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IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

**Actuarial Valuation Report
as of June 30, 2021**



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October 27, 2021

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

Re: June 30, 2021 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, 2021 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, 2021. There have been no changes to the benefit provisions or actuarial assumptions and methods since last year's valuation.

In preparing our report, we relied, without audit, on information (some oral and some in writing) supplied by the System's staff. This information includes, but is not limited to, 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.

In order to prepare the results in this report, we have utilized appropriate actuarial models that were developed for this purpose. These models use assumptions about future contingent events along with recognized actuarial approaches to develop the needed results. The valuation results summarized in this report involve actuarial calculations that require the use of many assumptions about future events. The assumptions are adopted by the Investment Board after consultation with the actuary. We believe that the assumptions and methods used in this report are reasonable and appropriate for the purpose for which they have been used. 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 could result in valuation results that are materially different. No single set of assumptions is uniquely correct, but rather there is a range of reasonable assumptions. Actuarial valuations do not affect the ultimate cost of System benefits, but only the timing of System contributions.

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Future actuarial measurement may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. 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 Statements No. 67 and No. 68 will be presented in separate reports.

We note that as we prepare this report, the world is recovering from a pandemic. We have considered available information, but do not believe that there is yet sufficient data to warrant the modification of any of our assumptions. We will continue to monitor the situation and advise of any adjustments that we believe would be appropriate.

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 this valuation was prepared in accordance with standards of practice promulgated by the Actuarial Standards Board. 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.

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

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

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

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



SECTION I – EXECUTIVE SUMMARY

INTRODUCTION

This report presents the results of the June 30, 2021 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 E),
- to evaluate the funded status of the System and disclose various asset and liability measures as of June 30, 2021,
- to determine the actuarial experience of the System since the last valuation,
- to assess and disclose the key risks associated with funding the System, and
- to analyze and report on trends in System contributions, assets, and liabilities over the past several years.

The actuarial valuation results provide a “snapshot” view of the System's financial condition on June 30, 2021. 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, 2021 for all three membership groups covered by IPERS is \$4.960 billion while the expected UAL was \$6.564 billion. The favorable experience was the net result of an experience gain of \$1.768 billion on the actuarial value of assets and an experience loss of \$164 million on System liabilities.

For many years, the contribution rates for Regular members and employers were set in state statute. Effective with the 2011 valuation, authority was given to IPERS 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 Contribution Rate Funding Policy and the valuation results, the Required Contribution Rate for Regular members remains unchanged at 15.73% of pay. The Required Contribution Rate also remains the same for the Protection Occupation group, while it decreased by 0.50% of pay for the Sheriffs and Deputies group. The contribution rate is split 50%/50% for the Sheriffs and Deputies group so the change will impact both employer and employee contribution rates. **The Required Contribution Rate is above the Actuarial Contribution Rate for all three groups, resulting in a contribution margin, as shown in the following table.**

Contribution Rate for FY 2023			
	Regular Membership	Sheriffs and Deputies	Protection Occupation
1. Normal Cost Rate	10.49%	16.93%	15.30%
2. Amortization of UAL	<u>3.65%</u>	<u>0.00%</u>	<u>0.00%</u>
3. Actuarial Contribution Rate	14.14%	16.93%	15.30%
4. Required Contribution Rate	15.73%	17.52%	15.52%
5. Shortfall/(Margin) (3) – (4)	(1.59%)	(0.59%)	(0.22%)
6. Employee Contribution Rate	6.29%	8.76%	6.21%
7. Employer Contribution Rate (4) - (6)	9.44%	8.76%	9.31%
8. Unfunded Actuarial Liability (\$M)	\$5,043	(\$22)	(\$61)
9. Funded Ratio	87.32%	102.73%	103.13%



SECTION I – EXECUTIVE SUMMARY

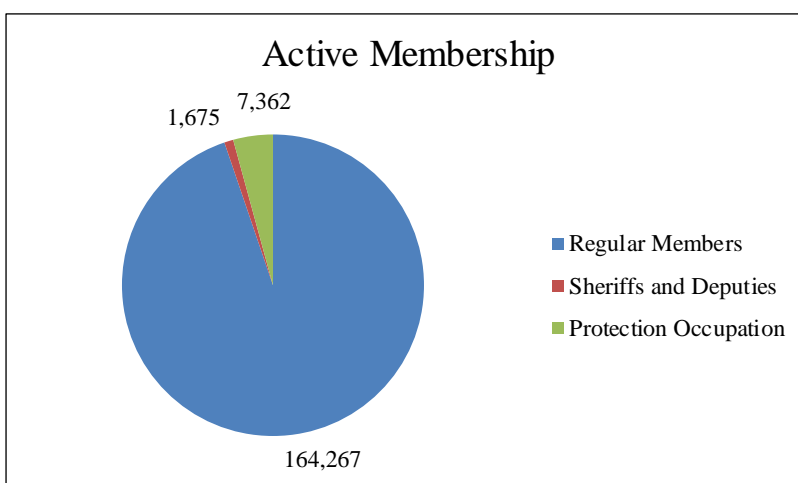
Further details on the June 30, 2021 valuation results can be found in the following sections of this Executive Summary.

EXPERIENCE FOR THE PRIOR PLAN YEAR

Numerous factors contributed to the change in the System's assets, liabilities and the Actuarial Contribution Rate between the June 30, 2020 and June 30, 2021 valuation. The components are examined in the following discussion.

MEMBERSHIP

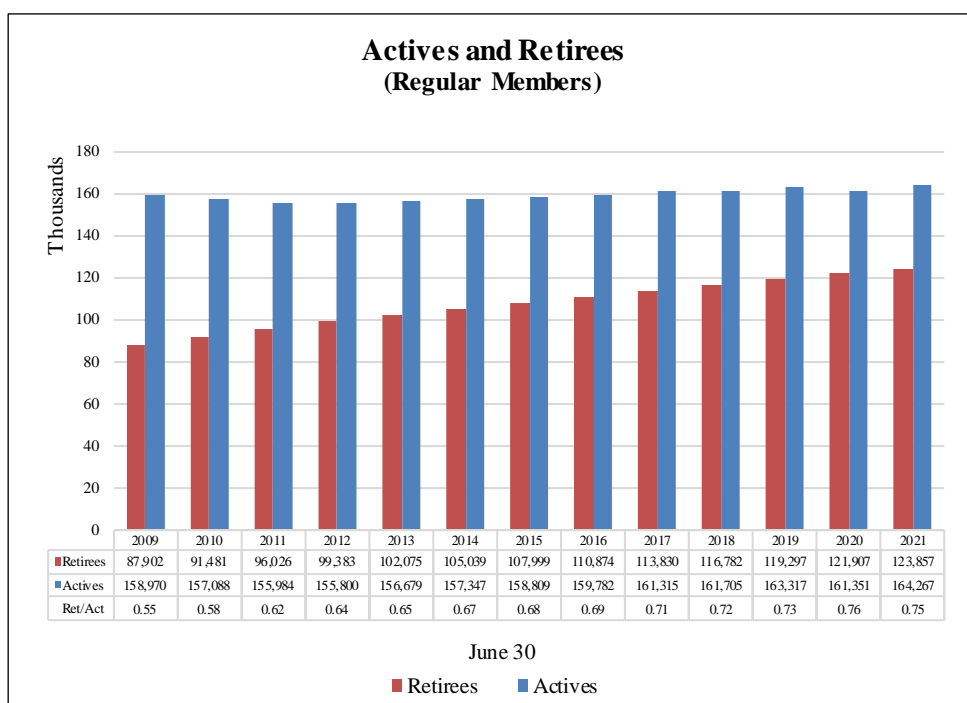
IPERS has three membership groups: Regular, Sheriffs and Deputies, and Protection Occupation. Each membership group has different retirement benefits and members of each group and their employers contribute to IPERS at different rates. Note that the split of the Required Contribution Rate for the Sheriffs and Deputies group is 50% employee/50% employer while the split for the Regular members and Protection Occupation group is 40% employee/60% employer. A breakdown of the active membership by group, as of June 30, 2021, is shown below. The Regular members represent about 95% of the total actives.



There were 164,267 active Regular members in the 2021 valuation compared to 161,351 in the 2020 valuation, a 1.8% increase. When the number of active members increases, it usually impacts the Actuarial Contribution Rate favorably. The unfunded actuarial liability is amortized assuming future covered payroll will increase 3.25% per year. If covered payroll increases more than assumed, the dollar amount of the UAL payment is divided by higher covered payroll, resulting in a lower UAL contribution rate and a corresponding lower Actuarial Contribution Rate. Due to the increase in the active membership since the 2020 valuation, payroll used for the valuation increased by 3.52% which was higher than the assumed increase of 3.25%.

SECTION I – EXECUTIVE SUMMARY

The following graph shows the number of members receiving a benefit (retired reemployed members are counted as retirees) compared to the number of active members for the Regular membership over the past 13 valuations. The number of active members in the Regular membership group has remained relatively stable for the past 13 years. In contrast, the number of members receiving a benefit has steadily increased. As a result, the ratio of retirees to actives has increased materially over this period.



Although the ratio of retirees to actives is different for the Sheriffs and Deputies and Protection Occupation groups, the same increasing trend is evident in all three membership groups (see Exhibit 25). This is common for very mature retirement systems and is one of the reasons for accumulating assets by funding the benefits in advance.

ASSETS

As of June 30, 2021, the System (all membership groups) had total net assets of \$42.890 billion, when measured on a market value (or “fair value”) basis. This was an increase of \$8.842 billion from the prior year.

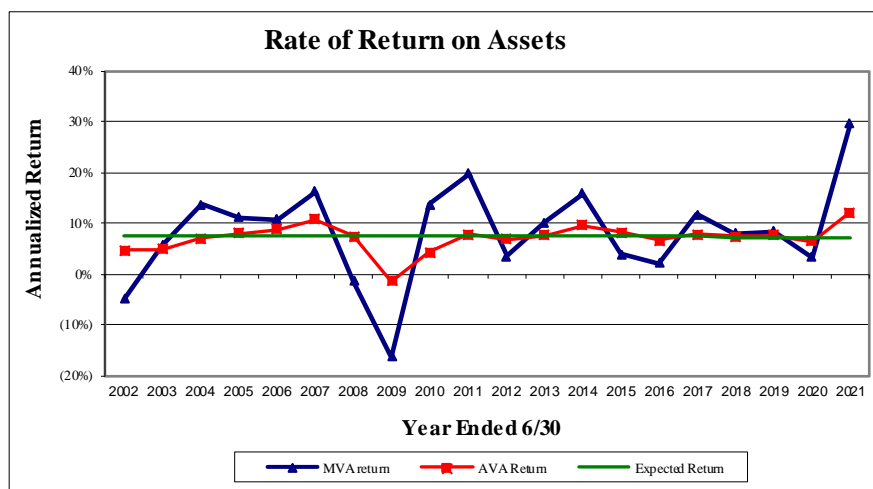
The market value of assets is not used directly in the calculation of the unfunded actuarial liability and the Actuarial Contribution Rates. An asset valuation method that smoothes the effect of market fluctuations is used to determine the value of assets used in the valuation. This amount, called the “actuarial value of assets”, is equal to the expected asset value, based on the actuarial value in the prior valuation, net cash flows, and the assumed rate of return (7.0%), plus 25% of the difference between the actual market value and the expected asset value. 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 rarely applies and did not impact the determination of the actuarial value of assets in this valuation. The actuarial value of assets as of June 30, 2021 was \$37.585 billion, an increase of \$3.099 billion from the value in the prior valuation. The components of the change in the asset values are shown in the following table.



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	Market Value (\$M)	Actuarial Value (\$M)
Net Assets, June 30, 2020	\$ 34,048	\$ 34,486
• Employer and Member Contributions	+ 1,372	+ 1,372
• Benefit Payments and Refunds	- 2,419	- 2,419
• Expected Investment Income, Net of Expenses (Based on 7.0% Assumption)	+ 2,347	+ 2,378
• Actuarial Gain/(Loss) on Investment Return	+ 7,542	+ 1,768
Net Assets, June 30, 2021 Before FED Transfer	\$ 42,890	\$ 37,585
• FED Transfer	+ 0	+ 0
Net Assets, June 30, 2021 After FED Transfer	\$ 42,890	\$ 37,585
• Application of Corridor	N/A	+ 0
Final Net Assets, June 30, 2021	\$ 42,890	\$ 37,585

The rate of return on a market value basis, as reported by IPERS, was 29.63%. Due to the favorable investment experience during FY 2021, the net rate of return, measured on the actuarial value of assets, was 12.21%. Since this return exceeded the investment return assumption of 7.00%, it generated an actuarial gain of \$1.768 billion.



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.

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, 2021.

In last year's valuation, there was a deferred (unrecognized) investment loss (actuarial value exceeded market value) of \$438 million. Due to the rate of return on the market value of assets for FY 2021, the net deferred investment experience in the current valuation is a gain of \$5.3 billion. The deferred investment gain will be recognized in the smoothing method in future years but may be offset by actual investment experience if less favorable than assumed. For example, a return of - 6.2% on the market value of assets for FY 2022 would eliminate the deferred investment gain and result in a return of 7.0% on the actuarial value of assets.



SECTION I – EXECUTIVE SUMMARY

LIABILITIES

The actuarial liability is that portion of the present value of future benefits that will not be paid by the future normal costs for active members. 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, 2021, is shown in the following table:

(\$ Millions)	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
Actuarial Liability	\$39,778	\$817	\$1,950	\$42,545
Actuarial Value of Assets	<u>34,735</u>	<u>839</u>	<u>2,011</u>	<u>37,585</u>
Unfunded Actuarial Liability*	\$5,043	(\$22)	(\$61)	\$4,960
Funded Ratio	87.32%	102.73%	103.13%	88.34%

* 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 decrease in the UAL from June 30, 2020 to June 30, 2021 was \$1.627 billion, largely due to the investment return on the actuarial value of assets that was higher than the expected return of 7.00%. The components of the net change in the UAL are shown in the following table (in millions):

Unfunded Actuarial Liability, June 30, 2020	\$ 6,587
• Expected increase from amortization method	12
• Expected decrease from contributions above actuarial rate	(30)
• Investment experience	(1,768)
• Liability experience*	164
• Other	(5)
Unfunded Actuarial Liability, June 30, 2021	\$ 4,960
• FED transfer for favorable experience	0
Unfunded Actuarial Liability, June 30, 2021	\$ 4,960

* Liability experience is 0.39% of the expected actuarial liability.

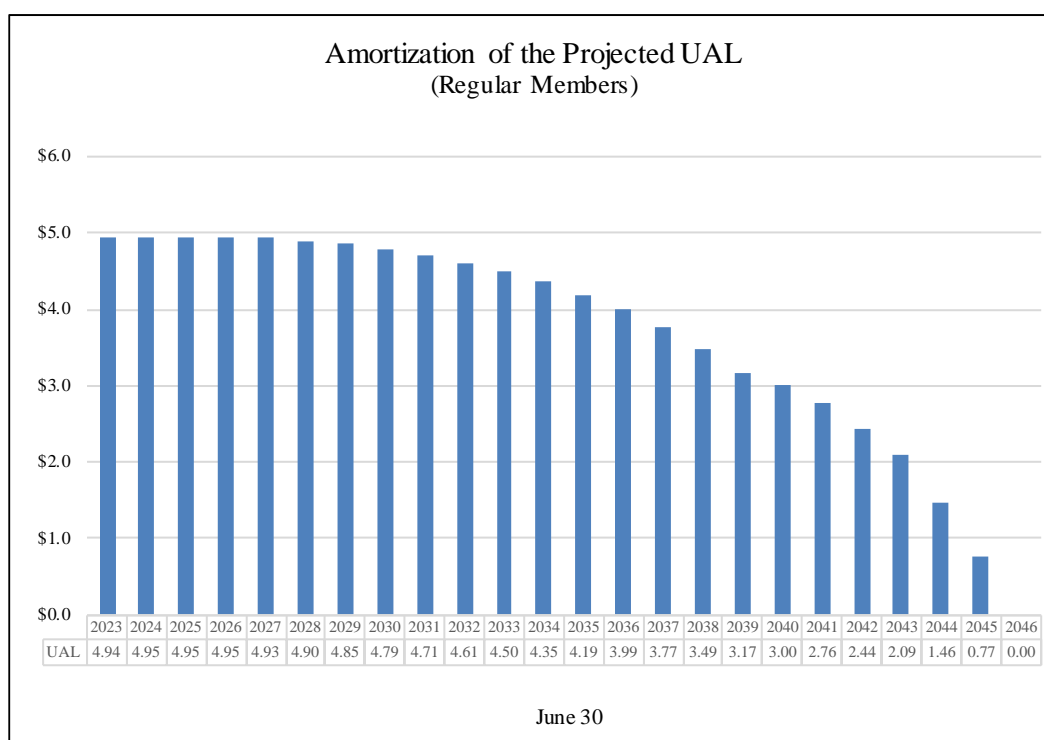
As can be observed above, various factors impacted the amount of the UAL as of June 30, 2021. Actuarial gains (losses), which result from actual experience that is more (less) favorable than anticipated based on the actuarial assumptions, are reflected in the UAL. They are measured as the difference between the expected unfunded actuarial liability and the actual unfunded actuarial liability, after taking into account any changes due to actuarial assumptions and methods or benefit provision changes. Overall, the System experienced a net



SECTION I – EXECUTIVE SUMMARY

actuarial gain of \$1.6 billion which may be explained by considering the separate experience of assets and liabilities. As discussed earlier, there was a \$1.768 billion actuarial gain on the actuarial value of assets and a net actuarial loss of \$164 million from demographic experience that was less favorable than anticipated by the actuarial assumptions. While there are various components of demographic experience, the most significant sources of actuarial loss were due to retirement and termination experience that was less favorable than anticipated, offset by an actuarial gain from salary increases that were lower than expected.

IPERS' UAL is amortized with payments that are determined as a level percentage of covered payroll. This is a common amortization methodology used by public plans. Because covered payroll is expected to increase each year, the dollar amounts of the UAL payments also increase in each future year. As a result, in the early years of the amortization schedule the dollar amount of contributions may be less than the interest on the UAL (called negative amortization), resulting in an increase in the dollar amount of UAL. The following graph illustrates the outstanding balance of the UAL (\$ in billions) for Regular members over the remainder of the amortization period if the Actuarial Contribution Rate is paid each year and all assumptions are met.



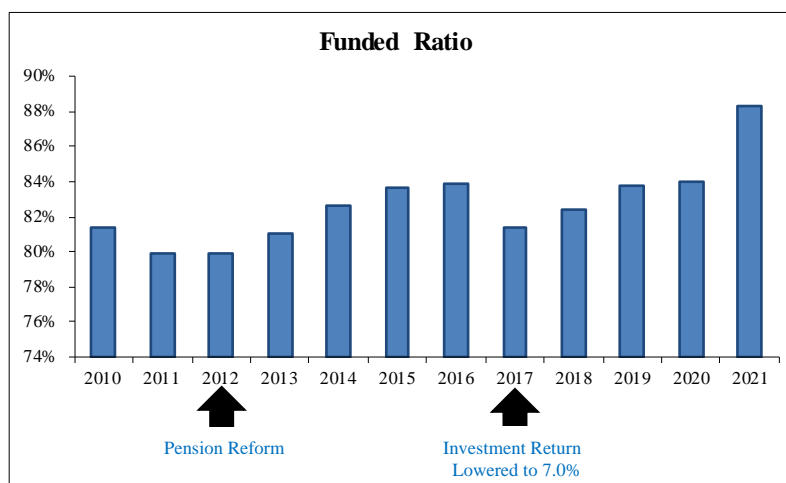
The dollar amount of UAL is slightly higher than the current amount through 2026 and then declines. The period over which negative amortization occurs is relatively short and the amount of negative amortization is small. Once the remaining amortization period for the legacy UAL (currently 23 years) falls below 20 years, there should be very little, if any, negative amortization. Note that given IPERS' Contribution Rate Funding Policy, the Required Contribution Rate may vary from the Actuarial Contribution Rate which will impact the outstanding balance of the UAL in future valuations compared to the amounts shown here. In addition, recognition of the deferred investment gains through the asset smoothing method in the future (absent offsetting investment losses) could also impact the actual rate of decline in the UAL compared to this projection.



SECTION I – EXECUTIVE SUMMARY

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, for the entire System, is shown in the following table (in millions).

	6/30/2017	6/30/2018	6/30/2019	6/30/2020	6/30/2021
Funded Ratio (Actuarial Value)	81.4%	82.4%	83.7%	84.0%	88.3%
Unfunded Actuarial Liability (\$M)	\$6,968	\$6,815	\$6,477	\$6,587	\$4,960



The funded ratio over this timeframe has typically remained between 80% and 84%, although an exceptionally strong investment return led to a sharp improvement in 2021. Note the decrease in 2017 resulted from lowering the investment return assumption from 7.5% to 7.0%.

Although IPERS has an unfunded actuarial liability, the funded ratio of 88% (actuarial assets divided by actuarial liability) marks the highest funded ratio for the System since the Great Recession and represents a positive trend. In addition, since the Contribution Rate Funding Policy was adopted, the actual contribution rate each year has met or exceeded the full actuarial contribution rate. This Funding Policy provides that the scheduled contribution dollars to eventually eliminate the unfunded actuarial liability over time will be made and the funded ratio should improve if all actuarial assumptions are met.

Measures of the funded ratio presented in this report are not an indication of the System's ability to settle its current obligations, nor, on their own, are they 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 (shown above).

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 liability allocated by the actuarial cost method to the service of active 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.



SECTION I – EXECUTIVE SUMMARY

This valuation is used to determine the contribution rates that will be effective July 1, 2022 for the fiscal year ending June 30, 2023. Prior to the 2011 valuation, Regular members (about 95% of the active membership) contributed according to fixed contribution rates set in statute. Beginning with the 2011 valuation (which set contribution rates for FY 2013), IPERS was given the statutory authority to set the Required Contribution Rate for Regular members, subject to a maximum change of 1.00% per year. **Based on IPERS' Contribution Rate Funding Policy, the Required Contribution Rate for Regular members in this valuation (which sets the contribution rate for FY 2023) will remain unchanged from the prior valuation.**

The remaining 5% of the active members, the Sheriffs and Deputies and the Protection Occupation groups, 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 (without the 1% cap). According to the Contribution Rate Funding Policy, if the Actuarial Contribution Rate is less than the previous Required Contribution Rate by 0.50% or more, then the Required Contribution Rate shall be lowered by 0.50% provided the funded ratio of the membership group is 95% or higher. The current valuation results show that the Actuarial Contribution Rate has increased by 0.01% for the Sheriffs and Deputies group and decreased by 0.16% for the Protection Occupation group. As a result, the Actuarial Contribution Rate for FY 2023 is now 1.09% below the FY 2022 Required Contribution Rate for Sheriffs and Deputies, and 0.22% below the FY 2022 Required Contribution Rate for Protection Occupation. In addition, both groups also have a funded ratio greater than 95%. **Therefore, the FY 2023 Required Contribution Rate for the Sheriffs and Deputies group will decrease by 0.50% of pay from the FY 2022 rate, while Required Contribution Rate for the Protection Occupation group will remain unchanged.** Based on the results of this valuation, the Required Contribution Rate is greater than 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 2023	Regular Membership	Sheriffs & Deputies	Protection Occupation
1. Actuarial Contribution Rate	14.14%	16.93%	15.30%
2. Required Contribution Rate	15.73%	17.52%	15.52%
3. Employee Contribution Rate	6.29%	8.76%	6.21%
4. Employer Contribution Rate (2) – (3)	9.44%	8.76%	9.31%
5. Shortfall/(Margin) (1) – (2)	(1.59%)	(0.59%)	(0.22%)

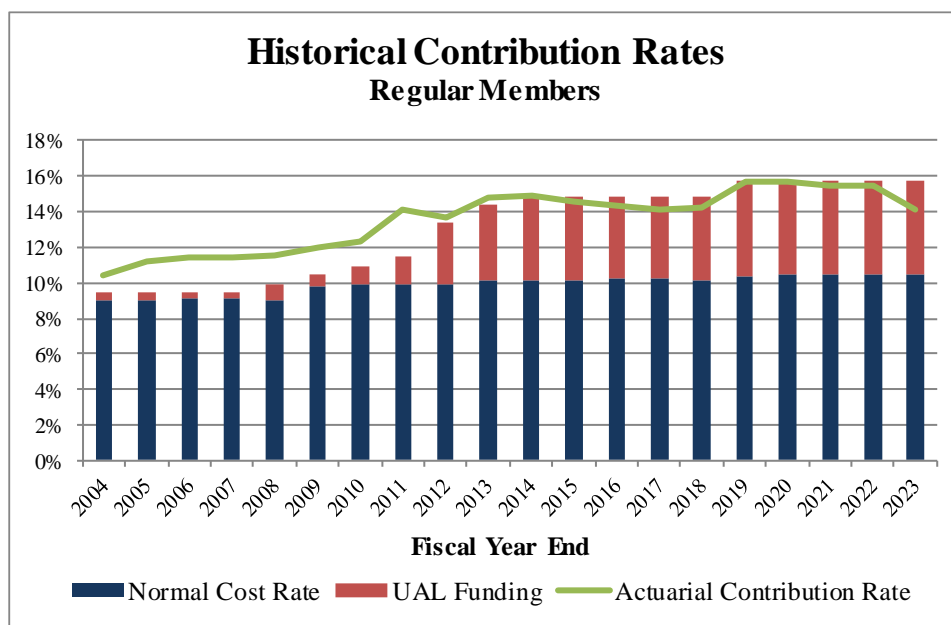
The Actuarial Contribution Rate is determined based on the snapshot of the System taken on the valuation date, June 30, 2021, and applies only for the fiscal year beginning July 1, 2022. The Actuarial Contribution Rate in future years will change each year as the deferred actuarial investment experience 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.

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

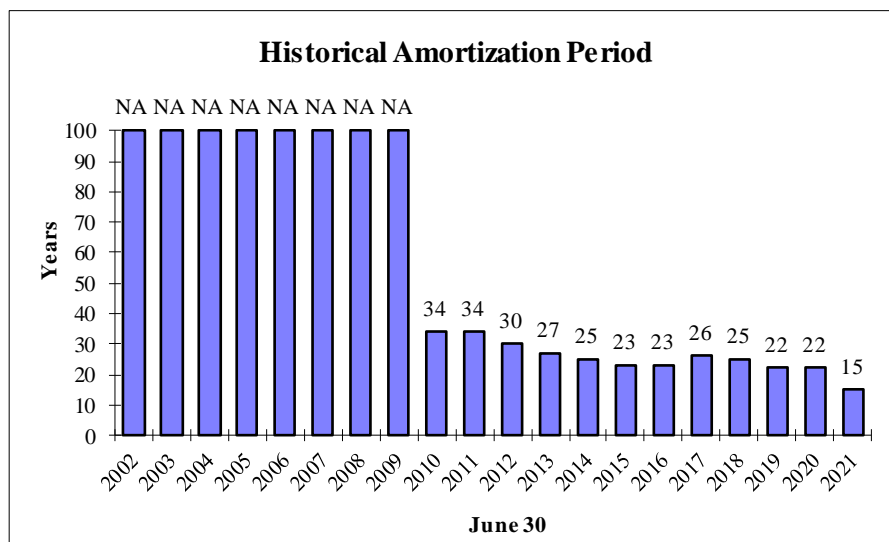


SECTION I – EXECUTIVE SUMMARY

summary of the actual contribution rate, split between the normal cost and the remaining amount available to fund the UAL, and the Actuarial Contribution Rate is shown in the following graph.



At the beginning of this time period, the actual contribution rates were less than the Actuarial Contribution Rate and a very small portion of the total contribution rate was available to fund the UAL. Recent changes have significantly increased this portion, providing more progress toward eliminating the UAL.



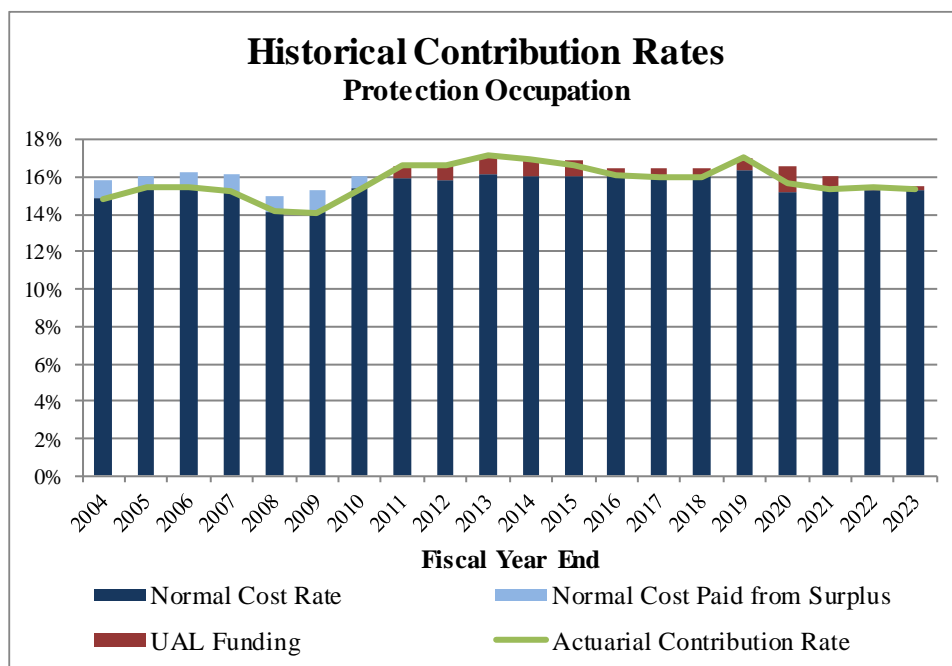
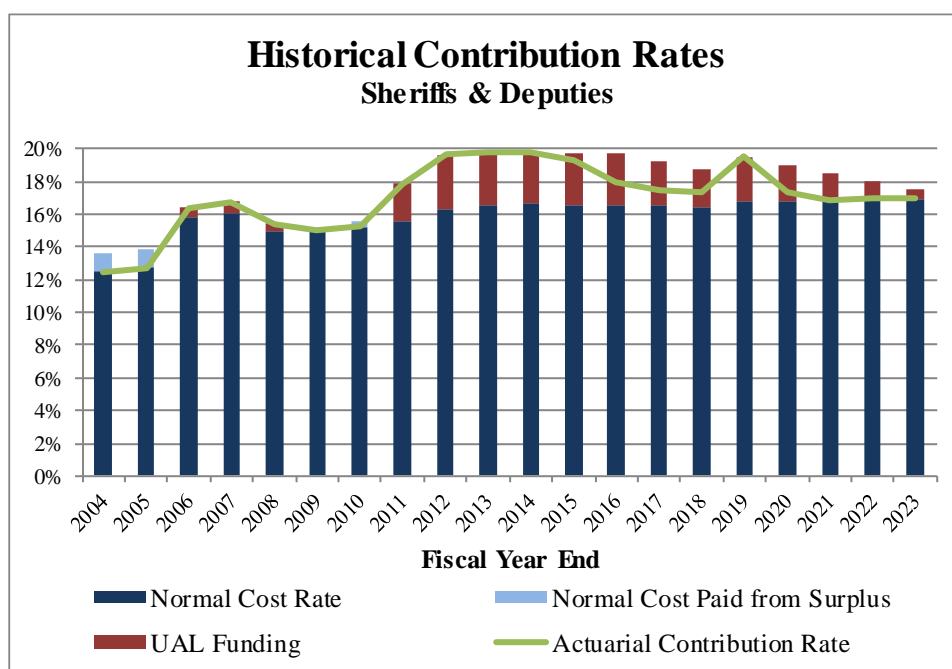
Based on the fixed contribution rates in place at the time, the UAL amortization period was infinite in the 2002 to 2009 valuations. Due to the benefit reductions in 2010 and increases in the contribution rate beginning in FY 2012, more is available to finance the UAL and the years to amortize is finite. Investment experience in the future will have a significant impact on 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 13 through 15 for the applicable amortization periods established pursuant to the Actuarial Amortization Method.



SECTION I – EXECUTIVE SUMMARY

As shown in the following graphs, the Sheriffs and Deputies group and the Protection Occupation group have historically contributed the full Actuarial Contribution Rate. During the 20-year period shown, both groups have contributed the full Actuarial Contribution Rate every year (sometimes using surplus to fund part of the normal cost rate), and have contributed more than the ACR in eight of the past nine years, due to the Contribution Rate Funding Policy. As a result, the current valuation results show that both groups have a very strong funded ratio (102.7% for Sheriffs and Deputies, and 103.1% for Protection Occupation).





SECTION I – EXECUTIVE SUMMARY

SUMMARY

The investment return on the market value of assets for FY 2021 was 29.63%, as reported by IPERS. This led to an investment return on the actuarial value of assets of 12.21%, which is above the assumed investment return of 7.00%. Therefore, there was an experience gain on the actuarial value of assets of \$1.768 billion. This was partially offset by an experience loss on the System's liabilities of \$164 million. The System's total experience for FY 2021 was a net experience gain of \$1.604 billion, resulting in a smaller unfunded actuarial liability than was expected.

For each membership group, the Actuarial Contribution Rate consists of the normal cost and an amortization payment (not less than zero) of the group's unfunded actuarial liability. The normal cost may only be offset by a negative amortization payment after a membership group has attained a funded ratio of 110% or greater for three consecutive years. The following table summarizes the change to the Actuarial Contribution Rate as well as the Required Contribution Rate, based on the current valuation results.

	2021 Valuation (FY 2023)	2020 Valuation (FY 2022)	Change
Regular Members			
Actuarial Contribution Rate	14.14%	15.52%	(1.38%)
Required Contribution Rate	15.73%	15.73%	0.00%
Sheriffs & Deputies			
Actuarial Contribution Rate	16.93%	16.92%	0.01%
Required Contribution Rate	17.52%	18.02%	(0.50%)
Protection Occupation			
Actuarial Contribution Rate	15.30%	15.46%	(0.16%)
Required Contribution Rate	15.52%	15.52%	0.00%

As illustrated above, the Required Contribution Rate declined for the Sheriffs and Deputies group but remained the same for the Regular Members and Protection Occupation groups. **The Required Contribution Rate remains higher than the Actuarial Contribution Rate for FY 2023 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, 2021, and applies only for the fiscal year beginning July 1, 2022. 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 the decrease in the rate. Therefore, depending on actual experience in future years, the Required Contribution Rate may vary from the Actuarial Contribution Rate.

As mentioned earlier, 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, particularly if deferred investment losses exist. The asset smoothing



SECTION I – EXECUTIVE SUMMARY

method impacts only the timing of when the actual market experience is recognized in the valuation process. As a result of the smoothing of actual returns, there is currently a deferred investment gain of \$5.305 billion. The key valuation results, using both actuarial and market value of assets, are shown below:

Actuarial Contribution Rate*	<u>Actuarial Value</u>	<u>Market Value</u>
<u>Regular Members</u>		
Normal Cost	10.49%	10.49%
UAL Contribution	<u>3.65%</u>	<u>(0.60%)</u>
Total Contribution	14.14%	9.89%
UAL (\$M)	\$5,043	\$140
Funded Ratio	87.32%	99.65%
<u>Sheriffs & Deputies</u>		
Normal Cost	16.93%	16.93%
UAL Contribution	<u>(1.03%)</u>	<u>(6.18%)</u>
Total Contribution	15.90%	10.75%
UAL (\$M)	(\$22)	(\$141)
Funded Ratio	102.73%	117.26%
<u>Protection Occupation</u>		
Normal Cost	15.30%	15.30%
UAL Contribution	<u>(0.84%)</u>	<u>(4.71%)</u>
Total Contribution	14.46%	10.59%
UAL (\$M)	(\$61)	(\$344)
Funded Ratio	103.13%	117.66%

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

A typical retirement plan faces many different risks. The term "risk" is most commonly associated with an outcome with undesirable results. However, in the actuarial world risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions each year and that uncertainty, whether favorable or unfavorable, creates risk. Actuarial Standard of Practice Number 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different from the actuarial assumptions.



SECTION I – EXECUTIVE SUMMARY

Risk evaluation is an important part of managing any defined benefit plan. A separate Risk Study was prepared for the Iowa Public Employees' Retirement System in March, 2019 that included a comprehensive evaluation of the various risks facing the System, using both qualitative and quantitative analysis. The findings and conclusions of the report were presented to the Investment Board on March 22, 2019. The Risk Report included various types of quantitative analysis including stress tests, sensitivity analysis, and stochastic modeling. A brief discussion of certain key risks is included in Section VI of this report, but for a more comprehensive discussion please see the full Risk Report, dated March, 2019. While the Risk Report was based on the 2018 valuation, we believe that the key results remain relevant.

We conclude this executive summary by presenting comparative statistics and actuarial information on both the June 30, 2021 and June 30, 2020 valuations. All figures shown include the Regular membership, Sheriffs and Deputies, and the Protection Occupation group.



SECTION I – EXECUTIVE SUMMARY

SUMMARY OF HISTORICAL CHANGE IN IPERS UNFUNDED ACTUARIAL LIABILITY

<u>(\$Millions)</u>	<u>FY03</u>	<u>FY04</u>	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>	<u>FY10</u>	<u>FY11</u>	<u>FY12</u>	<u>FY13</u>
Unfunded Actuarial Liability (BOY¹)	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 (EOY²)	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.



SECTION I – EXECUTIVE SUMMARY

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

<u>(\$Millions)</u>	<u>FY14</u>	<u>FY15</u>	<u>FY16</u>	<u>FY17</u>	<u>FY18</u>	<u>FY19</u>	<u>FY20</u>	<u>FY21</u>
Unfunded Actuarial Liability (BOY¹)	5,787	5,544	5,455	5,586	6,968	6,815	6,477	6,587
• Expected Change								
– From Amortization Method	99	72	54	52	185	43	14	12
– Contributions different than Actuarial Rate	0	(20)	(38)	(58)	(57)	0	(8)	(30)
• Investment Experience	(527)	(171)	236	(102)	(162)	(229)	146	(1,768)
• Liability and Other Experience	(29)	30	(121)	57	(154)	(152)	(42)	159
• Benefit Enhancements	0	0	0	0	0	0	0	0
• Change in Assumptions/Methods	215	0	0	1,433	35	0	0	0
• Change in Actuarial Software	0	0	0	0	0	0	0	0
• FED Transfer	(1)	0	0	0	0	0	0	0
Unfunded Actuarial Liability (EOY²)	5,544	5,455	5,586	6,968	6,815	6,477	6,587	4,960

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.



SECTION I – EXECUTIVE SUMMARY

IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM PRINCIPAL RESULTS

	June 30, 2021	June 30, 2020	% Chg
SYSTEM MEMBERSHIP			
1. Active Membership			
- Number of Members (excluding Retired/Reemployed)			
i) Regular	164,267	161,351	1.8
ii) Sheriffs & Deputies	1,675	1,685	(0.6)
iii) Protection Occupation	<u>7,362</u>	<u>7,304</u>	0.8
iv) Total	173,304	170,340	1.7
- Projected Payroll for Upcoming Fiscal Year	\$8,925M	\$8,621M	3.5
- Average Projected Salary	\$51,497	\$50,611	1.8
2. Inactive Membership			
- Number Not in Pay Status	78,515	77,224	1.7
- Number of Retirees/Beneficiaries	128,589	126,358	1.8
- Average Annual Benefit	\$18,252	\$17,827	2.4
ASSETS AND LIABILITIES			
1. Net Assets (excluding FED reserve)			
- Market Value	\$42,890M	\$34,048M	26.0
- Actuarial Value	37,585M	34,486M	9.0
2. Projected Liabilities			
- Retired Members	\$23,244M	\$22,406M	3.7
- Inactive Members	1,208M	1,025M	17.9
- Active Members	<u>26,649M</u>	<u>25,867M</u>	3.0
- Total Liability	\$51,100M	\$49,298M	3.7
3. Actuarial Liability	\$42,545M	\$41,072M	3.6
4. Unfunded Actuarial Liability	\$4,960M	\$6,587M	(24.7)
5. Funded Ratio			
a. Actuarial Value Assets/Actuarial Liability	88.34%	83.96%	5.2
b. Market Value Assets/Actuarial Liability	100.81%	82.90%	21.6
SYSTEM CONTRIBUTIONS			
Required Contribution Rate, Regular Members*	15.73%	15.73%	0.0
Employer Contribution Rate	9.44%	9.44%	0.0
Employee Contribution Rate	6.29%	6.29%	0.0
Total Actuarial Contribution Rate	14.14%	15.52%	(8.9)
Shortfall/(Margin)	(1.59%)	(0.21%)	657.1

Note: Totals may not add due to rounding

M = (\$)Millions

* Contribution rates for Sheriffs and Deputies are 8.76% for employers, 8.76% for employees

Contribution rates for Protection Occupation are 9.31% for employers, 6.21% for employees



SECTION II
SYSTEM ASSETS



SECTION II – SYSTEM ASSETS

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SECTION II – SYSTEM ASSETS

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.



SECTION II – SYSTEM ASSETS

EXHIBIT 1

ANALYSIS OF NET ASSETS AT MARKET VALUES

	(\$ Millions)			
	June 30, 2021		June 30, 2020	
	<u>Amount</u>	<u>% of Total</u>	<u>Amount</u>	<u>% of Total</u>
Cash & Equivalents	\$ 510	1.2%	\$ 487	1.4%
Capital Assets, Receivables and Payables	(772)	(1.8)	(1,286)	(3.8)
Domestic Equity	9,251	21.6	7,286	21.4
International Equity	9,649	22.5	7,776	22.8
Fixed Income	12,677	29.5	10,638	31.4
Private Real Assets	2,361	5.5	2,076	6.1
Private Equity/Debt	8,653	20.2	5,975	17.5
Securities Lending Collateral Pool	<u>561</u>	<u>1.3</u>	<u>1,096</u>	<u>3.2</u>
TOTAL NET ASSETS	\$ 42,890	100.0%	\$ 34,048	100.0%
FED Reserve (Before current year transfer)	0		0	
Current Year FED Transfer Payable	<u>0</u>		<u>0</u>	
Net Retirement System Assets	\$ 42,890		\$ 34,048	



SECTION II – SYSTEM ASSETS

EXHIBIT 2

SUMMARY OF FUND ACTIVITY (Market Value)

	<u>Regular Membership</u>	<u>Sheriffs & Deputies</u>	<u>Protection Occupation</u>	<u>FED Reserve</u>	<u>Total</u>
NET RETIREMENT SYSTEM ASSETS ON JUNE 30, 2020	\$31,493,894,122	\$749,717,084	\$1,804,080,906	\$0	\$34,047,692,112
REVENUE					
Employer contributions	767,476,814	11,762,537	38,322,099	0	817,561,450
Member contributions	511,766,745	11,762,537	25,561,358	0	549,090,640
Service purchase	5,002,225	73,194	144,803	0	5,220,222
Investment income	9,218,992,143	220,576,774	531,511,323	0	9,971,080,240
Total Revenue	<u>\$10,503,237,927</u>	<u>\$244,175,042</u>	<u>\$595,539,583</u>	<u>\$0</u>	<u>\$11,342,952,552</u>
DISBURSEMENTS					
Benefit payments	2,233,444,286	38,954,234	92,776,553	0	2,365,175,073
Member refunds	46,951,714	1,051,836	5,632,135	0	53,635,685
Administrative expenses	13,258,679	110,367	482,923	0	13,851,969
Investment expenses	62,969,208	1,506,623	3,630,424	0	68,106,255
Total Disbursements	<u>\$2,356,623,887</u>	<u>\$41,623,060</u>	<u>\$102,522,035</u>	<u>\$0</u>	<u>\$2,500,768,982</u>
PRELIMINARY NET ASSETS ON JUNE 30, 2021	\$39,640,508,162	\$952,269,066	\$2,297,098,454	\$0	\$42,889,875,682
TRANSFERS					
Membership changes	(2,763,312)	5,404,042	(2,640,730)	0	0
FED Reserve	0	0	0	0	0
ADJUSTED NET ASSETS ON JUNE 30, 2021	\$39,637,744,850	\$957,673,108	\$2,294,457,724	\$0	\$42,889,875,682



SECTION II – SYSTEM ASSETS

EXHIBIT 3

ACTUARIAL VALUE OF NET ASSETS

	<u>Regular Membership</u>	<u>Sheriffs & Deputies</u>	<u>Protection Occupation</u>	<u>Total</u>
1. Actuarial Value of Assets as of June 30, 2020	\$31,900,331,425	\$758,806,089	\$1,826,519,231	\$34,485,656,745
2. Actual Receipts/Disbursements				
a. Contributions	1,284,245,784	23,598,268	64,028,260	1,371,872,312
b. Benefit Payments and Refunds	2,280,396,000	40,006,070	98,408,688	2,418,810,758
c. Net Change	(996,150,216)	(16,407,802)	(34,380,428)	(1,046,938,446)
3. Expected Value of Assets as of June 30, 2021 $[(1) \times 1.07] + [(2c) \times (1.07)^{-5}]$	33,102,928,829	794,950,153	1,918,812,186	35,816,691,168
4. Preliminary Market Value of Assets as of June 30, 2021	39,640,508,162	952,269,066	2,297,098,454	42,889,875,682
5. Difference Between Market and Expected Values (4) - (3)	6,537,579,333	157,318,913	378,286,268	7,073,184,514
6. Preliminary Actuarial Value of Assets as of June 30, 2021 (3) + [(5) x 25%]	34,737,323,662	834,279,881	2,013,383,753	37,584,987,296
7. Transfers				
a. Membership changes	(2,421,528)	4,735,636	(2,314,108)	0
b. FED Reserve	0	0	0	0
8. Initial Actuarial Value of Assets as of June 30, 2021	\$34,734,902,134	\$839,015,517	\$2,011,069,645	\$37,584,987,296
9. Determination of Corridor				
a. 80% of Market Value of Assets	31,710,195,880	766,138,486	1,835,566,179	34,311,900,545
b. 120% of Market Value of Assets	47,565,293,820	1,149,207,730	2,753,349,269	51,467,850,819
10. Final Actuarial Value of Assets as of June 30, 2021 (8), but not less than (9a), nor greater than (9b)	\$34,734,902,134	\$839,015,517	\$2,011,069,645	\$37,584,987,296



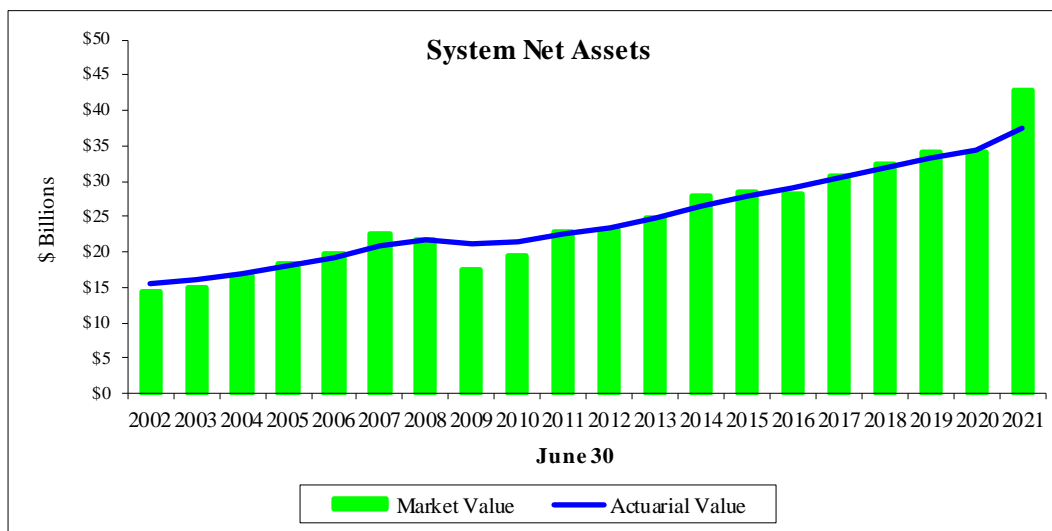
SECTION II – SYSTEM ASSETS

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
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%
2018	31,827,755,864	32,314,588,595	98%
2019	33,324,327,606	34,010,680,731	98%
2020	34,485,656,745	34,047,692,112	101%
2021	37,584,987,296	42,889,875,682	88%

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





SECTION II – SYSTEM ASSETS

EXHIBIT 5

SUMMARY OF FAVORABLE EXPERIENCE DIVIDEND RESERVE

1. Initial Market Value of FED Reserve as of June 30, 2021	\$	0
2. Transfer to Membership Groups		0
3. Final Value of FED Reserve as of June 30, 2021	\$	0
(1) - (2)		



SECTION III
SYSTEM LIABILITIES



SECTION III – SYSTEM LIABILITIES

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SECTION III – SYSTEM LIABILITIES

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:

<u>From</u>	<u>To</u>		
	<u>Regular</u>	<u>Sheriffs and Deputies</u>	<u>Protection Occupation</u>
Regular		16	202
Sheriffs and Deputies	3		25
Protection Occupation	196	70	

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

<u>Regular</u>	<u>Sheriffs and Deputies</u>	<u>Protection Occupation</u>
(\$3,415,812)	\$515,734	\$1,834,286



SECTION III – SYSTEM LIABILITIES

EXHIBIT 6

NET IMPACT OF MEMBER TRANSFERS DURING FY 2021

	<u>Regular Members</u>	<u>Sheriffs/ Deputies</u>	<u>Protection Occupation</u>
Preliminary Actuarial Liability	\$39,783,252,934	\$811,682,880	\$1,950,778,728
Net Effect of Transfers	(5,316,991)	5,020,798	(769,599)
Final Actuarial Liability	\$39,777,935,943	\$816,703,678	\$1,950,009,129
Preliminary Actuarial Value of Assets	\$34,736,803,313	\$834,510,453	\$2,013,673,530
Net Effect of Transfers	(1,901,179)	4,505,064	(2,603,885)
Final Actuarial Value of Assets	\$34,734,902,134	\$839,015,517	\$2,011,069,645
Preliminary Unfunded Actuarial Liability	\$5,046,449,621	(\$22,827,573)	(\$62,894,802)
Net Effect of Transfers	(3,415,812)	515,734	1,834,286
Final Unfunded Actuarial Liability	\$5,043,033,809	(\$22,311,839)	(\$61,060,516)
Preliminary Funded Ratio	87.32%	102.81%	103.22%
Final Funded Ratio	87.32%	102.73%	103.13%



SECTION III – SYSTEM LIABILITIES

EXHIBIT 7

PRESENT VALUE OF FUTURE BENEFITS as of June 30, 2021

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.

	<u>Regular Membership</u>	<u>Sheriffs & Deputies</u>	<u>Protection Occupation</u>	<u>Total</u>
Active Members				
Retirement benefits	\$22,583,561,108	\$545,237,857	\$1,249,151,943	\$24,377,950,908
Death benefits	271,833,813	7,275,507	23,785,398	302,894,718
Termination benefits	1,240,054,028	25,052,636	146,070,576	1,411,177,240
Disability benefits	484,704,718	17,622,865	54,584,451	556,912,034
Inactive Members				
Vested members	974,465,306	12,816,241	73,159,764	1,060,441,311
Nonvested members	143,112,212	452,786	3,551,689	147,116,687
Retired Members and Beneficiaries	<u>21,804,010,789</u>	<u>445,975,611</u>	<u>993,550,318</u>	<u>23,243,536,718</u>
Total Present Value of Future Benefits	\$47,501,741,974	\$1,054,433,503	\$2,543,854,139	\$51,100,029,616



SECTION III – SYSTEM LIABILITIES

EXHIBIT 8

UNFUNDED ACTUARIAL LIABILITY as of June 30, 2021

	<u>Regular Membership</u>	<u>Sheriffs & Deputies</u>	<u>Protection Occupation</u>	<u>Total</u>
1. Present Value of Future Benefits	\$47,501,741,974	\$1,054,433,503	\$2,543,854,139	\$51,100,029,616
2. Present Value of Future Normal Costs	<u>7,723,806,031</u>	<u>237,729,825</u>	<u>593,845,010</u>	<u>8,555,380,866</u>
3. Actuarial Liability (1) - (2)	\$39,777,935,943	\$816,703,678	\$1,950,009,129	\$42,544,648,750
4. Actuarial Value of Net Assets	<u>34,734,902,134</u>	<u>839,015,517</u>	<u>2,011,069,645</u>	<u>37,584,987,296</u>
5. Unfunded Actuarial Liability (3) - (4)	\$5,043,033,809	(\$22,311,839)	(\$61,060,516)	\$4,959,661,454
6. Funded Ratio (4) / (3)	87.32%	102.73%	103.13%	88.34%



SECTION III – SYSTEM LIABILITIES

EXHIBIT 9

CALCULATION OF ACTUARIAL (GAIN)/LOSS AND ANY TRANSFER TO THE FAVORABLE EXPERIENCE DIVIDEND RESERVE

Based on the June 30, 2021 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.

1. June 30, 2020 Unfunded Actuarial Liability	\$	6,586,770,795
2. Normal Cost for year ending June 30, 2021		869,569,752
3. Employer and Employee Contributions*		1,366,652,090
4. Change due to membership transfers		(1,065,792)
5. Change due to FED transfer		0
6. Change due to assumptions		0
7. Expected Unfunded Actuarial Liability as of June 30, 2021 [(1) + (2)] * 1.07 - (3) * (1.07) ⁻⁵ + (4) + (5) + (6)		6,563,542,679
8. Actual Unfunded Actuarial Liability as of June 30, 2021		4,959,661,454
9. (Gain)/loss (8) - (7)		(1,603,881,225)
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



SECTION III – SYSTEM LIABILITIES

EXHIBIT 10

ACTUARIAL (GAIN)/LOSS BY GROUP Based on the June 30, 2021 Actuarial Valuation

	<u>Regular Membership</u>	<u>Sheriffs & Deputies</u>	<u>Protection Occupation</u>	<u>Total</u>
1. Expected Actuarial Liability				
a. Actuarial Liability at June 30, 2020	\$38,469,643,936	\$766,018,806	\$1,836,764,798	\$41,072,427,540
b. Normal Cost for FY 2021	792,715,616	20,281,327	56,572,809	869,569,752
c. Benefit Payments for FY 2021	(2,280,396,000)	(40,006,070)	(98,408,688)	(2,418,810,758)
d. Interest on (a), (b), and (c) at 7.0%	2,669,901,204	53,664,479	129,147,582	2,852,713,265
e. Transfers and Service Purchases	(142,648)	5,096,510	(619,814)	4,334,048
f. Expected Actuarial Liability as of June 30, 2021	<u>\$39,651,722,108</u>	<u>\$805,055,052</u>	<u>\$1,923,456,687</u>	<u>\$42,380,233,847</u>
2. Actuarial Liability at June 30, 2021	\$39,777,935,943	\$816,703,678	\$1,950,009,129	\$42,544,648,750
3. Actuarial Liability (Gain)/Loss (2) - (1f)	\$126,213,835	\$11,648,626	\$26,552,442	\$164,414,903
4. Expected Actuarial Value of Assets				
a. Actuarial Value of Assets at June 30, 2020	\$31,900,331,425	\$758,806,089	\$1,826,519,231	\$34,485,656,745
b. Contributions for FY 2021	1,284,245,784	23,598,268	64,028,260	1,371,872,312
c. Benefit Payments for FY 2021	(2,280,396,000)	(40,006,070)	(98,408,688)	(2,418,810,758)
d. Interest on (a), (b), and (c) at 7.0%	2,198,747,620	52,551,866	126,673,383	2,377,972,869
e. Transfers	(2,421,528)	4,735,636	(2,314,108)	0
f. Expected Actuarial Value of Assets as of June 30, 2021	<u>\$33,100,507,301</u>	<u>\$799,685,789</u>	<u>\$1,916,498,078</u>	<u>\$35,816,691,168</u>
5. Actuarial Value of Assets at June 30, 2021	\$34,734,902,134	\$839,015,517	\$2,011,069,645	\$37,584,987,296
6. Actuarial Value of Assets (Gain)/Loss (4f) - (5)	(\$1,634,394,833)	(\$39,329,728)	(\$94,571,567)	(\$1,768,296,128)
7. Net Actuarial (Gain)/Loss (3) + (6)	(\$1,508,180,998)	(\$27,681,102)	(\$68,019,125)	(\$1,603,881,225)



SECTION IV
SYSTEM CONTRIBUTIONS



SECTION IV – SYSTEM CONTRIBUTIONS

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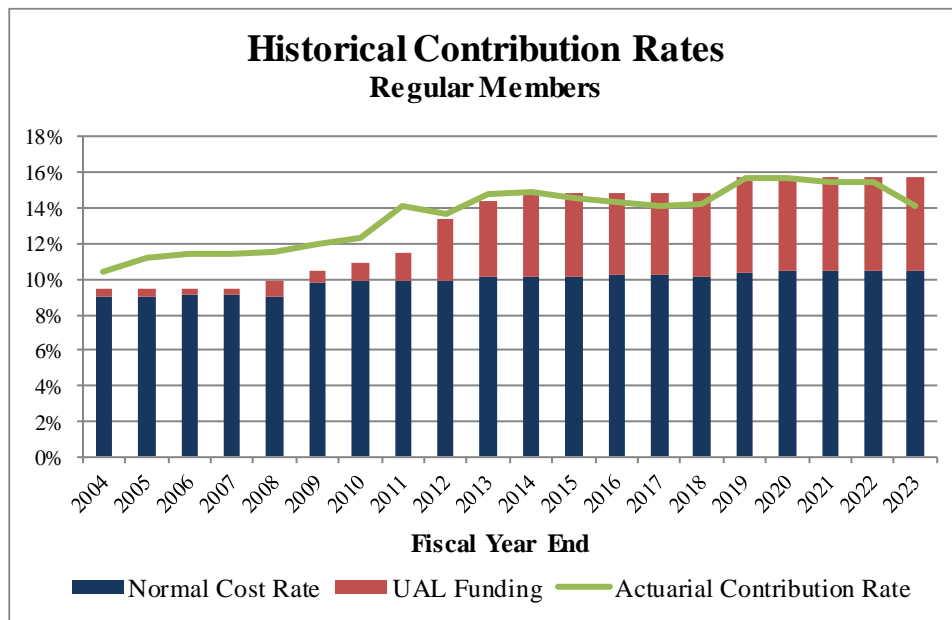
SECTION IV – SYSTEM CONTRIBUTIONS

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.



SECTION IV – SYSTEM CONTRIBUTIONS

EXHIBIT 11 ACTUARIAL BALANCE SHEET as of June 30, 2021

	<u>Regular Membership</u>	<u>Sheriffs & Deputies</u>	<u>Protection Occupation</u>	<u>Total</u>
<u>ASSETS</u>				
Actuarial value of assets	\$34,734,902,134	\$839,015,517	\$2,011,069,645	\$37,584,987,296
Present value of future normal costs	7,723,806,031	237,729,825	593,845,010	8,555,380,866
Present value of future contributions to amortize unfunded actuarial liability	5,043,033,809	(22,311,839)	(61,060,516)	4,959,661,454
Total Net Assets	\$47,501,741,974	\$1,054,433,503	\$2,543,854,139	\$51,100,029,616
<u>LIABILITIES</u>				
Present Value of Future Benefits:				
Retired Members and Beneficiaries	\$21,804,010,789	\$445,975,611	\$993,550,318	\$23,243,536,718
Active Members	24,580,153,667	595,188,865	1,473,592,368	26,648,934,900
Inactive Members	1,117,577,518	13,269,027	76,711,453	1,207,557,998
Total Liabilities	\$47,501,741,974	\$1,054,433,503	\$2,543,854,139	\$51,100,029,616



SECTION IV – SYSTEM CONTRIBUTIONS

EXHIBIT 12

PROJECTED UNFUNDED ACTUARIAL LIABILITY ON JUNE 30, 2022

	<u>Regular Membership</u>	<u>Sheriffs & Deputies</u>	<u>Protection Occupation</u>
1. FYE 2022 Required Contribution Rate	15.73%	18.02%	15.52%
2. Normal Cost Rate	10.49%	16.93%	15.30%
3. Contribution Rate Applied to Fund the UAL for FYE 2022 (1) - (2)	5.24%	1.09%	0.22%
4. Unfunded Actuarial Liability/(Surplus) on June 30, 2021	\$ 5,043,033,809	\$ (22,311,839)	\$ (61,060,516)
5. Projected Payroll for FYE 2022	\$ 8,492,337,363	\$ 131,646,478	\$ 419,435,203
6. Projected UAL on June 30, 2022 [(4) x 1.07] - [(3) x (5) x 1.07 ⁻⁵]	\$ 4,935,736,171	\$ (25,357,988)	\$ (66,289,260)



SECTION IV – SYSTEM CONTRIBUTIONS

EXHIBIT 13

UAL AMORTIZATION BASES REGULAR MEMBERS

Amortization Bases	Original Amount	Remaining Payments	Projected July 1, 2022 Balance	Annual Payment*
2014 Initial UAL	\$ 5,592,056,086	23	\$ 6,074,376,880	\$ 393,372,381
2015 Experience	(193,648,198)	14	(183,093,210)	(16,883,541)
2016 Experience	21,763,596	15	20,877,557	1,826,374
2017 Experience	(158,062,524)	16	(153,169,725)	(12,767,054)
2017 Assumption Changes	1,435,708,789	16	1,391,266,668	115,965,325
2018 Experience	(310,129,854)	17	(304,323,357)	(24,261,369)
2018 Assumption Changes	75,130,979	17	73,724,317	5,877,475
2019 Experience	(384,733,612)	18	(381,012,658)	(29,150,217)
2020 Experience	67,832,112	19	67,593,482	4,977,680
2021 Experience	(1,670,503,783)	20	(1,670,503,783)	(118,726,868)
Total			\$ 4,935,736,171	\$ 320,230,186

* Payment amount reflects mid-year timing.

1. Total UAL Amortization Payments	\$ 320,230,186
2. Projected Payroll for FYE 2022	\$ 8,492,337,363
3. Projected Payroll for FYE 2023 (2) x 1.0325	\$ 8,768,338,327
4. UAL Amortization Payment Rate (1) / (3)	3.65%

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.



SECTION IV – SYSTEM CONTRIBUTIONS

EXHIBIT 14

UAL AMORTIZATION BASES SHERIFFS & DEPUTIES

Amortization Bases	Original Amount	Remaining Payments	Projected July 1, 2022 Balance	Annual Payment*
2021 Initial UAL	(25,357,988)	30	(25,357,988)	(1,399,051)
Total			\$ (25,357,988)	\$ (1,399,051)

* Payment amount reflects mid-year timing.

1. Total UAL Amortization Payments	\$ (1,399,051)
2. Projected Payroll for FYE 2022	\$ 131,646,478
3. Projected Payroll for FYE 2023 (2) x 1.0325	\$ 135,924,989
4. UAL Amortization Payment Rate (1) / (3)	(1.03%)

Note: Based on the Actuarial Amortization Method, adopted by the Investment Board, once a group has a surplus the prior amortization bases will be eliminated and the surplus will be amortized over an open 30-year period.



SECTION IV – SYSTEM CONTRIBUTIONS

EXHIBIT 15

UAL AMORTIZATION BASES PROTECTION OCCUPATION

Amortization Bases	Original Amount	Remaining Payments	Projected July 1, 2022 Balance	Annual Payment*
2021 Initial UAL	(66,289,260)	30	(66,289,260)	(3,657,312)
Total			\$ (66,289,260)	\$ (3,657,312)

* Payment amount reflects mid-year timing.

1. Total UAL Amortization Payments	\$ (3,657,312)
2. Projected Payroll for FYE 2022	\$ 419,435,203
3. Projected Payroll for FYE 2023 (2) x 1.0325	\$ 433,066,847
4. UAL Amortization Payment Rate (1) / (3)	(0.84%)

Note: Based on the Actuarial Amortization Method, adopted by the Investment Board, once a group has a surplus the prior amortization bases will be eliminated and the surplus will be amortized over an open 30-year period.



SECTION IV – SYSTEM CONTRIBUTIONS

EXHIBIT 16

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, 2021 actuarial valuation and applies to the fiscal year beginning July 1, 2022 and ending June 30, 2023.

	<u>Regular Membership</u>	<u>Sheriffs & Deputies</u>	<u>Protection Occupation</u>
1. Normal Cost Rate	10.49%	16.93%	15.30%
2. UAL Contribution Rate for FY 2023	3.65%	(1.03%)	(0.84%)
3. Funded Ratio as of June 30, 2021	87.3%	102.7%	103.1%
Funded Ratio as of June 30, 2020	82.9%	99.1%	99.4%
Funded Ratio as of June 30, 2019	82.7%	99.0%	99.6%
4. UAL Contribution Rate Applicable for FY 2023* (2) if positive	3.65%	0.00%	0.00%
5. Actuarial Contribution Rate for FY 2023 (1) + (4)	14.14%	16.93%	15.30%
6. Required Contribution Rate for FY 2022	15.73%	18.02%	15.52%
7. Required Contribution Rate for FY 2023**	15.73%	17.52%	15.52%
Employer Contribution Rate	9.44%	8.76%	9.31%
Employee Contribution Rate	6.29%	8.76%	6.21%

* The UAL Contribution Rate is allowed to be negative only if the funded ratio was at least 110% in each of the past three years.

** 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.



SECTION IV – SYSTEM CONTRIBUTIONS

EXHIBIT 17

UNFUNDED ACTUARIAL LIABILITY AMORTIZATION SCHEDULE REGULAR MEMBERS

This schedule illustrates the theoretical funding of the UAL over the remaining amortization period assuming all assumptions are met in the future (no experience gains or losses) and the Actuarial Contribution Rate (rather than the Required Contribution Rate) is contributed in future years. As a result, the years to full funding shown here will vary from the number of years disclosed in the Executive Summary of this report.

Fiscal Year Ending June 30	Projected Active Member Payroll	Unfunded Actuarial Liability (BOY)	Annual Contributions	
			Dollars	% of Payroll
-----\$ in millions-----				
2023	8,768	4,936	320	3.65
2024	9,053	4,950	331	3.65
2025	9,348	4,954	341	3.65
2026	9,651	4,948	352	3.65
2027	9,965	4,930	364	3.65
2028	10,289	4,899	376	3.65
2029	10,623	4,853	388	3.65
2030	10,969	4,791	401	3.65
2031	11,325	4,712	414	3.65
2032	11,693	4,614	427	3.65
2033	12,073	4,495	441	3.65
2034	12,465	4,354	455	3.65
2035	12,871	4,188	470	3.65
2036	13,289	3,995	485	3.65
2037	13,721	3,772	528	3.84
2038	14,167	3,491	542	3.82
2039	14,627	3,175	387	2.65
2040	15,102	2,997	431	2.86
2041	15,593	2,760	497	3.19
2042	16,100	2,439	504	3.13
2043	16,623	2,088	746	4.49
2044	17,164	1,463	770	4.49
2045	17,721	769	795	4.49
2046	18,297	0	0	0.00

Note that the outstanding balance of the UAL increases for two years before starting to decline. This pattern is due to use of the level percent of payroll amortization methodology where the dollar amount of the UAL payment increases with expected payroll in future years. The current valuation results for the Sheriffs & Deputies and Protection Occupation groups have a negative UAL, which will be amortized over an open 30-year period. Consequently, no table is displayed.



SECTION V

HISTORICAL FUNDING AND OTHER INFORMATION



SECTION V – HISTORICAL FUNDING AND OTHER INFORMATION

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SECTION V – HISTORICAL FUNDING AND OTHER INFORMATION

In this section, we provide some historical information regarding the funding progress of the System. These exhibits retain some of the information that used to be required for accounting purposes and are included because they provide relevant information on the System's historical funding.



SECTION V – HISTORICAL FUNDING AND OTHER INFORMATION

EXHIBIT 18

SUMMARY OF VALUATION MEMBERSHIP

	<u>June 30, 2021</u>	<u>June 30, 2020</u>
Active Employees:		
Vested	98,399	97,354
Not yet vested	<u>74,905</u>	<u>72,986</u>
Total active employees	173,304	170,340
Retirees and beneficiaries currently receiving benefits*	128,589	126,358
Inactive vested members entitled to benefits but not yet receiving them	25,279	26,091
Inactive, nonvested members entitled to a refund of contributions**	53,236	51,133

* Retired/reemployed members are included in retiree counts, but not the active or inactive counts. Counts are 9,321 for 2021 and 10,530 for 2020.

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



SECTION V – HISTORICAL FUNDING AND OTHER INFORMATION

EXHIBIT 19

SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation <u>Date</u>	Net Actuarial Value of Assets <u>(a)</u>	Actuarial Liability (AL) <u>(b)</u>	Unfunded AL (UAL) <u>(b-a)</u>	Funded Ratio <u>(a/b)</u>	Actual Covered Payroll (P/R)* <u>(c)</u>	UAL as a Percentage of Covered P/R <u>[(b-a)/c]</u>
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%
6/30/18	31,827,755,864	38,642,833,653	6,815,077,789	82.36%	7,983,219,527	85.37%
6/30/19	33,324,327,606	39,801,338,797	6,477,011,191	83.73%	8,151,043,468	79.46%
6/30/20	34,485,656,745	41,072,427,540	6,586,770,795	83.96%	8,391,856,350	78.49%
6/30/21	37,584,987,296	42,544,648,750	4,959,661,454	88.34%	8,648,783,536	57.35%

* Covered payroll amount provided by the System.
Note: Includes all three membership groups.



SECTION V – HISTORICAL FUNDING AND OTHER INFORMATION

EXHIBIT 20

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.

Fiscal Year Ending	Actuarial Contribution Rate (ACR)				Percentage of ACR Contributed			
	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%
6/30/18	641,386,156	9,753,998	33,724,988	684,865,142	104.7%	108.3%	102.6%	104.7%
6/30/19	722,765,827	11,468,737	37,547,744	771,782,308	100.0%	100.0%	100.0%	100.0%
6/30/20	741,160,205	10,570,255	35,771,734	787,502,194	100.2%	109.9%	105.8%	100.6%
6/30/21	753,395,571	10,720,930	36,727,006	800,843,507	101.9%	109.7%	104.3%	102.1%



SECTION V – HISTORICAL FUNDING AND OTHER INFORMATION

EXHIBIT 21

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.

<u>Fiscal Year End</u>	<u>Actives at 6/30/21</u>	<u>Retirees at 6/30/21</u>	<u>Total</u>
2022	\$187,031,000	\$2,341,289,000	\$2,528,320,000
2023	329,835,000	2,300,681,000	2,630,516,000
2024	470,776,000	2,257,937,000	2,728,713,000
2025	609,580,000	2,212,859,000	2,822,439,000
2026	748,880,000	2,165,398,000	2,914,278,000
2027	888,704,000	2,115,450,000	3,004,154,000
2028	1,029,377,000	2,063,003,000	3,092,380,000
2029	1,174,962,000	2,008,212,000	3,183,174,000
2030	1,322,145,000	1,950,885,000	3,273,030,000
2031	1,469,891,000	1,890,729,000	3,360,620,000
2032	1,618,733,000	1,828,476,000	3,447,209,000
2033	1,771,998,000	1,764,212,000	3,536,210,000
2034	1,927,241,000	1,697,631,000	3,624,872,000
2035	2,083,510,000	1,628,785,000	3,712,295,000
2036	2,238,626,000	1,557,766,000	3,796,392,000
2037	2,398,402,000	1,484,722,000	3,883,124,000
2038	2,560,136,000	1,409,850,000	3,969,986,000
2039	2,723,802,000	1,333,395,000	4,057,197,000
2040	2,889,861,000	1,255,655,000	4,145,516,000
2041	3,057,358,000	1,176,989,000	4,234,347,000

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. All three membership groups are included.



SECTION V – HISTORICAL FUNDING AND OTHER INFORMATION

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SECTION VI
RISK CONSIDERATIONS



SECTION VI – RISK CONSIDERATIONS

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SECTION VI – RISK CONSIDERATIONS

A typical retirement plan faces many different risks. The term “risk” is most commonly associated with an outcome with undesirable results. However, in the actuarial world risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions each year and that uncertainty, whether favorable or unfavorable, creates risk. Actuarial Standard of Practice Number 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different than the actuarial assumptions.

Risk evaluation is an important part of managing a defined benefit plan. A separate Risk Study was prepared for the Iowa Public Employees’ Retirement System in March 2019 that included a comprehensive evaluation of the various risks facing the System, using both qualitative and quantitative analysis. The findings and conclusions of the report were presented to the Investment Board on March 22, 2019. The Risk Report included various types of quantitative analysis including stress tests, sensitivity analysis, and stochastic modeling. A brief discussion of certain key risks is included in this report, but for a more comprehensive discussion please see the full Risk Report, dated March 2019. While this Risk Report was based on the June 30, 2018 valuation, we believe that the key results and analysis remain relevant.

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 (these are not included in ASOP 51).

The IPERS Contribution Rate Funding Policy is designed to help IPERS manage contribution and funding risks. It is a positive factor in risk assessment because it permits the Required Contribution Rate to increase based on the results of the actuarial valuation but limits any reduction to the Required Contribution Rate until the group is at least 95% funded.

The most significant negative risk factor for IPERS and most retirement systems is investment returns because of the volatility of returns and the size of plan assets compared to payroll (see Exhibit 22). 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) differing from 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, the COVID-19 pandemic has reminded us that 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, or a new endemic disease. This type of event is also significant, although the experience is more easily absorbed by the System.

When the actuarial valuation is performed each year, it determines the funded ratio, unfunded actuarial liability and the contribution rates needed to fully fund the System based on IPERS funding policy. The contributions needed (normal cost plus UAL amortization) are expressed as a percent of payroll which is consistent with how contributions are collected. Because the amortization payment on the unfunded actuarial liability is determined using the level percent of payroll methodology, an assumption must be used to develop



SECTION VI – RISK CONSIDERATIONS

the payment schedule for the amortization of the UAL. The current payroll growth assumption for IPERS is 3.25% per year which implicitly assumes that the number of active members remains stable over time.

The funding of the System could be negatively impacted if there was a material decline in the IPERS' active membership. When the payroll of IPERS declines, it requires an increase in the contribution rate to fund the System even if the UAL is unchanged. While the dollar amount of the UAL payment might be the same, the contribution rate has to increase to collect the same dollar amount. A decline in IPERS active membership could occur for a number of reasons, but the risk is likely different for the three groups. If the state of Iowa experiences severe and prolonged fiscal challenges, the number of State employees might be reduced. Alternatively, if there is a decline in the student population, it could reduce the need to maintain the current level of teachers. Another possibility that could impact the number of active members is a shift in the way education is delivered, with higher utilization of online teaching. Regardless of the cause for the decline, a substantial decrease in the active membership could pose a risk to the stability of contribution rates.

The risk to the Regular membership of IPERS is likely mitigated because IPERS covers a diverse population across the entire state of Iowa and, as a result, is less vulnerable to significant decreases in the size of the active membership because changes often do not impact all of the various groups. The largest portion of the Regular membership is school employees which again, includes many different school districts across the state, thereby reducing the likelihood of a consistent reduction of active members across all school employers.

A significant decrease in the Sheriffs and Deputies or Protection Occupation groups may be less likely given the type of jobs covered and the ability of the state and counties to severely reduce the size of the covered group. However, because these groups are much smaller, modest changes could be more noticeable as a percentage of membership.

A common theme for most retirement plans is that risks change as a plan matures. Because this is a fundamental issue, ASOP 51 gives special attention to requiring the disclosure of appropriate measures of how a plan is maturing. In this section, we provide a number of illustrations to help demonstrate this trend. The following exhibits summarize some historical information that helps indicate how certain key risk metrics have changed over time. It is worth noting that the three membership groups in IPERS (Regular, Sheriffs and Deputies, and Protection Occupation) have some differences that relate to the nature of retirement eligibility and the historical inclusion of certain employment categories. This uniqueness can help explain why certain events may affect the groups differently.



SECTION VI – RISK CONSIDERATIONS

EXHIBIT 22

ASSET VOLATILITY 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 the asset volatility ratio, is an important indicator of the contribution risk for the System. The higher this ratio, the more sensitive a plan's contribution rate is to investment return volatility.

Fiscal Year End	Market Value of Assets (\$ Millions)			Actual Covered Payroll* (\$ Millions)			Asset Volatility Ratio		
	Regular Members	Sheriffs & Deputies	Protection Occupation	Regular Members	Sheriffs & Deputies	Protection Occupation	Regular Members	Sheriffs & Deputies	Protection Occupation
6/30/09	\$16,592.7	\$312.5	\$698.1	\$6,059.4	\$85.9	\$293.3	2.74	3.64	2.38
6/30/10	18,375.9	353.3	809.7	6,180.7	84.8	305.7	2.97	4.17	2.65
6/30/11	21,365.7	422.9	983.8	6,185.9	90.5	298.5	3.45	4.67	3.30
6/30/12	21,567.5	437.4	1,019.9	6,377.4	93.3	315.5	3.38	4.69	3.23
6/30/13	23,137.3	484.5	1,134.8	6,473.8	93.6	312.7	3.57	5.18	3.63
6/30/14	26,157.8	559.3	1,321.5	6,679.7	97.7	321.9	3.92	5.72	4.11
6/30/15	26,480.4	578.3	1,371.1	6,893.3	100.5	332.6	3.84	5.76	4.12
6/30/16	26,341.4	588.1	1,396.9	7,114.9	105.9	335.8	3.70	5.56	4.16
6/30/17	28,575.3	649.7	1,554.2	7,405.5	109.5	348.2	3.86	5.93	4.46
6/30/18	29,962.9	693.6	1,658.1	7,515.6	115.2	352.4	3.99	6.02	4.71
6/30/19	31,494.6	739.2	1,776.8	7,667.8	117.6	365.7	4.11	6.29	4.86
6/30/20	31,493.9	749.7	1,804.1	7,887.4	122.1	382.4	3.99	6.14	4.72
6/30/21	39,637.7	957.7	2,294.5	8,123.5	126.9	398.4	4.88	7.55	5.76

* Covered payroll amounts provided by the System.

Note: The impact of asset smoothing is not reflected in the impact on the ACR and amortization of the asset loss is over 20 years.
Current year assumptions are used for all years shown.



SECTION VI – RISK CONSIDERATIONS

EXHIBIT 22

HISTORICAL ASSET VOLATILITY RATIO (continued)

Fiscal Year End	Asset Volatility Ratio			Increase in ACR with a One-Time Return 10% Lower than Assumed		
	Regular Members	Sheriffs & Deputies	Protection Occupation	Regular Members	Sheriffs & Deputies	Protection Occupation
6/30/09	2.74	3.64	2.38	1.95%	2.59%	1.69%
6/30/10	2.97	4.17	2.65	2.11%	2.96%	1.88%
6/30/11	3.45	4.67	3.30	2.45%	3.32%	2.35%
6/30/12	3.38	4.69	3.23	2.40%	3.33%	2.30%
6/30/13	3.57	5.18	3.63	2.54%	3.68%	2.58%
6/30/14	3.92	5.72	4.11	2.79%	4.07%	2.92%
6/30/15	3.84	5.76	4.12	2.73%	4.09%	2.93%
6/30/16	3.70	5.56	4.16	2.63%	3.95%	2.96%
6/30/17	3.86	5.93	4.46	2.74%	4.21%	3.17%
6/30/18	3.99	6.02	4.71	2.84%	4.28%	3.35%
6/30/19	4.11	6.29	4.86	2.92%	4.47%	3.45%
6/30/20	3.99	6.14	4.72	2.84%	4.36%	3.35%
6/30/21	4.88	7.55	5.76	3.47%	5.37%	4.09%

Note: The impact of asset smoothing is not reflected in the impact on the ACR and amortization of the asset loss is over 20 years.
Current year assumptions are used for all years shown.



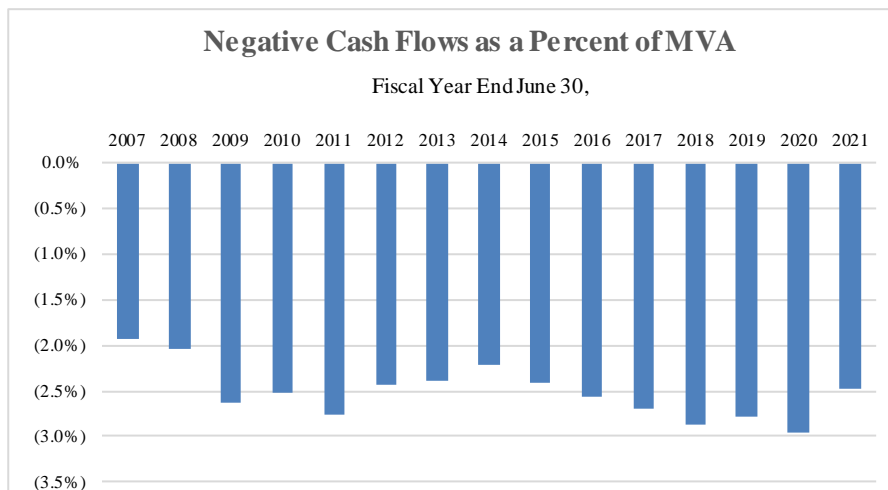
SECTION VI – RISK CONSIDERATIONS

EXHIBIT 23

HISTORICAL CASH FLOWS

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

<u>Fiscal Year End</u>	<u>Market Value of Assets (MVA)</u>	<u>Contributions</u>	<u>Benefit Payments and Expenses</u>	<u>Net Cash Flow</u>	<u>Net Cash Flow as a Percent of MVA</u>
6/30/07	\$22,624,387,015	\$574,604,219	\$1,008,234,774	(\$433,630,555)	(1.92%)
6/30/08	21,844,112,206	634,189,547	1,081,702,594	(447,513,047)	(2.05%)
6/30/09	17,603,316,618	695,559,397	1,159,167,389	(463,607,992)	(2.63%)
6/30/10	19,538,971,423	755,210,092	1,250,296,562	(495,086,470)	(2.53%)
6/30/11	22,772,344,651	789,353,899	1,418,667,406	(629,313,507)	(2.76%)
6/30/12	23,024,773,746	942,394,013	1,504,467,980	(562,073,967)	(2.44%)
6/30/13	24,756,663,715	1,019,108,941	1,608,482,773	(589,373,832)	(2.38%)
6/30/14	28,038,549,893	1,082,521,228	1,706,250,521	(623,729,293)	(2.22%)
6/30/15	28,429,834,829	1,115,600,029	1,804,360,197	(688,760,168)	(2.42%)
6/30/16	28,326,433,656	1,176,666,912	1,904,921,736	(728,254,824)	(2.57%)
6/30/17	30,779,116,326	1,182,392,100	2,009,453,153	(827,061,053)	(2.69%)
6/30/18	32,314,588,595	1,202,788,183	2,126,106,199	(923,318,016)	(2.86%)
6/30/19	34,010,680,731	1,294,438,481	2,238,353,408	(943,914,927)	(2.78%)
6/30/20	34,047,692,112	1,327,864,560	2,332,726,605	(1,004,862,045)	(2.95%)
6/30/21	42,889,875,682	1,371,872,312	2,432,662,727	(1,060,790,415)	(2.47%)





SECTION VI – RISK CONSIDERATIONS

EXHIBIT 24

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. 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.

Regular Members

<u>Fiscal Year End</u>	<u>Retiree Liability</u> (a)	<u>Total Actuarial Liability</u> (b)	<u>Retiree Percentage</u> (a) / (b)	<u>Covered Payroll</u> (c)	<u>Ratio</u> (b) / (c)
6/30/07	\$8,941,802,561	\$22,023,863,090	40.6%	\$5,510,430,731	4.00
6/30/08	9,611,150,768	23,332,771,315	41.2%	5,763,634,079	4.05
6/30/09	10,238,166,793	24,733,483,621	41.4%	6,059,370,512	4.08
6/30/10	11,293,531,095	25,080,605,814	45.0%	6,180,689,916	4.06
6/30/11	12,698,425,109	26,752,154,635	47.5%	6,185,889,267	4.32
6/30/12	13,573,602,957	27,852,385,453	48.7%	6,377,421,205	4.37
6/30/13	14,329,968,181	28,799,324,938	49.8%	6,473,818,092	4.45
6/30/14	15,230,657,798	30,204,846,287	50.4%	6,679,683,181	4.52
6/30/15	16,028,939,271	31,451,851,955	51.0%	6,893,254,991	4.56
6/30/16	16,768,695,428	32,577,657,593	51.5%	7,114,861,564	4.58
6/30/17	18,304,044,337	35,176,950,577	52.0%	7,405,484,923	4.75
6/30/18	19,516,533,248	36,289,160,885	53.8%	7,515,600,156	4.83
6/30/19	20,276,746,842	37,324,200,774	54.3%	7,667,747,786	4.87
6/30/20	21,098,889,528	38,469,643,936	54.8%	7,887,362,749	4.88
6/30/21	21,804,010,789	39,777,935,943	54.8%	8,123,447,536	4.90



SECTION VI – RISK CONSIDERATIONS

EXHIBIT 24 (continued)

Sheriffs & Deputies

<u>Fiscal Year End</u>	<u>Retiree Liability</u> (a)	<u>Total Actuarial Liability</u> (b)	<u>Retiree Percentage</u> (a) / (b)	<u>Covered Payroll</u> (c)	<u>Ratio</u> (b) / (c)
6/30/07	\$105,514,847	\$345,220,872	30.6%	\$78,112,455	4.42
6/30/08	119,881,091	374,066,361	32.0%	81,485,774	4.59
6/30/09	150,926,387	412,167,101	36.6%	85,935,900	4.80
6/30/10	169,436,571	447,627,643	37.9%	84,755,693	5.28
6/30/11	185,018,412	475,559,019	38.9%	90,506,138	5.25
6/30/12	195,188,608	502,716,830	38.8%	93,265,452	5.39
6/30/13	223,706,198	533,033,438	42.0%	93,607,893	5.69
6/30/14	240,964,615	556,135,092	43.3%	97,693,639	5.69
6/30/15	266,693,628	591,002,036	45.1%	100,469,418	5.88
6/30/16	281,179,979	624,791,635	45.0%	105,868,170	5.90
6/30/17	325,186,602	691,205,752	47.0%	109,516,368	6.31
6/30/18	341,195,487	697,339,410	48.9%	115,222,566	6.05
6/30/19	366,389,579	730,785,263	50.1%	117,564,234	6.22
6/30/20	384,403,732	766,018,806	50.2%	122,072,903	6.28
6/30/21	445,975,611	816,703,678	54.6%	126,886,204	6.44



SECTION VI – RISK CONSIDERATIONS

EXHIBIT 24 (continued)

Protection Occupation

<u>Fiscal Year End</u>	<u>Retiree Liability</u> (a)	<u>Total Actuarial Liability</u> (b)	<u>Retiree Percentage</u> (a) / (b)	<u>Covered Payroll</u> (c)	<u>Ratio</u> (b) / (c)
6/30/07	\$169,925,365	\$657,029,820	25.9%	193,163,013	3.40
6/30/08	191,726,385	815,378,913	23.5%	286,325,514	2.85
6/30/09	234,387,583	872,943,101	26.9%	293,336,712	2.98
6/30/10	306,902,663	940,186,193	32.6%	305,736,396	3.08
6/30/11	368,833,144	1,029,366,460	35.8%	298,477,314	3.45
6/30/12	383,175,993	1,091,095,203	35.1%	315,472,063	3.46
6/30/13	446,902,048	1,165,983,944	38.3%	312,705,149	3.73
6/30/14	503,104,371	1,243,474,709	40.5%	321,900,460	3.86
6/30/15	547,545,074	1,327,464,740	41.2%	332,623,732	3.99
6/30/16	607,529,406	1,417,299,919	42.9%	335,785,986	4.22
6/30/17	705,541,965	1,572,225,700	44.9%	348,159,152	4.52
6/30/18	801,836,796	1,656,333,358	48.4%	352,396,805	4.70
6/30/19	862,732,452	1,746,352,760	49.4%	365,731,448	4.77
6/30/20	922,989,793	1,836,764,798	50.3%	382,420,698	4.80
6/30/21	993,550,318	1,950,009,129	51.0%	398,449,796	4.89

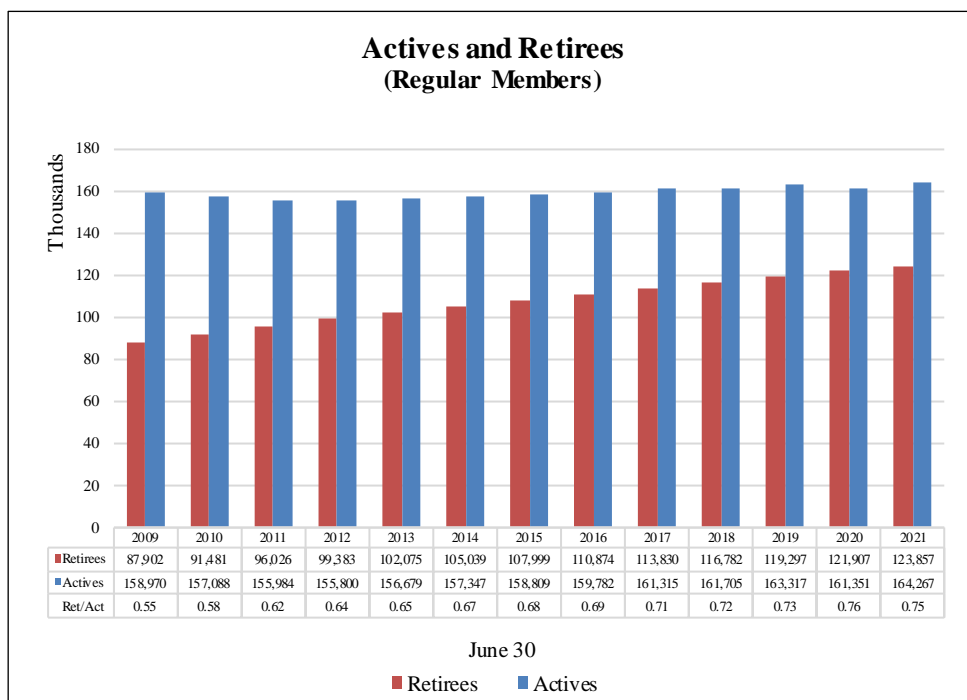


SECTION VI – RISK CONSIDERATIONS

EXHIBIT 25

HISTORICAL ACTIVE AND RETIREE COUNTS

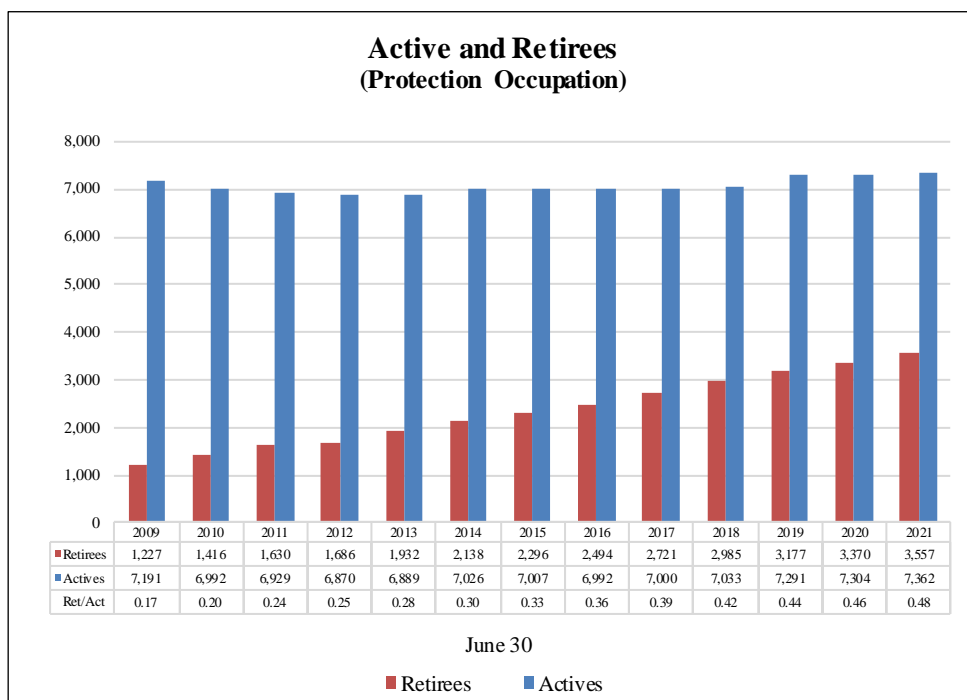
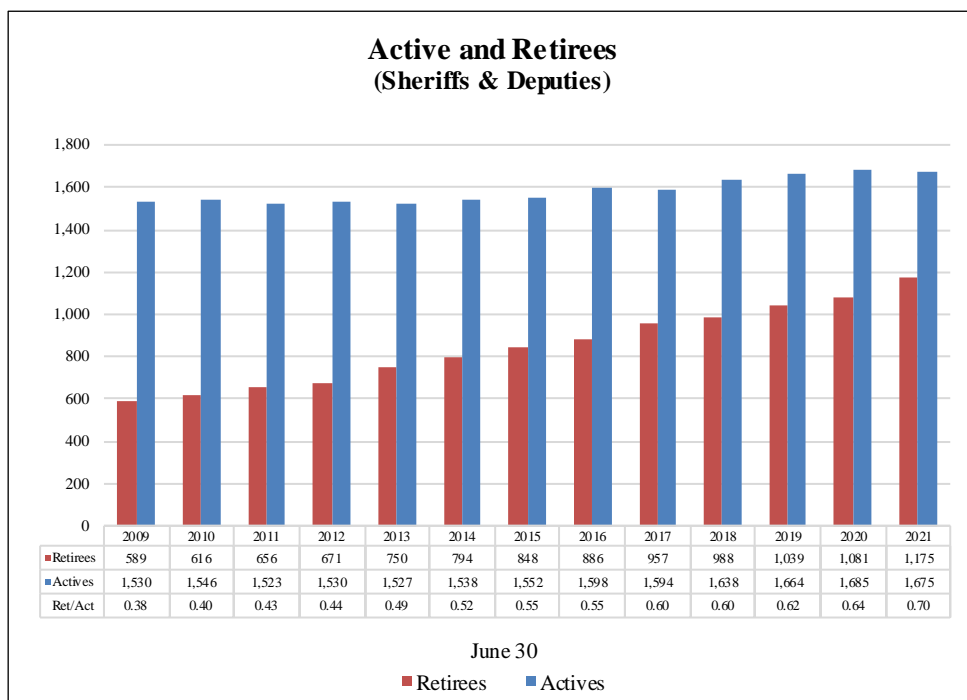
The funding of a mature retirement system is more sensitive to the impact of variations in actual versus expected experience (actuarial experience gains and losses). The larger the system's assets and liabilities are in comparison to the contribution or revenue base that supports it (covered payroll for IPERS), the greater the risk of contribution rate volatility. One measure of plan maturity is the ratio of the number of members receiving benefits to the number of active members, sometimes called the support ratio. The revenue base supporting the system is usually proportionate to the number of active members, so a relatively high support ratio indicates a larger system (assets and liabilities) relative to its revenue base. All three membership groups reflect a trend of increasing support ratios.





SECTION VI – RISK CONSIDERATIONS

EXHIBIT 25
(continued)





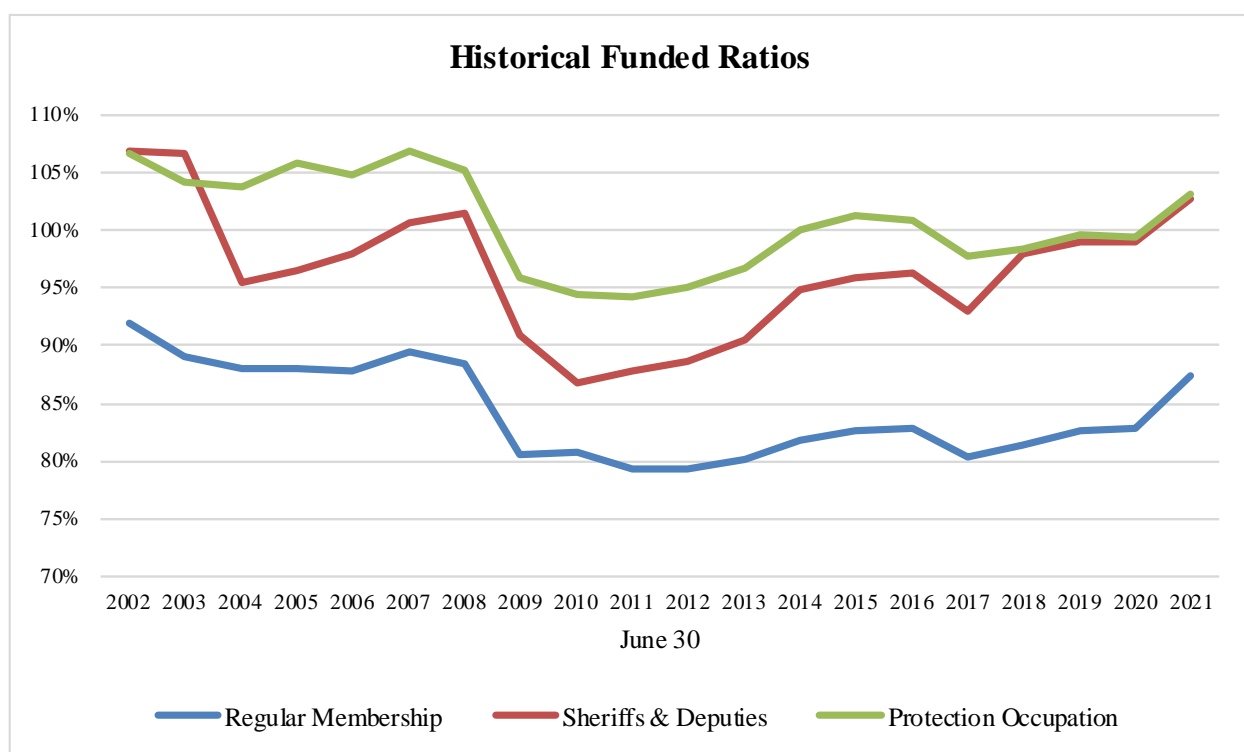
SECTION VI – RISK CONSIDERATIONS

EXHIBIT 26

IMPACT OF FUNDING POLICY

Prior to the 2011 valuation, Regular members (about 95% of the active membership) contributed according to fixed contribution rates set in statute. For many years, the fixed contribution rate was less than the actuarial contribution rate and the System's funded status declined. Beginning with the 2011 valuation (which set contribution rates for FY 2013), IPERS was given the statutory authority to set the Required Contribution Rate for Regular members, subject to a maximum change of 1.00% per year. Since that time, contributions have been equal to or greater than the Actuarial Contribution Rate. The remaining 5% of the active members, the Sheriffs and Deputies and the Protection Occupation groups, have historically contributed at the Actuarial Contribution Rate which was subject to change each year as actual versus expected experience unfolded. These groups now contribute based on the same funding policy as is used for the Regular members.

The following graph compares the funded ratios of the three IPERS membership groups, illustrating the clear advantage of contributing the full Actuarial Contribution Rate.





SECTION VI – RISK CONSIDERATIONS

EXHIBIT 27

COMPARISON OF VALUATION RESULTS UNDER ALTERNATE INVESTMENT RETURN ASSUMPTION

Regular Members

This exhibit compares the key June 30, 2021 valuation results over five different investment return assumptions to illustrate the impact of different assumptions on the funding of the System. Note that only the investment return assumption is changed, as identified in the heading below. All other assumptions are unchanged for purposes of this analysis (\$ in millions).

Investment Return Assumption	6.50%	6.75%	7.00%	7.25%	7.50%
Contributions for FY 2023					
Total Normal Cost	11.78%	11.11%	10.49%	9.91%	9.37%
Unfunded Actuarial Liability	5.49%	4.57%	3.65%	2.74%	1.84%
Actuarial Contribution Rate	17.27%	15.68%	14.14%	12.65%	11.21%
Required Contribution Rate	16.73%	15.73%	15.73%	15.73%	15.73%
Employer Contribution Rate	10.04%	9.44%	9.44%	9.44%	9.44%
Employee Contribution Rate	6.69%	6.29%	6.29%	6.29%	6.29%
Contribution Shortfall/(Margin)	0.54%	(0.05%)	(1.59%)	(3.08%)	(4.52%)
Actuarial Liability	\$42,080.0	\$40,903.2	\$39,777.9	\$38,700.8	\$37,670.0
Actuarial Value of Assets	34,734.9	34,734.9	34,734.9	34,734.9	34,734.9
Unfunded Actuarial Liability	\$7,345.1	\$6,168.3	\$5,043.0	\$3,965.9	\$2,935.1
Funded Ratio	82.54%	84.92%	87.32%	89.75%	92.21%

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



SECTION VI – RISK CONSIDERATIONS

EXHIBIT 27 (continued)

Sheriffs & Deputies

This exhibit compares the key June 30, 2021 valuation results over five different investment return assumptions to illustrate the impact of different assumptions on the funding of the System. Note that only the investment return assumption is changed, as identified in the heading below. All other assumptions are unchanged for purposes of this analysis (\$ in millions).

Investment Return Assumption	6.50%	6.75%	7.00%	7.25%	7.50%
Contributions for FY 2023					
Total Normal Cost	19.04%	17.94%	16.93%	15.98%	15.08%
Unfunded Actuarial Liability	1.22%	0.00%	0.00%	0.00%	0.00%
Actuarial Contribution Rate	20.26%	17.94%	16.93%	15.98%	15.08%
Required Contribution Rate	20.26%	18.02%	17.52%	17.52%	17.52%
Employer Contribution Rate	10.13%	9.01%	8.76%	8.76%	8.76%
Employee Contribution Rate	10.13%	9.01%	8.76%	8.76%	8.76%
Contribution Shortfall/(Margin)	0.00%	(0.08%)	(0.59%)	(1.54%)	(2.44%)
Actuarial Liability	\$865.3	\$840.5	\$816.7	\$794.0	\$772.2
Actuarial Value of Assets	839.0	839.0	839.0	839.0	839.0
Unfunded Actuarial Liability	\$26.3	\$1.4	(\$22.3)	(\$45.0)	(\$66.8)
Funded Ratio	96.96%	99.83%	102.73%	105.67%	108.65%

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



SECTION VI – RISK CONSIDERATIONS

EXHIBIT 27 (continued)

Protection Occupation

This exhibit compares the key June 30, 2021 valuation results over five different investment return assumptions to illustrate the impact of different assumptions on the funding of the System. Note that only the investment return assumption is changed, as identified in the heading below. All other assumptions are unchanged for purposes of this analysis (\$ in millions).

Investment Return Assumption	6.50%	6.75%	7.00%	7.25%	7.50%
Contributions for FY 2023					
Total Normal Cost	17.10%	16.17%	15.30%	14.48%	13.72%
Unfunded Actuarial Liability	1.12%	0.00%	0.00%	0.00%	0.00%
Actuarial Contribution Rate	18.22%	16.17%	15.30%	14.48%	13.72%
Required Contribution Rate	18.22%	16.17%	15.52%	15.02%	15.02%
Employer Contribution Rate	10.93%	9.70%	9.31%	9.01%	9.01%
Employee Contribution Rate	7.29%	6.47%	6.21%	6.01%	6.01%
Contribution Shortfall/(Margin)	0.00%	0.00%	(0.22%)	(0.54%)	(1.30%)
Actuarial Liability	\$2,068.6	\$2,008.0	\$1,950.0	\$1,894.6	\$1,841.5
Actuarial Value of Assets	2,011.1	2,011.1	2,011.1	2,011.1	2,011.1
Unfunded Actuarial Liability	\$57.5	(\$3.1)	(\$61.1)	(\$116.5)	(\$169.6)
Funded Ratio	97.22%	100.15%	103.13%	106.15%	109.21%

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



APPENDIX A

SUMMARY STATISTICS ON

SYSTEM MEMBERSHIP



APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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APPENDIX A
SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

RECONCILIATION OF ACTIVE MEMBERS

Below is a summary of the changes in active members (excluding retired re-employed members) between June 30, 2020 and June 30, 2021.

	<u>Regular Membership</u>	<u>Sheriffs & Deputies</u>	<u>Protection Occupation</u>	<u>Total</u>
6/30/2020 Starting count	161,351	1,685	7,304	170,340
New actives	16,137	79	787	17,003
Returning actives	4,273	4	105	4,382
Nonvested Terminations	(7,446)	(15)	(249)	(7,710)
Elected Refund	(2,528)	(10)	(166)	(2,704)
Vested Terminations	(2,614)	(26)	(189)	(2,829)
Total Withdrawals	<u>(12,588)</u>	<u>(51)</u>	<u>(604)</u>	<u>(13,243)</u>
Deaths	(250)	(1)	(15)	(266)
Disability Retirements	(51)	(4)	(3)	(58)
AE Benefits	(223)	0	(3)	(226)
Service Retirements	<u>(4,420)</u>	<u>(93)</u>	<u>(194)</u>	<u>(4,707)</u>
Total Retirements	<u>(4,694)</u>	<u>(97)</u>	<u>(200)</u>	<u>(4,991)</u>
Other/transfer	38	56	(15)	79
6/30/2021 Ending count	164,267	1,675	7,362	173,304



APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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	
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
2018	316,824	170,376	45.3	34.0	11.3	47,989	1.2%	10,601	25,693	120,755	1.41
2019	320,574	172,272	45.2	34.0	11.2	48,658	1.4%	10,793	24,789	123,513	1.39
2020	322,789	170,340	45.0	33.8	11.2	50,611	4.0%	10,530	26,091	126,358	1.35
2021	327,172	173,304	44.8	33.7	11.1	51,497	1.8%	9,321	25,279	128,589	1.35

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

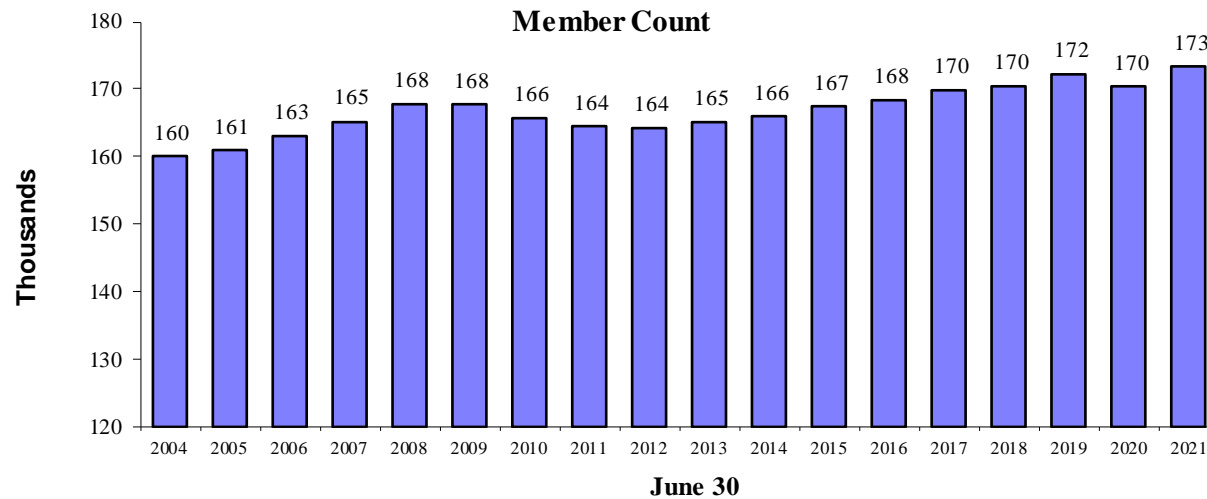


APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

SUMMARY OF ACTIVE MEMBERS

	Regular Membership	Sheriffs & Deputies	Protection Occupations	Total 6/30/2021	Total 6/30/2020	Percent Change
Total Active Members	164,267	1,675	7,362	173,304	170,340	1.7
Projected Payroll* (millions)	\$8,380	\$129	\$416	\$8,925	\$8,621	3.5
Average Age	45.0	40.1	40.7	44.8	45.0	(0.4)
Average Entry Age	33.9	26.6	30.4	33.7	33.8	(0.3)
Average Projected Salary	\$51,014	\$76,990	\$56,454	\$51,497	\$50,611	1.8
Retired Reemployed	6,645	121	237	7,003	8,505	(17.7)

*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.

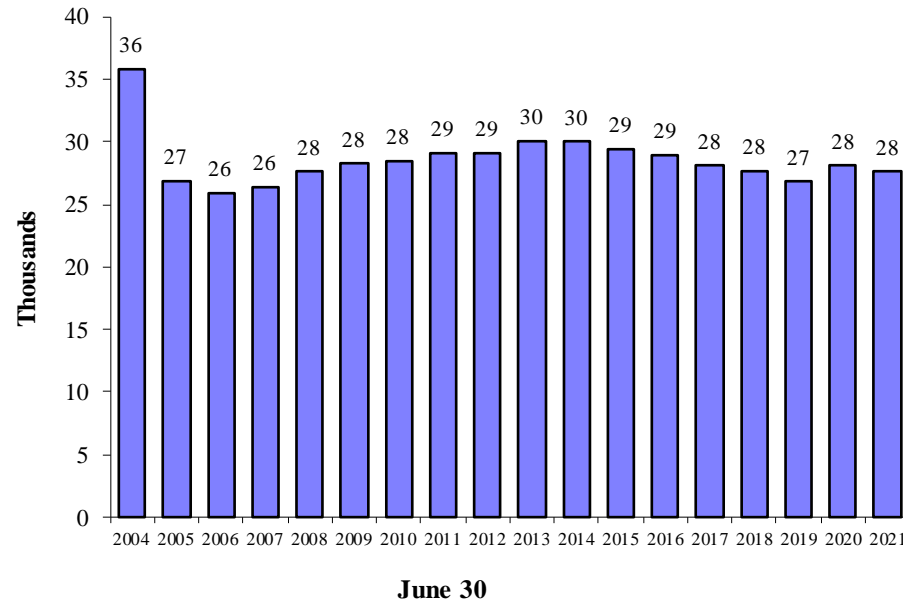




APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

SUMMARY OF INACTIVE VESTED MEMBERS

	Regular Membership	Sheriffs & Deputies	Protection Occupations	Total 6/30/2021	Total 6/30/2020	Percent Change
Inactive Vested	24,038	131	1,110	25,279	26,091	(3.1%)
Inactive Retired Reemployed	<u>2,259</u>	<u>19</u>	<u>40</u>	<u>2,318</u>	<u>2,025</u>	14.5%
Total Inactive Vested	26,297	150	1,150	27,597	28,116	(1.8%)

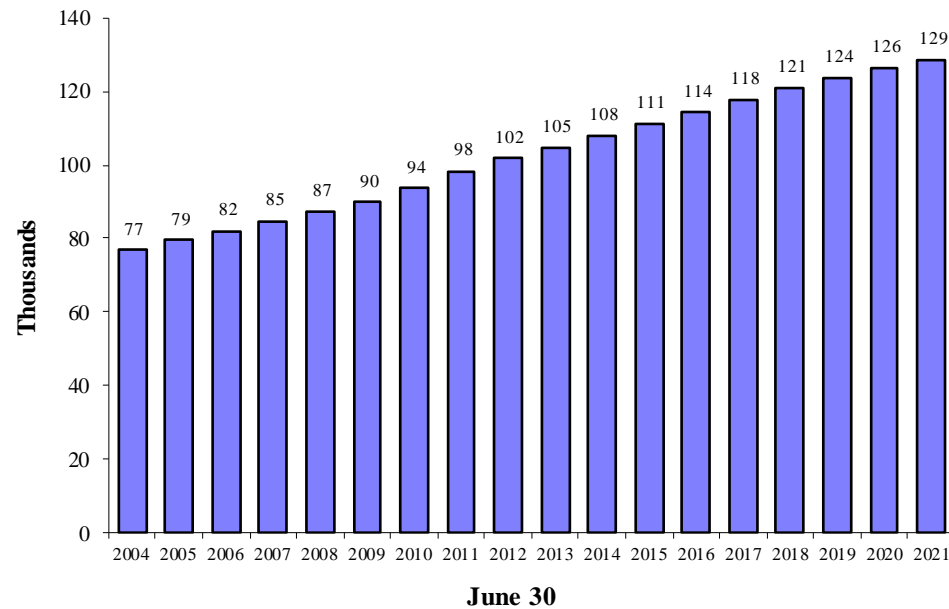




APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

SUMMARY OF RETIRED MEMBERS AND BENEFICIARIES

Regular Membership	Sheriffs & Deputies	Protection Occupations	Total 6/30/2021	Total 6/30/2020	Percent Change
123,857	1,175	3,557	128,589	126,358	1.8%





APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2021 FOR ACTIVE MEMBERS*

Males and Females - Regular Membership

Age	Years of Service																		Total	
	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			
	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	8,107	20,739	77	24,371	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	8,184	20,773
25-29	11,261	35,179	3,263	45,133	37	39,103	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	14,561	37,419
30-34	7,520	36,761	7,663	50,581	2,162	55,029	25	49,589	0	NA	0	NA	0	NA	0	NA	0	NA	17,370	45,150
35-39	6,492	36,625	5,175	51,926	5,528	61,204	1,910	66,466	20	58,029	0	NA	0	NA	0	NA	0	NA	19,125	50,872
40-44	5,934	35,503	4,837	48,344	3,710	59,892	4,967	68,911	1,607	71,201	8	63,672	0	NA	0	NA	0	NA	21,063	53,360
45-49	4,501	36,351	3,716	46,090	3,149	55,668	2,657	64,771	4,099	73,387	1,056	75,720	8	54,752	0	NA	0	NA	19,186	55,431
50-54	3,898	36,216	3,296	44,263	3,009	50,990	2,684	58,034	3,300	67,206	3,354	76,478	982	76,781	9	66,639	1	84,810	20,533	56,038
55-59	3,585	31,423	2,639	42,230	2,574	47,726	2,744	50,990	3,083	57,383	2,372	66,443	2,432	77,277	603	75,130	36	62,033	20,068	52,663
60-64	3,786	25,347	2,410	37,133	1,939	45,323	1,992	48,111	2,582	51,903	1,878	57,836	1,130	67,989	877	76,825	482	67,475	17,076	46,178
65-69	2,776	16,590	1,649	25,805	916	37,739	595	43,090	623	47,804	487	52,403	320	60,054	186	71,763	277	72,554	7,829	32,798
70 & over	3,137	18,607	1,630	15,530	694	17,872	230	18,602	108	28,453	36	34,228	22	41,244	20	81,004	40	59,979	5,917	18,523
Totals	60,997	31,264	36,355	44,705	23,718	53,436	17,804	59,762	15,422	63,672	9,191	68,540	4,894	73,708	1,695	75,662	836	68,585	170,912	46,936

*Including retired/reemployed members. Salary amounts are actual reported earnings from prior year, annualized for members with less than one year of service.



APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2021 FOR ACTIVE MEMBERS*

Males and Females - Sheriffs and Deputies

Age	Years of Service																			Total
	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			
	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	59	50,141	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	59	50,141
25-29	142	59,290	76	68,153	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	218	62,380
30-34	77	61,584	130	71,210	59	73,057	4	73,479	0	NA	0	NA	0	NA	0	NA	0	NA	270	68,902
35-39	40	61,073	83	72,994	112	74,537	53	72,575	0	NA	0	NA	0	NA	0	NA	0	NA	288	71,861
40-44	24	54,124	25	68,789	51	75,974	112	80,802	54	83,921	0	NA	0	NA	0	NA	0	NA	266	76,974
45-49	9	54,735	10	71,543	26	73,097	48	74,460	110	82,134	42	85,325	2	86,747	0	NA	0	NA	247	78,845
50-54	23	38,148	10	63,480	12	78,134	35	79,549	49	80,329	60	86,706	12	87,026	0	NA	0	NA	201	76,701
55-59	30	24,332	10	40,589	9	61,312	8	77,821	17	86,481	12	85,181	27	89,458	12	88,377	1	163,873	126	67,003
60-64	19	30,466	10	32,860	1	47,736	2	71,961	8	83,842	6	76,121	8	79,499	5	77,720	5	90,566	64	57,875
65-69	13	13,658	10	19,819	6	26,169	2	45,758	0	NA	2	118,567	1	61,871	1	77,228	2	80,711	37	31,403
70 & over	8	10,927	6	15,720	4	14,946	2	28,224	0	NA	0	NA	0	NA	0	NA	0	NA	20	14,898
Totals	444	51,363	370	66,466	280	72,098	266	76,929	238	82,536	122	86,082	50	86,621	18	84,798	8	97,266	1,796	69,504

*Including retired/reemployed members. Salary amounts are actual reported earnings from prior year, annualized for members with less than one year of service.



APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2021 FOR ACTIVE MEMBERS*

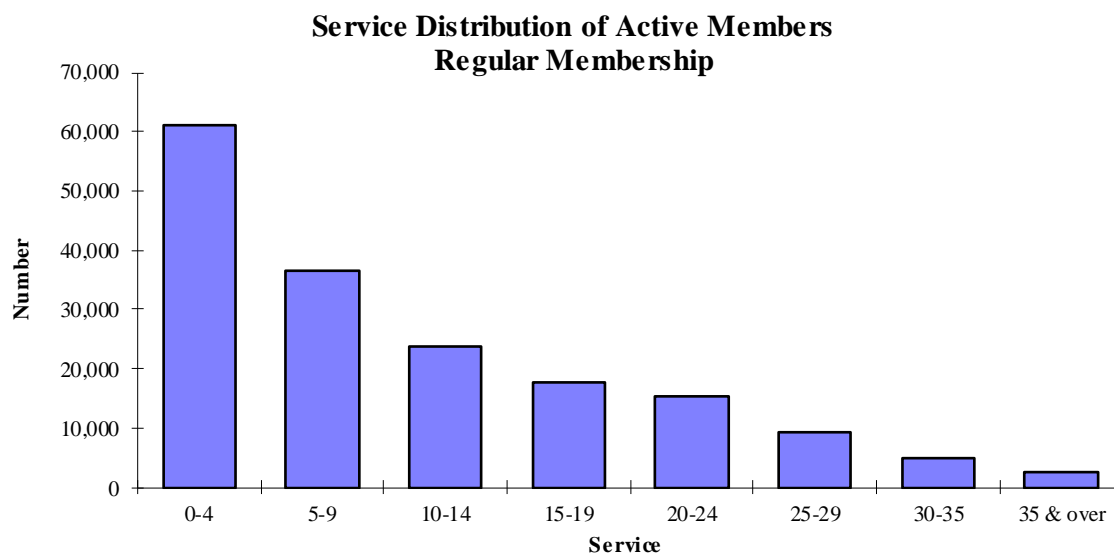
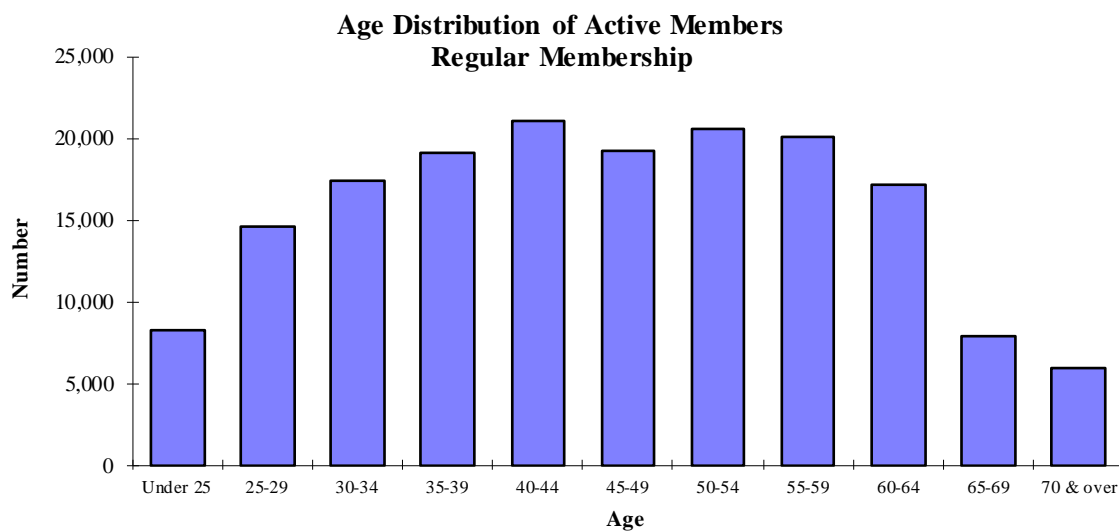
Males and Females - Protection Occupation

Age	Years of Service																		Total	
	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			
	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	612	33,675	8	35,109	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	620	33,694
25-29	729	41,709	220	52,543	2	59,118	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	951	44,252
30-34	532	41,404	374	54,641	115	59,842	1	77,893	0	NA	0	NA	0	NA	0	NA	0	NA	1,022	48,358
35-39	310	41,367	271	54,713	302	63,879	103	65,230	3	64,402	0	NA	0	NA	0	NA	0	NA	989	54,453
40-44	257	40,155	167	52,572	212	65,567	227	67,744	96	67,926	1	51,092	0	NA	0	NA	0	NA	960	57,239
45-49	160	40,581	118	53,360	142	58,193	142	64,651	224	69,684	58	72,169	1	93,129	0	NA	0	NA	845	59,315
50-54	132	42,403	99	49,455	126	56,133	141	63,963	202	69,570	169	74,027	65	73,361	1	62,855	0	NA	935	62,011
55-59	103	38,995	78	48,496	85	58,653	101	63,853	98	62,754	61	72,203	52	75,376	19	77,564	0	NA	597	58,930
60-64	110	26,943	52	44,114	61	56,626	50	52,150	65	63,024	33	55,307	24	66,364	24	69,044	14	85,774	433	50,096
65-69	62	16,800	24	21,669	17	42,469	17	52,180	14	51,471	9	54,365	6	47,684	5	74,464	5	70,829	159	33,919
70 & over	41	14,908	30	12,017	11	28,951	3	28,305	1	78,852	1	2,461	0	NA	1	62,794	0	NA	88	17,264
Totals	3,048	38,356	1,441	51,376	1,073	60,585	785	64,207	703	67,457	332	70,689	148	72,027	50	72,575	19	81,841	7,599	51,729

*Including retired/reemployed members. Salary amounts are actual reported earnings from prior year, annualized for members with less than one year of service.



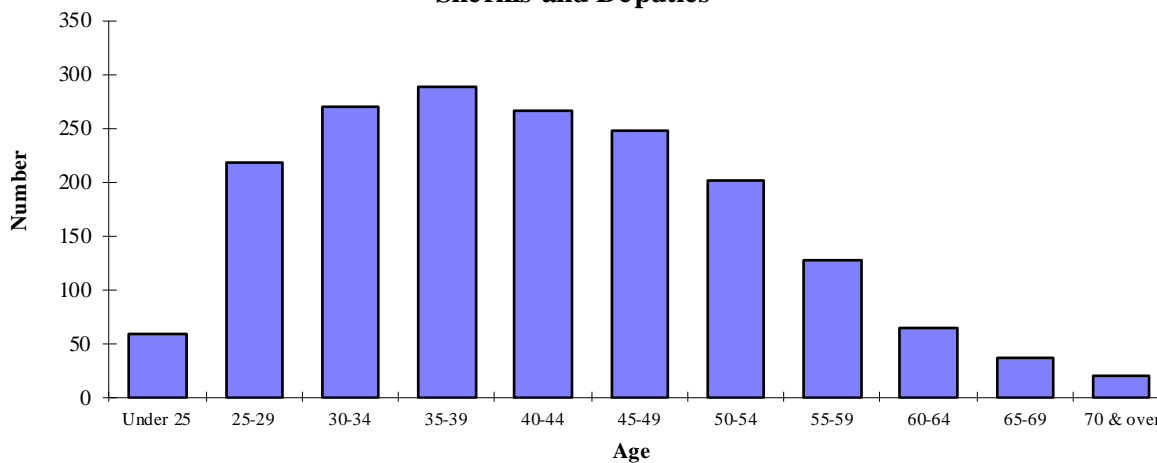
APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP



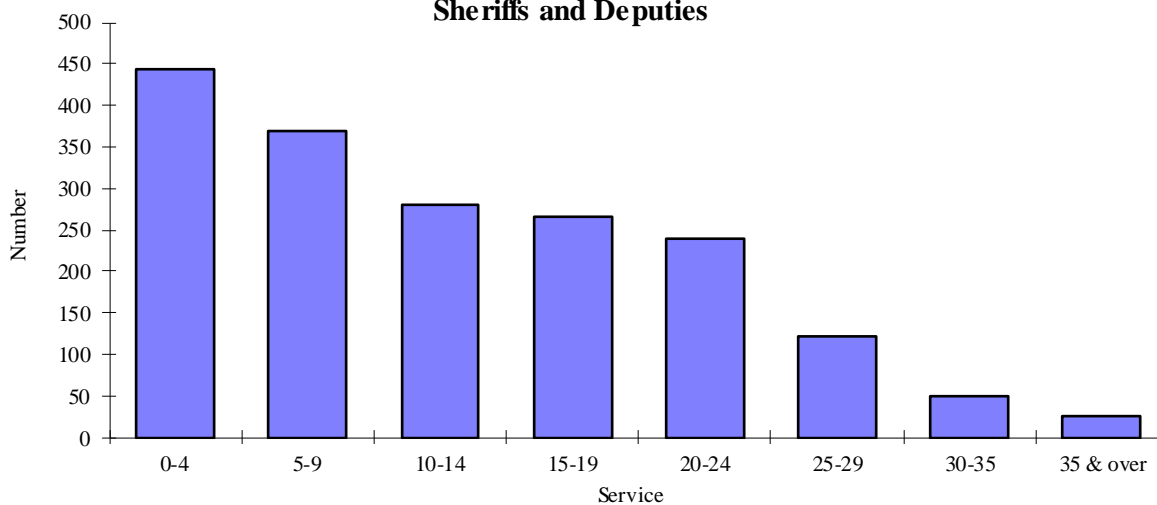


APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

**Age Distribution of Active Members
Sheriffs and Deputies**

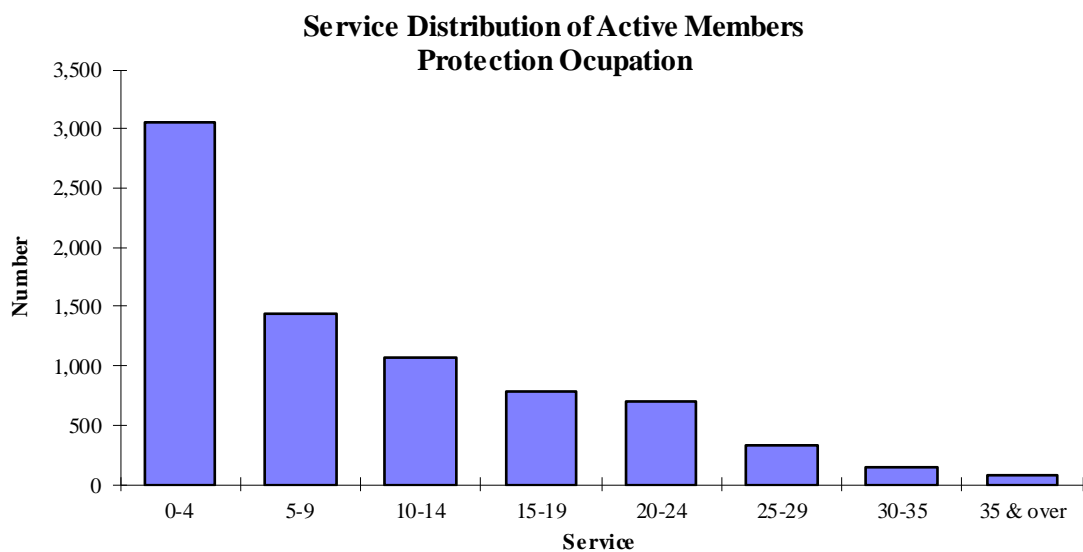
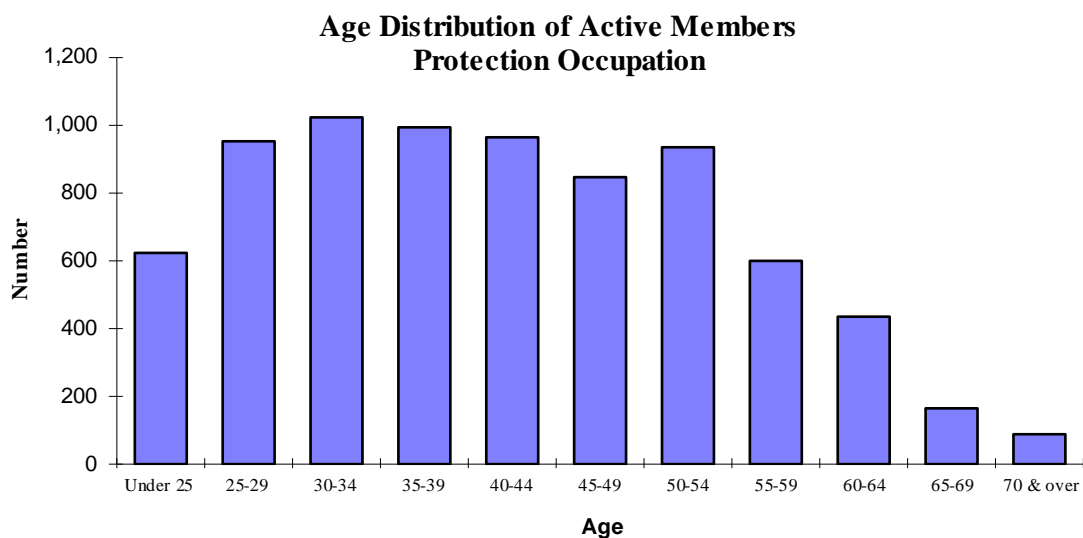


**Service Distribution of Active Members
Sheriffs and Deputies**





APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP





APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2021 FOR INACTIVE VESTED MEMBERS*

Males and Females - Regular Membership

Age	Years of Service																			Total	
	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				
	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	1	39,908	45	25,635	3	28,715	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	49	26,115	
30-34	31	13,010	520	36,736	69	43,346	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	620	36,286	
35-39	243	26,112	1,167	37,135	526	47,348	45	48,672	0	NA	0	NA	0	NA	0	NA	0	NA	1,981	38,756	
40-44	323	25,748	1,404	36,073	711	47,662	234	51,406	26	51,695	0	NA	0	NA	0	NA	0	NA	2,698	39,372	
45-49	304	25,625	1,361	33,141	755	41,991	353	55,048	131	61,924	8	47,039	0	NA	0	NA	0	NA	2,912	38,640	
50-54	357	24,056	1,743	29,352	1,075	36,202	536	47,669	245	54,317	90	61,612	14	58,485	0	NA	0	NA	4,060	35,440	
55-59	373	19,524	1,775	24,893	1,111	29,794	531	35,640	284	46,225	97	58,731	23	69,575	1	73,581	0	NA	4,195	29,557	
60-64	779	12,804	1,687	21,395	983	25,596	477	31,432	255	37,474	86	40,270	8	38,764	5	62,824	0	NA	4,280	23,333	
65-69	1,726	9,334	1,009	14,036	361	19,604	148	22,534	60	23,964	23	32,637	4	95,959	4	40,165	2	64,255	3,337	13,050	
70 & over	1,399	6,249	496	9,859	179	7,431	62	8,605	22	12,984	5	27,192	2	68,133	0	NA	0	NA	2,165	7,415	
Totals	5,536	13,294	11,207	27,647	5,773	34,498	2,386	40,649	1,023	46,110	309	51,677	51	63,710	10	54,836	2	64,255	26,297	28,393	

*Including inactive retired/reemployed members



APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2021 FOR INACTIVE VESTED MEMBERS*

Males and Females - Sheriffs and Deputies

Age	Years of Service																		Total	
	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			
	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	41,349	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	1	41,349
25-29	1	61,769	4	53,973	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	5	55,532
30-34	1	46,885	16	59,437	1	59,941	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	18	58,768
35-39	6	49,488	13	53,629	5	66,940	1	60,339	0	NA	0	NA	0	NA	0	NA	0	NA	25	55,566
40-44	3	44,180	10	49,495	6	53,196	4	62,839	1	74,296	0	NA	0	NA	0	NA	0	NA	24	53,013
45-49	3	37,415	10	46,648	11	48,583	3	63,780	5	60,241	0	NA	0	NA	0	NA	0	NA	32	50,178
50-54	2	14,640	5	37,860	4	57,925	4	58,186	3	62,913	0	NA	0	NA	0	NA	0	NA	18	48,431
55-59	4	17,248	2	53,661	2	60,687	3	55,270	0	NA	0	NA	0	NA	0	NA	0	NA	11	42,136
60-64	8	7,097	0	NA	1	33,743	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	9	10,057
65-69	2	18,862	4	29,551	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	6	25,988
70 & over	0	NA	1	5,395	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	1	5,395
Totals	31	28,532	65	49,934	30	54,502	15	60,106	9	62,694	0	NA	0	NA	0	NA	0	NA	150	48,207

*Including inactive retired/reemployed members



APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2021 FOR INACTIVE VESTED MEMBERS*

Males and Females - Protection Occupation

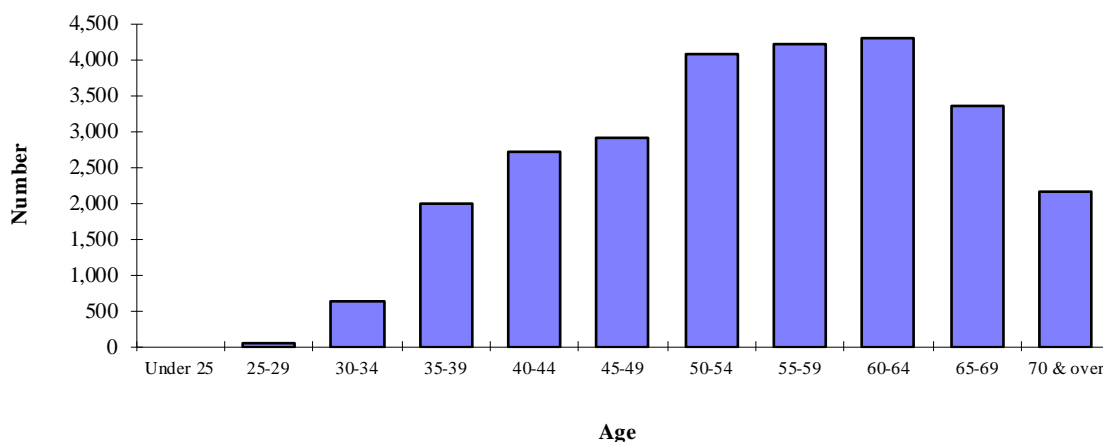
Age	Years of Service																		Total	
	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over			
	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.
Under 25	3	9,517	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	3	9,517
25-29	17	34,033	20	38,469	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	37	36,431
30-34	38	30,762	76	34,417	16	46,128	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	130	34,790
35-39	29	25,258	87	33,937	41	49,173	9	62,864	0	NA	0	NA	0	NA	0	NA	0	NA	166	37,752
40-44	21	21,969	86	30,929	52	45,939	13	58,430	6	36,008	0	NA	0	NA	0	NA	0	NA	178	36,436
45-49	12	36,693	69	27,025	34	41,817	21	53,487	9	56,744	5	63,272	0	NA	0	NA	0	NA	150	37,848
50-54	12	24,031	68	25,872	46	33,997	21	42,726	26	57,083	10	63,305	1	65,788	0	NA	0	NA	184	36,368
55-59	18	16,301	45	21,281	33	25,457	15	26,818	8	43,845	6	65,857	1	71,371	0	NA	0	NA	126	26,275
60-64	43	11,269	23	17,006	17	11,905	5	14,038	5	14,373	2	51,385	0	NA	0	NA	0	NA	95	13,926
65-69	36	7,305	13	12,566	6	20,546	6	4,339	1	37,792	1	4,767	0	NA	0	NA	0	NA	63	9,813
70 & over	11	15,522	6	5,213	0	NA	1	5,983	0	NA	0	NA	0	NA	0	NA	0	NA	18	11,556
Totals	240	20,460	493	28,732	245	37,936	91	42,311	55	48,570	24	60,504	2	68,580	0	NA	0	NA	1,150	31,722

*Including inactive retired/reemployed members

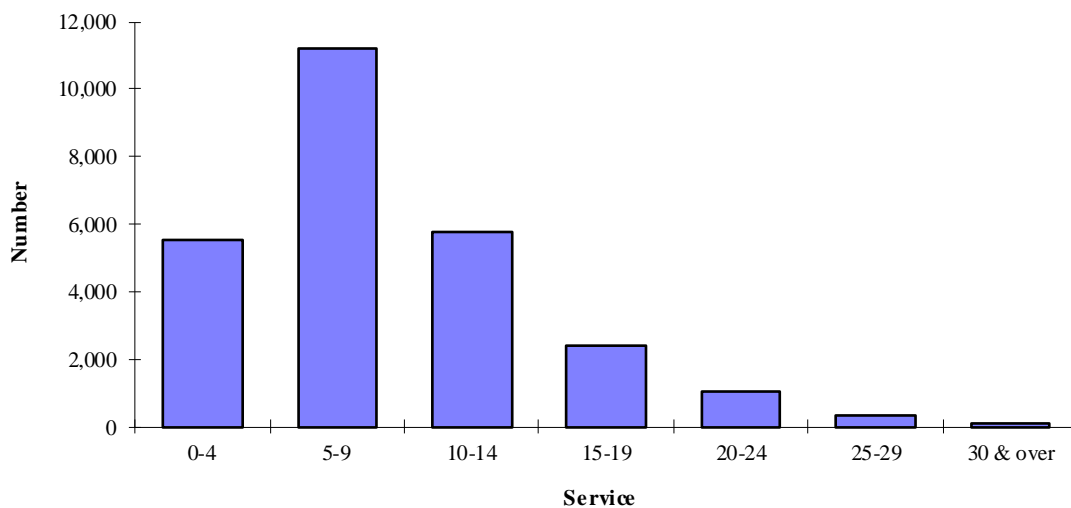


APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

**Age Distribution of Inactive Vested Members
Regular Membership**



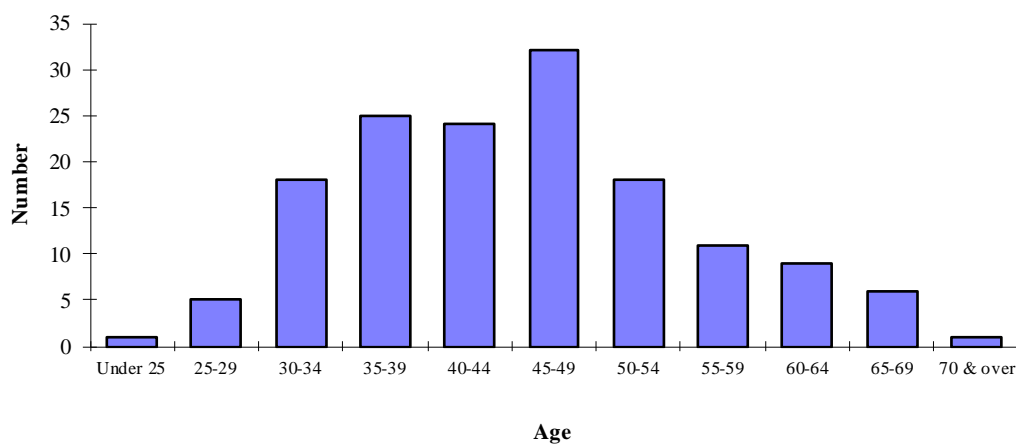
**Service Distribution of Inactive Vested Members
Regular Membership**



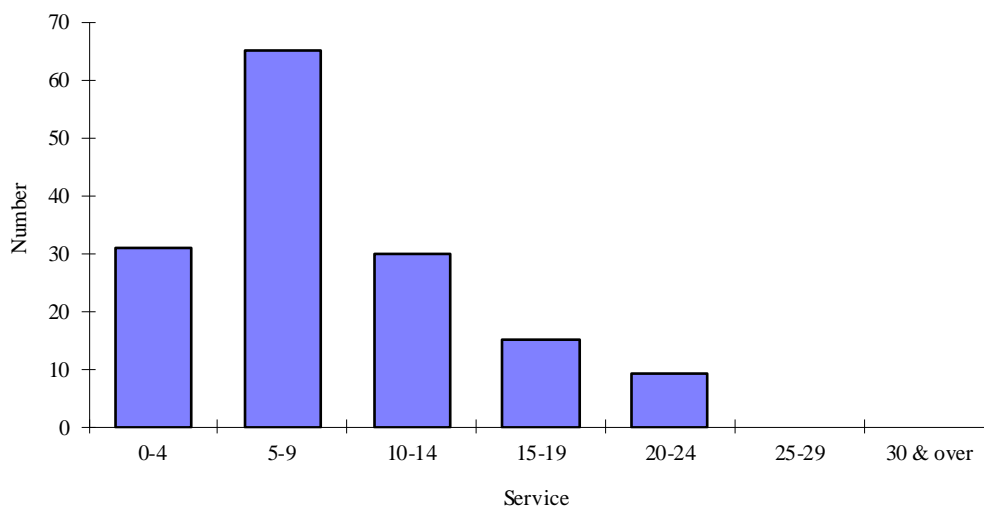


APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

**Age Distribution of Inactive Vested Members
Sheriffs and Deputies**



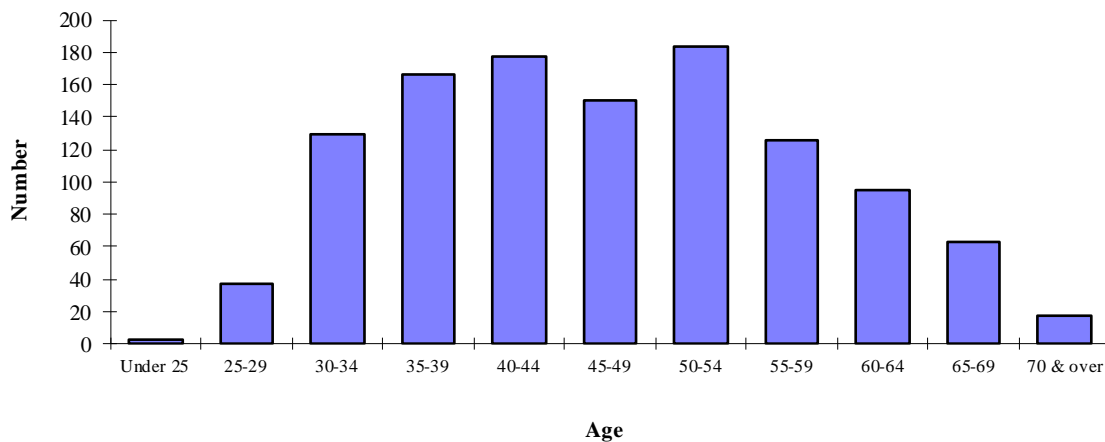
**Service Distribution of Inactive Vested Members
Sheriffs and Deputies**



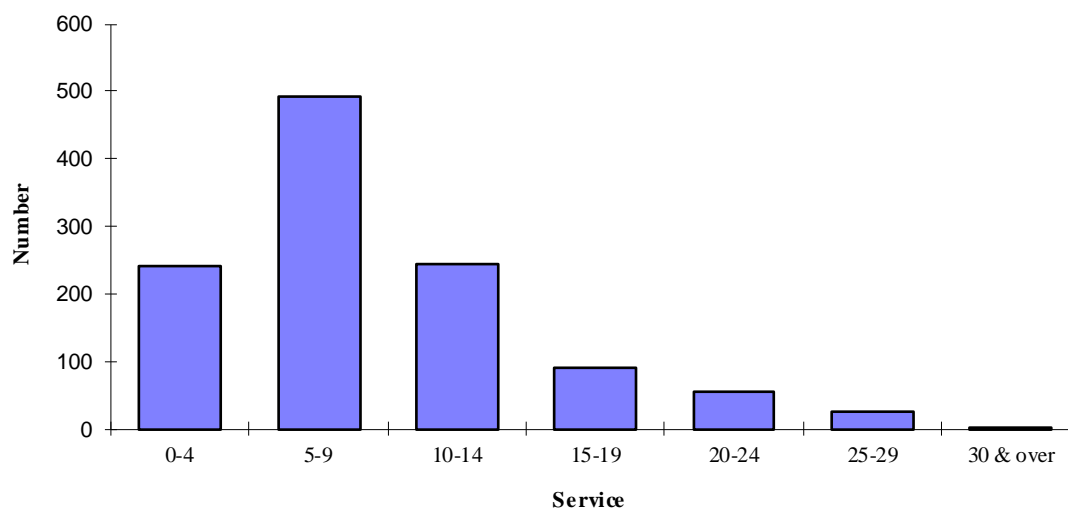


APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

**Age Distribution of Inactive Vested Members
Protection Occupation**



**Service Distribution of Inactive Vested Members
Protection Occupation**





APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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	5	2	1	0	65	1	8	11	93	\$8,151
40 to 44	7	4	5	0	27	0	3	8	54	9,923
45 to 49	16	8	5	7	54	2	9	7	108	8,543
50 to 54	39	33	9	15	104	8	36	5	249	12,441
55 to 59	601	657	239	234	198	219	978	6	3,132	23,414
60 to 64	2,183	2,804	979	890	428	997	4,145	18	12,444	24,842
65 to 69	4,894	6,377	2,687	1,898	727	2,040	7,781	21	26,425	21,543
70 to 74	6,118	7,542	3,951	2,165	1,174	2,530	7,386	37	30,903	19,394
75 to 79	4,588	5,137	3,116	1,664	1,218	1,955	3,324	13	21,015	15,872
80 to 84	3,526	3,287	2,139	1,604	1,178	1,559	982	3	14,278	12,863
85 to 89	2,554	2,055	1,136	1,312	989	1,110	109	3	9,268	10,165
90 to 94	1,238	1,116	457	480	560	485	11	1	4,348	7,481
95 to 99	392	365	139	124	174	143	1	0	1,338	5,675
100 & up	29	84	17	14	18	40	0	0	202	5,105
Counts	26,190	29,471	14,880	10,407	6,914	11,089	24,773	133	123,857	\$17,835
% of Total	21.1%	23.8%	12.0%	8.4%	5.6%	9.0%	20.0%	0.1%	100.0%	



APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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	0	1	1	0	0	0	3	\$22,930
40 to 44	1	0	1	2	2	0	2	0	8	31,697
45 to 49	0	0	0	0	2	0	2	0	4	20,828
50 to 54	12	7	2	19	2	3	44	0	89	46,865
55 to 59	22	21	8	31	8	8	74	0	172	43,624
60 to 64	34	19	16	38	12	6	97	0	222	40,935
65 to 69	30	29	20	52	21	17	83	0	252	37,233
70 to 74	43	28	10	31	13	10	76	0	211	32,056
75 to 79	28	11	8	22	14	5	23	0	111	24,045
80 to 84	8	4	4	17	8	5	5	0	51	21,937
85 to 89	12	4	2	10	11	1	1	0	41	13,988
90 to 94	1	1	0	1	5	0	0	0	8	11,982
95 to 99	0	1	0	1	1	0	0	0	3	7,053
100 & up	0	0	0	0	0	0	0	0	0	NA
Counts	192	125	71	225	100	55	407	0	1,175	\$34,012
% of Total	16.5%	10.6%	6.0%	19.1%	8.5%	4.7%	34.6%	0.0%	100.0%	



APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

ANALYSIS OF RETIREES AND BENEFICIARIES

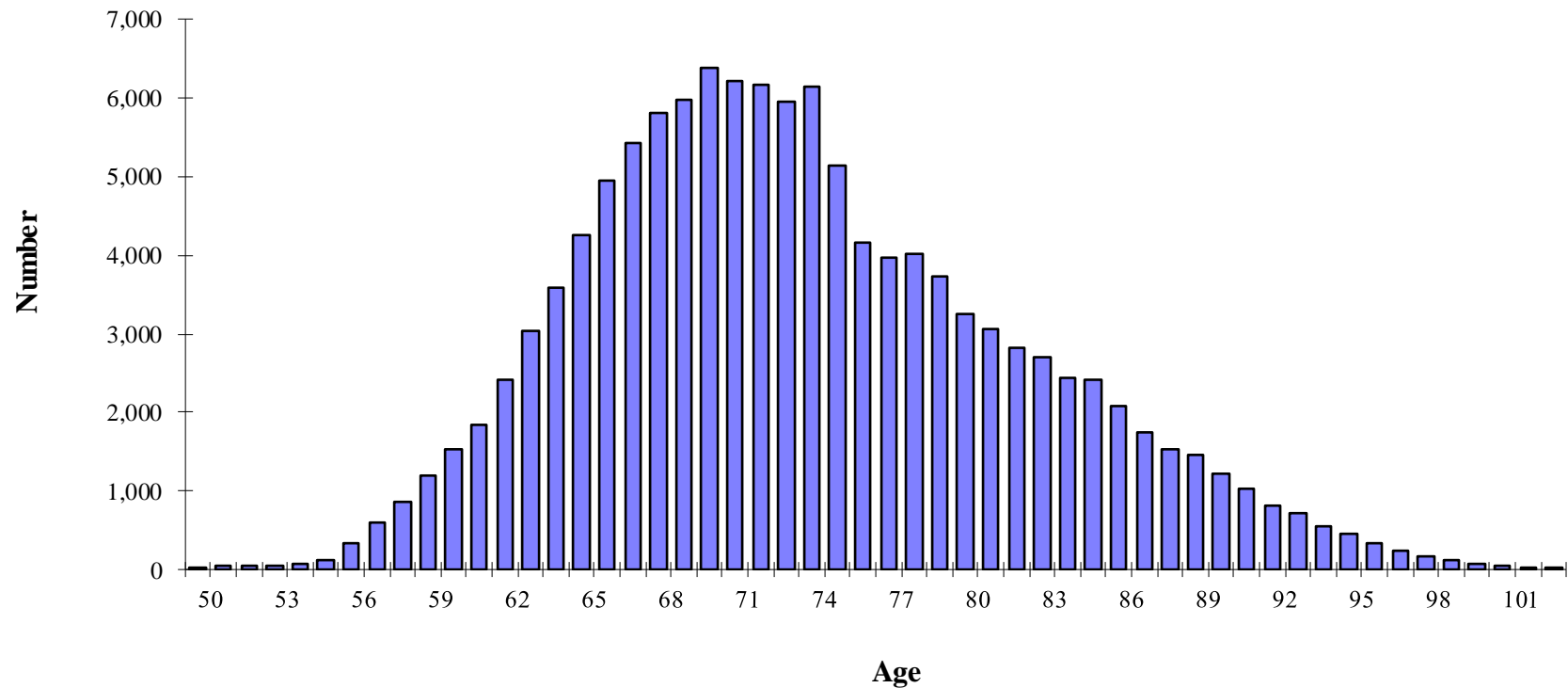
Males and Females - Protection Occupation

	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	1	1	0	5	3	0	0	0	10	\$20,426
40 to 44	1	1	0	3	6	0	0	0	11	15,451
45 to 49	1	0	1	4	1	2	5	0	14	29,567
50 to 54	6	1	3	7	10	3	7	1	38	21,986
55 to 59	71	63	36	78	11	11	157	0	427	33,351
60 to 64	122	113	45	145	35	31	280	0	771	32,513
65 to 69	168	157	46	125	45	50	298	0	889	28,239
70 to 74	147	148	60	113	49	31	224	2	774	24,040
75 to 79	75	56	25	53	33	17	83	0	342	18,906
80 to 84	35	27	15	42	40	9	27	0	195	16,203
85 to 89	14	5	2	13	18	3	2	0	57	11,518
90 to 94	5	1	2	7	10	3	0	0	28	10,423
95 to 99	0	0	0	0	1	0	0	0	1	9,479
100 & up	0	0	0	0	0	0	0	0	0	NA
Counts	646	573	235	595	262	160	1,083	3	3,557	\$26,772
% of Total	18.2%	16.1%	6.6%	16.7%	7.4%	4.5%	30.4%	0.1%	100.0%	



APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

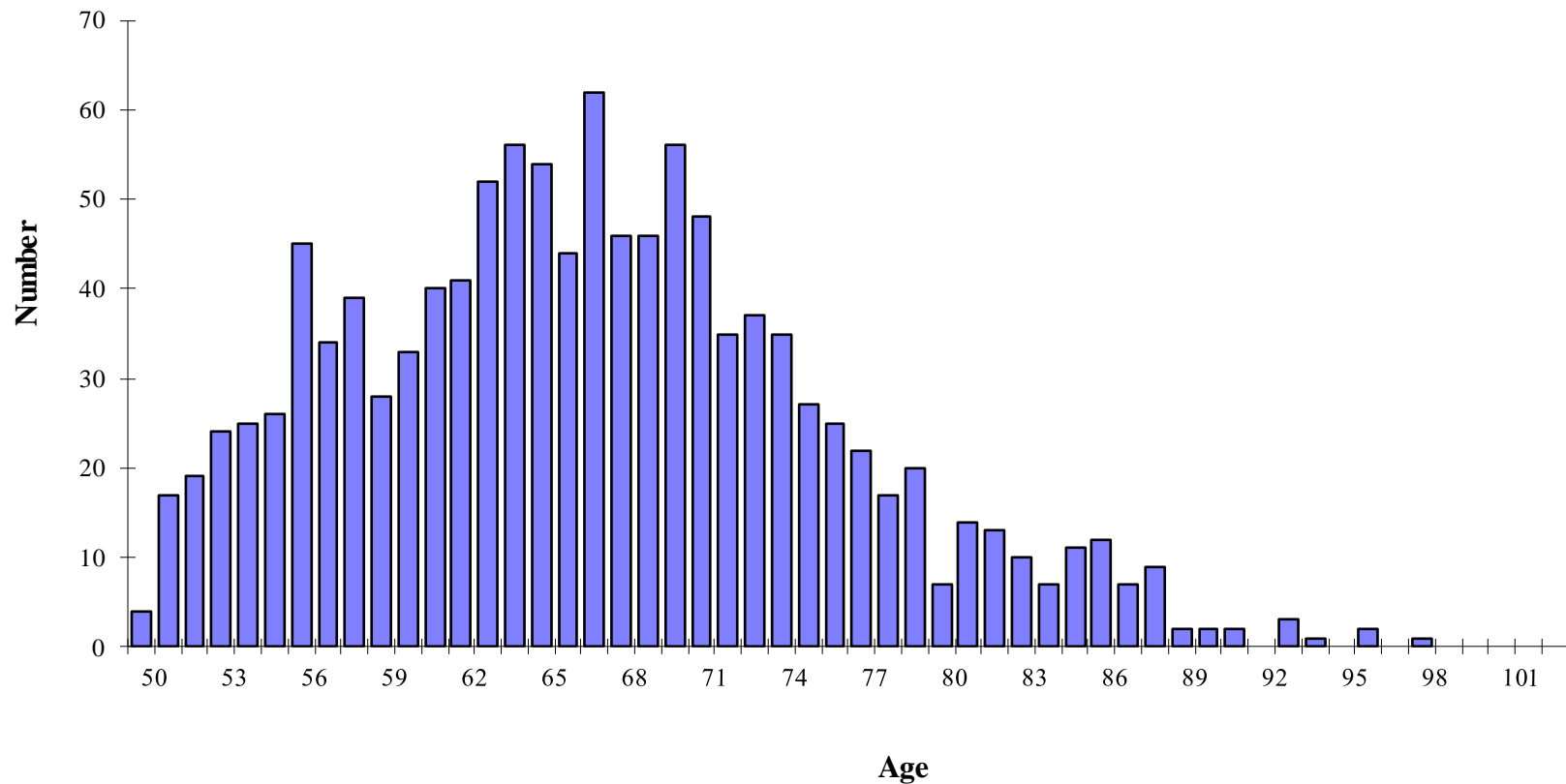
Age Distribution of Retirees & Beneficiaries Regular Membership





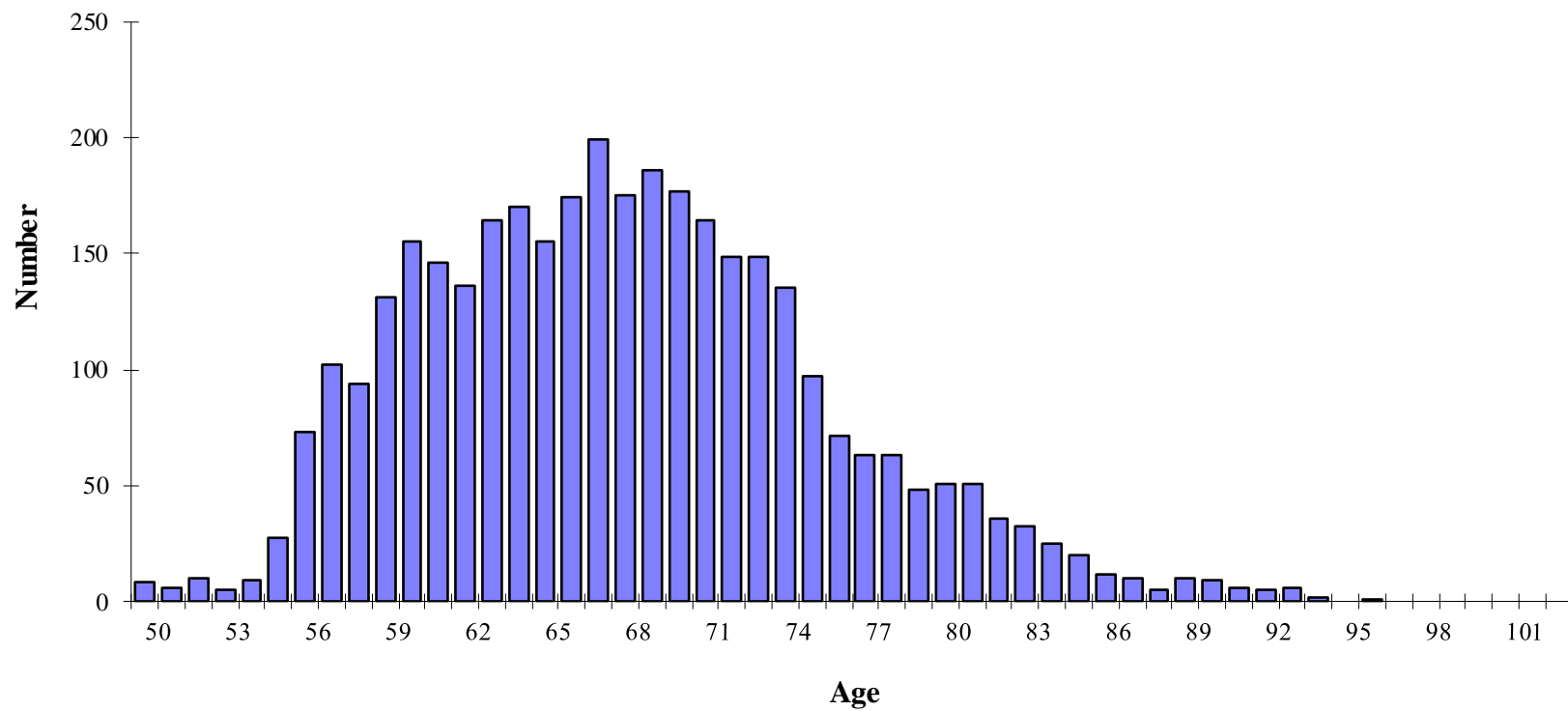
APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

Age Distribution of Retirees & Beneficiaries Sheriffs and Deputies





Age Distribution of Retirees & Beneficiaries Protection Occupation





APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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	129,026
Removed those no longer entitled to benefits	(268)
Removed those who have filed for benefits but are not receiving	(172)
Added those still entitled to benefits	<u>3</u>
Records used in the valuation	128,589
 Records on the not-in-pay data file	 262,381
Records removed because the member has received all benefits	(16)
Records removed because member is deceased	<u>(1,225)</u>
Records used in the valuation*	261,140

* These records are allocated as follows:

Active members	173,304
Retired, reemployed members	7,003
Vested inactive members	27,597
Nonvested inactive members	<u>53,236</u>
Total	261,140

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.



APPENDIX A – SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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APPENDIX B

SUMMARY OF PLAN PROVISIONS



APPENDIX B – SUMMARY OF PLAN PROVISIONS

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APPENDIX B – SUMMARY OF PLAN PROVISIONS

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 65 th 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 55 th 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.



APPENDIX B – SUMMARY OF PLAN PROVISIONS

Retirement Benefits:

Normal Retirement	An annuity equal to 2% of Average Salary 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 Average Salary.
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: <ol style="list-style-type: none">(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).



APPENDIX B – SUMMARY OF PLAN PROVISIONS

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%.



APPENDIX B – SUMMARY OF PLAN PROVISIONS

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.



APPENDIX B – SUMMARY OF PLAN PROVISIONS

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	<p>An annuity, payable immediately, equal to the Normal Retirement Benefit, without an adjustment.</p> <p>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.</p>
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)	<p>At the member's election either:</p> <p>(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</p>



APPENDIX B – SUMMARY OF PLAN PROVISIONS

(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



APPENDIX B – SUMMARY OF PLAN PROVISIONS

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:

$$(\text{December's Monthly benefit}) \times (12 \text{ months}) \times (\text{Rate}) \times (\text{Full calendar years retired}) = \text{FED}$$

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%.



APPENDIX B – SUMMARY OF PLAN PROVISIONS

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APPENDIX C

ACTUARIAL ASSUMPTIONS AND METHODS



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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 2018, based on experience from 2014-2017. A review of the economic actuarial assumptions was completed in 2017, followed by a review of the demographic assumptions that was completed in 2018. The Investment Board has adopted and approved the use of the economic assumptions presented in the 2017 Economic Experience Study, as well as the demographic assumptions presented in the 2018 Demographic Experience Study. The following is a summary of the assumptions and methods used in the valuation:



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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

Pre-Retirement (effective June 30, 2018)

State

Male	RP-2014 Employee Table Adjusted to 2006, Generational using MP-2017, base rates setback 4 years
Female	RP-2014 Employee Table Adjusted to 2006, Generational using MP-2017, base rates setback 4 years

School

Male	RP-2014 Employee Table Adjusted to 2006, Generational using MP-2017, base rates setback 4 years
Female	RP-2014 Employee Table Adjusted to 2006, Generational using MP-2017, base rates setback 8 years

Other

Male	RP-2014 Employee Table Adjusted to 2006, Generational using MP-2017, base rates setback 3 years
Female	RP-2014 Employee Table Adjusted to 2006, Generational using MP-2017, base rates setback 4 years



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

Sheriffs/Deputies and Protection Occupation

Male	RP-2014 Employee Table Adjusted to 2006, Generational using MP-2017, base rates setback 3 years
Female	RP-2014 Employee Table Adjusted to 2006, Generational using MP-2017, base rates setback 4 years

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

Post-Retirement (effective June 30, 2018)

State	RP-2014 Healthy Annuitant Adjusted to 2017, Generational using MP-2017
Male	8.5% increase in rates above age 75
Female	No adjustment
School	RP-2014 Healthy Annuitant Adjusted to 2017, Generational using MP-2017
Male	Base rates setback 2 years, 10% decrease in rates below age 75, 20% increase above age 75
Female	Base rates setback 2 years, 25% decrease below age 75, 10% increase above age 75
Other	RP-2014 Healthy Annuitant Adjusted to 2017, Generational using MP-2017
Male	Base rates set forward 1 year, 10% decrease below age 75, 8% increase above age 75
Female	Base rates setback 1 year, 10% decrease below age 75, 5% increase above age 75
Sheriffs/Deputies and Protection Occupation	RP-2014 Healthy Annuitant Adjusted to 2017, Generational using MP-2017
Male	Base rates set forward 1 year, 10% increase above age 75
Female	No adjustment
Beneficiaries:	Same as members
Disabled Members	RP-2014 Disabled Mortality, Generational using MP-2017
Male	Base rates set forward 3 years
Female	Base rates set forward 5 years

Note: All mortality scaling factors before and after age 75 are geometrically blended between ages 73 and 77.



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

Retirement Rates (effective June 30, 2018)

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

Assumed Retirement Rates – Early			
<u>Age</u>	<u>State</u>	<u>School</u>	<u>Other</u>
55	5.0%	6.0%	4.0%
56	5.0%	6.0%	4.0%
57	5.0%	6.0%	4.0%
58	5.0%	7.0%	4.0%
59	5.0%	8.0%	5.0%
60	5.0%	10.0%	5.0%
61	15.0%	15.0%	10.0%
62	15.0%	15.0%	15.0%
63	15.0%	15.0%	15.0%
64	15.0%	15.0%	15.0%

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

Assumed Retirement Rates – Select Unreduced			
<u>Age</u>	<u>State</u>	<u>School</u>	<u>Other</u>
55	20.0%	25.0%	20.0%
56	15.0%	25.0%	20.0%
57	15.0%	25.0%	17.0%
58	15.0%	25.0%	20.0%
59	15.0%	25.0%	20.0%
60	15.0%	25.0%	17.0%
61	20.0%	33.0%	20.0%
62	40.0%	40.0%	30.0%
63	35.0%	30.0%	25.0%
64	30.0%	30.0%	30.0%
65	30.0%	30.0%	30.0%



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

Assumed Retirement Rates – Ultimate Unreduced			
<u>Age</u>	<u>State</u>	<u>School</u>	<u>Other</u>
55	15.0%	20.0%	12.0%
56	15.0%	20.0%	12.0%
57	15.0%	20.0%	12.0%
58	15.0%	20.0%	12.0%
59	15.0%	21.0%	12.0%
60	15.0%	23.0%	15.0%
61	20.0%	28.0%	20.0%
62	40.0%	35.0%	30.0%
63	30.0%	30.0%	20.0%
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		
<u>Age</u>	<u>Sheriffs and Deputies</u>	<u>Protection Occupation</u>
50	17.0%	
51	15.0%	
52	15.0%	
53	15.0%	
54	15.0%	
55	15.0%	25.0%
56	15.0%	10.0%
57	15.0%	10.0%
58	15.0%	10.0%
59	15.0%	10.0%
60	15.0%	10.0%
61	15.0%	15.0%
62	30.0%	30.0%
63	30.0%	25.0%
64	30.0%	25.0%
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).



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

Rates of Disablement (effective June 30, 2018)

<u>Age</u>	<u>Assumed Rates</u>					
	<u>Males</u>			<u>Females</u>		
	<u>State</u>	<u>School</u>	<u>Other</u>	<u>State</u>	<u>School</u>	<u>Other</u>
27	0.020%	0.020%	0.020%	0.020%	0.020%	0.020%
32	0.020%	0.020%	0.020%	0.020%	0.020%	0.020%
37	0.030%	0.034%	0.030%	0.030%	0.030%	0.030%
42	0.050%	0.056%	0.050%	0.040%	0.040%	0.040%
47	0.100%	0.098%	0.110%	0.070%	0.070%	0.070%
52	0.180%	0.142%	0.260%	0.180%	0.130%	0.160%
57	0.260%	0.230%	0.500%	0.310%	0.190%	0.280%
62	0.340%	0.318%	0.720%	0.500%	0.260%	0.400%

<u>Age</u>	<u>Assumed Rates</u>	
	<u>Sheriffs/Deputies*</u>	<u>Protection Occupation*</u>
27	0.130%	0.130%
32	0.130%	0.130%
37	0.130%	0.130%
42	0.150%	0.150%
47	0.200%	0.200%
52	0.240%	0.240%
57	0.320%	0.320%
62	0.430%	0.430%

* 66.67% of disabilities are assumed to be in-service disabilities.

Rates of Termination of Employment (effective June 30, 2018)

Regular Membership

<u>Years of Service</u>	<u>Male</u>			<u>Female</u>		
	<u>State</u>	<u>School</u>	<u>Other</u>	<u>State</u>	<u>School</u>	<u>Other</u>
1	11.00%	14.20%	19.00%	11.00%	14.20%	19.99%
5	4.75%	6.60%	7.50%	4.75%	6.60%	8.35%
10	2.25%	2.70%	4.10%	2.25%	2.70%	4.93%
15	1.60%	1.70%	2.64%	1.60%	1.70%	3.36%
20	1.10%	1.20%	2.10%	1.10%	1.20%	2.66%
25	0.80%	1.00%	1.60%	0.80%	1.00%	1.98%
30	0.80%	1.00%	1.10%	0.80%	1.00%	1.30%



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

Sheriffs/Deputies and Protection Occupation

<u>Years of Service</u>	<u>Sheriffs/Deputies</u>	<u>Protection Occupation</u>
1	4.00%	10.00%
5	1.00%	6.50%
10	1.00%	3.50%
15	1.00%	2.20%
20	1.00%	1.45%
25	1.00%	1.00%
30	1.00%	1.00%

Probability of Electing a Deferred Vested Benefit (effective June 30, 2018)

<u>Years of Service</u>	<u>Regular Membership</u>					
	<u>Male</u>			<u>Female</u>		
	<u>State</u>	<u>School</u>	<u>Other</u>	<u>State</u>	<u>School</u>	<u>Other</u>
5	62.0%	74.0%	62.0%	56.0%	80.0%	70.0%
10	71.0%	79.0%	71.0%	62.0%	80.0%	73.0%
15	76.0%	84.0%	76.0%	72.0%	85.0%	80.0%
20	81.0%	89.0%	81.0%	82.0%	90.0%	85.0%
25	86.0%	94.0%	86.0%	92.0%	95.0%	90.0%
30	90.0%	95.0%	90.0%	100.0%	100.0%	90.0%

Sheriffs/Deputies and Protection Occupation

<u>Years of Service</u>	<u>Rate</u>
5	53.0%
10	65.0%
15	85.0%
20	95.0%
25	100.0%
30	100.0%



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

Rates of Salary Increase* (effective June 30, 2018)

Years of Service	Annual Increase				Sheriffs/Deputies and Protection Occupation
	State	School	Other		
1	14.25%	16.25%	14.25%		16.25%
5	7.75%	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	3.85%	3.40%	3.75%		3.75%
25	3.60%	3.25%	3.65%		3.75%
30	3.35%	3.25%	3.65%		3.25%
35+	3.25%	3.25%	3.25%		3.25%

* Includes 3.25% wage growth

Marriage Assumption

100% of members are assumed to be married, with males 3 years older than females.



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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:
4. The UAL for each membership group shall be amortized over a 30-year closed period.
5. 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.
6. 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.
7. 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.
8. 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.



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

9. 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.



APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

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. Additions to the Favorable Experience Dividend are not allowed until the System is at least 100% funded. Further, transfers are made only to the extent that actual experience results in actuarial gains. Given the difficulty involved in valuing this provision with a reliable estimation, the impact has not been reflected in the current valuation results. The Active Member Supplemental Account provisions would only serve to redirect contributions to the System, and so result in no possible future liability to the System.



APPENDIX D

DEFINITION OF TERMS



APPENDIX D – DEFINITION OF TERMS

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APPENDIX D – 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.



APPENDIX D – DEFINITION OF TERMS

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.



APPENDIX E

CONTRIBUTION RATE FUNDING POLICY



APPENDIX E – CONTRIBUTION RATE FUNDING POLICY

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APPENDIX E – CONTRIBUTION RATE FUNDING POLICY

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.



APPENDIX E – CONTRIBUTION RATE FUNDING POLICY

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.



ADDENDUM

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, 2021 valuation for the Iowa Public Employees' Retirement System.

The results shown in this Addendum may not be consistent with those in the June 30, 2021 valuation. The June 30, 2021 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 Beckham

Patrice A. Beckham, FSA, EA, FCA, MAAA

October 27, 2021

Date

Brent A. Banister

Brent A. Banister, PhD, FSA, EA, FCA, MAAA

October 27, 2021

Date

**ADDENDUM**

**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, 2021, 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	
	<u>June 30, 2021</u>	<u>June 30, 2020</u>
Summary of Costs		
Normal cost	10.49%	10.50%
UAL amortization	<u>3.11%</u>	<u>4.29%</u>
Total	13.60%	14.79%
Less Employee Contribution Rate	<u>(6.29%)</u>	<u>(6.29%)</u>
Employer Required Contribution Rate	7.31%	8.50%
Funded Status		
Actuarial liability	\$39,777,935,943	\$38,469,643,936
Actuarial value of assets	34,734,902,134	31,900,331,425
Unfunded actuarial liability	\$5,043,033,809	\$6,569,312,511
Funded Ratio	87.3%	82.9%
Asset Values		
Market value of assets (MVA)	\$39,637,744,850	\$31,493,894,122
Actuarial Value of Assets (AVA)	34,734,902,134	31,900,331,425
MVA/AVA	114%	99%



ADDENDUM

Sheriffs and Deputies Actuarial Valuation as of

	<u>June 30, 2021</u>	<u>June 30, 2020</u>
Summary of Costs		
Normal cost	16.93%	16.88%
UAL amortization	<u>(1.03%)</u>	<u>0.23%</u>
Total	15.90%	17.11%
Less Employee Contribution Rate	<u>(8.76%)</u>	<u>(9.01%)</u>
Employer Required Contribution Rate	7.14%	8.10%
Funded Status		
Actuarial liability	\$816,703,678	\$766,018,806
Actuarial value of assets	839,015,517	758,806,089
Unfunded actuarial liability	(\$22,311,839)	\$7,212,717
Funded Ratio	102.7%	99.1%
Asset Values		
Market value of assets (MVA)	\$957,673,108	\$749,717,084
Actuarial Value of Assets (AVA)	839,015,517	758,806,089
MVA/AVA	114%	99%



ADDENDUM

Protection Occupation Group*		
Actuarial Valuation as of		
	<u>June 30, 2021</u>	<u>June 30, 2020</u>
Summary of Costs		
Normal cost	15.30%	15.28%
UAL amortization	<u>(0.84%)</u>	<u>0.10%</u>
Total	14.46%	15.38%
Less Employee Contribution Rate	<u>(6.21%)</u>	<u>(6.21%)</u>
Employer Required Contribution Rate	8.25%	9.17%
Funded Status		
Actuarial liability	\$1,950,009,129	\$1,836,764,798
Actuarial value of assets	2,011,069,645	1,826,519,231
Unfunded actuarial liability	(\$61,060,516)	\$10,245,567
Funded Ratio	103.1%	99.4%
Asset Values		
Market value of assets (MVA)	\$2,294,457,724	\$1,804,080,906
Actuarial Value of Assets (AVA)	2,011,069,645	1,826,519,231
MVA/AVA	114%	99%

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