investment income will fund the benefits specified in Chapter 97B of the Iowa Code.

To move towards fully funding the benefits (100 percent or greater funded ratio) in as expeditious manner as is reasonable within the guidelines acknowledged herein.

Procedure:
The Investment Board shall retain a consulting actuary to conduct an annual actuarial valuation of assets and liabilities. The consulting actuary shall use the entry age normal cost method and all other actuarial assumptions and methods approved by the Investment Board.

In the annual valuation process, the consulting actuary shall calculate an Actuarial Contribution Rate and a Required Contribution Rate pursuant to this policy. Each shall be calculated as a level percent of pay.

There is a one-year lag between the completion of an annual actuarial valuation report and the fiscal year to which the contribution rates calculated therein are applied. Therefore, the Actuarial Contribution Rate and the Required Contribution Rate declared in the annual valuation process are applicable to the fiscal year immediately following the completion of the valuation report (for example the rates declared in the report presented to the Investment Board in December 2013 are applicable to the rates for the fiscal year beginning July 1, 2014).

Actuarial Contribution Rate (ACR):
1. ACR is the combined employer and employee contribution rate that is the minimum rate necessary to fund the benefits using the actuarial assumptions and methods approved by the Investment Board.

2. A separate ACR shall be determined for each membership group within IPERS according to this policy.

3. The ACR shall consist of:

    a. Normal cost and an amortization payment (not less than zero) of any unfunded actuarial liability.

b. Normal cost may only be offset by a negative amortization payment after a membership group has attained a funded ratio of 110 percent or greater for 3 consecutive years.

Required Contribution Rate:

1. The Required Contribution Rate is the combined employer and employee rate payable pursuant to this policy and Iowa Code §97B.11(3)(d).

2. The Required Contribution Rate shall be determined by comparing the ACR determined in the annual valuation process to the Required Contribution Rate of the previous year.

    a. If the ACR is less than the previous Required Contribution Rate by fewer than 50 basis points, then the Required Contribution Rate shall remain unchanged from the previous year.

    b. If the ACR is less than the previous Required Contribution Rate by 50 basis points or more, then the Required Contribution Rate shall be lowered by 50 basis points provided the funded ratio of the membership group is 95 percent or higher.

    c. If the ACR is greater than the Required Contribution Rate of the previous year, then the Required Contribution Rate shall be:

        i. Increased to be equal to ACR for Sheriffs and Deputies.
        ii. Increased to be equal to ACR for Protection Occupation Members.
        iii. Increased to be equal to ACR for Regular Members, or one percentage point greater than the prior year's Required Contribution Rate, whichever is smaller.

Policy Guidelines:

In adopting actuarial assumptions and methods to be used in setting contribution rates, the Investment Board shall strive to provide a balance among the following:

1. Stability in contribution rates (such as use of smoothing and amortization schedules that do not produce dramatic swings in the required contributions from year to year).

2. Disciplined funding approach (such as requiring full payment of normal cost and an amortization payment towards the unfunded actuarial liability and deferring decreases in contribution rates until strong funded ratios are attained).

3. Interperiod equity (such as shortening the amortization schedule when reasonable and amortization of retroactive benefit enhancements over a reasonable time period such as the average working lifetime for active members and the average life expectancy of retired members).

4. Support an affordable, sustainable plan (in consultation with the Benefits Advisory Committee review affordability of required contribution rates and/or the benefit provisions).

5. At a minimum, this policy will be reviewed in conjunction with the quadrennial experience study.

IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM
CERTIFICATION

This Addendum is being prepared solely for the purpose of providing the information required under Chapter 97 D.5 of the Iowa code. Calculations are based on the following prescribed methods:

Actuarial cost method: Entry Age Normal
Amortization method: Level percent of payroll
Amortization period: 30 years, open period

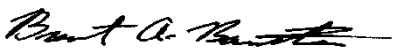
All other assumptions, methodologies, and System provisions used are consistent with those used in the June 30, 2017 valuation for the Iowa Public Employees' Retirement System.

The results shown in this Addendum may not be consistent with those in the June 30, 2017 valuation. The June 30, 2017 valuation results were determined in accordance with generally accepted actuarial principles and practices that are consistent with the Actuarial Standards of Practice promulgated by the Actuarial Standards Board and the applicable Guides to Professional Conduct, amplifying opinion and supporting recommendations of the American Academy of Actuaries. The results shown in this Addendum are not necessarily based on the methodologies adopted by the System.

We are available to answer any questions on the material contained in this report, or to provide explanations or further details as may be appropriate.

The undersigned credentialed actuaries meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

Patrice A. Beckham, FSA, EA, FCA, MAAA — October 27, 2017 (Date)



Brent A. Banister, PhD, FSA, EA, FCA, MAAA — October 27, 2017 (Date)

IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM
SUMMARY OF VALUATION RESULTS UNDER PRESCRIBED METHODOLOGY PER CHAPTER 97 D.5

This addendum report has been prepared to present the results of a valuation of the Iowa Public Employees' Retirement System as of June 30, 2017, based on the prescribed methodology under Chapter D.5.

The unfunded actuarial accrued liability has been amortized as a level percent of payroll over 30 years. The payroll growth assumption used was 3.25%.

A summary of results from the current and the prior valuation follows.

	Regular Membership Actuarial Valuation as of	
	June 30, 2017	**June 30, 2016**
Summary of Costs		
Normal cost	10.40%	10.20%
UAL amortization	4.86%	3.89%
Total	15.26%	14.09%
Less Employee Contribution Rate	(6.29%)	(5.95%)
Employer Required Contribution Rate	8.97%	8.14%
Funded Status		
Actuarial liability	$35,176,950,577	$32,577,657,593
Actuarial value of assets	28,292,788,895	27,001,194,364
Unfunded actuarial liability	$6,884,161,682	$5,576,463,229
Funded Ratio	80.4%	82.9%
Asset Values		
Market value of assets (MVA)	$28,575,257,607	$26,341,407,289
Actuarial Value of Assets (AVA)	28,292,788,895	27,001,194,364
MVA/AVA	101%	98%

	Sheriffs and Deputies Actuarial Valuation as of	
	June 30, 2017	**June 30, 2016**
Summary of Costs		
Normal cost	16.85%	16.41%
UAL amortization	2.34%	0.97%
Total	19.19%	17.38%
Less Employee Contribution Rate	(9.76%)	(9.38%)
Employer Required Contribution Rate	9.43%	8.00%
Funded Status		
Actuarial liability	$691,205,752	$624,791,635
Actuarial value of assets	642,509,070	602,213,442
Unfunded actuarial liability	$48,696,682	$22,578,193
Funded Ratio	93.0%	96.4%
Asset Values		
Market value of assets (MVA)	$649,668,861	$588,117,030
Actuarial Value of Assets (AVA)	642,509,070	602,213,442
MVA/AVA	101%	98%

	Protection Occupation Group* Actuarial Valuation as of	
	June 30, 2017	**June 30, 2016**
Summary of Costs		
Normal cost	16.31%	15.99%
UAL amortization	0.55%	(0.23%)
Total	16.86%	15.76%
Less Employee Contribution Rate	(6.81%)	(6.56%)
Employer Required Contribution Rate	10.05%	9.20%
Funded Status		
Actuarial liability	$1,572,225,700	$1,417,299,919
Actuarial value of assets	1,537,125,949	1,430,288,781
Unfunded actuarial liability	$35,099,751	($12,988,862)
Funded Ratio	97.8%	100.9%
Asset Values		
Market value of assets (MVA)	$1,554,189,858	$1,396,909,337
Actuarial Value of Assets (AVA)	1,537,125,949	1,430,288,781
MVA/AVA	101%	98%

* Includes all public safety members other than Sheriffs and Deputies.