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OKLAHOMA

**Oklahoma Public Employees
Retirement System**

**Actuarial Valuation Report
as of July 1, 2022**





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

October 5, 2022

Board of Trustees
Oklahoma Public Employees Retirement System
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Members of the Board:

In this report are submitted the results of the annual valuation of the assets and liabilities of the Oklahoma Public Employees Retirement System (“OPERS” or “System”), prepared as of July 1, 2022.

The purpose of this report is to provide a summary of the funded status of the System as of July 1, 2022 and to provide the actuarially determined rate. While not verifying the data at the source, the actuary performed tests for consistency and reasonability. There have been no changes to the actuarial assumptions or methods since the last valuation. However, the Board adopted a new amortization policy that is first reflected in the July 1, 2022 valuation.

The promised benefits of the System are included in the actuarially calculated contribution rates which are developed using the Entry Age Normal cost method. A five-year market-related value of assets is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded actuarial accrued liability (UAAL) that is being amortized by regular annual contributions as a level percentage of payroll, on the assumption that payroll will increase by 3.25% annually.

As in recent valuations, liabilities have been calculated without considering future cost of living adjustments (COLAs) in keeping with House Bill 2132 (2011). Should funding of future COLAs and/or stipends be provided by the System, the COLAs and/or stipends should be included in the actuarial valuation. In addition, House Bill 2630 (2014) closed the plan to most new employees hired after November 1, 2015.

This is to certify that the independent consulting actuaries are members of the American Academy of Actuaries and have experience in performing valuations for public retirement systems, that the valuation was prepared for funding purposes with assumptions and methods that meet the parameters of the Actuarial Standards of Practice, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

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In order to prepare the results in this report, we have utilized actuarial models that we developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results. Future actuarial results may differ significantly from the current results presented in this report due to factors such 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. Because the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

We have prepared the Schedule of Funding Progress and Trend Information shown in the financial section of the Annual Comprehensive Financial Report. We have also reviewed the supplemental medical benefits provided by the System under Section 401(h) of the Internal Revenue Code and have determined that these benefits are subordinate to the retirement benefits as required.

In our opinion, in order for the System to meet all the benefit obligations of the plan for current active and retired members, contributions equal to at least the actuarially determined rate are necessary for future fiscal years. Assuming these contributions are made to the System from year to year in the future at the rates recommended on the basis of the successive actuarial valuations, the continued sufficiency of the retirement fund to provide the benefits called for under the System may be safely anticipated. The statutory contribution exceeds the actuarially determined rate in this valuation, and we recommend the statutory contribution be used to pay the UAAL down faster than under the current schedule and to protect against potential future investment and experience losses.

The Table of Contents, which immediately follows, outlines the material contained in the report.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'Alisa Bennett'.

Alisa Bennett, FSA, EA, FCA, MAAA
President

A handwritten signature in blue ink, appearing to read 'Brent A. Banister'.

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



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EXECUTIVE SUMMARY

OVERVIEW

The Oklahoma Public Employees Retirement System (“OPERS” or “System”) provides retirement benefits for most employees of the State of Oklahoma, for most county employees, and for employees of local employers who have elected to participate in OPERS.

This report presents the results of the July 1, 2022 actuarial valuation for the System. The primary purposes of performing an actuarial valuation are to:

- Determine the employer contribution rate required to fund the System on an actuarial basis;
- Evaluate the sufficiency of the statutory contribution rate;
- Disclose asset and liability measures as of the valuation date;
- Determine the experience of the System since the last valuation date; and
- Analyze and report on trends in System contributions, assets, and liabilities.

As in recent valuations, liabilities have been calculated without considering future cost of living adjustments (COLAs) and/or stipends in keeping with House Bill 2132 (2011). Should funding of future COLAs and/or stipends be provided by the System, the COLAs and/or stipends should be included in the actuarial valuation.

As described in previous valuation reports, the Plan has been amended by House Bill 2630, enacted in 2014, which states that effective November 1, 2015, OPERS shall create a defined contribution plan for most people first employed by a participating employer. Exemptions from the new defined contribution plan include hazardous duty members and district attorneys, assistant district attorneys and employees of the district attorney’s office. In order to reduce the liabilities of the defined benefit plan, each employer shall send to OPERS the difference between the required employer contribution to OPERS and the amount required to match the participating employee’s contribution in the defined contribution plan, known as Pathfinder.

Senate Bill 2120, also enacted in 2014, amends House Bill 2630 to further exempt from the new defined contribution plan county elected officials and employees of a county, county hospital, city or town, conservation district, circuit engineering district, and any public or private trust in which a county, city or town participates. Senate Bill 2120 also states that employees who participate in the defined contribution system are excluded from the \$105 health care subsidy. New employees specifically exempted from the defined contribution plan will participate in the existing defined benefit plan.

Senate Bill 2120 and House Bill 2630 will, in combination, significantly reduce the number of new members entering the plan after November 1, 2015. While this had a small impact initially on the valuation results, as time goes by, there are potential ramifications of this legislation that will affect on-going plan funding. In particular, the current amortization of the UAAL is based on the assumption of increasing payroll. The current provision of this legislation should provide at least as much toward the UAAL as would have been expected otherwise, so we are comfortable with this methodology. We would encourage the Board to study the long-term impact of this legislation.

There have been no changes to the actuarial assumptions or plan provisions since the prior valuation. However, the Board adopted a new amortization method that is first reflected in the July 1, 2022 valuation. Under the new method, the unfunded actuarial accrued liability as of July 1, 2021 will continue to be amortized on the current schedule.



EXECUTIVE SUMMARY

However, new experience bases, due to such things as experience gains or losses, assumption or plan changes, and contributions differing from the needed rate, will be established each year and will be amortized over closed 15-year periods as a level percent of pay. This methodology will reduce the volatility of the UAAL amortization rate compared with a closed amortization period with fewer years remaining. As a result, the Actuarially Determined Contribution will also exhibit lower volatility.

The valuation results provide a snapshot view of the System's financial condition on July 1, 2022. The unfunded actuarial accrued liability for the System decreased by \$226.9 million due to various factors. A detailed analysis of the change in the unfunded actuarial accrued liability from July 1, 2021 to July 1, 2022 is shown on page 5.

The highlights of the valuation are shown below:

Funded Status \$(millions)	Actuarial Valuation Date	
	July 1, 2022	July 1, 2021
Actuarial Accrued Liability	\$11,140	\$11,046
Actuarial Value of Assets	\$11,312	\$10,991
Unfunded Actuarial Accrued Liability	(\$172)	\$55
Funded Ratio (Actuarial Value)	101.5%	99.5%
Market Value of Assets	\$10,393	\$12,526
Funded Ratio (Market Value)	93.3%	113.4%

There was a liability gain of \$71.1 million from demographic experience which resulted in an actuarial accrued liability that was lower than expected (0.63% of expected liability). The components of this net liability gain are identified on page 5.

The return on the market value of assets as reported by the System was -14.7%, net of investment manager fees, for the year ended June 30, 2022. The actuarial value of assets is determined using a method to smooth investment gains and losses in order to develop more stable contribution rates. The return on the actuarial value of assets was approximately 6.1% which resulted in an actuarial loss of \$38.4 million.

The actuarial contribution rate for the employer decreased from 2021 to 2022:

Contribution Rate	Actuarial Valuation Date	
	July 1, 2022	July 1, 2021
Normal Cost	10.81%	10.83%
Amortization of UAAL*	(0.41%)	0.52%
Budgeted Expenses	<u>0.56%</u>	<u>0.48%</u>
Actuarially Determined Contribution Rate	10.96%	11.83%
Less Estimated Member Contribution Rate	<u>4.28%</u>	<u>4.25%</u>
Employer Actuarially Determined Contribution Rate	6.68%	7.58%
Less Employer Statutory Contribution Rate	16.50%	16.50%
Contribution Shortfall (Surplus)	(9.82%)	(8.92%)

*The amortization of UAAL contribution rate recognizes the employer contributions made on behalf of the defined contribution plan participant payroll.



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Primarily due to the removal of the COLA assumption and reserve starting with the June 30, 2011 valuation, the employer actuarial contribution rate is less than the employer statutory contribution rate. It is recommended that the employer statutory contribution rate continue unchanged as this will decrease the unfunded actuarial accrued liability, accelerate progress on reaching long-term funding goals, and protect against potential future investment and experience losses.

EXPERIENCE: July 1, 2021 to July 1, 2022

In many respects, an actuarial valuation can be thought of as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is July 1, 2022. On that date, the assets available for the payment of benefits are appraised. The assets are compared with the liabilities of the System (liabilities are generally in excess of assets). The actuarial process leads to a method of determining the contributions needed by members and employers in the future to balance the System assets and liabilities.

Changes in the System's assets and liabilities impacted the change in the actuarial contribution rates between July 1, 2021 and July 1, 2022. Each component is examined in the following discussion.

ASSETS

As of July 1, 2022, the System had total assets of \$10.39 billion when measured on a market value basis. This was a decrease of \$2.14 billion from the July 1, 2021 figure of \$12.53 billion. The market value of assets is not used directly in the calculation of the actuarial contribution rate. An asset valuation method, which smooths the effect of market fluctuations, is used to determine the value of assets used in the valuation, called the "actuarial value of assets." Differences between the actual return on the market value of assets and the assumed return on the actuarial value of assets are phased in over a five-year period. The resulting value must be no less than 80% of the market value and no more than 120% of market value, referred to as "the corridor." See Table 3 for the detailed development of the actuarial value of assets as of July 1, 2022.

The actuarial value of assets as of July 1, 2022 was \$11.31 billion. The annualized dollar-weighted rate of return for fiscal year 2022, measured on the actuarial value of assets, was approximately 6.1%, which resulted in an actuarial loss of \$38.4 million. The return on the market value of assets, net of investment manager fees, was -14.7% as reported by the System.

The components of the change in the market and actuarial value of assets for the System are set forth below:

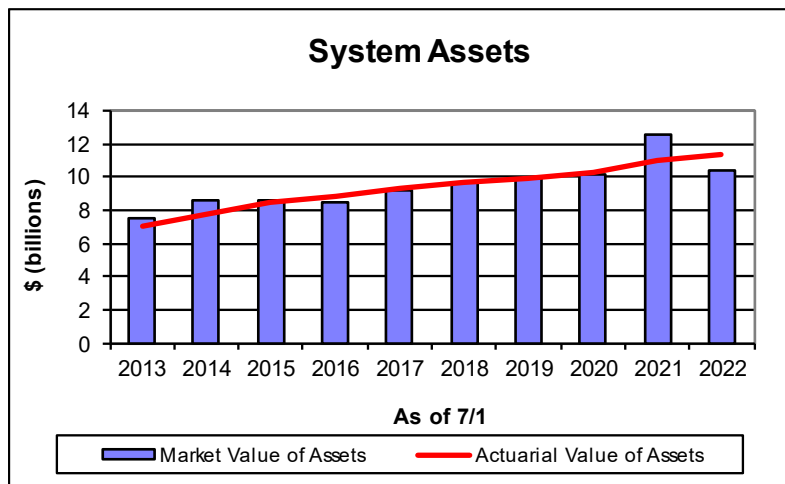
	Market Value \$(millions)	Actuarial Value \$(millions)
Net Assets, July 1, 2021	\$12,525.9	\$10,991.2
• Employer and Member Contributions	\$366.1	\$366.1
• Benefit Payments and Expenses	(\$710.6)	(\$710.6)
• Investment Income/(Loss)	(\$1,788.5)	\$665.1
Preliminary Value, July 1, 2022	\$10,392.9	\$11,311.8
Application of Corridor	N/A	N/A
Final Net Assets, July 1, 2022	\$10,392.9	\$11,311.8
Estimated Rate of Return*	(14.7%)	6.1%

*Rate of return on Market Value was reported by the System, net of investment manager fees.

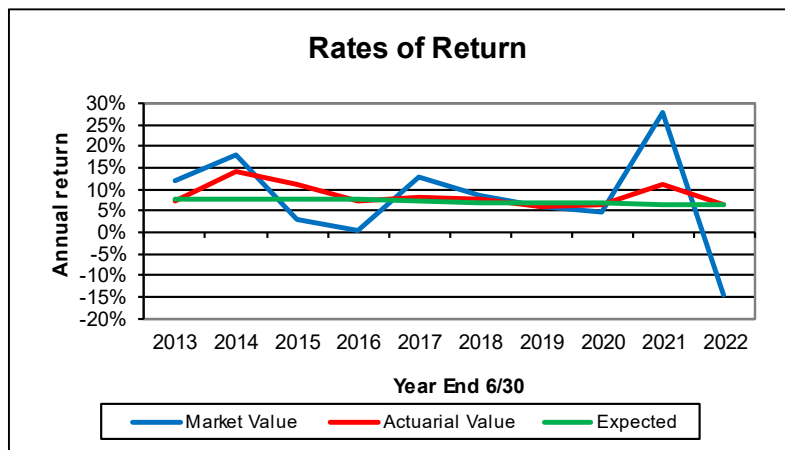


EXECUTIVE SUMMARY

Due to the use of an asset smoothing method, there is approximately \$0.9 billion of deferred investment loss that has not yet been recognized. This deferred investment experience will be reflected in the actuarial value of assets over the next five years.



There have been years during the last decade in which the actuarial value of assets has been both higher and lower than the market value, which is what would be expected using an asset smoothing method. As can be seen in the graph, there is currently a deferred loss resulting from market value returns less than expected. This net loss will be smoothed into the actuarial value of assets over time.



Rates of return on the market value of assets are very volatile. The more stable return on the actuarial value of assets illustrates the advantage of using an asset smoothing method.

SYSTEM LIABILITIES

The actuarial accrued liability is that portion of the present value of future benefits that will not be paid by future normal costs. The difference between this liability and the asset value at the same date is referred to as the unfunded actuarial accrued liability (UAAL). The UAAL will be reduced if the employers' contributions exceed the employers' normal cost for the year after allowing for interest earned on the previous years' balance of unfunded actuarial accrued liability. Benefit improvements, experience gains/losses, and changes in the actuarial assumptions and methods will also impact the total actuarial accrued liability and the unfunded portion thereof.

The unfunded actuarial accrued liability as of July 1, 2022 is:

Actuarial Accrued Liability	\$11,139,885,081
Actuarial Value of Assets	<u>11,311,760,330</u>
Unfunded Actuarial Accrued Liability/(Surplus)	(\$171,875,249)



EXECUTIVE SUMMARY

See Table 5 for the detailed development of the Actuarial Accrued Liability and the calculation of the Unfunded Actuarial Accrued Liability.

Other factors influencing the UAAL from year to year include actual experience versus that expected based on the actuarial assumptions (for assets and liabilities), changes in the actuarial assumptions, procedures or methods, as well as changes to the System's benefit provisions. The actual experience measured in this valuation is that which occurred during the plan year ended June 30, 2022. There was an experience loss on the actuarial value of assets due to the actual rate of return being lower than expected for the fiscal year. There was an experience gain on the liabilities due to demographic experience and data adjustments more favorable than expected. The net result was a \$226.9 million decrease in the UAAL, resulting in a UAAL surplus of \$171.9 million.

Between July 1, 2021 and July 1, 2022, the change in the unfunded actuarial accrued liability for the System was as follows (in millions):

	<u>\$(millions)</u>
Unfunded Actuarial Accrued Liability, July 1, 2021	\$55
• effect of contributions more than actuarial rate	(185)
• expected decrease due to amortization	(7)
• investment experience	38
• liability experience ¹	(71)
• other experience	<u>(2)</u>
Unfunded Actuarial Accrued Liability, July 1, 2022	(\$172)

¹ Liability gain is about 0.63% of total expected actuarial accrued liability

The liability gain for the System can be allocated to actual experience related to each actuarial assumption as follows:

Liability Source	Impact of AAL \$(millions)	% of Expected Liability
Salary Increases	14.2	0.13%
Mortality	(33.0)	(0.29%)
Termination of Employment	(32.9)	(0.29%)
Retirements	(4.6)	(0.04%)
Disability	0.9	0.01%
New Entrants and Rehires	21.0	0.19%
Miscellaneous/Data Changes	<u>(36.7)</u>	<u>(0.34%)</u>
Total (Gain)/Loss	(71.1)	(0.63%)

A detailed summary of the change in the UAAL is shown in Table 8.

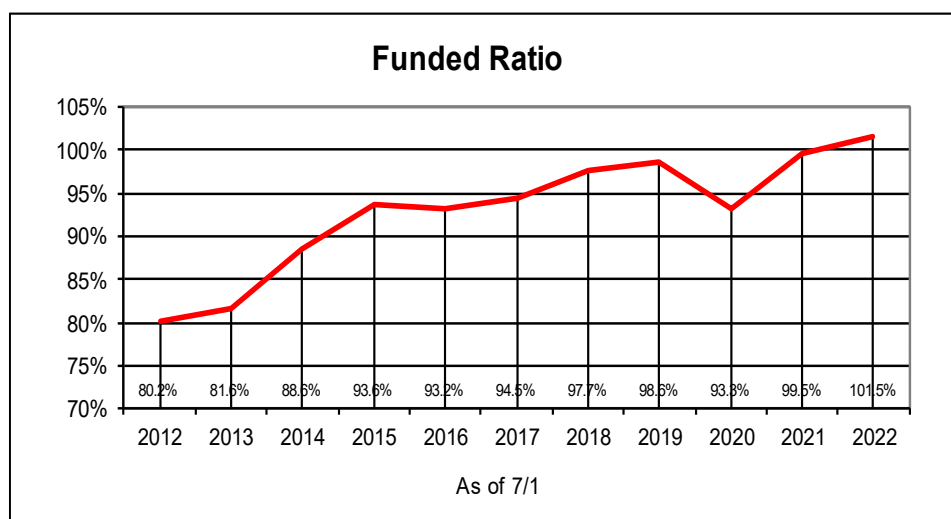
An evaluation of the unfunded actuarial accrued liability on a pure dollar basis may not provide a complete analysis because only the difference between the assets and liabilities (which are both very large numbers) is reflected. Another way to evaluate the unfunded actuarial accrued liability and the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



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The funded status information, on both an actuarial and market value basis, is shown below in \$(millions). These ratios do not indicate whether or not the plan could settle its liabilities with available assets, nor are they sufficient, on their own, to indicate the future funding needs of the System.

	7/1/17	7/1/18	7/1/19	7/1/20	7/1/21	7/1/22
Using Actuarial Value of Assets:						
Funded Ratio	94.5%	97.7%	98.6%	93.3%	99.5%	101.5%
Unfunded Actuarial Accrued Liability / (Surplus)	\$540	\$226	\$138	\$731	\$55	(\$172)
Using Market Value of Assets:						
Funded Ratio	94.4%	98.2%	99.1%	92.3%	113.4%	93.3%
Unfunded Actuarial Accrued Liability / (Surplus)	\$552	\$182	\$89	\$845	(\$1,480)	\$747



The plan's funded ratio has greatly increased over the past decade. There was a decrease in 2020 that was largely due to a change in assumptions and an ad hoc COLA granted in 2020. However, the funded ratio rebounded in 2021 due primarily to large asset gains. Note that these gains have been offset by large asset losses in 2022 and the plan remains underfunded on a market value of asset basis.

CONTRIBUTION RATES

The funding objective of the System is to pay the normal cost rate plus an amount that will pay off the unfunded actuarial accrued liability.

Under the Entry Age Normal cost method, the actuarial contribution rate consists of:

- A "normal cost" for the portion of projected liabilities allocated by the actuarial cost method to service of members during the year following the valuation date;
- An "administrative expense" component for the expenses expected to be paid from the Trust for the year;
- An "unfunded actuarial accrued liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.



EXECUTIVE SUMMARY

Contributions to the System are made by the members and their employers. Most State employees pay 3.5% of compensation. Local government employees contribute from 3.5% to 8.5% of compensation, depending on the rate chosen by their employer. Starting in 2004, most participants were eligible to make an election to contribute an additional 2.91% of pay and to increase their benefit accrual multiplier for future years of service to 2.5%. Hazardous Duty employees and most elected officials have a different required contribution rate (see Summary of Provisions section of this report).

Effective July 1, 1999, the State's contribution rate was reduced from 12.5% to 10.0% of payroll and stayed at that level until 2005. For the same period, the combined employer and employee contribution rates for the county and local employees were 13.5% of payroll. As of July 1, 2005, the State's contribution rate increased to 11.5% of payroll with additional increases of 1.0% each July until reaching 16.5%. The 1.0% increase that was supposed to be effective July 1, 2010 was delayed one year by the 2010 Legislature and was effective July 1, 2011. For county and local employees, the combined contribution rate increased to 15.0% on July 1, 2005 and increased an additional 1.0% of payroll each year beginning July 1, 2006 until it reached 20.0% on July 1, 2010.

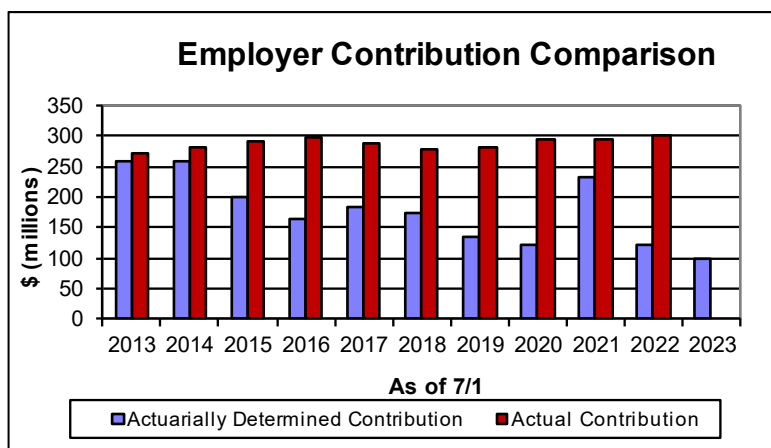
As described in previous valuation reports, the Plan has been amended by House Bill 2630, enacted in 2014, which states that effective November 1, 2015, OPERS shall create a defined contribution plan for most people first employed by a participating employer. In order to reduce the liabilities of the defined benefit plan, each employer shall send to OPERS the difference between the required employer contribution to OPERS and the amount required to match the participating employee's contribution in the defined contribution plan. The amortization of UAAL contribution rate in this valuation recognizes the employer contributions made on behalf of the defined contribution plan participant payroll.

The ultimate contribution rate of 16.5% for the State is greater than the employer actuarial contribution rate for the fiscal year developed in this valuation. When contributions to the System are greater than the actuarial rate, the UAAL is expected to decrease and be paid down faster. As of the July 1, 2022 valuation, the plan is in a surplus position on an actuarial value of assets basis, but is underfunded on a market value of assets basis. If the System receives the statutory rate and the expected employer contributions on behalf of the defined contribution member payroll and all assumptions are met, it will help offset the current deferred asset losses that will push down the actuarial value of assets and, thus, the funded ratio of the plan.

The following graph shows the total actuarially determined employer contribution compared to the amount actually received in each year. The funding policy contribution equals the System's normal cost, budgeted expenses, and an amortization of the unfunded actuarial accrued liability. For July 1, 1998 and prior years, the unfunded actuarial accrued liability was amortized over 25 years from July 1, 1987. For the July 1, 1999 valuation, the amortization period was changed to 40 years from July 1, 1987. For the July 1, 2008 valuation, the amortization period was changed to 20 years from July 1, 2007 (no change in the number of years remaining). The amortization method was updated as of July 1, 2022 to amortize new experience bases over closed 15-year periods as a level percent of pay.

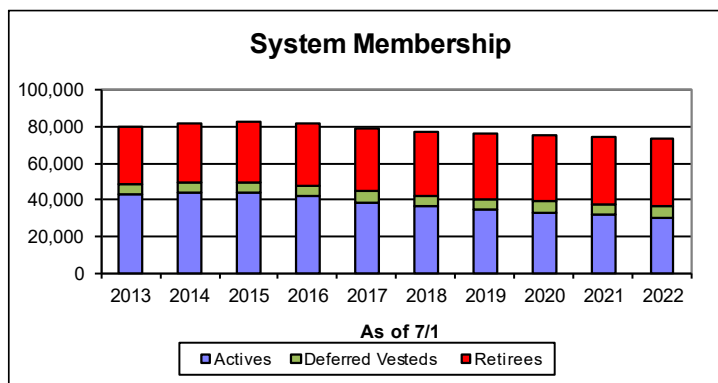


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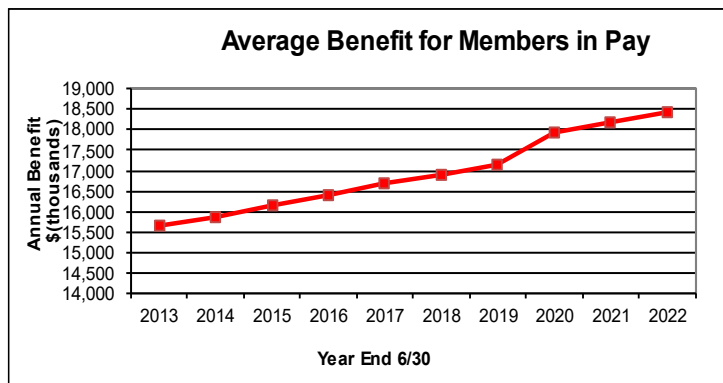


MEMBER INFORMATION

The number of active members included in the valuation decreased from 31,711 in the 2021 valuation to 29,912 in the 2022 valuation. The retired member population and the average retirement benefit amounts continued to increase steadily. There were 36,649 retirees and beneficiaries in the 2022 valuation, with an average benefit of \$1,537 per month. This represents a 1.4% increase in the average monthly benefit from the previous year.



The number of active members has been declining and is expected to decline in the future due to the defined benefit plan being closed to most new entrants. The number of terminated vested and retirees has increased which is to be expected in an ongoing retirement system.



The average benefit for retirees has climbed steadily over the past 10 years as new retirees leave with higher salaries and therefore, higher benefits than those already retired. In addition, most of the members who die are older with smaller benefits.



EXECUTIVE SUMMARY

COMMENTS

As the graph on page 4 shows, investment experience continues to be extremely volatile which creates significant challenges when funding retirement systems. The rate of return on the market value of assets, net of investment manager fees, for fiscal year 2022 was reported by the System as -14.7%, resulting in a net deferred loss versus the rate assumed in the prior valuation for the 2022 fiscal year of 6.5%. The asset smoothing mechanism will recognize the deferred \$0.9 billion loss in future years. There was also an experience gain of \$71.1 million on liabilities, due to various factors shown on page 5.

The employer contribution rate increased according to a statutory schedule to an ultimate rate of 16.50% which was reached July 1, 2011. It must be noted that the portion of the actuarial contribution rate to be used to amortize the unfunded actuarial accrued liability was calculated as a level percentage of payroll assuming payroll grows by 3.25% per year, even though House Bill 2630 closed the plan effective November 1, 2015 to all but specifically exempted new employees. This is because House Bill 2630 requires each employer to send to OPERS the difference between the required employer contribution to OPERS and the amount required to match the participating employee's contribution in the defined contribution plan. It is also important to note that this continued contribution stream payable on new employee payroll is incorporated into the actuarially determined rate calculated in this valuation, and any changes to reduce the funds received under this provision would negatively impact the actuarially determined rate either now or in the future.

As noted earlier in the report, due primarily to the removal of the COLA assumption and reserve starting on July 1, 2011, the actuarial contribution rate of 6.68% is less than what is currently being funded. Absent any future investment or experience losses, this will serve to decrease the UAAL and cause it to be paid down faster. As of the July 1, 2022 valuation, the plan has a negative UAAL, but also has large deferred asset losses that will be recognized over the next five years. On a market value of assets basis, the plan is currently underfunded. If the System pays the statutory rate and the plan continues to receive employer contributions on behalf of the defined contribution member payroll, it will help offset these large deferred asset losses that may lead to a UAAL as they are recognized. Paying the statutory rate also helps to protect against potential future investment and experience losses that may be more frequent and/or severe in this time of economic uncertainty.

Also, as noted earlier in the report, should funding of future COLAs and/or stipends be provided by the System, the COLAs and/or stipends should be included in the actuarial valuation.

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 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. Please see Section 5 of this report for an in-depth discussion of the specific risks facing the Oklahoma Public Employees Retirement System. Any potential changes to the benefits or contribution levels could materially change the risk profile of the System, and so we would encourage careful consideration before initiating such a change.



SECTION 1- SUMMARY OF FINDINGS

For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below.

COMPARISON OF PRINCIPAL VALUATION RESULTS

	7/1/2022 Valuation	7/1/2021 Valuation	% Change
1. PARTICIPANT DATA			
Number of:			
Active Members	29,912	31,711	(5.7)
Retired and Disabled Members and Beneficiaries	36,649	36,351	0.8
Inactive Members	6,454	6,133	5.2
Total Members	73,015	74,195	(1.6)
Projected Annual Salaries of Active Members	\$ 1,527,059,370	\$ 1,556,561,344	(1.9)
Annual Retirement Payments for Retired Members and Beneficiaries	\$ 675,895,605	\$ 661,011,030	2.3
2. ASSETS AND LIABILITIES			
Total Actuarial Accrued Liability	\$ 11,139,885,081	\$ 11,046,240,166	0.8
Market Value of Assets	\$ 10,392,907,883	\$ 12,525,883,234	(17.0)
Actuarial Value of Assets	\$ 11,311,760,330	\$ 10,991,205,271	2.9
Unfunded Actuarial Accrued Liability	\$ (171,875,249)	\$ 55,034,895	(412.3)
Funded Ratio	101.5%	99.5%	2.1
3. EMPLOYER CONTRIBUTION RATES AS A PERCENT OF PAYROLL			
Normal Cost Rate	10.81%	10.83%	
Amortization of Unfunded Actuarial Accrued Liability*	(0.41%)	0.52%	
Budgeted Expenses	0.56%	0.48%	
Total Actuarially Determined Contribution Rate	10.96%	11.83%	
Less Estimated Member Contribution Rate	4.28%	4.25%	
Employer Actuarially Determined Contribution Rate	6.68%	7.58%	
Less Statutory State Employer Contribution Rate	16.50%	16.50%	
Contribution Shortfall/(Surplus)	(9.82%)	(8.92%)	

* New amortization policy first reflected in the July 1, 2022 valuation.



SECTION 2 - ASSETS

Oklahoma Public Employees Retirement System

Market Value of Assets

The current market value represents the "snapshot" or "cash-out" value of System assets as of the valuation date. In addition, the market value of assets provides the basis for measuring investment performance. As of July 1, 2022, the market value of assets for the System was \$10.4 billion. Table 1 is a comparison, at market value, of System assets as of June 30, 2022, and June 30, 2021, in total and by investment category. Table 2 summarizes the change in the market value of assets from July 1, 2021 to June 30, 2022.

Actuarial Value of Assets

Neither the market value of assets, representing a "cash-out" value of System assets, nor the book value of assets, representing the cost of investments, may be the best measure of the System's ongoing ability to meet its obligations. A technique which dampens swings in the market value while still recognizing its volatility is used for determining the actuarial value of assets.

The actuarial value of assets is based on a five-year moving average of expected and actual market values determined as follows:

- at the beginning of each fiscal year, a preliminary expected actuarial asset value is calculated as the sum of the previous year's actuarial value increased with a year's interest at the System valuation rate plus net cash flow adjusted for interest (at the same rate) to the end of the previous fiscal year;
- the expected actuarial asset value is set equal to the preliminary expected actuarial value plus the unrecognized investment gains and losses as of the beginning of the previous fiscal year;
- the difference between the expected actuarial asset value and the market value is the investment gain or loss for the previous fiscal year;
- the (final) actuarial asset value is the preliminary value plus 20% of the investment gains and losses for each of the five previous fiscal years, but in no case more than 120% of the market value or less than 80% of the market value.

Table 3 shows the development of the actuarial value of assets (AVA) as of the valuation date.



SECTION 2 - ASSETS

Oklahoma Public Employees Retirement System

Table 1

Analysis of Net Assets at Market Value

	June 30, 2022		June 30, 2021	
	Amount \$(millions)	% of Total	Amount \$(millions)	% of Total
Cash & Equivalents	\$ 181.3	1.7%	\$ 523.3	4.0%
Short-term Investments	38.0	0.4%	40.0	0.3%
Government Obligations	2,405.0	22.4%	2,788.6	21.3%
Corporate Bonds	1,085.2	10.2%	1,008.8	7.7%
Domestic Equity	4,126.0	38.6%	5,110.9	39.2%
International Equity	2,837.0	26.6%	3,573.0	27.4%
Real Estate	8.7	0.1%	9.3	0.1%
Subtotal	\$ 10,681.2	100.0%	\$ 13,053.9	100.0%
Property (net)	0.0		0.0	
Other Assets	0.4		0.8	
Net Receivables/(Payables)	(288.7)		(528.8)	
Net Assets	\$ 10,392.9		\$ 12,525.9	



SECTION 2 - ASSETS

Oklahoma Public Employees Retirement System

Table 2

Statement of Changes in Net Assets

	Fiscal Year Ended June 30,	
	2022	2021
1. Market Value of Net Assets at Beginning of Year	\$ 12,525,883,234	\$ 10,097,798,827
2. Contributions		
a. Members	\$ 66,392,310	\$ 66,204,166
b. State and local agencies	299,743,221	293,018,730
c. Total contributions (2a) + (2b)	\$ 366,135,531	\$ 359,222,896
3. Net Investment Income		
a. Net appreciation (depreciation) in fair value of investments	\$ (1,902,266,424)	\$ 2,655,093,548
b. Interest	66,198,311	62,907,353
c. Dividends	60,645,658	63,388,918
d. Securities lending activities	1,323,272	1,413,785
e. Real estate	71,120	335,586
f. Total investment income/(loss)	\$ (1,774,028,063)	\$ 2,783,139,190
(3a) + (3b) + (3c) + (3d) + (3e)		
g. Investment expenses	(14,471,179)	(18,789,493)
h. Net investment income/(loss) (3f) + (3g)	\$ (1,788,499,242)	\$ 2,764,349,697
4. Total additions/(subtractions) (2c) + (3h)	\$ (1,422,363,711)	\$ 3,123,572,593
5. Deductions		
a. Retirement, death, and survivor benefits	\$ 692,813,323	\$ 679,280,964
b. Refunds and withdrawals	11,905,764	10,732,584
c. Administrative expenses	5,892,553	5,474,638
d. Total deductions (5a) + (5b) + (5c)	\$ 710,611,640	\$ 695,488,186
6. Net Change in Assets (4) - (5d)	\$ (2,132,975,351)	\$ 2,428,084,407
7. Market Value of Net Assets at End of Year	\$ 10,392,907,883	\$ 12,525,883,234
(1) + (6)		



SECTION 2 - ASSETS

Oklahoma Public Employees Retirement System

Table 3

Determination of Actuarial Value of Assets

1. Market Value as of July 1, 2021	\$	12,525,883,234
2. Contributions		
a. Member	\$	66,392,310
b. Employer		299,743,221
c. Total (a) + (b)	\$	366,135,531
3. Decreases During Year		
a. Benefit payments	\$	(692,813,323)
b. Refunds and withdrawals		(11,905,764)
c. Administrative expenses		(5,892,553)
d. Total (a) + (b) + (c)	\$	(710,611,640)
4. Expected Return on Assets at 6.50%	\$	803,163,180
5. Expected Market Value as of June 30, 2022 (1) + (2c) + (3d) + (4)	\$	12,984,570,305
6. Actual Market Value as of June 30, 2022	\$	10,392,907,883
7. Year End 2022 Asset Gain/(Loss) (6) - (5)	\$	(2,591,662,422)

Schedule of Asset Gains/(Losses)

Year End	Original Amount	Recognized in Prior Years	Recognized in This Year	Recognized in Future Years
2018	\$ 124,320,672	\$ 99,456,536	\$ 24,864,136	\$ 0
2019	(100,274,733)	(60,164,841)	(20,054,947)	(20,054,945)
2020	(241,792,937)	(96,717,174)	(48,358,587)	(96,717,176)
2021	2,118,749,352	423,749,870	423,749,870	1,271,249,612
2022	(2,591,662,422)	0	(518,332,484)	(2,073,329,938)
Total	\$ (690,660,068)	\$ 366,324,391	\$ (138,132,012)	\$ (918,852,447)
8. Asset Gain/(Loss) to be Recognized in the Future			\$	(918,852,447)
9. Initial Actuarial Value as of June 30, 2022 (6) - (8)			\$	11,311,760,330
10. Constraining Values:				
a. 80% of market value (6) x 0.8			\$	8,314,326,306
b. 120% of market value (6) x 1.2			\$	12,471,489,460
11. Actuarial Value as of June 30, 2022 (9), but not less than (10a), nor greater than (10b)			\$	11,311,760,330



SECTION 3 - SYSTEM LIABILITIES

Oklahoma Public Employees Retirement System

In the previous section, an actuarial valuation was compared with an inventory process, and an analysis was given of the inventory of assets of the System as of the July 1, 2022 valuation date. In this section, the discussion will focus on the commitments of the System, which are referred to as its liabilities.

Table 4 contains an analysis of the actuarial present value of all future benefits (PVFB) for contributing members, inactive members, retirees and their beneficiaries. The analysis is provided for each group.

The liabilities summarized in Table 4 include the actuarial present value of all future benefits expected to be paid with respect to each member. For an active member, this value includes measures of both benefits already earned and future benefits expected to be earned. For all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and, if an optional benefit is chosen, for the lives of the surviving beneficiaries.

The actuarial assumptions used to determine liabilities are based on the results of an experience study covering the three-year period ended June 30, 2019. This set of assumptions is shown in Appendix B. The liabilities reflect the benefit structure in place as of July 1, 2022.

Actuarial 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. An actuarial cost method is a mathematical technique that allocates the present value of future benefits into annual costs. In order to do this allocation, it is necessary for the funding method to “break down” the present value of future benefits into two components:

- (1) that which is attributable to the past; and
- (2) that which is attributable to the future.

Actuarial terminology calls the part attributable to the past the “past service liability” or the “actuarial accrued liability.” The portion allocated to the future is known as the “present value of future normal costs,” with the specific piece of it allocated to the current year being called the “normal cost.” Table 5 contains the calculation of actuarial liabilities for all groups, as well as the unfunded actuarial accrued liability.

In valuations prior to July 1, 2011, the System used an assumption of a 2% annual COLA each year in developing liabilities and contribution rates. The System did not have an automatic COLA provision, but ad hoc COLAs had historically been granted by the Legislature. The 2011 Oklahoma Legislature passed House Bill 2132 which removed COLAs from the definition of “non-fiscal retirement bills” in the Oklahoma Pension Legislation Actuarial Analysis Act (OPLAAA). The impact of this change was to make any COLA bill subject to all of the requirements of OPLAAA, including the requirement that such bills provide adequate funding to pay the cost. As a result, beginning with the July 1, 2011 actuarial valuation, the liabilities of the System have been calculated without a COLA assumption. Also, as noted earlier in the report, should funding of future COLAs and/or stipends be provided by the System, the COLAs and/or stipends should be included in the actuarial valuation.



SECTION 3 – SYSTEM LIABILITIES

Oklahoma Public Employees Retirement System

Table 4

**Present Value of Future Benefits
As of July 1, 2022**

	Regular	Elected Officials	Hazardous Duty	Total
1. Active Employees				
a. Retirement Benefit	\$ 4,092,029,707	\$ 200,060,780	\$ 219,014,604	\$ 4,511,105,091
b. Withdrawal Benefit	264,330,005	7,865,731	14,507,246	286,702,982
c. Pre-Retirement Death Benefit	89,929,738	2,147,900	3,172,808	95,250,446
d. Disability Benefit	70,132,326	2,520,866	3,365,036	76,018,228
e. Return of Member Contributions	30,182,960	330,467	5,013,784	35,527,211
f. Supplemental Medical Benefit	145,857,071	4,698,114	8,164,657	158,719,842
g. Subtotal	\$ 4,692,461,807	\$ 217,623,858	\$ 253,238,135	\$ 5,163,323,800
2. Inactive Nonvested Members				\$ 66,727,464
3. Inactive Vested Members				436,854,116
4. Return of Excess Contributions				164,788
5. Disabled Members				104,812,444
6. Retirees				5,988,296,179
7. Beneficiaries				464,415,307
8. Supplemental Medical Benefit for Retirees and Inactive Vested Members				194,701,001
9. Total Inactive Liability Sum of (2) through (8)				\$ 7,255,971,299
10. Total PVFB (1g) + (9)				\$ 12,419,295,099



SECTION 3 – SYSTEM LIABILITIES

Oklahoma Public Employees Retirement System

Table 5

Actuarial Accrued Liability As of July 1, 2022

	Regular	Elected Officials	Hazardous Duty	Total
1. Present Value of Future Benefits for Active Members				
a. Retirement Benefit	\$ 4,092,029,707	\$ 200,060,780	\$ 219,014,604	\$ 4,511,105,091
b. Withdrawal Benefit	264,330,005	7,865,731	14,507,246	286,702,982
c. Pre-Retirement Death Benefit	89,929,738	2,147,900	3,172,808	95,250,446
d. Disability Benefit	70,132,326	2,520,866	3,365,036	76,018,228
e. Return of Member Contributions	30,182,960	330,467	5,013,784	35,527,211
f. Supplemental Medical Benefit	<u>145,857,071</u>	<u>4,698,114</u>	<u>8,164,657</u>	<u>158,719,842</u>
g. Subtotal	\$ 4,692,461,807	\$ 217,623,858	\$ 253,238,135	\$ 5,163,323,800
2. Present Value of Future Normal Costs for Active Members				
a. Retirement Benefit	\$ 812,260,416	\$ 23,925,961	\$ 69,442,094	\$ 905,628,471
b. Withdrawal Benefit	150,702,926	5,463,186	7,709,661	163,875,773
c. Pre-Retirement Death Benefit	22,445,571	364,503	1,145,246	23,955,320
d. Disability Benefit	22,810,433	619,560	1,272,543	24,702,536
e. Return of Member Contributions	106,384,909	2,746,933	10,533,830	119,665,672
f. Supplemental Medical Benefit	<u>37,948,680</u>	<u>1,025,335</u>	<u>2,608,231</u>	<u>41,582,246</u>
g. Subtotal	\$ 1,152,552,935	\$ 34,145,478	\$ 92,711,605	\$ 1,279,410,018
3. Present Value of Future Benefits for Inactive Members (Table 4)				\$ <u>7,255,971,299</u>
4. Total Actuarial Accrued Liability (1g) - (2g) + (3)				\$ 11,139,885,081
5. Actuarial Value of Assets				11,311,760,330
6. Unfunded Actuarial Accrued Liability (4) - (5)				(171,875,249)



SECTION 4 – EMPLOYER CONTRIBUTIONS

Oklahoma Public Employees Retirement System

In the previous two sections, attention has been focused on the assets and the liabilities (present value of future benefits) of the System. A comparison of Tables 3 and 4 indicates there is a shortfall in current actuarial assets needed to meet the present value of all future benefits for current members and beneficiaries.

In an active system, there will always be a difference between the assets and the present value of all future benefits. An actuarial valuation determines a schedule of future contributions that will provide for this funding in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. Under an actuarial cost method, the contributions required to meet the difference between current assets and current liabilities are allocated each year between two elements: (1) the normal cost; and (2) the payment on the unfunded actuarial accrued liability.

The term “fully funded” is often applied to a system in which contributions at the normal cost rate are sufficient to pay for the benefits of existing employees as well as for those of new employees. More often than not, systems are not fully funded, either because of past benefit improvements that have not been completely funded and/or because of actuarial deficiencies that have occurred because experience has not been as favorable as anticipated under the actuarial assumptions. Under these circumstances, an unfunded actuarial accrued liability (UAAL) exists.

Description of Rate Components

The actuarial cost method used by the System is the traditional Entry Age Normal (EAN) cost method as a level percent of pay. Under the EAN cost method, the actuarial present value of each member’s projected benefit is allocated on a level basis over the member’s compensation between the entry age of the member and the assumed exit age. The portion of the actuarial present value allocated to the valuation year is called the normal cost. The actuarial present value of benefits allocated to prior years of service is called the actuarial accrued liability. The unfunded actuarial accrued liability represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains/losses.

Historically, there has been a single UAAL base scheduled to be paid down by 2027. Effective with the July 1, 2022 valuation, new experience bases are amortized as a level percent of payroll over a closed 15-year period while the legacy unfunded liability as of July 1, 2021 is amortized over the remaining five-year period. For members participating in the Pathfinder defined contribution plan, the employer sends to OPERS the difference between the OPERS required rate (16.5% for state members) and the amount required for the Pathfinder employer match. These extra contributions to OPERS allow the use of the level percent of payroll amortization method since they are expected to produce a payment stream that is constant, if not increasing, as a percent of covered payroll. Should this provision change, this method would also likely need to change.

Contribution Rate Summary

The normal cost rate is developed in Table 6. Table 7 illustrates the development of the contribution rate for amortization of the unfunded actuarial accrued liability shown in Table 5. Table 9 explains the development of the total actuarial contribution rate.



SECTION 4 – EMPLOYER CONTRIBUTIONS

Oklahoma Public Employees Retirement System

Table 6

Normal Cost Contribution Rates As a Percentage of Salary

	Regular	Elected Officials	Hazardous Duty	Total	% of Pay
1. Normal Cost					
a. Retirement Benefit	\$ 104,043,752	\$ 4,390,969	\$ 9,143,423	\$ 117,578,144	7.71%
b. Withdrawal Benefit	17,206,805	931,407	1,050,978	19,189,190	1.26%
c. Pre-Retirement Death Benefit	2,710,631	62,892	160,113	2,933,636	0.19%
d. Disability Benefit	2,617,077	97,707	175,885	2,890,669	0.19%
e. Return of Member Contributions	13,564,496	502,780	1,425,137	15,492,413	1.01%
f. Supplemental Medical Benefit	6,316,159	218,307	383,755	6,918,221	0.45%
g. Total	\$ 146,458,920	\$ 6,204,062	\$ 12,339,291	\$ 165,002,273	10.81%
2. Estimated Payroll for the Year	\$ 1,407,144,043	\$ 38,692,526	\$ 81,222,801	\$ 1,527,059,370	
3. Normal Cost Rate (1g)/(2)	10.41%	16.03%	15.19%	10.81%	



SECTION 4 – EMPLOYER CONTRIBUTIONS

Oklahoma Public Employees Retirement System

Table 7

Unfunded Actuarial Accrued Liability Contribution Rate

1. Unfunded Actuarial Accrued Liability at July 1, 2021	\$	55,034,895
2. Amortization Payment	\$	10,214,154
3. Expected Unfunded Actuarial Accrued Liability at July 1, 2022 [(1)*1.065] - [(2)*(1.065 ⁻⁵)]	\$	48,071,275
4. Actual Unfunded Actuarial Accrued Liability at July 1, 2022		<u>(171,875,249)</u>
5. Experience for Fiscal Year 2022 (4) - (3)	\$	(219,946,524)

Schedule of Amortization Bases

Amortization Bases	Original Amount	July 1, 2022 Remaining Payments	Date of Last Payment	Outstanding Balance as of July 1, 2022	Annual Contribution*
2021 UAAL	\$ 55,034,895	5	7/1/2027	\$ 48,071,275	\$ 10,546,115
2022 Experience	(219,946,524)	15	7/1/2037	<u>(219,946,524)</u>	<u>(18,630,789)</u>
Total				\$ (171,875,249)	\$ (8,084,674)

*The UAAL is amortized as a level percent of payroll, assuming payroll increases 3.25% per year. Contribution amounts reflect mid-year timing.

1. Total UAAL Amortization Payment	\$	(8,084,674)
2. Total Estimated Payroll for Year Ending June 30, 2023 ¹	\$	1,992,779,803
3. Amortization as a Percent of Payroll		(0.41%)

¹ Includes \$465,720,433 in payroll on behalf of DC plan participants.



SECTION 4 – EMPLOYER CONTRIBUTIONS

Oklahoma Public Employees Retirement System

Table 8

Calculation of Actuarial Gain/(Loss)

1. Expected Actuarial Accrued Liability	
a. Actuarial accrued liability at July 1, 2021	\$ 11,046,240,166
b. Normal cost at mid-year	168,617,332
c. Benefit payments for fiscal year ending June 30, 2022	(704,719,087)
d. Interest on (a), (b), and (c)	700,856,588
e. Impact of assumption changes	0
f. Impact of benefit changes	0
g. Expected actuarial accrued liability as of July 1, 2022	\$ 11,210,994,999
(a) + (b) + (c) + (d) + (e) + (f)	
2. Actuarial Accrued Liability at July 1, 2022	\$ 11,139,885,081
3. Actuarial Accrued Liability Gain/(Loss) (1g) - (2)	\$ 71,109,918
4. Expected Actuarial Value of Assets	
a. Actuarial value of assets at July 1, 2021	\$ 10,991,205,271
b. Contributions for fiscal year ending June 30, 2022	366,135,531
c. Benefit payment and administrative expenses for fiscal year ending June 30, 2022	(710,611,640)
d. Interest on (a), (b), and (c)	703,409,113
e. Expected actuarial value of assets as of July 1, 2022	\$ 11,350,138,275
(a) + (b) + (c) + (d)	
5. Actuarial Value of Assets at July 1, 2022	\$ 11,311,760,330
6. Actuarial Value of Assets Gain/(Loss) (5) - (4e)	\$ (38,377,945)
7. Net Actuarial Gain/(Loss) (3) + (6)	\$ 32,731,973
8. Contributions Above/(Below) the Actuarially Determined Contribution and Other Gain/(Loss)	
a. Previous Year's Actual Contribution	\$ 299,743,221
b. Required Employer Contribution	120,154,194
c. Excess Contribution (a) - (b)	\$ 179,589,027
d. Interest on (c) assuming mid-year payment	5,744,761
e. Excess Contributions as of July 1, 2022 (c) + (d)	\$ 185,333,788
f. Other Gain/(Loss), such as miscellaneous timing adjustment	1,880,763
g. Excess Contributions and Other Gain/(Loss) (e) + (f)	\$ 187,214,551
9. Total Experience Gain/(Loss) (7) + (8g)	\$ 219,946,524



SECTION 4 – EMPLOYER CONTRIBUTIONS

Oklahoma Public Employees Retirement System

Table 9

Actuarial Contribution Rate

	July 1,	
	2022	2021
1. Total Normal Cost Rate	10.81%	10.83%
2. Amortization of UAAL ¹	(0.41%)	0.52%
3. Budgeted Expenses ²	<u>0.56%</u>	<u>0.48%</u>
4. Total Actuarial Contribution Rate (1) + (2) + (3)	10.96%	11.83%
5. Estimated Member Contribution Rate	<u>4.28%</u>	<u>4.25%</u>
6. Employer Actuarial Contribution Rate (4) - (5)	6.68%	7.58%

¹ Amortization of UAAL is a level percent of payroll. Recognizes contributions received on behalf of defined contribution plan members.

² Provided by the System.



SECTION 4 – EMPLOYER CONTRIBUTIONS

Oklahoma Public Employees Retirement System

Table 10

Summary of Contribution Requirements

	Actuarial Valuation as of		Percent
	July 1, 2022	July 1, 2021	Change
1. Expected Annual Payroll	\$ 1,527,059,370	\$ 1,556,561,344	(1.9%)
2. Total Normal Cost	\$ 165,002,273	\$ 168,617,332	(2.1%)
3. Unfunded Actuarial Accrued Liability	\$ (171,875,249)	\$ 55,034,895	(412.3%)
4. Amortization of Unfunded Actuarial Accrued Liability	\$ (8,084,674)	\$ 10,214,154	(179.2%)
5. Budgeted Expenses (Provided by the System)	\$ 8,490,680	\$ 7,472,454	13.6%
6. Total Required Contribution (2) + (4) + (5)	\$ 165,408,279	\$ 186,303,940	(11.2%)
7. Estimated Member Contributions	\$ 65,321,686	\$ 66,149,746	(1.3%)
8. Required Employer Contribution (6) - (7)	\$ 100,086,593	\$ 120,154,194	(16.7%)
9. Previous Year's Actual Contribution			
a. Member	\$ 66,392,310	\$ 66,204,166	0.3%
b. Employer	299,743,221	293,018,730	2.3%
c. Total	\$ 366,135,531	\$ 359,222,896	1.9%

*Amortization of UAAL is a level percent of payroll.



SECTION 5 – RISK CONSIDERATION

Oklahoma Public Employees Retirement System

Actuarial Standards of Practice are issued by the Actuarial Standards Board and are binding on credentialed actuaries practicing in the United States. These standards generally identify what the actuary should consider, document and disclose when performing an actuarial assignment. In September 2017, Actuarial Standard of Practice Number 51, *Assessment and Disclosure of Risk in Measuring Pension Obligations*, (ASOP 51) was issued as final with application to measurement dates on or after November 1, 2018. This ASOP, which applies to funding valuations, actuarial projections, and actuarial cost studies of proposed plan changes, was first applicable for the July 1, 2019 actuarial valuation for the Oklahoma Public Employees Retirement System.

A typical retirement plan faces many different risks, but the greatest risk is the inability to make benefit payments when due. If plan assets are depleted, benefits may not be paid which could create legal risk or the plan could become “pay as you go.” 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 and that uncertainty, whether favorable or unfavorable, creates risk. ASOP 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that differs from the actuarial assumptions.

The various risk factors for a given plan can have a significant impact – positive or negative – on the actuarial projection of liability and contribution rates.

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

- economic risks, such as investment return and price inflation;
- demographic risks such as mortality, payroll growth, aging population including the impact of baby boomers, and retirement ages;
- contribution risk, i.e., the potential for contribution rates to be too high for the plan sponsor/employer to pay; and
- external risks such as the regulatory and political environment.

There is a direct correlation between healthy, well-funded retirement plans and consistent contributions equal to the full actuarial contribution rate each year. The sources of funding for OPERS do not guarantee that the full contributions will be made, but because the System is currently well-funded, the amounts are currently sufficient. There is a risk if the funded status declines significantly that the contribution structure would not be able to return the System to being considered well-funded.

Another significant risk factor for OPERS is investment return because of the volatility of returns and the size of plan assets compared to payroll (see Table 11). A perusal of historical returns over 10-20 years reveals that the actual return each year is rarely close to the average return for the same period. This is to be expected, given the underlying capital market assumptions and the System’s asset allocation.



SECTION 5 – RISK CONSIDERATION

Finally, because OPERS is a partially closed plan, there will be a decline in active membership for a number of years as current active employees leave, but are not replaced by an OPERS defined benefit plan member due to their participation in Pathfinder. Usually this would raise concerns because there would be a shrinking payroll over which to fund the amortization of the UAAL. Since OPERS currently collects contributions on the pay of the state employees not covered by OPERS and since OPERS is well funded, there is less concern with the partial closure. Should the funding approach change, however, there could be a significant increase in the risks faced by OPERS.

A key demographic risk for all retirement systems, including OPERS, is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions anticipate some improvements in mortality experience over time and these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities. Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, as experienced with the COVID-19 pandemic. This type of event is also significant, although more easily absorbed. While either of these events could happen, they are not frequent events and are generally modest in their impact, and thus represent much less risk than the volatility associated with investment returns.

The following exhibits summarize some historical information that helps indicate how certain key risk metrics have changed over time. Many are due to the maturing of the System.



SECTION 5 – RISK CONSIDERATION

Oklahoma Public Employees Retirement System

Table 11

Historical Asset Volatility Ratios

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. In other words, it will be harder to recover from investment losses with increased contributions.

Actuarial Valuation Date	Market Value of Assets	Estimated Plan Year Payroll	Asset Volatility Ratio	Increase in ACR with a Return 10% Lower than Assumed*
7/1/2005	\$5,504,489,147	\$1,454,210,509	3.79	3.21%
7/1/2006	5,817,165,538	1,568,350,023	3.71	3.14%
7/1/2007	6,640,477,411	1,626,737,832	4.08	3.46%
7/1/2008	6,255,207,565	1,682,663,413	3.72	3.15%
7/1/2009	5,173,537,778	1,732,975,532	2.99	2.53%
7/1/2010	5,774,379,263	1,683,697,139	3.43	2.91%
7/1/2011	6,841,001,769	1,570,500,148	4.36	3.69%
7/1/2012	6,821,303,541	1,633,837,374	4.18	3.54%
7/1/2013	7,441,781,618	1,695,347,809	4.39	3.72%
7/1/2014	8,570,104,910	1,744,041,536	4.91	4.16%
7/1/2015	8,636,441,984	1,808,972,785	4.77	4.04%
7/1/2016	8,435,578,907	1,790,809,603	4.71	3.99%
7/1/2017	9,229,499,873	1,688,543,856	5.47	4.63%
7/1/2018	9,702,031,567	1,601,074,591	6.06	5.13%
7/1/2019	9,958,113,213	1,584,630,994	6.28	5.32%
7/1/2020	10,097,798,827	1,571,954,116	6.42	5.44%
7/1/2021	12,525,883,234	1,556,561,344	8.05	6.82%
7/1/2022	10,392,907,883	1,527,059,370	6.81	5.77%

Note: Years prior to 7/1/2010 were provided by the prior actuary.

*The impact of asset smoothing is not reflected in the impact on the Actuarial Contribution Rate (ACR). Current year assumptions and 15-year amortization are used for all years shown.

The assets at June 30, 2022 are 681% of payroll, so underperforming the investment return assumption by 1.00% (i.e., earn 5.50% for one year) is equivalent to 6.81% of payroll. While the actual impact in the first year is mitigated by the asset smoothing method and amortization of the UAAL, this illustrates the risk associated with volatile investment returns.



SECTION 5 – RISK CONSIDERATION

Oklahoma Public Employees Retirement System

Table 12

Historical Cash Flows

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments. Note that negative cash flows are expected in mature retirement systems. If the System has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of the market value of assets (“MVA”) that may cause significant concerns. OPERS has generally had negative cash flows of around 3% in recent years, so there is no concern for the foreseeable future.

Year End	Market Value of Assets (MVA)	Contributions	Benefit Payments and Expenses	Net Cash Flow	Net Cash Flow as a Percent of MVA
6/30/2005	\$5,504,489,147	\$191,775,056	\$336,037,736	(\$144,262,680)	(2.62%)
6/30/2006	5,817,165,538	227,261,755	349,539,019	(122,277,264)	(2.10%)
6/30/2007	6,640,477,411	261,936,847	377,414,439	(115,477,592)	(1.74%)
6/30/2008	6,255,207,565	286,775,377	395,397,691	(108,622,314)	(1.74%)
6/30/2009	5,173,537,778	311,734,343	426,155,646	(114,421,303)	(2.21%)
6/30/2010	5,774,379,263	328,820,672	444,874,268	(116,053,596)	(2.01%)
6/30/2011	6,841,001,769	319,336,013	479,400,000	(160,063,987)	(2.34%)
6/30/2012	6,821,303,541	329,009,579	503,400,243	(174,390,664)	(2.56%)
6/30/2013	7,441,781,618	338,195,447	521,895,082	(183,699,635)	(2.47%)
6/30/2014	8,570,104,910	350,571,518	540,228,497	(189,656,979)	(2.21%)
6/30/2015	8,636,441,984	365,330,320	563,282,356	(197,952,036)	(2.29%)
6/30/2016	8,435,578,907	370,050,081	586,669,682	(216,619,601)	(2.57%)
6/30/2017	9,229,499,873	358,615,175	614,308,717	(255,693,542)	(2.77%)
6/30/2018	9,702,031,567	344,916,830	632,863,130	(287,946,300)	(2.97%)
6/30/2019	9,958,113,213	349,040,092	661,088,933	(312,048,841)	(3.13%)
6/30/2020	10,097,798,827	361,926,046	667,017,809	(305,091,763)	(3.02%)
6/30/2021	12,525,883,234	359,222,896	695,488,186	(336,265,290)	(2.68%)
6/30/2022	10,392,907,883	366,135,531	710,611,640	(344,476,109)	(3.31%)

Note: Years prior to 6/30/2010 were provided by the prior actuary.

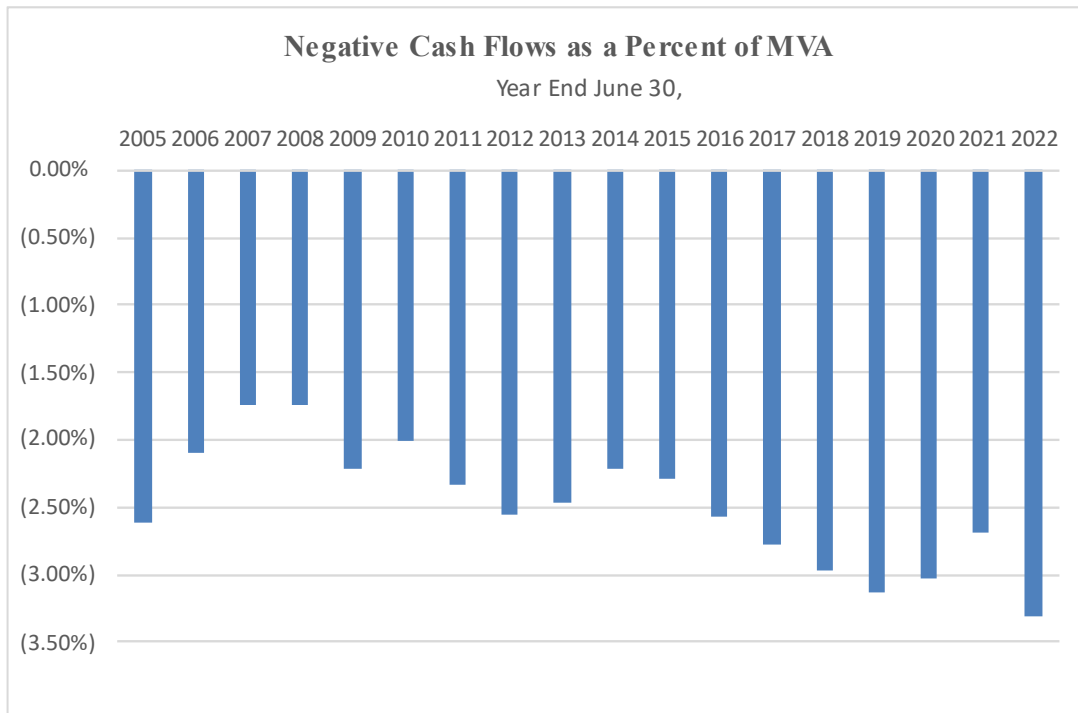


SECTION 5 – RISK CONSIDERATION

Oklahoma Public Employees Retirement System

Table 12 (continued)

Historical Cash Flows





SECTION 5 – RISK CONSIDERATION

Oklahoma Public Employees Retirement System

Table 13

Liability Maturity Measurement

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

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

Year End	Retiree Liability (a)	Total Actuarial Accrued Liability (b)	Retiree Percentage (a / b)	Covered Payroll (c)	Ratio (b/c)
6/30/2005	\$3,310,805,089	\$7,575,419,808	43.7%	\$1,454,210,509	5.21
6/30/2006	3,533,634,732	7,914,657,886	44.6%	1,568,350,023	5.05
6/30/2007	3,742,715,550	8,413,248,130	44.5%	1,626,737,832	5.17
6/30/2008	4,050,368,848	8,894,287,254	45.5%	1,682,663,413	5.29
6/30/2009	4,241,876,602	9,291,457,837	45.7%	1,732,975,532	5.36
6/30/2010	4,484,099,170	9,622,627,833	46.6%	1,683,697,139	5.72
6/30/2011	4,153,994,755	8,179,767,661	50.8%	1,570,500,148	5.21
6/30/2012	4,321,790,926	8,334,637,900	51.9%	1,633,837,374	5.10
6/30/2013	4,512,915,419	8,556,121,906	52.7%	1,695,347,809	5.05
6/30/2014	4,652,763,014	8,753,669,153	53.2%	1,744,041,536	5.02
6/30/2015	4,864,693,645	8,996,125,901	54.1%	1,808,972,785	4.97
6/30/2016	5,173,659,555	9,427,809,623	54.9%	1,790,809,603	5.26
6/30/2017	5,526,693,946	9,781,617,070	56.5%	1,688,543,856	5.79
6/30/2018	5,677,148,092	9,884,133,615	57.4%	1,601,074,591	6.17
6/30/2019	5,828,546,805	10,047,374,213	58.0%	1,584,630,994	6.34
6/30/2020	6,377,870,941	10,943,079,053	58.3%	1,571,954,116	6.96
6/30/2021	6,457,479,509	11,046,240,166	58.5%	1,556,561,344	7.10
6/30/2022	6,698,814,533	11,139,885,081	60.1%	1,527,059,370	7.29

Note: Years prior to 6/30/2010 were provided by the prior actuary.

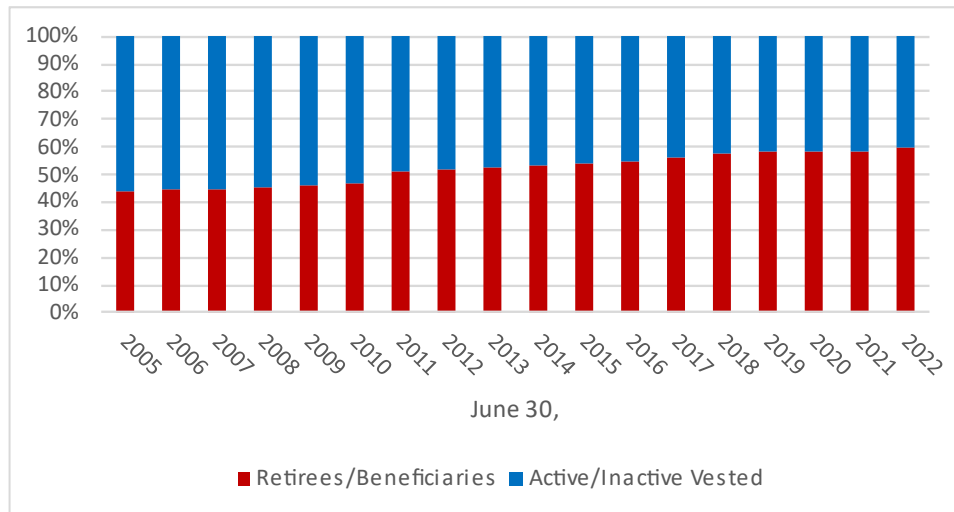


SECTION 5 – RISK CONSIDERATION

Oklahoma Public Employees Retirement System

Table 13 (continued)

Liability Maturity Measurement





SECTION 5 – RISK CONSIDERATION

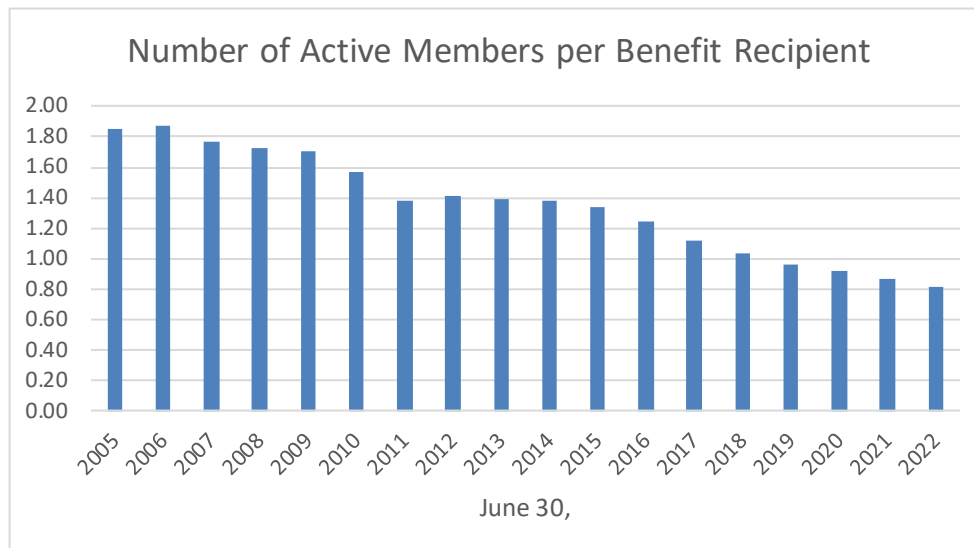
Oklahoma Public Employees Retirement System

Table 14

Historical Member Statistics

Valuation Date July 1	Active Members				Retired Members			
	Number	Payroll	Average Salary		Number	Active/ Retired	Average Benefits	
			\$	% Incr.			\$	% Incr.
2005	43,918	\$1,454,210,509	\$33,112		23,679	1.85	\$12,899	
2006	45,472	1,568,350,023	34,490	4.16%	24,372	1.87	13,529	4.88%
2007	44,712	1,626,737,832	36,383	5.49%	25,233	1.77	13,749	1.63%
2008	45,120	1,682,663,413	37,293	2.50%	26,033	1.73	14,449	5.09%
2009	45,683	1,732,975,532	37,935	1.72%	26,949	1.70	14,629	1.25%
2010	43,934	1,683,697,139	38,323	1.02%	28,009	1.57	14,877	1.70%
2011	40,551	1,570,500,148	38,729	1.06%	29,418	1.38	15,226	2.35%
2012	42,569	1,633,837,374	38,381	(0.90%)	30,263	1.41	15,422	1.29%
2013	43,273	1,695,347,809	39,178	2.08%	31,135	1.39	15,679	1.67%
2014	43,947	1,744,041,536	39,685	1.29%	31,833	1.38	15,862	1.17%
2015	43,843	1,808,972,785	41,260	3.97%	32,754	1.34	16,144	1.78%
2016	41,806	1,790,809,603	42,836	3.82%	33,749	1.24	16,404	1.61%
2017	38,873	1,688,543,856	43,437	1.40%	34,579	1.12	16,673	1.64%
2018	36,329	1,601,074,591	44,072	1.46%	35,260	1.03	16,884	1.27%
2019	34,536	1,584,630,994	45,883	4.11%	35,869	0.96	17,134	1.48%
2020	33,115	1,571,954,116	47,470	3.46%	36,179	0.92	17,930	4.65%
2021	31,711	1,556,561,344	49,086	3.40%	36,351	0.87	18,184	1.42%
2022	29,912	1,527,059,370	51,052	4.01%	36,649	0.82	18,442	1.42%

Note: Years prior to 7/1/2010 were provided by the prior actuary.





SECTION 5 – RISK CONSIDERATION

Oklahoma Public Employees Retirement System

Table 15

Comparison of Valuation Results under Alternate Investment Return Assumptions

Investment Return Assumption	5.50%	6.00%	6.50%	7.00%	7.50%
Contributions					
Normal Cost Rate	13.67%	12.14%	10.81%	9.65%	8.65%
Amortization of UAAL	4.63%	2.09%	(0.41%)	(2.85%)	(5.26%)
Budgeted Expenses	0.56%	0.56%	0.56%	0.56%	0.56%
Total Actuarial Determined Contribution	18.86%	14.79%	10.96%	7.36%	3.95%
Member Contribution Rate	(4.28%)	(4.28%)	(4.28%)	(4.28%)	(4.28%)
Statutory State Contribution Rate	(16.50%)	(16.50%)	(16.50%)	(16.50%)	(16.50%)
Contribution Shortfall/(Surplus)	(1.92%)	(5.99%)	(9.82%)	(13.42%)	(16.83%)
Actuarial Value of Assets (\$ in thousands)	\$11,311,760	\$11,311,760	\$11,311,760	\$11,311,760	\$11,311,760
Actuarial Accrued Liability	\$12,392,726	\$11,739,737	\$11,139,885	\$10,588,132	\$10,079,976
Funded Ratio	91.3%	96.4%	101.5%	106.8%	112.2%

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



SECTION 6 – OTHER INFORMATION

Oklahoma Public Employees Retirement System

In this section we provide exhibits showing the funding history and the expected benefit payments.



SECTION 6 – OTHER INFORMATION

Oklahoma Public Employees Retirement System

Table 16

Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b)-(a)	Funded Ratio (a)/(b)	Covered Payroll (c)	UAAL as a Percent of Covered Payroll ((b) - (a))/(c)
7/1/2013	6,978,873,421	8,556,121,906	1,577,248,485	81.6%	1,695,347,809	93.0%
7/1/2014	7,759,257,716	8,753,669,153	994,411,437	88.6%	1,744,041,536	57.0%
7/1/2015	8,420,306,645	8,996,125,901	575,819,256	93.6%	1,808,972,785	31.8%
7/1/2016	8,790,886,036	9,427,809,623	636,923,587	93.2%	1,790,809,603	* 35.6%
7/1/2017	9,241,292,469	9,781,617,070	540,324,601	94.5%	1,688,543,856	* 32.0%
7/1/2018	9,658,125,021	9,884,133,515	226,007,594	97.7%	1,601,074,591	* 14.1%
7/1/2019	9,909,683,940	10,047,374,213	137,690,273	98.6%	1,584,630,994	* 8.7%
7/1/2020	10,212,241,395	10,943,079,053	730,837,658	93.3%	1,571,954,116	* 46.5%
7/1/2021	10,991,205,271	11,046,240,166	55,034,895	99.5%	1,556,561,344	* 3.5%
7/1/2022	11,311,760,330	11,139,885,081	(171,875,249)	101.5%	1,527,059,370	* -11.3%

*Covered Payroll shown is for the defined benefit plan members only although employer contributions toward the UAAL are being received on behalf of defined contribution plan members.



SECTION 6 – OTHER INFORMATION

Oklahoma Public Employees Retirement System

Table 17

Projected Benefit Payments

The table below shows estimated benefits expected to be paid over the next ten years, based on the assumptions used in this valuation. The “Actives” column shows the benefits expected to be paid to members currently active on July 1, 2022. The “Retirees” column shows benefits expected to be paid to members receiving benefit payments as of July 1, 2022 or to members who have terminated employment and are entitled to a deferred vested benefit.

Retirement, Survivor and Withdrawal Benefits

Year Ending June 30	Actives	Retirees	Total
2023	\$ 29,294,000	\$ 681,178,000	\$ 710,472,000
2024	59,296,000	669,793,000	729,089,000
2025	88,752,000	657,802,000	746,554,000
2026	116,909,000	644,479,000	761,388,000
2027	144,271,000	630,298,000	774,569,000
2028	170,636,000	615,310,000	785,946,000
2029	196,952,000	599,108,000	796,060,000
2030	222,929,000	582,610,000	805,539,000
2031	248,840,000	565,595,000	814,435,000
2032	274,696,000	547,841,000	822,537,000

Supplemental Medical Premium Benefits

Year Ending June 30	Actives	Retirees	Total
2023	\$ 1,016,000	\$ 17,736,000	\$ 18,752,000
2024	2,518,000	17,493,000	20,011,000
2025	3,907,000	17,248,000	21,155,000
2026	5,199,000	16,947,000	22,146,000
2027	6,409,000	16,615,000	23,024,000
2028	7,519,000	16,248,000	23,767,000
2029	8,556,000	15,844,000	24,400,000
2030	9,517,000	15,470,000	24,987,000
2031	10,405,000	15,104,000	25,509,000
2032	11,226,000	14,733,000	25,959,000



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Following is a summary of the major System provisions used to determine the System's financial position as of July 1, 2022.

Effective date and fiscal year

The System became effective January 1, 1964. The fiscal year is July 1 to June 30.

Administration

The System is administered by the Oklahoma Public Employees Retirement System Board of Trustees. The Board acts as the fiduciary for the investment and administration of the System.

Employees included

All permanent employees of the State of Oklahoma, and any other employer such as a county, county hospital, city or town, conservation districts, circuit engineering districts, and any trust in which a county, city or town participates and is the primary beneficiary, are eligible to join if:

- a) the employee is not eligible for or participating in another retirement system authorized under Oklahoma law, is covered by Social Security and is not participating in the U.S. Civil Service Retirement System; and
- b) the employee is scheduled for at least 1,000 hours per year and salary is not less than the hourly rate of the monthly minimum wage for State employees (for employees of local government employers, not less than the hourly rate of the monthly minimum wage for such employees).

Membership is mandatory for new eligible employees on the first of the month following employment. Effective November 1, 2015, the Plan is closed to most new State employees. Any employee with service in the System prior to November 1, 2015 will continue to be a member or will join the System upon re-employment with a participating employer.

Employer and employee contributions

Most State employees except Hazardous Duty employees and most elected officials:

Employee:	3.5%
Employer:	16.5%
Total:	20.0%



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Employer and employee contributions (continued)

Prior to July 1, 2006 the employee contribution rate varied on pay above/below \$25,000 as shown in the chart at the end of this section. This plan provision was changed by the 2006 Legislature.

Before November 1, 2010, elected officials selected a contribution rate of 4.5%, 6%, 7.5%, 8.5%, 9% or 10% which determined the computation factor used in calculating their benefit. Elected officials elected or appointed on or after November 1, 2010 (but before November 1, 2011) were limited to selecting either the 4.5% contribution rate or the 10% contribution rate. Those elected after November 1, 2011 contribute at 3.5% like most non-elected members.

Contributions for Hazardous Duty employees are summarized at the end of this appendix.

Local government employees contribute from 3.5% to 8.5% of pay, depending on the rate chosen by their employers.

Starting in 2004, regular members may make an election to contribute an additional 2.91% of pay and increase their accrual rate for future years of service to 2.5% (referred to as Step-Up Option). Elected officials elected on or after November 1, 2011 may also elect Step-Up.

Contributions are based on compensation defined by the Board.

Contribution Summary: Regular State Contributions (By Statute) For Pay Under \$25,000

Fiscal Year	Employer Contribution	Employee Contribution	Total Contribution	Applicable Salary Cap
1994-1995	11.5%	2.0%	13.5%	\$50,000
1995-1996	11.5%	2.0%	13.5%	\$60,000
1996-1997	12.0%	2.5%	14.5%	\$70,000
1997-1998	12.5%	3.0%	15.5%	\$80,000
1998-1999	12.5%	3.0%	15.5%	No Cap
1999-2005	10.0%	3.0%	13.0%	No Cap
2005-2006	11.5%	3.0%	14.5%	No Cap



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Employer and employee contributions

(continued)

For Pay Between \$25,000 and Cap				
Fiscal Year	Employer Contribution	Employee Contribution	Total Contribution	Applicable Salary Cap
1994-1995	11.5%	3.5%	15.0%	\$50,000
1995-1996	11.5%	3.5%	15.0%	\$60,000
1996-1997	12.0%	3.5%	15.5%	\$70,000
1997-1998	12.5%	3.5%	16.0%	\$80,000
1998-1999	12.5%	3.5%	16.0%	No Cap
1999-2005	10.0%	3.5%	13.5%	No Cap
2005-2006	11.5%	3.5%	15.0%	No Cap

For All Pay			
Fiscal Year	Employer Contribution	Employee Contribution	Total Contribution
2006-2007	12.5%	3.5%	16.0%
2007-2008	13.5%	3.5%	17.0%
2008-2009	14.5%	3.5%	18.0%
2009-2011	15.5%	3.5%	19.0%
2011-Present	16.5%	3.5%	20.0%

Years of Service

Prior Service

All service of the employee prior to the employer's entry date is credited prior service providing the participating employer joined on or before January 1, 1975. Prior service for employees of employers who join after January 1, 1975, may be purchased by the employee. Prior service is allowed for certain active wartime military service (maximum 5 years credit) for members employed prior to July 1, 2000 and for employment with public schools or Board of Regents for Higher Education prior to July 1943. Service need not be continuous employment to be credited.



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Years of Service

Participating Service

After the employer's entry date, a member's participating service is credited for all periods of employment for which required contributions are made. Service is prorated according to hours worked per month on and after July 1, 1979. Certain active wartime military service is credited, provided the contribution accumulation is not withdrawn. Active and retired members are credited with additional participating service based on their accumulated contributions prior to June 30, 1977 (if not withdrawn prior to retirement), according to the following:

<u>Member Accumulation</u>				<u>Additional Years</u>
\$	1	to	\$ 500	1
	501	to	1,000	2
	1,001	to	1,500	3
	1,501	to	2,000	4
	2,001	to	More	5

A member who has withdrawn his or her contributions and later returns to membership may repay the amount withdrawn plus interest as determined by the Board to reinstate participating service which was canceled by his or her withdrawal.

A member may receive credit for those years of service as an elected official if the member is not receiving credit for that service in any other public retirement system. The member must pay an amount equal to the actuarial cost to fund the difference between the member's projected benefits with and without the additional service credit.

The total participating service of a member who retires or terminates employment and elects a vested benefit shall include up to one hundred thirty (130) days of unused sick leave accumulated subsequent to August 1, 1959, during the member's employment with any participating employer. Such credit shall be added in terms of whole months. If unused sick leave entitles the member to an additional year of service, the additional cost is borne by the employer. For members joining on or after November 1, 2012, any additional months of unused sick leave credit will be added to the service credit without rounding the total service up to the next higher year. Any cost to the employer will be based on the actual number of months of unused sick leave.



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Years of Service

Participating Service (continued)

A member may receive credit for those years of credited service accumulated while a member of the Oklahoma Firefighters Pension and Retirement System, the Oklahoma Police Pension and Retirement System, the Uniform Retirement System for Justices and Judges, the Oklahoma Law Enforcement Retirement System, or the Teachers' Retirement System of Oklahoma, if the member is not receiving or eligible to receive retirement credit or benefits from this service in any other public retirement system. The member may receive credit for this service by paying the amount actuarially determined to cover the cost of the previous service.

Credited Service

Credited service equals prior service plus participating service. The result is rounded up to the next year if the number of remaining months is equal to or greater than six. Credited service of members joining on or after November 1, 2012 will not be rounded up. Members will be credited with, and their benefit calculation will be computed on, the actual number of years and months of credited service.

Compensation

The member's basic salary and wages as defined by the Board of Trustees, including amounts contributed to deferred compensation plans. Overtime and moving expenses are excluded.

Final average compensation

The average of the thirty-six (36) highest months of compensation earned within the last ten (10) years of participating service. For members hired on or after July 1, 2013, final average compensation is the average of the sixty (60) highest months of compensation earned within the last ten (10) years of participating service. Final average compensation will be subject to any applicable salary caps and based on salary on which contributions have been made.

For all members hired prior to July 1, 1995, the minimum final average compensation is \$13,800. For members hired on or after July 1, 1995, no minimum is applied until the member has fifteen (15) years of service. For members with between fifteen (15) and twenty (20) years of service, the minimum final average compensation is \$6,900. For a member with more than twenty (20) years of service, the minimum is \$13,800.



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Normal retirement date

Normal retirement is the earliest of: (1) first day of the month coinciding with or next following the 62nd birthday; or, (2) the first day of the month coinciding with or following the date at which the sum of a member's age and number of years of credited service total eighty (80) if the member was hired prior to July 1, 1992; or (3) following the date at which the sum of member's age and number of years of credited service total ninety (90) if the member was hired after July 1, 1992. Members employed after January 1, 1983 must complete at least six (6) years of full-time equivalent employment with a participating employer before receiving any retirement benefits.

For regular employees hired on or after November 1, 2011, the retirement age is 65. Alternatively, they may retire under the "Rule of 90" if they are at least age 60.

The normal retirement date for elected officials is the first of the month coinciding with or following the official's 60th birthday or the first day of the month coinciding with or following the date at which the sum of the member's age and years of credited service total eighty (80).

For elected officials appointed or elected on or after November 1, 2011, the retirement age is 65 with a minimum of eight (8) years of elected service, or age 62 if they have ten (10) years of elected service.

Normal retirement benefit

The benefit on or after normal retirement, payable monthly for life to non-elected members, is as follows:

2% of final average compensation multiplied by years of credited service.

For members who have elected the Step-Up Option, a 2.5% multiplier is applied to the "stepped-up" full years. Elected officials appointed or elected on or after November 1, 2011, are also eligible for the Step-Up Option.



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Normal retirement benefit

(continued)

The benefit payable monthly for life to elected officials is the greater of 1) the preceding benefit, or 2) the benefit calculated using highest annual compensation as an elected official times credited service multiplied by the following applicable computation factor:

<u>% of Compensation Contributed</u>	<u>% of Highest Annual Compensation</u>
4.5%	1.9%
6.0%	2.5%
7.5%	3.0%
8.5%	3.4%
9.0%	3.6%
10.0%	4.0%

Elected officials who became members after July 1, 1990 must participate in the System as elected officials for at least six (6) years to qualify for the elected official benefit formula on all years of previous non-elected participating service. For elected officials elected or appointed on or after November 1, 2011, the vesting period is eight (8) years.

OPERS members who are elected after August 21, 2008 have a benefit cap of 100% of their highest annual salary. Elected officials who become members after August 21, 2008 (but before November 1, 2011) receive a benefit that consists of two separate calculations. Their non-elected years are multiplied by 2% and their elected years are multiplied by the applicable percentage selected and paid for by the members.

Elected officials who are appointed or elected on or after November 1, 2010 (but before November 1, 2011) have two benefit multiplier options: 1.9% and 4.0%. Those elected after November 1, 2011 contribute at 3.5%, like most non-elected members, and have a multiplier of 2%. In addition, they must be age 62 with at least ten (10) years as an elected official, or age 65 with at least eight (8) years as an elected official, to qualify for retirement.



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Early retirement benefit

A member with at least ten (10) years of participating service may retire as early as age 55. The benefit is determined by the normal retirement formula based on years of credited service and Final Average Compensation (highest annual compensation for elected officials) at termination. The percentage payable at early retirement age is:

<u>Elected Officials</u>		<u>Other Members</u>	
Age	Percentage	Age	Percentage
60	100%	62	100.00%
59	94	61	93.33
58	88	60	86.67
57	82	59	80.00
56	76	58	73.33
55	70	57	66.67
		56	63.33
		55	60.00

The following tables apply to regular and hazardous duty employees employed, or elected officials appointed or elected, on or after November 1, 2011:

<u>Elected Officials</u>		<u>Other Members</u>	
Age	Percentage	Age	Percentage
62	100.00%	65	100.00%
61	93.33	64	93.33
60	86.67	63	86.67
		62	80.00
		61	73.33
		60	66.67



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Disability benefit

A member with at least eight (8) years of credited service is eligible for a disability benefit provided the member qualifies for disability benefits as certified by the Social Security Administration or the Railroad Retirement Board and having a date of disability within one year after the date last physically on the job. The benefit is determined by the normal retirement formula based on service and salary history at date of disability. The benefit is payable immediately without actuarial reduction. Option A is the only available form of survivor payment for non-elected members.

Vested benefit

A member who terminates after eight (8) years of credited service (six years for most elected officials) is eligible for a vested benefit determined by the normal retirement formula, based on service and compensation to date of termination.

The benefit is payable at age 62 (or age 60 for most elected officials), provided the member's contribution accumulation is not withdrawn and the member has at least six (6) years of full-time equivalent employment. A member with ten (10) or more years of service also has the option of reduced benefits at early retirement age.

Members terminating with less than eight (8) years (or six years for most elected officials) of credited service may elect to receive a refund of their member contribution accumulation.

A limited additional retirement service benefit of \$200 per month is payable up to the total of excess contributions paid by the member for those vested members as of July 1, 1998. This is not applicable for active members who received a transfer of excess contributions or retired members as of July 1, 1998.

For regular employees employed on or after November 1, 2011, a vested benefit is not payable for Normal Retirement until age 65. For elected officials appointed or elected on or after November 1, 2011, a vested benefit requires at least eight (8) years of elected service and is not payable for normal retirement until age 65.



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Pre-retirement death benefit

For a deceased active member who had met normal, early or vested retirement provisions, the spouse may elect a spouse's benefit. This spouse's benefit is the amount that would have been paid if the member had instead retired and elected the joint and 100% survivor option (Option B). If named as the designated beneficiary, the spouse may elect a refund of the deceased member's contribution accumulation in lieu of the Option B monthly benefit.

In addition to the provision above, the eligible spouse of a deceased elected official with at least six (6) years of elected service or eight (8) years if elected on or after November 1, 2011, and married at least three (3) years immediately preceding death, may elect to receive 50% of the maximum benefit the member would have been eligible to receive. The starting date of benefits is the date the deceased member would have been eligible for early or normal retirement. Benefits cease upon death of the surviving spouse.

Any other designated beneficiary of a member other than an eligible spouse will receive a refund of the deceased member's contribution accumulation.

Post-retirement death benefit

Upon the death of a retired member, a \$5,000 lump-sum death benefit will be paid to the member's beneficiary, or estate if there is no beneficiary.



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Optional form of retirement benefits	<p>The normal form of benefit for an unmarried member, other than an elected official, is a single life monthly annuity with a guaranteed refund of the unpaid employee contribution accumulation. The normal form for a married member is a 50% joint and survivor annuity benefit. Optional forms of payment with actuarial reduction are available to all members retiring under the normal retirement, early retirement or vested retirement provision. These options are:</p> <p>Option A – Joint and 50% Survivor Annuity with a return to the unreduced amount if the joint annuitant dies.</p> <p>Option B – Joint and 100% Survivor Annuity with a return to the unreduced amount if the joint annuitant dies.</p> <p>Option C – Life Annuity with a minimum of 120 monthly payments.</p> <p>For married members, spousal consent is required for any option other than Option A or B, or a joint annuitant other than the spouse.</p> <p>Medicare Gap Benefit Option allows members under age 65 to receive a higher benefit before age 65 (to help pay health insurance premiums) and a permanently lower benefit after age 65.</p>
Post-retirement medical benefit	<p>The System will contribute the lesser of \$105 per month or the Medicare Supplement Premium to the Office of Management and Enterprise Services, Employees Group Insurance Division (or other eligible employer health plans) for members receiving retirement benefits.</p>
Expenses	<p>The expenses of administering the System are paid from the Retirement Trust Fund.</p>



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

Hazardous Duty Members (Department of Corrections, Officers, Grand River Dam Authority Public Safety Officers, Oklahoma Military Department Firefighters, Deputy Sheriffs, and County Jailers) Benefits

Members covered by the Hazardous Duty Provisions have the retirement eligibility requirements, contribution rates and benefit formula described below.

Department of Corrections:

The normal retirement age is the earliest of: twenty (20) years of service as a member covered by the Department of Corrections Hazardous Duty Provisions; or, the first day of the month coinciding with or next following the 62nd birthday; or, the first day of the month coinciding with or following the date at which the sum of a member's age and number of years of credited service total eighty (80), if the member was hired prior to July 1, 1992, or following the date at which the sum of a member's age and number of years of credited service total ninety (90) if the member was hired after July 1, 1992. Members employed after January 1, 1983 must complete at least six (6) years of full-time equivalent employment with a participating employer before receiving any retirement benefits. The benefit formula is 2.5% of final average compensation, multiplied by the number of years of service as an eligible officer for service, not exceeding twenty (20) years. For service in excess of twenty (20) years, the benefit formula is 2% of final average compensation.

For hazardous duty employees hired on or after November 1, 2011, the normal retirement age is age 65. Alternatively, they may retire under the earliest of (i) the "Rule of 90" if they are at least age 60 or (ii) twenty (20) years of service as a member covered by hazardous duty provisions.

Members eligible for these benefits with at least five (5) years of experience in their positions on or after June 30, 2004 remain eligible to retire after twenty (20) years even if they transfer to positions within DOC that are not eligible to retire after twenty (20) years.

Special Surviving Spouse and Child benefits for any member employed by the Department of Corrections (DOC) killed or mortally wounded during the performance of duty are equal to 2.5% of final average monthly compensation multiplied by the greater of the member's actual service or twenty (20) years. In addition, an amount of \$400 per month will be paid as long as a child of the deceased member is under the age of 18 (or 22 if enrolled full time at an institution of higher education).



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

**Hazardous Duty Members
(Department of Corrections,
Officers, Grand River Dam
Authority Public Safety Officers,
Oklahoma Military Department
Firefighters, Deputy Sheriffs, and
County Jailers) Benefits**
(continued)

Contributions for members covered by the Department of Corrections Hazardous Duty Provisions are:

	<u>Year</u>	<u>Up to \$25,000</u>	<u>Above \$25,000</u>
	1994/1995	6.5%	8.0%
	1995/1996	6.5%	8.0%
	1996/1997	7.0%	8.0%
	1997/1998	7.5%	8.0%

	<u>First 20 Years of Service</u>	<u>Service Beyond 20 Years</u>	
		<u>Up to \$25,000</u>	<u>Above \$25,000</u>
July 1998 – June 1999	8.0%	N/A	N/A
July 1999 – June 2000	8.0%	N/A	N/A
July 2000 – June 2010	8.0%	N/A	N/A
July 2010 and after	8.0%	3.5%	3.5%

Grand River Dam Authority Public Safety Officers Hired for the First Time in the Position on or after July 1, 2016:

The normal retirement date is the first day of the month following the date the member accrues twenty (20) years of full-time equivalent service as a member covered by the Grand River Dam Authority Public Safety Officers Provisions.

Alternatively, for members who began participating in OPERS before November 1, 2011, the normal age of retirement is age 62 with at least 6 years of full-time equivalent employment; or the first day of the month following the date at which the sum of the member's age and number of years of credited service totals eighty (80), if the member was hired before July 1, 1992; or the first day of the month following the date at which the sum of the member's age and number of years of credited service totals ninety (90), if the member was hired on or after July 1, 1992. For members who began participating in OPERS on or after November 1, 2011, the normal age of retirement is age 65 with at least 6 years of full-time equivalent employment, or the first day of the month following the date at which the sum of the member's age and number of years of credited service totals ninety (90) and the member is at least 60 years of age. Members must complete at least six (6) years of full-time equivalent employment with a participating employer before receiving any retirement benefits.



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

**Hazardous Duty Members
(Department of Corrections,
Officers, Grand River Dam
Authority Public Safety Officers,
Oklahoma Military Department
Firefighters, Deputy Sheriffs, and
County Jailers) Benefits**
(continued)

The benefit formula is 2.5% of final average compensation, multiplied by the number of years of service as an eligible officer for service, not exceeding twenty (20) years. For service in excess of twenty (20) years, the benefit formula is 2% of final average compensation.

Oklahoma Military Department Firefighters:

The benefit for Oklahoma Military Department firefighters who began employment July 1, 2002 and after is based on a 2.5% benefit multiplier. They are also eligible for full benefits after twenty (20) years as a firefighter and their employee contribution rate is 8%. Oklahoma Military Department firefighters employed prior to July 1, 2002 were given a one-time option to: (a) have their benefit formula, retirement eligibility, and employee contribution rate remain unchanged; (b) apply the new provisions (including the new contribution rate) to service after January 1, 2003; or (c) apply the new benefit formula and retirement eligibility to all of the member's service, apply the 8% contribution rate for service after July 1, 2002, and make a contribution equal to the increase in the actuarial value of the member's retirement benefit.

In contrast to DOC members, the 2.5% formula and 8% contribution rate applies to service after twenty (20) years.

**Deputy Sheriffs and County Jailers First Employed as a
Deputy Sheriff or County Jailer on or after November 1,
2020:**

The normal retirement date is the first day of the month following the date the member accrues twenty (20) years of full-time equivalent service as a member covered by the Deputy Sheriff or County Jailer provisions.



APPENDIX A – SUMMARY OF SYSTEM PROVISIONS

Oklahoma Public Employees Retirement System

**Hazardous Duty Members
(Department of Corrections,
Officers, Grand River Dam
Authority Public Safety Officers,
Oklahoma Military Department
Firefighters, Deputy Sheriffs, and
County Jailers) Benefits**

(continued)

Alternatively, for members who began participating in OPERS before November 1, 2020, the normal age of retirement is age 62 with at least 6 years of full-time equivalent employment; or the first day of the month following the date at which the sum of the member's age and number of years of credited service totals eighty (80), if the member was hired before July 1, 1992; or the first day of the month following the date at which the sum of the member's age and number of years of credited service totals ninety (90), if the member was hired on or after July 1, 1992. For members who began participating in OPERS on or after November 1, 2011, the normal age of retirement is age 65 with at least 6 years of full-time equivalent employment, or the first day of the month following the date at which the sum of the member's age and number of years of credited service totals ninety (90) and the member is at least 60 years of age. Members must complete at least six (6) years of full-time equivalent employment with a participating employer before receiving any retirement benefits.

The benefit formula is 2.5% of final average compensation, multiplied by the number of years of service, not exceeding twenty (20) years. For service in excess of twenty (20) years, the benefit formula is 2% of final average compensation.

Special Surviving Spouse and Child benefits for any member first employed as a Deputy Sheriff or County Jailer on or after November 1, 2020 and who is killed or mortally wounded during the performance of duty are equal to 2.5% of final average monthly compensation multiplied by the greater of the member's actual service or twenty (20) years. In addition, an amount of \$400 per month will be paid as long as a child of the deceased member is under the age of 18 (or 22 if enrolled full time at an institution of higher education).



APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Oklahoma Public Employees Retirement System

Entry Age Actuarial Cost Method

Liabilities and contributions shown in this report are computed using the Individual Entry Age method of funding. Sometimes called the “funding method,” this is a particular technique used by actuaries for establishing the amount of the annual actuarial cost of pension benefits, or normal cost, and the related unfunded actuarial accrued liability. Ordinarily the annual contribution to the System is comprised of (1) the normal cost; and (2) an amortization payment on the unfunded actuarial accrued liability.

Under the Entry Age Actuarial Cost Method, the **Normal Cost** is computed as the level percentage of pay which, if paid from the earliest time each member would have been eligible to join the System had it existed (thus entry age) until his retirement or termination, would accumulate with interest at the rate assumed in the valuation to a fund sufficient to pay all benefits under the System.

The **Actuarial Accrued Liability** under this method, at any point in time, is the theoretical amount of the fund that would have accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The **Unfunded Actuarial Accrued Liability** is the excess of the actuarial accrued liability over the actuarial value of System assets on the valuation date.

Under this method, experience gains or losses, i.e. decreases or increases in actuarial accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

Asset Valuation Method

The actuarial value of assets is based on a five-year moving average of expected and actual market values determined as follows:

- at the beginning of each fiscal year, a preliminary expected actuarial asset value is calculated as the sum of the previous year’s actuarial value increased with a year’s interest at the System valuation rate plus net cash flow adjusted for interest (at the same rate) to the end of the previous fiscal year;
- the expected actuarial asset value is set equal to the preliminary expected actuarial value plus the unrecognized investment gains and losses as of the beginning of the previous fiscal year;
- the difference between the expected actuarial asset value and the market value is the investment gain or loss for the previous year;
- the (final) actuarial asset value is the preliminary value plus 20% of the investment gains and losses for each of the five previous fiscal years, but in no case more than 120% of the market value or less than 80% of the market value.



APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Oklahoma Public Employees Retirement System

Amortization Method

The unfunded actuarial accrued liability as of July 1, 2021 is amortized as a level percent of payroll over a 20-year closed period commencing July 1, 2007. New experience bases due to assumption changes or actual experience gains/losses will be established each year and will be amortized over closed 15-year periods. Given a stable active workforce, this amortization method is expected to produce a payment stream that is consistent as a percent of covered payroll.

Valuation Procedures

The actuarial accrued liability held for non-vested, inactive members who have a break in service, or for non-vested members who have quit or been terminated, even if a break in service has not occurred as of the valuation date, is equal to the amount of the individual's unclaimed contributions.

The wages used in the projection of benefits and liabilities are considered earnings for the year ending on the valuation date, increased by the salary scale to develop expected earnings for the current valuation year. Earnings are annualized for new members assumed to have less than twelve months of reported earnings.

The calculations for the required employer contribution are determined as of mid-year. This is a reasonable estimate because contributions are made on a monthly basis throughout the year.

We did not value the IRC Section 415 limit for active participants. The impact was assumed to be *de minimus*.

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

Liability is included for members who appear to be deferred vested, but who have not yet submitted certain paperwork and therefore are not in the vested data provided. An estimated benefit was provided by the System. A corrected benefit and status will be provided by the System when the actual benefit and status have been finalized.

Members who are contributing to the System, but have not yet filled out an enrollment application, are included as active members. Where data elements are missing, reasonable estimates are used. Age is based on average entry age for other members. Gender is assigned in proportion to the overall group.

A liability is included for contribution amounts due to be refunded to terminated vested members who made voluntary contributions to increase the maximum compensation limit prior to July 1, 1998. The System supplied the included amounts.



APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Oklahoma Public Employees Retirement System

These assumptions were recommended in the 2016-2019 Experience Study to the Board, which then adopted them. That report, which is available on the OPERS website (www.opers.ok.gov), provides the rationale for the recommendations.

Economic Assumptions

Price Inflation:	2.50% per annum, compounded annually
Investment Return:	6.50% net of investment expenses per annum, compounded annually
Salary Increases:	Sample rates below (midpoint of range shown):

<u>Nearest Age</u>	<u>% Increase</u>
20 - 24	9.25
25 - 29	7.55
30 - 34	6.05
35 - 39	5.25
40 - 44	4.95
45 - 49	4.55
50 - 54	4.25
55 - 59	4.05
60 - 64	3.55
65+	3.25

Payroll Growth:	3.25% per year
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Ad hoc benefit increase assumptions

Monthly benefits	No increases assumed
Medical Supplement	No increases assumed

Projection of 401(a)(17) compensation limit:	Projected with inflation at 2.50%
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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Oklahoma Public Employees Retirement System

Demographic Assumptions

Annual Rates of Retirement Per 100 Eligible Regular Non-Elected Members

<u>Age</u>	<u>Hired Prior to 11/1/2011</u>		<u>Hired on or After 11/1/2011</u>	
	<u>Those Eligible For Unreduced Retirement</u>	<u>Those Eligible For Reduced Retirement</u>	<u>Those Eligible For Unreduced Retirement</u>	<u>Those Eligible For Reduced Retirement</u>
50	15	N/A	N/A	N/A
51	15	N/A	N/A	N/A
52	15	N/A	N/A	N/A
53	15	N/A	N/A	N/A
54	15	N/A	N/A	N/A
55	10	4	N/A	N/A
56	10	4	N/A	N/A
57	11	4	N/A	N/A
58	12	4	N/A	N/A
59	13	5	N/A	N/A
60	14	6	30/15*	5
61	20	13	30/15*	6
62	25	N/A	30/15*	6
63	15	N/A	30/15*	6
64	15	N/A	30/15*	13
65	30	N/A	30/15*	N/A
66	25	N/A	25	N/A
67	25	N/A	25	N/A
68	25	N/A	25	N/A
69	25	N/A	25	N/A
70	50	N/A	50	N/A
71	50	N/A	50	N/A
72	50	N/A	50	N/A
73	50	N/A	50	N/A
74	50	N/A	50	N/A
75	100	N/A	100	N/A

*30 when first eligible to retire and 15 thereafter



APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Oklahoma Public Employees Retirement System

Demographic Assumptions (continued)

Annual Rates of Retirement Per 100 Eligible Elected Members

<u>Age</u>	<u>Elected Prior to 11/1/2011</u>		<u>Elected on or After 11/1/2011</u>	
	<u>Those Eligible For Unreduced Retirement</u>	<u>Those Eligible For Reduced Retirement</u>	<u>Those Eligible For Unreduced Retirement</u>	<u>Those Eligible For Reduced Retirement</u>
50	25	N/A	N/A	N/A
51	25	N/A	N/A	N/A
52	25	N/A	N/A	N/A
53	25	N/A	N/A	N/A
54	25	N/A	N/A	N/A
55	20	7.0	N/A	N/A
56	20	7.0	N/A	N/A
57	20	7.0	N/A	N/A
58	20	7.0	N/A	N/A
59	20	7.0	N/A	N/A
60	20	N/A	N/A	10
61	20	N/A	N/A	10
62	20	N/A	20	N/A
63	20	N/A	20	N/A
64	20	N/A	20	N/A
65	20	N/A	20	N/A
66	20	N/A	20	N/A
67	35	N/A	35	N/A
68	35	N/A	35	N/A
69-74	35	N/A	35	N/A
75	100	N/A	100	N/A



APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Oklahoma Public Employees Retirement System

Demographic Assumptions (continued)

Annual Rates of Retirement Per 100 Eligible Hazardous Duty Members

<u>Hired Prior to 11/1/2011</u>				<u>Hired on or After 11/1/2011</u>			
<u>Less Than 20</u>		<u>At Least 20</u>		<u>Less Than 20</u>		<u>At Least 20</u>	
<u>Years of Service</u>		<u>Years of Service</u>		<u>Years of Service</u>		<u>Years of Service</u>	
Age		Service		Age		Service	
50	N/A	20	25	50	N/A	20	25
51	N/A	21	25	51	N/A	21	25
52	N/A	22	20	52	N/A	22	20
53	N/A	23-24	15	53	N/A	23-34	15
54	N/A	25-29	23	54	N/A	25-29	23
55	4	30-34	25	55	N/A	30-34	25
56	5	35+	100	56	N/A	35+	100
57	5			57	N/A		
58	5			58	N/A		
59	5			59	N/A		
60	5			60	7		
61	20			61	20		
62	40			62	20		
63	22			63	20		
64	25			64	20		
65	40			65	40		
66	25			66	25		
67	25			67	23		
68	25			68	22		
69	25			69	21		
70	100			70	100		



APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Oklahoma Public Employees Retirement System

Demographic Assumptions (continued)

Mortality Rates:

Active participants and
nondisabled pensioners

Pub-2010 Below Median, General Membership
Active/Retiree Healthy Mortality Table with base rates
projected to 2030 using Scale MP-2019. Male rates are
unadjusted and female rates are set forward two years.

Disabled pensioners

Nondisabled retiree mortality set forward 12 years for
disabled experience.

Hazardous Duty members

For Department of Corrections officers, we assumed the
mortality rate is 10% higher than the above table while
the participant is active. This 10% is assumed to be in-
line-of-duty.

Disability Rates:

Graduated rates

Disabled rates per 100 members

Nearest

Hazardous

Age

Regular/Elected

Duty

20

0.009

0.009

30

0.009

0.022

40

0.022

0.058

50

0.139

0.180

60

0.200

0.400



APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Oklahoma Public Employees Retirement System

Demographic Assumptions (continued)

Withdrawal Rates:

<u>Service</u>	<u>Rate</u>
0	26.0%
1	22.0%
2	18.0%
3	14.0%
4	12.0%
5	10.5%
6	9.0%
7	8.0%
8	7.0%
9	6.5%
10	6.0%
11	5.5%
12	5.0%
13	4.8%
14	4.5%
15	4.3%
16	4.0%
17	3.8%
18	3.5%
19	3.3%
20	3.0%
21	2.8%
22	2.5%
23	2.3%
24	2.0%
25	1.8%
26	1.5%
27	1.3%
28+	1.0%



APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Oklahoma Public Employees Retirement System

Demographic Assumptions (continued)

Probability of Electing Vested Benefit:

Regular Members Only	
<u>Duration</u>	<u>Rate</u>
8	80%
13	85%
18	90%
23	95%
28	100%

Marital Status:

Percentage Married	85%
Age difference	Males assumed to be four years older than spouses.

Children:

Special death benefits are provided upon the in-line-of-duty death of Department of Corrections' employees who have young children. We have assumed the average age of the youngest child of such employees is nine and that 50% of such children will attend an institution of higher education to age 22.

Form of Payment:

Participants are assumed to elect a life-only form of payment. In the event an Elected Official has previously commenced their benefits, has no beneficiary on the record, and has no defined optional form of payment, it is assumed that 60% will receive the 50% joint and survivor annuity.



APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Oklahoma Public Employees Retirement System

Demographic Assumptions (continued)

**Assumed age for commencement
of deferred benefits:**

Currently active members assumed to terminate in the future prior to retirement eligibility are assumed to commence benefits at age 62 (non-elected members) or age 60 (elected members).

Currently active members hired on or after 11/1/2011 assumed to terminate in the future prior to retirement eligibility are assumed to commence benefits at age 65.

Currently inactive members with deferred benefits are assumed to commence benefits on a date provided by OPERS.

Provision for expenses:

Administrative expenses, as budgeted by the Oklahoma Public Employees Retirement System.



APPENDIX C – DATA

Oklahoma Public Employees Retirement System Valuation Data Distribution – Actives – Regular Membership

Age	Years of Service									
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	Total
Under 25 Avg. Pay	813 \$27,941	16 \$36,666								829 \$28,110
25 to 29 Avg. Pay	831 \$32,527	288 \$40,522	7 \$45,279							1,126 \$34,652
30 to 34 Avg. Pay	779 \$32,245	1,056 \$47,114	282 \$50,445	7 \$42,587						2,124 \$42,088
35 to 39 Avg. Pay	742 \$33,443	1,054 \$49,076	826 \$56,452	216 \$57,068	2 \$60,920					2,840 \$47,753
40 to 44 Avg. Pay	604 \$34,859	1,046 \$48,284	896 \$56,035	686 \$60,617	174 \$59,976	2 \$52,573				3,408 \$51,025
45 to 49 Avg. Pay	541 \$34,759	805 \$47,848	739 \$54,552	646 \$57,840	565 \$61,696	122 \$63,517	3 \$50,867			3,421 \$51,962
50 to 54 Avg. Pay	508 \$35,707	802 \$46,746	755 \$52,744	652 \$55,580	583 \$58,065	439 \$61,674	122 \$64,209	3 \$84,679		3,864 \$51,942
55 to 59 Avg. Pay	435 \$34,836	772 \$45,106	673 \$49,578	629 \$54,002	520 \$55,754	439 \$58,040	362 \$63,946	103 \$65,946	15 \$64,000	3,948 \$51,338
60 to 64 Avg. Pay	370 \$35,394	635 \$45,927	644 \$50,998	595 \$51,474	474 \$53,494	352 \$55,822	293 \$65,442	209 \$64,675	140 \$61,414	3,712 \$51,731
65 to 69 Avg. Pay	136 \$33,699	275 \$47,811	299 \$47,955	251 \$57,214	193 \$53,484	138 \$56,315	107 \$63,189	82 \$66,850	67 \$65,441	1,548 \$52,424
70 & up Avg. Pay	91 \$27,317	131 \$45,009	121 \$53,406	112 \$51,556	77 \$55,519	52 \$60,155	31 \$60,738	22 \$57,533	41 \$63,342	678 \$49,804
Total Avg. Pay	5,850 \$32,991	6,880 \$46,988	5,242 \$53,133	3,794 \$56,020	2,588 \$57,269	1,544 \$58,910	918 \$64,219	419 \$65,181	263 \$62,888	27,498 \$49,070

*Amounts are not annualized.



APPENDIX C – DATA

Oklahoma Public Employees Retirement System Valuation Data Distribution – Actives – Elected Membership

Age	Years of Service									
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	Total
Under 25 Avg. Pay										0 \$0
25 to 29 Avg. Pay	1 \$45,056									1 \$45,056
30 to 34 Avg. Pay	3 \$58,211	5 \$53,530	1 \$54,732							9 \$55,224
35 to 39 Avg. Pay	4 \$55,507	13 \$55,129	7 \$52,985	6 \$56,806						30 \$55,014
40 to 44 Avg. Pay	5 \$55,022	16 \$52,264	7 \$63,974	12 \$57,779	10 \$57,042					50 \$56,458
45 to 49 Avg. Pay	11 \$51,333	20 \$60,661	17 \$58,803	9 \$64,844	8 \$63,749	10 \$55,079				75 \$58,959
50 to 54 Avg. Pay	11 \$52,719	18 \$49,268	18 \$65,701	17 \$53,947	30 \$57,795	17 \$71,344	11 \$57,328			122 \$58,555
55 to 59 Avg. Pay	6 \$50,814	17 \$57,998	14 \$58,705	16 \$64,991	18 \$55,188	17 \$55,981	12 \$54,931	2 \$55,789		102 \$57,533
60 to 64 Avg. Pay	8 \$55,215	14 \$54,647	33 \$56,901	20 \$58,954	17 \$62,710	17 \$57,371	9 \$64,083	13 \$71,349	2 \$48,681	133 \$59,448
65 to 69 Avg. Pay	5 \$47,290	19 \$55,845	15 \$58,788	11 \$72,169	11 \$70,109	11 \$54,584	5 \$60,749	2 \$55,800	4 \$51,933	83 \$59,854
70 & up Avg. Pay	3 \$37,949	5 \$50,423	10 \$57,748	3 \$51,931	3 \$53,017	2 \$47,910	3 \$107,239	2 \$57,413	1 \$59,421	32 \$57,815
Total Avg. Pay	57 \$51,900	127 \$54,998	122 \$59,136	94 \$60,675	97 \$59,835	74 \$59,282	40 \$62,300	19 \$66,607	7 \$52,074	637 \$58,358

*Amounts are not annualized.



APPENDIX C – DATA

Oklahoma Public Employees Retirement System Valuation Data Distribution – Actives – Hazardous Duty Membership

Age	Years of Service									
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	Total
Under 25	106	2								108
Avg. Pay	\$37,145	\$43,224								\$37,257
25 to 29	232	74								306
Avg. Pay	\$38,509	\$43,343								\$39,678
30 to 34	162	145	20							327
Avg. Pay	\$38,540	\$44,839	\$46,359							\$41,811
35 to 39	81	100	66	28						275
Avg. Pay	\$42,032	\$44,043	\$46,743	\$48,413						\$44,544
40 to 44	52	56	51	65	5					229
Avg. Pay	\$40,098	\$44,689	\$48,350	\$49,983	\$59,615					\$46,291
45 to 49	39	41	39	62	14	3				198
Avg. Pay	\$40,021	\$44,167	\$47,350	\$49,833	\$52,390	\$53,656				\$46,476
50 to 54	31	40	20	44	19	5	1			160
Avg. Pay	\$44,423	\$42,582	\$45,149	\$51,419	\$53,952	\$49,585	\$65,759			\$47,404
55 to 59	17	27	23	26	10	4	2	1		110
Avg. Pay	\$45,276	\$42,520	\$41,112	\$48,542	\$51,846	\$48,894	\$56,038	\$68,679		\$45,638
60 to 64	4	19	9	14	2		2			50
Avg. Pay	\$37,543	\$43,259	\$46,160	\$46,773	\$51,852		\$69,015			\$45,682
65 to 69	1	5	2	4						12
Avg. Pay	\$47,603	\$45,490	\$43,264	\$44,232						\$44,875
70 & up	1	1								2
Avg. Pay	\$42,004	\$30,381								\$36,192
Total	726	510	230	243	50	12	5	1		1,777
Avg. Pay	\$39,328	\$44,009	\$46,414	\$49,590	\$53,576	\$50,372	\$63,173	\$68,679		\$43,551

*Amounts are not annualized.



APPENDIX C – DATA

Oklahoma Public Employees Retirement System Valuation Data Distribution – Actives – All Membership Groups

Age	Years of Service									
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	Total
Under 25 Avg. Pay	919 \$29,003	18 \$37,395								937 \$29,164
25 to 29 Avg. Pay	1,064 \$33,844	362 \$41,099	7 \$45,279							1,433 \$35,732
30 to 34 Avg. Pay	944 \$33,408	1,206 \$46,867	303 \$50,189	7 \$42,587						2,460 \$42,099
35 to 39 Avg. Pay	827 \$34,391	1,167 \$48,712	899 \$55,712	250 \$56,093	2 \$60,920					3,145 \$47,542
40 to 44 Avg. Pay	661 \$35,424	1,118 \$48,161	954 \$55,683	763 \$59,667	189 \$59,811	2 \$52,573				3,687 \$50,804
45 to 49 Avg. Pay	591 \$35,414	866 \$47,970	795 \$54,289	717 \$57,235	587 \$61,502	135 \$62,673	3 \$50,867			3,694 \$51,810
50 to 54 Avg. Pay	550 \$36,539	860 \$46,605	793 \$52,847	713 \$55,285	632 \$57,928	461 \$61,900	134 \$63,655	3 \$84,679		4,146 \$51,961
55 to 59 Avg. Pay	458 \$35,433	816 \$45,289	710 \$49,484	671 \$54,052	548 \$55,664	460 \$57,884	376 \$63,617	106 \$65,781	15 \$64,000	4,160 \$51,339
60 to 64 Avg. Pay	382 \$35,831	668 \$46,034	686 \$51,219	629 \$51,608	493 \$53,805	369 \$55,894	304 \$65,425	222 \$65,066	142 \$61,234	3,895 \$51,917
65 to 69 Avg. Pay	142 \$34,276	299 \$48,282	316 \$48,440	266 \$57,637	204 \$54,380	149 \$56,187	112 \$63,081	84 \$66,587	71 \$64,680	1,643 \$52,744
70 & up Avg. Pay	95 \$27,807	137 \$45,100	131 \$53,737	115 \$51,566	80 \$55,425	54 \$59,702	34 \$64,841	24 \$57,523	42 \$63,249	712 \$50,126
Total Avg. Pay	6,633 \$33,847	7,517 \$46,921	5,594 \$52,988	4,131 \$55,748	2,735 \$57,293	1,630 \$58,864	963 \$64,134	439 \$65,251	270 \$62,607	29,912 \$48,940

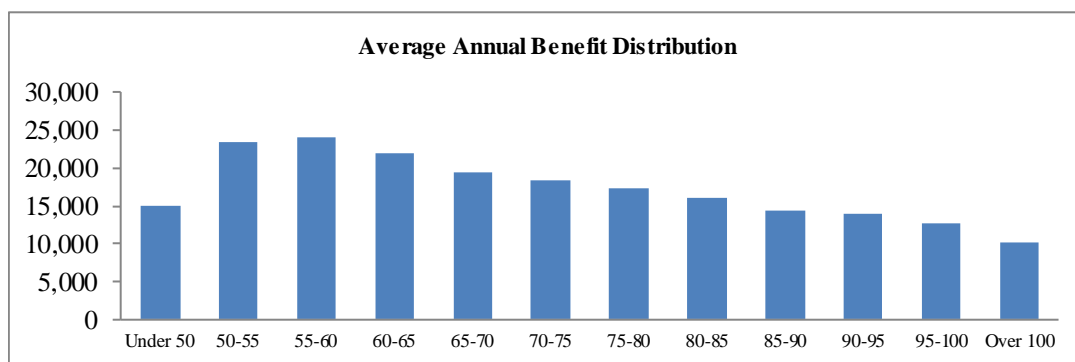
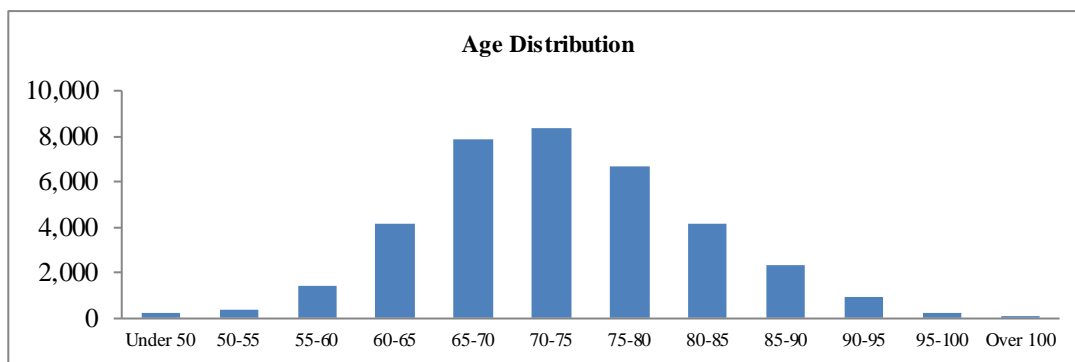
*Amounts are not annualized.



APPENDIX C – DATA

Oklahoma Public Employees Retirement System Valuation Data Distribution – Retired Members

Age	Number		Total	Annual Benefits		Total
	Male	Female		Male	Female	
Under 50	102	93	195	\$ 1,788,949	\$ 1,159,175	\$ 2,948,124
50-55	203	139	342	5,147,904	2,893,480	8,041,384
55-60	668	763	1,431	16,987,134	17,400,084	34,387,218
60-65	1,671	2,472	4,143	39,832,610	51,482,270	91,314,880
65-70	3,089	4,810	7,899	63,300,641	89,652,097	152,952,738
70-75	3,428	4,931	8,359	67,720,530	86,712,807	154,433,337
75-80	2,769	3,874	6,643	53,033,742	62,550,733	115,584,475
80-85	1,629	2,514	4,143	30,003,632	36,863,926	66,867,558
85-90	807	1,526	2,333	13,397,251	20,052,140	33,449,391
90-95	285	654	939	4,648,661	8,508,093	13,156,754
95-100	46	155	201	790,544	1,753,495	2,544,039
Over 100	3	18	21	66,133	149,574	215,707
Total	14,700	21,949	36,649	\$296,717,731	\$379,177,874	\$675,895,605





APPENDIX C – DATA

Oklahoma Public Employees Retirement System

	Actuarial Valuation as of		% Change
	7/1/2022	7/1/2021	
1. Active members			
a. Number	29,912	31,711	(5.7%)
b. Annual compensation	\$ 1,527,059,370	\$ 1,556,561,344	(1.9%)
c. Average annual compensation	51,052	49,086	4.0%
d. Average age	48.1	47.9	0.4%
e. Average service	12.2	12.0	1.7%
2. Accumulated member contributions			
a. Active members	\$ 562,043,200	\$ 566,230,528	(0.7%)
b. Unclaimed contribution amounts	66,727,464	61,193,069	9.0%
c. Total	\$ 628,770,664	\$ 627,423,597	0.2%
3. Vested terminated members			
a. Number	2,614	2,620	(0.2%)
b. Annual deferred benefits	\$ 29,793,344	\$ 28,733,517	3.7%
c. Average annual deferred benefit	11,398	10,967	3.9%
d. Annual supplemental medical insurance premiums	\$ 3,293,640	\$ 3,301,200	(0.2%)
4. Assumed deferred vested - count	3,840	3,513	9.3%
5. Retired members			
a. Number	30,879	30,637	0.8%
b. Annual retirement benefits	\$ 605,496,907	\$ 592,654,423	2.2%
c. Average annual retirement benefit	19,609	19,344	1.4%
d. Annual supplemental medical insurance premiums	\$ 16,390,080	\$ 16,774,380	(2.3%)
6. Beneficiaries			
a. Number	4,543	4,403	3.2%
b. Annual retirement benefits	\$ 57,195,979	\$ 54,390,425	5.2%
c. Average annual retirement benefit	12,590	12,353	1.9%
7. Disabled members			
a. Number	1,227	1,311	(6.4%)
b. Annual retirement benefits	\$ 13,202,719	\$ 13,966,182	(5.5%)
c. Average annual retirement benefit	10,760	10,653	1.0%
d. Annual supplemental medical insurance premiums	\$ 579,600	\$ 638,820	(9.3%)
8. Total members included in valuation	73,015	74,195	(1.6%)



APPENDIX C – DATA

Oklahoma Public Employees Retirement System

	Actuarial Valuation as of	
	7/1/2022	7/1/2021
Regular Members		
Number	27,498	29,001
Average reported compensation	\$ 49,070	\$ 47,369
Average age	48.6	48.5
Average service	12.4	12.2
Elected officials		
Number	637	645
Average reported compensation	\$ 58,358	\$ 57,263
Average age	55.4	54.5
Average service	16.4	15.6
Hazardous Duty		
Number	1,777	2,065
Average reported compensation	\$ 43,551	\$ 38,877
Average age	38.6	37.9
Average service	7.6	7.1
Total		
Number	29,912	31,711
Average reported compensation	\$ 48,940	\$ 47,017
Average age	48.1	47.9
Average service	12.2	12.0



APPENDIX C – DATA

Oklahoma Public Employees Retirement System

	Actuarial Valuation as of	
	7/1/2022	7/1/2021
Retirees		
Number	30,879	30,637
Average annual benefit	\$ 19,609	\$ 19,344
Average age	72.4	72.1
Disability Retirees		
Number	1,227	1,311
Average annual benefit	\$ 10,760	\$ 10,653
Average age	67.3	66.9
Beneficiaries		
Number	4,543	4,403
Average annual benefit	\$ 12,590	\$ 12,353
Average age	75.1	74.9
Total		
Number	36,649	36,351
Average annual benefit	\$ 18,442	\$ 18,184
Average age	72.6	72.3
Vested Members		
Number	6,454	6,133
Average annual benefit	\$ 10,251	\$ 10,658
Average age	52.6	52.5



APPENDIX C – DATA

Oklahoma Public Employees Retirement System

	Active Members	Vested Terminated	Receiving Benefits			Total Members
			Retirees	Disability Retirees	Benefici- aries	
As of July 1, 2021	31,711	6,133	30,637	1,311	4,403	74,195
Age retirements	(1,205)	(279)	1,484	0	0	0
Disability retirements	(7)	(7)	0	14	0	0
Deaths without payments continuing	(41)	(15)	(897)	(74)	(268)	(1,295)
Deaths with payments continuing	(27)	(14)	(341)	(26)	408	0
Nonvested terminations/refund of contributions	(2,779)	(78)	0	0	0	(2,857)
Vested terminations	(859)	859	0	0	0	0
Transfers	0	(12)	0	0	0	(12)
Data adjustments	0	7	(4)	2	0	5
Rehires	782	(140)	0	0	0	642
New entrants during the year	2,337	0	0	0	0	2,337
Net change	(1,799)	321	242	(84)	140	(1,180)
As of July 1, 2022	29,912	6,454	30,879	1,227	4,543	73,015

	Active	Retired	Terminated Vested	Total
Records submitted on data file	29,496	68,089	2,614	100,199
Remove deceased retirees	0	(31,437)	0	(31,437)
Remove unusable data	(7)	0	0	(7)
Remove those with another status	(13)	(3)	0	(16)
Add those with no application	436	0	0	436
Add assumed vesteds	0	0	3,840	3,840
Total valued	29,912	36,649	6,454	73,015



APPENDIX D - GLOSSARY

Oklahoma Public Employees Retirement System

Accrued Benefit

The amount of an individual's benefit (whether or not vested) as of a specific date, determined in accordance with the terms of a pension plan and based on compensation and service to that date.

Actuarial Accrued Liability

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of pension plan benefits and expenses which is not provided for by future Normal Costs.

Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement, and retirement; changes in compensation, rates of investment earnings, and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; and other relevant items.

Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.

Actuarial Gain (Loss)

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

Actuarial Present Value

The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions.

Actuarial Valuation

The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

Actuarial Value of Assets

The value of cash, investments and other property belonging to a pension plan, as used by the actuary for the purpose of an Actuarial Valuation.

Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

Amortization Payment

That portion of the pension plan contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.



Oklahoma Public Employees Retirement System

Deferred Vested Participant

A vested member who has terminated employment prior to early or normal retirement age who does not withdraw his or her contributions and is, therefore, due a retirement benefit at a later date.

Entry Age Actuarial Cost Method

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability.

Market Value of Assets

The fair value of cash, investments and other property belonging to a pension plan that could be acquired by exchanging them on the open market.

Normal Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method Projected Benefits.

Projected Benefits

Those pension plan benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits.

Unaccrued Benefit

The excess of an individual's Projected Benefits over the Accrued Benefits as of a specified date.

Unfunded Actuarial Accrued Liability

The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.

Withdrawal Liability

The liability due to an active member terminating employment with a deferred vested benefit.